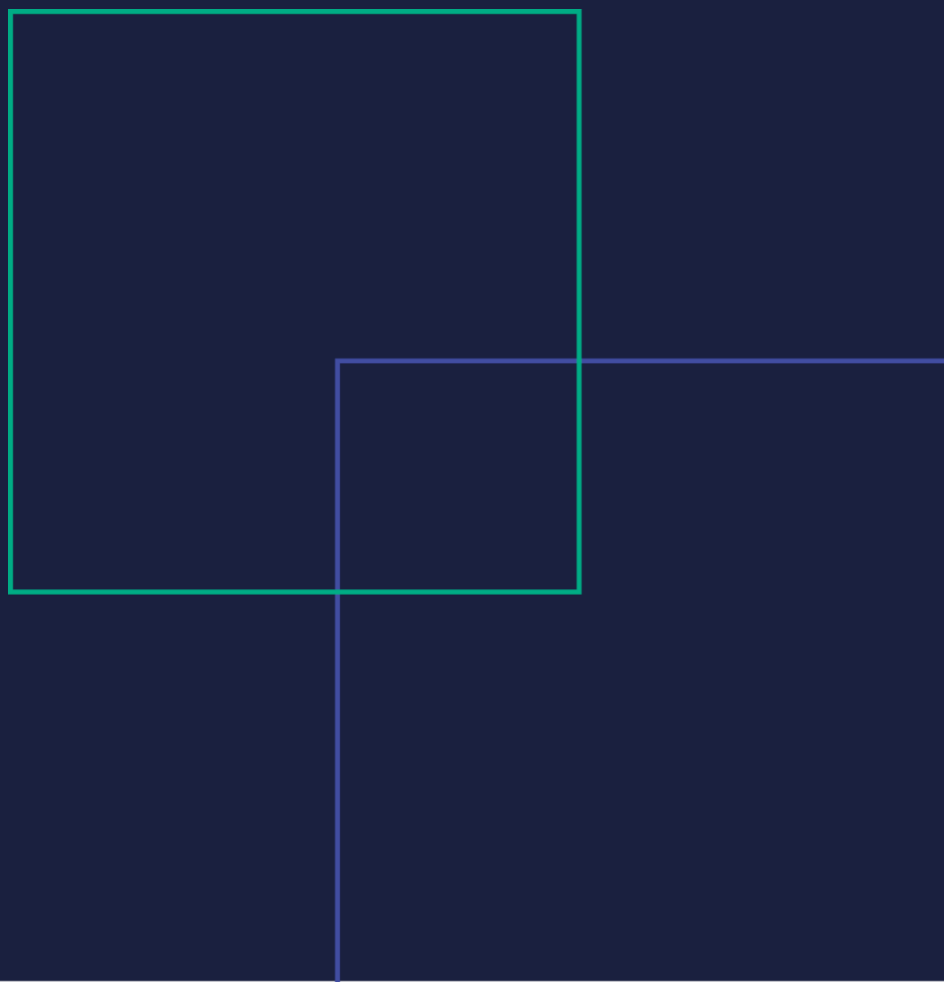
SCIDEV

WQMS Data Review

Huntly Bauxite Mine

AUGUST 2026



Document Control

Document Control			
Rev.	**Data Analysis**	**Approved By**	**Date**
B	Wendy Spunner	Nick O'Reilly	20/10/2026
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1. Executive Summary

SciDev conducted an analysis of turbidity data collected from Water Quality Monitoring Systems (WQMS) operating across Alcoa's Huntly bauxite mining operations for August 2026. The purpose of this assessment was to evaluate data quality, identify genuine turbidity exceedance events, and support compliance with the *Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

The review focused on events where turbidity exceeded 25 NTU for at least one hour. Events were evaluated in accordance with Alcoa's Turbidity Event Classification Guidelines and classified as either "true" exceedances, representing genuine increases in turbidity, or "false" exceedances resulting from environmental or operational interferences.

Key outcomes of the analysis were:

- **Excluded Unit**: Two (2) WQMS units were excluded from the analysis due to invalid data caused by equipment faults or environmental interference.
- **False Events**: thirty-three (33) turbidity exceedances were identified as false, commonly caused by debris, sensor obstruction, or hydraulic disturbances.
- **True Events**: Nine (9) "True" turbidity exceedance event were recorded following detailed assessment; however, none were attributable to mining activities.

Data gaps were also identified due to system outages, maintenance, and unexpected shutdowns. These have been documented to maintain transparency in reporting.

Overall, while turbidity exceedance events were recorded during August 2026, the assessment found no evidence that any true turbidity exceedance event was caused by mining activities.

2. Scope

SciDev were engaged by Alcoa to analyse turbidity data collected from the Huntly Water Quality Monitoring Systems (WQMS). The primary objective of this engagement is to assess the quality of the collected data and identify potential "true" turbidity events. This analysis supports Alcoa's reporting obligations under *Schedule 1, Division 2, Clause 6 of the Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

3. Introduction

3.1 Background

Alcoa of Australia Ltd (Alcoa) operates two bauxite mines, Huntly and Willowdale, approximately 100 km southeast of Perth, Western Australia. These mining operations are subject to environmental controls mandated by the *Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

Under this Exemption Order, Alcoa is required to implement drainage control measures and monitor effectiveness in water bodies within and downstream of mining operations. Turbidity, a critical water quality parameter, is monitored using Water Quality Monitoring Systems (WQMS), to detect deviations and identify high-turbidity events.

Alcoa is obligated to report monthly on-stream turbidity, including the identification and classification of any "true" high-turbidity exceedance events. (Refer to Appendix B for the site map showing WQMS locations.)

3.2 Monitoring Requirements

Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023 specifies that a drainage incident occurs when:

a. Runoff from a disturbance area enters the surrounding environment, resulting in surface water turbidity of at least 25 NTU for a duration of at least one hour; or
b. a discharge from containment infrastructure includes, or may include, environmentally hazardous material.

Trigger levels for drainage incidents are outlined in Schedule 1 of the Exemption Order. To meet these requirements, Alcoa has developed "Turbidity Event Classification Guidelines" which define

a true turbidity exceedance event as a WQMS recording turbidity levels of at least 25 NTU for a period exceeding one hour.

3.3 Water Quality Management System (WQMS)

During the August 2026 monitoring period, forty-three (43) WQMS units were deployed to monitor turbidity levels in streams subject to surface water runoff within and downstream of Huntly mining operations.

Each WQMS unit consists of the following components:

Aquas SMR10 Turbidity Probe

Positioned at a 90-degree angle to water flow, each probe is equipped with an automatic lens wiper and a guard to protect against larger debris.

Data Taker DT82 Logger

Records data locally every six seconds, with six-minute averages transmitted via IoT-enabled modems to a cloud-based platform.

Float Switch

Detects whether the sensor is submerged, or the stream is dry.

3.4 Purpose

This report aims to analyse turbidity data collected during August 2026, focusing on the identification and classification of "true" turbidity exceedance events based on Alcoa's Turbidity Event Classification Guidelines.

3.5 Exclusions

This report is not intended as:

- An assessment of the WQMS network or Alcoa's compliance with relevant legislation and requirements.
- An evaluation of the suitability of the trigger levels or event classification procedures adopted by Alcoa.

3.6 Abbreviations

	Term
IoT	Internet of Things
NTU	Nephelometric Turbidity Units
WQMS	Water Quality Management System

4. Methodology

4.1 WQMS Locations

A site map showing the WQMS locations is provided in Appendix B.

4.2 Data Review

Data recorded by the WQMS Units was reviewed to identify potential events where turbidity exceeded 25 NTU for at least one hour. Each potential event was categorised as either 'true' or 'false'.

4.2.1 True Turbidity Exceedance Events

These events are caused by an actual increase in stream turbidity. Per Alcoa's "Turbidity Event Classification Guidelines" true exceedance events typically exhibit:

- A sharp, sudden incline in turbidity levels.
- A return to baseline turbidity levels in a pattern resembling a normal (Gaussian) distribution.



Figure 1 Typical 'true' exceedance event

4.2.2 False Turbidity Exceedance Events

These events are caused by factors unrelated to actual turbidity increase, such as:

- Organic debris (e.g., leaves, sticks, algae) obstructing the sensor
- Air bubbles or water turbulence near the sensor
- Fluctuating water levels intermittently covering and uncover the sensor lens.

False events typically exhibit sharp inclines and declines without the characteristic bell curve shape of true events.

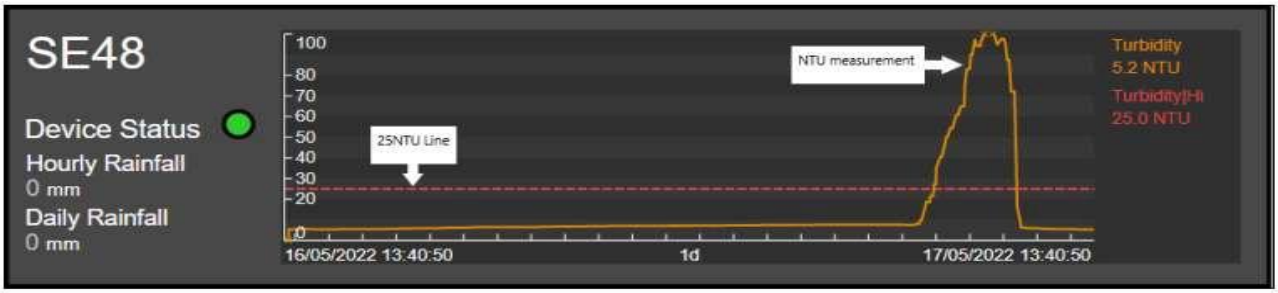


Figure 2 Typical 'False' Exceedance event

4.2.3 Missing Data

Missing data occurs when a WQMS unit fails to record information, this can occur from unexpected system logoffs, equipment faults, or unplanned shutdowns.

5. Results and Discussion

5.1 Events

Table 1 provides a summary of identified events. Table 2 offers detailed information about each event.

Table 1: Events Summary

Category	# of events
Total events	33
True Events	9
False events	24
Caused by mining related activity	0

It was found that:

a) There were thirty-three (33) total events recorded.
b) There were nine (9) True events. Zero (0) of these were directly caused by mining related activity.
c) Six (6) units that were previously dry, now had water present.
d) Two (2) units remained dry with no presence of water.
e) Forty-One (41) units remained flowing throughout the month.

Note:

A True event is recorded when there is water present within the water way, and, that the probe has not been affected by any external sources.

Table 2: Events Details

Event ID	Monitor	False Event (Y/N)	Event Start Date	Event Start Time	Event End Date	Event End Time	Event Duration Minutes	Event Duration Hrs/Mins	Ave. Turbidity (NTU)	Peak Turbidity (NTU)
HUN-2608-001	SE23T	Y	27/07/2026	11:31 AM	1/08/2026	1:36 PM	7325	122:05	39.48	310.7
HUN-2608-002	SE59T	Y	4/08/2026	11:56 PM	5/08/2026	1:21 AM	85	1:24	41.72	96.25
HUN-2608-003	SE12INV	Y	6/08/2026	9:37 PM	7/08/2026	2:46 AM	309	5:09	37.94	78.06
HUN-2608-004	SE12INV	Y	7/08/2026	3:35 AM	7/08/2026	11:22 AM	467	7:47	61.05	130.59
HUN-2608-005	SE12INV	Y	7/08/2026	8:52 PM	8/08/2026	3:33 AM	400	6:40	49.81	103.77
HUN-2608-006	SE25T	Y	8/08/2026	2:54 AM	8/08/2026	6:00 PM	906	15:06	247.94	522.41
HUN-2608-007	SE52T	N	8/08/2026	4:30 AM	8/08/2026	9:24 AM	294	4:54	41.69	65.98
HUN-2608-008	SE11T	Y	8/08/2026	4:42 AM	8/08/2026	9:42 AM	300	5:00	73.95	101.67
HUN-2608-009	SE61T	N	8/08/2026	5:00 AM	8/08/2026	10:21 AM	321	5:21	27.51	29.92
HUN-2608-010	SE12T	Y	8/08/2026	5:06 AM	8/08/2026	3:00 PM	594	9:54	203.03	743.02
HUN-2608-011	SE03T	N	8/08/2026	6:36 AM	8/08/2026	9:54 AM	198	3:17	28.27	31.7
HUN-2608-012	SE03INV1	N	8/08/2026	6:42 AM	8/08/2026	8:36 AM	114	1:54	26.14	27.41
HUN-2608-013	DB03T	N	8/08/2026	11:42 AM	8/08/2026	1:24 PM	102	1:42	26.32	27.07
HUN-2608-014	SE12T	Y	8/08/2026	9:12 PM	9/08/2026	1:06 AM	234	3:54	284.29	328.59
HUN-2608-015	SE12T	Y	9/08/2026	1:48 AM	9/08/2026	9:54 PM	1206	20:06	258.52	681.15
HUN-2608-016	SE59T	Y	9/08/2026	4:20 AM	9/08/2026	6:10 AM	110	1:50	49.56	142.08

HUN-2608-017	SE12T	Y	9/08/2026	10:24 PM	10/08/2026	4:36 AM	372	6:12	45.51	82.75
HUN-2608-018	SE25T	Y	10/08/2026	9:30 AM	10/08/2026	3:18 PM	348	5:48	218.82	2905.92
HUN-2608-019	SE12T	Y	10/08/2026	10:48 PM	10/08/2026	11:54 PM	66	1:06	25.20	25.31
HUN-2608-020	SE59T	Y	11/08/2026	11:31 PM	12/08/2026	12:50 AM	79	1:19	33.07	47.53
HUN-2608-021	SE12T	Y	12/08/2026	3:24 AM	13/08/2026	7:12 PM	2388	39:48	169.76	391.78
HUN-2608-022	SE12T	Y	13/08/2026	7:24 PM	13/08/2026	10:54 PM	210	3:30	31.76	58.34
HUN-2608-023	SE12INV	Y	14/08/2026	2:18 AM	14/08/2026	9:54 AM	456	7:36	31.47	33.26
HUN-2608-024	SE24T	Y	14/08/2026	4:30 AM	14/08/2026	6:37 AM	127	2:07	28.32	32.79
HUN-2608-025	SE12T	Y	15/08/2026	3:42 AM	15/08/2026	8:42 PM	1020	17:00	788.78	1284.8
HUN-2608-026	SE05T	N	17/08/2026	12:18 PM	17/08/2026	1:25 PM	67	1:07	32.44	41.36
HUN-2608-027	SE61T	N	17/08/2026	5:54 PM	17/08/2026	7:25 PM	91	1:31	26.05	26.57
HUN-2608-028	SE09T	Y	21/08/2026	2:49 PM	23/08/2026	1:53 AM	2103	35:03	29.84	42.13
HUN-2608-029	SE09T	Y	23/08/2026	6:13 AM	23/08/2026	10:28 AM	255	4:14	25.65	26.06
HUN-2608-030	SE12INV	Y	26/08/2026	9:54 AM	26/08/2026	12:24 PM	150	2:30	41.59	89.57
HUN-2608-031	SE52T	N	27/08/2026	1:30 AM	27/08/2026	4:42 AM	192	3:12	33.29	44.92
HUN-2608-032	SE03T	N	27/08/2026	2:30 AM	27/08/2026	5:48 AM	198	3:17	26.50	27.56
HUN-2608-033	FPWR1	Y	28/08/2026	1:36 AM	28/08/2026	7:18 AM	342	5:42	134.79	289.65

5.2 Event Assessment Outcomes

5.2.1 True Events

5.2.1.1 HUN-2608-007

SE52T

The turbidity exceedance event at monitoring location SE52T occurred between 04:30 and 09:24 on 8 August 2026. A total of 23.3 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 3, turbidity rose above the 25 NTU trigger value at approximately 04:30, increasing rapidly to an initial peak of approximately 38 NTU before declining slightly. Turbidity then increased again, reaching a second peak of approximately 54 NTU, followed by a brief reduction. A third and highest peak of approximately 66 NTU occurred at around 07:45, after which turbidity gradually declined towards baseline conditions. This recession pattern is consistent with the settling and downstream dispersion of suspended sediments following a runoff event.

The overall response, characterised by elevated turbidity, multiple distinct peaks, and a gradual recession, is consistent with a genuine environmental turbidity event associated with rainfall-driven runoff. The intermediate declines between peaks may reflect variations in runoff intensity, localised flow conditions, changing suspended sediment concentrations, or minor short-term sensor variability. However, the sustained elevated turbidity levels and coherent response pattern are not indicative of sensor malfunction. Given the recorded rainfall and the characteristic turbidity response observed, the exceedance is considered to represent a genuine rainfall-induced turbidity event.

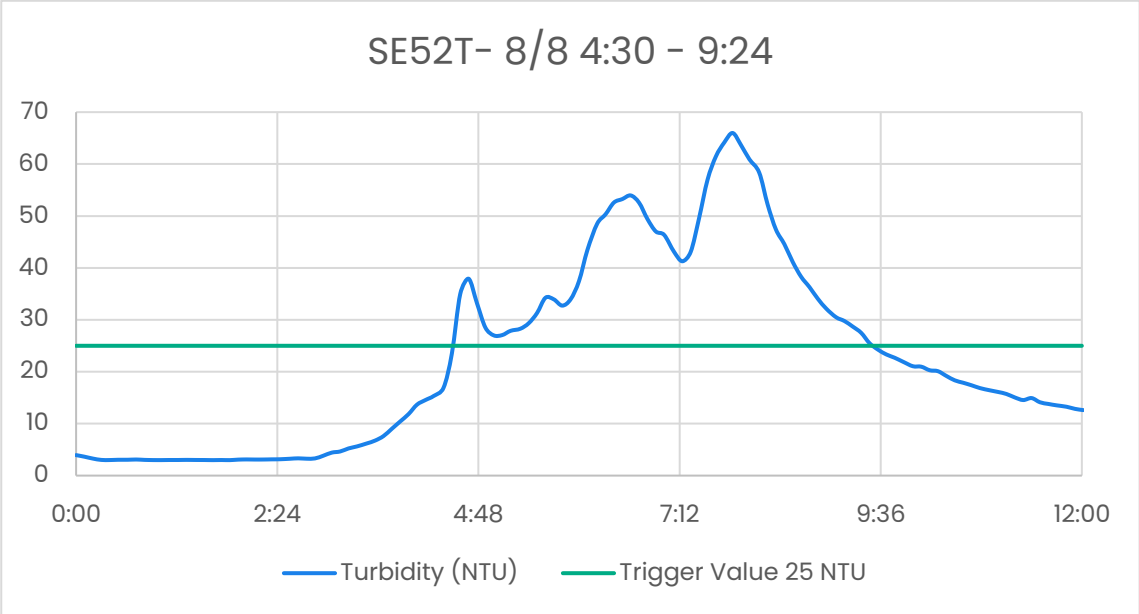


Figure 3 – SE52T August 8th

Field notes provided by Alcoa are included below.

> *'Compliance turbidity monitoring site SE52T recorded a turbidity event exceeding 25 NTU for >1 hour on 08 August 2026.*
> *The event was recorded on 08 August 2026 from 4:30 AM to 9:24 AM, with a duration of 4 hours and 54 minutes. The average turbidity value during the event was 41.69 NTU, with a peak of 65.98 NTU. There was 23.3mm of rainfall recorded in the 24 hours preceding the event. The data trend indicates turbidity increased following the commencement of the rainfall event, spiking once rainfall ceased before gradually declining to <5 NTU. The SE52T monitoring site was inspected on 8 August 2026. Increased stream velocity was observed in response to the rainfall event. The SE52T catchment was also inspected on 8 August 2026, with no evidence of mining-related contributions identified.'*

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.2 HUN-2608-009

SE61T

The turbidity exceedance event at monitoring location SE61T occurred between 05:00 and 10:21 on 8 August 2026. A total of 24.2 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 4, turbidity increased steadily from baseline conditions before exceeding the 25 NTU trigger value at approximately 05:00. A sharp, short-duration spike occurred shortly thereafter, reaching approximately 49 NTU, followed by a rapid decline to around 26 NTU. Following this initial spike, turbidity remained elevated above the trigger value for several hours, with a broader secondary peak of approximately 30 NTU occurring at around 08:15. Thereafter, turbidity gradually declined below the trigger value and continued receding towards baseline conditions, consistent with the settling and downstream dispersion of suspended sediments.

The overall response, characterised by an initial sharp peak, sustained elevated turbidity, and a gradual recession, is consistent with a genuine environmental turbidity event associated with rainfall-driven runoff. While the brief, isolated spike may indicate the passage of a concentrated sediment pulse or a short period of sensor interference, the prolonged period of elevated turbidity before and after the spike demonstrates a coherent environmental response. Given the recorded rainfall, the sustained exceedance above the trigger value, and the characteristic recession pattern, the exceedance is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

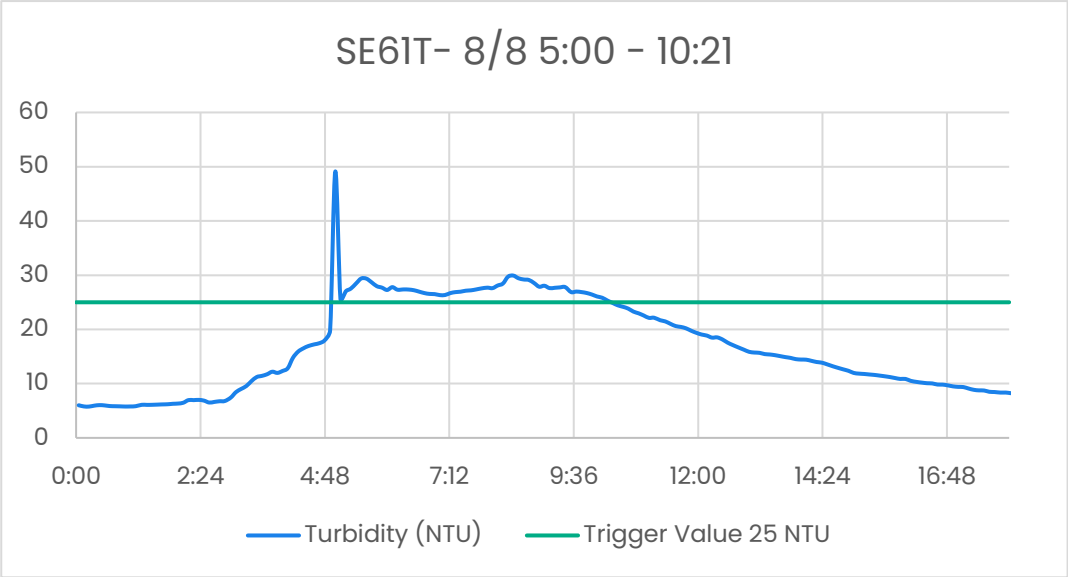


Figure 4 – SE61T August 8th

Field notes provided by Alcoa are included below.

> *'Local turbidity monitoring site SE61T recorded a turbidity event exceeding 25 NTU for >1 hour on 08/08/2026. The event was recorded from 5:00 AM to 10:21 AM, with a duration of 5 hours and 21 minutes. The average turbidity was 27.51 NTU, with a peak of 29.92 NTU. There was an estimated 24.2 mm of rainfall recorded in the preceding 24 hours (the 07/08 rainfall reading errored and was estimated at approximately 8 mm). The data trend shows turbidity gradually increasing above 25 NTU and remaining elevated for*

several hours before gradually declining below the trigger value. A site inspection completed on 09/08 identified the stream was clear and flowing. An inspection of the SE61T catchment area was completed, with no evidence of mining-related contribution to the exceedance identified.'

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.3 HUN-2608-011

SE03T

The turbidity exceedance event at monitoring location SE03T occurred between 06:36 and 09:54 on 8 August 2026. A total of 26.8 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 5, turbidity increased progressively from baseline conditions of approximately 5 NTU before exceeding the 25 NTU trigger value at approximately 06:36. Turbidity continued to rise, reaching a peak concentration of approximately 31 NTU at around 08:00. Following the peak, turbidity gradually declined, falling below the trigger value at approximately 09:54 and continuing to recede towards baseline conditions throughout the remainder of the day. A short-duration spike occurred later in the record at approximately 14:20; however, turbidity remained well below the trigger value during this period, and the response was not sustained.

The overall response is characteristic of a genuine environmental turbidity event associated with rainfall-driven runoff. The gradual rise to peak turbidity, followed by a steady recession towards baseline conditions, is consistent with the mobilisation, transport, and subsequent settling of suspended sediments following rainfall. While the isolated spike observed later in the record may reflect a brief sediment pulse, localised flow variability, or minor sensor interference, it does not affect the interpretation of the exceedance event. Given the recorded rainfall and the coherent turbidity response observed during the exceedance period, the event is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

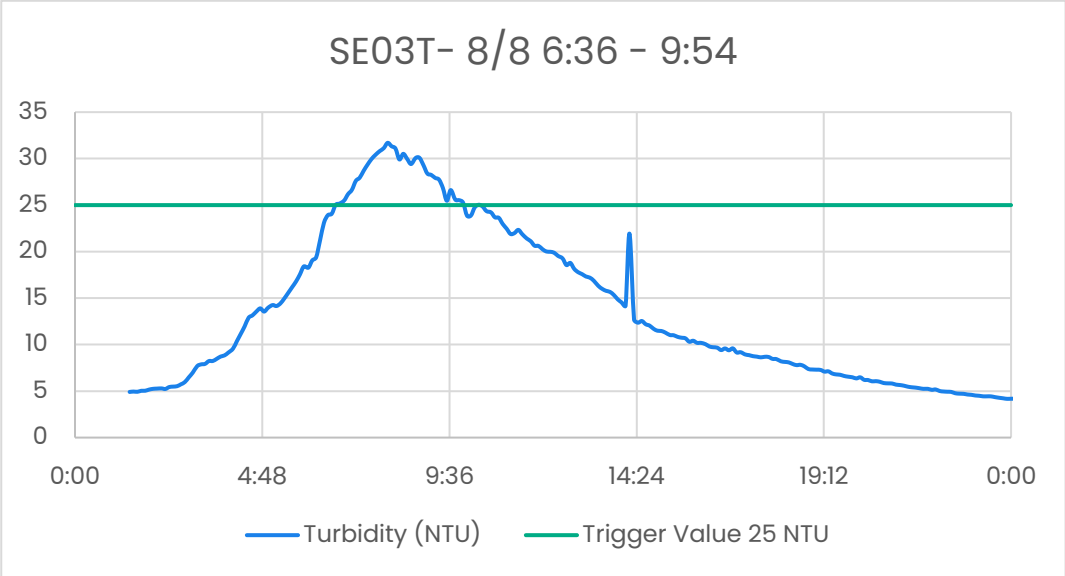


Figure 5 – SE03T August 8th

Field notes provided by Alcoa are included below.

> *'Local turbidity monitoring site SE03T recorded a turbidity event exceeding 25 NTU for more than 1 hour on 08 August 2026. The event was recorded from 6:36 AM to 9:54 AM, with a duration of 3 hours and 17 minutes. The average turbidity during the event was 28.27 NTU, with a peak of 31.7 NTU. There was 26.8 mm of rainfall recorded in the 24 hours preceding the event. The data trend shows a gradual incline and decline, which coincides with rainfall. The monitoring site was inspected on 08/08/2026. Increased stream depth and velocity were observed, with moderately turbid conditions and a measured turbidity of 14.79 NTU. The SE03T catchment area was inspected, with no evidence of mining-related contributions to the turbidity exceedance identified.'*

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.4 HUN-2608-012

SE03INV1

The turbidity exceedance event at monitoring location SE03INV1 occurred between 06:42 and 08:36 on 8 August 2026. A total of 26.8 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 6, turbidity increased progressively from baseline conditions of approximately 6 to 7 NTU before exceeding the 25 NTU trigger value at approximately 06:42. Turbidity continued to rise, reaching a peak concentration of approximately 27 NTU at around

07:45. Following the peak, turbidity gradually declined and fell below the trigger value at approximately 08:36. Thereafter, turbidity continued to recede steadily towards baseline conditions.

The overall response is characteristic of a genuine environmental turbidity event associated with rainfall-driven runoff. The gradual increase in turbidity, relatively broad peak, and sustained recession towards baseline conditions are consistent with the mobilisation, transport, and subsequent settling of suspended sediments following rainfall. The absence of abrupt or erratic fluctuations during the exceedance period further supports the interpretation of a natural environmental response. Given the recorded rainfall and the coherent turbidity pattern observed, the exceedance is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

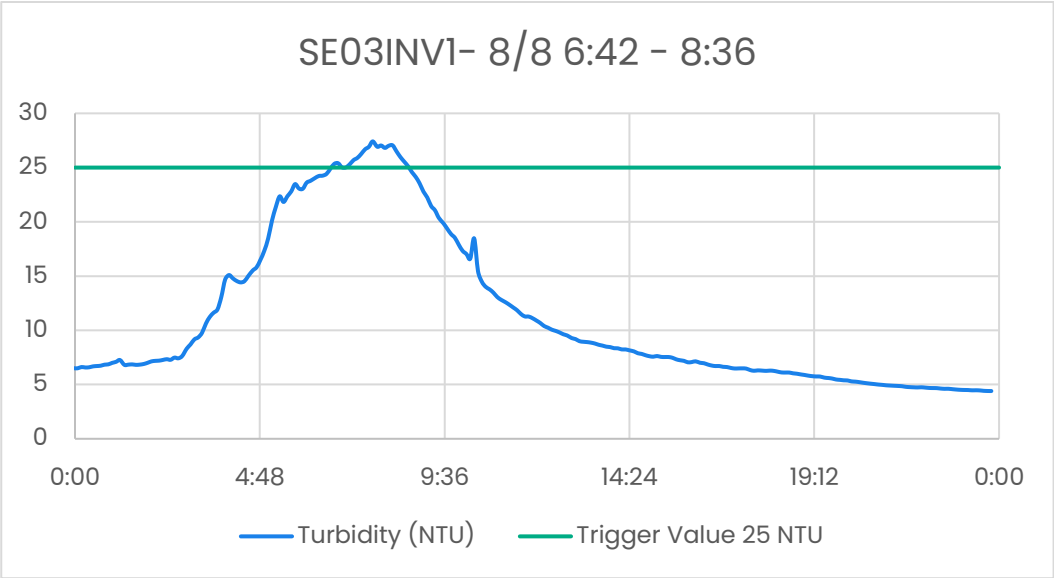


Figure 6 – SE03INV1 August 8th

Field notes provided by Alcoa are included below.

> *'Local turbidity monitoring site SE03INV1 recorded a turbidity event exceeding 25 NTU for >1 hour on 08/08/2026. The event was recorded from 6:42 AM to 8:36 AM, with a duration of 1 hour and 54 minutes. The average turbidity during the event was 26.14 NTU, with a peak of 27.41 NTU. There was 26.8 mm of rainfall recorded in the 24 hours preceding the event. The data trend shows a gradual incline and decline that coincides with the rainfall event. A site inspection completed on 08/08/2026 identified the stream was clear and flowing. The SE03INV1 catchment area was inspected, with no evidence of mining-related contributions to the turbidity exceedance identified.'*

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.5 HUN-2608-013

DB03T

The turbidity exceedance event at monitoring location DB03T occurred between 11:42 and 13:24 on 8 August 2026. A total of 31.4 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 7, turbidity increased progressively from baseline conditions of approximately 6 NTU throughout the morning before exceeding the 25 NTU trigger value at approximately 11:42. Turbidity continued to rise, reaching a peak concentration of approximately 27 NTU at around 12:30. Following the peak, turbidity gradually declined and fell below the trigger value at approximately 13:24. Thereafter, turbidity continued to recede steadily throughout the afternoon, although concentrations remained elevated relative to baseline conditions for several hours before stabilising. This recession pattern is consistent with the settling and downstream dispersion of suspended sediments following a runoff event.

The overall response is characteristic of a genuine environmental turbidity event associated with rainfall-driven runoff. The gradual increase in turbidity prior to the exceedance, the broad and sustained peak, and the subsequent recession towards baseline conditions are consistent with the mobilisation, transport, and settling of suspended sediments following rainfall. The absence of abrupt fluctuations or erratic behaviour during the exceedance period further supports the interpretation of a natural environmental response rather than instrument-related interference. Given the recorded rainfall and the coherent turbidity pattern observed, the exceedance is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

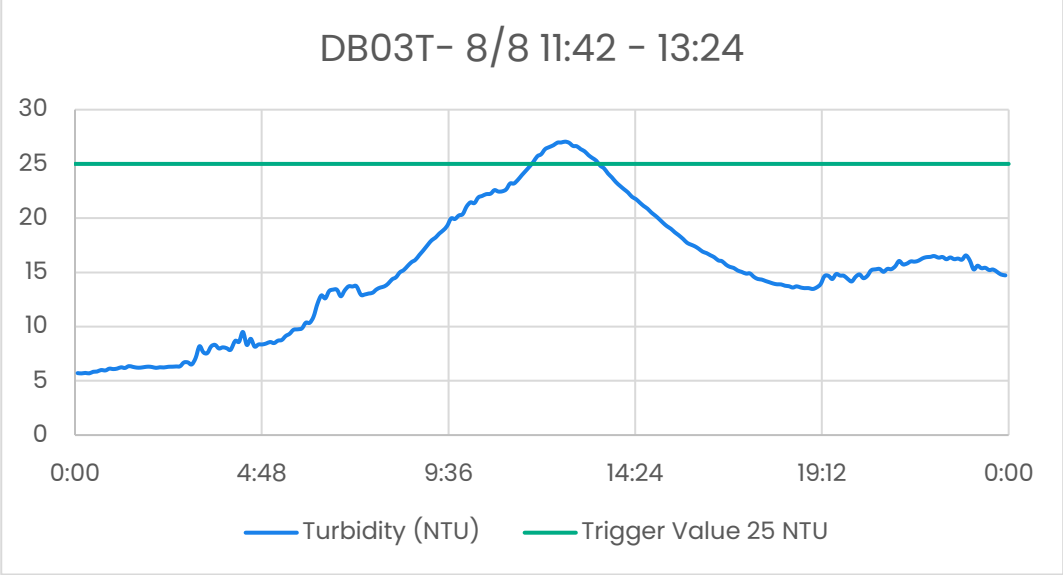


Figure 7 – DB03T August 8th

Field notes provided by Alcoa are included below.

> *'Compliance turbidity monitoring site DB03T recorded a turbidity event exceeding 25 NTU for >1 hour on 08 August 2026. The event was recorded from 11:42 AM to 1:24 PM, with a duration of 1 hour and 42 minutes. The average turbidity during the event was 26.32 NTU, with a peak of 27.07 NTU. There was 31.4 mm of rainfall recorded in the 24 hours preceding the event. The data trend shows a gradual incline and decline that coincides with the rainfall event. The monitoring site was inspected on 09/08/2026. Stream depth had increased since previous inspection, and the stream was clear with a measured value of 5.7 NTU. The DB03T catchment area was inspected, with no evidence of mining-related contributions to the exceedance identified.'*

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.6 HUN-2608-026

SE05T

The turbidity exceedance event at monitoring location SE05T occurred between 12:18 and 13:25 on 17 August 2026. A total of 12.0 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 8, turbidity remained relatively stable at approximately 5 to 6 NTU throughout the morning before increasing rapidly from around 11:00. Following several short-term fluctuations, turbidity exceeded the 25 NTU trigger value at approximately 12:18 and continued to rise sharply, reaching a peak concentration of approximately 41 NTU at around 12:40. Turbidity then declined rapidly and fell below the trigger value at approximately 13:25. Following the exceedance, turbidity continued to decrease gradually towards baseline conditions, although concentrations remained elevated above pre-event levels for several hours.

The overall response is characteristic of a genuine environmental turbidity event associated with rainfall-driven runoff. The rapid rise in turbidity, distinct peak, and subsequent recession are consistent with the mobilisation, transport, and settling of suspended sediments following rainfall. While minor fluctuations were observed during the rising limb of the event, these are consistent with variations in runoff and sediment delivery rather than indications of sensor malfunction. Given the recorded rainfall and the coherent turbidity response observed, the exceedance is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

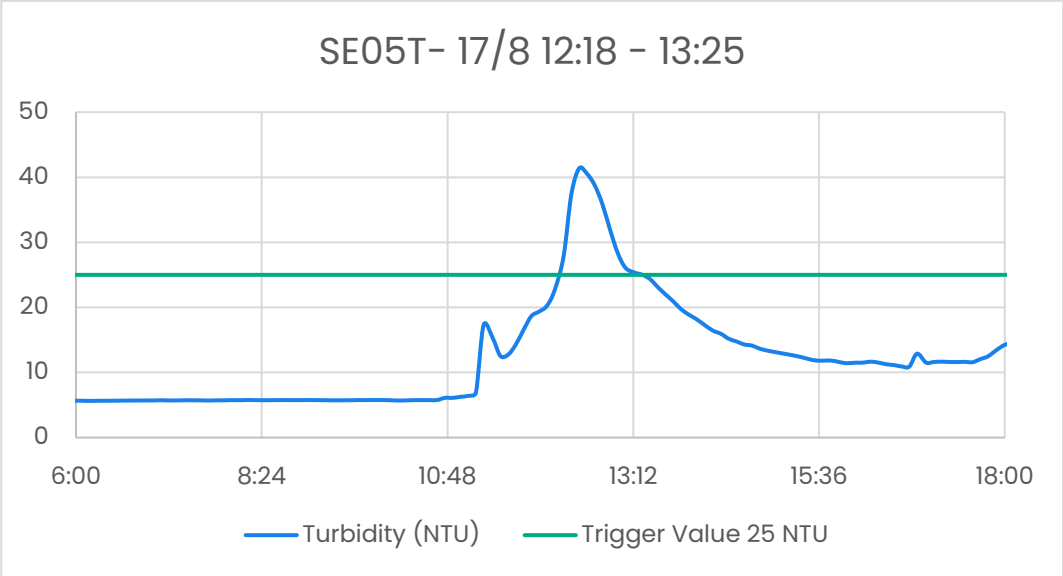


Figure 8 – SE05T August 17th

Field notes provided by Alcoa are included below.

> *'Compliance turbidity monitoring site SE05T recorded a turbidity event exceeding 25 NTU for >1 hour on 17 August 2026.*
> *The event was recorded on 17 August 2026 from 12:18 PM to 1:25 PM, with a duration of 1 hour and 7 minutes. The average turbidity value during the event was 32.44, with a peak of 41.36. There was 12mm of rainfall recorded in the 24 hours preceding the event. The data trend indicates that turbidity increased concurrently with rainfall. The exceedance commenced following 12 mm of rainfall and remained above 25 NTU until rainfall ceased, after which turbidity gradually declined to below 7 NTU.*
> *SE05T catchment was inspected and no evidence of mining related drainage concerns were observed.'*

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.7 HUN-2608-027

SE61T

The turbidity exceedance event at monitoring location SE61T occurred between 17:54 and 19:25 on 17 August 2026. A total of 16.5 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 9, turbidity increased progressively from baseline conditions of approximately 5 NTU during the early afternoon before rising rapidly to around 20 NTU by approximately 14:00. Turbidity remained elevated and continued to increase gradually throughout the afternoon, exceeding the 25 NTU trigger value at approximately 17:54. Turbidity then reached a broad peak of approximately 27 NTU shortly before 19:00 before gradually declining. Concentrations fell below the trigger value at approximately 19:25 and continued to recede steadily throughout the evening towards baseline conditions, consistent with the settling and downstream dispersion of suspended sediments.

The overall response is characteristic of a genuine environmental turbidity event associated with rainfall-driven runoff. The gradual rise in turbidity, broad peak, and sustained recession are consistent with the mobilisation, transport, and subsequent settling of suspended sediments following rainfall. The absence of abrupt spikes, erratic fluctuations, or other indicators of instrument malfunction further supports the interpretation of a natural environmental response. Given the recorded rainfall and the coherent turbidity pattern observed, the exceedance is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

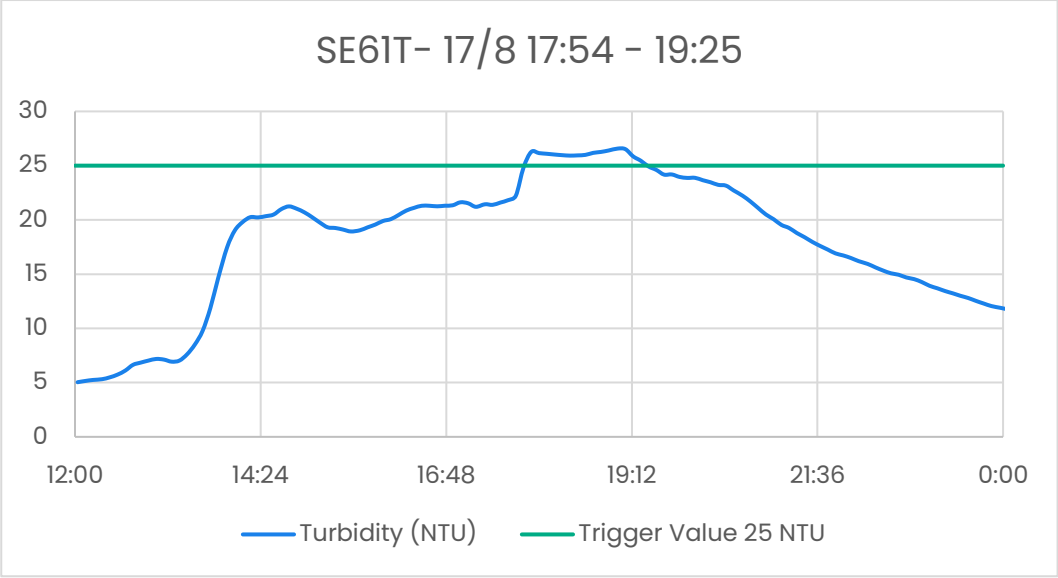


Figure 9 – SE61T August 17th

Field notes provided by Alcoa are included below.

> *'Local turbidity monitoring site SE61T recorded a turbidity event exceeding 25 NTU for >1 hour on 17/08/2026. The event was recorded from 5:54 PM to 7:25 PM, with a duration of 1 hour and 31 minutes. The average turbidity during the event was 26.05 NTU, with a peak of 26.57 NTU. There was an estimated 16.5 mm of rainfall recorded in the 24 hours preceding the event. The data trend shows a gradual increase and decline that coincides with the rainfall event. The monitoring site was inspected on 19/08/2026. The stream was observed to be clear and flowing, with increased stream depth and velocity present. Organic debris and algae were observed on the sensor. The SE61T catchment*

area was also inspected, with no evidence of mining-related contributions to the turbidity exceedance identified.'

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.8 HUN-2608-031

SE52T

The turbidity exceedance event at monitoring location SE52T occurred between 01:30 and 04:42 on 27 August 2026. A total of 25.3 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 10, turbidity increased steadily from approximately 18 NTU shortly after midnight, exceeding the 25 NTU trigger value at approximately 01:30. Turbidity continued to rise, reaching a peak concentration of approximately 45 NTU at around 03:05. Following the peak, turbidity declined progressively, falling below the trigger value at approximately 04:42. Thereafter, turbidity continued to recede towards baseline conditions throughout the morning, stabilising at approximately 10 to 12 NTU by late morning. This gradual recession is consistent with the settling and downstream dispersion of suspended sediments following a runoff event.

The overall response is characteristic of a genuine environmental turbidity event associated with rainfall-driven runoff. The steady increase in turbidity, well-defined peak, and gradual recession towards baseline conditions are consistent with the mobilisation, transport, and subsequent settling of suspended sediments following rainfall. The smooth and coherent turbidity profile, together with the absence of abrupt spikes or erratic fluctuations, provides no indication of sensor malfunction. Given the recorded rainfall and the characteristic turbidity response observed, the exceedance is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

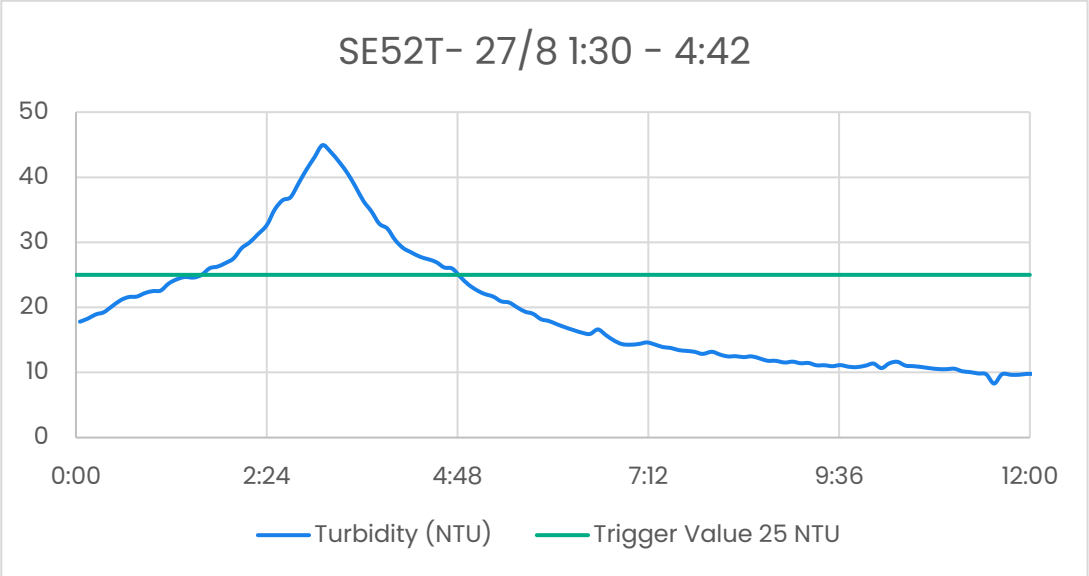


Figure 10 – SE52T August 27th

Field notes provided by Alcoa are included below.

> *'Compliance turbidity monitoring site SE52T recorded a turbidity event exceeding 25 NTU for >1 hour on 27 August 2026. The event was recorded from 1:30 AM to 4:42 AM, with a duration of 3 hours and 12 minutes. The average turbidity during the event was 33.29 NTU, with a peak of 44.92 NTU. There was 25.3 mm of rainfall recorded in the 24 hours preceding the event. The data trend shows a gradual increase in turbidity values approximately three hours after rainfall ceased, followed by a gradual decline. The SE52T catchment area was inspected, with no evidence of mining-related contributions to the turbidity exceedance identified.'*

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.1.9 HUN-2608-032

SE03T

The turbidity exceedance event at monitoring location SE03T occurred between 02:30 and 05:48 on 27 August 2026. A total of 25.3 mm of rainfall was recorded during the 24 hours preceding the event, providing a plausible mechanism for increased sediment mobilisation and transport within the monitored waterbody.

As shown in Figure 11, turbidity increased steadily from approximately 14 NTU shortly after midnight, exceeding the 25 NTU trigger value at approximately 02:30. Turbidity continued to rise and remained elevated above the trigger value for several hours, reaching a broad peak concentration of approximately 28 NTU between 03:00 and 05:00. Following this sustained

peak period, turbidity gradually declined, falling below the trigger value at approximately 05:48. Thereafter, turbidity continued to recede steadily throughout the morning, approaching baseline conditions of approximately 11 NTU by midday. This prolonged recession pattern is consistent with the settling and downstream dispersion of suspended sediments following a runoff event.

The overall response is characteristic of a genuine environmental turbidity event associated with rainfall-driven runoff. The gradual rise in turbidity, extended period above the trigger value, broad peak, and steady recession are consistent with the mobilisation, transport, and subsequent settling of suspended sediments following rainfall. The smooth and coherent turbidity profile, together with the absence of abrupt spikes or erratic fluctuations, provides no indication of sensor malfunction. Given the recorded rainfall and the characteristic turbidity response observed, the exceedance is considered to represent a genuine rainfall-induced turbidity event rather than sensor malfunction.

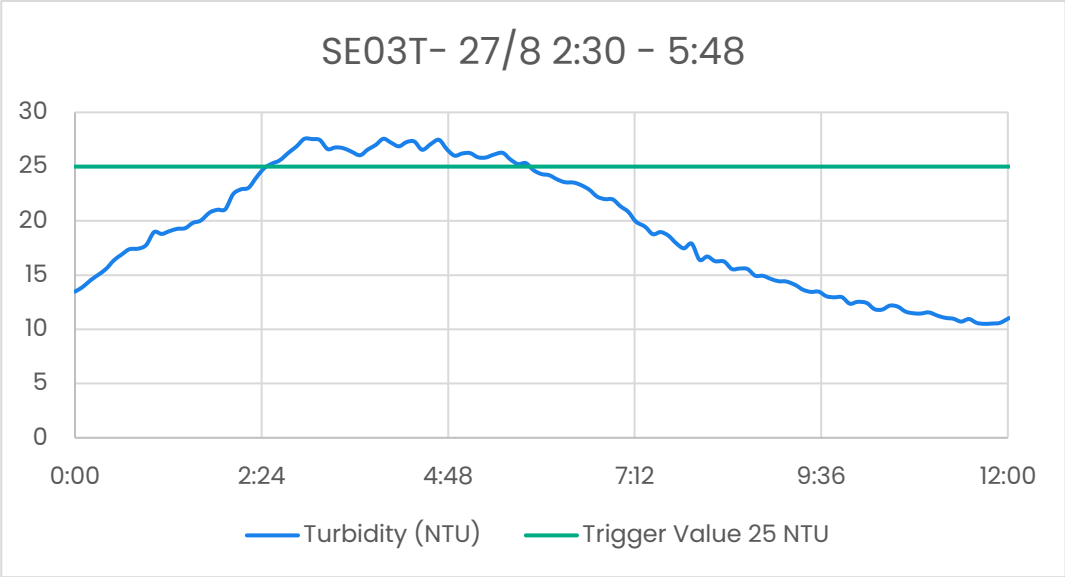


Figure 11 – SE03T August 27th

Field notes provided by Alcoa are included below.

> *'Local turbidity monitoring site SE03T recorded a turbidity event exceeding 25 NTU for more than 1 hour on 27 August 2026. The event was recorded from 2:30 AM to 5:48 AM, with a duration of 3 hours and 17 minutes. The average turbidity during the event was 26.50 NTU, with a peak of 27.56 NTU. There was 25.3 mm of rainfall recorded in the 24 hours preceding the event. The data trend shows a gradual increase in turbidity values, with turbidity exceeding 25 NTU approximately four hours following the cessation of rainfall, followed by a gradual decline. The monitoring site was inspected on 28/08/2026. The sensor was lightly impacted by sediment within the flow cell. The turbidity reading was <3 NTU both before and after sensor cleaning, and the stream was observed to be flowing clear. The SE03T catchment area was also inspected, with no evidence of mining-related contributions to the turbidity exceedance identified.'*

Based on the comments provided by Alcoa this event is considered 'True', however no evidence of mining related contributions to the turbidity exceedance.

5.2.2 False Event(s)

Thirty-three (33) 'False' events were identified during the reporting period. Rationale on potential causes is summarised below.

Table 3: False Events Rationale

Event ID	Monitor	SciDev Rationale	Alcoa Field Comments
HUN-2608-001	SE23T	The event is marked with slow increase in turbidity with an instant decrease. This is indicative of a false event	Site inspected on 1/08/2026. Ponded water is present, but the stream is not flowing. The turbidity and level sensors are submerged but water level has been fluctuating. The turbidity sensor was removed for cleaning which reduced the turbidity value from 39.79NTU to 9.56 NTU.
HUN-2608-002	SE59T	The event is marked by a rapid increase and decrease in turbidity. This is indicative of a false event.	The turbidity data trend rapidly spikes to >90 NTU, to below 25 NTU within 20 minutes, indicating the sensor likely was impacted by passing debris. The trend is consistent with a false event. No Rainfall was received in the 24 hours proceeding this event.
HUN-2608-003	SE12INV	This event is marked progressively increasing turbidity, interspersed with several abrupt spikes and fluctuations. This is indicative of a false event.	SE12INV site was visited on 10/08/2026. Stream was observed flowing again, clear and very shallow. The turbidity sensor was not submerged in the stream due to the very shallow depth. On the 30/07/2026, SE12INV stream was observed dry. Data trend of rapid inclines indicates sensor impacted by organic debris during stream initial flow.
HUN-2608-004	SE12INV	The event is marked by an abrupt increase in turbidity followed by step decrease until level is below 25NTU. This is indicative of a false event	SE12INV site was visited on 10/08/2026. Stream was observed flowing again, clear and very shallow. The turbidity sensor was not submerged in the stream due to the very shallow depth. On the 30/07/2026, SE12INV stream was observed dry. Data trend of rapid inclines indicates sensor impacted by organic debris during stream initial flow.
HUN-2608-005	SE12INV	This event is marked rapid increase in turbidity, interspersed with several abrupt spikes and fluctuations until a rapid decrease. This is indicative of a false event.	SE12INV site was visited on 10/08/2026. Stream was observed flowing again, clear and very shallow. The turbidity sensor was not submerged in the stream due to the very shallow depth. On the 30/07/2026, SE12INV stream was observed dry. Data trend of rapid inclines indicates sensor impacted by organic debris during stream initial flow.

Event ID	Monitor	SciDev Rationale	Alcoa Field Comments
HUN-2608-006	SE25T	This event is marked a swift increase in turbidity with progressively decrease until a final rapid decrease to below 25NUT. This is indicative of a false event.	The monitoring site was inspected on 05/08/2026 and the stream was dry. An inspection conducted on 30/08/2026 found that streamflow had commenced; however, the level float sensor was still recording 0 (dry). The data trend shows turbidity increasing rapidly from 8.7 NTU to 179.7 NTU within six minutes, followed by a rapid decline towards the end of the event, indicating the sensor was likely impacted by debris during the early stages of streamflow.
HUN-2608-008	SE11T	This event is marked rapid decrease. This is indicative of a false event.	SE11T site was visited on 13/08/2026 and stream is flowing and clear. Organic debris observed impacting the sensor. Float activated to flowing on 8/08/2026 at 9:42:01 AM. False event due to initial stream flush.
HUN-2608-010	SE12T	This event is marked rapid increase in turbidity, interspersed with several abrupt spikes and fluctuations. This is indicative of a false event.	SE12T site was visited on 11/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Data trend has rapid incline with staggered rapid declines also indicating impact from organic debris and sediment.
HUN-2608-014	SE12T	This event is marked rapid increase and decrease in turbidity. This is indicative of a false event.	SE12T site was visited on 11/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Data trend has rapid incline with staggered rapid declines also indicating impact from organic debris and sediment.
HUN-2608-015	SE12T	The event is marked with a rapid increase with several irregular oscillations. This is indicative of a false event	SE12T site was visited on 11/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Data trend has rapid incline with staggered rapid declines also indicating impact from organic debris and sediment.
HUN-2608-016	SE59T	The event is marked with a rapid increase with several irregular oscillations. This is indicative of a false event	The turbidity data trend rapidly spikes from <25 NTU to >140 NTU within 10 minutes, indicating the sensor likely was impacted by passing debris. The trend is consistent with a false event.

Event ID	Monitor	SciDev Rationale	Alcoa Field Comments
HUN-2608-017	SE12T	This event is marked rapid onsite and conclusion and the step like response in the turbidity exceedance. This is indicative of a false event.	SE12T site was visited on 11/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Data trend has rapid incline with staggered rapid declines also indicating impact from organic debris and sediment.
HUN-2608-018	SE25T	The event is marked by a rapid increase in turbidity followed by a rapid decrease. This is indicative of a false event.	The monitoring site was inspected on 05/08/2026 and the stream was dry. An inspection conducted on 30/08/2026 found that streamflow had commenced; however, the level float sensor was still recording 0 (dry). The data trend shows erratic turbidity readings, including extreme values, indicating the sensor was likely impacted by debris during the early stages of streamflow.
HUN-2608-019	SE12T	The event is marked by an increase in turbidity followed by a rapid decrease. This is indicative of a false event.	SE12T site was visited on 11/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Data trend has rapid incline with staggered rapid declines also indicating impact from organic debris and sediment.
HUN-2608-020	SE59T	This event is marked by an increase and decrease in turbidity with multiple sporadic peaks. This is indicative of a false event.	The turbidity data trend continuously rapidly spikes and drops throughout the duration of the event forb1 hour and 19 minutes. The trend indicates the sensor was likely impacted by passing debris. The trend is consistent with a false event.
HUN-2608-021	SE12T	This event is marked by a rapid increase and decrease with several irregular oscillations. This is indicative of a false event.	SE12T site was visited on 16/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Intermittently the sensor is only partially submerged due to gathered organic debris downstream clearing, significantly reducing the stream depth.
HUN-2608-022	SE12T	The event is marked with several irregular oscillations. This is indicative of a false event	SE12T site was visited on 16/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Intermittently the sensor is only partially submerged due to gathered organic debris downstream clearing, significantly reducing the stream depth.
HUN-2608-023	SE12INV	The event is marked by a continue low turbidity. This is indicative of a false event	SE12INV site was visited on 16/08/2026. Stream was observed flowing, clear and very shallow. The turbidity sensor was partially submerged in the stream due to the very shallow depth creating a false bell curve data trend.

Event ID	Monitor	SciDev Rationale	Alcoa Field Comments
HUN-2608-024	SE24T	This event is marked by a minor oscillations in turbidity. This is indicative of a false event.	The monitoring site was inspected on 05/08/2026 and the stream was dry. An inspection conducted on 30/08/2026 found that streamflow had commenced; however, the level float sensor was still recording 0 (dry). Data analysis indicates this event was likely caused by the sensor being partially out of the water as streamflow was initially commencing. This assessment is supported by the absence of rainfall during the preceding 24 hours and the gradual rise and fall observed in turbidity measurements.
HUN-2608-025	SE12T	This event is marked by a rapid increase and decrease with oscillations in turbidity. This is indicative of a false event.	SE12T site was visited on 16/08/2026. Stream has a very shallow, clear flow and therefore the sensor is impacted by the stream bed sediment and surrounding organic debris. Intermittently the sensor is only partially submerged due to gathered organic debris downstream clearing, significantly reducing the stream depth.
HUN-2608-028	SE09T	This event is marked by a rapid increase and decrease in turbidity with multiple oscillations. This is indicative of a false event.	The SE09T site was visited on 23 August 2026. The stream was observed to be clean and flowing. Organic debris was found to be impacting the sensor and, once cleared, turbidity decreased from 9.07 NTU to 1.2 NTU. A review of the turbidity trend showed a sharp increase in turbidity values, further indicating that the sensor had been affected by vegetation.
HUN-2608-029	SE09T	This event is marked by a rapid increase and decrease in turbidity with multiple oscillations. This is indicative of a false event.	The SE09T site was visited on 23 August 2026. The stream was observed to be clean and flowing. Organic debris was found to be impacting the sensor and, once cleared, turbidity decreased from 9.07 NTU to 1.2 NTU. A review of the turbidity trend showed a sharp increase in turbidity values, further indicating that the sensor had been affected by vegetation.
HUN-2608-030	SE12INV	This event is marked a gradual increase followed by two sporadic peaks and a rapid decrease in turbidity. This is indicative of a false event.	The site was inspected on 30/08/2026. The stream was flowing; however, water depth was insufficient to fully submerge the sensor, resulting in invalid readings. Water depth was also insufficient to activate the level float sensor, which continued to record a value of 0 (dry).

Event ID	Monitor	SciDev Rationale	Alcoa Field Comments
HUN-2608-033	FPWR1	This event is marked a rapid increase followed by return to baseline resembling a normal (Gaussian) distribution. The Site notes are the only reason for this to be classed as a false event.	FPWR1 site visited on 28/08/2026. The sensor was only partially submerged in the very shallow, clear stream. The float activated to flowing on 27/08/2026 at 9:12:01 PM. As this rain event was the initial flush of the stream and the extensive organic debris observed in the stream, this is a false event.

5.2.3 Excluded WQMS Units

Two WQMS Units were excluded from analysis due to inaccurate data. Alcoa confirmed the invalidity of data recorded from these units and provided commentary on the condition of each.

Table 4: Excluded WQMS Units

WQMS ID	Comment
SE04T	New monitoring site installed 20/11/2025, stream dry at time of installation.
SE26T	Stream dry as of 28/09/2025

5.2.4 Missing Data

Periods of missing data are detailed in Table 5.

Table 5: Missing Data Summary

WQMS ID	Data Notes
DB03T	Data gap from 14/8/2026 23:27 to 15/8/2026 4:11 due to loss of Coms 16/8/2026 3:00 to 31/8/2026 23:59 Vandalism of Equipment
FPWR1	Unit Dry 1/08/2026 to 27/8/2026
ND06T	Data gap from 1/8/2026 0:00 to 3/8/2026 13:18 due to equipment fault
ND014T	Data gap from 15/8/2026 0:32 to 18/8/2026 12:09 due to system power loss
SE03INV1	Data gap from 29/8/2026 7:57 to 29/8/2026 12:41 due to equipment fault
SE03T	Data gap from 29/8/2026 8:12 to 29/8/2026 12:55 due to equipment fault
SE08T	Data gap from 24/8/2026 23:29 to 25/8/2026 0:49 due to equipment fault
SE11T	Unit Dry 1/8/2026 to 8/8/2026
SE12INV	Unit Dry 1/8/2026 to 6/8/2026
SE15T	Unit Dry 1/8/2026 to 26/8/2026
SE23T	Data gap from 30/8/2026 15:36 to 16:28 due to equipment fault
SE24T	Unit Dry 1/8/2026 to 6/8/2026
SE25T	Unit Dry 1/8/2026 to 6/8/2026
SE36T	Data gap from 2/8/2026 23:49 to 3/8/2026 4:34 due to equipment fault
SE53T	Data gap 3/8/2026 5:43 to 3/8/2026 10:34 due to equipment fault
SE59T	Data gap 14/8/2026 8:48 to 14/8/2026 10:19 due to unit upgrade
SE61T	Data gap 19/8/2026 10:18 to 19/8 11:00 due to system maintenance

6. Huntly Raw WQMS Data

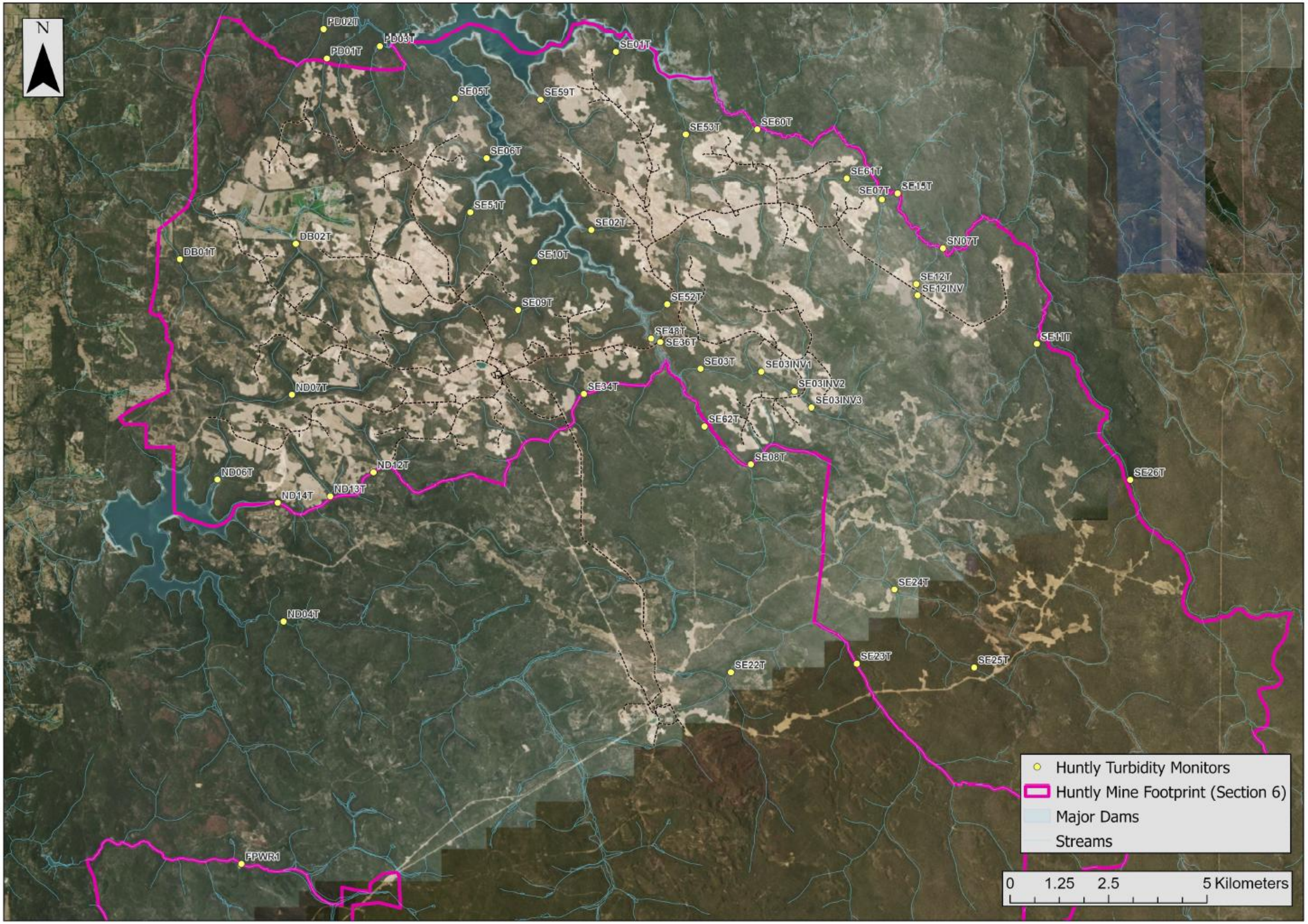
Date	Huntly WQMS Data – August 2026 - Events with turbidity > 25 NTU for an hour or more											
	DB01T	DB02T	DB03T	FPWR1	ND06T	ND07T	ND12T	ND13T	ND14T	PD01T	PD02T	PD03T
1/08/2026												
2/08/2026												
3/08/2026												
4/08/2026												
5/08/2026												
6/08/2026												
7/08/2026												
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11/08/2026												
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27/08/2026												
28/08/2026				1xFALSE								
29/08/2026												
30/08/2026												
31/08/2026												

Date	Huntly WQMS Data – August 2026 - Events with turbidity > 25 NTU for an hour or more											
	SE01T	SE02T	SE03INV1	SE03INV3	SE03T	SE04T	SE05T	SE06T	SE07T	SE08T	SE09T	SE10T
1/08/2026												
2/08/2026												
3/08/2026												
4/08/2026												
5/08/2026												
6/08/2026												
7/08/2026												
8/08/2026			1xTRUE		1xTRUE							
9/08/2026												
10/08/2026												
11/08/2026												
12/08/2026												
13/08/2026												
14/08/2026												
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21/08/2026											1x FALSE	
22/08/2026												
23/08/2026											1x FALSE	
24/08/2026												
25/08/2026												
26/08/2026												
27/08/2026					1xTRUE							
28/08/2026												
29/08/2026												
30/08/2026												
31/08/2026												

Date	Huntly WQMS Data – August 2026 - Events with turbidity > 25 NTU for an hour or more										
	SE11T	SE12T	SE12INV	SE15T	SE23T	SE24T	SE25T	SE26T	SE34T	SE36T	SE48T
1/08/2026											
2/08/2026											
3/08/2026											
4/08/2026											
5/08/2026											
6/08/2026		1x FALSE									
7/08/2026		2x FALSE									
8/08/2026	1x FALSE		2x FALSE				1x FALSE				
9/08/2026			2x FALSE								
10/08/2026			1x FALSE				1x FALSE				
11/08/2026											
12/08/2026			1x FALSE								
13/08/2026			1x FALSE								
14/08/2026		1x FALSE				1x FALSE					
15/08/2026			1x FALSE								
16/08/2026											
17/08/2026											
18/08/2026											
19/08/2026											
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22/08/2026											
23/08/2026											
24/08/2026											
25/08/2026											
26/08/2026		1x FALSE									
27/08/2026					1x FALSE						
28/08/2026											
29/08/2026											
30/08/2026											
31/08/2026											

Date	Huntly WQMS Data – August 2026 - Events with turbidity > 25 NTU for an hour or more							
	SE51T	SE52T	SE53T	SE59T	SE60T	SE61T	SE62T	SN07T
1/08/2026								
2/08/2026								
3/08/2026								
4/08/2026				1x FALSE				
5/08/2026								
6/08/2026								
7/08/2026								
8/08/2026		1xTRUE				1xTRUE		
9/08/2026				1x FALSE				
10/08/2026								
11/08/2026				1x FALSE				
12/08/2026								
13/08/2026								
14/08/2026								
15/08/2026								
16/08/2026								
17/08/2026						1xTRUE		
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22/08/2026								
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24/08/2026								
25/08/2026								
26/08/2026								
27/08/2026		1xTRUE						
28/08/2026								
29/08/2026								
30/08/2026								
31/08/2026								

Appendix A Huntly WQMS Locations


N
PD02T
PD03T
PD01T
SE01T
SE05T
SE59T
SE53T
SE60T
SE06T
SE61T
SE07T
SE15T
SE51T
SE02T
DB02T
DB01T
SE10T
SN07T
SE12T
SE12INV
SE09T
SE52T
SE48T
SE36T
SE11T
SE03T
SE03INV1
SE03INV2
SE03INV3
ND07T
SE34T
SE62T
SE08T
ND12T
ND06T
ND14T
ND13T
SE26T
SE24T
ND04T
SE23T
SE25T
SE22T
FPWR1
Huntly Turbidity Monitors
Huntly Mine Footprint (Section 6)
Major Dams
Streams
0
1.25
2.5
5 Kilometers

Appendix B WQMS General Arrangement

ANTENNA

SOLAR PANEL

DATA OUTLET

POWER INLET

60 X 60 MM CABLE DUCT

SIERRA WIRELESS FX30

60 X 60 MM CABLE DUCT

12 V, 120 AH LI-ION BATTERY

DATA INLET

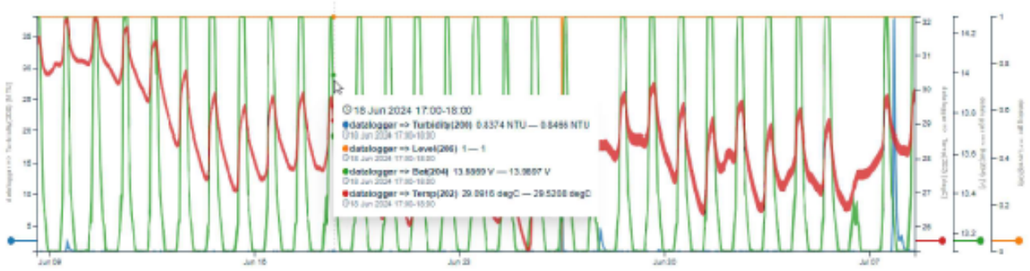
DATA TRANSMISSION TO IOT

SENSOR

STREAM DRY

SENSOR

STREAM FLOWING



REV.	REMARKS	DATE	DESIGNED	DRAWN	CHECKED	APPROVED	REFERENCE DRAWINGS
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TITLE

IOT TURBIDITY MONITORING STATION
SITE LAYOUT
GENERAL ARRANGEMENT

SHEET 1 OF 2

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HI0090 - ALCOA WQMS

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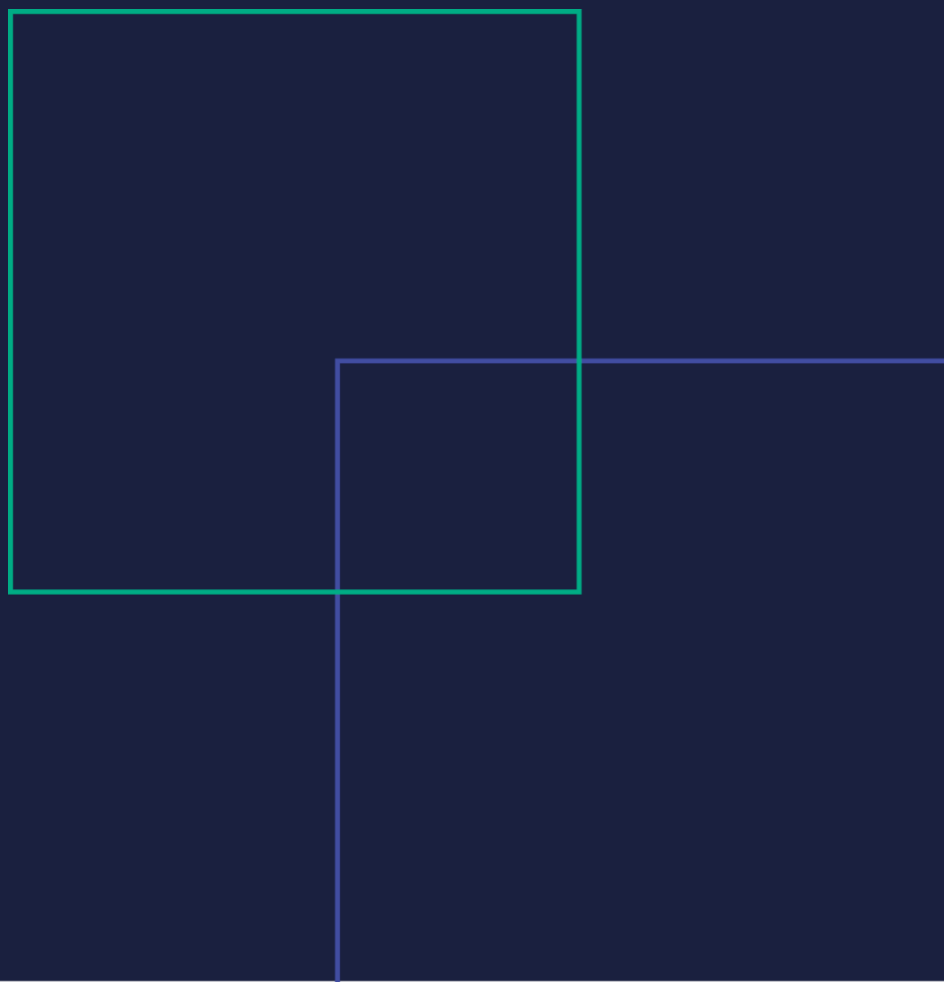
REV.
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SCIDEV

WQMS Data Review

Willowdale Bauxite Mine

AUGUST 2026



Document Control

Document Control			
Rev.	**Data Analysis**	**Approved By**	**Date**
A	Wendy Spunner	Nick O'Reilly	22/9/26
0	Wendy Spunner	Nick O'Reilly	27/10/26

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1. Executive Summary

SciDev conducted an analysis of turbidity data collected from Water Quality Monitoring Systems (WQMS) operating across Alcoa's Willowdale bauxite mining operations for August 2026. The purpose of this assessment was to evaluate data quality, identify genuine turbidity exceedance events, and support compliance with the *Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

The review focused on events where turbidity exceeded 25 NTU for at least one hour. Events were evaluated in accordance with Alcoa's Turbidity Event Classification Guidelines and classified as either "true" exceedances, representing genuine increases in turbidity, or "false" exceedances resulting from environmental or operational interferences.

Key outcomes of the analysis were:

- **Excluded Units**: Zero (0) WQMS units were excluded from the analysis due to invalid data caused by equipment faults or environmental interference.
- **False Events**: Five (5) turbidity exceedances were identified as false, commonly caused by debris, sensor obstruction, or hydraulic disturbances.
- **True Events**: Zero (0) "True" turbidity exceedance event were recorded following detailed assessment.

Data gaps were also identified due to system outages, maintenance, and unexpected shutdowns. These have been documented to maintain transparency in reporting.

Overall, while turbidity exceedance events were recorded during August 2026, the assessment found no evidence that any true turbidity exceedance event was caused by mining activities.

2. Scope

SciDev were engaged by Alcoa to analyse turbidity data collected from the Willowdale Water Quality Monitoring Systems (WQMS). The primary objective of this engagement is to assess the quality of the collected data and identify potential "true" turbidity events. This analysis supports Alcoa's reporting obligations under *Schedule 1, Division 2, Clause 6 of the Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

3. Introduction

3.1 Background

Alcoa of Australia Ltd (Alcoa) operates two bauxite mines, Huntly and Willowdale, approximately 100 km southeast of Perth, Western Australia. These mining operations are subject to environmental controls mandated by the *Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023*.

Under this Exemption Order, Alcoa is required to implement drainage control measures and monitor effectiveness in water bodies within and downstream of mining operations. Turbidity, a critical water quality parameter, is monitored using Water Quality Monitoring Systems (WQMS), to detect deviations and identify high-turbidity events.

Alcoa is obligated to report monthly on-stream turbidity, including the identification and classification of any "true" high-turbidity exceedance events. (Refer to Appendix B for the site map showing WQMS locations.)

3.2 Monitoring Requirements

Environmental Protection (Darling Range Bauxite Mining Proposal) Exemption Order 2023 specifies that a drainage incident occurs when:

a. Runoff from a disturbance area enters the surrounding environment, resulting in surface water turbidity of at least 25 NTU for a duration of at least one hour; or
b. a discharge from containment infrastructure includes, or may include, environmentally hazardous material.

Trigger levels for drainage incidents are outlined in Schedule 1 of the Exemption Order. To meet these requirements, Alcoa has developed "Turbidity Event Classification Guidelines" which define a true turbidity exceedance event as a WQMS recording turbidity levels of at least 25 NTU for a period exceeding one hour.

3.3 Water Quality Management System (WQMS)

During the August 2026 monitoring period, four (4) WQMS units were deployed to monitor turbidity levels in streams subject to surface water runoff within and downstream of Willowdale mining operations.

Each WQMS unit consists of the following components:

Aquas SMR10 Turbidity Probe

Positioned at a 90-degree angle to water flow, each probe is equipped with an automatic lens wiper and a guard to protect against larger debris.

Data Taker DT82 Logger

Records data locally every six seconds, with six-minute averages transmitted via IoT-enabled modems to a cloud-based platform.

Float Switch

Detects whether the sensor is submerged, or the stream is dry.

3.4 Purpose

This report aims to analyse turbidity data collected during August 2026, focusing on the identification and classification of "true" turbidity exceedance events based on Alcoa's Turbidity Event Classification Guidelines.

3.5 Exclusions

This report is not intended as:

An assessment of the WQMS network or Alcoa's compliance with relevant legislation and requirements.
An evaluation of the suitability of the trigger levels or event classification procedures adopted by Alcoa.

3.6 Abbreviations

	Term
IoT	Internet of Things
NTU	Nephelometric Turbidity Units
WQMS	Water Quality Management System

4. Methodology

4.1 WQMS Locations

A site map showing the WQMS locations is provided in Appendix B.

4.2 Data Review

Data recorded by the WQMS Units was reviewed and potential events where turbidity levels exceeded 25 NTU for at least one hour. Each potential event was categorised as either ‘true ‘or ‘false’.

4.2.1 True Turbidity Exceedance Events

These events are caused by an actual increase in stream turbidity. Per Alcoa’s "Turbidity Event Classification Guidelines" true exceedance events typically exhibit:

A sharp, sudden incline in turbidity levels.
A return to baseline turbidity levels in a pattern resembling a normal (Gaussian) distribution.



Figure 1 Typical 'True' exceedance event.

4.2.2 False Turbidity Exceedance Events

These events are caused by factors unrelated to actual turbidity increase, such as:

Organic debris (e.g., leaves, sticks, algae) obstructing the sensor
Air bubbles or water turbulence near the sensor

Fluctuating water levels intermittently covering and uncover the sensor lens.

False events typically exhibit sharp inclines and declines without the characteristic bell curve shape of true events

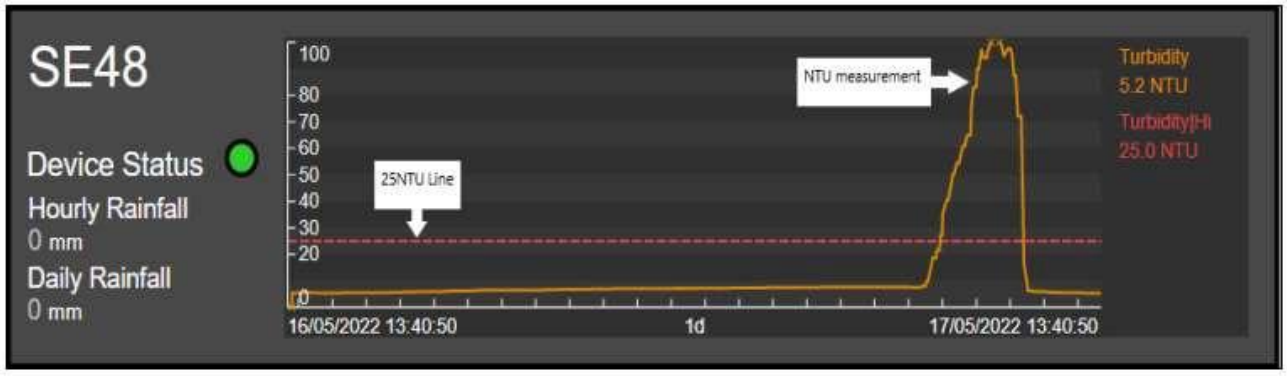


Figure 2 Typical 'false' exceedance event.

4.2.3 Missing Data

Missing data occurs when a WQMS unit fails to record information, this can occur from unexpected system logoffs, equipment faults, or unplanned shutdowns.

5. Results and Discussion

5.1 Events

Table 1 provides a summary of identified events. Table 2 offers detailed information about each event.

Table 1: Events Summary

Category	# of events
Total events	5
True events	0
False events	5
Caused by mining related activity	0

It was found that:

a. There were Zero (0) True events.
b. Zero (0) units remained dry with no presence of water.
c. One (1) unit that was previously dry, now has water present
d. Three (3) units remained flowing throughout the month.

Note:

A True event is recorded when there is water present within the water way, and, that the probe has not been affected by any external sources.

Table 2: Events Details

Event ID	Monitor	False Event (Y/N)	Event Start Date	Event Start Time	Event End Date	Event End Time	Event Duration	Ave. Turbidity (NTU)	Peak Turbidity (NTU)
WDL-2608-001	HV07T	Y	3/08/2026	1:34:00 PM	3/08/2026	2:35:00 PM	1 hour 1 min	30.96	32.869
WDL-2608-002	RHB2	Y	14/08/2026	1:15:00 AM	17/08/2026	12:59:00 AM	3 days 11 hours	92.94	674.88
WDL-2608-003	HV07T	Y	26/08/2026	2:49:00 PM	26/08/2026	4:09:00 PM	1 hour 20 min	183.97	483.67
WDL-2608-004	RHB3	Y	28/08/2026	9:33:00 AM	28/08/2026	11:47:00 AM	2 hours 13 min	36.77	69.459
WDL-2608-005	RHB3	Y	28/08/2026	12:05:00 PM	28/08/2026	1:54:00 PM	1 hour 49 min	41	64.391

5.2 Event Assessment Outcomes

5.2.1 True Events

Zero true events occurred during August.

5.2.2 False Event(s)

Five (5) 'False' events were identified during the reporting period. Rationale on potential causes is summarised below.

Table 3: False Events Rationale

Event ID	Monitor	SciDev Rationale	Alcoa Field Comments
WDL-2608-001	HV07T	This event is marked by a rapid increase and decrease in turbidity. This is indicative of a false event.	Local monitor HV07T recorded a turbidity event exceeding 25NTU for >1 hour on 03/08/2026. The stream was dry at the time of the event (as confirmed by float switch) and the data trend showed rapid spikes and drops in readings, indicative of a false event. Classified as a false event.
WDL-2608-002	RHB2	This event is marked by a rapid increase and decrease with multiple irregular oscillations. This is indicative of a false event.	Local monitoring site RHB2 recorded a turbidity event >25NTU for >1 hour commencing on 14/08/2026. The event consisted of a sharp increase in turbidity levels and then very erratic increases and decreases in turbidity. The monitor displayed multiple faults during the event. This trend is not indicative of a true event and is evident of leaf litter fouling, which when cleaned of debris immediately reduced to a turbidity of <3 NTU.
WDL-2608-003	HV07T	This event is marked by a rapid increase and decrease with several irregular oscillations. This is indicative of a false event.	Local monitoring site HV07T recorded a turbidity event >25NTU for >1hour on 26/08/2026. 16.4mm of rainfall was recorded in the 24 hours preceding the event. The stream was inspected on 28/08/2026. A branch had fallen into the stream on the monitor and some debris was caught on the probe. These were removed and the probe cleaned. The data during the event shows rapid spikes similar to a heartbeat pattern. This is indicative of a true evet. Classified as a false event.

Event ID	Monitor	SciDev Rationale	Alcoa Field Comments
WDL-2608-004	RHB3	This event is marked by a rapid increase in turbidity with three sporadic peaks. This is indicative of a false event.	Local monitoring site RHB3 recorded x2 turbidity events >25 NTU for >1 hour on 28/08/2026. The readings consisted of sharp spikes continuing in an upward trajectory with a final sudden drop back to baseline levels. No rainfall was recorded within the preceding 24 hours. The stream was inspected on 28/08/2026 at 1:45pm. The stake holding the probe in position within the stream had fallen over and the probe sensor had become face down on the stream bed. The stake was reinstalled with the probe appropriately placed in the stream. Turbidity readings immediately dropped to approximately 2.5NTU. Classified as false events.
WDL-2608-005	RHB3	This event is marked by a rapid increase and decrease in turbidity with multiple sporadic peaks. This is indicative of a false event.	Local monitoring site RHB3 recorded x2 turbidity events >25 NTU for >1 hour on 28/08/2026. The readings consisted of sharp spikes continuing in an upward trajectory with a final sudden drop back to baseline levels. No rainfall was recorded within the preceding 24 hours. The stream was inspected on 28/08/2026 at 1:45pm. The stake holding the probe in position within the stream had fallen over and the probe sensor had become face down on the stream bed. The stake was reinstalled with the probe appropriately placed in the stream. Turbidity readings immediately dropped to approximately 2.5NTU. Classified as false events.

5.2.3 Excluded WQMS Units

Zero (0) WQMS Units were excluded from analysis due to inaccurate data. Alcoa confirmed the invalidity of data recorded from these units and provided commentary on the condition of each.

Table 4: Excluded WQMS Units

WQMS ID	Status	Comment

5.2.4 Missing Data

Periods of missing data are detailed in Table 5.

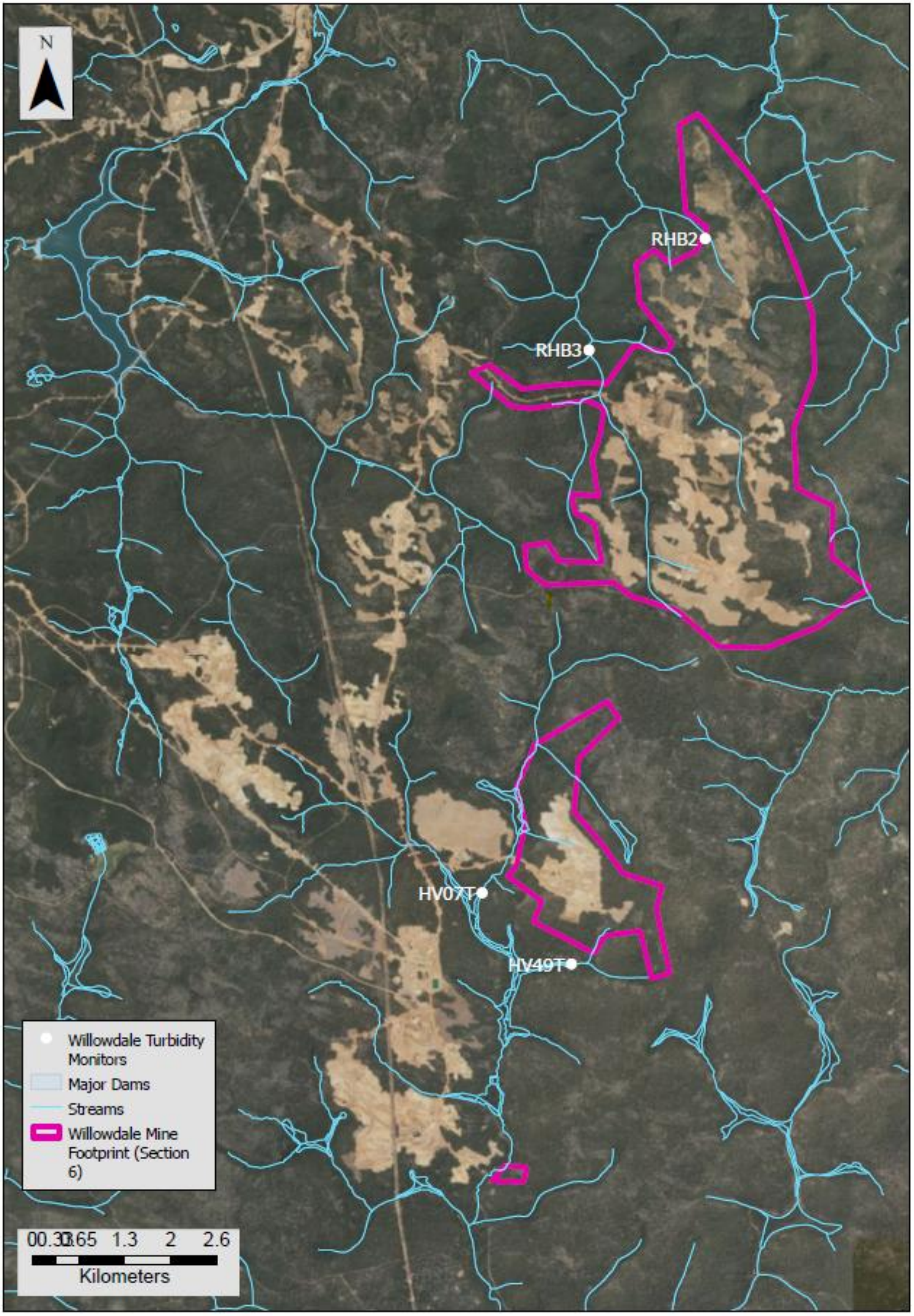
Table 5: Missing Data Summary

WQMS ID	Data Notes
HV07T	Equipment outage due to upgrade between 20/8/2026 9:30 to 20/08/2026 14:13.
RHB3	Equipment fault between 1/08/2026 13:06 to 3/08/2026 17:56. Data unavailable during this period.

Appendix A Willowdale Raw WQMS Data

Date	Willowdale WQMS Data – August 2026 - Events with turbidity > 25 NTU for an hour or more			
	HV07T	HV49T	RHB2	RHB3
1/08/2026				
2/08/2026				
3/08/2026	1 x False			
4/08/2026				
5/08/2026				
6/08/2026				
7/08/2026				
8/08/2026				
9/08/2026				
10/08/2026				
11/08/2026				
12/08/2026				
13/08/2026				
14/08/2026				
15/08/2026				
16/08/2026			1 x False	
17/08/2026				
18/08/2026				
19/08/2026				
20/08/2026				
21/08/2026				
22/08/2026				
23/08/2026				
24/08/2026				
25/08/2026				
26/08/2026	1 x False			
27/08/2026				
28/08/2026				2 x False
29/08/2026				
30/08/2026				

Appendix B Willowdale WQMS Locations


N
RHB2
RHB3
HV07T
HV49T
Willowdale Turbidity Monitors
Major Dams
Streams
Willowdale Mine Footprint (Section 6)
0 0.3 0.65 1.3 2 2.6
Kilometers

Appendix C WQMS General Arrangement

ANTENNA

SOLAR PANEL

DATA OUTLET

POWER INLET

60 X 60 MM CABLE DUCT

SIERRA WIRELESS FX30

60 X 60 MM CABLE DUCT

12 V, 120 AH LI-ION BATTERY

DATA INLET

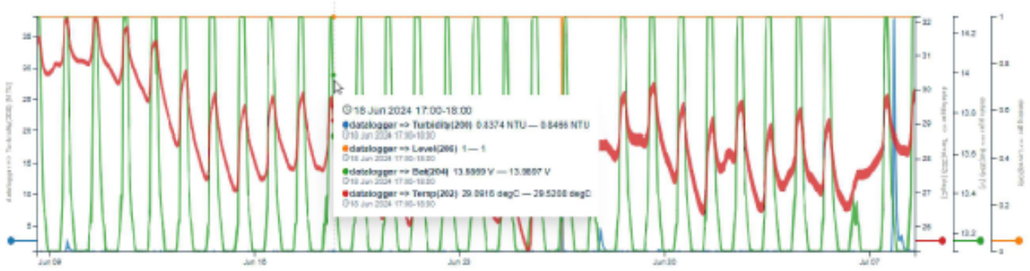
DATA TRANSMISSION TO IOT

SENSOR

STREAM DRY

SENSOR

STREAM FLOWING



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