NORTHERN STAR
RESOURCES LIMITED

February 24, 2022
COR-22-021
Via Electronic Submittal

Alaska Department of Environmental Conservation
Division of Water, Compliance Program
555 Cordova Street
Anchorage, AK 99501

Re: **Northern Star (Pogo) LLC 2021 Annual Quarter Monitoring Report**

To whom it may concern:

Enclosed is Northern Star (Pogo) LLC Annual 2021 Activity and Monitoring Report. This report is prepared to fulfill the requirements of the *Alaska Department of Natural Resources (ADNR) Pogo Mine Millsite Lease ADL416949*, *Alaska Department of Environmental Conservation (ADEC) APDES Permit AK0053341*, and *ADEC Waste Management Permit 2018DB0001*. This report covers the period from January 1, 2021 through December 31, 2021.

If you have any questions, please contact James Meyers, Senior Environmental Coordinator at 907-895-2879 or email him at jmeyers@nsrltd.com.

Sincerely,

Micheal Eckert
General Manager

Enclosure: Annual Pogo Mine Water Quality Monitoring Report, 2021

cc: Tim Pilon, ADEC (via ZENDTO)
Brent Martellaro, ADNR (via ZENDTO)
Kate Harper, ADNR (via ZENDTO)
dec-wqreporting@alaska.gov (via ZENDTO)

2021 ANNUAL MONITORING REPORT

NORTHERN STAR (POGO) LLC

Submitted To:

Alaska Department of Environmental Conservation
Division of Water, Compliance Program
555 Cordova Street
Anchorage, Alaska 99501

Alaska Department of Natural Resources
Division of Mining, Land, and Water
550 West 7th Avenue, Suite 900D
Anchorage, AK 99501-3557

Prepared by:

Northern Star (Pogo) LLC
P.O. Box 145
Delta Junction, Alaska 99737

February 23, 2022

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[SUBMITTED ELECTRONICALLY VIA ALASKA ZENDTO (STATE OF ALASKA)]

ACRONYMS

AAC:	Alaska Administrative Code
ADEC:	Alaska Department of Environmental Conservation
ADNR:	Alaska Department of Natural Resources
APDES:	Alaska Pollutant Discharge Elimination System
BOD:	Biological Oxygen Demand
cfs:	Cubic Feet Per Second
CIP:	Carbon-in-Pulp
DCS:	Distributed Control System
DSTF:	Dry Stack Tailings Facility
DMR:	Discharge Monitoring Report
gpm:	Gallons Per Minute
MDL:	Method Detection Limit
ML:	Method Limit
MWTP#3:	Mine Water Treatment Plant #3
NWP:	Nationwide Permit
ORTW:	Off-River Treatment Works
QAP:	Quality Assurance Plan
RTP:	Recycle Tailings Pond
SCW:	Seepage Collection Wells
STP:	Sewage Treatment Plant
TSS:	Total Suspended Solids
TDS:	Total Dissolved Solids
TWUA:	Temporary Water Use Authorization
WAD:	Weak Acid Dissociable
WQS:	Water Quality Standards
XRF:	x-ray fluorescence

1. INTRODUCTION

Northern Star (Pogo) LLC prepared this report to fulfill the requirements of the *Alaska Department of Environmental Conservation (ADEC) APDES Permit AK0053341 (7/27/17), Alaska Department of Environmental Conservation (ADEC) Waste Management Permit 2018DB0001 (5/24/2018), Alaska Department of Natural Resources (ADNR) Pogo Mine Millsite Lease ADL416949*, and *ADNR Plan of Operations Approval F20189500 (7/2/2020)*. This report addresses activities executed during the year of 2021. A General Location Map can be found in **Appendix A, Figure 1.1**. Graphs show data plotted on a log-scale axis and include the past six years of data. This report defines individual data sets and their relation to the detection limits and the ADEC Water Quality Standards (WQS).

2. 2021 MONITORING

A prescriptive environmental monitoring program is performed in accordance with State of Alaska permits and Pogo's approved *Pogo Mine Monitoring Plan* and *Quality Assurance Plan (QAP).*

The objectives of Pogo's monitoring programs are:

- To monitor the water quality of the effluent discharged from the facility,
- To establish a compliance trend for water quality in the Goodpaster River and the groundwater below the facility that can be correlated over time with mining activities or discharges from the facility.
- To monitor the Carbon-in-Pulp (CIP) tailings processes associated with the underground paste backfill, and,
- To monitor the flotation tailings and the materials placed in the Drystack Tailings Facility (DSTF).

Samples collected from the Mine Water Treatment Plant #3 (MWTP#3), groundwater stations, surface water stations, the Sewage Treatment Plant (STP) and the Off-River Treatment Works (ORTW) effluent were submitted to Energy Laboratories, Inc. and Pollen Environmental. Samples collected for PC002, monitoring mineralized waste rock, and PC003, monitoring flotation tailings, were analyzed by ALS Chemex. Annual Whole Effluent Toxicity (WET) Test samples were submitted to TRE Environmental and Eurofins Test America Laboratory, Seattle.

2.1 Summary

The WQS graphs for Cadmium, Copper, Lead, Nickel, Silver and Zinc have been updated to take the sample specific water hardness value into account. Previous reports used the lowest possible WQS for those constituents without sample hardness being considered.

A summary of the 2021 monitoring results shows:

APDES Permit:

- **Outfall 001:** Pogo reported one exceedance and atypical event at Outfall 001. Samples collected on May 2nd, 16th and 23rd showed elevated background levels of Mercury in influent Goodpaster River water (presumably from naturally occurring mercury minerals). On November 1 pump withdrawal rates rose above 15,000 GPM for approximately 19 hours. Refer to **Section 2.2.2** for more detail.
- **Outfall 011:** Pogo reported no exceedances at Outfall 011 during 2021. Refer to **Section 2.2.1** for more detail.
- **Outfall 002:** Pogo reported no exceedances at Outfall 002 during 2021. Refer to **Section 2.2.3** for more detail.

- **Surface Water:** No adverse trends were observed for the year. Refer to **Section 2.3.1** for more detail.
- **Whole Effluent Toxicity:** WET Testing took place in June. Chronic bioassays were conducted by two laboratories concurrently. All final test results were within the permit limits. Refer to **Section 2.3.2** for more detail.
- **Fish Tissue:** Annual fish tissue sampling was completed in September. Arsenic concentrations were elevated in two specimens upstream of the mine. No other adverse trends were observed. Refer to **Section 2.3.3** for more detail.

Waste Management Permit:

Ground Water

- **2011 Series Wells:** Two wells are located below the Drystack Tailings Facility: MW11-001A and MW11-001B. The wells monitor groundwater downstream of the DSTF and upstream of the Recycled Tailings Pond (RTP). TDS concentrations were above WQS in MW11-001A on August 13 and MW11-001B on June 11. Nitrate was above WQS for all of 2021 in both wells. Refer to **Section 2.4.1** for more detail.
- **500 Series Wells:** Three wells are located below the RTP Dam: MW12-500, MW12-501, and MW12-502. The wells monitor groundwater downstream of the RTP seepage collection well (SCW) system. Chloride, nitrate, and sodium levels were detected above trigger limits, arsenic and nitrate were above WQS. MW12-502 was above the trigger limit for Potassium on October 29th. Sodium has an increasing trend over the sampling period of 2014-2021. Refer to **Section 2.4.3.1** for more detail.
- **2018 Series Wells:** The 2018 series wells were installed in October 2018 and are sampled quarterly, with the exception of MW18-001 which is sampled monthly. MW18-001 had concentrations of arsenic and nitrate, above WQS. Nitrate is above WQS in MW18-002. MW18-003A and MW18-003B were installed as a nested pair of wells at the end of Liese Valley. Samples from MW18-003A indicate that Nitrate was above WQS in January at 13.7 mg/L but decreased below WQS for the rest of 2021. MW18-003B samples had concentrations of iron and manganese above the WQS. Refer to **Section 2.4.3.2** for wells MW18-001 and MW18-002, and to **Section 2.4.4.2** for wells MW18-003A and MW18-003B.
- **200 Series Wells:** MW11-216 is located downgradient of the ore body to monitor groundwater quality and is sampled semi-annually. A sample was collected August 14th, 2021. All analytes came back below WQS. Refer to **Section 2.4.4.1** for more detail.

Process Control

- **PC001:** PC001 monitors CIP tails prior to use in paste backfill. All samples are within limits and conditions set forth within the permit. Refer to **Section 2.5.3** for more detail.
- **PC002 and PC003 Solids:** PC002 samples monitor mineralized waste rock that is placed within the DSTF. PC003 Solids samples monitor flotation tailings that are placed within the DSTF. No adverse trends were observed. Refer to **Sections 2.5.4 and 2.5.5** for more detail.
- **PC003 Liquid:** PC003 Liquid samples monitor interstitial water pressed from the flotation tailings prior to placement within the DSTF. The following constituents were above the Target Operating Ranges: Iron in June, September and December; Copper in September and December; WAD CN and TKN in September; Mercury was at or over the operating limit for all 4 quarters. No other adverse trends were observed during 2021. Refer to **Section 2.5.6** for more detail. A discussion of the results for each sampling program is provided below.

2.2 Treated Effluent Monitoring

ADEC APDES AK0053341 (8/1/17), Appendix A, 3.0

Treated effluent data are submitted to ADEC monthly via the Discharge Monitoring Reports (DMRs) under the APDES Permit. The monitoring locations for treated effluent are shown on **Appendix A, Figure 1.2**, as Outfall 011, 001, and 002.

2.2.1 Outfall 011 – Treated Effluent from Mine Water Treatment Plant

ADEC APDES AK0053341 (8/1/17), 1.4

Groundwater and drill water collected from the underground workings are sent to MWTP#3 (located near the 1525 portal). The treated effluent is returned for use underground, sent to the mill to be used as process water, or discharged to the ORTW. Surface runoff and groundwater are collected in the RTP. RTP water and mine water are sent to MWTP#3, treated, and then discharged to the ORTW, or directed to the mill through the RTP head tank for use as process water. Treated effluent was discharged to the ORTW during 2021 at an average 352 gpm. The volume of water discharged from Outfall 011 during 2021 is shown below in **Figure 1.**

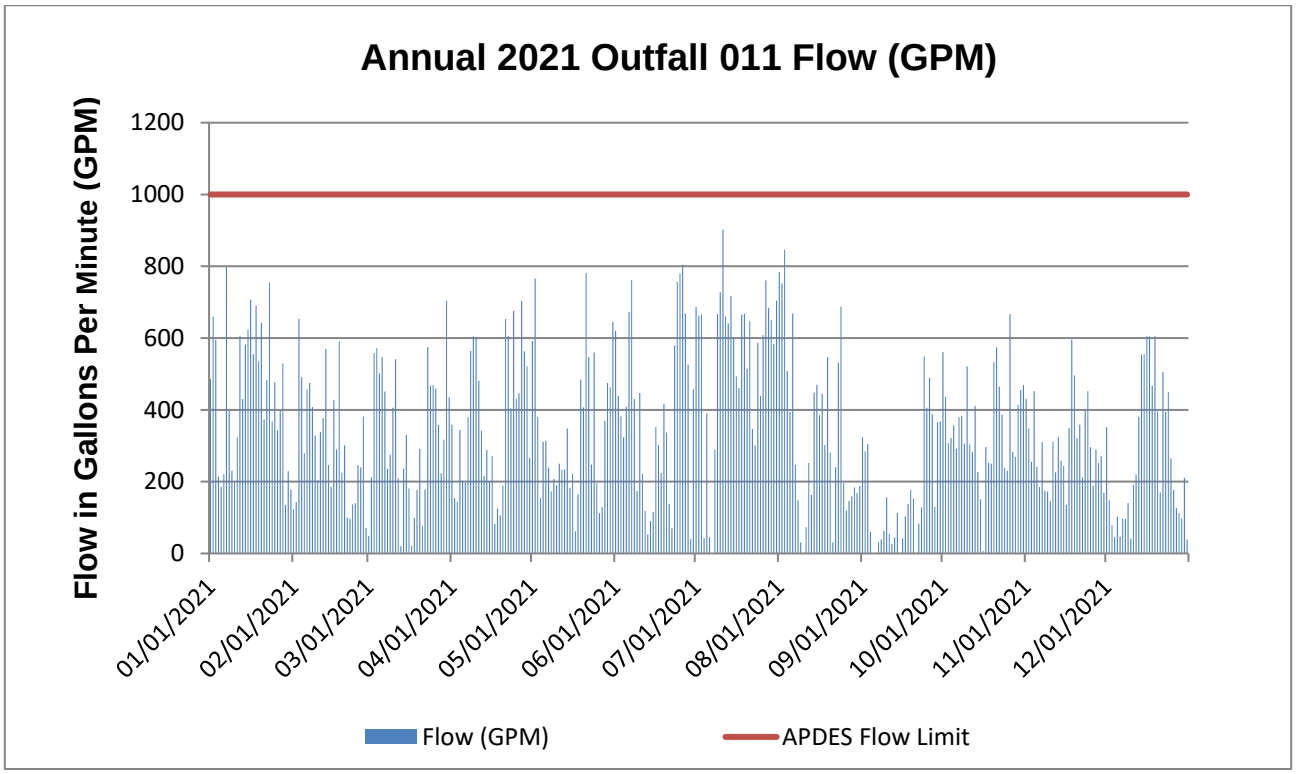


Figure 1: 2021 Annual MWTP#3 Outfall 011 Discharge to ORTW

Continuous pH data is collected at Outfall 011 along with weekly laboratory samples of WAD cyanide and quarterly laboratory samples for metals (arsenic, cadmium, copper, iron, lead, manganese, mercury, selenium, zinc), total suspended solids (TSS), hardness, and sulfate. All results are within the limits and conditions set forth in the permit. Outfall 011 has two continuous pH meters. pH readings taken during the year show compliance with permit limits. No adverse trends are reported for the year. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.2.2 Outfall 001 – Discharge from Off River Treatment Works

ADEC APDES AK0053341 (8/1/17), 1.3

Treated effluent from MWTP#3 is sent to the ORTW. After mixing in the ORTW, water flowed over the weir of Pond 2 (Outfall 001) into the Goodpaster River at an average of 13,746 gpm throughout 2021. The sampling location is at the weir. **Figure 2** presents the 2021 flow from Outfall 001.

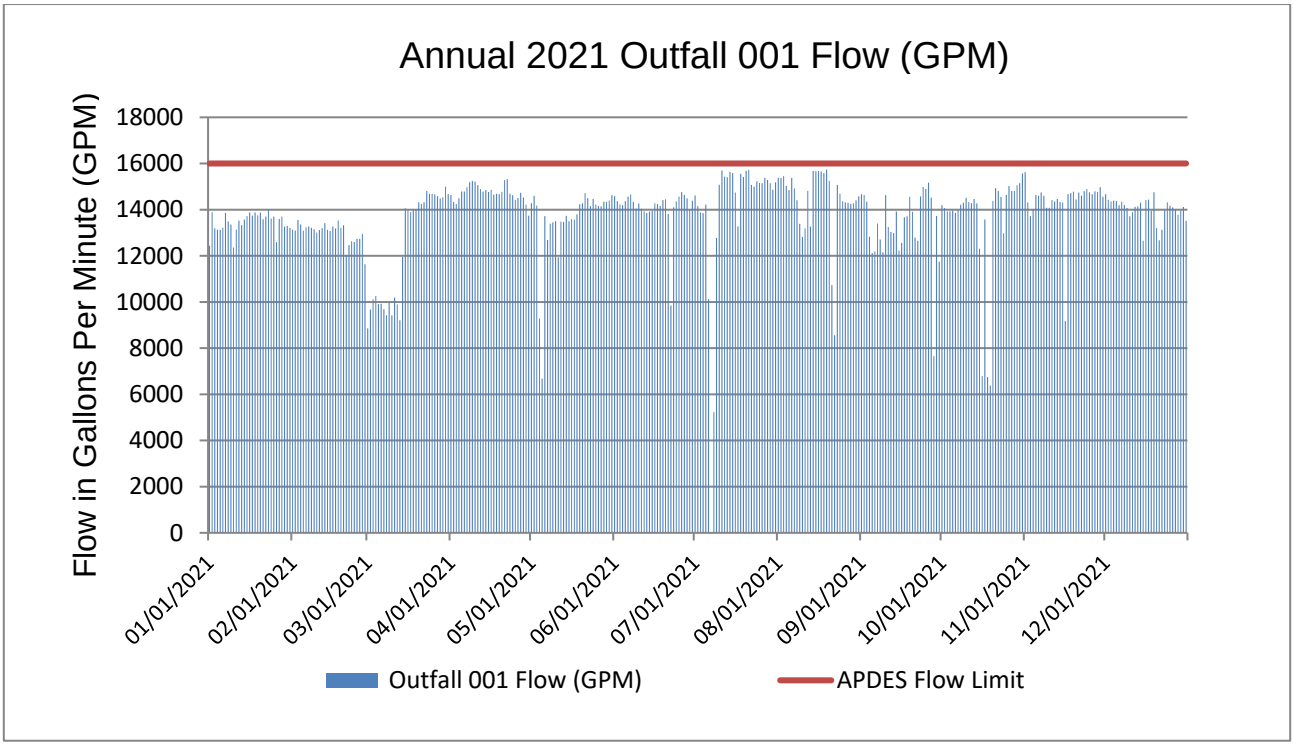


Figure 2: 2021 Annual Outfall 001 Discharge to Goodpaster River

Continuous turbidity data and twice-daily pH readings are collected along with weekly laboratory samples for copper, lead, manganese, WAD cyanide, pH, and temperature at Outfall 001. Monthly samples required by the permit include cadmium, mercury, zinc, hardness and lab turbidity

There was one exceedance and atypical event at Outfall 001 in 2021.

On May 2, 16, and 23, Mercury samples collected at the Goodpaster River inlet indicated that mercury concentrations (i.e., Goodpaster River) were higher than the allowable APDES Mercury discharge limit for Pogo Mine effluent. Consequently, ADEC determined that the natural conditions from the waters of the state, were of lower quality than the water quality criteria set out in 18 AAC 70.020(b).

On November 1, 2021, flow meters at Outfall 001 reported pump withdrawal rates above 15,000 gallons per minute for approximately 19 hours. The daily average flow at Outfall 001 was 15,623 gallons per minute (GPM), and 431 GPM at Outfall 011. The average water withdrawal from the Goodpaster River was 192 gallons over the 15,000 gallons per minute maximum allowed by the permit. Northern Star Water Operations ordered a new inline flowmeter, as well as implemented automated system preventative alarms to notify operators of high flow trends while working in the Mine Water Treatment Plant.

All 2021 WAD cyanide analytical results for Outfall 001 were 10 ug/L or less. None of the analytical results for WAD cyanide fell between the facility specific method limit (ML) of <20 ug/L and the facility specific method detection limit (MDL) of <10 ug/L. All other results are within the limits and

conditions set forth within the permit. Time series graphs are provided in **Appendix C** and show the change in concentration limits. Monitoring data is provided in **Appendix F.**

2.2.3 Outfall 002 – Treated Effluent from Sewage Treatment Plant

ADEC APDES AK0053341 (8/1/17), 1.5

The STP operated throughout 2021 with flows ranging between 4,858 and 35,932 gallons per day. The average flow during the period at Outfall 002 was 24,060 gallons per day. Daily field parameters were collected to assess quality of treated effluent. Monthly samples were also collected for metals (arsenic, cadmium, copper, lead, manganese, mercury, and zinc), biological oxygen demand (BOD_5), total suspended solids (TSS), fecal coliform, and nitrate/nitrite. **Figure 3** presents the gallons per day flow from Outfall 002 for 2021.

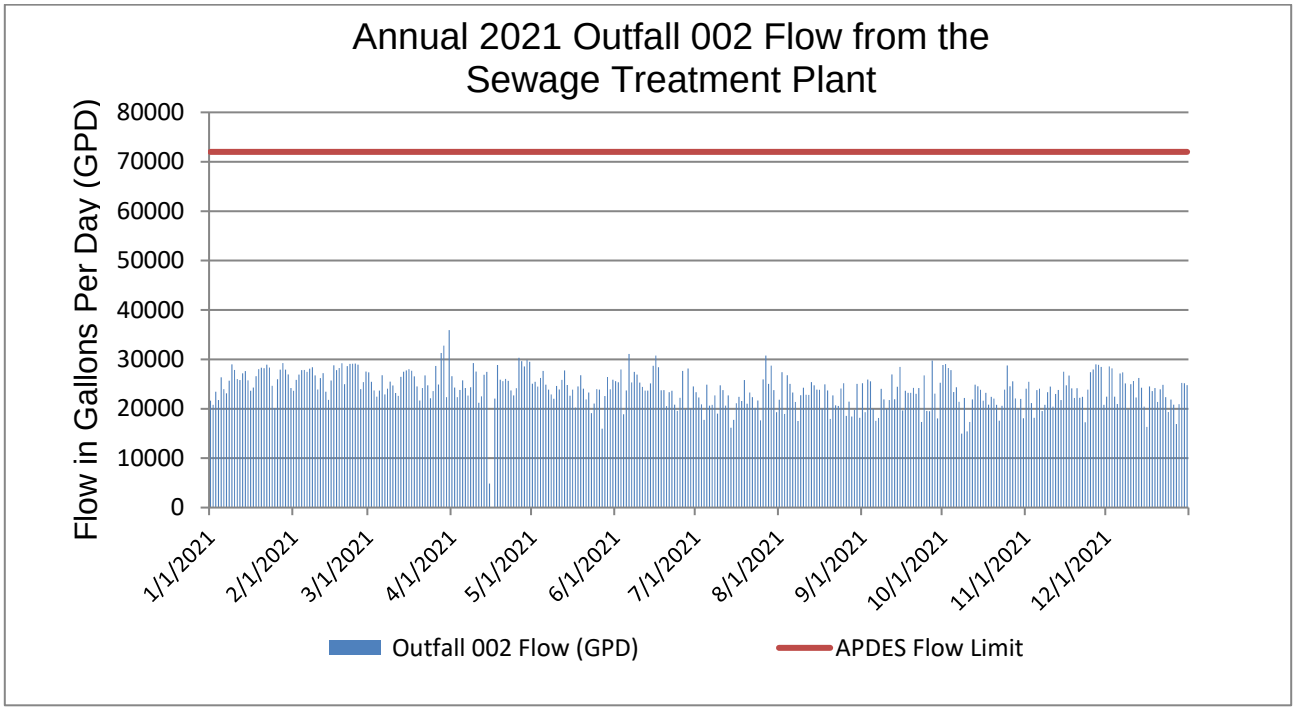


Figure 3: 2021 Annual Outfall 002 Discharge to Goodpaster River

Influent data from STP 002 were collected for BOD_5 and TSS on a quarterly basis to determine percent removal. All results were within the limits and conditions set forth in the permit. Time series graphs are provided in **Appendix C.** Monitoring data is provided in **Appendix F.**

2.3 Surface Water Monitoring

2.3.1 Goodpaster River

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.6.2; ADEC APDES AK0053341 (8/1/17), 1.8; Pogo Mine Monitoring Plan (7/20) 8.0

Six surface water stations are monitored to evaluate water quality along the Goodpaster River: SW01 and SW49 are located upstream of the Pogo Mine, SW41 is located downstream of Outfall 001, SW42 is downstream of Outfall 002, and SW15 and SW12 are located downstream from all

Pogo facilities. Surface water samples are analyzed six times a year for total metals (antimony, arsenic, cadmium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, and zinc) and WAD cyanide. Physical and aggregate properties of alkalinity, conductivity, hardness, nitrite plus nitrate, pH, total dissolved solids (TDS), turbidity, and temperature are also measured.

Surface water samples were collected on March 14, May 16, June 23, August 8, September 24, and December 7, 2021. All results were within the limits and conditions. No adverse trends were observed. The locations of the surface water monitoring stations are shown in **Appendix A, Figure 1.3.** Time series graphs are provided in **Appendix C**. Monitoring and historic data is provided in **Appendix F**.

2.3.2 Whole Effluent Toxicity

ADEC APDES Permit AK0053341 (8/1/17), 1.7

The annual WET test was conducted from June 21 to June 25 by TRE in Fort Collins, Colorado. A split of the same sample was also sent to Test America in Corvallis, Oregon. Results from both laboratories are presented in **Table 1**. All results were within the limits and conditions set forth within the permit. Laboratory reports are provided in **Appendix D**.

Table 1: Pogo Mine Whole Effluent Toxicity Testing 2021

Laboratory	Species	No Observed Effect Concentration (%)	Low Observed Effect Concentration (%)	Inhibition Concentration 25%	Toxicity Units Chronic	Was Toxicity Demonstrated TUc value > 2.0
TEST AMERICA	*Pimephales promelas*	100	>100	>100	<1	No
TRE	*Pimephales promelas*	100	>100	>100	<1	No

2.3.3 Fish Tissue

ADEC APDES Permit AK0053341 (8/1/17), 1.8.8

To assess long term trends in Goodpaster River quality, annual whole-body analyses of juvenile Chinook Salmon are required at monitoring sites both upstream (SW01) and downstream (SW12) from the project facilities. Juvenile Chinook salmon were collected from these two stations from September 24, 2021. At SW 01, all required fish were collected, and metals analysis was conducted on ten individual Chinook and a composite sample of five fish. Only eight juvenile Chinook salmon were collected at SW12, causing total body metals analysis to be run on only eight fish and with no composite sample for that location. Based on communications with Tim Pilon, ADEC and Brent Martellaro, ADNR on September 28th, 2021, NSR Pogo met the intent and spirit of APDES Permit AK0053341 with the reduced number of fish analyzed. As required by *Fish Resource Permit SF2020-175d*, a report of collection activities and a data submission form was submitted to ADF&G on November 11th, 2021.

Arsenic concentrations were elevated in two sample specimens collected upstream from the mine. All other results are consistent with historical data. Time series graphs are provided in **Appendix C**, lab reports are provided in **Appendix E**, and monitoring and historic data are provided in **Appendix F**.

2.4 Groundwater Quality monitoring

Groundwater samples are analyzed for WAD cyanide, major cations and anions, total metals, dissolved metals, physical and aggregate properties of ammonia, conductivity, hardness, nitrates, pH, TDS, TSS, and temperature. The locations of the groundwater monitoring stations are shown in **Appendix A**, **Figure 1.2.**

2.4.1 Downgradient of DSTF

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.1.4, 1.2.6, 1.2.7, 1.5.4; Pogo Mine Monitoring Plan (7/20), 9.0

MW11-001A and MW11-001B provide information on water quality trends down-gradient from the DSTF and up-gradient of the RTP. MW11-001A is an alluvial well and MW11-001B is a bedrock well. The MW11 wells were sampled on January 16, June 11, August 13 and October 30. MW11-001A was dry during the first quarter and no sample was collected.

TDS concentrations were above WQS in MW11-001A on August 13 and MW11-001B on June 11. Nitrate was above WQS in both wells for all of 2021. Both wells are located within the process facility, so concentrations above the WQS are under observation. WQS are shown on the graphs for reference purposes only. No other adverse trends were observed. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.2 Liese Creek Flumes

Four flumes were installed in Liese Creek in 2012. **Figure 4** provides flow data for Flume #1 (near the toe of the DSTF) versus precipitation rate in 2021. 2021 was a below average rainfall year.

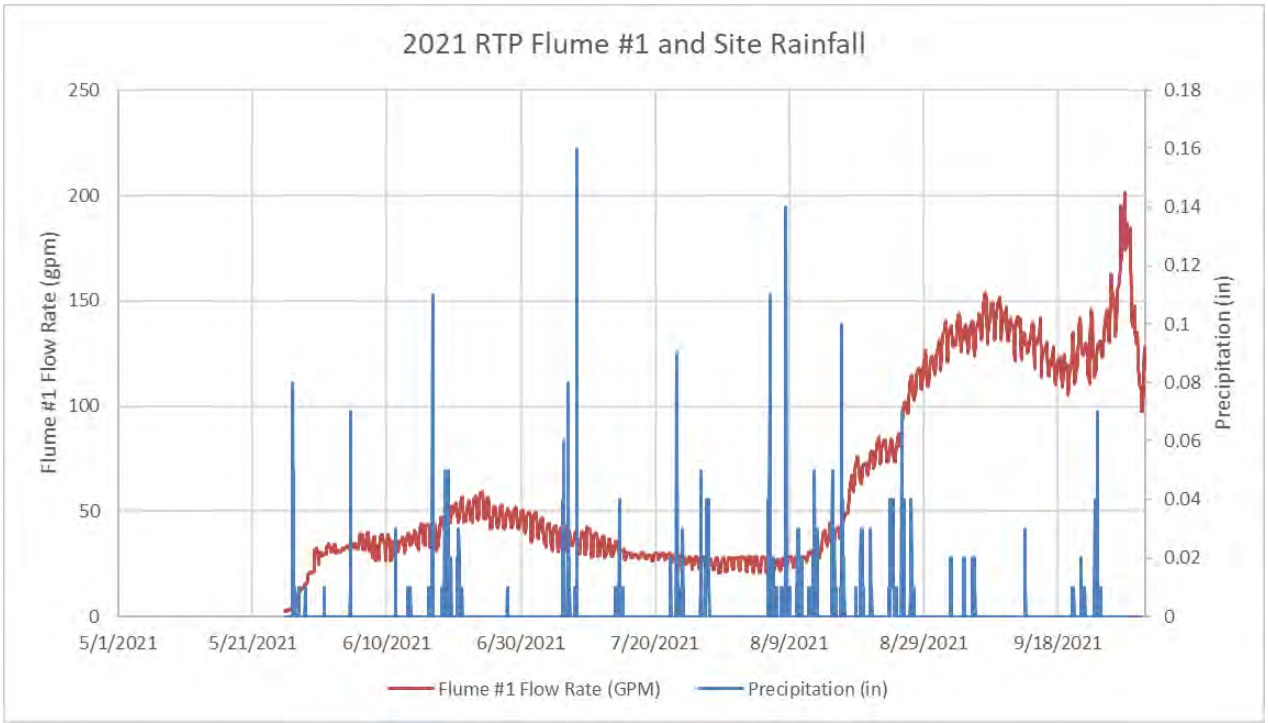


Figure 4: 2021 Flume #1 Flow and Site Rainfall

2.4.3 Downgradient of RTP Dam

2.4.3.1 MW12-500, 501, 502 WELLS

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.1.4, 1.2.6, 1.2.7, 1.5.4; Pogo Mine Monitoring Plan (7/20), 9.0

Three wells located below the RTP Dam, MW12-500, MW12-501, and MW12-502, monitor groundwater downstream of the RTP seepage collection system. Samples were collected quarterly throughout 2020 when there was available water. Trigger limits for groundwater monitoring at these locations are set forth in Pogo's ADEC Waste Management Permit 2018DB0001.

Samples for these wells were collected January 17, June 11, August 14, and October 29, 2021. No sample for MW-502 was collected in June due to low water level in the well.

Chloride, nitrate, and sodium levels were detected above trigger limits while arsenic and nitrate were detected above WQS. MW12-502 was above the trigger limit for Potassium on October 29th. Dam containment of the RTP water is under evaluation as part of a current corrective action investigation with ADEC. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.3.2 MW18-001 AND MW18-002

Two wells located below the RTP Dam near Liese Creek Flumes #2 and #3 are MW18-001 and MW18-002. These wells monitor groundwater downstream of the RTP seepage collection system. Samples were collected monthly for MW18-001 and quarterly for MW18-002. Well placement was designed to monitor changes in water quality parameters through the Liese Creek Valley and help identify SCW bypass flow.

MW18-001 (near Flume #2) and MW18-002 (near Flume #3) samples indicate chloride, nitrate, and sodium above the trigger limits set forth in Pogo's ADEC Waste Management Permit 2018DB0001. MW18-001 had one sample above the trigger limit for Potassium on October 29th 2021 and concentrations of arsenic and nitrate, above WQS. Nitrate is above WQS in MW18-002. Dam containment of the RTP water is under evaluation as part of a current corrective action investigation with ADEC.

Except as noted above, all other results are within the limits and conditions set forth within the permit. Locations of the wells are represented in **Appendix A, Figure 1.2** Pogo Monitoring Locations. Time series graphs are provided for the MW18 series wells in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.4 Downgradient of Ore Zone

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.1.4, 1.2.6, 1.2.7, 1.5.4; Pogo Mine Monitoring Plan (7/20), 9.0

2.4.4.1 MW11-216

Monitoring well MW11-216 provides information on water quality trends down-gradient from the ore zones. Samples are collected semi-annually. MW11-216 was sampled on June 13 and October 30th, 2021 and all results are below WQS. Piezometer well MW99-216 collects data continuously, and is verified quarterly for water elevation. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.4.4.2 MW18-003A AND MW18-003B

MW18-003A and MW18-003B were installed in 2018 to further evaluate groundwater downstream of the RTP and seepage collection well system. These wells also provide information on water quality

trends down gradient from the ore zones. MW18-003A and MW18-003B were installed as a nested pair of wells at the end of Liese Valley near Flume #4. MW18-003A is an alluvial well and MW18-003B is a bedrock well.

Samples were collected from both wells on January 17, June 12, August 14, and October 29, 2021. Samples from MW18-003A indicate that Nitrate was above WQS in January at 13.7 mg/L but decreased below WQS for the rest of 2021.

MW18-003B iron and manganese concentrations have exceeded WQS since installation of the well in 2018 and remained above WQS throughout 2021. These results, and a slow well recharge rate indicate a low hydraulic conductivity and reducing environment present around the well. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.5 Process Control Monitoring

Process facilities are monitored as described below.

2.5.1 Water Balance

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.2.4; Pogo Plan of Operations (7/20), 9.0; Water Rights LAS 24616 and LAS 32225

At the start of 2021, the RTP reservoir volume was 20.3 million gallons. On December 31, 2021, the RTP volume was 14.2 million gallons.

Water Added to RTP

- 44.6 million gallons of runoff and seepage water was collected in the RTP
- 51.4 million gallons of treated water was recycled to the RTP distribution system

Removed from RTP distribution system

- 27.8 million gallons were pumped from the RTP for underground process water
- 44.4 million gallons were pumped from the RTP to the mill process
- 7.9 million gallons were pumped from the RTP to MWTP#3

Recycled Treated Water

- 7.0 million gallons were recycled at the mill
- 51.5 million gallons of treated water was recycled to the RTP distribution system

Discharge to ORTW

- 181.7 million gallons were treated and discharged to the ORTW

2.5.2 Permits to Appropriate Water and Temporary Water Use Permit Summary

Pogo utilizes the following ADNR Permits to Appropriate Water: LAS32229, 32228, 32225, 32034, 32033, 32032, 24617, 24616, 24613, 24612, 24611 and ADNR Temporary Water Use Authorization TWUA F2016-109. A summary of water usage for Permits to Appropriate Water and Temporary Water Use Authorization is provided in **Table 2** and **Table 3**.

Table 2: Permits to Appropriate Water 2021 Monthly Total Flows

Month	LAS 24616/32225 Surface Water Collected in Recycle Tailings Pond (RTP) (gallons)	LAS 32228 RTP Seepage Collection System Wells (gallons)	LAS 24617/32229 Groundwater from Underground Mine Discharged to ORTW and Recycled Underground (gallons)	LAS 24613 Goodpaster River ORTW Influent (gallons)	LAS 24611 Drinking Water Wells DW02 & DW03 (gallons)	LAS 24612 Gravel Pit Pond* (gallons)	LAS 32032, 32033, 32034 Caribou, Shaw, and Gilles Creek Access Road Dust Control and Compaction ** (gallons)
January	3,127,411	2,361,565	38,681,089	578,437,920	835,501	24,000	0
February	7,010,253	1,975,513	17,676,256	509,065,119	808,073	24,000	0
March	1,548,094	2,056,869	21,201,758	533,207,042	788,316	24,000	0
April	2,028,521	1,670,406	19,256,152	612,909,386	750,938	80,250	414,000
May	4,577,984	2,159,179	19,404,901	588,918,645	761,279	259,500	580,500
June	3,633,547	2,541,356	21,561,011	593,442,710	730,481	24,000	571,500
July	1,220,964	2,386,489	25,649,039	597,027,834	721,625	753,750	355,500
August	5,495,897	2,434,078	18,696,932	628,457,826	714,505	36,000	18,000
September	6,455,256	2,390,502	10,063,492	549,389,251	716,281	63,000	0
October	779,365	2,586,883	22,222,809	590,352,376	745,573	0	0
November	4,073,915	2,721,716	20,492,797	609,061,343	759,461	0	0
December	4,747,647	2,287,827	17,495,027	612,633,251	747,980	0	0
Total (gallons)	44,698,852	27,572,384	252,401,263	7,002,902,703	9,080,014	1,288,500	1,939,500
Total in Acre-ft	137.2	84.6	774.6	21,490.9	27.9	3.95	6.0
Permit Limit Acre-ft	**967.8**	**600**	**2,000**	**24,195.11**	**81.77**	**241.95**	**98.5**

* Includes water used for mill make-up and for road dust control.

** Each LAS for Caribou, Shaw, and Gilles Creek allow 50,000 gallons per day from April 1st through October 31st. These have been combined to show total acre-ft for the access road dust control and compaction.

Table 3: 2021 Temporary Water Use Authorization Flows

TWUA F2016-109 Diversion Ditches	
Total Snowmelt Gallons Diverted	101,929,954
Total Rainfall Gallons Diverted	79,971,959
Total (gallons)	**181,901,913**
Total (acre-feet)	**558**
Permit Limit (acre-feet)	**1460**

2.5.3 Carbon-In-Pulp (CIP) Tailings Cyanide Destruction

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.3, 1.5.2.3; Pogo Mine Monitoring Plan (7/20), 7.2

After cyanide destruction, the CIP tailings are stored in the CIP tank prior to being mixed with cement and used as backfill in the mine. The NSR Pogo Mine Monitoring Plan requires collection of grab samples at station PC001 (CIP Stock Tank), located directly after the cyanide destruction circuit. A daily sample is collected during each paste pour. The Waste Management Permit 2018DB0001 requires that samples contain less than 10 mg/kg of WAD cyanide as a monthly average and none of the samples can contain more than 20 mg/kg of WAD cyanide. During 2021, two PC001 sample results were above 10 mg/kg at 17.5 and 13.4 mg/kg of WAD cyanide; however, the monthly average remained below 10 mg/kg. A split sample of PC001 was sent to SGS Fairbanks lab as a QC check on the Pogo Assay lab as required in the Pogo QAP, there was no issue. Time series graphs are provided in **Appendix C**. Monitoring data is provided in **Appendix F**.

2.5.4 Mineralized Development Rock Geochemistry

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.1, 1.5.2.6; Pogo Mine Monitoring Plan (7/20) 7.1

Samples of whole rock materials placed in the DSTF (PC002) are collected monthly and composited to form a quarterly sample for analysis. All sample result values are within the historical ranges and the composite samples showed no adverse trends. **Appendix B**, **Table 1**, shows selected parameters for PC002 whole rock monitoring. Monitoring data is provided in **Appendix F**.

2.5.5 Flotation Tailings Geochemistry

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.4; Pogo Mine Monitoring Plan (7/20) 7.1

Flotation tailings geochemistry solid samples were collected on March 7, June 13, September 5, and December 2, 2021 at PC003, the underflow of the filter-feed tank at the end of the mill circuit, prior to disposal on the DSTF. All sample result values are within the historical ranges and no adverse trends were observed otherwise. **Appendix B, Table 2**, shows selected parameters for the PC003 Solid, flotation tailings samples. Monitoring and historic data are provided in **Appendix F**.

2.5.6 Flotation Tailings Interstitial Water Chemistry

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.4; Pogo Mine Monitoring Plan (7/20) 7.1

The interstitial water from the tailings samples was collected at PC003 on March 7, June 13 (dissolved Mercury on June 19), September 5, and December 2, 2021. Most of the constituents were below the target operating ranges presented in Table 7-3 of the *2020 Pogo Mine Monitoring Plan*.

The following constituents were above the Target Operating Ranges: Iron in June, September and December; Copper in September and December; WAD CN and TKN in September; Mercury was at or over the operating limit for all 4 quarters. There were no sustained upward trends. Time series graphs are provided in Appendix C**.** Monitoring and historic data are provided in **Appendix F**.

An internal investigation began in 2018 to review the mercury concentration in PC003 as described in the 2020 Second Quarter Monitoring Report. The environmental concern with elevated mercury in the flotation tailings interstitial water is the potential for a corresponding mercury increase at the point of compliance groundwater monitoring wells down gradient of the DSTF. Data from the interstitial water samples show a mercury increase above the operating target range limit beginning in the third quarter of 2015, continuing through the first quarter of 2020 then at or above the operating range limit from the fourth quarter of 2020 through 2021. An evaluation of mine processes included mercury in water inputs to the mill, ore samples, mill reagents, liquid samples from areas within the mill circuit, solid samples of mineralized rock and flotation tailings, vapor samples from annual stack testing, and other areas unrelated to the mine process. During the evaluation, two primary factors were found to contribute to the exceedances of the flotation tails operating at target range limit:

1. The current operating target range was based on a data set with a high percentage of non-detect results.
2. Recent utilization of an analytical method with lower reporting precision and a higher reporting limit.

The observed changes in reported mercury levels for interstitial water samples have not resulted in a corresponding change in the point of compliance groundwater monitoring wells over the past five years, indicating no environmental impact occurred while mercury was elevated. Pogo has switched to a different EPA-approved dissolved mercury method (245.7) with lower reporting limits than EPA 245.1. This change is reflected in the revised QAP, which was submitted with the Plan of Operations Minor Modification in July 2020. Once a sufficient data set has been built using EPA method 245.7, the operating range limits will be revised using the new data set.

2.6 Visual Monitoring

2.6.1 Facility Inspection

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.2.1, 1.5.9.3, 1.5.9.4; Pogo Mine Monitoring Plan (7/20) 5.0, 3.1; Pogo RTP Operating and Maintenance Manual (7/18), 5.0

Weekly visual inspections of the DSTF, RTP Dam, and monitoring wells were completed throughout the year. No cracking, bulging, settlement, geotechnical concerns, erosion, or damage was observed. The most recent Period Safety Inspection (PSI) of the Recycle Tailings Pond (RTP) Dam was completed on July 9-11, 2019. Based on the 2019 PSI findings, the RTP Dam is considered to be in "*satisfactory condition*", as defined by the National Inventory of Dams (NID) Data Dictionary. The next PSI is planned for Summer of 2022.

A field inspection occurred on August 18, 2021 to support upcoming planned expansion of the Pogo dry stack facility in 2021. During this visit, ADNR Dam Safety and DOWL observed the Pogo RTP Dam and dry stack facility.

2.6.2 Biological Survey

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.5.2.5; Pogo Mine Monitoring Plan (7/20) 5.4

The objective of the visual biological survey program is to monitor wildlife interaction with the surface waste disposal facilities. No wildlife issues with the surface waste disposal facilities occurred during the year.

2.6.3 Invasive Weed Control

On June 14th, 2021, Salcha Delta Soil and Water Conservation District (SDSWCD) traveled the Pogo Access Road, visiting each active material site along the way. SDSWCD field staff scouted, mapped, and photographed the extent of the target species, bird vetch (Vicia cracca) (VICR), foxtail barley (Hordeum jubatum) (HOJU), alsike clover (Trifolium hybridum) (TRHY), narrowleaf hawksbeard (Crepis tectorum) (CRTE3), and shepherd's purse (Capsella bursa-pastoris) (CABU2), to determine treatment areas. On June 15th, 2021, two Alaska State certified pesticide applicators from SDSWCD carried out initial treatment activities at certain locations where VICR and MEAL2 were identified. On July 19th, 2021, field staff returned to each site to observe herbicide effectiveness and scouted and treated new or late emerging infestations. Field efforts will continue invasive weed monitoring into the summer of 2022.

2.7 Development Rock Segregation and storage

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.1, 1.5.2.6; Pogo Mine Monitoring Plan (7/20), 7.1.1

During 2021, 3090 rounds were blasted underground, and of these 2574 were sampled. A total of 516 rounds (16.7%) were not sampled due to operational challenges and were encapsulated in the DSTF. Of the sampled rounds, 624 (20.2%) exceeded either the arsenic threshold of 600 mg/l or the sulfide threshold of 0.5% and these were placed in the DSTF. 1950 rounds (63.1%) were classified as non-mineralized development rock and were used to build drains, construct shells, and line the edge of the DSTF. This material was also used as road surfacing and backfill material.

2.7.1 Handheld XRF Procedure

The handheld XRF development rock segregation program was ended on February 4, 2021. The development rock segregation procedures returned to the previously approved Assay Lab benchtop XRF process to quantify Arsenic and Sulfur in rock samples.

2.8 Waste Disposal

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.2.1, 1.4.4

During 2021, 708,035 dry tons of flotation tailings, 237,844 tons of mineralized rock, and 401,545 tons of non-mineralized rock, were placed in the DSTF. Approximately 125,233 dry tons of flotation tails and 106,296 dry tons of CIP tailing were placed underground as paste backfill in 2021. A DSTF survey using a WingtraOne drone on September 3rd, 2021, indicated 16.6 M tons of material were contained in the DSTF, representing 83% of the 20 M ton design capacity, leaving approximately 3.41 M tons. More frequent and accurate drone survey methods have replaced previously used approximation of tonnage calculated by truck load counts. **Figure 5** presents the approximate total waste disposal within the DSTF and indicates remaining design capacity.

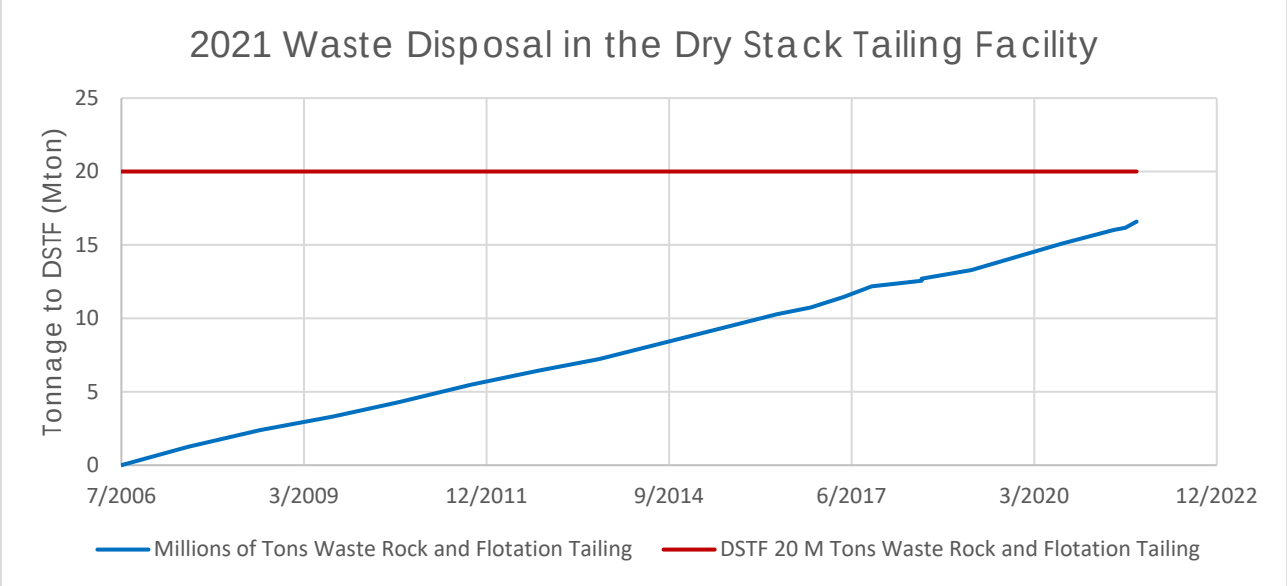


Figure 5: 2021 Annual Waste Disposal in the DSTF

The approximate quantities of miscellaneous waste materials placed either into the DSTF or underground during the year are shown in **Table 4**.

Table 4: Miscellaneous Waste Disposal in DSTF and Underground in 2021

Material	Disposal Location	Approximate Quantity	Unit
Assay Lab XRF Wafers	DSTF	63.7	lbs
Assay Lab Sample Reject	DSTF	432.5	cubic yards
CV002 Conveyor belt	DSTF	6	truck load
WTP filter cake	DSTF	800	tons
Burn pit debris	DSTF	4	truck load
Drill Cores	DSTF	12	truck load
Ball Mill Scat	DSTF	1	truck load
Filter cloths	DSTF	10	each
Grind bags	DSTF	51,000	lbs

2.9 Geotechnical Monitoring

ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.4.3, 1.4.3.4; Pogo DSTF Construction and Maintenance Plan (7/20)

Throughout 2021, pre-permitting studies, design, and permitting work was completed as part of the DSTF expansion project. AECOM completed a 2021 Geotechnical Review Report and a DSTF Conceptual Design Report. The primary purposes of these are listed below:

2021 Geotechnical Review Report

- Reviews all historic data related to the DSTF, including metallurgical and geotechnical moisture contents, compaction testing, and geotechnical drilling investigations.
- Analyzes the impact of reduction of the non-mineralized ("green") rock layer in Shell 1, including updated liquefaction and stability analyses.
- Provides recommendations for updated compaction QA/QC testing of the tailings.

DSTF Conceptual Design Report

- Calculates drainage analyses to size permanent and temporary diversion ditches.
- Provides water management, filling plan, and erosion control recommendations.
- Discusses options for final cover systems for eventual closure of the DSTF.

Shell construction took place on Shell 1 of the DSTF during all four quarters. The DSTF Construction and Maintenance Plan was updated during 2022 based on recommendations from the geotechnical review report and previous 2019 and 2020 geotechnical investigations. Compaction testing was completed as described below:

- On May 24, 2021, GPA Compaction Testing QA was completed by Mappa to provide points for a soil model analysis on the NSR Humboldt Electrical Density Gauge (EDG). Of the 10 points tested, 9 met the percent proctor of 90%. The percent proctor values ranged from 89.2-96.0%, with an average of 93%. Moisture contents ranged from 12.3-19.8%, with an average of 15.2%. NSR performed density testing at the same locations to create a soil model for the EDG. In addition to the onsite testing, three standard proctor tests were completed by Mappa. Maximum dry densities were determined to be 110.0, 111.5, and 112.0 pcf at 15.0, 15.5, and 15.5 % moisture contents, respectively.
- On June 11th, 2021, NSR performed compaction testing using the EDG on the GPA. All points met the standard proctor of 90%, with an average of 92.4%. Moisture contents ranged from 11.7-13.4%, with an average of 12.5% moisture.
- Compaction testing was attempted on June 18th, 2021 by NSR personnel; however, the cable for the EDG was damaged and testing was unable to be completed.
- NSR purchased a Troxler E-Gauge to replace the damaged Humboldt EDG. The instrument arrived in late October. On November 24, a tailings test plot was prepared with varying degrees of compaction to calibrate the NSR Troxler E-Gauge with the Mappa Troxler Nuclear Gauge. 10 samples were collected to determine moisture content values in the lab, and results varied from 15-18% moisture.
- Three tailings samples were sent to Mappa in November for standard proctor testing. Maximum dry densities were determined to be 112.5, 114.0, and 113.5 pcf at moisture contents of 13.5, 14.0, and 14.5%, respectively. The maximum dry density for purposes compaction testing was set at 113.3 pcf.
- The majority of the fourth quarter was spent calibrating the gauge for winter conditions, as low temperatures, frozen tailings, and significant snowfall posed challenges for instrument usage and personnel safety. Compaction tests were performed on December 10 and December 21. Moisture content tests were completed in the lab for calibration and ranged from 10.34-20.18%.

2.10 Spill Reporting

ADEC APDES AK0053341 (8/1/17), Appendix A, 1.14; ADEC Waste Management Permit 2018DB0001 (5/24/2018), 1.4.10

During 2021 there were a total of 279 spills reported. Refer to **Figure 6**, 2021 Annual NSR Pogo Spill Reporting.

Figure 6: 2021 Pogo Spill Reporting

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Pogo Underground Spill	29	27	18	21	14	26	22	10	14	26	17	37
Contractor Spill	0	1	2	1	0	1	0	1	1	0	0	0
Pogo Surface Spill	1	0	1	0	1	1	1	1	1	1	0	3

3. AS-BUILT REPORTS AND MAPS

The Pogo Mine Site 2021 as-built maps are presented in **Appendix A. Figure 1.4** provides an overview of all facilities within the Pogo Millsite lease boundary at the end of 2021. **Figures 1.4a** through **1.4d** provide additional detail for the major areas of the mine.

4. RECLAMATION AND FINANCIAL RESPONSIBILITY

ADEC Waste Management Permit 2018DB0001 (5/24/18), 1.11, 3. ADNR Plan of Operations Approval F20189500 (5/24/2018), pg. 3, 9; ADNR Pogo Mine Millsite Lease ADL416949 (3/9/04), Section 8.

The Pogo Mine reclamation and closure bond including the road/transmission line is currently $71.91 million (refer to **Table 5**). The road/transmission line reclamation and closure cost estimate is currently at $7.08 million (**Table 6**). Reclamation and Financial Responsibility will be updated in 2022 as part of the Waste Management and Plan of Operations renewal process.

Table 5: Mine Reclamation and Closure Cost Estimates as of 2017

Summary of Estimated Reclamation and Closure Costs	
Item Description	
Earthwork/Recontouring	
Subtotal	$8,526,670
Revegetation/Stabilization	
Subtotal	$3,694,623
Detoxification/Water Treatment/Disposal of Wastewater	
Subtotal	$5,669,769
Structure, Equipment and Facility Removal	
Subtotal	$10,402,219
Monitoring	
Subtotal	$2,369,650
Construction Management and Support	
Subtotal	$1,093,448
Closure Planning	
Subtotal	$16,663,398
Subtotal Operational and Maintenance Costs	
Subtotal	**$48,419,777**
Indirect Costs	
Subtotal	$18,161,463
Total Direct and Indirect	**$66,581,240**
Inflation Proofing	$5,326,499
Grand Total	**$71,907,739**

Table 6: Pogo Access Road/Transmission Line Reclamation and Closure Cost Estimates as of 2017

Summary of Estimated Right of Way Closure Costs	
Item Description	
Earthwork/Recontouring	
Subtotal	$646,544
Revegetation/Stabilization	
Subtotal	$1,554,352
Detoxification/Water Treatment/Disposal of Wastewater	
Subtotal	$0
Structure, Equipment and Facility Removal	
Subtotal	$1,451,958
Monitoring	
Subtotal	$0
Construction Management and Support	
Subtotal	$400,440
Closure Planning	
Subtotal	$726,229
Subtotal Operational and Maintenance Costs	
Subtotal	**$4,779,523**
Indirect Costs	
Subtotal	$1,784,132
Total Direct and Indirect	**$6,563,655**
Inflation Proofing	$525,092
Grand Total	**$7,088,747**

5. PERMIT ACTIVITIES

5.1 Annual 2021 Permit activities

Regulatory notifications and major permitting activities completed in 2021 are identified below.

- **Potable water system notifications:**
  - **Pogo Mine Wastewater Treatment Plant Operator Certification Submission:** NSR

Pogo updated ADEC with the current water operators and their certifications monthly (ADEC).

- **Northern Star (Pogo) Permanent Camp LLC 2021 Sanitary Survey Response Letter PWSID #: 372685; Classification: Non-Transient Source Type: Ground Water Under the Direct Influence of Surface Water (GWUDISW):** This letter was in response to a Sanitary Survey conducted by Mr. Stephen Hammond of M2C1 Construction and Engineering on April 13th, 2021. This letter designated that Pogo's operating system has one deficiency per the survey that has since been corrected. The deficiency was a sanitary seal that was not properly sealed where heat trace entered the well on WL003.
- **Northern Star (Pogo) Water Operations Summary for Additional Camp Units (Temporary Tents) Serviced by PWSID# 372643 and PWSID# 372685:** Notification of a temporary tent facility constructed adjacent to F-wing due to increased camp population projections and the COVID-19 restricted rooming situation. The temporary facility is serviced by the F-wing potable water haul truck and is not connected to the Pogo potable water or sewage distribution system. (This tent facility was removed in September 2021)
- **Ozone Excursion- PWSID 372685:** On July 21st, NSR reported an ozone excursion that occurred at approximately 12:50 pm at PWSID #327685. Potable 2 was monitored after the ozone generator was increased.
- **Ozone Excursion-PWSID 372685:** On August 23rd, NSR reported an ozone excursion at PWSID #327685. Two consecutive days, August 21st and August 22nd, ozone residual fell below 0.3 mg/L. The reason for the low readings is believed to be the result of performing a repair on a leak found in the waterline that transports water from our deep wells to the plant. After corrected, the plant saw ozone residual build back up towards the permit minimum of 0.3 mg/L ozone residual. On August 27th through 31st**,** the ozone probe was undergoing maintenance and replacement, which resulted in a reading of 0.05 on August 27th and no readings on August 29th and 30th.
- **Pogo Mine Camp Expansion Request to Construct Potable Water Line Connections (Phase I):** NSR requested approval to construct potable water infrastructure additions for Phase I of Pogo's Lower Camp capacity expansion on July 24th. This was approved through ADEC on September 1st.

- **Multi-Sector General Permit (MSGP) Annual Report AKR06AC58:** NSR Pogo submitted the required 2020 MSGP Annual Report via ADEC OASYS on January 28th.
- **Air Permitting:**
  - **Semiannual Facility Operating Report, Second Half 2020, Permit No. AQ0406MSS07:** On January 25th, NSR Pogo submitted the Semiannual Facility Operating Report, Second Half 2021 (ADEC/EPA).
  - **Semiannual Facility Operating Report, Second Half 2020, Permit No. AQ0406TVP02:** On January 25th, NSR Pogo submitted the Semiannual Facility Operating Report, Second Half 2020 (ADEC/EPA).
  - **2020 Annual Report – CISWI Unit ID 412, Permit No. AQ0406TVP02:** NSR Pogo submitted this report on January 25th (ADEC / EPA).
  - **Assessable Emissions Estimates for Calendar Year 2020, Permit No. AQ0406MSS07:**

NSR Pogo submitted the 2020 Assessable Emissions Estimates on January 25th (ADEC / EPA).

- **Annual Compliance Certification, Air Quality Operating Permit No. AQ0406TVP02:** On January 25th, NSR Pogo submitted the Annual Compliance Certification for Permit No. AQ0406TVP02 (ADEC / EPA). **2021 Mercury Performance Test Plan Submittal:** On July 12th, NSR Pogo submitted the 2021 Mercury Performance Test Plan to ADEC regarding permit AQ0406TVP02.
- **Semiannual Facility Operating Report, First Half 2021, Air Quality Control Permit No. AQ0406MSS07:** Northern Star submitted the Semiannual Facility Operating Report for the first half of the year on July 26th to ADEC.
- **Semiannual Facility Operating Report, First Half 2021, Title V Operating Permit No. AQ0406TVP02:** Northern Star submitted the Semiannual Facility Operating Report for the first half of the year on July 30th to ADEC.
- **2021 Mercury Performance Test 10-Day Notification:** NSR submitted the 2021 Mercury Performance Test 10-Day Notification to ADEC on August 30th.
- **2021 Mercury Compliance Performance Test:** NSR completed the annual compliance testing during September 10-13, on the sources to NESHAP Subpart EEEEEEE.
- **Asbestos-Notification of Demolition and Renovation:** Northern Star submitted an Asbestos-Notification of Demolition and Renovation notification on September 3rd.
- **2021 Annual Stack Testing Final Report:** Cover letter and test report documenting NESHAP Subpart EEEEEE testing completed for the refinery processes at Pogo Mine were submitted for Condition 10.1 of the facility's Title V permit on November 9th, 2021, to ADEC.
- **Title V Permit Renewal Application:** Northern Star submitted the Title V permit renewal application on December 6th, 2021. This is due to requirements under 18 AAC 50.326 (c), 40 CFR 71.7 (b), and 40 CFR 71.5 (a)(1)(iii). The application provided documents specific to Emission Unit IDs 1-3 (Electrowinning Cells), 5 (Induction Furnace), and 6 (Carbon Kiln).
- **Air Quality Full Compliance Evaluation, Information Request:** On October 8th, 2021, Northern Star received the information request for data related to Pogo Mine Air Quality Operating Permits No. AQ0406MSS07 and No. AQ406TVP02. A response letter was submitted by Northern Star to fulfill this request on October 19th, 2021.

- **APDES Permit No. AK0053341 activities:**
  - **Proposed Pogo Mine Water Treatment Plant 2 Clarifier Conversion to Equalization Tank:** The modification will convert the MWTP2 clarifier into an equalization tank to accept surges in water from the underground influent flow. The clarifier is currently unused and has been offline since Mine Water Treatment Plant 3 (MWTP3) was commissioned. The equalization tank will reduce fluctuations and provide a steady flow of water through MWTP3, allowing more consistent operation of the plant.
  - **Accidental Discharge/Spill Notification form for RTP pipeline breach:** On April 11, Pogo submitted an accidental discharge notification to the ADEC Division of Water. The RTP water pipeline was struck by heavy equipment working near the

storm water pond. Maintenance shut the water off to the affected pipe within 31 minutes and repaired the break shortly after.

- **Accidental Discharge/Spill Notification form for RTP pipeline breach:** On April 11, Pogo submitted an accidental discharge notification to the ADEC Division of Water. The RTP water pipeline was struck by heavy equipment working near the storm water pond. Maintenance shut the water off to the affected pipe within 31 minutes and repaired the break shortly after.
- **Accidental Discharge/Spill Notification for Gray Water Discharge at Temporary Tents:** Gray water was discharged from a line that fell to the ground due to a failure of an original fastener when the discharge line and tank were installed. The discharge line was placed back into the discharge tank and secured with additional fasteners/ tie-offs. Lime was applied to neutralize any potential for bacteria formation. The contacted material was disposed of in the DSTF.
- **DMR-QA Study 41:** A data report form for laboratory checklists was submitted to ADEC regarding the DMR-QA study performed at Pogo for 2021. One analyte, Silver, was recorded as not acceptable after results came back from SGS Laboratories. All other analytes were graded as acceptable.
- **Shell 1 Proposed Design Change for the Pogo Mine DSTF (NID ID # AK00304) and Submittal of Ongoing DSTF Expansion Project Reports:** Two reports were submitted in the support of the ongoing DSTF Expansion Project as part of the Certificate of Approval to Modify a Dam. The DSTF Pre-Design Considerations and Design Basis and the 2021 Geotechnical Review Report were completed by AECOM to evaluate pre-design considerations and provide a design basis for the DSTF Expansion.
- **2021 Aquatic Resource Permit Application submitted:** On July 19th, NSR Pogo submitted a request for the Aquatic Resource Permit through ADFG for annual fish tissue sampling.
- **Accidental Discharge/Spill Notification for Kitchen Sink Pipe:** Approximately 100 gallons of kitchen sink graywater appears to have spilled in the crawl space under the kitchen area after a drainage pipe broke and pulled away from the bottom side of the floor. No runoff occurred and was localized over an area of no greater than 10'x10'. All solids and topsoil were removed, totaling nearly half a cubic yard of soil and gravel. The pipe was replaced, and drainpipes were braced underneath the building to prevent future occurrences.
- **Request for Approval to Construct Sewage Treatment Plant Distribution Lines:** NSR requested approval to construct sewage treatment plant distribution system lines on July 30th through ADEC. This was approved through ADEC on August 18th.
- **Notification of Completion of 2021 Emergency Action Plan Orientation:** The annual orientation exercise for the Pogo Recycle Tailings Pond (RTP) Dam Emergency Action Plan (EAP) in accordance with the special conditions of the Certificate of Approval to Operate a Dam, RTP Dam (NID ID#AK00304) was completed on November 8th, 2021.
- **Updated Pogo Mine QAPP:** Minor updates were made in the Quality Assurance Plan to address changes in personnel. A more thorough review is due to be completed as part of the Waste Management Permit and Plan of Operations renewal applications in 2022.

- **RO Addition Form ADEC AQ-Adding Michael Eckert as GM:** Due to operational changes at Northern Star, a new Responsible Official was appointed. Jim Coxon will remain as a Responsible Official, but will be taking on a new role with Northern Star Resources as Vice President- Operations, North America. Michael Eckert, Pogo's current Mine Manager, has accepted the General Manager position and will begin his role in January 2022.
- **Accidental Discharge/Spill Notification for CN Recovery at Pogo Mill:** Approximately 20 gallons of CN Recovery fluid was discovered precipitating as icicles on the roof below the CN Recovery silo. The initial cause is believed to be a rotted out panel that allowed CN Recovery overflow to escape the silo onto the roof. Contaminated snow and ice were placed back into the mill process.
- **Renewal of Alaska Pollutant Discharge Elimination System Permit No.** AK0053341
- **2021 Aquatic Resource Final Report:** Pogo submitted an Aquatic Resource Final Report in regard to Fish Tissue sampling on the Goodpaster River on November 10th, 2021.

- **Waste Management Permit No. 2018DB0001 activities:**
  - **Minor Modification:** Pogo submitted a minor modification to amend the waste rock characterization method. To streamline the previously approved waste rock characterization process, would resume using the Rigaku benchtop XRF instrument in lieu of the Niton XL5 handheld XRF to analyze waste rock samples for sulfur and arsenic. Underground personnel will communicate assay tag information to dispatch and directly transfer the drill cuttings collected to the Assay Lab. Lab technicians will analyse the material with the Rigaku benchtop XRF to determine the designation of mineralized (red) or unmineralized (green). Samples from underground headings are reviewed daily to ensure waste rock is being characterized correctly and identify any missing samples or process issues. Assay lab XRF results are transferred from the internal Laboratory Information Management System directly into InMine, a new PowerBi based software being utilized for easier reporting between departments across the mine site. The environmental department will be tasked with daily QC checking of the data and waste rock process for any issues.
  - **Minor Modification:** Pogo Mine STP MBR Planned Changes will allow for increased efficiency, less plant downtime, and redundancy of the MBR system in the event of maintenance Phase I includes a retrofit to the two present MBR modules with the NHP series modules. The NHP210-300S unit is from the same vendor and has the same dimensions as the existing TMR140-100S, allowing for a simple retrofit. The NHP series MBR modules contain more densely packed plates for a reduction in clogging of the system. Phase II will include installation of two identical NHP series MBR modules in parallel to the existing MBR system. The parallel system will allow for system redundancy, which is needed for minimizing downtime and increasing the availability of the plant for operation at the original permitted capacity.
  - **Minor Modification:** DSTF Radio Controlled Pump System Construction involves installation of a larger sump and a remote radio-controlled pump station above the right finger drain of the DSTF and directly below the diversion ditches. The larger system will reroute additional surface water runoff to the diversion ditch during high flow periods to bolster the diversion system. The pump will be VFD capable and operate with set levels in the standpipe column that are

programmed to shutoff when water level is low and start up when the water level reaches a high set point.

- **Re: Clarifier Conversion As-Built Submittal:** Northern Star submitted a planned change to convert the Mine Water Treatment Plant 2 (MWTP2) clarifier into an equalization tank on January 19th. This work was approved by ADEC on January 20th. The construction for the converted equalization tank was completed and NSR submitted the most recent as-built drawings for MWTP2 clarifier conversion in accordance with Condition 1.4.9 of the Pogo Mine Waste Management Permit #2018DB0001.
- **Minor Modification:** DSTF Radio Controlled Pump System Construction involves installation of a larger sump and a remote radio-controlled pump station above the right finger drain of the DSTF and directly below the diversion ditches. The larger system will reroute additional surface water runoff to the diversion ditch during high flow periods to bolster the diversion system. The pump will be VFD capable and operate with set levels in the standpipe column that are programmed to shutoff when water level is low and start up when the water level reaches a high set point.
- **Request Extension per 40 CFR 262-17(b):** Extension was requested for waste beyond 90-days, since TSDF's have a backlog of incineration waste and are not accepting anymore at this time.

- **Resource Conservation and Recovery Act (RCRA) Notice of Violation (NOV):** NSR Pogo is in discussions with the EPA in response to a Notice of Violation following a RCRA audit in 2019 (EPA).
- **Other:**
  - **Nationwide Permit Pre-construction notification Goodpaster Exploration Road Project (USACE NWP):** On July 22st, NSR submitted a Pre-construction notification form under the Nationwide Permit 14, proposing construction of an exploration road through a wetland area. This would disturb 0.06 acres of wetlands.
  - **Nationwide Permit Pre-construction notification Liese Creek Bridge – Pogo Mine Road Project (USACE NWP):** On August 19th, NSR submitted a Pre-construction notification form under the Nationwide Permit 14, proposing construction of a bypass road over Liese Creek. This would disturb 0.23 acres of wetlands.
  - **Request for Extension per 40 CFR 262-17(b) for Waste Beyond 90-Days (EPA):** Northern Star requested an extension for accumulated Hazardous Waste beyond the 90-day time limit. Some of Pogo's waste is treated via incineration, there is a backlog of waste to be incinerated at TSDF's across the nation and therefore TSDF's are not accepting any further waste. The waste to be incinerated is kept in a CAA that is inspected weekly, in containment, and locked. A subsequent extension was requested on September 30th.
  - **Plan of Operations Modification-Liese Creek Culvert Project:** On August 26th, Northern Star submitted a request for approval to amend the Pogo Mine Plan of Operations by adding a bypass road and culvert over Liese Creek. This request was received by the Division of Mining, Land, and Water, Mining Section (DMLW) and was approved on September 13th.

    Request to Channel Flow at ORTW- Emergency Request Approval: Northern Star requested emergency approval to remove the buildup of sediment and ice

where the water from the Goodpaster River flows into NSR Pogo's inlet pond. The build-up of sediment and ice has decreased the Goodpaster River's flow into the inlet pond for NSR Pogo's Off-River Treatment Works (ORTW) on October 18th, 2021.

APPENDIX A – MAPS

Figure 1.1: General Location Map

Figure 1.2: Pogo Mine Monitoring Locations

Figure 1.3: Surface Water Monitoring Stations

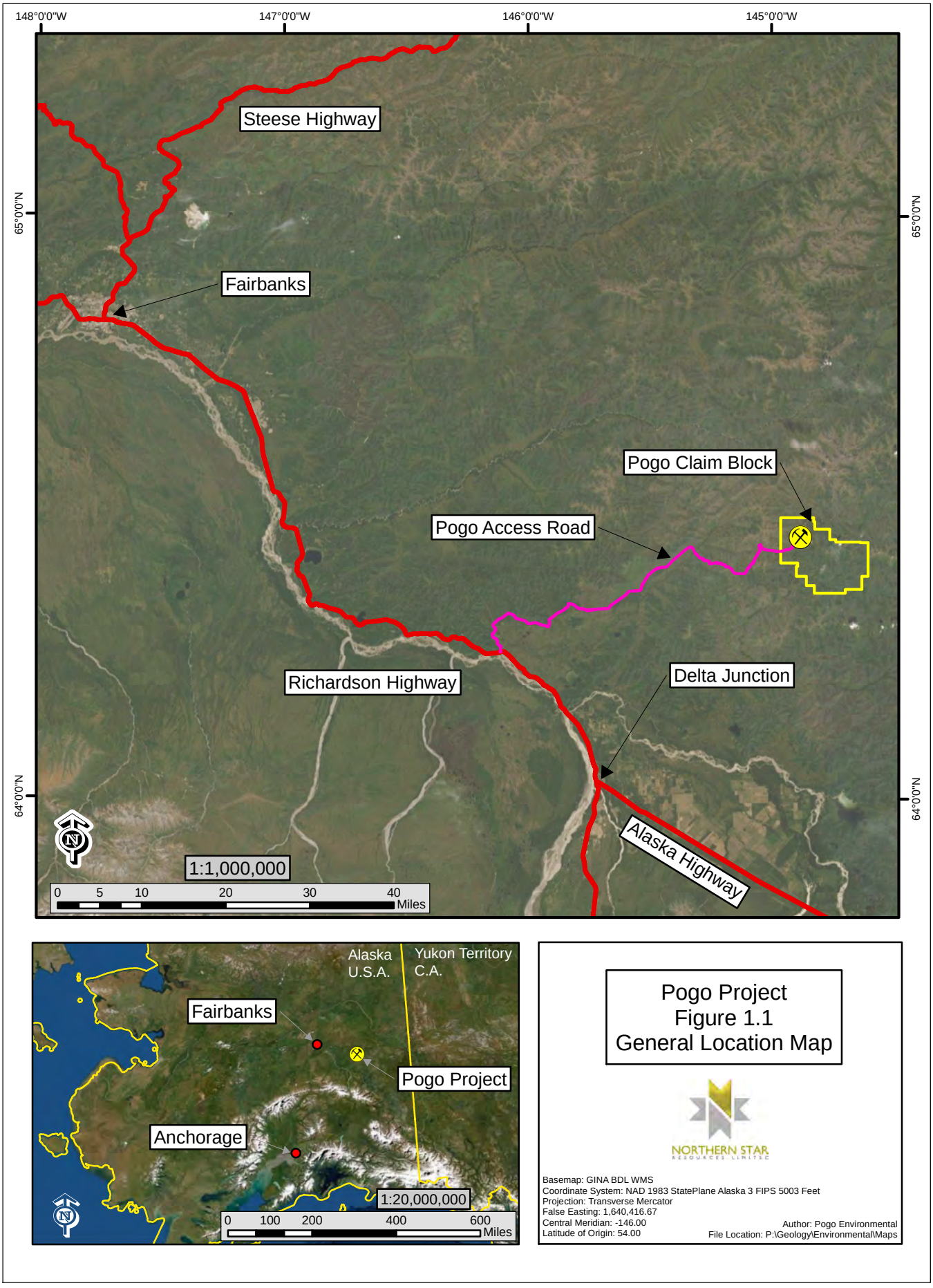
Figure 1.4: Pogo Mine As-Built

Figure 1.4a: 1525 Portal Area and Lower Camp As-Built

Figure 1.4b: Airstrip Area As-Built

Figure 1.4c: Mill and Permanent Camp Bench As-Built

Figure 1.4d: RTP & Dry Stack Area As-Built



Pogo Project
Figure 1.1
General Location Map

NORTHERN STAR RESOURCES LIMITED

Basemap: GINA BDL WMS
Coordinate System: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
False Easting: 1,640,416.67
Central Meridian: -146.00
Latitude of Origin: 54.00

Author: Pogo Environmental
File Location: P:\Geology\Environmental\Maps

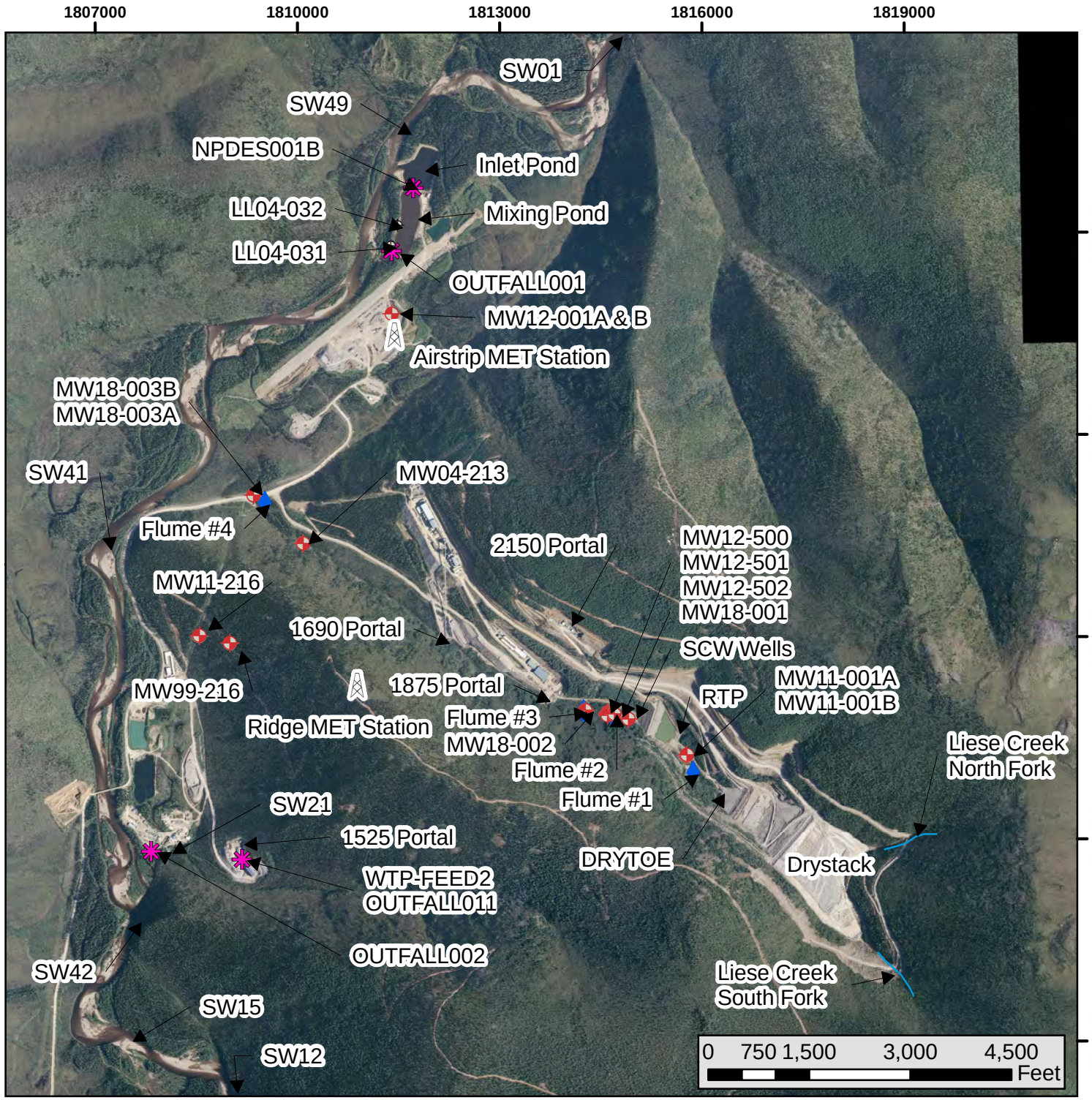
Figure 1.2
Monitoring Locations
Pogo Mine

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Jeremiah Drewel, Environmental Coordinator

Monitoring Locations

- MET Station
- LL Wells
- Monitoring Wells
- Flume
- OUTFALL

1:25,000



N
W E
S

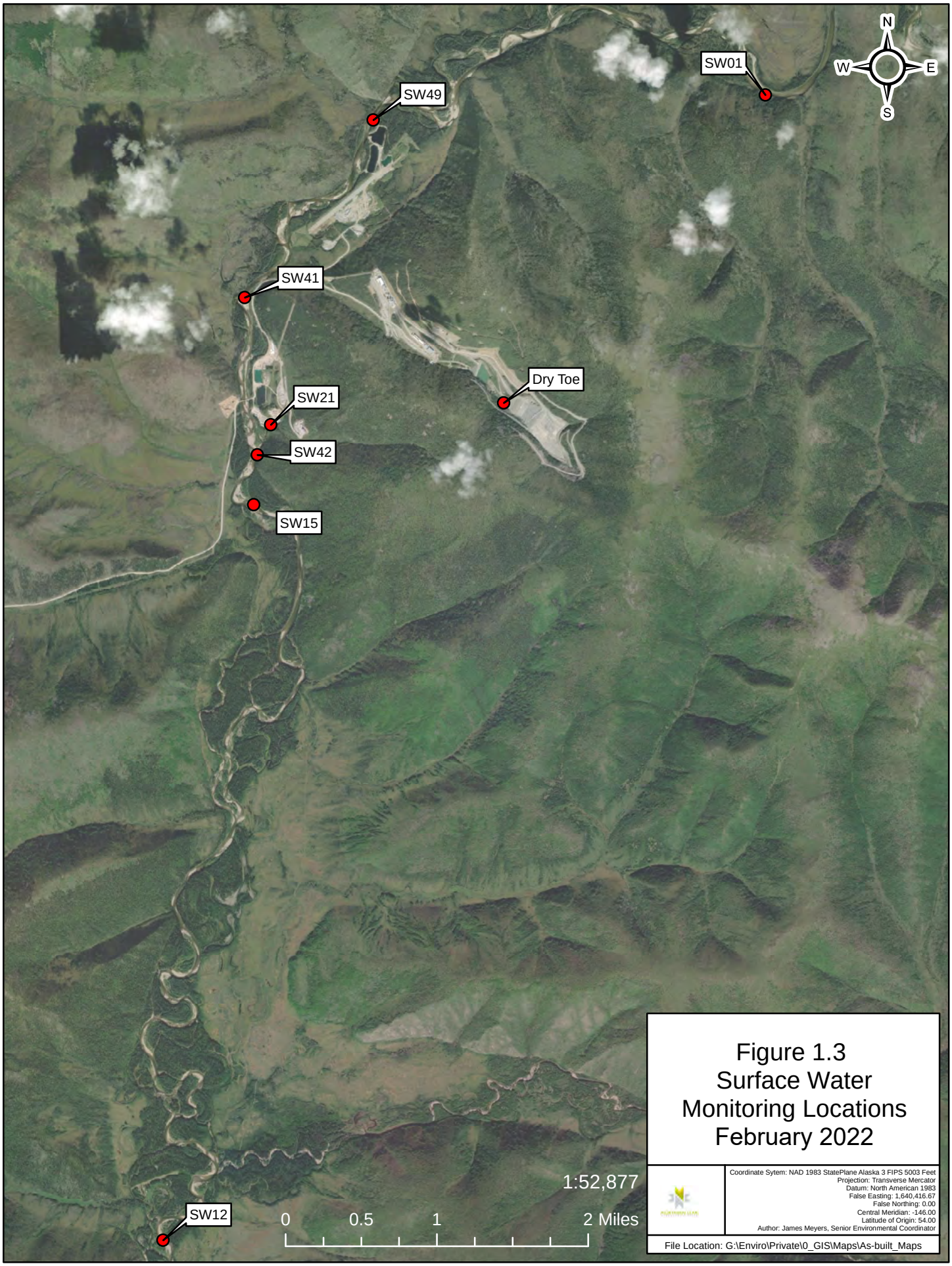


Figure 1.3
Surface Water Monitoring Locations
February 2022

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: James Meyers, Senior Environmental Coordinator

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps

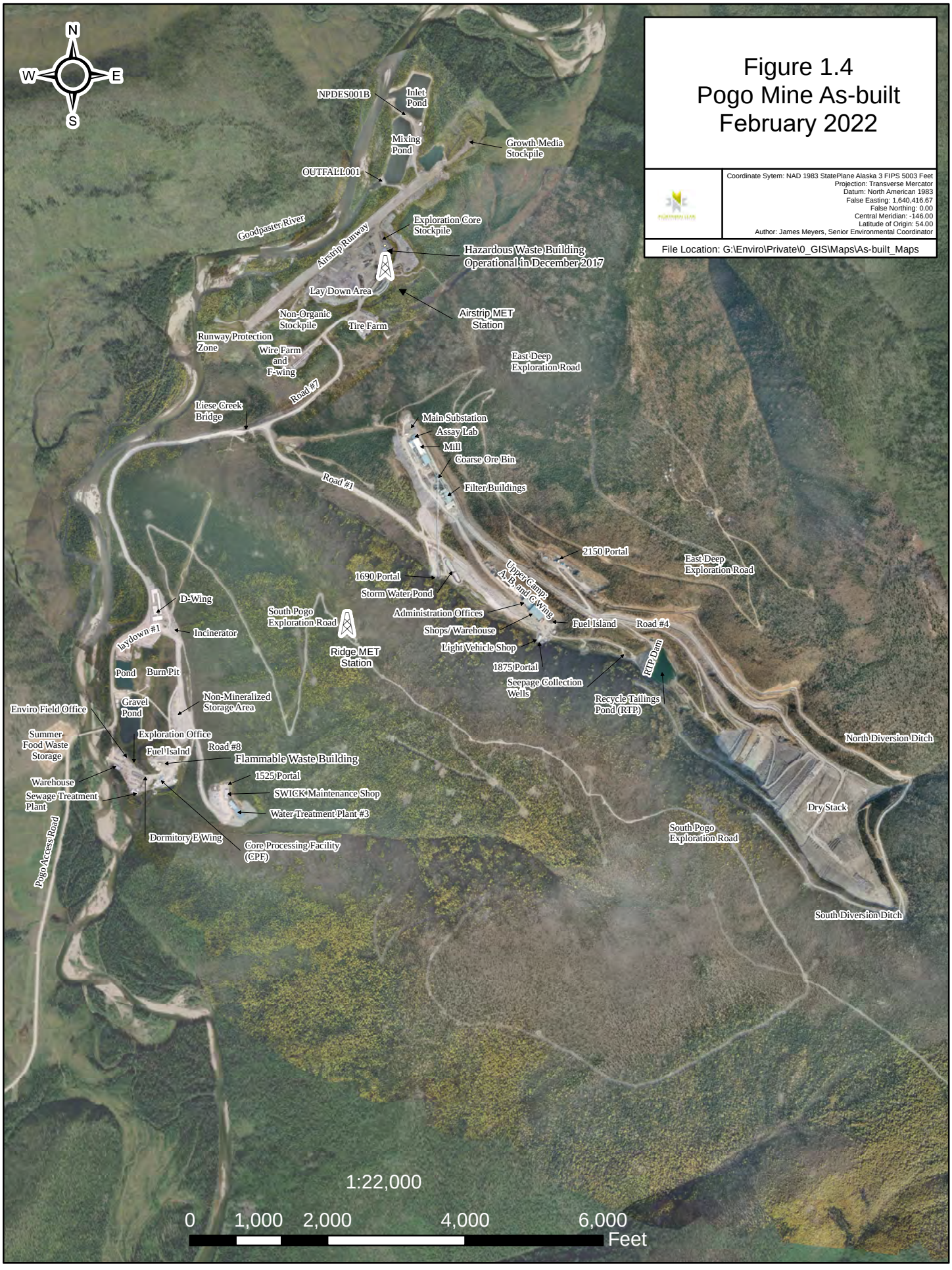

N
W
E
S
Figure 1.4
Pogo Mine As-built
February 2022
Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: James Meyers, Senior Environmental Coordinator
File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps
NPDES001B
Inlet Pond
Mixing Pond
Growth Media Stockpile
OUTFALL001
Goodpaster River
Airstrip Runway
Exploration Core Stockpile
Hazardous Waste Building Operational in December 2017
Lay Down Area
Airstrip MET Station
Non-Organic Stockpile
Tire Farm
Runway Protection Zone
Wire Farm and F-wing
East Deep Exploration Road
Road #7
Liese Creek Bridge
Main Substation
Assay Lab
Mill
Coarse Ore Bin
Road #1
Filter Buildings
2150 Portal
East Deep Exploration Road
1690 Portal
Storm Water Pond
Upper Camp A, B, and G Wing
D-Wing
South Pogo Exploration Road
Administration Offices
Fuel Island
Road #4
laydown #1
Incinerator
Shops/ Warehouse
Light Vehicle Shop
Ridge MET Station
1875 Portal
RTP Dam
Pond
Burn Pit
Seepage Collection Wells
Recycle Tailings Pond (RTP)
Gravel Pond
Non-Mineralized Storage Area
Enviro Field Office
Summer Food Waste Storage
Exploration Office
Fuel Isalnd
Road #8
Flammable Waste Building
North Diversion Ditch
Warehouse
1525 Portal
Sewage Treatment Plant
SWICK Maintenance Shop
Water Treatment Plant #3
Dry Stack
Pogo Access Road
Dormitory E Wing
Core Processing Facility (CPF)
South Pogo Exploration Road
South Diversion Ditch
1:22,000
0
1,000
2,000
4,000
6,000
Feet

Figure 1.4a
1525 Portal and Lower Camp As-Built
February 2022

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: James Meyers, Senior Environmental Coordinator

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps

0 250 500 1,000 1,500 Feet

1:5,000

South Pogo Exploration Road
Water Treatment Plant #3
SWICK Warehouse and Maintenance Shop
1525 Portal
Road #8
Powerline
Vaporizer Shack & Propane Tank
Incinerator
Dormitory D-Wing
Non-Mineralized Storage Area
Central Accumulation Area
Flammable Containment Building
Ruen Drilling Office
Helipad
Fuel Island
Core Processing Facility
Burn Pit
Exploration Office
Dormitory E-Wing
D-Wing addition
Sewage Treatment Plant (STP)
Laydown #1
Gravel Pond
Pond
To Airstrip and Upper Camp
Enviro Field Office
Potable Water Treatment Plant
Warehouse
Goodpaster River
Summer Food Waste Storage
Pogo Access Road to Richardson Highway

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, U

Figure 1.4b Airstrip Area As-Built February 2022

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: James Meyers, Senior Environmental Coordinator

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps

OUTFALL001
Goodpaster River
Inlet Pond
Mixing Pond
NPDES001B
Runway Protection Zone
Runway Protection Zone
Airstrip Runway
Non-Organic Stockpile
Lay Down Area
Exploration Core Stockpile
Growth Media Stockpile
Wire Farm and F-wing
Central Accumulation Area (Commissioned in December 2017)
To Lower Camp and 1525 Portal
Airstrip MET Station
Liese Creek Bridge
Tire Farm
To Upper Camp and Mill Bench

1:5,000

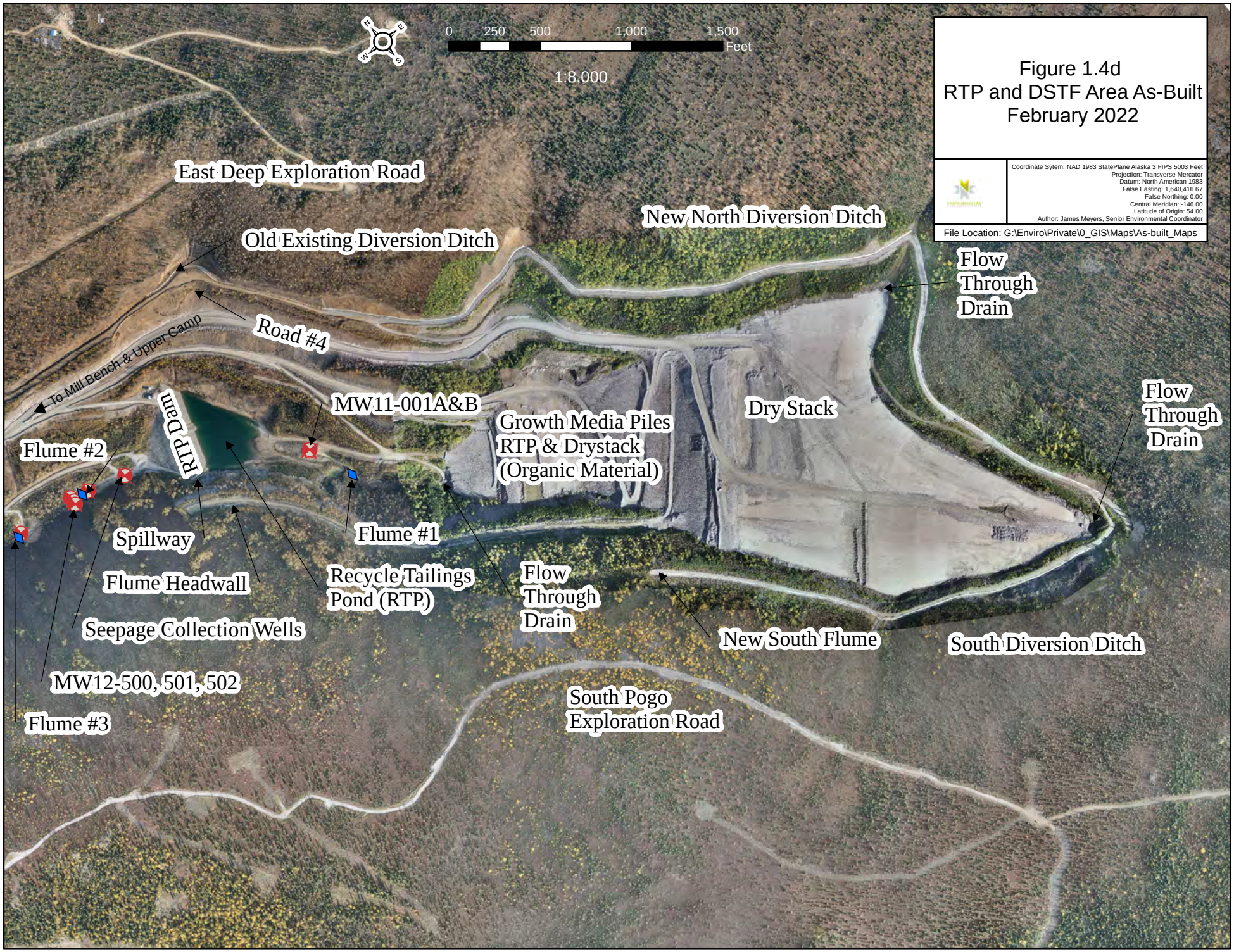
0 250 500 1,000 1,500 Feet

Source:

Figure 1.4c
Mill and Permanent Camp Bench As-Built
February 2022

Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: Martin Weiser, Environmental Specialist

File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps


0 250 500 1,000 1,500
Feet
1:8,000
Figure 1.4d
RTP and DSTF Area As-Built
February 2022
Coordinate Sytem: NAD 1983 StatePlane Alaska 3 FIPS 5003 Feet
Projection: Transverse Mercator
Datum: North American 1983
False Easting: 1,640,416.67
False Northing: 0.00
Central Meridian: -146.00
Latitude of Origin: 54.00
Author: James Meyers, Senior Environmental Coordinator
File Location: G:\Enviro\Private\0_GIS\Maps\As-built_Maps
East Deep Exploration Road
New North Diversion Ditch
Old Existing Diversion Ditch
Flow Through Drain
Road #4
To Mill Bench & Upper Camp
RTP Dam
MW11-001A&B
Growth Media Piles
RTP & Drystack
(Organic Material)
Dry Stack
Flow Through Drain
Flume #2
Spillway
Flume #1
Flume Headwall
Recycle Tailings Pond (RTP)
Flow Through Drain
Seepage Collection Wells
New South Flume
South Diversion Ditch
MW12-500, 501, 502
Flume #3
South Pogo Exploration Road

APPENDIX B –

WASTE ROCK GEOCHEMISTRY AND FLOTATION TAILINGS SOLIDS CHEMISTRY DATA

Table 1: Whole Rock Geochemistry for Rock Placed in Dry Stack 2021

Table 2: Geochemistry of Flotation Tailings Solids Placed in Dry Stack 2021

Appendix B. Table 1. Whole Rock Geochemistry for Rock placed into Drystack 2020

PC002	units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Antimony, Total	mg/kg	1.52	1.2	1.58	2.37
Arsenic, Total	mg/kg	555	568	997	2070
Carbon	%	0.36	0.53	0.33	0.36
Copper, Total	mg/kg	96.4	33.4	36.6	38.3
Inorganic Carbon	%	1.3	1.9	1.2	1.2
Iron, Total	mg/kg	38,100	41,200	34,000	42,400
Lead, Total	mg/kg	20.1	20.1	22.5	16
Maximum Potential Acidity	tCaCO3/1000t	13.8	9.4	10.9	11.9
Net Neutralization Potential	tCaCO3/1000t	22	43	30	37
pH, Paste	pH units	8.3	8.2	8.6	8.4
Potassium, Total	mg/kg	24,800	26,500	26,800	23,900
Ratio (NP/MPA)	su	2.62	5.55	3.75	4.13
Selenium, Total	mg/kg	2	1	<1	2
Sodium, Total	mg/kg	11,200	13,900	13,900	15,400
Sulfate Sulfur (CO_3 Leach)	%	0.02	<0.01	0.02	0.01
Sulfate Sulfur (HCL Leach)	%	<0.01	<0.01	0.02	<0.01
Sulfide Sulfur (Calculated)	%	0.42	0.3	0.33	0.37
Sulfur, Total (LECO)	%	0.44	0.3	0.35	0.38
Zinc, Total	mg/kg	60	68	60	63

Appendix B. Table 2. Geochemistry of Flotation Tailings Solids placed into Drystack 2020

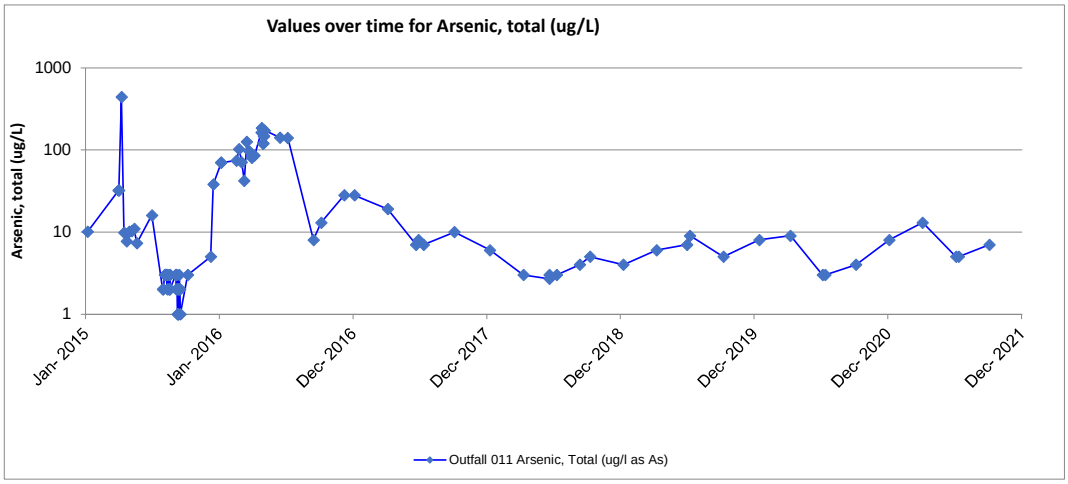
PC003 Solid	units	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Antimony, Total	mg/kg	0.85	0.8	1.03	2.63
Arsenic, Total	mg/kg	161	340	505	248
Carbon	%	0.3	0.36	0.37	0.39
Copper, Total	mg/kg	44.9	39	72.4	56.7
Inorganic Carbon	%	1.1	1.3	1.4	1.4
Iron, Total	mg/kg	28,800	23,200	27,300	32,200
Lead, Total	mg/kg	8.4	7.3	9.8	8.8
Maximum Potential Acidity	tCaCO3/1000t	5	2.2	4.7	3.4
Net Neutralization Potential	tCaCO3/1000t	25	37	32	48
pH, Paste	pH units	8.2	8.2	8.4	8.3
Potassium, Total	mg/kg	16,700	18,300	22,900	19,800
Ratio (NP/MPA)	su	6	17.83	7.89	14.84
Selenium, Total	mg/kg	1	<1	<1	1
Sodium, Total	mg/kg	9,200	7,800	8,500	9,700
Sulfate Sulfur (CO_3 Leach)	%	0.04	0.02	0.01	0.02
Sulfate Sulfur (HCL Leach)	%	<0.01	0.01	0.01	0.03
Sulfide Sulfur (Calculated)	%	0.12	0.05	0.14	0.09
Sulfur, Total (LECO)	%	0.16	0.07	0.15	0.11
Zinc, Total	mg/kg	30	21	30	32

APPENDIX C –

TIME SERIES GRAPHS OF MONITORING DATA

APPENDIX C –

OUTFALL 011 GRAPHS


Values over time for Arsenic, total (ug/L)
Arsenic, total (ug/L)
1000
100
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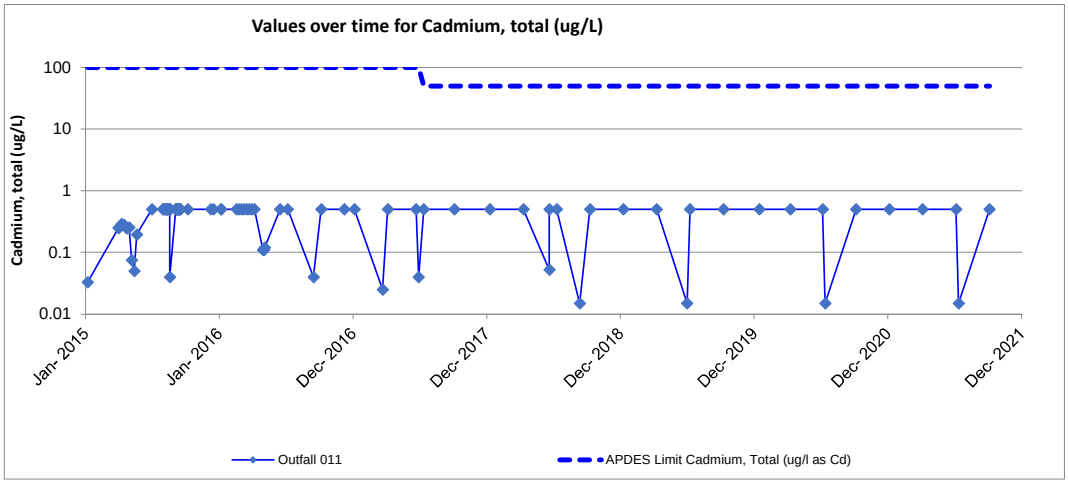
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011 Arsenic, Total (ug/l as As)


Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
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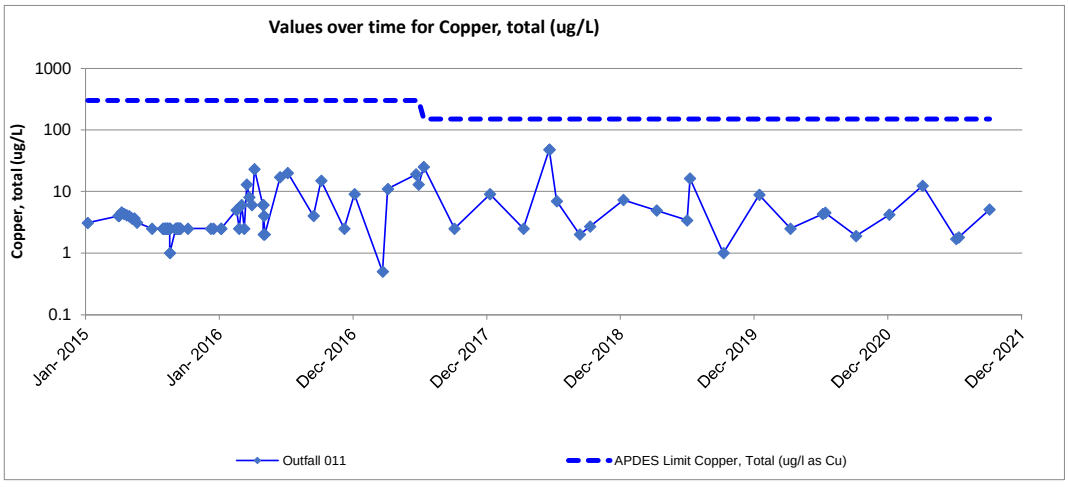
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit Cadmium, Total (ug/l as Cd)


Values over time for Copper, total (ug/L)
Copper, total (ug/L)
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100
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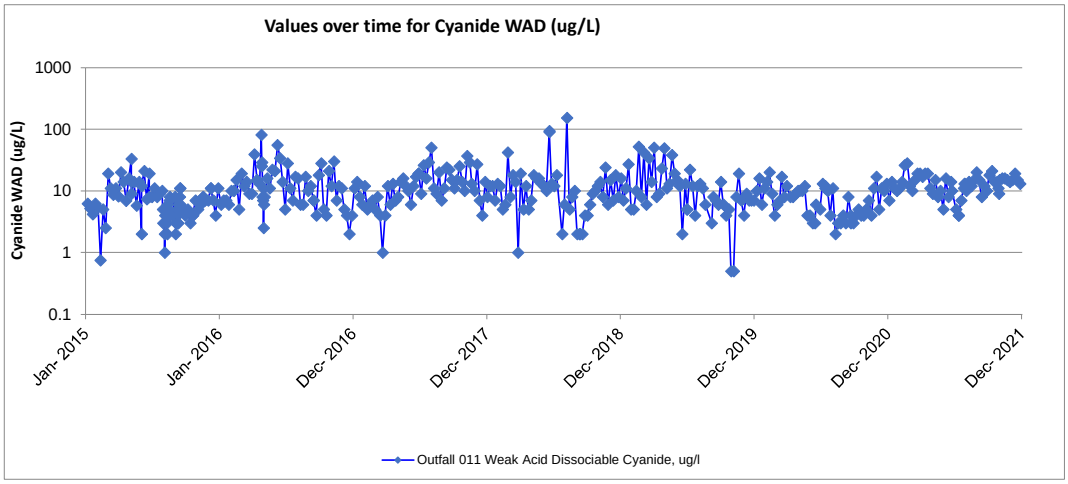
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit Copper, Total (ug/l as Cu)


Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
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100
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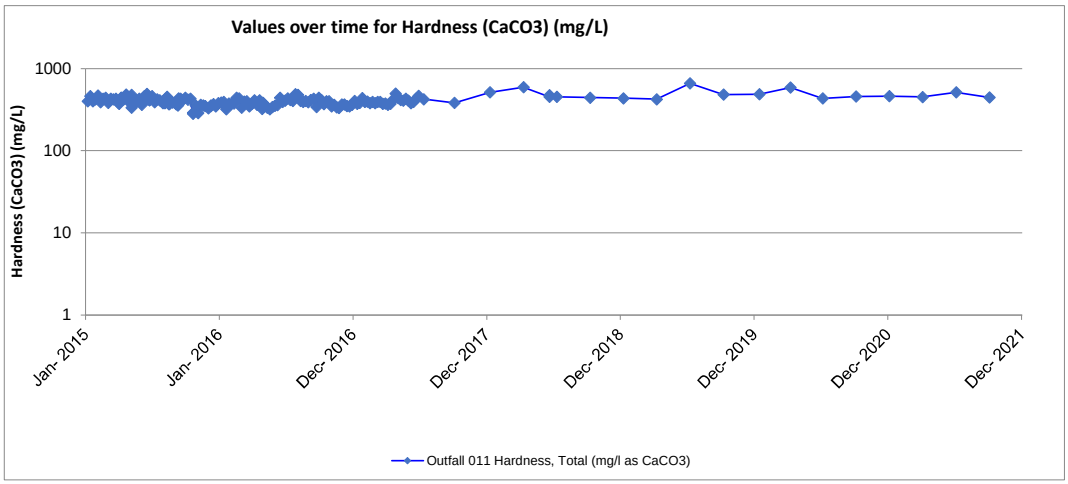
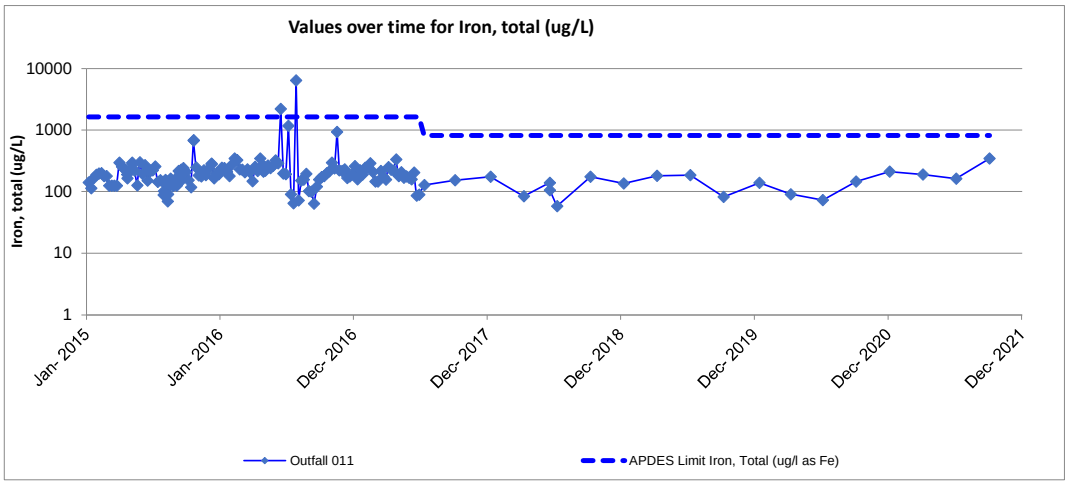
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011 Weak Acid Dissociable Cyanide, ug/l


Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011 Hardness, Total (mg/l as CaCO3)


Values over time for Iron, total (ug/L)
Iron, total (ug/L)
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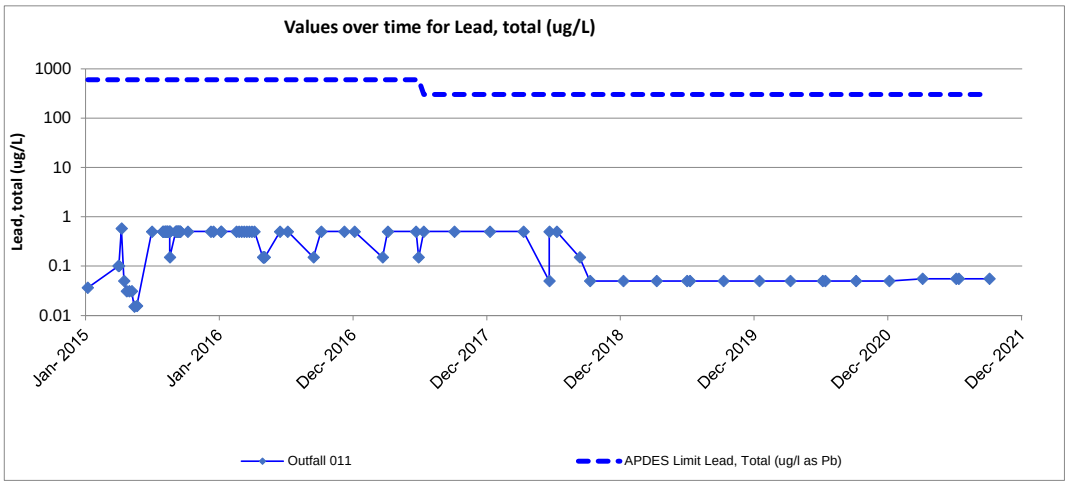
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit Iron, Total (ug/l as Fe)


Values over time for Lead, total (ug/L)
Lead, total (ug/L)
1000
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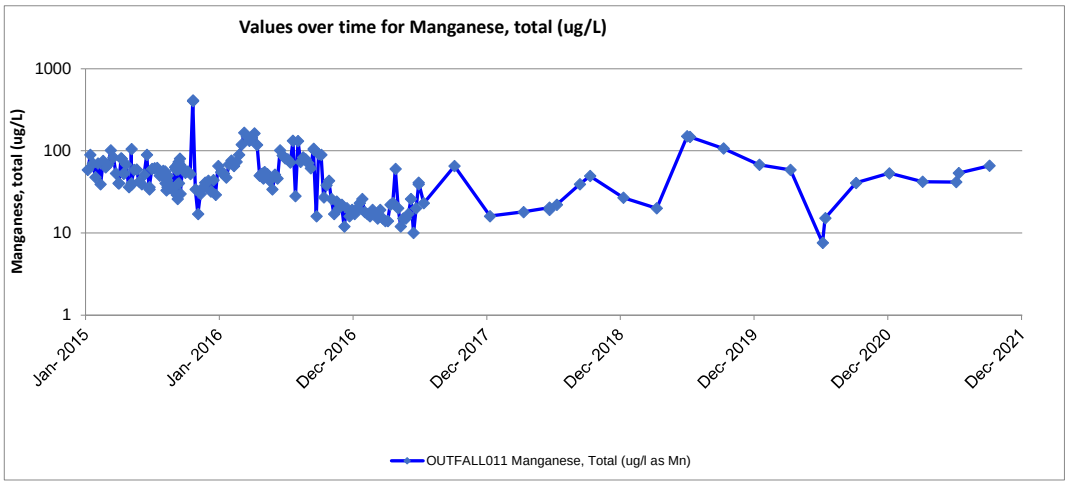
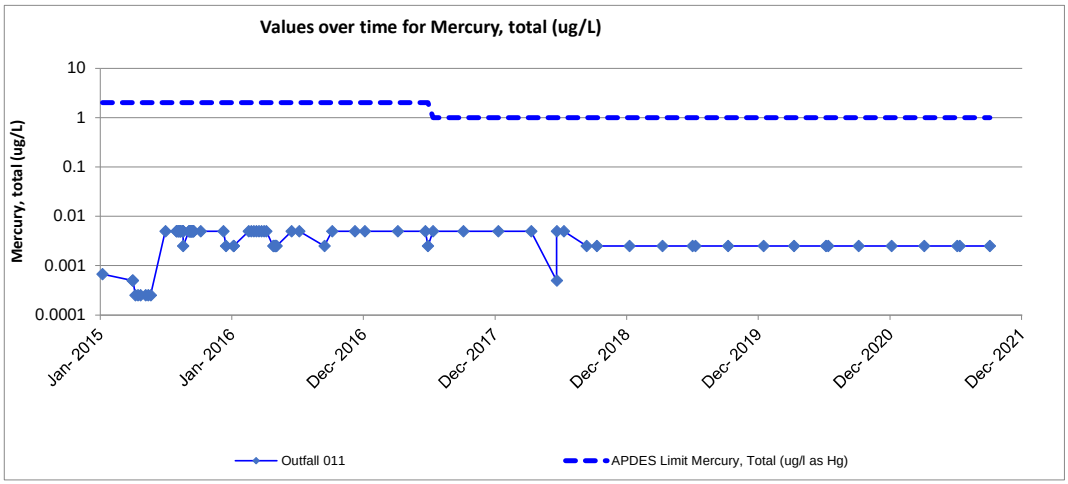
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit Lead, Total (ug/l as Pb)


Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL011 Manganese, Total (ug/l as Mn)


Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
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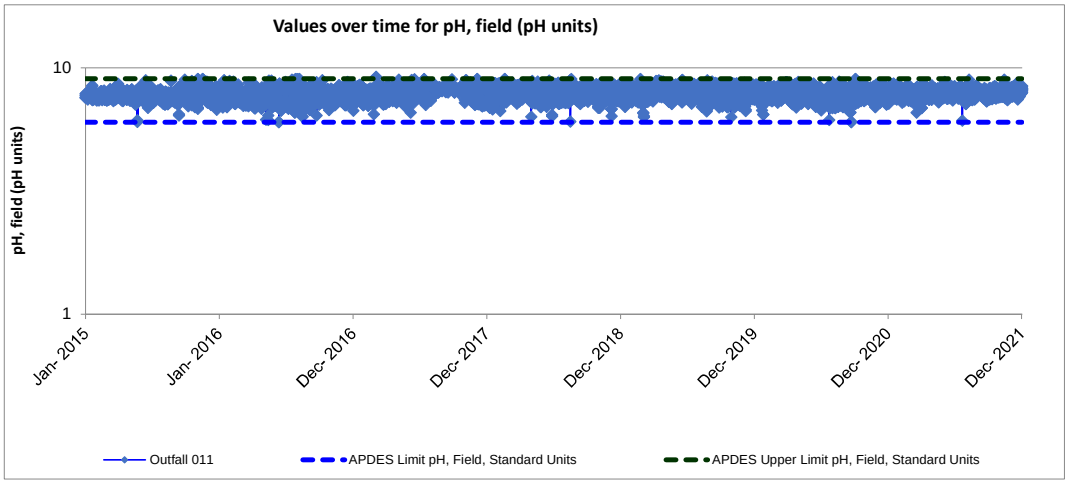
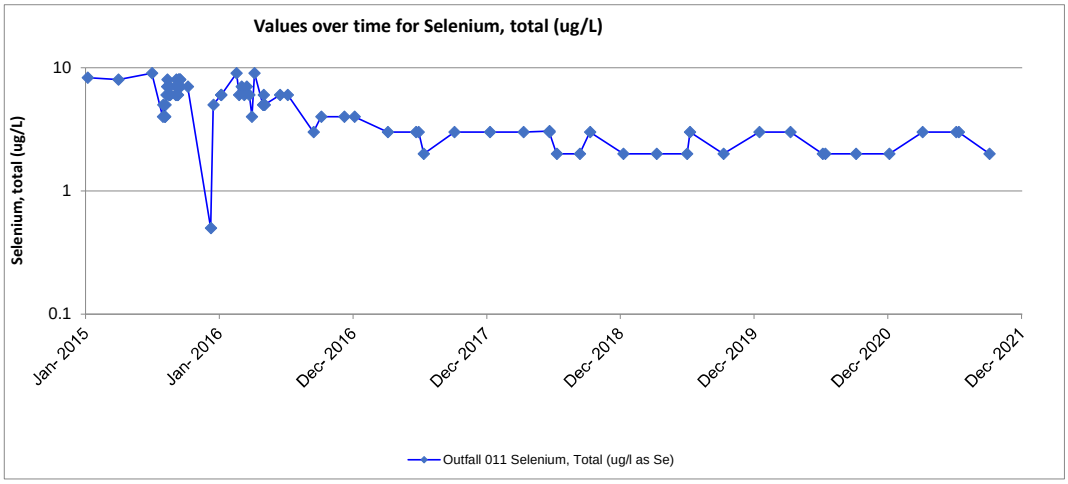
0.1
0.01
0.001
0.0001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit Mercury, Total (ug/l as Hg)


Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit pH, Field, Standard Units
APDES Upper Limit pH, Field, Standard Units


Values over time for Selenium, total (ug/L)
Selenium, total (ug/L)
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Jan- 2015
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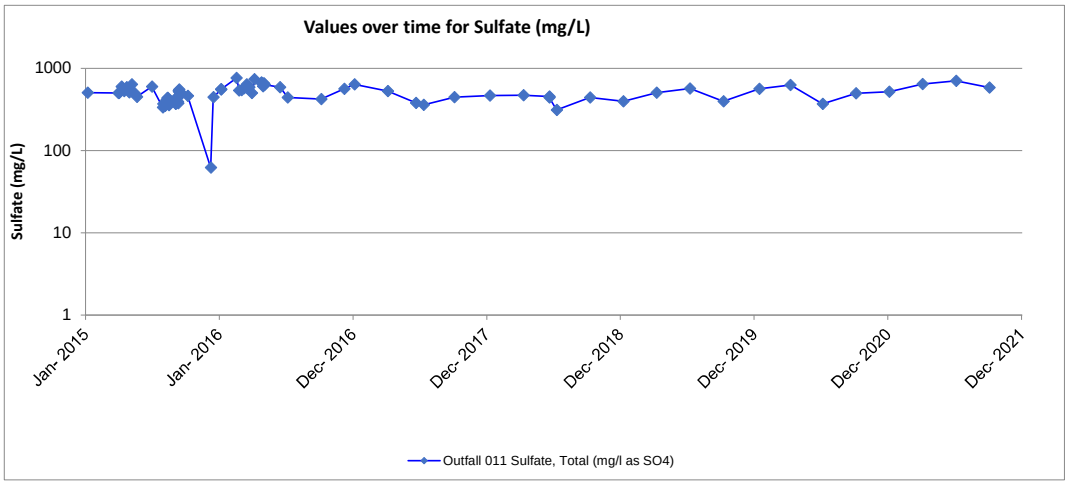
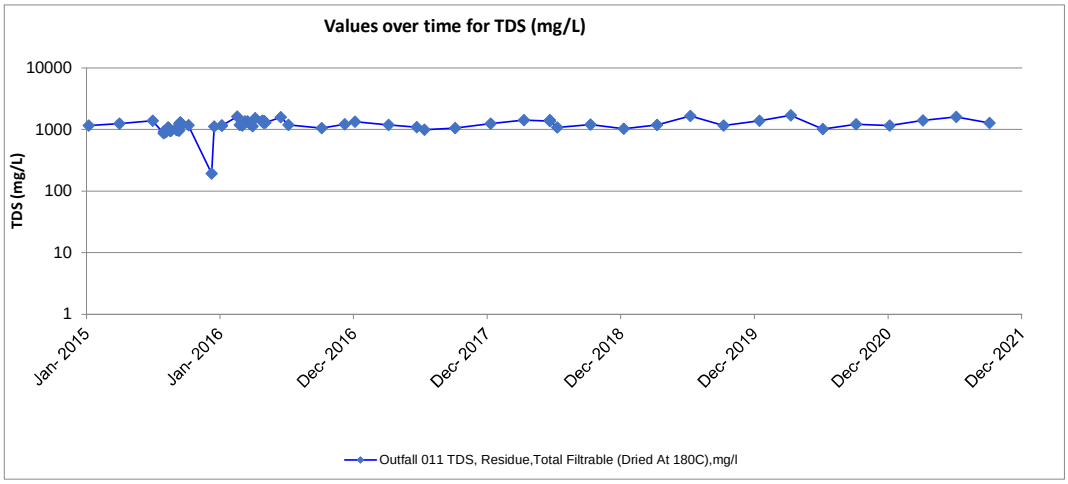
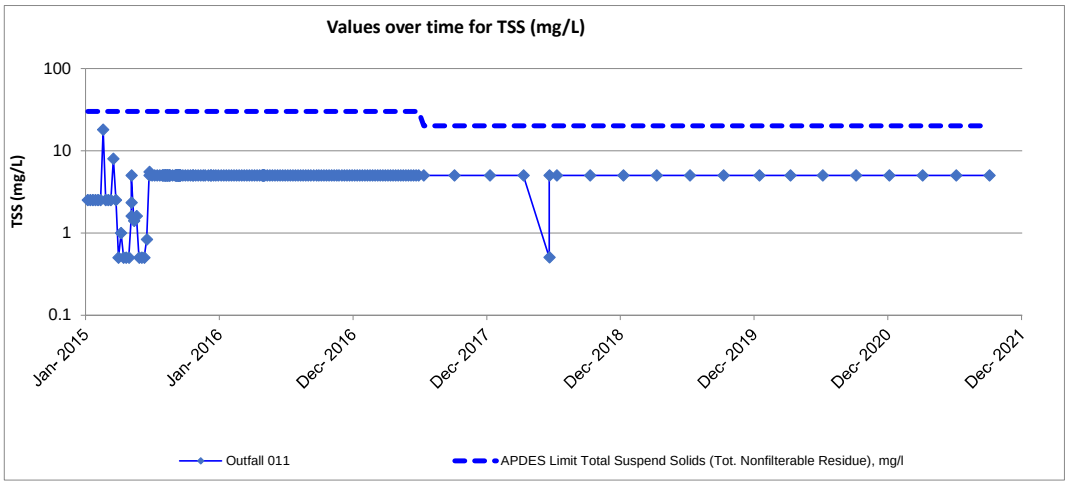
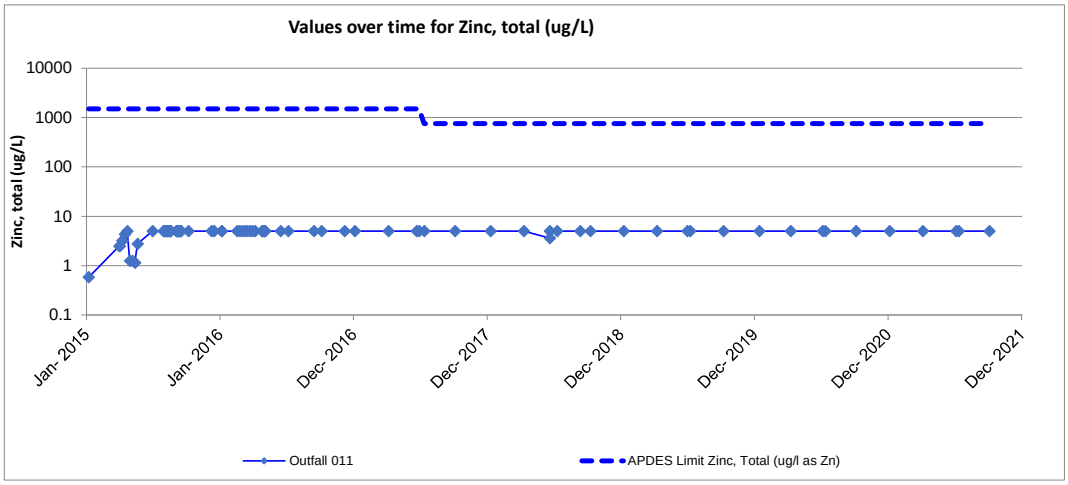
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011 Selenium, Total (ug/l as Se)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011 Sulfate, Total (mg/l as SO4)

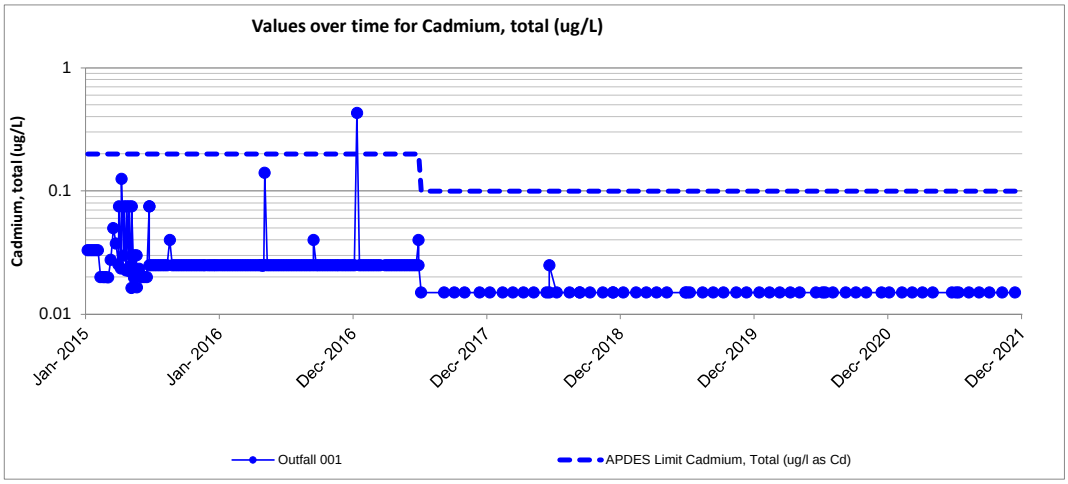

Values over time for TDS (mg/L)
TDS (mg/L)
10000
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011 TDS, Residue,Total Filtrable (Dried At 180C),mg/l


Values over time for TSS (mg/L)
TSS (mg/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit Total Suspend Solids (Tot. Nonfilterable Residue), mg/l


Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
10000
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 011
APDES Limit Zinc, Total (ug/l as Zn)

APPENDIX C –

OUTFALL 001 GRAPHS


Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
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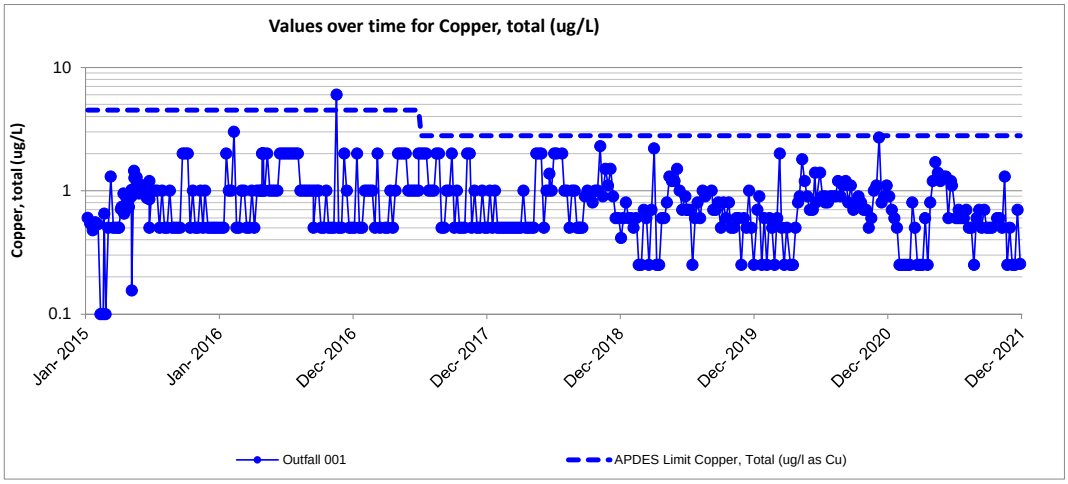
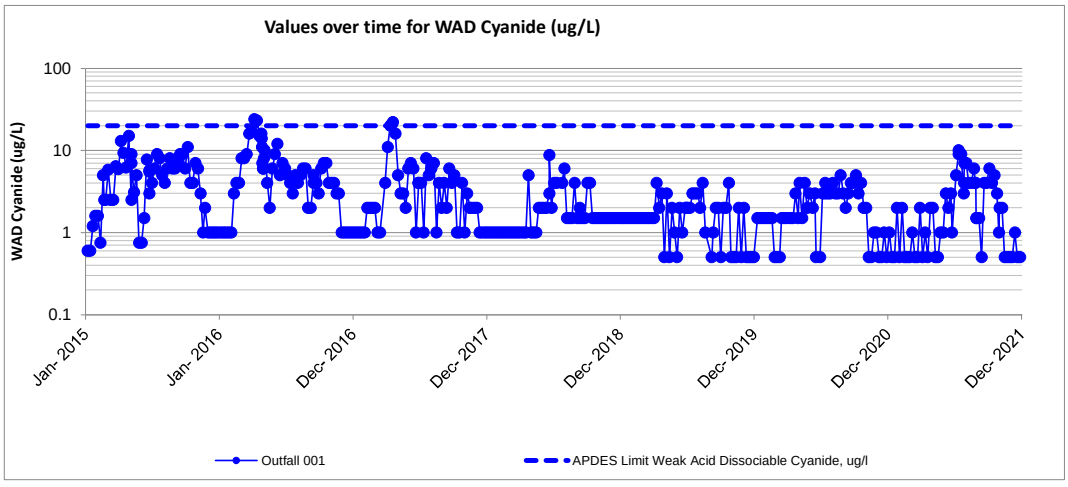
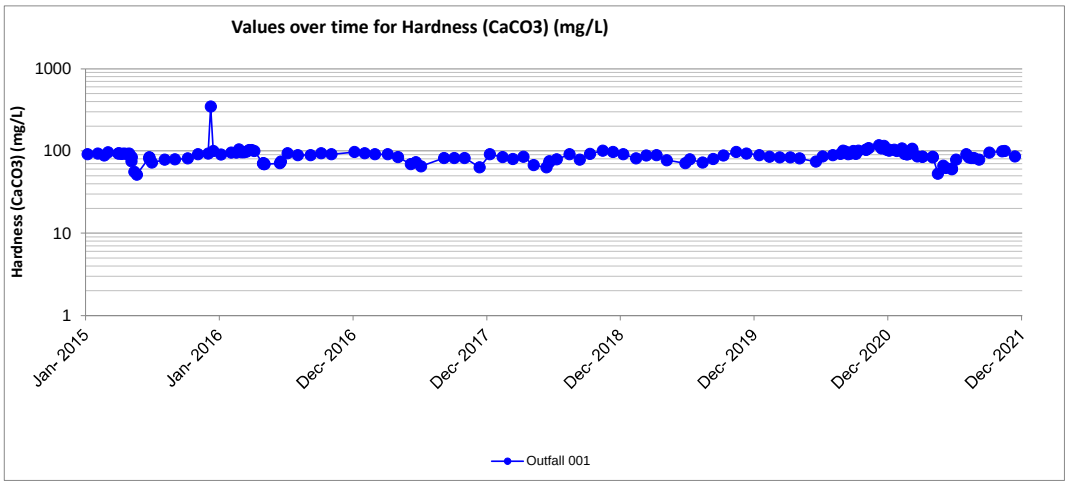
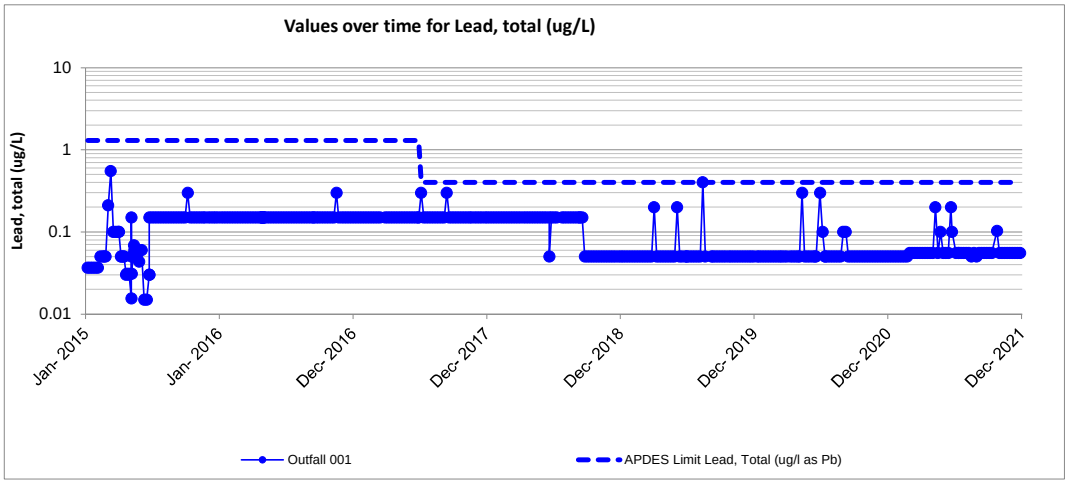
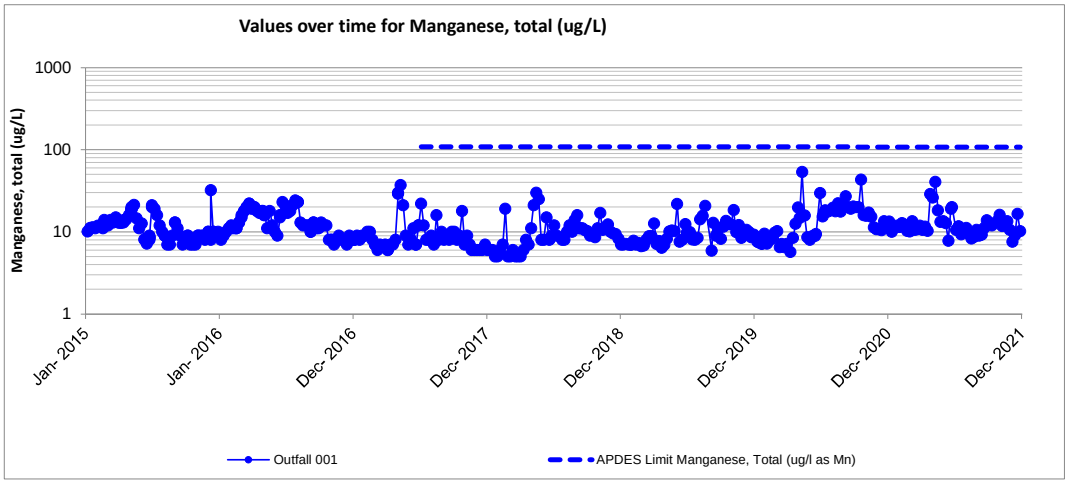
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit Cadmium, Total (ug/l as Cd)

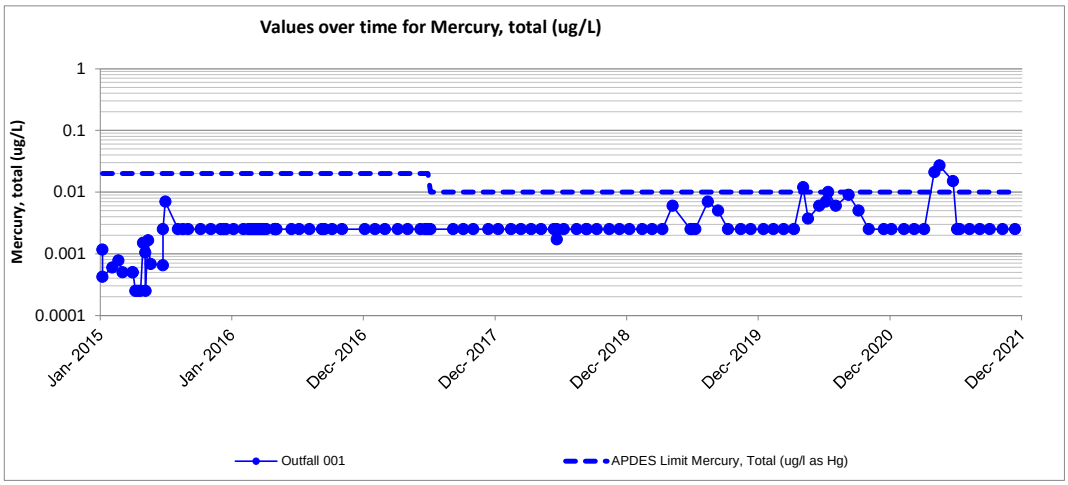

Values over time for Copper, total (ug/L)
Copper, total (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit Copper, Total (ug/l as Cu)

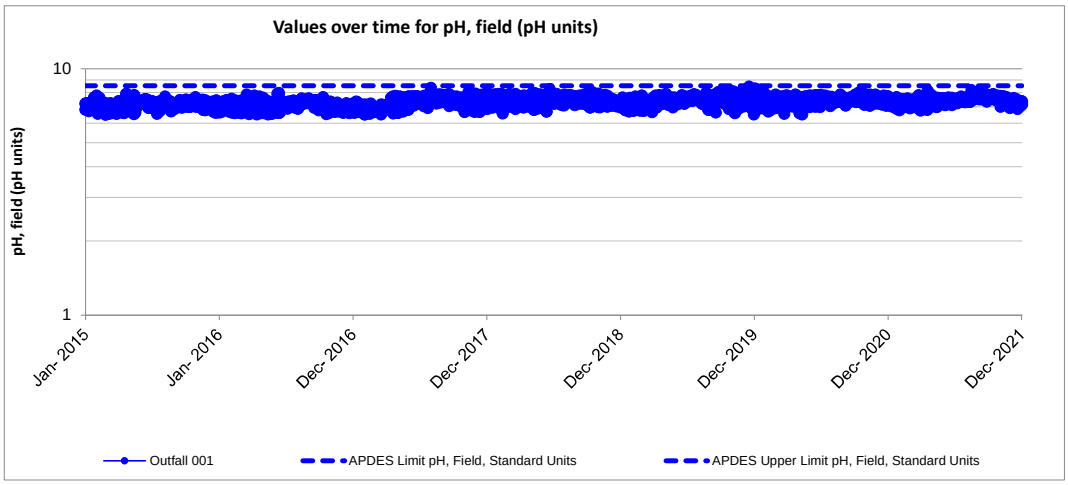

Values over time for WAD Cyanide (ug/L)
WAD Cyanide (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit Weak Acid Dissociable Cyanide, ug/l

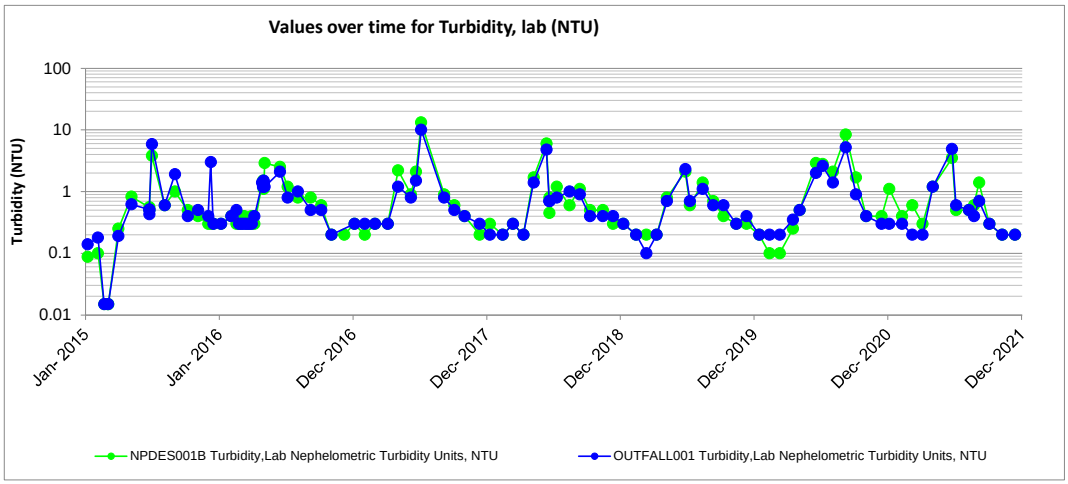

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001

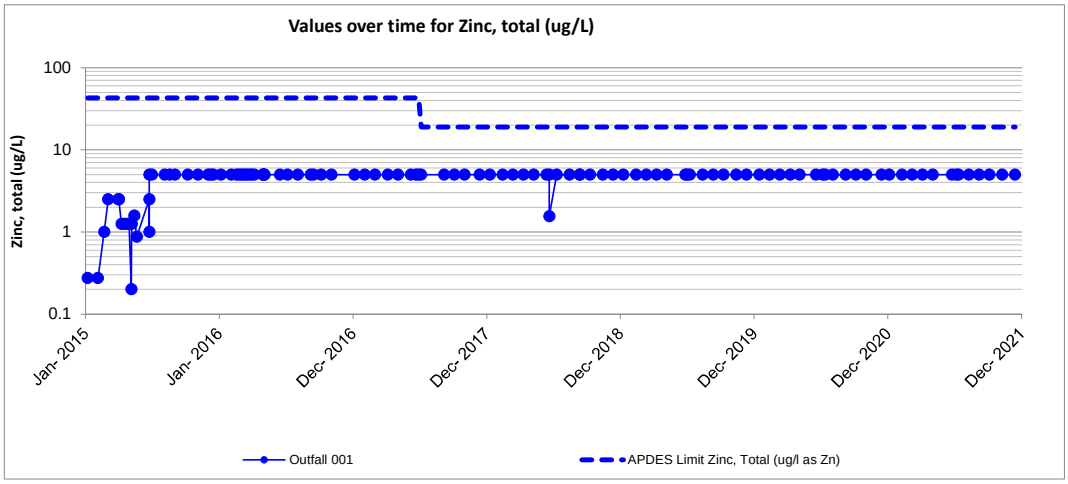

Values over time for Lead, total (ug/L)
Lead, total (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit Lead, Total (ug/l as Pb)


Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit Manganese, Total (ug/l as Mn)


Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
1
0.1
0.01
0.001
0.0001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit Mercury, Total (ug/l as Hg)

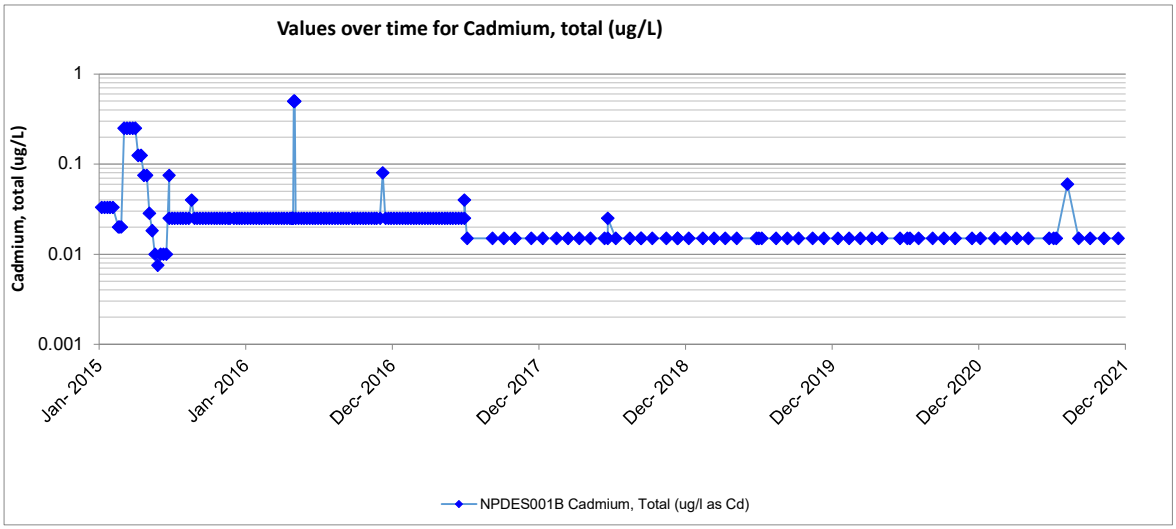

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit pH, Field, Standard Units
APDES Upper Limit pH, Field, Standard Units

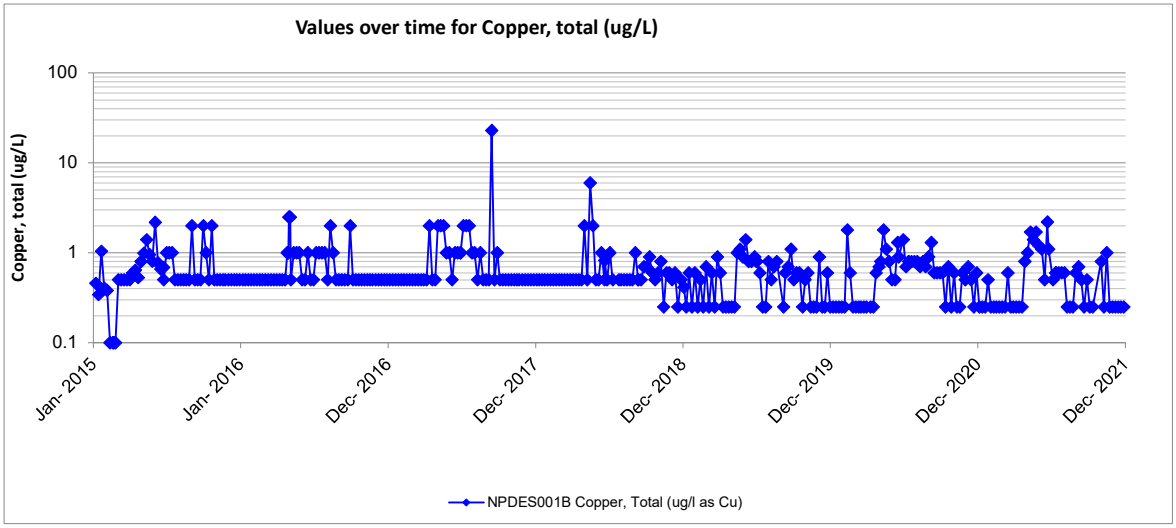

Values over time for Turbidity, lab (NTU)
Turbidity (NTU)
100
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Turbidity,Lab Nephelometric Turbidity Units, NTU
OUTFALL001 Turbidity,Lab Nephelometric Turbidity Units, NTU

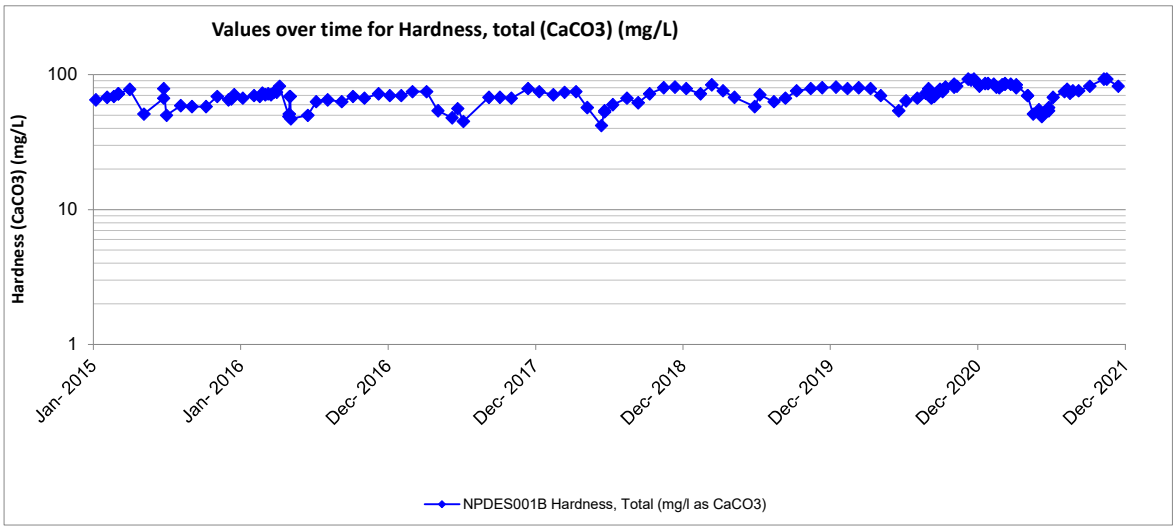

Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 001
APDES Limit Zinc, Total (ug/l as Zn)

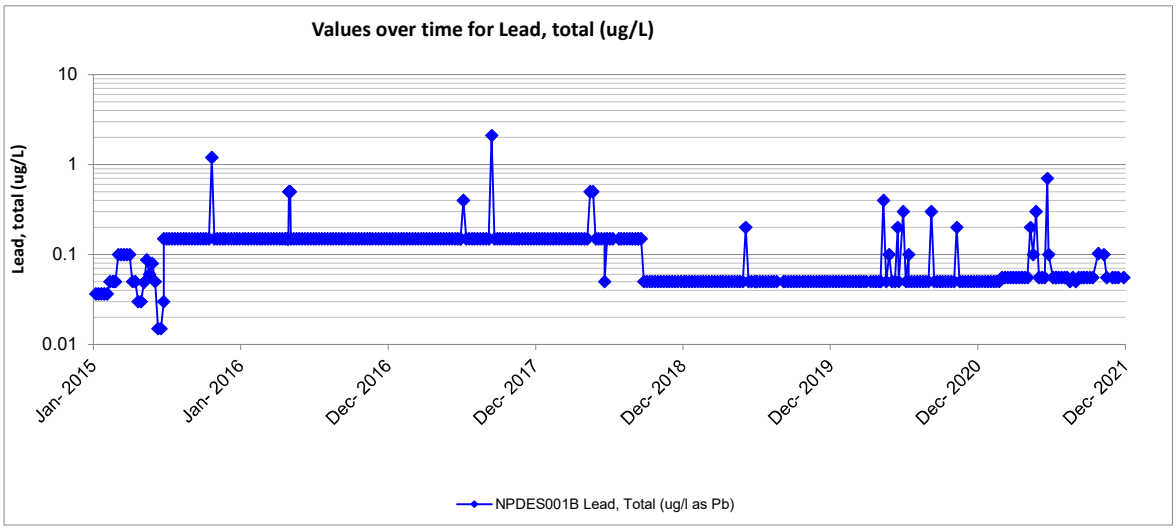
APPENDIX C –

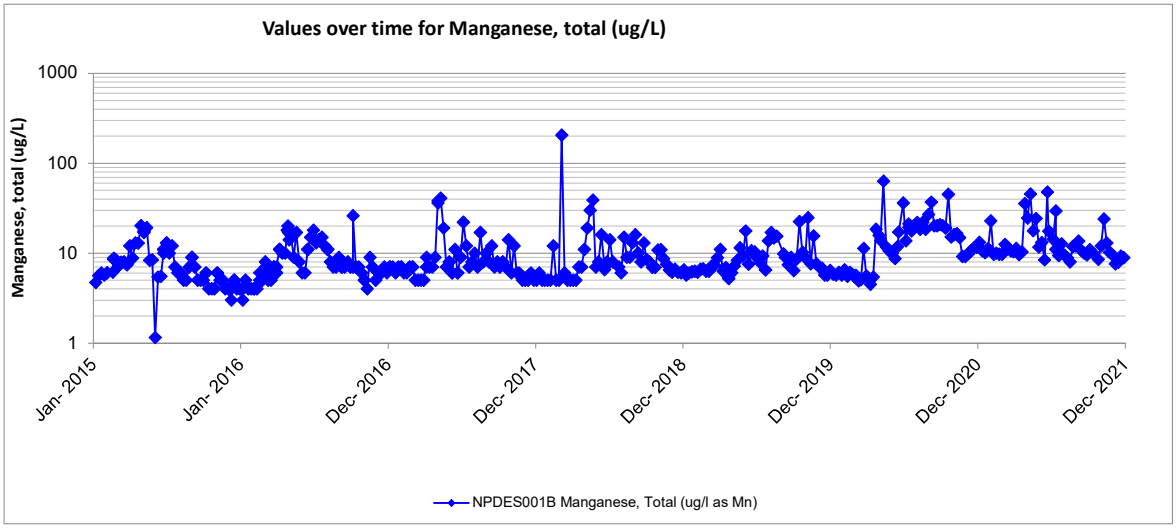
NPDES001B GRAPHS

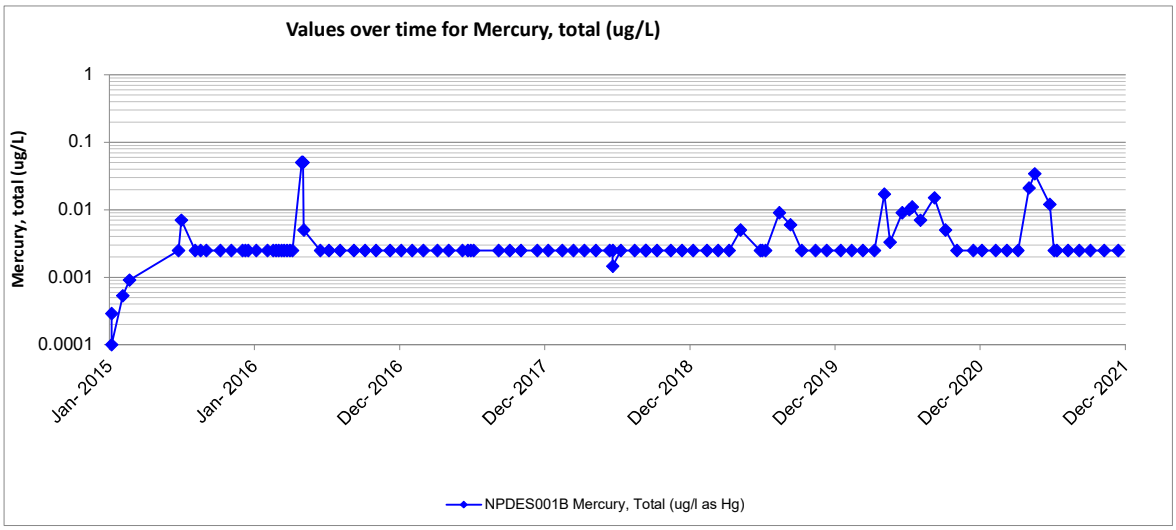

Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
1
0.1
0.01
0.001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Cadmium, Total (ug/l as Cd)

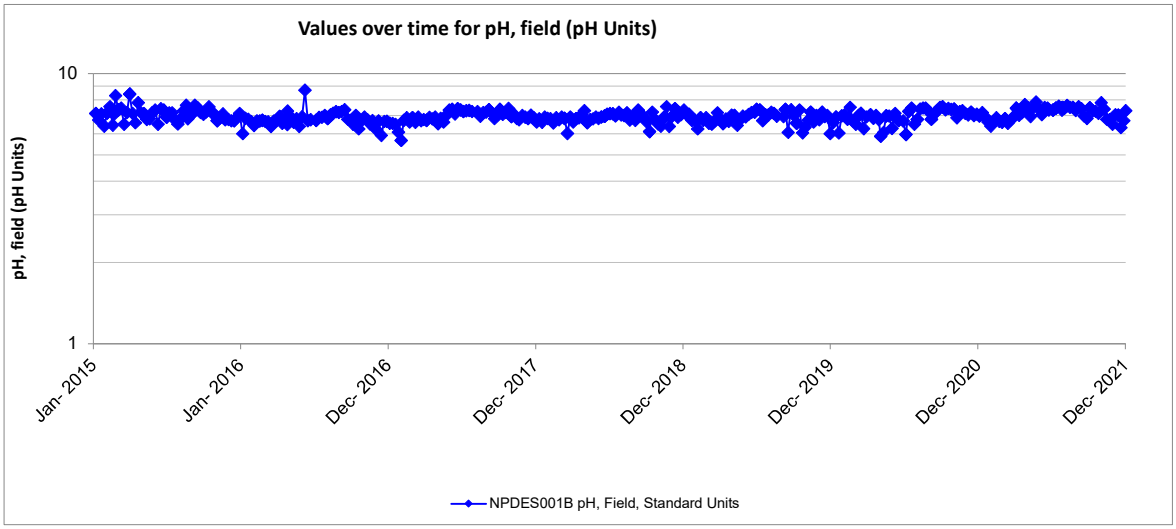

Values over time for Copper, total (ug/L)
Copper, total (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Copper, Total (ug/l as Cu)

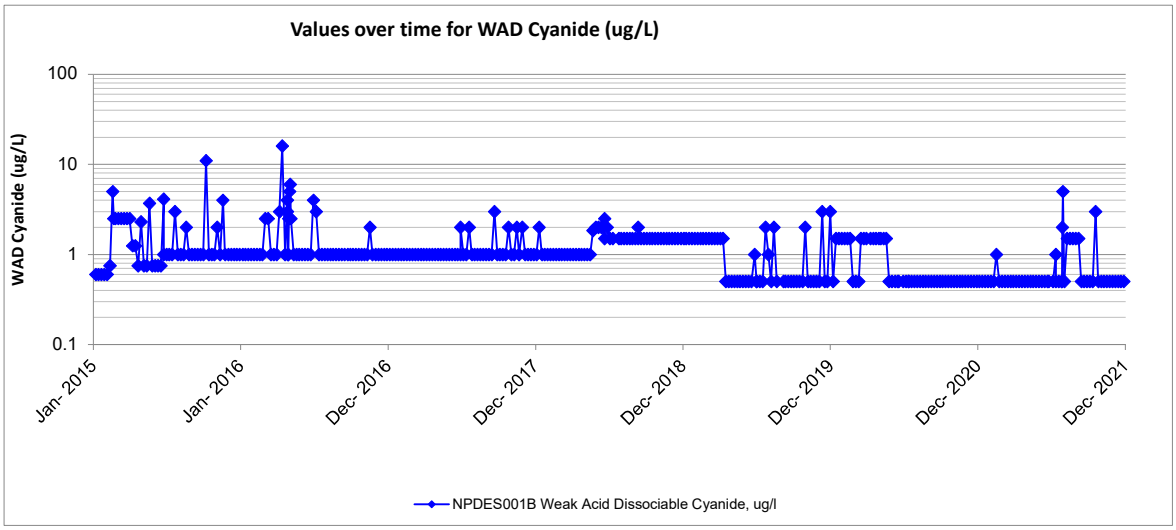

Values over time for Hardness, total (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Hardness, Total (mg/l as CaCO3)

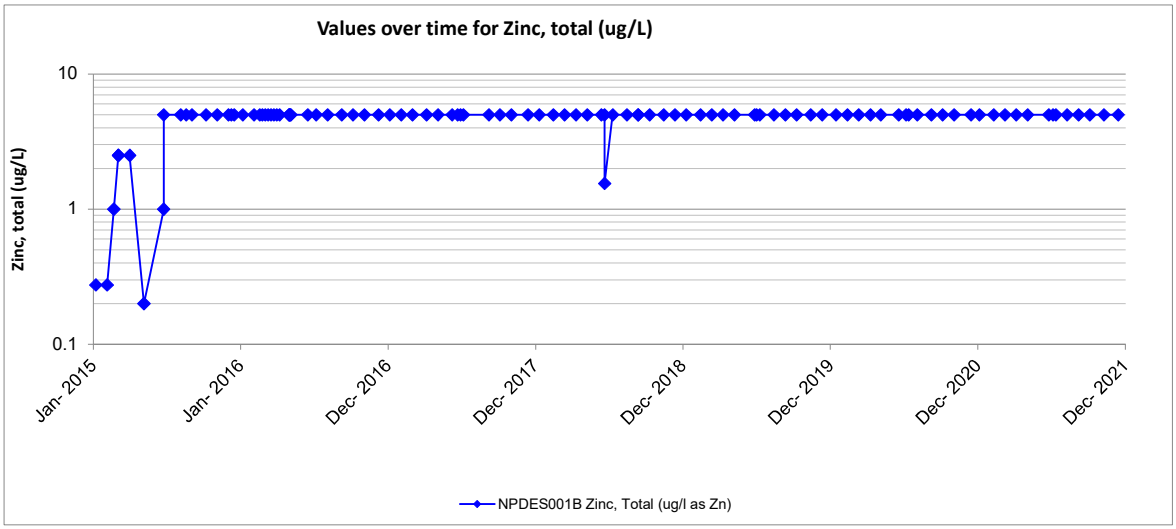

Values over time for Lead, total (ug/L)
Lead, total (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Lead, Total (ug/l as Pb)


Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Manganese, Total (ug/l as Mn)


Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
1
0.1
0.01
0.001
0.0001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Mercury, Total (ug/l as Hg)

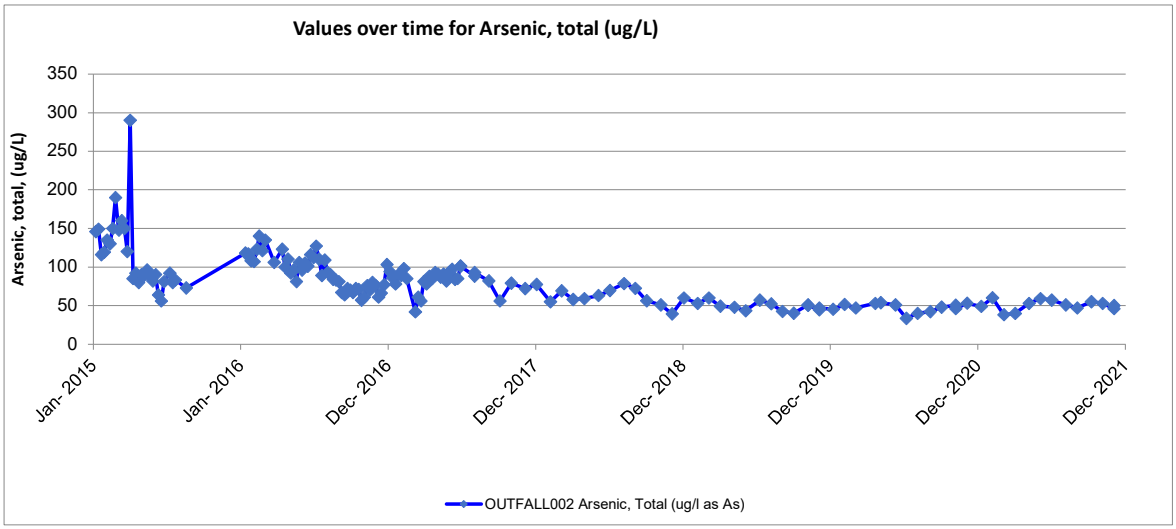

Values over time for pH, field (pH Units)
pH, field (pH Units)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B pH, Field, Standard Units

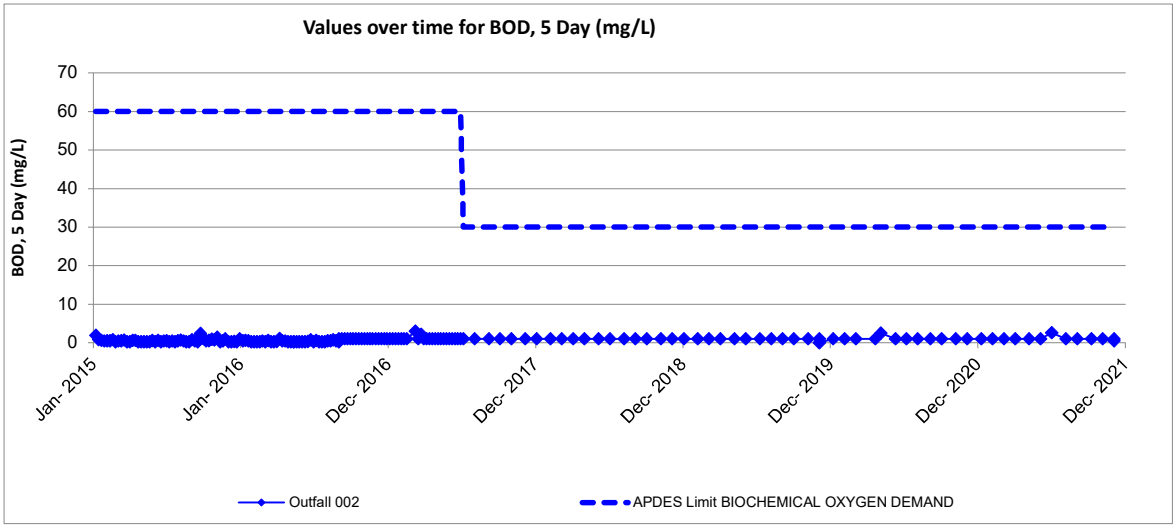

Values over time for WAD Cyanide (ug/L)
WAD Cyanide (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Weak Acid Dissociable Cyanide, ug/l

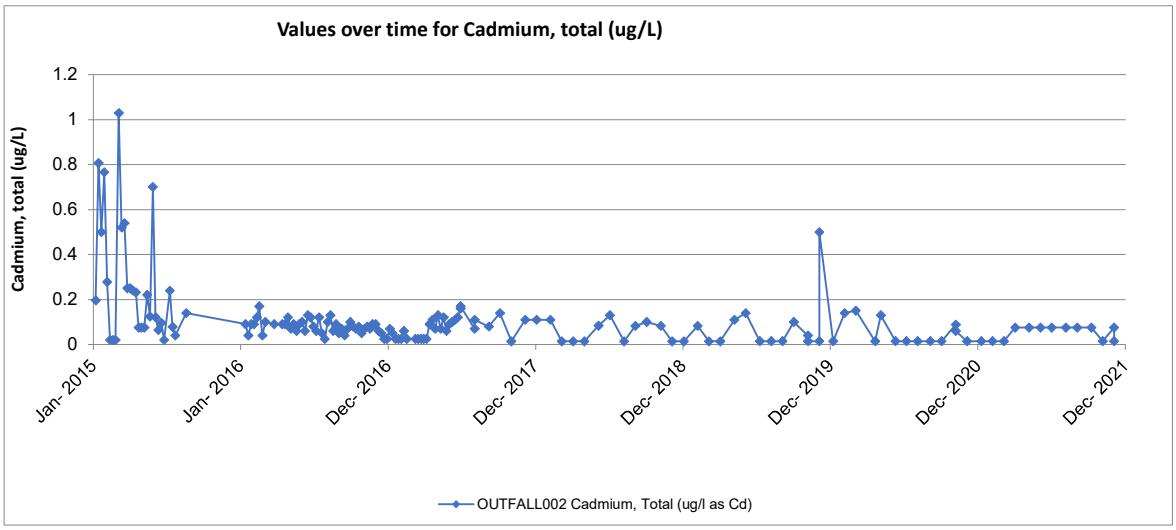

Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
NPDES001B Zinc, Total (ug/l as Zn)

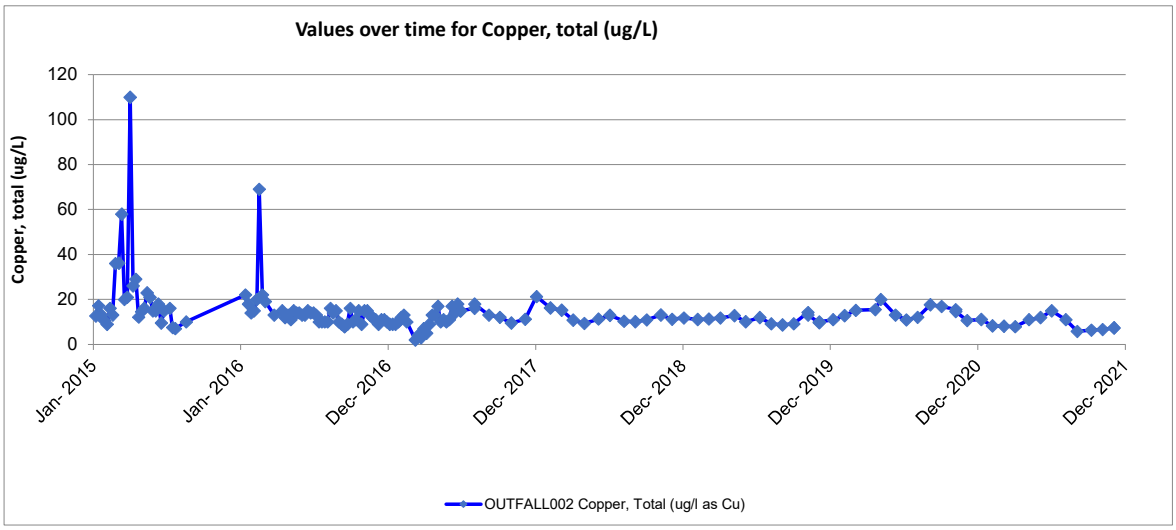
APPENDIX C –

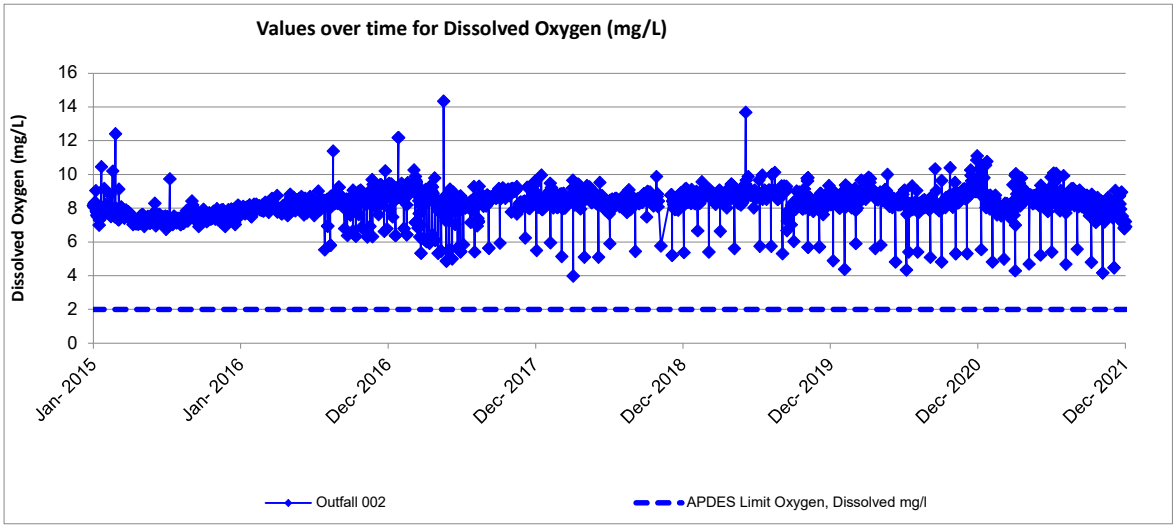
OUTFALL 002 GRAPHS

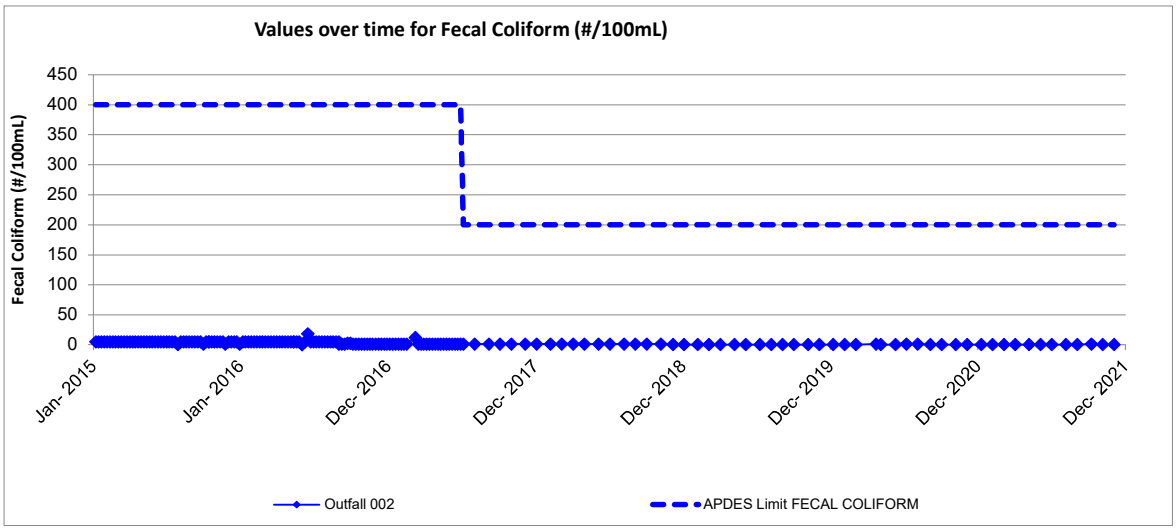

Values over time for Arsenic, total (ug/L)
Arsenic, total, (ug/L)
350
300
250
200
150
100
50
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Arsenic, Total (ug/l as As)

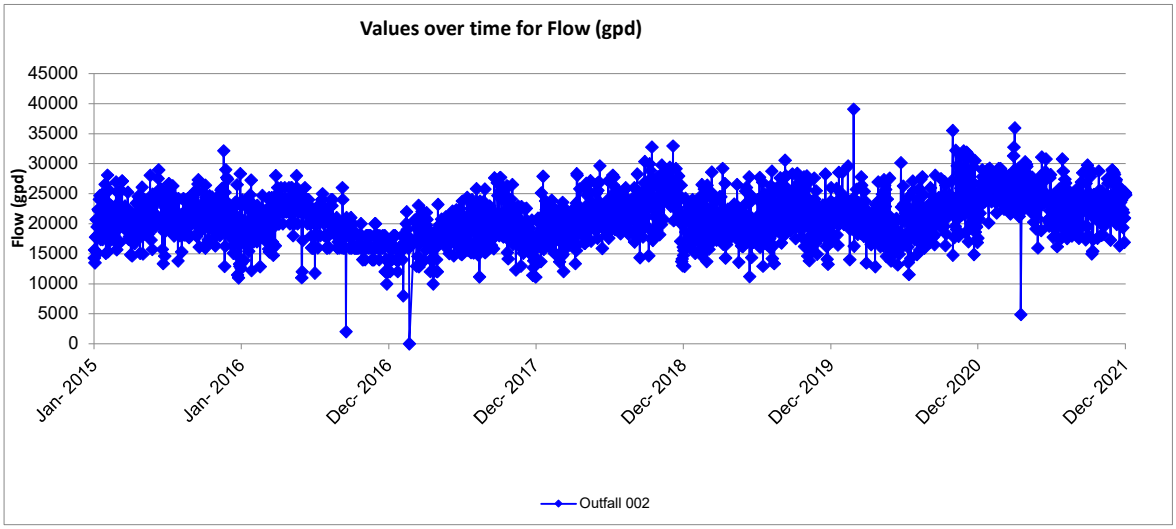

Values over time for BOD, 5 Day (mg/L)
BOD, 5 Day (mg/L)
70
60
50
40
30
20
10
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 002
APDES Limit BIOCHEMICAL OXYGEN DEMAND

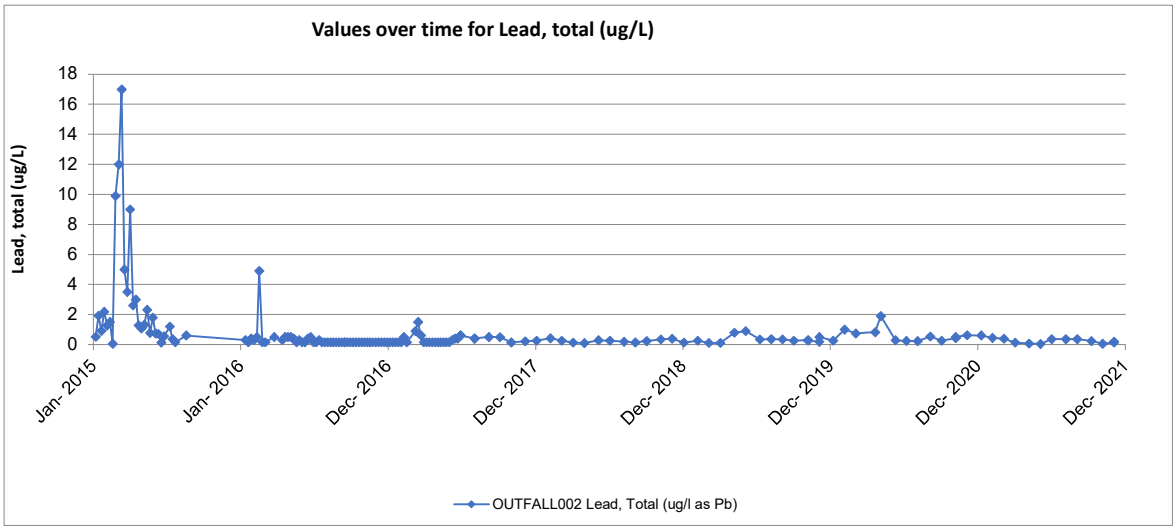

Values over time for Cadmium, total (ug/L)
Cadmium, total (ug/L)
1.2
1
0.8
0.6
0.4
0.2
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Cadmium, Total (ug/l as Cd)

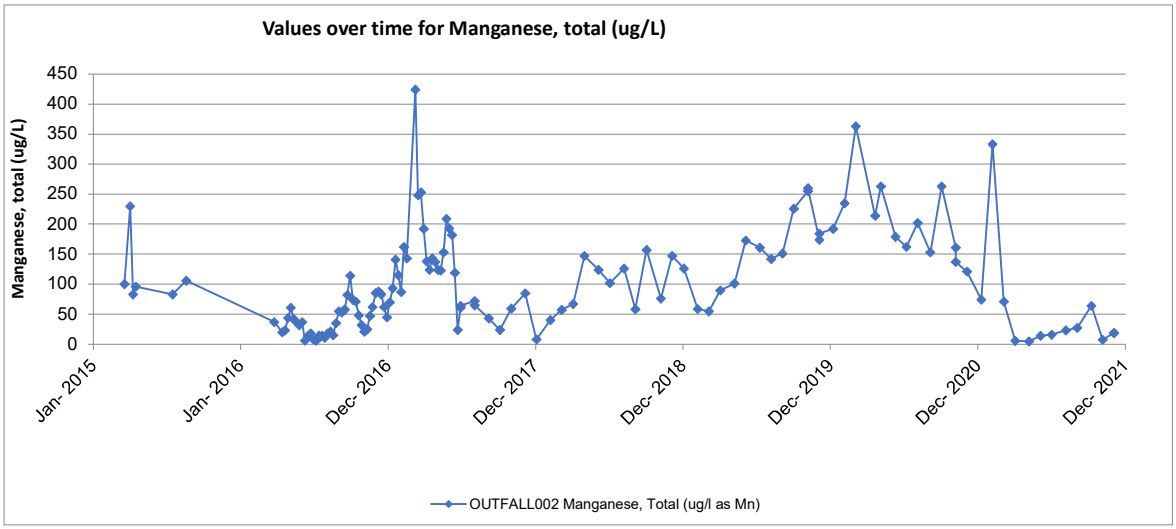

Values over time for Copper, total (ug/L)
Copper, total (ug/L)
120
100
80
60
40
20
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Copper, Total (ug/l as Cu)

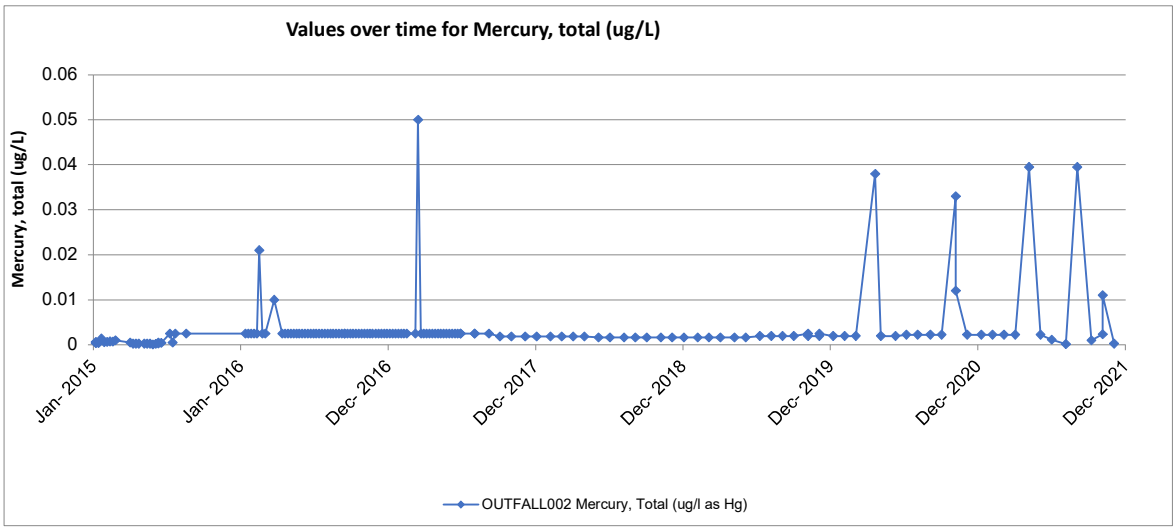

Values over time for Dissolved Oxygen (mg/L)
Dissolved Oxygen (mg/L)
16
14
12
10
8
6
4
2
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 002
APDES Limit Oxygen, Dissolved mg/l

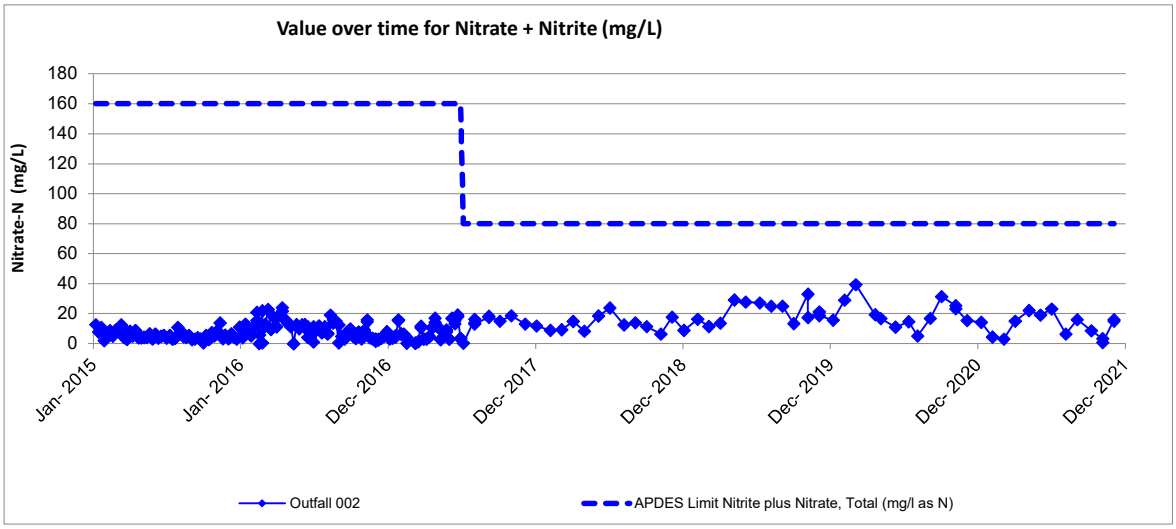

Values over time for Fecal Coliform (#/100mL)
Fecal Coliform (#/100mL)
450
400
350
300
250
200
150
100
50
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 002
APDES Limit FECAL COLIFORM

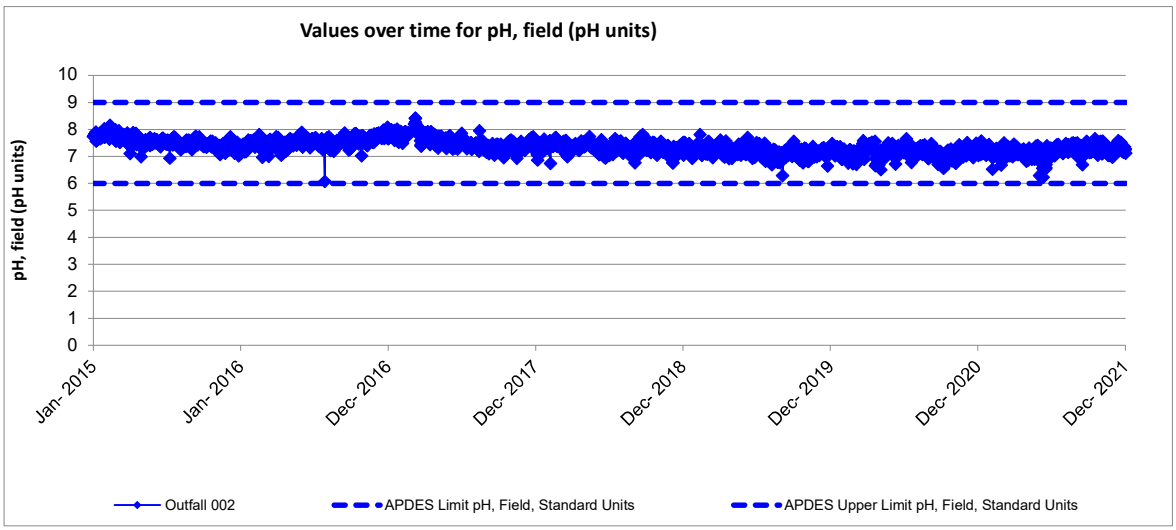

Values over time for Flow (gpd)
Flow (gpd)
45000
40000
35000
30000
25000
20000
15000
10000
5000
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 002

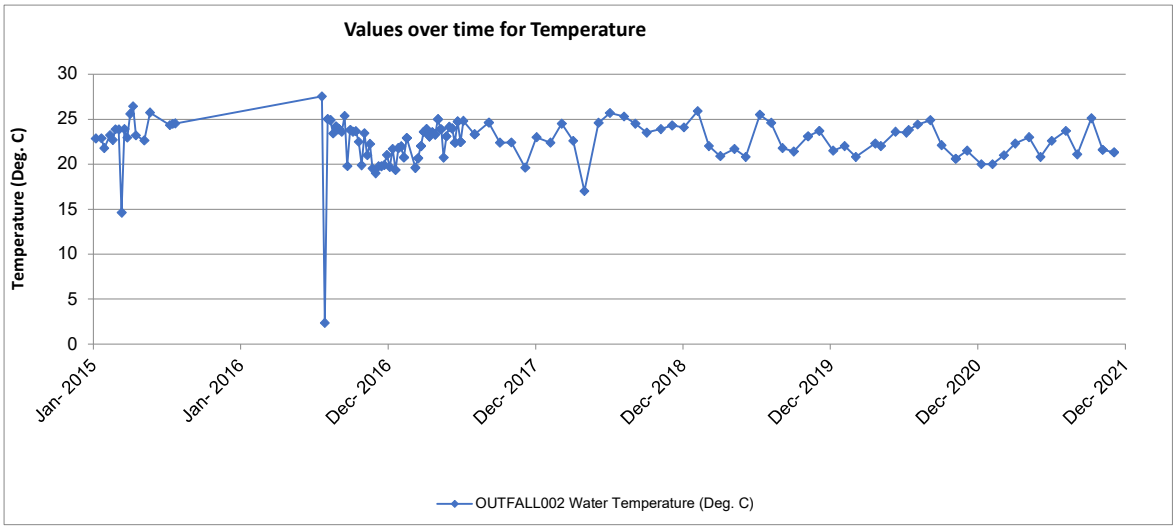

Values over time for Lead, total (ug/L)
Lead, total (ug/L)
18
16
14
12
10
8
6
4
2
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Lead, Total (ug/l as Pb)

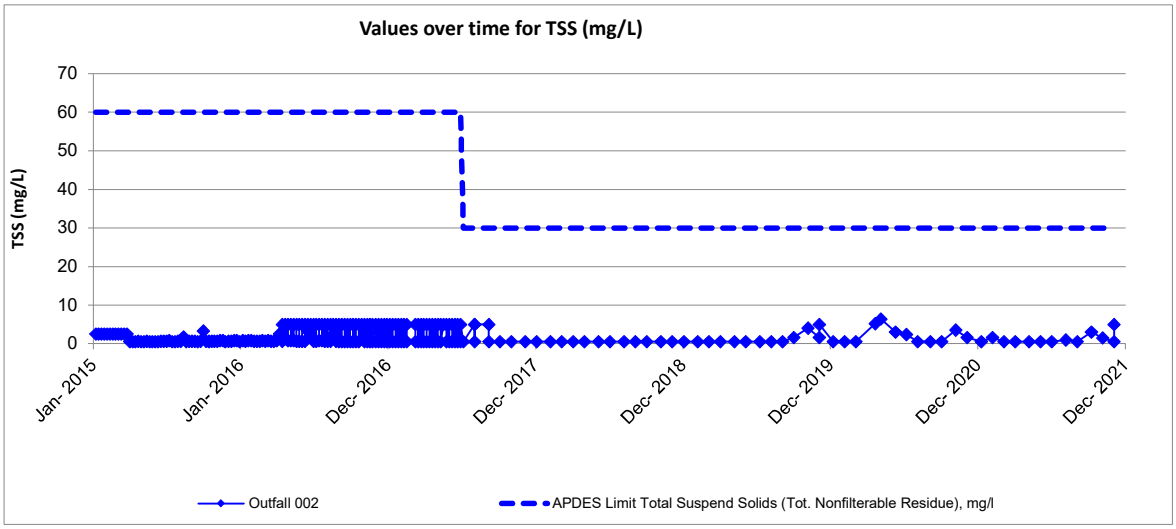

Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
450
400
350
300
250
200
150
100
50
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Manganese, Total (ug/l as Mn)

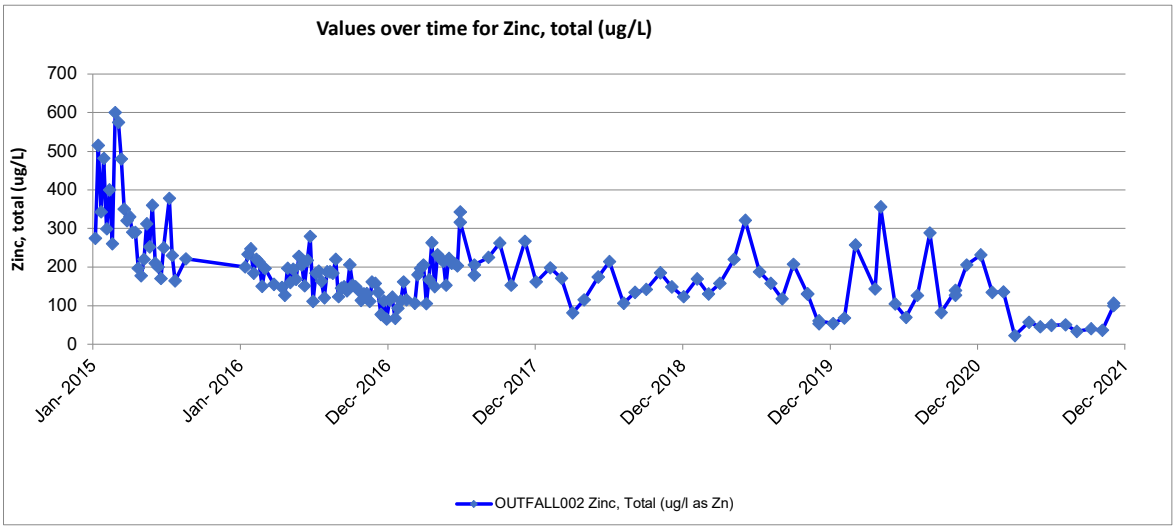

Values over time for Mercury, total (ug/L)
Mercury, total (ug/L)
0.06
0.05
0.04
0.03
0.02
0.01
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Mercury, Total (ug/l as Hg)


Value over time for Nitrate + Nitrite (mg/L)
Nitrate-N (mg/L)
180
160
140
120
100
80
60
40
20
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 002
APDES Limit Nitrite plus Nitrate, Total (mg/l as N)


Values over time for pH, field (pH units)
pH, field (pH units)
10
9
8
7
6
5
4
3
2
1
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 002
APDES Limit pH, Field, Standard Units
APDES Upper Limit pH, Field, Standard Units

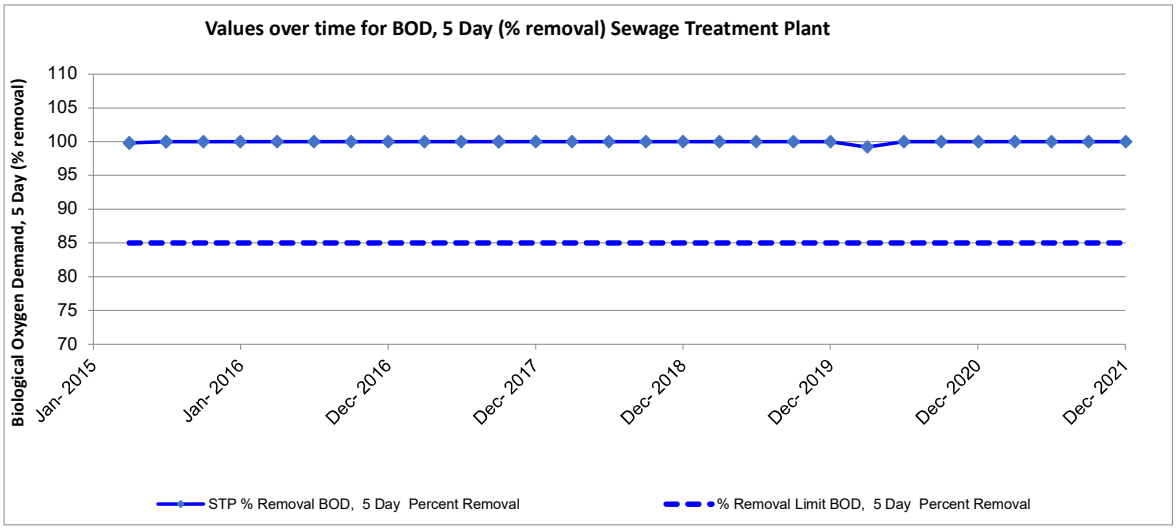

Values over time for Temperature
Temperature (Deg. C)
30
25
20
15
10
5
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Water Temperature (Deg. C)

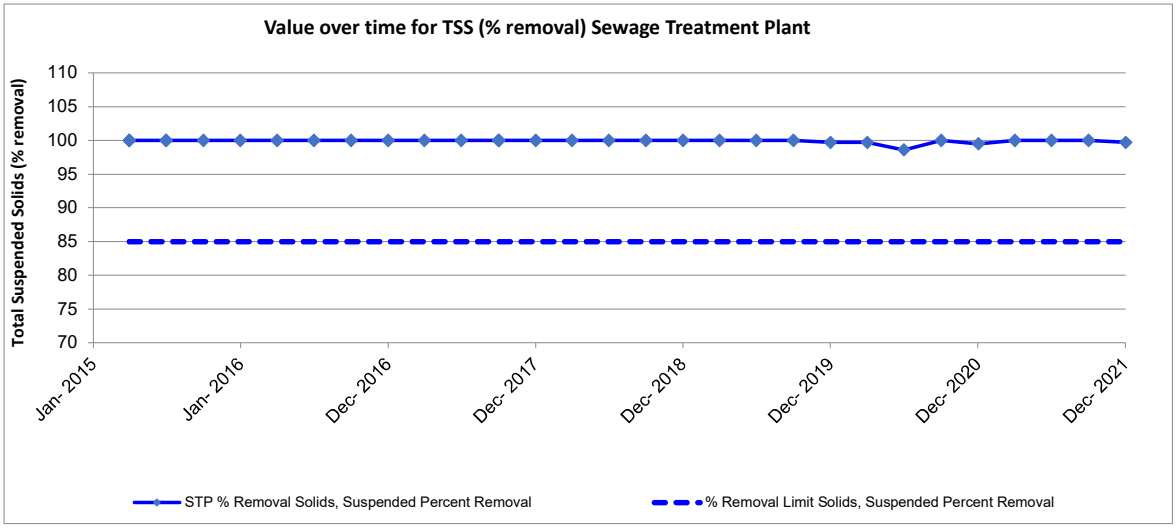

Values over time for TSS (mg/L)
TSS (mg/L)
70
60
50
40
30
20
10
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
Outfall 002
APDES Limit Total Suspend Solids (Tot. Nonfilterable Residue), mg/l


Values over time for Zinc, total (ug/L)
Zinc, total (ug/L)
700
600
500
400
300
200
100
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
OUTFALL002 Zinc, Total (ug/l as Zn)

APPENDIX C –

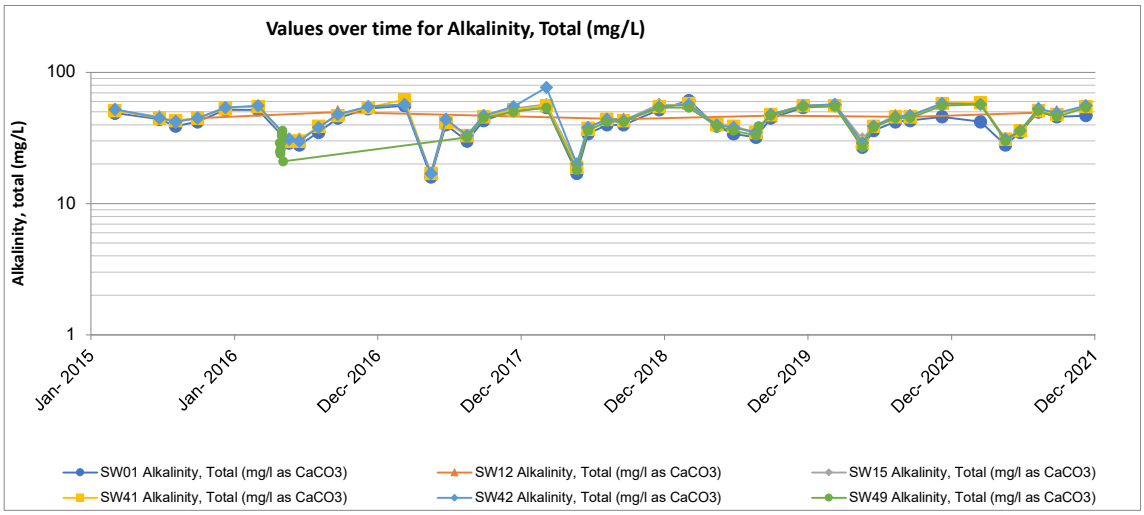
STP GRAPHS

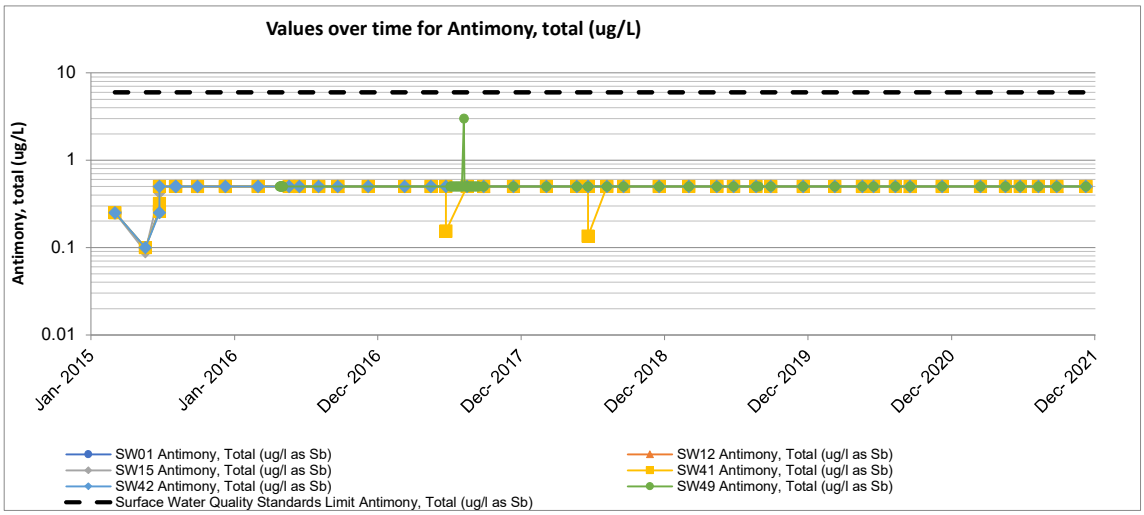

Values over time for BOD, 5 Day (% removal) Sewage Treatment Plant
Biological Oxygen Demand, 5 Day (% removal)
110
105
100
95
90
85
80
75
70
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
STP % Removal BOD, 5 Day Percent Removal
% Removal Limit BOD, 5 Day Percent Removal

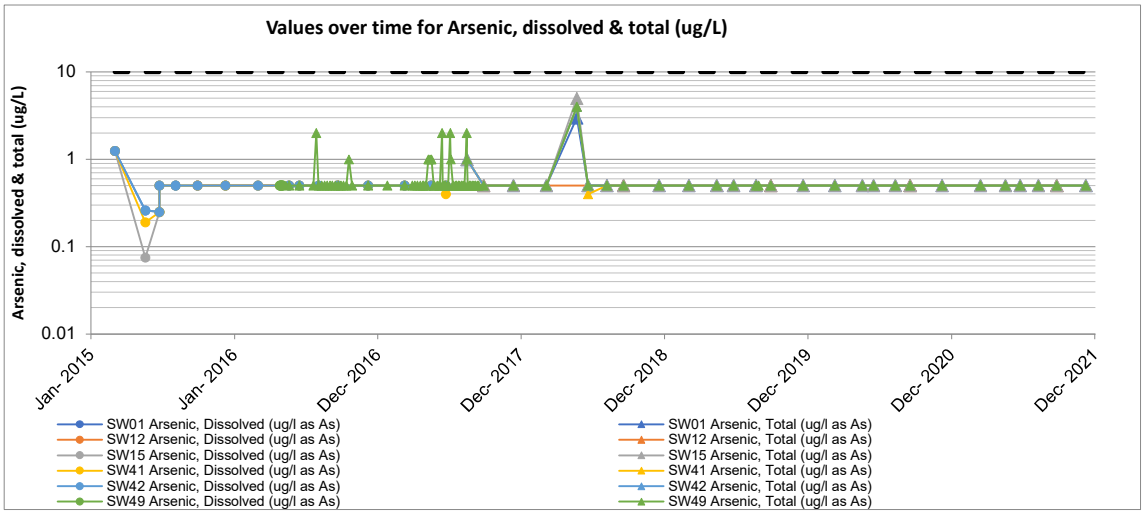

Value over time for TSS (% removal) Sewage Treatment Plant
Total Suspended Solids (% removal)
110
105
100
95
90
85
80
75
70
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
STP % Removal Solids, Suspended Percent Removal
% Removal Limit Solids, Suspended Percent Removal

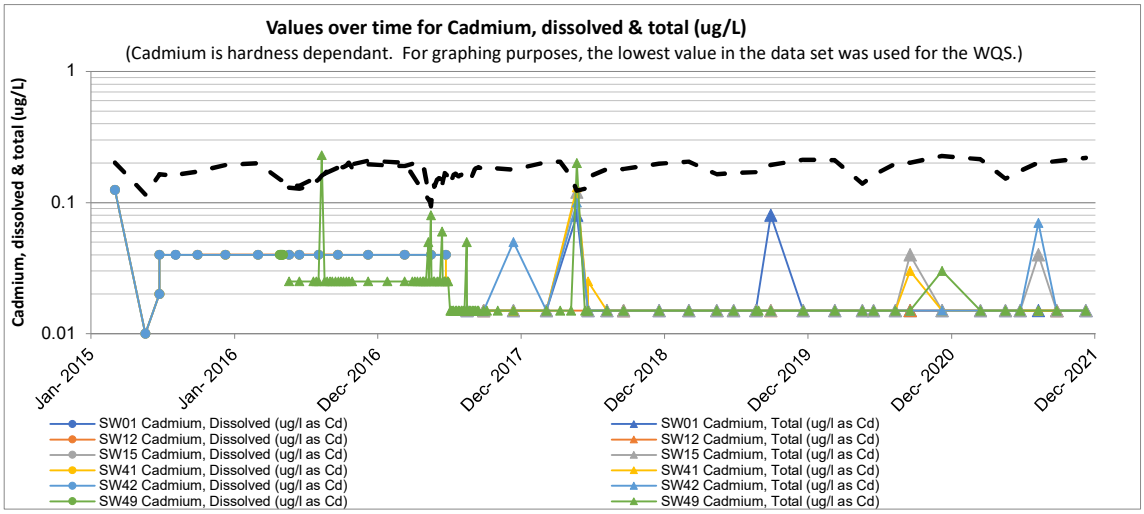
APPENDIX C –

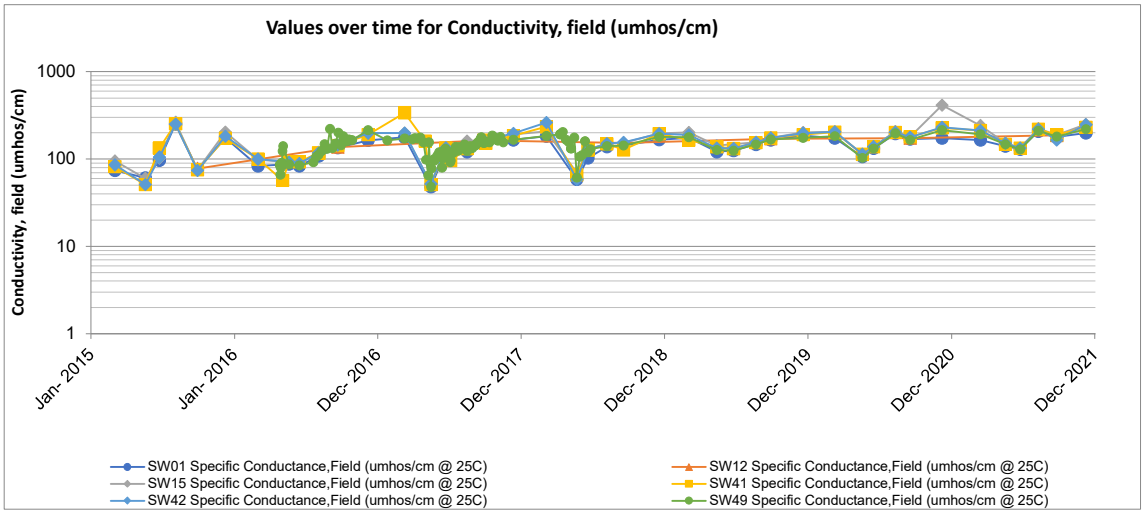
SURFACE WATER GRAPHS

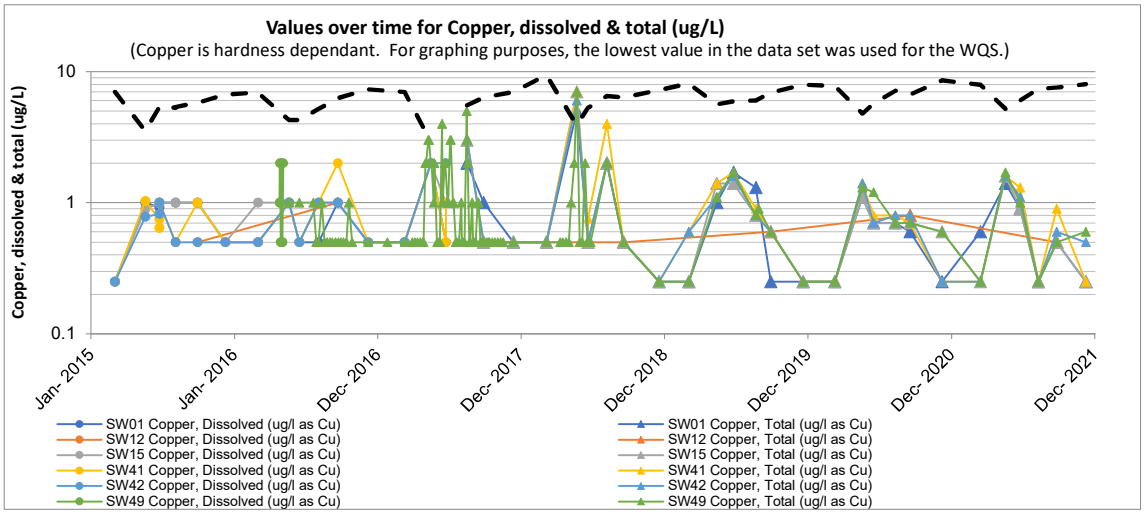

Values over time for Alkalinity, Total (mg/L)
Alkalinity, total (mg/L)
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Alkalinity, Total (mg/l as CaCO3)
SW12 Alkalinity, Total (mg/l as CaCO3)
SW15 Alkalinity, Total (mg/l as CaCO3)
SW41 Alkalinity, Total (mg/l as CaCO3)
SW42 Alkalinity, Total (mg/l as CaCO3)
SW49 Alkalinity, Total (mg/l as CaCO3)

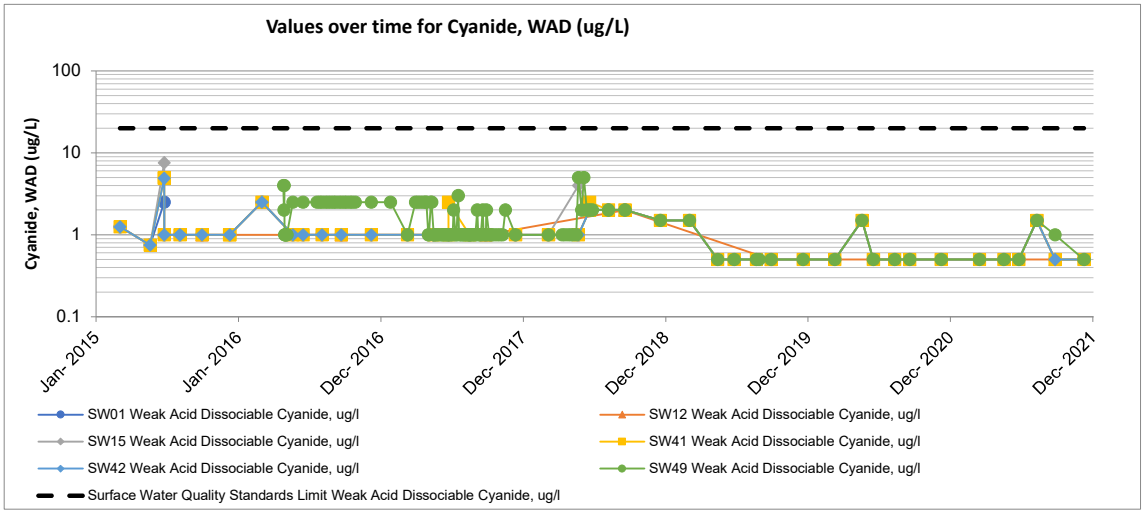

Values over time for Antimony, total (ug/L)
Antimony, total (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Antimony, Total (ug/l as Sb)
SW12 Antimony, Total (ug/l as Sb)
SW15 Antimony, Total (ug/l as Sb)
SW41 Antimony, Total (ug/l as Sb)
SW42 Antimony, Total (ug/l as Sb)
SW49 Antimony, Total (ug/l as Sb)
Surface Water Quality Standards Limit Antimony, Total (ug/l as Sb)

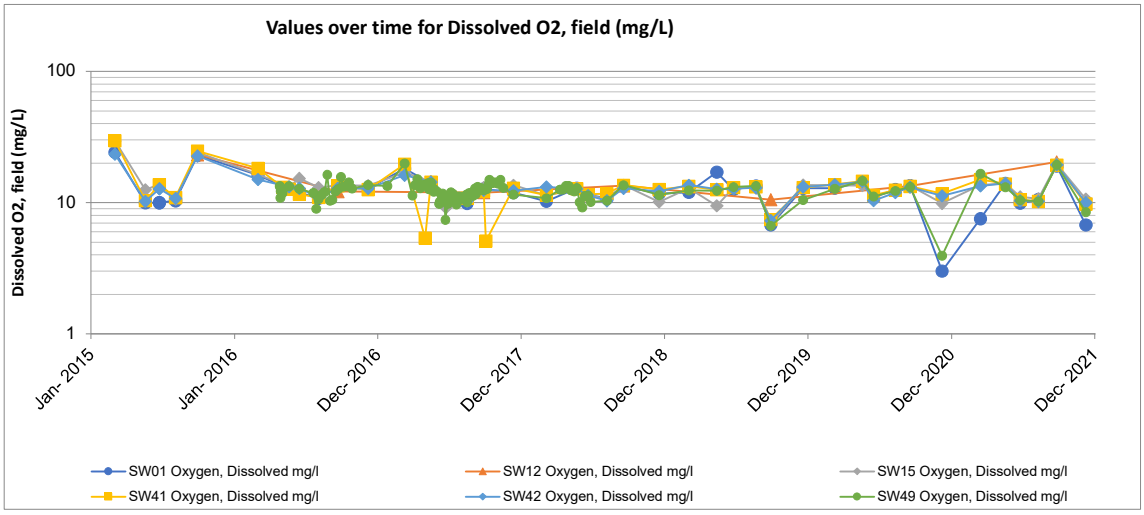

Values over time for Arsenic, dissolved & total (ug/L)
Arsenic, dissolved & total (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Arsenic, Dissolved (ug/l as As)
SW12 Arsenic, Dissolved (ug/l as As)
SW15 Arsenic, Dissolved (ug/l as As)
SW41 Arsenic, Dissolved (ug/l as As)
SW42 Arsenic, Dissolved (ug/l as As)
SW49 Arsenic, Dissolved (ug/l as As)
SW01 Arsenic, Total (ug/l as As)
SW12 Arsenic, Total (ug/l as As)
SW15 Arsenic, Total (ug/l as As)
SW41 Arsenic, Total (ug/l as As)
SW42 Arsenic, Total (ug/l as As)
SW49 Arsenic, Total (ug/l as As)

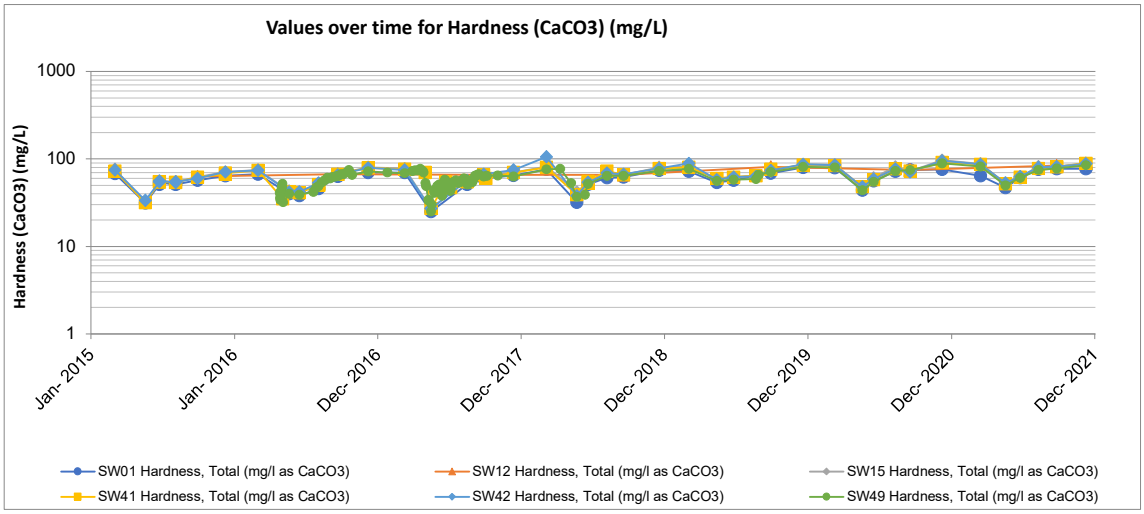

Values over time for Cadmium, dissolved & total (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Cadmium, dissolved & total (ug/L)
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Cadmium, Dissolved (ug/l as Cd)
SW12 Cadmium, Dissolved (ug/l as Cd)
SW15 Cadmium, Dissolved (ug/l as Cd)
SW41 Cadmium, Dissolved (ug/l as Cd)
SW42 Cadmium, Dissolved (ug/l as Cd)
SW49 Cadmium, Dissolved (ug/l as Cd)
SW01 Cadmium, Total (ug/l as Cd)
SW12 Cadmium, Total (ug/l as Cd)
SW15 Cadmium, Total (ug/l as Cd)
SW41 Cadmium, Total (ug/l as Cd)
SW42 Cadmium, Total (ug/l as Cd)
SW49 Cadmium, Total (ug/l as Cd)

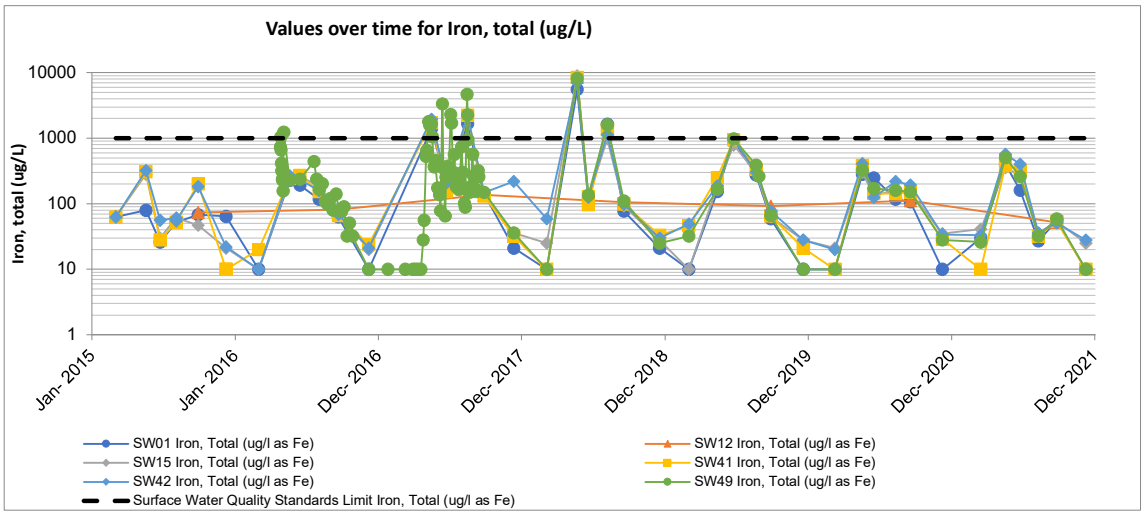

Values over time for Conductivity, field (umhos/cm)
Conductivity, field (umhos/cm)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Specific Conductance,Field (umhos/cm @ 25C)
SW12 Specific Conductance,Field (umhos/cm @ 25C)
SW15 Specific Conductance,Field (umhos/cm @ 25C)
SW41 Specific Conductance,Field (umhos/cm @ 25C)
SW42 Specific Conductance,Field (umhos/cm @ 25C)
SW49 Specific Conductance,Field (umhos/cm @ 25C)

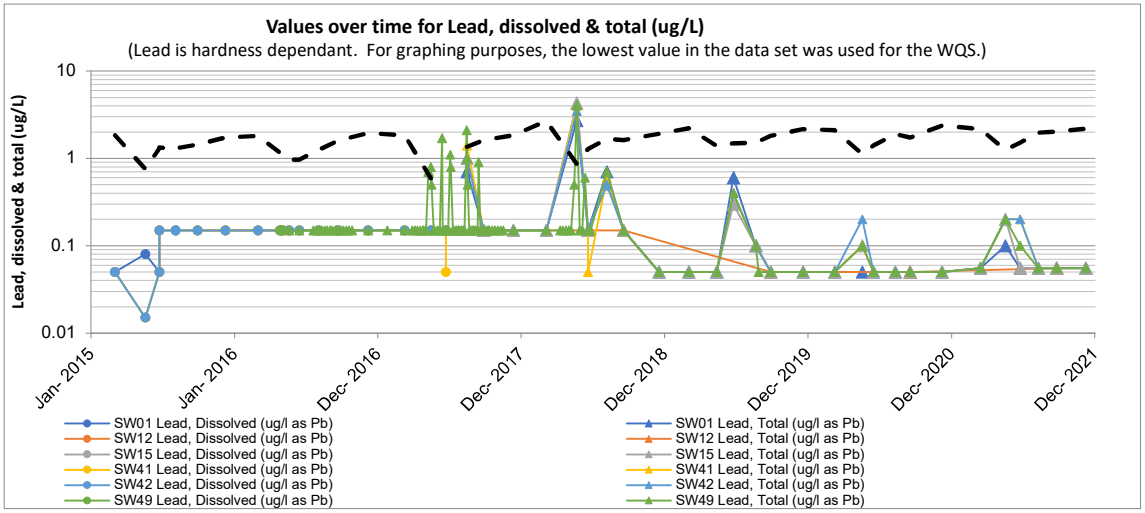

Values over time for Copper, dissolved & total (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Copper, dissolved & total (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Copper, Dissolved (ug/l as Cu)
SW12 Copper, Dissolved (ug/l as Cu)
SW15 Copper, Dissolved (ug/l as Cu)
SW41 Copper, Dissolved (ug/l as Cu)
SW42 Copper, Dissolved (ug/l as Cu)
SW49 Copper, Dissolved (ug/l as Cu)
SW01 Copper, Total (ug/l as Cu)
SW12 Copper, Total (ug/l as Cu)
SW15 Copper, Total (ug/l as Cu)
SW41 Copper, Total (ug/l as Cu)
SW42 Copper, Total (ug/l as Cu)
SW49 Copper, Total (ug/l as Cu)

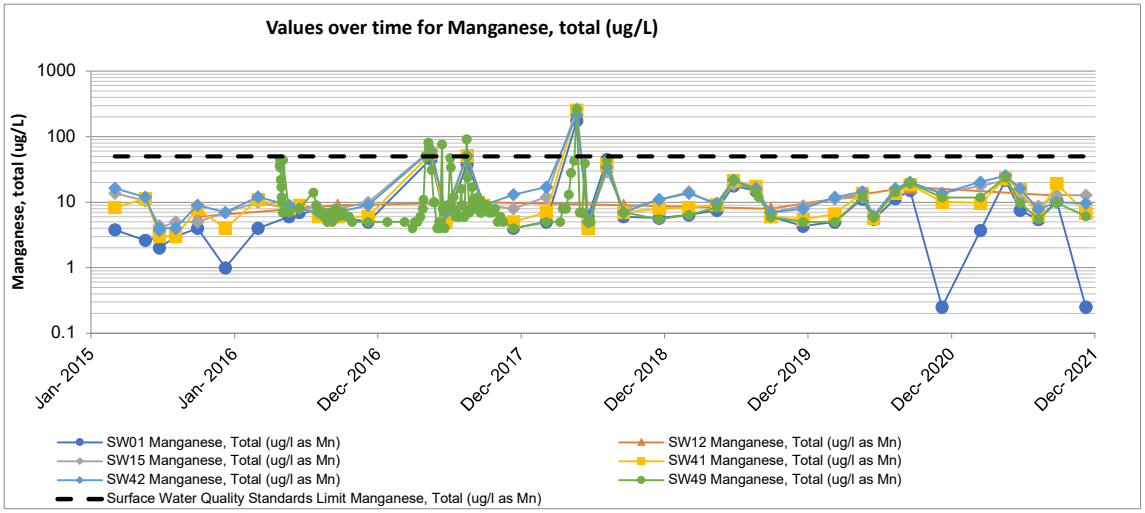

Values over time for Cyanide, WAD (ug/L)
Cyanide, WAD (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Weak Acid Dissociable Cyanide, ug/l
SW12 Weak Acid Dissociable Cyanide, ug/l
SW15 Weak Acid Dissociable Cyanide, ug/l
SW41 Weak Acid Dissociable Cyanide, ug/l
SW42 Weak Acid Dissociable Cyanide, ug/l
SW49 Weak Acid Dissociable Cyanide, ug/l
Surface Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

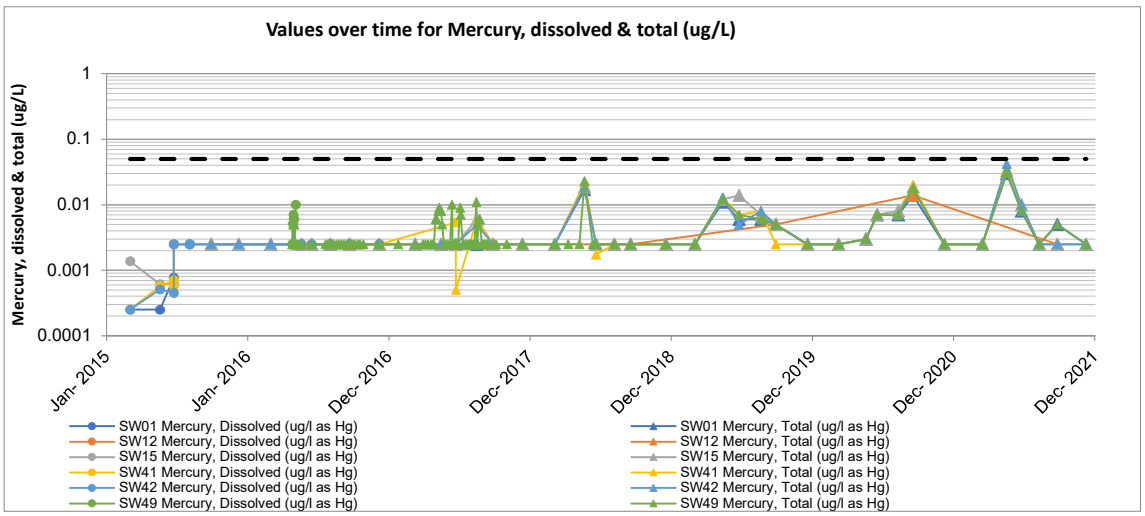

Values over time for Dissolved O2, field (mg/L)
Dissolved O2, field (mg/L)
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Oxygen, Dissolved mg/l
SW12 Oxygen, Dissolved mg/l
SW15 Oxygen, Dissolved mg/l
SW41 Oxygen, Dissolved mg/l
SW42 Oxygen, Dissolved mg/l
SW49 Oxygen, Dissolved mg/l

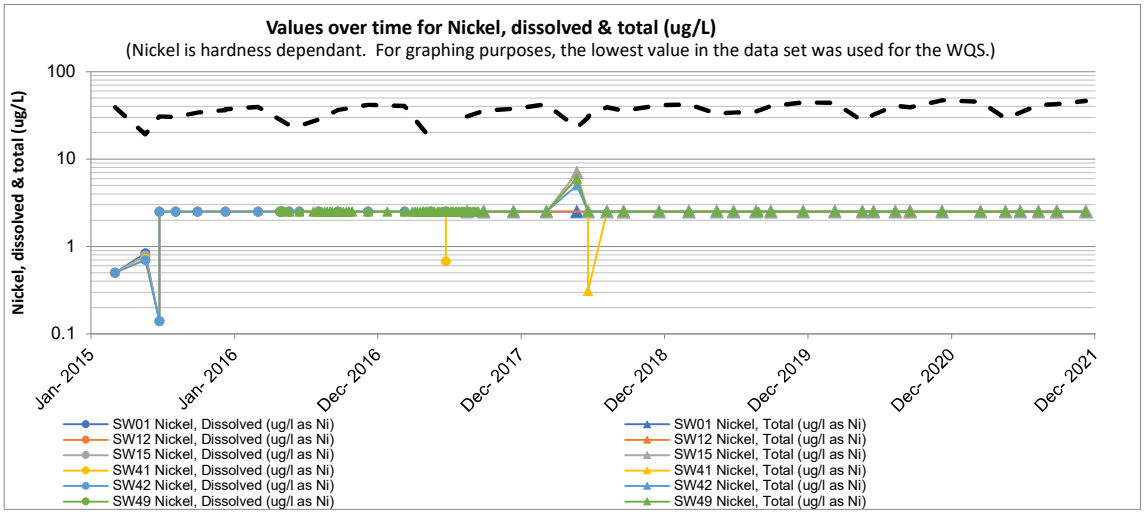

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Hardness, Total (mg/l as CaCO3)
SW12 Hardness, Total (mg/l as CaCO3)
SW15 Hardness, Total (mg/l as CaCO3)
SW41 Hardness, Total (mg/l as CaCO3)
SW42 Hardness, Total (mg/l as CaCO3)
SW49 Hardness, Total (mg/l as CaCO3)

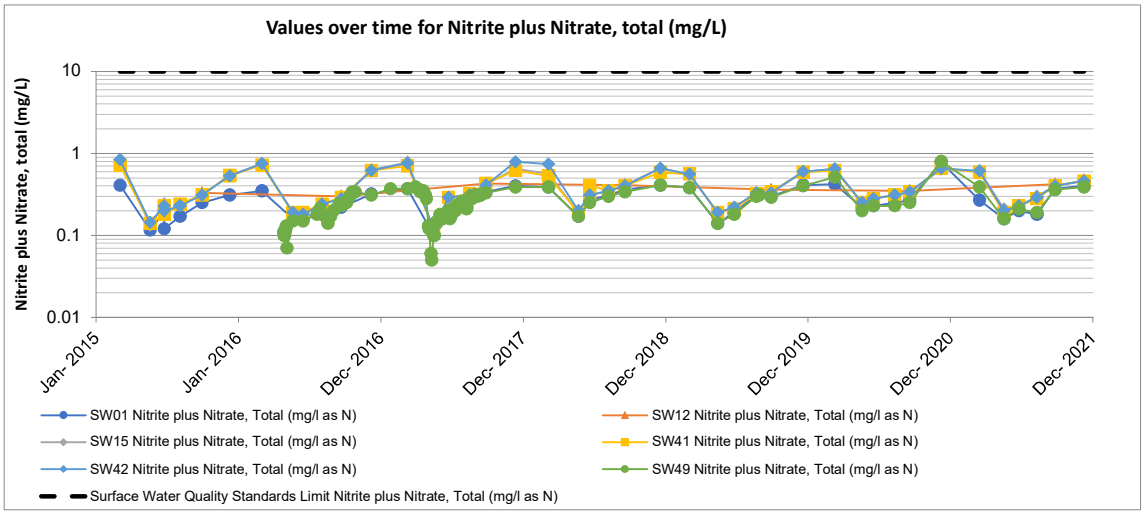

Values over time for Iron, total (ug/L)
Iron, total (ug/L)
10000
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Iron, Total (ug/l as Fe)
SW12 Iron, Total (ug/l as Fe)
SW15 Iron, Total (ug/l as Fe)
SW41 Iron, Total (ug/l as Fe)
SW42 Iron, Total (ug/l as Fe)
SW49 Iron, Total (ug/l as Fe)
Surface Water Quality Standards Limit Iron, Total (ug/l as Fe)

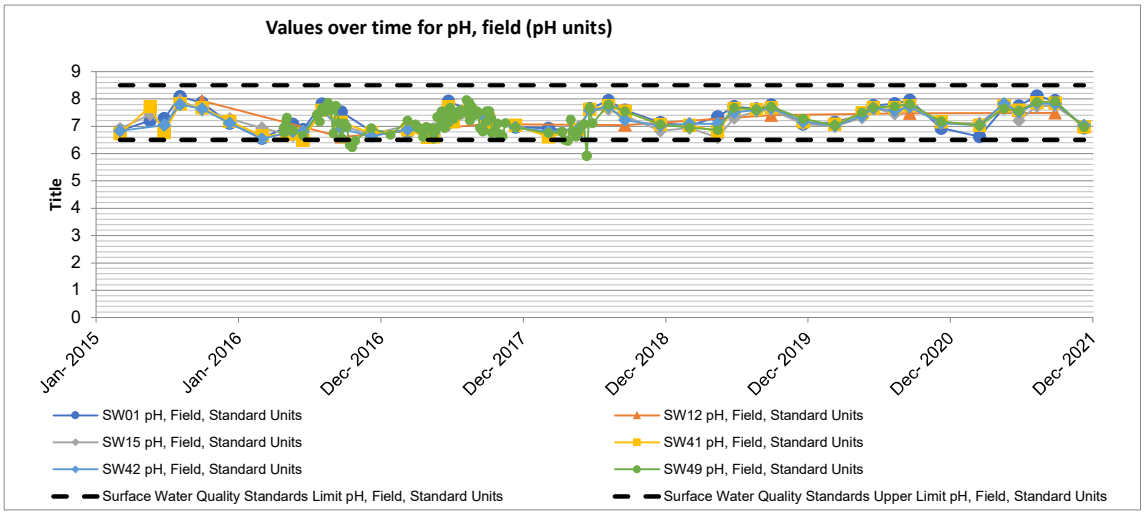

Values over time for Lead, dissolved & total (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Lead, dissolved & total (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Lead, Dissolved (ug/l as Pb)
SW12 Lead, Dissolved (ug/l as Pb)
SW15 Lead, Dissolved (ug/l as Pb)
SW41 Lead, Dissolved (ug/l as Pb)
SW42 Lead, Dissolved (ug/l as Pb)
SW49 Lead, Dissolved (ug/l as Pb)
SW01 Lead, Total (ug/l as Pb)
SW12 Lead, Total (ug/l as Pb)
SW15 Lead, Total (ug/l as Pb)
SW41 Lead, Total (ug/l as Pb)
SW42 Lead, Total (ug/l as Pb)
SW49 Lead, Total (ug/l as Pb)

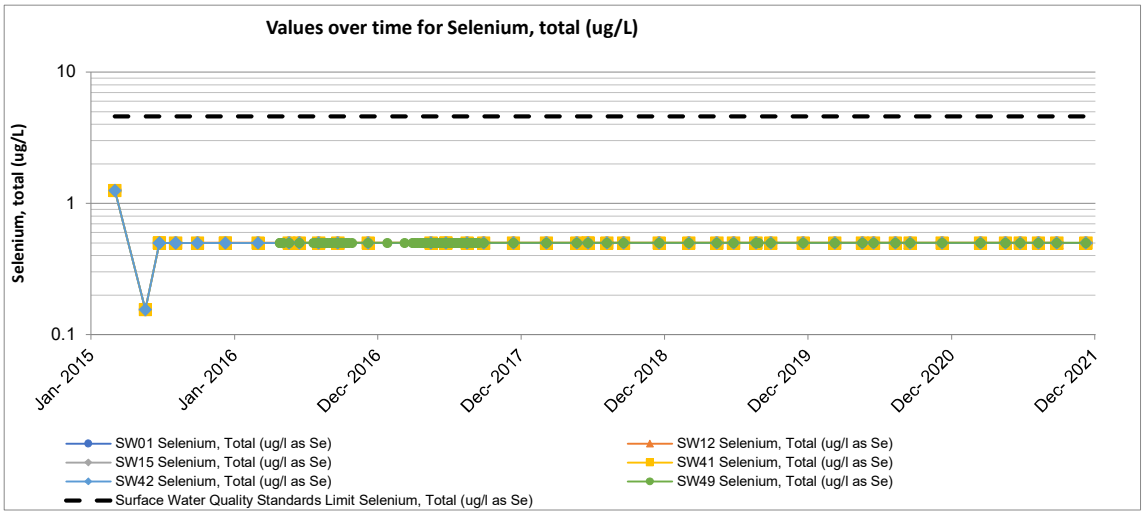

Values over time for Manganese, total (ug/L)
Manganese, total (ug/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Manganese, Total (ug/l as Mn)
SW12 Manganese, Total (ug/l as Mn)
SW15 Manganese, Total (ug/l as Mn)
SW41 Manganese, Total (ug/l as Mn)
SW42 Manganese, Total (ug/l as Mn)
SW49 Manganese, Total (ug/l as Mn)
Surface Water Quality Standards Limit Manganese, Total (ug/l as Mn)

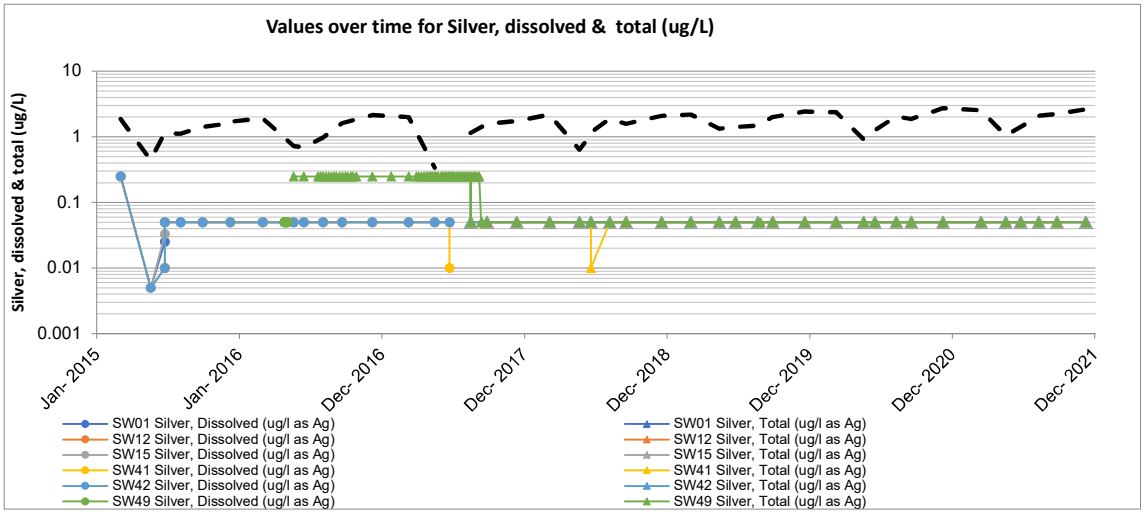

Values over time for Mercury, dissolved & total (ug/L)
Mercury, dissolved & total (ug/L)
1
0.1
0.01
0.001
0.0001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Mercury, Dissolved (ug/l as Hg)
SW12 Mercury, Dissolved (ug/l as Hg)
SW15 Mercury, Dissolved (ug/l as Hg)
SW41 Mercury, Dissolved (ug/l as Hg)
SW42 Mercury, Dissolved (ug/l as Hg)
SW49 Mercury, Dissolved (ug/l as Hg)
SW01 Mercury, Total (ug/l as Hg)
SW12 Mercury, Total (ug/l as Hg)
SW15 Mercury, Total (ug/l as Hg)
SW41 Mercury, Total (ug/l as Hg)
SW42 Mercury, Total (ug/l as Hg)
SW49 Mercury, Total (ug/l as Hg)

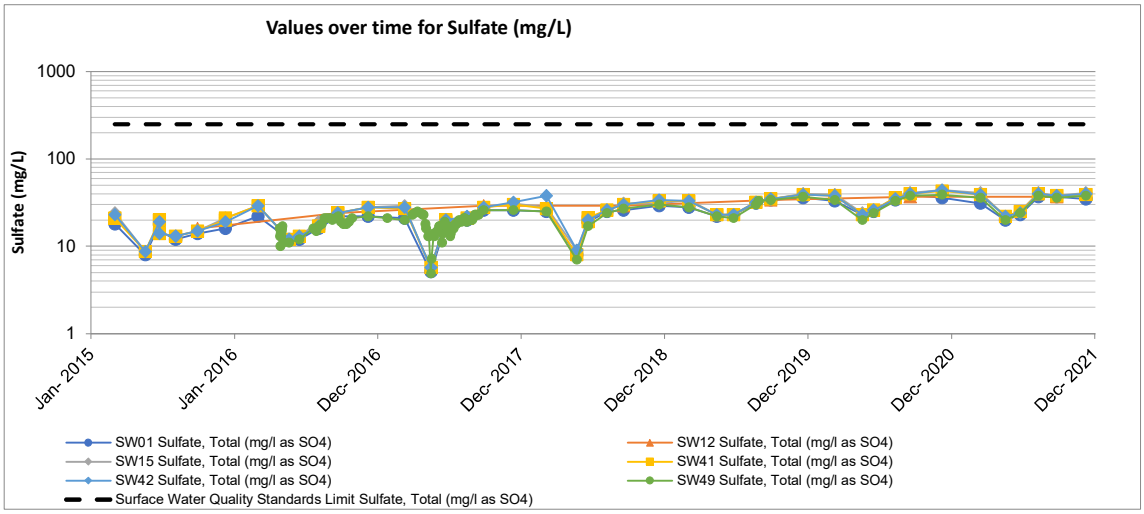

Values over time for Nickel, dissolved & total (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Nickel, dissolved & total (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Nickel, Dissolved (ug/l as Ni)
SW12 Nickel, Dissolved (ug/l as Ni)
SW15 Nickel, Dissolved (ug/l as Ni)
SW41 Nickel, Dissolved (ug/l as Ni)
SW42 Nickel, Dissolved (ug/l as Ni)
SW49 Nickel, Dissolved (ug/l as Ni)
SW01 Nickel, Total (ug/l as Ni)
SW12 Nickel, Total (ug/l as Ni)
SW15 Nickel, Total (ug/l as Ni)
SW41 Nickel, Total (ug/l as Ni)
SW42 Nickel, Total (ug/l as Ni)
SW49 Nickel, Total (ug/l as Ni)

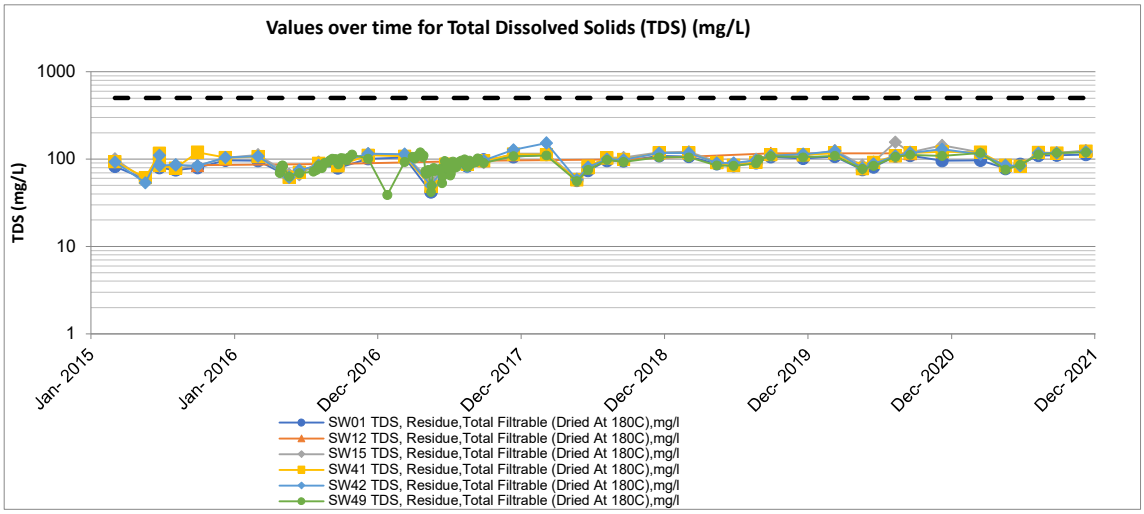

Values over time for Nitrite plus Nitrate, total (mg/L)
Nitrite plus Nitrate, total (mg/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Nitrite plus Nitrate, Total (mg/l as N)
SW12 Nitrite plus Nitrate, Total (mg/l as N)
SW15 Nitrite plus Nitrate, Total (mg/l as N)
SW41 Nitrite plus Nitrate, Total (mg/l as N)
SW42 Nitrite plus Nitrate, Total (mg/l as N)
SW49 Nitrite plus Nitrate, Total (mg/l as N)
Surface Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

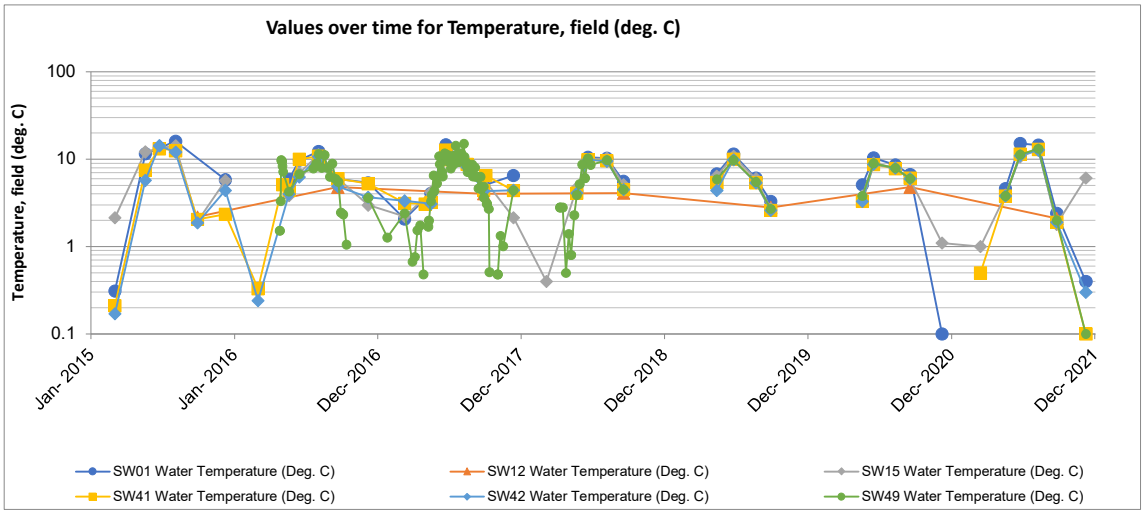

Values over time for pH, field (pH units)
Title
9
8
7
6
5
4
3
2
1
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 pH, Field, Standard Units
SW12 pH, Field, Standard Units
SW15 pH, Field, Standard Units
SW41 pH, Field, Standard Units
SW42 pH, Field, Standard Units
SW49 pH, Field, Standard Units
Surface Water Quality Standards Limit pH, Field, Standard Units
Surface Water Quality Standards Upper Limit pH, Field, Standard Units

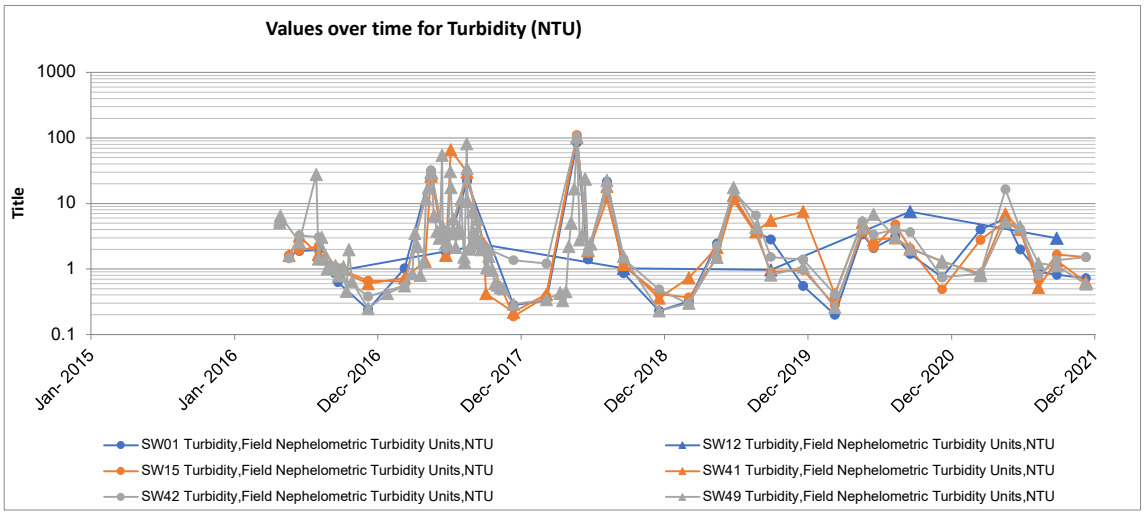

Values over time for Selenium, total (ug/L)
Selenium, total (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Selenium, Total (ug/l as Se)
SW12 Selenium, Total (ug/l as Se)
SW15 Selenium, Total (ug/l as Se)
SW41 Selenium, Total (ug/l as Se)
SW42 Selenium, Total (ug/l as Se)
SW49 Selenium, Total (ug/l as Se)
Surface Water Quality Standards Limit Selenium, Total (ug/l as Se)

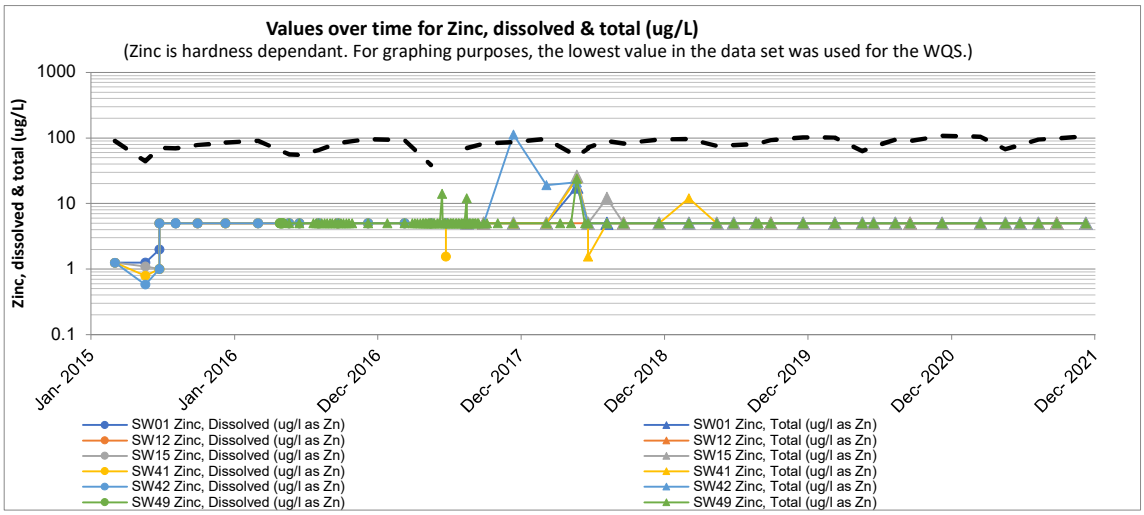

Values over time for Silver, dissolved & total (ug/L)
Silver, dissolved & total (ug/L)
10
1
0.1
0.01
0.001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Silver, Dissolved (ug/l as Ag)
SW12 Silver, Dissolved (ug/l as Ag)
SW15 Silver, Dissolved (ug/l as Ag)
SW41 Silver, Dissolved (ug/l as Ag)
SW42 Silver, Dissolved (ug/l as Ag)
SW49 Silver, Dissolved (ug/l as Ag)
SW01 Silver, Total (ug/l as Ag)
SW12 Silver, Total (ug/l as Ag)
SW15 Silver, Total (ug/l as Ag)
SW41 Silver, Total (ug/l as Ag)
SW42 Silver, Total (ug/l as Ag)
SW49 Silver, Total (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Sulfate, Total (mg/l as SO4)
SW12 Sulfate, Total (mg/l as SO4)
SW15 Sulfate, Total (mg/l as SO4)
SW41 Sulfate, Total (mg/l as SO4)
SW42 Sulfate, Total (mg/l as SO4)
SW49 Sulfate, Total (mg/l as SO4)
Surface Water Quality Standards Limit Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW12 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW15 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW41 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW42 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
SW49 TDS, Residue,Total Filtrable (Dried At 180C),mg/l

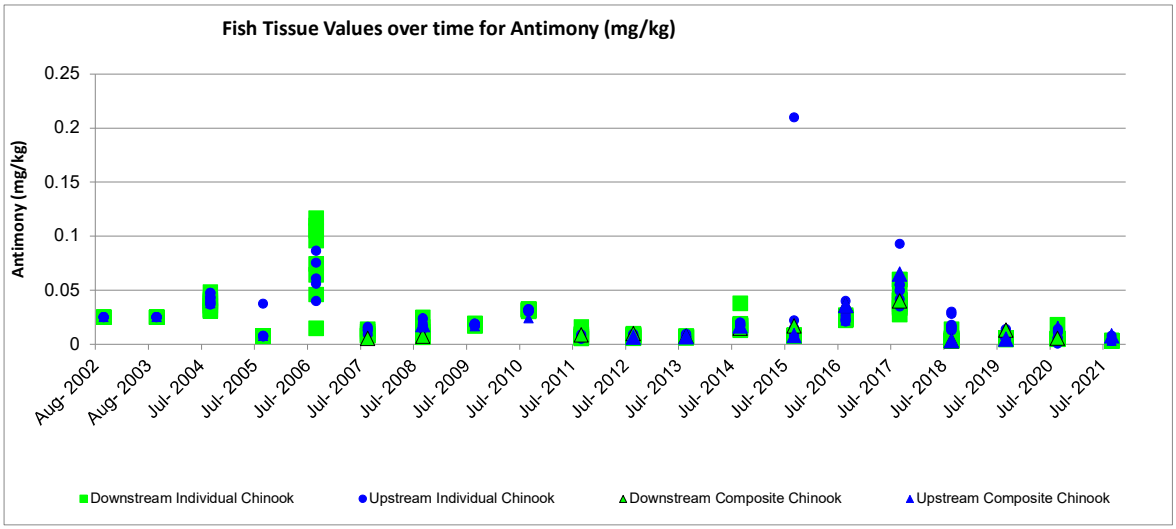

Values over time for Temperature, field (deg. C)
Temperature, field (deg. C)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Water Temperature (Deg. C)
SW12 Water Temperature (Deg. C)
SW15 Water Temperature (Deg. C)
SW41 Water Temperature (Deg. C)
SW42 Water Temperature (Deg. C)
SW49 Water Temperature (Deg. C)

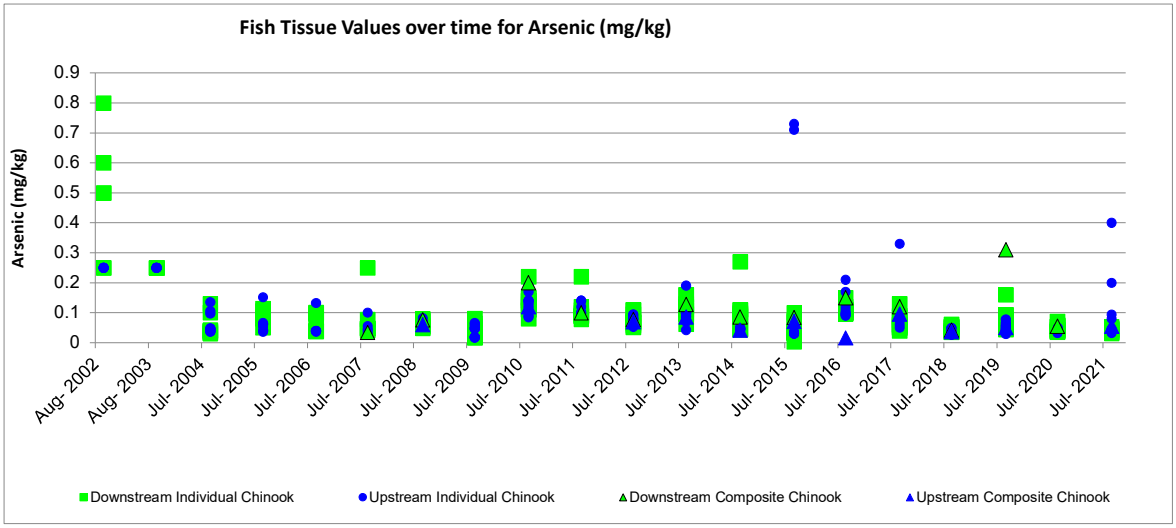

Values over time for Turbidity (NTU)
Title
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Turbidity,Field Nephelometric Turbidity Units,NTU
SW12 Turbidity,Field Nephelometric Turbidity Units,NTU
SW15 Turbidity,Field Nephelometric Turbidity Units,NTU
SW41 Turbidity,Field Nephelometric Turbidity Units,NTU
SW42 Turbidity,Field Nephelometric Turbidity Units,NTU
SW49 Turbidity,Field Nephelometric Turbidity Units,NTU

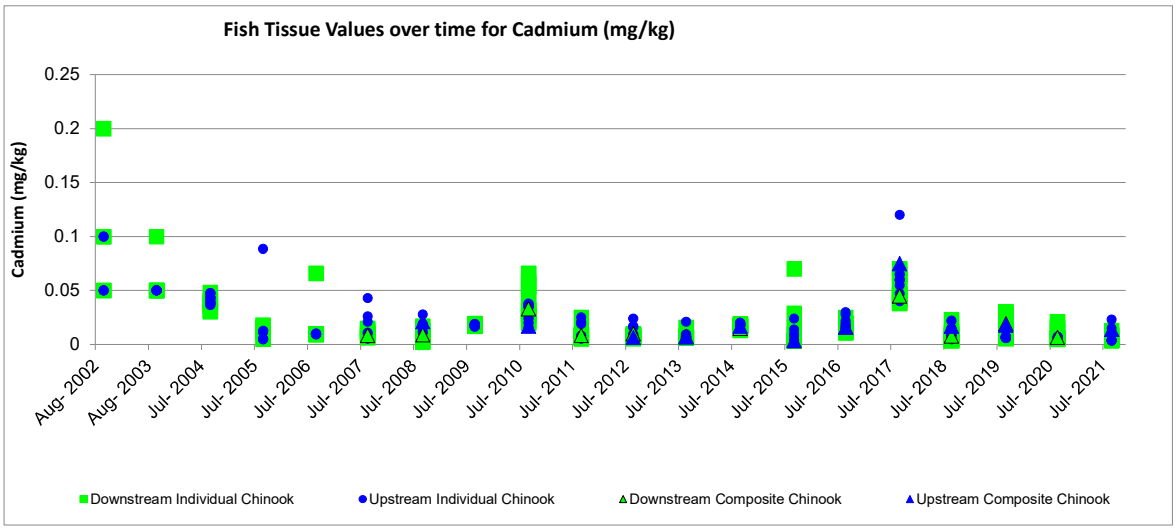

Values over time for Zinc, dissolved & total (ug/L)
(Zinc is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Zinc, dissolved & total (ug/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
SW01 Zinc, Dissolved (ug/l as Zn)
SW12 Zinc, Dissolved (ug/l as Zn)
SW15 Zinc, Dissolved (ug/l as Zn)
SW41 Zinc, Dissolved (ug/l as Zn)
SW42 Zinc, Dissolved (ug/l as Zn)
SW49 Zinc, Dissolved (ug/l as Zn)
SW01 Zinc, Total (ug/l as Zn)
SW12 Zinc, Total (ug/l as Zn)
SW15 Zinc, Total (ug/l as Zn)
SW41 Zinc, Total (ug/l as Zn)
SW42 Zinc, Total (ug/l as Zn)
SW49 Zinc, Total (ug/l as Zn)

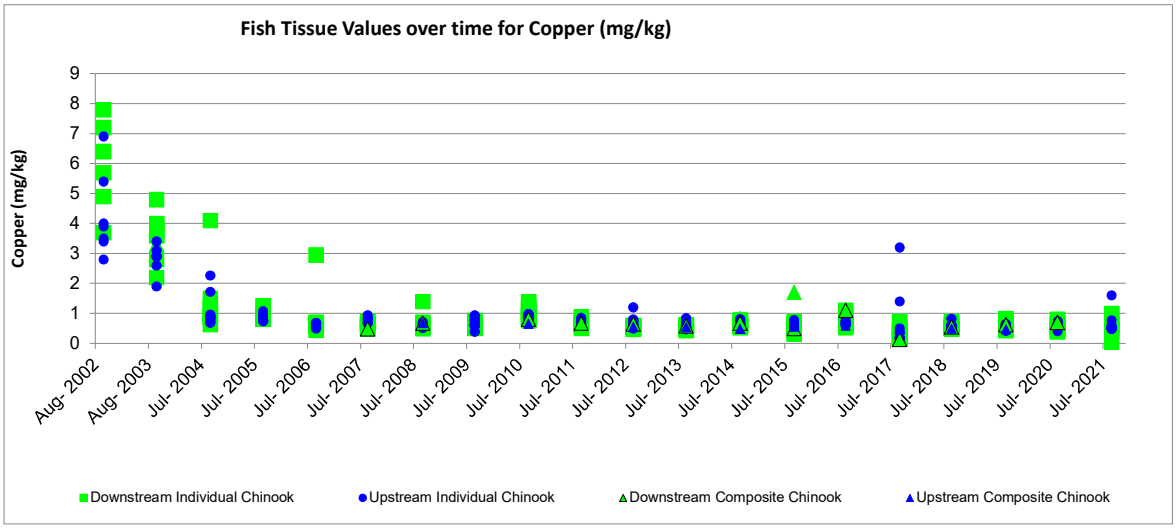
APPENDIX C –

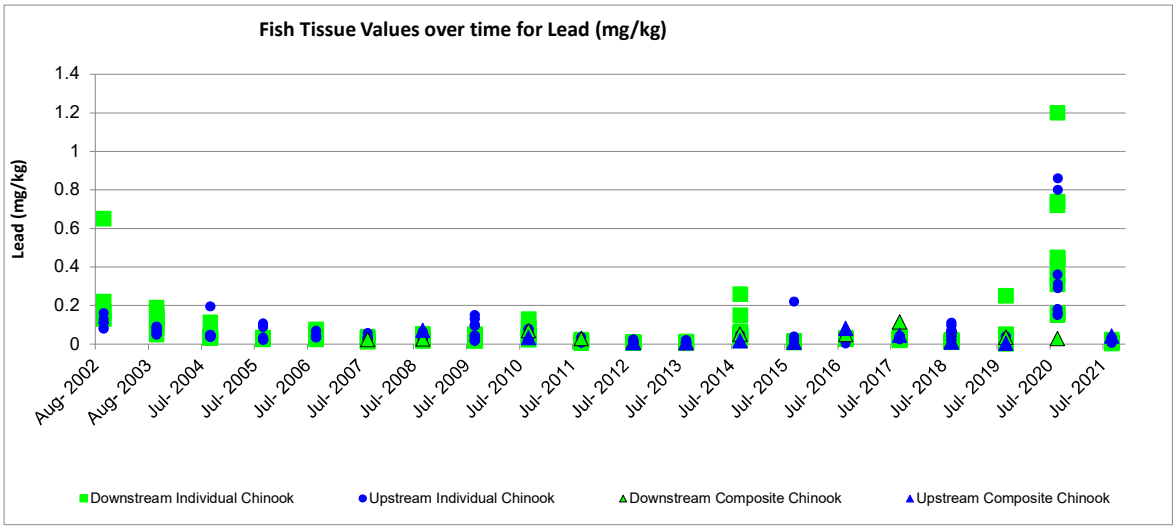
FISH TISSUE DATA GRAPHS

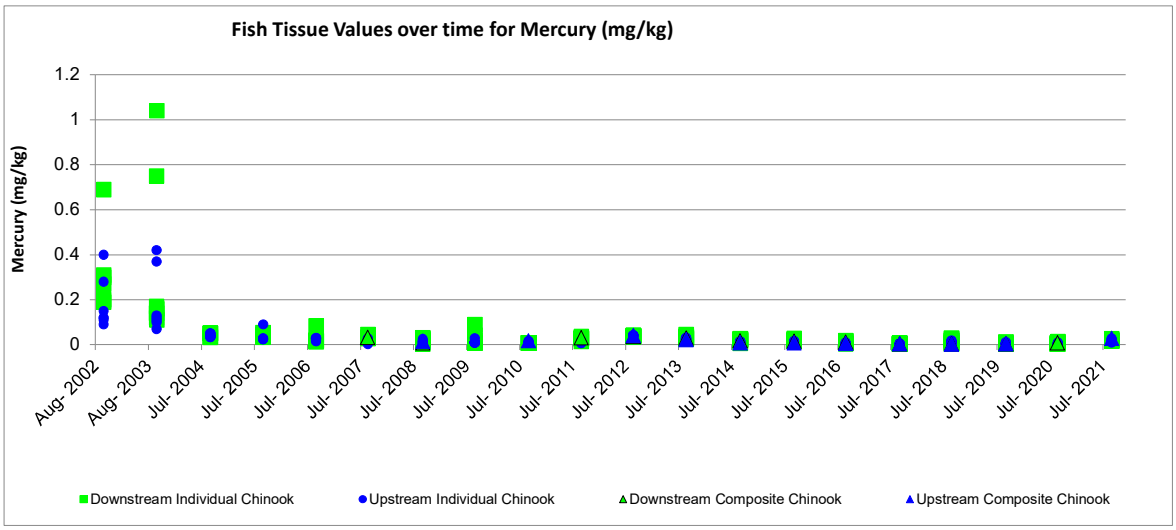

Fish Tissue Values over time for Antimony (mg/kg)
Antimony (mg/kg)
0.25
0.2
0.15
0.1
0.05
0
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook

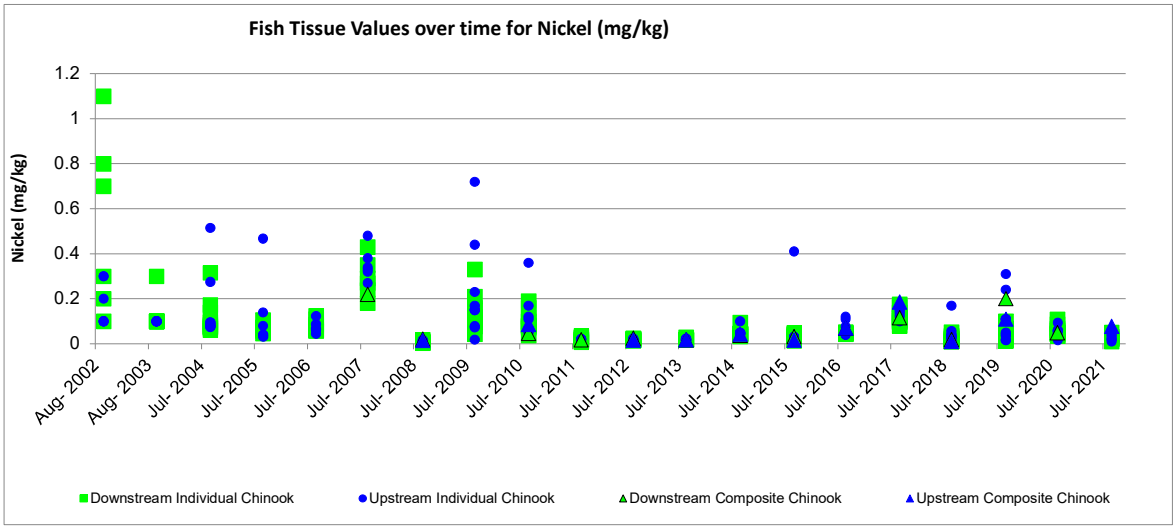

Fish Tissue Values over time for Arsenic (mg/kg)
Arsenic (mg/kg)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook

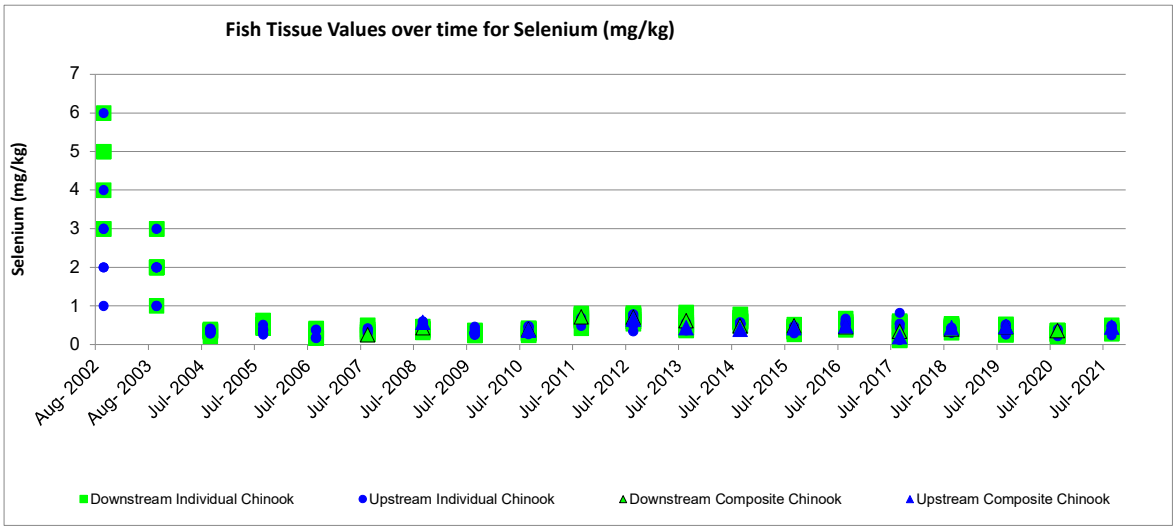

Fish Tissue Values over time for Cadmium (mg/kg)
Cadmium (mg/kg)
0.25
0.2
0.15
0.1
0.05
0
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook

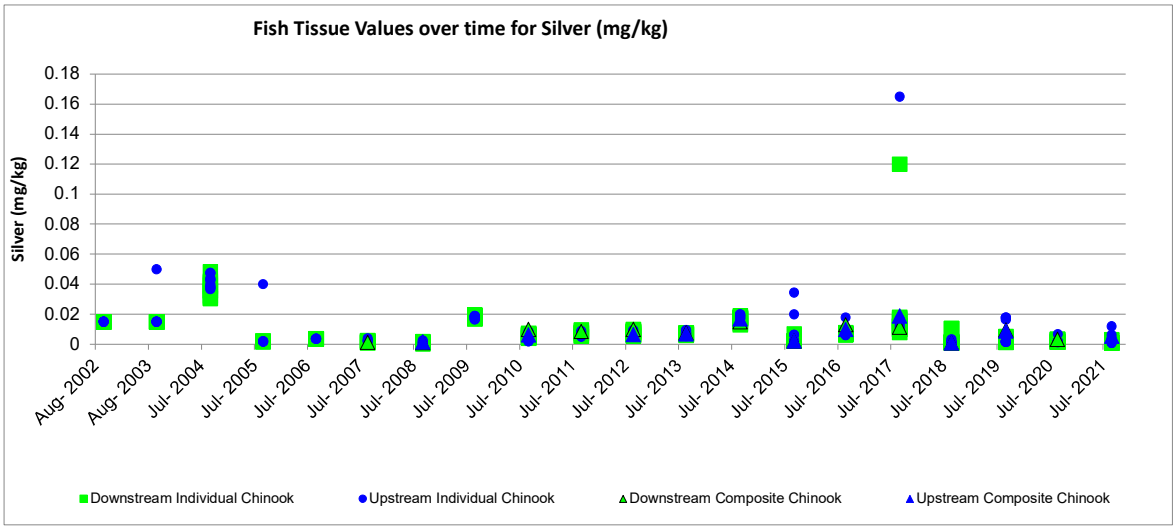

Fish Tissue Values over time for Copper (mg/kg)
Copper (mg/kg)
0
1
2
3
4
5
6
7
8
9
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook


Fish Tissue Values over time for Lead (mg/kg)
Lead (mg/kg)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook


Fish Tissue Values over time for Mercury (mg/kg)
Mercury (mg/kg)
0
0.2
0.4
0.6
0.8
1
1.2
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook

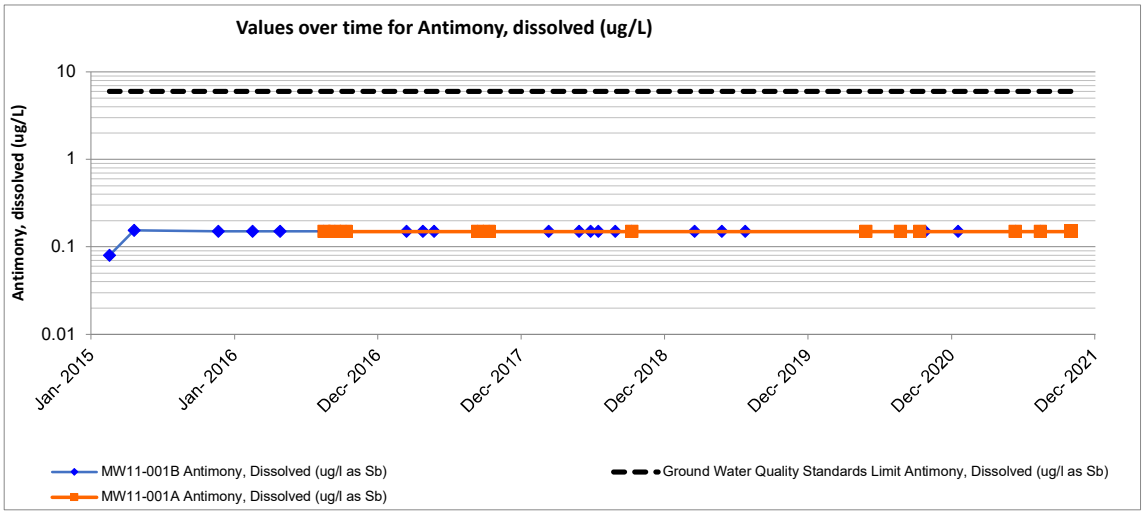

Fish Tissue Values over time for Nickel (mg/kg)
Nickel (mg/kg)
1.2
1
0.8
0.6
0.4
0.2
0
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook

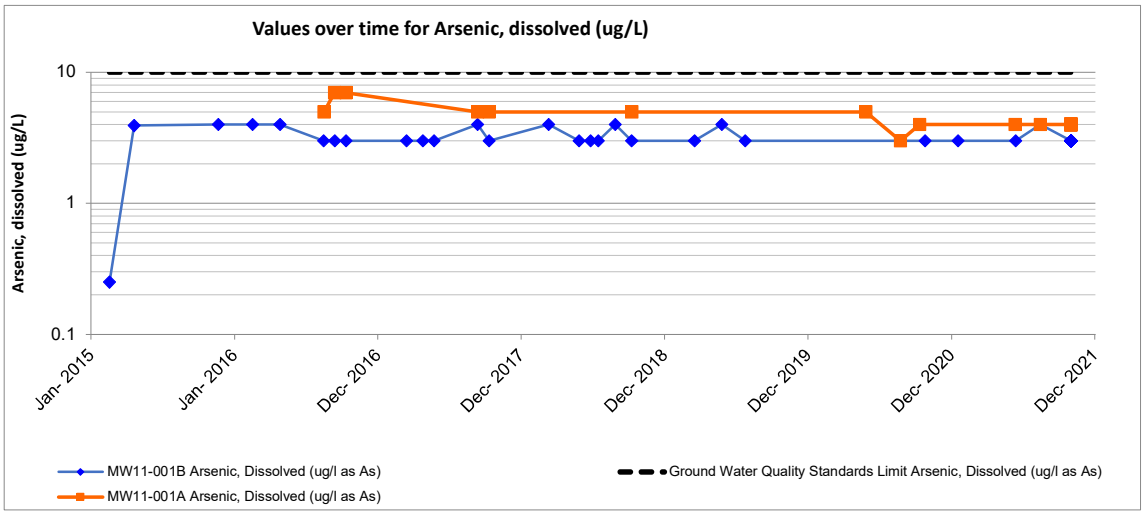

Fish Tissue Values over time for Selenium (mg/kg)
Selenium (mg/kg)
7
6
5
4
3
2
1
0
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook

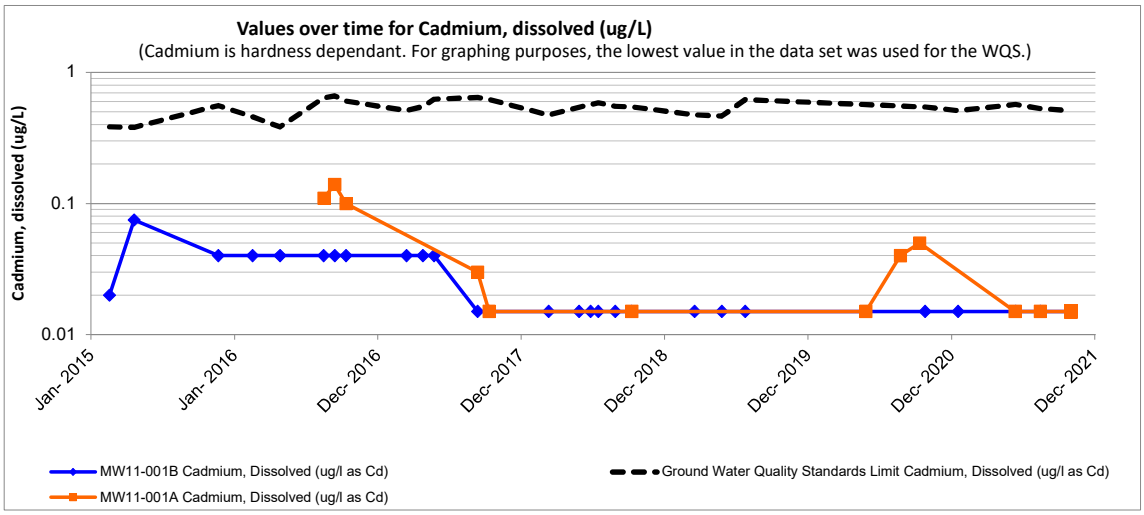

Fish Tissue Values over time for Silver (mg/kg)
Silver (mg/kg)
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Aug- 2002
Aug- 2003
Jul- 2004
Jul- 2005
Jul- 2006
Jul- 2007
Jul- 2008
Jul- 2009
Jul- 2010
Jul- 2011
Jul- 2012
Jul- 2013
Jul- 2014
Jul- 2015
Jul- 2016
Jul- 2017
Jul- 2018
Jul- 2019
Jul- 2020
Jul- 2021
Downstream Individual Chinook
Upstream Individual Chinook
Downstream Composite Chinook
Upstream Composite Chinook

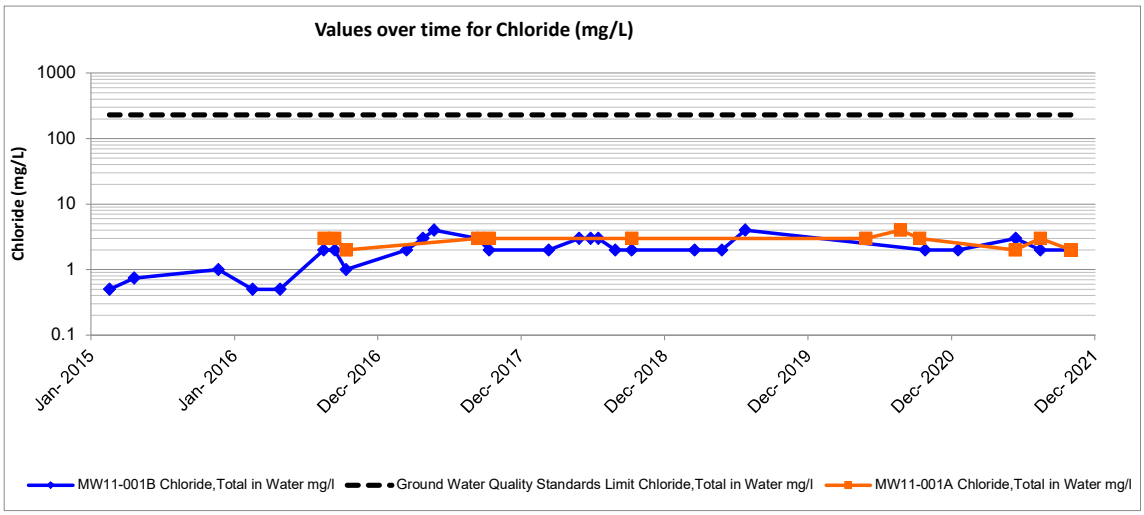
APPENDIX C –

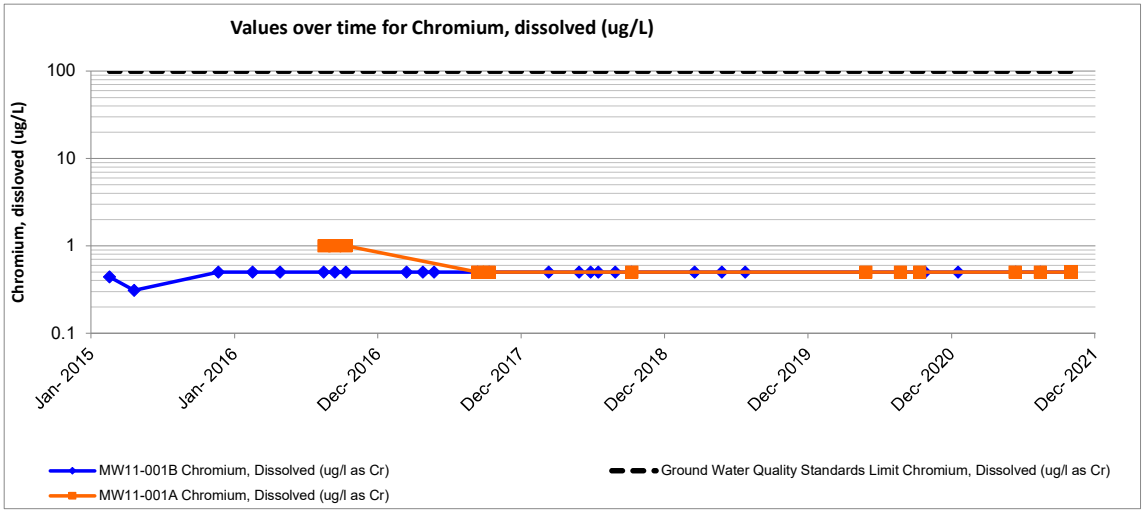
MW11-001A AND MW11-001B GRAPHS

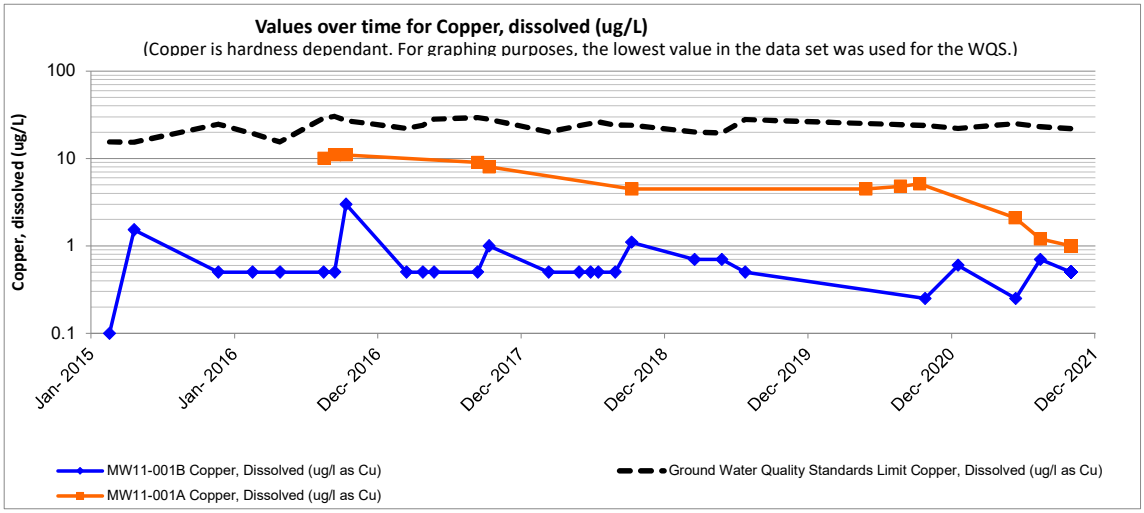

Values over time for Antimony, dissolved (ug/L)
Antimony, dissolved (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Antimony, Dissolved (ug/l as Sb)
MW11-001A Antimony, Dissolved (ug/l as Sb)
Ground Water Quality Standards Limit Antimony, Dissolved (ug/l as Sb)

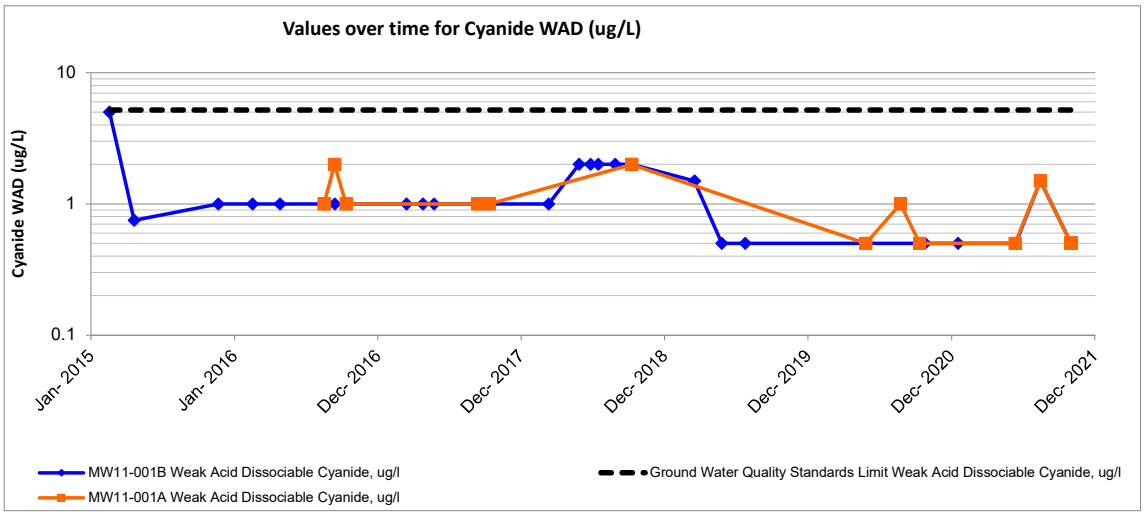

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Arsenic, Dissolved (ug/l as As)
MW11-001A Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)

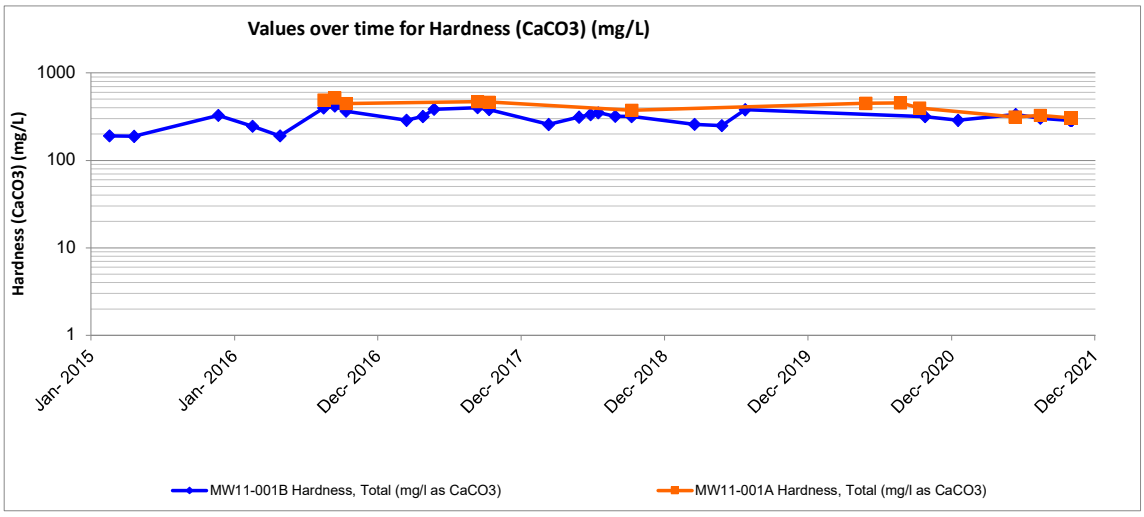

Values over time for Cadmium, dissolved (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Cadmium, dissolved (ug/L)
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Cadmium, Dissolved (ug/l as Cd)
MW11-001A Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)

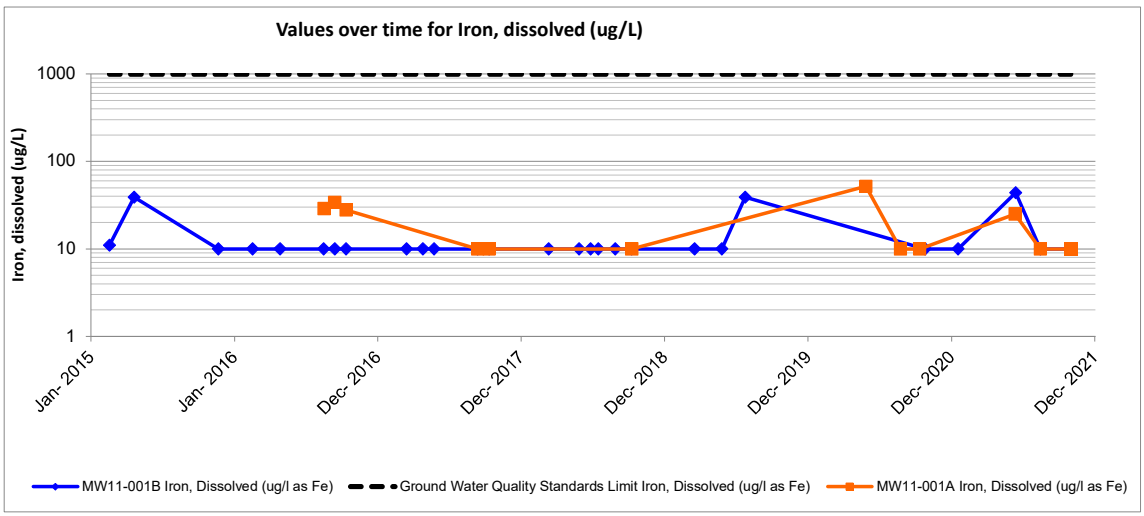

Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l
MW11-001A Chloride,Total in Water mg/l

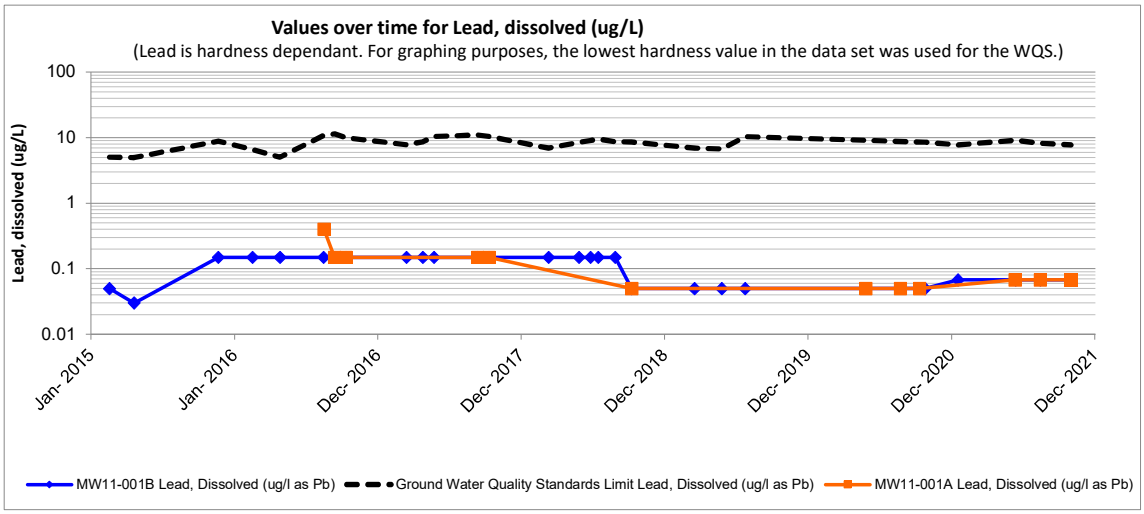

Values over time for Chromium, dissolved (ug/L)
Chromium, dissloved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)
MW11-001A Chromium, Dissolved (ug/l as Cr)

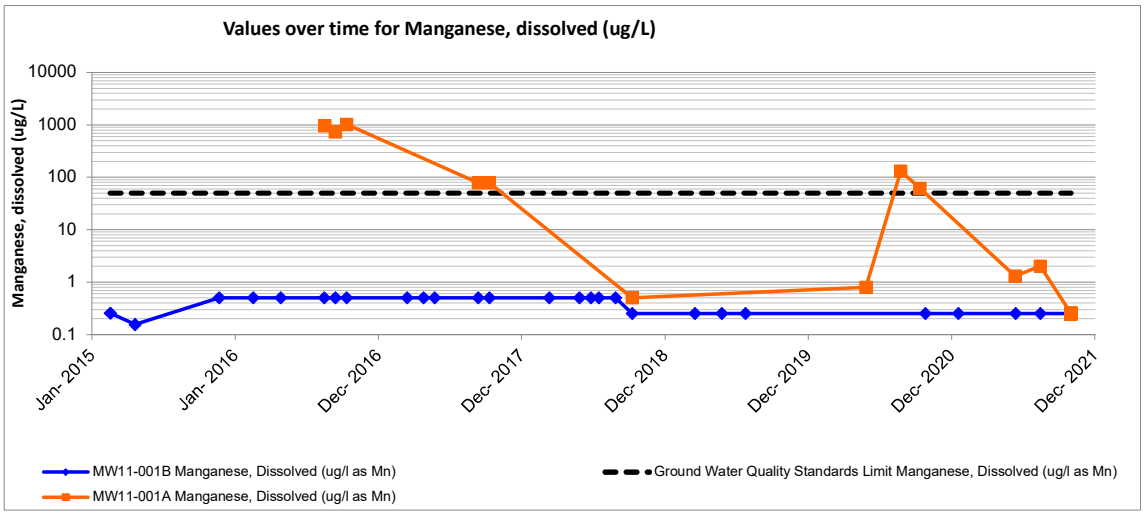

Values over time for Copper, dissolved (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Copper, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)
MW11-001A Copper, Dissolved (ug/l as Cu)

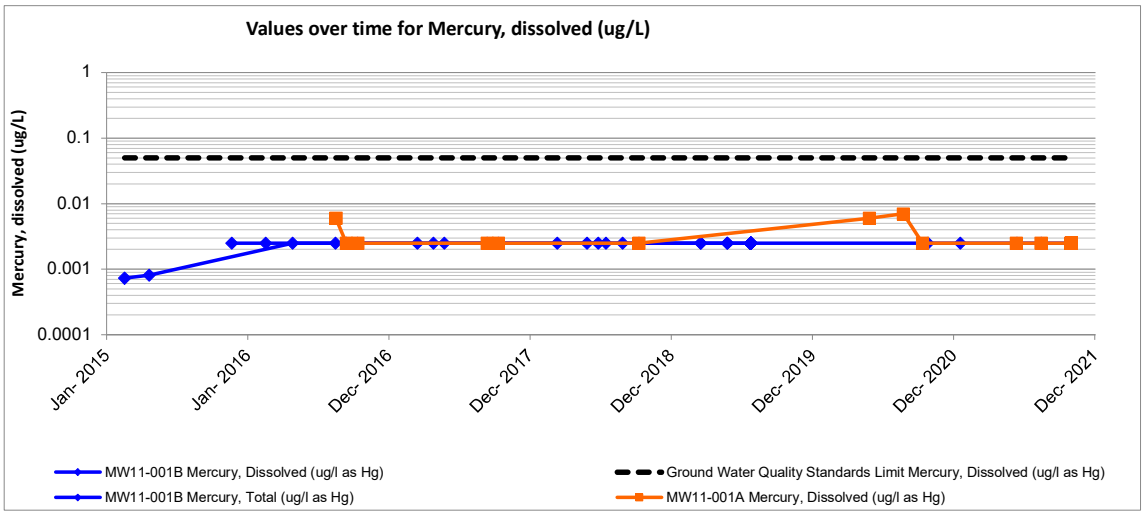

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Weak Acid Dissociable Cyanide, ug/l
MW11-001A Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

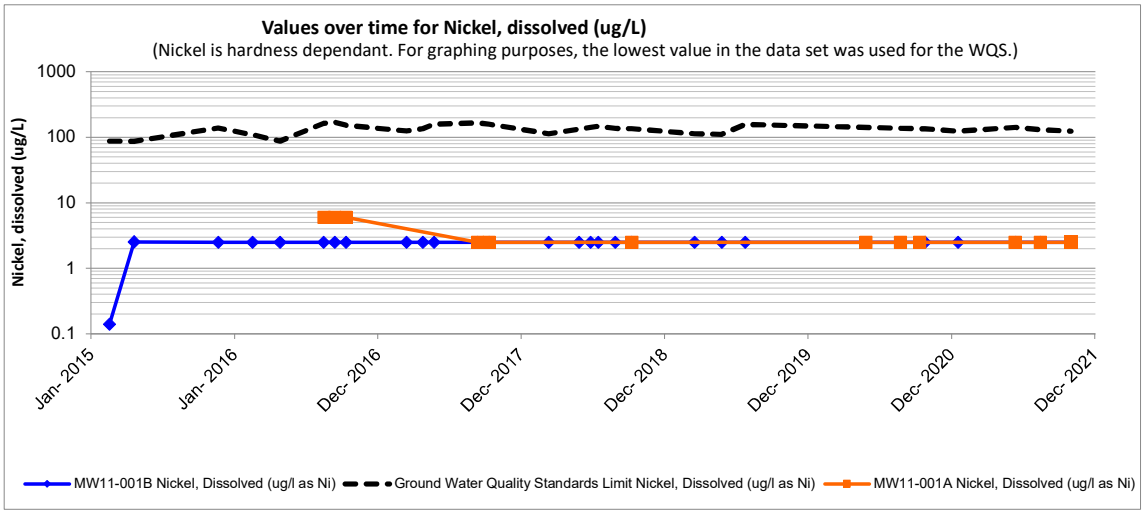

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Hardness, Total (mg/l as CaCO3)
MW11-001A Hardness, Total (mg/l as CaCO3)

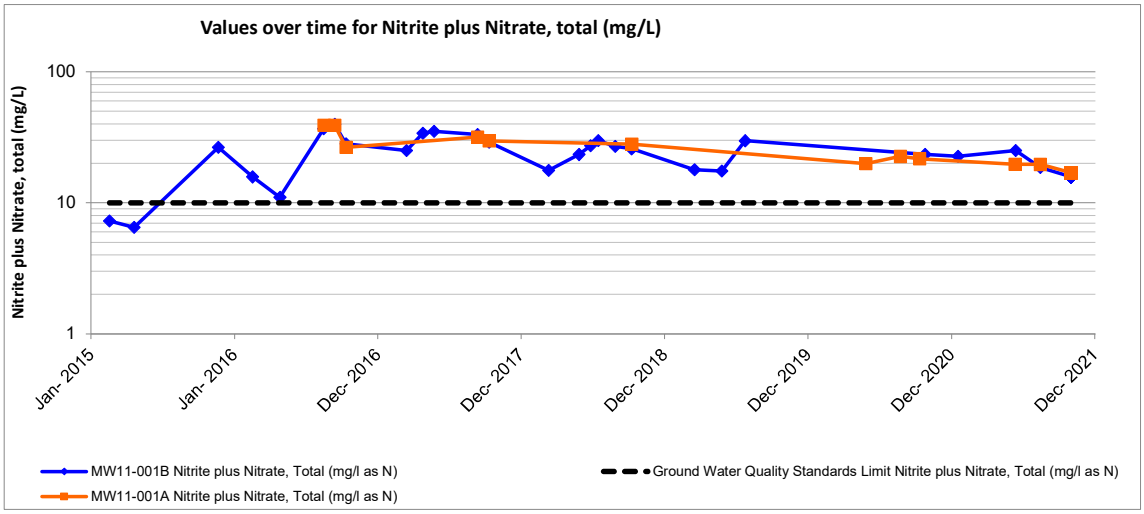

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)
MW11-001A Iron, Dissolved (ug/l as Fe)

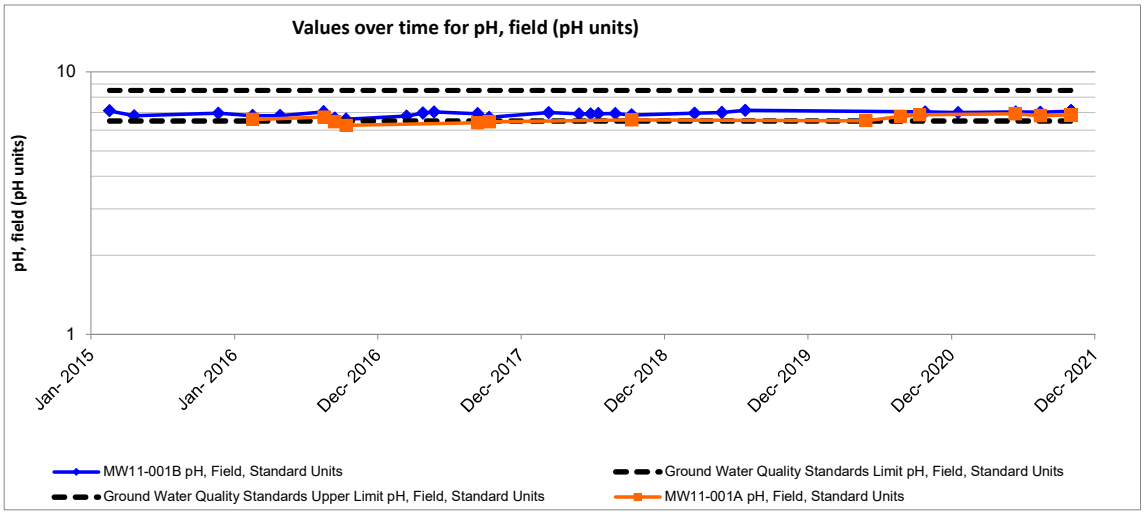

Values over time for Lead, dissolved (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest hardness value in the data set was used for the WQS.)
Lead, dissolved (ug/L)
100
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)
MW11-001A Lead, Dissolved (ug/l as Pb)

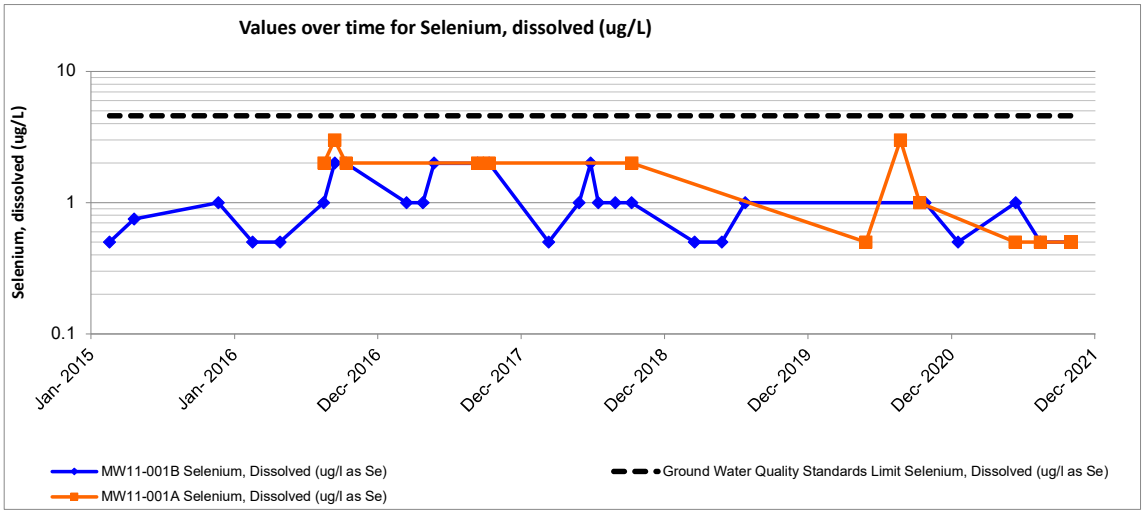

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
10000
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)
MW11-001A Manganese, Dissolved (ug/l as Mn)

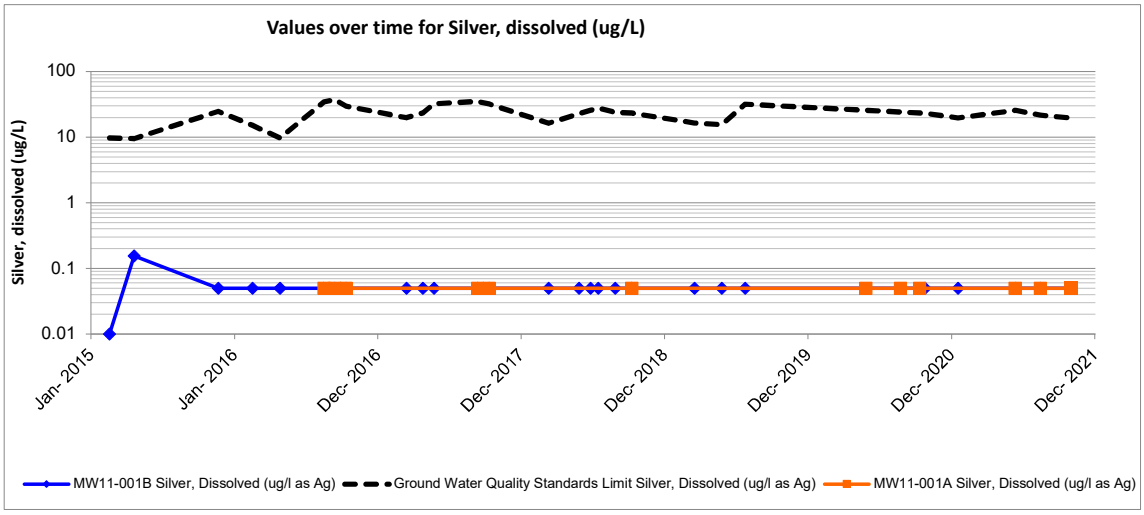

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
0.0001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)
MW11-001B Mercury, Total (ug/l as Hg)
MW11-001A Mercury, Dissolved (ug/l as Hg)

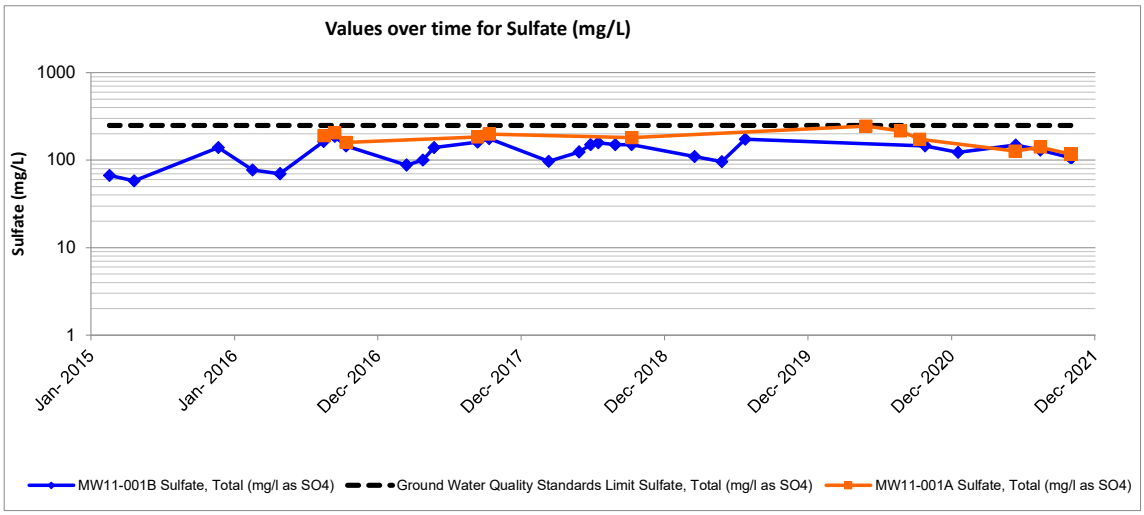

Values over time for Nickel, dissolved (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Nickel, dissolved (ug/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)
MW11-001A Nickel, Dissolved (ug/l as Ni)

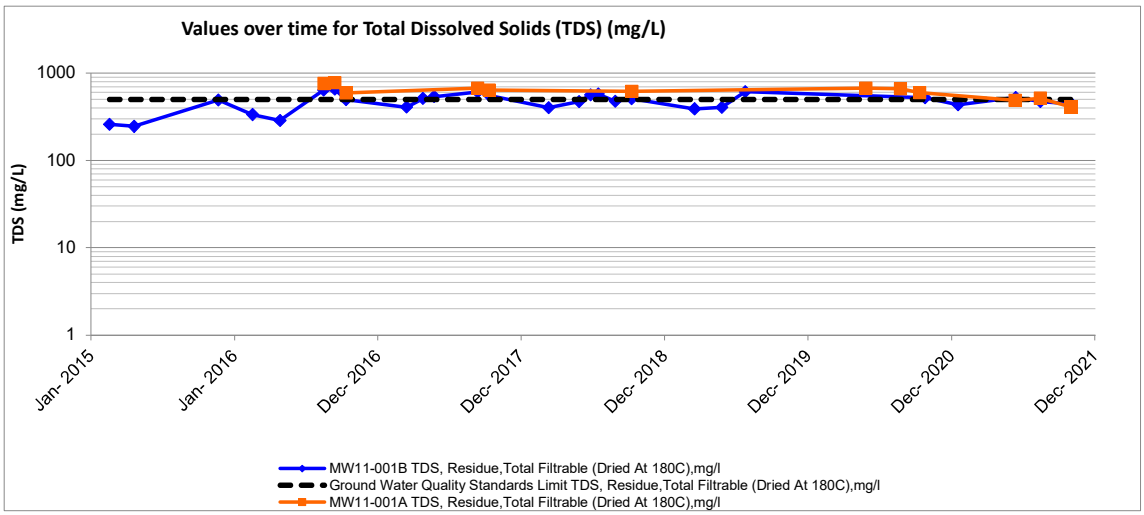

Values over time for Nitrite plus Nitrate, total (mg/L)
Nitrite plus Nitrate, total (mg/L)
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)
MW11-001A Nitrite plus Nitrate, Total (mg/l as N)

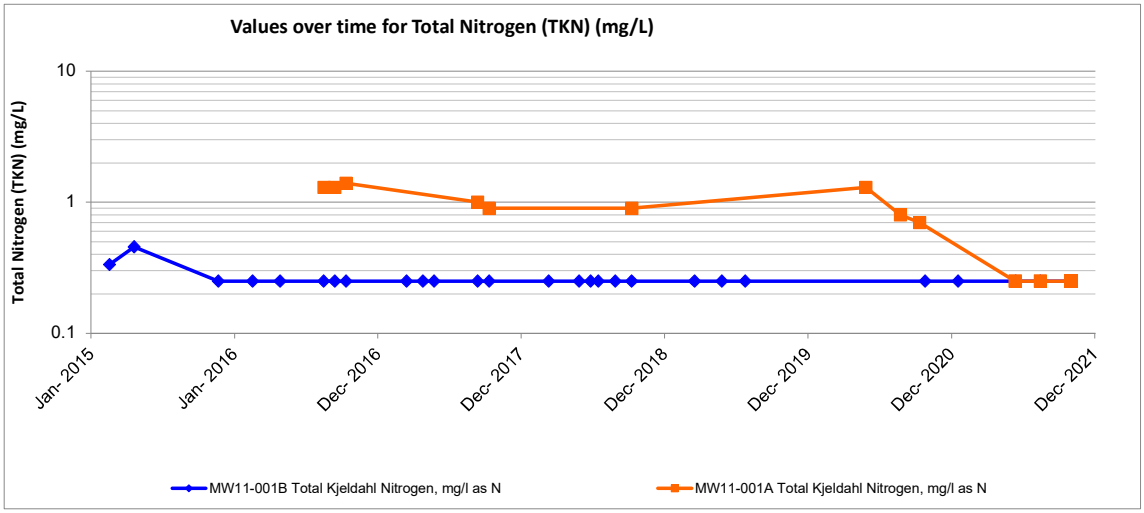

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units
MW11-001A pH, Field, Standard Units

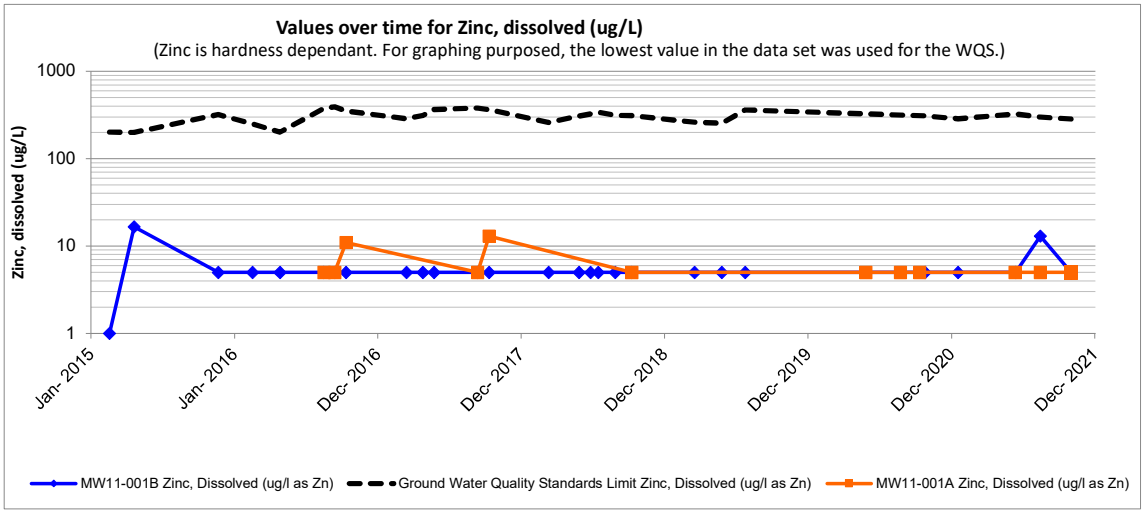

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Selenium, Dissolved (ug/l as Se)
MW11-001A Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)


Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)
MW11-001A Silver, Dissolved (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)
MW11-001A Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW11-001A TDS, Residue,Total Filtrable (Dried At 180C),mg/l


Values over time for Total Nitrogen (TKN) (mg/L)
Total Nitrogen (TKN) (mg/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Total Kjeldahl Nitrogen, mg/l as N
MW11-001A Total Kjeldahl Nitrogen, mg/l as N

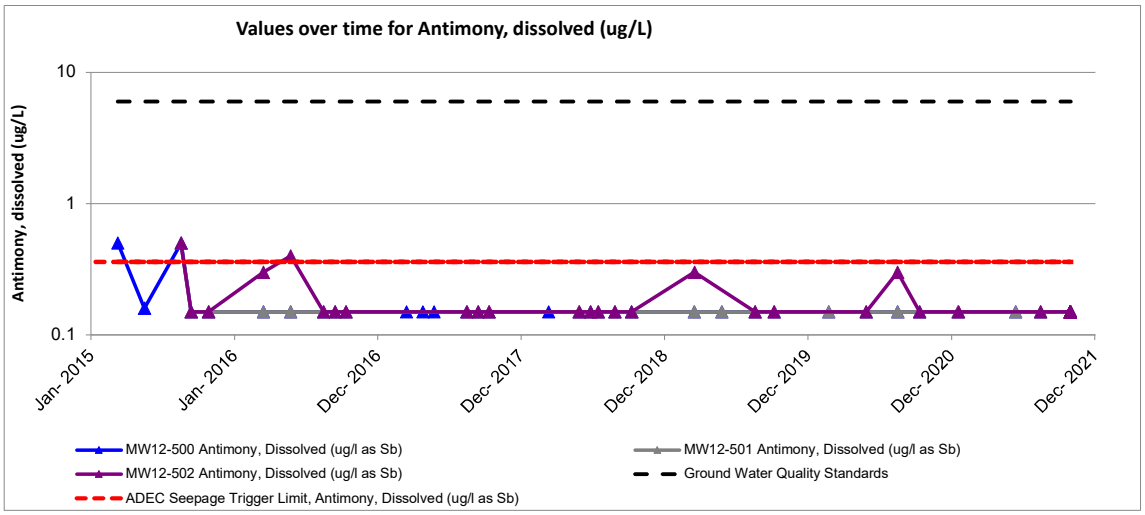

Values over time for Zinc, dissolved (ug/L)
(Zinc is hardness dependant. For graphing purposed, the lowest value in the data set was used for the WQS.)
Zinc, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW11-001B Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)
MW11-001A Zinc, Dissolved (ug/l as Zn)

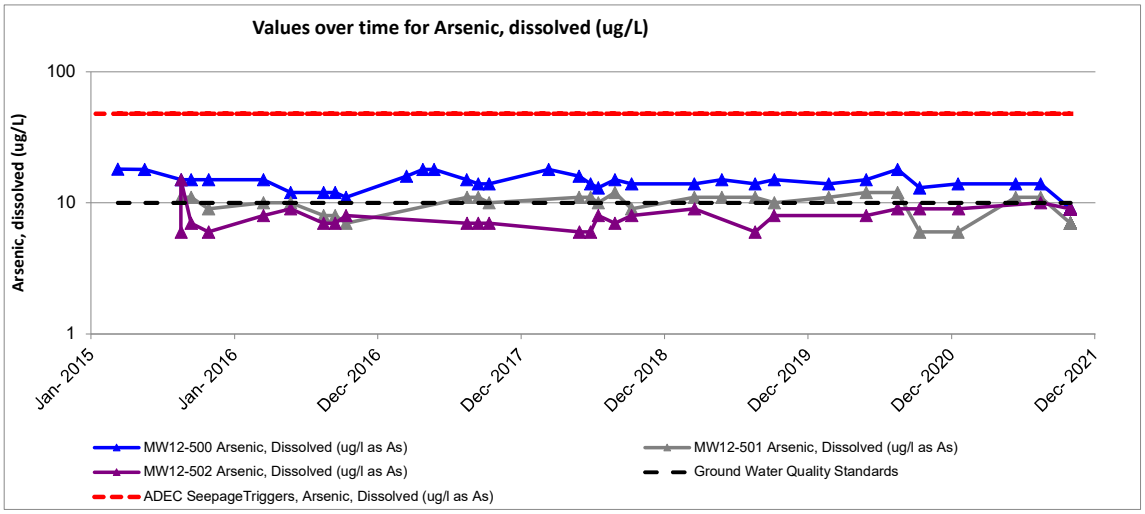
APPENDIX C –

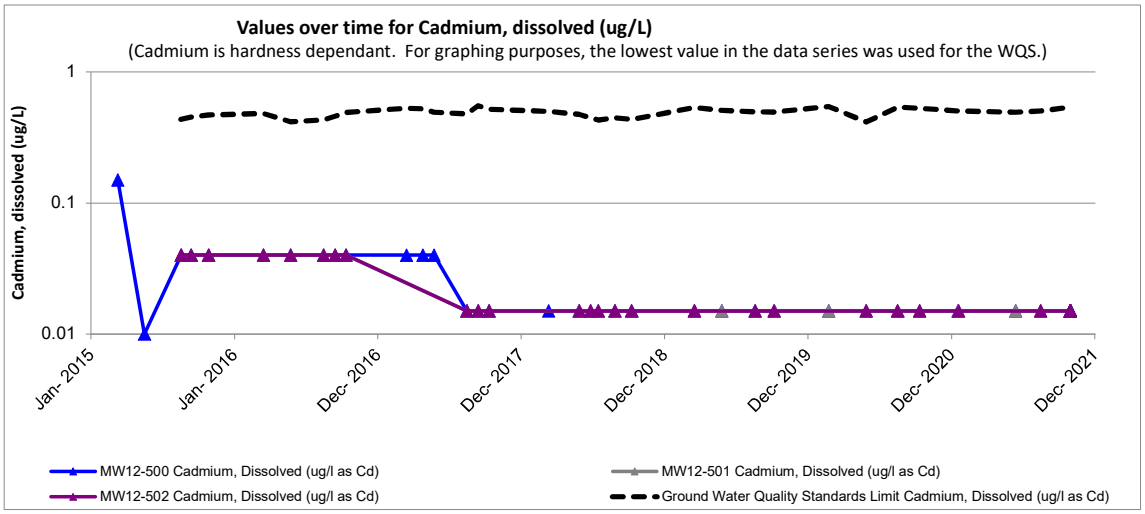
MW12-500, MW12-501, MW12-502 GRAPHS

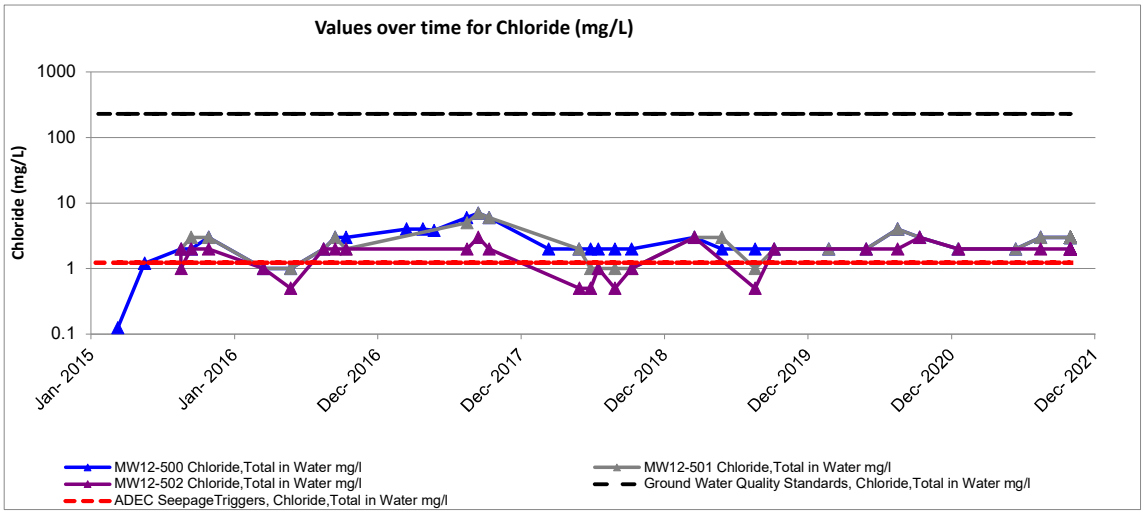
WATER QUALITY STANDARDS AND SEEPAGE

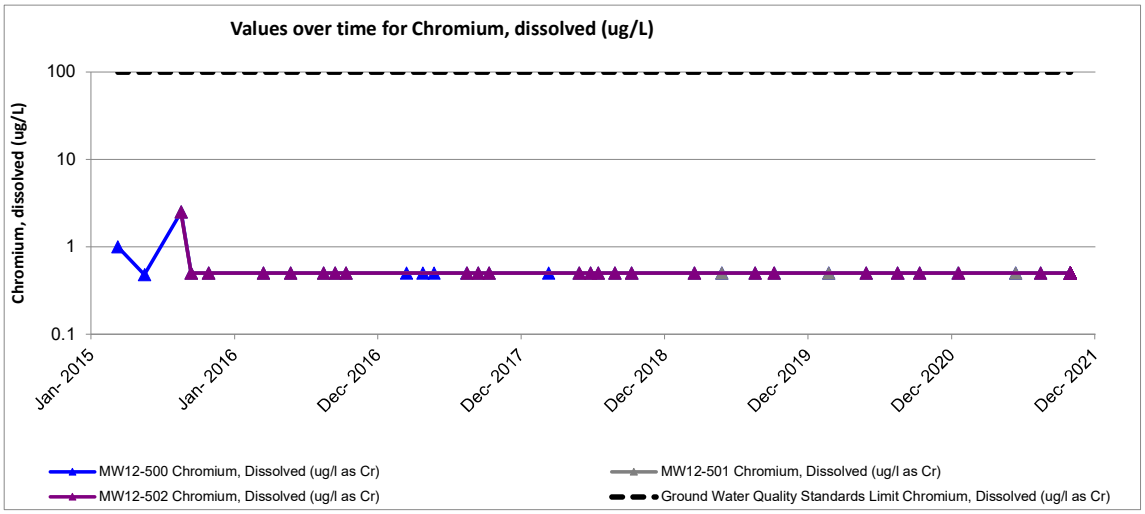
TRIGGER LIMITS

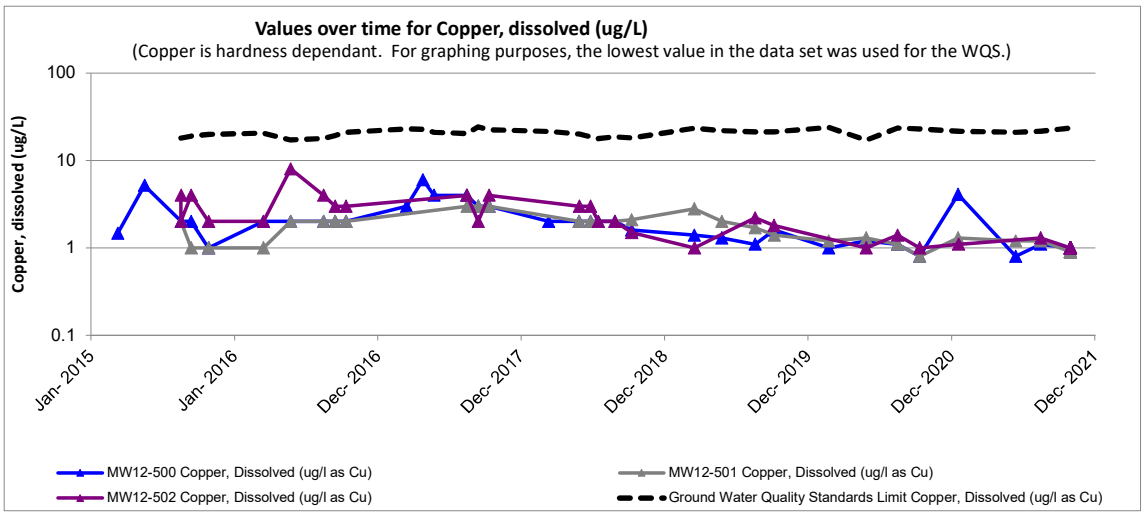

Values over time for Antimony, dissolved (ug/L)
Antimony, dissolved (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Antimony, Dissolved (ug/l as Sb)
MW12-501 Antimony, Dissolved (ug/l as Sb)
MW12-502 Antimony, Dissolved (ug/l as Sb)
Ground Water Quality Standards
ADEC Seepage Trigger Limit, Antimony, Dissolved (ug/l as Sb)

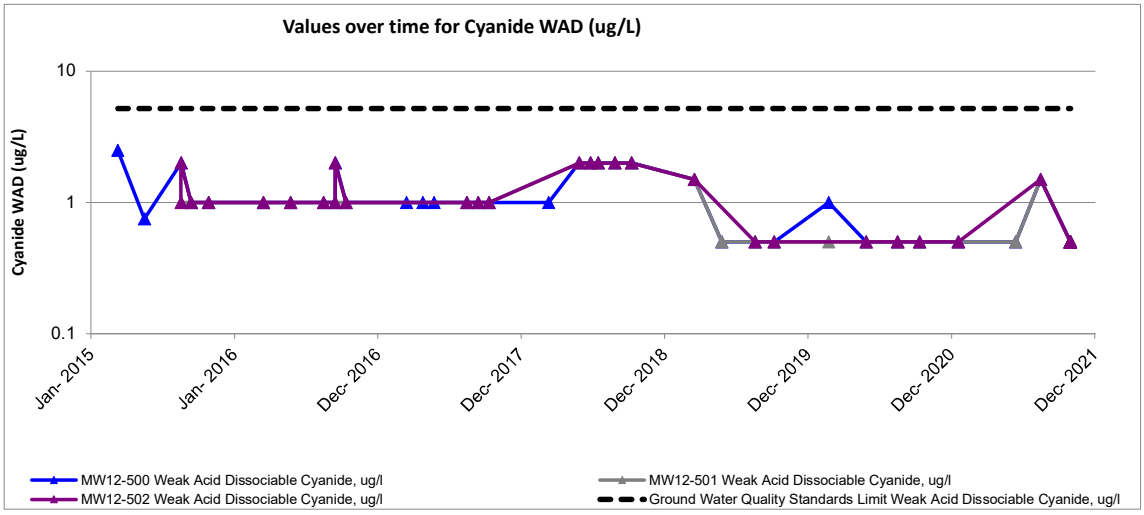

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Arsenic, Dissolved (ug/l as As)
MW12-501 Arsenic, Dissolved (ug/l as As)
MW12-502 Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards
ADEC SeepageTriggers, Arsenic, Dissolved (ug/l as As)

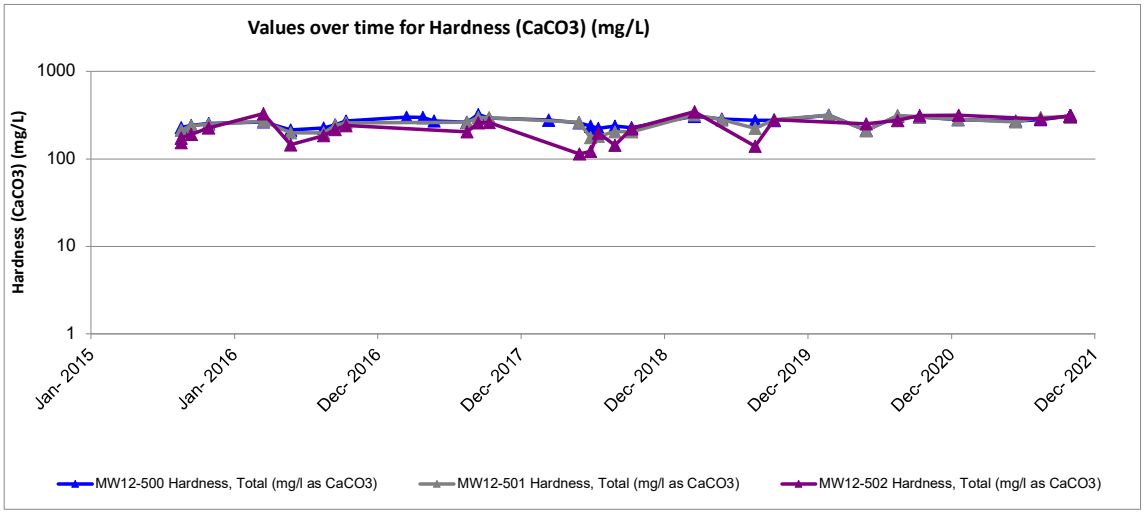

Values over time for Cadmium, dissolved (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data series was used for the WQS.)
Cadmium, dissolved (ug/L)
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Cadmium, Dissolved (ug/l as Cd)
MW12-501 Cadmium, Dissolved (ug/l as Cd)
MW12-502 Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)

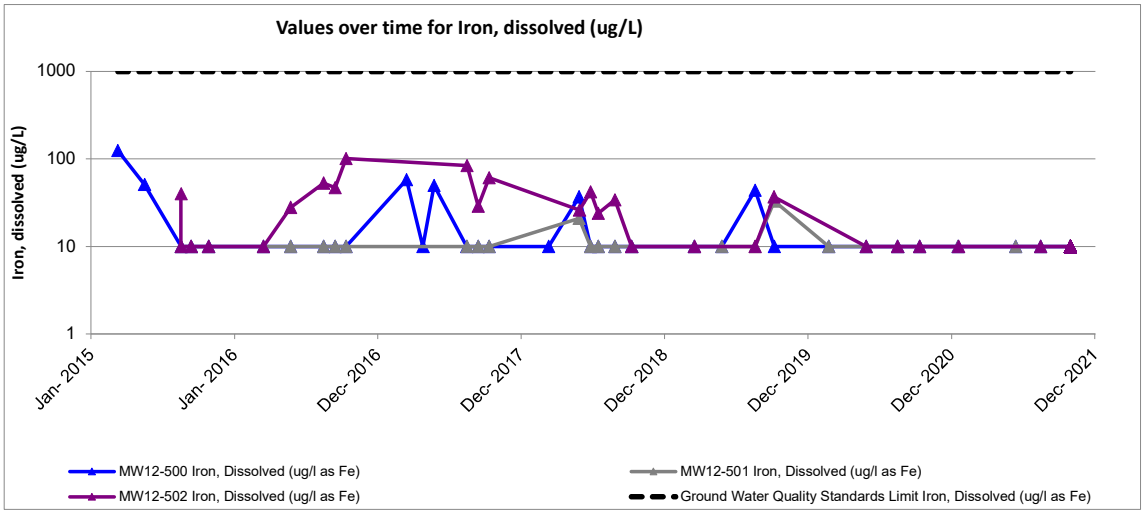

Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Chloride,Total in Water mg/l
MW12-501 Chloride,Total in Water mg/l
MW12-502 Chloride,Total in Water mg/l
Ground Water Quality Standards, Chloride,Total in Water mg/l
ADEC SeepageTriggers, Chloride,Total in Water mg/l

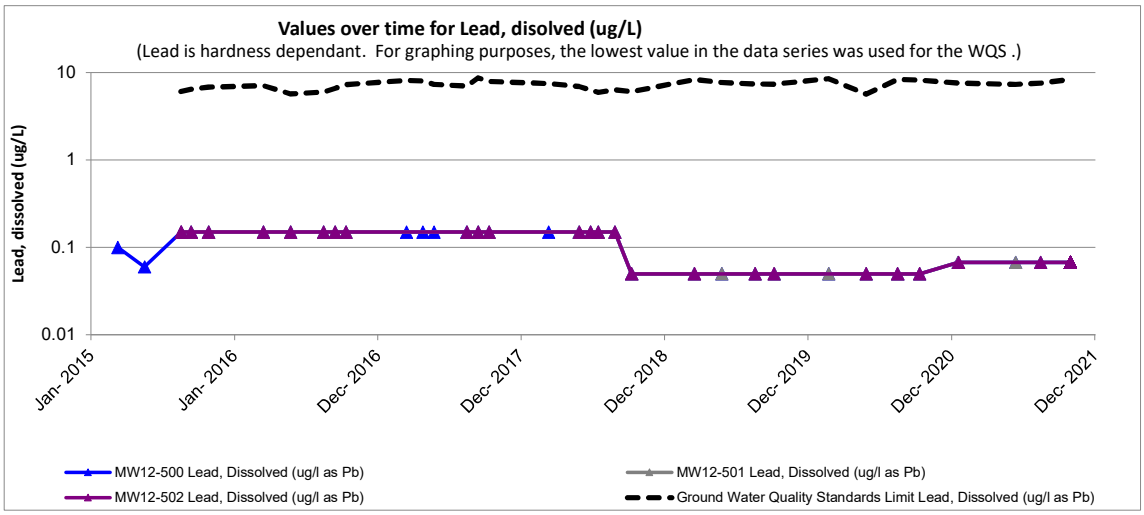

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Chromium, Dissolved (ug/l as Cr)
MW12-501 Chromium, Dissolved (ug/l as Cr)
MW12-502 Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)

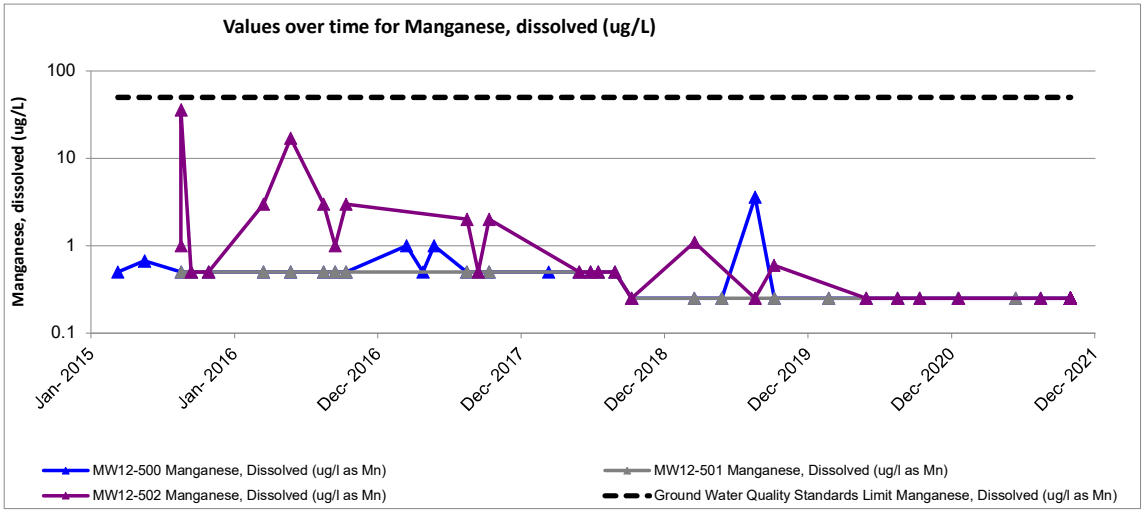

Values over time for Copper, dissolved (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Copper, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Copper, Dissolved (ug/l as Cu)
MW12-501 Copper, Dissolved (ug/l as Cu)
MW12-502 Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)

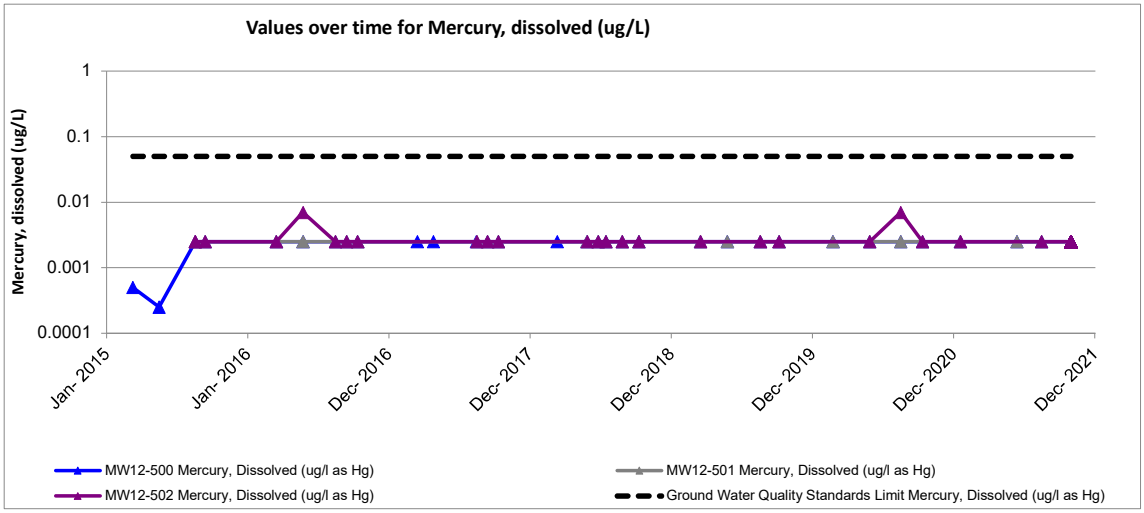

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Weak Acid Dissociable Cyanide, ug/l
MW12-501 Weak Acid Dissociable Cyanide, ug/l
MW12-502 Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

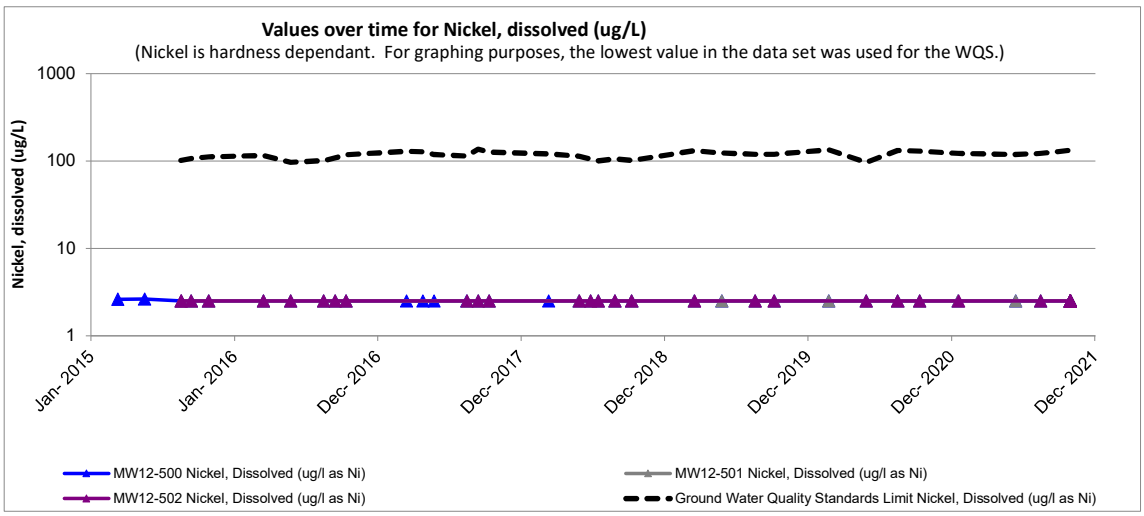

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Hardness, Total (mg/l as CaCO3)
MW12-501 Hardness, Total (mg/l as CaCO3)
MW12-502 Hardness, Total (mg/l as CaCO3)

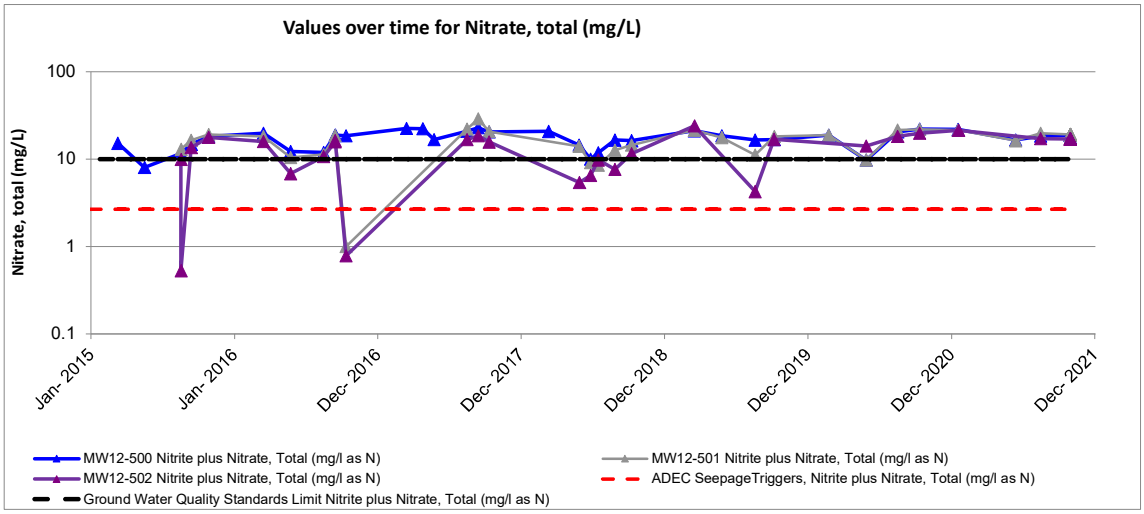

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Iron, Dissolved (ug/l as Fe)
MW12-501 Iron, Dissolved (ug/l as Fe)
MW12-502 Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)

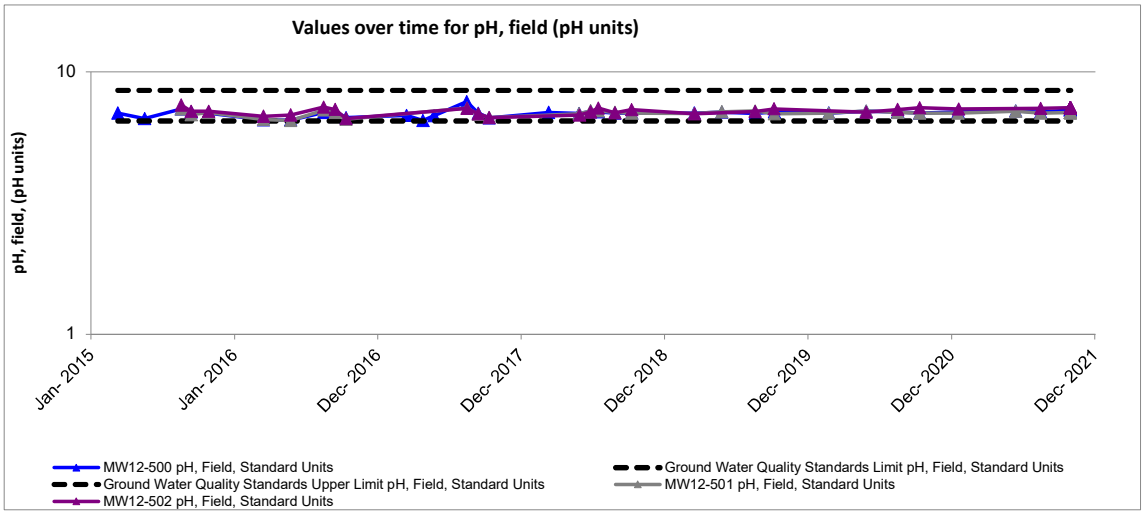

Values over time for Lead, disolved (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest value in the data series was used for the WQS .)
Lead, dissolved (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Lead, Dissolved (ug/l as Pb)
MW12-501 Lead, Dissolved (ug/l as Pb)
MW12-502 Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)

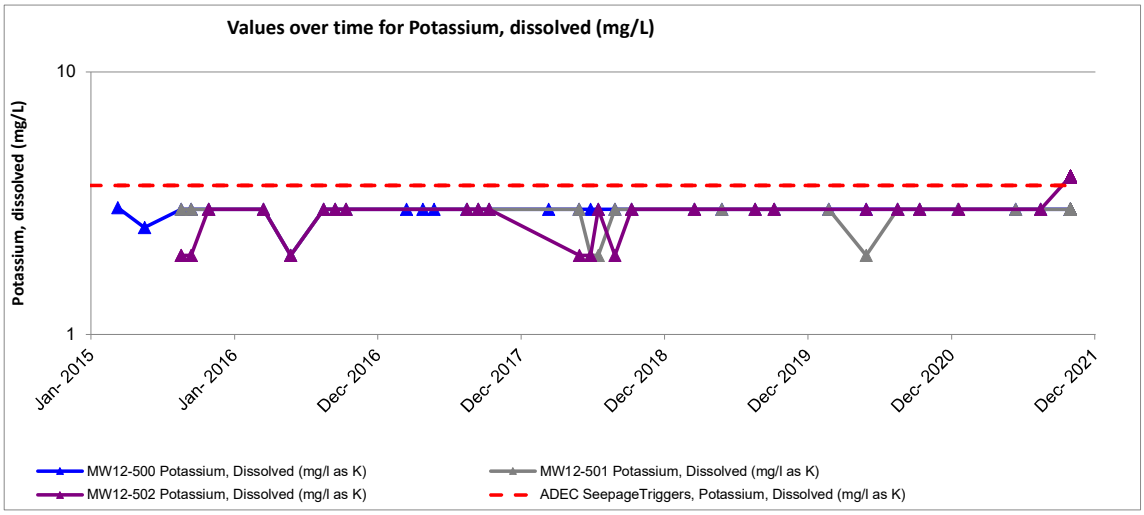

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Manganese, Dissolved (ug/l as Mn)
MW12-501 Manganese, Dissolved (ug/l as Mn)
MW12-502 Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)

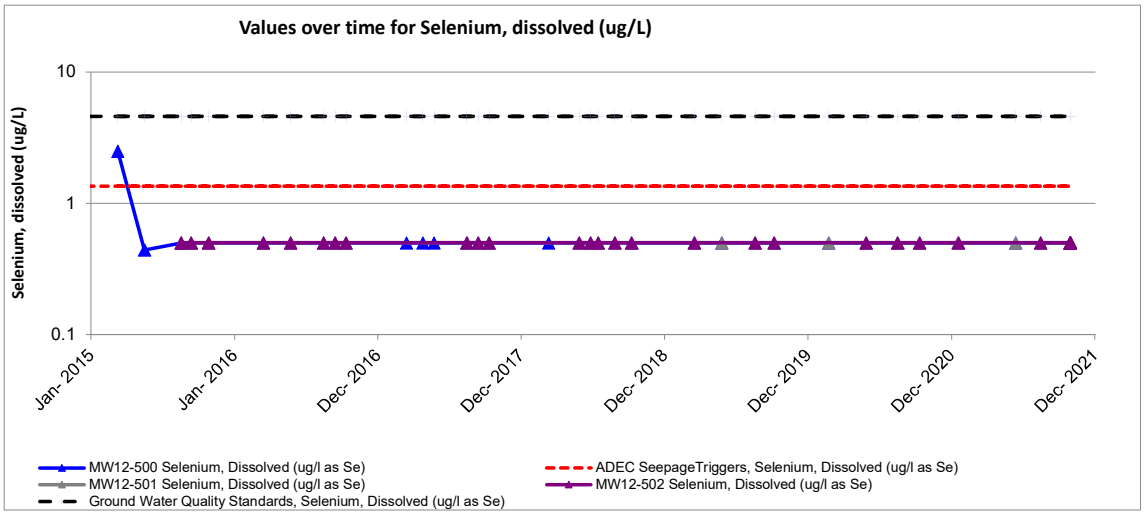

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
0.0001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Mercury, Dissolved (ug/l as Hg)
MW12-501 Mercury, Dissolved (ug/l as Hg)
MW12-502 Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)

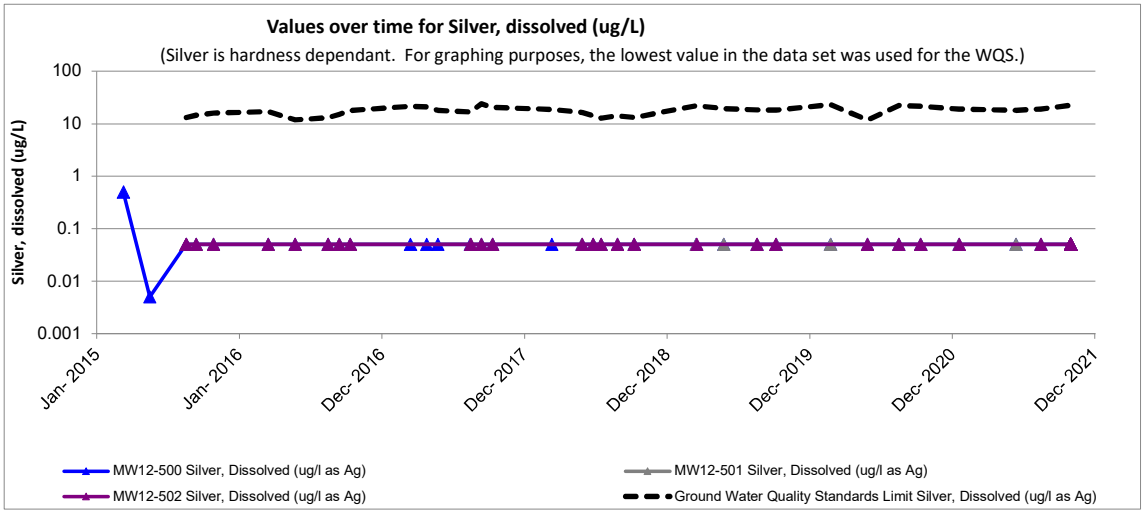

Values over time for Nickel, dissolved (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Nickel, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Nickel, Dissolved (ug/l as Ni)
MW12-501 Nickel, Dissolved (ug/l as Ni)
MW12-502 Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)

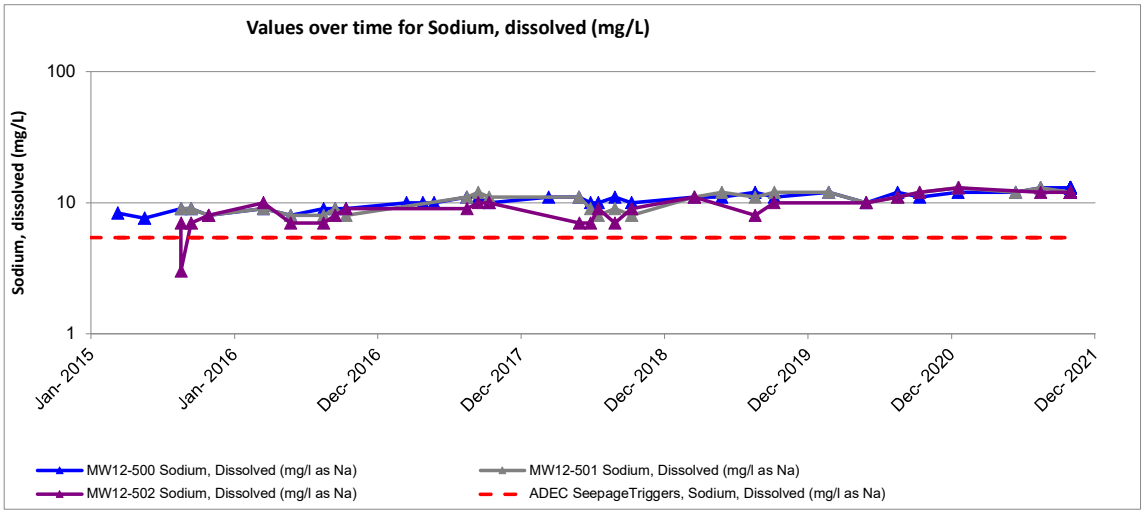

Values over time for Nitrate, total (mg/L)
Nitrate, total (mg/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Nitrite plus Nitrate, Total (mg/l as N)
MW12-501 Nitrite plus Nitrate, Total (mg/l as N)
MW12-502 Nitrite plus Nitrate, Total (mg/l as N)
ADEC SeepageTriggers, Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

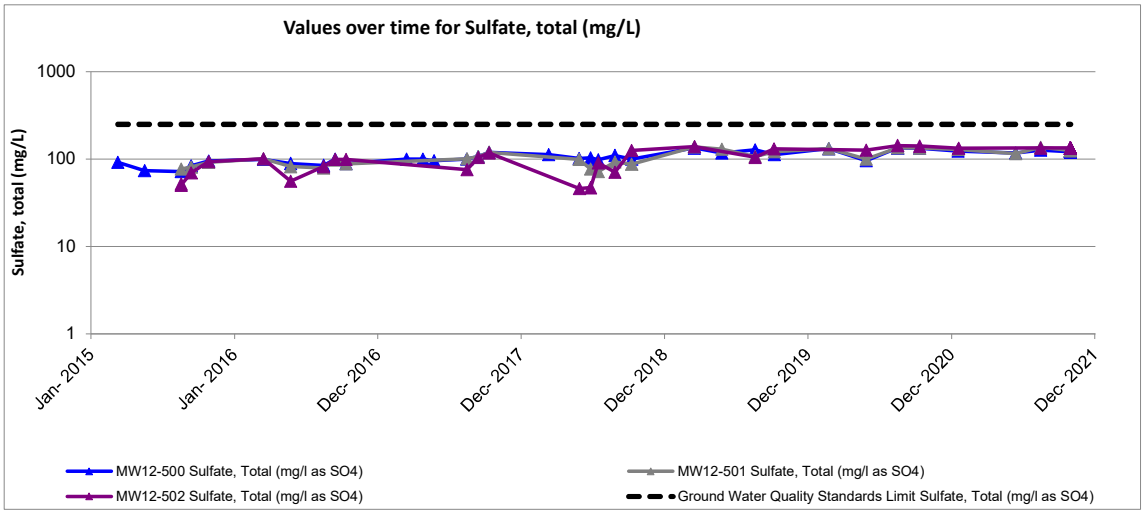

Values over time for pH, field (pH units)
pH, field, (pH units)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units
MW12-501 pH, Field, Standard Units
MW12-502 pH, Field, Standard Units

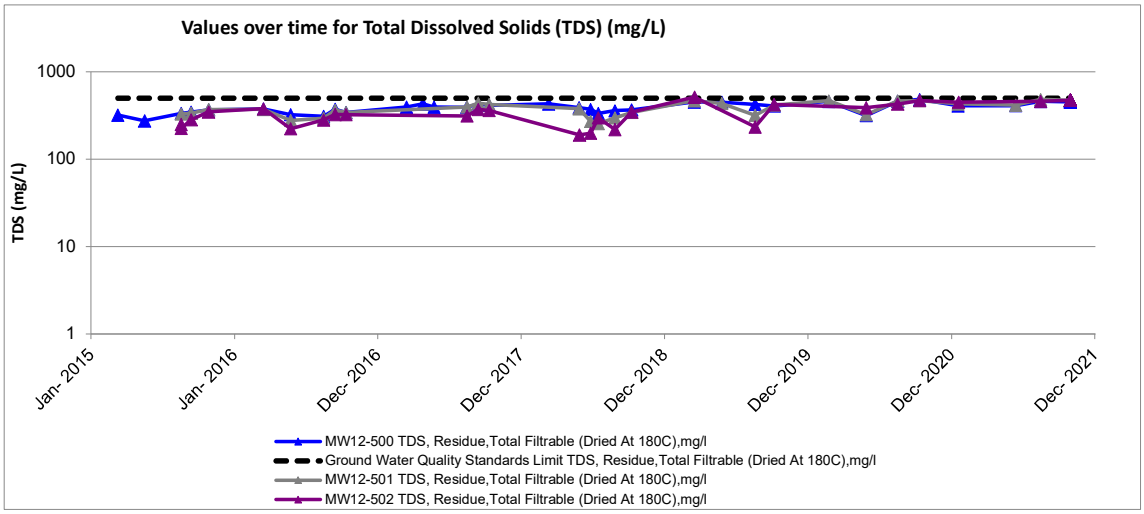

Values over time for Potassium, dissolved (mg/L)
Potassium, dissolved (mg/L)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Potassium, Dissolved (mg/l as K)
MW12-501 Potassium, Dissolved (mg/l as K)
MW12-502 Potassium, Dissolved (mg/l as K)
ADEC SeepageTriggers, Potassium, Dissolved (mg/l as K)

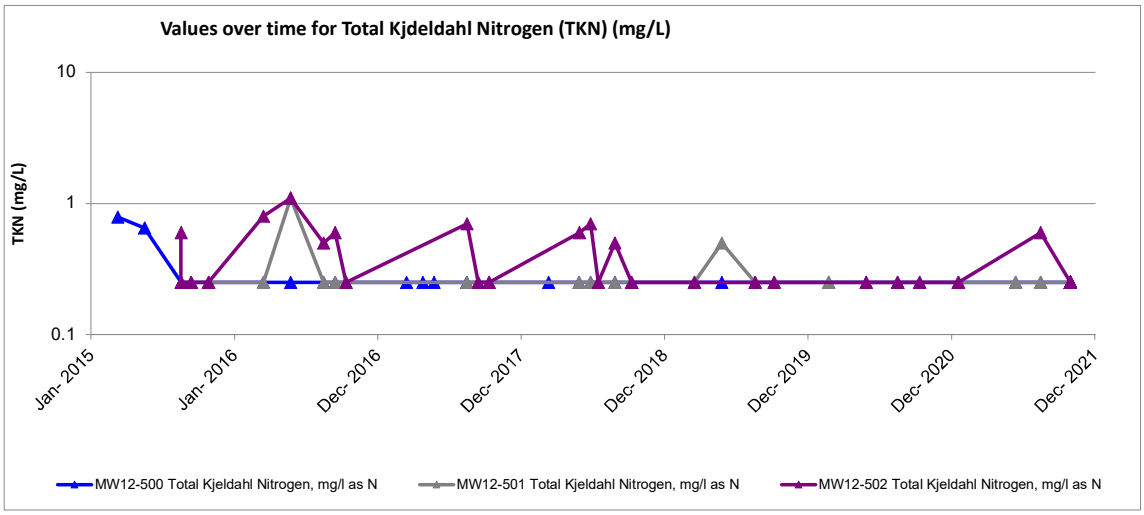

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Selenium, Dissolved (ug/l as Se)
MW12-501 Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards, Selenium, Dissolved (ug/l as Se)
ADEC SeepageTriggers, Selenium, Dissolved (ug/l as Se)
MW12-502 Selenium, Dissolved (ug/l as Se)

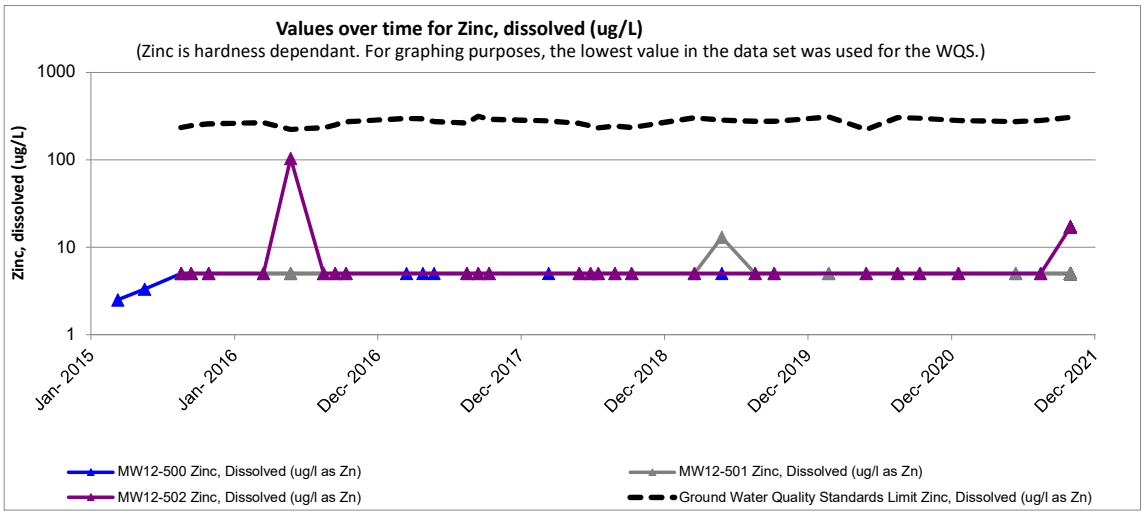

Values over time for Silver, dissolved (ug/L)
(Silver is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
0.001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Silver, Dissolved (ug/l as Ag)
MW12-501 Silver, Dissolved (ug/l as Ag)
MW12-502 Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)


Values over time for Sodium, dissolved (mg/L)
Sodium, dissolved (mg/L)
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Sodium, Dissolved (mg/l as Na)
MW12-501 Sodium, Dissolved (mg/l as Na)
MW12-502 Sodium, Dissolved (mg/l as Na)
ADEC SeepageTriggers, Sodium, Dissolved (mg/l as Na)


Values over time for Sulfate, total (mg/L)
Sulfate, total (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Sulfate, Total (mg/l as SO4)
MW12-501 Sulfate, Total (mg/l as SO4)
MW12-502 Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW12-501 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW12-502 TDS, Residue,Total Filtrable (Dried At 180C),mg/l

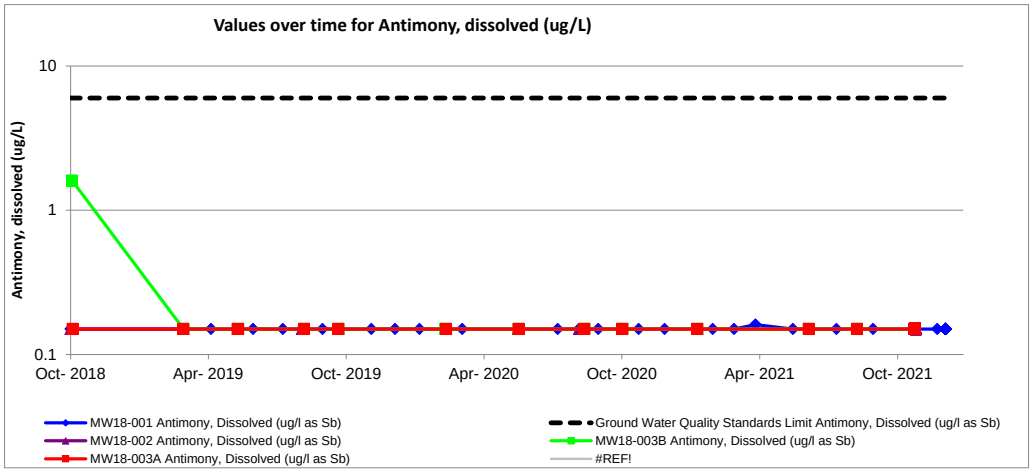

Values over time for Total Kjeldahl Nitrogen (TKN) (mg/L)
TKN (mg/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Total Kjeldahl Nitrogen, mg/l as N
MW12-501 Total Kjeldahl Nitrogen, mg/l as N
MW12-502 Total Kjeldahl Nitrogen, mg/l as N

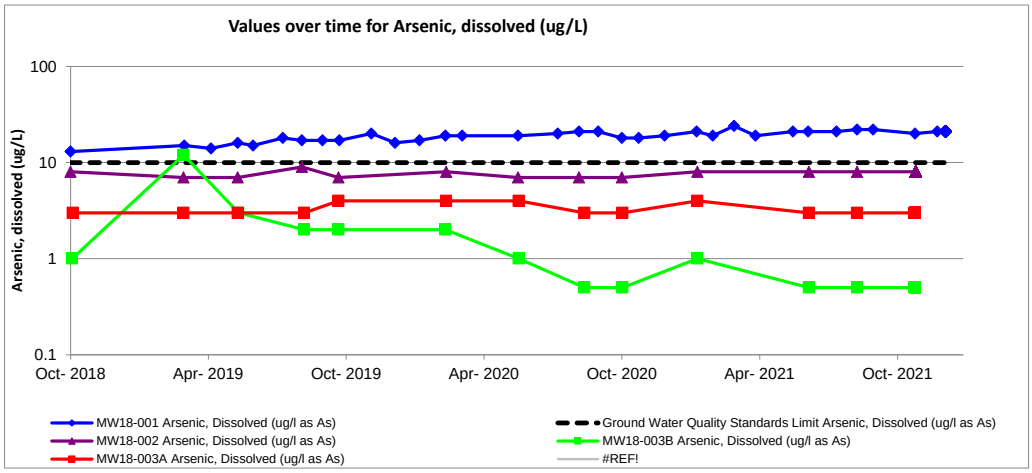

Values over time for Zinc, dissolved (ug/L)
(Zinc is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS.)
Zinc, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW12-500 Zinc, Dissolved (ug/l as Zn)
MW12-501 Zinc, Dissolved (ug/l as Zn)
MW12-502 Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)

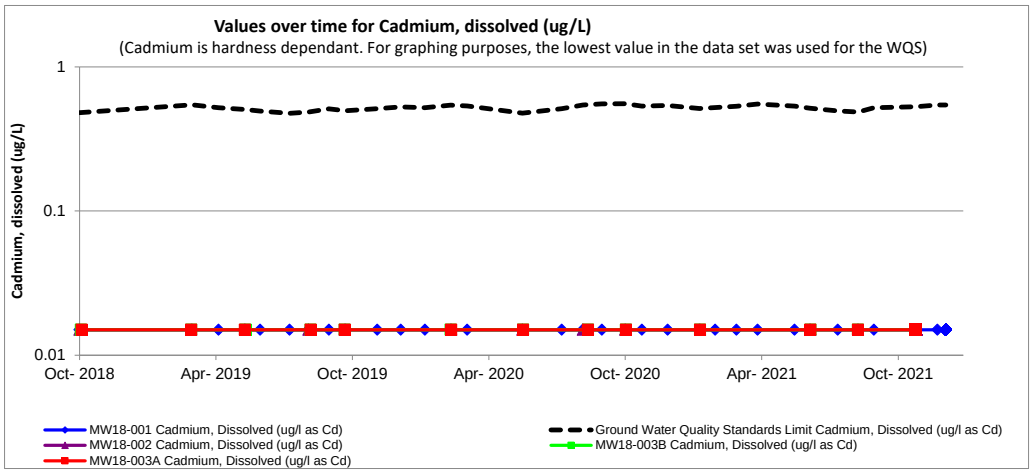
APPENDIX C –

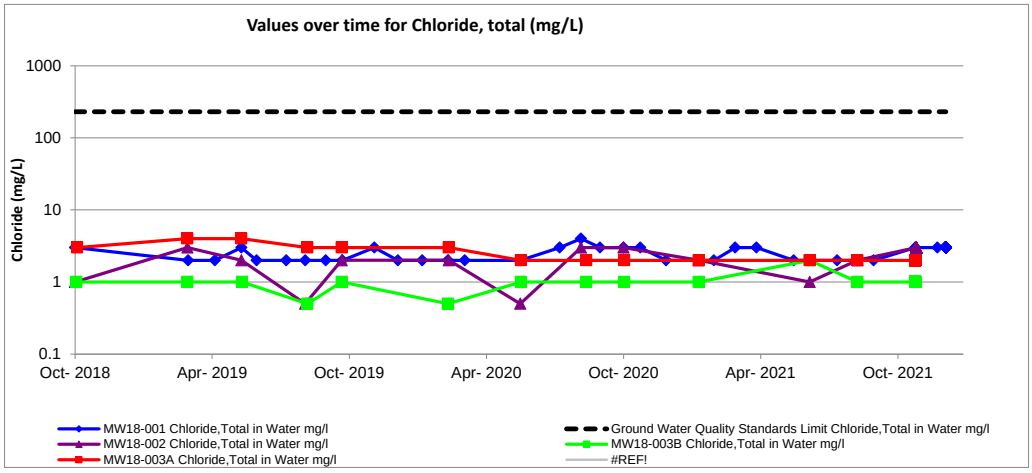
MW18-001, MW18-002, MW18-003A, MW18-003B GRAPHS

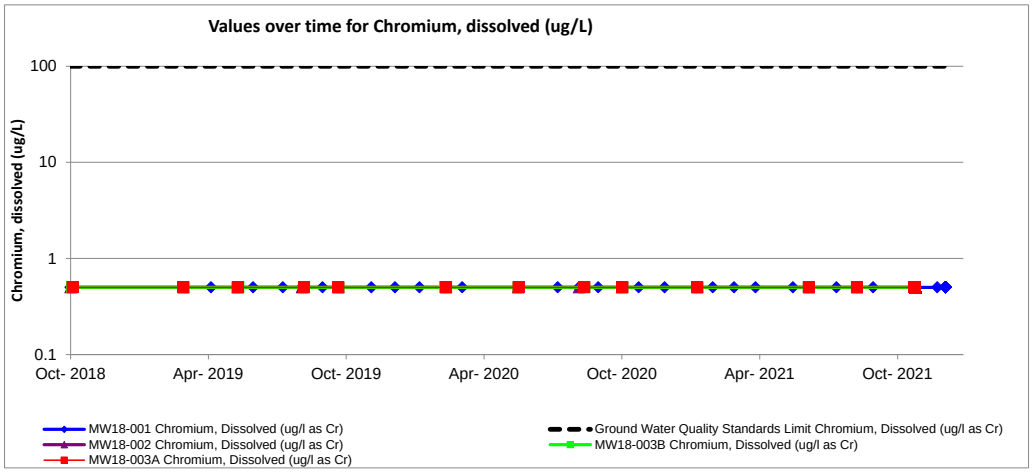
WATER QUALITY STANDARDS

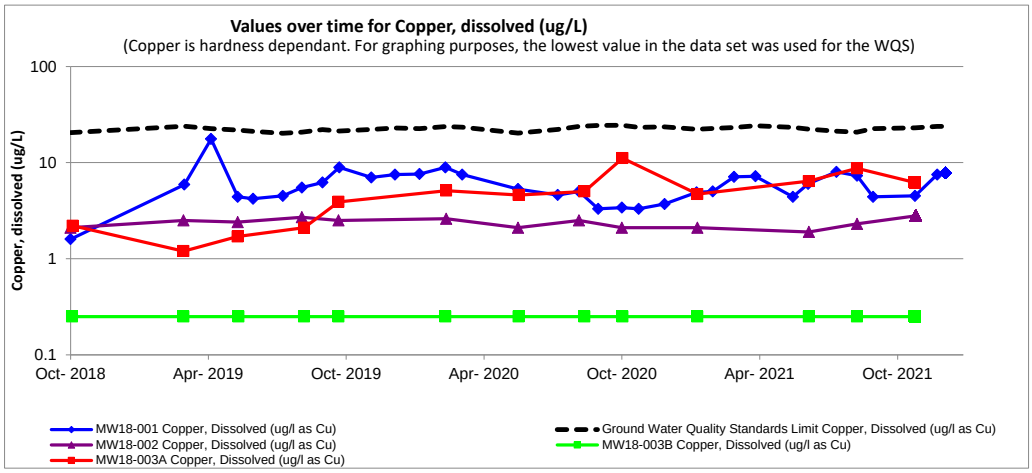

Values over time for Antimony, dissolved (ug/L)
Antimony, dissolved (ug/L)
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Antimony, Dissolved (ug/l as Sb)
MW18-002 Antimony, Dissolved (ug/l as Sb)
MW18-003A Antimony, Dissolved (ug/l as Sb)
Ground Water Quality Standards Limit Antimony, Dissolved (ug/l as Sb)
MW18-003B Antimony, Dissolved (ug/l as Sb)
#REF!

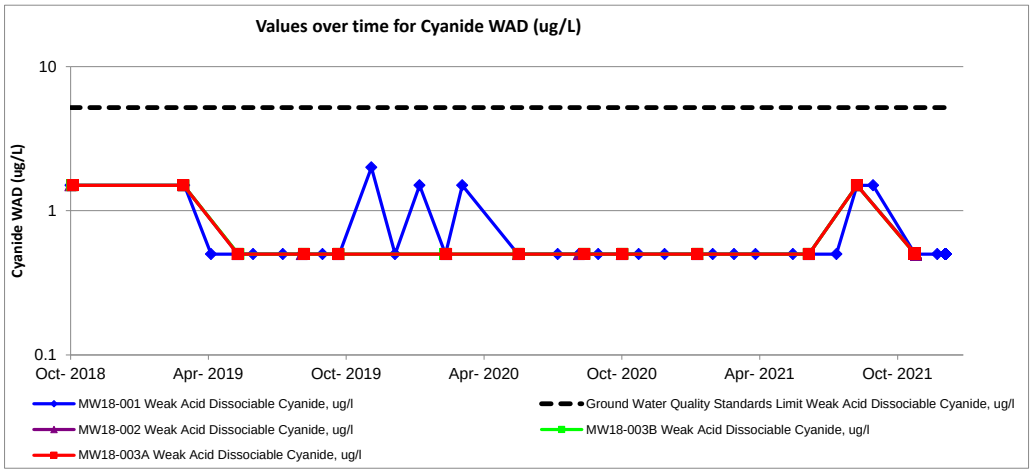

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
100
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Arsenic, Dissolved (ug/l as As)
MW18-002 Arsenic, Dissolved (ug/l as As)
MW18-003A Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)
MW18-003B Arsenic, Dissolved (ug/l as As)
#REF!

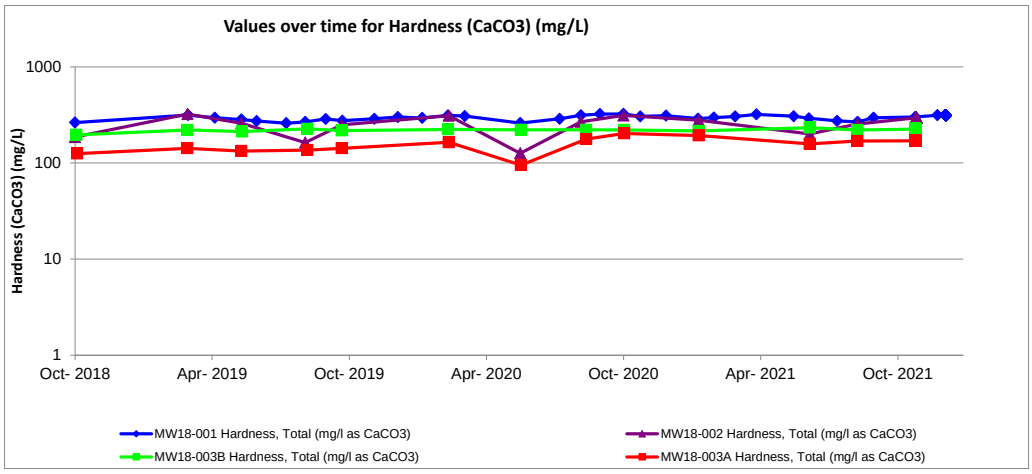

Values over time for Cadmium, dissolved (ug/L)
(Cadmium is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Cadmium, dissolved (ug/L)
1
0.1
0.01
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Cadmium, Dissolved (ug/l as Cd)
MW18-002 Cadmium, Dissolved (ug/l as Cd)
MW18-003A Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)
MW18-003B Cadmium, Dissolved (ug/l as Cd)

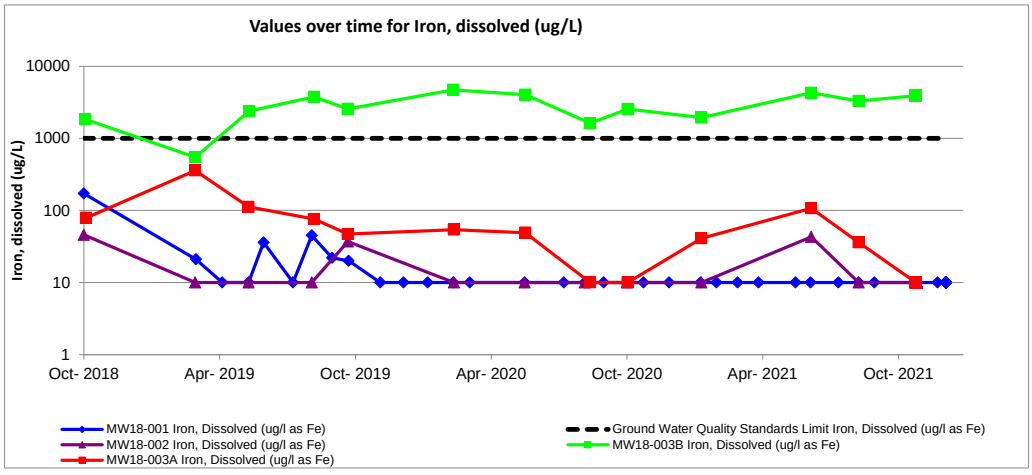

Values over time for Chloride, total (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Chloride,Total in Water mg/l
MW18-002 Chloride,Total in Water mg/l
MW18-003A Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l
MW18-003B Chloride,Total in Water mg/l
#REF!

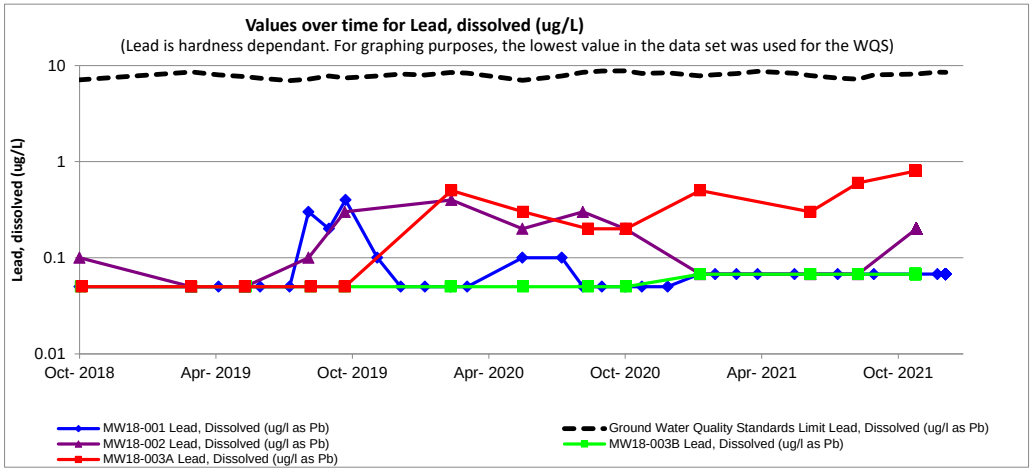

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
100
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Chromium, Dissolved (ug/l as Cr)
MW18-002 Chromium, Dissolved (ug/l as Cr)
MW18-003A Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)
MW18-003B Chromium, Dissolved (ug/l as Cr)

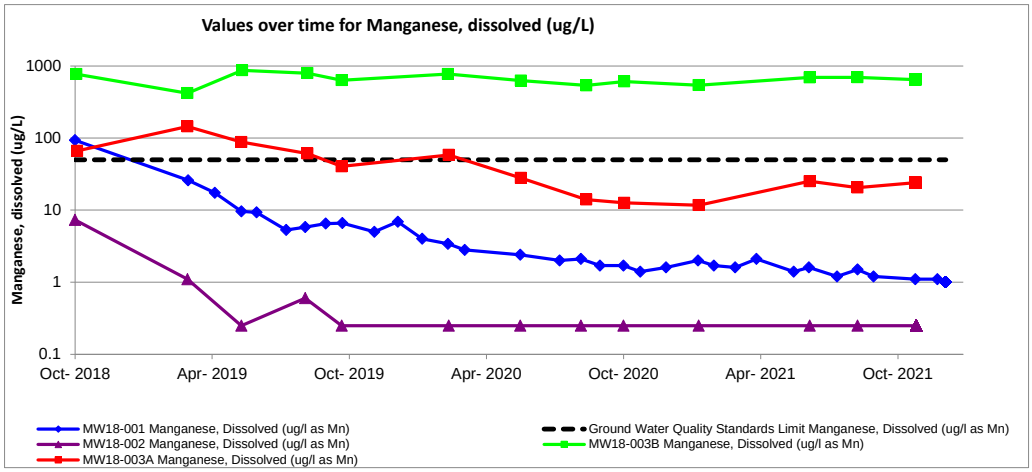

Values over time for Copper, dissolved (ug/L)
(Copper is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Copper, dissolved (ug/L)
100
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Copper, Dissolved (ug/l as Cu)
MW18-002 Copper, Dissolved (ug/l as Cu)
MW18-003A Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)
MW18-003B Copper, Dissolved (ug/l as Cu)

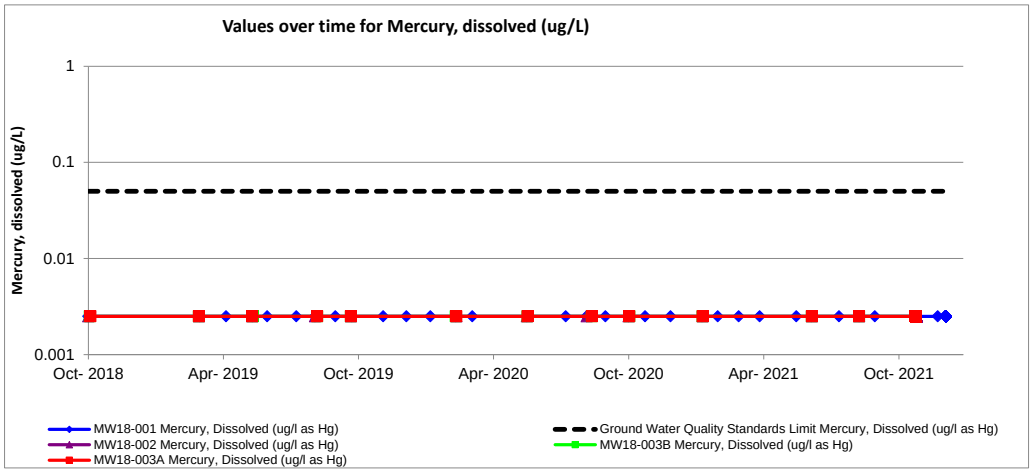

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l
MW18-002 Weak Acid Dissociable Cyanide, ug/l
MW18-003B Weak Acid Dissociable Cyanide, ug/l
MW18-003A Weak Acid Dissociable Cyanide, ug/l

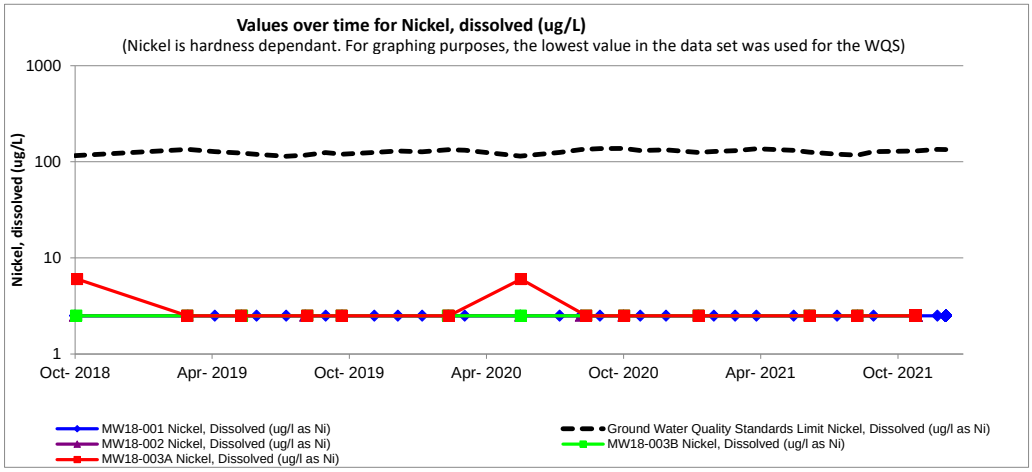

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Hardness, Total (mg/l as CaCO3)
MW18-002 Hardness, Total (mg/l as CaCO3)
MW18-003B Hardness, Total (mg/l as CaCO3)
MW18-003A Hardness, Total (mg/l as CaCO3)

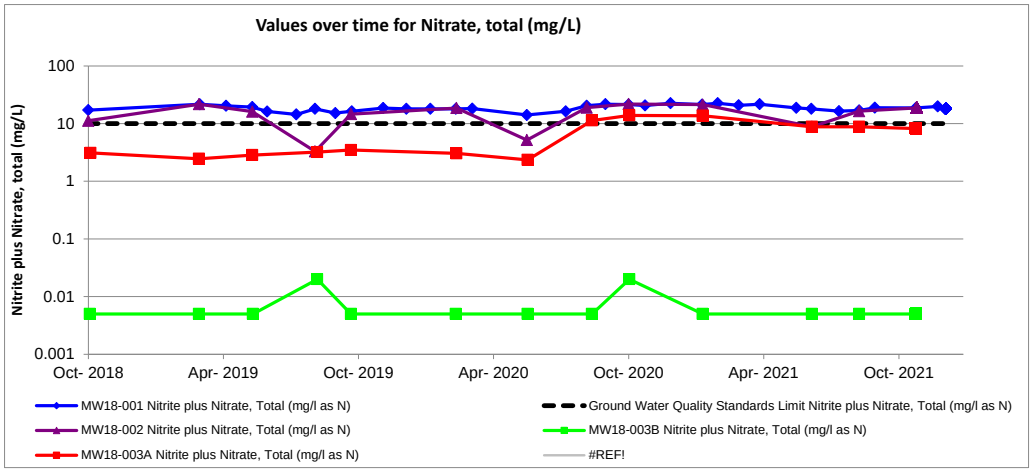

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
10000
1000
100
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)
MW18-002 Iron, Dissolved (ug/l as Fe)
MW18-003B Iron, Dissolved (ug/l as Fe)
MW18-003A Iron, Dissolved (ug/l as Fe)

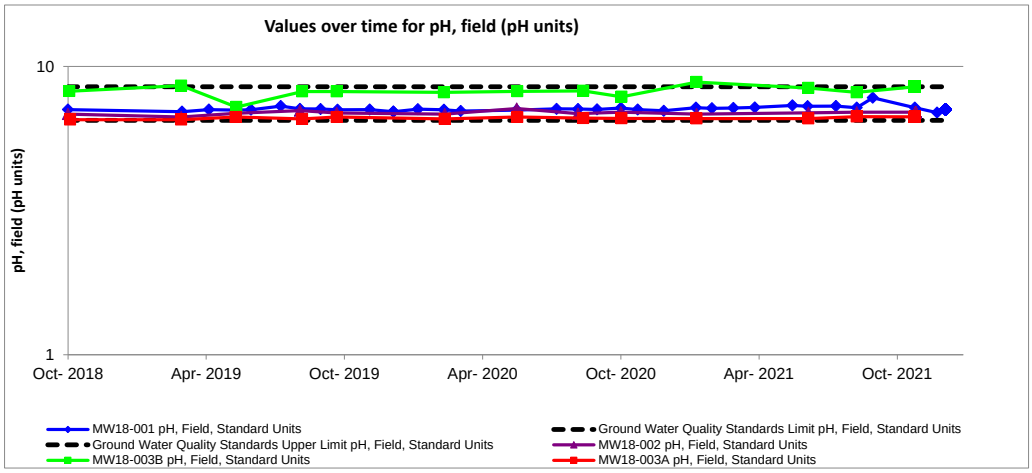

Values over time for Lead, dissolved (ug/L)
(Lead is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Lead, dissolved (ug/L)
10
1
0.1
0.01
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Lead, Dissolved (ug/l as Pb)
MW18-002 Lead, Dissolved (ug/l as Pb)
MW18-003A Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)
MW18-003B Lead, Dissolved (ug/l as Pb)

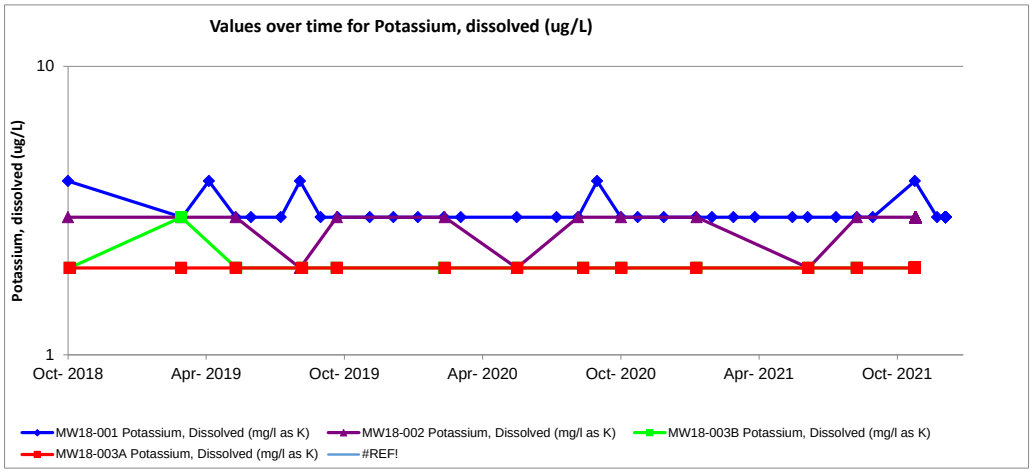

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
1000
100
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Manganese, Dissolved (ug/l as Mn)
MW18-002 Manganese, Dissolved (ug/l as Mn)
MW18-003A Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)
MW18-003B Manganese, Dissolved (ug/l as Mn)

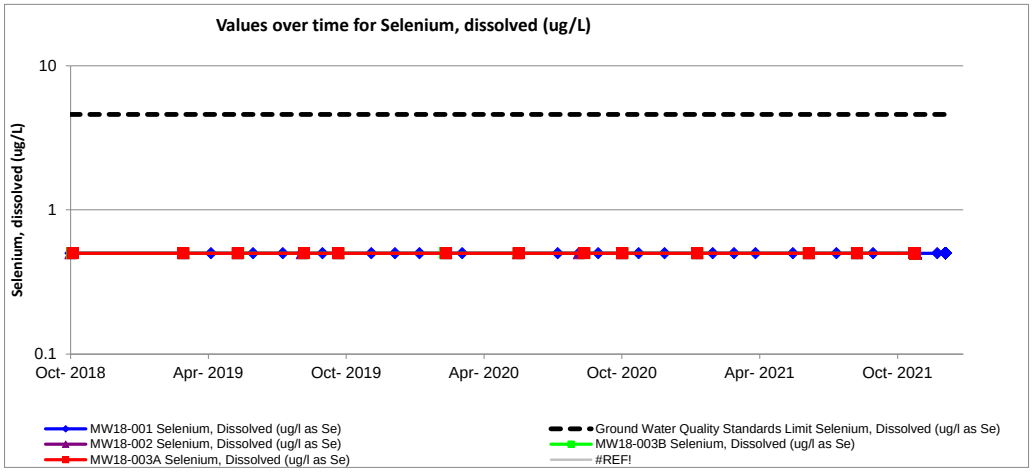

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Mercury, Dissolved (ug/l as Hg)
MW18-002 Mercury, Dissolved (ug/l as Hg)
MW18-003A Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)
MW18-003B Mercury, Dissolved (ug/l as Hg)

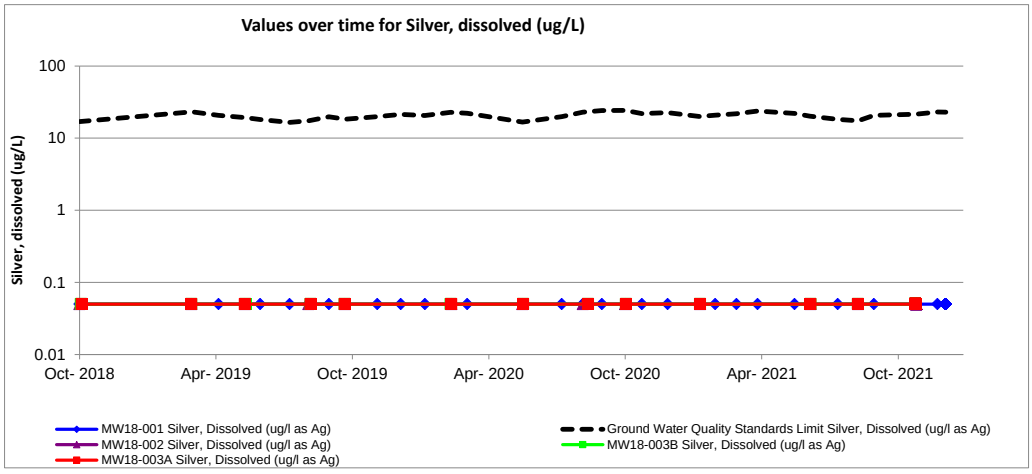

Values over time for Nickel, dissolved (ug/L)
(Nickel is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Nickel, dissolved (ug/L)
1000
100
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Nickel, Dissolved (ug/l as Ni)
MW18-002 Nickel, Dissolved (ug/l as Ni)
MW18-003A Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)
MW18-003B Nickel, Dissolved (ug/l as Ni)

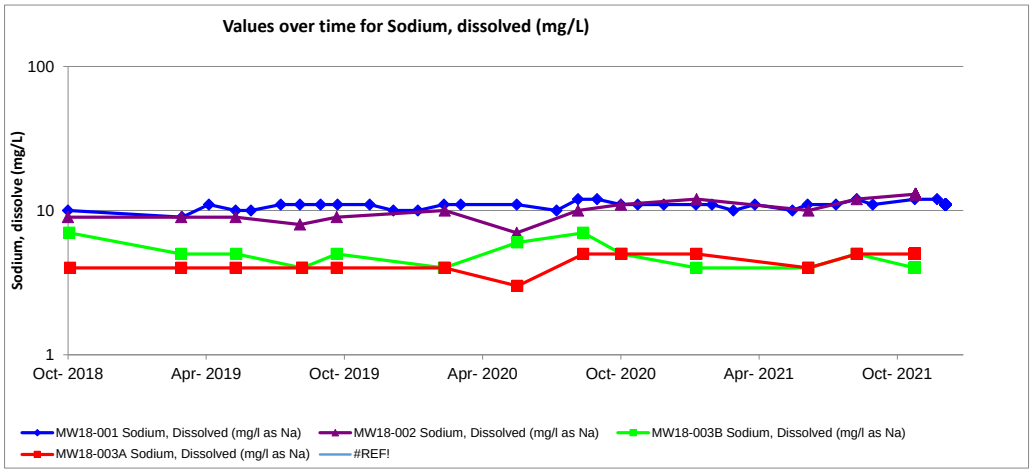

Values over time for Nitrate, total (mg/L)
Nitrite plus Nitrate, total (mg/L)
100
10
1
0.1
0.01
0.001
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Nitrite plus Nitrate, Total (mg/l as N)
MW18-002 Nitrite plus Nitrate, Total (mg/l as N)
MW18-003A Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)
MW18-003B Nitrite plus Nitrate, Total (mg/l as N)
#REF!

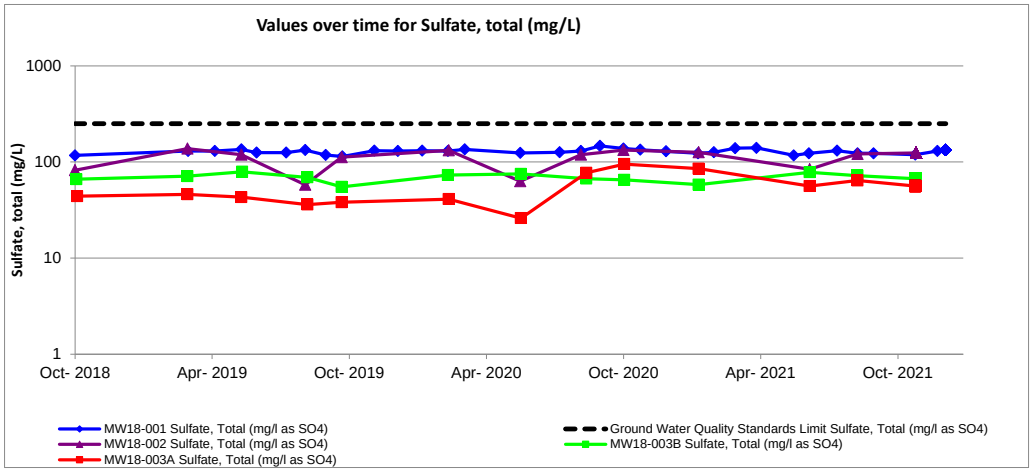

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units
MW18-003B pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
MW18-002 pH, Field, Standard Units
MW18-003A pH, Field, Standard Units

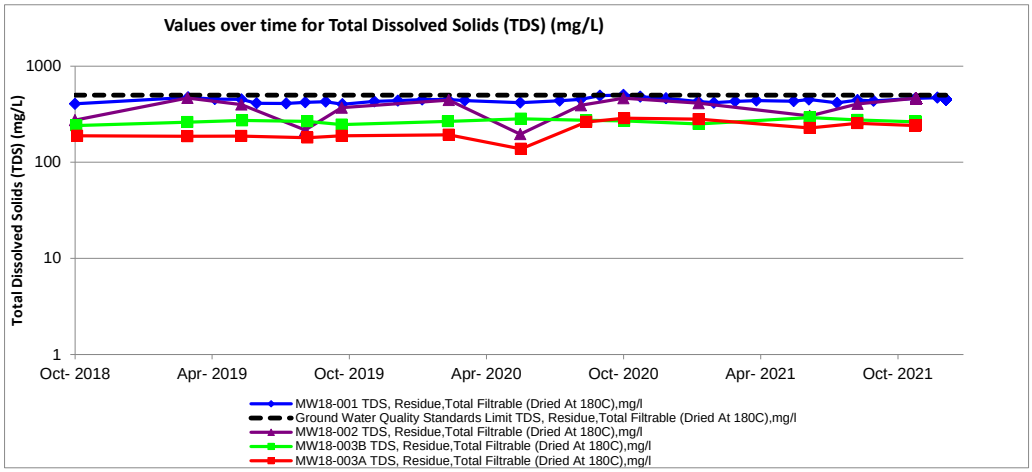

Values over time for Potassium, dissolved (ug/L)
Potassium, dissolved (ug/L)
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Potassium, Dissolved (mg/l as K)
MW18-002 Potassium, Dissolved (mg/l as K)
MW18-003B Potassium, Dissolved (mg/l as K)
MW18-003A Potassium, Dissolved (mg/l as K)
#REF!

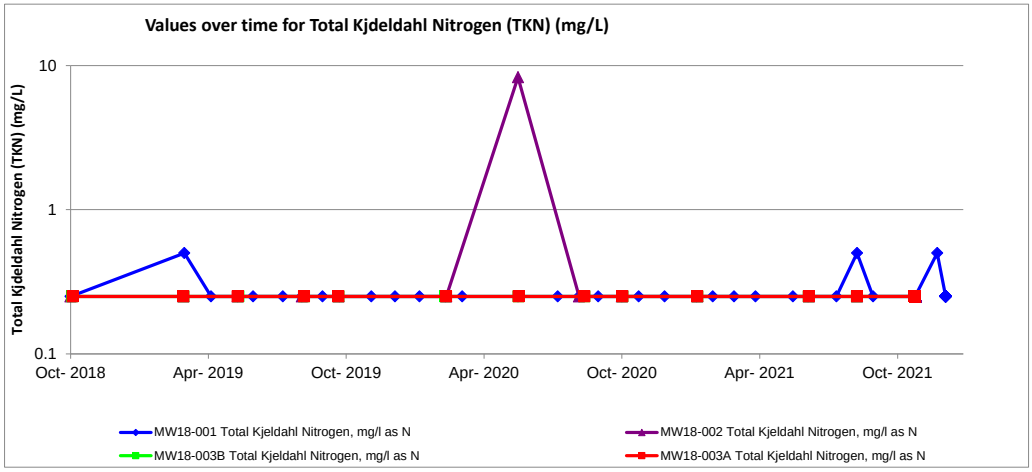

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Selenium, Dissolved (ug/l as Se)
MW18-002 Selenium, Dissolved (ug/l as Se)
MW18-003A Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)
MW18-003B Selenium, Dissolved (ug/l as Se)
#REF!

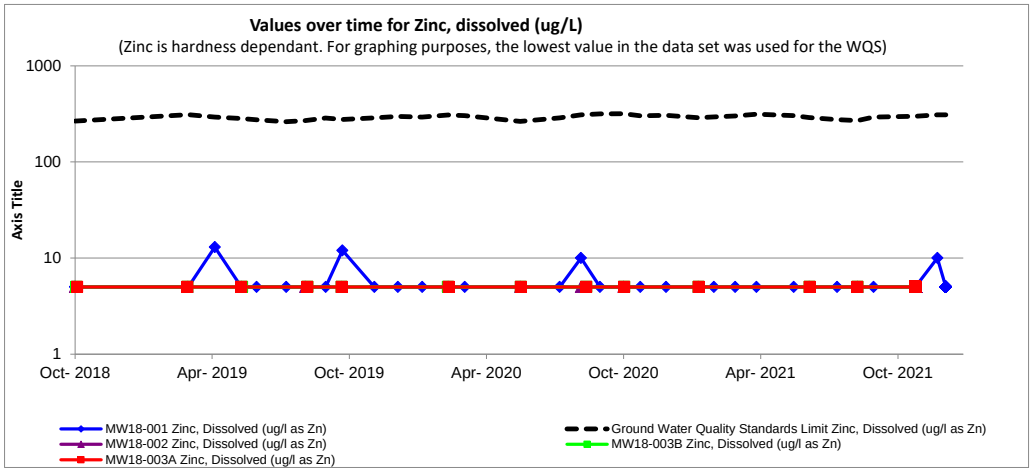

Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Silver, Dissolved (ug/l as Ag)
MW18-002 Silver, Dissolved (ug/l as Ag)
MW18-003A Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)
MW18-003B Silver, Dissolved (ug/l as Ag)


Values over time for Sodium, dissolved (mg/L)
Sodium, dissolve (mg/L)
100
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Sodium, Dissolved (mg/l as Na)
MW18-002 Sodium, Dissolved (mg/l as Na)
MW18-003B Sodium, Dissolved (mg/l as Na)
MW18-003A Sodium, Dissolved (mg/l as Na)
#REF!


Values over time for Sulfate, total (mg/L)
Sulfate, total (mg/L)
1000
100
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Sulfate, Total (mg/l as SO4)
MW18-002 Sulfate, Total (mg/l as SO4)
MW18-003A Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)
MW18-003B Sulfate, Total (mg/l as SO4)

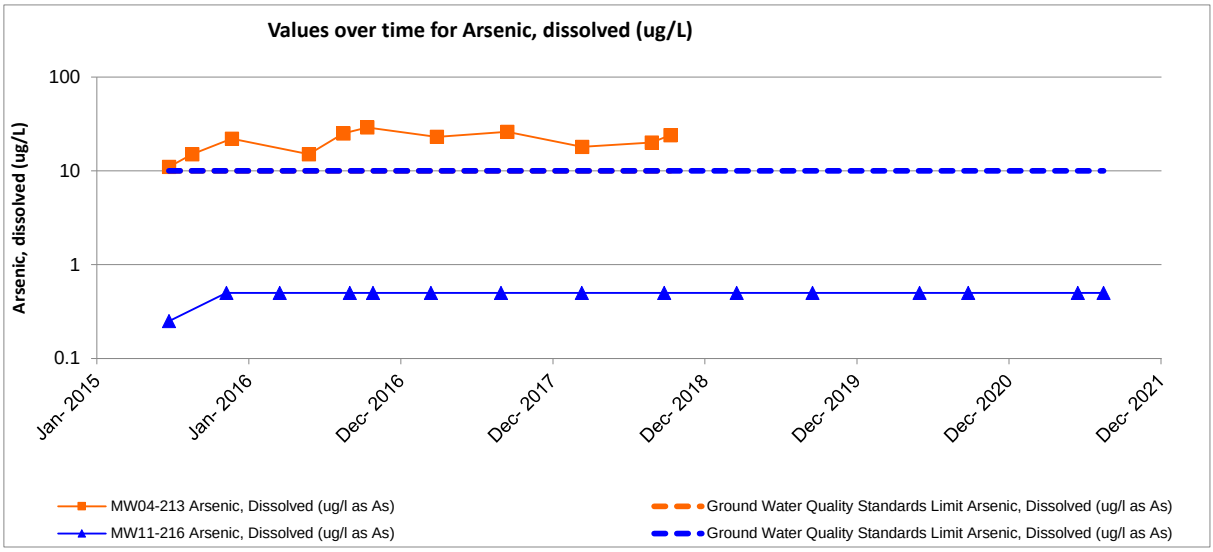

Values over time for Total Dissolved Solids (TDS) (mg/L)
Total Dissolved Solids (TDS) (mg/L)
1000
100
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW18-002 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW18-003B TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW18-003A TDS, Residue,Total Filtrable (Dried At 180C),mg/l

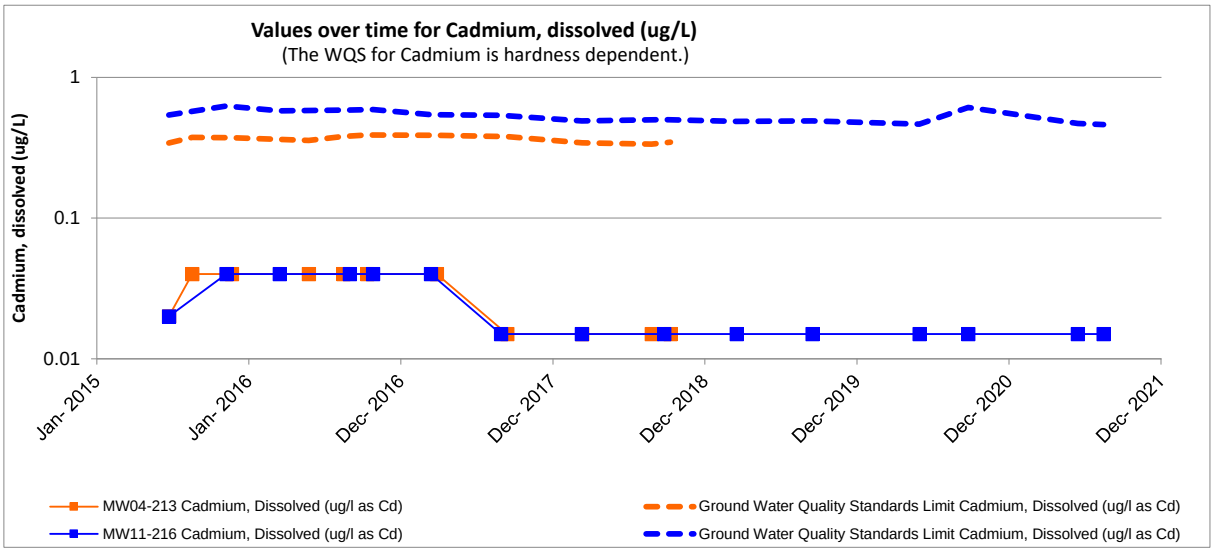

Values over time for Total Kjeldahl Nitrogen (TKN) (mg/L)
Total Kjeldahl Nitrogen (TKN) (mg/L)
10
1
0.1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Total Kjeldahl Nitrogen, mg/l as N
MW18-002 Total Kjeldahl Nitrogen, mg/l as N
MW18-003B Total Kjeldahl Nitrogen, mg/l as N
MW18-003A Total Kjeldahl Nitrogen, mg/l as N

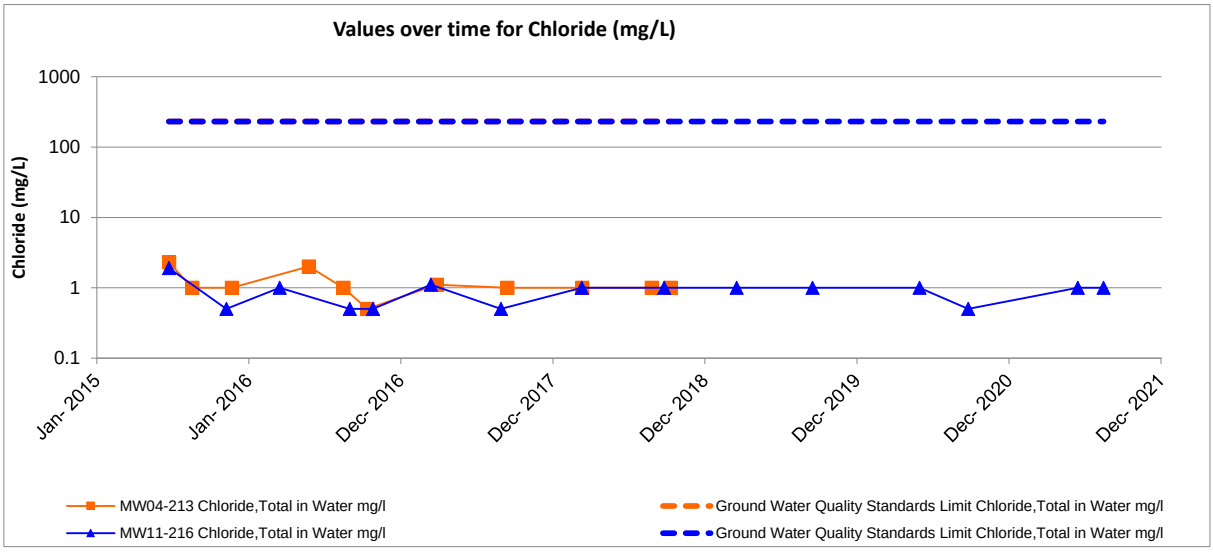

Values over time for Zinc, dissolved (ug/L)
(Zinc is hardness dependant. For graphing purposes, the lowest value in the data set was used for the WQS)
Axis Title
1000
100
10
1
Oct- 2018
Apr- 2019
Oct- 2019
Apr- 2020
Oct- 2020
Apr- 2021
Oct- 2021
MW18-001 Zinc, Dissolved (ug/l as Zn)
MW18-002 Zinc, Dissolved (ug/l as Zn)
MW18-003A Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)
MW18-003B Zinc, Dissolved (ug/l as Zn)

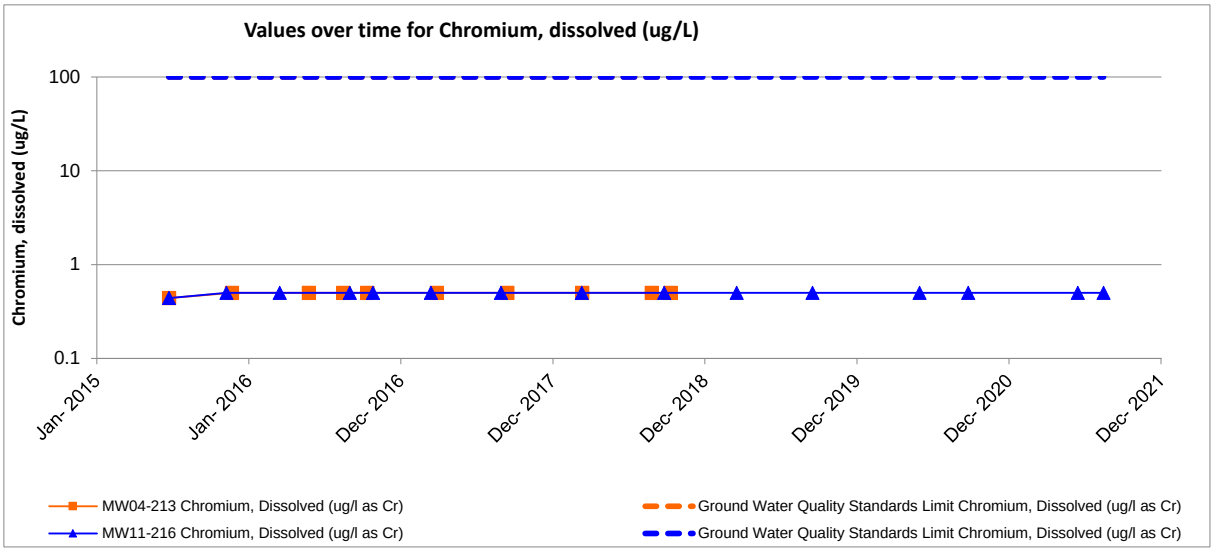
APPENDIX C –

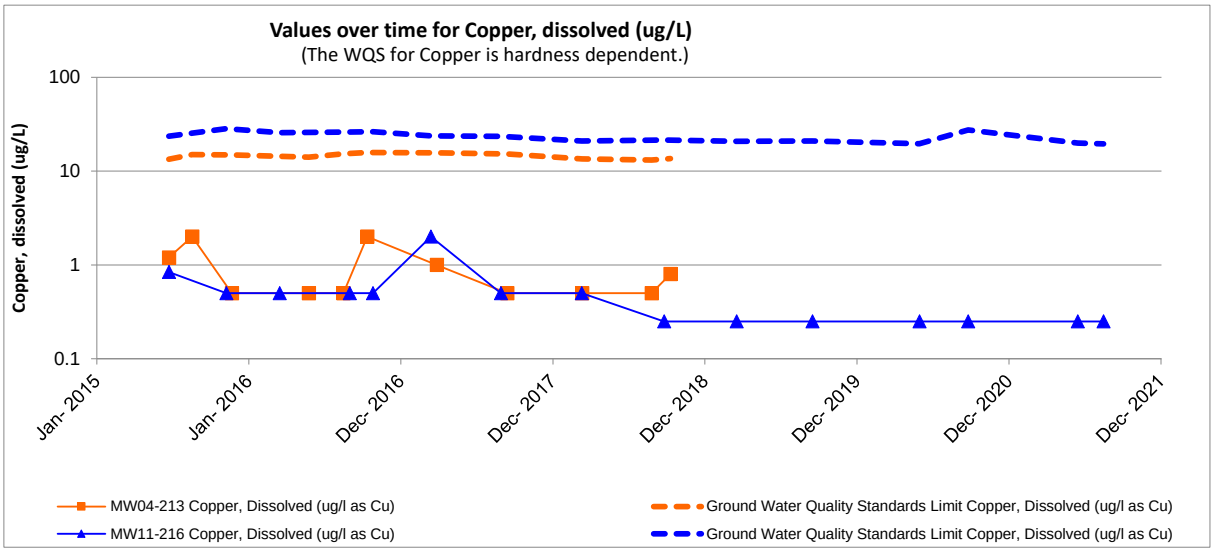
MW11-216 GRAPHS

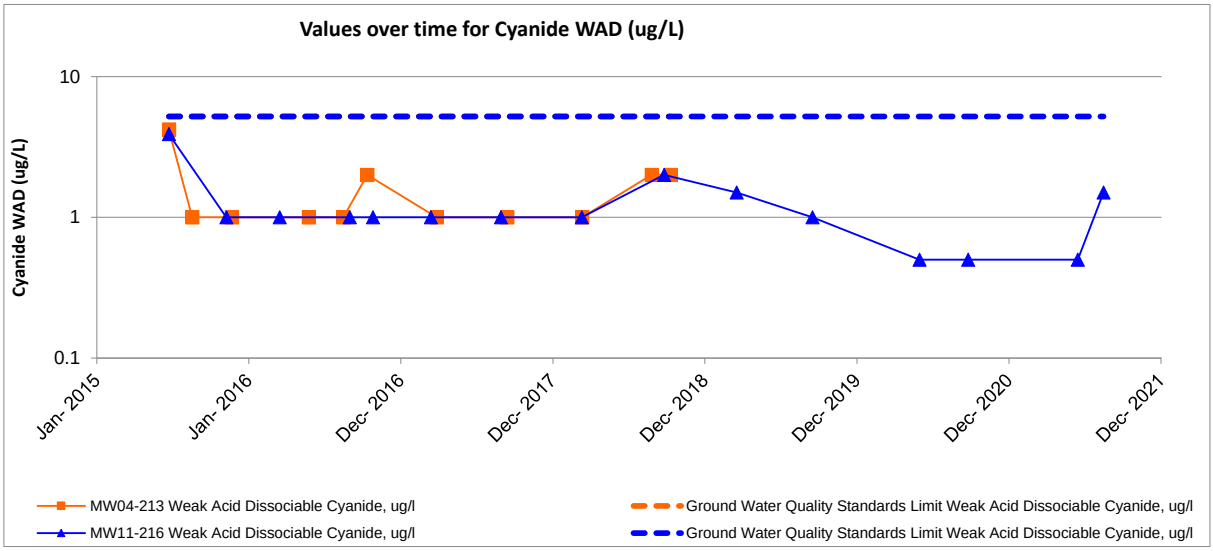

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Arsenic, Dissolved (ug/l as As)
MW11-216 Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)
Ground Water Quality Standards Limit Arsenic, Dissolved (ug/l as As)

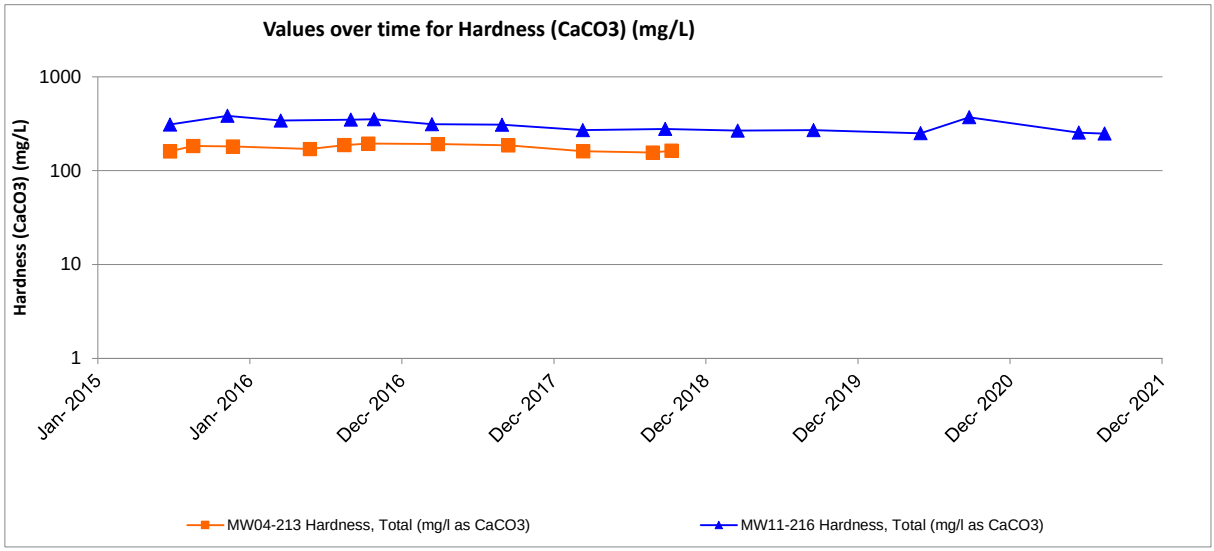

Values over time for Cadmium, dissolved (ug/L)
(The WQS for Cadmium is hardness dependent.)
Cadmium, dissolved (ug/L)
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Cadmium, Dissolved (ug/l as Cd)
MW11-216 Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)
Ground Water Quality Standards Limit Cadmium, Dissolved (ug/l as Cd)


Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Chloride,Total in Water mg/l
MW11-216 Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l
Ground Water Quality Standards Limit Chloride,Total in Water mg/l

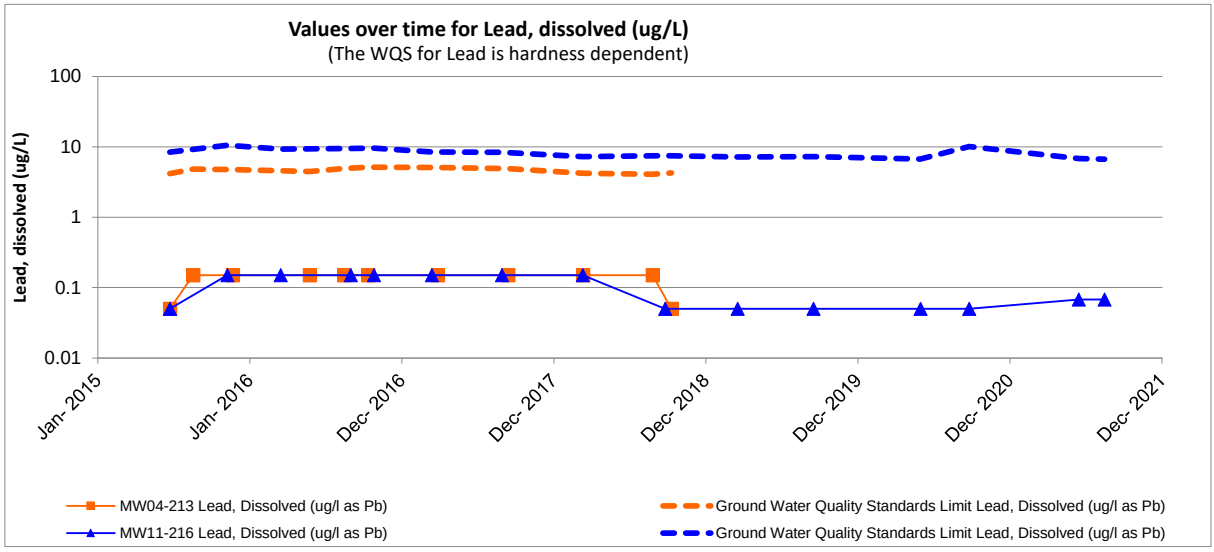

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Chromium, Dissolved (ug/l as Cr)
MW11-216 Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)
Ground Water Quality Standards Limit Chromium, Dissolved (ug/l as Cr)

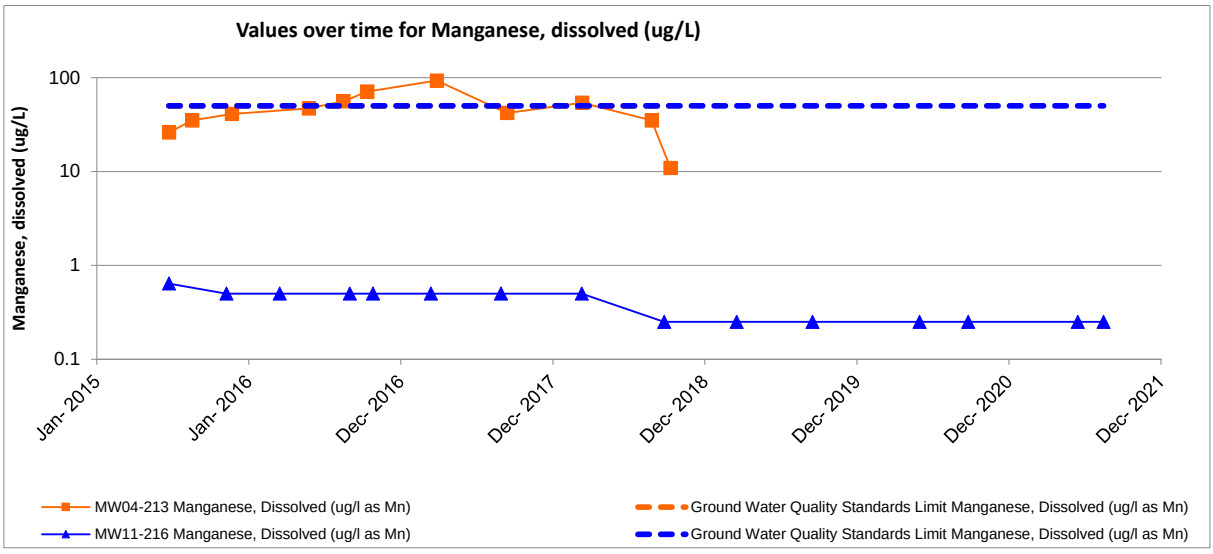

Values over time for Copper, dissolved (ug/L)
(The WQS for Copper is hardness dependent.)
Copper, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Copper, Dissolved (ug/l as Cu)
MW11-216 Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)
Ground Water Quality Standards Limit Copper, Dissolved (ug/l as Cu)

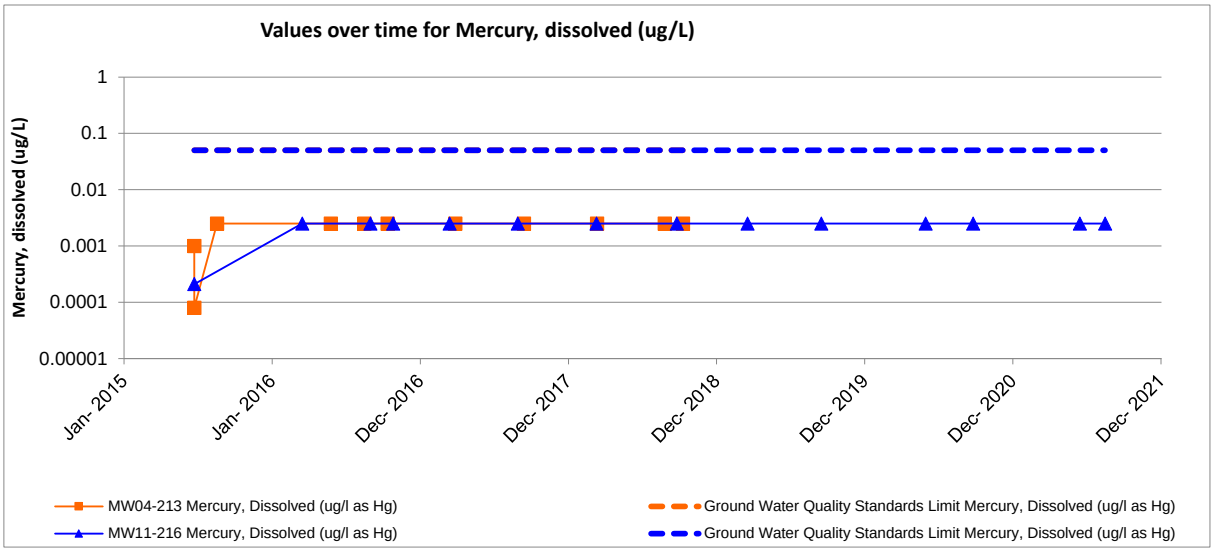

Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Weak Acid Dissociable Cyanide, ug/l
MW11-216 Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l
Ground Water Quality Standards Limit Weak Acid Dissociable Cyanide, ug/l

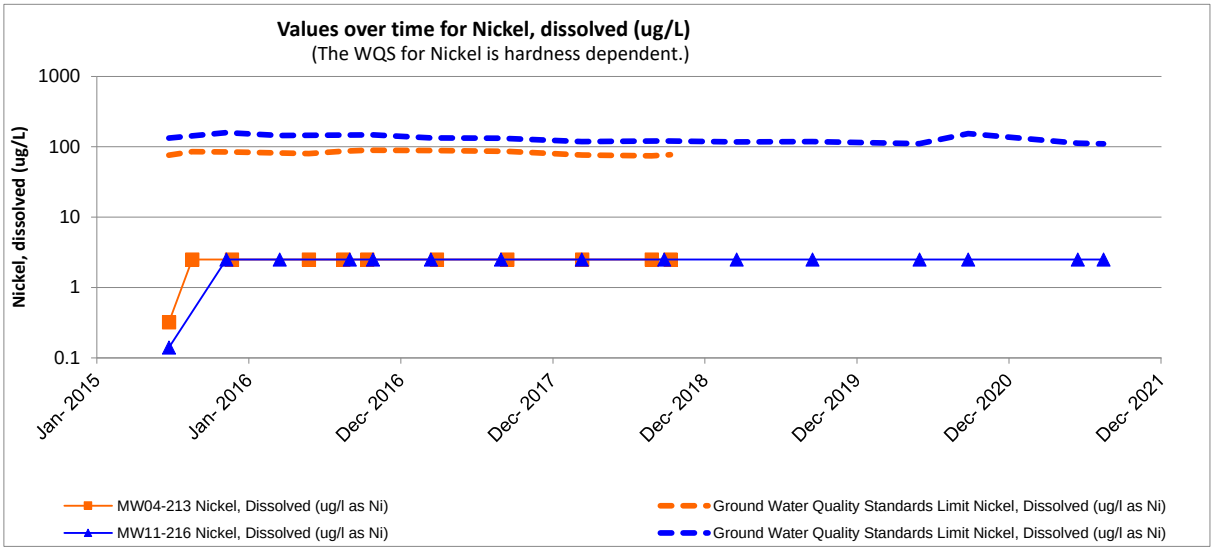

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3) (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Hardness, Total (mg/l as CaCO3)
MW11-216 Hardness, Total (mg/l as CaCO3)

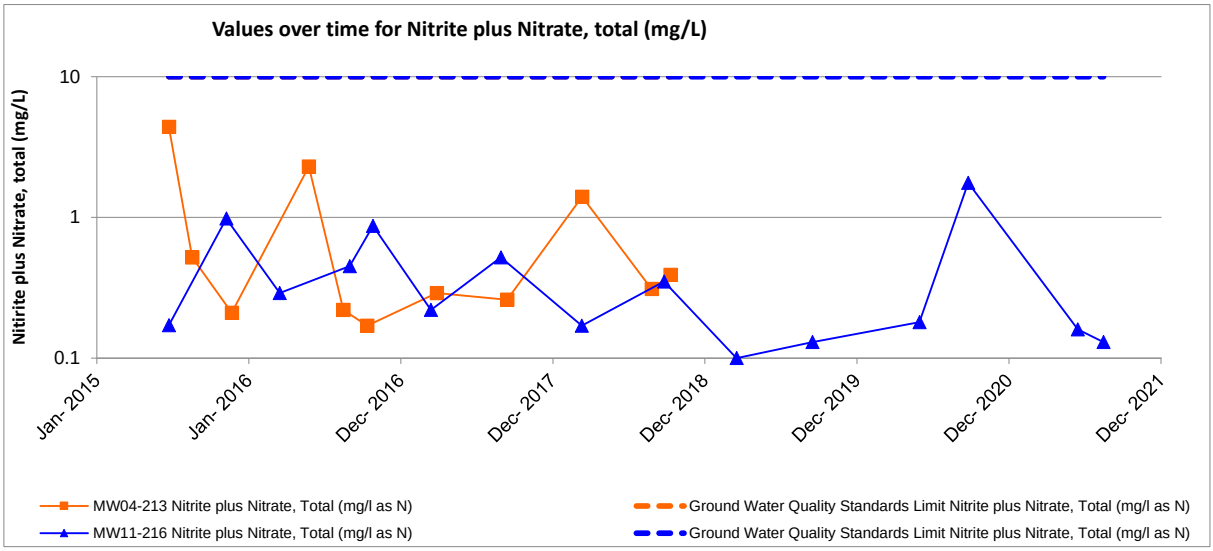

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Iron, Dissolved (ug/l as Fe)
MW11-216 Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)
Ground Water Quality Standards Limit Iron, Dissolved (ug/l as Fe)

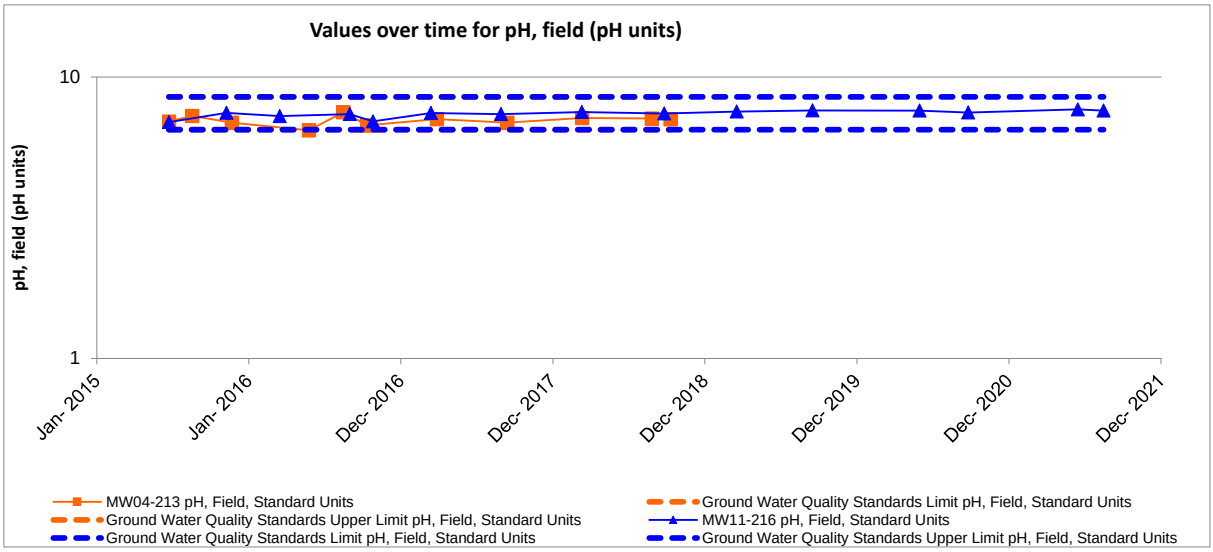

Values over time for Lead, dissolved (ug/L)
(The WQS for Lead is hardness dependent)
Lead, dissolved (ug/L)
100
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Lead, Dissolved (ug/l as Pb)
MW11-216 Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)
Ground Water Quality Standards Limit Lead, Dissolved (ug/l as Pb)

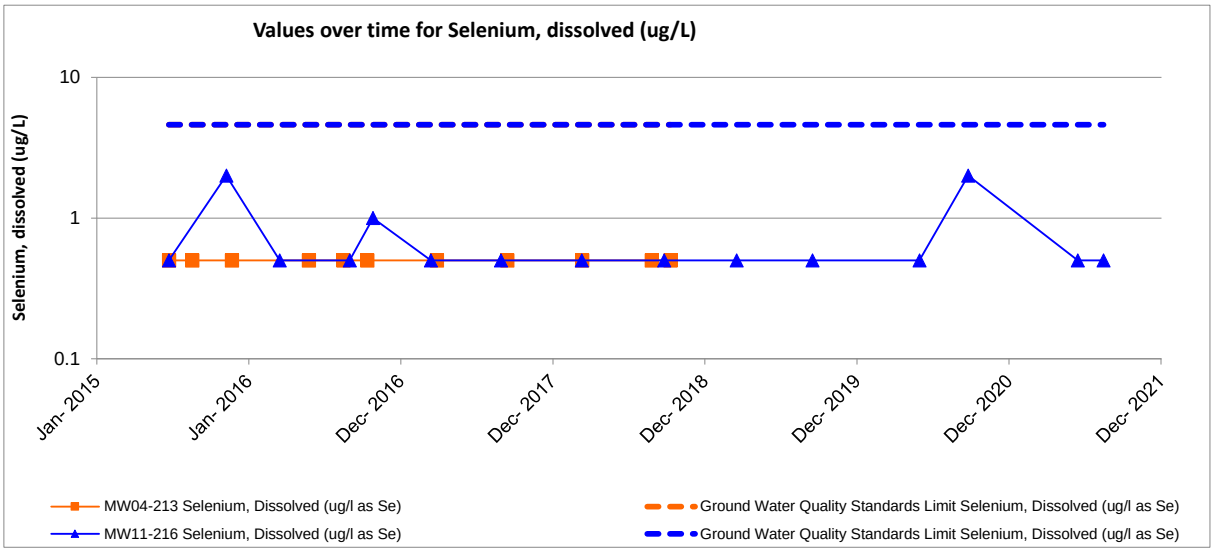

Values over time for Manganese, dissolved (ug/L)
Manganese, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Manganese, Dissolved (ug/l as Mn)
MW11-216 Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)
Ground Water Quality Standards Limit Manganese, Dissolved (ug/l as Mn)

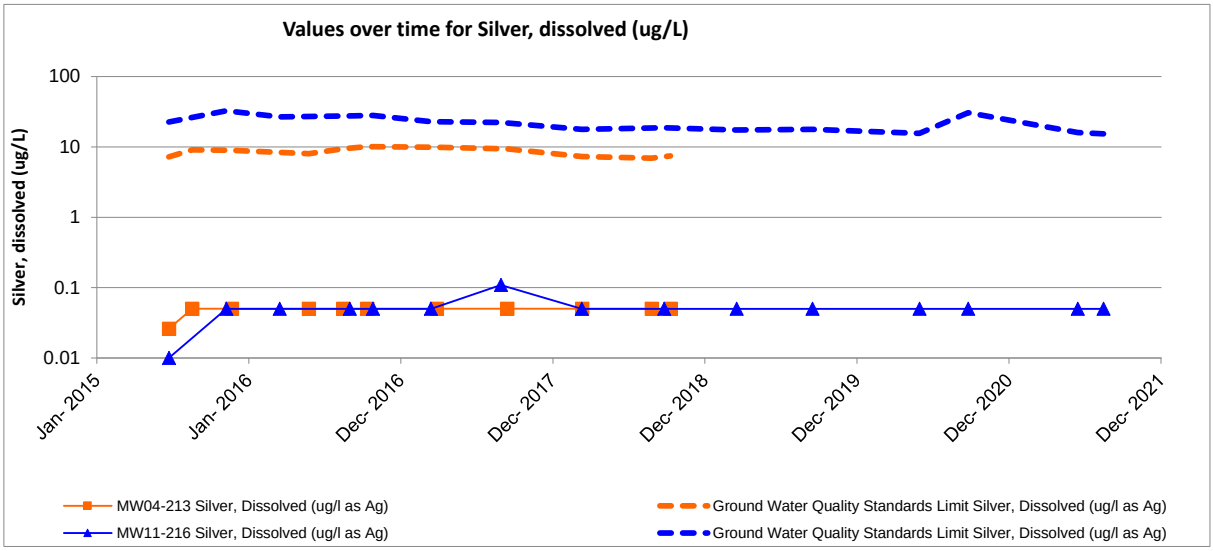

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
0.0001
0.00001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Mercury, Dissolved (ug/l as Hg)
MW11-216 Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)
Ground Water Quality Standards Limit Mercury, Dissolved (ug/l as Hg)

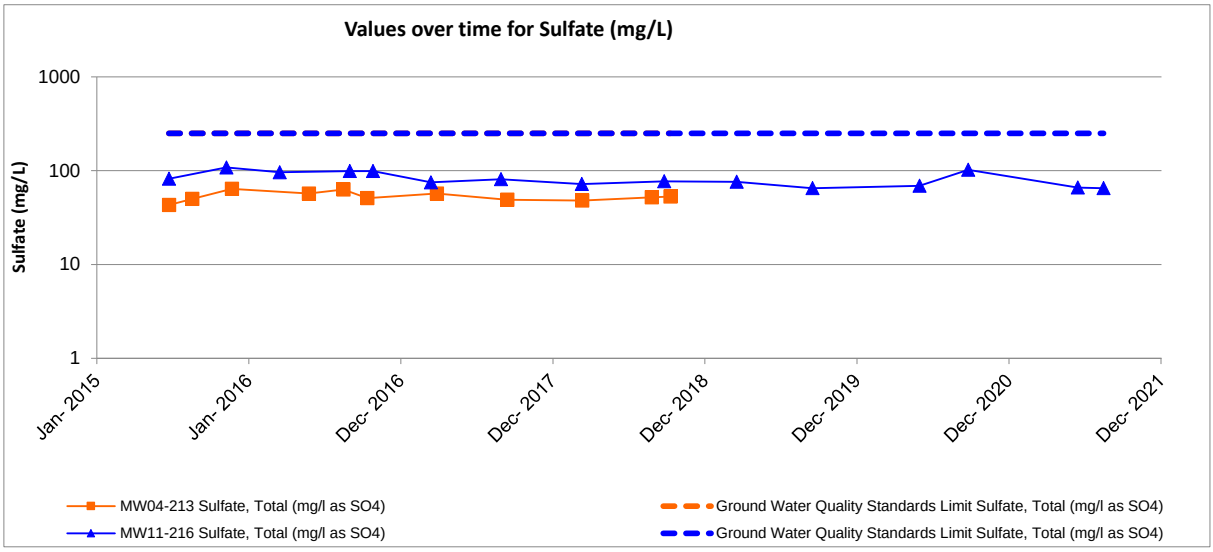

Values over time for Nickel, dissolved (ug/L)
(The WQS for Nickel is hardness dependent.)
Nickel, dissolved (ug/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Nickel, Dissolved (ug/l as Ni)
MW11-216 Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)
Ground Water Quality Standards Limit Nickel, Dissolved (ug/l as Ni)

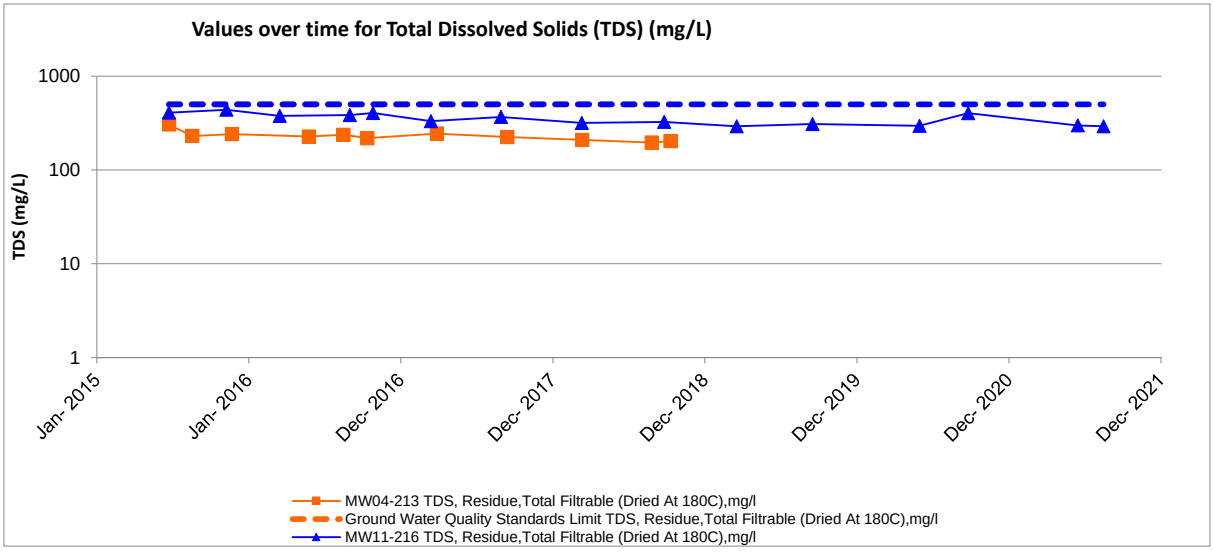

Values over time for Nitrite plus Nitrate, total (mg/L)
Nitirite plus Nitrate, total (mg/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Nitrite plus Nitrate, Total (mg/l as N)
MW11-216 Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)
Ground Water Quality Standards Limit Nitrite plus Nitrate, Total (mg/l as N)

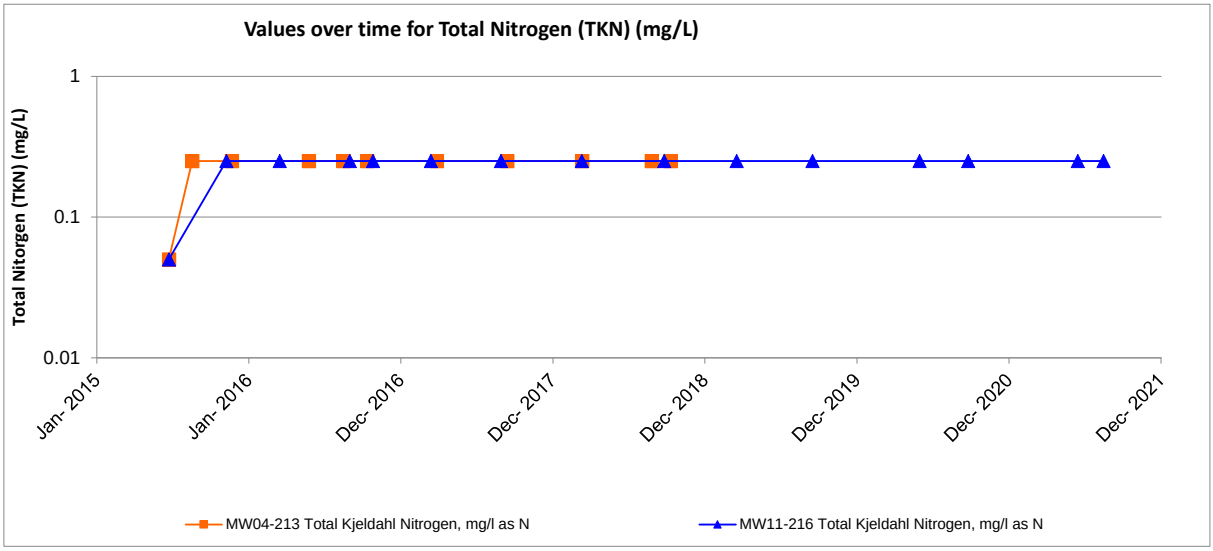

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
Ground Water Quality Standards Limit pH, Field, Standard Units
MW11-216 pH, Field, Standard Units
Ground Water Quality Standards Upper Limit pH, Field, Standard Units

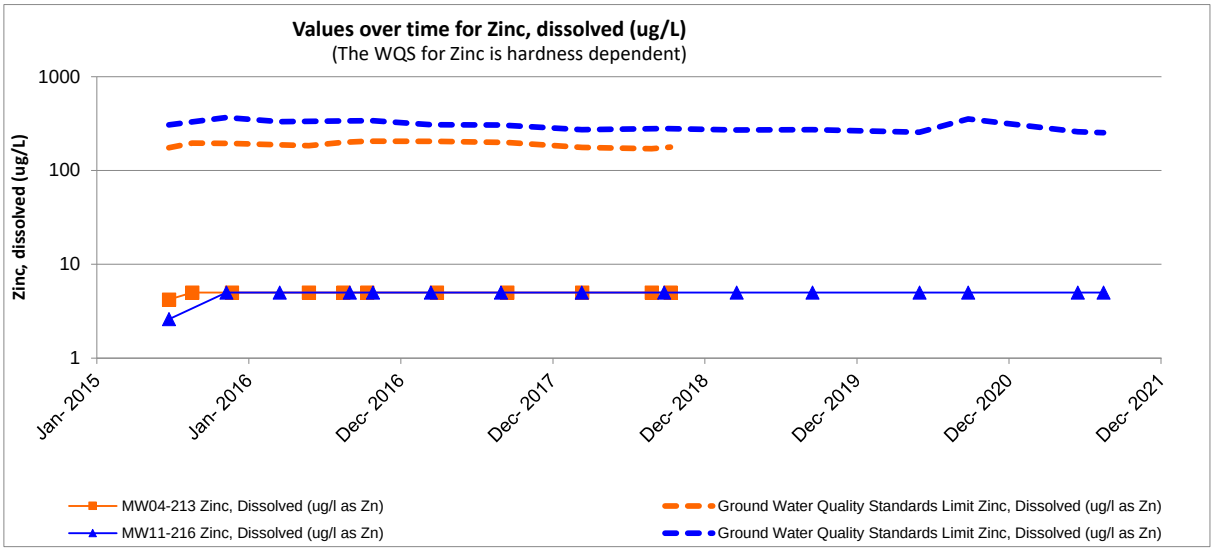

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Selenium, Dissolved (ug/l as Se)
MW11-216 Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)
Ground Water Quality Standards Limit Selenium, Dissolved (ug/l as Se)


Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
100
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Silver, Dissolved (ug/l as Ag)
MW11-216 Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)
Ground Water Quality Standards Limit Silver, Dissolved (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Sulfate, Total (mg/l as SO4)
MW11-216 Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)
Ground Water Quality Standards Limit Sulfate, Total (mg/l as SO4)


Values over time for Total Dissolved Solids (TDS) (mg/L)
TDS (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Ground Water Quality Standards Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l
MW11-216 TDS, Residue,Total Filtrable (Dried At 180C),mg/l

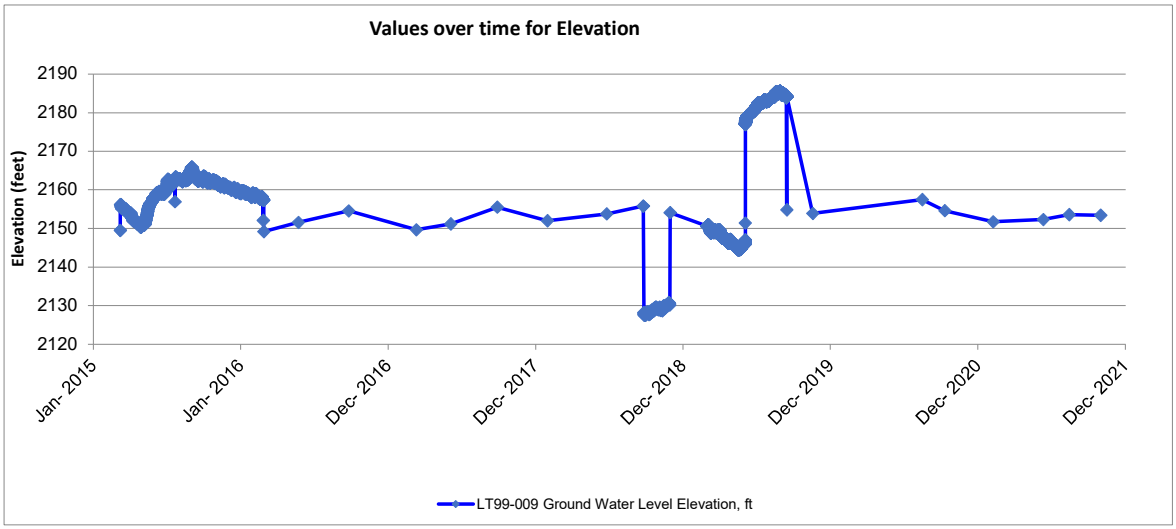

Values over time for Total Nitrogen (TKN) (mg/L)
Total Nitorgen (TKN) (mg/L)
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Total Kjeldahl Nitrogen, mg/l as N
MW11-216 Total Kjeldahl Nitrogen, mg/l as N

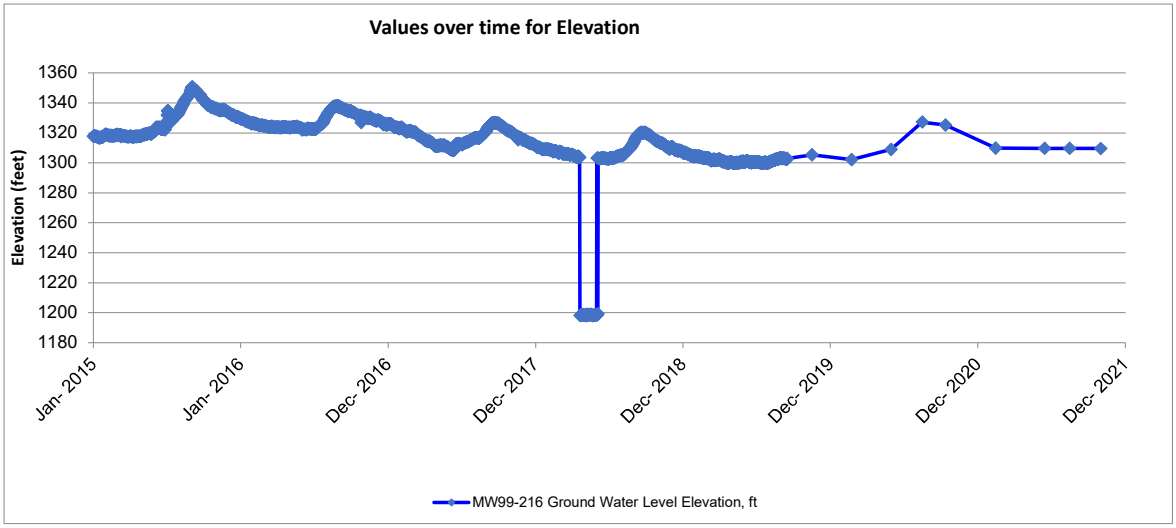

Values over time for Zinc, dissolved (ug/L)
(The WQS for Zinc is hardness dependent)
Zinc, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW04-213 Zinc, Dissolved (ug/l as Zn)
MW11-216 Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)
Ground Water Quality Standards Limit Zinc, Dissolved (ug/l as Zn)

APPENDIX C –

MW99-216 AND LT99-009

GROUNDWATER ELEVATION GRAPHS

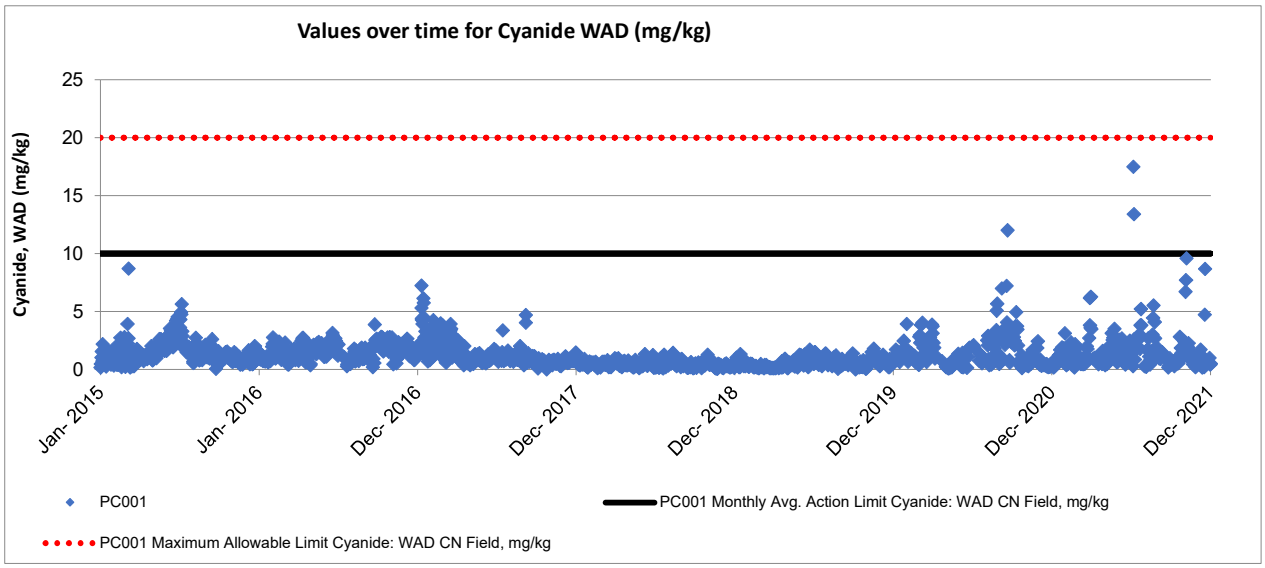

Values over time for Elevation
Elevation (feet)
2190
2180
2170
2160
2150
2140
2130
2120
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
LT99-009 Ground Water Level Elevation, ft


Values over time for Elevation
Elevation (feet)
1360
1340
1320
1300
1280
1260
1240
1220
1200
1180
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
MW99-216 Ground Water Level Elevation, ft

NORTHERN STAR
RESOURCES LIMITED

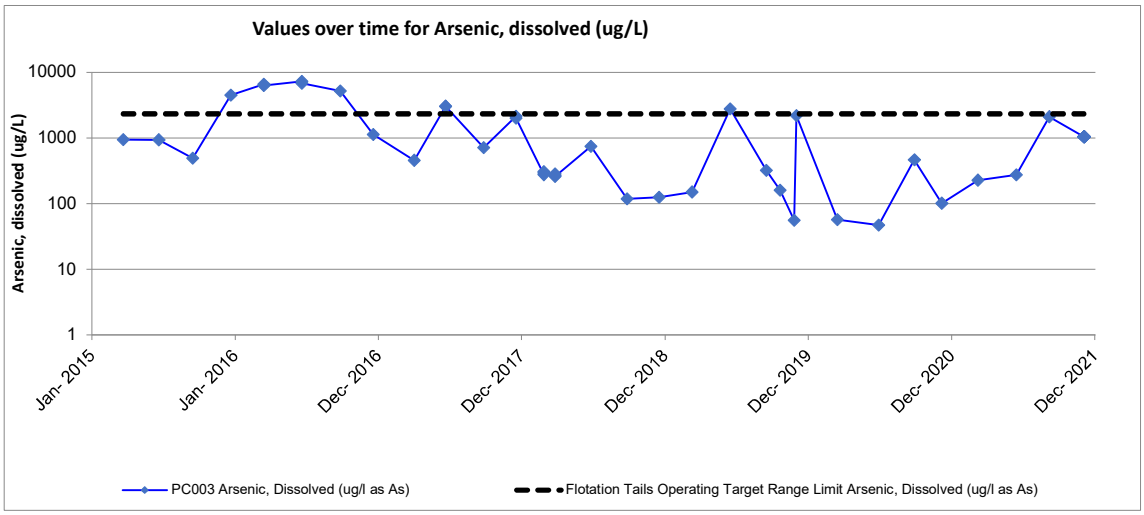
APPENDIX C –

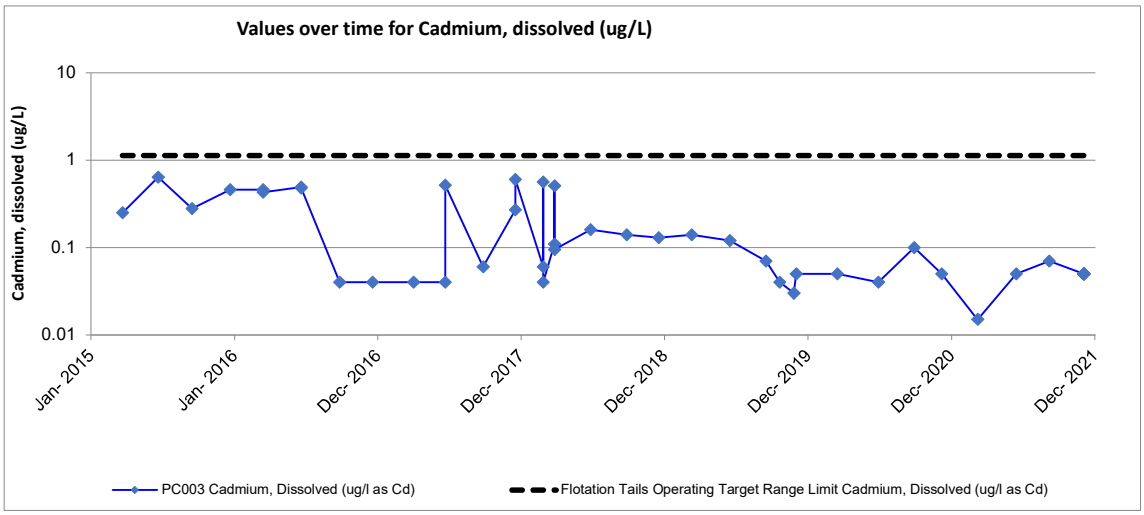
PC001 GRAPH

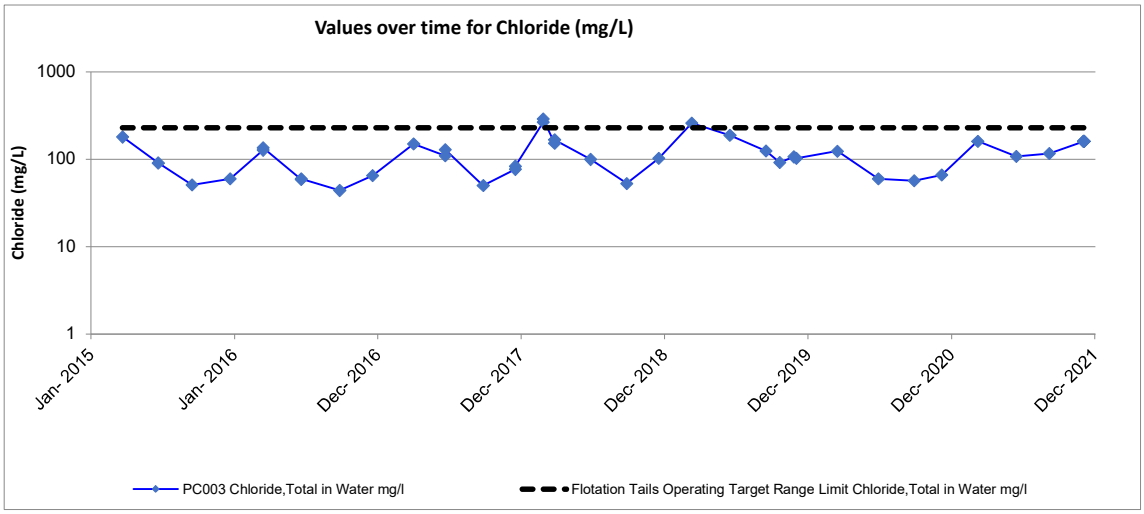

Values over time for Cyanide WAD (mg/kg)
Cyanide, WAD (mg/kg)
25
20
15
10
5
0
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC001
PC001 Monthly Avg. Action Limit Cyanide: WAD CN Field, mg/kg
PC001 Maximum Allowable Limit Cyanide: WAD CN Field, mg/kg

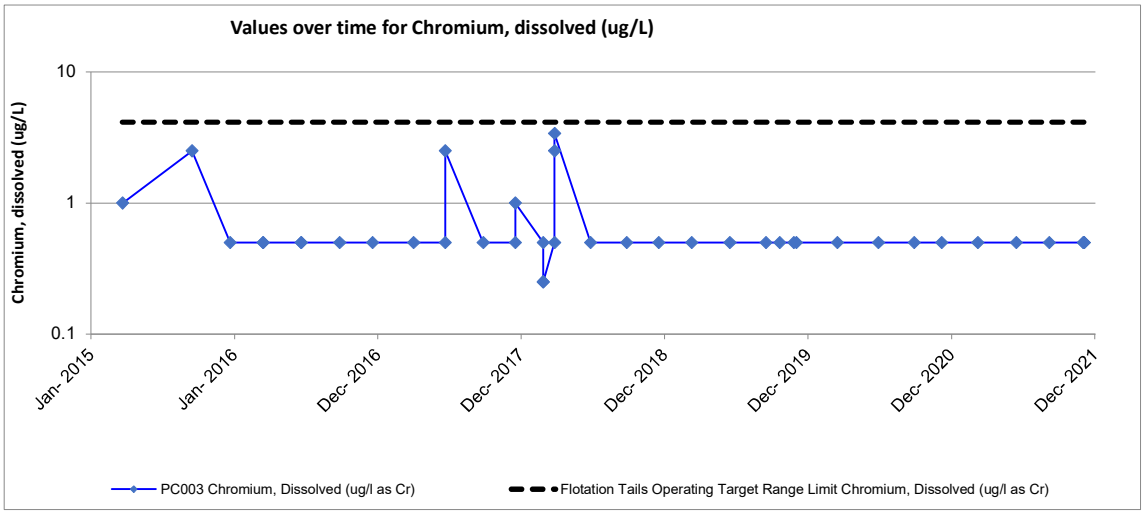
APPENDIX C –

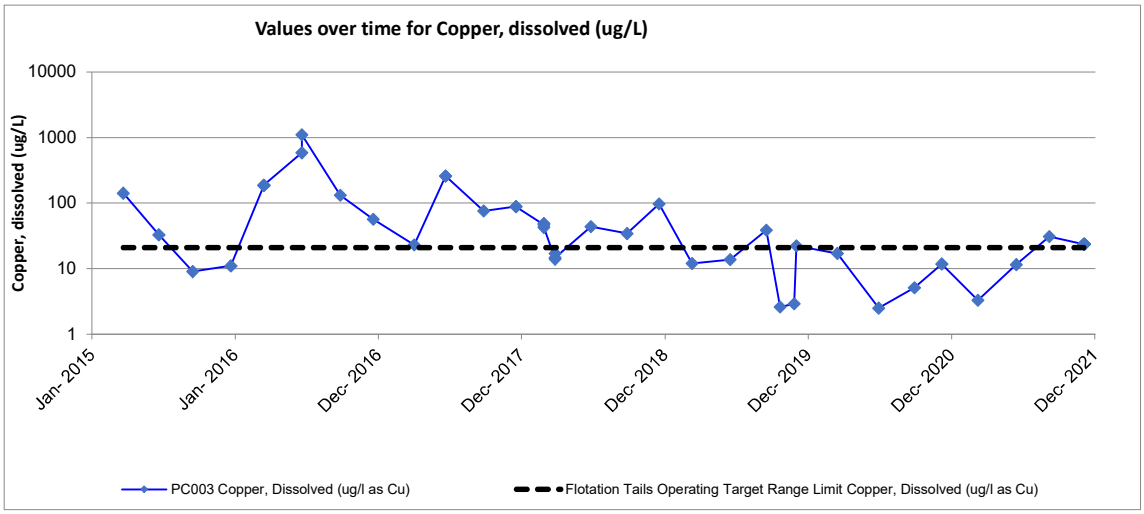
PC003 INTERSTITIAL WATER GRAPHS

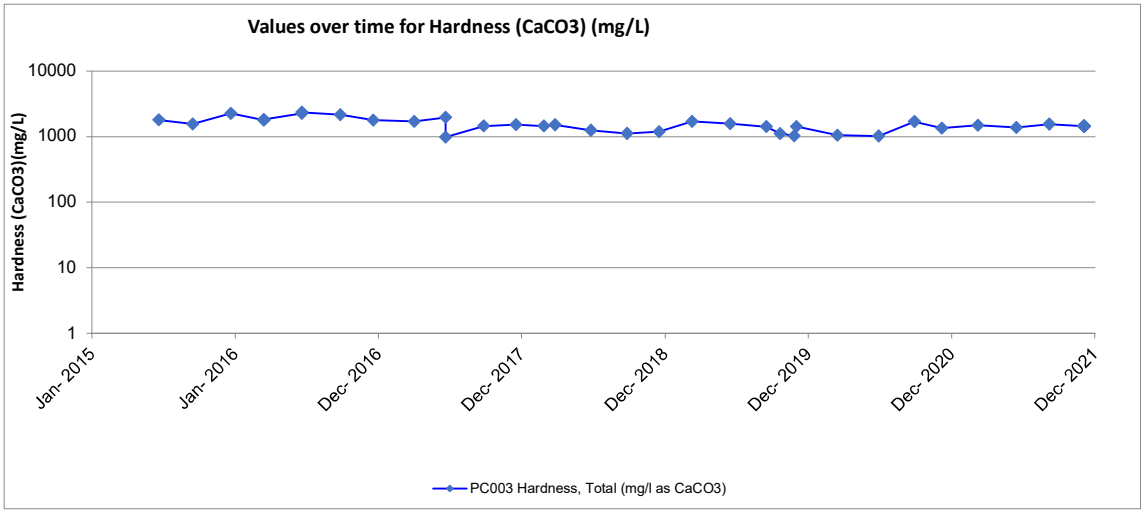

Values over time for Arsenic, dissolved (ug/L)
Arsenic, dissolved (ug/L)
10000
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Arsenic, Dissolved (ug/l as As)
Flotation Tails Operating Target Range Limit Arsenic, Dissolved (ug/l as As)

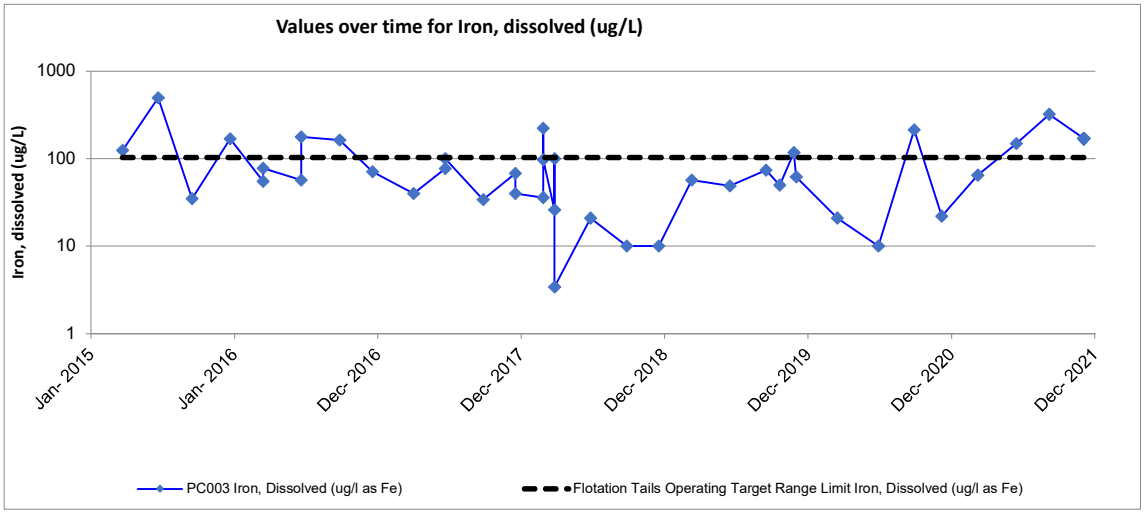

Values over time for Cadmium, dissolved (ug/L)
Cadmium, dissolved (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Cadmium, Dissolved (ug/l as Cd)
Flotation Tails Operating Target Range Limit Cadmium, Dissolved (ug/l as Cd)

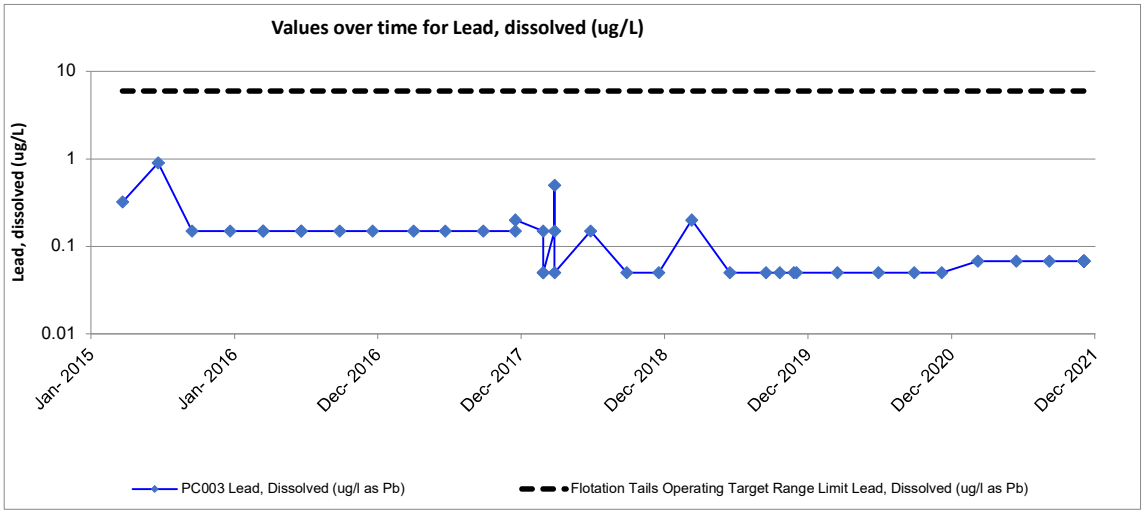

Values over time for Chloride (mg/L)
Chloride (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Chloride,Total in Water mg/l
Flotation Tails Operating Target Range Limit Chloride,Total in Water mg/l

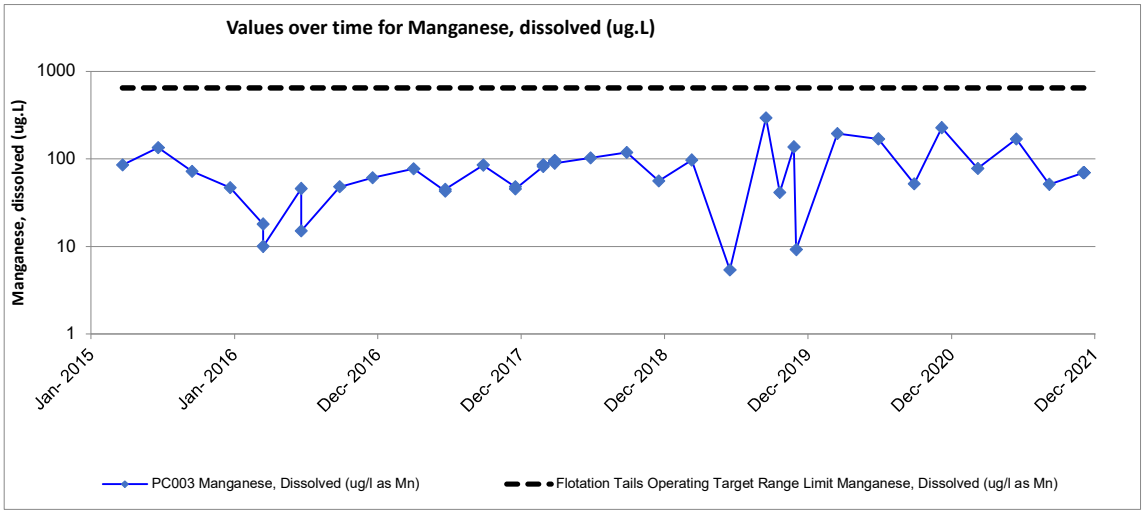

Values over time for Chromium, dissolved (ug/L)
Chromium, dissolved (ug/L)
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Chromium, Dissolved (ug/l as Cr)
Flotation Tails Operating Target Range Limit Chromium, Dissolved (ug/l as Cr)

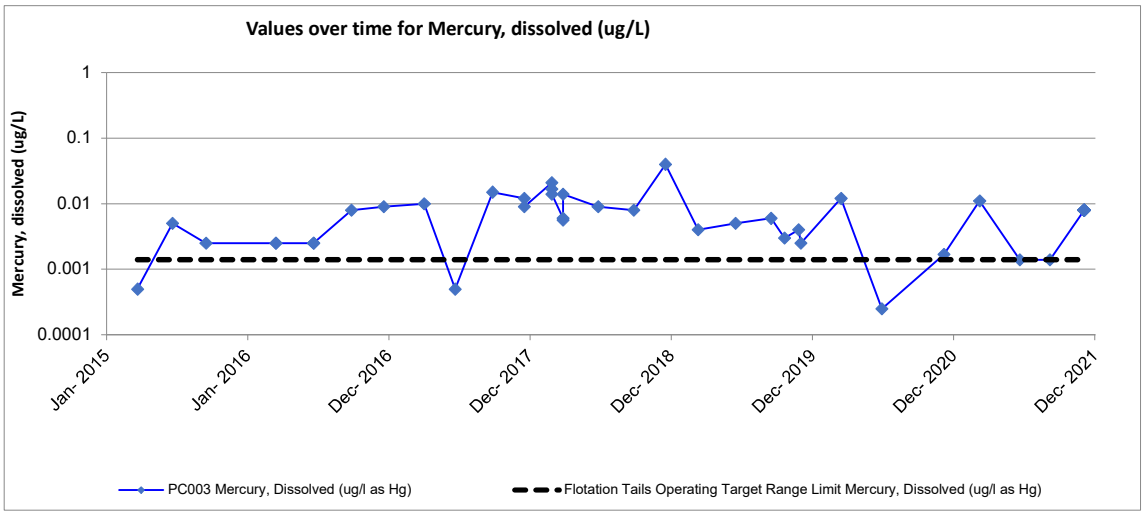

Values over time for Copper, dissolved (ug/L)
Copper, dissolved (ug/L)
10000
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Copper, Dissolved (ug/l as Cu)
Flotation Tails Operating Target Range Limit Copper, Dissolved (ug/l as Cu)

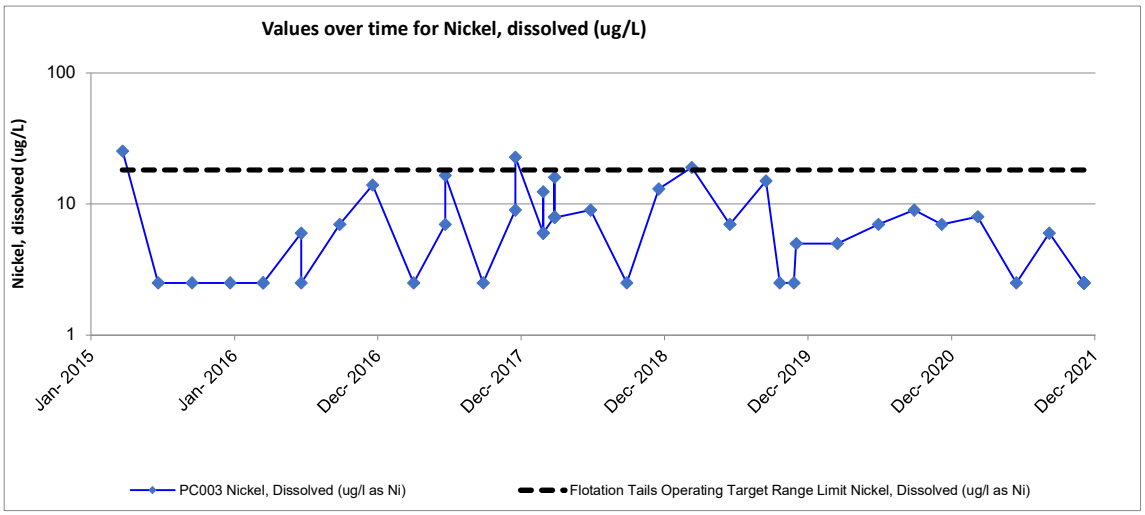

Values over time for Hardness (CaCO3) (mg/L)
Hardness (CaCO3)(mg/L)
10000
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Hardness, Total (mg/l as CaCO3)

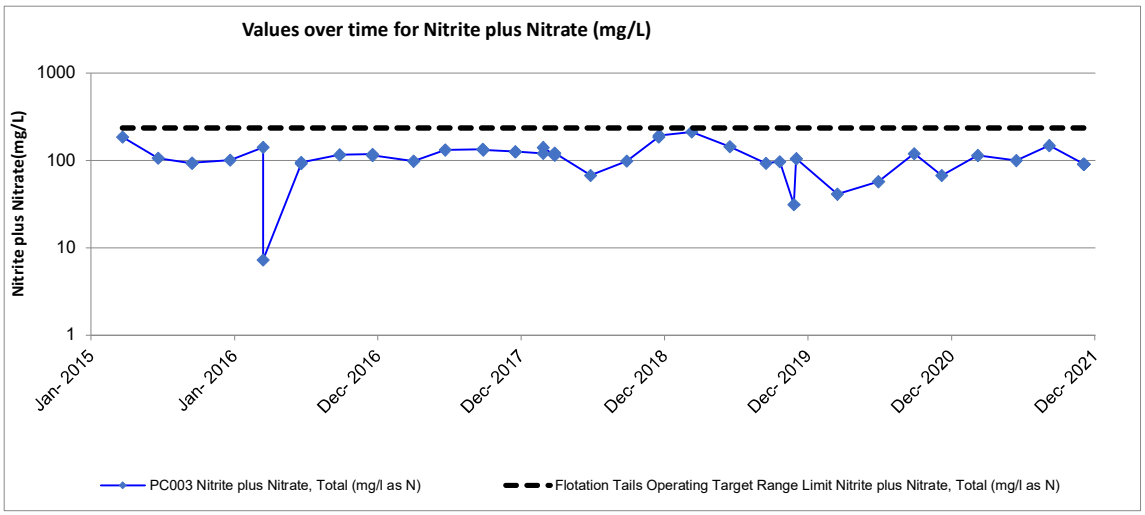

Values over time for Iron, dissolved (ug/L)
Iron, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Iron, Dissolved (ug/l as Fe)
Flotation Tails Operating Target Range Limit Iron, Dissolved (ug/l as Fe)

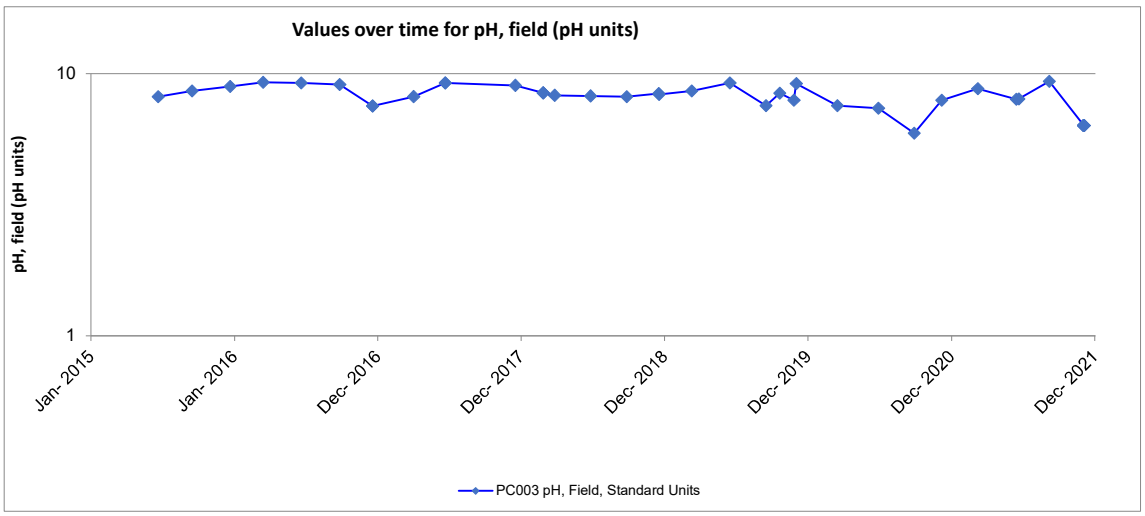

Values over time for Lead, dissolved (ug/L)
Lead, dissolved (ug/L)
10
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Lead, Dissolved (ug/l as Pb)
Flotation Tails Operating Target Range Limit Lead, Dissolved (ug/l as Pb)

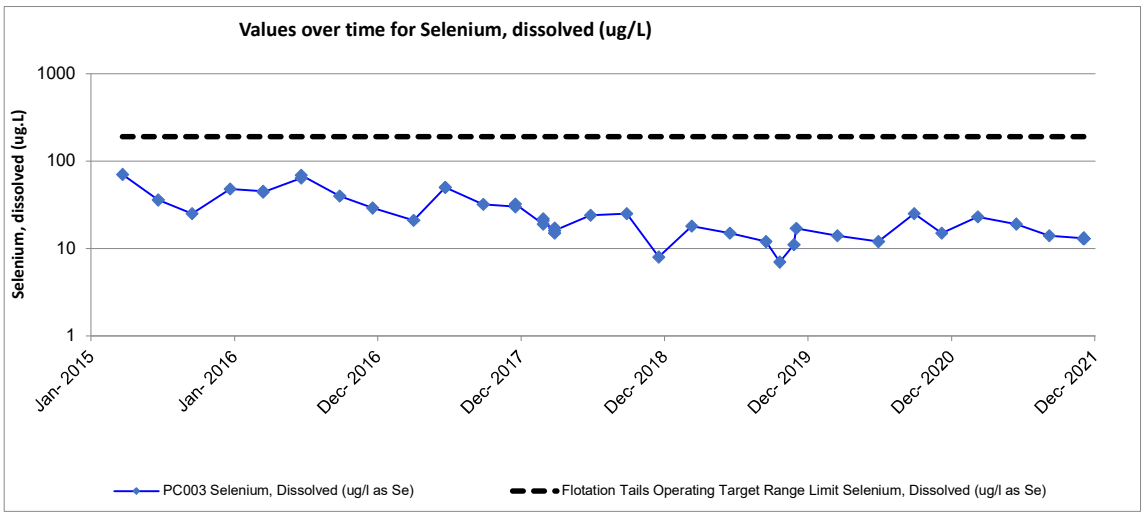

Values over time for Manganese, dissolved (ug.L)
Manganese, dissolved (ug.L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Manganese, Dissolved (ug/l as Mn)
Flotation Tails Operating Target Range Limit Manganese, Dissolved (ug/l as Mn)

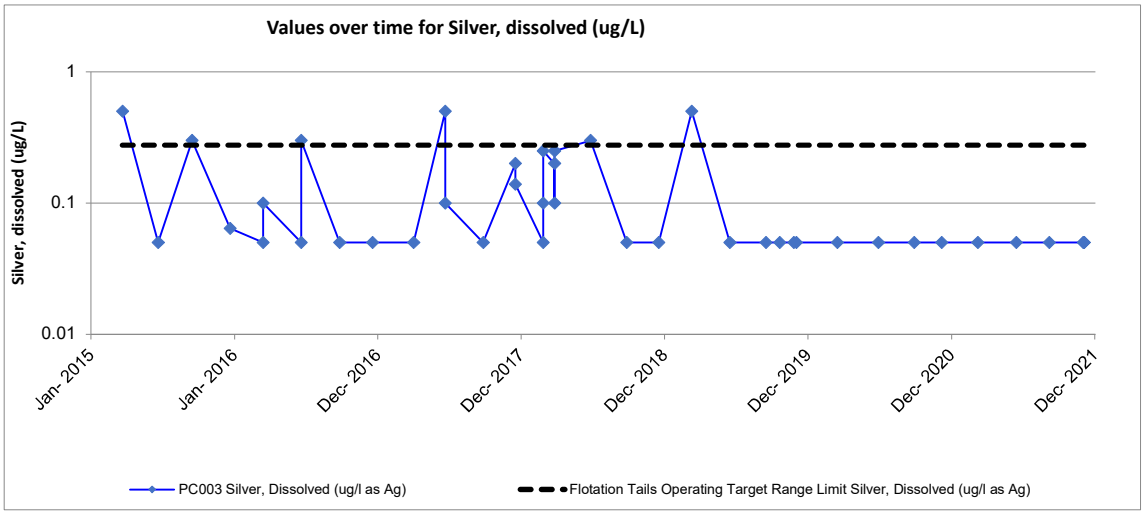

Values over time for Mercury, dissolved (ug/L)
Mercury, dissolved (ug/L)
1
0.1
0.01
0.001
0.0001
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Mercury, Dissolved (ug/l as Hg)
Flotation Tails Operating Target Range Limit Mercury, Dissolved (ug/l as Hg)

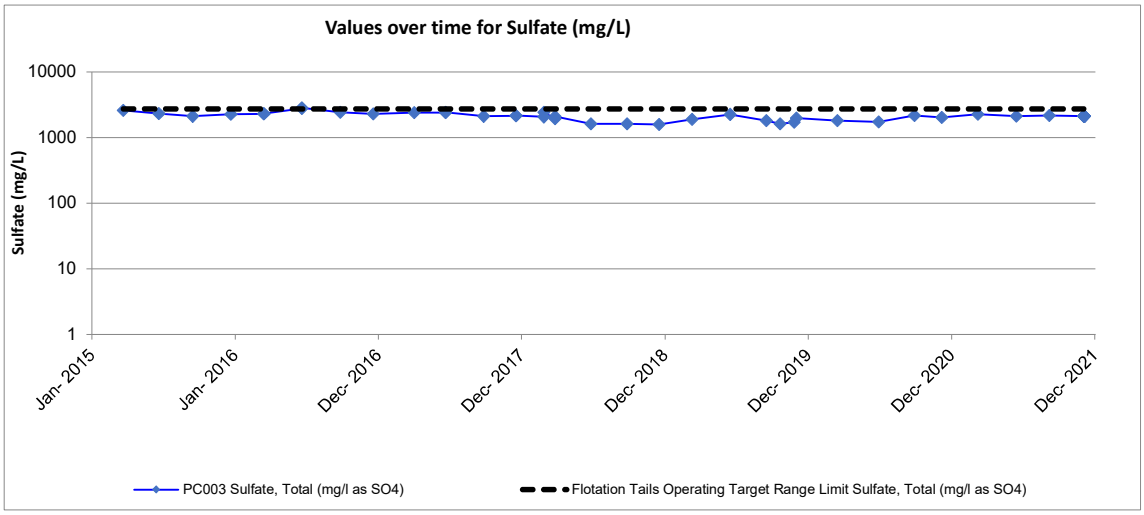

Values over time for Nickel, dissolved (ug/L)
Nickel, dissolved (ug/L)
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Nickel, Dissolved (ug/l as Ni)
Flotation Tails Operating Target Range Limit Nickel, Dissolved (ug/l as Ni)

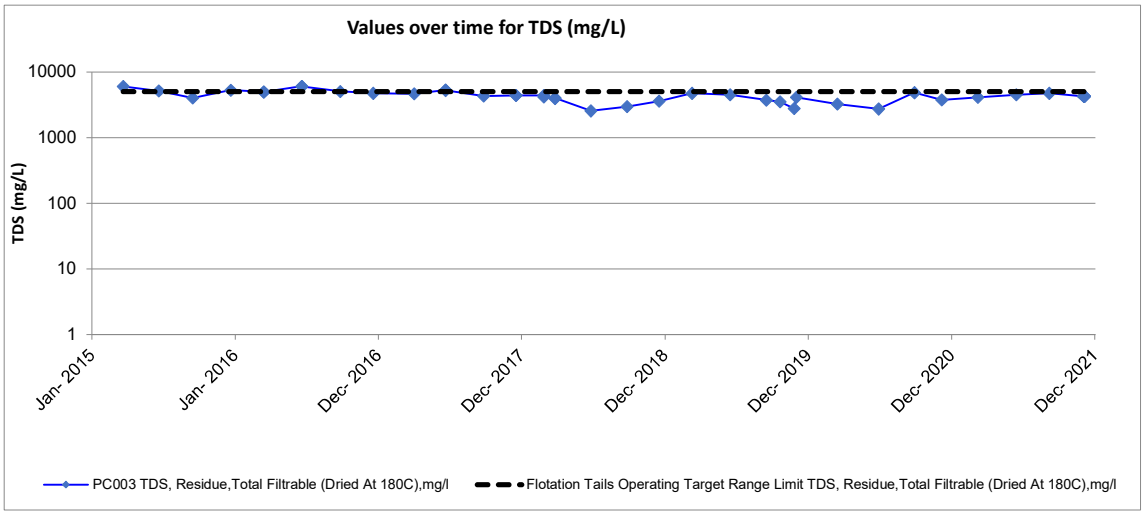

Values over time for Nitrite plus Nitrate (mg/L)
Nitrite plus Nitrate(mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Nitrite plus Nitrate, Total (mg/l as N)
Flotation Tails Operating Target Range Limit Nitrite plus Nitrate, Total (mg/l as N)

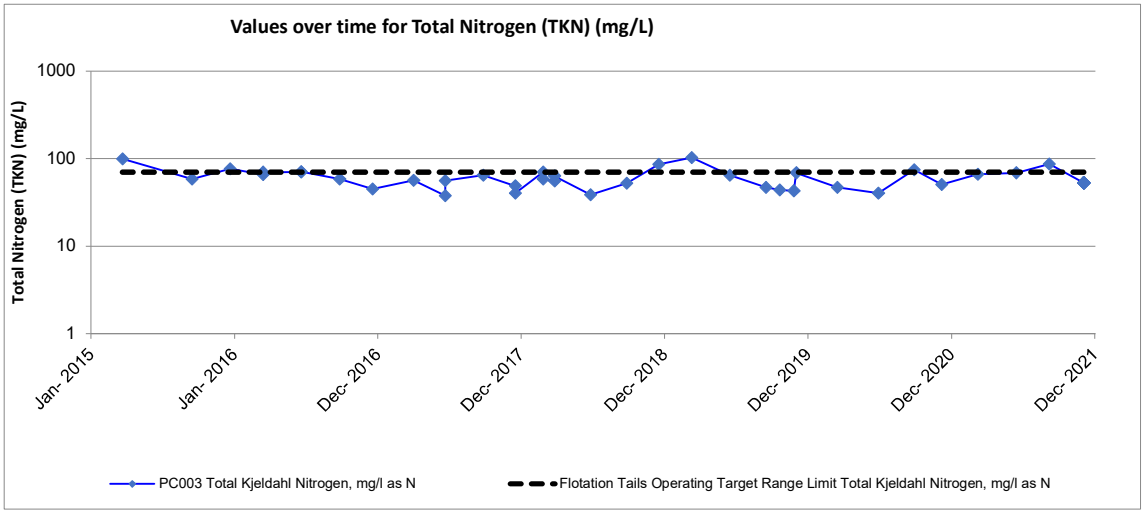

Values over time for pH, field (pH units)
pH, field (pH units)
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 pH, Field, Standard Units

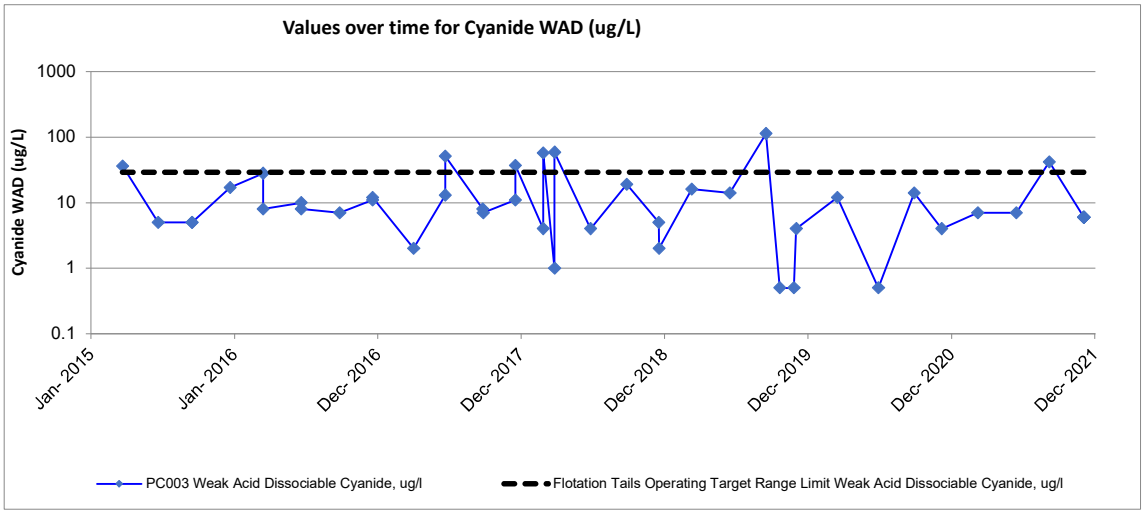

Values over time for Selenium, dissolved (ug/L)
Selenium, dissolved (ug/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Selenium, Dissolved (ug/l as Se)
Flotation Tails Operating Target Range Limit Selenium, Dissolved (ug/l as Se)

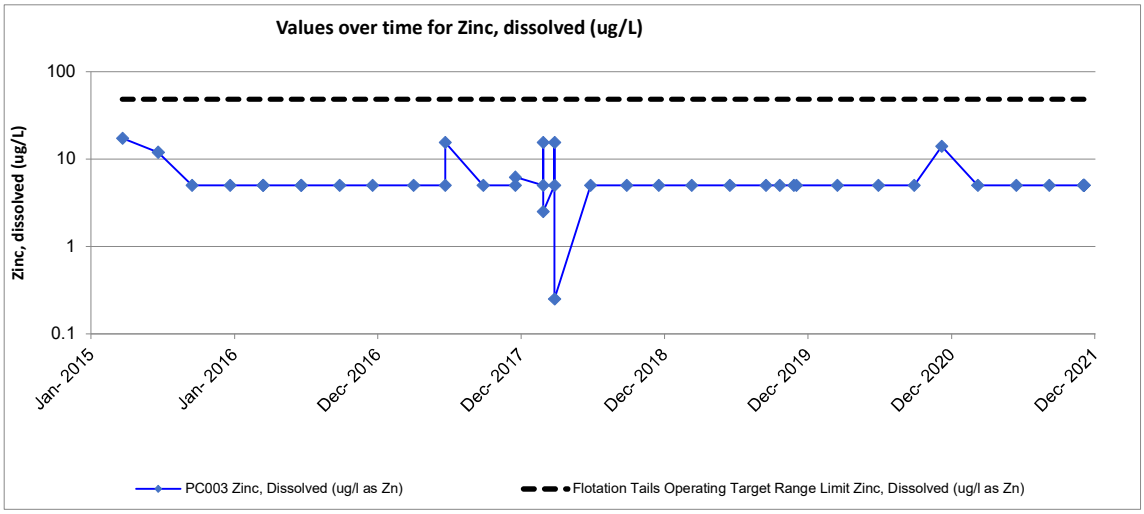

Values over time for Silver, dissolved (ug/L)
Silver, dissolved (ug/L)
1
0.1
0.01
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Silver, Dissolved (ug/l as Ag)
Flotation Tails Operating Target Range Limit Silver, Dissolved (ug/l as Ag)


Values over time for Sulfate (mg/L)
Sulfate (mg/L)
10000
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Sulfate, Total (mg/l as SO4)
Flotation Tails Operating Target Range Limit Sulfate, Total (mg/l as SO4)


Values over time for TDS (mg/L)
TDS (mg/L)
10000
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 TDS, Residue,Total Filtrable (Dried At 180C),mg/l
Flotation Tails Operating Target Range Limit TDS, Residue,Total Filtrable (Dried At 180C),mg/l


Values over time for Total Nitrogen (TKN) (mg/L)
Total Nitrogen (TKN) (mg/L)
1000
100
10
1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Total Kjeldahl Nitrogen, mg/l as N
Flotation Tails Operating Target Range Limit Total Kjeldahl Nitrogen, mg/l as N


Values over time for Cyanide WAD (ug/L)
Cyanide WAD (ug/L)
1000
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Weak Acid Dissociable Cyanide, ug/l
Flotation Tails Operating Target Range Limit Weak Acid Dissociable Cyanide, ug/l


Values over time for Zinc, dissolved (ug/L)
Zinc, dissolved (ug/L)
100
10
1
0.1
Jan- 2015
Jan- 2016
Dec- 2016
Dec- 2017
Dec- 2018
Dec- 2019
Dec- 2020
Dec- 2021
PC003 Zinc, Dissolved (ug/l as Zn)
Flotation Tails Operating Target Range Limit Zinc, Dissolved (ug/l as Zn)

APPENDIX D –

2021 WHOLE EFFLUENT TOXICITY TESTING

WET LABORATORY REPORTS

AQUATIC TOXICOLOGY REPORT

Project Name: NORTHERN STAR (POGO) LLC

Location: DELTA JUNCTION, ALASKA

Prepared by: Eurofins TestAmerica - Corvallis

1100 NE Circle Boulevard, Suite 310
Corvallis, Oregon 97330
541-243-6137

Oregon Environmental Laboratory Accreditation Program #OR100022 (NELAP)
State of Washington DOE Environmental Laboratory Accreditation Program, Lab ID C556
California State Environmental Laboratory Accreditation Program, Certificate No.: 1726

Report Date: July 14, 2021 Released by: Michelle Bennett

Eurofins TestAmerica – Corvallis Lab I.D. No. B5084

CONTENTS

LABORATORY CONTACT: Alise Lampi, Aquatic Toxicity Department Manager
Alyssa.Lampi@eurofinset.com (541) 243-0964

INTRODUCTION

Eurofins TestAmerica – Corvallis (ET-C) Aquatic Toxicology Laboratory conducted toxicity testing on samples from Northern Star (Pogo) LLC.

Testing was initiated on: June 22, 2021

The test was conducted using:

- the fathead minnow (*Pimephales promelas*)

OVERVIEW OF REGULATORY GUIDANCE

The following provides an overview and excerpts of applicable permit specifics, regulatory guidance, and other relevant information. This is intended only as a helpful guide, from a laboratory perspective, for understanding test outcomes. The final responsibility for interpretation of results remains with the client and/or regulatory agency.

The following guidance is taken from ET-C reading of the NPDES permit for Northern Star - Pogo (permit #AK0053341, effective July 1, 2017, expires June 30, 2022).

Whole Effluent Toxicity Testing (WET) Requirements:

- "1.7.2 Chronic toxicity testing must be conducted on grab sample of effluent."
- "1.7.3 Chronic Test Species and Methods"
  - "1.7.3.1 For Outfall 001, chronic tests must be conducted annually prior to August 1."
  - "1.7.3.2 … using the fathead minnow, *Pimephales promelas.* "
  - "1.7.3.3 The presence of chronic toxicity must be determined as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition (EPA/821-R-02-013, October 2002)."
  - "1.7.3.4 Results must be reported in TU_c, where $TU_c = 100/IC_{25}$."
- 1.7.4 Quality Assurance
  - 1.7.4.3.1 If organisms are not cultured in-house, concurrent testing with reference toxicants must be conducted. If organisms are cultured in-house, monthly reference toxicant testing is sufficient. Reference toxicant tests must be conducted using the same test conditions as the effluent toxicity tests.
- "1.7.5 A trigger for chronic toxicity of 2 TUc shall apply for the purposes of determining compliance with Permit Part 1.7.6 [accelerated testing] and 1.7.7 [TIE/TRE]."

SUMMARY OF TEST RESULTS

Exhibit 1 provides a summary of the final test results.

EXHIBIT 1
Summary of Chronic Test Results

Species	NOEC (%)	LOEC (%)	IC_{25} (%)	TUc	Was chronic toxicity demonstrated (a TUc value > 2.0)?
P. promelas	100	> 100	> 100	< 1	No

Note: acronyms are as defined below.

From the NPDES permit - *Chronic Toxicity Trigger*: "Toxicity Triggers. Since data does not exist to support the development of a WET limit at this time, a target level for chronic toxicity of 2 TUc shall apply …"

More detailed information is provided in the Results and Discussion section.

ACRONYM DEFINITIONS (from EPA guidance):

NOEC = No Observed Effect Concentration: The highest test concentration that causes no observable adverse effects on the test organisms (i.e. no statistically significant reduction from the control).
LOEC = Low Observed Effect Concentration: The lowest test concentration that does cause an observable adverse effect on the test organisms (i.e. is statistically significant reduction from the control).
IC_{25} = Inhibition Concentration (25%): A point estimate of the test concentration that would cause a 25 percent reduction of a non-quantal biological measurement (i.e. growth, reproduction, etc.) for the test population.
TUc = Toxic Units (Chronic): Calculated as 100% sample divided by the chronic IC_{25} value.

METHODS AND MATERIALS

TEST METHODS

The chronic test methods were performed according to: *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, (EPA 2002), EPA-821-R-02-013.

Additional guidance was provided by:

- *Method Guidance and Recommendations for Whole Effluent Toxicity (WET) Testing* (40 CFR Part 136), (EPA August 2000), EPA 821-B-00-004.

DEVIATIONS FROM PROTOCOLS

Deviations from required procedures in the test methods:

- None noted.

Deviations from recommended procedures in the test methods:

- None noted.

TEST DESIGN

The following summarizes the conditions used for both overall testing and the specifics for each test (observations and notations can be found on the datasheets in Appendix A):

Overall Test Design:

Chronic tests: 6.25, 12.5, 25, 50, and 100 percent sample + dilution water for the control.

Test Organism Conditions**:**

All organisms tested were fed and maintained during culturing, acclimation, and testing as prescribed by the EPA (2002).

The test organisms appeared vigorous and in good condition prior to testing.

P. promelas chronic test:

- Source: Aquatox Inc., Hot Springs, Arkansas
- Age: Less than 48 hours old and within an 24 hour age range
- Design: Four test vessels per concentration, ten organisms per vessel
- Test Solution Renewal: Daily
- Monitoring:
    - Daily: Survival
    - Daily: DO and pH in pre and post-renewal solutions, all concentrations
    - Daily: Temperature in pre-renewal solutions, all concentrations

    - With each new sample: Conductivity in post-renewal solutions, control and highest sample concentration
- Termination: 7 days after test initiation.
- Endpoints: Survival and Growth (average dry weight per organism added @ initiation)

DILUTION WATER

The dilution water used was the standard culture water used by ET-C:

- Reconstituted, moderately hard water (as per EPA protocol) with a total hardness of 75 to 105 mg/L as $CaCO_3$ and an alkalinity of 50 to 75 mg/L as $CaCO_3$.

SAMPLE COLLECTION AND STORAGE

Samples were collected by Northern Star (Pogo) LLC personnel. The samples were accepted as scheduled by ET-C. Chain of Custody and Sample Receipt Records are provided in Appendix C.

- All samples were received within the EPA recommended 0 to 6 ^{o}C range.
- All samples were initially used for test initiation or test solution renewal within the EPA recommended maximum holding time of 36 hours of sample collection.
- All subsequent uses of a sample occurred within the EPA recommended maximum holding time of 72 hours past the time of initial use of that sample.
- Following receipt, the samples were stored in the dark at 0 to 6 °C until test solutions were prepared and tested.

SAMPLE PREPARATION

Samples used during these tests were:

- Temperature adjusted prior to test initiation and each daily renewal.

DATA ANALYSIS

The statistical analyses performed for the chronic test were those outlined in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, USEPA Office of Water, Fourth Edition (EPA 2002), EPA-821-R-02-013, CETIS.

- The specific statistical analysis and CETIS version used for each endpoint evaluation is listed with the statistical outputs included with each test in Appendix A.
- If any additional analysis methods were also used, an explanation of the rationale and reference to the source method is included with the presentation of those results below.

RESULTS AND DISCUSSION

The raw data sheets for all tests are presented in Appendix A.

CHRONIC BIOASSAY

Table 1 summarizes the survival and reproduction data for the *P. promelas* chronic test.

Table 1
Summary of Chronic Results
P. promelas

Sample Concentration (%)	Percent Survival	Mean Dry Weight per Organism Added (mg)
Control	97.5	0.902
6.25	97.5	0.984
12.5	100	0.954
25.0	92.5	0.919
50.0	90.0	0.889
100	87.5	0.860

Statistical analysis in accordance with the EPA protocol results in:

- NOEC = 100%
- LOEC > 100 %
- IC_{25} > 100 %
- TUc < 1

From the NPDES permit - *Chronic Toxicity Trigger*: "Toxicity Triggers. Since data does not exist to support the development of a WET limit at this time, a target level for chronic toxicity of 2 TUc shall apply …"

- The TUc (calculated as = $100/IC_{25}$) did not exceed 2.0.

The dissolved oxygen levels in the chronic tests remained above 4.0 mg/L. Test temperatures remained at 25±1 °C.

The test meets Test Acceptability Criteria (TAC) for a minimum 80 percent control survival and a minimum weight of 0.250 mg per surviving control organism. Except as referenced above, the *P. promelas* chronic test proceeded without any noted deviations or interruptions that could have affected test results. The testing should be considered "valid".

REFERENCE TOXICANT TESTS

Reference toxicant (reftox) testing is performed to document both initial and ongoing laboratory performance of the test method(s). While the health of the test organisms is primarily evaluated by the performance of the laboratory control, reftox test results also may be used to assess the health and sensitivity of the test organisms. Reftox test results within their respective cumulative summary (Cusum) chart limits are indicative of consistent laboratory performance and normal test organism sensitivity.

The results of the reftox tests indicate that the test organisms were within their respective cusum chart limits based on EPA guidelines. This demonstrates ongoing laboratory proficiency of the test methods and suggests normal test organism sensitivity in the associated client testing.

The *P. promelas* reftox test was conducted using potassium chloride. The data sheets for the reference toxicant tests are provided in Appendix B.

Table 2 summarizes the reference toxicant test results and Cusum chart limits.

Table 2
Chronic Reference Toxicant Tests (g/L)

Species	IC_{25}	Cusum Chart Limits
P. promelas (survival)	0.61	0.52 to 0.70
P. promelas (growth)	0.60	0.44 to 0.72

APPENDIX A

RAW DATA SHEETS

TestAmerica

FRESHWATER TOXICITY TEST: SAMPLE AND DILUTION WATER DATA

Client: Northern Star

Contact: Nathan Kehoe / Jill Van Patten 907-895-2760 / 907-687-3579

SDG # B S0834

Test Initiation: Date 6/22/21

Test Termination: Date 6-29-21

Sample ID Number	Field ID	Collected Date (mm/dd/yy)	Collected Time (Pacific Zone)	Received Date (mm/dd/yy)	Received Time (Pacific Zone)	Temp (°C) as Rc'vd	Total Residual Chlorine (mg/l) ☐ Dechlorination allowed as Rc'vd / after Dechlor.	Ammonia NH_3-N mg/l as Rc'vd	Hardness mg/l as $CaCO_3$ as Rc'vd	Alkalinity mg/l as $CaCO_3$ as Rc'vd	DO (mg/L) as Rc'vd	pH as Rc'vd	Cond. (uS) as Rc'vd	60 um filtered prior to use?
B5034-01	Outfall 001	6/21/21	07:31	6/22/21	11:47	1.6 / 1.5	0.02 / -	0.58	75	-	-	-	-	☑ TC
B5034-02	Outfall 001	6/23/21	07:47	6/24/21	11:10	1.6 / 1.7	<0.02 / -	0.31	64	-	-	-	-	☑ TC
B5084 -03	Outfall 001	6/25/21	0543	6/26/21	09:50	20 / 1.5	0.03 / -	1.23	72	-	-	-	-	☑ TC
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
							/							
Reporting Limits:						na	0.02 mg/L	0.10 mg/L	5 mg/L	5 mg/L	na	na	na	na

Note: "-" Indicates data collection or dechlorination not needed. Any other adjustments to samples prior to use are documented in Comments below or on Dilutions page.

Dilution Water	ID#	Hardness mg/l as $CaCO_3$	Alkalinity mg/l as $CaCO_3$
Recon MH (FHM)	5346	92	69
	5347	80	60
	5348	84	60
	5349	80	60

Comments: ☑ Indicates the action was taken, (☐= action not taken): " - " = sample not dechlorinated, or analyte not collected/needed.

Water Quality Meters Used/ID#: Dissolved Oxygen # 4 pH # 11 Conductivity # 2

TestAmerica

FRESHWATER TOXICITY TEST: TEST ORGANISM INFORMATION

Client Northern Star Sample Designation (SDG): B 5084

Test Species Information	FHM # 3164 *Pimephales promelas* Chronic				
Organism Age at Initiation	<48 hrs, all within a 24 hour window				
Test Container Size	400 ml				
Test Volume	500 ml				
Feeding: Type and Amount	0.15 ml *Artemia*, 2 x Daily				
Aeration: In Test Chambers via Slow Bubble :	☑ None ☐ Prior to use ☐ @ _____ hrs				
Acclimation Period	<24 hrs				
Organism Source	Aquatox				
Size	-				
Loading Rate	-				

Dissolved Oxygen aeration justifications (in test chambers):

Test(s): ☐ All ☐ _____

Date:

Comments:

Test Solution Preparation and Dilution Record

Client: Northern Star

Note: ☐ Indicates task not done, ☑ Indicates task was done. Temp adj. = Temperature adjusted to ambient or test temp

Ditto marks ('') indicate that the same SDG, batch of dilution water, or food as the previous day's entry was used.

Fathead minnow - Chronic

Test Concentration (%)	Sample Volume (mls)		Final Volume (mls)
Control	0.00	→	2000
6.25	125	→	2000
12.5	250	→	2000
25	500	→	2000
50	1,000	→	2000
100	2,000	→	2000

Total Sample volume needed per day = 3875 mls

Test Day	Sample ID Used	Daily Sample Preparation (prior to dilution)	Dilution Water Used	Date	Time	Initials
0 (Initiation)	B5034-01	☐ Temp adj, ☐ Aerated	ID # 5346	6/22/2021	12:05	JC
1	B5034-01	☐ Temp adj, ☐ Aerated	ID # 5346	6/23/21	09:15	JC
2	B5034-02	☐ Temp adj, ☐ Aerated	ID # 5347	6/24/21	11:25	JC
3	B5034-02	☐ Temp adj, ☐ Aerated	ID # 5347	6/25/21	08:35	BC
4	B5034-03	☐ Temp adj, ☐ Aerated	ID # 5348	6/26/21	11:15	AM
5	B5034-03	☐ Temp adj, ☐ Aerated	ID # 5348	6/27/21	09:00	JC
6	B5034-03	☐ Temp adj, ☐ Aerated	ID # 5349	6/28/21	10:57	JC

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 1 | Waterbath/incubator Used: # 10 | Date Initiated 6/22/2021 Time 15:00

Initial sample ID B 5084 - 01 | Date Terminated 6/29/2021 Time 09:47

Client: Northern Star | Sample Description: Outfall 001

Tech: Day 0 ~~AM~~/TC Day 1 TC Day 2 TC Day 3 BC Day 4 ~~Jan~~ Day 5 TC Day 6 TC Day 7 TC

Time: Day 0 1500 Day 1 1037 Day 2 1420 Day 3 1330 Day 4 1350 Day 5 1225 Day 6 1415 Day 7 0847

Conc. or Percent	Day	Number of Live Organisms A	B	C	D	Dissolved O_2 (mg/l) Pre	Post	pH Pre	Post	Temp. (°C) Pre	Therm. ID #	Conductivity (µS) Post (1st use)
Control	0	10	10	10	10		7.4		8.2	Post: 25.4	253	338
	1	10	10	10	10	6.6 7.3 (1)	7.9	7.3	8.0	25.3	253	
	2	10	10	9✓	10	6.1	7.7	7.5	8.1	25.3	251	303
	3	10	10	9	10	6.2	7.6	7.4	7.3	25.3	251	
	4	10	10	9	10	5.9	6.8	7.5	7.9	25.4	2616	329
	5	10✓	10	9	10	6.9	7.7	7.7	8.0	25.5	2616	
	6	10	10	9	10	5.4	7.5	7.4	8.0	25.3	2616	
	7	10	10	9	10	10.0		7.4		25.2	2616	
6.25 %	0	10	D&O TC 6/23 10 9	10	10		7.4		8.1	Post: 25.2		
	1	10	9M	10	10	6.5 6.6 (1)	8.0	7.5	8.0	25.3		
	2	9	9	10	10	6.1	7.9	7.6	8.0	25.1		
	3	9	9	10	10	6.2	7.8	7.0	7.5	25.0		
	4	9	9	10	10	5.7	6.9	7.5	8.0	25.4		
	5	9	9	10✓✓	10✓	7.0	7.3	7.7	7.9	25.4		
	6	9	9	10	10	5.7	7.6	7.4	8.0	25.4		
	7	9	9	10	10	10.1		7.5		25.3		
12.5 %	0	10	10	10	10		7.8		8.1	Post: 25.2		
	1	10	10	10	10	6.6 7.5 (1)	8.1	7.5	8.0	25.2		
	2	10	10	10	10	6.1	8.1	7.5	8.0	25.3		
	3	10	10	10	10	6.5	7.9	7.0	7.5	25.0		
	4	10	10	10	10	5.7	7.0	7.4	7.9	25.3		
	5	10	10	10	10	7.0	8.0	7.7	7.9	25.6		
	6	10	10	10	10	5.4	8.0	7.3	8.0	25.5		
	7	10	10	10	10	5.9		7.6		25.2		
25 %	0	10	10	10	9 10 D&O TC 6/24		7.9		8.0	Post: 25.2		
	1	10	10	10	10 9M	6.6	8.2	7.4	7.9	25.3		
	2	10	9	10	9M	6.0	8.2	7.5	7.9	25.3		
	3	9	9	10	9	6.6	8.1	6.8	7.4	25.1		
	4	9	9	10✓	9	5.6	7.2	7.3	7.4	25.5		
	5	9	8	10	9	7.0	D&O 8.1	7.6	7.8	25.7		
	6	9	8	10	9✓	5.3	TC 6/24 8.0	7.3	7.9	25.6		
	7	9	8	10	9	9.9		7.6		25.4		
50 %	0	10	10	10	10		8.2		7.7	Post: 25.2		
	1	10	10	10	10✓	6.8	8.6	7.4	7.7	25.3		
	2	9	10	9	10	6.3	8.1	7.5	7.7	25.1		
	3	9	10	9	10	6.5	8.3	6.7	7.4	25.1		
	4	9	10	9	10	5.6	7.5	7.3	7.6	25.5		
	5	9	10	7F	10	7.1	8.3	7.5	7.7	25.4		
	6	9	10	7	10	5.1	8.2	7.2	7.8	25.4		
	7	9	10	7	10	6.0		7.4		25.4		
100 %	0	10	10	10	10		8.7		7.4	Post: 25.2		191.9
	1	10	10	10	10	6.9	9.1	7.2	7.3	25.3		
	2	10✓	10	10	10	6.4	9.1	7.3	7.3	25.2		163.9
	3	10	10	10	10	6.6	8.5	6.6	7.0	25.0		
	4	10	10	10	10	5.7	7.9	7.2	7.1	25.5		255
	5	8F	10	7F	10	7.1	9.1	7.4	7.2	25.5		
	6	8	10	7	10✓	5.2	8.6	7.2	7.4	25.5		
	7	9	10	7	10	6.1		7.4		25.3		

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container.
"M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats.
"F" = fungus noted on dead organisms.
☐ Aeration in test chambers begun @ _____ (Note observations on Test Organism Info sheet)

Pre =Pre-renewal solutions. Post =Post-renewal solutions.
Day 0 Temperatures = Post-renewals
Therm ID# = Thermometer ID used for all measurements that day.
(23.8) = Temp. out of recommended range

(1) DOLO TC 6/23/21

Fathead Minnow 7-d Larval Survival and Growth Test **Eurofins TestAmerica - Corvallis**

Batch ID:	06-3225-2173	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Michelle Bennett		
Start Date:	22 Jun-21 15:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	29 Jun-21 08:47	**Species:**	Pimephales promelas	**Brine:**			
Test Length:	6d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox, AR	**Age:**	1D
Sample ID:	01-7005-2064	**Code:**	B5084-01	**Project:**			
Sample Date:	21 Jun-21 07:31	**Material:**	Industrial Effluent	**Source:**	Northern Star (Pogo) LLC (AK0053341		
Receipt Date:	22 Jun-21 11:47	**CAS (PC):**		**Station:**			
Sample Age:	31h (1.5 °C)	**Client:**					

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
20-4934-2560	7d Survival Rate	Steel Many-One Rank Sum Test		100	>100	---	16.0%	1	1
07-2878-9171	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test		100	>100	---	25.1%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
06-6414-9391	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)		IC25	>100	---	---	<1	1

Test Acceptability

				TAC Limits			
Analysis ID	**Endpoint**	**Attribute**	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
20-4934-2560	7d Survival Rate	Control Resp	0.975	0.8	>>	Yes	Passes Criteria
06-6414-9391	Mean Dry Biomass-mg	Control Resp	0.9015	0.25	>>	Yes	Passes Criteria
07-2878-9171	Mean Dry Biomass-mg	Control Resp	0.9015	0.25	>>	Yes	Passes Criteria
07-2878-9171	Mean Dry Biomass-mg	PMSD	0.2514	0.12	0.3	Yes	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.9750	0.8954	1.0550	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
6.25		4	0.9750	0.8954	1.0550	0.9000	1.0000	0.0250	0.0500	5.13%	0.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	-2.56%
25		4	0.9250	0.7727	1.0770	0.8000	1.0000	0.0479	0.0957	10.35%	5.13%
50		4	0.9000	0.6750	1.1250	0.7000	1.0000	0.0707	0.1414	15.71%	7.69%
100		4	0.8750	0.6363	1.1140	0.7000	1.0000	0.0750	0.1500	17.14%	10.26%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	D	4	0.9015	0.7078	1.095	0.726	1.002	0.06085	0.1217	13.50%	0.00%
6.25		4	0.9837	0.8068	1.161	0.854	1.088	0.0556	0.1112	11.30%	-9.12%
12.5		4	0.9535	0.8425	1.064	0.855	1.018	0.03486	0.06973	7.31%	-5.77%
25		4	0.9186	0.6243	1.213	0.735	1.176	0.09249	0.185	20.14%	-1.90%
50		4	0.8887	0.665	1.112	0.679	0.974	0.0703	0.1406	15.82%	1.41%
100		4	0.8595	0.6323	1.087	0.681	1.019	0.0714	0.1428	16.62%	4.66%

Fathead Minnow 7-d Larval Survival and Growth Test **Eurofins TestAmerica - Corvallis**

7d Survival Rate Detail MD5: 71587F65EE84335589CF23CED19F9B4A

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	0.9000	1.0000
6.25		0.9000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		0.9000	0.8000	1.0000	1.0000
50		0.9000	1.0000	0.7000	1.0000
100		0.8000	1.0000	0.7000	1.0000

Mean Dry Biomass-mg Detail MD5: F88CE24FB0A86C1AA9C254E9164EE0EE

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.92	0.958	0.726	1.002
6.25		1.064	1.088	0.929	0.854
12.5		0.979	0.855	0.962	1.018
25		0.893	0.735	0.871	1.176
50		0.963	0.974	0.679	0.939
100		0.826	1.019	0.681	0.912

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	9/10	10/10
6.25		9/10	9/9	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		9/10	8/10	10/10	9/9
50		9/10	10/10	7/10	10/10
100		8/10	10/10	7/10	10/10

Fathead Minnow 7-d Larval Survival and Growth Test — **Eurofins TestAmerica - Corvallis**

Analysis ID:	20-4934-2560	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	12 Jul-21 14:48	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	12 Jul-21 14:47	**MD5 Hash:**	71587F65EE84335589CF23CED19F9B4A	**Editor ID:**	006-834-630-9

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.1563	16.03%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	18	10	2	6	CDF	0.8333	Non-Significant Effect
		12.5	20	10	1	6	CDF	0.9516	Non-Significant Effect
		25	15.5	10	2	6	CDF	0.5438	Non-Significant Effect
		50	15.5	10	2	6	CDF	0.5438	Non-Significant Effect
		100	15	10	1	6	CDF	0.4761	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.201	2.802	0.5006	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.100268	0.0200536	5	1.006	0.4426	Non-Significant Effect
Error	0.358868	0.0199371	18			
Total	0.459136		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test	0.9389	0.884	0.1541	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
6.25		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	0.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-2.56%
25		4	0.9250	0.7727	1.0000	0.9500	0.8000	1.0000	0.0479	10.35%	5.13%
50		4	0.9000	0.6750	1.0000	0.9500	0.7000	1.0000	0.0707	15.71%	7.69%
100		4	0.8750	0.6363	1.0000	0.9000	0.7000	1.0000	0.0750	17.14%	10.26%

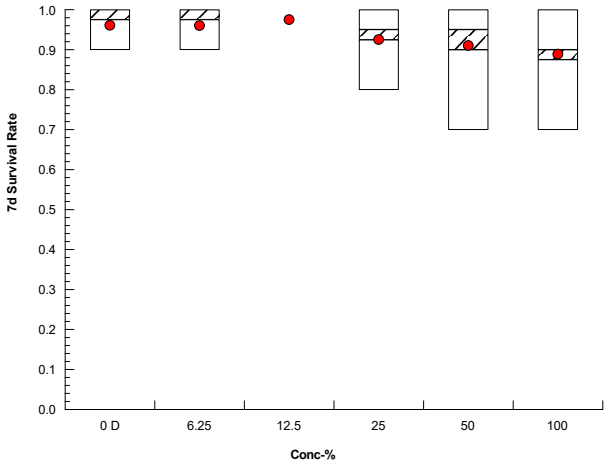
Angular (Corrected) Transformed Summary

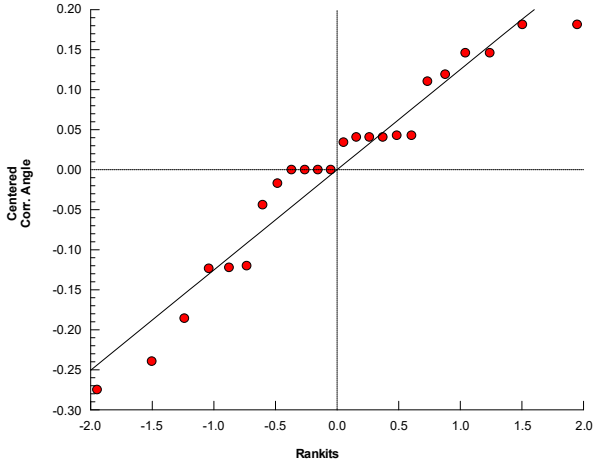
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.3710	1.2420	1.5010	1.4120	1.2490	1.4120	0.0407	5.94%	0.00%
6.25		4	1.3690	1.2420	1.4970	1.4080	1.2490	1.4120	0.0401	5.85%	0.16%
12.5		4	1.4120	1.4120	1.4120	1.4120	1.4120	1.4120	0.0000	0.00%	-2.97%
25		4	1.2930	1.0630	1.5230	1.3260	1.1070	1.4120	0.0724	11.19%	5.72%
50		4	1.2660	0.9499	1.5820	1.3310	0.9912	1.4120	0.0994	15.70%	7.67%
100		4	1.2310	0.8888	1.5720	1.2600	0.9912	1.4120	0.1074	17.45%	10.26%

Fathead Minnow 7-d Larval Survival and Growth Test **Eurofins TestAmerica - Corvallis**

Analysis ID:	20-4934-2560	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.7
Analyzed:	12 Jul-21 14:48	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Edit Date:	12 Jul-21 14:47	**MD5 Hash:**	71587F65EE84335589CF23CED19F9B4A	**Editor ID:**	006-834-630-9

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Eurofins TestAmerica - Corvallis**

Analysis ID:	07-2878-9171	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.7
Analyzed:	12 Jul-21 14:48	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Edit Date:	12 Jul-21 14:47	**MD5 Hash:**	F88CE24FB0A86C1AA9C254E9164EE0EE	**Editor ID:**	006-834-630-9

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	0.2267	25.14%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	-0.8728	2.407	0.227	6	CDF	0.9758	Non-Significant Effect
		12.5	-0.5522	2.407	0.227	6	CDF	0.9465	Non-Significant Effect
		25	-0.182	2.407	0.227	6	CDF	0.8813	Non-Significant Effect
		50	0.1354	2.407	0.227	6	CDF	0.7904	Non-Significant Effect
		100	0.446	2.407	0.227	6	CDF	0.6707	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Outlier	Grubbs Extreme Value Test	2.181	2.802	0.5332	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0405014	0.0081003	5	0.4567	0.8030	Non-Significant Effect
Error	0.319252	0.0177362	18			
Total	0.359753		23			

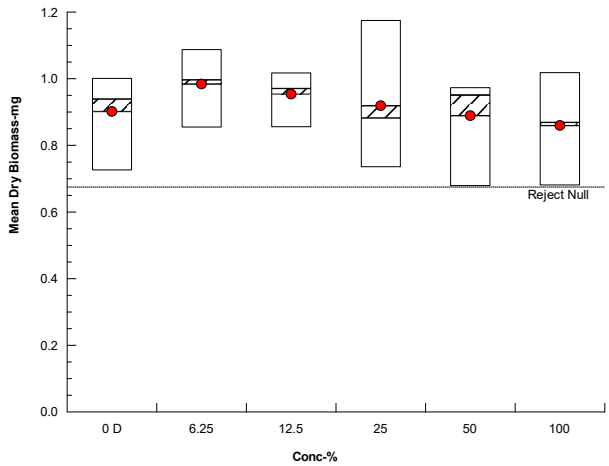
ANOVA Assumptions Tests

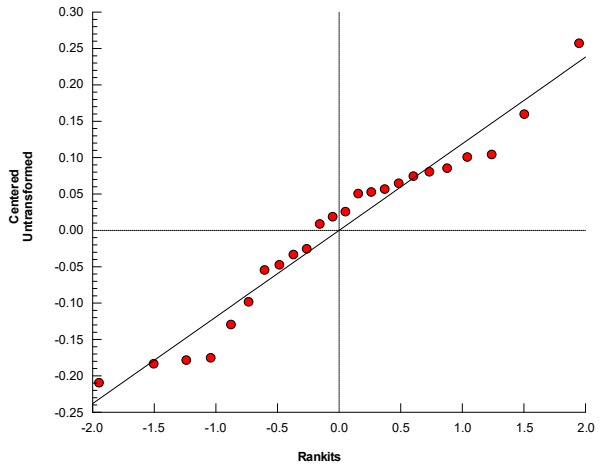
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.47	15.09	0.7810	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.958	0.884	0.4004	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.9015	0.7078	1.095	0.939	0.726	1.002	0.06085	13.50%	0.00%
6.25		4	0.9837	0.8068	1.161	0.9965	0.854	1.088	0.0556	11.30%	-9.12%
12.5		4	0.9535	0.8425	1.064	0.9705	0.855	1.018	0.03486	7.31%	-5.77%
25		4	0.9186	0.6243	1.213	0.882	0.735	1.176	0.09249	20.14%	-1.90%
50		4	0.8887	0.665	1.112	0.951	0.679	0.974	0.0703	15.82%	1.41%
100		4	0.8595	0.6323	1.087	0.869	0.681	1.019	0.0714	16.62%	4.66%

Graphics





Fathead Minnow 7-d Larval Survival and Growth Test — **Eurofins TestAmerica - Corvallis**

Analysis ID:	06-6414-9391	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.7
Analyzed:	12 Jul-21 14:48	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Edit Date:	12 Jul-21 14:47	**MD5 Hash:**	F88CE24FB0A86C1AA9C254E9164EE0EE	**Editor ID:**	006-834-630-9

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	321966	200	Yes	Two-Point Interpolation

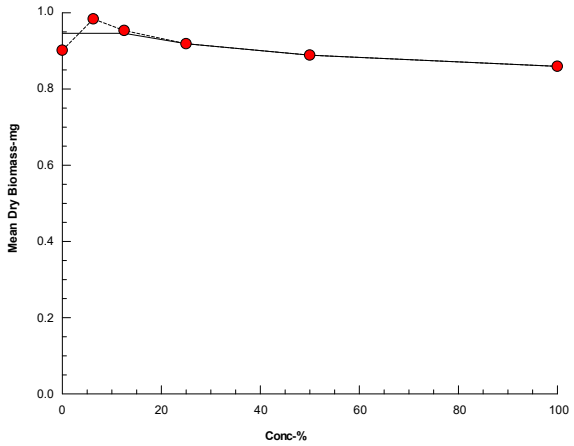
Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	D	4	0.9015	0.939	0.726	1.002	13.50%	0.00%	0.9462	0.00%
6.25		4	0.9837	0.9965	0.854	1.088	11.30%	-9.12%	0.9462	0.00%
12.5		4	0.9535	0.9705	0.855	1.018	7.31%	-5.77%	0.9462	0.00%
25		4	0.9186	0.882	0.735	1.176	20.14%	-1.90%	0.9186	2.92%
50		4	0.8887	0.951	0.679	0.974	15.82%	1.41%	0.8887	6.07%
100		4	0.8595	0.869	0.681	1.019	16.62%	4.66%	0.8595	9.17%

Graphics



APPENDIX B

REFERENCE TOXICANT DATA SHEETS

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

FATHEAD MINNOW 7-DAY SURVIVAL AND WATER QUALITY DATA

Random Template Used: 6 conc. x 4 reps. # 1 | Waterbath/incubator Used: # 10 | Date Initiated 6/22/20 21 Time 15:50

Stock Sol. ID JB 088 -01 | Date Terminated 6/29/20 21 Time 10:55

Organism ID: FHM 7164 | Test Container Size: 800 ml | Solution Volume / rep: 500 ml

Client: QA / QC - RefTox | Sample Description: KCl (50 g/L stock)

Tech: Day 0 [illegible] Day 1 TC Day 2 TC Day 3 [illegible] Day 4 [illegible] Day 5 TC Day 6 TC/[illegible] Day 7 [illegible]

Time: Day 0 1550 Day 1 1103 Day 2 1434 Day 3 1200 Day 4 1211e Day 5 1235 Day 6 1315 Day 7 1056

Conc. or Percent	Day	Number of Live Organisms A	B	C	D	Dissolved O_2 (mg/l) Pre	Post	pH Pre	Post	Temp. (°C) Pre	Therm. ID #	Conductivity (µS) Post (daily)
Control	0	10	10	10	10		7.6		8.2	Post: 25.1	251	334
	1	10	10	10	10	6.5	7.9	7.6	8.1	25.2	253	319
	2	10	10	10	10	6.0	7.5	7.5	8.1	25.0	251	312
	3	10	10	10	10	6.0	7.6	7.5	8.0	25.3	253	310
	4	10	10	10 ✓	10 ✓	7.2	7.7	7.4	7.9	25.1	2646	327
	5	10 ✓	10	10 ✓	10	6.6	Post 7.6	7.6	8.0	25.1	2646	324
	6	10	10	10	10	6.6 6.4	6.6 7.6	7.4	8.1	25.3	2646	314
	7	10	10	10	10	10.7		7.6		25.3	2646	
0.25 g/L	0	10	10	10	10		7.6		8.2	Post: 25.0		791
	1	10	10	10	10	6.5	8.0	7.6	8.1	25.1		764
	2	9	10	10	10	6.1	7.7	7.5	8.1	24.9		742
	3	9	10	10	10	6.2	7.9	7.5	8.0	25.2		813
	4	9 9	10	10	10	7.3	7.9	7.4	8.0	25.1		745
	5		10 ✓	10	10	6.6	7.8	7.5	8.0	25.1		764
	6	9	10	10	10 ✓	5.9	7.7	7.5	8.1	25.2		721
	7	9	10	10	10	6.5		7.6		25.2		
0.50 g/L	0	10	10	10	10		7.6		8.2	Post: 25.0		1264
	1	10	10	10	10	6.5	8.0	7.6	8.2	25.1		1159
	2	10	10	9	9	6.2	7.8	7.6	8.1	25.0		1159
	3	10	10	9	9	6.2	8.0	7.5	8.0	25.2		1210
	4	10	10	9	9	7.2	8.0	7.4	8.0	25.1		1243
	5	10	10 ✓	9	9	6.6	7.9	7.5	8.0	25.1		1242
	6	10	10 ✓	9	9	6.0	7.9	7.4	8.1	25.2		1192
	7	10	10	9	9	6.6		7.6		25.3		
1.0 g/L	0	10	10	10	10		7.8		8.2	Post: 25.0		2140
	1	5	9	5	8	6.9	8.0	7.6	8.2	25.2		2040
	2	5	7	5	8	6.4	7.8	7.6	8.1	25.1		2050
	3	5	6	4	8	6.3	8.0	7.5	8.1	25.2		2100
	4	2	3	4	5	7.4	8.0	7.4	8.1	25.2		2100
	5	2	2	2	1	6.8	7.9	7.5	8.1	25.2		2110
	6	1	2	2 ✓	1 ✓	6.1	7.9	7.4	8.1	25.3		2070
	7	1	2	2	1	7.2		7.6		25.3		
2.0 g/L	0	10	10	10	10		7.7		8.2	Post: 25.0		3580
	1	0	0	0	0	7.0	8.0	7.6	8.2	25.1		3650
	2											
	3											
	4											
	5											
	6											
	7											
4.0 g/L	0	10	10	10	10		7.7		8.2	Post: 25.0		7160
	1	0	0	0	0	7.1	0	7.6	0	25.1		
	2											
	3											
	4											
	5											
	6											
	7											

✓ Indicates one organism inadvertently poured off during solution renewal, replaced into container.

"M" = organism missing, start count reduced. "Inj" = organism injured, remove from stats.

"F" = fungus noted on dead organisms.

Pre =Pre-renewal solutions. Post =Post-renewal solutions.

Day 0 Temperatures = Post-renewals

Therm ID# = Thermometer ID used for all measurements that day.

(23.8) = Temp. out of recommended range

Endpoint		Cusum Chart Limits	
Survival - EC_{25}	0.61	0.52 to	0.70
Growth - IC_{25}	0.60	0.44 to	0.72

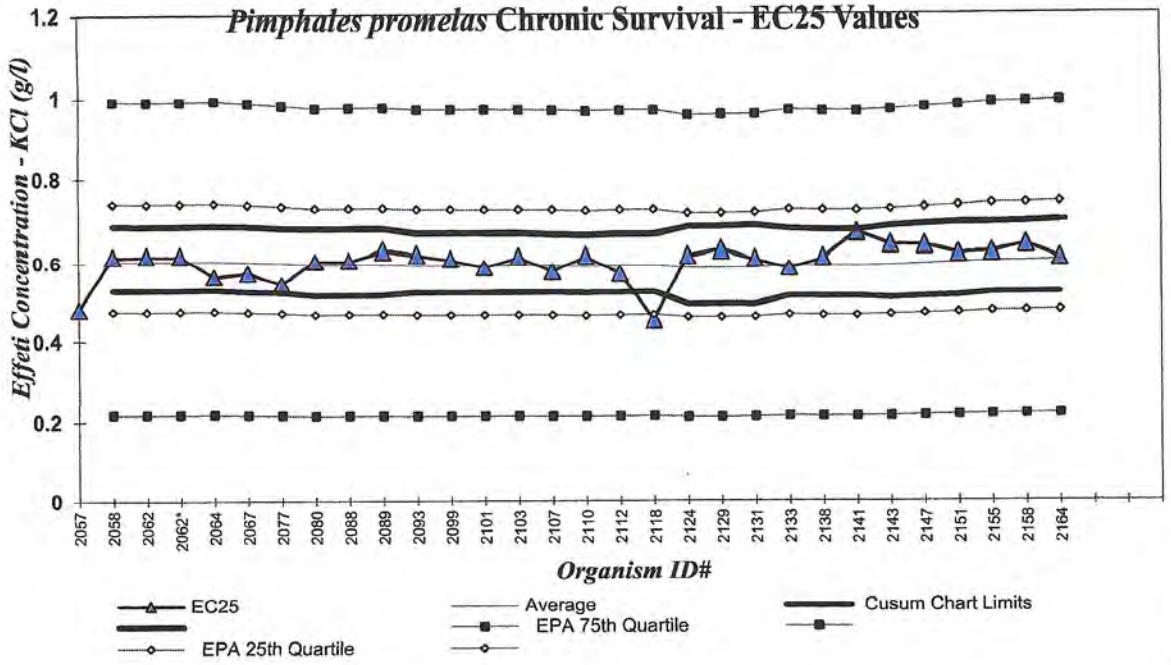
Task Manager: Alyssa Lampi

Project Manager: [signature]

QA Officer: [signature]

REPTOX - FHM chronic (KCl) ASL1282-1118.xlsm Doc Control ID: ASL1282-1118

REFERENCE TOXICANT CUMLATIVE SUMMARY (CUSUM) CHART



Pimephales promelas **- Chronic (EPA Test Method 1000.0)**

POTASSIUM CHLORIDE (g/L)

Endpoint: Chronic Survival

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 oC

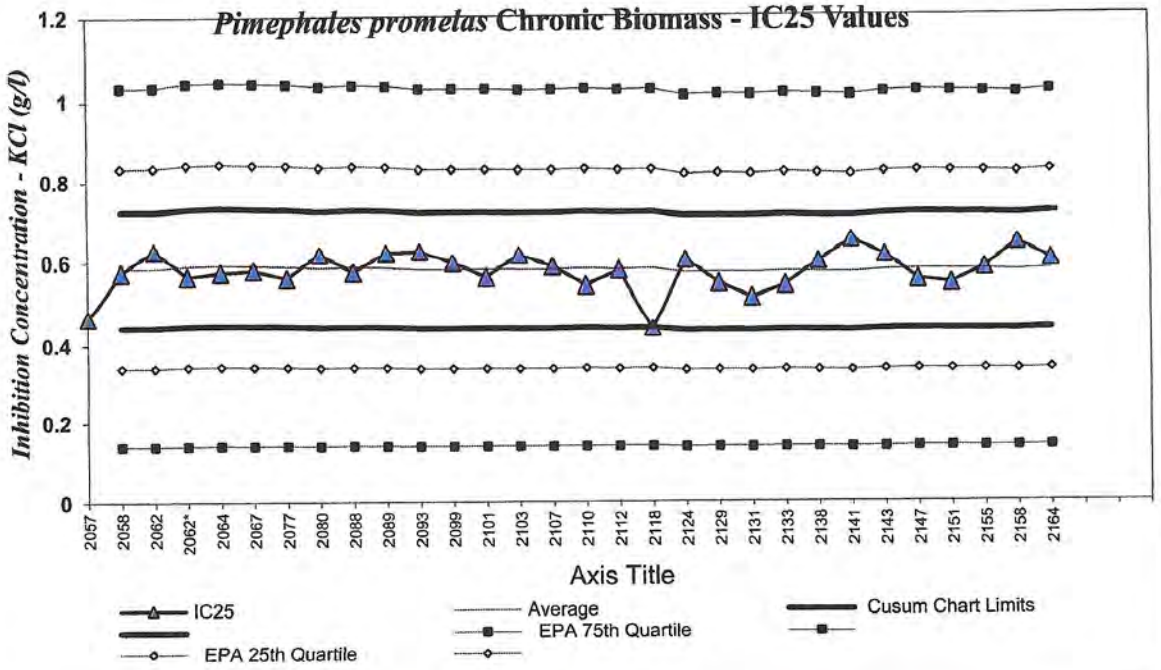
From EPA 833-R-00-003:

10th Quartile CV (*control limit*) =	0.03
25th Quartile CV (*warning limit*) =	0.11
75th Quartile CV (*warning limit*) =	0.32
90th Quartile CV (*control limit*) =	0.52

Intralab CV is compared to EPA ***Warning limits*** *(25th and 75th CV's) and* ***Control limits*** *(10th and 90th CV's), If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.*

Event #	FHM ID #	Test Start Date	EC25	Running Average	Running SD	Cusum Chart Limits AVG-2SD	Cusum Chart Limits AVG+2SD	Intralab CV
61	2124	9/3/2020	**0.62**	0.6	0.05	**0.49**	**0.68**	0.08
62	2129	10/6/2020	**0.63**	0.6	0.05	**0.49**	**0.68**	0.08
63	2131	10/20/2020	**0.61**	0.6	0.05	**0.49**	**0.68**	0.07
64	2133	10/27/2020	**0.58**	0.6	0.04	**0.51**	**0.68**	0.07
65	2138	12/3/2020	**0.61**	0.6	0.04	**0.51**	**0.67**	0.07
66	2141	12/29/2020	**0.67**	0.6	0.04	**0.51**	**0.67**	0.07
67	2143	1/12/2021	**0.64**	0.6	0.04	**0.51**	**0.68**	0.08
68	2147	2/2/2021	**0.64**	0.6	0.04	**0.51**	**0.69**	0.08
69	2151	3/23/2021	**0.62**	0.6	0.05	**0.51**	**0.69**	0.07
70	2155	4/15/2021	**0.63**	0.6	0.04	**0.52**	**0.69**	0.07
71	2158	5/11/2021	**0.64**	0.6	0.04	**0.52**	**0.69**	0.07
72	2164	6/22/2021	**0.61**	0.6	0.04	**0.52**	**0.70**	0.07
73								
74								

REFERENCE TOXICANT CUMLATIVE SUMMARY (CUSUM) CHART



Pimephales promelas **- Chronic (EPA Test Method 1000.0)**

POTASSIUM CHLORIDE (g/L)

Endpoint: Chronic Growth (Biomass)

Stats Method: Linear Interpolation

Test Conditions: Recon MH, 25 oC

From EPA 833-R-00-003:

10th Quartile CV (*control limit*) = 0.12

25th Quartile CV (*warning limit*) = 0.21

75th Quartile CV (*warning limit*) = 0.38

90th Quartile CV (*control limit*) = 0.45

Intralab CV is compared to EPA ***Warning limits*** *(25th and 75th CV's) and* ***Control limits*** *(10th and 90th CV's), If lab CV is outside EPA Control limits, the EPA Control limits are used to set Cusum chart limits.*

Event #	FHM ID #	Test Start Date	IC25	Running Average	Running SD	Cusum Chart Limits AVG-2SD	Cusum Chart Limits AVG+2SD	Intralab CV
61	2124	9/3/2020	**0.60**	0.57	0.05	**0.44**	**0.71**	0.08
62	2129	10/6/2020	**0.55**	0.58	0.05	**0.44**	**0.71**	0.08
63	2131	10/20/2020	**0.52**	0.57	0.05	**0.44**	**0.71**	0.08
64	2133	10/27/2020	**0.54**	0.58	0.04	**0.44**	**0.72**	0.08
65	2138	12/3/2020	**0.60**	0.58	0.04	**0.44**	**0.71**	0.07
66	2141	12/29/2020	**0.65**	0.57	0.04	**0.44**	**0.71**	0.08
67	2143	1/12/2021	**0.62**	0.58	0.05	**0.44**	**0.72**	0.08
68	2147	2/2/2021	**0.56**	0.58	0.05	**0.44**	**0.72**	0.08
69	2151	3/23/2021	**0.55**	0.58	0.05	**0.44**	**0.72**	0.08
70	2155	4/15/2021	**0.58**	0.58	0.05	**0.44**	**0.72**	0.08
71	2158	5/11/2021	**0.65**	0.58	0.05	**0.44**	**0.72**	0.08
72	2164	6/22/2021	**0.60**	0.58	0.05	**0.44**	**0.72**	0.08
73								
74								

APPENDIX C

CHAIN OF CUSTODY

eurofins | Environment Testing TestAmerica

Sample Receipt Record

Batch Number: BS084 Date Received: 6/22/21

Client/Project: PDGD Received By: JC

Were custody seals intact? ☒ Yes ☐ No ☐ N/A

Packing Material: ☐ Ice ☒ Blue Ice ☐ Box

Temp OK? (≤ 6°C) Therm ID: 173 Expires: 9/9/2021 Observed: 1.7 / 1.6 °C, Actual Temp: 1.4 / 1.5 °C ☒ Yes ☐ No ☐ N/A

If sample is noted @ ≤ 0.0 °C, is the sample frozen or partially frozen? ☐ Yes ☐ No ☒ N/A

Was a Chain of Custody (CoC) Provided? ☒ Yes ☐ No ☐ N/A

Was the CoC correctly filled out? (If No, document below) ☒ Yes ☐ No ☐ N/A

Were the sample containers in good condition (not broken or leaking)? ☐ Yes ☐ No ☐ N/A

Are all samples within 36 hours of collection? ☒ Yes ☐ No ☐ N/A

Method of Shipment: ☐ Hand Delivered, ☐ FedEx, ☐ UPS, ☐ Greyhound, ☒ Other: See below ☐ N/A

Sample Exception Report (The following exceptions were noted)

Client was notif

Resolution to E

...ipt verification
...D: ASL993-1119

CHAIN OF CUSTODY RECORD - FOR AQUATIC TOXICITY TESTING

eurofins | Environment Testing TestAmerica

Client: Northern Star (Pogo) LLC NPDES# AK0053341

Address: PO Box 145
Delta Junction, AK 99737

Contact Person: Nathan Kehoe
Phone: 907-895-2760

PO# 2025060

Composite Sample Information

Samples/Hour _____ Volume/Sample _____
Total Hours _____ Total Volume _____
Initiated: Date _____ Time _____
Ended: Date _____ Time _____
Chilled During Collection _____

Ship Samples to:

Eurofins TestAmerica
Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd. Suite 310
Corvallis, OR 97330
Phone: 541-243-6137

Analysis Required / Comments

Sample ID	Date	Time	Sample Type: Comp.	Sample Type: Grab	# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Daphnia Acute	Trout Acute	SHM Acute	SHM Chronic	MB Acute	MB Chronic	MYS Acute	MYS Chronic	Algae	CA Haz Waste	WA Haz Waste			Concentration and/or Comments
Outfall001-wet	6/21/21	06:31		✓	2	B50941-01	✓	✓																

Sampled By & Title (Please sign and print name): Nathan Kehoe - Enviro Coordinator	Date/Time: 6/21/21 07:33	Relinquished By (Please sign and print name):	Date/Time
Received By (Please sign and print name): Tori Crumvine	Date/Time: 6/22/21 1147	Relinquished By (Please sign and print name):	Date/Time
Received By (Please sign and print name):	Date/Time	Relinquished By (Please sign and print name):	Date/Time
Received By (Please sign and print name):	Date/Time	Shipped Via: UPS ___ Bus ___ Fed-Ex ___ Hand ___ Other X	Shipping #: COC_Bioassay.xlsx
Work Authorized By (Please sign and print name):	Remarks		Doc Control ID: ASL612-0519

027 FAI 6264 9554

027-6264 9554

Shipper's Name and Address
Northern Star (Pogo) LLC
Mile 50 Pogo Mile Road
Delta Junction, AK 99737
USA
Tel: 9076873579

Shipper's Account Number
27442486983
Customer's ID Number
48927

Not Negotiable
Air Waybill
Issued By
Alaska AIR CARGO
P.O. BOX 68900 SEATTLE, WA 98168
800-225-2752 ALASKACARGO.COM

Consignee's Name and Address
CITY DELIVERY SERVIC
PO BOX 311
CORVALLIS, OR 97339
USA
Tel: 541 926 7300

Consignee's Account Number

Also notify
N
Tel:

Issuing Carrier's Agent and City

Accounting Information
48927
Northern Star (Pogo) LLC
Mile 50 Pogo Mile Road
Delta Junction, AK 99737
USA

SRN/2025060
GoldStreak

Agent's IATA Code

Account No.

Airport of Departure (Addr. of First Carrier) and Requested Routing
Fairbanks

To	By First Carrier	To / By	To / By	To / By	Currency		WT/VAL		Other		Declared Value For Carriage	Declared Value For Customs
SEA	Alaska Airlines	PDX	AS		USD	PX	X		X		NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Portland	AS 234/22	AS 2264/22	XXX

Handling Information

SCI

No of Pieces	Gross Weight	kg / lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	76.0	L	Q	76.0		AS AGREED	NONHAZARDOUS WA Dims: 24 x 13 x14 x 1 GSX
1	76.0					AS AGREED	Volume: 2.528

Prepaid	Weight Charge	Collect	Other Charges
	AS AGREED		XBC 10.00

Valuation Charge

Tax

Total Other Charges Due Agent

Total Other Charges Due Carrier

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Northern Star (Pogo) LLC

Signature of Shipper or his Agent

[X] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

[ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Total Prepaid	Total Collect
AS AGREED	

21 Jun 2021 11:28 — Executed On (Date)
Fairbanks — at (Place)
Alaska Airlines — Signature of Issuing Carrier or its Agent

027-6264 9554

eurofins | Environment Testing TestAmerica

Sample Receipt Record

Batch Number: B 5084-02 | Date Received: 6/24/21

Client/Project: DOGO | Received By: TC

Were custody seals intact?	[X] Yes [ ] No [ ] N/A
Packing Material:	~~[X] Ice~~ [X] Blue Ice [ ] Box ([illegible] TC 6/24)
Temp OK? (≤ 6°C) Therm ID: 173 Expires: 9 /9 /2021 Observed: 1.8 / 1.9 °C, Actual Temp: 1.6 / 1.7 °C	[X] Yes [ ] No [ ] N/A
If sample is noted @ ≤ 0.0 °C, is the sample frozen or partially frozen?	[ ] Yes [ ] No [X] N/A
Was a Chain of Custody (CoC) Provided?	[X] Yes [ ] No [ ] N/A
Was the CoC correctly filled out? (If No, document below)	[X] Yes [ ] No [ ] N/A
Were the sample containers in good condition (not broken or leaking)?	[X] Yes [ ] No [ ] N/A
Are all samples within 36 hours of collection?	[X] Yes [ ] No [ ] N/A

Method of Shipment: [ ] Hand Delivered, [ ] FedEx, [ ] UPS, [ ] Greyhound, [X] Other: ______ [ ] N/A

Sample Exception Report (The following exceptions were noted)

Client was r

Resolution t

Bioassay Receipt verification
Doc Control ID: ASL993-1119

CHAIN OF CUSTODY RECORD - FOR AQUATIC TOXICITY TESTING

eurofins | Environment Testing TestAmerica

Client: Northern Star (Pogo) LLC NPDES# AK0053341

Address: PO Box 145
Delta Junction, AK 99737

Contact Person: Nathan Kehoe

Phone: 907-895-2760

PO# 2025060

Composite Sample Information
Samples/Hour _____ Volume/Sample _____
Total Hours _____ Total Volume _____
Initiated: Date _____ Time _____
Ended: Date _____ Time _____
Chilled During Collection _____

Ship Samples to:
Eurofins TestAmerica
Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd. Suite 310
Corvallis, OR 97330
Phone: 541-243-6137

Analysis Required / Comments

Sample ID	Date	Time	Sample Type Comp.	Sample Type Grab	# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Daphnia Acute	Trout Acute	SHM Acute	SHM Chronic	MB Acute	MB Chronic	MYS Acute	MYS Chronic	Algae	CA Haz Waste	WA Haz Waste			Concentration and/or Comments
Outfall001-wet	6/23/21	06:47		✓	2	B50624-02	✓	✓																

Sampled By & Title: Nathan Kehoe Env. Coordinator (Please sign and print name)	Date/Time 6/23/21 07:35	Relinquished By (Please sign and print name): Nathan Kehoe	Date/Time 6/23/21 07:35
Received By: Russell Gossett (Please sign and print name)	Date/Time 6-23-21 07:37	Relinquished By (Please sign and print name): Russell Gossett	Date/Time 6-23-21 11:00
Received By: (Please sign and print name) Tori Crumrine	Date/Time 6/24/21 1110	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via: UPS ___ Bus ___ Fed-Ex ___ Hand ___ Other X	Shipping # COC_Bioassay.xlsx
Work Authorized By (Please sign and print name)	Remarks		Doc Control ID: ASL612-0519

eurofins | Environment Testing TestAmerica

Sample Receipt Record

Batch Number: B5084-03 Date Received: 6-24-21

Client/Project: Pogo Received By: JBr

Were custody seals intact? ☒ Yes ☐ No ☐ N/A

Packing Material: ☐ Ice ☒ Blue Ice ☐ Box

Temp OK? (≤ 6°C) Therm ID: TH173 Expires: 9/9/2021 Observed: 2.3 / 1.8 °C, Actual Temp: 2.0 / 1.5 °C ☒ Yes ☐ No ☐ N/A

If sample is noted @ ≤ 0.0 °C, is the sample frozen or partially frozen? ☐ Yes ☐ No ☒ N/A

Was a Chain of Custody (CoC) Provided? ☒ Yes ☐ No ☐ N/A

Was the CoC correctly filled out? (If No, document below) ☒ Yes ☐ No ☐ N/A

Were the sample containers in good condition (not broken or leaking)? ☒ Yes ☐ No ☐ N/A

Are all samples within 36 hours of collection? ☒ Yes ☐ No ☐ N/A

Method of Shipment: ☐ Hand Delivered, ☐ FedEx, ☐ UPS, ☐ Greyhound, ☒ Other: Courier see attached ☐ N/A

Sample Exception Report (The following exceptions were noted)

Client was notified on: Client contact:

Resolution to Exception:

CHAIN OF CUSTODY RECORD - FOR AQUATIC TOXICITY TESTING

eurofins | Environment Testing TestAmerica

Client: Northern Star (Pogo) LLC NPDES# AK0053341

Address: PO Box 145
Delta Junction, AK 99737

Contact Person: Nathan Kehoe
Phone: 907-895-2760

PO# 2025060

Composite Sample Information
Samples/Hour _____ Volume/Sample _____
Total Hours _____ Total Volume _____
Initiated: Date _____ Time _____
Ended: Date _____ Time _____
Chilled During Collection _____

Ship Samples to:
Eurofins TestAmerica
Attention: Aquatic Toxicology Laboratory
1100 NE Circle Blvd. Suite 310
Corvallis, OR 97330
Phone: 541-243-6137

Analysis Required / Comments

Sample ID	Date	Time	Sample Type Comp.	Sample Type Grab	# of Containers	Lab ID#	Fathead Acute	Fathead Chronic	Cerio Acute	Cerio Chronic	Daphnia Acute	Trout Acute	SHM Acute	SHM Chronic	MB Acute	MB Chronic	MYS Acute	MYS Chronic	Algae	CA Haz Waste	WA Haz Waste			Concentration and/or Comments
Outfall001-wet	6/25/21	06:42		✓	2	85084-03	✓	✓																

Sampled By & Title: Nathan Kehoe Env Coordinator (Please sign and print name) Nathan Kehoe	Date/Time 6/25/21 @ 07:20	Relinquished By (Please sign and print name) Nathan Kehoe	Date/Time 6/25/2021 11:00
Received By (Please sign and print name) Allyssa Lampi	Date/Time 6/26/21 0950	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Relinquished By (Please sign and print name)	Date/Time
Received By (Please sign and print name)	Date/Time	Shipped Via UPS Bus Fed-Ex Hand Other ✓	Shipping # COC_Bioassay.xlsx
Work Authorized By (Please sign and print name)	Remarks pH 7.47 temp = 14.2°C		Doc Control ID: ASL612-0519

027 FAI 6264 9602 027-6264 9602

Shipper's Name and Address	Shipper's Account Number / Customer's ID Number	Not Negotiable / Air Waybill / Issued By
Northern Star (Pogo) LLC Mile 50 Pogo Mile Road Delta Junction, AK 99737 USA Tel: 9076873579	27442486983 48927	Alaska. AIR CARGO P.O. BOX 68900 SEATTLE, WA 98168 800-225-2752 ALASKACARGO.COM
Consignee's Name and Address	**Consignee's Account Number**	**Also notify**
CITY DELIVERY SERVIC PO BOX 311 CORVALLIS, OR 97339 USA Tel: 541 926 7300		Tel:
Issuing Carrier's Agent and City		**Accounting Information** 48927
		Northern Star (Pogo) LLC Mile 50 Pogo Mile Road Delta Junction, AK 99737 USA SRN/2027126 GoldStreak
Agent's IATA Code / **Account No.**		
Airport of Departure (Addr. of First Carrier) and Requested Routing		
Fairbanks		

To	By First Carrier	To / By		To / By		Currency		WT/VAL		Other		Declared Value For Carriage	Declared Value For Customs
SEA	Alaska Airlines	PDX	AS			USD	PX	X		X		NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
Portland	AS 124/25	AS 1247/26	XXX

Handling Information

STORE IN COOLER WHEN POSSIBLE

SCI

No of Pieces	Gross Weight	kg / lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	79.0	L	Q	79.0		AS AGREED	NONHAZARDOUS WA Dims: 24 x 13 x14 x 1 GSX COL
1	79.0					AS AGREED	Volume: 2.528

Prepaid	Weight Charge	Collect	Other Charges
AS AGREED			XBC 10.00
Valuation Charge			
Tax			
Total Other Charges Due Agent			
Total Other Charges Due Carrier			
Total Prepaid	Total Collect		
AS AGREED			

Shipper certifies that the particulars on the face hereof are correct and that **insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.**

For: Northern Star (Pogo) LLC

Signature of Shipper or his Agent

[RK] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

[ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Executed On (Date)	at (Place)	Signature of Issuing Carrier or its Agent
25 Jun 2021 10:48	Fairbanks	Alaska Airlines

027-6264 9602

Rec'd 6-26-21 AB

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A, Fort Collins, Colorado, 80524
T 970.416.0916 F 970.490.2963

TRE Environmental Strategies

July 5, 2021

Mr. Nathan Kehoe
Northern Star Resources Limited
Pogo Operations
P.O. Box 145
Delta Junction, Alaska 99737

RE: Results of WET test – June 2021

Dear Mr. Kehoe,

Attached is a copy of the report for the *Pimephales promelas* (fathead minnow) toxicity test initiated in June 2021 with effluent from your facility.

TRE Environmental Strategies, LLC greatly appreciates this opportunity to provide our services to you. Please do not hesitate to call if you have any questions.

Sincerely,

Whitney Naddy
Report Author
naddywm.tre@gmail.com

Rami B. Naddy, Ph.D.
Manager/Environmental Toxicologist
naddyrb.tre@gmail.com

Enclosures

14001-412-030

Report of Short-Term Chronic Toxicity Testing using the Fathead Minnow (*Pimephales promelas*)

Project ID: 14001-412-030
June 2021

Sponsor and Laboratory Information

Sponsor	Northern Star Resources Limited Pogo Operations P.O. Box 145 Delta Junction, AK 99737
Project Officer	Nathan Kehoe (907) 895-2760
Testing Facility	TRE Environmental Strategies, LLC 100 Racquette Drive, Unit A Fort Collins, CO 80524 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	Rami B. Naddy, Ph.D. (970) 416-0916 email: naddyrb.tre@gmail.com
Report Author	Whitney Naddy (970) 416-0916 email: naddywm.tre@gmail.com

Test Information

Test	Short-Term Chronic under Static-Renewal Conditions
Basis	USEPA (2002), method 1000.0
Test Dates and Time	June 22, 2021 @ 1420 to June 29, 2021 @ 1500
Test Length	7 days
Species	*Pimephales promelas*
Test Material	Effluent (Grab)
Outfall	001
Permit Number	AK-005334-1
Receiving Stream	Goodpaster River
Dilution Water	Moderately Hard Reconstituted Water
Test Concentrations	MH, 6.25, 12.5, 25, 50, and 100% effluent
IWC	100% effluent
Permit Compliance	__X__ **Pass** ____ Fail

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with The NELAC Institute (TNI) standards. Reports are intended to be considered in their entirety; TRE is not responsible for consequences arising from use of a partial report*
- *This report contains 6 pages plus 2 appendices*

Effluent Collection and Receipt

Sample No.	Field No.	Collection Date & Time	TRE No.	Date of Receipt	Temp. at Arrival (°C)	Qual.
1	NA	06/21/21 @ 0624 - 0630	35265	06/22/21	5.9	
2	NA	06/23/21 @ 0638 - 0647	35277	06/24/21	2.5	
3	NA	06/25/21 @ 0637 - 0640	35294	06/26/21	2.9	

Note: See Appendix A for chain of custody records

Effluent Characterization

Sample No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
1	7.6	62	33	178	<0.02	<1.0
2	7.8	62	32	166	0.03	<1.0
3	7.8	74	38	241	0.02	<1.0

Initial Dilution/Control Water Characterization

Batch No.	pH	Hard. (mg/L)[HA]	Alk. (mg/L)[HA]	Spec. Cond. (µS/cm)	TRC (mg/L)[G]	NH_3-N (mg/L)
14356	8.2	92	63	291	<0.02	<1.0

Test Conditions

Type	Static-Renewal Short-term Chronic
Test Endpoints	Survival and Growth (Dry Weight Per Original Fish)
Test Chambers	473-ml plastic cups
Test Solution Volume	250 ml
Replicates per Treatment	4
Organisms per Replicate	10
Test Temperature	25 ± 1°C (≤3°C differential)
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Random according to computer-generated chart
Aeration?	[X] No [ ] Yes
Test Solution Renewal	Daily

Test Organism

Species	*Pimephales promelas*
Age	<24 hours
Source	TRE In-house culture, batch 062221
Acclimation	None
Feeding	0.1 ml brine shrimp nauplii per test chamber 3x/day during the test
Reference Toxicant Testing	Initiated June 1, 2021 using sodium chloride (NaCl)

TEST RESULTS

Biological Data

Treatment (% Effluent)	Percent Survival of *Pimephales promelas*							Mean Dry Weight (mg)[W1]	Significant Reduction Relative to Control?	
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7		Surv.	Growth
0 (MH)	100	100	97.5	97.5	97.5	97.5	97.5	0.648	N/A	N/A
6.25	100	100	100	100	100	100	100	0.663	No	No
12.5	100	100	100	100	100	100	100	0.617	No	No
25	100	100	100	100	92.5	87.5	87.5	0.549	No	No
50	100	100	97.5	90	87.5	87.5	87.5	0.592	No	No
100	100	100	95	85	80	80	80	0.543	No	No
Percent Minimum Significant Difference (Growth)								29.8	Acceptable	

Note: See Appendix B for copies of laboratory data sheets

Data Analysis and Test Endpoints

Biological Endpoint	Statistical Endpoint	Value (% Effluent)	Endpoint < IWC?
Survival	NOEC	100	No
	LOEC	>100	---
Growth (per original fish)	NOEC	100	No
	LOEC	>100	---
	ChV	>100	---
	IC_{25}	>100	No
	TU_c ($100/IC_{25}$)	<1.0	---

NOEC = No Observed Effect Concentration
LOEC = Lowest Observed Effect Concentration
ChV = Chronic Value
IC_{25} = 25% Inhibition Concentration
TU_c = Chronic Toxic Units
Note: Analyses completed using, where appropriate, CETIS version 1.8.7 (2014).

Physical and Chemical Data

Treatment (% Effluent)	pH		Dissolved Oxygen (mg/L)		Conductivity (µS/cm)		Temperature (°C)		Qual.
	Low	High	Low	High	Low	High	Low	High	
0 (MH)	7.6	8.3	5.2	6.9	291	340	24	25	
100	7.4	8.0	4.9	8.3	161	241	24	25	
All Treatments	7.4	8.3	≥4.6		NA		23	25	T1, T3
							24	26	T4

Reference Toxicant Test Results for *P. promelas*

IC_{25} (mg Cl^-/L)	TRE Historical 95% Control Limits (mg Cl^-/L)	
	Low	High
2,201[R]	671	2,070

References

CETIS. 2014. Comprehensive Environmental Toxicity Information System. User Guide (version 1.8.7). Tidepool Scientific, LLC. McKinleyville, CA.

USEPA. 2002. Short-term methods for estimating the chronic toxicity of effluents and receiving waters to freshwater organisms. Fourth Edition. EPA-821-R-02-013.

Explanation of Qualifiers

Note: study-specific narratives within the body of the report are denoted, if necessary, with the superscript letters **a - d**, and associated footnotes. Other qualifications and definitions are defined below.

S -	Sample temperature upon receipt was outside the range recommended by USEPA (2002), (i.e., 0 to 6°C or ambient if collected and used on the same day).
I -	Ice was present in the sample upon receipt.
N1 -	Sample was not used for testing.
N2 -	Liquid from container with ice was not used for testing.
F -	Sample was filtered to remove indigenous organisms prior to use.
HT -	Sample hold time (normally 36 hours) was exceeded.
HA -	Hardness and alkalinity concentrations are presented as $CaCO_3$.
G -	TRC = Total Residual Chlorine
T1 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range but the allowed 3°C differential was not exceeded.
T2 -	Temperatures measured in some of the old test solutions were outside the recommended test temperature range and the allowed 3°C differential was exceeded.
T3 -	Temperatures measured in test solutions.
T4 -	Continuous temperatures measured in the environmental chamber or water bath.
X1 -	Mean young per original female. If any 4th or higher broods were produced, they were excluded from calculation of mean young per female and statistical analysis of reproduction.
X2 -	One or more organisms in this treatment were lost or not found in the test chamber and were excluded from analysis, as the loss was attributed to technician error. See laboratory data sheets for additional detail, as appropriate.
X3 -	One or more male *C. dubia* were found in this treatment and were included in analysis of survival but excluded from analysis of reproduction. See laboratory data sheets for additional detail, as appropriate.
X4 -	One or more fish were alive at test termination but were lost during the drying/weighing process. These fish were included in analysis of survival but excluded from analysis of growth. See laboratory data sheets for additional detail, as appropriate.
O1 -	Dissolved oxygen concentrations were ≤4.0 mg/L in one or more treatments during the test; aeration was initiated in all test chambers. See laboratory data sheets for additional detail, as appropriate.
O2 -	Dissolved oxygen concentrations ≤4.0 mg/L were observed in one or more treatments only at test termination.
O3 -	Dissolved oxygen concentrations were ≤4.0 mg/L in one or more treatments during the test but aeration was not possible. See laboratory data sheets for additional detail, as appropriate.
W1 -	Weight per original number of organisms introduced at test initiation.
W2 -	Weight per surviving number of organisms at test termination.
V1 -	Value was statistically (α=0.05 or 0.01, as appropriate) reduced relative to the control, but was considered a Type I error (anomalous false positive), and was disregarded. The NOEC was interpreted accordingly.
V2 -	Value was not statistically (α=0.05 or 0.01, as appropriate) less than the control, but was considered a Type II error (anomalous false negative). The NOEC was interpreted accordingly.
P1 -	PMSD was below the lower bound indicated by USEPA (2002). A statistically significant reduction for a treatment was disregarded if the RPD for that treatment was less than the lower bound.
P2 -	PMSD was above the upper bound indicated by USEPA (2002), and statistically significant reductions in organism performance were detected.
P3 -	PMSD was above the upper bound indicated by USEPA (2002), and no statistically significant reductions in organism performance were detected.
R -	Monthly reference toxicant test endpoint for this species was outside the 95% control limits for the 20 most recent endpoints.

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol (if applicable) and standard operating procedures, and that the resulting data and report meet the requirements of TNI standards. This report is an accurate reflection of the raw data.

Quality Assurance Unit — Date: July 5, 2024

Data Analyst — Date: 07/05/2024

APPENDIX A

Chain of Custody Records

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Northern Star Pogo | Project #: 14001-412-030

Chain of Custody Tape #: 50262 | Intact?(circle): (Yes) No Not Used

Sampler (Print/Affiliation): Nathan Kehoe / Pogo | Signature: [signature]

Client / Sample ID	Sample Collection				Sample Type		Volume	Preservation (i.e.: 0-6°C)	Test Requested							Sample Temp. Upon Arrival (Therm. #IR1) °C	Lab Sample ID
	Beginning		Ending						Matrix (Liq., Soil, Sediment, etc.)	FL							
	Date	Time	Date	Time	Grab	Comp.											
Eff1#1	6/21/21	06:24	6/21/21	6:30	✓		2.5gal	0-6°C	L	X						5.9	35265

Sample Relinquished By: (Print Name/Affiliation) Nathan Kehoe / NSR Pogo | Date: 6/21/21 | Time: 07:15 | Signature: [signature]

Received By: (Print Name/Affiliation) | Date: | Time: | Signature:

Sample Relinquished By: (Print Name/Affiliation) | Date: | Time: | Signature:

Received By: (Print Name/Affiliation) | Date: | Time: | Signature:

Sample Relinquished By: (Print Name/Affiliation) | Date: | Time: | Signature:

Received By: (Print Name/Affiliation) Mahmoud Elkady | Date: 6/22/21 | Time: 1020 | Signature: [signature]

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): (FedEx) Other UPS Courier | Temp Blank? Yes (No)

Received on Ice: (Yes) No

Comments: temp: 13.9°C pH: 7.52 River was slightly turbid 11.9 NTU PO# 2024988

Effective Date: 02/13/19

Serial No. 06114

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Northern Star Pogo | Project #: 14001-412

Chain of Custody Tape #: 50255 | Intact?(circle): Yes No Not Used

Sampler (Print/Affiliation): Nathan Kehoe / NSR Pogo | Signature:

Client / Sample ID	Sample Collection				Sample Type		Volume	Preservation (i.e.: 0-6°C)	Test Requested							Sample Temp. Upon Arrival (Therm. # DRL) °C	Lab Sample ID
	Beginning		Ending						Matrix (Liq., Soil, Sediment, etc.)	BTEX							
	Date	Time	Date	Time	Grab	Comp.											
Effl #2	6/23/21	06:38	6/23/21	06:43	✓		2.5gal	0-6°C	L	X						2.5	35277
Effl #2	6/23/21	06:44	6/23/21	06:47			1gal	0-6°C	L	X						2.5	35277

Sample Relinquished By: (Print Name/Affiliation) Nathan Kehoe / NSR Pogo | Date: 6/23/21 | Time: 07:20 | Signature:

Received By: (Print Name/Affiliation) Russell Gossett | Date: 6-23-21 | Time: 7:35am | Signature:

Sample Relinquished By: (Print Name/Affiliation) Russell Gossett | Date: 6-23-21 | Time: 11:00 am | Signature:

Received By: (Print Name/Affiliation) | Date: | Time: | Signature:

Sample Relinquished By: (Print Name/Affiliation) | Date: | Time: | Signature:

Received By: (Print Name/Affiliation) David Pilland/TRE | Date: 6/24/21 | Time: 0740 | Signature:

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): FedEx Other UPS Courier

Temp Blank? Yes No

Received on Ice: Yes No

Comments: temp: 11.6°C pH: 7.34 6.23 NTU PO# 2024988

Effective Date: 02/13/19

Serial No. 06115

TRE Environmental Strategies, LLC - Chain of Custody

100 Racquette Drive, Unit A Fort Collins, CO 80524 Phone: (970) 416-0916 Fax: (970) 490-2963

Client/Project Name: Northern Star Pogo — Project #: 14001-412-030

Chain of Custody Tape #: 50265 — Intact? (circle): (Yes) No Not Used

Sampler (Print/Affiliation): Nathan Kehoe NSR Pogo — Signature: [signature]

Client / Sample ID	Beginning Date	Beginning Time	Ending Date	Ending Time	Grab	Comp.	Volume	Preservation (i.e.: 0-6°C)	Matrix (Liq., Soil, Sediment, etc.)	4C						Sample Temp. Upon Arrival (Therm. #IR1) °C	Lab Sample ID
ESH #3	6/25/21	06:37	6/25/21	06:40	✓		2.5gal	0-6°C	L	X						2.9	35294
~~"~~							1gal	0-6°C	L	X							

NK

Sample Relinquished By: (Print Name/Affiliation)	Date / Time	Received By: (Print Name/Affiliation)	Date / Time
Nathan Kehoe NSR Pogo; Signature: [signature]	Date: 6/25/2021; Time: 07:15	Signature:	Date: ; Time:
Signature:	Date: ; Time:	Signature:	Date: ; Time:
Signature:	Date: ; Time:	Mahmoud Elkeady; Signature: [signature]	Date: 6/26/21; Time: 0945

Laboratory (Destination):

TRE Environmental Strategies, LLC
100 Racquette Drive, Unit A
Fort Collins, CO 80524
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via (circle): (FedEx) UPS Other Courier

Temp Blank? Yes (No)

Received on Ice: (Yes) No

Comments: temp: 15°C pH: 7.47 NTU: 3.31 only one 2.5 gallon needed, confirmed by Ronni PO# 2024988

Effective Date: 02/13/19

Serial No. 06116

APPENDIX B

Test Data

QA NAN 7/5/21

TOXICITY DATA PACKAGE COVER SHEET

Test Type: Chronic

Project Number: 14001-412-030

Test Substance: Effluent-(Outfall 001)

Species: *Pimephales promelas*

Dilution Water Type: Mod Hard

Organism Lot or Batch Number: 062221

Concurrent Control Water Type: NA

Age: <24hr (< 24 hr) Supplier: TRE

Date and Time Test Began: 6/22/21 @ 1420

Date and Time Test Ended: 6/29/21 @ 1500

Protocol Number: USEPA 2002, Method 1000.0

Investigator(s): JM / HR / MS / LB / SV / MG / AMB

Background Information

pH control?: Yes **No**

Type of Test: Static-Renewal

If yes, give % CO_2: N/A

Test Temperature: 25 ± 1 °C

Env. Chmbr/Bath #: 25

Test Chmbrs: 473-ml cups/beakers

Test Solution Vol.: 250 ml

Number of Replicates per Treatment: 4

Length of Test: 7 days

Number of Organisms per Replicate: 10

Photoperiod: 16 h light : 8 h dark

Light Intensity: 50 to 100 ft.-c.

Type of Food and Quantity per Chamber: 0.1 ml B.S.

Feeding Frequency: 3 x Daily

Test Substance Characterization Parameters and Frequency:

Hardness: Sx Receipt

Alkalinity: Sx Receipt

NH_3: Sx Receipt

TRC: Sx Receipt

pH: Daily

Conductivity: Daily

Test Concentrations (Volume:Volume): 0 (MH), 6.25, 12.5, 25, 50, and 100%

Agency Summary Sheet(s)?: None

Reference Toxicant Data: Test Dates 06/01/21 to 06/08/21 IC_{25}: 2201 mg/L

Hist. 95% Control Limits: 1071 to 2070 Method for Determining Ref. Tox. Value:

Special Procedures and Considerations:
D.O. maintained ≥ 4.0 mg/L
*Conductivity measured in dilution water and 100% effluent at test termination
If survival in any test chamber falls below 50%, reduce feeding in that chamber to 0.05 ml of brine shrimp
Appropriate correction factors have been applied to all temperatures recorded in this data package
Study Director Initials: AB for RBN Date: 6/22/21

QA ver 7/5/21

TEST SUBSTANCE USAGE LOG

Project Number: 14001-412-030

	Sample 1	Sample 2	Sample 3
Test Substance Number	35265	35277	35294
Test Substance Collection Date and Time	From: 6/21/21 @ 0624	From: 6/23/21 @ 0638	From: 6/25/21 @ 0637
	To: 6/21/21 @ 0630	To: 6/23/21 @ 0643	To: 6/25/21 @ 0640
Sample Type (Grab or Comp)	Grab	Grab	Grab
Date Test Substance Received	6/22/21	6/24/21	6/26/21
Dilution Water Number RW# or TRE#, circle one	14356	14356	A361
Concurrent Control Water RW#	NA	NA	NA
Date(s) Used	6/22/21	6/24/21	6/26/21
	6/23/21	6/25/21	6/27/21
			6/28/21

Preparation of Test Solutions

Test Substance Conc. (% Effluent)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)	Test Substance Volume (ml)	Dilution Water Volume (ml)	Total Volume (ml)
0 (MH)	0	1000	1000						
6.25%	62.5	938	1000						
12.5%	125	875	1000						
25%	250	750	1000						
50%	500	500	1000						
100%	1000	0	1000						
Total	1937.5	4062.5	6000						

Initials / Date	SM 6/22/21	Mixed FC	
Initials / Date	AB 6/23/21	" "	
Initials / Date	SV/HR 6/24/21	" "	
Initials / Date	AMB 6/25/21	" "	
Initials / Date	SV 6/26/21	" "	
Initials / Date	AMB 6/27/21	" "	
Initials / Date	AMB 6/28/21	" "	
Initials / Date			

FATHEAD MINNOW (*PIMEPHALES PROMELAS*)
CHRONIC BIOLOGICAL DATA

QA nrw 7/5/21

Project Number: 14001-412-030

%Conc.	Test Replicate	Number of Surviving Organisms: Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Remarks (% survival)
0 (MH)	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	97.5
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	9	9	9	9	9	
6.25%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	100
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	10	
12.5%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	100
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	10	
25%	A	10	10	10	10	10	7	5+	5	+1org siphoned
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	10	87.5
	D	10	10	10	10	10	10	10	10	
50%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	9	7	6	6	6	87.5
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	9	9	9	9	
100%	A	10	10	10	9	5	5	5	5	
	B	10	10	10	10	10	10	10	10	80
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	9Δ	9	7	7	7	Δ 1org siphoned
	A									
	B									
	C									
	D									
Date:		6/22/21	6/23/21	6/24/21	6/25/21	6/26/21	6/27/21	6/28/21	6/29/21	
Time:		1420	1615	0950	1135	1130	1125	1150	1500	
Initials:		JM/HP	AS	SV/HP	AEB	SV	AEB	AEB	AEB	

CHRONIC CHEMICAL DATA (INITIAL)

Project Number: 14001-412-030

Test Species: ***Pimephales promelas***

%	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: 0 (MH)									All Conc.	
pH	8.2	8.3	8.1	8.0	8.0	8.0	8.0		Fm-32	
D.O. (mg/L)	6.8	6.7	6.6	5.7	6.5	6.9	6.9		17	
Temp. (°C)	25	25	25	25	25	25	25		L-42	
Cond. (µS/cm)	291	304	318	340	314	297	311		16	
Hard. (mg/L)	92		92		90				Titr.	
Alk. (mg/L)	63		62		57				Titr.	
TRC (mg/L)	<0.02				0.04				22	
NH_3 (mg/L)	<1.0				4.0				HA1	
Conc.: 6.25%										
pH	8.2	8.2	8.2	8.1	8.0	8.1	8.1			
D.O. (mg/L)	6.9	6.7	6.7	5.7	6.3	7.0	7.0			
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (µS/cm)	300	304	318	305	312	298	294			
Hard. (mg/L)										
Alk. (mg/L)										
TRC (mg/L)										
NH_3 (mg/L)										
Conc.: 12.5%							8.3			
pH	8.2	8.2	8.2	8.0	8.1	8.1	7.9			
D.O. (mg/L)	6.9	6.8	6.8	5.7	6.2	7.1	8.3			
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (µS/cm)	277	297	306	294	308	294	293			
Conc.: 25%										
pH	8.1	8.2	8.2	8.1	8.1	8.1	8.2			
D.O. (mg/L)	6.9	6.8	7.2	6.1	6.3	7.1	7.1			
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (µS/cm)	279	292	286	275	299	288	283			
Date:	6/22/21	6/23/21	6/24/21	6/25/21	6/26/21	6/27/21	6/28/21			
Time:	1400	1550	DNLD	1125	1115	1115	1040			
Initials:	JM	AB	JV	AMB	JV	AMB	AMB			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log QA Form No. 084.

*Dilution/control water and effluent were brought to 25°C prior to making the dilution series. The temperature of resulting effluent dilution is assumed to also be 25°C.

DMCB 6/28/21; WP

QA rev 7/5/21

CHRONIC CHEMICAL DATA (INITIAL)

Project Number:	14001-412-030
Test Species:	*Pimephales promelas*

%	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Meter #	Remarks
Conc.: 50%									All Conc.	
pH	8.0	8.1	8.0	8.0	8.1	8.1	8.2			
D.O. (mg/L)	7.0	6.9	7.7	6.3	6.7	7.3	7.3			
Temp. (°C)	*	*	*	*	*	*	*			
Cond. (µS/cm)	245	248	246	239	285	272	268			
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Cond. (µS/cm)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Cond. (µS/cm)										
Conc.:										
pH										
D.O. (mg/L)										
Temp. (°C)										
Cond. (µS/cm)										
Conc.: 100%										
pH	7.6	7.9	7.8	7.9	7.8	7.9	8.0			
D.O. (mg/L)	7.9	7.0	8.3	7.3	7.0	7.8	7.6			
Temp. (°C)	25	25	25	25	25	25	25			
Cond. (µS/cm)	178	180	166	161	241	240	235			
Hard. (mg/L)	62		62		74					
Alk. (mg/L)	33		32		38					
TRC (mg/L)	<0.02		0.03		0.02					
NH_3 (mg/L)	<1.0		<1.0		<1.0					
Date:	6/22/21	6/23/21	6/24/21	6/25/21	6/26/21	6/27/21	6/28/21			
Time:	1400	1550	0940	1125	1115	1120	1040			
Initials:	JM	AO	SV	ALB	SV	ALB	ALB			

Note: Hardness, alkalinity, TRC, and NH3 data appearing on this page have been transcribed from the wet chemistry log QA Form No. 084.

*Dilution/control water and effluent were brought to 25°C prior to making the dilution series. The temperature of resulting effluent dilution is assumed to also be 25°C.

QA mm 7/5/21

CHRONIC CHEMICAL DATA (FINAL)

Project Number:	14001-412-030
Test Species:	***Pimephales promelas***

%		Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Meter #	Remarks
Conc.:	0 (MH)									All Conc.	* conductivity
pH		7.9	7.6	7.8	7.7	7.7	7.7	7.7		FM29	*295
D.O. (mg/L)		6.2	5.9	5.7	5.2	6.0	5.4	5.4		17	
Temp (°C)		25	24	24	24	24	25	25		LM	
Conc.:	6.25%										
pH		7.9	7.7	7.7	7.5	7.6	7.7	7.6			
D.O. (mg/L)		6.0	6.0	4.7	5.0	5.5	5.0	5.2			
Temp (°C)		25	24	24	24	24	24	25			
Conc.:	12.5%						7.6 @				
pH		7.9	7.7	7.6	7.5	7.6	~~5.0~~	7.5			
D.O. (mg/L)		6.0	5.9	4.6	4.9	5.1	~~7.6~~ 5.0	5.1			
Temp (°C)		25	24	24	24	24	24	25			
Conc.:	25%						7.6				
pH		7.9	7.7	7.6	7.5	7.5	~~5.0~~	7.5			
D.O. (mg/L)		6.1	5.6	4.7	4.9	5.1	~~7.6~~ 5.0	5.2			
Temp (°C)		25	23	24	24	24	24	25			
Conc.:	50%										
pH		7.9	7.7	7.6	7.4	7.5	7.6	7.5			
D.O. (mg/L)		6.1	5.9	4.9	4.7	5.2	5.0	5.4			
Temp (°C)		25	24	24	25	24	24	25			
Conc.:	100%										* conductivity
pH		7.9	7.7	7.6	7.4	7.5	7.5	7.4			*237
D.O. (mg/L)		6.1	6.0	5.4	5.0	5.2	4.9	5.9			
Temp (°C)		25	24	25	25	24	24	25			
Conc.:											
pH											
D.O. (mg/L)											
Temp (°C)											
Date:		6/23/21	6/24/21	6/25/21	6/26/21	6/27/21	6/28/21	6/29/21			
Time:		1550	0925	1195	1115	1120	1040	1500			
Initials:		AS	SV	AUB	SV	AUB	AUB	AUB			

QA AUB 6/28/21; EWP

DAILY TOXICITY TEST LOG

Reviewed 7/5/21

Project Number:	14001-412-030
Test Species:	***Pimephales promelas***

General Comments	Random Chart: Iota Min/Max Therm. #: M-32	Feeding * 0.05 BS Day 0-Day 4 Noon + 0.1 BS Day 4 PM-Day 6PM	Initials/Date
Test Day 0	Test Solution Mixed at: 1400 Test Organisms Added at: 1420	Fed @ *1550 ME/Sm	SM 6/22/21
Test Day 1	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ *0710 HR *1200 SV/Sm *1715 AUB	* 6/23/21
Test Day 2	Real Time Temp= 25 °C Range = 24-25 °C	Fed @ *0055 HR *1210 ME/Sm *1710 Sm	SV/HR 6/24/21
Test Day 3	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ *0835 AUB *1200 SV/EN *1705 SVEN	AUB 6/25/21
Test Day 4	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ *0045 HR *1230 ME/HR +1700 SV/HR	SV 6/26/21
Test Day 5	Real Time Temp= 25 °C Range = 24-26 °C	Fed @ +0920 AUB +1220 AUB +1700 AUB	AUB 6/27/21
Test Day 6	Real Time Temp= 25 °C Range = 25-26 °C	Fed @ +0830 Sm +1215 Sm +1620 Sm	AUB 6/28/21
Test Day 7	Real Time Temp= 25 °C Range = 25-26 °C	NONE	AUB 6/29/21
Test Day 8			

QA Form No.010
Revision 7
Effective 01/20
QA: AB 7-2-21

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: ① P. promelas 14001-412-030
Test Substance: Effluent (outfall 001)
Species: P. promelas
Analyst Tare: AB Analyst Gross: SV/EN
Date/Time of Tare Wt.: 6/29/21 @ 1150
Date/Time of Gross Wt.: 6/30/21 @ 0845
Comments:
Analytical Balance ID: SART #1
Dried in Oven # 2 from Date: 6/29/21 Time: 1605
to Date: 6/30/21 Time: 0640

Weight Type (Circle): Wet Blot Dry Dry (60-90°C) Dry (>100°C) AFDW (>500°C)
Lot or Batch Number: 062221

Boat No.	Treatment %	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	MH	A		1.07763	1.08419	0.00656					10		
		B		1.06050	1.06729	0.00679					10		
		C		1.05745	1.06378	0.00633					10		
		D		1.07150	1.07773	0.00623					9		
	6.25	A		1.06269	1.06926	0.00657					10		
		B		1.07081	1.07817	0.00736					10		
		C		1.07362	1.08091	0.00729					10		
		D		1.0665	1.06695	0.00530					10		
	12.5	A		1.07839	1.08468	0.00629					10		
	①17	B		1.07359	1.08003	0.00644					10		
		C		1.06147	1.06731	0.00584					10		
		D		①~~1.06~~ 1.07000	1.07612	0.00612					10		
Blank				1.07032	1.07033	0.00001							
Range													
Mean													

Test Solution Volume:
Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

① AMB 6/28/21; WP

QA Form No.010
Revision 7
Effective 01/20
QA: AB 7/2/21

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-412-030 | Test Substance: effluent (outfall 001)
Species: P. promelas | Analyst Tare: ACB | Analyst Gross: SV IEN
Date/Time of Tare Wt.: 6/29/21 @ 1150 | Date/Time of Gross Wt.: 6/30/21 @ 0845
Comments: Analytical Balance ID: BART #1
Dried in Oven # 2 from Date: 6/29/21 Time: 1605
to Date: 6/30/21 Time: 0640

Weight Type (Circle): Wet Blot Dry Dry (60-90°C) (Dry (>100°C)) AFDW (>500°C)
Lot or (Batch) Number: 062221

Boat No.	Treatment %	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	25	A		1.07504	1.07807	0.00303					5		
		B		1.06482	1.07048	0.00566					10		
		C		1.07571	1.08213	0.00642					10		
		D		1.07227	1.07911	0.00684					10		
	50	A		1.07471	1.08175	0.00704					10		
		B		1.07333	1.07801	0.00468					6		
		C		1.07859	1.08516	0.00657					10		
		D		1.07186	1.07726	0.00540					9		
	100	A		1.07083	1.07432	0.00349					5		
		B		1.06746	1.07465	0.00719					10		
		C		1.07685	1.08302	0.00617					10		
		D		1.06979	1.07466	0.00487					7		
Blank													
Range													
Mean													

Test Solution Volume: | Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

QA Form No. 010a
Revision 1
Effective 02/14
CJ 6/30/21
QA: AB 7/2/21

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 14001-412-030 Species: Fathead minnow

Treatment	Rep	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)	No of Orig. Organisms	Mean Wt./ Original Organism (mg)	Mean Wt./ Treatment (mg) (Original)	Number of Surv. Organisms	Mean Wt./ Surviving Organism (mg)	Mean Wt./ Treatment (mg) (Surviving)
MH	A		1.07763	1.08419	0.00656	0.00656	10	0.656	0.6478	10	0.656	0.6651
	B		1.06050	1.06729	0.00679	0.00679	10	0.679		10	0.679	
	C		1.05745	1.06378	0.00633	0.00633	10	0.633		10	0.633	
	D		1.07150	1.07773	0.00623	0.00623	10	0.623		9	0.692	
6.25%	A		1.06269	1.06926	0.00657	0.00657	10	0.657	0.6630	10	0.657	0.6630
	B		1.07081	1.07817	0.00736	0.00736	10	0.736		10	0.736	
	C		1.07362	1.08091	0.00729	0.00729	10	0.729		10	0.729	
	D		1.06165	1.06695	0.00530	0.00530	10	0.530		10	0.530	
12.5%	A		1.07839	1.08468	0.00629	0.00629	10	0.629	0.6173	10	0.629	0.6173
	B		1.07359	1.08003	0.00644	0.00644	10	0.644		10	0.644	
	C		1.06147	1.06731	0.00584	0.00584	10	0.584		10	0.584	
	D		1.07000	1.07612	0.00612	0.00612	10	0.612		10	0.612	
25%	A		1.07504	1.07807	0.00303	0.00303	10	0.303	0.5488	5	0.606	0.6245
	B		1.06482	1.07048	0.00566	0.00566	10	0.566		10	0.566	
	C		1.07571	1.08213	0.00642	0.00642	10	0.642		10	0.642	
	D		1.07227	1.07911	0.00684	0.00684	10	0.684		10	0.684	
50%	A		1.07471	1.08175	0.00704	0.00704	10	0.704	0.5923	10	0.704	0.6853
	B		1.07333	1.07801	0.00468	0.00468	10	0.468		6	0.780	
	C		1.07859	1.08516	0.00657	0.00657	10	0.657		10	0.657	
	D		1.07186	1.07726	0.00540	0.00540	10	0.540		9	0.600	
100%	A		1.07083	1.07432	0.00349	0.00349	10	0.349	0.5430	5	0.698	0.6824
	B		1.06746	1.07465	0.00719	0.00719	10	0.719		10	0.719	
	C		1.07685	1.08302	0.00617	0.00617	10	0.617		10	0.617	
	D		1.06979	1.07466	0.00487	0.00487	10	0.487		7	0.696	
Blank			1.07032	1.07033	0.00001							

CJ 01/30/24
QA: AB 7/2/21

Project Number: 14001-412-030 Species: Fathead minnow

Summary Statistics for Survival Data

Treatment	N	Min	Max	Mean	SD	C.V.
MH	4	0.9	1.0	0.9750	0.0500	5.128%
6.25%	4	1.0	1.0	1.0000	0.0000	0.000%
12.5%	4	1.0	1.0	1.0000	0.0000	0.000%
25%	4	0.5	1.0	0.8750	0.2500	28.571%
50%	4	0.6	1.0	0.8750	0.1893	21.634%
100%	4	0.5	1.0	0.8000	0.2449	30.619%

Summary Statistics for Growth Data (dry wt per original)

Treatment	N	Min	Max	Mean	SD	C.V.
MH	4	0.623	0.679	0.6478	0.0250	3.859%
6.25%	4	0.530	0.736	0.6630	0.0956	14.417%
12.5%	4	0.584	0.644	0.6173	0.0257	4.169%
25%	4	0.303	0.684	0.5488	0.1710	31.154%
50%	4	0.468	0.704	0.5923	0.1078	18.198%
100%	4	0.349	0.719	0.5430	0.1604	29.547%

Summary Statistics for Growth Data (dry wt per surviving organism)

Treatment	N	Min	Max	Mean	SD	C.V.
MH	4	0.633	0.692	0.6651	0.0261	3.923%
6.25%	4	0.530	0.736	0.6630	0.0956	14.417%
12.5%	4	0.584	0.644	0.6173	0.0257	4.169%
25%	4	0.566	0.684	0.6245	0.0504	8.065%
50%	4	0.600	0.780	0.6853	0.0761	11.112%
100%	4	0.617	0.719	0.6824	0.0449	6.574%

Fathead Minnow 7-d Larval Survival and Growth Test

TRE Environmental Strategies, LLC

Analysis ID:	20-2815-1361	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Jun-21 13:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	05-4313-7786	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	22 Jun-21 14:20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Jun-21 15:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	
Sample ID:	08-3038-0426	**Code:**	317E998A	**Client:**	Sumitomo Mining (Pogo)
Sample Date:	21 Jun-21 16:30	**Material:**	Ambient Sample	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	22 Jun-21 10:00	**Source:**	Discharge Monitoring Report		
Sample Age:	22h (3 °C)	**Station:**	Effluent		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Angular (Corrected)	NA	C > T	NA	NA	26.1%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		6.25	20	10	1	6	0.9516	Asymp	Non-Significant Effect
		12.5	20	10	1	6	0.9516	Asymp	Non-Significant Effect
		25	17.5	10	1	6	0.7867	Asymp	Non-Significant Effect
		50	15.5	10	2	6	0.5438	Asymp	Non-Significant Effect
		100	15	10	1	6	0.4761	Asymp	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.975	0.8 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2318974	0.04637947	5	1.051	0.4190	Non-Significant Effect
Error	0.7943997	0.04413332	18			
Total	1.026297		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.876	4.25	0.1487	Equal Variances
Variances	Levene Equality of Variance	6.225	4.25	0.0016	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8713	0.884	0.0056	Non-normal Distribution

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.975	0.8954	1	1	0.9	1	0.025	5.13%	0.0%
6.25		4	1	1	1	1	1	1	0	0.0%	-2.56%
12.5		4	1	1	1	1	1	1	0	0.0%	-2.56%
25		4	0.875	0.4772	1	1	0.5	1	0.125	28.6%	10.3%
50		4	0.875	0.5738	1	0.95	0.6	1	0.09465	21.6%	10.3%
100		4	0.8	0.4102	1	0.85	0.5	1	0.1225	30.6%	17.9%

Angular (Corrected) Transformed Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	0.0%
6.25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-2.97%
12.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	-2.97%
25		4	1.255	0.7568	1.754	1.412	0.7854	1.412	0.1567	25.0%	8.45%
50		4	1.24	0.8452	1.634	1.331	0.8861	1.412	0.124	20.0%	9.59%
100		4	1.15	0.6508	1.65	1.202	0.7854	1.412	0.1569	27.3%	16.1%

Analysis ID:	20-2815-1361	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Jun-21 13:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	0.9
6.25		1	1	1	1
12.5		1	1	1	1
25		0.5	1	1	1
50		1	0.6	1	0.9
100		0.5	1	1	0.7

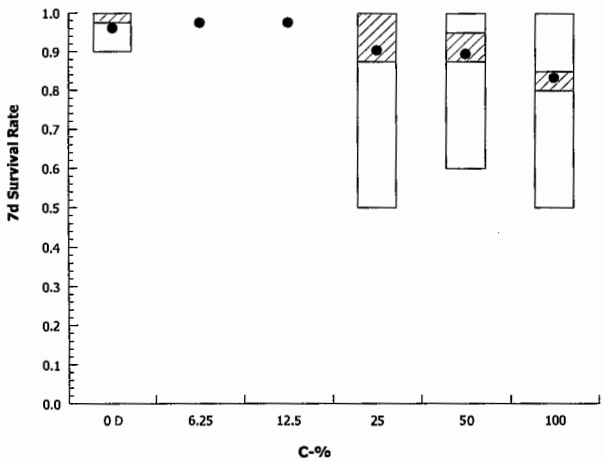
Angular (Corrected) Transformed Detail

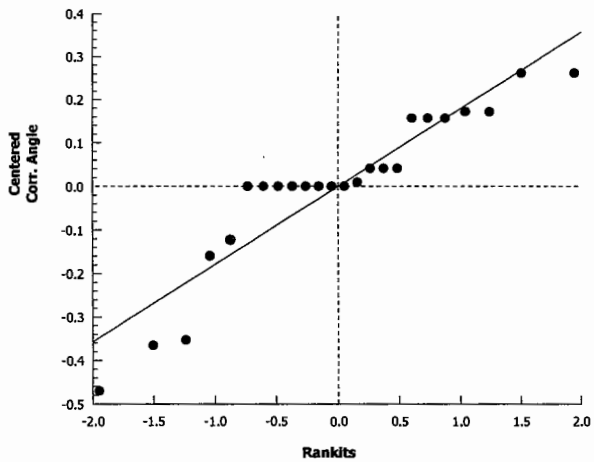
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.412	1.412	1.412	1.249
6.25		1.412	1.412	1.412	1.412
12.5		1.412	1.412	1.412	1.412
25		0.7854	1.412	1.412	1.412
50		1.412	0.8861	1.412	1.249
100		0.7854	1.412	1.412	0.9912

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	10/10	10/10	9/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		5/10	10/10	10/10	10/10
50		10/10	6/10	10/10	9/10
100		5/10	10/10	10/10	7/10

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **TRE Environmental Strategies, LLC**

Analysis ID:	05-1187-1875	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Jun-21 13:56	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	05-4313-7786	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	22 Jun-21 14:20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Jun-21 15:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	
Sample ID:	08-3038-0426	**Code:**	317E998A	**Client:**	Sumitomo Mining (Pogo)
Sample Date:	21 Jun-21 16:30	**Material:**	Ambient Sample	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	22 Jun-21 10:00	**Source:**	Discharge Monitoring Report		
Sample Age:	22h (3 °C)	**Station:**	Effluent		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C > T	NA	NA	29.8%	100	>100	NA	1

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Dilution Water		6.25	-0.1904	2.41	0.193	6	0.8832	CDF	Non-Significant Effect
		12.5	0.3807	2.41	0.193	6	0.6980	CDF	Non-Significant Effect
		25	1.236	2.41	0.193	6	0.3228	CDF	Non-Significant Effect
		50	0.6928	2.41	0.193	6	0.5613	CDF	Non-Significant Effect
		100	1.308	2.41	0.193	6	0.2951	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.6478	0.25 - NL	Yes	Passes Acceptability Criteria
PMSD	0.2977	0.12 - 0.3	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04983301	0.009966602	5	0.7765	0.5792	Non-Significant Effect
Error	0.231023	0.01283461	18			
Total	0.280856		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	13.03	15.1	0.0231	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9585	0.884	0.4081	Normal Distribution

Mean Dry Biomass-mg Summary

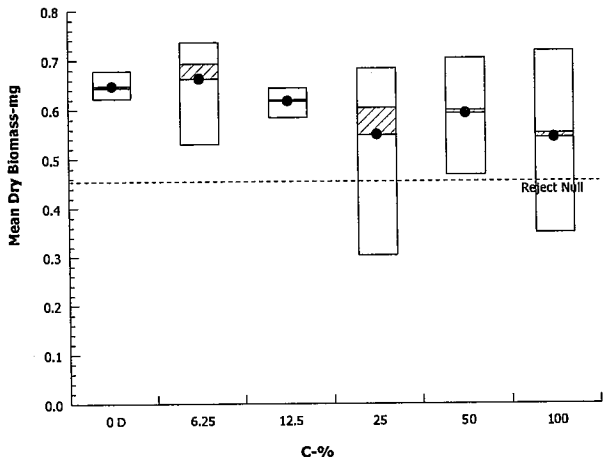
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.6478	0.608	0.6875	0.6445	0.623	0.679	0.0125	3.86%	0.0%
6.25		4	0.663	0.5109	0.8151	0.693	0.53	0.736	0.04779	14.4%	-2.35%
12.5		4	0.6172	0.5763	0.6582	0.6205	0.584	0.644	0.01287	4.17%	4.71%
25		4	0.5488	0.2767	0.8208	0.604	0.303	0.684	0.08548	31.2%	15.3%
50		4	0.5923	0.4208	0.7637	0.5985	0.468	0.704	0.05389	18.2%	8.57%
100		4	0.543	0.2877	0.7983	0.552	0.349	0.719	0.08022	29.5%	16.2%

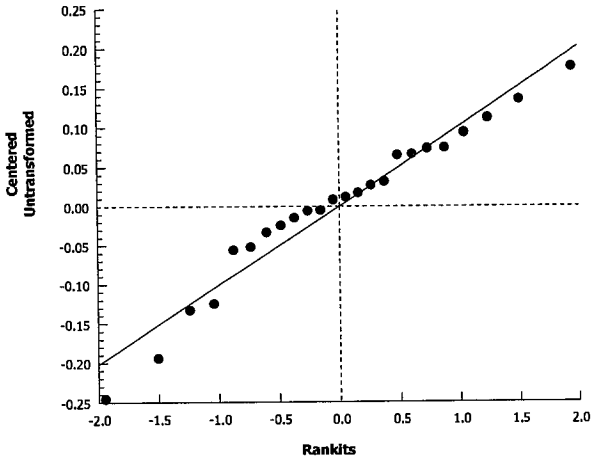
Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.656	0.679	0.633	0.623
6.25		0.657	0.736	0.729	0.53
12.5		0.629	0.644	0.584	0.612
25		0.303	0.566	0.642	0.684
50		0.704	0.468	0.657	0.54
100		0.349	0.719	0.617	0.487

Analysis ID:	05-1187-1875	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Jun-21 13:56	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Fathead Minnow 7-d Larval Survival and Growth Test — **TRE Environmental Strategies, LLC**

Analysis ID:	21-1069-0997	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Jun-21 13:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-4313-7786	**Test Type:**	Growth-Survival (7d)	**Analyst:**	Lab Tech
Start Date:	22 Jun-21 14:20	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Jun-21 15:00	**Species:**	Pimephales promelas	**Brine:**	Not Applicable
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	
Sample ID:	08-3038-0426	**Code:**	317E998A	**Client:**	Sumitomo Mining (Pogo)
Sample Date:	21 Jun-21 16:30	**Material:**	Ambient Sample	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	22 Jun-21 10:00	**Source:**	Discharge Monitoring Report		
Sample Age:	22h (3 °C)	**Station:**	Effluent		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1463770	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.6478	0.25 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	11.62	N/A	95.49	8.604	1.047	NA
IC10	19.83	6.914	N/A	5.043	NA	14.46
IC15	74.42	N/A	N/A	1.344	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Mean Dry Biomass-mg Summary

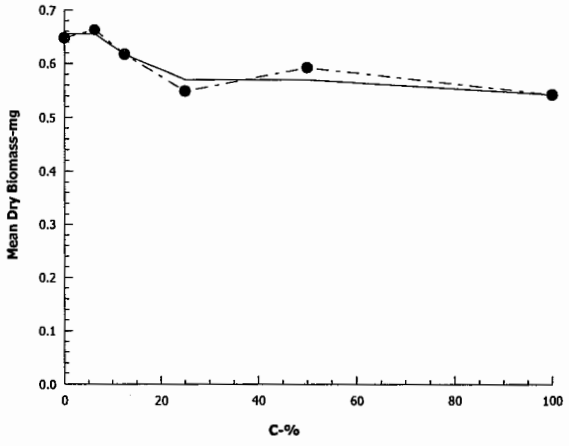
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.6478	0.623	0.679	0.0125	0.025	3.86%	0.0%
6.25		4	0.663	0.53	0.736	0.04779	0.09559	14.4%	-2.35%
12.5		4	0.6172	0.584	0.644	0.01287	0.02573	4.17%	4.71%
25		4	0.5488	0.303	0.684	0.08548	0.171	31.2%	15.3%
50		4	0.5923	0.468	0.704	0.05389	0.1078	18.2%	8.57%
100		4	0.543	0.349	0.719	0.08022	0.1604	29.5%	16.2%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.656	0.679	0.633	0.623
6.25		0.657	0.736	0.729	0.53
12.5		0.629	0.644	0.584	0.612
25		0.303	0.566	0.642	0.684
50		0.704	0.468	0.657	0.54
100		0.349	0.719	0.617	0.487

Analysis ID:	21-1069-0997	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Jun-21 13:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



APPENDIX E –

2021 FISH TISSUE TESTING

LABORATORY REPORTS

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins FGS, Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-106424-1
Client Project/Site: Chinook - Discrete and Composites

For:
Northern Star (Pogo) LLC
PO BOX 145
Delta Junction, Alaska 99737

Attn: Nathan Kehoe

Authorized for release by:
10/28/2021 10:24:31 AM

Sheri Cruz, Project Manager I
(253)922-2310
Sheri.Cruz@Eurofinset.com

Table of Contents

Job ID: 580-106424-1

Laboratory: Eurofins FGS, Seattle

Narrative

CASE NARRATIVE

Client: Northern Star (Pogo) LLC
Project: Chinook - Discrete and Composites
Report Number: 580-106424-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues.

It should be noted that samples with elevated Reporting Limits (RLs) resulting from a dilution may not be able to satisfy customer reporting limits in some cases. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes within the calibration range of the instrument or that reduces the interferences thereby enabling the quantification of target analytes.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT
The samples were received on 10/05/2021; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.1 C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

TOTAL METALS (ICPMS)
Samples SW12F01 (580-106424-1), SW12F02 (580-106424-2), SW12F03 (580-106424-3), SW12F04 (580-106424-4), SW12F05 (580-106424-5), SW12F06 (580-106424-6), SW12F07 (580-106424-7), SW12F08 (580-106424-8), Bait (580-106424-9), SW01F01 (580-106424-11), SW01F02 (580-106424-12), SW01F03 (580-106424-13), SW01F04 (580-106424-14), SW01F05 (580-106424-15), SW01F06 (580-106424-16), SW01F07 (580-106424-17), SW01F08 (580-106424-18), SW01F09 (580-106424-19), SW01F10 (580-106424-20) and SW01FCOMP (580-106424-21) were analyzed for total metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/20/2021 and analyzed on 10/21/2021.

Cadmium, Lead and Silver exceeded the RPD limit for the duplicate of sample SW01FCOMPDU (580-106424-21).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL RECOVERABLE METALS (ICPMS)
Sample SW-FB2 (580-106424-10) was analyzed for total recoverable metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 10/25/2021 and analyzed on 10/26/2021.

Cadmium was detected in method blank MB 580-371547/21-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

Sample SW-FB2 (580-106424-10)[5X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Job ID: 580-106424-1 (Continued)

Laboratory: Eurofins FGS, Seattle (Continued)

TOTAL MERCURY

Sample SW-FB2 (580-106424-10) was analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 10/18/2021 and analyzed on 10/19/2021.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Samples SW12F01 (580-106424-1), SW12F02 (580-106424-2), SW12F03 (580-106424-3), SW12F04 (580-106424-4), SW12F05 (580-106424-5), SW12F06 (580-106424-6), SW12F07 (580-106424-7), SW12F08 (580-106424-8), Bait (580-106424-9), SW01F01 (580-106424-11), SW01F02 (580-106424-12), SW01F03 (580-106424-13), SW01F04 (580-106424-14), SW01F05 (580-106424-15), SW01F06 (580-106424-16), SW01F07 (580-106424-17), SW01F08 (580-106424-18), SW01F09 (580-106424-19), SW01F10 (580-106424-20) and SW01FCOMP (580-106424-21) were analyzed for total mercury in accordance with EPA SW-846 Method 7471A. The samples were prepared on 10/20/2021 and analyzed on 10/21/2021.

Method 7471A: The matrix spike / matrix spike duplicate (MS/MSD) recoveries for preparation batch 580-371106 and analytical batch 580-371229 were outside control limits. Mercury also exceeded the RPD limit. Sample matrix interference and/or non-homogeneity are suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Qualifiers

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
F2	MS/MSD RPD exceeds control limits
F5	Duplicate RPD exceeds limit, and one or both sample results are less than 5 times RL, and the absolute difference between results is < the upper reporting limits for both.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW12F01
Lab Sample ID: 580-106424-1
Date Collected: 09/24/21 14:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 15:53	2
Arsenic	**0.053**		0.050	0.0099	mg/Kg		10/20/21 11:46	10/21/21 15:53	2
Cadmium	**0.013**	**J**	0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 15:53	2
Copper	**0.63**		0.099	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:53	2
Lead	**0.0060**	**J**	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 15:53	2
Nickel	**0.030**	**J**	0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:53	2
Selenium	**0.38**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:53	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:53	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.017**	**J**	0.024	0.0071	mg/Kg		10/20/21 11:59	10/21/21 13:16	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW12F02
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-2
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0067	mg/Kg		10/20/21 11:46	10/21/21 15:49	2
Arsenic	**0.048**	**J**	0.049	0.0099	mg/Kg		10/20/21 11:46	10/21/21 15:49	2
Cadmium	**0.0078**	**J**	0.079	0.0076	mg/Kg		10/20/21 11:46	10/21/21 15:49	2
Copper	**0.38**		0.099	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:49	2
Lead	**0.023**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 15:49	2
Nickel	**0.024**	**J**	0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:49	2
Selenium	**0.28**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:49	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:49	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.017**	**J**	0.022	0.0065	mg/Kg		10/20/21 11:59	10/21/21 13:14	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW12F03
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-3
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0067	mg/Kg		10/20/21 11:46	10/21/21 15:46	2
Arsenic	**0.035**	**J**	0.049	0.0098	mg/Kg		10/20/21 11:46	10/21/21 15:46	2
Cadmium	ND		0.079	0.0076	mg/Kg		10/20/21 11:46	10/21/21 15:46	2
Copper	**0.38**		0.098	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:46	2
Lead	**0.0051**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 15:46	2
Nickel	**0.020**	**J**	0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:46	2
Selenium	**0.50**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:46	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:46	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.019**	**J**	0.021	0.0063	mg/Kg		10/20/21 11:59	10/21/21 13:12	1

Client Sample Results

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW12F04

Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-4

Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0067	mg/Kg		10/20/21 11:46	10/21/21 15:42	2
Arsenic	**0.031**	**J**	0.050	0.0099	mg/Kg		10/20/21 11:46	10/21/21 15:42	2
Cadmium	ND		0.079	0.0076	mg/Kg		10/20/21 11:46	10/21/21 15:42	2
Copper	**0.51**		0.099	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:42	2
Lead	**0.0057**	**J**	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 15:42	2
Nickel	**0.032**	**J**	0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:42	2
Selenium	**0.29**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:42	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:42	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.016**	**J**	0.025	0.0074	mg/Kg		10/20/21 11:59	10/21/21 13:09	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW12F05
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-5
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0066	mg/Kg		10/20/21 11:46	10/21/21 15:38	2
Arsenic	**0.045**	**J**	0.049	0.0097	mg/Kg		10/20/21 11:46	10/21/21 15:38	2
Cadmium	ND		0.078	0.0075	mg/Kg		10/20/21 11:46	10/21/21 15:38	2
Copper	**0.99**		0.097	0.021	mg/Kg		10/20/21 11:46	10/21/21 15:38	2
Lead	**0.0093**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 15:38	2
Nickel	**0.051**		0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:38	2
Selenium	**0.34**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:38	2
Silver	**0.0026**	**J**	0.019	0.0019	mg/Kg		10/20/21 11:46	10/21/21 15:38	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.016**	**J**	0.030	0.0089	mg/Kg		10/20/21 11:59	10/21/21 13:07	1

Client Sample Results

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW12F06
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-6
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.048	0.0065	mg/Kg		10/20/21 11:46	10/21/21 15:35	2
Arsenic	**0.043**	**J**	0.048	0.0096	mg/Kg		10/20/21 11:46	10/21/21 15:35	2
Cadmium	**0.0092**	**J**	0.077	0.0074	mg/Kg		10/20/21 11:46	10/21/21 15:35	2
Copper	**0.47**		0.096	0.021	mg/Kg		10/20/21 11:46	10/21/21 15:35	2
Lead	**0.0066**	**J**	0.048	0.0046	mg/Kg		10/20/21 11:46	10/21/21 15:35	2
Nickel	**0.023**	**J**	0.048	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:35	2
Selenium	**0.44**		0.14	0.027	mg/Kg		10/20/21 11:46	10/21/21 15:35	2
Silver	ND		0.019	0.0019	mg/Kg		10/20/21 11:46	10/21/21 15:35	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.027**		0.021	0.0064	mg/Kg		10/20/21 11:59	10/21/21 13:05	1

Client Sample Results

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW12F07
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-7
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 15:31	2
Arsenic	**0.042**	**J**	0.050	0.010	mg/Kg		10/20/21 11:46	10/21/21 15:31	2
Cadmium	ND		0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 15:31	2
Copper	**0.66**		0.10	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:31	2
Lead	ND		0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 15:31	2
Nickel	ND		0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:31	2
Selenium	**0.38**		0.15	0.029	mg/Kg		10/20/21 11:46	10/21/21 15:31	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:31	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.019**		0.018	0.0055	mg/Kg		10/20/21 11:59	10/21/21 12:57	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW12F08
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-8
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0067	mg/Kg		10/20/21 11:46	10/21/21 15:27	2
Arsenic	**0.036**	**J**	0.049	0.0098	mg/Kg		10/20/21 11:46	10/21/21 15:27	2
Cadmium	ND		0.079	0.0076	mg/Kg		10/20/21 11:46	10/21/21 15:27	2
Copper	**1.0**		0.098	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:27	2
Lead	**0.0088**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 15:27	2
Nickel	**0.023**	**J**	0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:27	2
Selenium	**0.30**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:27	2
Silver	**0.0031**	**J**	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:27	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.024**	**J**	0.027	0.0080	mg/Kg		10/20/21 11:59	10/21/21 12:55	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: Bait

Date Collected: 09/23/21 13:30
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-9

Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0067	mg/Kg		10/20/21 11:46	10/21/21 15:23	2
Arsenic	**0.40**		0.049	0.0098	mg/Kg		10/20/21 11:46	10/21/21 15:23	2
Cadmium	**0.0087**	**J**	0.078	0.0075	mg/Kg		10/20/21 11:46	10/21/21 15:23	2
Copper	**42**		0.098	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:23	2
Lead	**0.0061**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 15:23	2
Nickel	**0.025**	**J**	0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:23	2
Selenium	**4.3**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:23	2
Silver	**0.11**		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:23	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.018	0.0055	mg/Kg		10/20/21 11:59	10/21/21 12:53	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW-FB2
Date Collected: 09/24/21 16:10
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-10
Matrix: Water

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0050	0.0010	mg/L		10/25/21 18:26	10/26/21 12:47	5
Antimony	ND		0.0040	0.00063	mg/L		10/25/21 18:26	10/26/21 12:47	5
Cadmium	ND		0.0020	0.00019	mg/L		10/25/21 18:26	10/26/21 12:47	5
Copper	ND		0.010	0.0030	mg/L		10/25/21 18:26	10/26/21 12:47	5
Lead	ND		0.0020	0.00020	mg/L		10/25/21 18:26	10/26/21 12:47	5
Nickel	ND		0.015	0.00063	mg/L		10/25/21 18:26	10/26/21 12:47	5
Selenium	ND		0.040	0.010	mg/L		10/25/21 18:26	10/26/21 12:47	5
Silver	ND		0.0020	0.00013	mg/L		10/25/21 18:26	10/26/21 12:47	5

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030	0.00015	mg/L		10/18/21 18:58	10/19/21 14:43	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F01
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-11
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0067	mg/Kg		10/20/21 11:46	10/21/21 13:51	2
Arsenic	**0.034**	**J**	0.049	0.0098	mg/Kg		10/20/21 11:46	10/21/21 13:51	2
Cadmium	**0.015**	**J**	0.079	0.0076	mg/Kg		10/20/21 11:46	10/21/21 13:51	2
Copper	**0.53**		0.098	0.022	mg/Kg		10/20/21 11:46	10/21/21 13:51	2
Lead	**0.026**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 13:51	2
Nickel	**0.038**	**J**	0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 13:51	2
Selenium	**0.38**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 13:51	2
Silver	**0.0044**	**J**	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 13:51	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.0091**	**J**	0.018	0.0055	mg/Kg		10/20/21 11:59	10/21/21 12:50	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F02
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-12
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 15:05	2
Arsenic	**0.046**	**J**	0.050	0.010	mg/Kg		10/20/21 11:46	10/21/21 15:05	2
Cadmium	ND		0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 15:05	2
Copper	**0.49**		0.10	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:05	2
Lead	**0.010**	**J**	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 15:05	2
Nickel	**0.023**	**J**	0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:05	2
Selenium	**0.24**		0.15	0.029	mg/Kg		10/20/21 11:46	10/21/21 15:05	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:05	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.011**	**J**	0.026	0.0077	mg/Kg		10/20/21 11:59	10/21/21 12:48	1

Client Sample Results

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW01F03
Lab Sample ID: 580-106424-13
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0067	mg/Kg		10/20/21 11:46	10/21/21 15:01	2
Arsenic	**0.040**	**J**	0.049	0.0098	mg/Kg		10/20/21 11:46	10/21/21 15:01	2
Cadmium	ND		0.078	0.0075	mg/Kg		10/20/21 11:46	10/21/21 15:01	2
Copper	**0.50**		0.098	0.022	mg/Kg		10/20/21 11:46	10/21/21 15:01	2
Lead	**0.011**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 15:01	2
Nickel	**0.021**	**J**	0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 15:01	2
Selenium	**0.34**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 15:01	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 15:01	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.012**	**J**	0.027	0.0080	mg/Kg		10/20/21 11:59	10/21/21 12:46	1

Client Sample Results

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW01F04
Lab Sample ID: 580-106424-14
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 14:57	2
Arsenic	**0.041**	**J**	0.050	0.010	mg/Kg		10/20/21 11:46	10/21/21 14:57	2
Cadmium	ND		0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 14:57	2
Copper	**0.48**		0.10	0.022	mg/Kg		10/20/21 11:46	10/21/21 14:57	2
Lead	**0.0096**	**J**	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 14:57	2
Nickel	ND		0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 14:57	2
Selenium	**0.49**		0.15	0.029	mg/Kg		10/20/21 11:46	10/21/21 14:57	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 14:57	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.027**	**J**	0.028	0.0085	mg/Kg		10/20/21 11:59	10/21/21 12:43	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F05
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-15
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.049	0.0067	mg/Kg		10/20/21 11:46	10/21/21 14:54	2
Arsenic	**0.033**	**J**	0.049	0.0098	mg/Kg		10/20/21 11:46	10/21/21 14:54	2
Cadmium	ND		0.078	0.0075	mg/Kg		10/20/21 11:46	10/21/21 14:54	2
Copper	**0.48**		0.098	0.022	mg/Kg		10/20/21 11:46	10/21/21 14:54	2
Lead	**0.0050**	**J**	0.049	0.0047	mg/Kg		10/20/21 11:46	10/21/21 14:54	2
Nickel	**0.019**	**J**	0.049	0.019	mg/Kg		10/20/21 11:46	10/21/21 14:54	2
Selenium	**0.35**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 14:54	2
Silver	ND		0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 14:54	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.014**	**J**	0.022	0.0065	mg/Kg		10/20/21 11:59	10/21/21 12:41	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F06
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-16
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0079	J	0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 14:50	2
Arsenic	0.20		0.050	0.010	mg/Kg		10/20/21 11:46	10/21/21 14:50	2
Cadmium	0.023	J	0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 14:50	2
Copper	0.77		0.10	0.022	mg/Kg		10/20/21 11:46	10/21/21 14:50	2
Lead	0.034	J	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 14:50	2
Nickel	0.061		0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 14:50	2
Selenium	0.47		0.15	0.029	mg/Kg		10/20/21 11:46	10/21/21 14:50	2
Silver	0.0032	J	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 14:50	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.017	J	0.026	0.0077	mg/Kg		10/20/21 11:59	10/21/21 12:39	1

Client Sample Results

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW01F07
Lab Sample ID: 580-106424-17
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.051	0.0069	mg/Kg		10/20/21 11:46	10/21/21 14:46	2
Arsenic	**0.039**	**J**	0.051	0.010	mg/Kg		10/20/21 11:46	10/21/21 14:46	2
Cadmium	ND		0.081	0.0078	mg/Kg		10/20/21 11:46	10/21/21 14:46	2
Copper	**0.52**		0.10	0.022	mg/Kg		10/20/21 11:46	10/21/21 14:46	2
Lead	**0.013**	**J**	0.051	0.0049	mg/Kg		10/20/21 11:46	10/21/21 14:46	2
Nickel	**0.044**	**J**	0.051	0.020	mg/Kg		10/20/21 11:46	10/21/21 14:46	2
Selenium	**0.33**		0.15	0.029	mg/Kg		10/20/21 11:46	10/21/21 14:46	2
Silver	**0.0022**	**J**	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 14:46	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.025**		0.024	0.0072	mg/Kg		10/20/21 11:59	10/21/21 12:36	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F08
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-18
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0067	mg/Kg		10/20/21 11:46	10/21/21 14:42	2
Arsenic	**0.080**		0.050	0.0099	mg/Kg		10/20/21 11:46	10/21/21 14:42	2
Cadmium	**0.0097**	**J**	0.079	0.0076	mg/Kg		10/20/21 11:46	10/21/21 14:42	2
Copper	**1.6**		0.099	0.022	mg/Kg		10/20/21 11:46	10/21/21 14:42	2
Lead	**0.021**	**J**	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 14:42	2
Nickel	**0.033**	**J**	0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 14:42	2
Selenium	**0.39**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 14:42	2
Silver	**0.012**	**J**	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 14:42	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.022**	**J**	0.023	0.0070	mg/Kg		10/20/21 11:59	10/21/21 12:29	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F09
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-19
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 14:39	2
Arsenic	**0.094**		0.050	0.0099	mg/Kg		10/20/21 11:46	10/21/21 14:39	2
Cadmium	**0.0090**	**J**	0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 14:39	2
Copper	**0.58**		0.099	0.022	mg/Kg		10/20/21 11:46	10/21/21 14:39	2
Lead	**0.031**	**J**	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 14:39	2
Nickel	**0.053**		0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 14:39	2
Selenium	**0.44**		0.15	0.028	mg/Kg		10/20/21 11:46	10/21/21 14:39	2
Silver	**0.0034**	**J**	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 14:39	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.024**	**J**	0.027	0.0082	mg/Kg		10/20/21 11:59	10/21/21 12:27	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F10
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-20
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 14:35	2
Arsenic	**0.045**	**J**	0.050	0.010	mg/Kg		10/20/21 11:46	10/21/21 14:35	2
Cadmium	**0.011**	**J**	0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 14:35	2
Copper	**0.60**		0.10	0.022	mg/Kg		10/20/21 11:46	10/21/21 14:35	2
Lead	**0.034**	**J**	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 14:35	2
Nickel	**0.060**		0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 14:35	2
Selenium	**0.49**		0.15	0.029	mg/Kg		10/20/21 11:46	10/21/21 14:35	2
Silver	**0.0064**	**J**	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 14:35	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	**0.014**	**J**	0.030	0.0089	mg/Kg		10/20/21 11:59	10/21/21 12:24	1

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01FCOMP
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-21
Matrix: Tissue

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	0.0078	J	0.050	0.0068	mg/Kg		10/20/21 11:46	10/21/21 13:54	2
Arsenic	0.055		0.050	0.010	mg/Kg		10/20/21 11:46	10/21/21 13:54	2
Cadmium	0.014	J	0.080	0.0077	mg/Kg		10/20/21 11:46	10/21/21 13:54	2
Copper	0.62		0.10	0.022	mg/Kg		10/20/21 11:46	10/21/21 13:54	2
Lead	0.042	J	0.050	0.0048	mg/Kg		10/20/21 11:46	10/21/21 13:54	2
Nickel	0.078		0.050	0.019	mg/Kg		10/20/21 11:46	10/21/21 13:54	2
Selenium	0.45		0.15	0.029	mg/Kg		10/20/21 11:46	10/21/21 13:54	2
Silver	0.0054	J	0.020	0.0020	mg/Kg		10/20/21 11:46	10/21/21 13:54	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.028	J F1 F2	0.030	0.0091	mg/Kg		10/20/21 11:59	10/21/21 12:15	1

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 580-371104/24-A
Matrix: Tissue
Analysis Batch: 371299

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 371104

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.10	0.014	mg/Kg		10/20/21 11:46	10/21/21 13:47	2
Arsenic	ND		0.10	0.020	mg/Kg		10/20/21 11:46	10/21/21 13:47	2
Cadmium	ND		0.16	0.015	mg/Kg		10/20/21 11:46	10/21/21 13:47	2
Copper	ND		0.20	0.044	mg/Kg		10/20/21 11:46	10/21/21 13:47	2
Lead	ND		0.10	0.0096	mg/Kg		10/20/21 11:46	10/21/21 13:47	2
Nickel	ND		0.10	0.039	mg/Kg		10/20/21 11:46	10/21/21 13:47	2
Selenium	ND		0.30	0.057	mg/Kg		10/20/21 11:46	10/21/21 13:47	2
Silver	ND		0.040	0.0040	mg/Kg		10/20/21 11:46	10/21/21 13:47	2

Lab Sample ID: LCS 580-371104/25-A
Matrix: Tissue
Analysis Batch: 371299

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 371104

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	50.0	56.0		mg/Kg		112	80 - 120
Arsenic	50.0	52.4		mg/Kg		105	80 - 120
Cadmium	50.0	55.1		mg/Kg		110	80 - 120
Copper	50.0	51.1		mg/Kg		102	80 - 120
Lead	50.0	50.2		mg/Kg		100	80 - 120
Nickel	50.0	51.5		mg/Kg		103	80 - 120
Selenium	50.0	49.8		mg/Kg		100	80 - 120
Silver	50.0	52.5		mg/Kg		105	80 - 120

Lab Sample ID: LCSD 580-371104/26-A
Matrix: Tissue
Analysis Batch: 371299

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 371104

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	50.0	55.6		mg/Kg		111	80 - 120	1	20
Arsenic	50.0	52.1		mg/Kg		104	80 - 120	1	20
Cadmium	50.0	54.7		mg/Kg		109	80 - 120	1	20
Copper	50.0	50.6		mg/Kg		101	80 - 120	1	20
Lead	50.0	49.8		mg/Kg		100	80 - 120	1	20
Nickel	50.0	51.0		mg/Kg		102	80 - 120	1	20
Selenium	50.0	49.5		mg/Kg		99	80 - 120	1	20
Silver	50.0	51.8		mg/Kg		104	80 - 120	1	20

Lab Sample ID: 580-106424-21 MS
Matrix: Tissue
Analysis Batch: 371299

Client Sample ID: SW01FCOMP
Prep Type: Total/NA
Prep Batch: 371104

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	0.0078	J	25.0	25.6		mg/Kg		102	80 - 120
Arsenic	0.055		25.0	26.1		mg/Kg		104	80 - 120
Cadmium	0.014	J	25.0	27.4		mg/Kg		109	80 - 120
Copper	0.62		25.0	26.4		mg/Kg		103	80 - 120
Lead	0.042	J	25.0	24.6		mg/Kg		98	80 - 120
Nickel	0.078		25.0	25.1		mg/Kg		100	80 - 120
Selenium	0.45		25.0	26.0		mg/Kg		102	80 - 120

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-106424-21 MS
Matrix: Tissue
Analysis Batch: 371299

Client Sample ID: SW01FCOMP
Prep Type: Total/NA
Prep Batch: 371104

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Silver	0.0054	J	25.0	25.3		mg/Kg		101	80 - 120

Lab Sample ID: 580-106424-21 MSD
Matrix: Tissue
Analysis Batch: 371299

Client Sample ID: SW01FCOMP
Prep Type: Total/NA
Prep Batch: 371104

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony	0.0078	J	25.8	26.8		mg/Kg		104	80 - 120	5	20
Arsenic	0.055		25.8	27.6		mg/Kg		107	80 - 120	5	20
Cadmium	0.014	J	25.8	28.7		mg/Kg		111	80 - 120	5	20
Copper	0.62		25.8	27.5		mg/Kg		104	80 - 120	4	20
Lead	0.042	J	25.8	25.7		mg/Kg		100	80 - 120	4	20
Nickel	0.078		25.8	26.4		mg/Kg		102	80 - 120	5	20
Selenium	0.45		25.8	27.3		mg/Kg		104	80 - 120	5	20
Silver	0.0054	J	25.8	26.7		mg/Kg		103	80 - 120	5	20

Lab Sample ID: 580-106424-21 DU
Matrix: Tissue
Analysis Batch: 371299

Client Sample ID: SW01FCOMP
Prep Type: Total/NA
Prep Batch: 371104

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Antimony	0.0078	J	ND		mg/Kg		NC	20
Arsenic	0.055		0.0480	J	mg/Kg		14	20
Cadmium	0.014	J	0.00886	J F5	mg/Kg		44	20
Copper	0.62		0.584		mg/Kg		6	20
Lead	0.042	J	0.0329	J F5	mg/Kg		25	20
Nickel	0.078		0.0648		mg/Kg		18	20
Selenium	0.45		0.431		mg/Kg		4	20
Silver	0.0054	J	0.00304	J F5	mg/Kg		56	20

Lab Sample ID: MB 580-371547/21-A
Matrix: Water
Analysis Batch: 371668

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 371547

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Antimony	ND		0.00080	0.00013	mg/L		10/25/21 18:26	10/26/21 11:33	1
Arsenic	ND		0.0010	0.00020	mg/L		10/25/21 18:26	10/26/21 11:33	1
Cadmium	0.0000400	J	0.00040	0.000037	mg/L		10/25/21 18:26	10/26/21 11:33	1
Copper	ND		0.0020	0.00060	mg/L		10/25/21 18:26	10/26/21 11:33	1
Lead	ND		0.00040	0.000040	mg/L		10/25/21 18:26	10/26/21 11:33	1
Nickel	ND		0.0030	0.00013	mg/L		10/25/21 18:26	10/26/21 11:33	1
Selenium	ND		0.0080	0.0021	mg/L		10/25/21 18:26	10/26/21 11:33	1
Silver	ND		0.00040	0.000025	mg/L		10/25/21 18:26	10/26/21 11:33	1

Lab Sample ID: LCS 580-371547/22-A
Matrix: Water
Analysis Batch: 371668

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 371547

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Antimony	1.00	1.03		mg/L		103	80 - 120

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 580-371547/22-A
Matrix: Water
Analysis Batch: 371668

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 371547

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Arsenic			1.00	1.01		mg/L		101	80 - 120		
Cadmium			1.00	1.02		mg/L		102	80 - 120		
Copper			1.00	1.03		mg/L		103	80 - 120		
Lead			1.00	1.05		mg/L		105	80 - 120		
Nickel			1.00	1.04		mg/L		104	80 - 120		
Selenium			1.00	0.985		mg/L		98	80 - 120		
Silver			1.00	1.03		mg/L		103	80 - 120		

Lab Sample ID: LCSD 580-371547/23-A
Matrix: Water
Analysis Batch: 371668

Client Sample ID: Lab Control Sample Dup
Prep Type: Total Recoverable
Prep Batch: 371547

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Antimony			1.00	1.03		mg/L		103	80 - 120	0	20
Arsenic			1.00	1.03		mg/L		103	80 - 120	2	20
Cadmium			1.00	1.02		mg/L		102	80 - 120	0	20
Copper			1.00	1.03		mg/L		103	80 - 120	0	20
Lead			1.00	1.06		mg/L		106	80 - 120	0	20
Nickel			1.00	1.03		mg/L		103	80 - 120	1	20
Selenium			1.00	1.01		mg/L		101	80 - 120	2	20
Silver			1.00	1.02		mg/L		102	80 - 120	1	20

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 580-370940/23-A
Matrix: Water
Analysis Batch: 371068

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 370940

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.00030	0.00015	mg/L		10/18/21 18:58	10/19/21 14:36	1

Lab Sample ID: LCS 580-370940/24-A
Matrix: Water
Analysis Batch: 371068

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 370940

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Mercury			0.00200	0.00204		mg/L		102	80 - 120		

Lab Sample ID: LCSD 580-370940/25-A
Matrix: Water
Analysis Batch: 371068

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 370940

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury			0.00200	0.00194		mg/L		97	80 - 120	5	20

Method: 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 580-106424-10 MS
Matrix: Water
Analysis Batch: 371068

Client Sample ID: SW-FB2
Prep Type: Total/NA
Prep Batch: 370940

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	ND		0.00200	0.00204		mg/L		102	80 - 120

Lab Sample ID: 580-106424-10 MSD
Matrix: Water
Analysis Batch: 371068

Client Sample ID: SW-FB2
Prep Type: Total/NA
Prep Batch: 370940

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	ND		0.00200	0.00199		mg/L		99	80 - 120	3	20

Lab Sample ID: 580-106424-10 DU
Matrix: Water
Analysis Batch: 371068

Client Sample ID: SW-FB2
Prep Type: Total/NA
Prep Batch: 370940

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Mercury	ND		ND		mg/L		NC	20

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 580-371106/24-A
Matrix: Tissue
Analysis Batch: 371229

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 371106

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.018	0.0054	mg/Kg		10/20/21 11:59	10/21/21 12:08	1

Lab Sample ID: LCS 580-371106/25-A
Matrix: Tissue
Analysis Batch: 371229

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 371106

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.100	0.0991		mg/Kg		99	80 - 120

Lab Sample ID: LCSD 580-371106/26-A
Matrix: Tissue
Analysis Batch: 371229

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 371106

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.100	0.105		mg/Kg		105	80 - 120	6	20

Lab Sample ID: 580-106424-21 MS
Matrix: Tissue
Analysis Batch: 371229

Client Sample ID: SW01FCOMP
Prep Type: Total/NA
Prep Batch: 371106

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.028	J F1 F2	0.160	0.0643	F1	mg/Kg		23	80 - 120

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: 580-106424-21 MSD
Matrix: Tissue
Analysis Batch: 371229

Client Sample ID: SW01FCOMP
Prep Type: Total/NA
Prep Batch: 371106

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Mercury	0.028	J F1 F2	0.152	0.138	F1 F2	mg/Kg		73	80 - 120	73	20

Lab Sample ID: 580-106424-21 DU
Matrix: Tissue
Analysis Batch: 371229

Client Sample ID: SW01FCOMP
Prep Type: Total/NA
Prep Batch: 371106

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Mercury	0.028	J F1 F2		0.0233	J	mg/Kg				17	20

Lab Chronicle

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW12F01
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-1
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:53	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 13:16	JLS	FGS SEA

Client Sample ID: SW12F02
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-2
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:49	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 13:14	JLS	FGS SEA

Client Sample ID: SW12F03
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-3
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:46	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 13:12	JLS	FGS SEA

Client Sample ID: SW12F04
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-4
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:42	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 13:09	JLS	FGS SEA

Client Sample ID: SW12F05
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-5
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:38	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 13:07	JLS	FGS SEA

Lab Chronicle

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW12F06
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-6
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:35	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 13:05	JLS	FGS SEA

Client Sample ID: SW12F07
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-7
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:31	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:57	JLS	FGS SEA

Client Sample ID: SW12F08
Date Collected: 09/24/21 14:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-8
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:27	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:55	JLS	FGS SEA

Client Sample ID: Bait
Date Collected: 09/23/21 13:30
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-9
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:23	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:53	JLS	FGS SEA

Client Sample ID: SW-FB2
Date Collected: 09/24/21 16:10
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	3005A			371547	10/25/21 18:26	TMH	FGS SEA
Total Recoverable	Analysis	6020		5	371668	10/26/21 12:47	FCW	FGS SEA
Total/NA	Prep	7470A			370940	10/18/21 18:58	TMH	FGS SEA
Total/NA	Analysis	7470A		1	371068	10/19/21 14:43	JLS	FGS SEA

Lab Chronicle

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW01F01
Lab Sample ID: 580-106424-11
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 13:51	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:50	JLS	FGS SEA

Client Sample ID: SW01F02
Lab Sample ID: 580-106424-12
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:05	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:48	JLS	FGS SEA

Client Sample ID: SW01F03
Lab Sample ID: 580-106424-13
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 15:01	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:46	JLS	FGS SEA

Client Sample ID: SW01F04
Lab Sample ID: 580-106424-14
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 14:57	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:43	JLS	FGS SEA

Client Sample ID: SW01F05
Lab Sample ID: 580-106424-15
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 14:54	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:41	JLS	FGS SEA

Lab Chronicle

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Client Sample ID: SW01F06
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-16
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 14:50	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:39	JLS	FGS SEA

Client Sample ID: SW01F07
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-17
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 14:46	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:36	JLS	FGS SEA

Client Sample ID: SW01F08
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-18
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 14:42	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:29	JLS	FGS SEA

Client Sample ID: SW01F09
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-19
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 14:39	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:27	JLS	FGS SEA

Client Sample ID: SW01F10
Date Collected: 09/24/21 16:20
Date Received: 10/05/21 14:29

Lab Sample ID: 580-106424-20
Matrix: Tissue

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 14:35	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:24	JLS	FGS SEA

Lab Chronicle

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Client Sample ID: SW01FCOMP
Lab Sample ID: 580-106424-21
Date Collected: 09/24/21 16:20
Matrix: Tissue
Date Received: 10/05/21 14:29

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			371104	10/20/21 11:46	TMH	FGS SEA
Total/NA	Analysis	6020		2	371299	10/21/21 13:54	FCW	FGS SEA
Total/NA	Prep	7471A			371106	10/20/21 11:59	TMH	FGS SEA
Total/NA	Analysis	7471A		1	371229	10/21/21 12:15	JLS	FGS SEA

Laboratory References:

FGS SEA = Eurofins FGS, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Northern Star (Pogo) LLC
Job ID: 580-106424-1
Project/Site: Chinook - Discrete and Composites

Laboratory: Eurofins FGS, Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	20-004	02-19-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020	3005A	Water	Antimony
6020	3005A	Water	Arsenic
6020	3005A	Water	Cadmium
6020	3005A	Water	Copper
6020	3005A	Water	Lead
6020	3005A	Water	Nickel
6020	3005A	Water	Selenium
6020	3005A	Water	Silver
6020	3050B	Tissue	Antimony
6020	3050B	Tissue	Arsenic
6020	3050B	Tissue	Cadmium
6020	3050B	Tissue	Copper
6020	3050B	Tissue	Lead
6020	3050B	Tissue	Nickel
6020	3050B	Tissue	Selenium
6020	3050B	Tissue	Silver
7471A	7471A	Tissue	Mercury

Oregon	NELAP	4167	07-07-22

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
6020	3050B	Tissue	Antimony
6020	3050B	Tissue	Arsenic
6020	3050B	Tissue	Cadmium
6020	3050B	Tissue	Copper
6020	3050B	Tissue	Lead
6020	3050B	Tissue	Nickel
6020	3050B	Tissue	Selenium
6020	3050B	Tissue	Silver
7471A	7471A	Tissue	Mercury

Sample Summary

Client: Northern Star (Pogo) LLC
Project/Site: Chinook - Discrete and Composites

Job ID: 580-106424-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-106424-1	SW12F01	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-2	SW12F02	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-3	SW12F03	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-4	SW12F04	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-5	SW12F05	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-6	SW12F06	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-7	SW12F07	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-8	SW12F08	Tissue	09/24/21 14:20	10/05/21 14:29
580-106424-9	Bait	Tissue	09/23/21 13:30	10/05/21 14:29
580-106424-10	SW-FB2	Water	09/24/21 16:10	10/05/21 14:29
580-106424-11	SW01F01	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-12	SW01F02	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-13	SW01F03	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-14	SW01F04	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-15	SW01F05	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-16	SW01F06	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-17	SW01F07	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-18	SW01F08	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-19	SW01F09	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-20	SW01F10	Tissue	09/24/21 16:20	10/05/21 14:29
580-106424-21	SW01FCOMP	Tissue	09/24/21 16:20	10/05/21 14:29

580-106424 Chain of Custody

Northern Star (Pogo) LLC Chain of Custody

# of Coolers: 1

Company	Contact Name:	Phone:	Laboratory Name:
Northern Star (Pogo) LLC	Nathan Kehoe	(907) 895-2760	**Eurofins TestAmerica**
Report Mail Address:	**Invoice to:**		**Mail Adddress:**
3204 International Street	pogo.ap@nsrltd.com		**Eurofins TestAmerica - Seattle**
Fairbanks, Alaska 99701	P.O. or Contract #:	PO# 2032082	**5755 8th Street East**
			Tacoma, WA 98424
Email:	**Turnaround Time for Results (TAT)**		**Lab Phone:**
pogoenvironment@nsrltd.com	X Standard ____ Expedited		**(253)922-2310**

APDES Permit #: AK0053341

Public Water System (PWS) ID#:

Special Instructions/Comments:

Requested Analysis/Method: Fish Tissue per Quote 58016959

Lab ID#

Client Sample Identification / Location	Date Sampled	Time Sampled	Matrix (S-DW-WW-Other)	No. of Containers	EPA 6020 Metals Sb, As, Cd, Cu, Pb, Ni, Se, Ag (Pre: None)	EPA 7471A Mercury (Pre: None)							Field Preserved
SW12F01	9/24/2021	14:20	Fish	1	X	X							N
SW12F02	9/24/2021	14:20	Fish	1	X	X							N
SW12F03	9/24/2021	14:20	Fish	1	X	X							N
SW12F04	9/24/2021	14:20	Fish	1	X	X							N
SW12F05	9/24/2021	14:20	Fish	1	X	X							N
SW12F06	9/24/2021	14:20	Fish	1	X	X							N
SW12F07	9/24/2021	14:20	Fish	1	X	X							N
SW12F08	9/24/2021	14:20	Fish	1	X	X							N
Bait	9/23/2021	13:30	FISH	1	X	X							N

Relinquished by:	Date	Time	Received by:	Date	Time
Lauren Jennings	10/04/21	08:00	[signature]	10/5/21	1235
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Name of Sampler: (printed) Nathan Kehoe / Katie Schumacher / James Meyers/Lauren Jennings

Section To Be Completed by Laboratory

Custody Seal Intact? Y / N

Therm. ID: A2 Cor: 0.1 ° Unc: 0.4 °

Cooler Dsc: Lg Blue

Packing: Bub

Cust. Seal: Yes X No ____

Blue Ice (Wet) Dry, None

FedEx: ____

UPS: ____

Lab Cour: X

Other: ____

Add Notes: GW/SK

Northern Star (Pogo) LLC Chain of Custody

# of Coolers: 1

Company Name: **Northern Star (Pogo) LLC**	Contact Name: Nathan Kehoe Phone: (907) 895-2760	Laboratory Name: **TestAmerica Seattle**
Report Mail Address: ***3204 International Street Fairbanks, Alaska 99701***	Invoice to: pogo.ap@nsrltd.com P.O. or Contract #: PO# 2032082	Mail Adddress: **Eurofins TestAmerica - Seattle 5755 8th Street East Tacoma, WA 98424**
pogoenvironment@nsrltd.com	**Turnaround Time for Results (TAT)** X Standard ____ Expedited	Lab Phone: **(253)922-2310**
		APDES Permit #: AK0053341
		Public Water System (PWS) ID#:

Special Instructions/Comments:

Requested Analysis/Method: Fish Tissue per Quote 58016959

Lab ID#

Client Sample Identification / Location	Date Sampled	Time Sampled	Matrix (S-DW-WW-Other)	No. of Containers	EPA 6020 Metals Sb, As, Cd, Cu, Pb, Ni, Se, Ag (Pres: None)	EPA 7471A Mercury (Pres: None)							Field Preserved
SW-FB2	9/24/2021	16:10	Water	1	X	X				Preserved with HNO3			Y
SW01F01	9/24/2021	16:20	Fish	1	X	X							N
SW01F02	9/24/2021	16:20	Fish	1	X	X							N
SW01F03	9/24/2021	16:20	Fish	1	X	X							N
SW01F04	9/24/2021	16:20	Fish	1	X	X							N
SW01F05	9/24/2021	16:20	Fish	1	X	X							N
SW01F06	9/24/2021	16:20	Fish	1	X	X							N
SW01F07	9/24/2021	16:20	Fish	1	X	X							N
SW01F08	9/24/2021	16:20	Fish	1	X	X							N
SW01F09	9/24/2021	16:20	Fish	1	X	X							N
SW01F10	9/24/2021	16:20	Fish	1	X	X							N
SW01COMP	9/24/2021	16:20	Fish	5	X	X							N

Relinquished by:	Date	Time	Received by:	Date	Time
[signature]	10/04/21	08:00	[signature]	10/5/21	1235
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Section To Be Completed by Laboratory

Custody Seal Intact? Y / N ____

Samples On Ice? Y / N ____

Receipt Temperature: ____ °C

Signatures Complete? Y / N ____

Signatures Match? Y / N ____

Add'l Notes: ____

Name of Sampler: (printed) Nathan Kehoe / James Meyers / Katie Schumacher/Lauren Jennings

Login Sample Receipt Checklist

Client: Northern Star (Pogo) LLC

Job Number: 580-106424-1

Login Number: 106424
List Number: 1
Creator: Greene, Ashton R

List Source: Eurofins FGS, Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

APPENDIX F –

ELECTRONIC MONITORING DATA

[SUBMITTED ELECTRONICALLY VIA ALASKA ZENDTO (STATE OF ALASKA)]