

TEP Report – 20th May 2016

Conditions of Approval Update

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1. Purpose

This report addresses the conditions of Schedule 1 of Certificate of Approval (MAN17560).

It aims to report on water quality of receiving environment sample sites included in Schedule C table 4 of EA EPML00911413, during the life of TEP – MAN17560.

Water quality data analysis is limited to graphical analysis, and aims to assess if:

1. Water quality of receiving waters was maintained or improved during the period of TEP (condition 2 of Schedule 1 of Certificate of approval MAN17560);
2. Identify receiving environmental water quality exceedances during the period of TEP (condition 4 & 5 of Schedule 1 of Certificate of approval MAN17560).

Statistical analyses of water quality data, is part of Capricorn Copper's Environmental Compliance Strategy scope of works. Capricorn Copper has engaged NRA to develop and guide its Compliance Strategy Program.

2. Schedule 1 MAN17560 – TEP Approval Conditions

Condition No.	Condition	Capricorn Copper Summary
1	All conditions of the EA apply during the period of the TEP unless a condition of this certificate of approval specifies otherwise.	Capricorn Copper is acting in accordance with this condition.
2	BMG (CCM) must ensure that the water quality of receiving waters is maintained or improved during the period of the TEP.	Capricorn Copper has worked to maintain and improve the receiving water quality by improving site water drainage, discontinuing discharge, and engaging NRA to provide a comprehensive site compliance strategy
3	Contaminant releases may occur from the area defined in Figure 1 as “Old TSF”, subject to condition 2 of this certificate of approval.	Capricorn Copper acknowledges that contaminant releases have occurred historically from the area defined as “Old TSF” and is actively working to maintain and improve the receiving water quality through localised drainage earth works, sump maintenance, and engaging NRA to provide a comprehensive site compliance strategy
4	BMG (CCM) must ensure there is no exceedance of any EA contaminant limit, except for: (a) The sulphate contaminant limit within the Section 1 of Gunpowder Creek, subject to condition 2 of this certificate (b) The sulphate contaminant limit within the section of Gunpowder Creek defined in Figure 1 as Section 3 of Gunpowder Creek, which must not	Refer to Section 3.2 for a summary of exceedances. Capricorn Copper has engaged NRA to provide a comprehensive site compliance strategy to assist in addressing historical exceedance issues.

	exceed 2,000 mg/L during the period of this TEP.	
5	BMG (CCM) must ensure there is no exceedance of any EA contaminant limit within the section of Magazine Creek defined as 'Section 2: Magazine Ck', except for copper and pH, subject to condition 2 of this certificate of approval.	Refer to Section 3.2 for a summary of exceedances. Capricorn Copper has engaged NRA to provide a comprehensive site compliance strategy to assist in addressing historical exceedance issues.
6	BMG (CCM) must ensure that a review of water quality monitoring data, sufficient to determine compliance and condition 2 of this certificate of approval, is undertaken by an appropriately qualified person at least once per calendar month.	Capricorn Copper would like to discuss this condition further with DEHP, in order to better define the requirements going forward.
7	BMG (CCM) must notify the administering authority within 24 hours of identifying any non-compliance with a condition of this certificate of approval	Capricorn Copper will continue to adhere to this condition, as it has done previously.
8	The progress of the TEP must be monitored by BMG (CCM) and documented in a report completed at a frequency of once every six months.	Capricorn Copper will continue to adhere to this condition, as it has done previously.

3. Receiving Environment Water Quality Results

3.1. Trigger and Contaminant Limits

Table 1- EA Trigger limits and Contaminant Limits

Parameter	EA Trigger Limit	EA Contaminant Limit
pH (pH units)	6 – 8.5	
EC (µs/cm)	435	1000
Fluoride (mg/L)	0.2	2
Sulphate (mg/L)	250	1000
Aluminium (mg/L)	0.055	5
Arsenic (mg/L)	0.013	0.5
Boron (mg/L)	0.37	5
Cadmium (mg/L)	0.0002	0.01
Chromium (mg/L)	0.001	1
Cobalt (mg/L)	-	1
Copper (mg/L)	0.0014	1
Lead (mg/L)	0.0034	0.01
Manganese (mg/L)	1.9	1.9
Nickel (mg/L)	0.011	1
Uranium (mg/L)	-	0.2
Zinc (mg/L)	0.008	20

3.2. Receiving Water Quality Results

Each sample site and parameter will be approached separately with particular focus on the identification of parameter exceedances. Relevant weather events or other incidents will be referred to. Only parameters with contaminant concentrations near or surpassing their limits, will be included. The remaining parameters charts can be referred to in Appendix A.

3.2.1. Gunpowder Creek

3.2.1.1. GPU1

GPU1 is the Gunpowder Creek reference site.

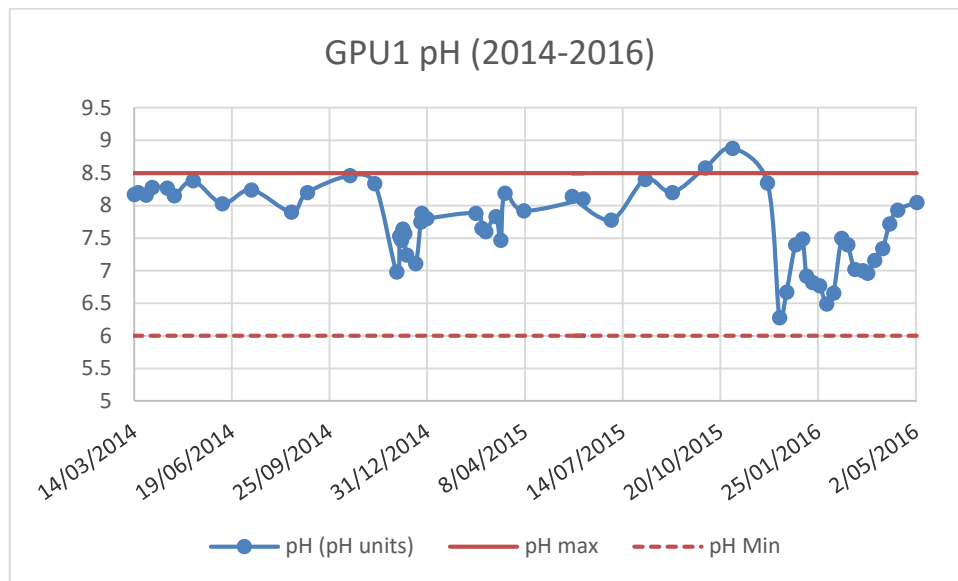


Figure 1- pH at GPU1 during the period of TEP

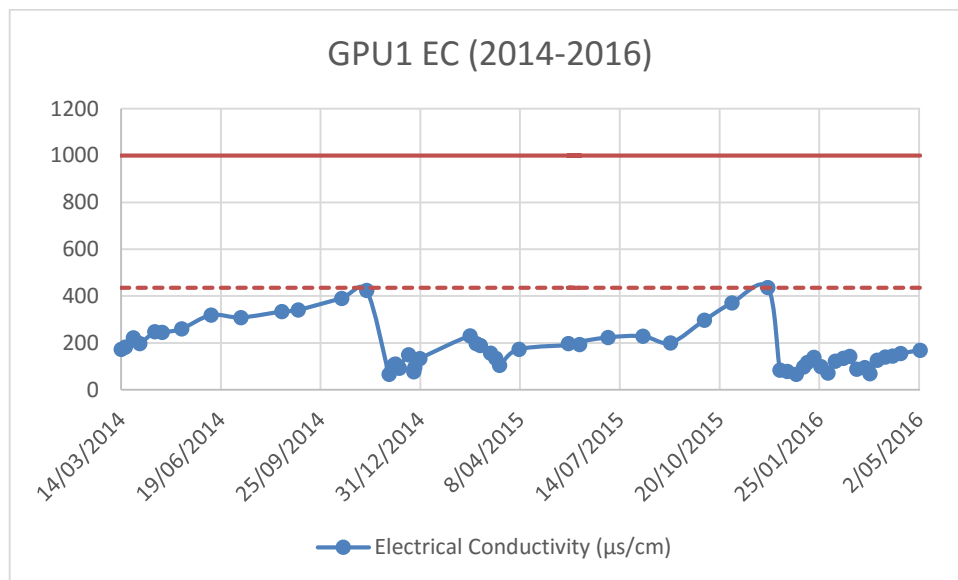


Figure 2- Electrical conductivity at GPU1 during the period of TEP

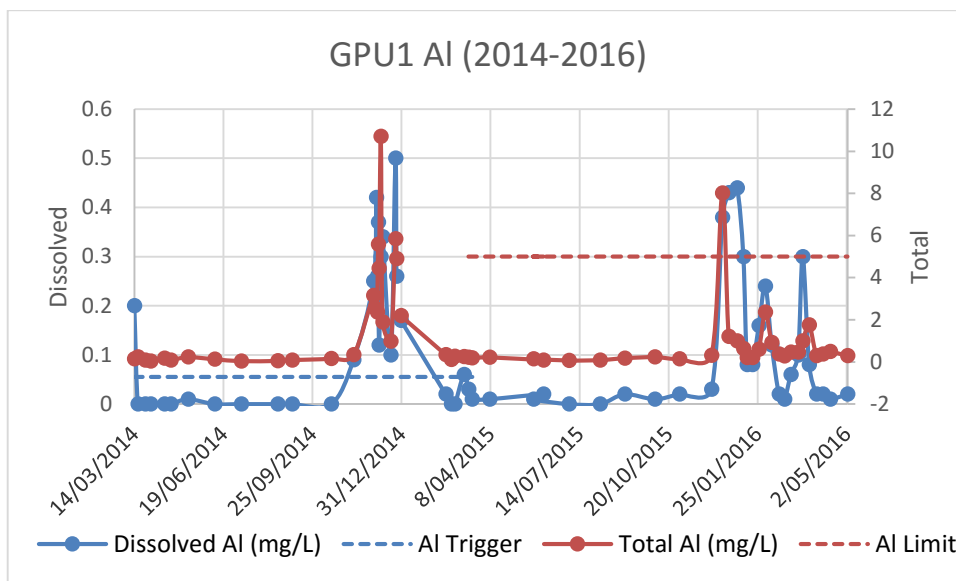


Figure 3- Aluminium at GPU1 during the period of TEP

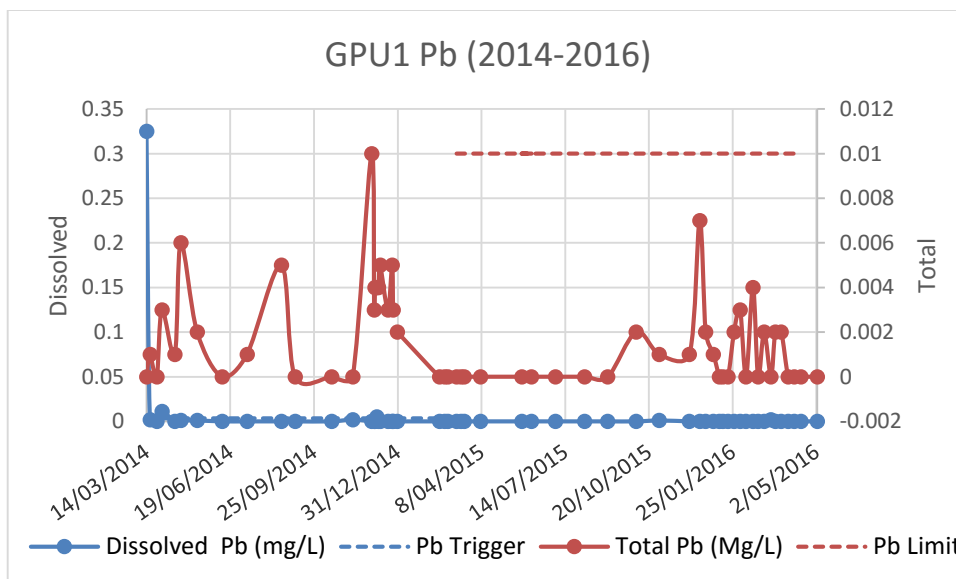


Figure 4- Pb at GPU1 during the period of TEP

Despite GPU1 being upstream of mining activity influences, it has recorded spikes of aluminium and lead contamination in flow events during the wet season.

3.2.1.2. GPA2

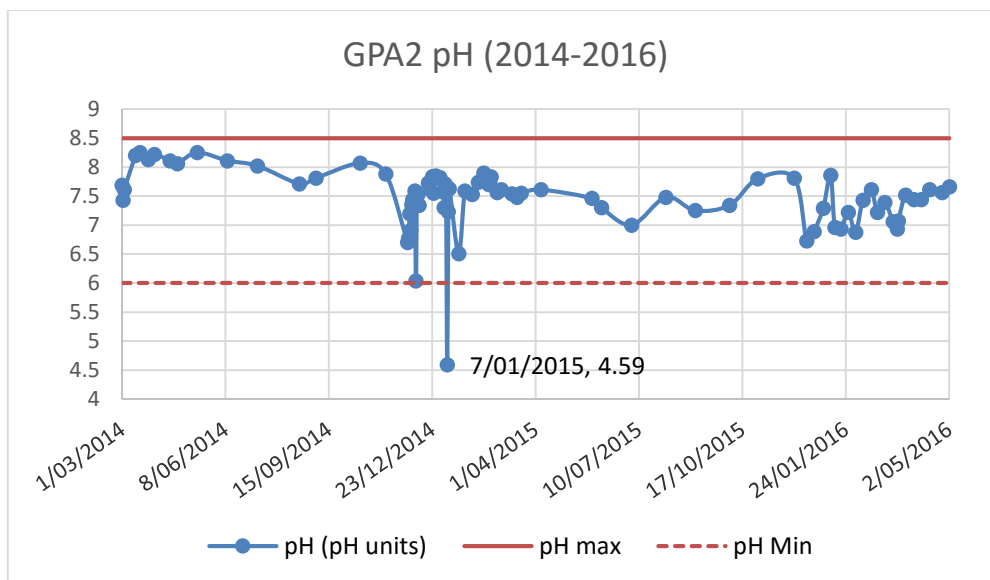


Figure 5- pH at GPA2 during the period of TEP

The event in which pH dropped below the minimum limit was recorded on 7-Jan-15. This was caused by an uncontrolled release from North Rock Sump, as a result of a severe rainfall event. Since this time, the North Rock Sump pumping system has been improved by Capricorn Copper.

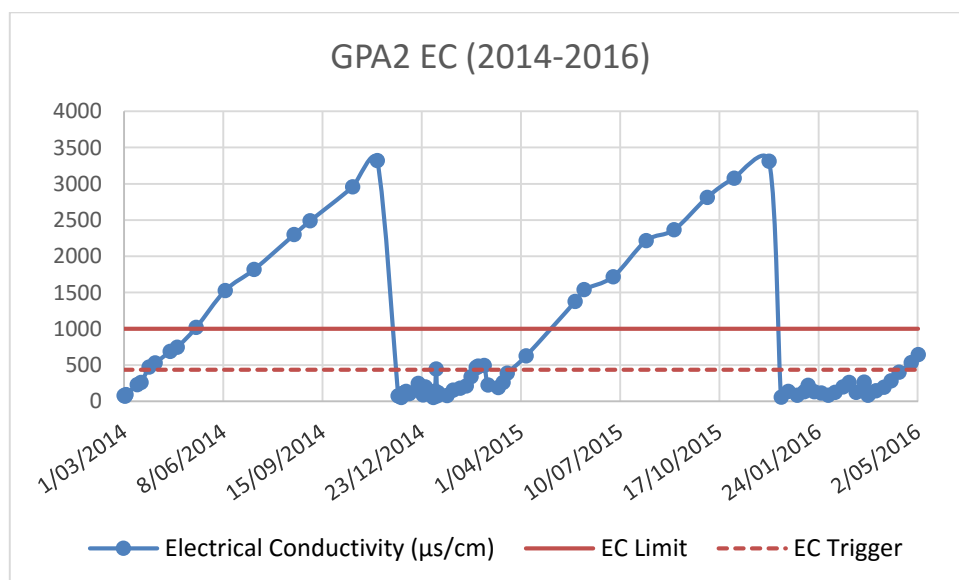


Figure 6- Electro conductivity at GPA2 during the period of TEP

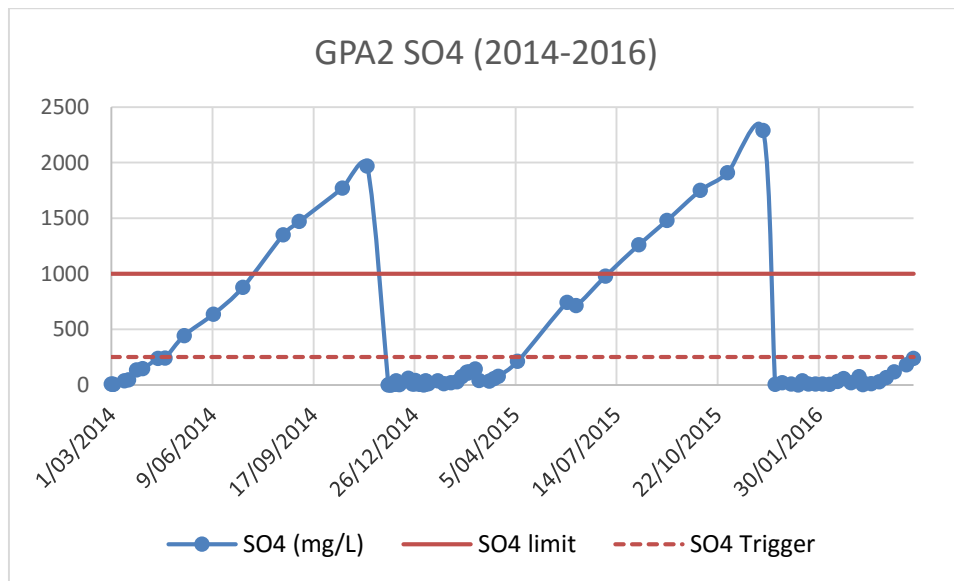


Figure 7- Sulphate at GPA2 during the period of TEP

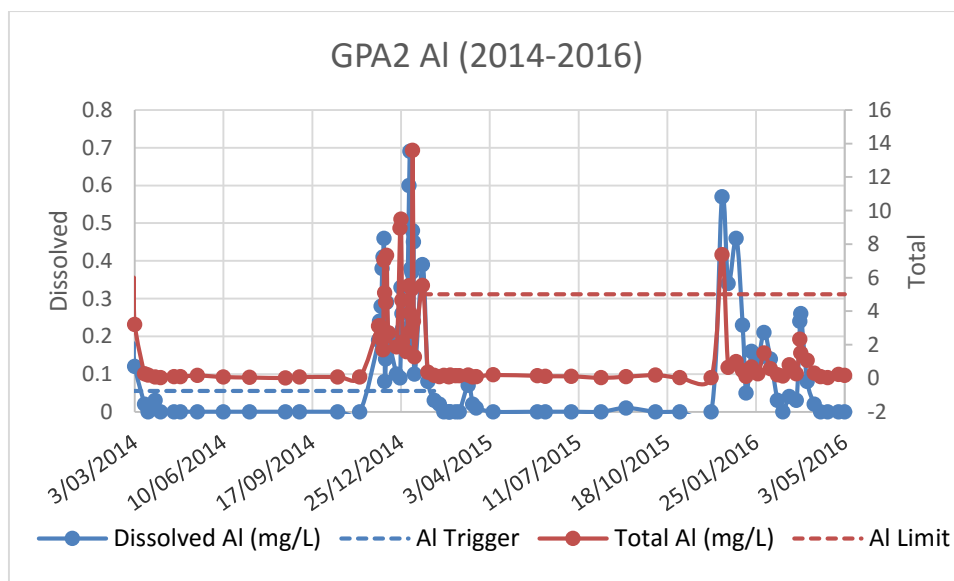


Figure 8- Aluminium at GPA2 during the period of TEP

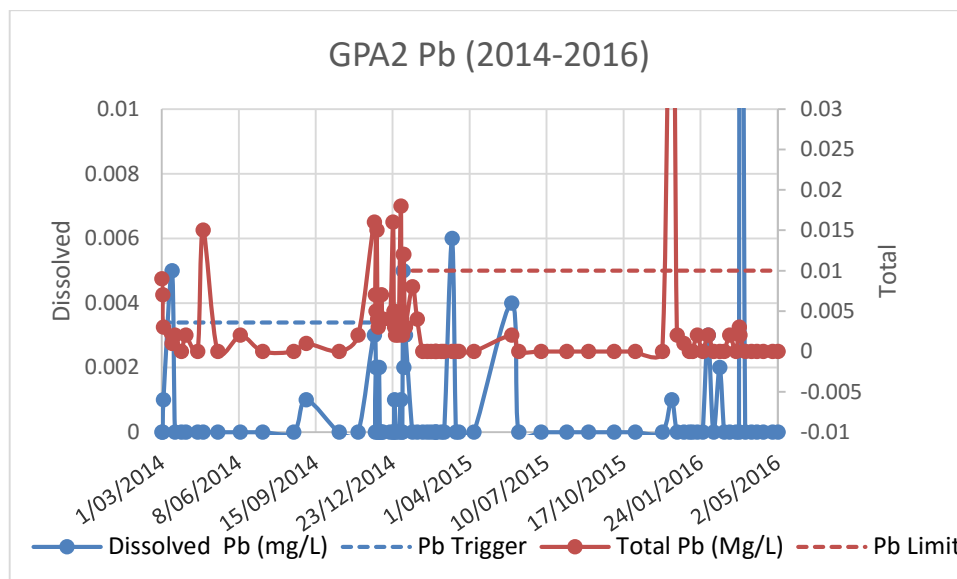


Figure 9- Pb at GPA2 during the period of TEP

The outlier value recorded at the end of December 2015 (0.08 mg/L) is not consistent with downstream readings or other local data (sample mal practice may be the cause).

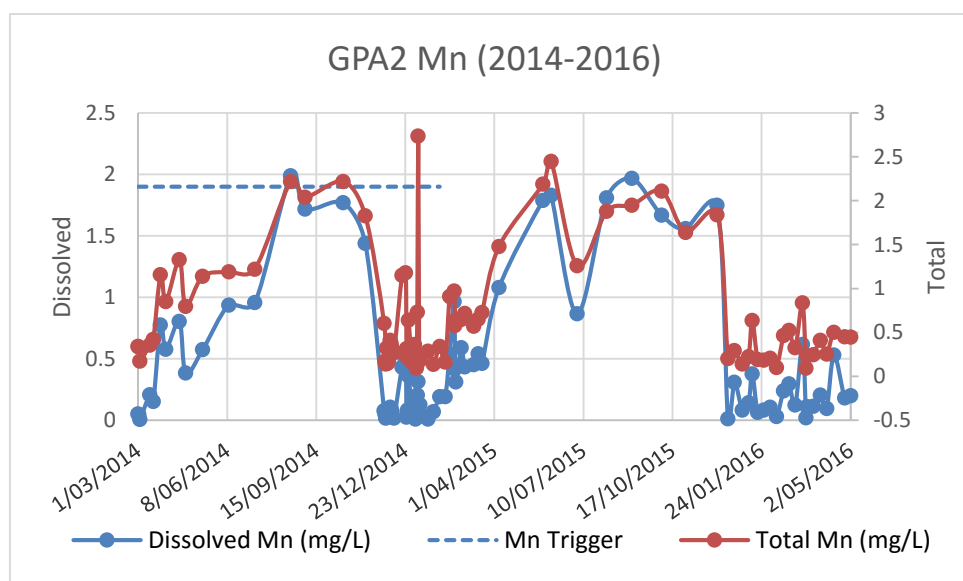


Figure 10- Mn at GPA2 during the period of TEP

3.2.1.3. GPA5

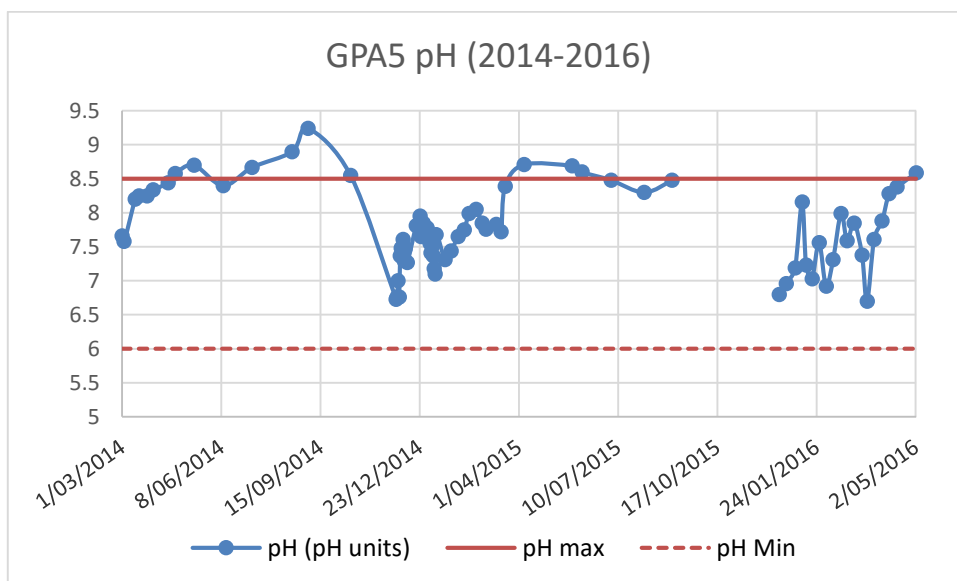


Figure 11- pH at GPA5 during the period of TEP

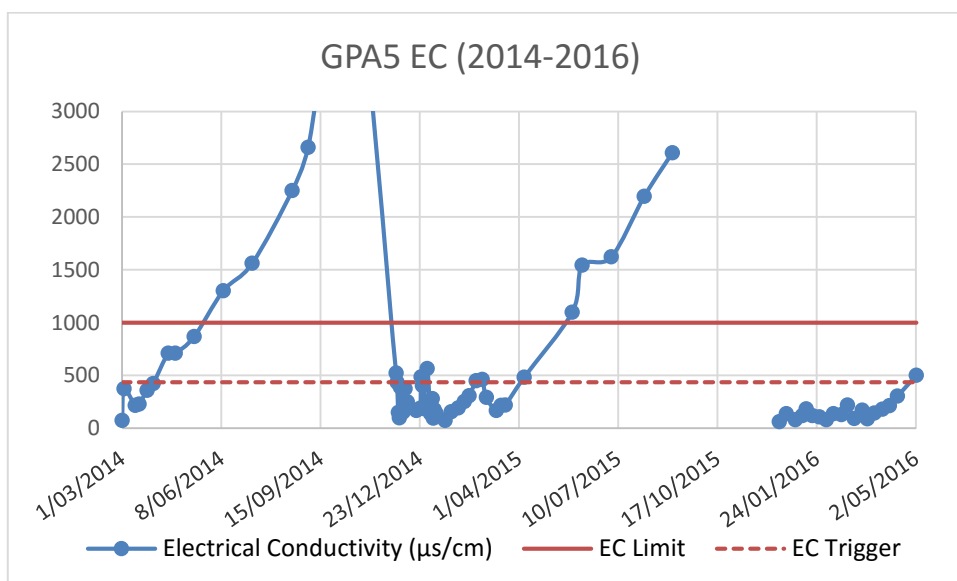


Figure 12- Electro conductivity at GPA5 during the period of TEP

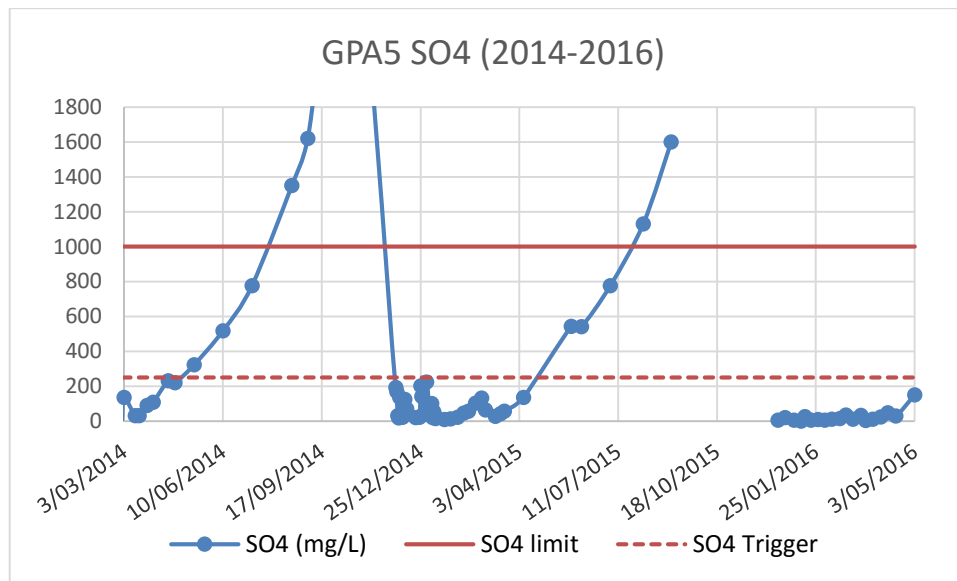


Figure 13- Sulphate at GPA5 during the period of TEP

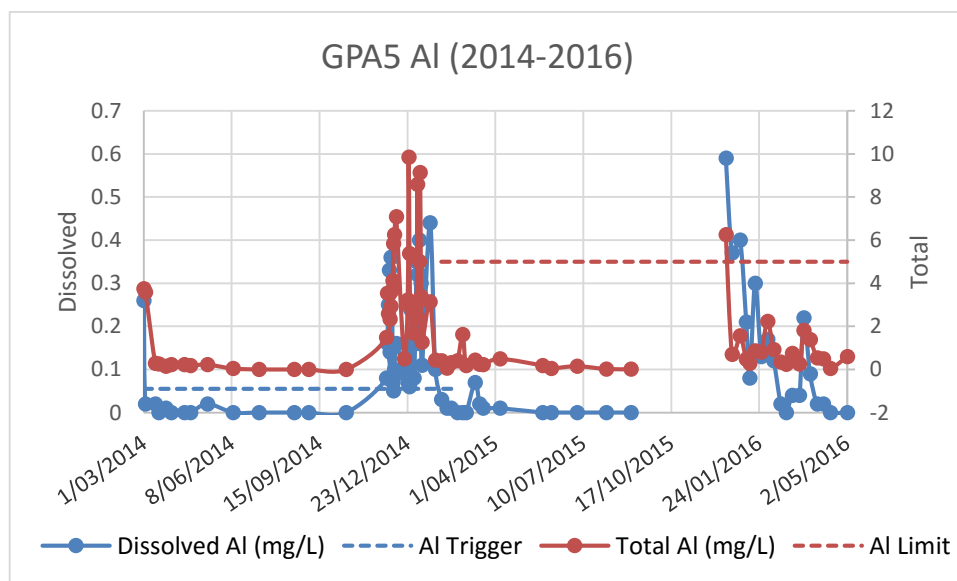


Figure 14- Aluminium at GPA5 during the period of TEP

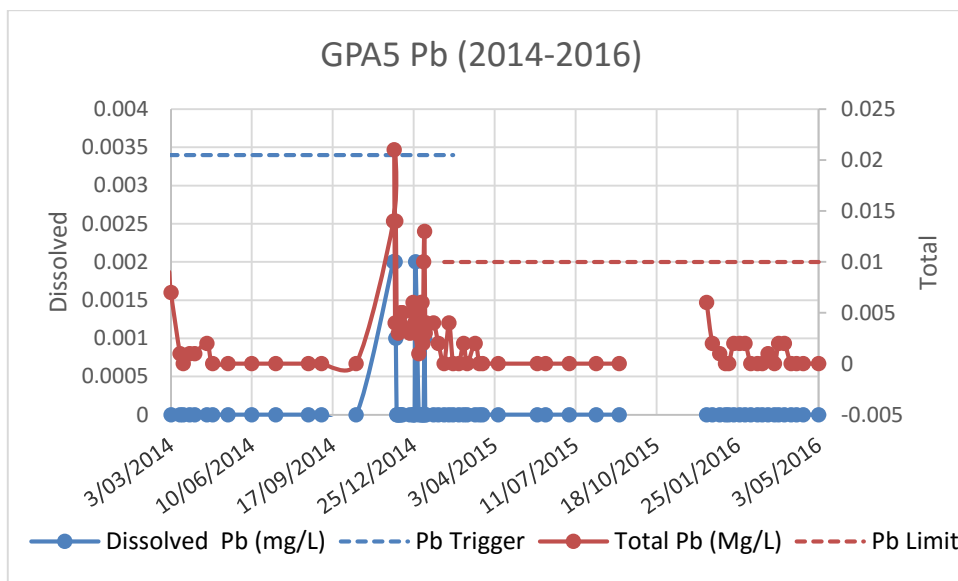


Figure 15- Lead at GPA5 during the period of TEP

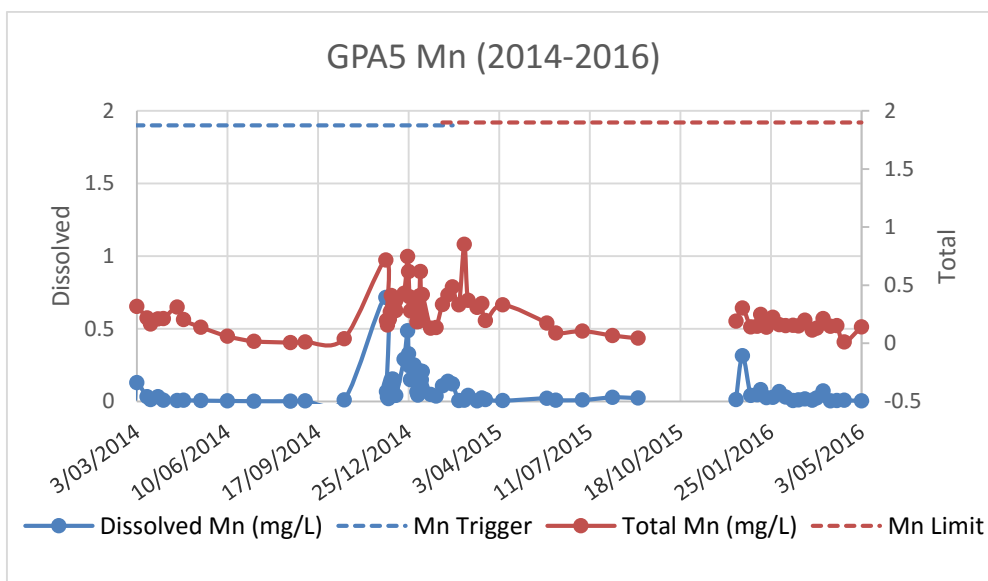


Figure 16- Manganese at GPA5 during the period of TEP

3.2.1.4. GPA7

GPA7 sample site is located between GPD1 and GPA5, 100 metres upstream of Greenstone Creek's convergence with Gunpowder Creek. This site is only sampled when access to GPD1 is closed due to Gunpowder Creek's water level.

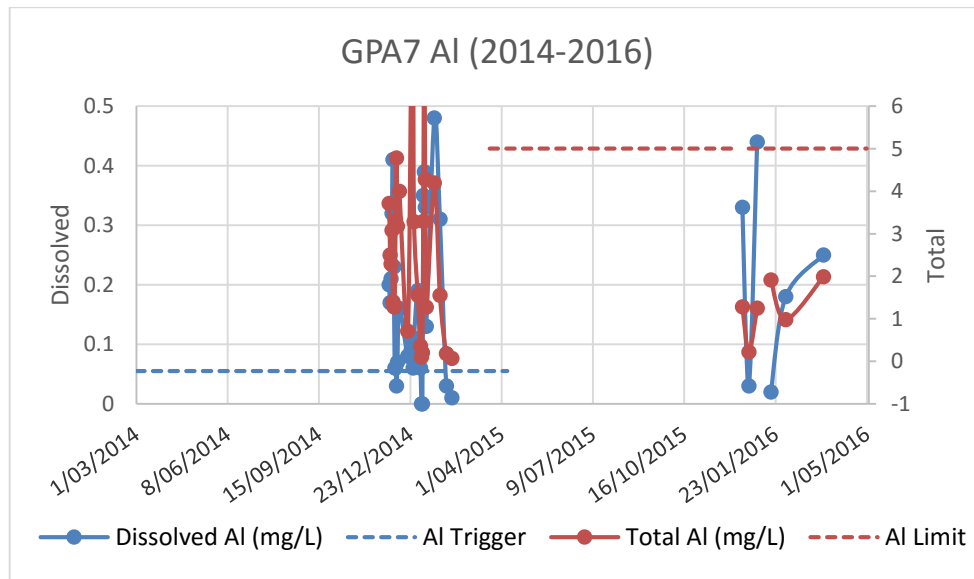


Figure 17- Aluminium at GPA7 during the period of TEP

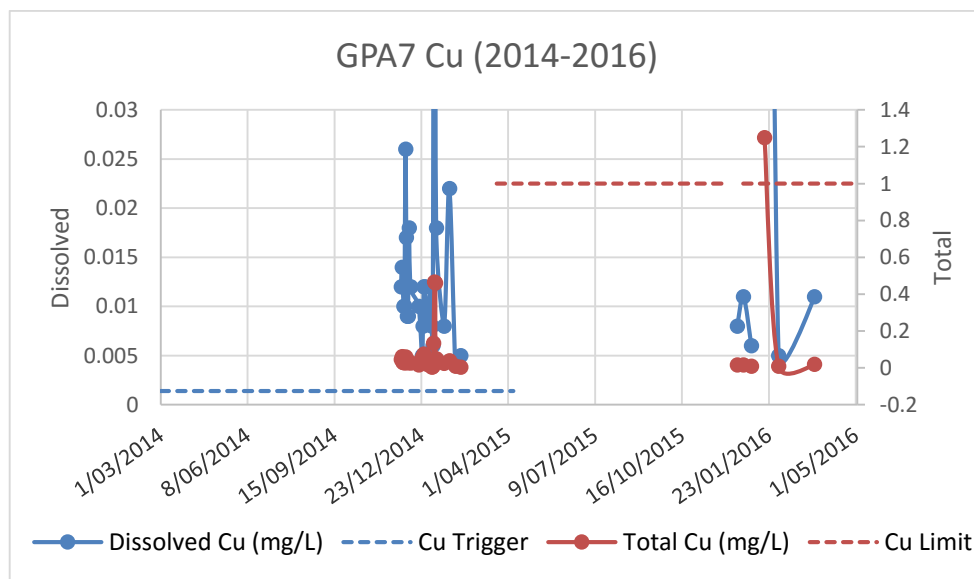


Figure 18- Copper at GPA7 during the period of TEP

Copper level has exceeded contaminant limit once as result of an uncontrolled release at GPA6 caused by a severe rainfall event.

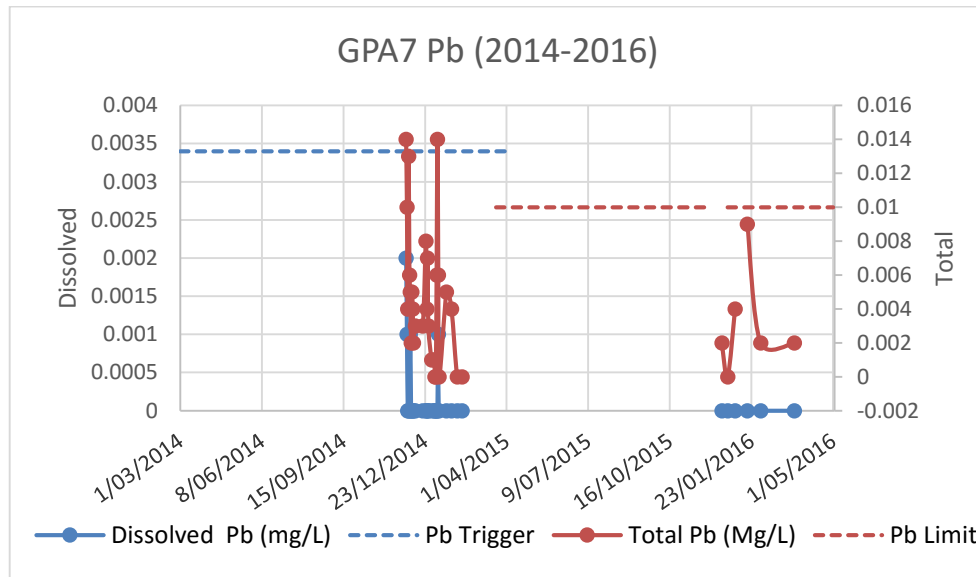


Figure 19- Lead at GPA7 during the period of TEP

3.2.1.5. GPD1

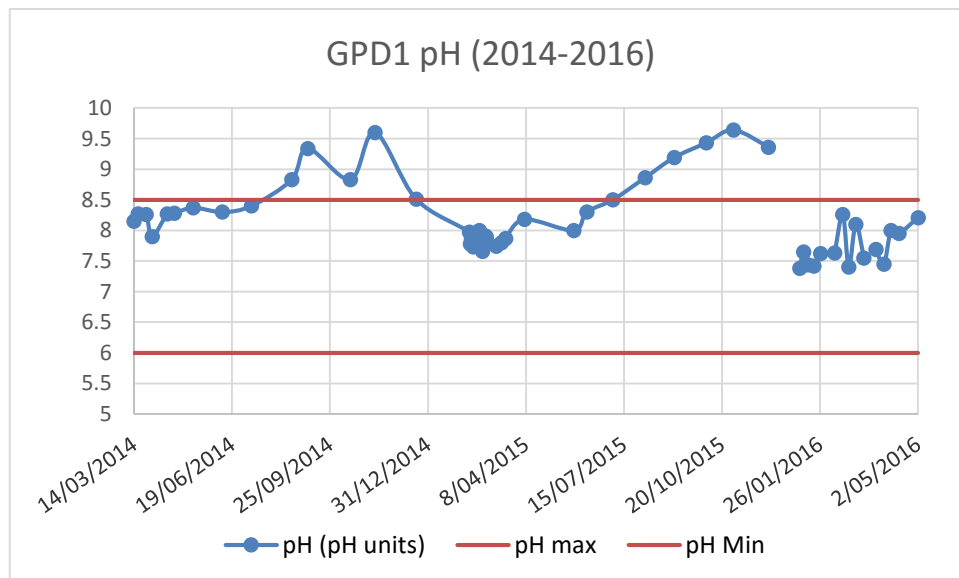


Figure 20- pH at GPD1 during the period of TEP

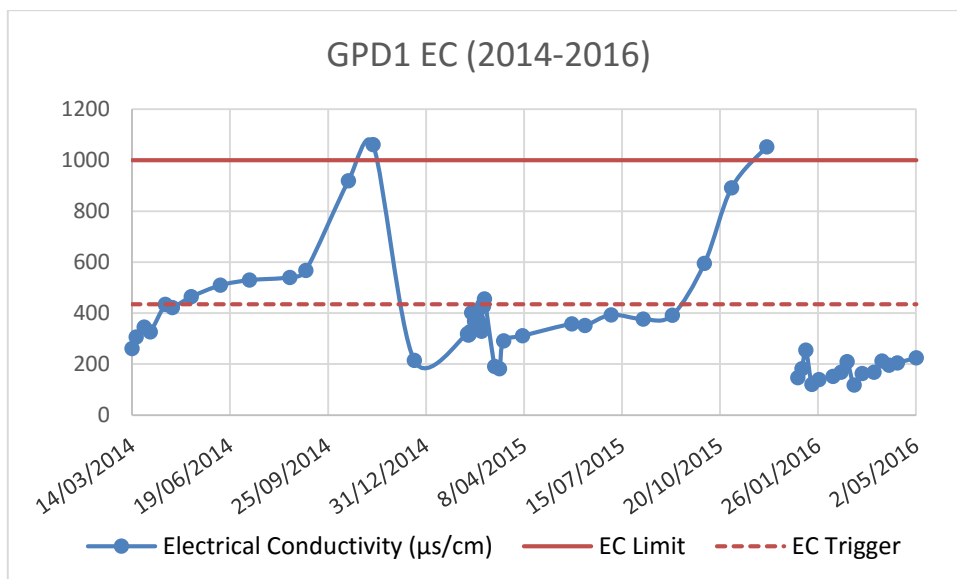


Figure 21- Electrical conductivity at GPD1 during the period of TEP

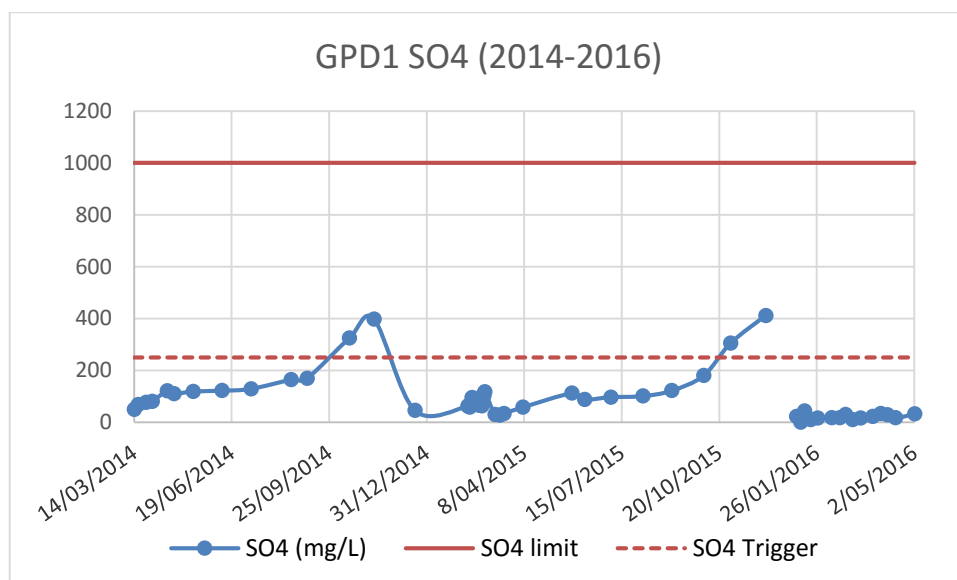


Figure 22- Sulphate at GPD1 during the period of TEP

3.2.2. Magazine Creek and Green Stone Creek

3.2.2.1. MGU1

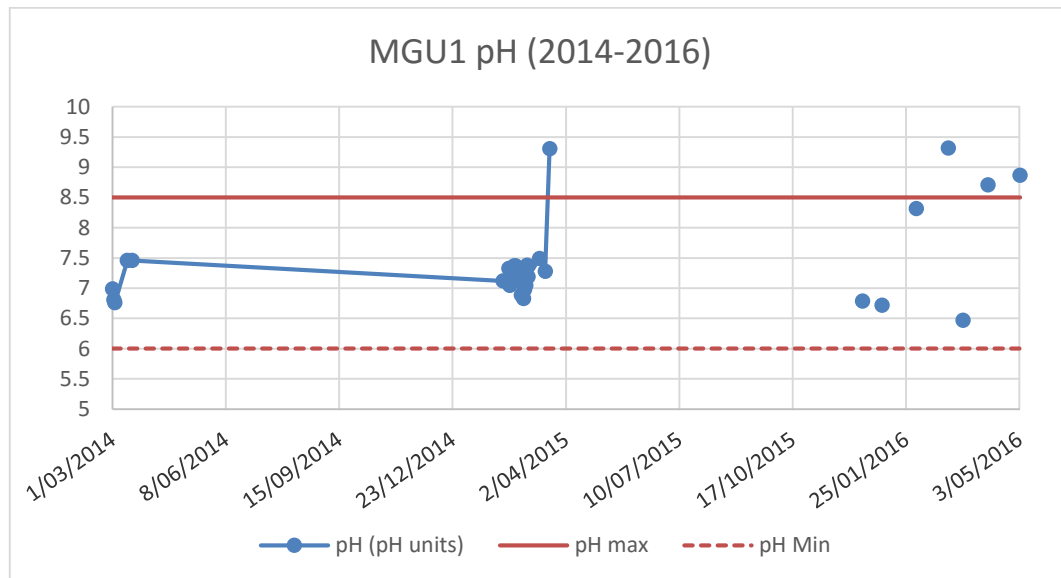


Figure 23- pH at MGU1 during the period of TEP

The short number of samples from MGU 1 is due to the limited presence of water in this site. Elevated pH levels are recorded when the water body is very shallow and small.

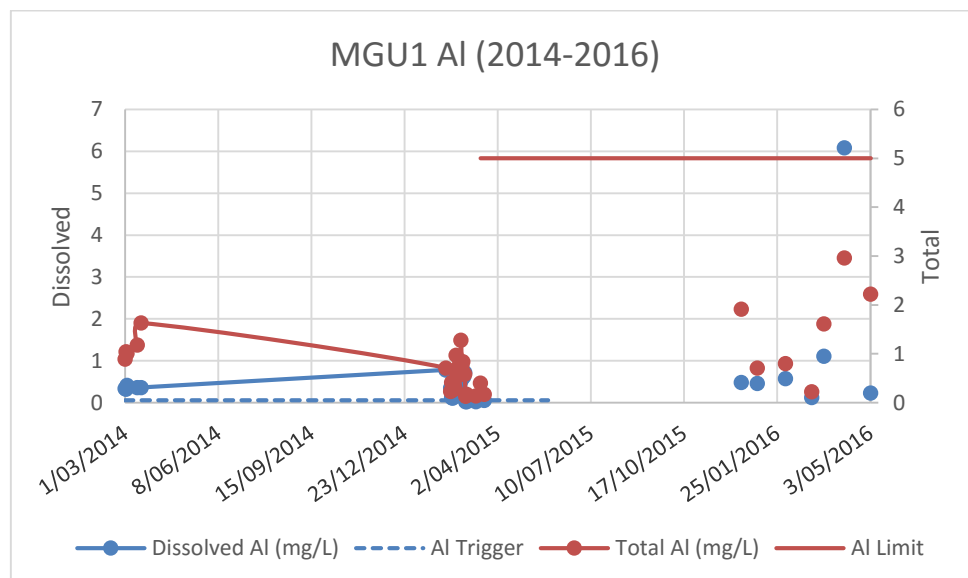


Figure 24- Aluminium at MGU1 during the period of TEP

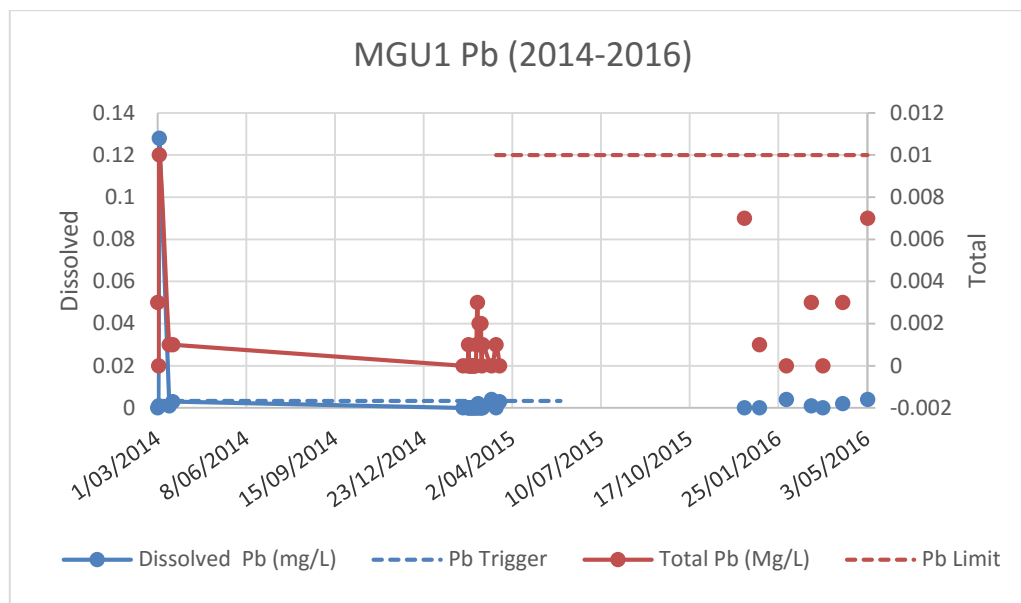


Figure 25- Lead at MGU1 during the period of TEP

3.2.2.2. MGA1

MGA1 is a site with historical exceedances during wet season flows. Flows are very limited in this site, occurring normally during and after severe rainfall events. A series of sumps have been placed upstream to contain contaminated runoff. Despite the efforts to reduce contaminant load entering this site, whenever there is water flow there is mobilisation of contaminants.

This site dataset has a small population due to dry conditions for most of the wet season.

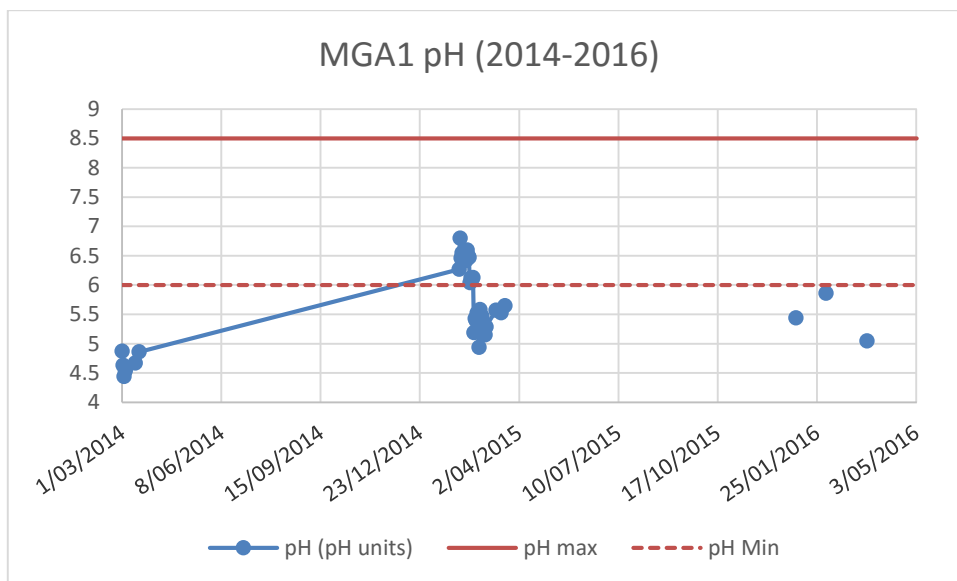


Figure 26- pH at MGA1 during the period of TEP

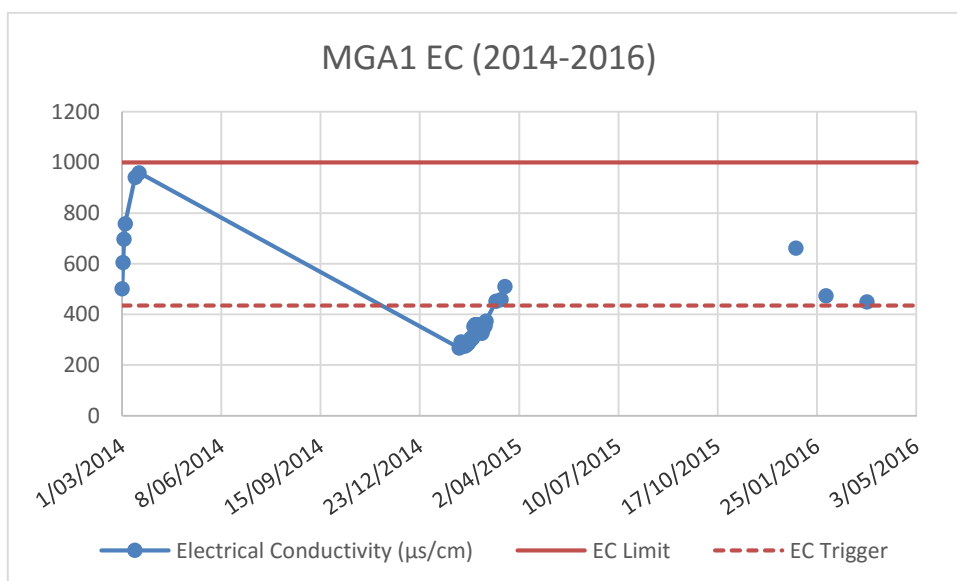


Figure 27- Electrical conductivity at MGA1 during the period of TEP

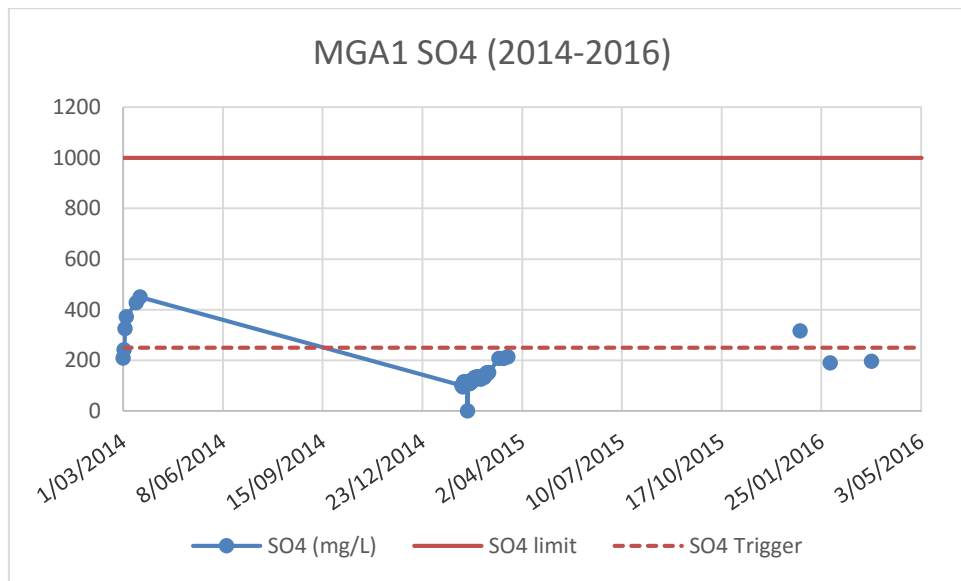


Figure 28- Sulphate at MGA1 during the period of TEP

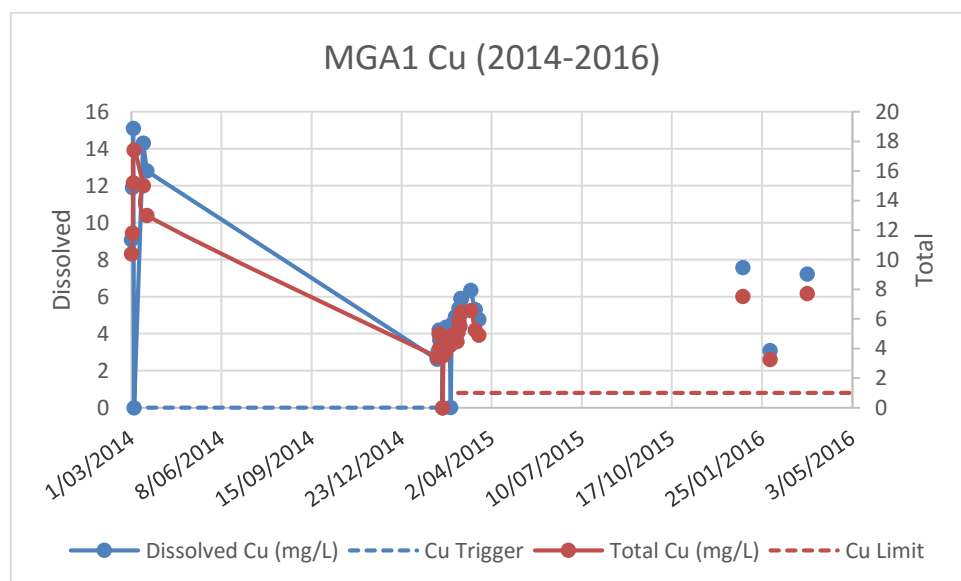


Figure 29- Copper at MGA1 during the period of TEP

3.2.2.3. GS2

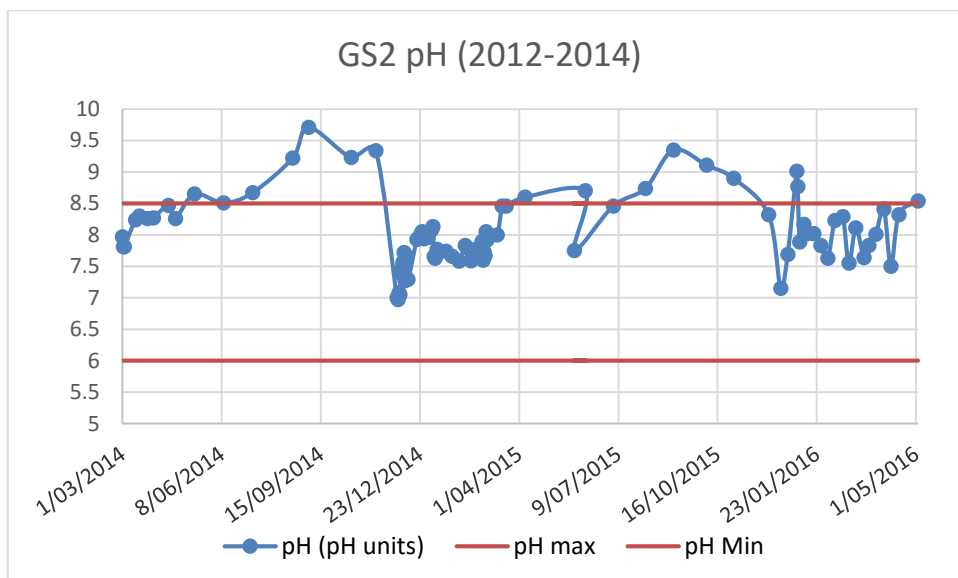


Figure 30- pH at GS2 during the period of TEP

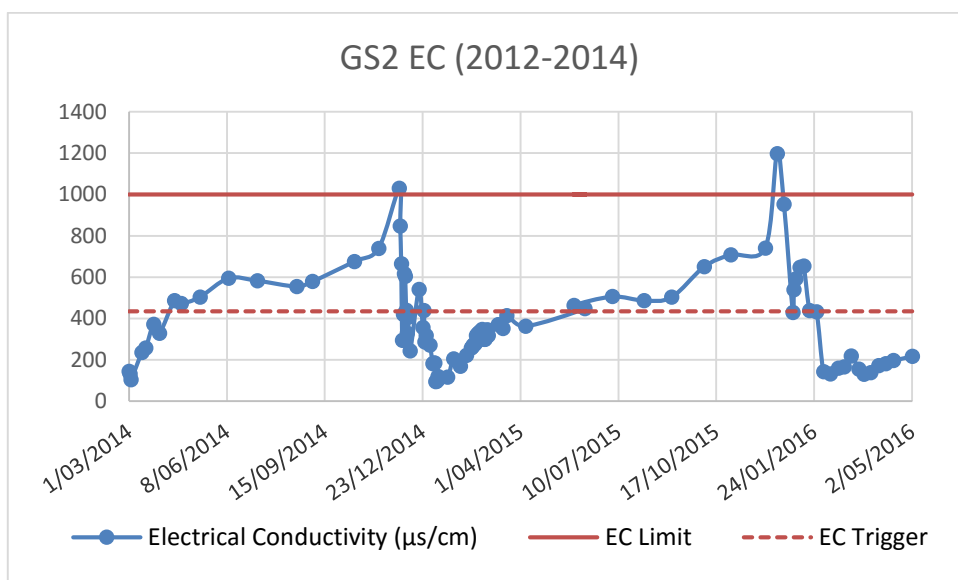


Figure 31- Electrical conductivity at GS2 during the period of TEP

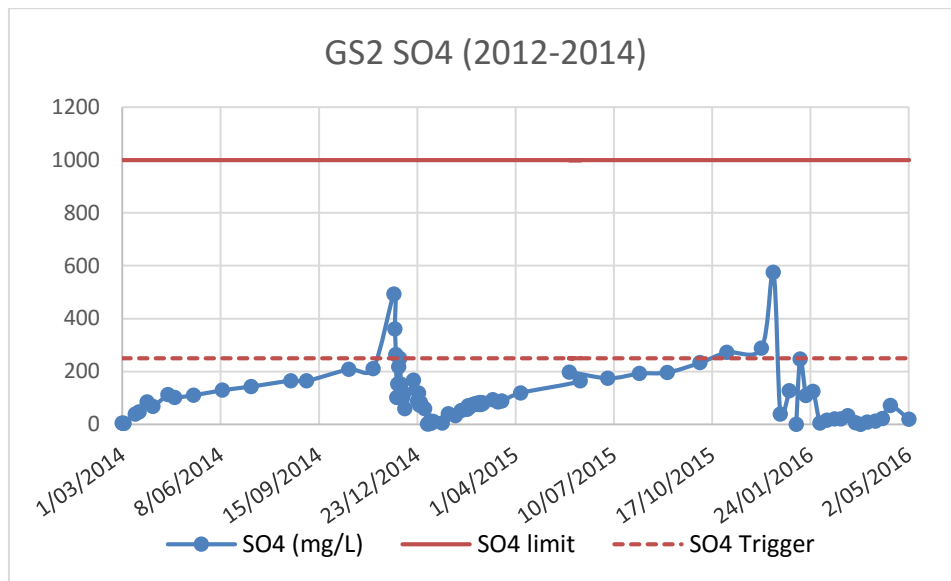


Figure 32- Sulphate at GS2 during the period of TEP

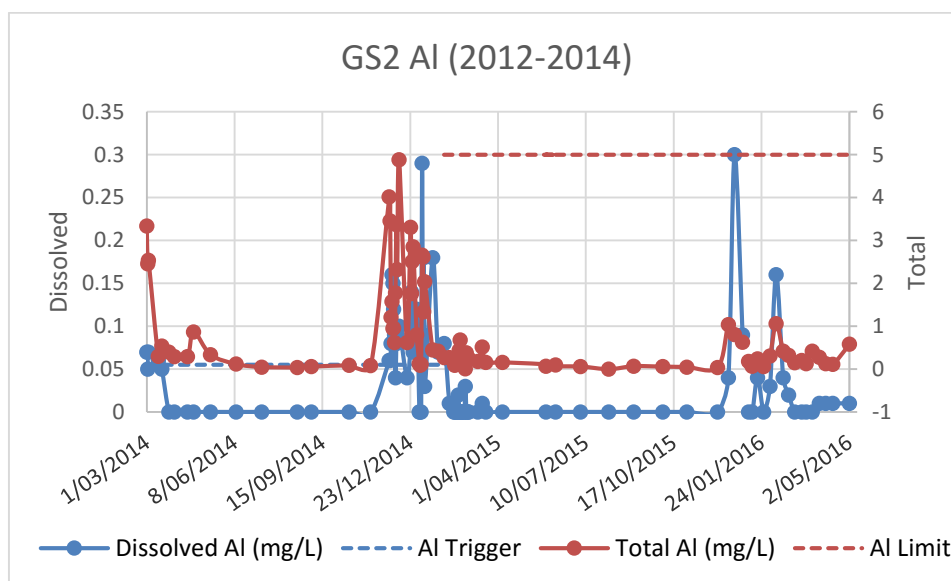


Figure 33- Aluminium at GS2 during the period of TEP

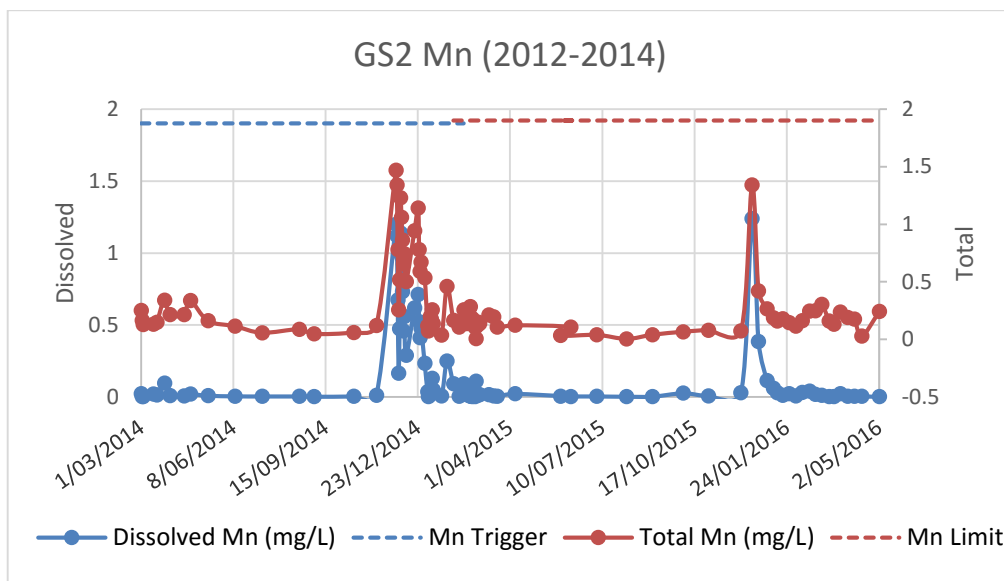


Figure 34- Manganese at GS2 during the period of TEP

4. EA contaminant limit exceedances

The transitional environmental program certificate of approval demarks 3 separate section of waterway assessment. Below are exceedances recorded and reported to DEHP during the life of the TEP.

3.1. Section 1

The tables below detail number of exceedances recorded per parameter per site.

Table 2- Number of SO4 exceedances in Section 1

SO4					
	GPU1	GPA2	GPA5	GPA7	Total
2014	0	4	3	0	7
2015	0	5	2	0	7
2016	0	0	0	0	0

Table 3- Number of pH exceedances in Section 1

pH				
	GPU1	GPA2	GPA5	GPA7
2014	0	0	6	0
2015	2	1	3	0
2016	0	0	1	0

All exceedances were alkaline.

Table 4- Number of Al exceedances in Section 1

Al				
	GPU1	GPA2	GPA5	GPA7
2014	3	0	5	3
2015	1	1	4	1
2016	0	0	0	0

Aluminium exceedances have been recorded upstream mine site influence area, suggesting exceedances recorded on sites adjacent to mine site are partly influenced by upstream catchment.

Table 5- Number of Cu exceedances in Section 1

Cu				
	GPU1	GPA2	GPA5	GPA7
2014	0	0	0	0
2015	0	1	0	0
2016	0	0	0	1

Table 6- Number of Pb exceedances in Section 1

Pb				
	GPU1	GPA2	GPA5	GPA7
2014	2	4	3	2
2015	0	4	1	1
2016	0	1	0	0

3.2. Section 2

Table 7- Number of pH exceedances in Section 2

pH			
	MGU1	MGA1	GS2
2014	0	6	7
2015	1	16	6
2016	3	3	3

Table 8- Number of Cu exceedances in Section 2

Cu			
	MGU1	MGA1	GS2
2014	1	6	0
2015	0	33	0
2016	0	3	0

Table 9- Number of Al exceedances in Section 2

Al			
	MGU1	MGA1	GS2
2014	0	0	0
2015	0	0	0
2016	1	0	0

Table 10- Number of Pb exceedances in Section 2

Pb			
	MGU1	MGA1	GS2
2014	1	0	1
2015	0	0	0
2016	0	0	0

3.3. Section 3

Table 11- Number of pH and Pb exceedances in Section 3

GPD1		
	pH	Pb
2014	5	1
2015	5	2
2016	0	0

5. Conclusion

As the Department is aware, Capricorn has engaged consultants NRA, to execute a comprehensive Environmental Compliance Strategy and Program. Capricorn has commissioned this program to address all site compliance issues with the view that the TEP and associated conditions will be addressed also.