

Greenstone Mine

2021 Fish and Fish Habitat

Federal EIS Follow-Up Monitoring

Report

(To satisfy Federal EIS Conditions 3.15, 3.16, 3.17, 3.2, 5.4, and 5.5.1)

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- Appendix C Fish Tissue Data

List of Abbreviations

ASTM	American Society for Testing and Materials
BACI	before-after-control-impact
BGS	below ground surface
CALA	Canadian Association for Laboratory Accreditation
COC	chain of custody
DFO	Fisheries and Oceans Canada
DO	dissolved oxygen
EA	Environmental Assessment
ECA	Environmental Compliance Approval
EIS	Environmental Impact Statement
ETP	effluent treatment plant
GFC	Goldfield Creek
GGM	Greenstone Gold Mines GP Inc.
HDPE	High density polyethylene
HSA	hollow stem auger
ICP-MS	inductively coupled plasma mass spectrometry
ISW	industrial sewage works
MDMER	Metal and Diamon Mining Effluent Regulations
MHT	MacLeod high tailings
O.Reg.	Ontario Regulation
PDA	Project Development Area
PoPC	parameter of potential concern
PTTW	Permit to Take Water

PVC	Polyvinyl chloride
QA/QC	quality assurance / quality control
STP	sewage treatment plant
SWAT	Southwest Arm Tributary
TMF	Tailings Management Facility
tpd	tonnes per day (tpd)
WRSA	Waste Rock Storage Area
YOY	young-of-the-year

1 Introduction

Greenstone Gold Mines GP Inc. (GGM) is in the process of constructing the Greenstone Mine (the Project), which was formerly referred to as the Hardrock Project. The Mine site is located just south of Geraldton, Ontario, within the municipality of Greenstone, at the intersection of Highway 11 and Highway 584. The Project’s Environmental Impact Statement (EIS) (Stantec 2018a) was approved by the Canadian Environmental Assessment Agency (CEAA), as outlined in the Decision Statement issued under Section 54 of the *Canadian Environmental Assessment Act, 2012*. The federal Decision Statement contained various Conditions of Approval. A Fish and Fish Habitat Follow-up Monitoring Plan (the Plan) (GGM 2021) was prepared to address seven specific federal Conditions of Approval related to monitoring potential effects of the Project on fish and fish habitat (Conditions 3.14, 3.15, 3.16, 3.17, 3.2, 5.4, and 5.5.1). This 2021 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report describes activities undertaken during the period of October 1, 2020, through September 30, 2021 (i.e., the 2021 monitoring year) to satisfy the requirements of the Plan.

Construction started March 1, 2021, with tree clearing activities, which allowed for the construction of a temporary camp to house mine workers, the set-up of construction trailers, and the construction of a temporary effluent treatment plant (TETP). No activities that involved the excavation or movement of soil occurred prior to the TETP being commissioned on September 15, 2021.

1.1 Purpose

The purpose of this Fish and Fish Habitat Follow-up Monitoring Report is to describe monitoring activities for the period of October 1, 2020, through September 30, 2021, that were undertaken to assess the accuracy of the EIS as it pertains to federal Conditions of Approval related to fish and fish habitat and to determine the effectiveness of related mitigation measures. The overall objectives related to each condition are provided Table 1-1, which also references the applicable section of this 2021 Fish and Fish Habitat Follow-up Monitoring Report.

Table 1-1: Objectives for Federal Conditions of Approval Related to Fish and Fish Habitat

Federal Condition	Report Section	Objective (from federal Decision Statement, 9/4/2019)
3.14	2.1	<i>develop, prior to construction, and implement, during all phases of the Designated Project and in a manner consistent with the Fisheries Act and its regulations, measures to control erosion and sedimentation in the project development area. The Proponent shall submit these measures to the Agency before implementing them. Among other measures, the Proponent shall maintain stream bank stability using ditches and diversion berms.</i>
3.15	2.4	<i>determine the effectiveness of the mitigation measures as it pertains to the adverse environmental effects of blasting on fish and fish habitat</i>

Table 1-1: Objectives for Federal Conditions of Approval Related to Fish and Fish Habitat

Federal Condition	Report Section	Objective (from federal Decision Statement, 9/4/2019)
3.16	2.2	<i>verify the accuracy of the environmental assessment and to determine the effectiveness of the mitigation measures as it pertains to adverse environmental effects on fish and fish habitat caused by changes in water quality in Kenogamisis Lake, Mosher Lake and the Southwest Arm Tributary</i>
3.17	2.3	<i>verify the accuracy of the environmental assessment and to determine the effectiveness of the mitigation measures as it pertains to the adverse environmental effects on fish and fish habitat of from changes in groundwater quality</i>
3.2	2.4	<i>develop, prior to the start of blasting activities in or near water, and implement, during blasting activities in or near water, mitigation measures to avoid or prevent adverse effect on fish and fish habitat from the use of explosives</i>
5.4	2.5 (water) 2.6 (fish)	<i>verify the accuracy of the environmental assessment as it pertains to the adverse environmental effects on the health of Indigenous Peoples of changes in concentrations of contaminants in water and fish*</i>
5.5.1	2.7	<i>verify the accuracy of the environmental assessment and to determine the effectiveness of the mitigation measures as it pertains to the adverse environmental effects on the health of Indigenous Peoples of changes in concentrations of contaminants in fish tissue</i>

* Note that the objectives of this report are to present fish tissue data that will support the Indigenous Peoples Health Risk Assessment Follow-up Plan (GGM 2020a). Implementation of the Indigenous Peoples Health Risk Assessment Follow-up Plan will assess the accuracy of the environmental assessment as it pertains to the adverse environmental effects on the health of Indigenous Peoples.

2 Follow-up Monitoring

Sections 2.1 through 2.7 provide a description of follow-up monitoring activities undertaken in the 2021 monitoring year to satisfy Conditions 3.15, 3.16, 3.17, 3.2, 5.4, and 5.5.1.

2.1 Erosion and Sediment Control

As per the requirements of federal Condition 3.14, GGM has developed and implemented measures to control erosion and sedimentation in the Project Development Area (PDA) (GGM 2020b). Minimal work in and around fish habitat occurred during the 2021 reporting period because GGM was restricted from excavating and transporting soil until the TETP plant was commissioned on September 15, 2021, just 15 days prior to the end of the 2021 reporting period. Works completed around water during the 2021 reporting period included installation of the freshwater intake and TETP effluent discharge pipelines in Kenogamisis Lake. Soil erosion was reduced and managed at these locations primarily by locating this project infrastructure in areas with an existing road base (i.e., coarse, stable soils) and by maintaining rooted vegetation along the lake shore. Pipelines were not buried in the nearshore area but laid on the ground surface. Silt fencing was also installed between disturbed areas and the lake.

Erosion and sediment controls were regularly inspected to verify the effectiveness of mitigation measures. Management practices were implemented to protect the environment, and to determine whether new management strategies were required. The following activities were undertaken as part of the regular erosion and sediment control monitoring:

- Work sites were inspected and monitored on an on-going basis for compliance with the Erosion and Sediment Control Plan. (GGM 2020b)
- Earthworks were inspected daily to detect evidence of erosion and sedimentation and corrective measures were taken as necessary.
- Where required, work activities were ceased to address potential erosion and sediment control issues.
- Silt fence barriers were inspected daily and immediately following rainfall events.
- Silt fence was immediately repaired or replaced if it was not functioning as intended.
- Stand-by material of prefabricated silt fence barrier was maintained on the construction site and was available for rapid deployment.
- Erosion control structures were reinforced when significant rainfall events were forecasted.

2.2 Surface Water Quality

The following section describes the measures carried out to satisfy federal Condition 3.16 of the EIS approval by presenting surface water quality monitoring completed by GGM to support the identified mitigation measures to reduce adverse effects on fish and fish habitat. This follow-up program describes the results of the October 2020 through September 2021 water quality in Kenogamisis Lake, Mosher Lake, and the Southwest Arm Tributary (SWAT) (Condition 3.16).

There are two components of surface water quality monitoring presented herein:

1. Surface water quality monitoring
2. Dissolved oxygen and water temperature profiling

2.2.1 *Methods*

2.2.1.1 **Surface Water Quality Monitoring Methods**

The surface water monitoring locations, sampling frequency, sampling methods, analytical parameters, and data analysis are presented in the following sections.

2.2.1.1.1 Data Collection

Surface water quality in lakes and streams may potentially be affected through the sewage treatment plant (STP) and effluent treatment plant (ETP) discharges to the Southwest Arm of Kenogamisis Lake or from groundwater seepage from the Waste Rock Storage Areas (WRSAs), TMF, and historical tailings.

Surface water quality sampling locations are presented in Figure 2-1. Surface water monitoring locations will be reviewed throughout the adaptive management process presented in the Plan (GGM 2021). Monitoring locations may be added or removed from the monitoring program in accordance with their utility in monitoring potential effects of the Project.

Table 2-1 presents the frequency of sampling and rationale for each monitoring station for surface water quality. Surface water quality monitoring includes:

- Water quality monitoring (monthly) of the Southwest Arm of Kenogamisis Lake to monitor the extent of the effluent mixing zones within the receiver as well as potential effects of the TMF on the Southwest Arm of Kenogamisis Lake.
- Water quality monitoring (monthly) of Barton Bay, Central Basin, and Outflow Basin of Kenogamisis Lake, and downstream of Kenogamisis Lake at the locations indicated on Figure 2-1 to document changes in water quality.
- Water quality monitoring (monthly) of Goldfield Creek (GFC) Tributary, GFC diversion channel, SWAT inflow to the Southwest Arm of Kenogamisis Lake, Magnet Creek, and Mosher Lake to document changes in water quality.

Of the twenty-five (25) surface water quality monitoring stations, twenty-four (24) locations were sampled during 2021. Station 54 will commence sampling once the GFC diversion occurs and water is available to sample, expected in 2022. The location of Station 46 may be modified to monitor the mixing zone for the full scale ETP, after a plume delineation study is completed to determine the best location for the additional water quality monitoring station. The surface water quality monitoring locations were monitored monthly, when safe to do so, to assess seasonal fluctuations in water quality. Data from monthly monitoring will be used to monitor potential trends in surface water quality and to evaluate whether fluctuations in quality are due to natural variation or from a Project related effect. The frequency of monitoring will be reduced to quarterly if there are no trigger thresholds exceeded during a two-year period (approximately 24 samples). The surface water quality monitoring stations are shown on Figure 2-1.

- Legend**
- Local Assessment Area
 - Regional Assessment Area
 - Discharge Location
 - Routine Water Quality Monitoring
 - Temperature/ DO Profile
 - Mercury and Methylmercury Monitoring
 - New Highway 11 Alignment
 - Diversion Channel
 - Collection Ponds
 - Open Pit- Full Extent
 - Tailings Management Facility
 - Grade Control Structure
 - Inundated Area ; Backwater effect
 - Waste Rock Storage Area
- Existing Features**
- Highway
 - Major Road
 - Local Road
 - Existing SW Arm Tributary Channel
 - Existing Portion of Goldfield Creek (to be overprinted)
 - Watercourse
 - Provincial Park
 - Wetland (Eco-Site Based)
 - Waterbody

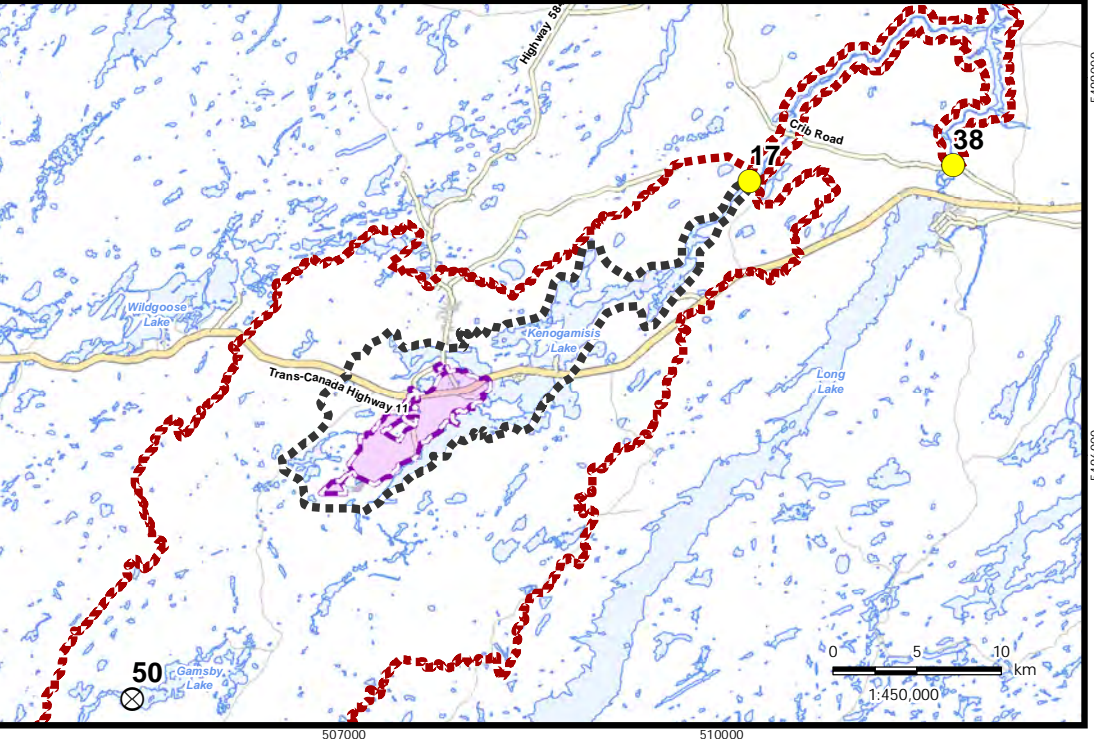
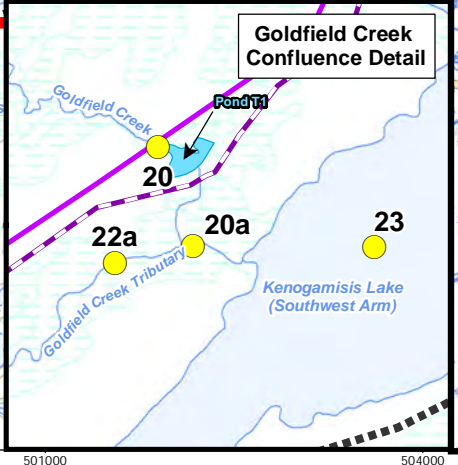
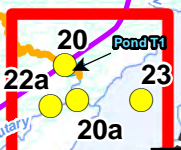
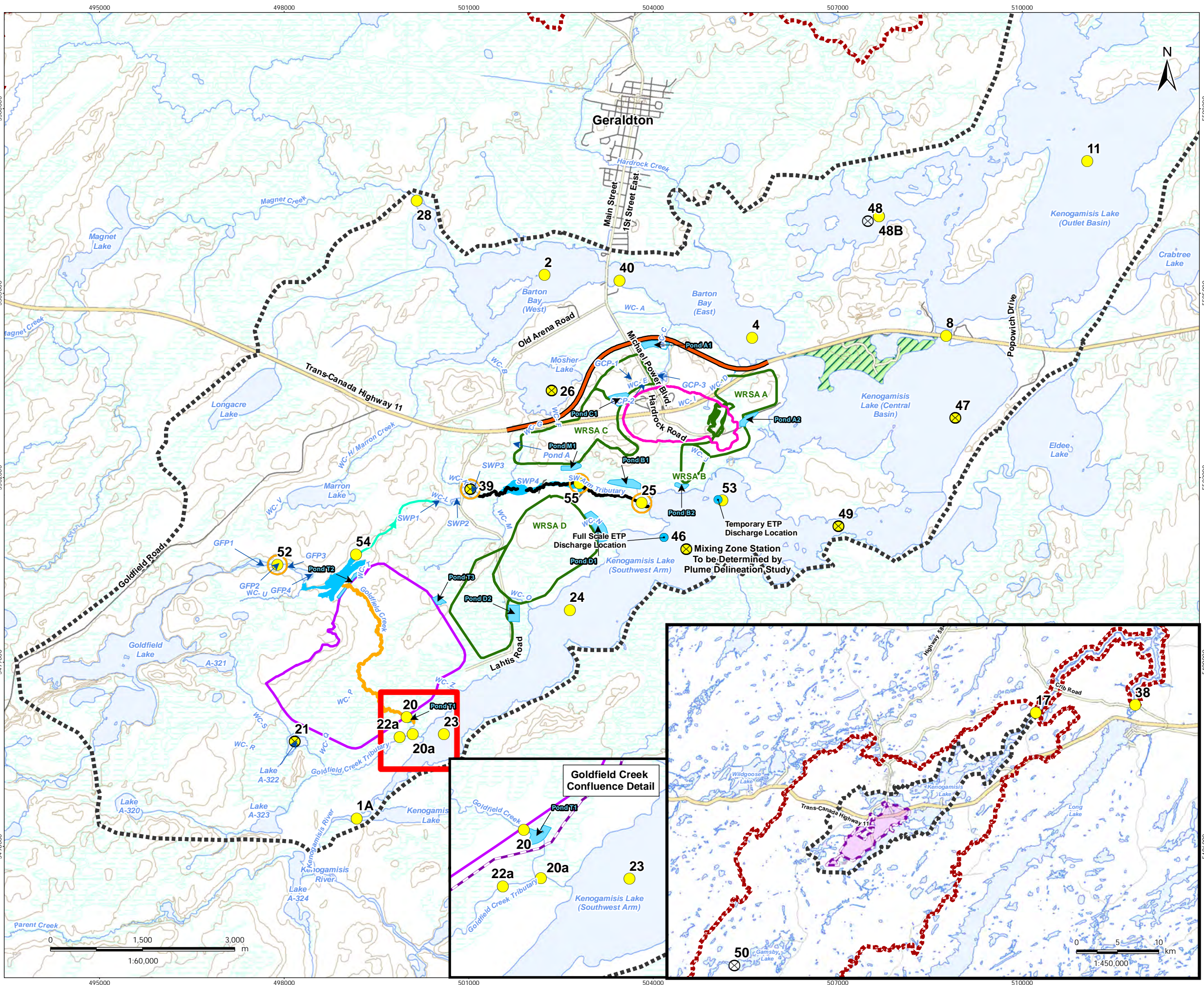
- Notes**
1. Coordinate System: NAD 1983 UTM Zone 16N
 2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

December 2021
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Client/Project
Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
2-1

Title
Surface Water
Quality Monitoring Locations



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Table 2-1: Surface Water Quality Monitoring Locations, Frequency, and Rationale

Station	Frequency	Rationale
1A	Monthly	Background station, upstream of Southwest Arm
2	Monthly	Monitor for potential effects of historical Little Long Lac tailings seepage discharge
4	Monthly	Monitor for potential effects of historical MacLeod tailings seepage discharge and Geraldton STP discharge on Barton Bay East
8	Monthly	Monitor for potential effects downstream of the Kenogamisis Lake Central Basin near the outlet to the Outlet Basin
11	Monthly	Monitor for potential effects midway through the Outlet Basin
17	Monthly	Kenogamisis Dam. End of Local Assessment Area
20	Monthly	Monitor for potential effects of the TMF on GFC, upstream of confluence of GFC and GFC Tributary and upstream of Kenogamisis Lake
20A	Monthly	Monitor for potential effects of the TMF on GFC, downstream of confluence of GFC and GFC Tributary and upstream of Kenogamisis Lake
21	Monthly	Monitor potential effects of TMF on Lake A-322.
22A	Monthly	Monitor for potential effects of the TMF on Goldfield Creek Tributary, upstream of confluence of GFC and GFC Tributary.
23	Monthly	Monitor potential effects of the TMF on the Southwest Arm of Kenogamisis Lake
24	Monthly	Monitor for potential effects of the TMF and/or WRSA D on the Southwest Arm of Kenogamisis Lake
25	Monthly	Monitor for potential effects of mining activities at the mouth of the SWAT
26	Monthly	Monitor for potential effects of WRSA C on Mosher Lake. Requirement of Condition 3.16 of CEAA Decision Statement
28	Monthly	Background station. Magnet Creek, upstream of Barton Bay
38	Monthly	Downstream of Outlet Basin upstream of Long Lake
39	Monthly	Southwest Pond 3 (SWP3) of SWAT, downstream of Goldfield Creek Diversion
40	Monthly	Barton Bay East. Upstream of historical MacLeod tailings seepage discharge and Geraldton STP
46	Monthly	Monitor full scale ETP mixing zone; station location post discharge to be determined/confirmed by plume delineation study.
47	Monthly	Monitor for potential effects in the Central Basin
49	Monthly	Monitor for potential effects where Southwest Arm outlets to Central Basin
52	Monthly	Background station upstream of Goldfield Creek Diversion
53	Monthly	Monitor water quality at the end of the mixing zone for the temporary ETP
54	Monthly	Monitor for potential effects at the outlet of the Goldfield Creek Diversion Pond
55	Monthly	Monitor potential effects of the Project in the Southwest Am Tributary (SWAT), including the Goldfield Creek realignment

Surface water sampling was completed by grab sampling, using in bottles provided by the laboratory that contained appropriate preservative, where required. Samples for dissolved forms of metals were filtered using a 0.45 µm membrane filter. Water quality samples were taken just below the surface of the water (0.1 m deep). Water quality samples were collected by an experienced technician using suitable sampling equipment. Samples were preserved (if applicable) and transported in appropriate containers to maintain the integrity of sample temperatures and hold times. Samples were submitted to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory under chain of custody (COC) documentation.

2.2.1.1.2 Laboratory Analysis

The accredited CALA laboratory used the authorized analytical methods set out in the industrial sewage works (ISW) environmental compliance approvals (ECAs), permits to take water (PTTWs), and regulations (i.e., Metal and Diamond Mining Effluent Regulations [MDMER] and Ontario Regulation [O.Reg.] 560/94).

The surface water quality samples were analyzed for general chemistry, nutrients, and total and dissolved metals (including arsenic), total suspended solids (TSS), nitrate (as N), total kjeldahl nitrogen (as N), pH, total phosphorus, and sulfate. Chlorophyll A was also be analyzed for samples collected at Stations 25, 26, and 46. Unionized ammonia was calculated based on total ammonia, and field pH and field temperature measurements.

In situ temperature, pH, conductivity, turbidity, and dissolved oxygen (DO) were measured at the water surface during sample collection using a multi parameter water quality meter. A sample collection form was used to record *in situ* parameters and to record current weather (i.e., air temperature, raining, snowing) and flow conditions (i.e., low flows, high flows, ice cover conditions).

Quality assurance (QA) / quality control (QC) principles for sampling and laboratory analysis outlined in Metal Mining Technical Guidance for Environmental Effects Monitoring (EC 2012) were followed. Duplicate samples were collected from a subset of samples collected to quantify environmental variability and analytical consistency, with a minimum of one duplicate for every 10 parent samples. A minimum of one travel and one field blank was collected per sampling event to detect potential sources of contamination. Field instruments were calibrated regularly according to the manufacturer's specifications and calibration logs were maintained.

Water quality data were entered into an electronic database and was validated against the original laboratory certificate of analysis.

2.2.1.1.4 Data Analysis

The raw data set for each parameter at each station was compiled into a spreadsheet to present the monitoring completed for the 2021 period. As the monitoring occurred prior to the start of discharge from the temporary ETP on September 15, 2021, the data are considered to be additional baseline data for this reporting period.

For the 2022 reporting period, the compilation of monthly data will be compared to predictions made in the combined EIS and provincial Environmental Assessment (EA) (Stantec 2018a) for the operational period or compared to the seasonal trigger thresholds as identified in the Plan (GGM 2021). The trigger threshold monitoring stations, parameters, and rationale are presented in Table 2-2. The locations of the trigger threshold monitoring stations are presented in Figure 2-2.

Table 2-2: Surface Water Trigger Threshold Monitoring Stations

Trigger Threshold Monitoring Station	Frequency of Measurement	Trigger Threshold Parameter	Rationale
4	Monthly	As, Co, Fe, P, Sb, U	Monitor for potential effects of the historical tailings and WRSAs seepage and Geraldton STP discharge on Barton Bay East.
8	Monthly	As, Co, Fe, P, Sb, U	Monitor for potential Project effects downstream of the Kenogamisis Lake Central Basin near the outlet to the Outlet Basin.
20A	Monthly	As, Co, Cu, Fe, P, Sb, U, CN free & total	Monitor for potential effects of the TMF on GFC, downstream of confluence of GFC and GFC Tributary and upstream of Kenogamisis Lake
24	Monthly	As, Co, Cu, Fe, P, Sb, U, CN free & total	Monitor for potential effects of the TMF and/or WRSA D on the Southwest Arm of Kenogamisis Lake
25	Monthly	As, Co, Fe, P, Sb, U, Hg, MeHg	Monitor for potential effects of mining activities on the water at the mouth of the SWAT
26	Monthly	As, Co, Fe, P, Sb, U	Monitor for potential effects of WRSA C on Mosher Lake
39	Monthly	As, Co, Fe, P, Sb, U, Hg, MeHg	Monitor for potential effects of mining activities on SWAT, downstream of GFC Diversion
49	Monthly	As, Co, Fe, P, Sb, U	Monitor for potential effects where Southwest Arm outlets to Central Basin
52	Monthly	As, Co, Fe, P, Sb, U, Hg, MeHg	Background station upstream GFC Diversion
53	Monthly	As, Co, Fe, P, Sb, U	Monitor for potential effects beyond the temporary ETP mixing zone

Legend

- Project Development Area
- Local Assessment Area
- Regional Assessment Area
- Discharge Location
- Temperature/ DO Profile
- Mercury and Methylmercury Monitoring
- Routine Water Quality Monitoring

Trigger Threshold Surface Water Quality Stations and Routine Monitoring

- Monthly Sampling for As, Co, P, Sb, U, Hg, Fe and MeHg
- Monthly Sampling for As, Co, Cu, Fe, P, Sb, U, CN Free and CN Total
- Monthly Sampling for As, Co, Fe, P, Sb, U

Site Plan Revised Post Final EA/EIS

- New Highway 11 Alignment
- Diversion Channel
- Collection Ponds
- Open Pit- Full Extent
- Tailings Management Facility
- Grade Control Structure
- Inundated Area ; Backwater effect
- Waste Rock Storage Area

Existing Features

- Highway
- Major Road
- Local Road
- Existing SW Arm Tributary Channel
- Existing Portion of Goldfield Creek (to be overprinted)
- Watercourse
- Provincial Park
- Wetland (Eco-Site Based)
- Waterbody

Notes

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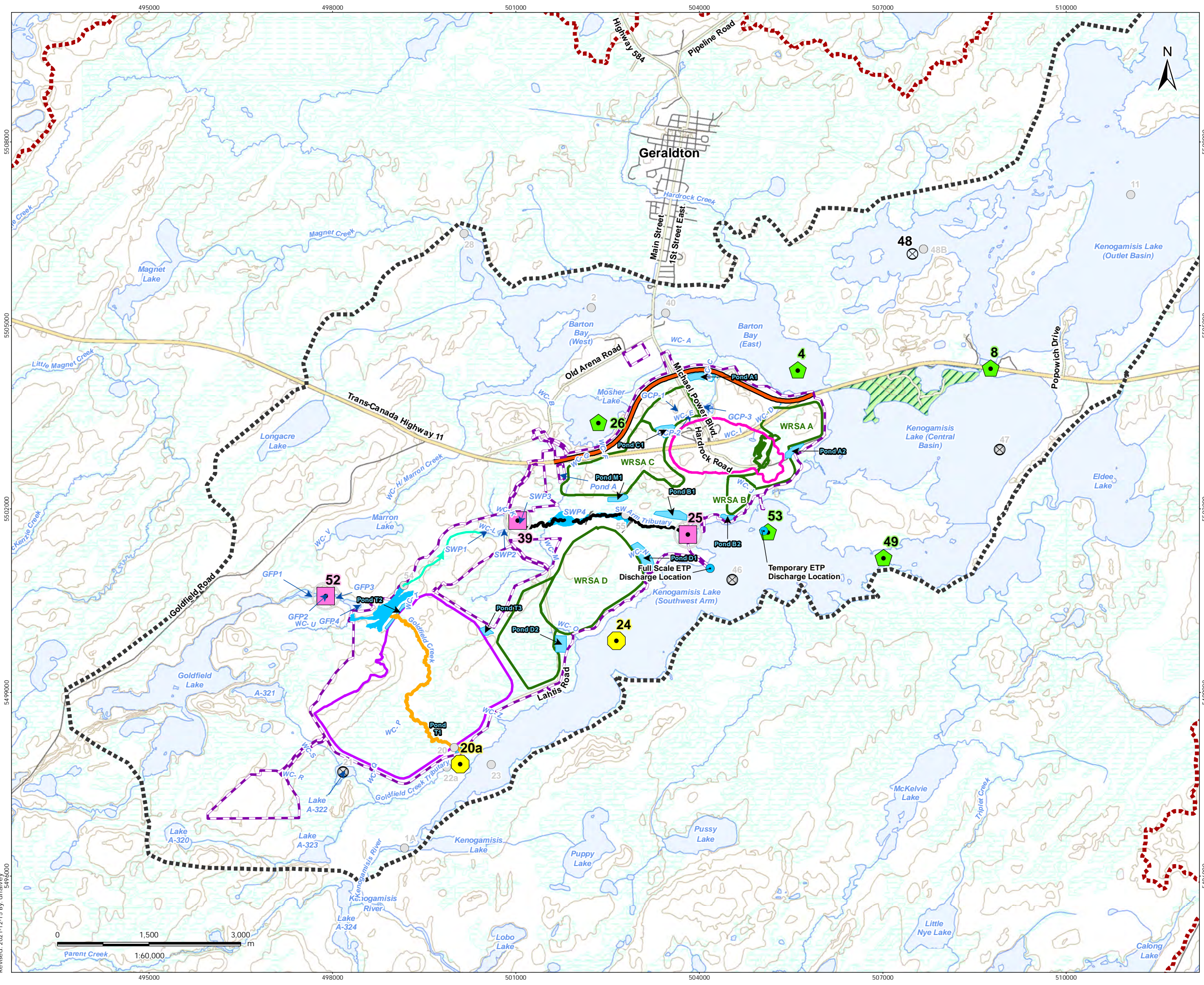
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Client/Project

Greenstone Gold Mines GP Inc. (GGM)
Hardrock Project

Figure No.
2-2

Title
Surface Water Quality Trigger
Threshold Monitoring Locations



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2.2.1.2 Dissolved Oxygen and Water Temperature Profile Monitoring Methods

2.2.1.2.1 Data Collection

The DO and water temperature profile monitoring locations are presented in Figure 2-1. Temperature and DO water column profile sampling was completed at eight surface water monitoring locations. Table 2-3 presents the location, frequency of profile sampling, and rationale for each temperature and DO water column profile sampling location.

Table 2-3: Dissolved Oxygen and Water Temperature Profile Monitoring Locations, Frequency, and Rationale

Station	Frequency	Rationale
21	Quarterly	Deepest point in Lake A-322
26	Quarterly	Deepest point in Mosher Lake
39	Quarterly	Deepest point in Southwest Pond 3 (SWP3) of SWAT
46	Quarterly	Southwest Arm near proposed effluent discharge location
47	Quarterly	Deepest point in Central Basin
48	Quarterly	Deepest point in Outlet Basin, Hardrock Bay
49	Quarterly	Deep location at narrows where Southwest Arm outlets to Central Basin
50	Quarterly	Gamsby Lake – Reference area, 25 km southwest of the Project, no known historical mine influences

DO and temperature was measured at 1 m intervals from the surface of the water column at the profile sampling locations. DO and temperature were measured using a handheld multi parameter water quality meter with an extended cable for the probe, sufficient to reach the full depth of the water column. The meter was calibrated prior to use according to the manufacturer’s specifications using the appropriate calibration standards. The probe was lowered with a graduated tape measure to confirm the depth of the probe. The probe was allowed to equilibrate prior to taking a reading.

2.2.1.2.2 Data Analysis

The raw data set for each parameter at each station was compiled into a spreadsheet to present the monitoring completed for the 2021 period. Each quarterly monitoring event was plotted on a graph comparing the depth of the water column to the water temperature and DO levels for a visual representation of observed conditions.

2.2.2 Results

A summary of the surface water sampling results for routine surface water quality monitoring and DO and temperature profiling from October 2020 through September 2021 is presented in the subsequent sections below.

2.2.2.1 Routine Surface Water Quality Monitoring

2.2.2.1.1 Data Collection

A summary of water quality sampling dates during the 2021 reporting period is provided in Table 2-4. These water quality data, when combined with other data collected prior to the 2021 reporting period, provide a comprehensive documentation of baseline condition. Baseline surface water quality data collected to support the EIS and monitoring programs were collected from roughly 2012 through 2019. There was then a brief period of reduced sampling in 2020. Sampling efforts during this period focused on collecting samples from surface water quality stations with fewer prior sampling events. For this reason, surface water quality sampling was completed at Station 20 and 20A in October 2020. Routine monthly water quality sampling was then reinitiated in March 2021. Some stations could not be safely accessed during ice out and during the spring freshet (i.e., March and April), as shown in Table 2-4.

Table 2-4: Routine Surface Water Quality Monitoring Completion

Station	Sampling Month							
	20-Oct	21-Mar	21-Apr	21-May	21-Jun	21-Jul	21-Aug	21-Sep
1A	-	-	-	✓	✓	✓	✓	✓
2	-	-	-	✓	✓	✓	✓	✓
4	-	✓	-	✓	✓	✓	✓	✓
8	-	✓	✓	✓	✓	✓	✓	✓
11	-	✓	-	✓	✓	✓	✓	✓
17	-	✓	✓	✓	✓	✓	✓	✓
20	✓	✓	-	✓	✓	✓	✓	✓
20A	✓	✓	-	✓	✓	✓	✓	✓
21	-	-	-	✓	✓	✓	✓	✓
22A	-		-	✓	✓	✓	✓	✓
23	-	✓	-	✓	✓	✓	✓	✓
24	-	✓	-	✓	✓	✓	✓	✓
25	-	✓	-	✓	✓	✓	✓	✓
26	-	✓	-	✓	✓	✓	✓	✓
28	-	✓	-	✓	✓	✓	✓	✓
38	-	✓	✓	✓	✓	✓	✓	✓
39	-	✓	-	✓	✓	✓	✓	✓
40	-	✓	✓	✓	✓	✓	✓	✓
46 (or equivalent)	-	✓	-	✓	✓	✓	✓	✓
47	-	✓	-	✓	✓	✓	✓	✓
49	-	✓	-	✓	✓	✓	✓	✓
52	-	✓	-	✓	✓	✓	✓	✓
53	-	✓	-	✓	✓	✓	✓	✓
54	-	-	-	-	-	-	-	-
55	-	-	-	✓	✓	✓	✓	✓

Station 54 will begin monitoring following the diversion of Goldfield Creek, once the proposed monitoring location is inundated and water is available to monitor, which is anticipated to be in 2022.

Monthly surface water quality sampling is expected to continue for the stations in Table 2-1 for the 2022 reporting period during the construction phase of mine life.

2.2.2.1.2 Data Analysis

A summary of surface water analytical results for the stations presented in Table 2-4 is provided in Appendix B, Table B-1. Results are not compared to predicted water quality for the operational phase of mine life because September 15, 2021 was the start of discharge from the TETP and marks the end of baseline conditions. A comparison to the EIS/EA (Stantec 2018a) predicted operational conditions will be presented in the 2022 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report.

The 2021 surface water quality monitoring data were used to update the seasonal surface water quality trigger thresholds for the stations identified in Table 2-2. The four seasonal periods were defined as winter (January – March), spring (April – June), summer (July-September), and fall (October – December). The seasonal 95th percentile was calculated using available baseline data up to September 8, 2021, prior to the start of the temporary ETP discharge, and is presented in Appendix B, Table B-2. The 2022 surface water quality monitoring data will be compared to the updated seasonal trigger thresholds in the 2022 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report.

2.2.2.2 Dissolved Oxygen and Water Temperature Profile

2.2.2.2.1 Data Collection

The quarterly DO and water temperature profile monitoring was completed, when safe to do so, at least once per quarter. The summary of monitoring completion is presented in Table 2-5.

Table 2-5: Dissolved Oxygen and Water Temperature Profile Monitoring Completion

Year	Sampling Season	In-Situ Water Quality Profile Station Number							
		21	26	39	46	47	48	49	50
2021	Winter	-	-	✓	✓	✓	✓	✓	-
	Spring	✓	✓	✓	✓	✓	✓	✓	-
	Summer	✓	✓	✓	✓	✓	✓	✓	✓
	Fall	✓	✓	✓	✓	✓	✓	✓	✓

Fall monitoring for Stations 21, 26, 39, 49, and 50 was completed in October 2021, following the data reporting period for this 2021 monitoring report, but is included in the data summary for completeness. An additional winter profile was completed for Stations 46, 47, 48, and 49.

Quarterly DO and water temperature profile monitoring is expected to continue for the stations in Table 2-5 for the October 2021 through September 2022 reporting period.

2.2.2.2.2 Data Analysis

Raw, *in situ* temperature and DO profile data from October 2020 through September 2021 are presented in Appendix A-3. Temperature and DO profile graphs are presented in Appendix A-4. EIS/EA (Stantec 2018a) predictions and trigger thresholds were not defined for the DO and water temperature profiling for comparison.

2.2.3 Adaptive Management

2.2.3.1 Surface Water Quality

The 2021 reporting period occurred during continued baseline monitoring conditions. As such, no changes to the existing monthly water quality monitoring stations/locations are recommended. The existing monitoring program (stations, locations, frequency) will be continued for the 2022 reporting year.

2.2.3.2 Dissolved Oxygen and Water Temperature Profile

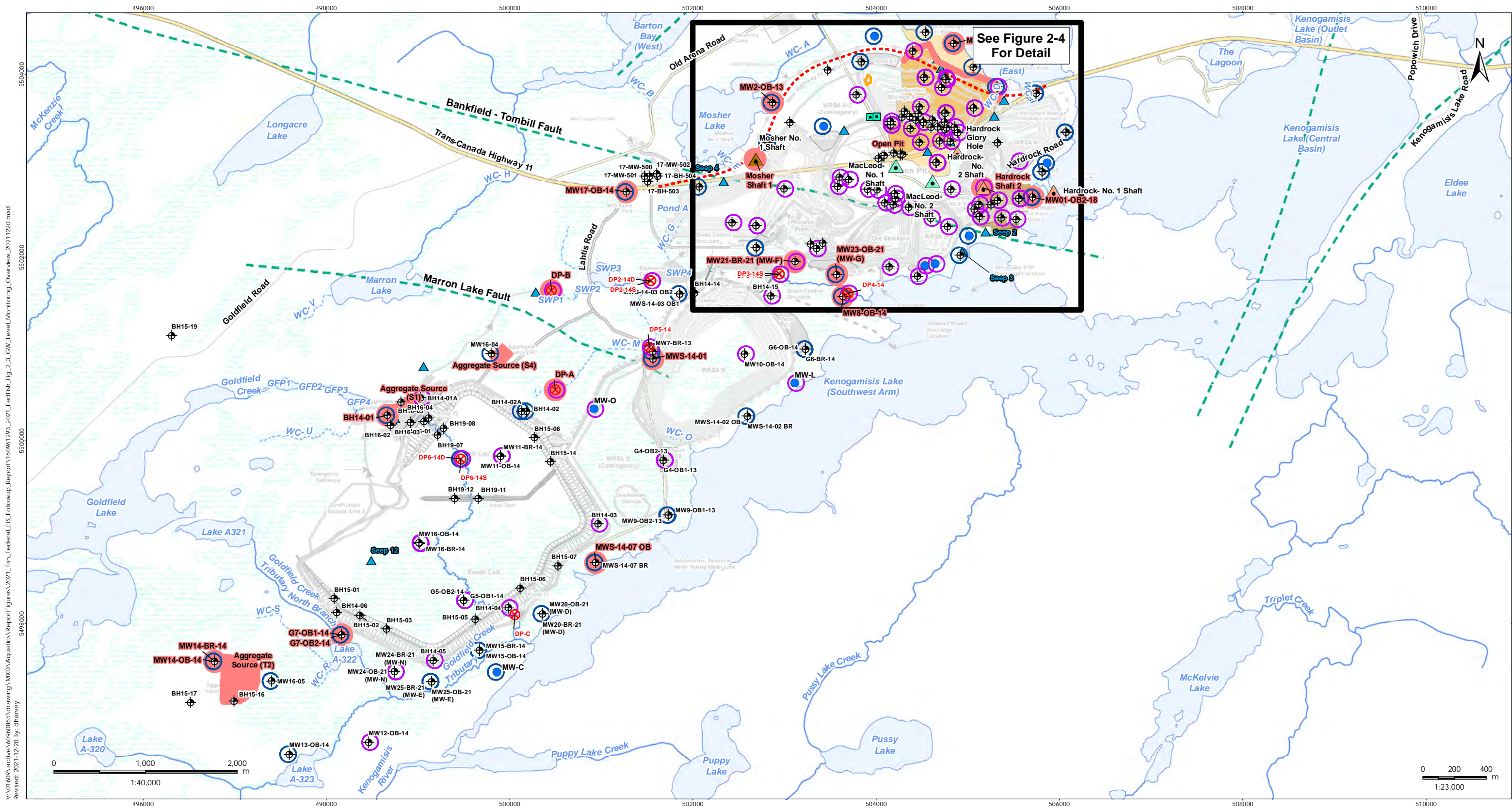
An adaptive management plan (AMP) does not exist for DO and water temperature profile monitoring. As such, no changes to the existing quarterly monitoring stations/locations for DO and water temperature profiling are recommended. The existing monitoring program (stations, locations, frequency) will be continued for the 2022 reporting year.

2.3 Groundwater

The following section describes methods and results of groundwater monitoring during the 2021 reporting period that were undertaken to address federal Condition 3.17 of the federal EIS approval, which relates to mitigating and monitoring potential adverse effects on fish and fish habitat with respect to groundwater. There are four main groundwater monitoring components:

- 1) Monitoring Well and Drive Point Piezometer Installations
- 2) Pumped Volume Monitoring
- 3) Water Level Monitoring
- 4) Water Quality Monitoring

Methods and results for these groundwater monitoring components are described herein, along with recommendations for adaptive management. An overview of the groundwater quantity and quality monitoring locations, as well as the locations where pumped volume is monitored, are presented in Appendix B-1, Table B-1-1. The groundwater quantity monitoring locations are shown in Figure 2-3 and Figure 2-4 and the groundwater quality locations are shown on Figure 2-5.



Legend

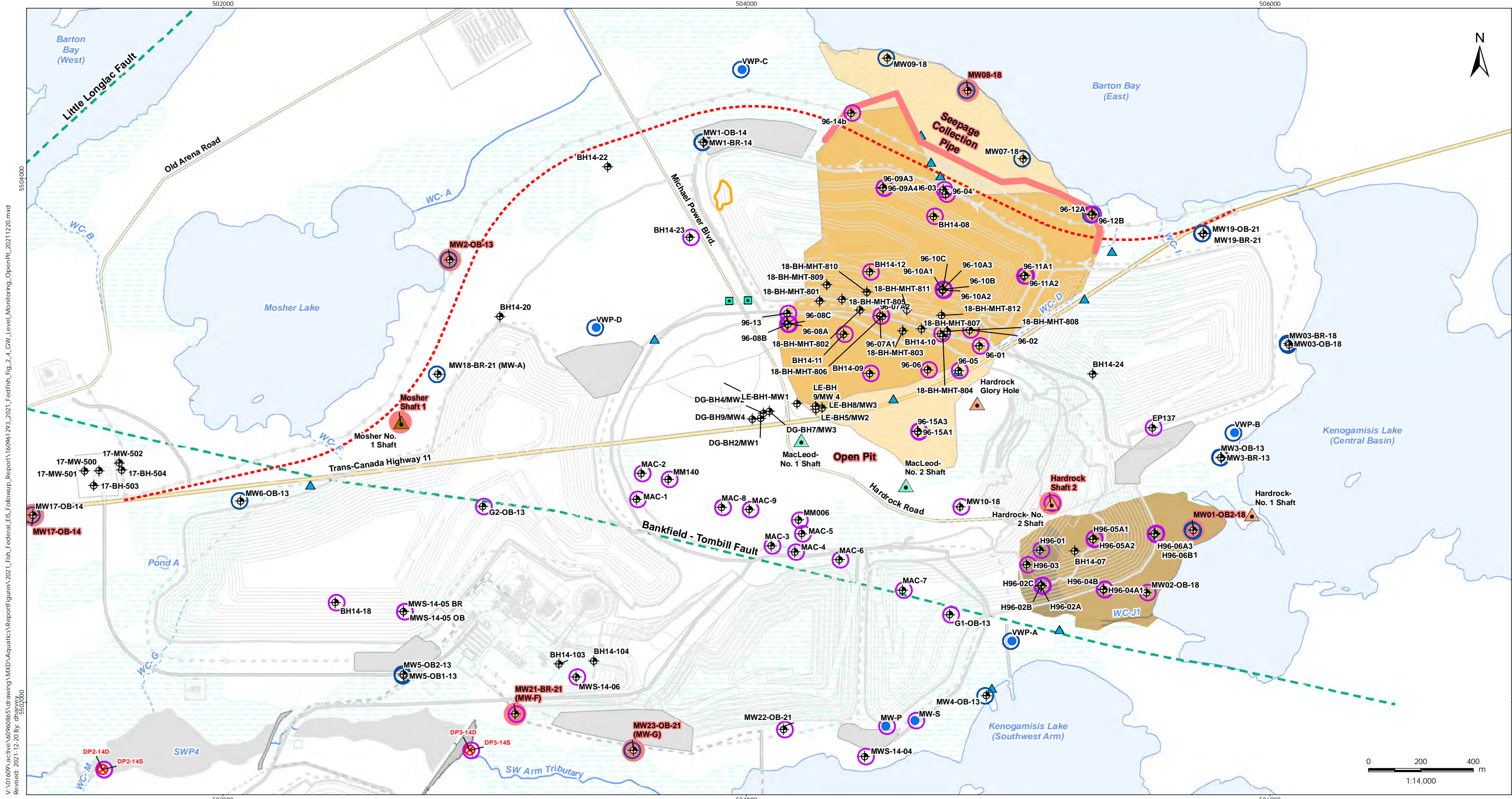
- | | | | |
|--|--|---|---|
| <ul style="list-style-type: none"> Monitoring Well Groundwater Quantity Trigger Threshold Monitoring Locations Drive Point Proposed Monitoring Location Manual Groundwater Level Measurement Data Logger | <ul style="list-style-type: none"> Seep Former Gas Station Faults Watercourse - Permanent Watercourse - Intermittent Former Macleod Landfill Site Wetland (Eco-Site Based) | <ul style="list-style-type: none"> Historic Tailings Areas Hardrock Tailings Hardrock Reactive Tailings Area MacLeod High Tailings MacLeod Low Tailings Historical Tailings Areas Mine Shafts Consolidated Moshier Long Lac Shaft Hard Rock Gold Mine Shaft | <ul style="list-style-type: none"> Little Longlac Mine Shaft MacLeod-Cockshutt Mine Shaft |
|--|--|---|---|

- Notes**
- Coordinate System: NAD 1983 UTM Zone 16N
 - Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

Client/Project
Greenstone Gold Mines GP Inc (GGM)
Hardrock Project

Figure No.
2-3

Title
Groundwater Quantity
Monitoring Locations
(Overview)



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 Reviewed: 2021-12-20 By: dhanvey
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160961293



Legend

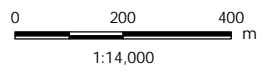
- | | | | |
|--|--|---|---|
| <ul style="list-style-type: none"> Monitoring Well Groundwater Quantity Trigger Threshold Monitoring Locations Drive Point Proposed Monitoring Location Manual Groundwater Level Measurement Data Logger | <ul style="list-style-type: none"> Seep Former Gas Station Faults Watercourse- Permanent Watercourse- Intermittent Former Macleod Landfill Site Wetland (Eco-Site Based) | <ul style="list-style-type: none"> Historic Tailings Areas Hardrock Tailings Hardrock Reactive Tailings Area MacLeod High Tailings MacLeod Low Tailings Historical Tailings Areas Mine Shafts Consolidated Moshier Long Lac Shaft Hard Rock Gold Mine Shaft | <ul style="list-style-type: none"> Little Longlac Mine Shaft MacLeod-Cockshutt Mine Shaft |
|--|--|---|---|

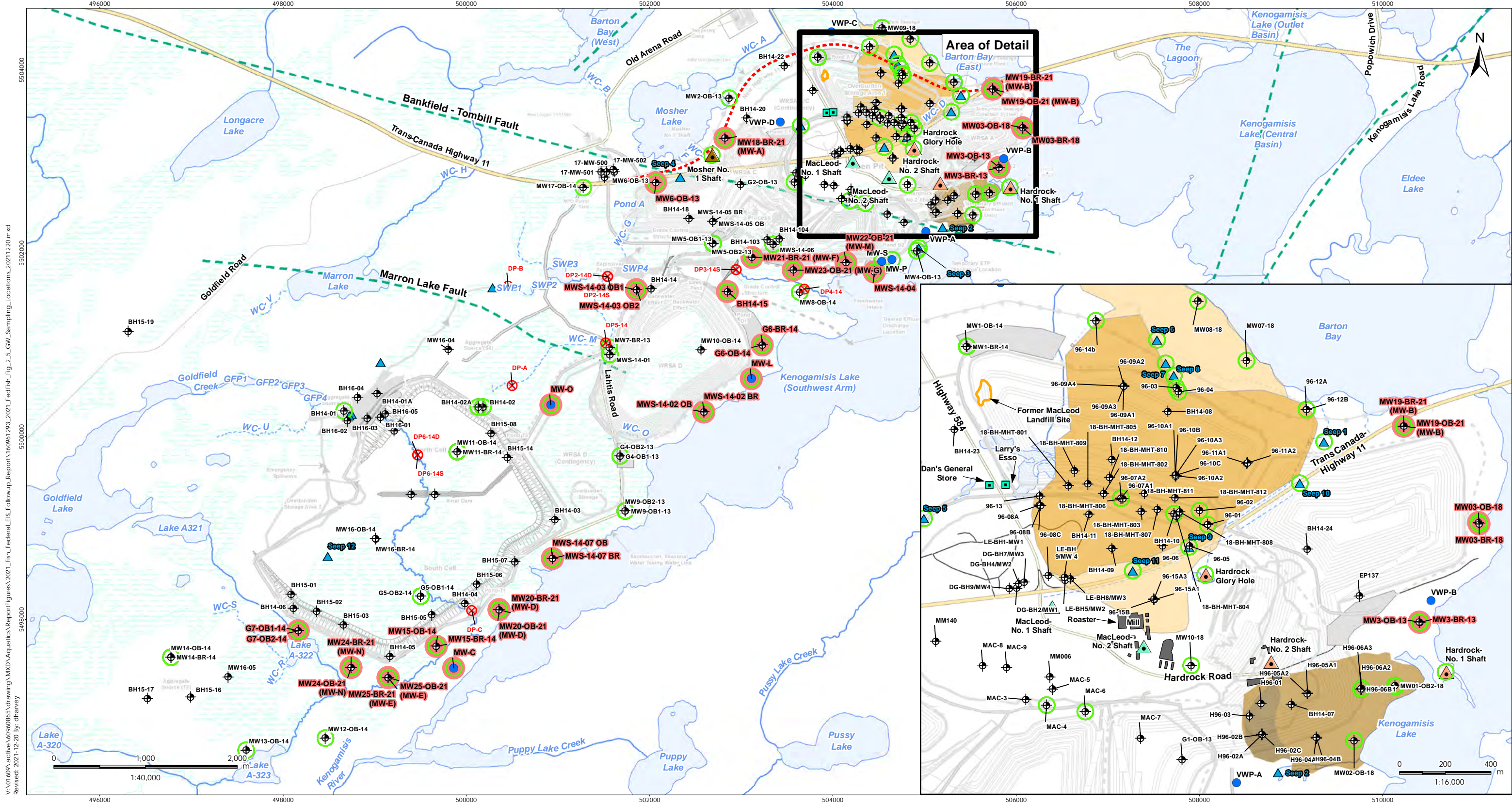
- Notes**
- Coordinate System: NAD 1983 UTM Zone 16N
 - Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

Client/Project
Greenstone Gold Mines GP Inc (GGM)
Hardrock Project

Figure No.
2-4

Title
Groundwater Quantity Monitoring Locations (Open Pit Area)





Legend

- Monitoring Well
- Trigger Threshold Groundwater Quality Monitoring Location
- Drive Point
- Proposed Monitoring Location
- Groundwater Sampling Location
- Seep
- Former Gas Station
- Faults
- New Highway 11 Alignment
- Watercourse- Permanent
- Watercourse- Intermittent
- Former Macleod Landfill Site
- Wetland (Eco-Site Based)
- Historic Tailings Areas
- Hardrock Tailings
- Hardrock Reactive Tailings Area
- MacLeod High Tailings
- MacLeod Low Tailings
- Historical Tailings Areas Mine Shafts
- Consolidated Moshier Long Lac Shaft
- Hard Rock Gold Mine Shaft
- Little Longlac Mine Shaft
- MacLeod-Cockshutt Mine Shaft

Notes

- Coordinate System: NAD 1983 UTM Zone 16N
- Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

Client/Project
Greenstone Gold Mines GP Inc (GGM)
Hardrock Project

Figure No.
2-5

Title
Groundwater Quality Monitoring Locations

2.3.1 Methods

The following section presents the methods and a summary of the required data analysis, as presented in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

2.3.1.1 Borehole Drilling and Monitoring Well Installation

In June and July 2021, twelve (12) of the monitoring wells proposed in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021) were installed. The following monitoring wells were installed between June 23, 2021 and July 19, 2021 and their locations are presented in Figure 2-3, Figure 2-4, and Figure 2-5 (the proposed location name as presented in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan is provided for cross-reference in Table 2-6).

Table 2-6: 2021 Monitoring Well Installation Summary

Proposed Monitoring Well Name	New Monitoring Well Name	Proposed Monitoring Well Name	New Monitoring Well Name
MW-A (Bdrk)	MW18-BR-21	MW-B (Bdrk)	MW19-BR-21
MW-B (Ob)	MW19-OB-21	MW-D (Bdrk)	MW20-BR-21
MW-D (OB)	MW20-OB-21	MW-E (Bdrk)	MW25-BR-21
MW-E (Ob)	MW25-OB-21	MW-F	MW21-BR-21
MW-G	MW23-OB-21	MW-M	MW22-OB-21
MW-N (Bdrk)	MW24-BR-21	MW-N (Ob)	MW24-OB-21

Borehole drilling and monitoring well installation was completed by Aardvark Drilling Inc. using a track mount Acker Renegade. Boreholes were advanced using 203 mm outside diameter hollow stem auger (HSA) drilling techniques until refusal was encountered. If refusal was encountered before the target depth then HQ diamond drilling techniques were used to advance the borehole until the target depth was reached. Generally, HQ diamond drilling was used to drill through very dense/hard overburden and when bedrock was encountered.

Soil samples were collected at 0.6 m intervals to 3 m below ground surface (BGS), followed by 1.5 m intervals to borehole completion. A 450 mm long, 50 mm inside diameter (ID), split spoon sampler was used to collect soil samples while drilling with HSA. The HQ drilling system produced a 61.1 mm diameter core (96.0 mm diameter borehole), generally 1.5 m in length. The recovered soil cores were logged in the field by Stantec personnel using the American Society for Testing and Materials (ASTM) guideline for visual manual description and identification of soils (ASTM D2488 00). Bedrock core was logged in the field by Stantec for solid core recovery, rock quality designation (RQD), and occurrence of fractures and/or joints.

During drilling, the soil relative density/consistency was determined by standard penetration tests (SPT). The SPT utilized the split spoon sampler driven by a 63.5 kg safety hammer falling from a distance of 760 mm. The number of blows required to penetrate the sampler by 300 mm was defined as the SPT value or 'N'.

Monitoring wells were constructed using 50 mm ID Schedule 40 polyvinyl chloride (PVC) well casing. The wells were constructed with No. 10 slot (0.01-inch slot) PVC well screens generally 1.5 m in length (range of 0.61 m to 3.05 m). The annular space between the monitoring well and formation was backfilled with number 02 grade silica sand to approximately 0.3 m above the top of the well screen. The remainder of the annular space was filled with bentonite chips or bentonite grout to reduce the potential for a hydraulic connection between the ground surface and the monitoring well screen. Each well was completed with a lockable, above ground, protective steel casing. All monitoring wells constructed as part of this investigation were completed in accordance with O. Reg. 903.

Following completion, monitoring wells were developed by removing a minimum of ten well casing volumes of water or purging dry three times. Development was completed using a 16 mm outer diameter (13 mm ID) high density polyethylene (HDPE) tubing and Waterra^R foot valve.

Borehole and monitoring well completion details are presented in Table B-2-1 of Appendix B-2. Borehole logs for the monitoring wells installed during the 2021 reporting period are presented in Appendix B-2.

The majority of remaining proposed monitoring wells in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021) will be installed during construction to allow sufficient time to assess current conditions prior to commencement of mining activities. Groundwater monitoring at the proposed locations shall begin up to one month prior to dewatering activities associated with construction and shall continue throughout mine operation except for the locations associated with the MacLeod high tailings (MHT) seepage collection system drain (proposed MW-H to MW-K). The proposed MHT monitoring well locations will be installed after the construction of the MHT seepage collection system due to site access constraints.

2.3.1.2 Drive Point Piezometer Installation

Two drive point piezometers (DP-A and DP-B) were installed at proposed drive-point piezometer locations DP-A and DP-B recommended in the Fish and Fish Habitat Federal EIS Follow-up Monitoring Plan (GGM 2021) in spring 2021. Drive point piezometer locations are shown on Figure 2-3. Drive point piezometers (DP-A and DP-B) consisted of a 19 mm diameter, 0.45 m long steel drive point piezometer screen connected to 25 mm diameter steel riser pipes. The drive point was equipped with a vented, threaded steel cap. Installation details are summarized in Table B-2-1 of Appendix B-2.

2.3.1.3 Pumped Volume Monitoring

2.3.1.3.1 Data Collection

The water pumped from the open pit, Mosher No. 1 Shaft, Hardrock No. 2 Shaft, MHT seepage collection system, and aggregate pits and quarry will be measured. In addition to these operational features, the water pumped from excavations during the construction of some of the mine features, including the TMF, Goldfield Creek diversion, process plant, culverts and water management ponds, will be measured and tracked.

The frequency of sampling for each of the groundwater monitoring locations presented in Table B-1-1 of Appendix B-1 is described as follows:

- Water quantity (flow rate and total daily volume) pumped from Mosher No. 1 Shaft and Hardrock No. 2 Shaft during dewatering of historical underground workings and open pit.
- Water quantity (flow rate and total daily volume) pumped from the MHT seepage collection system (east pumping chamber discharge).
- Water quantity (flow rate and total daily volume) pumped from the aggregate pits (S1 and T2) and TMF Quarry.
- Water quantity (flow rate and total daily volume) pumped from various construction excavations.

The pumped volume from Mosher Shaft No. 1, Hardrock Shaft No. 2, the open pit, and the aggregate pits will be monitored using a flow meter or totalizer so that the pumped volume may be measured or calculated based on flow rate and duration of pumping on a daily basis. For construction dewatering from excavations, the pumped volume may be estimated based on pump capacity and daily run times.

2.3.1.3.2 Data Analysis

The pumped volume from the open pit will be compared to the predicted dewatering rate to assess whether there is potential for drawdown greater than that predicted in the EIS/EA (Stantec 2018a). For example, if the pumping rate is greater than that predicted in the EIS/EA (Stantec 2018a) then the resulting drawdown may be greater than predicted in the EIS/EA (Stantec 2018a), which can potentially result in changes in baseflow in nearby surface water features.

Select locations where water is pumped were chosen as trigger threshold monitoring locations under the adaptive management plan for groundwater (GGM 2021). Table B-1-1 in Appendix B-1 presents a summary of the groundwater pumped volume trigger threshold monitoring locations and associated rationale. The pumped volume for trigger threshold monitoring locations will be reviewed with respect to the trigger threshold quarterly.

In the case of construction dewatering, the volume of water will be recorded as a single pumped volume but is required to be reported as a separate groundwater taking and surface water taking, in accordance with the relevant issued PTTWs. It is not possible to separate groundwater and surface water flow from the total flow in the field. Therefore, in the analysis of the pumped volume data, the division of groundwater and surface water was considered and divided on a consistent percentage basis.

2.3.1.4 Groundwater Water Level Monitoring

2.3.1.4.1 Data Collection

Groundwater levels within the vicinity of the open pit, TMF, WRSAs, aggregate pits, Kenogamisis Lake, SWAT, and Goldfield Creek are monitored to assess potential effects of the Project on groundwater quantity. Figure 2-3 and Figure 2-4 show the groundwater level monitoring locations.

Groundwater level monitoring will be completed at up to 136 existing monitoring wells (91 locations) as well as 43 proposed monitoring wells, drive-point piezometers, and/or vibrating wire piezometers (23 locations) for a total of 179 monitoring points (114 locations). Data loggers are installed in up to 74 monitoring points (43 locations) and includes 29 proposed monitoring points at 12 locations. Proposed monitoring locations are added to the monitoring program once installation has been completed. Table B-1-1 in Appendix B-1 presents the groundwater level monitoring program. The total number of locations monitored during the reporting period are described in Section 2.3.2.2.1.1.

Water levels at the monitoring wells and drive-point piezometers were monitored using a combination of manual and automated techniques. Manual water level measurements were collected using a battery-operated probe and calibrated tape, water depths were measured in meters below the top of casing (BTOC) and recorded.

Monitoring wells instrumented with a data logger record pressure and frequency. If the data logger is not vented, then the atmospheric pressure was recorded at the site so that the data logger readings may be corrected for atmospheric pressure to obtain the actual height of water above the data logger. The data loggers were set to record at a frequency that is sufficient to understand the variability in the groundwater level at the given monitoring well (minimum 1-hour intervals).

2.3.1.4.2 Data Analysis

The groundwater levels in monitoring wells are compared to baseline conditions and those predicted in the EIS/EA (Stantec 2018a). The purpose is to assess whether there is potential for a change in associated baseflow to nearby surface water features that is greater than that predicted in the EIS/EA (Stantec 2018a) and to confirm the reversal of the horizontal hydraulic gradient between the historical MacLeod and Hardrock tailings and Kenogamisis Lake.

Select locations, where groundwater levels are monitored, were chosen as trigger threshold monitoring locations for groundwater level and/or horizontal hydraulic gradient under the adaptive management plan for groundwater (Stantec 2020). Table 2-7 presents a summary of the groundwater level and horizontal hydraulic gradient trigger threshold monitoring locations and associated rationale. The groundwater level and horizontal hydraulic gradient for trigger threshold monitoring locations will be reviewed with respect to the trigger thresholds in spring, summer, and fall of a given year.

Table 2-7: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
Groundwater Quantity			
Mosher and Hardrock No. 2 Shafts	Daily Compared to Trigger Threshold – Quarterly	Pumped Volume	Indirectly monitor potential effects of dewatering the open pit on groundwater levels.
Open Pit	Compared to Trigger Threshold – Quarterly	Pumped Volume	
Aggregate Pit S1	Daily Compared to Trigger Threshold - Quarterly	Pumped Volume	Indirectly monitor potential effects of dewatering the aggregate pits on groundwater levels.
Aggregate Pit T2	Daily Compared to Trigger Threshold - Quarterly	Pumped Volume	
Aggregate Pit S4	Daily Compared to Trigger Threshold - Quarterly	Pumped Volume	
BH14-01 G7-OB1-14 G7-OB2-14 MW14-OB-14 MW14-BR-14 MWS-14-01 MWS-14-07 OB DP-A (Proposed Drive-Point Piezometer DP-A in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)) (Central Wetland)	Manual - Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Spring, Summer, and Fall	Water Level	Monitor potential changes in groundwater levels associated with the TMF and/or dewatering of the aggregate pits to be protective of wetlands and baseflow to surface water features.
DP-B (Proposed Drive-Point Piezometer DP-B in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)) (GFC Diversion)	Manual - Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Spring, Summer, and Fall	Water Level	Monitor potential changes in groundwater levels associated with the GFC diversion on a wetland located in the upper reaches of the SWAT.

Table 2-7: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
MW2-OB-13 MW8-OB-14 MW17-OB-14 MW01-OB2-18 MW08-18	Manual - Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Spring, Summer, and Fall	Water Level	Monitor potential changes in groundwater levels associated with dewatering the open pit to be protective of wetlands and baseflow to surface water features.
MW21-BR-21 (Proposed Monitoring Well MW-F in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)) MW23-OB-21 (Proposed Monitoring Well MW-G in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021))	Manual - Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Monthly during Construction Dewatering of process plant	Horizontal Hydraulic Gradient toward the SWAT	Monitor potential changes in groundwater levels associated with temporary construction dewatering of the process plant area to be protective of wetlands and baseflow to surface water features. Confirm there is a horizontal hydraulic gradient toward the SWAT.
MHT Seepage Collection Drain	Manual - Spring, Summer, and Fall Data Logger – 1 hour Intervals Compared to Trigger Threshold – Spring, Summer, and Fall	Horizontal Hydraulic Gradient	Confirm that an inward horizontal hydraulic gradient is maintained toward the MHT seepage collection drain and/or toward the open pit. The horizontal hydraulic gradient will be interpreted based on water level measurements at nearby and surrounding monitoring locations ((via access holes in the drain, 96-03, 96-04, 96-09A1, 96-09A2, 96-09A3, 96-09A4, 96-11A1, 96-11A2, 96-12A, 96-12B, 96-14B, MW07-18, MW08-18, MW09-18, MW-H, MW-I, MW-J, and/or MW-K)
Reversal in horizontal hydraulic gradient between the historical MacLeod and Hardrock tailings and Kenogamisis Lake.	To Be Determined (will be based on updated groundwater flow modelling)	Horizontal Hydraulic Gradient	Monitor timing of reversal in hydraulic gradient between historical tailings and the open pit to reduce mass loading from historical tailings to Kenogamisis Lake.

Table 2-7: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
Groundwater Quality			
G7-OB1-14 G7-OB2-14	Spring, Summer, and Fall	CN- (free), SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from the TMF on Lake A-322
MW15-OB-14 MW15-BR-14 MW25-BR-21 and MW25-OB-21 (Proposed Monitoring Well MW-E in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)) MW24-BR-21 and MW24-OB-21 (Proposed Monitoring Well MW-N in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021))	Spring, Summer, and Fall	CN- (free), SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from the TMF prior to discharge to GFC Tributary
MWS-14-07 OB MWS-14-07BR MW20-BR-21 and MW20-OB-21 (Proposed Monitoring Well MW-D in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)) Proposed Monitoring Wells MW-C	Spring, Summer, and Fall	CN- (free), SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from the TMF prior to discharge to Southwest Arm
MWS-14-02 OB MWS-14-02-BR G6-BR-14 G6-OB-14 Proposed Monitoring Well MW-L	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA D prior to discharge to Southwest Arm
BH14-15 MWS-14-03 OB1 MWS-14-03 OB2	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA D prior to discharge to SWAT

Table 2-7: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
MWS-14-04 MW22-OB-21 (Proposed Monitoring Well MW-M in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)) Proposed Monitoring Well MW-O	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA B and/or Ore Stockpile prior to Discharge to Southwest Arm
MW6-OB-13 MW18-BR-21 (Proposed Monitoring Well MW-A in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021))	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effect of seepage from WRSA C prior to discharge to Mosher Lake
MW3-OB-13 MW3-BR-13 MW03-OB-18 MW03-BR-18 MW19-BR-21 and MW19-OB-21 (Proposed Monitoring Well MW-B in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021))	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA A prior to discharge to Central Basin and Barton Bay
MW21-BR-21 (Proposed Monitoring Well MW-F in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021)) MW23-OB-21 (Proposed Monitoring Well MW-G in Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021))	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, Ur, BTEX, and PHCs	Monitor for potential effects of the process plant and associated facilities (fuel storage) on groundwater quality as well as potential effects of seepage from upgradient WRSAs.

2.3.1.5 Groundwater Water Quality Monitoring

2.3.1.5.1 Data Collection

Groundwater quality will be monitored upgradient, cross gradient, and downgradient of the TMF, WRSAs, and historical MacLeod and Hardrock tailings to monitor for changes in groundwater quality due to Project development. Figure 2-5 shows the groundwater quality monitoring locations. A summary of the groundwater quantity and quality monitoring locations are presented in Table B-1-1 of Appendix B-1.

Groundwater quality monitoring will be completed at up to 82 existing monitoring wells (50 locations) as well as 21 proposed monitoring wells (13 locations) for a total of 103 monitoring points (63 locations). Proposed monitoring locations are added to the monitoring program once installation has been completed. Actual monitoring wells sampled during the reporting period are described in Section 2.3.2.3.1.1.

Groundwater quality sampling of 65 monitoring wells (41 locations) (existing and proposed) occurs annually (fall) and 38 monitoring wells (22 locations) (existing and proposed) occurs in spring, summer, and fall.

Newly installed monitoring wells for groundwater quality will be sampled in spring, summer, and fall until 10 sampling events are completed, then sampling frequency will change to fall, unless the new monitoring well is associated with a trigger threshold monitoring location as per the Plan (Section 2.3.3) then frequency will remain as spring, summer, and fall.

Dedicated equipment was used, when possible, and reusable equipment was decontaminated between sampling locations using phosphate free detergent, deionized water, and methanol or isopropyl rinse (where appropriate). Groundwater samples were collected in laboratory supplied bottles containing appropriate preservative. Samples that require filtering (e.g., samples for metals analysis) were filtered in the field using a dedicated 0.45 µm filter.

Groundwater quality sampling for general chemistry and metals analysis was completed by purging the monitoring wells prior to sample collection. Where feasible, the monitoring wells were purged by removing a minimum of three well casing volumes of water, or until the well was purged dry three times. Monitoring wells were sampled using dedicated HDPE tubing and inertial lift foot valves. Field parameters comprising temperature, pH, conductivity, oxidation-reduction potential (ORP), and DO were measured during purging using a multi-parameter water quality meter and flow through cell where feasible. The meter was calibrated prior to use according to the manufacturer's specifications using the appropriate calibration standards.

Groundwater quality sampling for organic parameters will be conducted using low flow sampling techniques. A peristaltic or bladder pump will be used and set to a maximum flow rate of 1 L/min, but ideally less than 0.5 L/min to avoid aerating the water. Field measurements, including conductivity, temperature, DO and pH, will be measured during purging using a multi-parameter water quality meter and flow through cell where feasible. Field parameters will be allowed to stabilize prior to sampling. Stabilization for low flow sampling is defined as three successive readings within ± 0.1 pH units, $\pm 3\%$ for specific conductance, ± 10 mV for ORP, and $\pm 10\%$ for turbidity and DO. No sampling for organic parameters was completed during the reporting period.

QA/QC samples were collected as a check on the field methodology, laboratory analytical methods, and on sample precision in accordance with Environment Canada (2012). A minimum one field blank and trip blank were collected per sampling event in addition to one blind field duplicate for approximately 10% of groundwater samples per sampling event.

Groundwater quality samples were placed on ice and sent, under COC documentation, to an analytical laboratory that is accredited under CALA.

2.3.1.5.2 Laboratory Analysis

Groundwater quality samples collected as part of this monitoring program were analyzed for general chemistry, nutrients, and metals as listed in Table 2-8. Once fuel storage begins near the process plant, four monitoring wells located downgradient of the fuel storage location (MW5-OB1-13, MW5-OB2-13, MW21-BR-21 (MW-F) and MW23-OB-21 (MW-G)) will be sampled for organic parameters listed in Table 2-8.

Dissolved metals analysis is considered appropriate for groundwater samples and is more representative of metals chemistry in the aquifer than total metals since the suspended solids are generally not transported through aquifer materials and water supply wells are typically designed and developed to a state to reduce the potential for sediment in the pumped water. Therefore, the dissolved metals fraction is analyzed and compared to regulatory criteria and/or the trigger thresholds as per the Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

Table 2-8: Summary of Analytical Parameters for Groundwater Quality Samples

Parameter	
Alkalinity	Cobalt
Ammonia (as N)	Copper
Chloride	Iron
Electrical Conductivity	Lead
Cyanide (free and total)	Magnesium
Fluorine	Manganese
Hardness	Mercury
Nitrite (as N)	Molybdenum
Nitrate (as N)	Nickel
pH	Potassium
Phosphorus	Selenium
Sulfate	Silver
Total Dissolved Solids (TDS)	Sodium
Total Suspended Solids	Thallium
Total Suspended Solids	Tungsten
Turbidity	Uranium
Aluminum	Vanadium
Antimony	Zinc
Arsenic	Zirconium
Beryllium	Benzene *
Boron	Toluene *
Calcium	Ethylbenzene *
Cadmium	Xylenes *
Chromium (total)	Petroleum Hydrocarbons (PHCs) Fraction 1 (F1) to 4 (F4) *

* Benzene, Toluene, Ethylbenzene, Xylenes, and PAHs sampled at monitoring wells located downgradient of fuel storage locations (MW5-OB1-13, MW5-OB2-13 and MW21-BR-21 (MW-F), and MW23-OB-21 (MW-G))

2.3.2 Results

The following sections present the results of the groundwater quantity and quality monitoring program including comparisons of data to groundwater trigger thresholds as required by the AMP. As required by the Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021) monitoring began March 1, 2021 corresponding with the start of construction of the mine. Results include data collected between March 1, 2021 and the end of the monitoring period, September 30, 2021.

2.3.2.1 Pumped Volume Monitoring

2.3.2.1.1.1 Data Collection

As the open pit has not yet been developed, there was no dewatering of the historical underground workings or open pit during the reporting period. Dewatering that occurred during the reporting period was related to construction dewatering.

Construction dewatering of groundwater and surface water occurred in the area of the process plant and was associated with dewatering of construction excavations to support construction of the associated infrastructure. Flow rates and total daily volumes are presented in Appendix B-3, Figure B-3-1. Total pumped volume was recorded. For PTTW reporting purposes, the total pumped volume must be divided between groundwater and surface water. As it is not possible to measure the proportion of total flow that is groundwater versus surface water in the field, the total flow was divided into groundwater and surface water takings based on an assigned percentage (3% of the total pumped volume was assigned to groundwater with the remainder assigned to surface water).

2.3.2.1.1.2 Data Analysis

There was no dewatering associated with groundwater pumped volume trigger threshold monitoring locations and therefore no comparisons of pumped volume to groundwater pumped volume trigger thresholds as defined in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021) is required for the reporting period.

2.3.2.2 Groundwater Water Level Monitoring

2.3.2.2.1.1 Data Collection

Groundwater level monitoring is to be completed in the spring, summer and fall at most locations. However, based on when data was collected and the timing of the start of mine construction, this report presents data from the 2021 spring and summer sampling events.

In spring 2021, manual measurements of groundwater level were collected at 132 of the 179 required monitoring locations. Four monitoring wells (i.e., MW6-OB-13, MW12-OB-14, MWS-14-03 OB1 and MWS-14-03 OB2) could not be safely accessed during the spring monitoring event due to tree clearing activities. The remaining 47 monitoring wells are proposed and were not installed at the time of the spring 2021 monitoring event. In summer 2021, manual measurements of groundwater level were collected at 148 of 179 monitoring locations. Twelve of these monitoring locations were proposed locations in the Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021) and were installed in June and July 2021. These locations were incorporated into the summer 2021 monitoring event. Details of the additional monitoring locations are provided in Section 2.3.1.1 and Appendix B-2, Table B-2-1. The remaining 31 monitoring locations are proposed locations that were not installed at the time of the summer 2021 monitoring event. Twenty-seven of the remaining proposed monitoring well locations are associated with site infrastructure that needs to be installed prior to the installation of the monitoring wells. The remaining four proposed monitoring wells could not be

installed in 2021 due to access and will be installed once access roads extend near the proposed locations. The summer monitoring event included one additional location (DP-C) for provincial compliance monitoring and is included in this report for completeness.

In spring 2021, data loggers were processed at 42 of the 74 required monitoring locations. Three monitoring wells (i.e., MW6-OB-13, MWS-14-03 OB1 and MWS-14-03 OB2) could not be safely accessed during the spring monitoring event due to tree clearing activities. The data loggers installed at these locations were downloaded during the summer monitoring event, capturing data from the spring monitoring event. The remaining 29 data loggers are associated with proposed monitoring wells that were not installed at the time of the spring 2021 monitoring event. In summer 2021, 54 of the 74 data loggers were processed and included nine monitoring locations installed in June and July 2021 and incorporated into the monitoring program. The remaining 20 data logger locations are associated with proposed monitoring wells that will be installed as mine construction progresses but prior to dewatering associated with the open pit. Details of the monitoring locations installed in June and July 2021 are included in Section 2.3.1.1 and Appendix B-2, Table B-2-1. During data processing it was determined that the datalogger in MW16-04 was malfunctioning. A new datalogger has been ordered and will be installed when conditions permit.

2.3.2.2.1.2 Data Analysis

Manual groundwater level measurements collected during the reporting period are presented in Appendix B-3, Table B-3-1. Groundwater level data collected via data loggers are presented in hydrographs in Appendix B-3, Figures B-3-3 to B-3-10. There are one groundwater level and three horizontal hydraulic gradient trigger thresholds under the groundwater adaptive management plan. The thresholds are related to dewatering of mine features (open pit, aggregate pits, historical underground workings) and/or infrastructure such as the MHT seepage collection system and GFC diversion. Up until September 15, 2021, there was no Project activity related to the features associated with the groundwater level and horizontal hydraulic gradient triggers thresholds. Therefore, the data collected during the reporting period up until September 15, 2021 are considered baseline data and there was no comparison of the baseline data to groundwater level or horizontal hydraulic gradient trigger thresholds.

On September 15, 2021, construction of the process plant commenced, which included construction dewatering. Groundwater quantity trigger threshold 3 (Stantec 2020) states that prior to the diversion of the GFC, a horizontal hydraulic gradient toward the SWAT from proposed monitoring wells MW-F (MW21-BR-21) and MW-G (MW23-OB-21) will be maintained with data reviewed with respect to the trigger on a monthly basis while construction dewatering associated with the process plant is occurring. Horizontal hydraulic gradient trigger threshold hydrographs are presented in Appendix B-3, Figure B-3-2 for the process plant area. A reference elevation for the surface water monitoring location in the SWAT was not available at the time of report preparation; therefore, the horizontal hydraulic gradient was conservatively calculated using bank elevation at the SWAT adjacent to MW21-BR-21 (MW-F) and MW23-OB-21 (MW-G). A horizontal gradient towards the SWAT between MW21-BR-21 and MW23-OB-21 was maintained following the start of construction dewatering of the process plant.

During the reporting period, there were no exceedances of the groundwater level and horizontal hydraulic gradient trigger thresholds for groundwater quantity as defined in the Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

2.3.2.3 Groundwater Water Quality Monitoring

2.3.2.3.1.1 Data Collection

Groundwater quality monitoring is to be completed in the spring, summer and fall at select locations. However, based on when data was collected and the timing of the start of mine construction, this report presents data from the 2021 spring and summer sampling events.

In spring 2021, groundwater quality samples were collected at 15 of the 38 required monitoring wells. Four monitoring wells (BH14-15, MW6-OB-13, MWS-14-03 OB1, and MWS-14-03 OB2) were inaccessible for the duration of the spring monitoring event due to tree clearing activities in the area and the remaining 19 samples are associated with proposed monitoring wells that were not installed as of spring 2021. In summer 2021, groundwater samples were collected at 31 of the 38 required monitoring locations. The summer monitoring event included 12 new monitoring wells installed in spring 2021. The remaining seven groundwater samples are associated with monitoring wells that were not installed as of summer 2021. The remaining monitoring wells to be installed are associated with infrastructure that needs to be constructed prior to the installation of the monitoring wells or are associated with areas of the site where access was an issue and will be installed once access roads are constructed. One additional location (DP-C) was sampled for provincial compliance monitoring purposes and is included in this report for completeness.

A summary of the groundwater quality monitoring program is presented in Appendix B-1, Table B-1-1.

2.3.2.3.1.2 Data Analysis

Table B-4-1 (Appendix B-4) presents the groundwater quality results for the reporting period. Laboratory Certificates of Analysis for the spring and summer sampling events are provided in Appendix B-4. Groundwater quality trigger thresholds were chosen to alert to changing groundwater quality downgradient of the TMF, WRSAs, and ore stockpile prior to discharge to surface water features. As the TMF, WRSAs, and ore stockpile have not been constructed, the groundwater quality data collected during the reporting period are considered baseline data and there was no comparison to groundwater quality trigger thresholds as defined in the Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

2.3.3 Recommended Adaptive Management

The groundwater quantity and quality trigger locations were evaluated as per the AMP. The following sections present recommendations and/or updates to the Plan and associated groundwater monitoring and trigger threshold monitoring locations, frequency, thresholds, and/or rationale. Table 2-9, Figure 2-3 and Figure 2-4 present the groundwater quantity and quality monitoring locations and trigger monitoring locations with recommended changes highlighted. Recommended changes to the water quantity and water quality monitoring programs are detailed below.

Table 2-9: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale with Recommended Changes Bolded

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
Groundwater Quantity			
Mosher and Hardrock No. 2 Shafts	Daily Compared to Trigger Threshold – Quarterly	Pumped Volume	Indirectly monitor potential effects of dewatering the open pit on groundwater levels.
Open Pit	Compared to Trigger Threshold – Quarterly	Pumped Volume	
Aggregate Pit S1	Daily Compared to Trigger Threshold – Quarterly	Pumped Volume	Indirectly monitor potential effects of dewatering the aggregate pits on groundwater levels.
Aggregate Pit T2	Daily Compared to Trigger Threshold – Quarterly	Pumped Volume	
Aggregate Pit S4	Daily Compared to Trigger Threshold – Quarterly	Pumped Volume	
BH14-01 G7-OB1-14 G7-OB2-14 MW14-OB-14 MW14-BR-14 MWS-14-01 MWS-14-07 OB DP-A (Central Wetland)	Manual – Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Spring, Summer, and Fall	Water Level	Monitor potential changes in groundwater levels associated with the TMF and/or dewatering of the aggregate pits to be protective of wetlands and baseflow to surface water features.

Table 2-9: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale with Recommended Changes Bolded

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
DP-B (GFC Diversion)	Manual – Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Spring, Summer, and Fall	Water Level	Monitor potential changes in groundwater levels associated with the GFC diversion on a wetland located in the upper reaches of the SWAT.
MW2-OB-13 MW8-OB-14 MW17-OB-14 MW01-OB2-18 MW08-18	Manual – Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Spring, Summer, and Fall	Water Level	Monitor potential changes in groundwater levels associated with dewatering the open pit to be protective of wetlands and baseflow to surface water features.
MW21-BR-21 (MW-F) MW23-OB-21 (MW-G)	Manual – Spring, Summer, and Fall Data Logger – 1 hour Intervals Compare to Trigger Threshold – Monthly during Construction Dewatering of process plant	Horizontal Hydraulic Gradient toward the SWAT	Monitor potential changes in groundwater levels associated with temporary construction dewatering of the process plant area to be protective of wetlands and baseflow to surface water features. Confirm there is a horizontal hydraulic gradient toward the SWAT.
MHT Seepage Collection Drain	Manual – Spring, Summer, and Fall Data Logger – 1 hour Intervals at select wells Compared to Trigger Threshold – Spring, Summer, and Fall	Horizontal Hydraulic Gradient	Confirm that an inward horizontal hydraulic gradient is maintained toward the MHT seepage collection drain and/or toward the open pit. The horizontal hydraulic gradient will be interpreted based on water level measurements at nearby and surrounding monitoring locations (via access holes in the drain, 96-03, 96-04, 96-09A1, 96-09A2, 96-09A3, 96-

Table 2-9: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale with Recommended Changes Bolded

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
			09A4, 96-11A1, 96-11A2, 96-12A, 96-12B, 96-14B, MW07-18, MW08-18, MW09-18, MW-H, MW-I, MW-J, and/or MW-K, as available)
Reversal in horizontal hydraulic gradient between the historical MacLeod and Hardrock tailings and Kenogamisis Lake by year 5 of open pit development.	Manual – Spring, Summer, and Fall Data Logger – 1 hour Intervals at select wells Compared to Trigger Threshold – Fall starting in year 5 of open pit development	Horizontal Hydraulic Gradient	Monitor timing of reversal in hydraulic gradient between historical tailings and Kenogamisis Lake to reduce mass loading from historical tailings to Kenogamisis Lake. The horizontal hydraulic gradient will be interpreted based on water level measurements at monitoring wells completed within and surrounding the historical MacLeod and Hardrock tailings that will be monitored as per the groundwater sampling program (Section 2.3.1.4.1, Figure 2-3 and Figure 2-4)
Horizontal Hydraulic Gradient Associated with Water Management Ponds	Manual – Spring, Summer, and Fall Data Logger – 1 hour intervals Compared to Trigger Threshold – Monthly	Horizontal Hydraulic Gradient Toward Water Management Ponds	Confirm an inward horizontal hydraulic gradient is maintained toward the pond outside of precipitation events. Based on water levels measured at MW-T, MW-U, MW-V, MW-W, MW-X, MW-Y, MW-Z and the respective pond surface water level.

Table 2-9: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale with Recommended Changes Bolded

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
Groundwater Quality			
G7-OB1-14 G7-OB2-14	Spring, Summer, and Fall	CN- (free), SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from the TMF on Lake A-322
MW15-OB-14 MW15-BR-14 MW25-BR-21 (MW-E (Bdrk)) MW25-OB-21 (MW-E (Ob)) MW24-BR-21 (MW-N (Bdrk)) MW24-OB-21 (MW-N (Ob)) DP-C	Spring, Summer, and Fall	CN- (free), SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from the TMF prior to discharge to Goldfield Creek Tributary
MWS-14-07 OB MWS-14-07BR MW20-BR-21 (MW-D (Bdrk)) MW20-OB-21 (MW-D (Ob)) Proposed Monitoring Wells MW-C	Spring, Summer, and Fall	CN- (free), SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from the TMF prior to discharge to Southwest Arm
MWS-14-02 OB MWS-14-02-BR G6-BR-14 G6-OB-14 Proposed Monitoring Well MW-L	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA D prior to discharge to Southwest Arm
BH14-15 MWS-14-03 OB1 MWS-14-03 OB2	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA D prior to discharge to SWAT
MWS-14-04 MW22-OB-21 (MW-M) Proposed Monitoring Well MW-O	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA B and/or Ore Stockpile prior to Discharge to Southwest Arm

Table 2-9: Groundwater Trigger Threshold Monitoring Locations, Frequency, Parameters, and Rationale with Recommended Changes Bolded

Trigger Threshold Monitoring Location	Frequency of Measurement and Comparison to Trigger Threshold	Trigger Threshold Parameter	Rationale
MW18-BR-21 (MW-A) MW6-OB-13	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effect of seepage from WRSA C prior to discharge to Mosher Lake
MW19-BR-21 (MW-B (Bdrk)) MW19-OB-21 (MW-B (Ob)) MW3-OB-13 MW3-BR-13 MW03-OB-18 MW03-BR-18	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, and Ur	Monitor for potential effects of seepage from WRSA A prior to discharge to Central Basin and Barton Bay
MW21-BR-21 (MW-F) MW23-OB-21 (MW-G)	Spring, Summer, and Fall	SO ₄ , and dissolved Sb, As, Co, Fe, Ur, BTEX, VOCs and PHCs	Monitor for potential effects of the process plant and associated facilities (fuel storage) on groundwater quality as well as potential effects of seepage from upgradient WRSAs.

Notes:

Bold: Updates to the groundwater trigger threshold monitoring locations, frequency, parameters, and/or rationale compared to the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

2.3.3.1 Groundwater Quantity Monitoring

The following are recommended for the groundwater quantity monitoring and/or adaptive management plan to finalize trigger thresholds presented in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan and to coincide with provincial compliance monitoring plans:

- The reversal of the horizontal hydraulic gradient between the historical Hardrock and MacLeod tailings and Kenogamis Lake as a result of open pit dewatering was a trigger for groundwater quantity in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan. The timing of the trigger threshold (i.e., the timing of the reversal in hydraulic gradient) was to be determined based on future groundwater flow modelling. Groundwater flow modelling was completed and the reversal in the hydraulic gradient was predicted to occur at the end of year 4 of open pit development. Therefore, the trigger threshold for the reversal of the horizontal hydraulic gradient should be evaluated beginning in year 5 of open pit development. If the reversal had not occurred by year 5 of open pit development, then the trigger response plan presented in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan will be implemented. As presented in the Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan, the horizontal hydraulic gradient will be interpreted based on water level measurements at monitoring wells completed within the historical MacLeod and Hardrock tailings and surrounding area that will be monitored as per the groundwater monitoring program (Section 2.3.1.4.1 and Figure 2-3 and Figure 2-4).

Baseline data collected during and prior to the reporting period will be used to update the water level trigger thresholds presented in the Federal Fish and Fish Habitat Federal EIS Follow-Up Monitoring Plan (GGM 2021).

The existing groundwater quantity monitoring program with the above recommendations will be continued for the 2022 reporting year.

2.3.3.2 Groundwater Quality Monitoring

To coincide with provincial compliance monitoring plans, it is recommended that drive-point piezometer DP-C be added to the groundwater quality monitoring program to monitor shallow groundwater quality within GFC for potential effects of seepage from the TMF.

The existing groundwater quality monitoring program with the addition of DP-C will be continued for the 2022 reporting year.

2.4 Use of Explosives in or Near-Water

The following section describes measures implemented in the 2021 monitoring period to mitigate potential adverse effects on fish and fish habitat from the use of explosives near water and to satisfy federal Condition 3.2 and 3.15 of the EIS. Fisheries and Oceans Canada (DFO) guidance for protecting fish from blasting overpressure (i.e., instantaneous pressure change) and vibrations (i.e., peak particle velocity) are used for follow-up monitoring. The Noise and Vibration Monitoring and Management Plan (NVMMP) (GGM 2019) identifies an overpressure threshold of 50 kPa (in the water) and a vibration threshold of 13 mm/sec (in substrate).

The open pit will generally be set back a sufficient distance from fish and fish bearing habitat to limit potential effects to fish and fish habitat due to the use of explosives, except around the eastern extension. The edge of the eastern extension of the open pit will be located approximately 220 m from the high-water level mark of Kenogamisis Lake. Predicted overpressure and peak particle velocity (vibrations) in fish habitat did not exceed federal guidelines (Stantec 2017) and, therefore, impacts to fish or fish habitat because of blasting were deemed not significant in the EIS.

A single blast event occurred during the 2021 reporting period, at 2:05 pm on September 29, 2021. The blast charge was relatively small and occurred at a rock outcrop approximately 200 m east of the existing, historical head frame near the intersection of Highway 11 and Highway 584 (approximate UTM coordinates: 16U 0504064E 5503091N). Based on the charge size used, a setback distance of 47 m was calculated to meet the project overpressure threshold of 50 kPa for fish habitat as identified in the NVMMP. The closest fish habitat was approximately 470 m away from the blasting location (WC-E). Therefore, overpressure from the blasting was expected to be well under the applicable overpressure threshold in the fish habitat that was nearest to the blast.

As required by the blasting plan, vibration monitoring (PPV) will also be monitored during the restrictive timing window for work in and around fish habitat (i.e., between April 1 to June 20).

2.4.1 Adaptive Management

Since a single blast event occurred in the 2021 reporting period, that blast occurred 470 m away from fish habitat, and the 50 kPa overpressure threshold was estimated to occur 120 m from the blast, effects on fish and fish habitat due to blasting were not anticipated. Therefore, modifications to the NVMMP are not recommended at this time. GMM will continue to implement the NVMMP throughout the upcoming 2022 monitoring period.

2.5 Concentration of Mercury and Methylmercury in Water

2.5.1 Methods

2.5.1.1 Data Collection

The realignment of GFC is planned to facilitate siting of the TMF and to offset for predicted effects on fish and fish habitat. GFC will be diverted into the existing SWAT, which will increase flow in the SWAT and result in an increase of the permanently inundated area by approximately 15 ha. The management and monitoring measures identified in this section deal specifically with potential effects related to changes in mercury concentrations and methylmercury generation in the GFC diversion. The surface water monitoring locations, sampling frequency, and sampling methods as it pertains to mercury and methylmercury are presented in the following sections.

Surface water at Stations 25, 39, 52, and 55 presented in Figure 2-1, were monitored monthly and will be assessed for potential changes to mercury and methylmercury as a result of the GFC diversion and associated inundated areas. Monitoring locations may be added or removed from the monitoring program in accordance with their utility in monitoring the effects of the Project on the environment or to account for modifications during detailed design.

Table 2-10 presents the frequency of sampling and rationale for each monitoring station for surface water quality. Four surface water monitoring locations were monitored monthly for mercury and methylmercury, when safe to do so, to assess seasonal fluctuations in water quality. Monthly monitoring data will be used to conduct trend analysis of surface water quality to differentiate whether observed fluctuations in quality are due to natural/seasonal sample variation, or if they may indicate a project related effect. The frequency of monitoring will be reduced to quarterly if there are no trigger thresholds exceeded during a two-year period (approximately 24 samples). The surface water quality monitoring stations are shown in Figure 2-1.

Table 2-10: Receiving Environment Surface Water Quality Monitoring Locations, Frequency, and Rationale

Station	Frequency	Rationale
25	Monthly	Monitor potential effects of the Project, including the GFC diversion, on mercury and methylmercury concentrations in surface water at the downstream end of the GFC diversion
39	Monthly	Monitor potential effects of the Project, including the GFC diversion, on mercury and methylmercury concentrations in surface water in SWP3 and the middle section of the channel diversion
52	Monthly	Document background mercury and methylmercury concentrations in surface water upstream of the GFC diversion
55	Monthly	Monitor potential effects of the Project, including the Goldfield Creek realignment, on mercury and methylmercury concentrations in surface water in SWP5 and the middle section of the channel realignment

Surface water grab samples were collected using laboratory-provided bottles, containing appropriate preservative. Samples for dissolved forms of metals were filtered using a 0.45 µm membrane filter. Water quality samples were taken just below the surface of the water (0.1 m deep). Water quality samples were collected by an experienced technician using suitable sampling equipment. Samples were preserved (if applicable) and transported in appropriate containers to maintain the integrity of sample temperatures and hold times. Samples were submitted to a CALA accredited laboratory under COC documentation.

2.5.1.2 Laboratory Analysis

The accredited CALA laboratory used the authorized analytical methods set out in the ISW ECAs, PTTWs, and regulations (i.e., MDMER and O. Reg. 560/94).

The method detection limits (MDLs) used by the CALA laboratory for mercury and methylmercury have been revised since the beginning of the baseline monitoring program. MDLs for mercury and methylmercury are currently 0.0001 µg/L and 0.00002 µg/L, respectively. The current MDLs are capable of detecting the concentrations of mercury of methylmercury in surface water and have been used to develop baseline and 95th percentile concentrations for surface water quality Stations 25, 39, and 52.

QA/QC principles for sampling and laboratory analysis outlined in Environment Canada (2012) were followed. Duplicate samples were collected from a subset of samples collected to quantify environmental variability and analytical consistency, with a minimum of one duplicate sample in approximately 10 surface water samples per sample set. A minimum of one travel and one field blank were collected per sampling event to detect potential sources of contamination. Field instruments were calibrated regularly according to the manufacturer's specifications and calibration logs were maintained.

Water quality data were entered into an electronic database and was cross-checked against the original laboratory certificate of analysis and validated.

2.5.1.3 Data Analysis

The raw data set for mercury and methylmercury at the applicable stations was compiled into a spreadsheet to present the monitoring completed for the 2021 period. Since monitoring occurred prior to the start of discharge from the TETP, and prior to soil excavation on site, these data are considered as baseline data for this reporting period.

For the 2022 reporting period, monthly data for applicable stations will be compared to the seasonal trigger thresholds during the 2022 reporting period as identified in the Plan (GGM 2021) to determine potential exceedances.

The trigger threshold monitoring stations, parameters, and rationale are presented in Table 2-11. The locations of the trigger threshold monitoring stations are presented in Figure 2-2.

Table 2-11: Mercury and Methylmercury Trigger Threshold Monitoring Stations

Trigger Threshold Monitoring Station	Frequency of Measurement	Trigger Threshold Parameter	Rationale
25	Monthly	Hg, MeHg	Monitor for potential effects of mining activities on the water at the mouth of the SWAT
39	Monthly	Hg, MeHg	Monitor for potential effects of mining activities on SWAT, downstream of GFC Diversion
52	Monthly	Hg, MeHg	Background station upstream GFC Diversion

2.5.2 Results

Mercury and methylmercury are both parameters included in the surface water quality monitoring presented in Section 2.2.2.1. As such, Section 2.2.2.1 should be referred to for results of the Federal Condition 5.4 of the EIS reporting.

2.5.3 Adaptive Management

Mercury and methylmercury are both parameters included in the surface water quality monitoring adaptive management plan, as indicated in Section 2.2.1.1.3. As such, Section 2.2.2.1 should be referred to for changes to the adaptive management to support federal Condition 5.4 of the EIS reporting.

2.6 Fish Tissue Monitoring - SWAT

2.6.1 Methods

The realignment of Goldfield Creek is planned to facilitate siting of the TMF and to offset for predicted effects on fish and fish habitat. Goldfield Creek will be diverted into the existing SWAT, which will increase flow in the SWAT and result in an increase of the permanently inundated area by approximately 15 ha. The management and monitoring measures identified in this section deal specifically with EIS Condition 5.4 and potential effects related to changes in mercury concentrations and methylmercury generation in the Goldfield Creek Diversion. EIS Condition 5.5.1, which also relates to fish tissue, is addressed in Section 2.7 of this report.

The purpose of fish tissue sampling is to monitor potential changes in the concentration of mercury and methylmercury in fish tissue and, if changes are observed, to determine if there is an adverse effect on fish health or an increased risk to human and wildlife consumers. This monitoring program will document potential changes to the concentration of parameters of potential concern in fish tissue and the assessment of risk to human health will be described under the reporting requirements of the Indigenous Peoples Health Risk Assessment Follow-up Plan (GGM 2020a).

A before-after-control-impact (BACI) study design is planned, examining potential changes in mercury and methylmercury concentrations in fish tissue along the Goldfield Creek realignment. Yellow Perch (*Perca flavescens*) will be used as the sentinel species for mercury monitoring, as they may be consumed by humans and by wildlife and are the only species that are abundant enough in each test area to achieve a reasonable sample size.

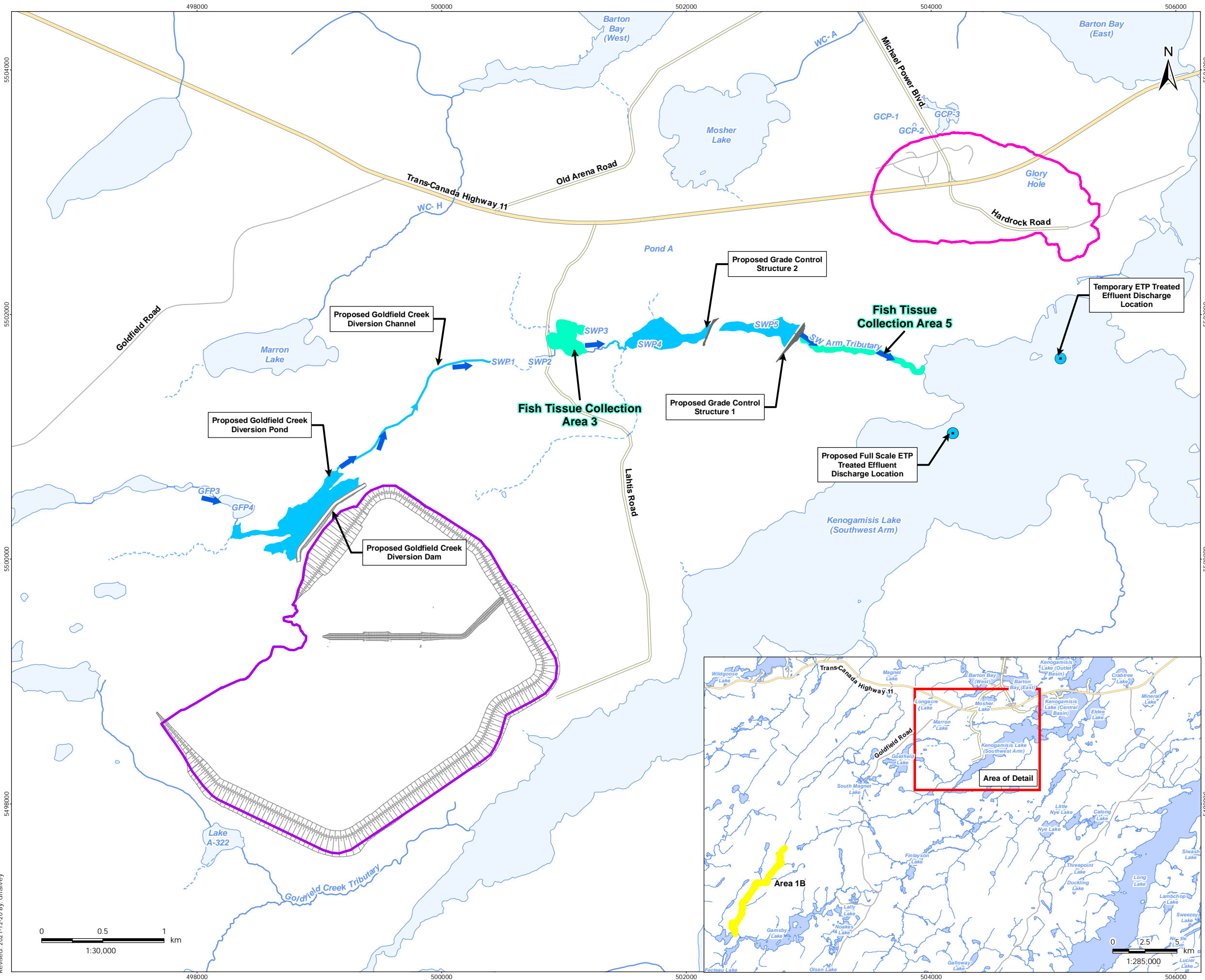
The need for this study is driven primarily by the realignment of Goldfield Creek, and the associated inundation of adjacent wetlands that is anticipated in some areas. Since the Goldfield Creek realignment has not yet occurred, a pre-post comparison of fish tissue concentrations is not yet required. However, additional baseline data were collected in 2021 to build on the existing set of fish tissue baseline data and to better document variation in pre-construction (i.e., natural) conditions. The Goldfield Creek Realignment is planned for 2022, with the first year of post construction monitoring planned for 2023 (GGM 2021).

In 2021, additional baseline Yellow Perch tissue were collected from two test areas and one reference area (Figure 2-6). Fish collections occurred from June 16 to June 21, 2021. The test areas were Area 3, in the middle of the realignment, and Area 5, at the downstream end of the realignment (Figure 2-6). The reference area differs from the reference areas identified in the Plan, but was selected for the following reasons:

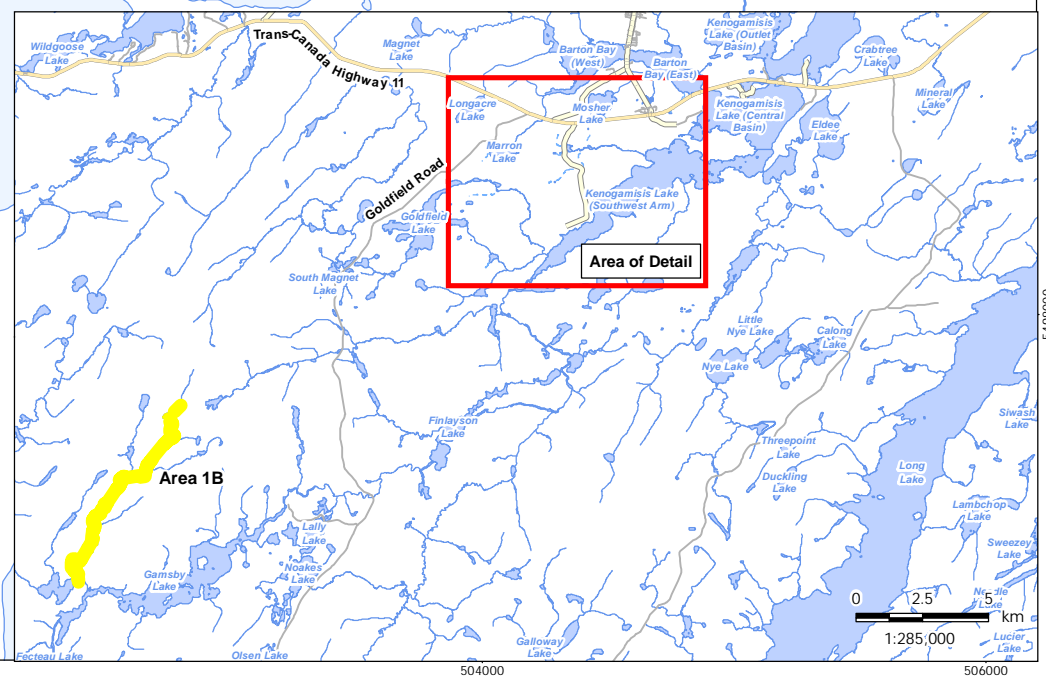
- Sampling in large lakes was a contingency, in case the required number of fish could not be captured in the lower end of the SWAT. In 2021, good catches of Yellow Perch were realized in the lower portion of the SWAT, upstream of Kenogamisis Lake, negating the need to sample fish from Kenogamisis lake. Therefore, a “large lake” reference is no longer required.
- Sampling was completed in an unnamed tributary to Gamsby Lake rather than in South Magnet Lake because the habitat in the unnamed tributary more closely resembles the habitat in the test areas.
- The reference area used in the unnamed tributary to Gamsby Lake is also used in a study being completed under the requirements of provincial EA Conditions of Approval (Condition 14) and this sampling area is identified in that overlapping monitoring requirement.

Young of the Year (YOY) Yellow Perch (i.e., roughly age 1) were preferentially targeted because they presumably have a smaller geographic range than their adult counterparts and, therefore, are more representative of the site from which they are collected. Yellow Perch sampled in 2021 for were collected using a boat electrofisher. Copies of field collection forms and morphometric bench sheets are provided in Appendix C-1.

Composite samples were created by combining whole Yellow Perch into a single sample with a target minimum sample mass of 10 g wet weight. Composite samples were homogenized by the laboratory prior to analysis. A subset of composite samples included additional individual fish, to achieve enough sample mass for the laboratory to complete duplicate analysis. A summary of Yellow Perch morphometric data is provided in Appendix C-2. Appendix C-2 also includes a column labelled “Sample ID”, which indicates how each fish was used (e.g., sample ID ‘A5-02’ was the second fish homogenized in Sample A5).



- Legend**
- Fish Tissue Collection
 - Fish Tissue Reference
 - Flow Direction
 - Diffuser Location
 - Tailings Management
 - Open Pit- Full Extent
 - Diversion Channel
 - Highway
 - Major Road
 - Local Road
 - Watercourse- Permanent
 - Watercourse- Intermittent
 - Waterbody



Notes

1. Coordinate System: NAD 1983 UTM Zone 16N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.

December 2021
160961293

Client/Project
Greenstone Gold Mines GP Inc (GGM)
Hardrock Project

Figure No.
2-6

Title
2021 Sampling Areas for Monitoring
Mercury and Methylmercury in
Fish Tissue

V:\01609\active\60960865\drawing\MXD\Aquatics\Report\Figures\2021_Fish_Federal_EIS_Followup_Report\160961293_2021_FedFish_Fig_2_6_Mercury_Monitoring_Fish_Tissue_20211220.mxd
Revised: 2021-12-20 By: dhanvey

0 0.5 1 km
1:30,000

0 2.5 5 km
1:285,000

To reduce fish handling and help to acquire sufficient sample mass, age structures were not collected from age 1 Yellow Perch submitted for tissue analysis but rather from a sample of representative individual fish. Age analysis is not yet complete but will be reported in the first post-construction monitoring report. Age will be estimated in two ways. First, fish lengths will be plotted into length frequency histograms to identify seasonal growth trends and age/length relationships. Second, a separate sample of Yellow Perch otoliths will be submitted for age estimation to establish length at age relationships for each waterbody.

Total length, fork length and weight were measured in the field and recorded from fish collected for tissue analysis. Methods used in 2021 were consistent with previous baseline data collection efforts to allow for meaningful data comparison.

Muscle tissue was sent to ALS Laboratories in Thunder Bay for analysis of metals, mercury, methylmercury and the supporting parameters percent lipid and percent moisture. The laboratory followed the MOECC (2014) “Protocol for the Collection of Fish Samples for Contaminant Analyses” and Environment Canada (2012) “Metal Mining Technical Guidance for Environmental Effects Monitoring” during tissue preparation. Where method requirements differ, the more rigorous method was used. Muscle samples were analyzed for total mercury using cold vapour atomic spectrophotometry, which achieves a lower detection limit than inductively coupled plasma mass spectrometry (ICP-MS). The detection limit for mercury was 0.001 µg/g wet weight. The detection limit for methylmercury was 0.0001 mg/kg wet weight.

2.6.2 Results

Morphometric baseline data are provided in Appendix C-2. Copies of the ALS certificate of analysis and sample submission forms are provided in Appendix C-3. Sampling locations on the certificate of analysis are referred to as follows:

- Fish Tissue Collection Area 5 is references as A5
- Fish Tissue Collection Area 3 (SWP3) is references as A3
- Fish Tissue Collection Area 1B is references as A1B.

Although not a requirement under the Plan, an ICPMS metals scan was also completed, since the volume of fish tissue collected was sufficient to include this additional analysis (Appendix C-3).

BACI analysis of the data will be completed following the collection of post-construction data.

2.6.3 Adaptive Management

Changes to the Plan related to fish tissue monitoring in the SWAT are not recommended at this time. The data collected in 2021 are expected to form a good basis for comparison to data collected post-construction. GMM will continue to implement the SWAT fish tissue monitoring program as planned.

2.7 Fish Tissue Monitoring - Kenogamisis Lake

No activities related to monitoring fish tissue in Kenogamisis Lake occurred in the 2021 reporting period, nor were monitoring activities required by the Plan. The first phase of monitoring is required after there has been a period of potential exposure to mine effluent or potentially changing water quality conditions in Kenogamisis Lake. Monitoring is required within 24 months from when the mine first began discharging effluent via the TETP, which occurred on September 15, 2021. The monitoring cycle is scheduled for every two years for the first six years of operation, after which time the need for additional monitoring will be evaluated.

Since fish tissue monitoring in Kenogamisis Lake was not required during the 2021 reporting period, modifications to the Plan related to sampling fish tissue in Kenogamisis Lake are not recommended. GMM will continue to implement the Kenogamisis Lake fish tissue monitoring program as scheduled.

3 Closing

This 2021 Fish and Fish Habitat Follow-up Monitoring Report was prepared to address the monitoring requirements of the Fish and Fish Habitat Follow-up Monitoring Plan (the Plan) (GGM 2021); which was designed to address seven specific federal Conditions of Approval related to monitoring potential effects of the Project on fish and fish habitat (Conditions 3.14, 3.15, 3.16, 3.17, 3.2, 5.4, and 5.5.1). This report describes activities undertaken during the period of October 1, 2020, through September 30, 2021 (i.e., the 2021 monitoring year) to satisfy the requirements of the Plan. As discussed herein, and as outlined in the Plan, the monitoring information presented in this report adds to the existing baseline data set for the Project. Mine construction officially began March 1, 2021, with some minor site preparations, including the construction of a temporary camp to house mine workers, the set-up of construction trailers, the construction of a temporary effluent treatment plant (TETP), and the construction of an effluent discharge pipe into Kenogamisis Lake. Most of these activities occurred away from fish habitat. No activities that involved the excavation or movement of soil occurred prior to the TETP being commissioned on September 15, 2021. Subsequent annual Fish and Fish Habitat Follow-up Monitoring Reports will include an assessment of the data, including an evaluation of trigger threshold criteria, to assess predictions made in the EIS.

4 References

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APPENDIX A

SURFACE WATER DATA

Table A-1

Sample Location Sample ID Sampling Company Laboratory Laboratory Work Order Laboratory Sample ID Sample Type	24				24				25				25						
	17-Mar-21 GGM L2568922-2	17-Mar-21 DUPLICATE 1 GGM L2568922-9	11-May-21 GGM L2587232-8	9-Jun-21 GGM L2599960-5	12-Jul-21 GGM L2613514-4	4-Aug-21 STANTEC L2623082-9	2-Sep-21 GGM L2635785-5	17-Mar-21 GGM L2568922-1	6-May-21 GGM L2588227-5	9-Jun-21 GGM L2599960-7	12-Jul-21 GGM L2613514-6	3-Aug-21 STANTEC L2622644-5	2-Sep-21 GGM L2635785-7	17-Mar-21 GGM L2568922-2	6-May-21 GGM L2588227-5	9-Jun-21 GGM L2599960-7	12-Jul-21 GGM L2613514-6	3-Aug-21 STANTEC L2622644-5	2-Sep-21 GGM L2635785-7
Field Parameters																			
pH, Field	-																		
Temperature, Field	-																		
General Chemistry																			
Acidity as CaCO3	-																		
Alkalinity, Bicarbonate (as CaCO3)	-																		
Alkalinity, Carbonate (as CaCO3)	-																		
Alkalinity, Hydroxide (as CaCO3)	-																		
Alkalinity, Total	-																		
Ammonia	-																		
Ammonia (as N)	-																		
Ammonia, Un-ionized (Calculated)	-																		
Arson Sum	-																		
Calcium Sum	-																		
Chloride	-																		
Chlorophyll a	-																		
Color, True	-																		
Cyanide	-																		
Cyanide (Free)	-																		
Cyanide (Weak Acid Dissociable)	-																		
Dissolved Organic Carbon (DOC)	-																		
Electrical Conductivity, Lab	-																		
Fluoride	-																		
Hardness (as CaCO3)	-																		
Ion Balance	-																		
Langelier Index	-																		
Langelier Index Temperature	-																		
Nitrate (as N)	-																		
Nitrate + Nitrite (as N)	-																		
Nitrite (as N)	-																		
Orthophosphate (as P)	-																		
pH, Field	-																		
pH, Lab	-																		
Phaeophytin A	-																		
Phosphorus, Total	-																		
Silica (as SiO2)	-																		
Sulfate	-																		
Temperature, Field	-																		
Total Dissolved Solids	-																		
Total Kjeldahl Nitrogen	-																		
Total Organic Carbon	-																		
Total Suspended Solids	-																		
Turbidity, Lab	-																		
See notes on last page																			
Speciated Metals																			
Aluminum	-																		
Antimony	-																		
Arsenic	-																		
Barium	-																		
Bismuth	-																		
Boron	-																		
Cadmium	-																		
Calcium	-																		
Cesium	-																		
Chromium	-																		
Cobalt	-																		
Copper	-																		
Iron	-																		
Lead	-																		
Lithium	-																		
Magnesium	-																		
Manganese	-																		
Molybdenum	-																		
Nickel	-																		
Phosphorus	-																		
Potassium	-																		
Rubidium	-																		
Selenium	-																		
Silicon	-																		
Silver	-																		
Sodium	-																		
Strontium	-																		
Sulfur	-																		
Tellurium	-																		
Thallium	-																		
Thorium	-																		
Tin	-																		
Titanium	-																		
Tungsten	-																		
Uranium	-																		
Vanadium	-																		
Zinc	-																		
Zirconium	-																		
See notes on last page																			
Total Metals																			
Aluminum	-																		
Antimony	-																		
Arsenic	-																		
Barium	-																		
Bismuth	-																		
Boron	-																		
Cadmium	-																		
Calcium	-																		
Cesium	-																		
Chromium	-																		
Cobalt	-																		
Copper	-																		
Iron	-																		
Lead	-																		
Lithium	-																		
Magnesium	-																		
Manganese	-																		
Mercury	-																		
Molybdenum	-																		
Nickel	-																		
Phosphorus	-																		
Potassium	-																		
Rubidium	-																		
Selenium	-																		
Silicon	-																		
Silver	-																		
Sodium	-																		
Strontium	-																		
Sulfur	-																		
Tellurium	-																		
Thallium	-																		
Thorium	-																		
Tin	-																		
Titanium	-																		
Tungsten	-																		
Uranium	-																		
Vanadium	-																		
Zinc	-																		
Zirconium	-																		

Table A-1

Summary of Surface Water Quality Analytical Results
2021 Fish and Fish Habitat Follow-Up Monitoring Report
Greenstone Gold Mine GP Inc.

Main data table with columns for Sample Location, Sample Date, and various chemical parameters (Field Parameters, Speciated Metals, Dissolved Metals, Total Metals) across multiple dates (e.g., 22-Mar-21, 22-Apr-21, etc.).



Appendix B-2
Summary of Surface Water Quality Trigger Thresholds
Greenstone Mine

Station	Parameter	Units	PWQO	Predicted EIS/EA concentration + 10%	Spring		Summer		Fall		Winter	
					Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile
4	Phosphorus, Total	mg/L	0.02 ₃₄ ^C	-	11	0.0372	14	0.0446	6	0.0318	11	0.0389
	Antimony	µg/L	20 ^C	-	12	0.42	18	1.04	9	1.02	13	0.70
	Arsenic	µg/L	100 ^A 5 ^C	-	13	42.4	18	122.4	9	68.3	13	21.7
	Cobalt	µg/L	0.9 ^C	-	12	0.29	18	0.31	9	0.26	13	0.25
	Iron	µg/L	300 ^A	-	13	627	18	591	9	633	13	374
	Uranium	µg/L	5 _a ^C	-	12	0.038	14	0.066	7	0.073	8	0.063
8	Phosphorus, Total	mg/L	0.02 ₃₄ ^C	-	10	0.0149	13	0.0204	5	0.0133	10	0.008
	Antimony	µg/L	20 ^C	-	11	0.13	17	0.3	7	0.28	13	0.30
	Arsenic	µg/L	100 ^A 5 ^C	-	12	7.56	17	23.4	7	17.7	13	6.06
	Cobalt	µg/L	0.9 ^C	-	11	0.05	17	0.25	7	0.19	13	0.25
	Iron	µg/L	300 ^A	-	12	141	17	127	7	152.1	13	108
	Uranium	µg/L	5 _a ^C	-	11	0.126	14	0.165	6	0.166	7	0.271
20A	Phosphorus, Total	mg/L	0.03 ₃₄ ^C	-	7	0.0463	8	0.0118	4	0.0113*	7	0.009
	Cyanide	mg/L	n/v	0.0053**	3	-	3	-	1	-	3	-
	Cyanide (Free)	mg/L	0.005 ^A	0.0053	3	-	3	-	1	-	3	-
	Antimony	µg/L	20 ^C	0.73	7	-	8	-	4	-	7	-
	Arsenic	µg/L	100 ^A 5 ^C	9.04	7	-	8	-	4	-	7	-
	Cobalt	µg/L	0.9 ^C	0.664	7	-	8	-	4	-	7	-
	Copper	µg/L	5 ^A 1/5 ₁₃ ^C	1.487	7	-	8	-	4	-	7	-
	Iron	µg/L	300 ^A	389	7	-	8	-	4	-	7	-
	Uranium	µg/L	5 _a ^C	3.127	7	-	8	-	4	-	7	-
24	Phosphorus, Total	mg/L	0.02 ₃₄ ^C	-	5	0.0162	8	0.0144	5	0.0141	7	0.0066
	Cyanide	mg/L	n/v	0.0030**	7	-	12	-	11	-	10	-
	Cyanide (Free)	mg/L	0.005 ^A	0.0030	7	-	12	-	11	-	10	-
	Antimony	µg/L	20 ^C	-	6	0.1	12	0.30	11	0.30	10	0.30
	Arsenic	µg/L	100 ^A 5 ^C	-	7	1.92	12	5.03	11	3.23	10	0.82
	Cobalt	µg/L	0.9 ^C	-	6	0.05	12	0.25	11	0.25	10	0.25
	Copper	µg/L	5 ^A 1/5 ₁₃ ^C	-	7	0.75	12	0.60	11	0.50	10	0.59
	Iron	µg/L	300 ^A	-	7	140	12	169	11	158	10	113
	Uranium	µg/L	5 _a ^C	-	6	0.186	9	0.231	6	0.263	4	0.303*
25	Phosphorus, Total	mg/L	0.03 ₃₄ ^C	-	8	0.0138	11	0.0134	6	0.0127	9	0.0211
	Antimony	µg/L	20 ^C	1.88	10	-	15	-	12	-	12	-
	Arsenic	µg/L	100 ^A 5 ^C	-	10	46.4	15	51.4	12	25.16	12	42.5
	Cobalt	µg/L	0.9 ^C	-	10	0.16	15	0.25	12	0.21	12	0.25
	Iron	µg/L	300 ^A	-	10	129	15	184	12	106	12	799
	Mercury	µg/L	0.2 ^A	-	12	0.00253***	12	0.00253***	12	0.00253***	12	0.00253***
	Methyl Mercury	µg/L	n/v	-	12	0.000436***	12	0.000436***	12	0.000436***	12	0.000436***
	Uranium	µg/L	5 _a ^C	-	9	0.040	12	0.165	7	0.189	6	0.095
	26	Phosphorus, Total	mg/L	0.03 ₃₄ ^C	-	7	0.0102	9	0.0170	5	0.0166	6
Antimony		µg/L	20 ^C	1.57	8	-	13	-	11	-	9	-
Arsenic		µg/L	100 ^A 5 ^C	-	8	20.7	13	35.2	11	26.1	9	16.5
Cobalt		µg/L	0.9 ^C	-	8	0.18	13	0.25	11	0.25	9	0.71
Iron		µg/L	300 ^A	-	8	91	13	131	11	125	9	48
Uranium		µg/L	5 _a ^C	-	7	0.057	10	0.065	6	0.062	5	0.063
39	Phosphorus, Total	mg/L	0.03 ₃₄ ^C	-	9	0.0080	10	0.0082	6	0.0104	8	0.0053
	Antimony	µg/L	20 ^C	-	9	0.05	10	0.05	6	0.12	8	0.11
	Arsenic	µg/L	100 ^A 5 ^C	-	9	7.03	10	8.04	6	6.64	8	5.89
	Cobalt	µg/L	0.9 ^C	-	9	0.05	10	0.05	6	0.05	8	0.05
	Iron	µg/L	300 ^A	-	9	98.2	10	64	6	95	8	244.4
	Mercury	µg/L	0.2 ^A	-	12	0.00199***	12	0.00199***	12	0.00199***	12	0.00199***
	Methyl Mercury	µg/L	n/v	-	12	0.000088***	12	0.000088***	12	0.000088***	12	0.000088***
	Uranium	µg/L	5 _a ^C	-	9	0.057	10	0.075	6	0.096	8	0.099
		Phosphorus, Total	mg/L	0.03 ₃₄ ^C	-	9	0.0131	11	0.0158	7	0.0369	8
Antimony		µg/L	20 ^C	-	9	0.05	11	0.09	7	0.13	8	0.1085

Appendix B-2
Summary of Surface Water Quality Trigger Thresholds
Greenstone Mine

Station	Parameter	Units	PWQO	Predicted EIS/EA concentration + 10%	Spring		Summer		Fall		Winter	
					Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile
49	Arsenic	µg/L	100 ^A 5 ^C	-	9	3.28	11	15.05	7	7.02	8	1.3475
	Cobalt	µg/L	0.9 ^C	-	9	0.11	11	0.05	7	0.05	8	0.05
	Iron	µg/L	300 ^A	-	9	168	11	137	7	190	8	103.3
	Uranium	µg/L	5 ^C	-	9	0.149	11	0.232	7	0.262	8	0.323
52	Phosphorus, Total	mg/L	0.03 ₃₄ ^C	-	6	0.0121	5	0.0175	7 ^X	0.0101 ^{**}	11 ^X	0.0058 ^{**}
	Antimony	µg/L	20 ^C	-	6	0.05	5	0.05	7 ^X	0.12 ^{**}	11 ^X	0.1 ^{**}
	Arsenic	µg/L	100 ^A 5 ^C	-	6	3.14	5	5.40	7 ^X	6.63 ^{**}	11 ^X	5.78 ^{**}
	Cobalt	µg/L	0.9 ^C	-	6	0.05	5	0.05	7 ^X	0.05 ^{**}	11 ^X	0.05 ^{**}
	Iron	µg/L	300 ^A	-	6	99	5	327	7 ^X	95 ^{**}	11 ^X	243 ^{**}
	Mercury	µg/L	0.2 ^A	-	12	0.00236 ^{***}	12	0.00236 ^{***}	12	0.00236 ^{***}	12	0.00236 ^{***}
	Methyl Mercury	µg/L	n/v	-	12	0.000126 ^{***}	12	0.000126 ^{***}	12	0.000126 ^{***}	12	0.000126 ^{***}
Uranium	µg/L	5 ^C	-	6	0.138	5	0.192	7 ^X	0.120 ^{**}	11 ^X	0.137 ^{**}	
53	Phosphorus, Total	mg/L	0.03 ₃₄ ^C	-	11 ^Y	0.0130	14 ^Y	0.0154	7 ^Y	0.0369	9 ^Y	0.0349
	Antimony	µg/L	20 ^C	-	11 ^Y	0.05	14 ^Y	0.08	7 ^Y	0.13	9 ^Y	0.1
	Arsenic	µg/L	100 ^A 5 ^C	-	11 ^Y	3.26	14 ^Y	13.56	7 ^Y	7.02	9 ^Y	1.34
	Cobalt	µg/L	0.9 ^C	-	11 ^Y	0.1	14 ^Y	0.05	7 ^Y	0.05	9 ^Y	0.05
	Iron	µg/L	300 ^A	-	11 ^Y	190	14 ^Y	136	7 ^Y	190	9 ^Y	103
	Uranium	µg/L	5 ^C	-	11 ^Y	0.148	14 ^Y	0.229	7 ^Y	0.262	9 ^Y	0.322

Appendix B-2
Summary of Surface Water Quality Trigger Thresholds
Greenstone Mine

Station	Parameter	Units	PWQO	Predicted EIS/EA concentration + 10%	Spring		Summer		Fall		Winter	
					Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile	Sample Count Summary	95th Percentile

Notes:

- PWQO Provincial Water Quality Objectives of the Ministry of Environment and Energy (MOEE, 1999)
- A PWQO Table 2
- C PWQO Table 2 - Interim
- 15.2 Measured concentration did not exceed the indicated standard.
- <0.03 Analyte was not detected at a concentration greater than the laboratory reporting limit.
- n/v No standard/guideline value.
- Parameter not analyzed / not available.
- a This Interim PWQO was set for emergency purposes based on the best information readily available. Employ due caution when applying this value.
- s4 Applies to Phosphorus, total. PWQO is 0.03 mg/L for rivers and streams, 0.02 mg/L for lakes, and 0.01 mg/L for lakes naturally below this value.
- s13 The interim PWQO for copper is hardness dependent. If hardness <20 mg/L than PWQO is 0.001 mg/L. For hardness >20 mg/L, PWQO is 0.005 mg/L.
- * 95th percentile calculated using 4 samples
- ** No EIS/EA predictions were made for total cyanides. Therefore, free cyanides were conservatively used as triggers for both free and total forms of cyanides
- *** Annual 95th percentile
- X Due to a limited seasonal dataset, seasonal data from station 39 has been included in the sample count and 95th percentile calculations
- Y Due to a limited seasonal dataset, seasonal data from station 49 has been included in the sample count and 95th percentile calculations

Table A-3: Raw In Situ Temperature and Dissolved Oxygen Data

Sub-Location	Station Name	Date	Time	UTM Easting	UTM Northing	Sample Depth (m)	Water Temperature (°C)	Dissolved Oxygen (mg/L)
Lake A-322	21	6/3/2021	2:23:00 PM			0	19.5	8.81
Lake A-322	21	6/3/2021	2:23:00 PM			1	19.2	8.87
Lake A-322	21	6/3/2021	2:23:00 PM			1.5	18.7	8.93
Lake A-322	21	8/4/2021	12:45:00 PM			0	21.9	8.53
Lake A-322	21	8/4/2021	12:45:00 PM			1	21.4	8.52
Lake A-322	21	8/4/2021	12:45:00 PM			1.5	20.8	8.5
Lake A-322	21	10/21/2021	1:26:00 PM			0	8.3	10.1
Lake A-322	21	10/21/2021	1:28:00 PM			1	8.3	10.08
Lake A-322	21	10/21/2021	1:32:00 PM			1.5	8.3	10.07
Mosher Lake	26	6/3/2021	12:12:00 PM			0	17.8	9.65
Mosher Lake	26	6/3/2021	12:12:00 PM			1	17.7	9.65
Mosher Lake	26	6/3/2021	12:12:00 PM			2	17.5	9.61
Mosher Lake	26	6/3/2021	12:12:00 PM			3	17.3	9.61
Mosher Lake	26	6/3/2021	12:12:00 PM			3.5	16.8	9.47
Mosher Lake	26	8/3/2021	3:46:00 PM			0	21.7	9.1
Mosher Lake	26	8/3/2021	3:49:00 PM			1	20.8	9.3
Mosher Lake	26	8/3/2021	3:52:00 PM			2	20.2	9.23
Mosher Lake	26	8/3/2021	3:54:00 PM			3	19.8	9.22
Mosher Lake	26	8/3/2021	3:56:00 PM			4	19.4	4.36
Mosher Lake	26	10/19/2021	3:03:00 PM			0	11.4	10.15
Mosher Lake	26	10/19/2021	3:05:00 PM			1	11.4	10.18
Mosher Lake	26	10/19/2021	3:07:00 PM			2	11.3	10.19
Mosher Lake	26	10/19/2021	3:10:00 PM			3	11.3	10.22
Mosher Lake	26	10/19/2021	3:12:00 PM			3.5	11.5	10
Southwest Pond 3	39	3/22/2021	10:14:00 AM			0	1.3	3.85
Southwest Pond 3	39	3/22/2021	10:14:00 AM			1	3.7	3.1
Southwest Pond 3	39	3/22/2021	10:14:00 AM			2	4.1	2.57
Southwest Pond 3	39	3/22/2021	10:14:00 AM			3	4.4	2.23
Southwest Pond 3	39	3/22/2021	10:14:00 AM			4	4.6	2.1
Southwest Pond 3	39	3/22/2021	10:14:00 AM			5	4.8	2.04
Southwest Pond 3	39	3/22/2021	10:14:00 AM			6	5	1.97
Southwest Pond 3	39	3/22/2021	10:14:00 AM			7	5.1	1.91
Southwest Pond 3	39	3/22/2021	10:14:00 AM			7.5	5.1	1.89
Southwest Pond 3	39	6/3/2021	10:48:00 AM			0	17.3	8.66
Southwest Pond 3	39	6/3/2021	10:48:00 AM			1	17.5	8.66
Southwest Pond 3	39	6/3/2021	10:48:00 AM			2	13.5	8.16
Southwest Pond 3	39	6/3/2021	10:48:00 AM			3	9.2	9.35
Southwest Pond 3	39	6/3/2021	10:48:00 AM			4	7	5.35
Southwest Pond 3	39	6/3/2021	10:48:00 AM			5	6	0.75
Southwest Pond 3	39	6/3/2021	10:48:00 AM			6	5.5	0.59
Southwest Pond 3	39	8/4/2021	10:34:00 AM			0	21.2	8.78
Southwest Pond 3	39	8/4/2021	10:34:00 AM			1	21.2	8.8
Southwest Pond 3	39	8/4/2021	10:34:00 AM			2	20.1	8.75
Southwest Pond 3	39	8/4/2021	10:34:00 AM			3	18.4	7.09
Southwest Pond 3	39	8/4/2021	10:34:00 AM			4	12.8	3.91
Southwest Pond 3	39	8/4/2021	10:34:00 AM			5	9.4	0.73
Southwest Pond 3	39	8/4/2021	10:34:00 AM			6	7.7	0.6
Southwest Pond 3	39	10/21/2021	2:41:00 PM			0	10.1	8.74
Southwest Pond 3	39	10/21/2021	2:43:00 PM			1	10.1	8.67
Southwest Pond 3	39	10/21/2021	2:45:00 PM			2	10.1	8.65
Southwest Pond 3	39	10/21/2021	2:47:00 PM			3	10.1	8.64
Southwest Pond 3	39	10/21/2021	2:49:00 PM			4	10.1	8.63
Southwest Pond 3	39	10/21/2021	2:53:00 PM			5	10	8.51
Southwest Pond 3	39	10/21/2021	2:59:00 PM			6	10	8.34
Southwest Arm	46	3/10/2021	11:30:00 AM	504538	5500839	0	-0.08	12.94
Southwest Arm	46	3/10/2021	11:30:00 AM	504538	5500839	1	0.44	11.64
Southwest Arm	46	3/10/2021	11:30:00 AM	504538	5500839	2	1.11	9.5
Southwest Arm	46	3/10/2021	11:30:00 AM	504538	5500839	3	2.02	6.83
Southwest Arm	46	3/10/2021	11:30:00 AM	504538	5500839	3.8	2.1	3.66
Southwest Arm	46	3/25/2021	12:18:00 PM	504538	5500839	0	0.8	12.73
Southwest Arm	46	3/25/2021	12:18:00 PM	504538	5500839	1	1.5	11.56
Southwest Arm	46	3/25/2021	12:18:00 PM	504538	5500839	2	2.6	10.48
Southwest Arm	46	3/25/2021	12:18:00 PM	504538	5500839	3	4.4	6.27
Southwest Arm	46	3/25/2021	12:18:00 PM	504538	5500839	4	4.7	4.29
Southwest Arm Proposed	46	6/2/2021	1:05:00 PM			0	16	9.49
Southwest Arm Proposed	46	6/2/2021	1:06:00 PM			1	16	9.49
Southwest Arm Proposed	46	6/2/2021	1:07:00 PM			2	15.9	9.49

Table A-3: Raw In Situ Temperature and Dissolved Oxygen Data

Southwest Arm Propose	46	6/2/2021	1:09:00 PM			3	15.9	9.48
Southwest Arm Propose	46	6/2/2021	1:11:00 PM			3.5	15.4	9.42
Southwest Arm Propose	46	8/3/2021	10:03:00 AM			0	19.5	8.73
Southwest Arm Propose	46	8/3/2021	10:07:00 AM			1	19.5	8.73
Southwest Arm Propose	46	8/3/2021	10:11:00 AM			2	19.4	8.71
Southwest Arm Propose	46	8/3/2021	10:15:00 AM			3	19.4	8.69
Southwest Arm Propose	46	8/3/2021	10:19:00 AM			4	19.4	8.53
Southwest Arm Propose	46	9/13/2021	-			0	14.9	9.3
Southwest Arm Propose	46	9/13/2021	-			1	14.8	9.3
Southwest Arm Propose	46	9/13/2021	-			2	14.8	9.29
Southwest Arm Propose	46	9/13/2021	-			3	14.8	9.26
Southwest Arm Propose	46	10/19/2021	10:08:00 AM			0	11.2	10.01
Southwest Arm Propose	46	10/19/2021	10:12:00 AM			1	11.2	10
Southwest Arm Propose	46	10/19/2021	10:15:00 AM			2	11.2	9.99
Southwest Arm Propose	46	10/19/2021	10:17:00 AM			3	11.2	9.97
Southwest Arm Propose	46	10/19/2021	10:19:00 AM			3.5	11.1	9.94
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	0	0.4	14.44
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	1	1.7	13.54
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	2	2.7	11.45
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	3	3.4	10.41
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	4	3.9	8.33
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	5	3.7	8.36
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	6	3.7	7.32
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	7	4.3	5.48
Central Basin	47	3/9/2021	2:45:00 PM	508910	5502966	7.5	4.6	4.59
Central Basin	47	3/29/2021	3:42:00 PM	508910	5502966	0	1.6	9.12
Central Basin	47	3/29/2021	3:42:00 PM	508910	5502966	1	2.02	8.41
Central Basin	47	3/29/2021	3:42:00 PM	508910	5502966	2	2.57	8.55
Central Basin	47	3/29/2021	3:42:00 PM	508910	5502966	3	3.56	7.85
Central Basin	47	3/29/2021	3:42:00 PM	508910	5502966	4	4.05	6.42
Central Basin	47	3/29/2021	3:42:00 PM	508910	5502966	5	3.99	5.15
Central Basin	47	3/29/2021	3:42:00 PM	508910	5502966	6	4.4	3.33
Central Basin	47	6/2/2021	12:04:00 PM			0	16.3	9.47
Central Basin	47	6/2/2021	12:06:00 PM			1	16.3	9.45
Central Basin	47	6/2/2021	12:07:00 PM			2	16.1	9.44
Central Basin	47	6/2/2021	12:09:00 PM			3	16	9.43
Central Basin	47	6/2/2021	12:12:00 PM			4	15.9	9.42
Central Basin	47	6/2/2021	12:15:00 PM			5	15.6	9.38
Central Basin	47	6/2/2021	12:17:00 PM			6	14.8	9.03
Central Basin	47	6/2/2021	12:18:00 PM			7	14.4	8.9
Central Basin	47	8/3/2021	11:30:00 AM			0	19.9	8.77
Central Basin	47	8/3/2021	11:30:00 AM			1	19.8	8.77
Central Basin	47	8/3/2021	11:30:00 AM			2	19.7	8.76
Central Basin	47	8/3/2021	11:30:00 AM			3	19.6	8.71
Central Basin	47	8/3/2021	11:30:00 AM			4	19.5	8.62
Central Basin	47	8/3/2021	11:30:00 AM			5	19.5	8.56
Central Basin	47	8/3/2021	11:30:00 AM			6	19.5	8.53
Central Basin	47	8/3/2021	11:30:00 AM			7	19.4	8.43
Central Basin	47	9/13/2021	-			0	15.2	9.16
Central Basin	47	9/13/2021	-			1	15.2	9.14
Central Basin	47	9/13/2021	-			2	15.2	9.14
Central Basin	47	9/13/2021	-			3	15.2	9.13
Central Basin	47	9/13/2021	-			4	15.2	9.11
Central Basin	47	9/13/2021	-			5	15.2	9.1
Central Basin	47	9/13/2021	-			6	15.2	9.1
Central Basin	47	9/13/2021	-			6.5	15.2	9.12
Central Basin	47	10/21/2021	11:35:00 AM			0	12.1	10.02
Central Basin	47	10/21/2021	11:37:00 AM			1	12.2	10.02
Central Basin	47	10/21/2021	11:39:00 AM			2	12.2	10.02
Central Basin	47	10/21/2021	11:41:00 AM			3	12.1	10
Central Basin	47	10/21/2021	11:43:00 AM			4	12.1	9.95
Central Basin	47	10/21/2021	11:45:00 AM			5	12	9.9
Central Basin	47	10/21/2021	11:47:00 AM			6	12	9.88
Central Basin	47	10/21/2021	11:49:00 AM			7	12	9.82
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	0	-3.3	12.18
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	1	0.4	9.96
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	2	0.61	9.21
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	3	0.74	8.76
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	4	0.86	8.58

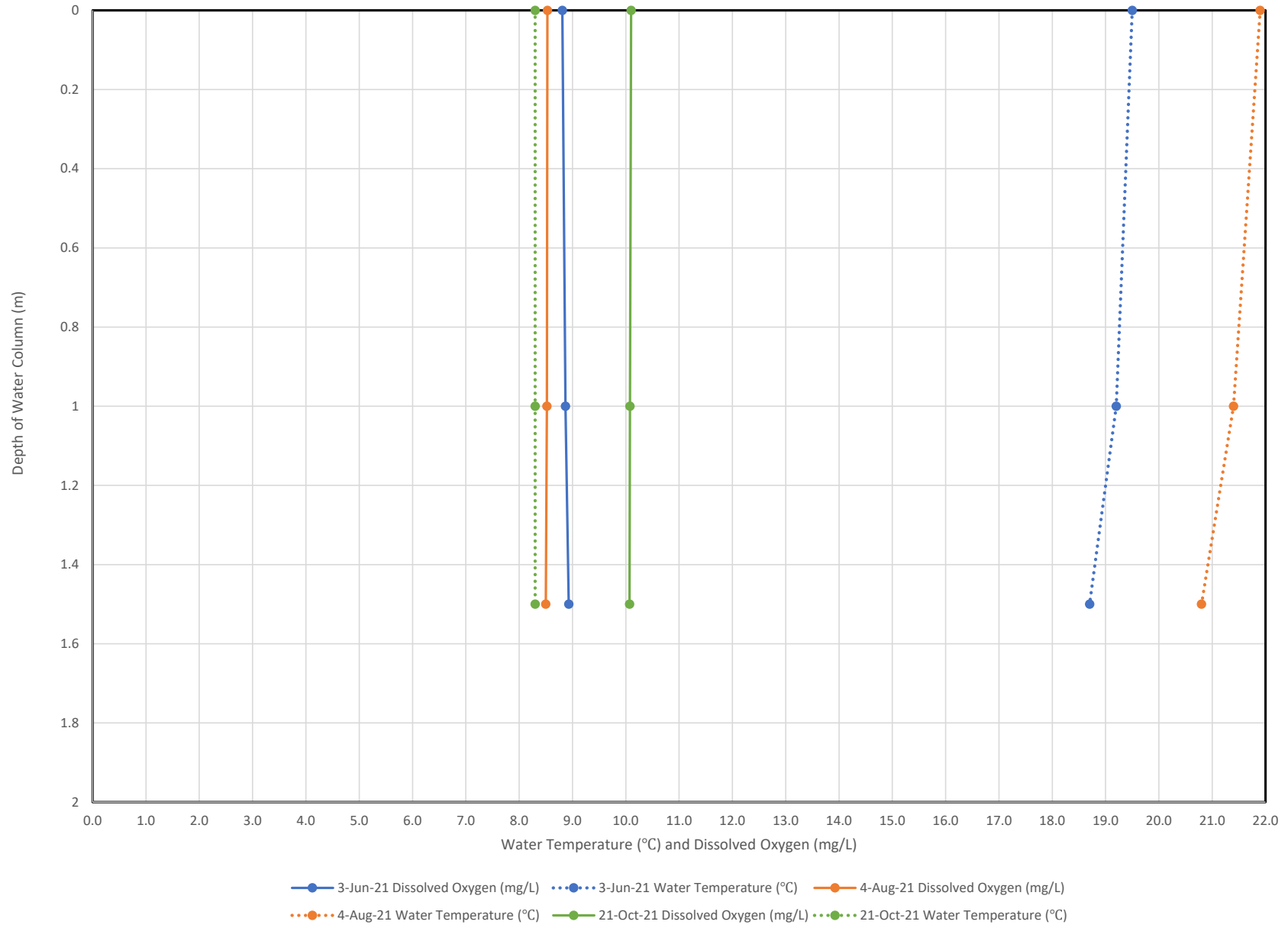
Table A-3: Raw In Situ Temperature and Dissolved Oxygen Data

Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	5	0.91	8.52
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	6	1.09	8.19
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	7	1.13	8.18
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	8	1.16	8.1
Outlet Basin	48	3/15/2021	10:52:00 AM	507487	5506168	9	1.27	6.3
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	0	1.8	10.73
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	1	2.78	9.88
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	2	3.11	8.96
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	3	3.25	8.31
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	4	3.33	7.94
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	5	3.35	7.65
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	6	3.44	7.35
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	7	3.56	7.05
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	8	3.6	6.86
Outlet Basin	48	3/29/2021	1:48:00 PM	507487	5506168	8.8	3.6	6.43
Hardrock Bay	48	6/2/2021	10:35:00 AM			0	15.6	9.58
Hardrock Bay	48	6/2/2021	10:40:00 AM			2	15.4	9.56
Hardrock Bay	48	6/2/2021	10:44:00 AM			3	14.3	9.34
Hardrock Bay	48	6/2/2021	10:47:00 AM			4	13.6	9.19
Hardrock Bay	48	6/2/2021	10:49:00 AM			5	13.2	8.97
Hardrock Bay	48	6/2/2021	10:51:00 AM			6	13	8.95
Hardrock Bay	48	6/2/2021	10:53:00 AM			7	12.4	8.66
Hardrock Bay	48	6/2/2021	10:55:00 AM			8	10.7	7.4
Hardrock Bay	48	6/2/2021	10:57:00 AM			9	9.4	6.57
Hardrock Bay	48	6/2/2021	10:59:00 AM			9.5	8.3	5.21
Hardrock Bay	48	8/3/2021	12:24:00 PM			0	20.2	8.28
Hardrock Bay	48	8/3/2021	12:28:00 PM			1	20	8.27
Hardrock Bay	48	8/3/2021	12:32:00 PM			2	19.7	8.16
Hardrock Bay	48	8/3/2021	12:36:00 PM			3	19.7	8.15
Hardrock Bay	48	8/3/2021	12:40:00 PM			4	19.6	8.14
Hardrock Bay	48	8/3/2021	12:44:00 PM			5	19.6	8
Hardrock Bay	48	8/3/2021	12:48:00 PM			6	19.5	7.93
Hardrock Bay	48	8/3/2021	12:52:00 PM			7	17.3	2.45
Hardrock Bay	48	8/3/2021	12:56:00 PM			8	15.1	0.59
Hardrock Bay	48	8/3/2021	12:00:00 AM			9	12	0.43
Hardrock Bay	48	8/3/2021	1:03:00 PM			10	11.4	0.42
Hardrock Bay	48	9/13/2021	-			0	15.8	8.7
Hardrock Bay	48	9/13/2021	-			1	15.8	8.66
Hardrock Bay	48	9/13/2021	-			2	15.8	8.64
Hardrock Bay	48	9/13/2021	-			3	15.7	8.58
Hardrock Bay	48	9/13/2021	-			4	15.7	8.59
Hardrock Bay	48	9/13/2021	-			5	15.7	8.55
Hardrock Bay	48	9/13/2021	-			6	15.7	8.54
Hardrock Bay	48	9/13/2021	-			7	15.6	8.46
Hardrock Bay	48	9/13/2021	-			8	15.6	8.41
Hardrock Bay	48	9/13/2021	-			9	15.6	8.37
Hardrock Bay	48	9/13/2021	-			9.5	15.6	8.33
Hardrock Bay	48	10/19/2021	1:17:00 PM			0	13	9.03
Hardrock Bay	48	10/19/2021	1:20:00 PM			1	12.9	9.03
Hardrock Bay	48	10/19/2021	1:22:00 PM			2	12.8	9.01
Hardrock Bay	48	10/19/2021	1:24:00 PM			3	12.8	9
Hardrock Bay	48	10/19/2021	1:26:00 PM			4	12.8	8.99
Hardrock Bay	48	10/19/2021	1:28:00 PM			5	12.6	8.97
Hardrock Bay	48	10/19/2021	1:30:00 PM			6	12.6	8.96
Hardrock Bay	48	10/19/2021	1:32:00 PM			7	12.5	8.88
Hardrock Bay	48	10/19/2021	1:34:00 PM			8	12.5	8.78
Hardrock Bay	48	10/19/2021	1:36:00 PM			9	12.4	8.7
Hardrock Bay	48	10/19/2021	1:38:00 PM			10	12.4	8.19
Southwest Arm	49	3/9/2021	4:20:00 PM	507013	5501203	0	0.2	14.63
Southwest Arm	49	3/9/2021	4:20:00 PM	507013	5501203	1	1	14.11
Southwest Arm	49	3/9/2021	4:20:00 PM	507013	5501203	2	2.2	12.18
Southwest Arm	49	3/9/2021	4:20:00 PM	507013	5501203	3	3.2	9.8
Southwest Arm	49	3/9/2021	4:20:00 PM	507013	5501203	4	4	7.32
Southwest Arm	49	3/9/2021	4:20:00 PM	507013	5501203	5	4.1	5.71
Southwest Arm	49	3/9/2021	4:20:00 PM	507013	5501203	5.7	4.2	4.79
Southwest Arm	49	3/25/2021	1:11:00 PM	507013	5501203	0	0.6	13.97
Southwest Arm	49	3/25/2021	1:11:00 PM	507013	5501203	1	1.2	12.9
Southwest Arm	49	3/25/2021	1:11:00 PM	507013	5501203	2	2.2	11.23
Southwest Arm	49	3/25/2021	1:11:00 PM	507013	5501203	3	3.7	8.53

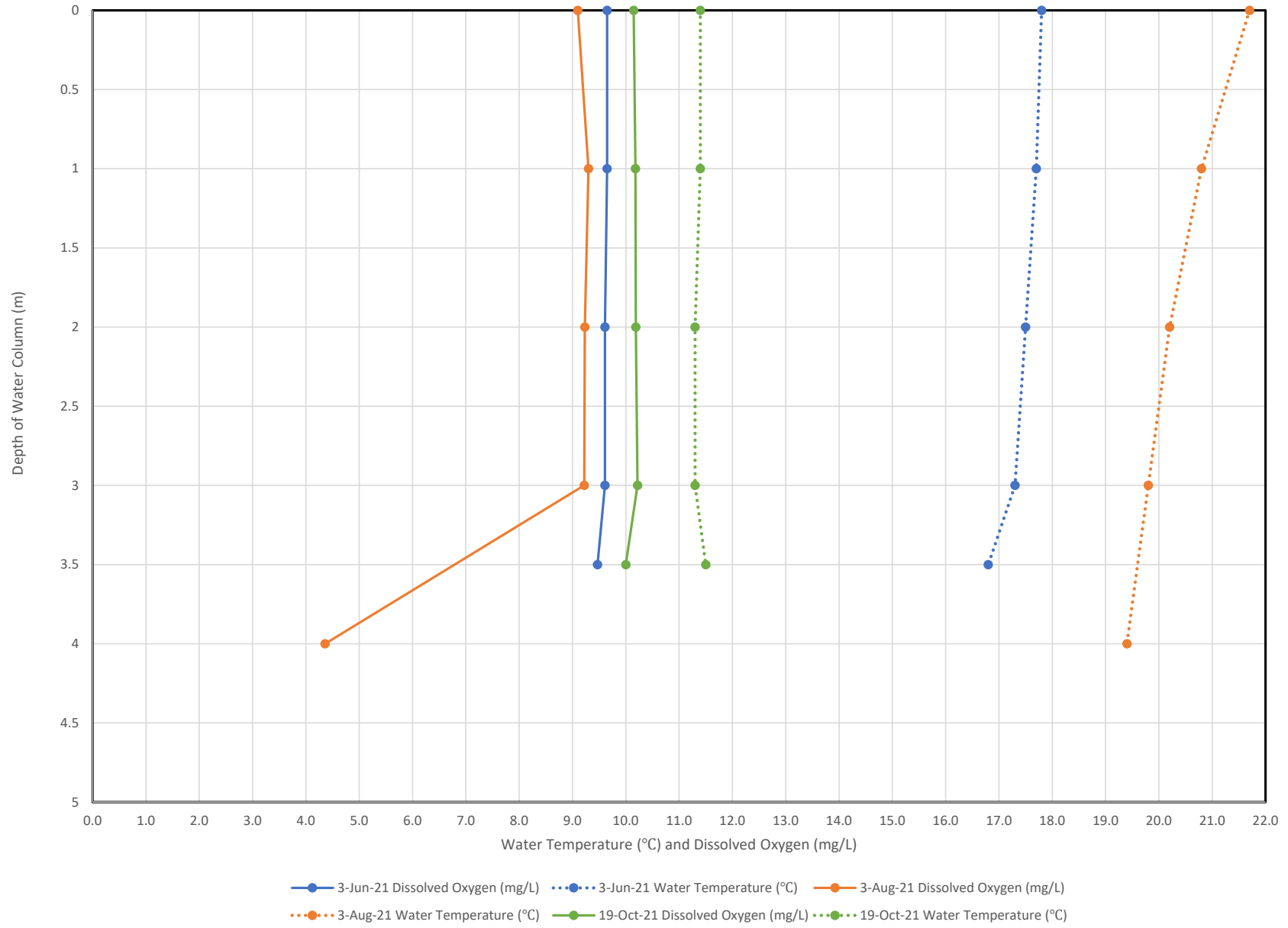
Table A-3: Raw In Situ Temperature and Dissolved Oxygen Data

Southwest Arm	49	3/25/2021	1:11:00 PM	507013	5501203	4	3.8	6.63
Southwest Arm	49	3/25/2021	1:11:00 PM	507013	5501203	5	3.9	6.09
Southwest Arm	49	3/25/2021	1:11:00 PM	507013	5501203	5.5	3.9	5.91
Southwest Arm	49	6/2/2021	12:35:00 PM			0	16.8	9.44
Southwest Arm	49	6/2/2021	12:38:00 PM			1	16.6	9.43
Southwest Arm	49	6/2/2021	12:39:00 PM			2	15.6	9.27
Southwest Arm	49	6/2/2021	12:41:00 PM			3	14.7	8.97
Southwest Arm	49	6/2/2021	12:43:00 PM			4	14.2	8.6
Southwest Arm	49	6/2/2021	12:45:00 PM			5	14	8.49
Southwest Arm	49	6/2/2021	12:47:00 PM			5.5	14	8.45
Southwest Arm	49	8/3/2021	10:42:00 AM			0	19.7	8.71
Southwest Arm	49	8/3/2021	10:46:00 AM			1	19.6	8.72
Southwest Arm	49	8/3/2021	10:50:00 AM			2	19.4	8.68
Southwest Arm	49	8/3/2021	10:54:00 AM			3	19.3	8.61
Southwest Arm	49	8/3/2021	10:58:00 AM			4	19.3	8.56
Southwest Arm	49	8/3/2021	11:03:00 AM			5	19.3	8.56
Southwest Arm	49	8/3/2021	11:07:00 AM			5.5	19.3	8.53
Southwest Arm	49	10/19/2021	11:00:00 AM			0	11.2	9.99
Southwest Arm	49	10/19/2021	11:03:00 AM			1	11.2	9.98
Southwest Arm	49	10/19/2021	11:05:00 AM			2	11.2	9.97
Southwest Arm	49	10/19/2021	11:09:00 AM			3	11.1	9.95
Southwest Arm	49	10/19/2021	11:11:00 AM			4	11.1	9.94
Southwest Arm	49	10/19/2021	11:13:00 AM			5	11.1	9.95
Southwest Arm	49	10/19/2021	11:15:00 AM			6	11	9.91
Gamsby Lake	50	8/9/2021	1:20:00 PM			0	21.3	8.39
Gamsby Lake	50	8/9/2021	1:25:00 PM			1	20.2	8.4
Gamsby Lake	50	8/9/2021	1:30:00 PM			2	19.9	8.23
Gamsby Lake	50	8/9/2021	1:35:00 PM			3	19.8	8.23
Gamsby Lake	50	8/9/2021	1:40:00 PM			4	19.6	7.9
Gamsby Lake	50	8/9/2021	1:45:00 PM			5	19.4	7.34
Gamsby Lake	50	8/9/2021	1:50:00 PM			6	17.7	3.07
Gamsby Lake	50	10/20/2021	2:20:00 PM			0	10.7	9.87
Gamsby Lake	50	10/20/2021	2:21:00 PM			1	10.7	9.82
Gamsby Lake	50	10/20/2021	2:23:00 PM			2	10.7	9.81
Gamsby Lake	50	10/20/2021	2:24:00 PM			3	10.8	9.79
Gamsby Lake	50	10/20/2021	2:25:00 PM			4	10.8	9.78
Gamsby Lake	50	10/20/2021	2:26:00 PM			5	10.7	9.75
Gamsby Lake	50	10/20/2021	2:27:00 PM			6	10.6	9.71

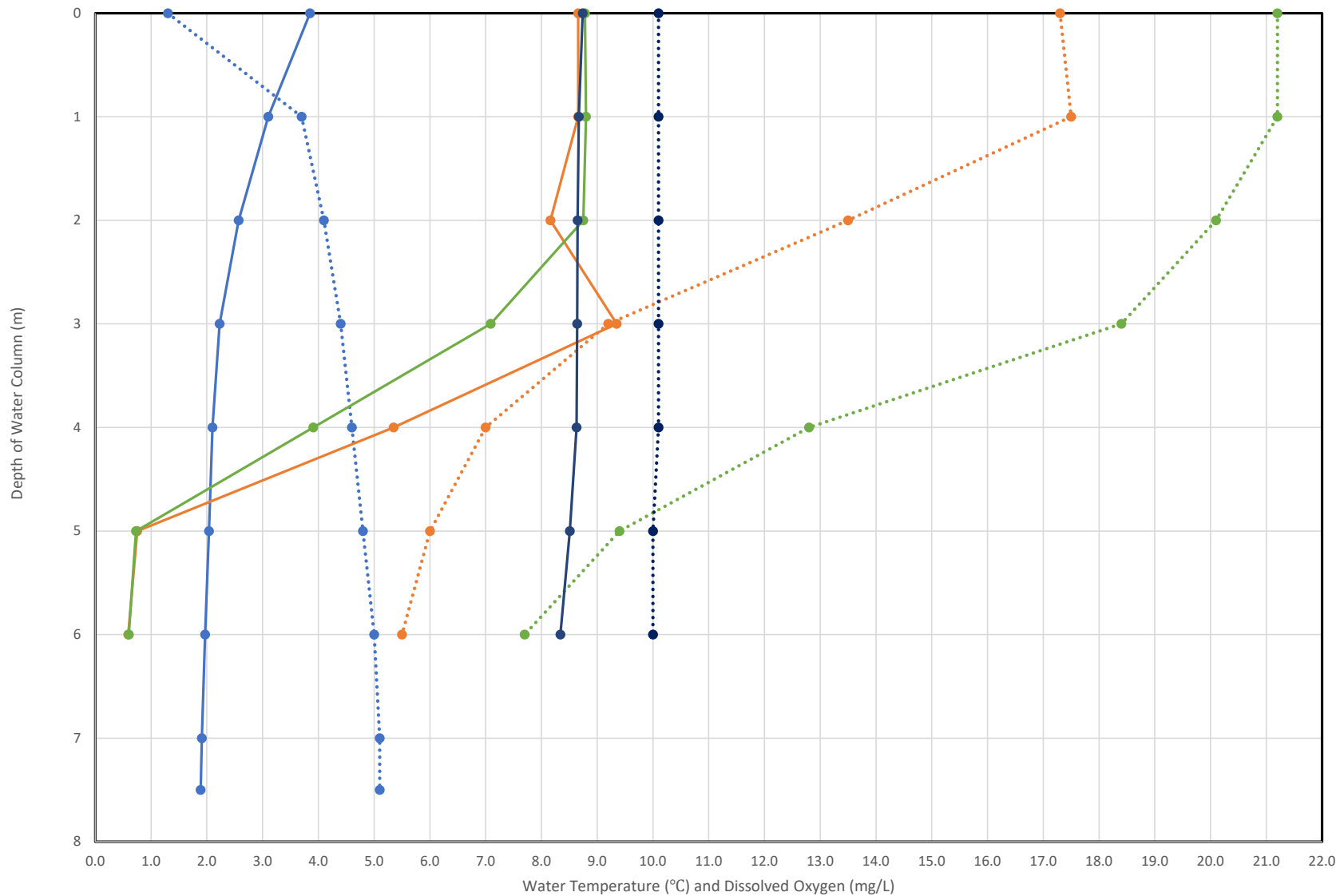
Water Temperature and Dissolved Oxygen Concentration at Station 21



Water Temperature and Dissolved Oxygen Concentration at Station 26

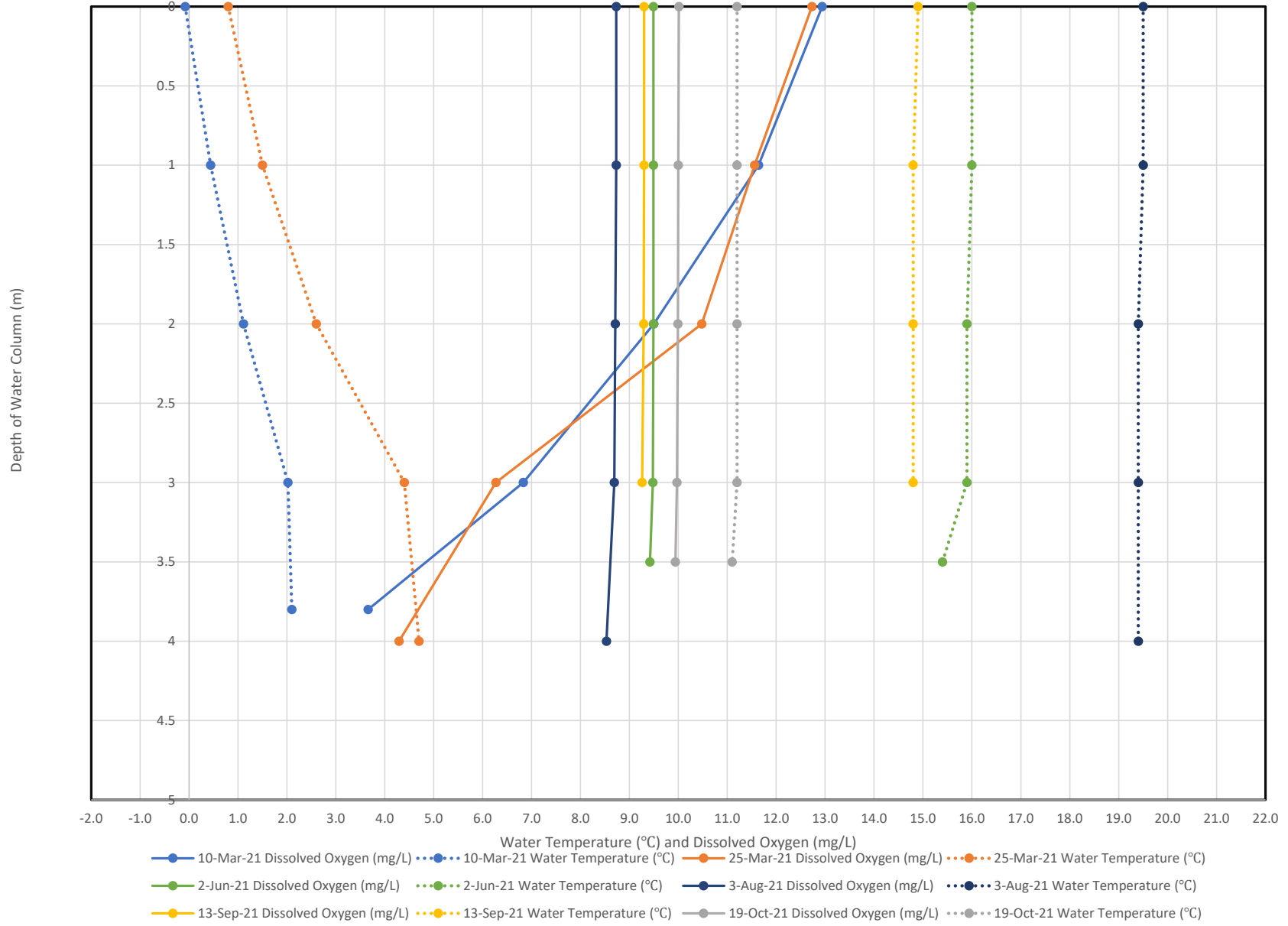


Water Temperature and Dissolved Oxygen Concentration at Station 39

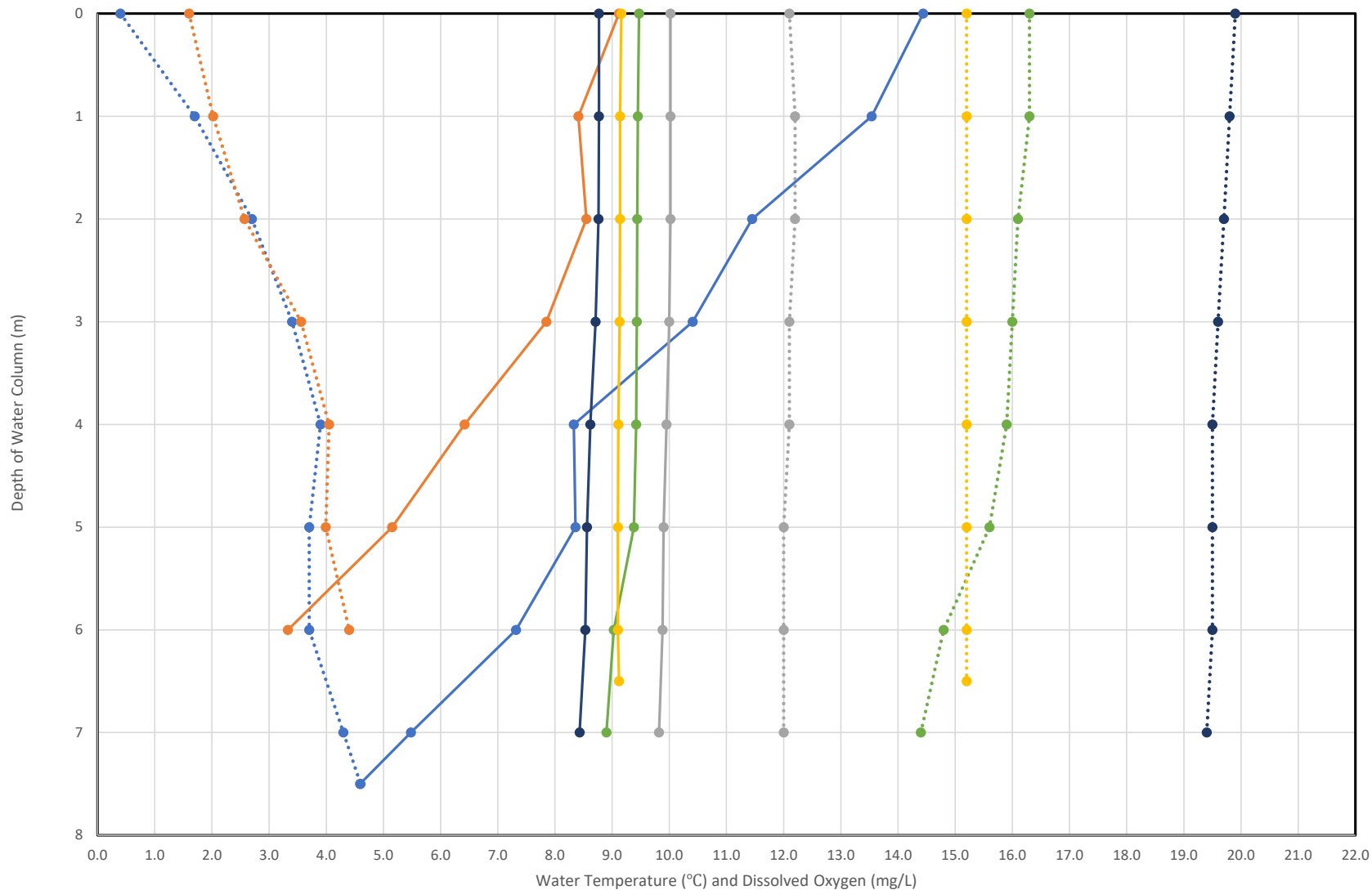


—●— 22-Mar-21 Dissolved Oxygen (mg/L)
 ·····●····· 22-Mar-21 Water Temperature (°C)
 —●— 3-Jun-21 Dissolved Oxygen (mg/L)
 ·····●····· 3-Jun-21 Water Temperature (°C)
 —●— 4-Aug-21 Dissolved Oxygen (mg/L)
 ·····●····· 4-Aug-21 Water Temperature (°C)
 —●— 21-Oct-21 Dissolved Oxygen (mg/L)
 ·····●····· 21-Oct-21 Water Temperature (°C)

Water Temperature and Dissolved Oxygen Concentration at Station 46

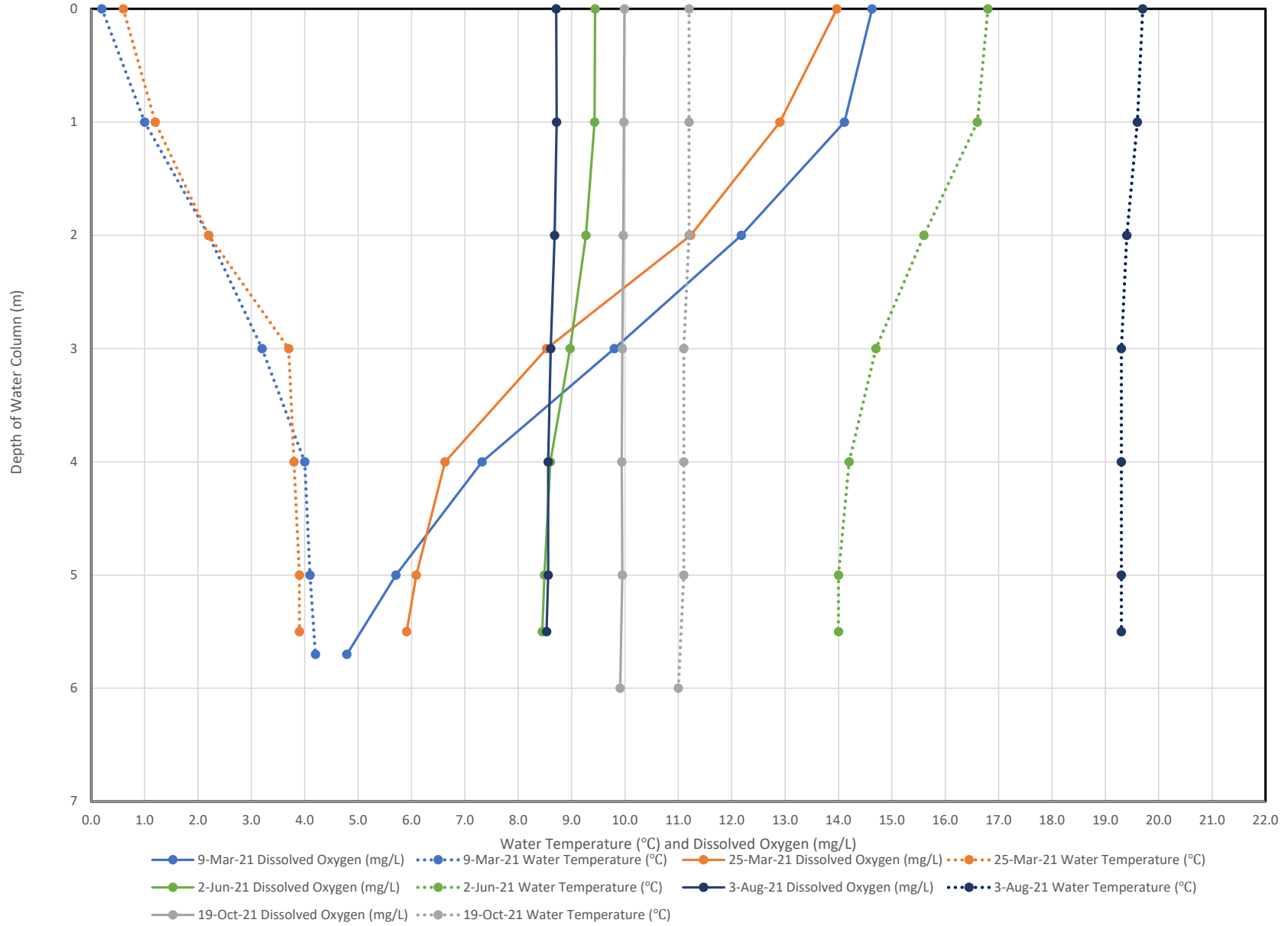


Water Temperature and Dissolved Oxygen Concentration at Station 47

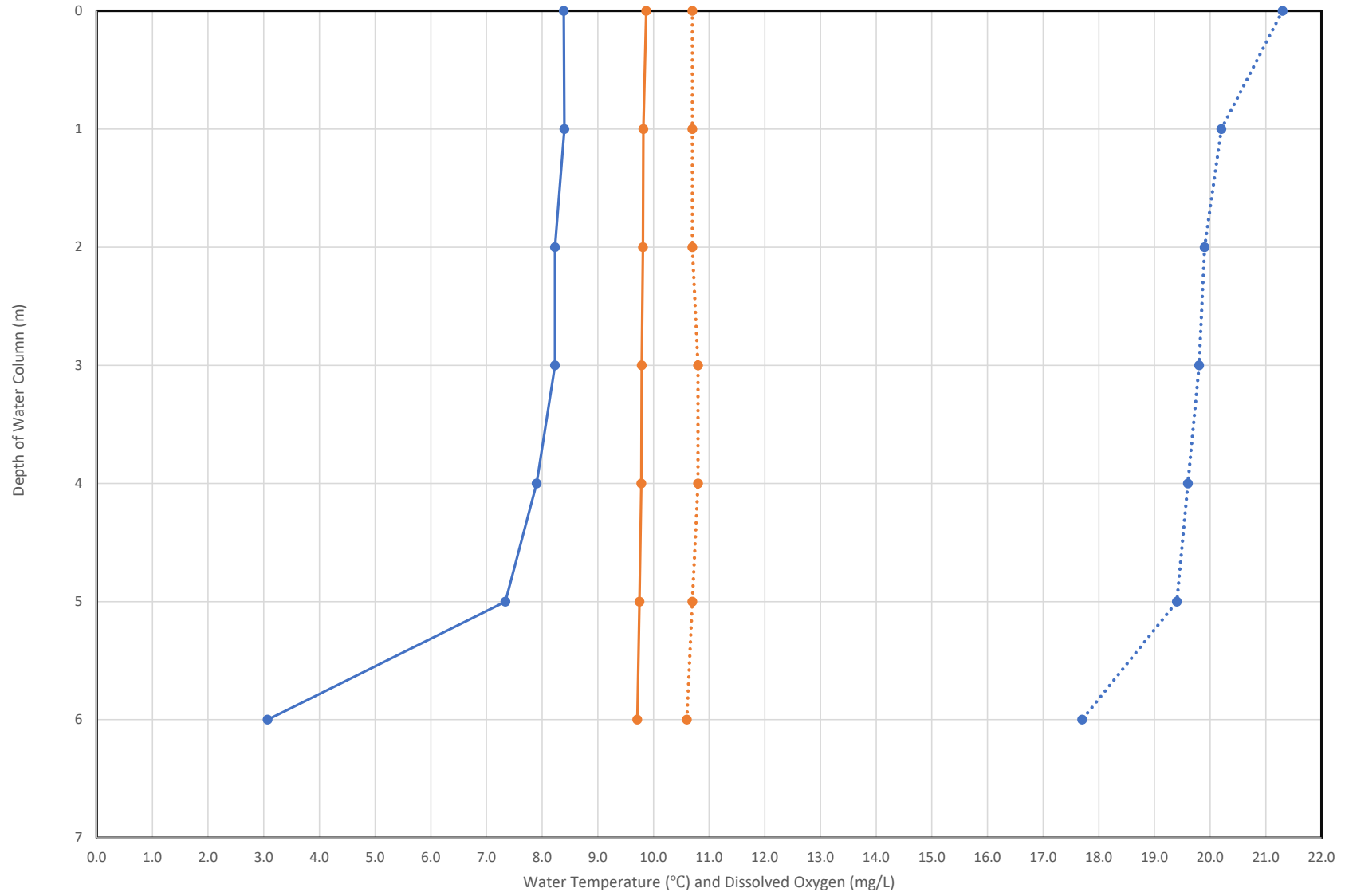


- 9-Mar-21 Dissolved Oxygen (mg/L)
 ···●··· 9-Mar-21 Water Temperature (°C)
 —●— 29-Mar-21 Dissolved Oxygen (mg/L)
 ···●··· 29-Mar-21 Water Temperature (°C)
- 2-Jun-21 Dissolved Oxygen (mg/L)
 ···●··· 2-Jun-21 Water Temperature (°C)
 —●— 3-Aug-21 Dissolved Oxygen (mg/L)
 ···●··· 3-Aug-21 Water Temperature (°C)
- 13-Sep-21 Dissolved Oxygen (mg/L)
 ···●··· 13-Sep-21 Water Temperature (°C)
 —●— 21-Oct-21 Dissolved Oxygen (mg/L)
 ···●··· 21-Oct-21 Water Temperature (°C)

Water Temperature and Dissolved Oxygen Concentration at Station 49



Water Temperature and Dissolved Oxygen Concentration at Station 50



—●— 9-Aug-21 Dissolved Oxygen (mg/L) ···●··· 9-Aug-21 Water Temperature (°C) —●— 20-Oct-21 Dissolved Oxygen (mg/L) ···●··· 20-Oct-21 Water Temperature (°C)

APPENDIX B

GROUNDWATER DATA

**Table B-1-1
Groundwater Monitoring Summary
2021 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report
Greenstone Project**

Monitoring Location	Spring				Summer				Trigger Threshold Monitoring Location	Location		
	Level		Total Daily Volume	Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)	Level		Total Daily Volume			Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)
	Manual	Data Logger				Manual	Data Logger					
Monitoring Wells												
BH14-01	X	X				X	X				WL	Adjacent to Borrow Area S1 and TMF West Dam
BH14-01A	X					X						Within Footprint of TMF West Dam
BH14-02	X	X				X	X					Adjacent to TMF Northeast Dam
BH14-02A	X	X				X	X					Adjacent to TMF Northeast Dam
BH14-03	X*					X*						Within Footprint of TMF Northwest Dam
BH14-04	X*					X*						Within Footprint of TMF Southwest Dam
BH14-05	X*					X*						Within Footprint of TMF Southwest Dam
BH14-08	X*					X*						Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings
BH14-09	X*					X*						Within Footprint of Open Pit and Historical MacLeod Tailings
BH14-10	X					X*						Between Overburden Storage Area 1 and Open Pit and within Footprint of Historical MacLeod Tailings
BH14-11	X*					X*						Within Footprint of Open Pit and Historical MacLeod Tailings
BH14-12	X*					X*						Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings
BH14-15	X			TC		X			X		WQ	Between WRSA D and SW Arm Tributary
BH14-18	X*					X*						Within Footprint of WRSA C
BH14-23	X					X						Within Footprint of WRSA A/C (Contingency)
G1-OB-13	X*					X*						Within Footprint of WRSA B
G2-OB-13	X*					X*						Within Footprint of WRSA C
G4-OB1-13	X					X						Within Footprint of Contingency WRSA D and Pond D2
G4-OB2-13	X					X						Within Footprint of Contingency WRSA D and Pond D2
G5-OB1-14	X*					X*						Within Footprint of TMF
G5-OB2-14	X*					X*						Within Footprint of TMF
G6-BR-14	X	X		X		X	X		X		WQ	Downgradient of WRSA D and Adjacent to Southwest Arm
G6-OB-14	X	X		X		X	X		X		WQ	Downgradient of WRSA D and Adjacent to Southwest Arm
G7-OB1-14	X	X		X		X	X		X		WL/WQ	Adjacent TMF Southwest Dam and Lake A-322
G7-OB2-14	X	X		X		X	X		X		WL/WQ	Adjacent TMF Southwest Dam and Lake A-322
MAC-1	X					X						West of Open Pit
MAC-2	X*					X*						Within Footprint of Open Pit
MAC-3	X*					X*						Within Footprint of Open Pit
MAC-4	X*					X*						South of Open Pit
MAC-5	X*					X*						Within Footprint of Open Pit
MAC-6	X*					X*						Between Open Pit and Ore Stockpile
MAC-7	X*					X*						Within Footprint of WRSA B
MAC-8	X*					X*						Within Footprint of Open Pit
MAC-9	X*					X*						Within Footprint of Open Pit
MW1-BR-14	X	X				X	X					Downgradient of Overburden Storage Area 1
MW1-OB-14	X	X				X	X					Downgradient of Overburden Storage Area 1
MW2-OB-13	X	X				X	X				WL	Downgradient of WRSA A/C (Contingency) and Adjacent to Mosher Lake
MW3-BR-13	X	X		X		X	X		X		WQ	Downgradient of WRSA A and Adjacent to Central Basin
MW3-OB-13	X	X		X		X	X		X		WQ	Downgradient of WRSA A and Adjacent to Central Basin
MW4-OB-13	X	X				X	X					Downgradient of WRSA B and Adjacent to Southwest Arm
MW5-OB1-13	X	X				X	X					Downgradient of WRSA C and Process Plan
MW5-OB2-13	X	X				X	X					Downgradient of WRSA C and Process Plan
MW6-OB-13	TC	TC		TC		X	X		X		WQ	Downgradient of WRSA C and Adjacent to HWY 11
MW7-BR-13	X	X				X	X					Downgradient of WRSA D (northwest)
MW8-OB-14	X	X				X	X				WL	Downgradient of WRSA D and Adjacent to SW Arm Tributary
MW9-OB1-13	X	X				X	X					Downgradient of Contingency WRSA D (Contingency) and Overburden Storage Area 2
MW9-OB2-13	X	X				X	X					Downgradient of Contingency WRSA D (southeast)
MW10-OB-14	X*					X*						Within Footprint of WRSA D
MW11-BR-14	X*					X*						Within Footprint of TMF
MW11-OB-14	X*					X*						Within Footprint of TMF
MW12-OB-14	TC					X						Background - South of TMF and Goldfield Creek Tributary

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Greenstone Project**

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	Level		Total Daily Volume	Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)	Level		Total Daily Volume			Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)
	Manual	Data Logger				Manual	Data Logger					
Monitoring Wells (continued)												
MW13-OB-14	X	X				X	X				Background - South of TMF and Adjacent to Lake A-323	
MW14-BR-14	X	X				X	X			WL	Background - Southwest of TMF and Within Footprint of Aggregate Source T2	
MW14-OB-14	X	X				X	X			WL	Background - Southwest of TMF and Within Footprint of Aggregate Source T2	
MW15-BR-14	X	X		X		X	X		X	WQ	Downgradient of TMF and north of Goldfield Creek Tributary	
MW15-OB-14	X	X		X		X	X		X	WQ	Downgradient of TMF and north of Goldfield Creek Tributary	
MW16-BR-14	X*					X*					Within Footprint of TMF	
MW16-OB-14	X*					X*					Within Footprint of TMF	
MW17-OB-14	X	X				X	X			WL	Southeast Corner of HWY 11 and Lahitis Road	
MW18-BR-21 (MW-A)	NI	NI		NI		X	X		X	WQ	Downgradient of WRSA C, Adjacent to Mosher Lake	
MW19-BR-21 (MW-B)	NI	NI		NI		X	X		X	WQ	Downgradient of WRSA A, Adjacent to Barton Bay,	
MW19-OB-21 (MW-B)	NI	NI		NI		X	X		X	WQ	Downgradient of WRSA A, Adjacent to Barton Bay, overburden	
MW20-BR-21 (MW-D)	NI	NI		NI		X	X		X	WQ	Downgradient of TMF, adjacent to Southwest Arm, bedrock	
MW20-OB-21 (MW-D)	NI	NI		NI		X	X		X	WQ	Downgradient of TMF, adjacent to Southwest Arm, overburden	
MW21-BR-21 (MW-F)	NI	NI		NI	NI	X	X		X	X ^{CS}	Downgradient of Process Plant, overburden	
MW22-OB-21 (MW-M)	NI			NI		X			X	WQ	Between the Ore Stockpile and Kenogamisis Lake, to the West of MWS-14-04 and East of Proposed Mon	
MW23-OB-21 (MW-G)	NI	NI		NI	NI	X	X		X	X ^{CS}	Downgradient of Process Plant and Pond B1, overburden	
MW24-BR-21 (MW-N)	NI			NI		X			X	WQ	Between the TMF and Goldfield Creek Tributary, Northwest of Proposed Monitoring Well MW-E and South	
MW24-OB-21 (MW-N)	NI			NI		X			X	WQ	Between the TMF and Goldfield Creek Tributary, Northwest of Proposed Monitoring Well MW-E and South	
MW25-BR-21 (MW-E)	NI	NI		NI		X	X		X	WQ	Downgradient of TMF, adjacent to Goldfield Creek Tributary, bedrock	
MW25-OB-21 (MW-E)	NI	NI		NI		X	X		X	WQ	Downgradient of TMF, adjacent to Goldfield Creek Tributary, overburden	
MW16-04	X	X				X	X				Within Footprint of Aggregate Source S4	
MW16-05	X	X				X	X				Adjacent to Aggregate Source T2	
MW03-BR-18	X	X		X		X	X		X	WQ	East of WRSA A, Adjacent to Central Basin	
MW03-OB-18	X	X		X		X	X		X	WQ	East of WRSA A, Adjacent to Central Basin	
MW10-18	X*					X*					Within Footprint of Open Pit, South of Historical MacLeod Tailings	
MWS-14-01	X	X				X	X			WL	Downgradient of WRSA D (Northwest)	
MWS-14-02 BR	X	X		X		X	X		X	WQ	Downgradient of WRSA D and Adjacent to Southwest Arm	
MWS-14-02 OB	X	X		X		X	X		X	WQ	Downgradient of WRSA D and Adjacent to Southwest Arm	
MWS-14-03 OB1	TC	TC		TC		X	X		X	WQ	Downgradient of WRSA D and South of SW Arm Tributary	
MWS-14-03 OB2	TC	TC		TC		X	X		X	WQ	Downgradient of WRSA D and South of SW Arm Tributary	
MWS-14-04	X			X		X			X	WQ	Downgradient of WRSA B and Adjacent to Southwest Arm	
MWS-14-05 BR	X*					X*					Within Footprint of WRSA C	
MWS-14-05 OB	X*					X*					Within Footprint of WRSA C	
MWS-14-06	X					X					Adjacent to Process Plant	
MWS-14-07 BR	X	X		X		X	X		X	WQ	Downgradient of TMF and Adjacent to Southwest Arm	
MWS-14-07 OB	X	X		X		X	X		X	WL/WQ	Downgradient of TMF and Adjacent to Southwest Arm	
Historical MacLeod Tailings Monitoring Wells												
96-01	X*					X*					Between Overburden Storage Area 1 and Open Pit, Within Footprint of Historical MacLeod Tailings	
96-02	X*					X*					Between Overburden Storage Area 1 and Open Pit, Within Footprint of Historical MacLeod Tailings	
96-03	X					X					Downgradient of Overburden Storage Area 1 and Within Footprint of Historical MacLeod Tailings	
96-04	X					X					Downgradient of Overburden Storage Area 1 and Within Footprint of Historical MacLeod Tailings	
96-05	X*					X*					Within Footprint of Open Pit	
96-06	X*					X*					Within Footprint of Open Pit	
96-07A1	X*					X*					Between Overburden Storage Area 1 and Open Pit, Within Footprint of Historical MacLeod Tailings	
96-07A2	X*					X*					Between Overburden Storage Area 1 and Open Pit, Within Footprint of Historical MacLeod Tailings	
96-08A	X*					X*					Within Footprint of Open Pit	
96-08B	X*					X*					Within Footprint of Open Pit	
96-08C	X*					X*					Within Footprint of Open Pit	
96-09A1	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-09A2	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-09A3	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-09A4	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-10A1	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	

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Monitoring Location	Spring				Summer				Trigger Threshold Monitoring Location	Location		
	Level		Total Daily Volume	Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)	Level		Total Daily Volume			Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)
	Manual	Data Logger				Manual	Data Logger					
Historical MacLeod Tailings Monitoring Wells (Continued)												
96-10A2	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-10A3	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-10B	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-10C	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-11A1	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-11A2	X*					X*					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-12A	X					X					Downgradient of WRSA A and Within Footprint of Historical MacLeod Tailings	
96-12B	X	X				X	X				Downgradient of WRSA A and Within Footprint of Historical MacLeod Tailings	
96-13	X*					X*					Between Overburden Storage Area 1 and Open Pit, Within Footprint of Historical MacLeod Tailings	
96-14b	X					X					Within Footprint of Overburden Storage Area 1 and Historical MacLeod Tailings	
96-15A1	X*					X*					Within Footprint of Open Pit	
96-15A3	X*					X*					Within Footprint of Open Pit	
96-15B	X*					X*					Within Footprint of Open Pit	
MW07-18	X	X				X	X				Within Footprint of Historical MacLeod Low Tailings, Adjacent to Barton Bay	
MW08-18	X	X				X	X			WL	Within Footprint of Historical MacLeod Low Tailings, Adjacent to Barton Bay	
MW09-18	X	X				X	X				Within Footprint of Historical MacLeod Low Tailings, Adjacent to Barton Bay	
Historical Hardrock Tailings Monitoring Wells												
H96-01	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-02A	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-02B	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-02C	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-03	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-04A1	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-04B	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-05A1	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-05A2	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-06A1	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-06A2	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-06A3	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
H96-06B	X*					X*					Within Footprint of WRSA A and Historical Hardrock Tailings	
MW01-OB1-18	X	X				X	X				Within Footprint of Historical Hardrock Tailings, Adjacent to Central Basin	
MW01-OB2-18	X	X				X	X			WL	Within Footprint of Historical Hardrock Tailings, Adjacent to Central Basin	
MW02-OB-18	X					X					Within Footprint of Historical Hardrock Tailings, Adjacent to Central Basin	
Drive-Point Piezometers												
DP2-14D	X					X					Downgradient of WRSA D and South of SW Arm Tributary	
DP2-14S	X					X					SW Arm Tributary	
DP3-14D	X					X					SW Arm Tributary	
DP3-14S	X					X					SW Arm Tributary	
DP4-14	X					X					SW Arm Tributary	
DP5-14	X					X					WC-M	
DP6-14D	X*	X*				X*	X*				Goldfield Creek	
DP6-14S	X*					X*					Goldfield Creek	
DP-A	NI	NI				X	NI			WL	Within the footprint of the sparse treed fend located east of the TMF	
DP-B	NI	NI				X	NI			WL	Within wetland located at the headwaters of SWAT and confluence with Goldfield Creek Diversion	
DP-C	NI			NI		X		X		WQ	Within Goldfield Cree, downgradient of TMF and Pond T1	

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Monitoring Location	Spring				Summer				Trigger Threshold Monitoring Location	Location		
	Level		Total Daily Volume	Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)	Level		Total Daily Volume			Sample (General Chemistry, Dissolved Metals)	Sample (VOCs, BTEX, and PHCs)
	Manual	Data Logger				Manual	Data Logger					
Seeps												
Seep 1											Downgradient of WRSA A and Historical MacLeod Tailings	
Seep 3											Downgradient of WRSA B and Adjacent to Southwest Arm	
Seep 5											Within Footprint of WRSA A/C (Contingency)	
Seep 6											Downgradient of Overburden Storage Area 1, within Footprint of Historical MacLeod Tailings	
Seep 7											Downgradient of Overburden Storage Area 1, within Footprint of Historical MacLeod Tailings	
Seep 8											Downgradient of Overburden Storage Area 1, within Footprint of Historical MacLeod Tailings	
Seep 9											Within Footprint of Open Pit and Historical MacLeod Tailings	
Seep 10											Within Footprint of WRSA A and Adjacent to HWY 11	
Seep 11											Within Footprint of Open Pit and Historical MacLeod Tailings	
Exploration Boreholes, Historical Shafts and Mine Infrastructure												
Hardrock Shaft 1				NP					NP		Downgradient of WRSA A and Adjacent to Central Basin	
Hardrock Shaft 2	NP**		NP	NP		NP**		NP	NP	PV	Within Footprint of WRSA A and Adjacent to Historical Hardrock Tailings	
Hardrock Glory Hole				NP					NP		Within Footprint of Open Pit and Adjacent to Historical MacLeod Tailings	
Mosher Shaft 1	X	X	NP			X	X	NP		PV	Adjacent to WRSA C and Mosher Lake	
Construction Dewatering (Process Plant - Temp ETP PTW)			NP					X			Associated with Construction of the Process Plant, TMF, Goldfield Creek Diversion, Culvert Crossings, W	
EP137	X*					X*					Within Footprint of WRSA A	
MM006	X*					X*					Within Footprint of Open Pit	
MM140	X*					X*					Within Footprint of Open Pit	
Total Existing Monitoring Locations:	151	56	3	35	2	151	56	3	35	2		
Proposed Monitoring Locations												
MHT SCS East Chamber (Temp ETP PTW)			NP					NP		HG	MHT Seepage Collection System, located between MHT and Kenogamisis Lake	
Open Pit and Underground Workings			NP					NP		PV	Northern Portion of Project Development Area	
Aggregate Pit S1			NP					NP		PV	Northeast of the TMF, Headwaters of the Goldfield Creek Diversion	
Aggregate Pit T2			NP					NP		PV	Southwest of the TMF	
Aggregate Pit S4			NP					NP		PV	Northeast of the TMF	
TMF Quarry			NP					NP				
Construction Dewatering (TMF - South Side PTW)			NP					NP				
Construction Dewatering (Goldfield Creek Diversion - South Side PTW)			NP					NP				
Construction Dewatering (Culvert Crossings - South Side PTW)			NP					NP				
Construction Dewatering (Water Management Ponds - Full Scale ETP PTW)			NP					NP				
Proposed Monitoring Well MW-C (Ob)	NI	NI		NI		NI	NI		NI	WQ	Downgradient of TMF and Goldfield Creek Tributary, adjacent to Southwest Arm, overburden	
Proposed Monitoring Well MW-C (Bdrk)	NI	NI		NI		NI	NI		NI	WQ	Downgradient of TMF and Goldfield Creek Tributary, adjacent to Southwest Arm, bedrock	
Proposed Monitoring Well MW-H	NI					NI				HG	Downgradient of MHT Seepage Collection System	
Proposed Monitoring Well MW-I	NI	NI				NI	NI			HG	Downgradient of MHT Seepage Collection System	
Proposed Monitoring Well MW-J	NI					NI				HG	Downgradient of MHT Seepage Collection System	
Proposed Monitoring Well MW-K	NI					NI				HG	Downgradient of MHT Seepage Collection System	
Proposed Monitoring Well MW-L (Ob)	NI			NI		NI			NI	WQ	Between WRSA D and Kenogamisis Lake to the northeast of MWS-14-02 and southwest of G6-14	
Proposed Monitoring Well MW-L (Bdrk)	NI			NI		NI			NI	WQ	Between WRSA D and Kenogamisis Lake to the northeast of MWS-14-02 and southwest of G6-14	
Proposed Monitoring Well MW-O (Ob)	NI			NI		NI			NI	WQ	Monitoring well northwest of WRSA D contingency to be installed once access roads have been construct	
Proposed Monitoring Well MW-O (Bdrk)	NI			NI		NI			NI	WQ	Monitoring well northwest of WRSA D contingency to be installed once access roads have been construct	
Proposed Monitoring Well MW-P	NI			NI		NI			NI		Monitoring well downgradient of WRSA B and the construction and demolition landfill	
Proposed Monitoring Well MW-S	NI			NI		NI			NI		Monitoring well downgradient of WRSA B and the construction and demolition landfill	

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	Manual	Data Logger				Manual	Data Logger					
Proposed Monitoring Locations (continued)												
Vibrating Wire Piezometer VWP-A-A	NI	NI				NI	NI				Between the Open Pit and Southwest Arm, shallow bedrock	
Vibrating Wire Piezometer VWP-A-B	NI	NI				NI	NI				Between the Open Pit and Southwest Arm, intermediate bedrock	
Vibrating Wire Piezometer VWP-A-C	NI	NI				NI	NI				Between the Open Pit and Southwest Arm, intermediate bedrock	
Vibrating Wire Piezometer VWP-A-D	NI	NI				NI	NI				Between the Open Pit and Southwest Arm, deep bedrock	
Vibrating Wire Piezometer VWP-B-A	NI	NI				NI	NI				Between the Open Pit and Central Basin, shallow bedrock	
Vibrating Wire Piezometer VWP-B-B	NI	NI				NI	NI				Between the Open Pit and Central Basin, intermediate bedrock	
Vibrating Wire Piezometer VWP-B-C	NI	NI				NI	NI				Between the Open Pit and Central Basin, intermediate bedrock	
Vibrating Wire Piezometer VWP-B-D	NI	NI				NI	NI				Between the Open Pit and Central Basin, deep bedrock	
Vibrating Wire Piezometer VWP-C-A	NI	NI				NI	NI				Between the Open Pit and Barton Bay, shallow bedrock	
Vibrating Wire Piezometer VWP-C-B	NI	NI				NI	NI				Between the Open Pit and Barton Bay, intermediate bedrock	
Vibrating Wire Piezometer VWP-C-C	NI	NI				NI	NI				Between the Open Pit and Barton Bay, intermediate bedrock	
Vibrating Wire Piezometer VWP-C-D	NI	NI				NI	NI				Between the Open Pit and Barton Bay, deep bedrock	
Vibrating Wire Piezometer VWP-D-A	NI	NI				NI	NI				West of Open Pit, shallow bedrock	
Vibrating Wire Piezometer VWP-D-B	NI	NI				NI	NI				West of Open Pit, intermediate bedrock	
Vibrating Wire Piezometer VWP-D-C	NI	NI				NI	NI				West of Open Pit, intermediate bedrock	
Vibrating Wire Piezometer VWP-D-D	NI	NI				NI	NI				West of Open Pit, deep bedrock	
Total Proposed Monitoring Locations:	30	19	0	10	0	30	19	0	10	0		
Total Proposed and Existing Monitoring Locations:	181	75	3	45	2	181	75	3	45	2		

Notes:

- * Monitoring requirements to be re-evaluated once construction starts. Majority of locations will be removed from program but select locations will require replacement wells to be constructed outside of infrastructure footprint.
- ** Monthly manual water level monitoring to commence once pumping from shaft has started.
- *** Mosher Shaft 1 is sampled at 5 different depth intervals (21 m, 122 m, 244, 396 m and 512 m)
- MHT MacLeod High Tailings
- Ob/BR Nested monitoring well with one screen in overburden and one screen in shallow bedrock.
- TC Location inaccessible due to tree clearing activities
- F Frozen. Pressure transducer could not be downloaded
- NP No pumping occurred during monitoring period
- PV Pumped Volume
- WL Water Level
- HG Horizontal Gradient
- WQ Water Quality
- NI Not Yet Installed
- FOS Sampling begins once fuel is stored on site

Monitoring Well: MW18-BR-21

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: East of Mosher Lake
Number: 160961397.306.102
Field investigator: S. Baer
Contractor: Maple Leaf Drilling

Method: Track Mount Acker Renegade (HQ)
Date started/completed: 23-Jun-2021 / 24-Jun-2021
Ground surface elevation: 350.21 m AMSL
Top of casing elevation: 351.30 m AMSL
Easting: 502821
Northing: 5503253

SUBSURFACE PROFILE					SAMPLE DETAILS					INSTALLATION DETAILS	
Depth (ft) (m)	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	SCR	RGD	Fractures per 1.52m	Diagram	Description
0		Ground Surface	350.21								
0		BEDROCK	0.00								
0		Dark grey (10YR 4/1) with quartz veins									
5		- sand and silt infilling fractures		1	CC	60" 90%	39" 58%	39" 58%	4.5		
5		- iron oxidation of fracture surface		2	CC	21" 91%	20" 87%	20" 87%	2.6		
10				3	CC	56" 98%	40" 70%	53" 93%	3		
15				4	CC	55" 100%	40" 73%	37" 67%	3		
15		- iron oxidation of fracture surface		5	CC	60" 100%	35" 58%	40" 67%	7		
20		- trace pyrite between 5.13 m and 5.54 m BGS		6	CC	59" 100%	25" 42%	27" 46%	5		
20		- increase in high angle fractures		7	CC	61" 88%	25" 36%	38" 55%	3		
25		- pyrite at 6.78 m BGS		8	CC	64" 100%	43" 67%	40" 63%	4		
25		- iron oxidation of fracture surface									
25		- weathering between 7.60 m and 8.10 m BGS									
25		- iron oxidation of fracture surface									
30		- weathering between fractures at 8.28 m and 8.66 m BGS									
35											

Screen Interval: 19.81 - 21.34 m BGS
 Sand Pack Interval: 19.51 - 21.64 m BGS
 Well Seal Interval: 0.00 - 19.51 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 CC - continuous core sample
 n/a - not available



Monitoring Well: MW18-BR-21

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: East of Mosher Lake
Number: 160961397.306.102
Field investigator: S. Baer
Contractor: Maple Leaf Drilling

Method: Track Mount Acker Renegade (HQ)
Date started/completed: 23-Jun-2021 / 24-Jun-2021
Ground surface elevation: 350.21 m AMSL
Top of casing elevation: 351.30 m AMSL
Easting: 502821
Northing: 5503253

SUBSURFACE PROFILE					SAMPLE DETAILS						INSTALLATION DETAILS	
Depth (ft) (m)	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	SCR	RGD	Fractures per 1.52m	Diagram	Description	
40		BEDROCK Dark grey (10YR 4/1) with quartz veins - silt infilling of fracture at 11.53 m BGS		9	CC	60" 100%	51" 85%	56" 93%	1			
45		- small amount of weathering at 14.55 m BGS		10	CC	59" 100%	47" 80%	55" 93%	2			
50				11	CC	59" 100%	50" 85%	53" 90%	2			
55				12	CC	60" 100%	57" 95%	58" 97%	0			
60		- green colouring of fracture at 18.59 m		13	CC	56" 98%	46" 81%	53" 93%	3			
65				14	CC	42" 100%	31" 74%	37" 88%	1			
70		- weathering and well fractured between 20.12 m and 20.52 m BGS		15	CC	61" 100%	29" 48%	36" 59%	4			
75		End of Borehole	328.57 21.64									

Screen Interval: 19.81 - 21.34 m BGS
 Sand Pack Interval: 19.51 - 21.64 m BGS
 Well Seal Interval: 0.00 - 19.51 m BGS

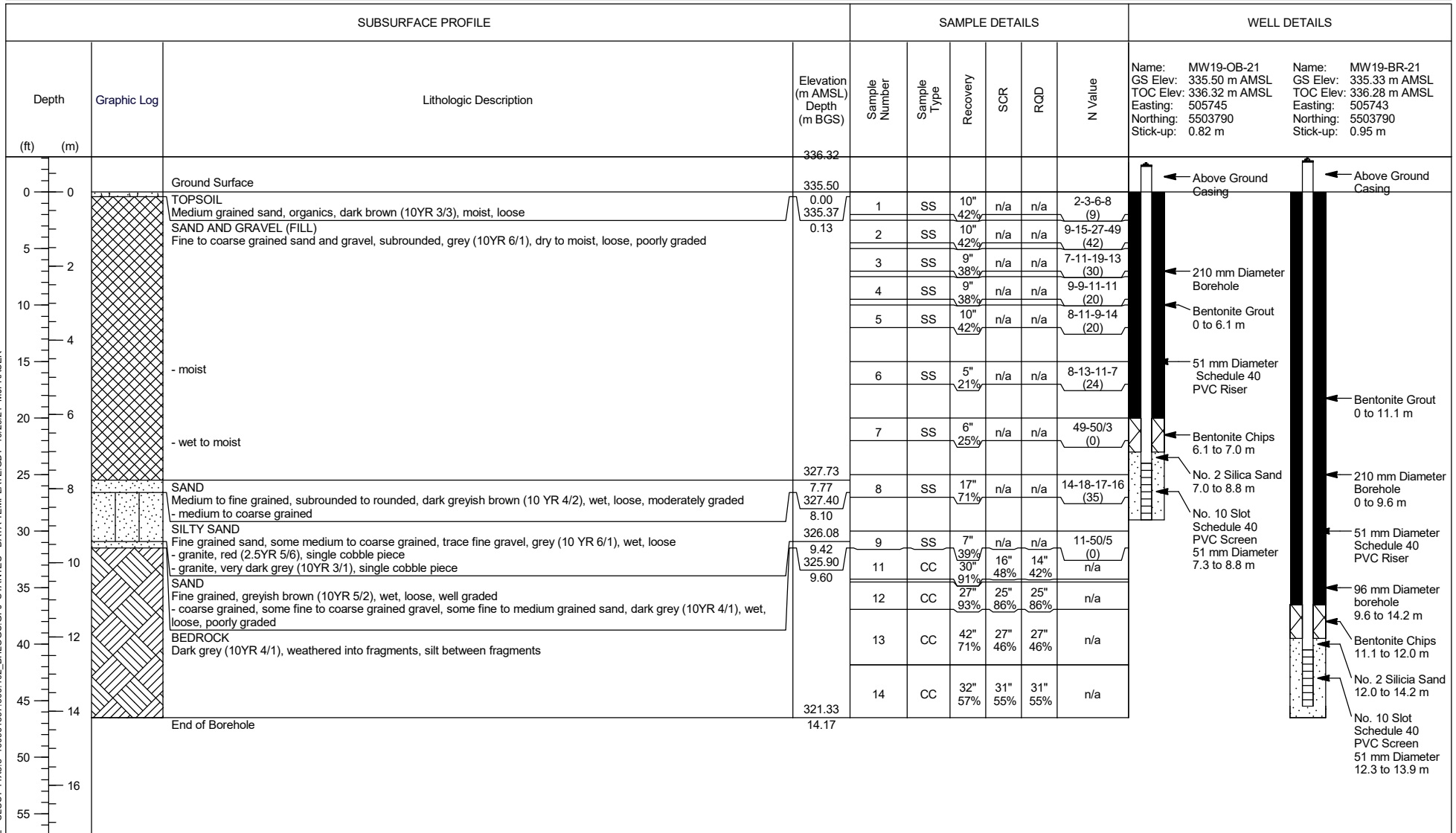
Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 CC - continuous core sample
 n/a - not available



Monitoring Well: MW19-21 (OB/BR)

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: North of WRSA A, Adjacent to BBE
Number: 160961397.306.102

Field investigator: S. Baer
Contractor: Maple Leaf Drilling
Method: Track Mount Acker Renegade (HSA/HQ)
Date started/completed: 25-Jun-2021 / 26-Jun-2021



Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
m BTOC - metres below top of casing
SS - split-spoon sample
CC - continuous core sample
n/a - not available

Screen Interval: 7.32 - 8.84; 12.34 - 13.87 m BGS
Sand Pack Interval: 12.04 - 14.17 m BGS
Well Seal Interval: 0.00 - 12.04 m BGS



STANTEC BOREHOLE AND WELL - CLUST 11X8.5 - 160961397.306.102 - BHLGSGR STANTEC - DATA TEMPLATE GDT 10/28/21 - MJFRASER

Monitoring Well: MW20-21 (OB/BR)

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: Between TMF and SWA
Number: 160961397.306.102

Field investigator: S. Baer
Contractor: Maple Leaf Drilling
Method: Track Mount Acker Renegade (HSA/HQ)
Date started/completed: 29-Jun-2021 / 28-Jun-2021

SUBSURFACE PROFILE				SAMPLE DETAILS						WELL DETAILS		
Depth (ft) (m)	Graphic Log	Lithologic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	SCR	RGD	Fractures per 1.52m	N Value	Name: MW20-OB-21 GS Elev: 333.83 m AMSL TOC Elev: 334.64 m AMSL Easting: 500357 Northing: 5498110 Stick-up: 0.81 m	Name: MW20-BR-21 GS Elev: 333.84 m AMSL TOC Elev: 334.77 m AMSL Easting: 500357 Northing: 5498108 Stick-up: 0.93 m
0		Ground Surface	334.64									
0		TOPSOIL Organics, brown (10YR 4/3), moist, loose	333.83	1	SS	16" 67%	n/a	n/a	n/a	2-2-1-2 (3)		
0.10		SAND Fine grained, yellowish brown (10YR 5/8), moist, loose, poorly graded - light brownish grey (10 YR 6/2)	333.73	2	SS	18" 75%	n/a	n/a	n/a	5-8-31-28 (39)		
5		SILT TILL Some fine to coarse gravel, trace clay, trace fine sand, subangular to subrounded, yellowish brown (10YR 5/8), moist, compact - wet - dense - very dense	332.81	3	SS	14" 58%	n/a	n/a	n/a	13-12-11-13 (23)		
10			1.01	4	SS	15" 63%	n/a	n/a	n/a	10-30-23-33 (53)		
15				5	SS	18" 75%	n/a	n/a	n/a	12-20-24-37 (44)		
20				6	SS	8" 33%	n/a	n/a	n/a	50/5 (0)		
25				7	SS	15" 63%	n/a	n/a	n/a	25-41-50/4 (41)		
30				8	SS	13" 54%	n/a	n/a	n/a	43-48-50/3 (48)		
35				9	SS	18" 75%	n/a	n/a	n/a	41-48-50/3 (48)		
40				10	SS	7" 29%	n/a	n/a	n/a	24-50/4 (0)		
45				11	SS	0" 0%	n/a	n/a	n/a	50/1 (0)		
45		silt till with some cobbles, very dense Auger refusal at 12.65 m BGS, switch to HQ coring										

Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
m BTOC - metres below top of casing
SS - split-spoon sample
CC - continuous core sample
n/a - not available

Screen Interval: 2.44 - 3.96; 21.77 - 23.29 m BGS
Sand Pack Interval: 21.46 - 23.60 m BGS
Well Seal Interval: 0.00 - 21.46 m BGS



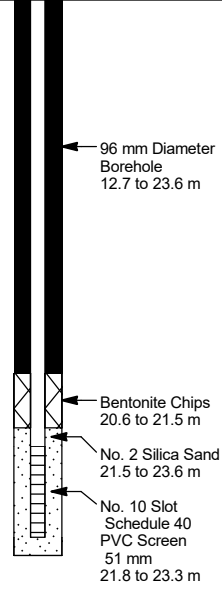
STANTEC BOREHOLE AND WELL - CLUST 11x8.5 - 160961397.306.102_BH LOGS GPJ STANTEC - DATA TEMPLATE GDT 10/29/21 - MJFRASER

Monitoring Well: MW20-21 (OB/BR)

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: Between TMF and SWA
Number: 160961397.306.102

Field investigator: S. Baer
Contractor: Maple Leaf Drilling
Method: Track Mount Acker Renegade (HSA/HQ)
Date started/completed: 29-Jun-2021 / 28-Jun-2021

SUBSURFACE PROFILE				SAMPLE DETAILS						WELL DETAILS		
Depth	Graphic Log	Lithologic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	SCR	RGD	Fractures per 1.52m	N Value	Name:	Name:
(ft)	(m)										MW20-OB-21	MW20-BR-21
50		SILT TILL Some fine to coarse gravel, trace clay, trace fine sand, subangular to subrounded, yellowish brown (10YR 5/8), moist, compact BEDROCK Grey (10YR 5/1), trace quartz veins	313.99	12	CC	18" 30%	n/a	n/a	n/a	n/a	GS Elev: 333.83 m AMSL	GS Elev: 333.84 m AMSL
55			13	CC	26" 43%	n/a	n/a	n/a	n/a	n/a	TOC Elev: 334.64 m AMSL	TOC Elev: 334.77 m AMSL
60			14	CC	23" 39%	n/a	n/a	n/a	n/a	n/a	Easting: 500357	Easting: 500357
65			15	CC	24" 40%	n/a	n/a	n/a	n/a	n/a	Northing: 5498110	Northing: 5498108
70			16	CC	21" 100%	14" 67%	14" 67%	2.8	n/a	Stick-up: 0.81 m	Stick-up: 0.93 m	
75			17	CC	55" 100%	49" 89%	47" 86%	7	n/a			
80			18	CC	62" 95%	55" 85%	57" 88%	3	n/a			
85			End of Borehole		310.23							
90			23.60									



Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 m BTOC - metres below top of casing
 SS - split-spoon sample
 CC - continuous core sample
 n/a - not available

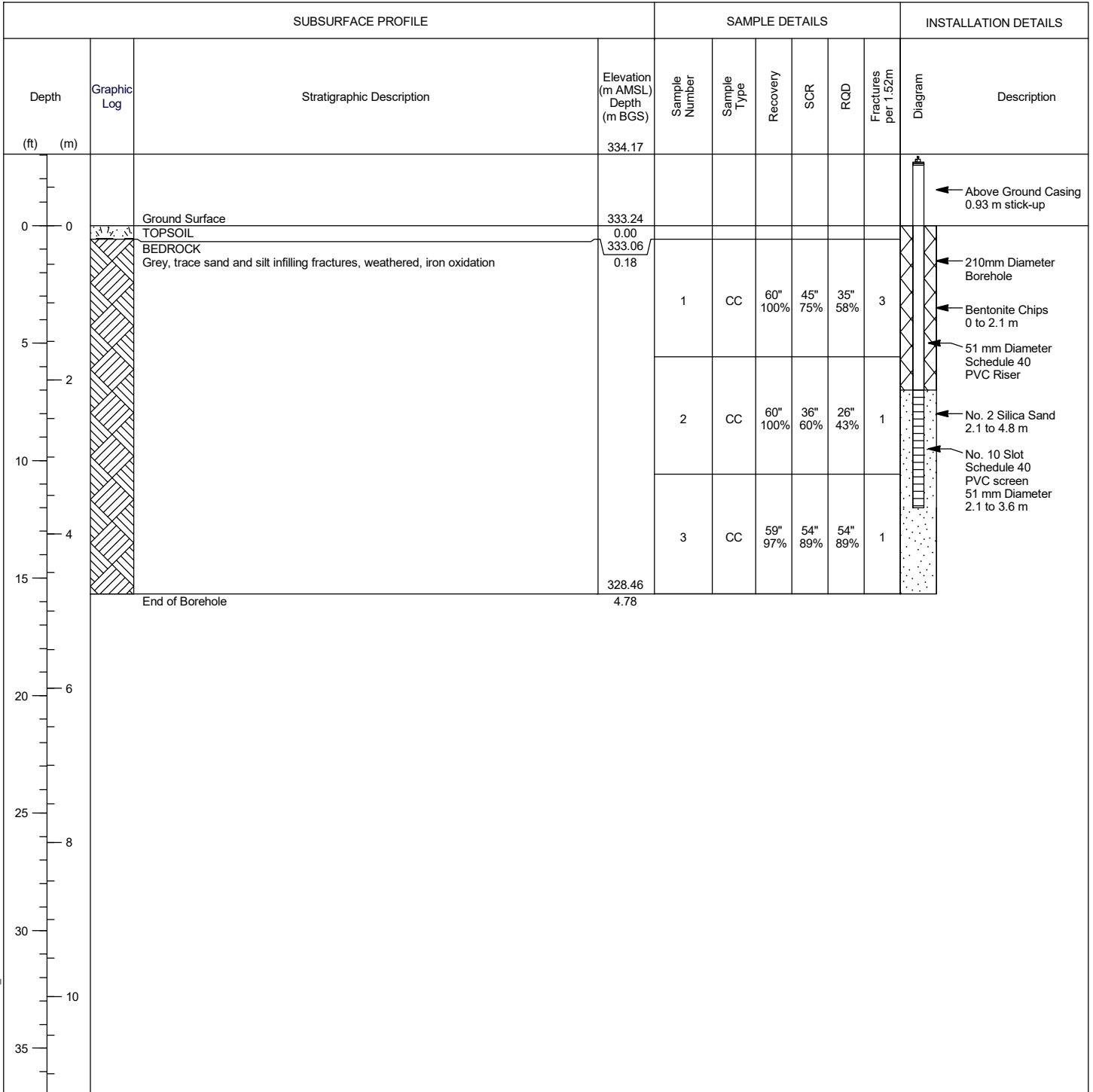
Screen Interval: 2.44 - 3.96; 21.77 - 23.29 m BGS
 Sand Pack Interval: 21.46 - 23.60 m BGS
 Well Seal Interval: 0.00 - 21.46 m BGS



STANTEC BOREHOLE AND WELL - CLUST 11X8.5 -160961397.306.102_BHLOGS.GPJ STANTEC - DATA TEMPLATE.GDT 10/29/2021 10:49:58 AM

Monitoring Well: MW21-BR-21

Project: Greenstone Mine 2021 Field Programs Client: Greenstone Gold Mines GP Inc. Location: Between Process Plant and SWAT Number: 160961397.306.102 Field investigator: T. Morrison Contractor: Maple Leaf Drilling	Method: Track Mount Acker Renegade (HQ rock core) Date started/completed: 16-Jul-2021 Ground surface elevation: 333.24 m AMSL Top of casing elevation: 334.17 m AMSL Easting: 503116 Northing: 5501955
--	---



Screen Interval: 2.13 - 3.66 m BGS
 Sand Pack Interval: 2.13 - 4.78 m BGS
 Well Seal Interval: 0.00 - 2.13 m BGS

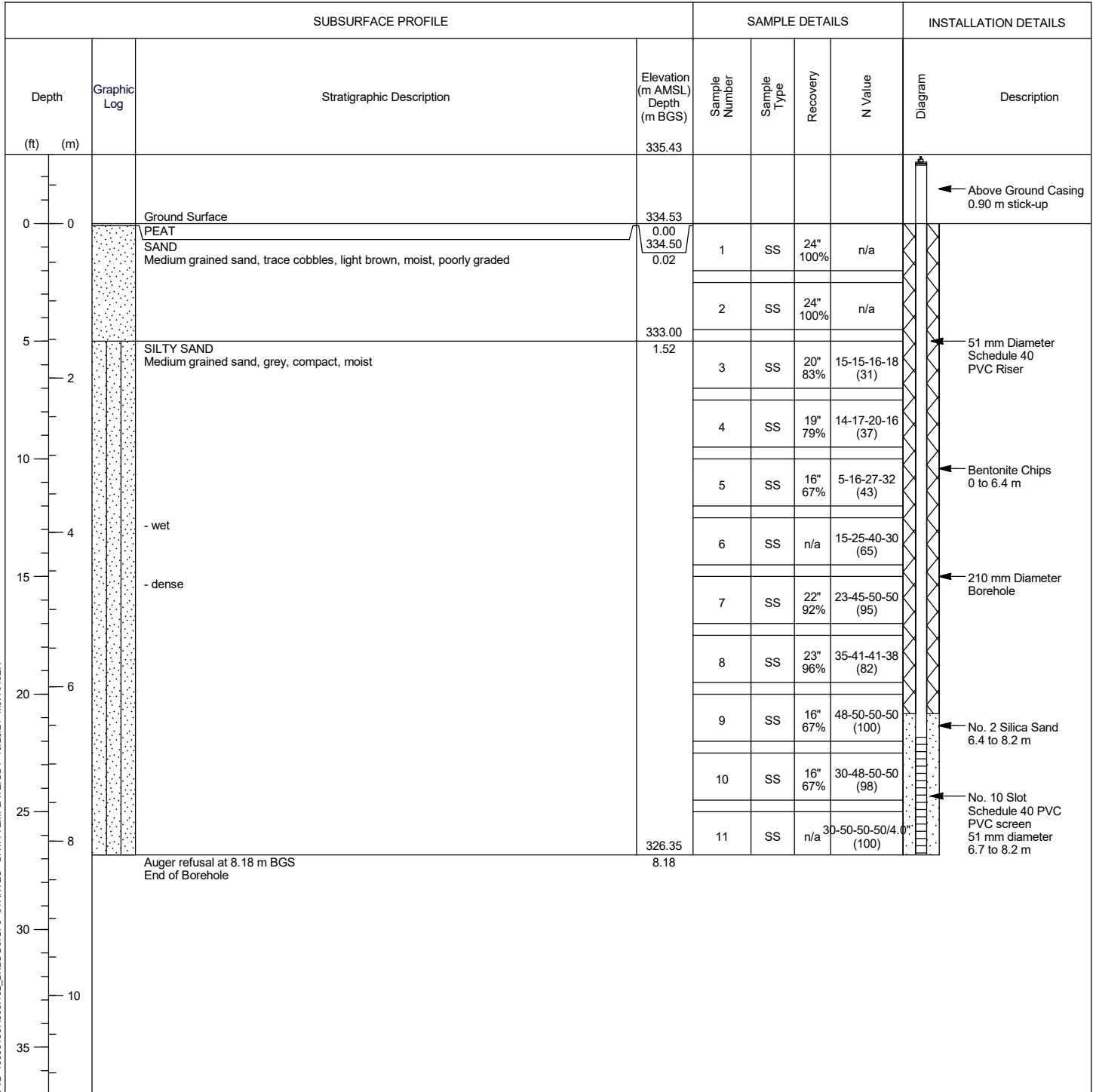
Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 CC - continuous core sample
 n/a - not available



Monitoring Well: MW22-OB-21

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: Between Ore Stockpile and SWA
Number: 160961397.306.102
Field investigator: T. Morrison
Contractor: Maple Leaf Drilling

Method: Track Mount Acker Renegade (HSA)
Date started/completed: 16-Jul-2021
Ground surface elevation: 334.53 m AMSL
Top of casing elevation: 335.43 m AMSL
Easting: 504142
Northing: 5501895



Screen Interval: 6.65 - 8.18 m BGS
 Sand Pack Interval: 6.35 - 8.18 m BGS
 Well Seal Interval: 0.00 - 6.35 m BGS

Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 SS - split-spoon sample
 n/a - not available



Monitoring Well: MW23-21

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: Between Pond B1 and SWAT
Number: 160961397.306.102
Field investigator: T. Morrison
Contractor: Maple Leaf Drilling

Method: Track Mount Acker Renegade (HSA)
Date started/completed: 17-Jul-2021
Ground surface elevation: 330.04 m AMSL
Top of casing elevation: 330.92 m AMSL
Easting: 503568
Northing: 5501816

SUBSURFACE PROFILE				SAMPLE DETAILS						INSTALLATION DETAILS		
Depth (ft) (m)	Graphic Log	Stratigraphic Description	Elevation (m AMSL) Depth (m BGS)	Sample Number	Sample Type	Recovery	SCR	RGD	Fractures per 1.52m	N Value	Diagram	Description
0		Ground Surface	330.04									← Above Ground Casing 0.88 m stick-up
0		PEAT	0.00	1	GB	n/a	n/a	n/a	n/a	n/a		
0		SILTY SAND Medium grained sand, trace clay, grey, moist	329.89 0.15	2	GB	n/a	n/a	n/a	n/a	n/a		← 51 mm Diameter Schedule 40 PVC Riser
2				3	SS	21" 88%	n/a	n/a	n/a	3-5-6-11 (11)		← Bentonite Chips 0 to 2.9 m
2		SAND fine grained sand, trace silt, poorly graded, compact, moist	327.75	4	SS	12" 50%	n/a	n/a	n/a	12-13-12-14 (25)		← 210 mm Diameter Borehole
10		SILTY SAND Medium grained sand, trace clay, grey, moist	326.99	5	SS	17" 79%	n/a	n/a	n/a	4-12-16-50/3.6' (28)		← No. 2 Silica Sand 2.9 to 8.1 m
4		BEDROCK Grey, quartz veins, trace sand and silt infilling fractures	3.60	6	SS	54" 98%	47" 86%	47" 86%	1	n/a		← No. 10 Slot Schedule 40 PVC screen 51 mm diameter 3.2 to 4.7 m
15				7	HQ	60" 100%	58" 97%	57" 95%	3	n/a		
20				8	HQ	60" 100%	56" 93%	56" 93%	0	n/a		
8		End of Borehole	321.96 8.08									

Screen Interval: 3.20 - 4.72 m BGS
 Sand Pack Interval: 2.90 - 8.08 m BGS
 Well Seal Interval: 0.00 - 2.90 m BGS

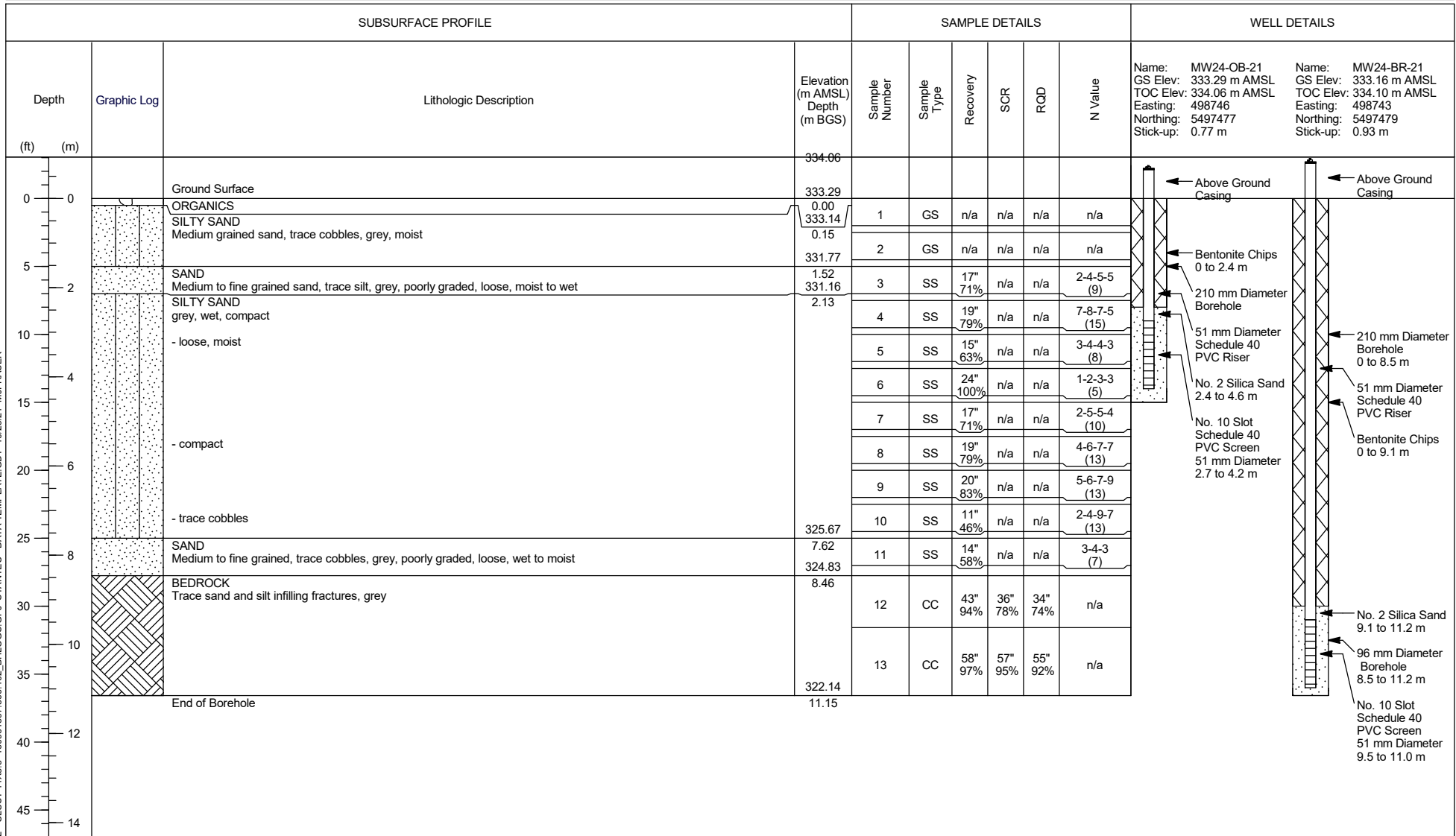
Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 SS - split-spoon sample
 GB - grab sample
 n/a - not available



Monitoring Well: MW24-21 (OB/BR)

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: Between TMF and GFC Tributary
Number: 160961397.306.102

Field investigator: T. Morrison
Contractor: Maple Leaf Drilling
Method: Track Mount Acker Renegade (HSA/HQ)
Date started/completed: 18-Jul-2021



Notes:
m AMSL - metres above mean sea level
m BGS - metres below ground surface
m BTOC - metres below top of casing
SS - split-spoon sample
CC - continuous core sample
n/a - not available

Screen Interval: 2.74 - 4.27; 9.45 - 10.97 m BGS
Sand Pack Interval: 9.14 - 11.15 m BGS
Well Seal Interval: 0.00 - 9.14 m BGS

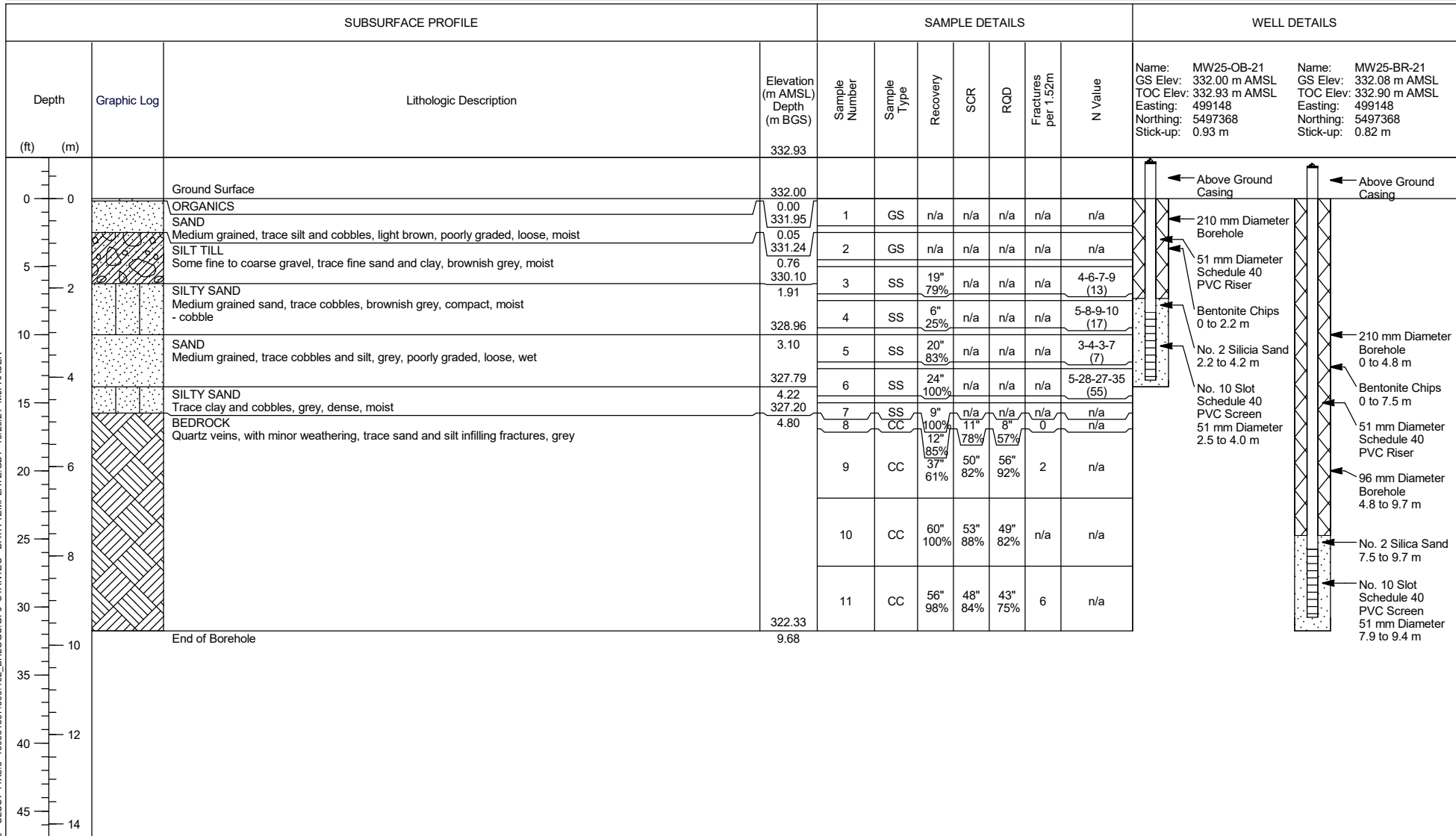


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Monitoring Well: MW25-21 (OB/BR)

Project: Greenstone Mine 2021 Field Programs
Client: Greenstone Gold Mines GP Inc.
Location: Between TMF and GFC Tributary
Number: 160961397.306.102

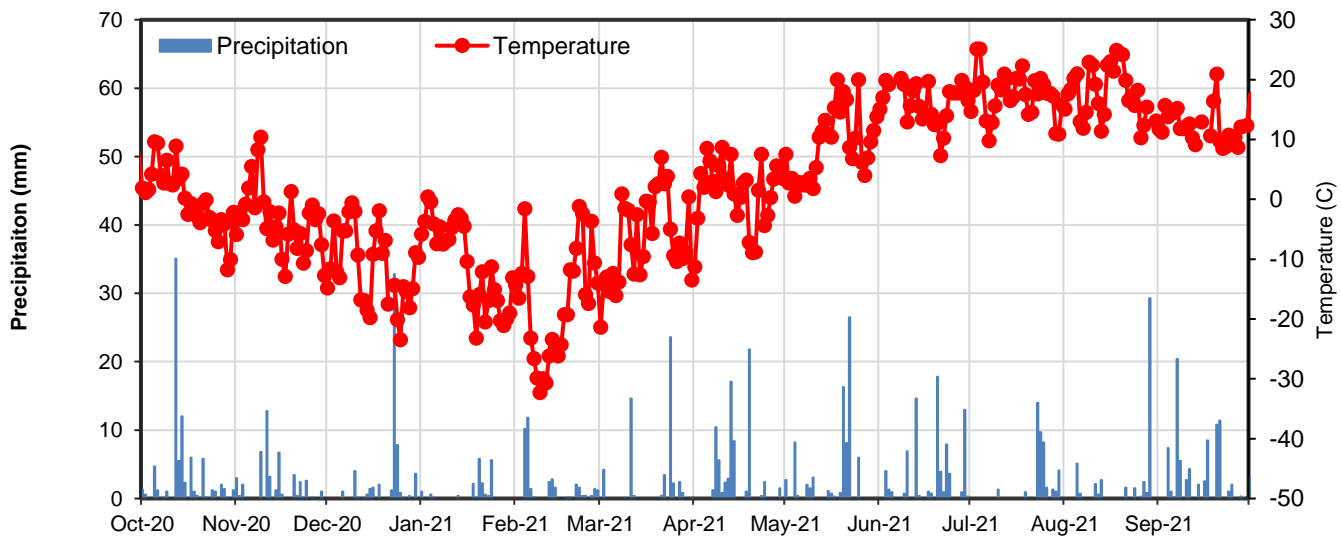
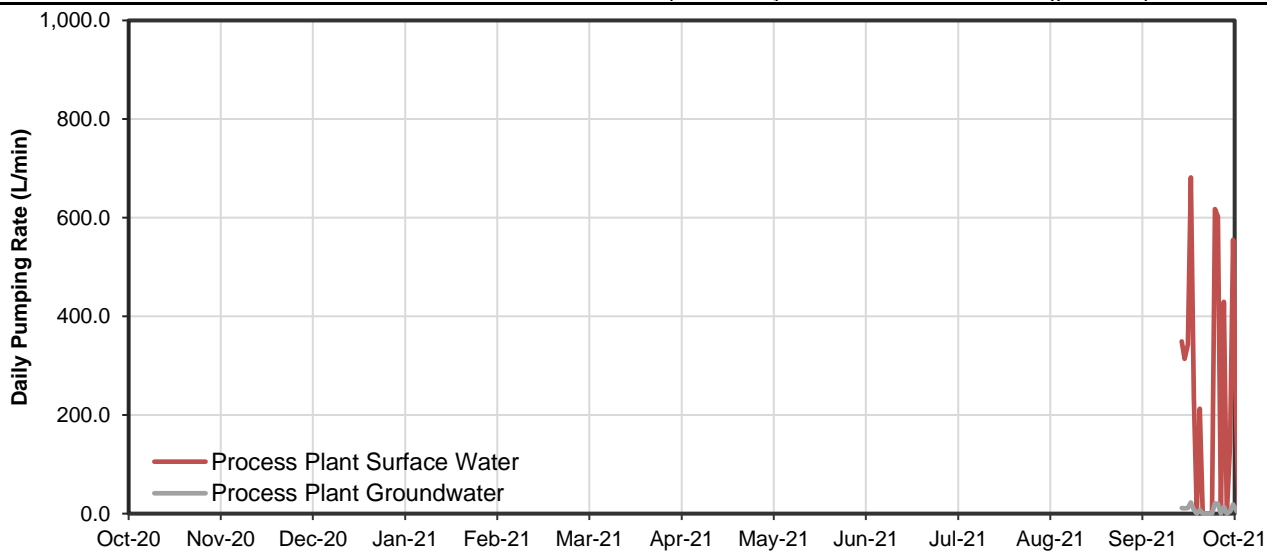
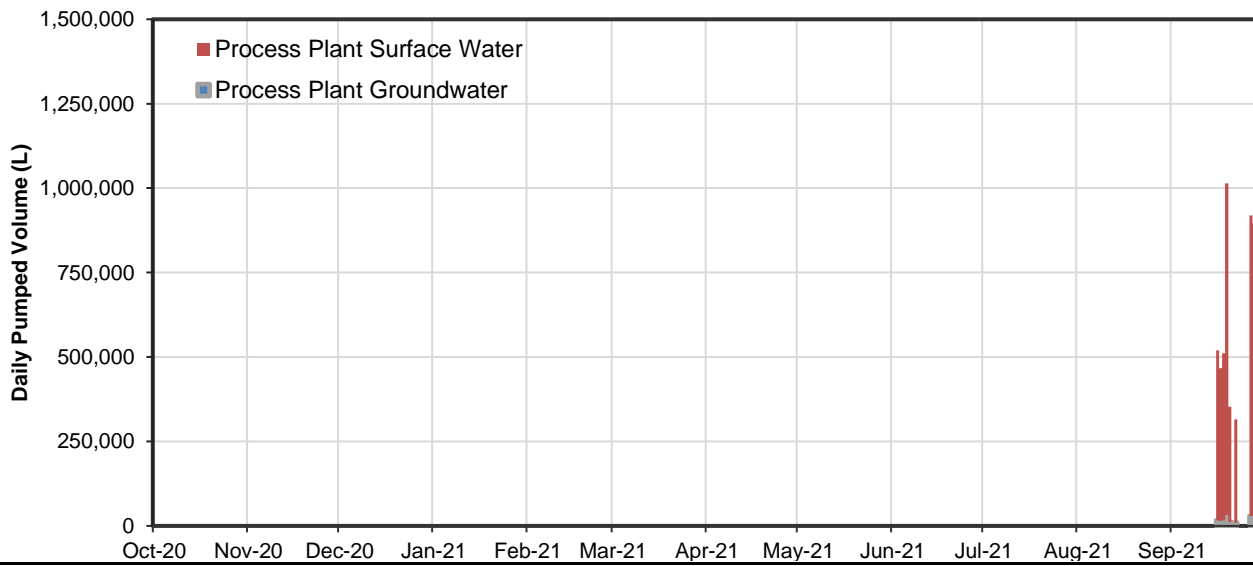
Field investigator: S. Baer / T. Morrison
Contractor: Maple Leaf Drilling
Method: Track Mount Acker Renegade (HSA/HQ)
Date started/completed: 18-Jul-2021 / 19-Jul-2021



Notes:
 m AMSL - metres above mean sea level
 m BGS - metres below ground surface
 m BTOC - metres below top of casing
 SS - split-spoon sample
 CC - continuous core sample
 n/a - not available

Screen Interval: 2.54 - 4.06; 7.85 - 9.37 m BGS
 Sand Pack Interval: 7.54 - 9.68 m BGS
 Well Seal Interval: 0.00 - 7.54 m BGS





Client/Project

2021 Fish and Fish Habitat
Federal EIS Follow-Up Monitoring Report
Greenstone Project

Notes:

- Pumping data provided by GGM
- Pumping began on September 15, 2021

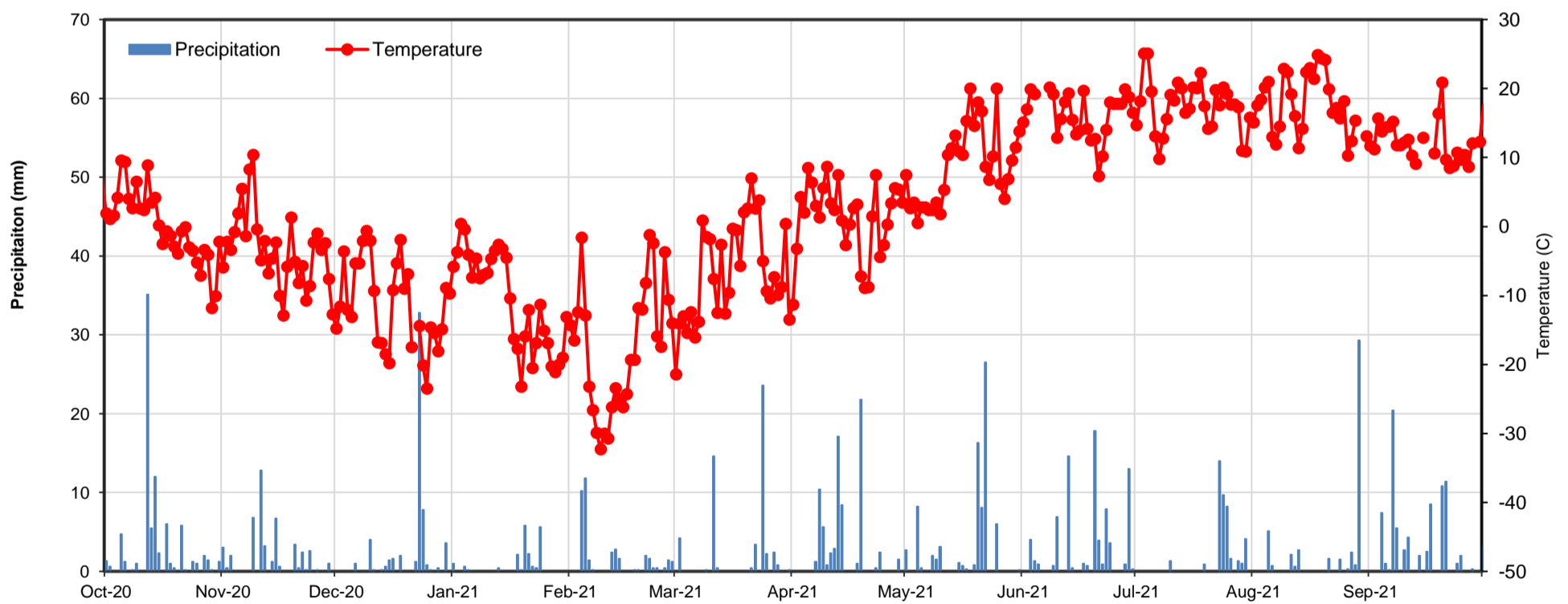
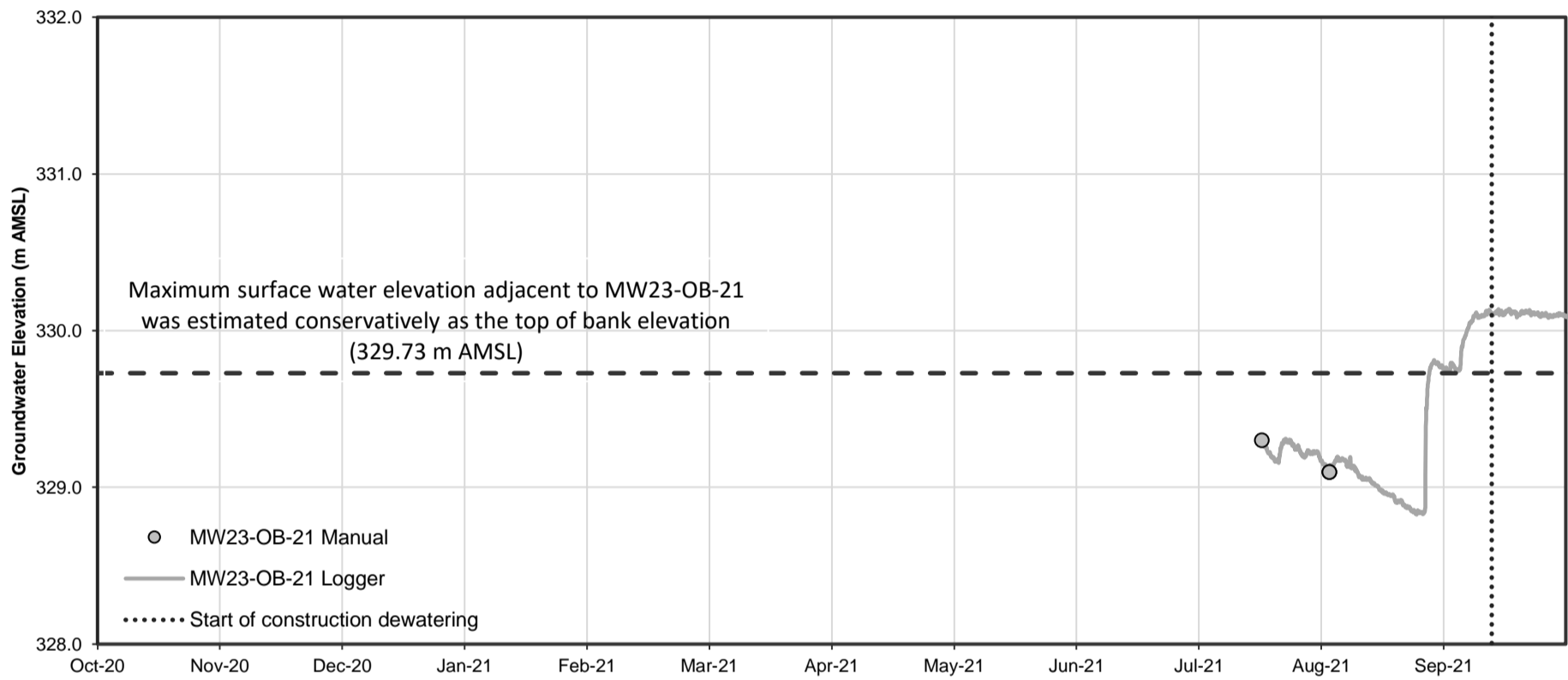
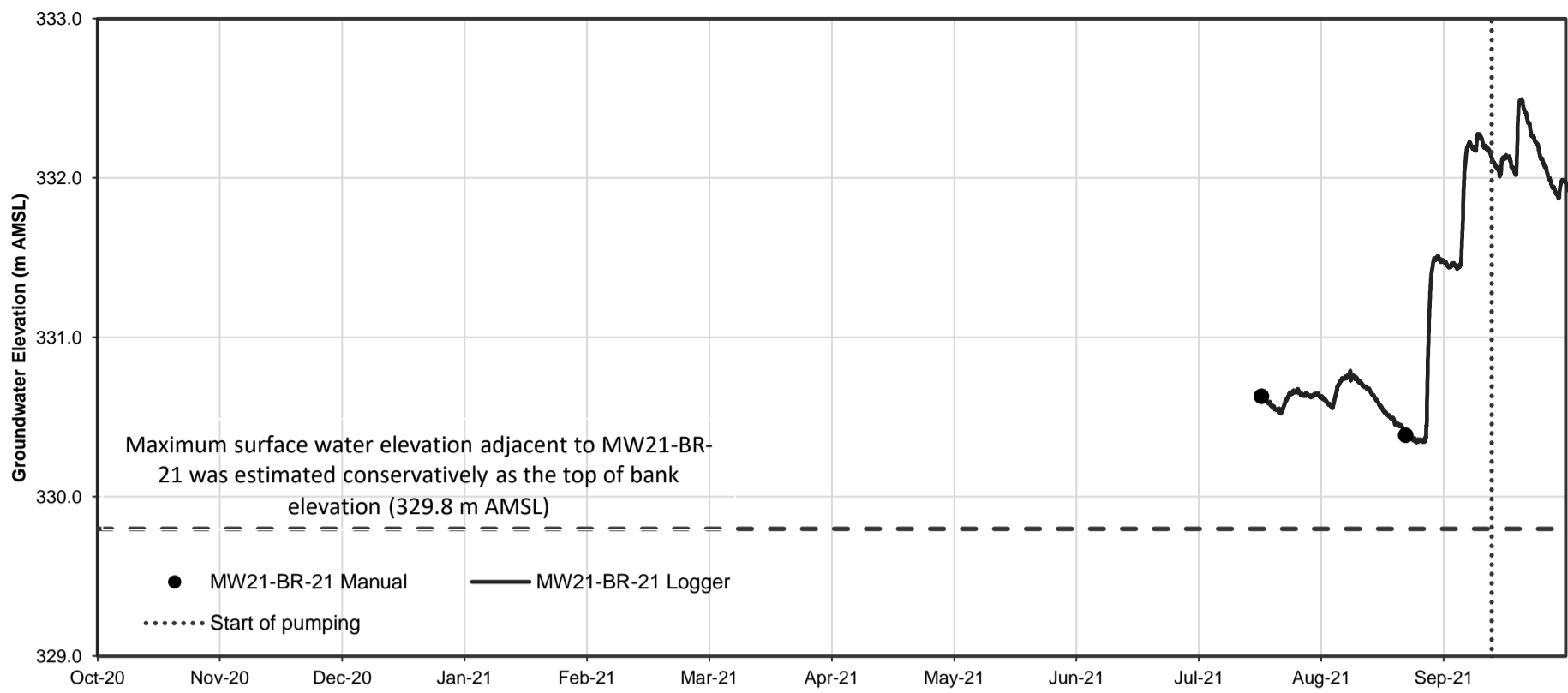
Figure No.

B-3 -1

Title

**Construction Dewatering Hydrograph
Process Plant**





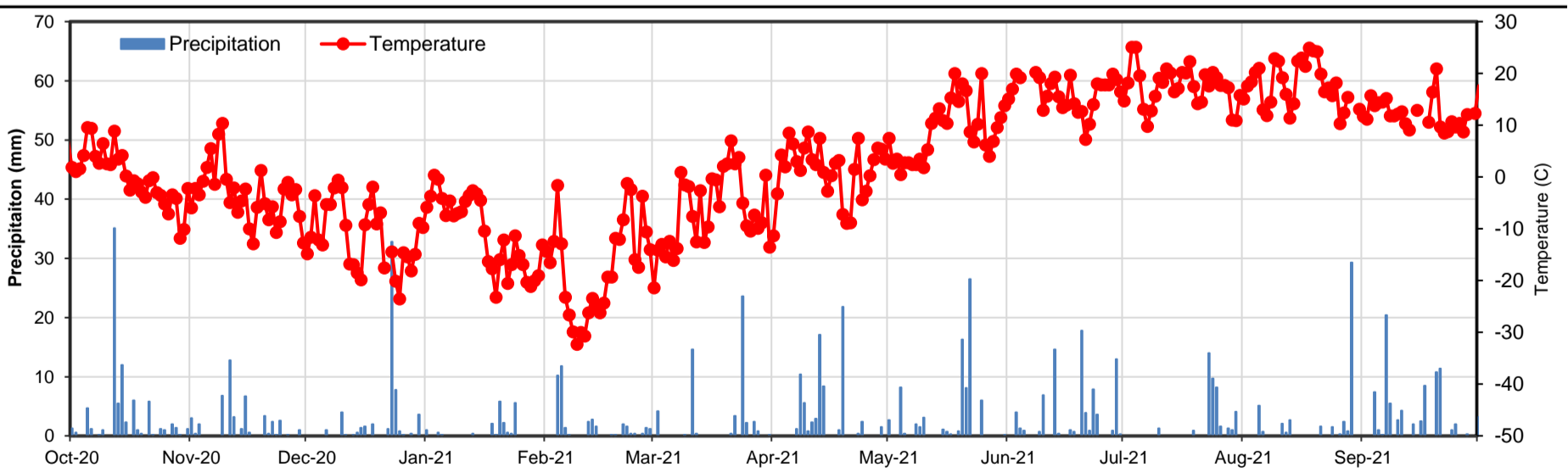
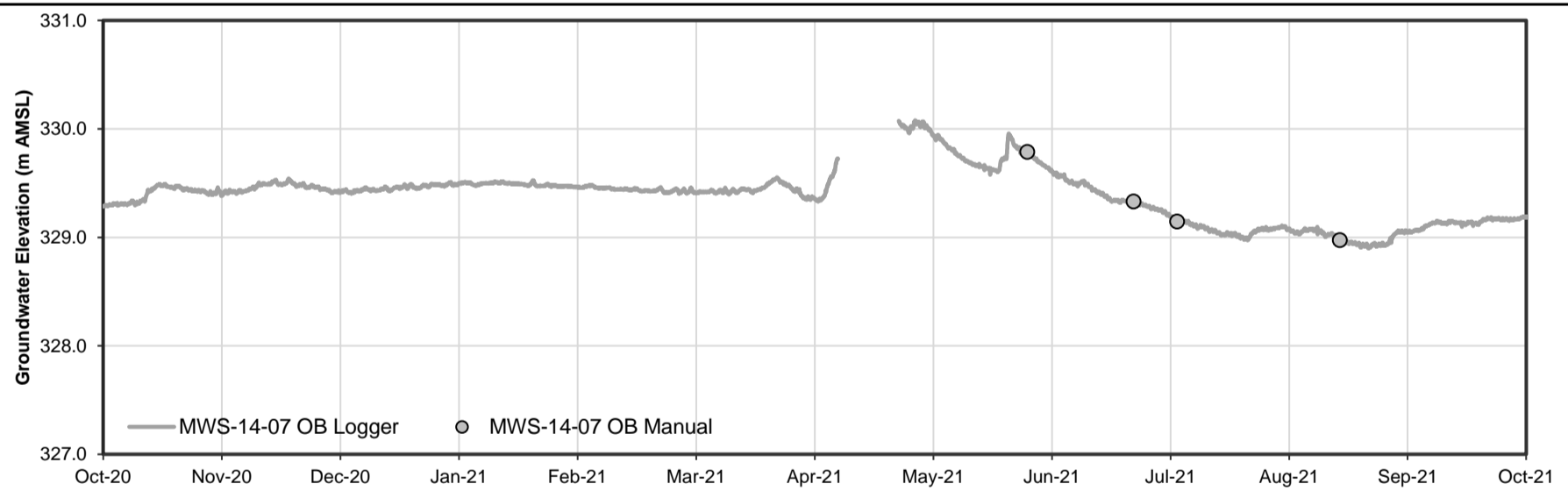
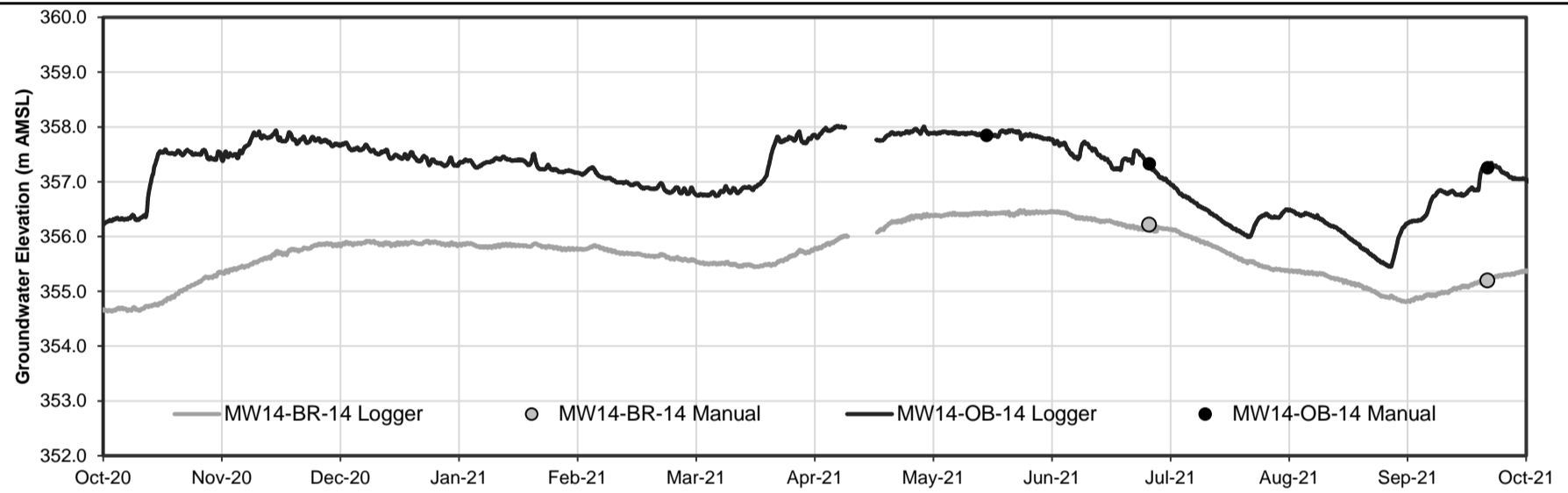
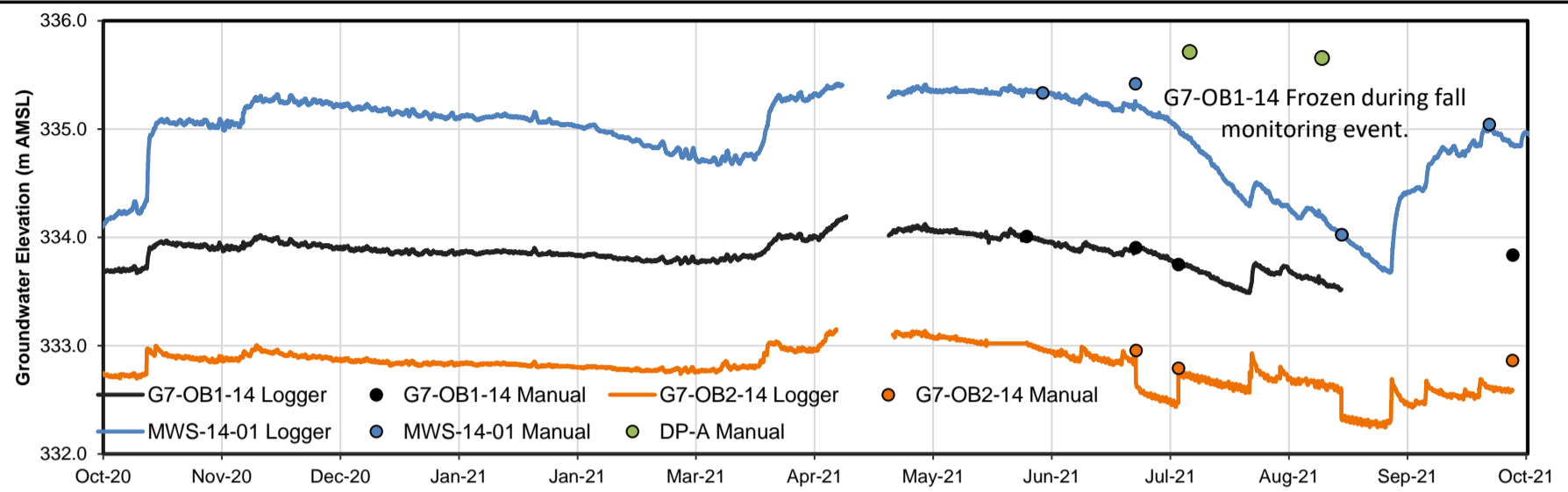
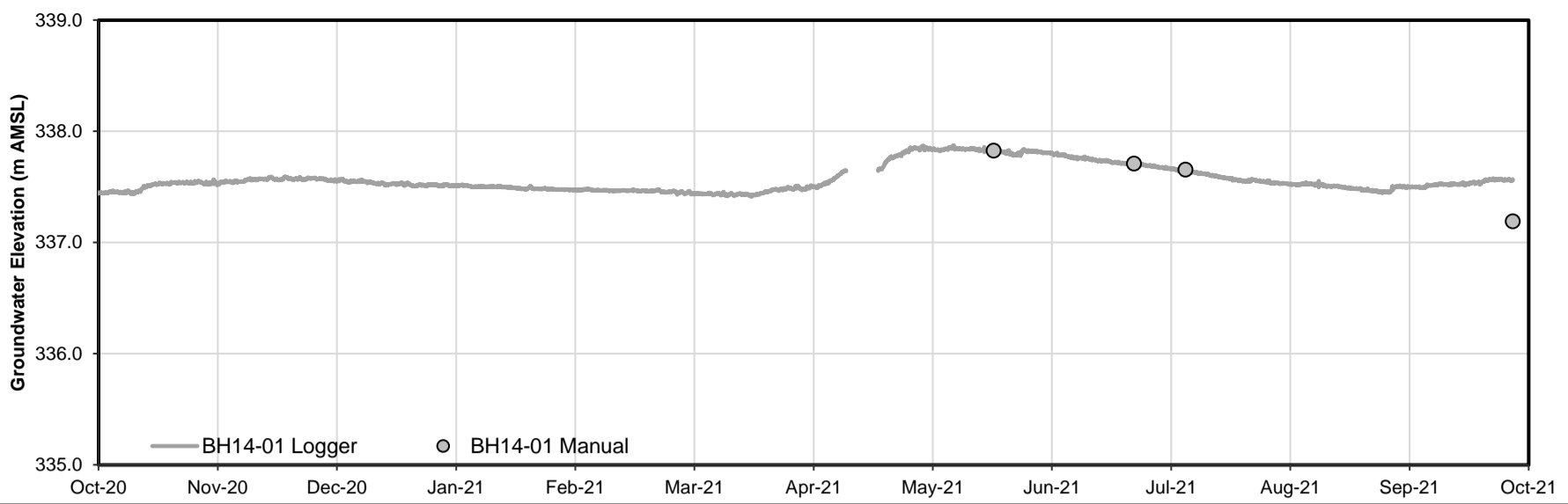
Notes:
Climate data obtain from the Environment Canada Website: Station Geraldton A

Client/Project
2021 Fish and Fish Habitat
Federal EIS Follow-Up Monitoring Report
Greenstone Mine

Figure No.
B-3 -2

Title
Gradient Hydrographs





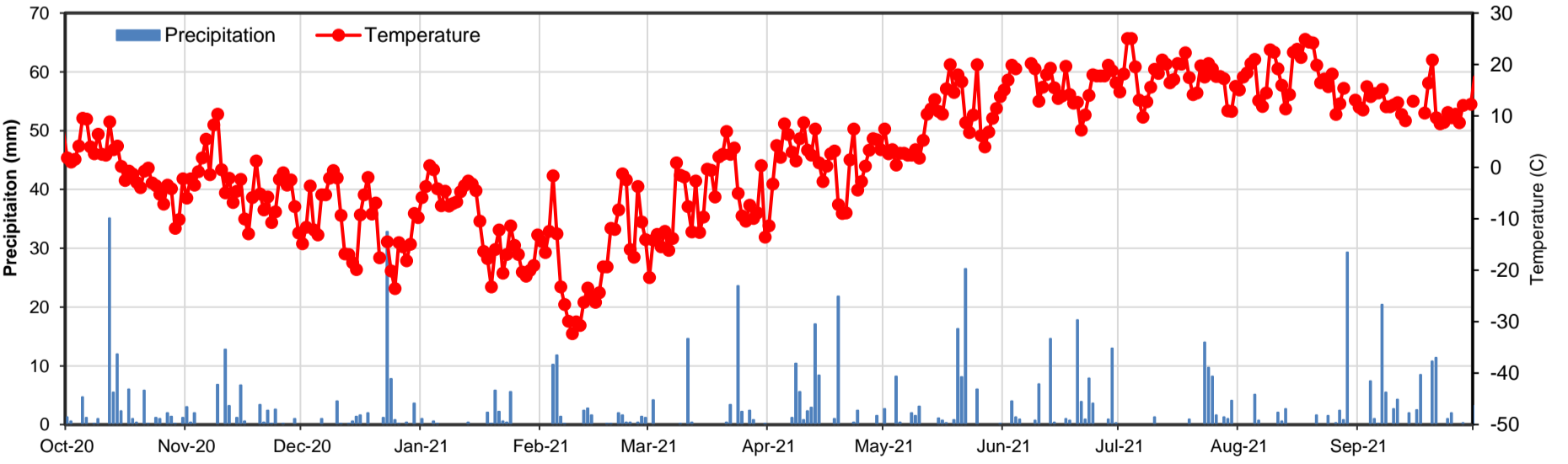
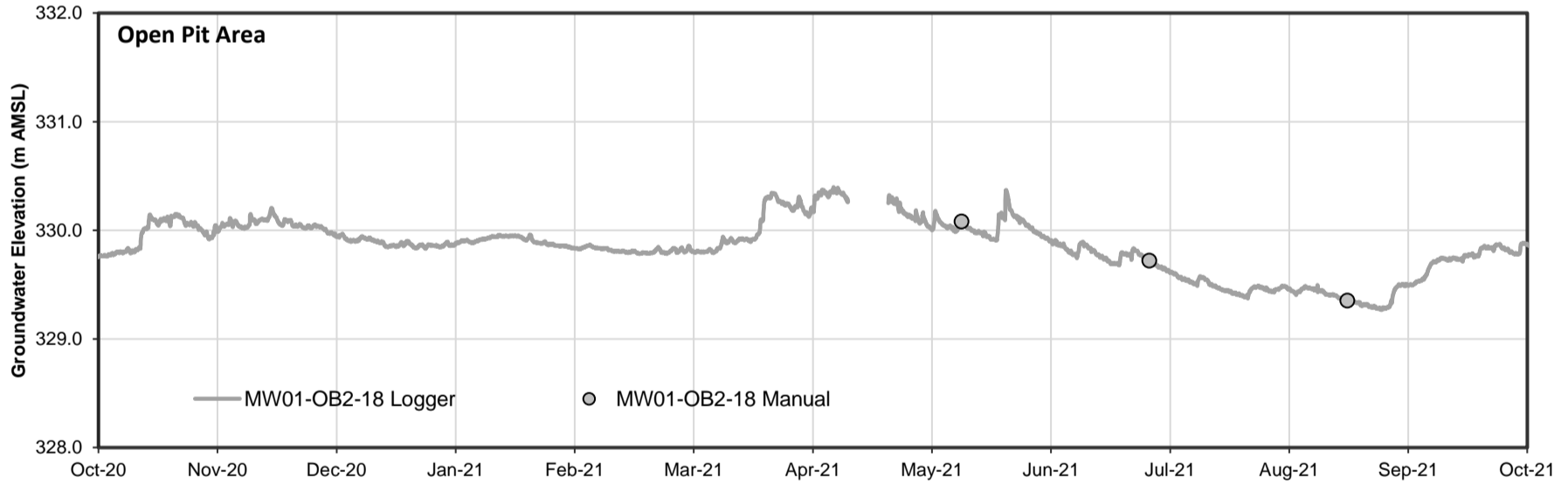
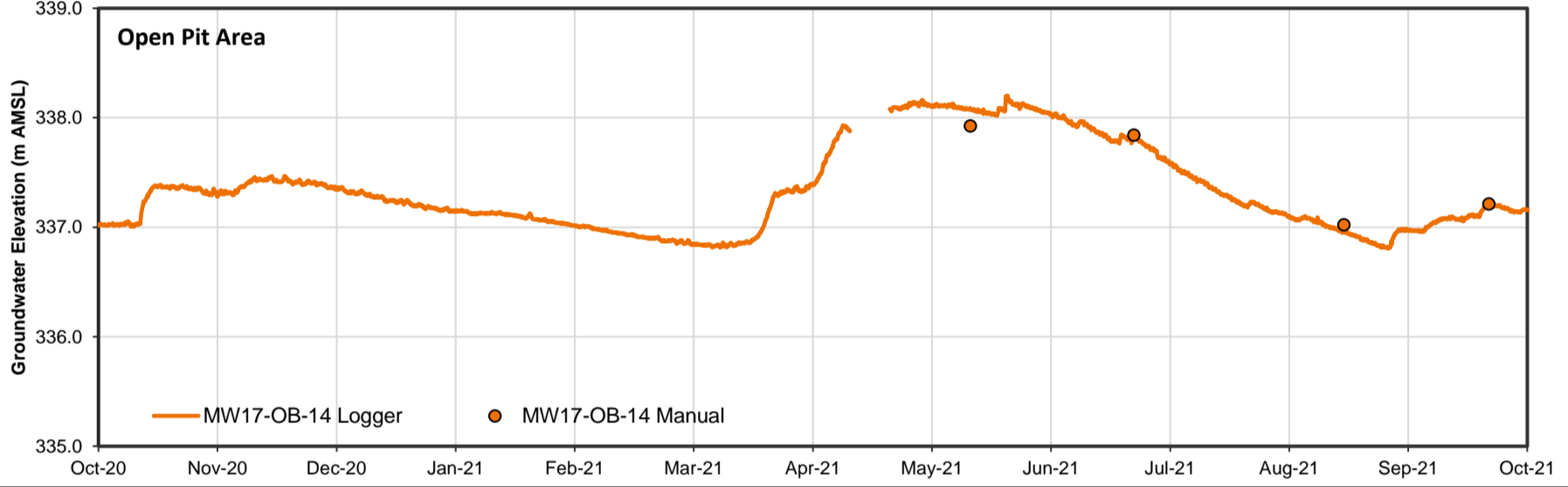
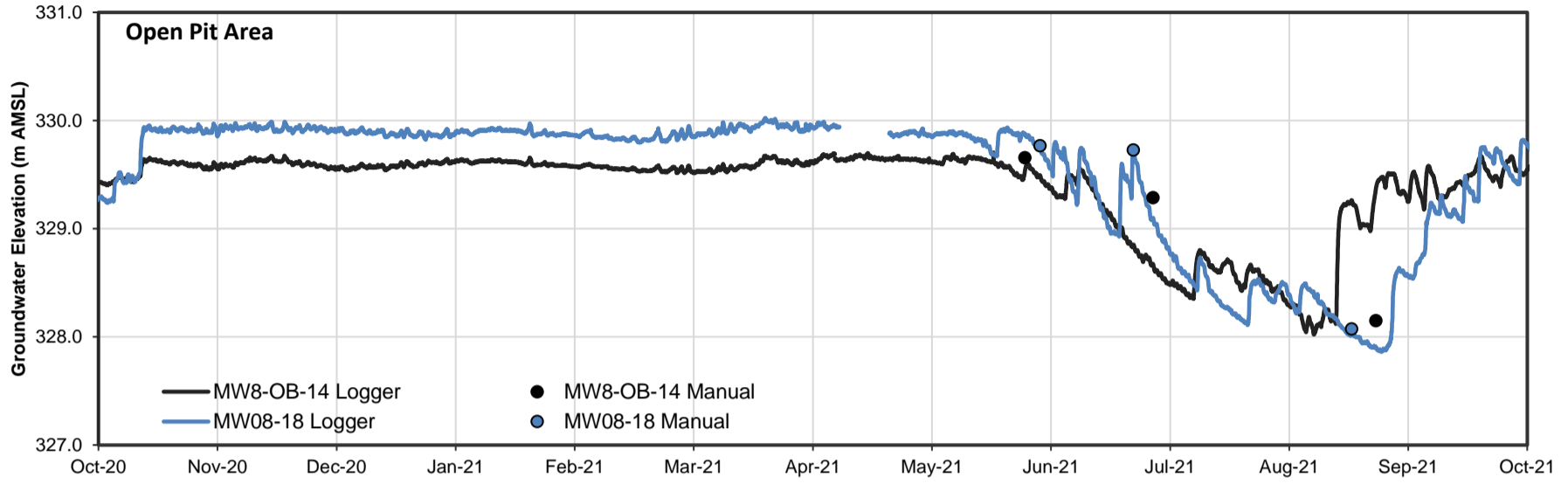
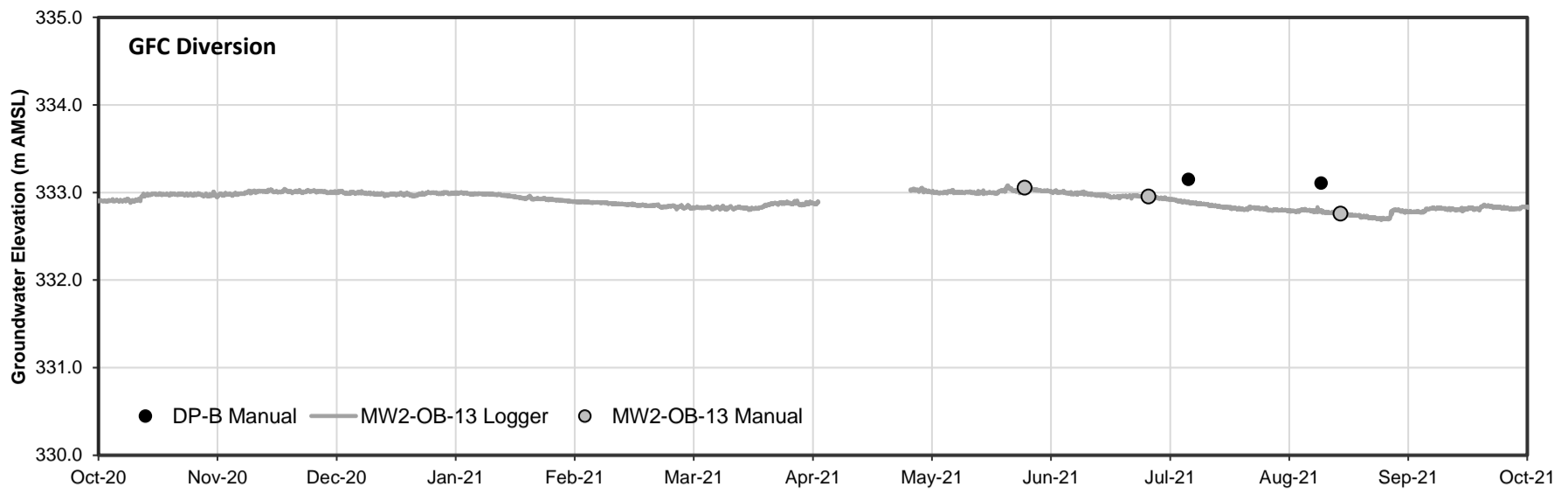
Notes:
 Error in barologger. Data from mid-April 2021 removed.
 Climate data obtain from the Environment Canada Website: Station Geraldton A

Client/Project
 2021 Fish and Fish Habitat
 Federal EIS Follow-Up Monitoring Report
 Greenstone Project

Figure No.
B-3 -3

Title
**Trigger Threshold Hydrographs
 TMF and Aggregate Pit Area**





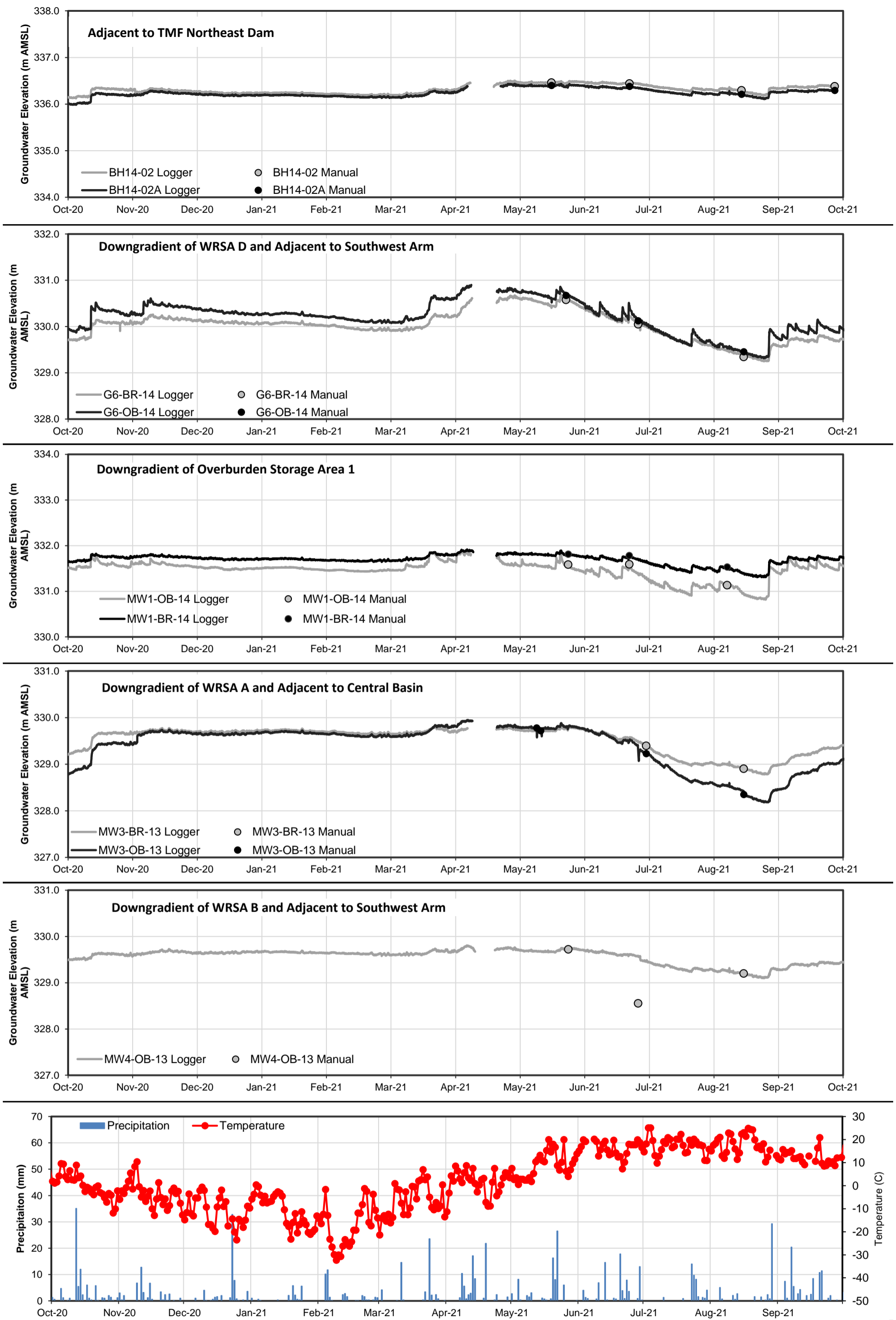
Notes:
 Error in barologger. Data from mid-April 2021 removed.
 Climate data obtain from the Environment Canada Website: Station Geraldton A

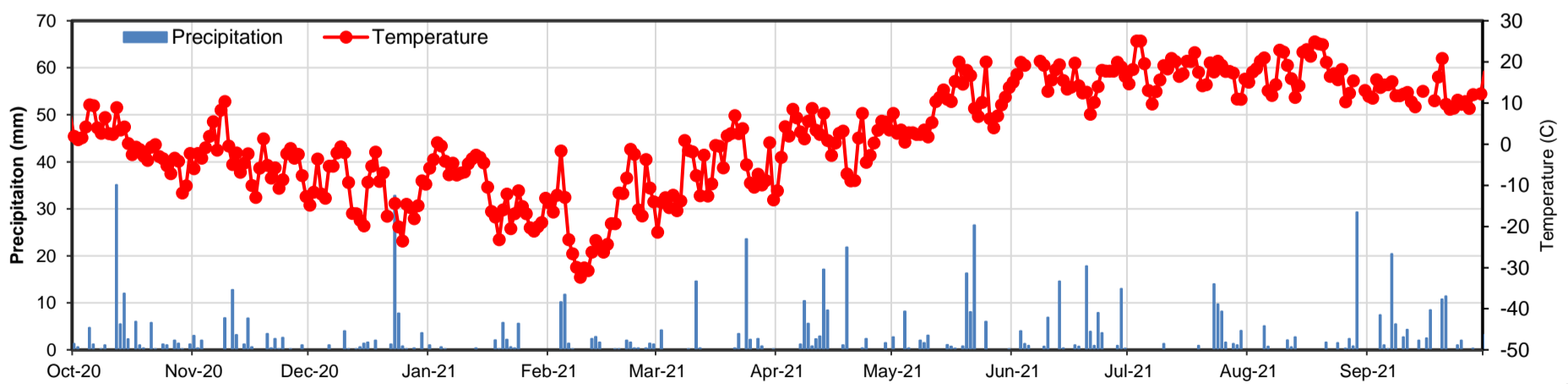
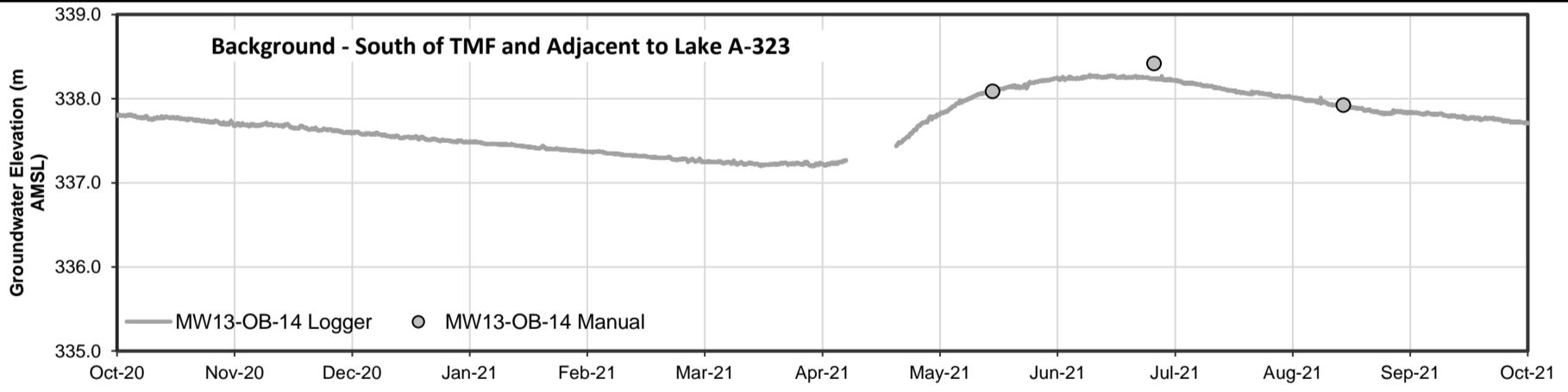
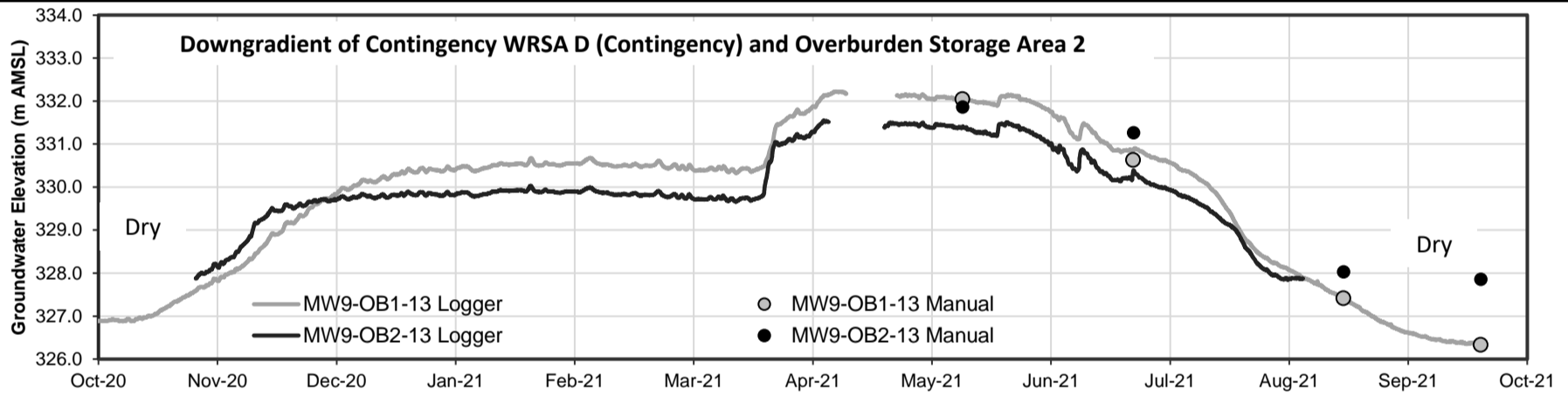
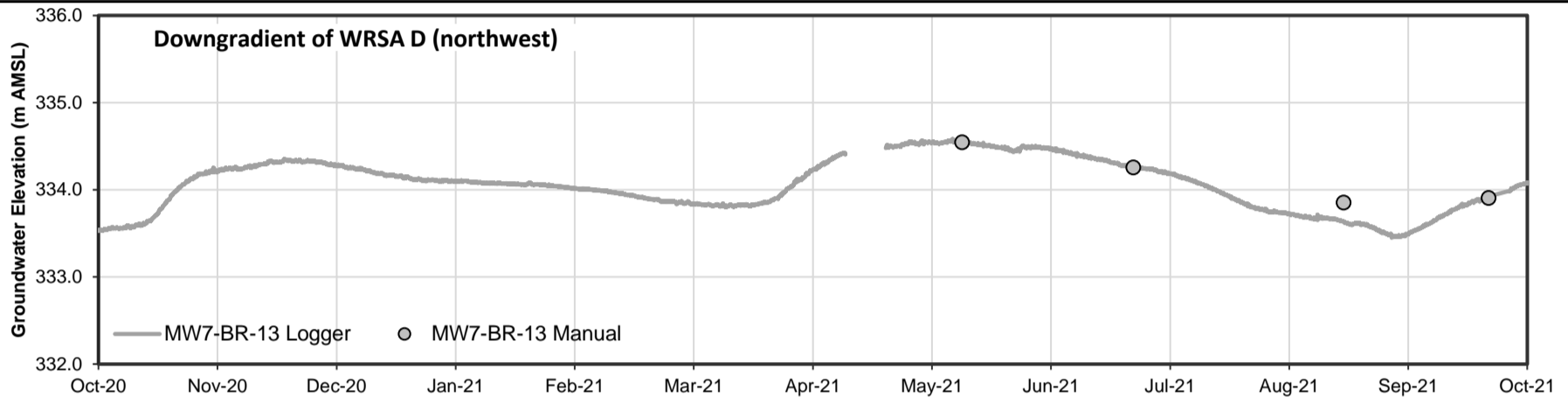
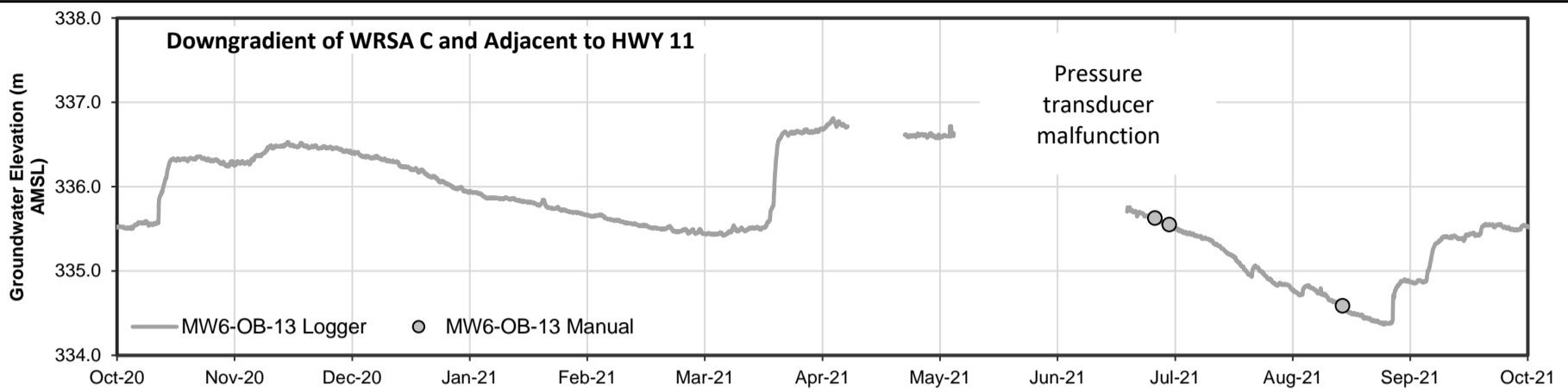
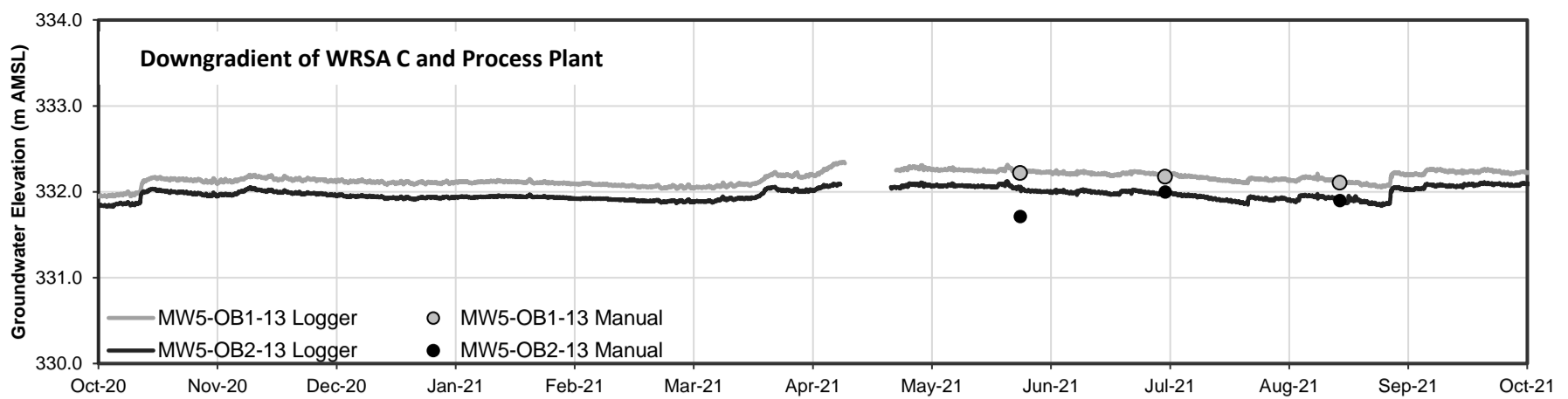
Client/Project
 2021 Fish and Fish Habitat
 Federal EIS Follow-Up Monitoring Report
 Greenstone Project

Figure No.
B-3 -4

Title
**Trigger Threshold Hydrographs
 GFC Diversion and Open Pit Area**







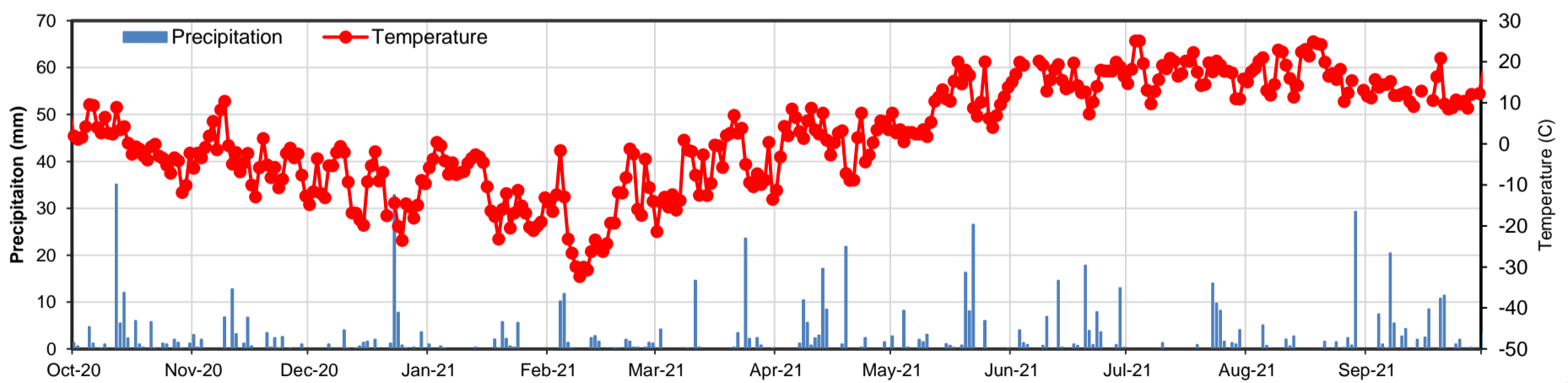
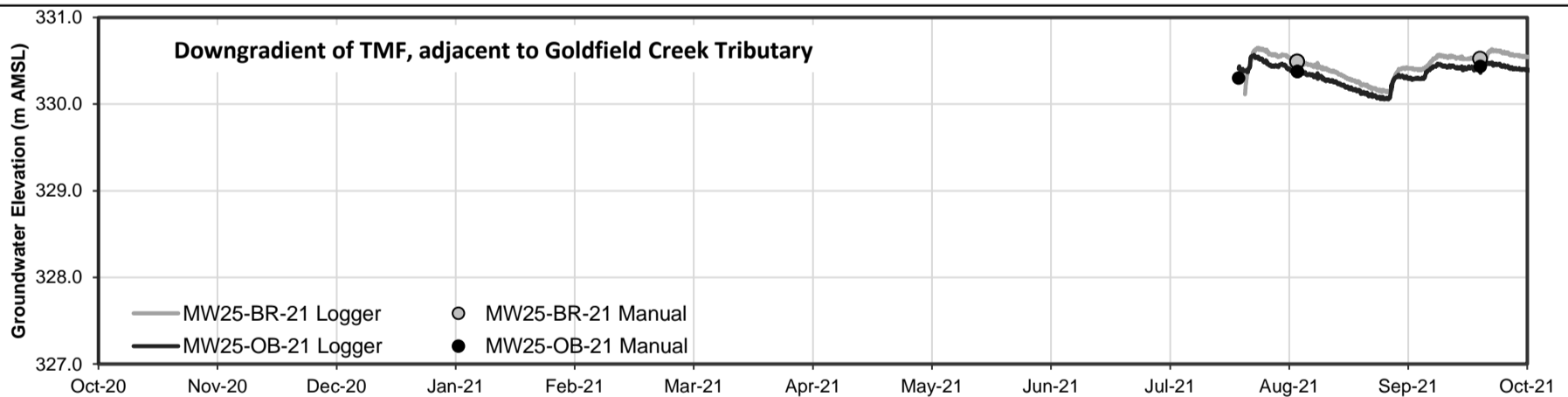
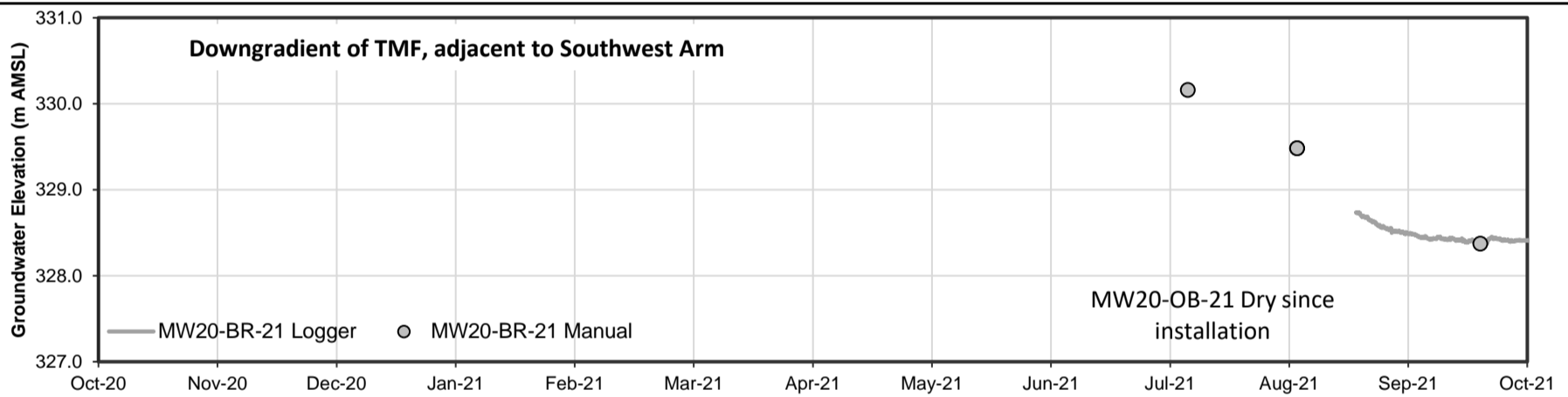
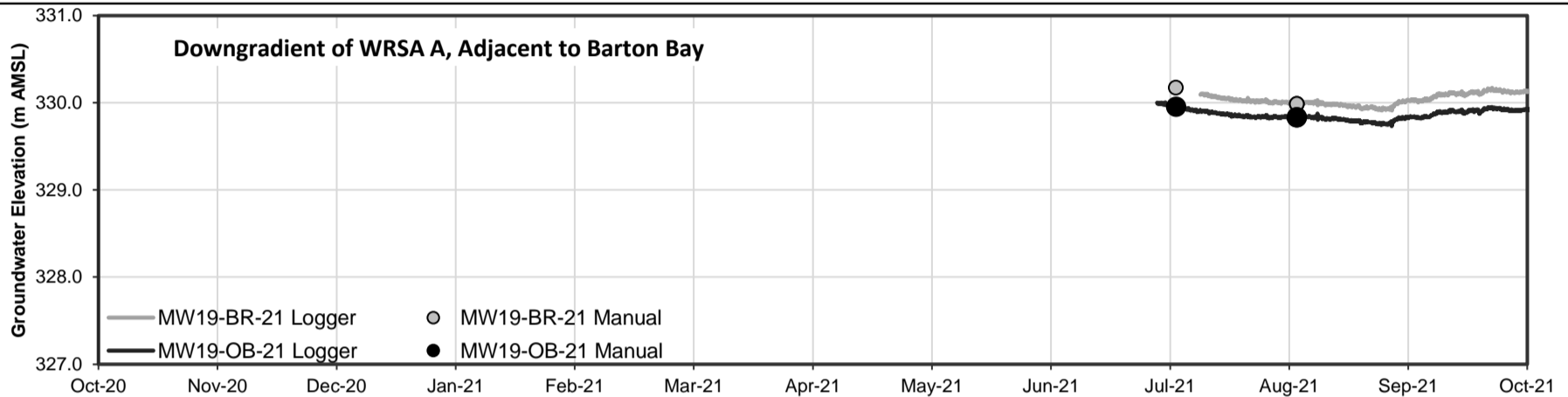
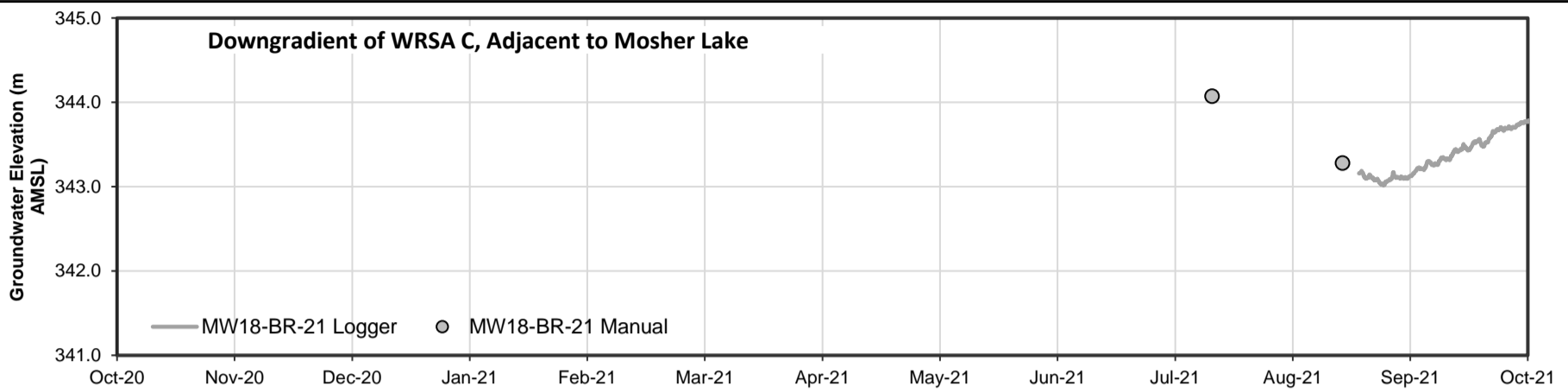
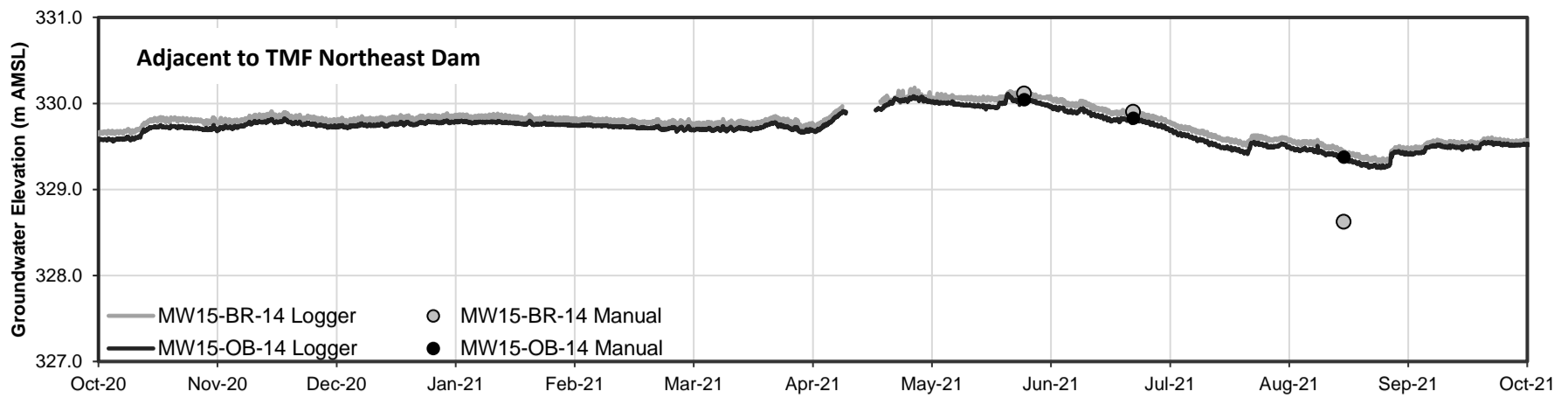
Notes:
 Error in barologger. Data from mid-April 2021 removed.
 Climate data obtain from the Environment Canada Website: Station Geraldton A

Client/Project
 2021 Fish and Fish Habitat
 Federal EIS Follow-Up Monitoring Report
 Greenstone Project

Figure No.
 B-3 -6

Title
 Hydrographs





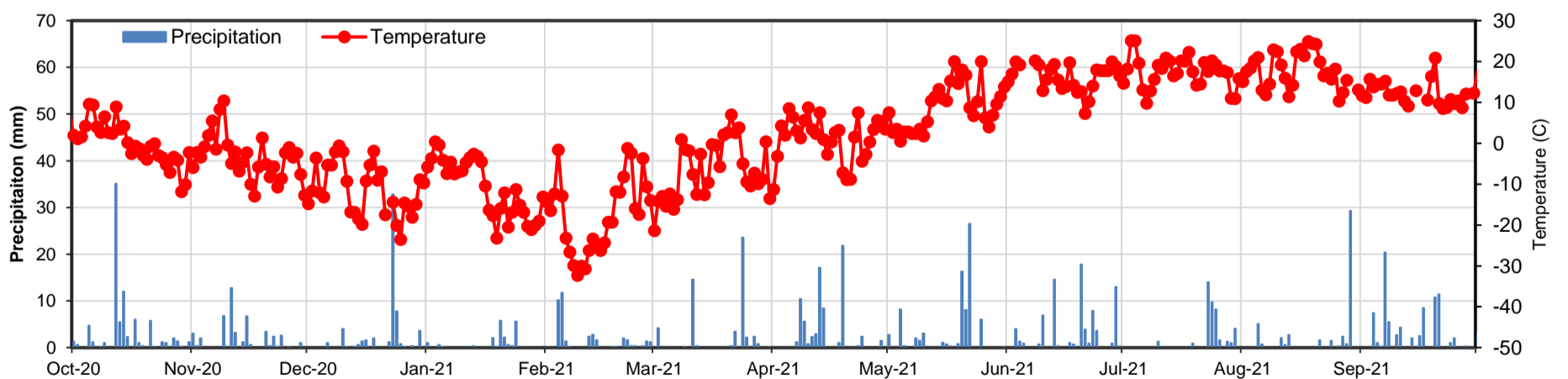
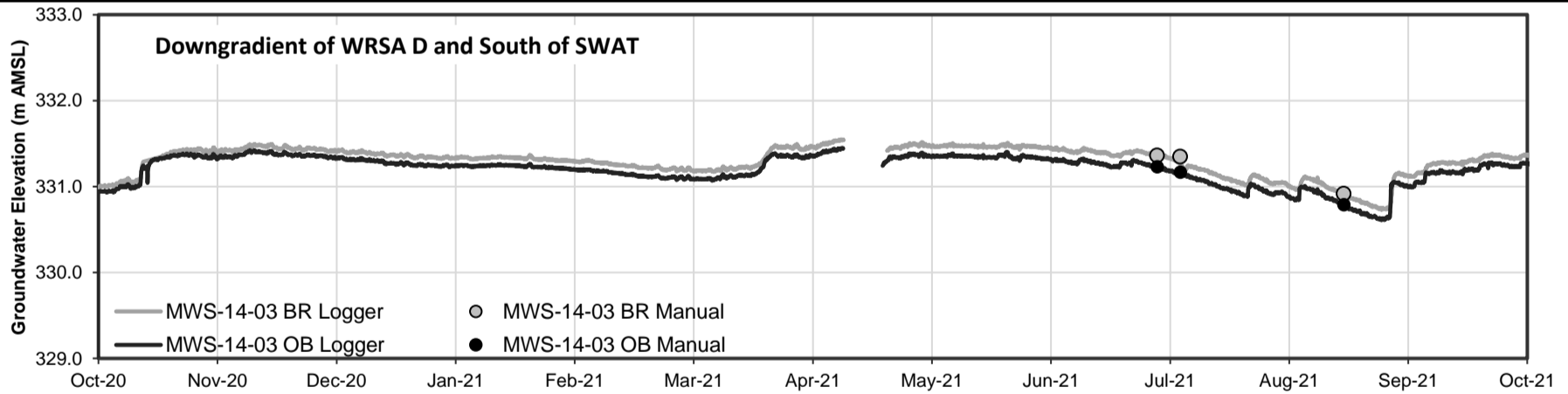
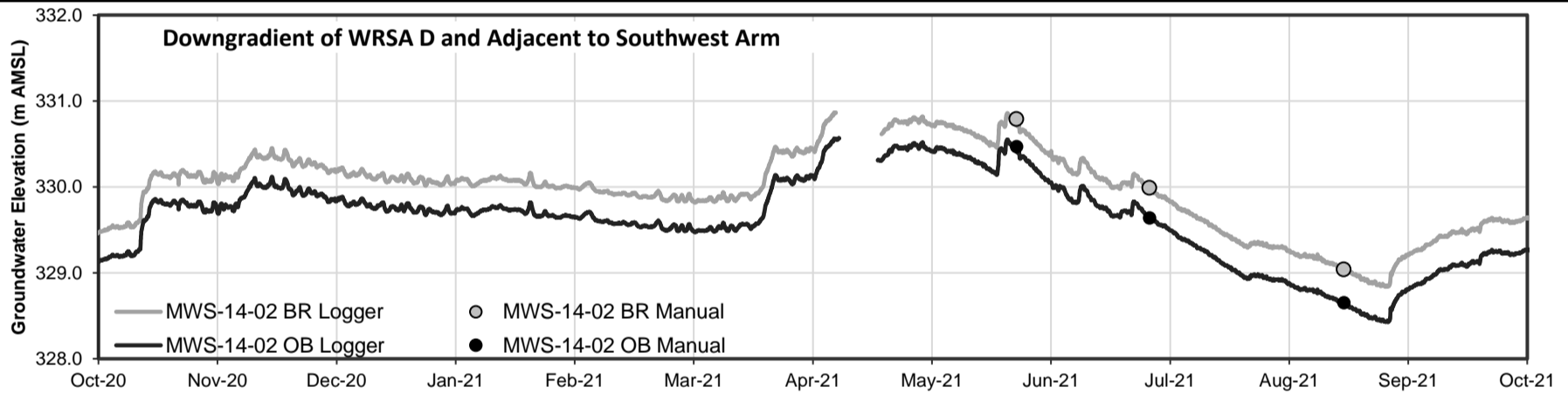
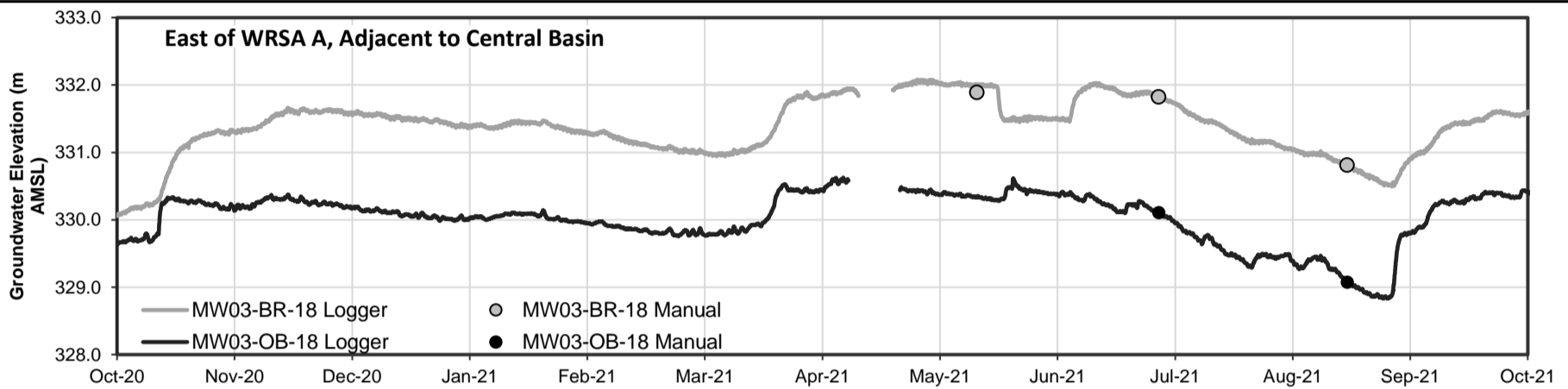
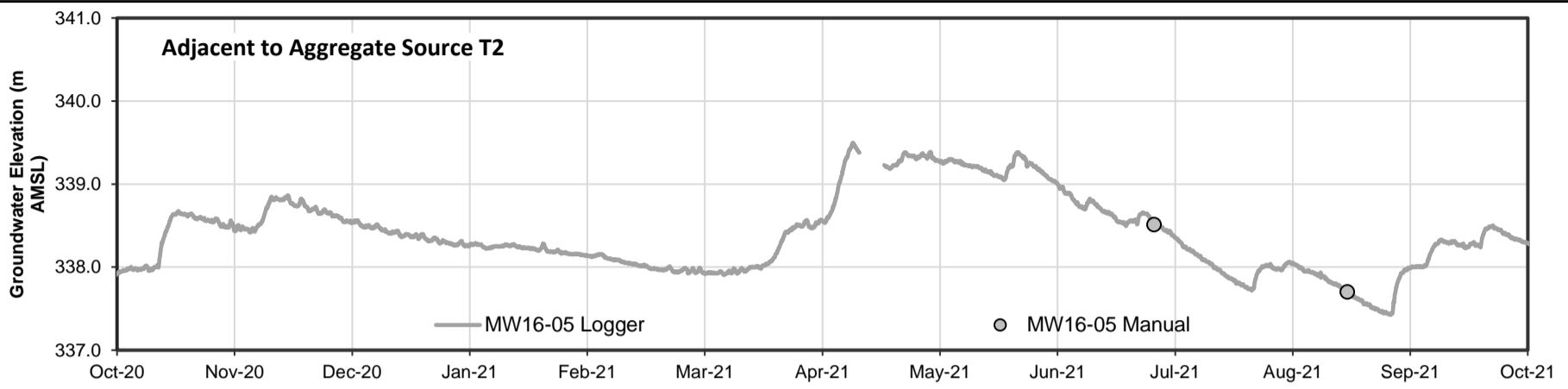
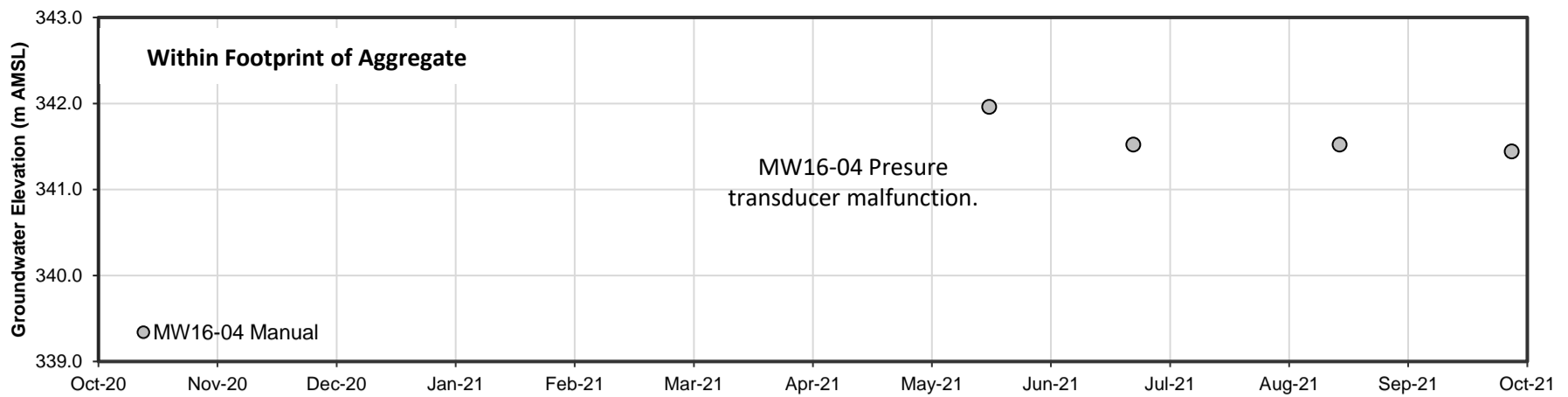
Notes:
 Error in barologger. Data from mid-April 2021 removed.
 Climate data obtain from the Environment Canada Website: Station Geraldton A

Client/Project
 2021 Fish and Fish Habitat
 Federal EIS Follow-Up Monitoring Report
 Greenstone Project

Figure No.
B-3 -7

Title
Hydrographs





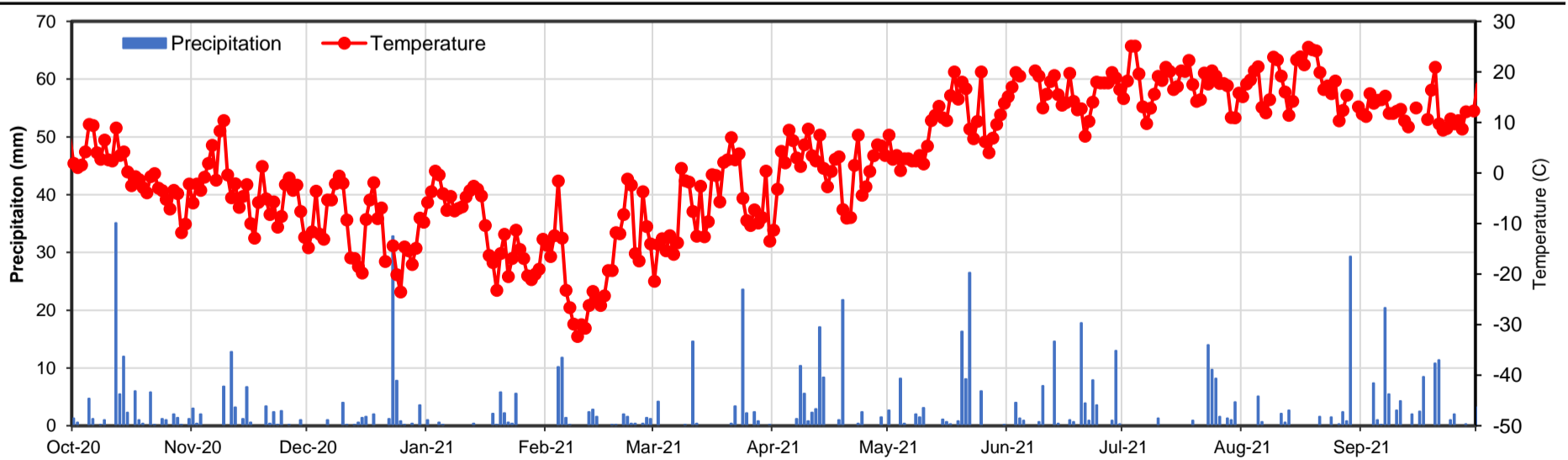
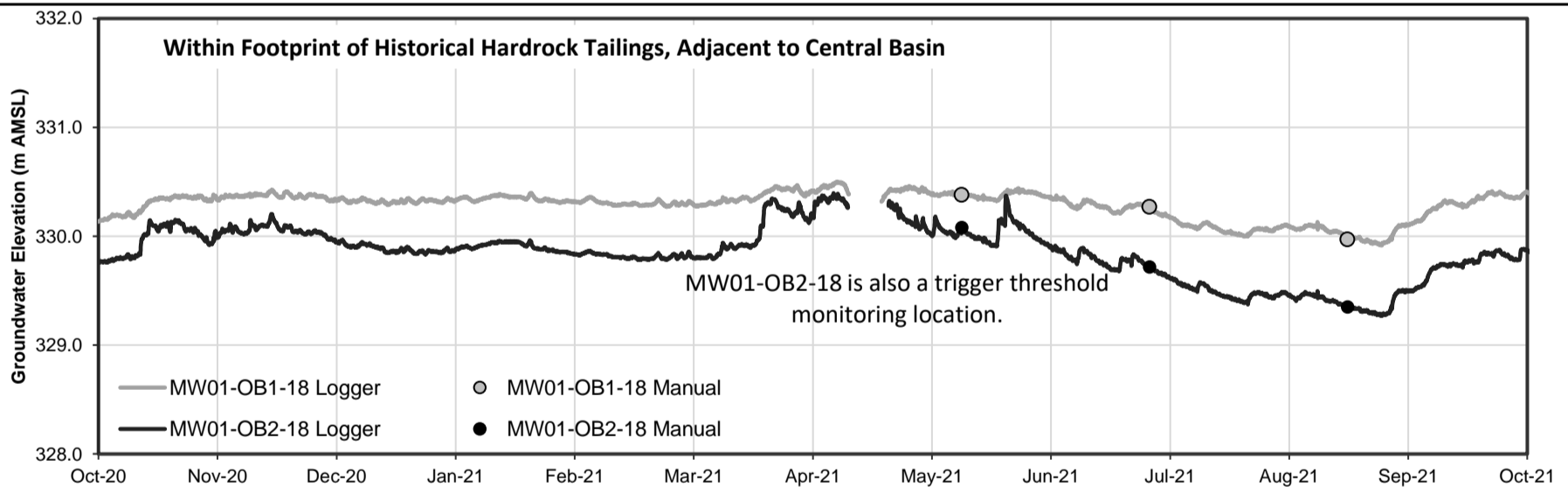
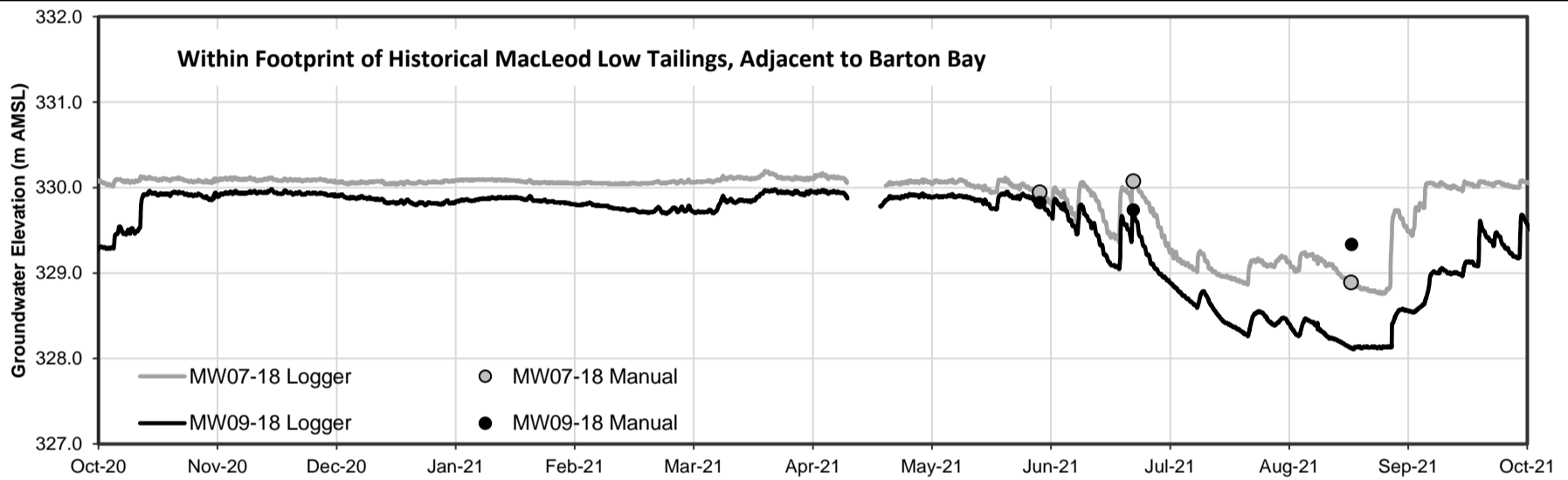
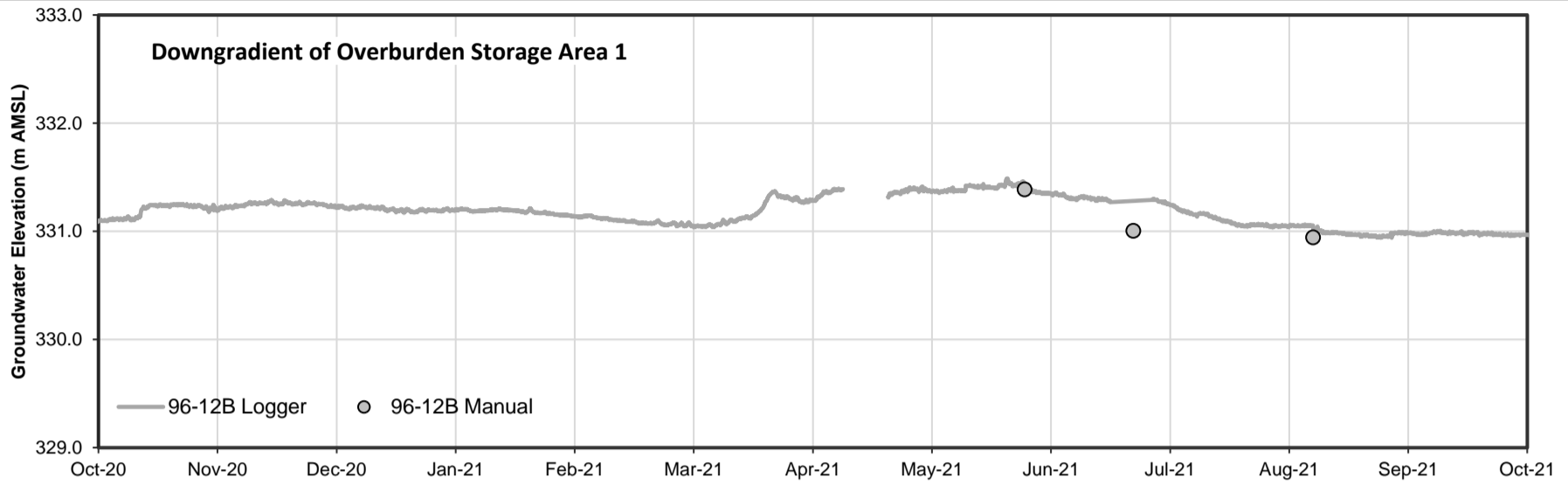
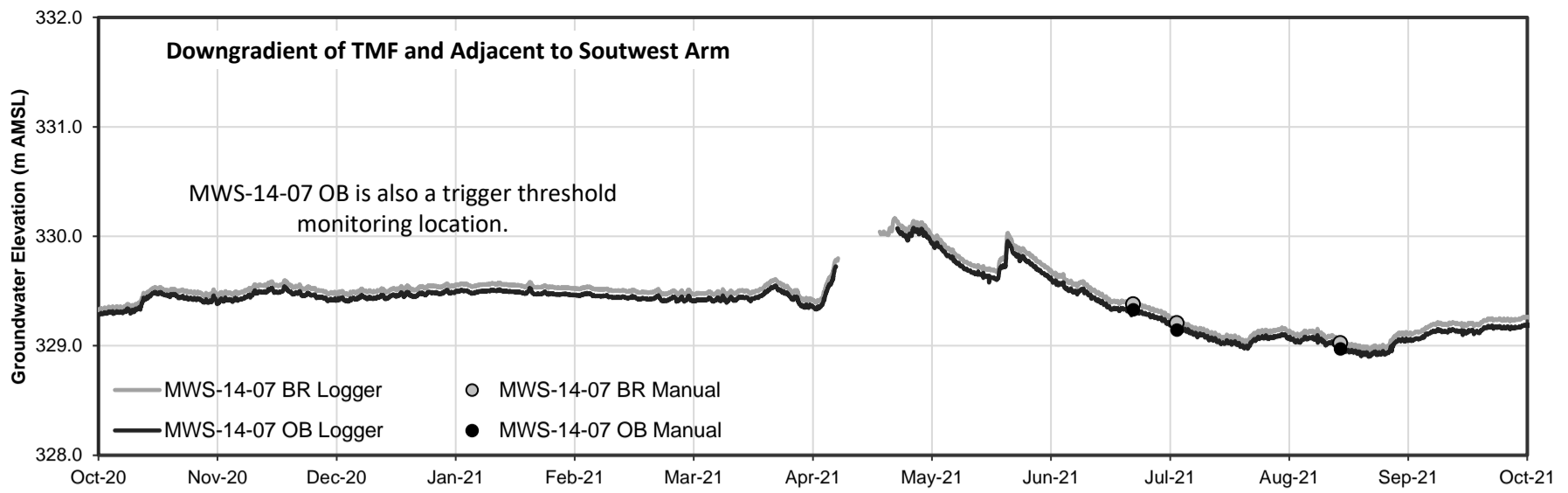
Notes:
 Error in barologger. Data from mid-April 2021 removed.
 Climate data obtain from the Environment Canada Website: Station Geraldton A

Client/Project
 2021 Fish and Fish Habitat
 Federal EIS Follow-Up Monitoring Report
 Greenstone Project

Figure No.
 B-3 -8

Title
 Hydrographs





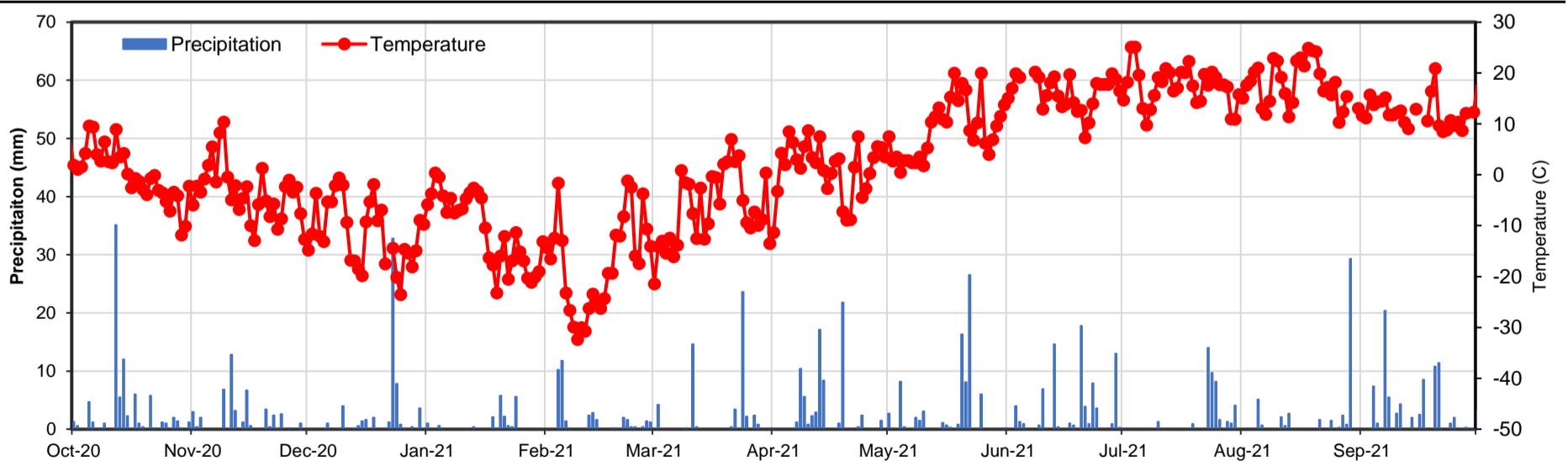
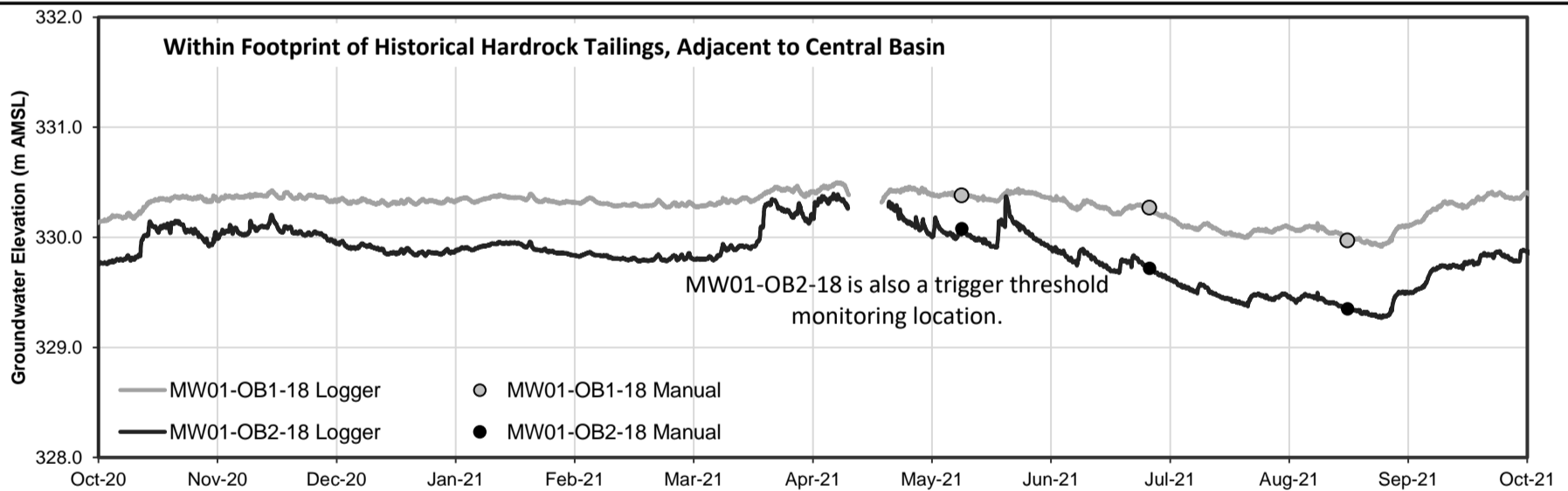
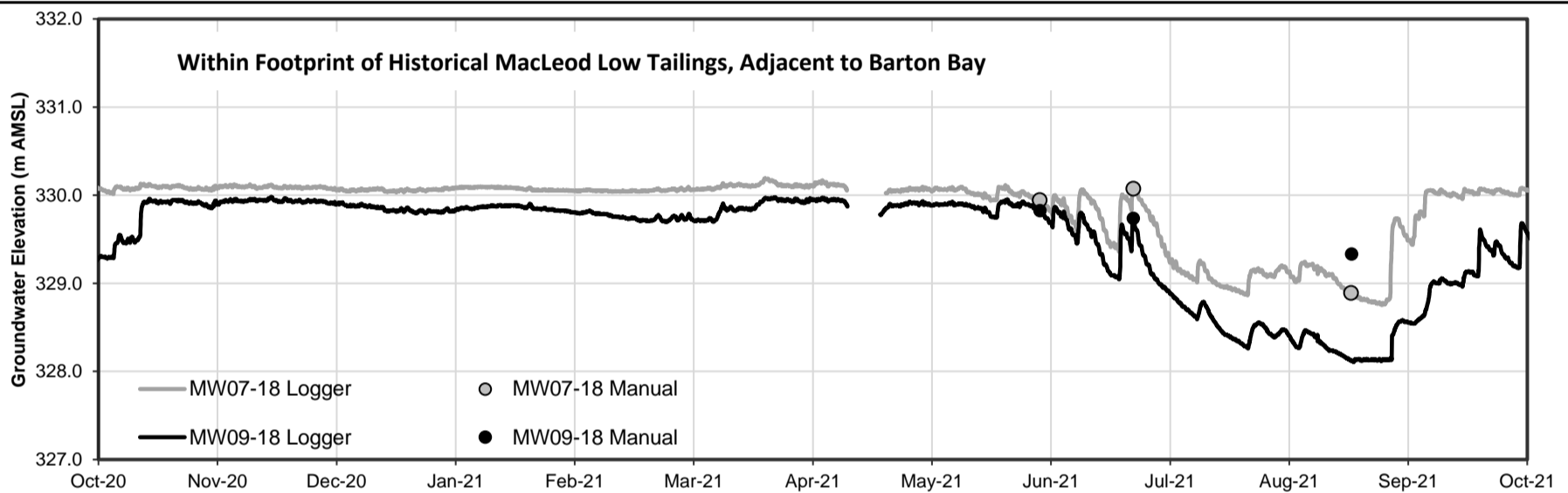
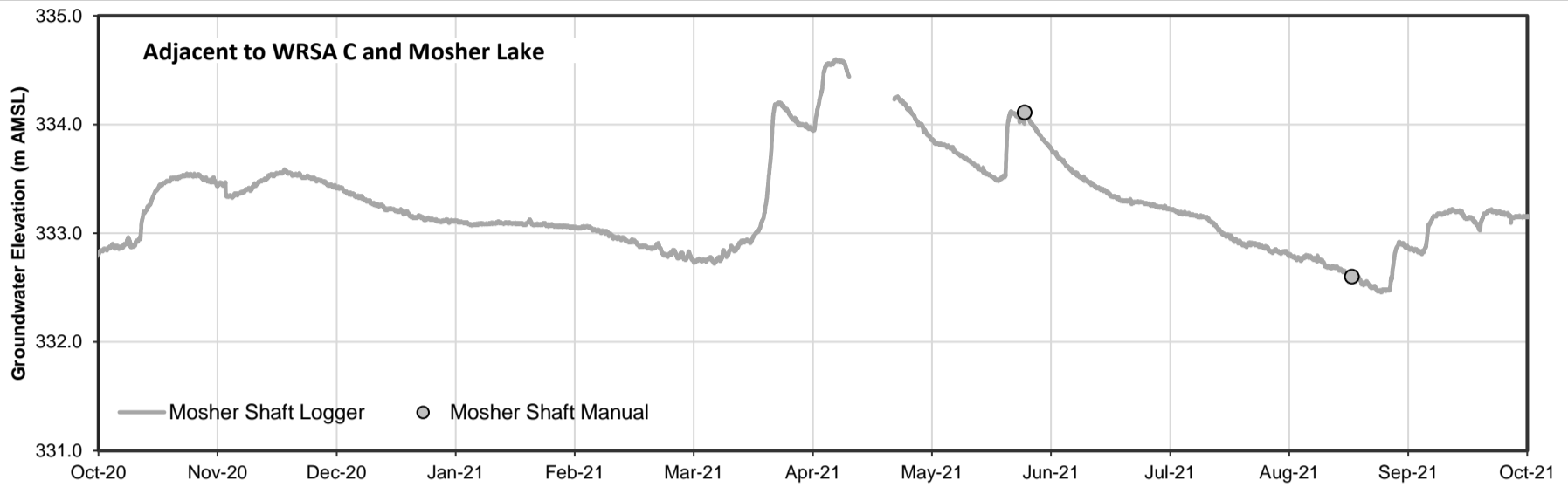
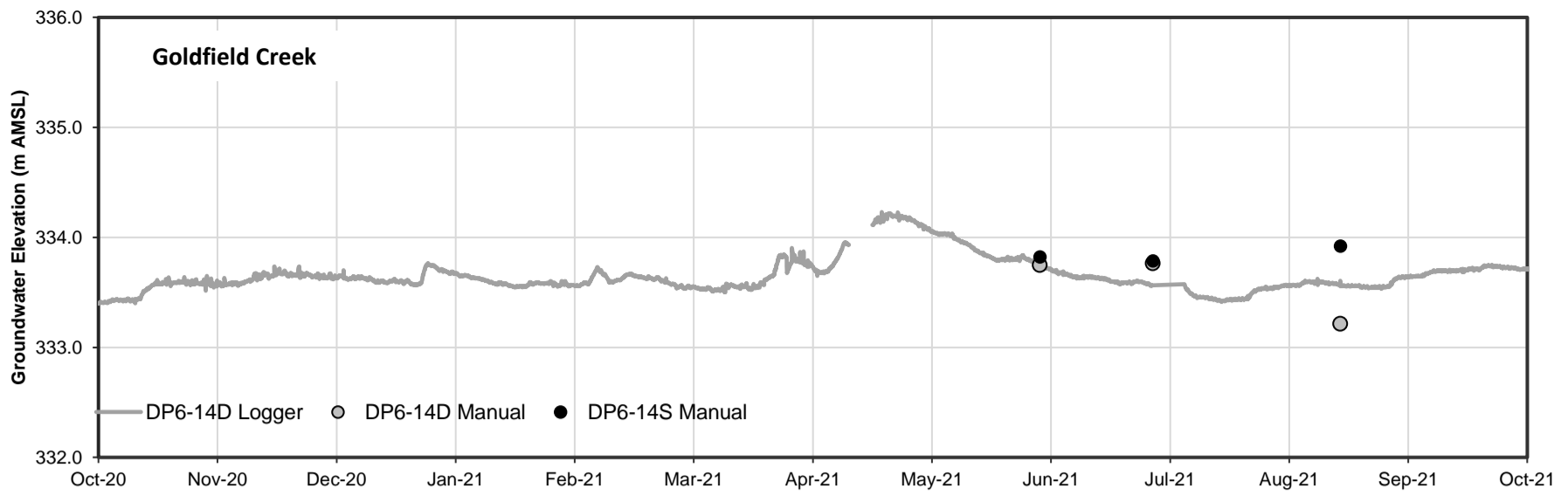
Notes:
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 Climate data obtain from the Environment Canada Website: Station Geraldton A

Client/Project
 2021 Fish and Fish Habitat
 Federal EIS Follow-Up Monitoring Report
 Greenstone Project

Figure No.
 B-3 -9

Title
 Hydrographs





Notes:

Error in barologger. Data from mid-April 2021 removed.
Climate data obtain from the Environment Canada Website: Station Geraldton A

Client/Project

2021 Fish and Fish Habitat
Federal EIS Follow-Up Monitoring Report
Greenstone Project

Figure No.

B-3 -10

Title

Hydrographs



APPENDIX C

FISH TISSUE DATA

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number 160961397
 Project Name: 2021 Merc. Monitoring Field Work
 Waterbody Name: SWAT
 Field Staff: N. Barrett, J. Hersh

Station Number A5-MT-07
 Lift / Haul / Pass No. 1
 Date (yyyymmdd): ~~2021~~ June 16/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: Mesh Sizes:
 Trap Net
 Hoop/Fyke Net
 Minnow Trap 3 set of 3 set furthest vs in Area 5 in SWAT
 Other (specify)

Descriptive Location of Station see above - WPT 941 (NAD GPS) set at 40cm depth.

TM Coordinates: Zone 16U Easting 502935 Northing 5501819 Map Datum NAD83

SET Date: June 16/21 LIFT Date: June 16/21
 Time: 12:10 Time: 16:00

Bottom Depths (m): Min: Middle 40cm Max:

Temperature Measurements (recorded at time of net set) SPC

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Salinity (µS/cm)
0.25	18.6	5.86	7.42	378.8

Time of on-situ measurements: 12:10

Additional Catch Data on Separate Sheet? Y(N)
 Detailed Fish Measurements on Separate Sheet? Y(N)

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>No catch</u>			

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number: 160961397 Station Number: A5-MT-02 / A5-GN-01
 Project Name: 2021 MERC monitoring fishway Lift / Haul / Pass No.: 1
 Waterbody Name: Southwest Arm Tributary (SWAT) Date (yyyymmdd): June 16/21
 Field Staff: N.B. J.H.

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 1 x 50' Mesh Sizes: mm 0.5"
 Trap Net
 Hoop/Fyke Net
 Minnow Trap x 3 set in a group of 3 in A5.
 Other (specify) _____

Descriptive Location of Station: WPT-942 along SWAT

UTM Coordinates: Zone 16U Easting 503046 Northing 5501957 Map Datum NAD83

SET: Date: June 16/21 LIFT: Date: June 16/21
 Time: 12:37 Time: 13:55

Bottom Depths (m): Min: 0.25 Middle: _____ Max: 0.95

Supporting Measurements (recorded at time of net set) SPC

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.</u>	<u>19.0</u>	<u>7.46</u>	<u>7.59</u>	<u>377.5</u>

Time of on-situ measurements: 12:37

Additional Catch Data on Separate Sheet? Y
 Detailed Fish Measurements on Separate Sheet? Y

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>MT</u>	<u>NO catch</u>		
<u>GN</u>	<u>NO catch</u>		

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number: 160961397
 Project Name: 2021 MRC Monitoring Fieldwork
 Waterbody Name: SWAT
 Field Staff: NB, JK

Station Number: A5-MT-03/A5-GN-02
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): June 16/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 0N2 Mesh Sizes: small mesh - 0N2
 Trap Net
 Hoop/Fyke Net
 Minnow Trap 3 set along SWAT in side bay
 Other (specify) _____

Descriptive Location of Station: WPT-943

UTM Coordinates: Zone 16U Easting 503076 Northing 5501927 Map Datum NAD83

SET Date: June 16/21 LIFT Date: June 16/21
 Time: 12:45 Time: 15:42

Deployment Depths (m): Min: 0.35 Middle: - Max: 0.85

Depth Measurements (recorded at time of net set) SPC

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Conductivity (µS/cm)
0.1	19.9	7.52	7.65	370.9

Time of on-situ measurements: 12:57

Additional Catch Data on Separate Sheet?:
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
GN	YLPR	11 (2)	1 dead
	NRPR	11 (3)	
MT	No catch		

Fishing Record and Catch Results (passive collection methods) Page of

Project Number 160961379
 Project Name: 2021 MERC monitoring field work
 Waterbody Name: SWAT
 Field Staff: NB, J. h.

Station Number AS-MT-04
 Lift / Haul / Pass No. 1
 Date (yyyymmdd): June 16/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: Mesh Sizes:
 Trap Net
 Hoop/Fyke Net
 Minnow Trap 3
 Other (specify)

Descriptive Location of Station along SWAT furthest dis set.

UTM Coordinates: Zone 16U Easting 503314 Northing 5501714 Map Datum NAD83

SET: Date: June 16/21 LIFT: Date: June 16/21
 Time: 13:05 Time: 15:40

Water Depth (m): Min: 0.5 Middle: Max: 0.95

Supporting Measurements (recorded at time of net set) SPL

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.1</u>	<u>20.6</u>	<u>7.19</u>	<u>7.51</u>	<u>367.6</u>

Time of on-situ measurements: 13:05

Additional Catch Data on Separate Sheet?
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>No catch</u>			

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number: 160961397
 Project Name: Doal Merc, monitoring GCM Fieldwork
 Waterbody Name: SWAT
 Field Staff: N.B. J.K.

Station Number: A4-MT-01/GN-01
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): June 16/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 1 x 50' Mesh Sizes: 0.5"
 Trap Net
 Hoop/Fyke Net
 Minnow Trap x3
 Other (specify) _____

Descriptive Location of Station: WPT-946. Just W of beaver dam. Down at. WPT 947 (MT-02)

TM Coordinates: Zone 16U Easting 502755 Northing 5501937 Map Datum NAD83

SET Date: June 16/21 LIFT Date: 2021/08/17
 Time: 16:25 Time: 9:45

Deployment Depths (m): Min: 0.6 Middle: _____ Max: 1.7

Temperature Measurements (recorded at time of net set) 2021/06/17

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>18.8</u>	<u>5.07</u>	<u>7.65</u>	<u>380.0</u>

Time of on-situ measurements: 9:45 am

Additional Catch Data on Separate Sheet? Y/N
 Detailed Fish Measurements on Separate Sheet? Y/N

Catch Data

No catch

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>0.5"</u>	<u>North Pike</u>	<u>2</u>	<u>released</u>

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number: 160961397
 Project Name: 2021 GGM merc. monitoring
 Waterbody Name: SWAT
 Field Staff: NB, J.K.

Station Number: D4-MT-02
 Lift / Haul / Pass No.: 4
 Date (yyyymmdd): June 16/21

Fishing Method (check one) and Gear Specs: Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap x3
 Other (specify) _____

Descriptive Location of Station: WPT-947 at beaver dam (WS side)

UTM Coordinates: Zone 16N Easting 502768 Northing 5501921 Map Datum NAD 83

SET: Date: June 16/21 LIFT: Date: 2021 10/1/21
 Time: 16:37 Time: 9:55

Water Column Depths (m): Min: - Middle 0.9 Max: -

Supporting Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
		<u>See results</u>		

Time of on-situ measurements: _____

Additional Catch Data on Separate Sheet?: Y/N
 Detailed Fish Measurements on Separate Sheet?: Y/N

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>no catch</u>		

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Stant:

Project Number: 160961397
 Project Name: 2021 GGM MRF. Monitoring
 Waterbody Name: SWAT including Pond 4 / SWP4
 Field Staff: N.B. Jason - GGM

Station Number: A4-GN-02
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): June 17/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 02 Mesh Sizes: various - MRF 02 net
 Trap Net
 Hoop/Fyke Net
 Minnow Trap
 Other (specify) _____

Descriptive Location of Station: Setin Pond 4 East to west. WP 950

TM Coordinates: Zone 16N Easting 501828 Northing 5501826 Map Datum NAD83

SET: Date: June 17/21 LIFT: Date: June 18/21
 Time: 10:51 Time: 13:28

Bottom Depths (m): Min: 0.3 Middle: - Max: 1.0

Temp. Measurements (recorded at time of net set) SPC

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>19.1</u>	<u>5.11</u>	<u>7.61</u>	<u>371.0</u>

Time of on-situ measurements: 13:28

Additional Catch Data on Separate Sheet? Y
 Detailed Fish Measurements on Separate Sheet? Y

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>NRPK</u>	<u>4</u>	<u>live released</u>
	<u>WHSC</u>	<u>1</u>	<u>Mort.</u>

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Start: _____
 Project Number: 16096/397
 Project Name: 2021 GGM REC. Monitoring
 Waterbody Name: SLP4
 Field Staff: N.B., B.M.

Station Number: A4-GN-02
 Lift / Haul / Pass No.: 2
 Date (yyyymmdd): June 18/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 0N2 Mesh Sizes: MNR 0N2
 Trap Net
 Hoop/Fyke Net
 Minnow Trap
 Other (specify) _____

Descriptive Location of Station: Set in SLP4 East to West WP950

UTM Coordinates: Zone 16U Easting 501828 Northing 550826 Map Datum NAD83

SET Date: June 18/21 LIFT Date: June 19/21
 Time: 13:30 Time: 9:25

Deployment Depths (m): Min: 0.3 Middle: _____ Max: 1.0

Temperature Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
	<u>See Set 1</u>			

Time of on-situ measurements: _____

Additional Catch Data on Separate Sheet? Y/N
 Detailed Fish Measurements on Separate Sheet? Y/N

Catch Data

Mesh Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>No Catch</u>		

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number: 160961397
 Project Name: 2021 LGM Merc. Monitoring
 Waterbody Name: SWAT-SWP4
 Field Staff: N.B., B.M.

Station Number: A4-GN03
 Lift / Haul / Pass No.: 2
 Date (yyyymmdd): June 18/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 1 Mesh Sizes: 0.5"
 Trap Net
 Hoop/Fyke Net
 Minnow Trap
 Other (specify) _____

Descriptive Location of Station: SWP4 North to south wpt 951

UTM Coordinates: Zone 16U Easting 501846 Northing 5501801 Map Datum NAD83

SET: Date: June 18/21 Time: 13:35
 LIFT: Date: June 19/21 Time: 9:12

Bottom Depths (m): Min: 0.4 Middle: _____ Max: 1.0

Supporting Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
	<u>see</u>	<u>set 1</u>		

Time of on-situ measurements: _____

Additional Catch Data on Separate Sheet?
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>NRPK</u>	<u>6</u>	<u>2 all 2, all > 10"</u>

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number: 160961397
 Project Name: 2021 GGM Merc. Monitoring
 Waterbody Name: SWAT-Pond 4/SWP4
 Field Staff: J. Burnett + GGM-Jason

Station Number: A4-GN03
 Lift/Haul/Pass No.: 1
 Date (yyyymmdd): June 17/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 1 Mesh Sizes: 0.5"
 Trap Net
 Hoop/Fyke Net
 Minnow Trap
 Other (specify) _____

Descriptive Location of Station: in Pond 4 set North to South Wpt 951

TM Coordinates: Zone 6N Easting 501846 Northing 5501601 Map Datum NAD83

SET Date: June 17/21 LIFT Date: June 18/21
 Time: 10:57 Time: 13:33

Water Depth (m): Min: 0.4 Middle: _____ Max: 1.0

Temperature Measurements (recorded at time of net set) SPC

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>19.2</u>	<u>5.11</u>	<u>7.63</u>	<u>370.6</u>

Time of on-situ measurements: 13:33

Additional Catch Data on Separate Sheet?
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>NRPH</u>	<u>1 (1)</u>	<u>1 alive</u>

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number: 160961397
 Project Name: 2021 GGM MACK monitoring
 Waterbody Name: SWAT
 Field Staff: N.B. J.K.

Station Number: A4-MT-03
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): June 16/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap x3
 Other (specify) _____

Descriptive Location of Station: at flow station on SWAT. WPT-948

UTM Coordinates: Zone 16N Easting 502784 Northing 5501909 Map Datum NAD83

SET Date: June 16/21 LIFT Date: 2021/06/17
 Time: 16:40 Time: 10:00 am

Deployment Depths (m): Min: 0.6 Middle: _____ Max: 0.9

Temperature Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.3</u>	<u>17.9</u>	<u>4.35</u>	<u>7.50</u>	<u>384.2</u>

Time of on-situ measurements: 10:01 am

Additional Catch Data on Separate Sheet?:
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>Bullhead</u>	<u>1</u>	<u>released</u>

Project Number 1160961397
Project Name: 2021 GGM meec. monitoring
Waterbody Name: SWAT
Field Staff: N.B. S.H.

Station Number A4-MY-04
Lift / Haul / Pass No. 1
Date (yyyymmdd): June 16/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap 3
 Other (specify) _____

Descriptive Location of Station SWAT-WPT-~~949~~ ⁹⁴⁹ N 100m dis of ^{beaver} dam

UTM Coordinates: Zone 16U Easting 502818 Northing 5501890 Map Datum NAD83

SET: Date: June 16/21 LIFT: Date: 2021/06/17
Time: 16:42 Time: 10:08 a.m.

Water Depth (m): Min: 0.25 Middle _____ Max: 0.6

Supporting Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
	<u>See results</u>			

Time of on-situ measurements: _____

Additional Catch Data on Separate Sheet?
Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>No Catch</u>		

Fishing Record and Catch Results (passive collection methods) Page 1 of 1

Project Number: 160961397
 Project Name: 2021 Comm. Monitoring
 Waterbody Name: SLAT-SUP4
 Field Staff: N.B., B.M.

Station Number: A4-GN~~04~~05
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): June 21/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 1 Mesh Sizes: 0.5"
 Trap Net
 Hoop/Fyke Net
 Minnow Trap
 Other (specify) _____

Descriptive Location of Station: sup4 North to South WPT 951

UTM Coordinates: Zone 16U Easting 501846 Northing 5501801 Map Datum NAD83

SET Date: June 21/21 LIFT Date: June 22/21
 Time: 13:45 Time: 14:25

Deployment Depths (m): Min: 0.4 Middle: — Max: 1.0

Temperature Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
	<u>17.4</u>	<u>5.91</u>	<u>7.48</u>	<u>422.4</u>

Time of on-situ measurements: 13:45

Additional Catch Data on Separate Sheet? Y/N
 Detailed Fish Measurements on Separate Sheet? Y/N

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>No catch</u>		

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Project Number 16096/397
 Project Name: 2021 GGM Merc. Monitoring
 Vessel Name: SWAY - SWP4
 Field Staff: NB, BM.

Station Number A4-GN-04/MT-05
 Lift / Haul / Pass No. 1
 Date (yyyymmdd): June 18/21

Fishing Method (check one) and Gear Specs:
 Gillnet No. of Panels: 1 Mesh Sizes: 0.5"
 Trap Net
 Hoop/Fyke Net
 Minnow Trap x 3
 Other (specify) _____

Descriptive Location of Station Set near inlet, WPT 954 of SWP4

UTM Coordinates: Zone 16U Easting 501788 Northing 5501827 Map Datum NAD83

SET: Date: June 18/21 LIFT: Date: June 19/21
 Time: 13:39 Time: 19:06

Bottom Depths (m): Min: 0.3 Middle - Max: 0.8

Temperature Measurements (recorded at time of net set) SPC

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>19.1</u>	<u>5.08</u>	<u>7.60</u>	<u>371.3</u>

Time of on-situ measurements: 13:39

Additional Catch Data on Separate Sheet?
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>GN</u>	<u>NO Catch</u>		
<u>MT</u>	<u>NO Catch</u>		

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Site ID: _____

Project Number: 16096/397
 Project Name: 2021 GCM MESC Monitoring
 Waterbody Name: SWAT-SWP4
 Field Staff: NB, BM

Station Number: A4-MT-08
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): June 18/21

Fishing Method (check one) and Gear Specs: _____ Gillnet No. of Panels: _____ Mesh Sizes: _____
 _____ Trap Net _____
 _____ Hoop/Fyke Net _____
 Minnow Trap x 3
 _____ Other (specify) _____

Descriptive Location of Station: at outlet of SWP4 wpt-939

UTM Coordinates: Zone 16N Easting 501936 Northing 550797 Map Datum NAD83

SET Date: June 18/21 LIFT Date: June 19/21
 Time: 13:55 Time: 8:51

Bottom Depths (m): Min: — Middle 0.6 Max: —

Supporting Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
		<u>see other sets</u>	<u>other sets</u>	<u>ts</u>

Time of on-situ measurements: —

Additional Catch Data on Separate Sheet?
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>No catch</u>		

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

State: _____

Project Number 160961397
 Project Name: 2021 GGM MISC. Monitoring
 Waterbody Name: SWAY-SWP4
 Field Staff: N.B., B.M.

Station Number A4-MT-06
 Lift / Haul / Pass No. 1
 Date (yyyymmdd): June 18/21

Fishing Method (check one) and Gear Specs: _____ Gillnet No. of Panels: _____ Mesh Sizes: _____
 _____ Trap Net _____
 _____ Hoop/Fyke Net _____
 Minnow Trap 3
 _____ Other (specify) _____

Descriptive Location of Station set along ^{North} shore of SWP4. at WPT 955

UTM Coordinates: Zone 16U Easting 501790 Northing 5501919 Map Datum NAD83

SET: Date: June 18/21 LIFT: Date: June 19/21
 Time: 13:46 Time: 9:01

Bottom Depths (m): Min: 0.5 Middle 0.5 Max: _____

Supporting Measurements (recorded at time of net set) SPC

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>19.0</u>	<u>5.06</u>	<u>7.62</u>	<u>379.2</u>

Time of on-situ measurements: 13:46

Additional Catch Data on Separate Sheet?
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>No catch</u>		

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Station: _____

Project Number: 16096/397
 Project Name: 2021 CGM Macc. Monitoring
 Waterbody Name: SWAT-SWP4
 Field Staff: NB, BM.

Station Number: A4-MT-07
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): June 18/21

Fishing Method (check one) and Gear Specs: Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap 3
 Other (specify) _____

Descriptive Location of Station: along SWP4 shore at WPT-956

UTM Coordinates: Zone 16U Easting 510887 Northing 550843 Map Datum NAD83

SET: Date: June 18/21 LIFT: Date: June 19/21
 Time: 13:51 Time: 8:55

Deployment Depths (m): Min: _____ Middle: 0.6 Max: _____

Supporting Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
See other sets				

Time of on-situ measurements: _____

Additional Catch Data on Separate Sheet?: Y
 Detailed Fish Measurements on Separate Sheet?: Y

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>NRPK</u>	<u>11 (2)</u>	<u>~ 4-6"</u>

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Station: _____

Project Number: 160961397
 Project Name: GBA Mtg Baseline
 Waterbody Name: SWAT
 Field Staff: JK RD

Station Number: A4-MT-09
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): 2021/06/20

Fishing Method (check one) and Gear Specs: Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap 3
 Other (specify) _____

Descriptive Location of Station: 20 m US Border on SWAT in Area 4

UTM Coordinates: Zone 16U Easting 502757 Northing 5501937 Map Datum _____

SET: Date: 2021/06/20 LIFT: Date: 2021/06/22
 Time: 9:55 Time: 9:48 am

Sampling Depths (m): Min: 0.1 Middle _____ Max: 0.5

Temperature Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>13.7</u>	<u>6.77</u>	<u>7.48</u>	<u>468.4</u>

Time of on-situ measurements: 10:00 am

Additional Catch Data on Separate Sheet?:
 Detailed Fish Measurements on Separate Sheet?

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>No catch</u>			

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Start:

Project Number: 160161397
 Project Name: GGM-Hg Baseline
 Waterbody Name: SWAT
 Field Staff: JK RD

Station Number: A4-MT-10
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): 2021/06/20

Fishing Method (check one) and Gear Specs: Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap 3
 Other (specify) _____

Descriptive Location of Station: 3 m US Benthos on SWAT in Area 4

TM Coordinates: Zone 16N Easting 502771 Northing 5501932 Map Datum _____

SET: Date: 2021/06/20 LIFT: Date: 2021/06/22
 Time: 10:02 Time: 9:48

Deployment Depths (m): Min: 0.5 Middle: _____ Max: 0.7

Environmental Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>13.7</u>	<u>6.77</u>	<u>7.48</u>	<u>468.4</u>

Time of on-situ measurements: 10:00 am
see set 1
 Additional Catch Data on Separate Sheet?:
 Detailed Fish Measurements on Separate Sheet?:

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>No Catch</u>			

Fishing Record and Catch Results (passive collection methods) Page _____ of _____

Stant: _____

Project Number: 160961397
 Project Name: GGN - H₂ Baseba
 Waterbody Name: SWAT
 Field Staff: JK RD

Station Number: A4-MT-11
 Lift / Haul / Pass No.: 1
 Date (yyyymmdd): 2021/06/20

Fishing Method (check one) and Gear Specs: Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap 3
 Other (specify) _____

Descriptive Location of Station: DS Bander dan 4m on SWAT Box Area 4

TM Coordinates: Zone 16U Easting 502777 Northing 5501917 Map Datum _____

SET: Date: 2021/06/20 LIFT: Date: 2021/06/22
 Time: 9:40 Time: 9:55 am

Bottom Depths (m): Min: 0.4 Middle _____ Max: 0.8

Temperature Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>15.9</u>	<u>6.70</u>	<u>7.11</u>	<u>392.9</u>

Time of on-situ measurements: 9:40 am

Additional Catch Data on Separate Sheet?: YN
 Detailed Fish Measurements on Separate Sheet?: YN

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
<u>No Catch</u>			

Fishing Record and Catch Results (passive collection methods) Page 1 of 1

Start:

Project Number: 160961397
 Project Name: GGM Hg Barbot
 Waterbody Name: SWAT
 Field Staff: JK RD

Station Number: A4-MT-12
 Lift / Haul / Pass No.: _____
 Date (yyyymmdd): 2021/06/20

Fishing Method (check one) and Gear Specs: Gillnet No. of Panels: _____ Mesh Sizes: _____
 Trap Net _____
 Hoop/Fyke Net _____
 Minnow Trap 3
 Other (specify) _____

Descriptive Location of Station: @ drive part off green T-bar

UTM Coordinates: Zone 16U Easting 502770 Northing 5501927 Map Datum _____

SET: Date: 2021/06/20 LIFT: Date: 2021/06/22
 Time: 9:35 am Time: 9:59

Bottom Depths (m): Min: 0.4 Middle _____ Max: 0.6

Temperature Measurements (recorded at time of net set)

Depth (m)	Temp. (°C)	D.O. (mg/L)	pH	Cond. (µS/cm)
<u>0.2</u>	<u>16.3</u>	<u>6.78</u>	<u>7.75</u>	<u>400.4</u>

Time of on-situ measurements: 9:35 am

Additional Catch Data on Separate Sheet?: Y/N
 Detailed Fish Measurements on Separate Sheet? Y/N

Catch Data

Fish Size	Species	Number	Comments (i.e. age, disease, etc.)
	<u>Barbot</u>	<u>1</u>	<u>released</u>



Stantec

413-503-046, 5501757
613-503-630, 5501610
Stantec Consulting Ltd.
1-70 Southgate Drive, Guelph ON N1G 4P5

Electrofishing Record and Fish Catch Results

Project Number: 160961397

Project Name: 2021 GGM REC. Monitoring

Date: June 16/21

Field Personnel: NB, J.H.

Station No.: A5-BEF-01

Pass No.: 4 (if applicable)

UTM Coordinates: see E top of page N
Zone Easting Northing

Datum: NAD83

Photos: NB iPhone.

Descriptive Location: ~75-100 m up of mouth of SLAT to top of AREA 5

Method

Fishing Method (check one): Backpack Boat Unit Make/Model: GPP

Sampling Method (check one): Even Habitat Transect Spot

Effort (Electrofishing Seconds): 2404 + 1723 No. of Netters: 1.5 No. of Anodes: 1

Settings

Frequency: 100 (Hz) Voltage: 50-500 (volts) Current: 8 (amps) Power: 40 W (watts)

Station Information

Length of Stream Surveyed: see coordinates (m)

Station Characteristics: Width: / (m) Range: / Average: /

Depth: / (m) Range: / Average: /

Water Clarity/Colour: / Water Velocity (if measured): / (m/s) Time: 11:45

Temperature 18.6 (°C) Conductivity: 378.8 (µS/cm) WQ Meter ID: #4

pH: 7.2 Dissolved Oxygen: 5.86 (mg/L)

Catch Data

Species	No. of Fish & Notes (e.g. age, disease, etc.)
<u>BLSH</u>	<u>(6) + (3) + (9)</u>
<u>WHSC</u>	<u>1 + 5 + 12 = (18)</u>
<u>YLPR</u>	<u>25 + 44 + 36 = kept YOY.</u>
<u>NRPK</u>	<u>2 + 6 = (8)</u>
	<u>(105)</u>

Y/N - Fish measurements provided on separate sheet?

STATION DIAGRAM ON REVERSE

PAGE 1 OF 1

Print Name & Initial: N. Burne #4
(field notes author)

Quality Control: This form is complete & legible

Print Name & Initial: _____
(field notes QA/QC personnel)



Stantec Fish Morphometrics Data Sheet

Project Number: 16091/307
 Project Name: MESC Montong 2021
 Project Manager: Mike Johns

Date: June 16/21
 Field Samplers: NB, JK

* Physical defects on some YLPR

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
A5	BEF-01		YLPR	YLPR-001	6.3	6.6	3.04	
				002	6.7	7.0	4.24	
				003	6.2	6.5	2.98	
				004	6.4	6.8	3.40	
				005	6.3	6.7	5.31	
				006	6.5	7.1	2.96	
				007	6.9	7.2	4.55	
				008	6.8	7.2	4.91	
				009	6.9	7.3	4.59	
				010	6.9	7.4	4.51	
				011	7.4	7.7	6.21	
				012	6.5	6.8	3.29	
				013	6.3	6.6	2.96	
				014	6.4	6.7	3.55	
				015	6.7	7.1	4.21	
				016	6.9	7.2	4.98	
				017	7.3	7.6	5.40	
				018	7.1	7.5	5.45	
				019	7.4	7.6	5.13	
				020	6.8	7.2	4.63	
				021	6.1	6.3	2.64	
				022	6.4	6.6	3.34	
				023	6.7	7.0	3.90	
				024	6.4	6.6	3.01	
				025	6.4	6.7	3.12	
				026	6.6	6.9	3.25	
				027	7.2	7.5	5.26	
				028	7.5	7.9	6.17	
				029	7.0	7.4	4.53	
				030	6.6	6.9	3.63	

deformed/growth abnormal

Quality Control:

This form is complete () & legible (). QA/QC by: (signature):

Stantec Fish Morphometrics Data Sheet

Project Number: 160961397

Date: June 16/21

Project Name: MERC Monitoring 2021

Field Samplers: NJB, JM

Project Manager: Mike Johns

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
A5	BEF-01		Y. Percy.	Y4R-031	6.2	6.5	2.82	
				032	6.9	7.2	3.50	
				033	6.3	6.9	3.29	
				034	6.6	6.9	3.84	
				035	6.3	6.6	3.42	
				036	6.9	7.3	4.75	
				037	7.3	7.7	5.31	
				038	7.0	7.4	4.97	
				039	6.3	6.5	3.10	
				040	7.1	7.4	4.94	
				041	6.6	6.8	3.54	
				042	6.7	7.0	4.04	
				043	6.6	6.9	2.93	
				044	6.2	6.4	2.55	
				045	6.2	6.5	2.99	
				046	6.5	6.8	3.58	
				047	6.2	6.5	3.15	
				048	6.8	7.2	4.85	
				049	6.7	7.1	4.00	
				050	7.7	8.0	6.05	
				051	7.4	7.7	5.60	
				052	6.2	6.5	2.93	
				053	6.3	6.5	2.89	
				054	7.2	7.5	5.04	
				055	6.9	7.2	4.69	
				056	6.8	7.2	3.62	
				057	6.2	6.5	2.64	
				058	6.4	6.8	3.82	
				059	6.6	6.9	3.84	
				060	7.6	8.0	6.03	

Quality Control:

This form is complete () & legible (). QA/QC by: (signature):

Stantec Fish Morphometrics Data Sheet

Project Number: 160961397

Date: June 16/21

Project Name: 2021 MERC Monitoring GCM

Field Samplers: NR, JK

Project Manager: Mike Johns

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
A5	BEF-D1		Y. Perch	YLR-061	7.0	7.4	5.43	
				062	6.2	6.5	3.36	
				063	6.2	6.5	2.95	
				064	6.3	6.5	3.71	
				065	6.1	6.4	2.75	
				066	6.1	6.4	3.12	
				067	6.2	6.5	2.80	
				068	6.3	6.6	3.08	
				069	7.0	7.3	3.87	
				070	6.9	7.3	4.84	
				071	6.3	6.6	3.29	
				072	6.5	6.8	3.40	
				073	7.5	7.8	5.59	
				074	7.3	7.6	5.64	
				075	6.2	6.5	3.15	
				076	6.8	7.1	4.38	
				077	6.6	6.9	4.07	
				078	6.9	7.3	4.50	
				079	6.3	6.6	3.69	
				080	7.0	7.4	5.13	
081	6.5	6.9	3.30					
082								

Quality Control: _____ This form is complete () & legible (). QA/QC by: (signature): _____

Electrofishing Record and Fish Catch Results

Project Number: 160961397
 Date: June 17/21
 Station No.: A4-EF-01
 UTM Coordinates: See E below N
 Zone Easting Northing
 Photos: —

Project Name: EGM MERC. Monitoring
 Field Personnel: NB, GGM-Jason
 Pass No.: 1 (if applicable)
 Datum: NAD83
 Descriptive Location: Pond 4 inlet ~ 30m, pond 4 from outlet 0.5 km coordinates below.

Method

Fishing Method (check one): Backpack Boat
 Sampling Method (check one): Even Habitat Transect Spot
 Effort (Electrofishing Seconds): 2424-outlet No. of Netters: 1 No. of Anodes: 1

Settings

Frequency: 60 (Hz) Voltage: 200 (volts) Current: 1.3 (amps) Power: 480w (watts)

Station Information

Length of Stream Surveyed: see coordinates ~ 500m (m)
 Station Characteristics: Width: — (m) Range: — Average: —
 Depth: — (m) Range: — Average: —
 Water Clarity/Colour: — Water Velocity (if measured): — (m/s) Time: —
 Temperature — (°C) Conductivity: — (µS/cm) WQ Meter ID: —
 pH: — Dissolved Oxygen: — (mg/L)

Catch Data

Species	No. of Fish & Notes (e.g. age, disease, etc.)
<u>Pond 4 inlet (~30m) - No cat chg.</u>	
<u>Pond 4 outlet at ~50m along pond shoreline near the outlet</u>	
<u>- spn NRPM (2) (10", 5") caught ~ 20m dis of Pond 4.</u>	
<u>No other fish caught.</u>	
<u>Pond 4 outlet coordinates - u/s-16U-501935, 5501793</u>	
<u>d/s-16U-502433, 5501911</u>	
<u>Major Beaver activity and altered habitat - flooding in Area 4. Very different from previous studies, see mt sets of location of dam, but flooding extends 1/2 way from beaver dam to Pond 4.</u>	

Fish measurements provided on separate sheet? STATION DIAGRAM ON REVERSE

PAGE 1 OF —
 Print Name & Initial: N. Burnett (field notes author)
 Quality Control: — This form is complete & legible
 Print Name & Initial: — (field notes QA/QC personnel)

Electrofishing Record and Fish Catch Results

Project Number: 16096/397
Date: June 18/21
Station No.: A4-BEE-01
UTM Coordinates: see E below. N
Zone Easting Northing
Photos: -

Project Name: 2021 GGM marsh monitoring
Field Personnel: NB, BM
Pass No.: 1 (if applicable)
Datum: NAD83
Descriptive Location: 1/3 end of A4 to beaver dam

Method

Fishing Method (check one): Backpack Boat Unit Make/Model: GAP box
Sampling Method (check one): Even Habitat Transect Spot
Effort (Electrofishing Seconds): 700 No. of Netters: 1 No. of Anodes: Array
Settings: 120
Frequency: 120 (Hz) Voltage: 50-500 (volts) Current: 8 (amps) Power: 40 (watts)

Station Information

Length of Stream Surveyed: ~100 (m)
Station Characteristics: Width: 3m (m) Range: - Average: -
Depth: 0.9 (m) Range: - Average: -
Water Clarity/Colour: - Water Velocity (if measured): - (m/s) Time: 12:45
Temperature: 18.8 (°C) S.P. Conductivity: 380.2 (µS/cm) WQ Meter ID: 4
pH: 5.8-7.62 Dissolved Oxygen: 5.06 (mg/L)

Catch Data

Species	No. of Fish & Notes (e.g. age, disease, etc.)
<u>NRPK</u> <u>YLPR</u>	<u>11 @</u> <u>just 1 @ - adult.</u>
<u>dozens of fingerlings / summer phase YLPR below dam (this spring)</u>	
<u>WIS-164 502818, 5501888 (right near WPT-949)</u>	
<u>WIS-164 502876, 5501846 (WPT-952)</u>	

Fish measurements provided on separate sheet? STATION DIAGRAM ON REVERSE

PAGE 1 OF 1
Print Name & Initial: N. Burnett (field notes author) Quality Control: This form is complete & legible
Print Name & Initial: _____ (field notes QA/QC personnel)



Electrofishing Record and
Fish Catch Results

Project Number: 16096/397
Date: June 19/21
Station No.: SWP3-BFF-01
UTM Coordinates: entire perimeter of lake.
Zone Easting Northing
Photos:

Project Name: GGM 2021 NREK Monitoring
Field Personnel: NB, A.O.
Pass No.: 1 (if applicable)
Datum: NAD83
Descriptive Location: entire perimeter.

Method

Fishing Method (check one): Backpack Boat Unit Make/Model: G.P.P. 5.0
Sampling Method (check one): Even Habitat/shoreline Transect Spot
Effort (Electrofishing Seconds): 2732+1600 No. of Nets: No. of Anodes: Array

Settings

Frequency: 120 (Hz) Voltage: 50-500 (volts) Current: 8 (amps) Power: 20% (watts)

Station Information

Length of Stream Surveyed: perimeter. (m)
Station Characteristics: Width: (m) Range: Average:
Depth: (m) Range: 0.25-1.5 Average:
Water Clarity/Colour: light tea stain. Water Velocity (if measured): (m/s) Time: 10:00
Temperature 18.6 (°C) ~~SRC~~ conductivity: 382.1 (µS/cm) WQ Meter ID: 4
pH: 7.55 Dissolved Oxygen: 6.31 (mg/L)

Catch Data

Species	No. of Fish & Notes (e.g. age, disease, etc.)
<u>YL PR</u>	<u>80 + 46</u>
<u>NR PK</u>	
	<u>7</u>

* SWP3 sed results on back!

N - Fish measurements provided on separate sheet? STATION DIAGRAM ON REVERSE

PAGE 1 OF 1
Print Name & Initial: N. Burnett (field notes author) Quality Control: This form is complete & legible
Print Name & Initial: (field notes QA/QC personnel)



Stantec Fish Morphometrics Data Sheet

Project Number: 160961397

Date: 19-Jun-2021

Project Name: 2021 CGM MRC monitoring

Field Samplers: NB/AO

Project Manager: Mike Johns

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
DWR3-BG01	Boat EFish	/	YLPR	A3-YLPR-001	6.5	6.9	3.57	
				002	6.4	6.8	3.39	
				003	6.5	6.9	3.33	
				004	7.5	7.9	5.56	
				005	5.7	6.1	2.75	
				006	6.5	6.9	3.18	
				007	7.0	7.4	3.69	black spot.
				008	7.0	7.5	5.06	
				009	6.6	7.1	3.95	
				010	7.3	7.7	5.52	
				011	6.7	7.1	3.96	black spot
				012	7.0	7.4	4.20	
				013	6.2	6.5	2.18	
				014	7.1	7.5	4.92	
				015	6.0	6.4	2.75	black spot
				016	6.3	6.7	2.95	
				017	6.0	6.4	2.95	
				018	6.8	7.2	4.48	
				019	7.4	7.9	5.53	
				020	6.7	7.7	3.74	
				021	6.0	6.4	2.77	
				022	7.4	7.8	4.84	
				023	6.6	7.0	3.95	
				024	7.6	8.00	5.71	
				025	6.1	6.5	2.91	
				026	6.3	6.8	3.21	
				027	6.5	7.0	3.59	
				028	6.6	7.1	3.52	
				029	6.6	7.0	3.44	
				030	6.8	7.2	3.98	

QA/QC Control:

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Stantec Fish Morphometrics Data Sheet

Project Number: 160961397

Date: June 19/21

Project Name: 2021 GGM MERC monitoring

Field Samplers: NB, AD.

Project Manager: Mike Johns

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
SMP3-BEFO1	BOFT E-FISH		YLPR	A3-YLPR-031	7.0	7.5	5.06	
				032	7.4	7.8	5.53	
				033	7.4	7.9	4.70	
				034	7.5	7.9	6.31	
				035	7.0	7.5	5.12	
				036	6.5	6.9	3.78	
				037	6.5	7.0	3.32	
				038	6.0	6.5	2.86	
				039	6.4	6.9	3.65	
				040	6.1	6.5	2.70	
				041	6.1	6.5	2.57	
				042	6.1	6.5	3.20	
				043	6.9	7.3	4.13	black spot.
				044	6.7	7.2	4.13	
				045	6.2	6.6	3.00	
				046	6.8	7.3	3.95	
				047	6.5	7.0	3.97	
				048	6.4	6.9	3.68	
				049	7.2	7.7	4.51	
				050	7.4	7.9	5.50	
051	6.2	6.5	3.08					
052	7.1	7.6	5.01					
053	6.4	6.8	3.24					
054	6.4	6.9	3.53					
055	6.4	6.8	3.71					
056	6.3	6.7	2.86					
057	6.3	6.7	3.18					
058	6.4	6.9	3.42					
059	5.9	6.3	2.66					
060	6.0	6.5	2.77					

Quality Control:

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Stantec Fish Morphometrics Data Sheet

Project Number: 460961397

Date: 19-Jun-21

Project Name: 2021 LGM MRC monitoring

Field Samplers: NB/AO

Project Manager: Mike Johns

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
SNP3-BEF-01	BEF-01	1	YLPR	YLPR-061	6.5	6.9	3.31	
				062	5.9	6.2	2.56	
				063	6.5	7.0	3.45	
				064	6.7	7.2	4.22	
				065	6.5	6.9	3.52	
				066	7.4	7.9	5.83	
				067	6.1	6.6	3.28	
				068	6.4	6.8	3.03	
				069	6.6	7.1	3.95	
				070	7.4	7.9	5.26	
				071	6.7	7.1	4.16	
				072	7.2	7.6	5.25	
				073	6.8	7.3	4.27	
				074	6.9	7.4	4.37	
				075	6.7	7.0	3.32	
				076	6.3	6.7	3.42	
				077	6.3	6.7	3.14	
				078	5.8	6.2	2.74	
				079	5.9	6.3	2.83	
				080	6.7	7.1	3.33	

Quality Control:

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Project Number: 160961397

Date: June 20/21

Station No.: UTG-BEF-01

UTM Coordinates: see below Zone Easting Northing

Photos: Not for iPhone

Project Name: 201 GGM rec. monitoring

Field Personnel: A.B.A.R.

Pass No.: 1 (if applicable)

Datum: NAD83

Descriptive Location: From v23 of small lake to next v13 lake.

Method

Fishing Method (check one): Backpack Boat

Sampling Method (check one): Even Habitat

Effort (Electrofishing Seconds): 3521

No. of Netters: 1

No. of Anodes: Array

Unit Make/Model: GPR 5.0

Transect Spot

Settings

Frequency: 100 (Hz)

Voltage: 50-500 (volts)

Current: 8 (amps)

Power: 100 (watts)

Station Information

Length of Stream Surveyed: see UTM (m)

Station Characteristics: Width: / (m)

Range: / Average: /

Depth: / (m)

Range: / Average: /

Water Clarity/Colour: trans.

Water Velocity (if measured): / (m/s)

Time: 10:00

Temperature: 15.9 (°C)

Conductivity: 123.1 (µS/cm)

WQ Meter ID: GGM

pH: 7.67

Dissolved Oxygen: 8.00 (mg/L)

Catch Data

Species	No. of Fish & Notes (e.g. age, disease, etc.)
BLSH	(50)
YLDR	(122) - 70 kept
NRPK	(50)
WASC	(10)
wpt965.413 16U. 482746, 5486430	
wpt966.413 16U. 482520, 5485692	

/ N - Fish measurements provided on separate sheet?

STATION DIAGRAM ON REVERSE

PAGE 1 OF 1

Print Name & Initial: N. Burnett

(field notes author)

Quality Control: This form is complete & legible

Print Name & Initial:

(field notes QA/QC personnel)

Stantec Fish Morphometrics Data Sheet

deal 667 merc. monitoring
 Number: 1
 Project Name: 16096L397
 Project Manager: Mike Johns

Date: 20 Jun 21
 Field Samplers: AD/NB

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
UTG-BEF-01	Boat E Fishing	X	YLR	UTG-YLR-001	6.1	6.5	3.08	
				002	7.3	7.8	5.33	
				003	6.7	7.2	5.05	
				004	5.9	6.3	2.77	
				005	6.3	6.6	3.33	
				006	7.0	7.5	4.31	
				007	6.8	7.2	4.99	
				008	6.8	7.3	4.05	
				009	7.3	7.8	5.72	
				010	6.2	6.6	3.62	
				011	6.7	7.2	4.55	
				012	6.6	7.0	3.70	
				013	7.5	8.0	6.43	
				014	6.0	6.5	3.23	
				015	6.5	6.9	3.75	
				016	6.6	7.1	4.53	
				017	6.6	7.1	4.61	
				018	6.2	6.6	3.11 3.34	
				019	6.6	7.0	4.48	
				020	7.4	7.8	6.21	
				021	6.2	6.6	3.73	
				022	6.6	7.0	4.35	
				023	6.3	6.7	3.29	
				024	6.2	6.6	3.18	
				025	7.1	7.6	5.40	
				026	7.0	7.5	5.43	
				027	7.2	7.7	5.57	
				028	6.6	7.0	4.18	
				029	6.0	6.4	3.05	
				030	7.3	7.8	5.78	

Control:

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Stantec Fish Morphometrics Data Sheet

Project Number: 100961397
 Project Name: 2021 Merc. Monitoring
 Project Manager: Mike Johns

Date: June 20/21
 Field Samplers: N.B., A.O.

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, leed parasites, other abnormalities
SIG-BEE-01	BOAT E.FISH		YLPR	WTG-YLPR-031	6.8	7.3	4.73	
				-032	7.0	7.5	5.26	
				-033	7.2	7.6	5.53	
				-034	6.2	6.6	3.95	
				-035	7.1	7.6	5.05	
				-036	6.8	7.4	5.38	
				-037	5.9	6.3	2.98	
				-038	5.5	5.9	2.02	
				-039	7.0	7.5	5.15	
				-040	6.1	6.5	3.02	
				041	6.4	6.9	3.76	
				042	5.2	5.5	1.85	
				043	6.9	7.4	4.46	
				044	6.1	6.5	3.28	
				045	6.3	6.8	3.60	
				046	7.0	7.5	5.00	
				047	5.9	6.3	2.97	
				048	6.4	6.7	3.36	
				049	6.3	6.7	3.68	
				050	7.2	7.6	4.73	
				051	5.6	6.0	2.51	
				052	7.0	7.5	5.17	
				053	6.1	6.6	2.73	
				054	6.1	6.5	3.13	
				055	6.0	6.5	3.18	
				056	6.6	7.1	4.68	
				057	6.2	6.7	3.80	
				058	5.0	5.4	1.74	
				059	7.2	7.7	6.48	
				060	7.3	7.8	6.02	

Quality Control: _____ This form is complete () & legible (). QA/QC by: (signature): _____

Stantec Fish Morphometrics Data Sheet

Project Number: 16091397

Date: 20-June-21

Project Name: 2021 G6m MFC monitoring

Field Samplers: AO/AB

Project Manager: Mike Johns

Station Number	Collection Method	Gang 1 or 2	Species	Fish ID	FL (cm)	TL (cm)	Total Wt (g)	Comments: internal/external condition, lesions, parasites, other abnormalities
UTG-BEF-01	Boat FISH	X	YLPR	UTG-YLR-061	6.6	7.0	4.50	
				-062	7.1	7.6	5.68	
				-063	6.4	6.8	3.98	
				-064	6.8	7.3	4.44	
				-065	5.9	6.3	3.44	
				-066	6.3	6.7	3.38	
				-067	6.9	7.4	5.65	
				-068	5.3	5.6	2.26	
				-069	5.1	5.5	1.84	
				✓ -070	6.0	6.4	2.80	

Control:

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Greenstone Mine - 2021 Fish and Fish Habitat Federal EIS Follow-Up Monitoring Report

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
SWAT-A5	A5-YLPR-001	6.3	6.6	3.04	A5-02		
SWAT-A5	A5-YLPR-002	6.7	7.0	4.24	age		
SWAT-A5	A5-YLPR-003	6.2	6.5	2.98	A5-01	15.04	
SWAT-A5	A5-YLPR-004	6.4	6.8	3.40	A5-03		
SWAT-A5	A5-YLPR-005	6.3	6.7	5.31	age		
SWAT-A5	A5-YLPR-006	6.5	7.1	2.96			
SWAT-A5	A5-YLPR-007	6.9	7.2	4.55	A5-05		
SWAT-A5	A5-YLPR-008	6.8	7.2	4.91	A5-05		
SWAT-A5	A5-YLPR-009	6.9	7.3	4.59			
SWAT-A5	A5-YLPR-010	6.9	7.4	4.51	A5-06		
SWAT-A5	A5-YLPR-011	7.4	7.7	6.21	A5-07		
SWAT-A5	A5-YLPR-012	6.5	6.8	3.29	A5-03		
SWAT-A5	A5-YLPR-013	6.3	6.6	2.96	A5-02		
SWAT-A5	A5-YLPR-014	6.4	6.7	3.55	A5-03	16.65	
SWAT-A5	A5-YLPR-015	6.7	7.1	4.21			
SWAT-A5	A5-YLPR-016	6.9	7.2	4.98	A5-05		
SWAT-A5	A5-YLPR-017	7.3	7.6	5.40	A5-07		
SWAT-A5	A5-YLPR-018	7.1	7.5	5.45			
SWAT-A5	A5-YLPR-019	7.4	7.6	5.13	A5-07		
SWAT-A5	A5-YLPR-020	6.8	7.2	4.63	A5-05		
SWAT-A5	A5-YLPR-021	6.1	6.3	2.64			
SWAT-A5	A5-YLPR-022	6.4	6.6	3.34	A5-02		
SWAT-A5	A5-YLPR-023	6.7	7.0	3.90			
SWAT-A5	A5-YLPR-024	6.4	6.6	3.01	age		
SWAT-A5	A5-YLPR-025	6.4	6.7	3.12	A5-03		
SWAT-A5	A5-YLPR-026	6.6	6.9	3.25			
SWAT-A5	A5-YLPR-027	7.2	7.5	5.26	age		
SWAT-A5	A5-YLPR-028	7.5	7.9	6.17			
SWAT-A5	A5-YLPR-029	7.0	7.4	4.53	A5-06		

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
SWAT-A5	A5-YLPR-030	6.6	6.9	3.63	age		
SWAT-A5	A5-YLPR-031	6.2	6.5	2.82	A5-01		
SWAT-A5	A5-YLPR-032	6.9	7.2	3.50	age		
SWAT-A5	A5-YLPR-033	6.3	6.7	3.29	A5-03		
SWAT-A5	A5-YLPR-034	6.6	6.9	3.84	A5-04	17.98	
SWAT-A5	A5-YLPR-035	6.3	6.6	3.42			
SWAT-A5	A5-YLPR-036	6.9	7.3	4.75	age		
SWAT-A5	A5-YLPR-037	7.3	7.7	5.31	age		
SWAT-A5	A5-YLPR-038	7.0	7.4	4.97	age		
SWAT-A5	A5-YLPR-039	6.3	6.5	3.10	A5-01		
SWAT-A5	A5-YLPR-040	7.1	7.4	4.94			
SWAT-A5	A5-YLPR-041	6.6	6.8	3.54	age		
SWAT-A5	A5-YLPR-042	6.7	7.0	4.04			
SWAT-A5	A5-YLPR-043	6.6	6.9	2.93	A5-04		
SWAT-A5	A5-YLPR-044	6.2	6.4	2.55			
SWAT-A5	A5-YLPR-045	6.2	6.5	2.99	A5-01		
SWAT-A5	A5-YLPR-046	6.5	6.8	3.58			
SWAT-A5	A5-YLPR-047	6.2	6.5	3.15	A5-01		
SWAT-A5	A5-YLPR-048	6.8	7.2	4.85			
SWAT-A5	A5-YLPR-049	6.7	7.1	4.00	age		
SWAT-A5	A5-YLPR-050	7.7	8.0	6.05			
SWAT-A5	A5-YLPR-051	7.4	7.7	5.60			
SWAT-A5	A5-YLPR-052	6.2	6.5	2.93	age		
SWAT-A5	A5-YLPR-053	6.3	6.5	2.89			
SWAT-A5	A5-YLPR-054	7.2	7.5	5.04	A5-07	27.42	Lab Duplicate
SWAT-A5	A5-YLPR-055	6.9	7.2	4.69			
SWAT-A5	A5-YLPR-056	6.8	7.2	3.62			
SWAT-A5	A5-YLPR-057	6.2	6.5	2.64			
SWAT-A5	A5-YLPR-058	6.4	6.8	3.82			
SWAT-A5	A5-YLPR-059	6.6	6.9	3.84	A5-04		

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
SWAT-A5	A5-YLPR-060	7.6	8.0	6.03	age		
SWAT-A5	A5-YLPR-061	7.0	7.4	5.43			
SWAT-A5	A5-YLPR-062	6.2	6.5	3.36			
SWAT-A5	A5-YLPR-063	6.2	6.5	2.95			
SWAT-A5	A5-YLPR-064	6.3	6.5	3.71	age		
SWAT-A5	A5-YLPR-065	6.1	6.4	2.75			
SWAT-A5	A5-YLPR-066	6.1	6.4	3.12	age		
SWAT-A5	A5-YLPR-067	6.2	6.5	2.80	A5-02	15.29	
SWAT-A5	A5-YLPR-068	6.3	6.6	3.03			
SWAT-A5	A5-YLPR-069	7.0	7.3	3.87	A5-06	22.25	
SWAT-A5	A5-YLPR-070	6.9	7.3	4.84	A5-06		
SWAT-A5	A5-YLPR-071	6.3	6.6	3.29			
SWAT-A5	A5-YLPR-072	6.5	6.8	3.40			
SWAT-A5	A5-YLPR-073	7.5	7.8	5.59			
SWAT-A5	A5-YLPR-074	7.3	7.6	5.64	A5-07		
SWAT-A5	A5-YLPR-075	6.2	6.5	3.15	A5-02		
SWAT-A5	A5-YLPR-076	6.8	7.1	4.38	A5-05	23.45	
SWAT-A5	A5-YLPR-077	6.6	6.9	4.07	A5-04		
SWAT-A5	A5-YLPR-078	6.9	7.3	4.50	A5-06		
SWAT-A5	A5-YLPR-079	6.3	6.6	3.69			
SWAT-A5	A5-YLPR-080	7.0	7.4	5.13			
SWAT-A5	A5-YLPR-081	6.5	6.9	3.30	A5-04		
SWP3	A3-YLPR-001	6.5	6.9	3.57			
SWP3	A3-YLPR-002	6.4	6.8	3.39			
SWP3	A3-YLPR-003	6.5	6.9	3.33	A3-03		
SWP3	A3-YLPR-004	7.5	7.9	5.56	A3-07		
SWP3	A3-YLPR-005	5.7	6.1	2.75			
SWP3	A3-YLPR-006	6.5	6.9	3.18	A3-03		
SWP3	A3-YLPR-007	7.0	7.4	3.69	age		
SWP3	A3-YLPR-008	7.0	7.5	5.06	A3-06		

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
SWP3	A3-YLPR-009	6.6	7.1	3.95			
SWP3	A3-YLPR-010	7.3	7.7	5.52			
SWP3	A3-YLPR-011	6.7	7.1	3.96			
SWP3	A3-YLPR-012	7.0	7.4	4.20	A3-06	23.61	
SWP3	A3-YLPR-013	6.2	6.5	2.68	A3-01		
SWP3	A3-YLPR-014	7.1	7.5	4.92	A3-06		
SWP3	A3-YLPR-015	6.0	6.4	2.75	A3-01		
SWP3	A3-YLPR-016	6.3	6.7	2.95	A3-02		
SWP3	A3-YLPR-017	6.0	6.4	2.95	A3-01		
SWP3	A3-YLPR-018	6.8	7.2	4.48	A3-05		
SWP3	A3-YLPR-019	7.4	7.9	5.53	A3-07		
SWP3	A3-YLPR-020	6.7	7.1	3.74			
SWP3	A3-YLPR-021	6.0	6.4	2.77	A3-01		
SWP3	A3-YLPR-022	7.4	7.8	4.84	age		
SWP3	A3-YLPR-023	6.6	7.0	3.95	A3-04	18.27	
SWP3	A3-YLPR-024	7.6	8.0	5.71	age		
SWP3	A3-YLPR-025	6.1	6.5	2.91	age		
SWP3	A3-YLPR-026	6.3	6.8	3.21			
SWP3	A3-YLPR-027	6.5	7.0	3.59	A3-04		
SWP3	A3-YLPR-028	6.6	7.1	3.52	age		
SWP3	A3-YLPR-029	6.6	7.0	3.44	A3-04		
SWP3	A3-YLPR-030	6.8	7.2	3.98	A3-05		
SWP3	A3-YLPR-031	7.0	7.5	5.06	A3-06		
SWP3	A3-YLPR-032	7.4	7.8	5.73	A3-07	27.83	Lab Duplicate
SWP3	A3-YLPR-033	7.4	7.9	4.70	A3-07		
SWP3	A3-YLPR-034	7.5	7.9	6.31	A3-07		
SWP3	A3-YLPR-035	7.0	7.5	5.12	age		
SWP3	A3-YLPR-036	6.5	6.9	3.78	A3-03		
SWP3	A3-YLPR-037	6.5	7.0	3.32	A3-04		
SWP3	A3-YLPR-038	6.0	6.5	2.86			

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
SWP3	A3-YLPR-039	6.4	6.9	3.65	age		
SWP3	A3-YLPR-040	6.1	6.5	2.70			
SWP3	A3-YLPR-041	6.1	6.5	2.57			
SWP3	A3-YLPR-042	6.1	6.5	3.20			
SWP3	A3-YLPR-043	6.9	7.3	4.13			
SWP3	A3-YLPR-044	6.7	7.2	4.13	age		
SWP3	A3-YLPR-045	6.2	6.6	3.00	A3-02		
SWP3	A3-YLPR-046	6.8	7.3	3.95			
SWP3	A3-YLPR-047	6.5	7.0	3.97	A3-04		
SWP3	A3-YLPR-048	6.4	6.9	3.68			
SWP3	A3-YLPR-049	7.2	7.7	4.51			
SWP3	A3-YLPR-050	7.4	7.9	5.50	age		
SWP3	A3-YLPR-051	6.2	6.5	3.08	age		
SWP3	A3-YLPR-052	7.1	7.6	5.01			
SWP3	A3-YLPR-053	6.4	6.8	3.24	age		
SWP3	A3-YLPR-054	6.4	6.9	3.53			
SWP3	A3-YLPR-055	6.4	6.8	3.71	A3-03	17.03	
SWP3	A3-YLPR-056	6.3	6.7	2.86	A3-02		
SWP3	A3-YLPR-057	6.3	6.7	3.18	age		
SWP3	A3-YLPR-058	6.4	6.9	3.42			
SWP3	A3-YLPR-059	5.9	6.3	2.66	age		
SWP3	A3-YLPR-060	6.0	6.5	2.77	A3-02	14.86	
SWP3	A3-YLPR-061	6.5	6.9	3.31			
SWP3	A3-YLPR-062	5.9	6.2	2.56			
SWP3	A3-YLPR-063	6.5	7.0	3.45	age		
SWP3	A3-YLPR-064	6.7	7.2	4.22			
SWP3	A3-YLPR-065	6.5	6.9	3.52	age		
SWP3	A3-YLPR-066	7.4	7.9	5.83			
SWP3	A3-YLPR-067	6.1	6.6	3.28	A3-02		
SWP3	A3-YLPR-068	6.4	6.8	3.03	A3-03		

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
SWP3	A3-YLPR-069	6.6	7.1	3.95	A3-05	19.9	
SWP3	A3-YLPR-070	7.4	7.9	5.26			
SWP3	A3-YLPR-071	6.7	7.1	4.16	A3-05		
SWP3	A3-YLPR-072	7.2	7.6	5.25			
SWP3	A3-YLPR-073	6.8	7.3	4.27			
SWP3	A3-YLPR-074	6.9	7.4	4.37	A3-06		
SWP3	A3-YLPR-075	6.7	7.0	3.32			
SWP3	A3-YLPR-076	6.3	6.7	3.42			
SWP3	A3-YLPR-077	6.3	6.7	3.14			
SWP3	A3-YLPR-078	5.8	6.2	2.74			
SWP3	A3-YLPR-079	5.9	6.3	2.83	A3-01	13.98	
SWP3	A3-YLPR-080	6.7	7.1	3.33	A3-05		
UTGA	UTGA-YLPR-001	6.1	6.5	3.08			
UTGA	UTGA-YLPR-002	7.3	7.8	5.33	A1B-07	29.06	Lab Duplicate
UTGA	UTGA-YLPR-003	6.7	7.2	5.05			
UTGA	UTGA-YLPR-004	5.9	6.3	2.77	A1B-01	15.21	
UTGA	UTGA-YLPR-005	6.3	6.6	3.33	A1B-02		
UTGA	UTGA-YLPR-006	7.0	7.5	4.31	age		
UTGA	UTGA-YLPR-007	6.8	7.2	4.99			
UTGA	UTGA-YLPR-008	6.8	7.3	4.05	age		
UTGA	UTGA-YLPR-009	7.3	7.8	5.72	A1B-07		
UTGA	UTGA-YLPR-010	6.2	6.6	3.62	A1B-02		
UTGA	UTGA-YLPR-011	6.7	7.2	4.55			
UTGA	UTGA-YLPR-012	6.6	7.0	3.70			
UTGA	UTGA-YLPR-013	7.5	8.0	6.43	age		
UTGA	UTGA-YLPR-014	6.0	6.5	3.23			
UTGA	UTGA-YLPR-015	6.5	6.9	3.75			
UTGA	UTGA-YLPR-016	6.6	7.1	4.53	A1B-04		
UTGA	UTGA-YLPR-017	6.6	7.1	4.61	A1B-04		
UTGA	UTGA-YLPR-018	6.2	6.6	3.34	A1B-02		

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
UTGA	UTGA-YLPR-019	6.6	7.0	4.48	age		
UTGA	UTGA-YLPR-020	7.4	7.8	6.21	A1B-07		
UTGA	UTGA-YLPR-021	6.2	6.6	3.73	age		
UTGA	UTGA-YLPR-022	6.6	7.0	4.35	A1B-04	22.17	
UTGA	UTGA-YLPR-023	6.3	6.7	3.29	age		
UTGA	UTGA-YLPR-024	6.2	6.6	3.18			
UTGA	UTGA-YLPR-025	7.1	7.6	5.40	A1B-06		
UTGA	UTGA-YLPR-026	7.0	7.5	5.43			
UTGA	UTGA-YLPR-027	7.2	7.7	5.57			
UTGA	UTGA-YLPR-028	6.6	7.0	4.18	A1B-04		
UTGA	UTGA-YLPR-029	6.0	6.4	3.05	A1B-01		
UTGA	UTGA-YLPR-030	7.3	7.8	5.78	A1B-07		
UTGA	UTGA-YLPR-031	6.8	7.3	4.73	A1B-05	24.66	
UTGA	UTGA-YLPR-032	7.0	7.5	5.26			
UTGA	UTGA-YLPR-033	7.2	7.6	5.53	A1B-06		
UTGA	UTGA-YLPR-034	6.2	6.6	3.95			
UTGA	UTGA-YLPR-035	7.1	7.6	5.05	A1B-06		
UTGA	UTGA-YLPR-036	6.8	7.4	5.38	A1B-05		
UTGA	UTGA-YLPR-037	5.9	6.3	2.98	A1B-01		
UTGA	UTGA-YLPR-038	5.5	5.9	2.02			
UTGA	UTGA-YLPR-039	7.0	7.5	5.15	age		
UTGA	UTGA-YLPR-040	6.1	6.5	3.02			
UTGA	UTGA-YLPR-041	6.4	6.9	3.76			
UTGA	UTGA-YLPR-042	5.2	5.5	1.85			
UTGA	UTGA-YLPR-043	6.9	7.4	4.46	A1B-05		
UTGA	UTGA-YLPR-044	6.1	6.5	3.28	age		
UTGA	UTGA-YLPR-045	6.3	6.8	3.60	A1B-03		
UTGA	UTGA-YLPR-046	7.0	7.5	5.00	A1B-06	26.15	
UTGA	UTGA-YLPR-047	5.9	6.3	2.97	A1B-01		
UTGA	UTGA-YLPR-048	6.4	6.7	3.36	A1B-03	17.82	

Appendix C-2: 2021 Baseline Yellow Perch Morphometric Data and Tissue Samples Collected in 2021

Sampling Area	Fish ID	Fork Length (cm)	Total Length (cm)	Total Weight (g)	Sample ID	Sample Mass	Lab Duplicate
UTGA	UTGA-YLPR-049	6.3	6.7	3.68	A1B-03		
UTGA	UTGA-YLPR-050	7.2	7.6	4.73	age		
UTGA	UTGA-YLPR-051	5.6	6.0	2.51	age		
UTGA	UTGA-YLPR-052	7.0	7.5	5.17	A1B-06		
UTGA	UTGA-YLPR-053	6.1	6.6	2.73			
UTGA	UTGA-YLPR-054	6.1	6.5	3.13	A1B-02	16.6	
UTGA	UTGA-YLPR-055	6.0	6.5	3.18	A1B-02		
UTGA	UTGA-YLPR-056	6.6	7.1	4.68	age		
UTGA	UTGA-YLPR-057	6.2	6.7	3.80	A1B-03		
UTGA	UTGA-YLPR-058	5.0	5.4	1.74			
UTGA	UTGA-YLPR-059	7.2	7.7	6.48	age		
UTGA	UTGA-YLPR-060	7.3	7.8	6.02	A1B-07		
UTGA	UTGA-YLPR-061	6.6	7.0	4.50	A1B-04		
UTGA	UTGA-YLPR-062	7.1	7.6	5.68			
UTGA	UTGA-YLPR-063	6.4	6.8	3.98	age		
UTGA	UTGA-YLPR-064	6.8	7.3	4.44	A1B-05		
UTGA	UTGA-YLPR-065	5.9	6.3	3.44	A1B-01		
UTGA	UTGA-YLPR-066	6.3	6.7	3.38	A1B-03		
UTGA	UTGA-YLPR-067	6.9	7.4	5.65	A1B-05		
UTGA	UTGA-YLPR-068	5.3	5.6	2.26			
UTGA	UTGA-YLPR-069	5.1	5.5	1.84			
UTGA	UTGA-YLPR-070	6.0	6.4	2.80	age		



Greenstone Gold Mines GP INC.
ATTN: Mike Johns
1-70 Southgate Drive
Guelph ON N1G 4P5

Date Received: 24-JUN-21
Report Date: 13-SEP-21 08:09 (MT)
Version: FINAL

Client Phone: 519-780-8145

Certificate of Analysis

Lab Work Order #: L2606251
Project P.O. #: 21-00200
Job Reference: 160961397
C of C Numbers:
Legal Site Desc:

<original signed by>

Christine Paradis
Project Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2606251-1 Fish Tissue 19-JUN-21 A3-01	L2606251-2 Fish Tissue 19-JUN-21 A3-02	L2606251-3 Fish Tissue 19-JUN-21 A3-03	L2606251-4 Fish Tissue 19-JUN-21 A3-04	L2606251-5 Fish Tissue 19-JUN-21 A3-05
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	76.6	76.9	76.5	76.7	77.4
Metals	Aluminum (Al)-Total (mg/kg wwt)	1.80	1.83	2.82	2.46	1.65
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Arsenic (As)-Total (mg/kg wwt)	0.293	0.226	0.289	0.245	0.230
	Barium (Ba)-Total (mg/kg wwt)	0.608	0.622	0.518	0.461	0.441
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd)-Total (mg/kg wwt)	0.0023	0.0018	0.0015	0.0035	0.0016
	Calcium (Ca)-Total (mg/kg wwt)	12200	12600	11800	11600	13400
	Cesium (Cs)-Total (mg/kg wwt)	0.0119	0.0130	0.0108	0.0109	0.0102
	Chromium (Cr)-Total (mg/kg wwt)	0.035	0.030	0.023	0.026	0.098
	Cobalt (Co)-Total (mg/kg wwt)	0.0105	0.0098	0.0132	0.0139	0.0113
	Copper (Cu)-Total (mg/kg wwt)	0.564	0.515	0.598	0.516	0.540
	Iron (Fe)-Total (mg/kg wwt)	25.6	18.6	26.6	24.6	20.7
	Lead (Pb)-Total (mg/kg wwt)	0.0121	0.0081	0.0129	0.0100	0.0082
	Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
	Magnesium (Mg)-Total (mg/kg wwt)	447	446	440	427	416
	Manganese (Mn)-Total (mg/kg wwt)	12.8	11.3	9.38	11.9	7.20
	Mercury (Hg)-Total (mg/kg wwt)	0.0756	0.0736	0.0688	0.0653	0.0656
	Molybdenum (Mo)-Total (mg/kg wwt)	0.0179	0.0148	0.0191	0.0151	0.0171
	Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	0.057
	Phosphorus (P)-Total (mg/kg wwt)	8130	8190	8170	7750	8100
	Potassium (K)-Total (mg/kg wwt)	3470	3460	3790	3310	3250
	Rubidium (Rb)-Total (mg/kg wwt)	10.1	10.7	9.80	9.65	8.88
	Selenium (Se)-Total (mg/kg wwt)	0.212	0.192	0.194	0.173	0.172
	Sodium (Na)-Total (mg/kg wwt)	919	909	930	812	825
	Strontium (Sr)-Total (mg/kg wwt)	3.23	3.48	3.08	2.87	3.74
	Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg wwt)	0.00470	0.00439	0.00331	0.00316	0.00349
	Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg wwt)	0.00065	0.00072	0.00099	0.00095	0.00087
	Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
	Zinc (Zn)-Total (mg/kg wwt)	27.8	24.4	24.0	24.0	22.8
	Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Speciated Metals	Methylmercury (as MeHg) (mg/kg wwt)	0.0859	0.0734	0.0721	0.0804	0.0682
Aggregate Organics	Lipid Content (% wwt)	1.9	1.8	2.1	2.2	1.9

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L2606251-6 Fish Tissue 19-JUN-21 A3-06	L2606251-7 Fish Tissue 19-JUN-21 A3-07	L2606251-8 Fish Tissue 19-JUN-21 A3-07 DUP	L2606251-9 Fish Tissue 16-JUN-21 A5-01	L2606251-10 Fish Tissue 16-JUN-21 A5-02
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)	75.4	77.1	77.0	78.2	77.7
Metals	Aluminum (Al)-Total (mg/kg wwt)	1.67	2.24	1.99	1.91	1.76
	Antimony (Sb)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Arsenic (As)-Total (mg/kg wwt)	0.249	0.341	0.340	0.433	0.377
	Barium (Ba)-Total (mg/kg wwt)	0.404	0.357	0.420	0.658	0.788
	Beryllium (Be)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg wwt)	<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Boron (B)-Total (mg/kg wwt)	<0.20	<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd)-Total (mg/kg wwt)	0.0014	0.0020	0.0017	0.0066	0.0072
	Calcium (Ca)-Total (mg/kg wwt)	12800	10000	12900	12100	15600
	Cesium (Cs)-Total (mg/kg wwt)	0.0093	0.0092	0.0095	0.0240	0.0224
	Chromium (Cr)-Total (mg/kg wwt)	0.024	0.042	0.022	0.032	0.018
	Cobalt (Co)-Total (mg/kg wwt)	0.0099	0.0118	0.0104	0.0099	0.0089
	Copper (Cu)-Total (mg/kg wwt)	0.579	0.519	0.545	0.474	0.511
	Iron (Fe)-Total (mg/kg wwt)	20.5	25.0	24.9	16.6	16.5
	Lead (Pb)-Total (mg/kg wwt)	0.0099	0.0100	0.0085	0.0115	0.0197
	Lithium (Li)-Total (mg/kg wwt)	<0.10	<0.10	<0.10	<0.10	<0.10
	Magnesium (Mg)-Total (mg/kg wwt)	420	391	441	433	471
	Manganese (Mn)-Total (mg/kg wwt)	6.20	8.05	8.97	6.93	9.85
	Mercury (Hg)-Total (mg/kg wwt)	0.0599	0.0587	0.0588	0.0577	0.0506
	Molybdenum (Mo)-Total (mg/kg wwt)	0.0194	0.0173	0.0180	0.0165	0.0167
	Nickel (Ni)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
	Phosphorus (P)-Total (mg/kg wwt)	7880	6950	8230	8070	9540
	Potassium (K)-Total (mg/kg wwt)	3380	3470	3550	3320	3430
	Rubidium (Rb)-Total (mg/kg wwt)	9.74	8.98	9.21	11.1	11.4
	Selenium (Se)-Total (mg/kg wwt)	0.157	0.178	0.171	0.213	0.215
	Sodium (Na)-Total (mg/kg wwt)	852	855	913	1090	1130
	Strontium (Sr)-Total (mg/kg wwt)	3.58	2.57	3.20	2.44	2.77
	Tellurium (Te)-Total (mg/kg wwt)	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg wwt)	0.00299	0.00281	0.00312	0.00579	0.00581
	Tin (Sn)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg wwt)	0.00091	0.00080	0.00078	0.00116	0.00118
	Vanadium (V)-Total (mg/kg wwt)	<0.020	<0.020	<0.020	<0.020	<0.020
	Zinc (Zn)-Total (mg/kg wwt)	21.2	19.7	22.1	25.0	26.4
	Zirconium (Zr)-Total (mg/kg wwt)	<0.040	<0.040	<0.040	<0.040	<0.040
Speciated Metals	Methylmercury (as MeHg) (mg/kg wwt)	0.0745	0.0678	0.0693	0.0695	0.0556
Aggregate Organics	Lipid Content (% wwt)	2.6	2.2	2.2	1.5	1.5

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L2606251-11 Fish Tissue 16-JUN-21 A5-03	L2606251-12 Fish Tissue 16-JUN-21 A5-04	L2606251-13 Fish Tissue 16-JUN-21 A5-05	L2606251-14 Fish Tissue 16-JUN-21 A5-06	L2606251-15 Fish Tissue 16-JUN-21 A5-07
Grouping	Analyte						
TISSUE							
Physical Tests	% Moisture (%)		77.8	78.8	76.7	77.5	76.9
Metals	Aluminum (Al)-Total (mg/kg ww)		1.72	1.58	1.91	1.75	2.12
	Antimony (Sb)-Total (mg/kg ww)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Arsenic (As)-Total (mg/kg ww)		0.518	0.431	0.575	0.580	0.638
	Barium (Ba)-Total (mg/kg ww)		0.599	0.575	0.410	0.536	0.429
	Beryllium (Be)-Total (mg/kg ww)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg ww)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Boron (B)-Total (mg/kg ww)		<0.20	<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd)-Total (mg/kg ww)		0.0045	0.0063	0.0058	0.0035	0.0040
	Calcium (Ca)-Total (mg/kg ww)		12500	13200	12400	13400	13400
	Cesium (Cs)-Total (mg/kg ww)		0.0236	0.0252	0.0277	0.0246	0.0285
	Chromium (Cr)-Total (mg/kg ww)		0.016	0.015	0.019	0.057	0.034
	Cobalt (Co)-Total (mg/kg ww)		0.0075	0.0095	0.0100	0.0081	0.0091
	Copper (Cu)-Total (mg/kg ww)		0.483	0.521	0.589	0.456	0.555
	Iron (Fe)-Total (mg/kg ww)		14.3	16.2	14.2	12.5	15.3
	Lead (Pb)-Total (mg/kg ww)		0.0097	0.0119	0.0204	0.0080	0.0140
	Lithium (Li)-Total (mg/kg ww)		<0.10	<0.10	<0.10	<0.10	<0.10
	Magnesium (Mg)-Total (mg/kg ww)		420	444	407	440	408
	Manganese (Mn)-Total (mg/kg ww)		8.20	9.01	8.09	8.66	8.60
	Mercury (Hg)-Total (mg/kg ww)		0.0519	0.0501	0.0433	0.0469	0.0411
	Molybdenum (Mo)-Total (mg/kg ww)		0.0193	0.0187	0.0237	0.0192	0.0222
	Nickel (Ni)-Total (mg/kg ww)		<0.040	<0.040	<0.040	<0.040	<0.040
	Phosphorus (P)-Total (mg/kg ww)		8200	8400	8130	8470	8100
	Potassium (K)-Total (mg/kg ww)		3360	3330	3430	3250	3400
	Rubidium (Rb)-Total (mg/kg ww)		12.2	11.8	15.6	12.5	15.9
	Selenium (Se)-Total (mg/kg ww)		0.184	0.188	0.152	0.161	0.162
	Sodium (Na)-Total (mg/kg ww)		1100	1060	1110	1040	1060
	Strontium (Sr)-Total (mg/kg ww)		2.77	2.81	2.95	3.00	3.02
	Tellurium (Te)-Total (mg/kg ww)		<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg ww)		0.00589	0.00617	0.00696	0.00649	0.00697
	Tin (Sn)-Total (mg/kg ww)		<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg ww)		0.00075	0.00084	0.00085	0.00064	0.00076
	Vanadium (V)-Total (mg/kg ww)		<0.020	<0.020	<0.020	<0.020	<0.020
	Zinc (Zn)-Total (mg/kg ww)		23.4	23.7	21.5	21.0	22.2
	Zirconium (Zr)-Total (mg/kg ww)		<0.040	<0.040	<0.040	<0.040	0.089
Speciated Metals	Methylmercury (as MeHg) (mg/kg ww)		0.0556	0.0550	0.0543	0.0546	0.0446
Aggregate Organics	Lipid Content (% ww)		1.5	1.6	2.5	1.8	2.6

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L2606251-16	L2606251-17	L2606251-18	L2606251-19	L2606251-20
		Description	Fish Tissue	Fish Tissue	Fish Tissue	Fish Tissue	Fish Tissue
		Sampled Date	16-JUN-21	20-JUN-21	16-JUN-21	16-JUN-21	16-JUN-21
		Sampled Time					
		Client ID	A5-07 DUP	A1B-01	A1B-02	A1B-03	A1B-04
Grouping	Analyte						
TISSUE							
Physical Tests	% Moisture (%)		76.1	76.8	76.9	76.1	75.7
Metals	Aluminum (Al)-Total (mg/kg wwt)		2.44	2.06	1.51	2.89	1.56
	Antimony (Sb)-Total (mg/kg wwt)		<0.0020	0.0025	<0.0020	<0.0020	<0.0020
	Arsenic (As)-Total (mg/kg wwt)		0.582	0.0904	0.0672	0.0660	0.0520
	Barium (Ba)-Total (mg/kg wwt)		0.356	0.795	0.690	0.835	0.829
	Beryllium (Be)-Total (mg/kg wwt)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg wwt)		<0.0020	<0.0020	<0.0020	<0.0020	<0.0020
	Boron (B)-Total (mg/kg wwt)		<0.20	<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd)-Total (mg/kg wwt)		0.0044	0.0068	0.0057	0.0065	0.0064
	Calcium (Ca)-Total (mg/kg wwt)		12500	11100	10300	11800	11900
	Cesium (Cs)-Total (mg/kg wwt)		0.0291	0.0372	0.0402	0.0465	0.0365
	Chromium (Cr)-Total (mg/kg wwt)		0.015	0.104	0.032	0.032	0.056
	Cobalt (Co)-Total (mg/kg wwt)		0.0087	0.0078	0.0070	0.0089	0.0055
	Copper (Cu)-Total (mg/kg wwt)		0.573	0.663	0.604	0.636	0.619
	Iron (Fe)-Total (mg/kg wwt)		14.4	13.5	12.0	15.0	11.6
	Lead (Pb)-Total (mg/kg wwt)		0.0127	0.0052	0.0046	0.0058	0.0047
	Lithium (Li)-Total (mg/kg wwt)		<0.10	0.10	<0.10	0.13	0.11
	Magnesium (Mg)-Total (mg/kg wwt)		385	392	370	395	386
	Manganese (Mn)-Total (mg/kg wwt)		7.94	4.06	3.94	4.56	5.77
	Mercury (Hg)-Total (mg/kg wwt)		0.0432	0.0468	0.0432	0.0390	0.0354
	Molybdenum (Mo)-Total (mg/kg wwt)		0.0195	0.0261	0.0240	0.0254	0.0270
	Nickel (Ni)-Total (mg/kg wwt)		<0.040	0.050	<0.040	<0.040	<0.040
	Phosphorus (P)-Total (mg/kg wwt)		7480	7430	6810	7730	7770
	Potassium (K)-Total (mg/kg wwt)		3460	3490	3610	3550	3460
	Rubidium (Rb)-Total (mg/kg wwt)		16.0	9.28	9.51	9.49	9.05
	Selenium (Se)-Total (mg/kg wwt)		0.160	0.189	0.185	0.169	0.158
	Sodium (Na)-Total (mg/kg wwt)		1050	969	990	1040	964
	Strontium (Sr)-Total (mg/kg wwt)		2.78	2.42	2.24	2.46	2.39
	Tellurium (Te)-Total (mg/kg wwt)		<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg wwt)		0.00698	0.00565	0.00541	0.00566	0.00532
	Tin (Sn)-Total (mg/kg wwt)		<0.020	<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg wwt)		0.00093	0.00131	0.00094	0.00203	0.00127
	Vanadium (V)-Total (mg/kg wwt)		<0.020	<0.020	<0.020	<0.020	<0.020
	Zinc (Zn)-Total (mg/kg wwt)		20.1	23.3	21.8	20.9	20.8
	Zirconium (Zr)-Total (mg/kg wwt)		<0.040	<0.040	<0.040	<0.040	<0.040
Speciated Metals	Methylmercury (as MeHg) (mg/kg wwt)		0.0467	0.0500	0.0325	0.0347	0.0357
Aggregate Organics	Lipid Content (% wwt)		2.5	2.2	2.0	2.4	3.4

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID Description Sampled Date Sampled Time Client ID	L2606251-21 Fish Tissue 16-JUN-21 A1B-05	L2606251-22 Fish Tissue 16-JUN-21 A1B-06	L2606251-23 Fish Tissue 16-JUN-21 A1B-07	L2606251-24 Fish Tissue 16-JUN-21 A1B-07 DUP
Grouping	Analyte					
TISSUE						
Physical Tests	% Moisture (%)		76.5	77.2	76.6	77.0
Metals	Aluminum (Al)-Total (mg/kg wwt)		1.22	3.07	3.63	3.21
	Antimony (Sb)-Total (mg/kg wwt)		<0.0020	<0.0020	0.0025	<0.0020
	Arsenic (As)-Total (mg/kg wwt)		0.0524	0.0779	0.0711	0.0719
	Barium (Ba)-Total (mg/kg wwt)		0.778	0.707	0.929	0.980
	Beryllium (Be)-Total (mg/kg wwt)		<0.0020	<0.0020	<0.0020	<0.0020
	Bismuth (Bi)-Total (mg/kg wwt)		<0.0020	<0.0020	<0.0020	<0.0020
	Boron (B)-Total (mg/kg wwt)		<0.20	<0.20	<0.20	<0.20
	Cadmium (Cd)-Total (mg/kg wwt)		0.0042	0.0085	0.0068	0.0059
	Calcium (Ca)-Total (mg/kg wwt)		10100	11000	11200	11500
	Cesium (Cs)-Total (mg/kg wwt)		0.0386	0.0485	0.0535	0.0542
	Chromium (Cr)-Total (mg/kg wwt)		0.023	0.047	0.030	0.094
	Cobalt (Co)-Total (mg/kg wwt)		0.0054	0.0101	0.0090	0.0097
	Copper (Cu)-Total (mg/kg wwt)		0.585	0.720	0.788	0.741
	Iron (Fe)-Total (mg/kg wwt)		10.0	13.7	14.7	13.6
	Lead (Pb)-Total (mg/kg wwt)		0.0049	0.0061	0.0068	0.0078
	Lithium (Li)-Total (mg/kg wwt)		<0.10	0.11	0.11	0.11
	Magnesium (Mg)-Total (mg/kg wwt)		322	381	369	372
	Manganese (Mn)-Total (mg/kg wwt)		3.43	4.11	4.35	3.88
	Mercury (Hg)-Total (mg/kg wwt)		0.0362	0.0436	0.0327	0.0350
	Molybdenum (Mo)-Total (mg/kg wwt)		0.0253	0.0321	0.0304	0.0315
	Nickel (Ni)-Total (mg/kg wwt)		<0.040	<0.040	<0.040	0.052
	Phosphorus (P)-Total (mg/kg wwt)		6430	7340	7090	7390
	Potassium (K)-Total (mg/kg wwt)		2980	3620	3460	3460
	Rubidium (Rb)-Total (mg/kg wwt)		7.72	9.86	9.47	9.49
	Selenium (Se)-Total (mg/kg wwt)		0.138	0.176	0.168	0.165
	Sodium (Na)-Total (mg/kg wwt)		835	1030	964	993
	Strontium (Sr)-Total (mg/kg wwt)		2.17	2.60	3.03	3.33
	Tellurium (Te)-Total (mg/kg wwt)		<0.0040	<0.0040	<0.0040	<0.0040
	Thallium (Tl)-Total (mg/kg wwt)		0.00436	0.00562	0.00574	0.00596
	Tin (Sn)-Total (mg/kg wwt)		<0.020	<0.020	<0.020	<0.020
	Uranium (U)-Total (mg/kg wwt)		0.00113	0.00204	0.00177	0.00152
	Vanadium (V)-Total (mg/kg wwt)		<0.020	<0.020	<0.020	<0.020
	Zinc (Zn)-Total (mg/kg wwt)		16.9	20.6	18.6	19.5
	Zirconium (Zr)-Total (mg/kg wwt)		<0.040	<0.040	0.073	<0.040
Speciated Metals	Methylmercury (as MeHg) (mg/kg wwt)		0.0346	0.0415	0.0305	0.0326
Aggregate Organics	Lipid Content (% wwt)		3.2	2.8	3.3	2.9

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HG-WET-CVAFS-N-VA	Tissue	Mercury in Tissue by CVAAS (WET)	EPA 200.3, EPA 245.7
<p>This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Analysis is by atomic fluorescence spectrophotometry or atomic absorption spectrophotometry, adapted from US EPA Method 245.7.</p>			
LIPIDS-GRAV-VA	Tissue	Lipids in Tissue by Gravimetric	EPA 3570, 8290A
<p>A portion of homogenized sample is extracted with dichloromethane. The extract is evaporated to dryness and the lipid content determined gravimetrically.</p>			
MEHG-WET-MIC-GCAF-VA	Tissue	Methylmercury in Tissue by GCAFS (Wet)	Liang et al. (1994)
<p>This method follows the procedures published by Liang, Bloom and Horvat in Clinical Chemistry (Vol 40, No 4, 1994). Samples are homogenized and then digested in a methanolic potassium hydroxide solution. An aliquot of the digestate is analyzed by aqueous phase ethylation, purge and trap, desorption and GC separation. The separated species are then pyrolyzed to elemental Hg and quantified by cold vapour atomic fluorescence spectroscopy. Results are reported "as MeHg".</p>			
MET-WET-CCMS-N-VA	Tissue	Metals in Tissue by CRC ICPMS (WET)	EPA 200.3/6020A
<p>This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).</p>			
<p>Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.</p>			
MOISTURE-TISS-VA	Tissue	% Moisture in Tissues	Puget Sound WQ Authority, Apr 1997
<p>This analysis is carried out gravimetrically by drying the sample at 105 C for a minimum of six hours.</p>			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 688 9878



L2606251-COFC

COC Number: 17 -

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Report To Contact and company name below will appear on the final report Company: <u>Core Stone Gold Mines</u> Contact: <u>Nike Johns</u> Phone: <u>(507) 880-8146</u> Company address below will appear on the final report Street: <u>641 Highway 80</u> City/Province: <u>Geraldton, ON</u> Postal Code: <u>V0T 1M0</u> Invoice To: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Same as Report To Copy of Invoice with Report: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Company: Contact: Project Information ALS Account # / Quote #: <u>202485</u> Job #: <u>160961397</u> PO / AF#: <u>Contract # Nike Johns #</u> USD:		Report Format / Distribution Select Report Format: <input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EOD (DIGITAL) Quality Control (QC) Report with Report: <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1: <u>ewillson@metalrequirements.com</u> Email 2: <u>Nike Johns @ Stone, com</u> Email 3:		Select Service Level below - Contact your AAM to confirm all EAP TATs (surcharges may apply) Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply 4 day [P4-20%] 3 day [P3-25%] 2 day [P2-40%] Emergencies: <input type="checkbox"/> 1 Business day [E - 100%] Same Day, Weekend or Statutory holiday [E2 - 200%] (Laboratory opening fees may apply) 1	
ALS Lab Work Order # (lab use only): <u>L2606251</u> ALS Sample # (lab use only): Sample Identification and/or Coordinates (This description will appear on the report) A3-01 A3-02 A3-03 A3-04 A3-05 A3-06 A3-07* A5-01 A5-02 A5-03 A5-04 A5-05		ALS Contact: <u>Kristine Perleis</u> Date: <u>19-Jun-21</u> Time: <u>14:53:21</u> Sample Type: <u>153 Tissue</u> Sampler: <u>N. Bureff</u>		Invoice Distribution Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX Email 1: <u>ap@agmines.com</u> Email 2: <u>shir@agmines.com</u> Oil and Gas Required Field (client use) APEC/Coat Center: Manager Code: Requester: Location:	
Drinking Water (DW) Samples (client use) Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO SHIPMENT RELEASE (client use) Released by: _____ Date: _____ Time: _____		Special Instructions / Specify Criteria to add or report by clicking on the drop-down list below (electronic COC only) <u>AS per communication with Nike Johns - email. Some methods and detection limits of lab report - L22, 10068 from 2019. * please run a lab duplicate sample on this as well.</u>		NUMBER OF CONTAINERS Mescury in tissue by CVAAS (UET) <u>1</u> Lipids in tissue by gravimetric <u>1</u> Methylmercury in tissue by CCAS (UET) <u>1</u> Metals in tissue by CRC ICPMS (UET) <u>1</u> Moisture in tissue <u>1</u> Lab Duplicate * <u>1</u>	
Shipping Release (client use) Date: _____ Time: _____ Received by: <u>CR</u> INITIAL SHIPMENT RECEPTION (lab use only) Date: <u>06-01-21</u> Time: <u>3:00</u>		White - Laboratory Copy Date: _____ Time: _____ Received by: _____ FINAL SHIPMENT RECEPTION (lab use only) Date: _____ Time: _____		Yellow - Client Copy Date: _____ Time: _____ Received by: _____ FINAL SHIPMENT RECEPTION (lab use only) Date: _____ Time: _____	

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

SAMPLES ON HOLD
SUSPECTED HAZARD (see Special Instructions)



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Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878



L2606251-COFC

QC Number: 17 -

Page 2 of 2

* Keep Frozen!

Report To		Report Format / Distribution		Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)																														
Company: Cree Stone Gold Mines		Select Report Format: <input type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input type="checkbox"/> EDO (DIGITAL)		Regular [R] <input checked="" type="checkbox"/> Standard TAT if received by 3 pm - business days - no surcharges apply																														
Contact: Mike Johns		Quality Control (QC) Report with Report <input type="checkbox"/> YES <input type="checkbox"/> NO		Priority (Business Day): 4 day [P4-20%] <input type="checkbox"/>																														
Phone: (507) 980-8145		<input type="checkbox"/> Compare Results to Criteria on Report - provide details below if box checked		Emergency: 1 Business day [E - 100%] <input type="checkbox"/>																														
Street: 6 Twilight Bay		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		Same Day, Weekend or Statutory holiday [E2 - 200%] <input type="checkbox"/>																														
City/Province: Geraldton, ON		Email 1: environmental@aggmines.com		Date and Time Required for all E&P TATs:																														
Postal Code: R0T 1M0		Email 2: Mike.Johns@stonec.com		For tests that can not be performed according to the service level selected, you will be contacted.																														
Invoice To: Same as Report To <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Email 3:		Analysis Request																														
Copy of Invoice with Report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		Invoice Distribution		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																														
Company:		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX		<table border="1"> <tr> <th rowspan="4">NUMBER OF CONTAINERS</th> <th colspan="7">Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below</th> </tr> <tr> <td>Free water tissue by CAPPs (NET)</td> <td>Lipids in tissue by gravimetric</td> <td>Metal mercury in tissue by CAPPs (NET)</td> <td>Metals in tissue by CAPPs (NET)</td> <td>Moisture in tissue</td> <td>Lab Duplicate*</td> <td></td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td>1</td> <td></td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> </tr> </table>		NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below							Free water tissue by CAPPs (NET)	Lipids in tissue by gravimetric	Metal mercury in tissue by CAPPs (NET)	Metals in tissue by CAPPs (NET)	Moisture in tissue	Lab Duplicate*		1	1	1	1	1	1		X	X	X	X	X	X	
NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below																																	
	Free water tissue by CAPPs (NET)	Lipids in tissue by gravimetric	Metal mercury in tissue by CAPPs (NET)				Metals in tissue by CAPPs (NET)	Moisture in tissue	Lab Duplicate*																									
	1	1	1				1	1	1																									
	X	X	X	X	X	X																												
Contact:		Email 1: ep@aggmines.com		<table border="1"> <tr> <th colspan="2">Oil and Gas Required Fields (client use)</th> </tr> <tr> <td>A/E/Coast Center:</td> <td>PO#</td> </tr> <tr> <td>Major/Minor Code:</td> <td>Routing Code:</td> </tr> </table>		Oil and Gas Required Fields (client use)		A/E/Coast Center:	PO#	Major/Minor Code:	Routing Code:																							
Oil and Gas Required Fields (client use)																																		
A/E/Coast Center:	PO#																																	
Major/Minor Code:	Routing Code:																																	
Project Information		Email 2: environmental@aggmines.com																																
ALS Account # / Quote #: 202285		Requisitioner:																																
Job #: 160961397		Location:																																
PO / A/E:		ALS Contact: Christine Paradi																																
LSD:		Sampler: A. Burnett																																
ALS Lab Work Order # (lab use only):																																		
ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mm-yy)	Time (hh:mm)	Sample Type																														
A5-06		16-Jun-21		FISH TISSUE	1	X	X	X	X	X																								
A5-07*		↓			1																													
A1B-01		20-Jun-21			1																													
A1B-02					1																													
A1B-03					1																													
A1B-04					1																													
A1B-05					1																													
A1B-06					1																													
A1B-07*					1																													
Drinking Water (DW) Samples (client use)		Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)		SAMPLE CONDITION AS RECEIVED (lab use only)																														
Are samples taken from a Regulated DW System? <input type="checkbox"/> YES <input type="checkbox"/> NO		As per communication with Mike Johns - email. Some methods and detection limits as lab report - L2290068 from 2019. *Please run a lab duplicate on these samples as well		Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>																														
Are samples for human consumption/ use? <input type="checkbox"/> YES <input type="checkbox"/> NO				Ice Packs <input checked="" type="checkbox"/> Ice Cubes <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>																														
				Cooling Initiated <input checked="" type="checkbox"/>																														
				INITIAL COOLER TEMPERATURES °C: 10.0																														
				FINAL COOLER TEMPERATURES °C:																														
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)		FINAL SHIPMENT RECEPTION (lab use only)																														
Released by:		Received by: CB		Received by:																														
Date:		Date: 06-21-21		Date:																														
Time:		Time: 3:00		Time:																														

SAMPLES ON HOLD
SUSPECTED HAZARD (see Special Instructions)

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.