



Pre-construction Water Quality Monitoring Report

Event 13 2023

Project Number: 22-013





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1. Introduction

In 2020 Snowy Hydro Limited (Snowy Hydro) obtained approval (application number SSI 9208 and EPBC 2018/8322) to expand the existing Snowy Mountains Hydro-electric Scheme (Snowy Scheme), by linking the existing Tantangara and Talbingo reservoirs through a series of underground tunnels and constructing a new underground hydro-electric power station (referred to as 'Snowy 2.0').

To connect Snowy 2.0 to the National Energy Market (NEM), a new transmission connection is required. NSW Electricity Networks Operations Pty Ltd as a trustee for NSW Electricity Operations Trust (known as TransGrid and the Proponent) will construct a substation and overhead transmission lines (the Project) to facilitate the connection of Snowy 2.0 to the existing electrical transmission network. The Project location is approximately 27 kilometres (km) east of Tumbarumba, New South Wales (NSW). UGL has been engaged on behalf of the Proponent to undertake the Project.

The purpose of the pre-construction water quality monitoring is to address the requirements of the Environmental Impact Statement (EIS) (Jacobs 2020) that was prepared by the Proponent under Part 5, Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* to assess the environmental impacts of the proposed Project. Subsequently, an Amendment Report (TransGrid 2021b) was submitted with the Response to Submissions (TransGrid 2021a) to the Department of Planning and Environment (DPE) with updated mitigation measures for the Project.

The objective of the pre-construction surface water quality monitoring is to collect baseline data prior to Project construction works. Baseline data will be compared to ANZG (2018) guidelines to characterise the existing surface water quality. The data will be compared to the water quality objectives (WQO) for the Project area.

2. Program and methodology

The Pre-construction Water Quality Monitoring Program and Methodology (the Program) (NGH 2022) has been prepared to detail the WQOs for the Project, the location of the monitoring locations and the methodology for water sampling.

The Project area within Kosciuszko National Park is an area of high conservation value. Therefore, the water quality objectives for physical and chemical stressors includes **no change beyond natural variability** (ANZG 2018). The Default Guideline Values (DGV) for Upland Rivers has been provided for physical and chemical stressors and is detailed in the Program (NGH 2022).

The location of the sampling points in relation to the Project footprint is provided in Figure 2-1.

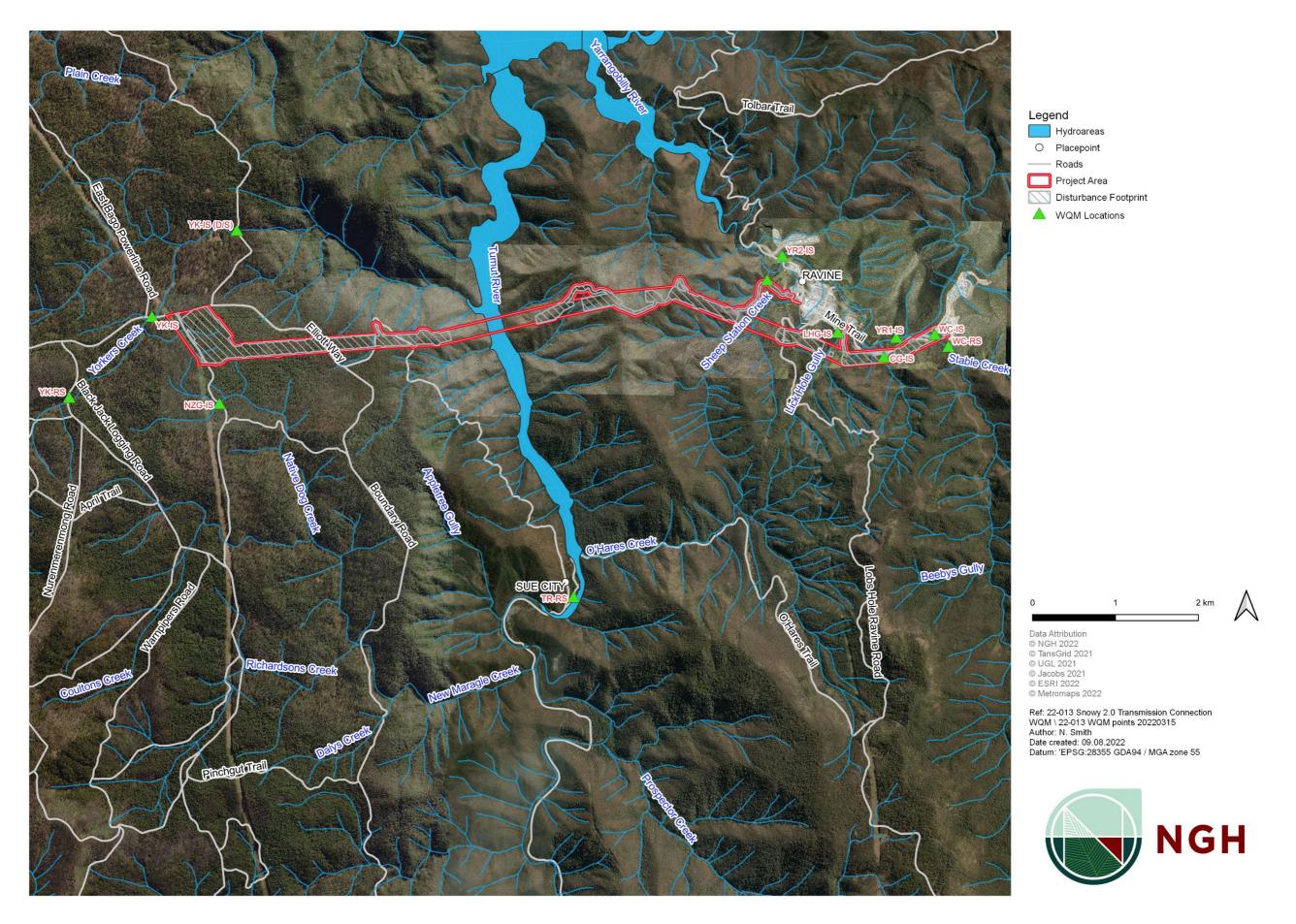


Figure 2-1 WQM locations

3. Monitoring event observations and results

Images for Cave Gully, Talbingo Reservoir and Yorkers Creek are provided as Figure 3-1 to Figure 3-3. Water quality results for each site and are provided in Appendix A. Results are highlighted where they exceed the default guideline value (refer to the Program (NGH 2022)). Table 3-1 identifies exceedances of the DGVs for metals, cyanide and nutrients. Physico-chemical results have been provided in Figure 3-4 to Figure 3-33. Field data and observations are provided in Appendix B.

3.1. Event 13

NGH conducted the first, second and third rounds of sampling in March (Event 1), April (Event 2), May and early June (Event 3), late June (Event 4), July (Event 5), August (Event 6), early October (Event 7), late October (Event 8), November (Event 9), December (Event 10) 2022, January (Event 11) 2023 and February (Event 13). Reports for each event were prepared following receival of the laboratory results (NGH 2022a; 2022b; 2022c; 2022d; 2022e, 2022f, 2022g, 2022h, 2022i, 2022j, 2023a, 2023b). The results of Event 1 through to Event 12 have been compared in this report to the results of Event 13.

NGH Environmental Scientist, Nicola Smith, conducted the Event 13 monitoring event with a UGL representative on 15 and 16 March 2023. The weather was sunny with a slight breeze. Data from the Cabramurra SMHEA automatic weather station on 15 March 2023 (Station ID 072161) indicates that wind speeds were from the west, with speeds of 13 km/hr in the morning and 50 km/hr in the afternoon. Temperatures on the day included a low of 11°C and a high of 20.2°C. Data from the Tumbarumba weather station for 16 March 2023 (Station ID 072043) indicates that the weather was calm, with temperatures ranging from a low of 13°C to a high of 29.5°C.

Generally, low, clear water flows were observed. Water was observed to be cloudy at YK-IS (D/S) and YK-IS. No hydrocarbon sheen or odours were noted. The banks of each channel were well vegetated with the vegetation matrix weedier in some locations. Evidence of bank erosion from hooved animals was observed at the New Zealand Gully site, the Yorkers Creek impact site and Yorkers Creek reference site. Flows were observed to have decreased, in comparison to recent sampling events.



Figure 3-1 Cave Gully impact site (CG-IS)



Figure 3-2 Talbingo Reservoir reference site(TR-RS)



Figure 3-3 Yorkers Creek reference site (YK-RS)

3.1.1. Results

The results indicate that the water quality in the locations where samples were taken generally meets the DGVs for Upland Rivers with a 99% species protection level for toxicants. Locations where a laboratory result was returned for a physical or chemical stressor was above the DGV are provided in Table 3-1.

Table 3-1 Results above the DGV for Upland Rivers with 99% species protection level

Site identification	Analyte	DGV	Result	Comment
TR-RS	Nitrogen Oxides mg/L	0.015	0.1	
CG-IS	Zinc mg/L	0.0024	0.005	Always returns a high total dissolved solid result.
	Total Nitrogen mg/L	0.25	2	Results for Zinc and TSS are consistent with prior sampling events.
	Total Dissolved Solids (TDS) mg/L		271	
	Total Suspended Solids (TSS) mg/L	0.2	2	
LHG-IS	Aluminium mg/L	0.027	0.13	Always returns a high total dissolved solid result. Results for Zinc and TSS are consistent with prior
	Zinc mg/L	0.0024	0.005	sampling events.
	Total Dissolved Solids (TDS) mg/L		293	
	Total Suspended Solids (TSS) mg/L	0.2	3	
WC-IS	Zinc mg/L	0.0024	0.02	This is consistent with prior sampling events.
YK-IS (D/S)	Aluminium mg/L	0.027	0.26	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the
	Iron mg/L	0.3	0.31	State Forest upstream. Sample taken upstream of culvert.
	Total Nitrogen mg/L	0.25	9	
	Nitrogen Oxides mg/L	0.015	0.1	
	Total Suspended Solids (TSS) mg/L	0.2	9	
NZG-IS	Aluminium mg/L	0.027	0.11	Located within Bago State Forest. Sample taken upstream of timber supported

Site identification	Analyte	DGV	Result	Comment
				unsealed track bridge. Banks heavily vegetated, shallow channel.
YK-RS	Aluminium mg/L	0.027	0.36	Located within Bago State Forest and adjacent to an unsealed track. Unknown activities within the
	Iron mg/L	0.3	0.37	State Forest upstream. Sample taken downstream of culvert under
	Total Nitrogen mg/L	0.25	6	unsealed track. Flow through culvert is restricted upstream causing a wetland environment.
	Nitrogen Oxides mg/L	0.015	0.1	
	Total Suspended Solids (TSS) mg/L	0.2	6	
YK-IS	Aluminium mg/L	0.027	0.32	Located within Bago State Forest and adjacent to Elliott Way (road). Unknown activities within the
	Iron mg/L	0.3	0.35	State Forest upstream.
	Total Nitrogen mg/L	0.25	5	
	Total Suspended Solids (TSS) mg/L	0.2	5	

CG-IS and LHG-IS displayed elevated values for total dissolved solids compared to the other sampling locations. Total suspended solids (TSS) at CG-IS, LHG-IS, YK-IS (D/S), YK-RS and YK-IS were above the 0.2 mg/L assigned DGV (refer to Figure 3-18).

Water temperatures ranged from 12.9 degrees Celsius at YK-IS (D/S) to 20.9 degrees Celsius at YR2-RS.

Many of the results are recorded as below (<) the limit of detection. To enable calculation of the statistics, the *Limit of Detection Divided by Two (LOD/2) Method* (Cohen and Ryan 1989) has been applied. This data is provided in Appendix A.

The following time series, Figure 3-4 to Figure 3-23, display physico-chemical water quality through time for monitoring Event 1 (March), Event 2 (April), Event 3 (May/June), Event 4 (June), Event 5 (July), Event 6 (August), Event 7 (early October), Event 8 (late October), Event 9 (November), Event 10 (December), Event 11 (January), Event 12 (February) and Event 13 (March). Where a DGV is available, these values are shown on the graph and have been included for dissolved oxygen (%), conductivity, pH and turbidity.

No flows were present at SSC-IS for Event 13 at the time of sampling. No data was available for collection at this location.

In addition to this, no data was obtained for Dissolved Oxygen (%) or Specific Conductance (uS/cm) during Event 13, due to technical issues with the Water Quality Meter (WQM).

Temperatures within the Talbingo Reservoir catchment have generally decreased since Event 12, refer to Figure 3-4. TR-RS registered the greatest decrease in temperature, from 19.3°C during Event 12 to 14.6°C in Event 13. YK-RS and YK-IS, within the Yorkers Creek catchment, both registered slight increases in temperature, when compared to Event 12, refer to Figure 3-5.

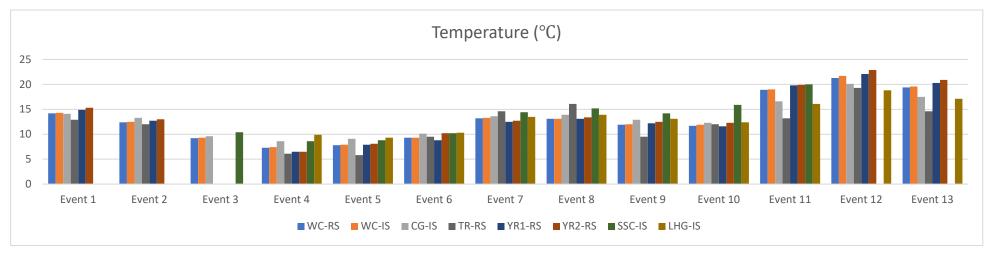


Figure 3-4 Temperature for Talbingo Reservoir catchment

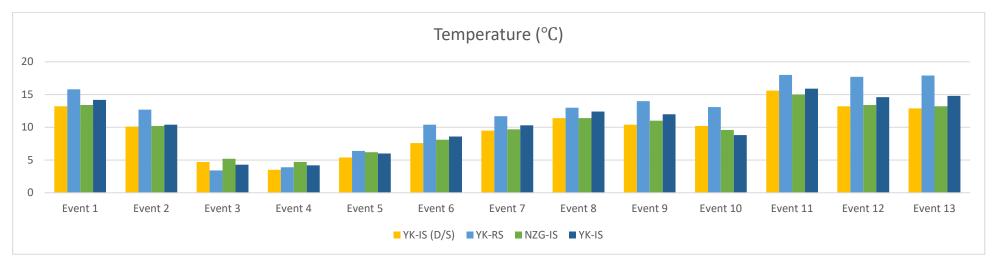


Figure 3-5 Temperature for Yorkers Creek catchment

The results for DO (ppm) for the Talbingo Reservoir catchment have generally decreased, when compared with results for Event 12, refer to Figure 3-8. WC-RS registered a slight increase, from 8.92 ppm during Event 12, to 9.11 ppm during Event 13. Results for DO (ppm) within the Yorkers Creek catchment have also decreased, refer to Figure 3-9. The highest reading for DO (ppm) was recorded within the Talbingo catchment at CG-IS (9.56 ppm).

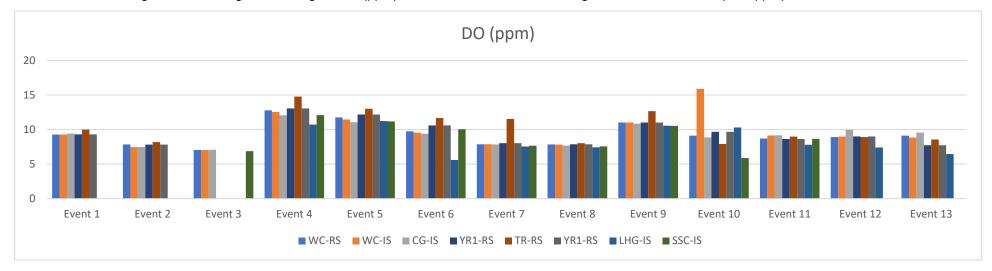


Figure 3-6 Dissolved Oxygen (ppm) for Talbingo Reservoir catchment

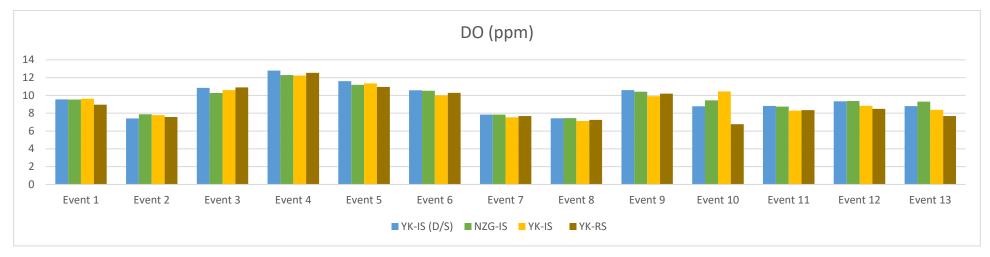


Figure 3-7 Dissolved Oxygen (ppm) for Yorkers Creek catchment

Conductivity within the Talbingo Reservoir catchment has slightly increased during Event 13, when compared with results from Event 12, refer to Figure 3-12. Conductivity at LHG-IS recorded the most significant increase within the Talbingo Reservoir with a reading of 445.6 μ S/cm for Event 13, up from 399.3 μ S/cm during Event 12. Results for the Yorkers Creek catchment continue to return relatively low conductivity readings, refer to Figure 3-13. This is considered likely a result of the geology upstream. Conductivity at NZG-IS (39.2 μ S/cm) has increased, when compared with results from Event 12 (31.6 μ S/cm). Conductivity results from NZG-IS continues to be greater than the conductivity recorded at the Yorkers Creek sites, with the result 9.2 μ S/cm above the lower DGV threshold. The pattern between sites is mostly reflective of the pattern for specific conductance.

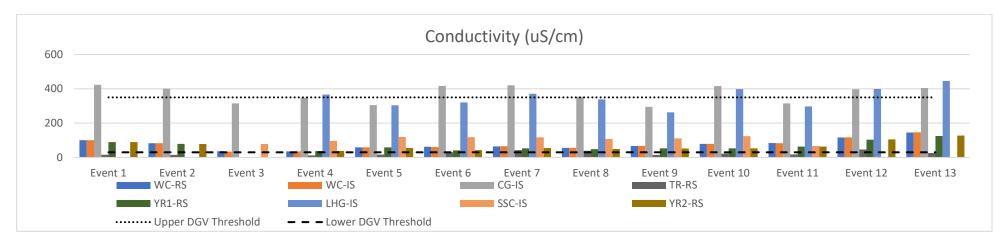


Figure 3-8 Conductivity (µS/cm) for Talbingo Reservoir catchment

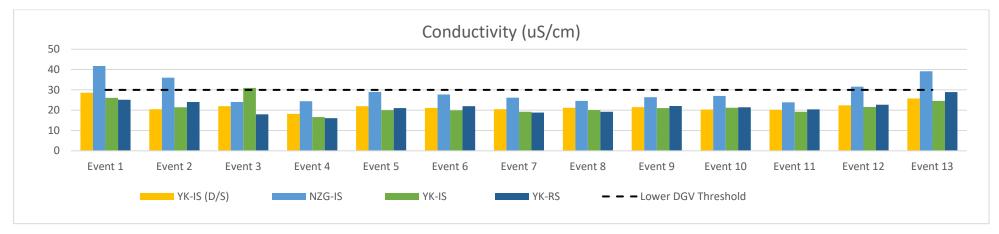


Figure 3-9 Conductivity (µS/cm) for Yorkers Creek catchment

Turbidity values were below the lower DGV threshold (2 NTU) within the Talbingo Reservoir catchment for Event 13. Turbidity readings within the Talbingo Reservoir catchment have notably decreased since Event 8, refer to Figure 3-14 and Figure 3-15. Note that the results for CG-IS have been provided in Figure 3-15 in this report to more accurately display the other sampling locations in the Talbingo reservoir catchment.

Turbidity readings within the Yorkers Creek catchment have remained relatively consistent, with the exception of YK-IS (D/S), which recorded a reading of 12 NTU during Event 13, down from 20.22 NTU during Event 12, refer to Figure 3-16.

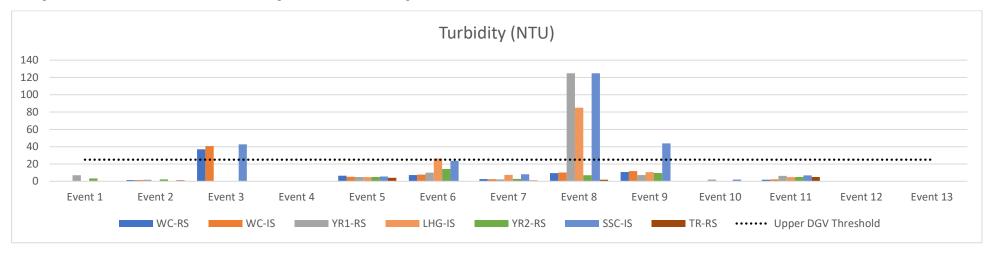


Figure 3-10 Turbidity (NTU) for the Talbingo Reservoir catchment

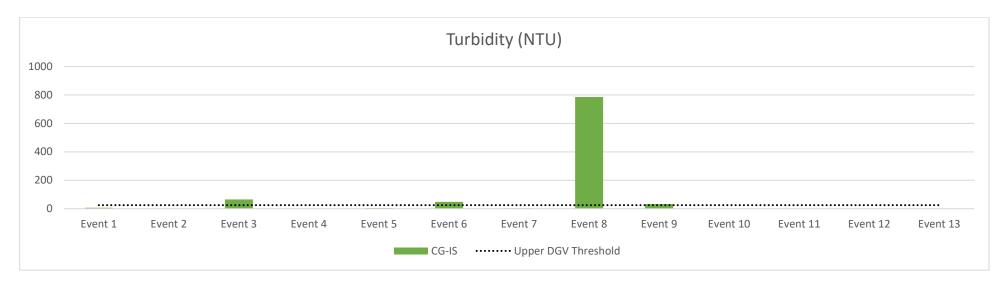


Figure 3-11 Turbidity (NTU) for CG-IS, within the Talbingo Reservoir catchment

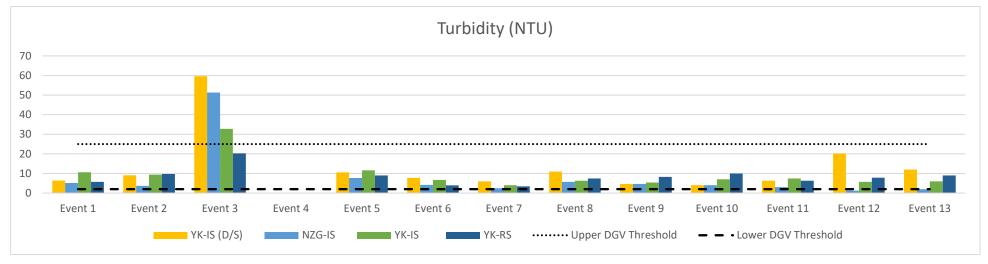


Figure 3-12 Turbidity (NTU) for the Yorkers Creek catchment

Total suspended solids (TSS) have decreased within the Talbingo Reservoir catchment since Event 12, refer to Figure 3-17. Total suspended solids remain low at CG-IS for Event 13, refer to Figure 3-18. Total suspended solids have also decreased within Yorkers Creek, with YK-IS (D/S) decreasing from 28 mg/L during Event 12, to 9 mg/L during Event 13, refer to Figure 3-19.

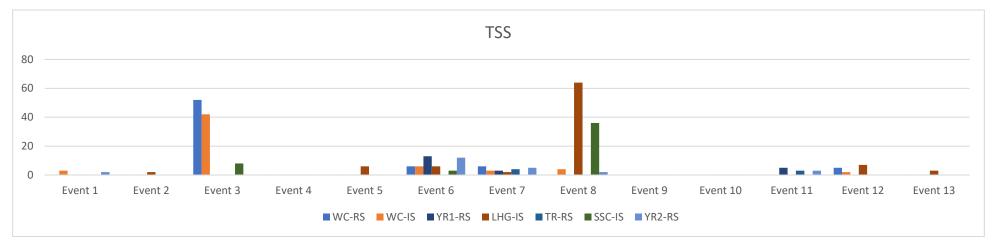


Figure 3-13 Total Suspended Solids for the Talbingo Reservoir catchment

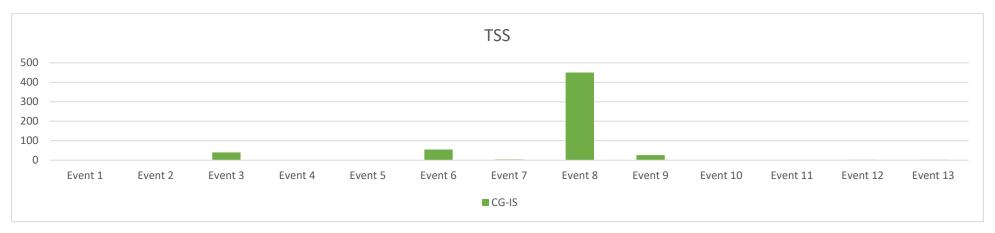


Figure 3-14 Total Suspended Solids for CG-IS, within the Talbingo Reservoir catchment

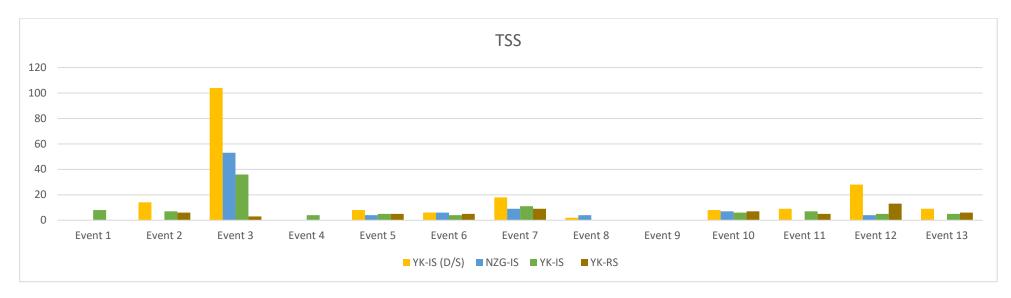


Figure 3-15 Total Suspended Solids for the Yorkers Creek catchment

Values of pH for the Talbingo Reservoir catchment have slightly increased since Event 12. Five sites (WC-RS, WC-IS, CG-IS, YR2-RS and YR1-RS) had values of pH that fell above the upper DGV range of 8 pH units, refer to Figure 3-20.

Values of pH for the Yorkers Creek catchment have also increased since Event 12, refer to Figure 3-21. All readings fell within the DGV range for values of pH (6.5 – 8 pH units).

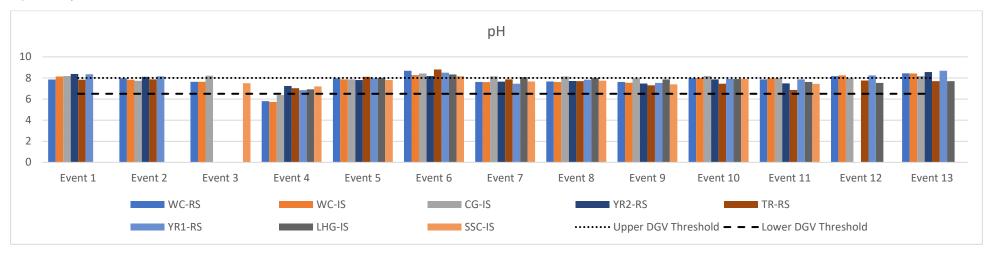


Figure 3-16 Potential of Hydrogen (pH) for Talbingo Reservoir catchment



Figure 3-17 Potential of Hydrogen (pH) for Yorkers Creek catchment

The values for oxygen redox potential within the Talbingo Reservoir catchment have decreased since Event 12, with the exception of LHG-IS, which increased from a negative value of -19.1 mV in Event 12, to 6 mV during Event 13, refer to Figure 3-22. Oxygen redox potential has also notably decreased within the Yorkers Creek catchment, refer to Figure 3-23.

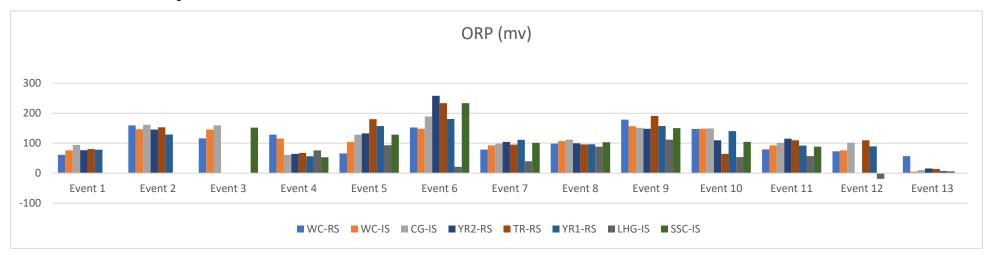


Figure 3-18 Oxygen Redox Potential (ORP) for Talbingo Reservoir catchment

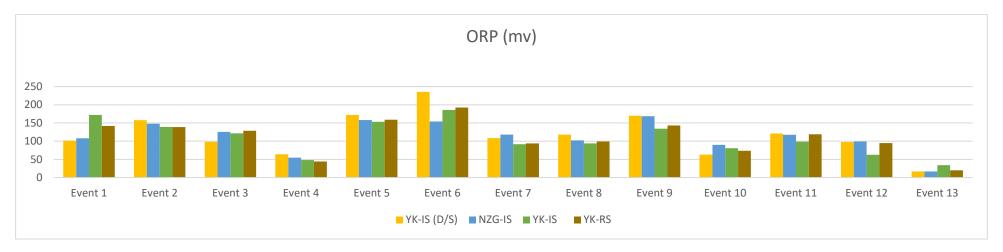


Figure 3-19 Oxygen Redox Potential (ORP) for Yorkers Creek catchment

Ammonia (mg/L) levels were below the limit of reporting for all sites within the Talbingo and Yorkers Creek catchments for Event 13, with the exception of YR2-RS, which registered a reading of 0.2 mg/L, refer to Figure 3-24 and Figure 3-25.

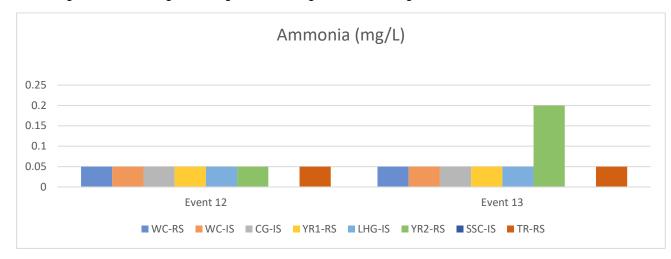


Figure 3-20 Ammonia (mg/L) for the Talbingo Reservoir catchment

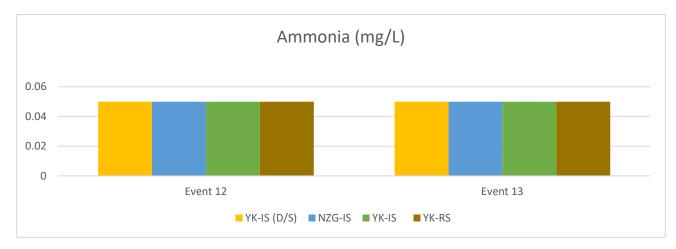


Figure 3-21 Ammonia (mg/L) for the Yorkers Creek catchment

Nitrogen Oxides (mg/L) have remained consistent within the Talbingo Reservoir, with the exception of TR-RS, which returned a reading of 0.1 mg/L during Event 13, refer to Figure 3-26. Similarly, Nitrogen Oxides (mg/L) within the Yorkers Creek catchment have remained relatively consistent, with the exception of YK-IS (D/S) and YK-RS, which returned readings of 0.1 mg/L during Event 13, refer to Figure 3-27.

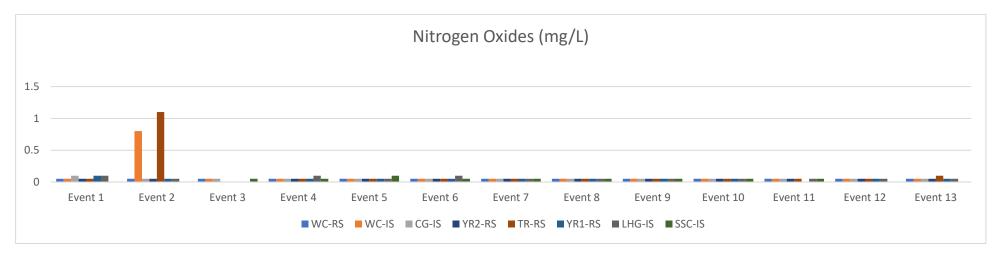


Figure 3-22 Nitrogen Oxides (mg/L) for the Talbingo Reservoir catchment

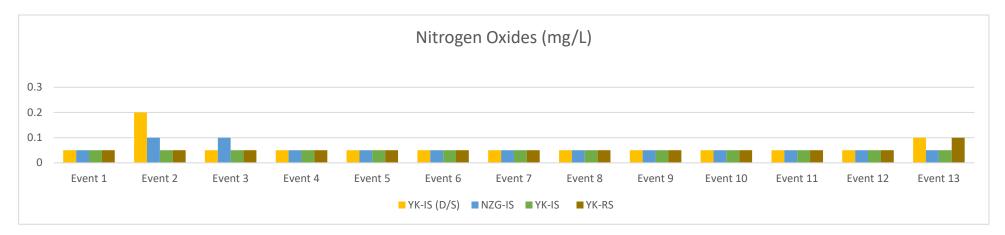


Figure 3-23 Nitrogen Oxides (mg/L) for the Yorkers Creek catchment

Reactive Phosphorous (mg/L) varied across the Talbingo Reservoir catchment, refer to Figure 3-28. Reactive Phosphorous was highest at WC-IS (0.05 mg/L) during Event 13. Reactive Phosphorous was below the limit of reporting within the Yorkers Creek catchment for Event 13, refer to Figure 3-29

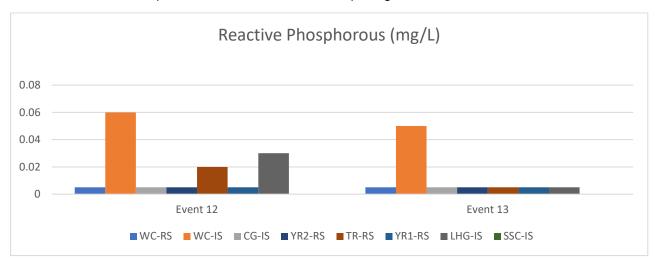


Figure 3-24 Reactive Phosphorous (mg/L) for the Talbingo Reservoir catchment

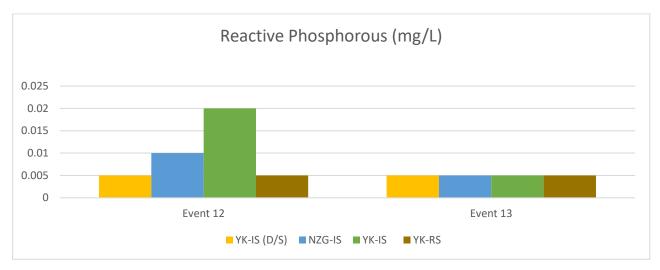


Figure 3-25 Reactive Phosphorous (mg/L) for the Yorkers Creek catchment

Total Hardness (CaCO₃, mg/L) within the Talbingo Reservoir catchment for Event 13 varied from very soft at TR-RS (6 mg/L) to hard at LHG-IS (270 mg/L), refer to Figure 3-30. Total Hardness (CaCO₃, mg/L) within the Yorkers Creek catchment was generally very soft, ranging from 1 – 10 mg/L, refer to Figure 3-31.

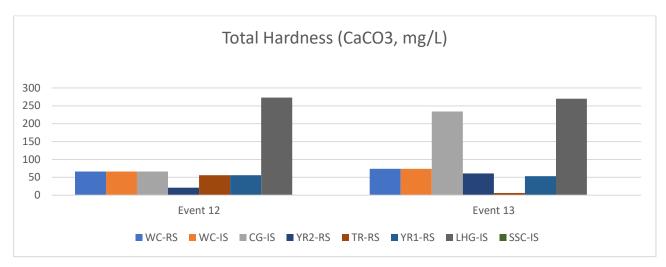


Figure 3-26 Total Hardness (CaCO₃) for the Talbingo Reservoir catchment

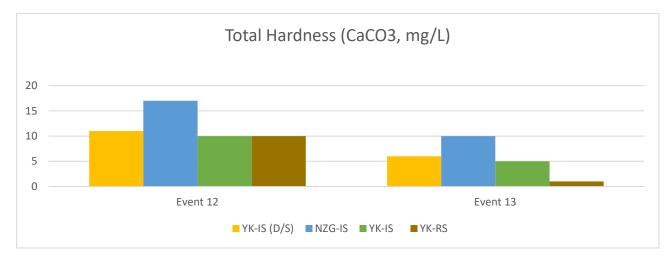


Figure 3-27 Total Hardness (CaCO₃) for the Yorkers Creek catchment

Total Kjedahl Nitrogen (TKN, mg/L) has remained relatively consistent for the Talbingo Reservoir and Yorkers Creek catchments, with the exception of YR2-RS (7 mg/L), which registered a notable decrease when compared with the results from Event 12, refer to Figure 3-32 and Figure 3-33.

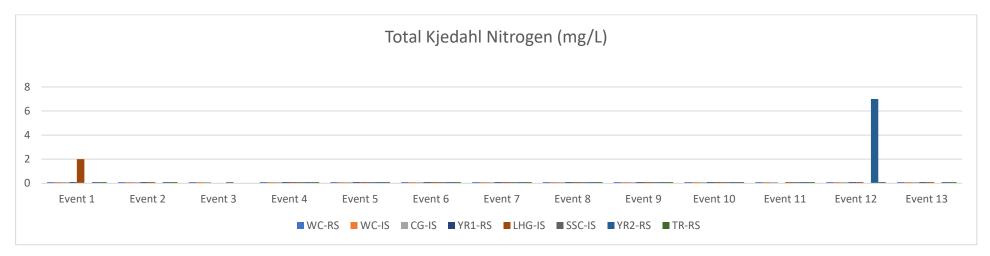


Figure 3-28 Total Kjedahl Nitrogen (TKN) for the Talbingo Reservoir catchment

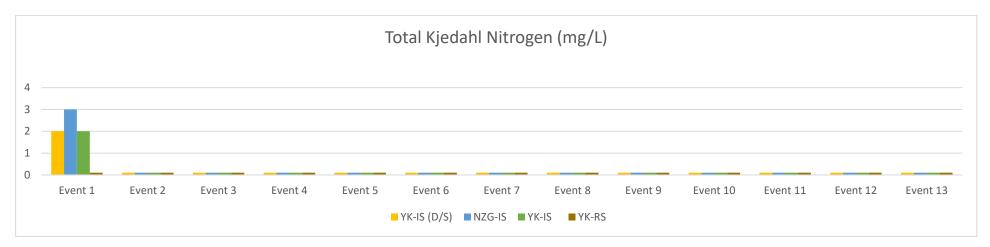


Figure 3-29 Total Kjedahl Nitrogen (TKN) for the Yorkers Creek catchment

3.1.2. Quality Assurance / Quality Control

A Quality Assurance and Quality Control (QA/QC) program was undertaken as part of this investigation including:

- A field duplicate sample, at a rate of one per 20 samples, was taken (DUP01) from the WQM site WC-IS on 15 March 2023. DUP01 was analysed for metals and metalloids. The duplicate sample has been compared against the WC-IS sample by Relative Percentage Difference (RPD) and has returned within an acceptable range (less than 30% for inorganic or less than 5 times the laboratory limit of reporting (LOR)), with the exception of Aluminium, which returned an RPD of 33%. This has been assessed as an acceptable sample, due to consistently low detection levels (0.015 0.36 mg/L).
- A water blank was supplied by the laboratory. The water blank sample was analysed for metals and metalloids. There were no exceedances of the sample results above the LORs.

NGH consider the QA/QC program to have been effective and the data reliable and representative to achieve the objectives of the investigation.

Refer to Appendix C for the laboratory analysis certificate, Appendix D for the RPD Table and Appendix E for the calibration certificates.

4. Conclusion

Water temperatures for Event 13 have generally decreased across the sites compared to the water temperatures for Event 12. WQM results for Event 13 were generally consistent with Event 12.

Results for Event 13 indicate there has been a slight decrease in turbidity (NTU) and total suspended solids (TSS) within the Yorkers Creek catchment. There has been an increase in pH readings within both catchments, with the Talbingo Reservoir catchment registering readings above the upper DGV threshold (8.0 pH units).

There was a decrease in Oxygen Redox Potential (ORP) across both catchments, when compared to previous events. Results for Oxidation Redox Potential (ORP) for Event 13 were all positive, in comparison with Event 12, which registered the first negative value of -19.1 mv (LHG-IS). While the environment is no longer reducing, ORP values were notably lower than previous WQM events.

Results for Ammonia were relatively consistent across the catchments, with the exception of YR2-RS, which returned an elevated reading of 0.2 mg/L for Event 13.

Similarly, results for Nitrogen Oxides were relatively consistent across the catchments, with the exception of YK-IS (D/S) and YK-RS, which returned readings of 0.1 mg/L for Event 13.

Reactive phosphorous has decreased across the catchments for Event 13.

Total Hardness (CaCO₃) generally increased within the Talbingo Reservoir catchment for Event 13, varying from very soft at TR-RS (6 mg/L) to hard at LHG-IS (270 mg/L). Total Hardness (CaCO₃) decreased at the Yorkers Creek catchment ranging from 1 – 10 mg/L (very soft).

Results for Total Kjedahl Nitrogen (TKN) consistently registered very low readings for Event 13.

Laboratory results for Event 13 were generally consistent with the results of the previous monitoring events, with the majority of analytes reported below the Limit of Reporting. Results exceeded the DGV for:

- Total suspended solids (0.2 mg/L) at CG-IS, LHG-IS, YK-IS (D/S), YK-RS and YK-IS
- Iron (0.3 mg/L) at YK-IS (D/S), YK-IS and YK-RS
- Aluminium (0.027 mg/L) at LHG-IS, YK-IS (D/S), NZG-IS, YK-RS and YK-IS
- Zinc (0.0024 mg/L) at CG-IS, WC-IS and LHG-IS
- Total Nitrogen (0.015 mg/L) at CG-IS, YK-IS (D/S), YK-RS and YK-IS
- Nitrogen Oxides (mg/L) at YK-IS (D/S) and YK-RS.
- Total dissolved solids were elevated at CG-IS and LHG-IS, which is a pattern that has carried through all events.

All results and statistics are provided in Appendix A.

5. References

Jacobs Pty Ltd. 2020. Snowy 2.0 Transmission Connection Project EIS.

NGH Pty Ltd. 2022. Pre-construction Water Quality Monitoring Program and Methodology.

NGH Pty Ltd. 2022a. Pre-construction Water Quality Monitoring Report: Event 1 April 2022.

NGH Pty Ltd. 2022b. Pre-construction Water Quality Monitoring Report: Event 2 April 2022.

NGH Pty Ltd. 2022c. Pre-construction Water Quality Monitoring Report: Event 3 May and June 2022.

NGH Pty Ltd. 2022d. Pre-construction Water Quality Monitoring Report: Event 4 June 2022.

NGH Pty Ltd. 2022e. Pre-construction Water Quality Monitoring Report: Event 5 July 2022.

NGH Pty Ltd. 2022f. Pre-construction Water Quality Monitoring Report: Event 6 August 2022.

NGH Pty Ltd. 2022g. Pre-construction Water Quality Monitoring Report: Event 7 October 2022.

NGH Pty Ltd. 2022h. Pre-construction Water Quality Monitoring Report: Event 8 October 2022.

NGH Pty Ltd. 2022i. Pre-construction Water Quality Monitoring Report: Event 9 November 2022.

NGH Pty Ltd. 2022j. Pre-construction Water Quality Monitoring Report: Event 10 December 2022.

NGH Pty Ltd. 2023a. Pre-construction Water Quality Monitoring Report: Event 11 January 2023.

NGH Pty Ltd. 2023b. Pre- construction Water Quality Monitoring Report: Event 12 February 2023.

TransGrid. 2021a. Snowy 2.0 Transmission Connection Project Submissions Report.

TransGrid. 2021b. Snowy 2.0 Transmission Connection Project Amendment Report.

Event 13 2023

APPENDIX A EVENT DATA TABLE

| | | Sheen/ oil/
grease | ℃
Temp.() | Dissolved
Oxygen (DO %
 | DO (mag) | Specific EC
(SPC | EC
(uS/cm)
 | рН | Redox
(mV) | Turbidity
(NTU) | Al
(mg/L)
 | As
(mg/L) | Cd
(mg/L) | Cr
(mg/L) | Cu (mg/L) (
 | cyanide F
(mg/L) (mg | Pb | Mn
(mg/L) | Hg
(mg/L) | Ni
(mg/L)
 | TN
(mg/L) | TP
(mg/L) | Ag
(mg/L) | Zn
(mg/L) | Ammonia
(mg/L)
 | Nitrogen
Oxides | Reactive
Phosphorous | Total
Hardness | Total
Kjedahl
Nitrogen | TDS
mo/L | TSS
(mall)
 |
|--|--|---|--
--	--	---
--	---	---
---	--	--
---	---	---
---	--	---
--	--	--
--		
22-913 DGV ID WC-RS	Pre-construction WQM efault Guideline Value) Event 1 Event 2	No No o but on sedim
 | 928 | uS/cm)
-
105 8
109 | 30-350
100.7
83.1
 | 6.5-8
7.65
7.95 | 61.2
159.4 | 2525
0.37
1.40 | 0.027
 | 0.0008 | 0.00006 | 0.00001 | 0.001
 | 0.004 0. | 0.001 | 1.2
0.011
0.001 | 0.00006 | 0.008
 | 0.25 | 0.02 | 0.00002 | 0.0024 | 0.013
 | 0.015 | 0.015 | (CaCO3) | (TKN) | 2 | 0.2
 |
| | Event 3
Event 4
Event 5 | No
No
No | 92
7.3
7.8 | 73.5
61.3
75.1
98.9
 | 7.05
12.78
11.76 | 151
128.9
88 | 35
35
35
39
 | 7.64
5.8
7.95 | 195.3
125.4
65.5 | 3.96
6.45 | 0.015
0.015
0.015
 | 0.00015
0.00015
0.00015 | 0.00001
100000
100000 | 0.000005 | 0.0001
0.0001
0.0001
 | 0.001 00
0.001 00
0.001 00 | 5 0,0005
5 0,0005
5 0,0005 | 0.0005 | 0.000015
0.000015
0.000015 | 0.0005
 | 0.1
0.1
0.1 | 0.005
0.005
0.005 | 0.0000F
0.0000F
0.0000F | 100.0
100.0
100.0 |
 | 0.05
0.05
0.05 | | | 01 | 50
19
55 | 01
 |
| | Event 6
Event 7
Event 8
Event 9 | No
no
no | 93
13.2
13.1 | 79.86
74.9
74.5
 | 9.74
7.87
7.84 | 89.6
83.5
71.8 | 62.7
64.6
55.4
 | 7.52 | 152.6
78.7
98.4
178.4 | 7.15
2.62
9.52 | 0.015
 | 0.00015
0.00015 | 0.00001
0.00001
0.00001 | 0.000005
0.000005 | 0.0001
0.0001
0.0001
 | 0.001 00
0.001 00
0.001 00 | 5 0,0005
5 0,0005
5 0,0005 | 0.0005
0.0005
0.002 | 0.000015
0.000015 | 0.0005
 | 0.1
0.1 | 0.005
0.005
0.08 | 0.00001
0.00001
0.00001 | 0.001
0.001
0.001 |
 | 0.05
0.05
0.05 | | | 01
01 | 53
29
24 | 6 01
 |
| | Event 10
Event 11
Event 12 | No
No | 11.7
18.9
21.3 | 100.6
 | 9.12
8.7
8.92 | 94.9 | 79.5
83.9
116.1
 | 7.97
7.86
5.16 | 147.5
79.1
73.1 | 0.05
1.94
0.1 | 0.015
 | 0.00015 | 0.00001 | 0.000005 | 0.0001
0.0001
0.0001
 | 0.001 Qu
0.001 Qu | 6 0.0005
2 0.0005
8 0.0005 | 0.004 | 0.000015 | 0.0005
 | 0.1
0.1 | 0.005
0.005
0.005 | 0.00001 | 0.009
0.001
0.001 | 0.05
 | 0.05
0.05 | 0.005 | 8 | 0.1
0.1 | 34
52 | 01
 |
| | Min
Max
Mean | No | 7.30
21.30
13.05 | 61.30
106.80
 | 2.11
7.05
12.78
9.31 | 71.80
151.00 | 35.30
945.80
76.12
 | 5.80 | 57
57.00
178.40
107.40 | 0.05
0.05
36.96
6.45 | 0.03
 | 0.00 | 0.0001 | 0.00 | 0.0001
0.00
0.00
 | 0.001 0.
0.00 0.
0.00 0. | 1 0.00
8 0.00 | 0.0005
0.00
0.01 | 0.00 | 0.00
 | 0.10
3.00 | 0.03
0.01
0.08 | 0.0001
0.00
0.00 | 0.003 | 0.05
0.05
0.05
 | 0.05
0.05
0.05 | 0.005
0.01
0.01 | 55.00
55.00 | 0.10
0.10
0.10 | 100
74.00
35.42 | 0.10
52.00
5.82
 |
| WC-IS | Court
St. Dev
Event 1 | No | 13.00
4.19
14.3 | 11.00
15.05
90.6
 | 13.00
1.74
9.28 | 11.00
24.45
126.7 | 13.00
23.94
100.8
 | 13.00
0.68
8.14 | 13.00
40.98
76 | 11.00
10.64
0.32 | 12:00
0:10
0:01
 | 12.00
0.00
0.00015 | 12.00
0.00
0.00001 | 12.00
0.00
0.000005 | 12.00
0.00
0.0001
 | 12:00 12
0:00 0:
0:001 0: | 92.00
3 0.00 | 12:00
0:00
0:011 | 12.00
0.00
0.000015 | 12:00
0:00
0:0005
 | 12:00
0.84
0.1 | 12.00
0.02
0.005 | 12:00
0:00
0:00001 | 12:00
0:01
0:001 | 1.00
#DV/01
 | 12.00
0.00
0.05 | 1.00
#DN/03 | 100
#DIVIDE | 12:00
0:00
0:1 | 12:00
23:57
80 | 12:00
14:76
3
 |
| | Event 2
Event 3
Event 4 | No
No | 12.5
9.3
7.4 | 69.9
61.2
43.7
 | 7.44
7.03
12.55 | 109
48
52.3 | 33
35
 | 5.73 | 145.8
145.9 | 139
40.77 | 0.015
0.015
0.015
 | 0.00015 | 0.00001 | 0.000005
0.000005 | 0.0001
0.0001
 | 0.001 00 | 5 0,0005
5 0,0005
5 0,0005 | 0.0005 | 0.000015
0.000015 | 0.0005
 | 0.8
0.1
0.1 | 0.005 | 0.0000F
0.0000F
1.0000F | 100.0
100.0
100.0 |
 | 0.05 | | | 01
01
01 | 63
41
27 | 01
42
01
 |
| | Event 6
Event 7
Event 8 | No
No | 93
133
131 | 72.36
75.1
74.4
 | 9.55
7.85
7.82 | 85.6
83.8
71.7 | 60.3
65.1
55.4
 | 7.62 | 145
92.6
107.1 | 7.78
2.41
90.1 | 0.015
 | 0.00015 | 0.00001 | 0.000005
0.000005 | 0.0001
0.0001
 | 0.001 0.0
0.001 0.0 | 5 0.0005
5 0.0005
5 0.0005 | 0.0005 | 0.000015 | 0.0005
 | 0.1
0.1 | 0.005 | 0.00001 | 0.001
0.001
0.001 |
 | 0.05
0.05 | | | 01
01 | 47 | 3
 |
| | Event 9
Event 10
Event 11
Event 12 | No
No
No | 12
11.9
19
21.7 | 102.2
 | 11.02
15.88
9.15
8.98 | 88.7
94 | 79.2
83.2
 | 7.55
7.99
7.96 | 155.0
548
92.6
75.2 | 11.79
0.05
2.15 | 0.015
 | 0.00015 | 0.00001
0.00001
0.00001 | 0.000005 | 0.0001
0.0001
0.0001
 | 0.001 Q.
0.001 Q.
0.001 Q. | 0.0005 | 0.003
0.004
0.0005
0.003 | 0.000015 | 0.0005
 | 01 | 0.02 | 0.00001
0.00001 | 0.001
0.001
0.001 |
 | 0.05
0.05
0.05 | | | 0.1
0.1 | 6
68
43
80 | 01
 |
| | Min
Max | No. | 7.40
21.70 | 43.70
108.20
 | 7.03
15.88 | | 145.1
33.00
145.10
 | 573
543 | 5.00
156.80 | 0.05
0.05
40.77 | 0.015
0.01
0.36
 | 0.00 | 0.0001 | 0.00 | 0.00
 | 0.001 0.00 | 1 0.00 | 0.0005 | 0.00 | 0.00
 | 0.10 | 0.01
0.01
0.02 | 0.00 | 0.003 | 0.05
0.05
 | 0.05
0.05
0.00 | 0.05 | 34
65.00
65.00 | 0.10
0.10 | 94
1.00
94.00 | 0.10
0.10
42.00
 |
| | Mean
Count
St. Dev | | 13.18
13.00
4.25 | 81.81
11.00
20.46
 | 9.76
13.00
2.54 | 95.44
11.00
25.50 | 75.70
13.00
24.61
 | 7.76
13.00
0.67 | 108.85
13.00
30.15 | 7.46
11.00
11.79 | 0.05
12.00
0.10
 | 0.00
12.00
0.00 | 0.00
12.00
0.00 | 0.00
12.00
0.00 | 0:00
12:00
0:00
 | 0.00 0:
12.00 13
0.00 0: | 2 0.00
00 12.00
3 0.00 | 0.00
12.00
0.00 | 0.00
12.00
0.00 | 0.00
12.00
0.00
 | 0.16
12.00
0.20 | 0.01
12.00
0.01 | 0.00
12.00
0.00 | 0.00
13.00
0.01 | 0.05
1.00
#DW0!
 | 0.11
12.00
0.22 | 0.05
1.00
#CM/G | 55.00
1.00
#CIVIDI | 0.10
12.00
0.00 | 45.31
13.00
28.94 | 5.05
12.00
11.80
 |
| CG-IS | Event 1
Event 2
Event 3
Event 4 | No
No
No | 16.1
13.3
9.6
8.6 | 91.6
71.6
62.1
44.57
 | 7.45
7.07
12.05 | 536
517
447
321.3 | 423.6
401.2
315
349
 | 6.37 | 94.3
161.4
159.2
61.1 | 1.35 | 0.015
 | 0.00015 | 0.00001 | 0.000005 | 0.0001
0.0001
0.0001
 | 0.001 00
0.001 00 | 5 0,0005
5 0,0005
5 0,0005 | 0.002 | 0.000015
0.000015
0.000015 | 0.0005
 | 0.1
0.1 | 0.005 | 0.00001
0.00001 | 100.0
100.0
100.0 |
 | 0.05 | | | 01
01
01 | 202
270
266 | 01
 |
| | Event 5
Event 6
Event 7 | No
No
No | 9.1
10.1
13.6 | 95.1
73.2
75.5
 | 11.07
9.4
7.54 | 473
583
538 | 305
417.2
420.8
 | 7.85
8.42
8.15 | 125.7
189.2
98.8 | 4.22
48.5
3.75 | 0.015
0.015
0.015
 | 0.00015
0.00015
0.00015 | 0.00001
0.00001
0.00001 | 0.000005
0.000005
0.000005 | 0.0001
0.0001
0.0001
 | 0.001 0.0
0.001 0.0 | 5 0.0005
5 0.0005
5 0.0005 | 0.0005
0.0005
0.0005 | 0.000015
0.000015
0.000015 | 0.0005
0.0005
 | 10 | 0.005
0.005
0.005 | 0.00001
0.00001
0.00001 | 0.00f
0.00f
0.002 |
 | 0.05
0.05 | | | 10 | 203
203
243 | 0.1
55
4
 |
| | Event 9
Event 10
Event 11 | No
No
No | 13.9
12.9
12.3
16.6 | 102.9
 | 7.68
10.86
8.87
9.17 | 448.3
384
375.2 | 294.9
415.7
315.2
 | 8.10 | 111.9
151.2
149.1
101.1 | 32.04
0.05
1.2 | 0.44
0.015
0.05
 | 0.00015
0.00015 | 0.00001
0.00001
0.00001 | 0.000005
0.000005 | 0.0001
0.0001
0.0001
 | 0.001 Q
0.001 Q
0.001 Q | 9 0.0005
2 0.0005
1 0.0005 | 0.011
0.002
0.002
0.001 | 0.000015
0.000015
0.000015 | 0.0005
 | 0.1
0.1
0.1 | 0.02
0.005
0.005 | 0.00001
0.00001
0.00001 | 0.002
0.001
0.042
0.004 |
 | 0.05
0.05
0.05 | | | 01
01
01 | 202
209
200 | 25
0.1
 |
| | Event 12
Event 13
Min | No
No | 20.1
17.5
8.60 | 116.9
 | 9.98
9.56
7.07 | 438.4
321.30 | 397.7
404.9
294.90
 | | 101.5
10
10.00 | 0.1
0.05
0.05 | 0.04
0.11
0.01
 | 0.00015 | 0.00001 | 0.000005 | 0.0001
0.0001
 | 0.000 0.0
0.000 0.0 | | 0.0005
0.0005
0.00 | 0.000015
0.00015 | 0.0005
 | 0.1
2
0.10 | 0.005
0.005
0.01 | 0.0000F
0.0000F | 0.004 | 0.05
0.05
0.05
 | 0.05
0.05 | 0.005
0.005
0.01 | 55
234
65.00 | 0.1
0.10 | 292
271
232.00 | 2 0.10
 |
| | Mean
Court
St. Dev | | 20.10
13.21
13.00 | 116.90
82.76
11.00
 | 12.05
9.27
13.00 | 583.00
400.11
11.00 | 423.60
370.29
13.00
 | | 189.20
116.73
13.00
47.64 | 785.48
86.21
11.00 | 1.05
0.14
12.00
 | 0.00
0.00
12.00 | 0.00
0.00
12.00 | 0.00
0.00
12.00 | 0.00
12.00
 | 0.00 0
0.00 0
12.00 12 | 2 0.00
5 0.00
00 12.00
4 0.00 | 0.01
0.00
12.00 | 0.00
0.00
12.00 | 0.00
0.00
12.00
 | 0.10
0.10
12.00 | 0.35
0.04
12.00 | 0.00
0.00
12.00 | 0.04
0.01
13.00 | 0.05
0.05
1.00
 | 0.90
0.05
12.00 | 0.01
0.01
1.00 | 65.00
65.00
1.00 | 0.10
0.10
12.00 | 317.00
279.54
13.00 | 450.00
44.58
13.00
 |
| YR1-RS | Event 1
Event 2
Event 3 | No
No
No sarrole | 14.9 | 92.2
73.6
 | 9.31
7.83 | 110.7 | 89.3
79.2
 | 8.35
8.15 | 78.3
128.6 | 6.94
1.85 | 0.015
 | 0.00015 | 0.00001 | 0.000005 | 0.0001
 | 0.001 0.0 | 5 0,0005
5 0,0005 | 0.003 | 0.000015 | 0.0005
 | 0.1 | 0.005 | 0.0000f | 0.001
0.001 |
 | 0.1 | | | 0.1 | 50 | 01
 |
| | Event 5
Event 5
Event 6
Event 7 | No
No
No | 6.5
7.9
8.8
12.5 | 24.6
102.6
73.3
75.5
 | 13.05
12.18
10.59
8.03 | 34.7
82
59.7
69.6 | 35.9
59
41.2
53.1
 | 7.97 | 55.3
157.1
180.9
111.4 | 5
10
2.19 | 0.015
0.015
0.015
 | 0.00015
0.00015
0.00015 | 0.00001
0.00001
0.00001
0.00001 | 0.000005
0.000005
0.000005 | 0.0001
0.0001
0.0001
 | 0.001 00
0.001 00
0.001 00 | 0 00005
5 00005
5 00005
2 0007 | 0.0005
0.0005
0.0005 | 0.000015
0.000015
0.000015 | 0.0005
0.0005
0.0005
 | 01
01
01 | 0.005
0.005
0.005 | 0.00001
0.00001
0.00001 | 0.001
0.001
0.001
0.000 |
 | 0.05
0.05
0.05 | | | 01
01
01 | 33
53
26
38 | 01
01
13
 |
| | Event 6
Event 9
Event 10 | No
No
No | 13.1
12.2
11.6 | 74.8
102.7
 | 7.85
11.02
9.55 | 62.9
70.8 | 53.5
53.5
53.1
 | 7.83
7.53
7.91 | 95.5
157.4
140.3 | 124 93
7.3
2 | 0.088
0.015
 | 0.00015 | 0.00001 | 0.000005
0.000005
0.000005 | 1000 D
1000 D
1000 D
 | 0.001 0.0
0.001 0.0 | 5 0,0005
7 0,0005
5 0,0005 | 0.002
0.002
0.003 | 0.000015
0.000015 | 0.0005
 | 01 | 0.01
0.01
0.01 | 0.00001
0.00001 | 0.001 |
 | 0.05
0.05
0.05 | | | 01
01
01 | 35
30
67 | 01
01
01
 |
| | Dent 11
Dent 12
Event 13
Min | No
No | 19.8
22.1
20.3
6.50 | 101.6
109.4
 | 9.01
7.73
7.73 | 70.5
109.7 | 63.5
103.7
124.6
36.90
 | | 92.3
89.5
7
7.09 | 0.1
0.05
0.10 | 0.22
0.03
0.015
 | 0.00015
0.00015
0.00015 | 0.00001
0.00001
0.00001 | 0.000005 | 1000.0
1000.0
1000.0
 | 0.007 Q
0.007 Q
0.000 Q | 6 0.0005
2 0.0005
1 0.0005 | 0.002
0.002
0.002 | 0.000015
0.000015
0.000015 | 0.0005
0.0005
0.0005
 | 0.1
0.1
0.1 | 0.005
0.005
0.005 | 0.00001
0.00001
0.00001 | 0.002
0.002
0.002 | 0.05
0.05
 | 0.05 | 0.005
0.005
0.00 | 55
53
56,00 | 0.1
0.1
0.50 | 50
12
73
12.00 | 0.1
0.1
 |
| | Max
Mean
Count
St. Dev | | 22.10
13.53
12.00 | 102.40
83.05
10.00
 | 13.05
9.58
12.00 | 110.70
77.45
10.00 | 124.60
67.14
12.00
 | 7.95
12.00 | 180.90
107.99
12.00 | 124.93
16.66
10.00 | 0.30
0.07
11.00
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12.00 | 13.00
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| LHG-IS | St. Dev
Event 1
Event 2
Event 3 | No
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No sample | 4.97 | 24.27
 | 1.78 | 24.45 | 26.74
 | 0.51 | 48.74 | 3.25 | 0.10
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0.0000r | 000
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 | 0.02
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0.05 | 0.00 | 212 | 2 01 | 9.20
346
253 | 385
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 |
| | Event 4
Event 5
Event 6 | No
No
No | 9.9
9.3
10.3 | 97.8
49.9
 | 10.71
11.22
5.59 | 0
434
445.4 | 304
320.5
 | | 76.3
93.1
20.9 | 4.75
26.33 | 0.015
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0.00001 | 0.000005
0.000005 | 0.0001
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0.0001
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0.000 0.0 | 8 0,0005
8 0,0005
8 0,0005 | 0.0005
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0.0005 | 0.000015
0.000015
0.000015 | 0.0005
0.0005
 | 0.1
0.1 | 0.005
0.005 | 0.0000f
0.0000f | 100.0
100.0
100.0 |
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0.05
0.1 | | | 01
01
01 | 395
319
203 | 01
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| | Event 5
Event 9
Event 10 | No
No
No | 13.5
13.9
13.1
12.4 | 72.4
72
100.5
 | 7.54
7.43
10.55
10.31 | 476.2
429.4
340.6 | 371.3
338.3
263.3
397.9
 | 7.89 | 39.9
88.4
111.7
53.5 | 7.45
85.15
10.45
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0.18
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10000.0
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5 0,0005 | 0.0005
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0.003 | 0.000015
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0.000015 | 0.0005
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0.0005
 | 0.1
0.1
0.1 | 0.005
0.07
0.02
0.005 | 0.00001
0.00001
0.00001 | 0.002
0.002
0.001
0.005 |
 | 0.05
0.05
0.05 | | | 01
01
01 | 271
273
200
310 | 0.1
0.1
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| | Duent 11
Event 12
Event 13 | No
No
No | 16.1
18.8
17.1 | 85.2
84.3
 | 7.8
7.4
6.45 | 357.9
453.4 | 297
399.3
445.6
 | 7.62
7.53
7.7 | 55.9
-19.1
-6 | 4.82
0.1
0.05 | 0.05
0.05
 | 0.00015
0.00015
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0.001 Q.
0.001 Q. | 0.0005
0.0005
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0.073
0.08 | 0.000015
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 | 1.0 | 0.005
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0.02 | 0.00001
0.00001
1000001 | 0.003
0.004
0.005 | 0.05
 | 0.05
0.05 | 0.00 | 273
270 | 10 | 311
280
293 | 7 3
 |
| | Max
Mean
Court | | 9.30
18.80
13.44
10.00 | 0.00
100.50
70.26
8.00
 | 5.59
11.22
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10.00 | 0.00
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367.11
8.00 | 263.30
445.60
250.41
10.00
 | 6.93
8.34
7.80
10.00 | -19.10
111.70
52.76
10.00 | 0.05
85.15
17.39
8.00 | 0.01
0.41
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12.00
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0.00
11.00 | 0.00
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11.00 | 0.00
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11.00 12 | 1 0.00
3 0.00
5 0.00
11.00 | 0.00
0.08
0.02
12.00 | 0.00
0.00
11.00 | 0.00
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0.00
 | 0.10
2.00
0.27
11.00 | 0.01
0.07
0.01
11.00 | 0.00
0.00
11.00 | 0.00
0.01
0.00
12.00 | 0.05
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 | 0.05
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11.00 | 0.03
0.03
0.03
1.00 | 273.00
273.00
273.00
1.00 | 0.10
2.00
0.27
11.00 | 200.00
253.00
293.42
12.00 | 0.10
64.00
7.54
12.00
 |
| YR2-RS | St. Dev
Event 1
Event 2 | No
No | 3.95
15.3
13 | 32.63
93.1
73.6
 | 2.01
9.32
7.74 | 155.56
109.4
101 | 55.83
89.2
78.3
 | 0.39
8.36
8.11 | 41.45
75.5
145.4 | 27.39
1.28
2.29 | 0.12
0.01
0.015
 | 0.00 | 0.0001 | 0.00
0.000005
0.000005 | 0.00
0.0001
0.0001
 | 0.001 0.001 | 5 0.000
5 0.0005
8 0.0005 | 0.03
0.003
0.002 | 0.00
0.000015
0.000015 | 0.00
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0.1
0.1 | 0.005
0.005 | 0.00
0.0000f | 000
100.0
100.0 | 0.00
 | 0.02
0.05
0.05 | 0.02 | 2.12 | 0.55
0.1
0.1 | 40.72
74
39 | 17.97
2
0.1
 |
| | Event 3
Event 4
Event 5
Event 6 | No sample
No
No | 6.5
8.1
10.2 | 83.35
95.2
86.3
 | 19.18
11.26 | 105.2
82
62 | 38.4
55
42.9
 | 7.81 | 64.5
132.6
258.3 | 5.05 | 0.015
0.015
0.015
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0.00001 | 0.000005 | 0.0001
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0.0001
 | 0.001 0.0
0.001 0.0 | S 0,0005
S 0,0005
S 0,0005 | 0.0005 | 0.000015
0.000015 | 0.0005
 | 0.1
0.1 | 0.005 | 0.00001
0.00001 | 0.001
0.001 |
 | 0.05
0.05 | | | 0.1
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0.1 | 38
57
47 | 01
01
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| | Event 7
Event 8
Event 9 | No
No
No | 12.7
13.4
12.5
12.3 | 75.7
75.1
103
 | 8.02
7.84
10.97 | 71.3
131.6
68.4 | 54.6
49.7
52.1
 | 7.65
7.71
7.47 | 104.3
99.5
145.1 | 2.84
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| | Dent 10
Dent 11
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Dent 13 | No
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No | 12.3
19.9
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20.9 | 101.8
108.2
 | 9.94
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8.24 | 74.5
109.7 | 53.3
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 | 7.40 | 109.8 | 5.07
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72 | 01
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| | Min
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Count | | 6.50
22.90
13.98 | 73.60
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89.54
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| SSC-IS | St. Dev
Exert 1
Exert 2 | No flow
No flow | 12:00
5:02 | 12.59
 | 3.19 | 22.92 | 27.19
 | 0.41 | 60.89 | 4.42 | 0.09
 | 0.00 | 0.00 | 0.00 | 0.00
 | 0.00 0. | 5 0.00 | 0.00 | 0.00 | 0.00
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 | 0.00 | 0.00 | 28.28 | 1.99 | 24.79 | 351
 |
| SSC-IS | St. Dev Exert 1 Exert 2 Exert 3 Exert 4 Exert 5 | No flow
No
No | 10.4
8.5
8.8 | 10:00
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61:4
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96:2
 | 6.87
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| \$9C-IS | St. Dev
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111.2
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6 0.005 | 0.000
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G.00001 | 2.001
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2.001
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2.001
2.002
2.002 | 0.11
 | 0.05
0.05
0.05
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0.05
0.05 | 0.00 | 28.28 | 0.1
0.1
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0.1 | 54
69
54
81
81
95 | 01
01
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 |
| \$9C-18 | St. Dav St. Dav Caret 1 Dant 2 Dant 2 Dant 3 Dant 4 Caret 5 Dant 6 Dant 7 Dant 8 Dant 9 Cont 10 Dont 11 Dont 12 | No flow
No
No
No | 10.4
8.6
8.8
10.2
14.4 | 19.00
12.59
12.59
161.4
61.4
96.2
73
75.3
102.6
 | 6.87
12.09
11.17
10.04
7.65
7.55
10.52
5.87
8.65 | 172 | 119
118.7
117.6
 | 7.01
8.17
7.66 | 152.2
53.1
128.7
233.8
101.1 | 4.42
42.72
5.49
23.7
8.09
124.93
43.80
2
6.93 | 0.00
0.00015
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1.73
1.73
9.3
 | 0.00 0.00015 0.00015 0.00015 0.00015 0.00015 0.00015 0.00015 | 0.0001
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 | 0.001 | 5 0.00
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81 | 3 01 01 3 01 W 01 01 01 01 01 01
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| SSC-IS | St. Dav Exact 1 Exact 2 Exact 3 Exact 4 Exact 5 Exact 6 Exact 7 Exact 9 Exact 9 Exact 9 Exact 9 Exact 9 | No flow No | 10.4
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14.2
15.9
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8.60
20.00 | 19.00
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61.4
96.2
73
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102.6
97.7
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80.33
 | 6.87
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11.17
10.04
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7.55
10.52
5.87
8.65 | 172 | 119
118.7
117.6
106.9
111.2
123.7
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67.30
 | 7.01
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7.65
7.74
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7.91
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7.19
8.17
7.65 | 152.2
53.1
128.7
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101.1
103.3
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88.5 | 4.42
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6.93
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32.22 | 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0
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APPENDIX B OBSERVATIONS AND FIELD DATA

S S S S S S S S S S S S S S S S S S S	Sur	wy, Shig	vi breeze.	15 Marc	h 2083 - li	obbastole	. 16 M	March 202	3 - Bayo	State
830 E	22-013 Pre-constru	uction WQM	Grease/oil/ To sheen		olved Dissolved en (%) Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	Oxidation pH Reduction Potential (m\	Turbidity (NTU)	LOVES
0 6		Month	NO	19.4	- 9.11	- 1	45.818.	44 57.	lab	
<u> </u>	WC-RS	Comment	low flow	o, Cheav						, /
ter	3	Month	No I	9.6 -	- 8.85		146.118	.43 5	lab	4
tenhas	WC-IS	Comment	As alo	ove.						
of one	j	Month	No I	7.5 -	- 9.56	_	404.9 8	.18 10	lab	
M	CG-IS	Comment	\ew\	ow, Oleo	iv, algae relet to phe	on Mu	face in.	some loes	hors	
		Month		20,3 -	- 7.73	— I		69 7	lab.	
	YR1-RS	Comment	lew s	Now, de	av, some	sulau	suds.			

22-013 Pre-cons	truction WQM	Grease/oil/ sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	рН	Oxidation Reduction Potential (mV)	Turbidity (NTU)
	Month	No	17.1		6.45		445.6	7.70	6.	lab
LHG-IS	Comment	Very	low	lew.						
	Month	No	2019		8-24	4/2 42- 33	127.4	8.56	16	lah
YR2-RS	Comment		Agreement B				nfia e		n 1905-	CE.M
	Month									
SSC-IS	Comment	DRY		/		1	. /	7 /		
Sunny	Month	No	14.6		8.57		26.0	7.70	14	lab
Sunry breeze TR-RS	Comment	low	navli,	demile	or 60 Clear.					
11/3/	Month	No.	12.9		8.80		25.8	7.97	17	Talo.
YK-IS (D/S)	Comment	Jey 1	ion fla	y nu	10 cm	depeler	Clou	deg.		

16/3/23. Tumba.

-									10-4100	
22-013 Pre-const	ruction WQM	Grease/oil/ sheen	Temperature (°C)	Dissolved Oxygen (%)	Dissolved Oxygen (ppm)	Specific Conductivity (SPC uS/cm)	Conductivity (uS/cm)	рН	Oxidation Reduction Potential (mV)	Turbidity (NTU)
	Month	No	13.2		9.31		39.2	7.54	17.	lay
NZG-IS	Comment	low	flow, of	ept.	210 av	n fast	flow	org		
	Month	No	14.8	production in the second	8.38		24-6	7.29	34	Talo
YK-IS	Comment	Clou	dy, Sc	uim 0	n dula	ce of	poole	l ara	S.	
	Month	Ne.	17.9		7.68		28.9	7.43	20	lab
YK-RS	Comment	flow	oug, Cle	LOW, S	cum a	n leps	f poole	d wa	he of	shean

APPENDIX C LABORATORY CERTIFICATES



CLIENT:	NGH Pty Ltd		1				Α	NAL	/TES	REQU	IRED	Comp		ick as n	equire	đ				
CLIENT:	NGA Fly Ltd										, E		S		208					
CONTACT:	Nicola Smith								Solids	Solids	, Z		S	<i>\ \ \ \</i>	~					
	35 Kincaid Street						s			Soll	₹ 6		2							
ADDRESS:	Wagga Wagga NSW 2650			_ ا	oru		dec	pa	tals 7, F	L	\gtrsim		2	Ì			:			
	ABN: 31 124 444	622		g	sph		pen	À	Me ,	S	Havan	3	\preceq							
TELEPHONE:	0410 411	660	hconsulting.com.au		Phosphorus	ide	Sus	Diss	olved 7, C.	Turbi dita		Ammoni	3							
SAMPLE IDENTIFICATION	NATURE OF SAMPLE	DATE SAMPLED	TIME SAMPLED	CONTAINER TYPE	NUMBER OF CONTAINERS	Total	Total	Cyanide	Total Suspended	Total Dissolved	Dissolved Metals (AI, As, Cd, Cr, Cu, Pb, Hg, NI, Zn	/3	Tokal	4	Keachure					
WC-RS	Water	15.3.23		jav r It botte	3	×	X	X	X	X	X	X	X	X	X					
WC-IS	Water	ìc		ч	3	X	X	X	X	X	X	X	X	X	X					
CG-IS	Water	11		V\$	3	X	X	X	X	X	×	X	X	X	X					
YR1-IS	Water	11		10	3	X	X	X	X	×	X	X	X	X	X					
LHG-IS	Water	11		11	3	X	X	X	X	X	X	X	X	X	X					
YR2-IS	Water	3(16	3	X	X	X	X	X	×	×.	X	\times	X					
-SSC-IS	Water						_	<u></u>	<u> </u>		<u> </u>	-							*	
TR-RS	Water	16.3.23		Ч	3	X	X	X	X	X	X	\times	X	\times	\times					
YK-IS (d/s)	Water	¥		11.	3	X	X	\times	X	X	X	X	X.	\times	义					
NZG-IS	Water	U		1/	3	X	X	\times	X	\times	X	. X	X	\times	\times					
YK-IS	Water	11		1/	3	\times	\times	\times	\times	\times	X	×	X	\times	\times					
YK-RS	Water	<i>[]</i>		Ŋ	3	\times	X	X	X	X	X	X	X	X	X					
DUP01	Water	15.3.23		IL BOHG							X									
WATER BLANK	Water	_	-	2/25414	3	X	芝	X	HI	W	X	the	W	W	W					
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	NAME	SIGNATURE		ORGANISATION	DATE TIME
RELINQUISHED BY:	Nicola Smith	4)	NGH Pty Ltd		16.3.23
Mode of Transport Include Consignment Note # if applicable	Delivery				
RECEIVED BY:	M. GLAZIER		en		16/3/17



ENVIRONMENTAL AND ANALYTICAL LABORATORIES

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NGH Environmental

Suite 1/39 Fitzmaurice Strret

Wagga Wagga NSW 2650

Attention: Nicole Isles

Monday, April 24, 2023



NATA Accredited Laboratory

Number: 9597

Accredited for compliance with ISO/IEC 17025 - Testing

LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 1 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced

17-March-2023

Sample TypeCollected ByDate ReceivedWaterN. Smith17-March-2023

EAL ID	Client ID. Date/Time sample	<u>Test</u> taken	Result	(units)	Method Reference	Limit of Reporting
23Mar-0173	WC-RS 15.03.23					
	10.00.20	Aluminium (dissolved)	0.03	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	< 0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	25.4	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	< 0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	< 0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	74	mg/L	LTM-W-038	2
		Iron (dissolved)	0.02	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	< 0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	2.68	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	< 0.001	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	< 0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	< 0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.03	mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	129	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2



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Monday, April 24, 2023



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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 2 of 16

For all enquiries related to this report please quote document number: 2303-0072

<u>Facility:</u> <u>Order #</u> <u>Date Analysis Commenced</u>

17-March-2023

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EAL ID	Client ID. Date/Time sample	<u>Test</u> e taken	<u>Result</u>	(units)	Method Reference	Limit of Reporting
23Mar-0173	WC-RS 15.03.23					
		Total Suspended Solids	<0.2	mg/L	APHA 2540 D	0.2
		Turbidity	<1	NTU	APHA 2130 B	1
		Zinc (dissolved)	0.003	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0174	WC-IS 15.03.23					
		Aluminium (dissolved)	<0.03	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	25.2	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	74	mg/L	LTM-W-038	2
		Iron (dissolved)	0.02	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	2.65	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	< 0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1

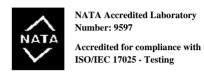


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Attention: Nicole Isles

LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 3 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced
17-March-2023

 Sample Type
 Collected By
 Date Received

 Water
 N. Smith
 17-March-2023

EAL ID	Client ID. Date/Time sample	<u>Test</u> e taken	Result	(units)	<u>Method Reference</u>	Limit of Reporting
23Mar-0174	WC-IS 15.03.23					
	10.00.20	Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.01	mg/L	LTM-W-030	0.01
		Silver (dissolved)	< 0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	94	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2	mg/L	APHA 2540 D	0.2
		Turbidity	<1	NTU	APHA 2130 B	1
		Zinc (dissolved)	0.003	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0175	CG-IS 15.03.23					
		Aluminium (dissolved)	0.11	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	< 0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	84.6	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	< 0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	< 0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	234	mg/L	LTM-W-038	2
		Iron (dissolved)	<0.01	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	5.59	mg/L	APHA 3030 B/3120 B	2



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Monday, April 24, 2023



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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 4 of 16

For all enquiries related to this report please quote document number: 2303-0072

<u>Facility:</u> <u>Order #</u> <u>Date Analysis Commenced</u>

17-March-2023

EAL ID	Client ID. Date/Time sample	<u>Test</u> e taken	Result	(units)	Method Reference	Limit of Reporting
23Mar-0175	CG-IS 15.03.23					
		Manganese (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	2	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	<0.01	mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	271	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2
		Total Suspended Solids	2	mg/L	APHA 2540 D	0.2
		Turbidity	<1	NTU	APHA 2130 B	1
		Zinc (dissolved)	0.005	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0176	YR1-IS 15.03.23					
		Aluminium (dissolved)	<0.03	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	21.1	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002



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Attention: Nicole Isles

Monday, April 24, 2023



NATA Accredited Laboratory Number: 9597

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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 5 of 16

For all enquiries related to this report please quote document number: 2303-0072

<u>Facility:</u> <u>Order #</u> <u>Date Analysis Commenced</u>

17-March-2023

EAL ID	Client ID. Date/Time samp	<u>Test</u> le taken	<u>Result</u>	(units)	Method Reference	Limit of Reporting
23Mar-0176	YR1-IS 15.03.23					
		Cyanide	< 0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	53	mg/L	LTM-W-038	2
		Iron (dissolved)	0.01	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	< 0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	< 0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.01	mg/L	LTM-W-030	0.01
		Silver (dissolved)	< 0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	73	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2	mg/L	APHA 2540 D	0.2
		Turbidity	<1	NTU	APHA 2130 B	1
		Zinc (dissolved)	0.002	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0177	LHG-IS 15.03.23					
		Aluminium (dissolved)	0.13	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1



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Attention: Nicole Isles

Monday, April 24, 2023



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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 6 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced

17-March-2023

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EAL ID	Client ID. Date/Time sample	<u>Test</u> le taken	Result	(units)	Method Reference	Limit of Reporting	
23Mar-0177	LHG-IS 15.03.23						
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003	
		Cadmium (dissolved)	< 0.00002	mg/L	APHA 3030 B/3120 B	0.0000	
		Calcium (dissolved)	99.2	mg/L	APHA 3030 B/3120 B	2	
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000	
		Copper (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002	
		Cyanide	<0.002	mg/L	* APHA 4500-CN E	0.002	
		Total Hardness as CaCO3	270	mg/L	LTM-W-038	2	
		Iron (dissolved)	0.08	mg/L	APHA 3030 B/3120 B	0.01	
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001	
		Magnesium (dissolved)	5.43	mg/L	APHA 3030 B/3120 B	2	
		Manganese (dissolved)	0.080	mg/L	APHA 3030 B/3120 B	0.001	
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000	
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001	
		Nitrogen, total	3	mg/L	* APHA 4500-Norg B + 4110 B	0.2	
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1	
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01	
		Phosphorus, Total	0.02	mg/L	LTM-W-030	0.01	
		Silver (dissolved)	< 0.00002	mg/L	* APHA 3030 B/3120 B	0.0000	
		Total Dissolved Solids	293	mg/L	LTM-W-035	2	
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2	
		Total Suspended Solids	3	mg/L	APHA 2540 D	0.2	
		Turbidity	<1	NTU	APHA 2130 B	1	



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Attention: Nicole Isles

NATA Accredited Laboratory Number: 9597

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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 7 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced

17-March-2023

 Sample Type
 Collected By
 Date Received

 Water
 N. Smith
 17-March-2023

EAL ID	Client ID. Date/Time samp	<u>Test</u> le taken	Result	(units)	Method Reference	Limit of Reporting
23Mar-0177	LHG-IS 15.03.23					
		Zinc (dissolved)	0.005	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0178	YR2-IS 15.03.23					
		Aluminium (dissolved)	<0.03	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	0.2	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	< 0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	21.3	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	61	mg/L	LTM-W-038	2
		Iron (dissolved)	0.01	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	2.00	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	< 0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.01	mg/L	LTM-W-030	0.01



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NGH Environmental Monday, April 24, 2023

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NATA Accredited Laboratory Number: 9597

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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 8 of 16

For all enquiries related to this report please quote document number: 2303-0072

<u>Facility:</u> <u>Order #</u> <u>Date Analysis Commenced</u>

17-March-2023

EAL ID	Client ID. Date/Time sample	<u>Test</u> le taken	Result	(units)	Method Reference	Limit of Reporting
23Mar-0178	YR2-IS 15.03.23					
		Silver (dissolved)	< 0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	72	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2	mg/L	APHA 2540 D	0.2
		Turbidity	<1	NTU	APHA 2130 B	1
		Zinc (dissolved)	0.002	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0179	TR-RS 16.03.23					
		Aluminium (dissolved)	< 0.03	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	2.27	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	< 0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	6	mg/L	LTM-W-038	2
		Iron (dissolved)	0.05	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.003	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000



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Monday, April 24, 2023

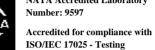
NGH Environmental

Suite 1/39 Fitzmaurice Strret

Wagga Wagga NSW 2650

Attention: Nicole Isles

NATA Accredited Laboratory



LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 9 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced
17-March-2023

EAL ID	Client ID. Date/Time sample	<u>Test</u> e taken	Result	(units)	Method Reference	<u>Limit of</u> Reporting
23Mar-0179	TR-RS 16.03.23					
		Nickel (dissolved)	< 0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	<0.2	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1	mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.02	mg/L	LTM-W-030	0.01
		Silver (dissolved)	< 0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	41	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2
		Total Suspended Solids	<0.2	mg/L	APHA 2540 D	0.2
		Turbidity	<1	NTU	APHA 2130 B	1
		Zinc (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0180	YK-IS(d/s) 16.03.23					
		Aluminium (dissolved)	0.26	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	2.25	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	< 0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	< 0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	6	mg/L	LTM-W-038	2



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Attention: Nicole Isles

Monday, April 24, 2023



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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 10 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced

17-March-2023

EAL ID	Client ID. Date/Time sample	<u>Test</u> taken	Result	(units)	Method Reference	Limit of Reporting
23Mar-0180	YK-IS(d/s) 16.03.23					
		Iron (dissolved)	0.31	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.003	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	9	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1	mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.02	mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2
		Total Suspended Solids	9	mg/L	APHA 2540 D	0.2
		Turbidity	12	NTU	APHA 2130 B	1
		Zinc (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0181	NZG-IS 16.03.23					
		Aluminium (dissolved)	0.11	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002	mg/L	APHA 3030 B/3120 B	0.0000



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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 11 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced

17-March-2023

vv atei		N. Sililui			17-Watch-2023		
EAL ID	Client ID. Date/Time sampl	t ID. Test ime sample taken	<u>Result</u>	Result (units)		Limit of Reporting	
23Mar-0181	NZG-IS 16.03.23						
		Calcium (dissolved)	4.17	mg/L	APHA 3030 B/3120 B	2	
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000	
		Copper (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002	
		Cyanide	<0.002	mg/L	* APHA 4500-CN E	0.002	
		Total Hardness as CaCO3	10	mg/L	LTM-W-038	2	
		Iron (dissolved)	0.14	mg/L	APHA 3030 B/3120 B	0.01	
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001	
		Magnesium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2	
		Manganese (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001	
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000	
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001	
		Nitrogen, total	<0.2	mg/L	* APHA 4500-Norg B + 4110 B	0.2	
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1	
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01	
		Phosphorus, Total	0.02	mg/L	LTM-W-030	0.01	
		Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000	
		Total Dissolved Solids	<2	mg/L	LTM-W-035	2	
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2	
		Total Suspended Solids	<0.2	mg/L	APHA 2540 D	0.2	
		Turbidity	2	NTU	APHA 2130 B	1	
		Zinc (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002	

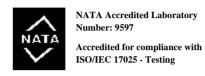


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NGH Environmental

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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 12 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced
17-March-2023

EAL ID	Client ID. Date/Time sample	<u>Test</u> e taken	Result	(units)	Method Reference	Limit of Reporting
23Mar-0182	YK-IS 16.03.23					
	10.00.20	Aluminium (dissolved)	0.32	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	<0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	2.00	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	<0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	5	mg/L	LTM-W-038	2
		Iron (dissolved)	0.35	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.003	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	5	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1
		Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.02	mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2



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Monday, April 24, 2023



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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 13 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced

17-March-2023

EAL ID	Client ID. Date/Time sampl	<u>Test</u> le taken	Result	(units)	Method Reference	Limit of Reporting
23Mar-0182	YK-IS 16.03.23					
		Total Suspended Solids	5	mg/L	APHA 2540 D	0.2
		Turbidity	6	NTU	APHA 2130 B	1
		Zinc (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0183	YK-RS 16.03.23					
		Aluminium (dissolved)	0.36	mg/L	APHA 3030 B/3120 B	0.03
		Ammonia as N	<0.1	mg/L	LTM-W-042	0.1
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	< 0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Calcium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
		Cyanide	< 0.002	mg/L	* APHA 4500-CN E	0.002
		Total Hardness as CaCO3	<2	mg/L	LTM-W-038	2
		Iron (dissolved)	0.37	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Magnesium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2
		Manganese (dissolved)	0.003	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Nitrogen, total	6	mg/L	* APHA 4500-Norg B + 4110 B	0.2
		Nitrate/Nitrite as N	0.1	mg/L	LTM-W-014	0.1
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LABORATORY ANALYSIS REPORT

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For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # **Date Analysis Commenced**

17-March-2023

EAL ID	Client ID. Test Result (units) Date/Time sample taken		(units)	Method Reference	Limit of Reporting	
23Mar-0183	YK-RS 16.03.23					
	10.03.23	Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01
		Phosphorus, Total	0.04	mg/L	LTM-W-030	0.01
		Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Total Dissolved Solids	<2	mg/L	LTM-W-035	2
		Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2
		Total Suspended Solids	6	mg/L	APHA 2540 D	0.2
		Turbidity	9	NTU	APHA 2130 B	1
		Zinc (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
23Mar-0184	DUP01 15.03.23					
		Aluminium (dissolved)	0.03	mg/L	APHA 3030 B/3120 B	0.03
		Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003
		Cadmium (dissolved)	< 0.00002	mg/L	APHA 3030 B/3120 B	0.0000
		Chromium (dissolved)	<0.00001	mg/L	APHA 3030 B/3120 B	0.0000
		Copper (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002
		Iron (dissolved)	0.02	mg/L	APHA 3030 B/3120 B	0.01
		Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Manganese (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000
		Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001
		Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000
		Zinc (dissolved)	0.002	mg/L	APHA 3030 B/3120 B	0.002



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Report Number:2303-0072 Page 15 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # Date Analysis Commenced

17-March-2023

vv ater		N. Silitui		17-Watch-2023					
EAL ID	Client ID. Test Date/Time sample taken	Result	(units)	Method Reference	Limit of Reporting				
23Mar-0185	Water Blank								
	Aluminium (dissolved)	<0.03	mg/L	APHA 3030 B/3120 B	0.03				
	Ammonia as N	<0.1	mg/L	LTM-W-042	0.1				
	Arsenic (dissolved)	<0.0003	mg/L	APHA 3030 B/3120 B	0.0003				
	Cadmium (dissolved)	<0.00002	mg/L	APHA 3030 B/3120 B	0.0000				
	Calcium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2				
	Chromium (dissolved)	< 0.00001	mg/L	APHA 3030 B/3120 B	0.0000				
	Copper (dissolved)	<0.002	mg/L	APHA 3030 B/3120 B	0.002				
	Cyanide	<0.002	mg/L	* APHA 4500-CN E	0.002				
	Total Hardness as CaCO3	<2	mg/L	LTM-W-038	2				
	Iron (dissolved)	<0.01	mg/L	APHA 3030 B/3120 B	0.01				
	Lead (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001				
	Magnesium (dissolved)	<2.00	mg/L	APHA 3030 B/3120 B	2				
	Manganese (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001				
	Mercury (dissolved)	<0.00003	mg/L	APHA 3030 B/3120 B	0.0000				
	Nickel (dissolved)	<0.001	mg/L	APHA 3030 B/3120 B	0.001				
	Nitrogen, total	<0.2	mg/L	* APHA 4500-Norg B + 4110 B	0.2				
	Nitrate/Nitrite as N	<0.1	mg/L	LTM-W-014	0.1				
	Ortho-Phosphate as P	<0.01	mg/L	LTM-W-030	0.01				
	Phosphorus, Total	0.03	mg/L	LTM-W-030	0.01				
	Silver (dissolved)	<0.00002	mg/L	* APHA 3030 B/3120 B	0.0000				
	Total Dissolved Solids	<2	mg/L	LTM-W-035	2				
	Total Kjeldahl Nitrogen	<0.2	mg/L	LTM-W-034	0.2				



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LABORATORY ANALYSIS REPORT

Report Number:2303-0072 Page 16 of 16

For all enquiries related to this report please quote document number: 2303-0072

Facility: Order # **Date Analysis Commenced**

17-March-2023

Sample Type Collected By **Date Received** Water N. Smith 17-March-2023

EAL ID	Client ID. Date/Time sample taken	<u>Test</u>	Result	(units)	Method Reference E	Limit of Reporting	
23Mar-0185	Water Blank						
	Total Suspended Solids		<0.2	mg/L	APHA 2540 D	0.2	
	Turbi	dity	<1	NTU	APHA 2130 B	1	
	Zinc (dissolved)	< 0.002	mg/L	APHA 3030 B/3120 B	0.002	

Note:

Signed Michael Glazier, Laboratory Manager.

All samples analysed as received. All soil results are reported on a dry basis. The EAL takes no responsibility for the end use of results within this report. This report shall not be reproduced except in full. This report replaces any previously issued report

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^{*} NATA Accreditation does not cover the performance of this service.

APPENDIX D RPD TABLE

			Al (mg/L)	As (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Cyanide (mg/L)	Fe (mg/L)	Pb (mg/L)	Mn (mg/L)	Hg (mg/L)	Ni (mg/L)	Ag (mg/L)	Zn (mg/L)
	Event 1	DUP01	0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.06	0.0005	0.003	0.000015	0.0005	0.00001	0.001
		YR1-IS	0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.06	0.0005	0.003	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Event 2	DUP01	< 0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.001	0.000015	0.0005	0.00001	0.001
		WC-IS	< 0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.002	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range except Mn	0%	0%	0%	0%	0%	0%	0%	0%	67%	0%	0%	0%	0%
	Event 3	DUP01	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		Yk-IS (D/S	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
		DUP01	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
DUP01		WC-RS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
	F	RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Event 4	DUP01	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		WC-RS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001 0%
	Event 5	RPD% - Acceptable Range DUP01	0% 0.015	0.00015	0.00001	0,000005	0.0001	0.001	0,005	0%	0.0005	0.000015	0.0005	0.00001	0.001
	Evenio	WC-RS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
	Event 6	DUP01	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		WC-RS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Event 7	DUP01	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		WC-RS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Event 8	DUP01	1.79	0.00015	0.00001	0.000005	0.0001	0.001	0.73	0.0005	0.011	0.000015	0.0005	0.00001	0.002
		SSC-IS	1.73	0.00015	0.00001	0.000005	0.0001	0.001	0.69	0.0005	0.011	0.000015	0.0005	0.00001	0.002
		RPD% - Acceptable Range	3.4090909	0%	0%	0%	0%	0%	5.633802817	0%	0%	0%	0%	0%	0%
	Event 9	DUP01	0.35	0.00015	0.00001	0.000005	0.0001	0.001	0.06	0.0005	0.003	0.000015	0.0005	0.00001	0.001
		WC-RS	0.36	0.00015	0.00001	0.000005	0.0001	0.001	0.08	0.0005	0.004	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	2.82	0%	0%	0%	0%	0%	28.57	0%	0%	0%	0%	0%	0%
	Event 10	DUP01	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.09	0.0005	0.005	0.000015	0.0005	0.00001	0.006
		WC-RS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.08	0.0005	0.004	0.000015	0.0005	0.00001	0.019
		RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	11.76	0%	0%	0%	0%	0%	0%
	Event 11	DUP01	0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.02	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		WC-RS	0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.02	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
	Event 12	DUP01	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.02	0.0005	0.006	0.000015	0.0005	0.00001	0.002
		WC-RS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.005	0.0005	0.0005	0.000015	0.0005	0.00001	0.001
		RPD% - Acceptable Range	0%	0%	0%	0%	0%	0%	60%	0%	85%	0%	0%	0%	33%
		DUP01	0.03	0.00015	0.00001	0.000005	0.0001	0.001	0.02	0.0005	0.0005	0.000015	0.0005	0.00001	0.002
	Event 13	WC-IS	0.015	0.00015	0.00001	0.000005	0.0001	0.001	0.02	0.0005	0.0005	0.000015	0.0005	0.00001	0.003
		RPD% - Acceptable Range	33%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	20%
	Event 1														
	Event 1	Nothing above LOR Nothing above LOR	<0.02 <0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 3		<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
/ater Blar	Event 4	Nothing above LOR Nothing above LOR	< 0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 5	Nothing above LOR Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 6	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 7	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 8	Nothing above LOR	<0.03	<0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	<0.00003	<0.001	<0.00002	<0.002
	Event 9	Nothing above LOR	<0.03	< 0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	< 0.00003	<0.001	<0.00002	<0.002
	Event 10	Nothing above LOR	<0.03	< 0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	< 0.00003	<0.001	<0.00002	<0.002
	Event 11	Nothing above LOR	<0.03	< 0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	< 0.00003	<0.001	<0.00002	<0.002
	Event 12	Nothing above LOR	<0.03	< 0.0003	<0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	< 0.00003	<0.001	<0.00002	<0.002
	Event 13	Nothing above LOR	< 0.03	< 0.0003	< 0.00002	<0.00001	<0.0002	<0.002	<0.01	<0.001	<0.001	< 0.00003	<0.001	<0.00002	< 0.002
		g abore con	3.00	2.3000	2.3000L	2.30001	2.0002	-:001	3.01	2.001	2.001	2.30000	2.001	2.3000L	2.002

RPD % |(X 2 - X 1)|/((X 2 + X 1)/2)

How to calculate the Relative Percent Difference (RPD)

The basic equation for RPD is
$$RPD = \frac{|R1-R2|}{(R1+R2)} \times 100,$$
 where
$$R1 \text{ is sample 1, and}$$

R2 is sample 2.

R1 and R2 are your sample and duplicate values. Basically, this equation has you calculate the RPD by dividing the difference between the sample and duplicate by the average of the two. Using absolute value signs ensures the RPD doesn't end up as a negative percentage, which wouldn't make sense when looking for a percent difference.

The equation you plug into Excel looks like this:

=ABS((B3-C3)/AVERAGE(B3:C3)*100)

ABS stands for Absolute Value. Using the cell labels in the equation, as seen above (83, C3), allows you to use the equation down for all your sample/duplicate pairs so you don't have to write a new equation each time. You can do this by clicking on the cell with the equation in it, then click and drag the bottom right corner of the cell down for the rest of your samples.

APPENDIX E CALIBRATION CERTIFICATES

