Howse Property Annual Report

April 2021 - March 2022 Activities

TATA

June 2022

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1 HOWSE PROPERTY PROJECT UPDATE

As of March 31st, 2022, Tata Steel Minerals Canada (TSMC) has not started any work, including any construction activities, on the Howse Property Project. The economical, environmental, social and operational feasibility of developing the Howse Property is currently being assessed by TSMC. As per the Annual Report requirement of the Howse Property Iron Mine Project Decision Statement issued in June 2018, the present report covers the pre-construction phase for the reporting period of April 1st, 2021 to March 31st, 2022.

A Table of Concordance for Conditions is provided at the end of the text.

2 GENERAL CONDITIONS

Section 2 covers Conditions 2.1-2.13

As per condition 2.5.21, the Wetland Monitoring Plan was modified (see Section 4.2 for details) and request for feedback was forwarded via email to members of all five Indigenous groups on September 14th, 2018, with the invitation to submit comments. No feedback was received, from April 2021 to March 2022 regarding modifications to the wetland monitoring plan submitted in 2018.

No other updates were done on the follow-up programs and there has been no changes to the project during the reporting year.

As per Condition 2.10, TSMC's landing webpage went live in February, 2021. TSMC's Howse Annual Reports for the years 2019, 2020 and 2021 are available through this medium.

3 FISH AND FISH HABITAT

3.1 Erosion and sediment control

TSMC's Environment team conducted revegetation trials at the Pinette Lake well pad in 2020. Willow cutting were planted in exposed areas in an effort to mitigate erosion at this site. The survival rate of the cuttings exceeded 80%, showing that this revegetation approach could be implemented successfully in the Howse Project area.

Figure 1. Willow stems planted in 2020

Currently, there is no deposition of deleterious substances in waters frequented by fish in relation to the Howse Property Project, which is not started.

3.2 Follow Up Program

3.2.1 Surface Water Quality

Surface water quality samples were taken between June 8th and October 25th, 2021 for four quarters (taken at least 1 month apart). These samples are collected as a part of the baseline monitoring of surface water quality for the Water Chemistry Analysis Program in the creeks and lakes in conjunction with the effluent discharge when the Howse project will go into the construction and subsequently into the mining phase. The locations sampled are Triangle Lake (TL), Burnetta Creek (BC), Burnetta Lake (BL), Pinette Lake (SW5) and 4 points along Goodream Creek and its tributaries (SW1,2,3 and 4) that fall into the watershed and might be affected by Howse operations.

Sampling results for the baseline surface water quality monitoring are presented in Appendix I.

3.2.2 Lake Water Levels

Due to operational restrictions linked to the COVID-19 pandemic, Lake water levels were not measured in 2021. Upon visiting the stations in early summer 2021, damage from ice or wave action was noticed at all stations, except the one located at Burnetta Lake. The tubes housing the depth probes were displaced or were floating freely. A consultant was engaged to assess the conditions of the probes, including Burnetta Lake, and propose a long-term solution for probe movement.

Surveying equipment required to reinstall the probe was received late in the season, therefore the probes could not be replaced in 2021. This will be done early summer 2022 after the lakes become accessible.

3.3 Groundwater Levels

Groundwater levels in the wells on the Howse Property were not measured in 2021 since construction was not started and no activities impacting the deep aquifer occurred.

See Section 4.2 for Howse Wetland Monitoring.

3.4 Snow Sampling

Snow sampling is to be conducted to assess dustfall amounts during the winter months. TSMC's Follow up program for air quality, which includes provisions for snow sampling, is set to be implemented from the start of construction to the end of decommissioning of the Designated Project.

4 MIGRATORY BIRDS

4.1 Bank Swallow

No Bank Swallows were observed in the designated Howse project area between April 1st, 2021 to March 31st, 2022.

4.2 Howse Wetland Monitoring (avifauna habitat)

Results of measurement of water levels at wetlands are presented in Appendix II Wetland Water Levels Results .

5 HEALTH AND SOCIO-ECONOMIC CONDITIONS OF INDIGENOUS PEOPLES

5.1 Air Quality

TSMC's Follow up program for air quality is set to be implemented from the start of construction to the end of decommissioning of the Designated Project.

Following multiple consultations with community leadership from the Schefferville-Matimekush-Kawawachikamach area, and in order to minimize an exposure risks for workers and for community members, TSMC took the following measures which also had a positive effect on air quality. These measures remained effective throughout the reporting period:

- prevented any workers from leaving site to go to Schefferville unless to take outgoing charter;
- incoming and outgoing flights were limited to once every two weeks; subsequently, rotations were extended to every three weeks to increase the isolation period at the mine site;
- charter passengers bypass the inside of the Schefferville airport deplane/embark directly between the plane to a bus traveling directly to site. Shuttle service maintained with a local Indigenous company for travel to the airport on shift-change days.

5.2 Country Foods

Under the Country Food Follow Up Plan, TSMC is committed to duplicating the Country Foods sampling program 2 years after the commencement of the Howse Operations phase and, subsequently, every five years for the duration of the operations phase.

6 CURRENT USE OF LANDS AND RESOURCES FOR TRADITIONAL PURPOSES

6.1 Bypass roads

Upgrade of the DSO3-4 bypass road were completed on the first 5 kilometers of the road by a First Nations contractor in summer 2021, as part of a previous commitment unrelated to Howse. Work on the Howse bypass road has not started

Indigenous groups have been kept apprised of developments on this matter through the Joint Community Health, Safety & Environment meetings (held on April 20, 2021 and September 8, 2021) and periodic correspondence, as recorded in TSMC's Community Engagement & Consultation Log (available upon request).

6.2 Caribou

TSMC no longer has a formal arrangement to receive caribou data. TSMC is currently in discussion with Caribou Ungava to resume the agreement. No data is available for the reporting year.

6.3 Communication

TSMC communicated progress and high-level results of its current monitoring programs to Indigenous groups during its Joint Community Health, Safety and Environment Committee meetings, held in this reporting period on April 20 2021 and September 8, 2021.

7 PHYSICAL AND CULTURAL HERITAGE AND STRUCTURES, SITES OR THINGS OF HISTORICAL, ARCHAEOLOGICAL, PALEONTOLOGICAL OR ARCHITECTURAL SIGNIFICANCE

All conditions pertaining to Conditions 7.1-7.6 were respected during the reporting year.

8 CUMULATIVE EFFECTS

As the Howse Project is not yet in the Construction Phase, this requirement is not yet in place.

9 ACCIDENTS AND MALFUNCTIONS

There were no incidents on Howse Property infrastructure during the reporting year.

9.1 Communication Plan

No changes were made to the Communication Plan during the reporting year.

10 SCHEDULES AND RECORD KEEPING

Conditions 10.1-10.4 of the Howse Property Decision Statement indicate how the Proponent will submit to the Agency schedules associated with the Howse Property Project after the start of construction. Currently, this is not applicable, as construction phase has not started.

TSMC has maintained all records required to demonstrate compliance with the conditions of the release of the Howse Property Project.

The Annual Report requirements under conditions 2.8 and 2.9 of the Howse Property Iron Mine Project Decision Statement issued in June 2018 are presented below for the reporting period of April 1st, 2021 to March 31st, 2022.

Table 1. Table of Concordance for Conditions

	CEAA Release Condition	2021-2022 Activities
2. General Conditions		
2.1	The Proponent shall ensure that its actions in meeting the conditions set out in this Decision Statement are considered in a careful and precautionary manner, promote sustainable development, are informed by the best information and knowledge available at the time the Proponent takes action, including community and Indigenous traditional knowledge, are based on methods and models that are recognized by standard-setting bodies, are undertaken by qualified individuals, and have applied the best available economically and technically feasible technologies.	▪ TSMC is committed to follow best practices for all its activities.
2.2	The Proponent shall, where consultation is a requirement of a condition set out in this Decision Statement: 2.2.1 provide a written notice of the opportunity for the party or parties being consulted to present their views and information on the subject of the consultation; 2.2.2 provide sufficient information on the scope and the subject matter of the consultation and a reasonable period of time to permit the party or parties being consulted to prepare their views and information; 2.2.3 undertake an impartial consideration of all views and information presented by the party or parties being consulted on the subject matter of the consultation; and 2.2.4 advise in a timely manner the party or parties being consulted on how the views and information received have been considered by the Proponent.	▪ TSMC is committed to follow this requirement for all consultation activities.
2.3	The Proponent shall, where consultation with Indigenous groups is a requirement of a condition set out in this Decision Statement, communicate with each Indigenous group with respect to the manner by which to satisfy the consultation requirements referred to in condition 2.2, including methods of notification, the type of information, the period of time to be provided when seeking input, the process to be used by the Proponent to undertake impartial consideration of all views and information presented on the subject of the consultation, the period of time to advise Indigenous groups of how their views and information were considered by the Proponent and the means by which Indigenous groups will be advised.	▪ TSMC is committed to follow this requirement for all consultation activities.
2.4	The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement, determine the following information, for each follow-up program: 2.4.1 the methodology, location, frequency, timing and duration of monitoring associated with the follow-up program; 2.4.2 the scope, content and frequency of reporting of the results of the follow-up program; 2.4.3 the levels of environmental change relative to baseline conditions that would require the Proponent to implement modified or additional mitigation measure(s), including instances where the Proponent may require Designated Project activities to be stopped; and 2.4.4 the technically and economically feasible mitigation measures to be implemented by the Proponent if monitoring conducted as part of the follow-up program shows that the levels of environmental change referred to in condition 2.4.3 have been reached or exceeded.	▪ Existing follow-up programs for TSMC's DSO and Howse sites, include this information.
2.5	The Proponent shall submit the information referred to in condition 2.4 to the Agency prior to the implementation of each follow-up program. The Proponent shall update that information in consultation with Indigenous groups and relevant authorities during the implementation of each follow-up program, and shall provide the updated	▪ No updates were done on the follow-up program during this reporting year.

	CEAA Release Condition	2021-2022 Activities
	information to the Agency, Indigenous groups and relevant authorities within 30 days of the information being updated.	
2.6	The Proponent shall, where a follow-up program is a requirement of a condition set out in this Decision Statement:	▪ Follow-up programs for the Howse Project were submitted to the Agency and Indigenous groups in Spring 2018. Follow-up programs will be implemented when the construction will start.
	2.6.1 conduct the follow-up program according to the information determined pursuant to condition 2.4;	
	2.6.2 undertake monitoring and analysis to verify the accuracy of the environmental assessment as it pertains to the particular condition and/or to determine the effectiveness of any mitigation measure(s);	
	2.6.3 determine whether modified or additional mitigation measures are required based on the monitoring and analysis undertaken pursuant to condition 2.6.2; and	
	2.6.4 if modified or additional mitigation measures are required pursuant to condition 2.6.3, implement these mitigation measures in a timely manner and monitor them pursuant to condition 2.6.2.	
2.7	Where consultation with Indigenous groups is a requirement of a follow-up program, the Proponent shall discuss with each Indigenous group opportunities for the participation of that Indigenous group in the implementation of the follow-up program, including the analysis of the follow-up results and whether modified or additional mitigation measures are required, as set out in condition 2.6.	▪ TSMC is committed to follow this requirement for all consultation activities.
2.8	The Proponent shall, commencing in the reporting year during which the Proponent begins the implementation of the conditions set out in this Decision Statement, prepare an annual report that sets out:	▪ TSMC has produced an annual report for its 2018-2019, 2019-2020 and 2020-2021 activities; and the current report covers 2021-2022 activities.
	2.8.1 the activities undertaken by the Proponent in the reporting year to comply with each of the conditions set out in this Decision Statement;	
	2.8.2 how the Proponent complied with condition 2.1;	
	2.8.3 for conditions set out in this Decision Statement for which consultation is a requirement, how the Proponent considered any views and information that the Proponent received during or as a result of the consultation;	
	2.8.4 the information referred to in conditions 2.4 and 2.5 for each follow-up program;	
	2.8.5 the results of the follow-up program requirements identified in conditions 3.6, 4.7, 4.8, 5.9, 5.10, 6.6, 6.7, and 7.5; and	
	2.8.6 any modified or additional mitigation measures implemented or proposed to be implemented by the Proponent, as determined under condition 2.6.	
2.9	The Proponent shall submit to the Agency the annual report referred to in condition 2.8, including an executive summary in both official languages, no later than June 30 following the reporting year to which the annual report applies.	▪ TSMC is committed to comply with this condition
2.10	The Proponent shall publish on the Internet, or any medium which is publicly available, the annual reports and the executive summaries referred to in conditions 2.8 and 2.9, the dust management strategy referred to in condition 5.7, the communication plan referred to in condition 6.8, the cultural heritage control plan referred to in condition 7.6, the communication plan referred to in condition 9.5, the schedules referred to in conditions 10.1, and 10.2, and any update(s) or revision(s) to the above documents, upon submission of these documents to the parties referenced in the respective conditions. The Proponent shall keep these documents publicly available for 25 years following the end of operation, or until the end of decommissioning of the Designated Project, whichever comes first. The Proponent shall notify the Agency and Indigenous groups of the availability of these documents within 48 hours of their publication.	▪ Annual reports have been placed on TSMC's website: https://www.tatasteelcanada.com/

	CEAA Release Condition	2021-2022 Activities
2.11	The Proponent shall notify the Agency and Indigenous groups in writing no later than 60 days after the day on which there is a transfer of ownership, care, control or management of the Designated Project in whole or in part.	▪ TSMC is committed to comply with this condition.
2.12	The Proponent shall consult with Indigenous groups prior to initiating any material change(s) to the Designated Project that may result in adverse environmental effects and shall notify the Agency in writing no later than 60 days prior to initiating the change(s).	▪ There were no changes to the Designated Project in the reporting year.
2.13	In notifying the Agency pursuant to condition 2.12, the Proponent shall provide the Agency with a description of the potential adverse environmental effects of the change(s) to the Designated Project, the proposed mitigation measures and follow-up requirements to be implemented by the Proponent and the results of the consultation with Indigenous groups.	▪ TSMC is committed to comply with this condition.
3. Fish and fish habitat		
3.1	The Proponent shall implement erosion and sedimentation control measures within the Designated Project area during all phases of the Designated Project to avoid the deposit of deleterious substances in waters frequented by fish.	▪ There is no deposition of deleterious substances in waters frequented by fish in relation to the Howse Property Project, which is not started.
3.2	The Proponent shall collect site runoff and pit dewatering water into HowseA and Timmins4 sedimentations ponds. The Proponent shall treat water at the sedimentation ponds prior to its discharge into the environment, if necessary, to meet the requirements of subsection 36(3) of the Fisheries Act.	▪ Not applicable, as the Project has not started.
3.3	The Proponent shall use a time delay blasting technique when blasting.	▪ Not applicable as there is no activity, including blasting, on the Howse Property.
3.4	The Proponent shall not set the blast charge per delay to above 1092 kilograms.	▪ Not applicable as there is no activity, including blasting, on the Howse Property
3.5	The Proponent shall manage waste rock acid generation taking into account the Mine Environment Neutral Drainage program's *Prediction Manual for Drainage Chemistry from Sulphidic Geological Materials*.	▪ TSMC is committed to comply with this condition once the Project starts.
3.6	The Proponent shall develop, prior to construction, a follow-up program to verify the accuracy of the environmental assessment as it pertains to fish and fish habitat and to determine the effectiveness of mitigation measures referred to in conditions 3.1 to 3.5. The Proponent shall provide the follow-up program to the Agency prior to construction. The Proponent shall implement the follow-up program from the start of construction to the end of decommissioning. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and relevant authorities and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency and Indigenous groups in Spring 2018.
	3.6.1 monitor water quality and quantity parameters as per the Water Management Plan (October 2015) in the environmental impact statement and at locations outlined in figure 1 of the Proponent's final response to Information Request 106 (July 24, 2017), including:	▪ TSMC is committed to comply with this condition, see below.
	3.6.1.1 water levels in Triangle Lake, Morley Lake, Burnetta Lake and Pinette Lake;	▪ Water gauges were installed at these locations in fall 2017 ▪ Data collection was not possible

	CEAA Release Condition	2021-2022 Activities
		in 2021, but will resume in 2022.
	3.6.1.2 groundwater levels at monitoring well locations outlined in figure 1 or equivalent locations where groundwater may be impacted by the Designated Project;	▪ Additional monitoring well will be installed at the beginning of the construction phase near Triangle Lake.
	3.6.1.3 iron concentration at the final discharge points of the HowseA and Timmins 4 sedimentation ponds;	▪ Not applicable, as the Project has not started.
	3.6.1.4 effluent quality at the final discharge points of the HowseA and Timmins 4 sedimentation ponds, in accordance with the Metal Mining Effluent Regulations and taking into account the Canadian Council of Ministers of the Environment's Water Quality Guidelines for the Protection of Aquatic Life; and	▪ Not applicable, as the Project has not started.
	3.6.1.5 water quality between the HowseA sedimentation pond final discharge point and Triangle Lake, and in Triangle Lake, Burnetta Lake and Pinette Lake.	▪ Not applicable, as the Project has not started.
	3.6.2 update the hydrogeological groundwater model from the Proponent's final response to Information Request 106 (July 24, 2017) at the end of mining phases I, II and III based on the results from 3.6.1; and	▪ Updates will be done following the mining phases.
	3.6.3 monitor fish and fish habitat in Triangle Lake, Burnetta Lake, Pinette Lake and Goodream Creek.	▪ Not applicable at this time.
4. Migratory birds		
4.1	The Proponent shall carry out the Designated Project in a manner that protects migratory birds and avoids harming, killing or disturbing migratory birds or destroying, disturbing or taking their nests or eggs. In this regard, the Proponent shall take into account Environment and Climate Change Canada's Avoidance Guidelines. The Proponent's actions when taking into account the Avoidance Guidelines shall be in compliance with the Migratory Birds Convention Act, 1994 and with the Species at Risk Act.	▪ Not applicable, as the Project has not started.
4.2	The Proponent shall have a qualified individual survey, during operation, the mine pit walls annually during the nesting period to determine if bank swallows (Riparia riparia) are using the open pit as a nesting site. The Proponent shall conduct an additional survey one to two days prior to undertaking any new activity associated with the Designated Project during the nesting period areas where bank swallows (Riparia riparia) may occur. The Proponent shall identify, in consultation with Environment and Climate Change Canada and other relevant authorities, and implement a setback distance in which no Designated Project activity shall take place around any bank swallow (Riparia riparia) nest(s) found and shall maintain the setback distance until the young have permanently left the area of the nest. The Proponent shall implement additional measures to deter bank swallows (Riparia riparia) from nesting in the area prior to the next breeding period.	▪ Not applicable as the operations phase has not begun at Howse.
4.3	The Proponent shall notify Environment and Climate Change Canada if it finds bank swallow (*Riparia riparia*) nests within the Designated Project area.	▪ Bank Swallow were not observed in the Howse Property area during the reporting year.
4.4	The Proponent shall control lighting required for the construction, operation and decommissioning of the Designated Project, including direction, timing and intensity, to avoid adverse effects on migratory birds, while meeting health and safety requirements.	▪ Not applicable as construction activities have not begun at Howse.
4.5	The Proponent shall prohibit vehicles and heavy equipment associated with the Designated Project from entering wetlands except those affected by components of the Designated Project as identified in figure 7-33 of the environmental impact statement.	▪ No vehicles and/or heavy equipment entered wetlands during the reporting year.

	CEAA Release Condition	2021-2022 Activities
4.6	The Proponent shall not undertake vehicle, machinery and equipment cleaning, fueling and maintenance and shall not store substance with the potential to cause harmful effects to the receiving environment, within 20 metres of any wetland.	▪ This was respected in the reporting year.
4.7	The Proponent shall develop, prior to construction and in consultation with relevant authorities, a follow-up program to determine the effectiveness of all mitigation measures to avoid harm to migratory birds, their eggs and nests. The Proponent shall provide the follow-up program to the Agency prior to construction. The Proponent shall implement the follow-up program during all phases of the Designated Project. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and relevant authorities and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	4.7.1 conduct migratory bird surveys in the Triangle Lake, Burnetta Lake and Pinette Lake watersheds every year for the first three years following completion of construction. After three years, the Proponent shall determine, in consultation with Indigenous groups and relevant authorities, the frequency of additional surveys based on the results of the follow-up program.	▪ Not applicable at this time.
4.8	The Proponent shall develop, prior to construction, and implement a follow-up program to verify the predictions of the environmental assessment as it pertains to the adverse environmental effects of the Designated Project on wetland functions that support migratory birds, and to determine the effectiveness of the mitigation measures referred to in conditions 4.5 and 4.6 during all phases of the Designated Project. The Proponent shall provide the follow-up program to the Agency prior to construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and Environment and Climate Change Canada and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ This condition was complied with.
	4.8.1 have a qualified individual conduct a wetland disturbance survey every five years, with the first survey conducted at the start of construction, to assess wetland functions that support migratory birds; and	▪ Not applicable, as the Project has not started.
	4.8.2 monitor groundwater levels associated with the wetlands located north of the open pit to verify the effects of pit dewatering on wetlands. Monitoring wells shall be spaced no more than 50 metres apart and measurements shall be taken every two weeks during operation.	▪ This information is provided in the annual report.
5. Health and socio-economic conditions of Indigenous peoples		
5.1	The Proponent shall, in consultation with Indigenous groups, undertake progressive reclamation of the areas disturbed by the Designated Project, including by stabilizing, compacting and revegetating with native plant species overburden stockpiles and waste rock piles.	▪ Not applicable, as the Designated project area has not been disturbed.
5.2	Using a qualified individual, the Proponent shall design overburden stockpiles and waste rock piles, in consultation with Indigenous groups and relevant authorities, and in consideration of reducing effects to viewscapes. The Proponent shall implement the design throughout all phases of the Designated Project.	▪ The design of the overburden stockpiles and waste rock piles was completed during the Howse EIS.
5.3	The Proponent shall apply dust suppressant on the Howse haul road during all phases of the Designated Project to control the release of dust. The Proponent shall select, in consultation with relevant authorities, dust suppressants with the least potential effects on human health and the environment.	▪ Not applicable at this time.
5.4	The Proponent shall control dust, if observed visually, during the unloading of ore from trucks, except if not feasible for safety reasons.	▪ Not applicable at this time.
5.5	The Proponent shall implement measures to mitigate dust emissions at the conveyor transfer and drop points	▪ Not applicable, as the Project has

	CEAA Release Condition	2021-2022 Activities
	when the conveyor is active, in the drum scrubber when ore is mixed and at the crude ore recovery tunnel, the secondary crusher and the dryer during ore processing activities	not started.
5.6	The Proponent shall fill borehole necks with clean crushed rock to reduce dust and gas emissions from blasting during construction and operation.	▪ Not applicable, as the Project has not started.
5.7	The Proponent shall develop, prior to construction, a dust management strategy to control dust generated by vehicles associated with the Designated Project using the road to Schefferville and for vehicles entering Schefferville. The Proponent shall implement the strategy during all phases of the Designated Project. The Proponent shall provide the dust management strategy to the Agency prior to the start of construction. The Proponent shall review and update the dust management strategy in consultation with Indigenous groups, relevant authorities and the Town of Schefferville prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first.	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
5.8	Throughout all phases of the Designated Project, the Proponent shall implement incentive measures to reduce the number of vehicles from the Designated Project, including by providing shuttle buses to transport workers to and from the Designated Project area.	▪ TSMC is complying with this condition.
5.9	The Proponent shall develop, prior to construction, a follow-up program to verify the accuracy of the environmental assessment as it pertains to air quality and the effects of dust on the health of Indigenous peoples and to determine the effectiveness of the mitigation measures referred to in conditions 5.3 to 5.8. The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall implement the follow-up program from the start of construction to the end of decommissioning of the Designated Project. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and relevant authorities and shall provide the update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	5.9.1 monitor air quality at receptors R3, R9, R10, R16, R18, R24, R36, R38 and R40 identified by the Proponent in Table 7-13 of the environmental impact statement, including for total particulate matter, particulate matter less than 10 microns, particulate matter less than 2.5 microns, dustfall, nitrogen oxides, sulfur oxides, carbon monoxide, and periodic monitoring of nitrogen dioxides after blasting activities;	
	5.9.2 monitor dust generation and deposition from the Designated Project at locations potentially affected by the Designated Project, using a dust tracking system and mobile monitoring equipment;	
	5.9.3 analyse concentrations of contaminants of concern in dust, including a minimum of one sampling of heavy metal content between the months of June and August of every year that analyses are conducted; and	
	5.9.4 if the results of the follow-up program demonstrate that modified or additional mitigation measures are required, as determined in condition 2.6, at the Howse mini-plant, Designated Project roads, waste rock piles or overburden stockpiles, the Proponent shall implement modified or additional mitigation measures.	
5.10	The Proponent shall develop, prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first, and in consultation with Indigenous groups and relevant authorities, a follow-up program to verify the accuracy of the environmental assessment as it pertains to country foods. Country foods may include game birds, mammals, fish, and plant species. The Proponent shall implement the follow-up program. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	5.10.1 sample country food species commonly consumed by Indigenous groups and identified in consultation with Indigenous groups including brook trout (Salvelinus fontinalis) and lake trout (Salvelinus namaycush);	
	5.10.2 sample species identified in condition 5.10.1 for heavy metals, and other contaminants of concern	

	CEAA Release Condition	2021-2022 Activities
	identified in consultation with Indigenous groups and relevant authorities;	
	5.10.3 sample in areas where Indigenous groups harvest country foods and that may be adversely affected by the Designated Project and in a control site that is not affected by activities of the Designated Project. Fish sampling shall include sampling in Goodream Creek, Triangle Lake, and Pinette Lake; and	
	5.10.4 start sampling two years after the start of operation and continue sampling at a frequency and for a duration determined in consultation with Indigenous groups and relevant authorities.	
6. Current use of lands and resources for traditional purposes		
6.1	The Proponent shall upgrade, from the start of construction, a bypass road around the Designated Project in order to provide access for Indigenous groups to Pinette Lake, Kauteitnat and the Howells River Valley. The Proponent shall maintain the bypass road at least twice per calendar year until the end of decommissioning to ensure its usability.	▪ Not applicable, as the Construction Phase of the Project has not started.
6.2	The Proponent shall upgrade, from the start of construction, a bypass road around the Direct Shipping Ore 4 area in order to provide access for Indigenous groups to hunting grounds to the northwest of the Designated Project near the Kivivic and Goodwood deposits. The Proponent shall maintain the bypass road at least twice per calendar year until the end of decommissioning to ensure its usability.	▪ Not applicable at this time.
6.3	The Proponent shall not use the bypass roads, referred to in conditions 6.1 and 6.2, for Designated Project activities, except when undertaking the maintenance of those bypass roads as required by conditions 6.1 and 6.2, or if required for safety or emergency reasons.	▪ TSMC has not used the bypass road for any Project activities during the reporting year (this road is accessed only for the purposes of environmental monitoring, and only when no other access exists).
6.4	The Proponent shall prohibit employees and contractors associated with the Designated Project from fishing and hunting within the designated project area, unless an employee or a contractor is provided access by the Proponent for traditional purposes or for exercising Aboriginal rights, to the extent that such access is safe.	▪ This was respected during the reporting year.
6.5	If the Proponent is made aware of or observes caribou within a 20-kilometre radius of the active pit or of the Howse mini-plant, the Proponent shall consult the Newfoundland and Labrador Department of Fisheries and Land Resources to determine the appropriate course of action.	▪ TSMC is not aware of any caribou within 20km of the active pit or the Howse mini-Plant.
6.6	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the adverse effects of the Designated Project on the current use of lands and resources for traditional purposes and to determine the effectiveness of the mitigation measures referred to in conditions 6.1 to 6.4, including maintenance of the bypass roads. The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first.	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
6.7	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the adverse effects of the Designated Project on the George River herd of Eastern migratory caribou (Rangifer tarandus caribou). The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and the Government of Newfoundland and Labrador, and shall provide this update to the Agency prior to operation or within 120 days of	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.

	CEAA Release Condition	2021-2022 Activities
	the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall monitor movement of the George River herd of Eastern migratory caribou (*Rangifer tarandus caribou*) and develop and implement modified or additional mitigation measures if the range of the George River herd of Eastern migratory caribou (*Rangifer tarandus caribou*) expands to occupy areas within a 20-kilometre radius of the Designated Project.	
6.8	The Proponent shall develop, prior to construction and in consultation with Indigenous groups, a communication plan to share information related to the Designated Project with Indigenous groups. The Proponent shall implement and maintain the communication plan up to date during all phases of the Designated Project. The communication plan shall include procedures, including timing, for sharing information on the following:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018 ▪ TSMC is committed to comply with this condition.
	6.8.1 the Designated Project activities requiring notification to Indigenous groups and the timing of these notifications. For blasting, the Proponent shall advertise blasting schedules via local radio stations and directly to Indigenous groups at a minimum 48 hours prior to each blasting event;	
	6.8.2 follow-up activities and monitoring results referred to in conditions 3.6, 4.7, 4.8, 5.9, 5.10, 6.6, 6.7, and 7.5; and	
	6.8.3 temporary and permanent restrictions on access to traditional territories, including the location and timing of these restrictions, the availability of alternate routes, and the timing of maintenance activities for the bypass roads as per 6.1 and 6.2.	
6.9	The Proponent shall develop, as part of the communication plan referred to in condition in 6.8, procedures for Indigenous groups to provide feedback to the Proponent about adverse environmental effects caused by the Designated Project related to access to and use of traditional territories, traffic, air quality, including dust and dust deposition, and country foods and procedures for the Proponent to document and respond in a timely manner to the feedback received and demonstrate how issues have been addressed. The Proponent shall implement these procedures during all phases of the Designated Project.	▪ These procedures were in place during the reporting year.
6.10	The Proponent shall provide Indigenous groups with the schedules referred to in conditions 10.1 and 10.2 and updates or revisions to the initial schedules pursuant to condition 10.3 and 10.4 at the same time these documents are provided to the Agency.	▪ Not applicable at this time.
7. Physical and cultural heritage and structures, sites or things of historical, archaeological, paleontological or architectural significance		
7.1	If requested by Indigenous groups 48 hours prior to their planned use of Kauteitnat, the Proponent shall refrain from blasting for a period of 24 hours during that time of planned use of Kauteitnat, or less if Indigenous groups are no longer using Kauteitnat.	▪ Not applicable at this time.
7.2	The Proponent shall not conduct any Designated Project activity to the south of proposed water diversion ditch, identified in figure 2 in the environmental assessment report, except for activities required for the construction and maintenance of the diversion ditch. The Proponent shall clearly identify the exclusion zone with signage on the ground, within its lease area, posted at the edge of the exclusion zone.	▪ Not applicable as no project activity has taken place.
7.3	During the months of June, July, August and September, the Proponent shall not blast more than twice in a week and more than five times per month.	▪ Not applicable as no project activity has taken place.
7.4	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, a protocol for receiving complaints related to the exposure to noise from the Designated Project. The Proponent shall provide the protocol to the Agency and Indigenous groups prior to the start of construction. The Proponent shall review and update the protocol in consultation with Indigenous groups and shall provide this update to the Agency and Indigenous groups prior to operation or within 120 days of the issuance of this Decision Statement,	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.

	CEAA Release Condition	2021-2022 Activities
	whichever comes first. The Proponent shall respond to any noise complaints within 48 hours of the complaint being received and shall implement corrective actions to reduce exposure to noise in a timely manner.	
7.5	The Proponent shall develop prior to construction, and implement during all phases of the Designated Project, a follow-up program to verify the accuracy of the environmental assessment as it pertains to the effects of the Designated Project on the use of cultural and other sites as a result of noise levels. The Proponent shall provide the follow-up program to the Agency prior to the start of construction. The Proponent shall review and update the follow-up program in consultation with Indigenous groups and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. As part of the follow-up program, the Proponent shall:	▪ Follow-up programs for the Howse Project were submitted to the Agency in Spring 2018.
	7.5.1 monitor noise levels at receptor sites R9, R10, R11, R13 and R24 identified by the Proponent in figure 7.10 of the environmental impact statement. The Proponent shall implement modified or additional mitigation measures if noise levels at these sites exceed 5 decibels above the baseline noise levels as a result of the Designated Project, except during blasting.	
7.6	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project a cultural heritage control plan. The Proponent shall provide the cultural heritage control plan to the Agency prior to the start of construction. The Proponent shall review and update the plan in consultation with Indigenous groups and the Government of Newfoundland and Labrador and shall provide this update to the Agency prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first. If any previously unidentified structures, sites or things of historical, archaeological, paleontological or architectural significance are discovered within the Designated Project area by the Proponent or brought to the attention of the Proponent by an Indigenous group or another party during construction, the Proponent shall:	▪ All required programs for the Howse Project were submitted to the Agency in Spring 2018.
	7.6.2 delineate an area of at least 30 metres around the discovery as a no-work zone. The no-work requirement shall not apply to action(s) required to be undertaken to protect the integrity of the discovery;	
	7.6.3 have a qualified individual conduct an assessment at the location of the discovery;	
	7.6.4 inform Indigenous groups within 24 hours of the discovery, and allow for monitoring by Indigenous groups during work related to the discovery; and	
	7.6.5 comply, in consultation with Indigenous groups and relevant authorities, with all applicable legislative or legal requirements and associated regulations and protocols respecting the discovery, recording, transferring and safekeeping of previously unidentified structures, sites or things of historical, archaeological, paleontological or architectural significance.	
8. Cumulative Effects		
8.1	The Proponent shall participate in regional initiative(s), if requested by a relevant authority or the Town of Schefferville, relating to the monitoring, assessment and management of cumulative environmental effects, including cumulative health effects related to dust likely to result from the Designated Project in combination with other mining activities that have or will be carried out in the region, should there be any such initiative(s) during the construction and operation phases of the Designated Project.	▪ TSMC will continue to participate in regional initiatives if requested by regional Indigenous groups and/or authorities.
9. Accidents and malfunctions		
9.1	The Proponent shall take all reasonable measures to prevent accidents and malfunctions that may result in adverse environmental effects. The measures taken by the Proponent shall include measures to prevent slope failures, sedimentation pond failures, ditch failures, destabilization of waste rock piles and overburden stockpiles, and rock slides.	▪ An accident and malfunction response plan specific for the Howse project is currently drafted.

	CEAA Release Condition	2021-2022 Activities
9.2	The Proponent shall develop, prior to construction, and implement during all phases of the Designated Project, an accident and malfunction response plan. The accident and malfunction plan shall include the types of accidents and malfunctions that may cause adverse environmental effects, and response plans for slope failures, sedimentation pond failures, ditch failures, destabilization of waste rock piles and overburden stockpiles, or rock slides in addition to all emergency response plans identified in the environmental impact statement. The Proponent shall provide the accident and malfunction response plan to the Agency prior to the start of construction.	▪ See above.
9.3	The Proponent shall review and update the measures to be implemented to prevent accidents and malfunctions and the accidents and malfunctions response plan in consultation with Indigenous groups and relevant authorities prior to operation or within 120 days of the issuance of this Decision Statement, whichever comes first.	▪ Not applicable for this reporting year.
9.4	In the event of an accident or malfunction with the potential to cause adverse environmental effects, the Proponent shall implement the accidents and malfunctions response plan referred to in condition 9.2 or any subsequent update(s) referred to in condition 9.3 and shall:	▪ Not applicable for this reporting year.
	9.4.1 notify, as soon as possible, Indigenous groups and relevant authorities of the accident or malfunction, and notify the Agency in writing no later than 24 hours following the accident or malfunction. When notifying Indigenous groups and in the notification to the Agency, the Proponent shall specify;	
	9.4.1.1 the date the accident or malfunction occurred;	
	9.4.1.2 a description of the accident or malfunction;	
	9.4.1.3 a list of all substances potentially released in the environment as a result of the accident or malfunction.	
	9.4.2 implement immediate measures to mitigate any adverse environmental effects caused by the accident or malfunction;	
	9.4.3 submit a written report to the Agency no later than 30 days after the day on which the accident or malfunction took place. The written report shall include:	▪ Not applicable for this reporting year.
	9.4.3.1 a description of the accident or malfunction and of its adverse environmental effects;	
	9.4.3.2 the measures that were taken by the Proponent to mitigate the adverse environmental effects caused by the accident or malfunction;	
	9.4.3.3 any view(s) from Indigenous groups and advice from relevant authorities received with respect to the accident or malfunction, its adverse environmental effects and the measures taken by the Proponent to mitigate these adverse environmental effects;	
	9.4.3.4 a description of any residual adverse environmental effects and any modified or additional measures required by the Proponent to mitigate residual adverse environmental effects; and	
	9.4.3.5 details concerning the implementation of the accident or malfunction response plan referred to in condition 9.2 or any subsequent update(s) referred to in condition 9.3.	
	9.4.4 submit a written report to the Agency no later than 90 days after the day on which the accident or malfunction took place, on the changes made to avoid a subsequent occurrence of the accident or malfunction and on the implementation of any modified or additional measure(s) to mitigate and monitor residual adverse environmental effects and to carry out any required progressive reclamation, taking into account the information submitted in the written report pursuant to condition 9.4.3. The report shall include all additional views from Indigenous groups and advice from relevant authorities since the views and advice referred to in condition 9.4.3.3	▪ Not applicable for this reporting year.

	CEAA Release Condition	2021-2022 Activities
	have been received by the Proponent.	
9.5	The Proponent shall develop a communication plan in consultation with Indigenous groups. The Proponent shall develop the communication plan prior to construction and shall implement and keep it up to date during all phases of the Designated Project. The plan shall include:	▪ Communication plan for the Howse Project was submitted to the Agency in April 2018 and is currently being updated
	9.5.1 the types of accidents and malfunctions requiring the Proponent to notify the respective Indigenous groups;	
	9.5.2 the manner by which Indigenous group shall be notified by the Proponent of an accident or malfunction and of any opportunities for the Indigenous groups to assist in the response to the accident or malfunction; and	
	9.5.3 the contact information of the representatives of the Proponent that the Indigenous groups may contact and of the representatives of the respective Indigenous groups to which the Proponent provides notification.	
10. Schedules		
10.1	The Proponent shall submit to the Agency a schedule for all conditions set out in this Decision Statement no later than 30 days after the start of construction. The schedule shall detail all activities planned to fulfill each condition set out in this Decision Statement and the commencement and estimated completion month(s) and year(s) for each of these activities.	▪ Not applicable, as construction phase has not started.
10.2	The Proponent shall submit to the Agency a schedule outlining all activities required to carry out all phases of the Designated Project no later than 30 days after the start of construction. The schedule shall indicate the commencement and estimated completion month(s) and year(s) and duration of each of these activities.	▪ Not applicable, as construction phase has not started.
10.3	The Proponent shall submit to the Agency in writing an update to schedules referred to in conditions 10.1 and 10.2 every year no later than June 30, until completion of all activities referred to in each schedule.	▪ Not applicable, as construction phase has not started.
10.4	The Proponent shall provide to the Agency revised schedules if any change(s) are made to the initial schedules referred to in condition 10.1 and 10.2 or to any subsequent update(s) referred to in condition 10.3, upon revision of the schedules.	▪ Not applicable, as construction phase has not started.
11. Record Keeping		
11.1	The Proponent shall maintain all records required to demonstrate compliance with the conditions set out in this Decision Statement. The Proponent shall provide the aforementioned records to the Agency upon demand within a timeframe specified by the Agency.	▪ TSMC is committed to comply with this condition.
11.2	The Proponent shall retain all records referred to in condition 11.1 at a facility in Canada. The records shall be retained and made available throughout construction and operation and for 25 years following the end of operation or until the end of decommissioning of the Designated Project, whichever comes first. The Proponent shall notify the Agency at least 30 days prior to any change to the physical location of the facility where the records are retained, and shall provide to the Agency the address of the new location.	▪ TSMC is committed to comply with this condition.

Appendix 1 Surface Water Quality Certificates

Your P.O. #: 3000000997
Your Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your C.O.C. #: 828590-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/07/09
Report #: R2671747
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C131163
Received: 2021/06/23, 17:00

Sample Matrix: Surface Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	9	N/A	2021/06/28	STL SOP-00038	SM 23 2320-B m
Anions	9	N/A	2021/06/29	STL SOP-00014	MA.300–Ions 1.3 R3 m
Real Color	9	N/A	2021/06/28	STL SOP-00046	MA103 - Col. 2.0 R4m
Conductivity	9	N/A	2021/06/28	STL SOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	9	2021/06/28	2021/06/28	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	9	2021/06/29	2021/06/30	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	9	2021/06/26	2021/06/28	STL SOP-00062	MA.200–Mét. 1.2 R7
Ammonia Nitrogen	9	N/A	2021/06/30	STL SOP-00040	MA.300–N 2.0 R2 m
Nitrate and/or Nitrite	9	N/A	2021/06/29	STL SOP-00014	MA.300–Ions 1.3 R3 m
Dissolved Oxygen	9	N/A	2021/06/25	STL SOP-00008	MA.315–DBO 1.1 R3 m
pH	9	N/A	2021/06/28	STL SOP-00038	MA.100–pH 1.1 R3 m
pH Measured @ 15° C	9	N/A	2021/06/25	STL SOP-00016	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP	9	2021/06/29	2021/06/30	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	9	N/A	2021/06/25	STL SOP-00003	MA.303–P 1.1 R2 m
Total Phosphorus	9	N/A	2021/06/25	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Sulfides (as S2-)	9	2021/07/02	2021/07/02	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	9	2021/06/29	2021/06/30	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Total Nitrogen	9	2021/06/30	2021/07/01	STL SOP-00077	MOE:TOTNUT-E3516v1.3
Turbidity	9	N/A	2021/06/26	STL SOP-00022	MA.103–Tur. 1.0 R5 m
Un-ionized Ammonia as N @ 15° C	9	N/A	2021/07/01	STL SOP-00040	MA.300 – N 2.0 R1 m
Total Extractable Mercury - Cold Vapour (1)	9	2021/06/30	2021/06/30	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	9	2021/06/29	2021/06/30	ATL SOP 00022	EPA 366.0 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

Your P.O. #: 3000000997
Your Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your C.O.C. #: 828590-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/07/09
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CERTIFICATE OF ANALYSIS

LAB BV JOB #: C131163
Received: 2021/06/23, 17:00

Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga via Montreal
(2) This test was performed by Bureau Veritas Bedford via Montreal
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201

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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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Lab BV Job #: C131163
Report Date: 2021/07/09

TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

RESULTS OF ANALYSES OF SURFACE WATER

Lab BV ID		JH4743	JH4744	JH4745	JH4746		
Sampling Date		2021/06/08 10:17	2021/06/08 11:14	2021/06/08 11:06	2021/06/08 10:39		
COC Number		828590-01-01	828590-01-01	828590-01-01	828590-01-01		
	Units	HOW-SW1-Q1-2021	HOW-SW2-Q1-2021	HOW-SW3-Q1-2021	HOW-SW4-Q1-2021	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	4.7	3.0	2.3	4.3	0.50	2203583
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	<0.01	0.01	2203482

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Lab BV ID		JH4747	JH4748	JH4749	JH4749	JH4750		
Sampling Date		2021/06/08 09:25	2021/06/08 11:56	2021/06/08 12:41	2021/06/08 12:41	2021/06/08 11:34		
COC Number		828590-01-01	828590-01-01	828590-01-01	828590-01-01	828590-01-01		
	Units	HOW-SW5-Q1-2021	HOW-TL-Q1-2021	HOW-BL-Q1-2021	HOW-BL-Q1-2021 Lab-Dup	HOW-BC-Q1-2021	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	1.9	4.7	5.7	N/A	2.4	0.50	2203583
METALS								
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	2203482

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

Lab BV ID		JH4751		
Sampling Date		2021/06/08 08:38		
COC Number		828590-01-01		
	Units	HOW-ML-Q1-2021	RDL	QC Batch
INORGANICS				
Reactive silica (SiO2) †	mg/L	1.6	0.50	2203584
METALS				
Mercury (Hg) †	ug/L	<0.01	0.01	2203482

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JH4743	JH4744	JH4745	JH4746		
Sampling Date		2021/06/08 10:17	2021/06/08 11:14	2021/06/08 11:06	2021/06/08 10:39		
COC Number		828590-01-01	828590-01-01	828590-01-01	828590-01-01		
	Units	HOW-SW1-Q1-2021	HOW-SW2-Q1-2021	HOW-SW3-Q1-2021	HOW-SW4-Q1-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	66	80	57	23	10	2201486
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Barium (Ba)	ug/L	<2.0	2.6	<2.0	<2.0	2.0	2201486
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Boron (B) †	ug/L	<50	<50	<50	<50	50	2201486
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2201486
Calcium (Ca) †	ug/L	2200	<500	<500	2000	500	2201486
Chromium (Cr)	ug/L	<5.0	<5.0	16	<5.0	5.0	2201486
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Total Hardness (CaCO3) ††	ug/L	13000	1400	<1000	12000	1000	2201486
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Iron (Fe)	ug/L	95	230	160	<60	60	2201486
Magnesium (Mg) †	ug/L	1700	160	120	1700	100	2201486
Manganese (Mn)	ug/L	7.4	27	8.9	2.0	1.0	2201486
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2201486
Molybdenum (Mo)	ug/L	<1.0	<1.0	2.2	<1.0	1.0	2201486
Nickel (Ni)	ug/L	3.0	<2.0	14	<2.0	2.0	2201486
P2O5 ††	ug/L	<25	<25	<25	<25	25	2201486
Total phosphorous	ug/L	<10	<10	<10	<10	10	2201486
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2201486
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2201486
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2201486
Sodium (Na)	ug/L	560	<500	<500	<500	500	2201486
Strontium (Sr) †	ug/L	4.7	2.3	<2.0	4.8	2.0	2201486
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2201486
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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† Parameter is not accredited

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Lab BV Job #: C131163
Report Date: 2021/07/09

TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JH4743	JH4744	JH4745	JH4746		
Sampling Date		2021/06/08 10:17	2021/06/08 11:14	2021/06/08 11:06	2021/06/08 10:39		
COC Number		828590-01-01	828590-01-01	828590-01-01	828590-01-01		
	Units	HOW-SW1-Q1-2021	HOW-SW2-Q1-2021	HOW-SW3-Q1-2021	HOW-SW4-Q1-2021	RDL	QC Batch
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	7.0	2201486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JH4747	JH4748	JH4749	JH4750		
Sampling Date		2021/06/08 09:25	2021/06/08 11:56	2021/06/08 12:41	2021/06/08 11:34		
COC Number		828590-01-01	828590-01-01	828590-01-01	828590-01-01		
	Units	HOW-SW5-Q1-2021	HOW-TL-Q1-2021	HOW-BL-Q1-2021	HOW-BC-Q1-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	20	29	<10	95	10	2201486
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Barium (Ba)	ug/L	<2.0	2.7	<2.0	<2.0	2.0	2201486
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Boron (B) †	ug/L	<50	<50	<50	<50	50	2201486
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2201486
Calcium (Ca) †	ug/L	<500	2600	4200	<500	500	2201486
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2201486
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Total Hardness (CaCO3) ††	ug/L	1800	14000	23000	1600	1000	2201486
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Iron (Fe)	ug/L	79	120	<60	70	60	2201486
Magnesium (Mg) †	ug/L	210	1900	2900	250	100	2201486
Manganese (Mn)	ug/L	18	36	1.6	5.2	1.0	2201486
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2201486
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
P2O5 ††	ug/L	<25	<25	<25	<25	25	2201486
Total phosphorous	ug/L	<10	<10	<10	<10	10	2201486
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2201486
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2201486
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2201486
Sodium (Na)	ug/L	<500	500	700	<500	500	2201486
Strontium (Sr) †	ug/L	2.3	5.1	5.7	<2.0	2.0	2201486
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2201486
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2201486

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QC Batch = Quality Control Batch
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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JH4747	JH4748	JH4749	JH4750		
Sampling Date		2021/06/08 09:25	2021/06/08 11:56	2021/06/08 12:41	2021/06/08 11:34		
COC Number		828590-01-01	828590-01-01	828590-01-01	828590-01-01		
	Units	**HOW-SW5-Q1-2021**	**HOW-TL-Q1-2021**	**HOW-BL-Q1-2021**	**HOW-BC-Q1-2021**	**RDL**	**QC Batch**
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2201486
Zinc (Zn)	ug/L	<7.0	<7.0	13	<7.0	7.0	2201486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JH4751		
Sampling Date		2021/06/08 08:38		
COC Number		828590-01-01		
	Units	HOW-ML-Q1-2021	RDL	QC Batch
METALS				
Aluminum (Al)	ug/L	370	10	2201486
Antimony (Sb)	ug/L	<1.0	1.0	2201486
Silver (Ag)	ug/L	<1.0	1.0	2201486
Arsenic (As)	ug/L	<1.0	1.0	2201486
Barium (Ba)	ug/L	4.3	2.0	2201486
Beryllium (Be)	ug/L	<2.0	2.0	2201486
Bismuth (Bi) ††	ug/L	<1.0	1.0	2201486
Boron (B) †	ug/L	<50	50	2201486
Cadmium (Cd)	ug/L	<0.20	0.20	2201486
Calcium (Ca) †	ug/L	1700	500	2201486
Chromium (Cr)	ug/L	<5.0	5.0	2201486
Cobalt (Co)	ug/L	<1.0	1.0	2201486
Copper (Cu)	ug/L	<1.0	1.0	2201486
Total Hardness (CaCO3) ††	ug/L	8900	1000	2201486
Tin (Sn)	ug/L	<2.0	2.0	2201486
Iron (Fe)	ug/L	1000	60	2201486
Magnesium (Mg) †	ug/L	1100	100	2201486
Manganese (Mn)	ug/L	45	1.0	2201486
Mercury (Hg)	ug/L	<0.10	0.10	2201486
Molybdenum (Mo)	ug/L	<1.0	1.0	2201486
Nickel (Ni)	ug/L	<2.0	2.0	2201486
P2O5 ††	ug/L	<25	25	2201486
Total phosphorous	ug/L	<10	10	2201486
Lead (Pb)	ug/L	<0.50	0.50	2201486
Potassium (K) †	ug/L	<500	500	2201486
Selenium (Se)	ug/L	<3.0	3.0	2201486
Sodium (Na)	ug/L	<500	500	2201486
Strontium (Sr) †	ug/L	3.6	2.0	2201486
Thallium (Tl)	ug/L	<2.0	2.0	2201486
Titanium (Ti) ††	ug/L	<10	10	2201486
Uranium (U) ††	ug/L	<1.0	1.0	2201486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JH4751		
Sampling Date		2021/06/08 08:38		
COC Number		828590-01-01		
	Units	**HOW-ML-Q1-2021**	**RDL**	**QC Batch**
Vanadium (V)	ug/L	<2.0	2.0	2201486
Zinc (Zn)	ug/L	<7.0	7.0	2201486

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JH4743	JH4743	JH4744		
Sampling Date		2021/06/08 10:17	2021/06/08 10:17	2021/06/08 11:14		
COC Number		828590-01-01	828590-01-01	828590-01-01		
	Units	HOW-SW1-Q1-2021	HOW-SW1-Q1-2021 Lab-Dup	HOW-SW2-Q1-2021	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.036	N/A	0.0039	0.0010	2202054
Dissolved organic carbon †	mg/L	0.95	N/A	3.6	0.20	2201670
Dissolved oxygen †	mg/L	9.5	N/A	9.5	1.0	2201308
Nitrate (N) and Nitrite(N)	mg/L	0.16	N/A	<0.020	0.020	2201789
Nitrates (N-NO3-)	mg/L	0.16	N/A	<0.020	0.020	2201789
Nitrites (N-NO2-)	mg/L	<0.020	N/A	<0.020	0.020	2201789
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	<0.020	0.020	2202831
Orthophosphate (P)	mg/L	<0.050	N/A	<0.050	0.050	2201411
pH	pH	6.89	N/A	6.13	N/A	2202050
pH (15° C) †	pH	6.74	N/A	5.55	N/A	2201437
Phenols-4AAP	mg/L	<0.0020	N/A	<0.0020	0.0020	2202564
Real Color	UCV	7.9	N/A	31	2.0	2201889
Sulfides (S2-)	mg/L	<0.020	<0.020	<0.020	0.020	2203706
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	<0.40	0.40	2203091
Turbidity	NTU	0.76	N/A	0.51	0.10	2201522
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	<0.0005	0.0005	2201178
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	10	N/A	1.3	1.0	2202053
Bicarbonates (HCO3 as CaCO3) †	mg/L	10	N/A	1.3	1.0	2202053
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	<1.0	1.0	2202053
Chloride (Cl)	mg/L	0.31	N/A	<0.050	0.050	2201790
Sulfates (SO4)	mg/L	2.6	N/A	<0.50	0.50	2201790
Total Dissolved Solids	mg/L	34	N/A	29	10	2202339
Total suspended solids (TSS)	mg/L	<2.0	N/A	<2.0	2.0	2202327

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JH4745		JH4746	JH4747		
Sampling Date		2021/06/08 11:06		2021/06/08 10:39	2021/06/08 09:25		
COC Number		828590-01-01		828590-01-01	828590-01-01		
	Units	HOW-SW3-Q1-2021	QC Batch	HOW-SW4-Q1-2021	HOW-SW5-Q1-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0055	2202067	0.026	0.0038	0.0010	2202054
Dissolved organic carbon †	mg/L	3.5	2201670	0.86	1.0	0.20	2201670
Dissolved oxygen †	mg/L	9.4	2201308	9.4	9.4	1.0	2201308
Nitrate (N) and Nitrite(N)	mg/L	<0.020	2201789	0.15	<0.020	0.020	2201789
Nitrates (N-NO3-)	mg/L	<0.020	2201789	0.15	<0.020	0.020	2201789
Nitrites (N-NO2-)	mg/L	<0.020	2201789	<0.020	<0.020	0.020	2201789
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2202831	<0.020	<0.020	0.020	2202831
Orthophosphate (P)	mg/L	<0.050	2201411	<0.050	<0.050	0.050	2201411
pH	pH	6.08	2202062	6.63	6.31	N/A	2202050
pH (15° C) †	pH	5.27	2201437	6.59	6.05	N/A	2201437
Phenols-4AAP	mg/L	<0.0020	2202564	<0.0020	<0.0020	0.0020	2202564
Real Color	UCV	27	2201889	9.0	8.5	2.0	2201889
Sulfides (S2-)	mg/L	<0.020	2203706	<0.020	<0.020	0.020	2203706
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	2203091	<0.40	<0.40	0.40	2203091
Turbidity	NTU	0.19	2201522	1.4	0.44	0.10	2201522
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	2201178	<0.0005	<0.0005	0.0005	2201178
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.2	2202064	8.3	2.2	1.0	2202053
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.2	2202064	8.3	2.2	1.0	2202053
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2202064	<1.0	<1.0	1.0	2202053
Chloride (Cl)	mg/L	<0.050	2201790	0.27	0.079	0.050	2201790
Sulfates (SO4)	mg/L	<0.50	2201790	3.2	<0.50	0.50	2201790
Total Dissolved Solids	mg/L	25	2202339	30	26	10	2202339
Total suspended solids (TSS)	mg/L	<2.0	2202327	2.0	5.0	2.0	2202327

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JH4747	JH4748		JH4749		
Sampling Date		2021/06/08 09:25	2021/06/08 11:56		2021/06/08 12:41		
COC Number		828590-01-01	828590-01-01		828590-01-01		
	Units	HOW-SW5-Q1-2021 Lab-Dup	HOW-TL-Q1-2021	QC Batch	HOW-BL-Q1-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	N/A	0.028	2202054	0.046	0.0010	2202067
Dissolved organic carbon †	mg/L	N/A	1.3	2201670	0.48	0.20	2201670
Dissolved oxygen †	mg/L	N/A	9.4	2201308	9.6	1.0	2201308
Nitrate (N) and Nitrite(N)	mg/L	N/A	0.077	2201789	<0.020	0.020	2201789
Nitrates (N-NO3-)	mg/L	N/A	0.077	2201789	<0.020	0.020	2201789
Nitrites (N-NO2-)	mg/L	N/A	<0.020	2201789	<0.020	0.020	2201789
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	N/A	<0.020	2202831	<0.020	0.020	2202831
Orthophosphate (P)	mg/L	N/A	<0.050	2201411	<0.050	0.050	2201411
pH	pH	N/A	6.67	2202050	6.85	N/A	2202062
pH (15° C) †	pH	6.08	6.71	2201437	6.95	N/A	2201437
Phenols-4AAP	mg/L	N/A	<0.0020	2202564	<0.0020	0.0020	2202564
Real Color	UCV	N/A	13	2201889	6.4	2.0	2201889
Sulfides (S2-)	mg/L	N/A	<0.020	2203706	<0.020	0.020	2203706
TKN Total Kjeldahl Nitrogen	mg/L	N/A	<0.40	2203091	<0.40	0.40	2203091
Turbidity	NTU	N/A	0.70	2201522	0.12	0.10	2201522
Un-ionized Ammonia at 15°C †	mg/L	N/A	<0.0005	2201178	<0.0005	0.0005	2201178
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	N/A	12	2202053	23	1.0	2202064
Bicarbonates (HCO3 as CaCO3) †	mg/L	N/A	12	2202053	23	1.0	2202064
Carbonate (CO3 as CaCO3) †	mg/L	N/A	<1.0	2202053	<1.0	1.0	2202064
Chloride (Cl)	mg/L	N/A	0.19	2201790	0.14	0.050	2201790
Sulfates (SO4)	mg/L	N/A	2.1	2201790	2.1	0.50	2201790
Total Dissolved Solids	mg/L	N/A	25	2202339	42	10	2202339
Total suspended solids (TSS)	mg/L	N/A	3.0	2202327	<2.0	2.0	2202327

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JH4750		JH4751		
Sampling Date		2021/06/08 11:34		2021/06/08 08:38		
COC Number		828590-01-01		828590-01-01		
	Units	HOW-BC-Q1-2021	QC Batch	HOW-ML-Q1-2021	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.0039	2202067	0.017	0.0010	2202054
Dissolved organic carbon †	mg/L	3.7	2201670	1.5	0.20	2201670
Dissolved oxygen †	mg/L	9.5	2201308	9.4	1.0	2201308
Nitrate (N) and Nitrite(N)	mg/L	<0.020	2201789	<0.020	0.020	2201789
Nitrates (N-NO3-)	mg/L	<0.020	2201789	<0.020	0.020	2201789
Nitrites (N-NO2-)	mg/L	<0.020	2201789	<0.020	0.020	2201789
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2202831	<0.020	0.020	2202831
Orthophosphate (P)	mg/L	<0.050	2201411	<0.050	0.050	2201411
pH	pH	5.82	2202062	6.61	N/A	2202050
pH (15° C) †	pH	5.30	2201437	6.64	N/A	2201437
Phenols-4AAP	mg/L	<0.0020	2202564	<0.0020	0.0020	2202564
Real Color	UCV	32	2201889	91	2.0	2201889
Sulfides (S2-)	mg/L	<0.020	2203706	<0.020	0.020	2203706
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	2203091	<0.40	0.40	2203091
Turbidity	NTU	0.35	2201522	37	0.10	2201522
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	2201178	<0.0005	0.0005	2201178
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	<1.0	2202064	5.9	1.0	2202053
Bicarbonates (HCO3 as CaCO3) †	mg/L	<1.0	2202064	5.9	1.0	2202053
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2202064	<1.0	1.0	2202053
Chloride (Cl)	mg/L	0.065	2201790	0.054	0.050	2201790
Sulfates (SO4)	mg/L	0.56	2201790	2.5	0.50	2201790
Total Dissolved Solids	mg/L	17	2202339	15	10	2202339
Total suspended solids (TSS)	mg/L	7.0	2202327	5.0	2.0	2202327

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† Parameter is not accreditable
N/A = Not Applicable

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GENERAL COMMENTS

Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4743
Real Color: Holding time already past upon reception.: JH4743
Total Suspended Solids: Holding time already past upon reception.: JH4743
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4743
pH: Holding time already past upon reception.: JH4743
pH Measured @ 15° C: Holding time already past upon reception.: JH4743
Ortho Phosphate: Holding time already past upon reception.: JH4743
Total Dissolved Solids: Holding time already past upon reception.: JH4743
Turbidity: Holding time already past upon reception.: JH4743
Dissolved Oxygen: Holding time already past upon reception.: JH4743
Dissolved Organic Carbon: Holding time already past upon reception.: JH4743
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4744
Real Color: Holding time already past upon reception.: JH4744
Total Suspended Solids: Holding time already past upon reception.: JH4744
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4744
pH: Holding time already past upon reception.: JH4744
pH Measured @ 15° C: Holding time already past upon reception.: JH4744
Ortho Phosphate: Holding time already past upon reception.: JH4744
Total Dissolved Solids: Holding time already past upon reception.: JH4744
Turbidity: Holding time already past upon reception.: JH4744
Dissolved Oxygen: Holding time already past upon reception.: JH4744
Dissolved Organic Carbon: Holding time already past upon reception.: JH4744
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4745
Real Color: Holding time already past upon reception.: JH4745
Total Suspended Solids: Holding time already past upon reception.: JH4745
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4745
pH: Holding time already past upon reception.: JH4745
pH Measured @ 15° C: Holding time already past upon reception.: JH4745
Ortho Phosphate: Holding time already past upon reception.: JH4745
Total Dissolved Solids: Holding time already past upon reception.: JH4745
Turbidity: Holding time already past upon reception.: JH4745
Dissolved Oxygen: Holding time already past upon reception.: JH4745
Dissolved Organic Carbon: Holding time already past upon reception.: JH4745
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4746
Real Color: Holding time already past upon reception.: JH4746
Total Suspended Solids: Holding time already past upon reception.: JH4746
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4746
pH: Holding time already past upon reception.: JH4746
pH Measured @ 15° C: Holding time already past upon reception.: JH4746
Ortho Phosphate: Holding time already past upon reception.: JH4746
Total Dissolved Solids: Holding time already past upon reception.: JH4746
Turbidity: Holding time already past upon reception.: JH4746
Dissolved Oxygen: Holding time already past upon reception.: JH4746
Dissolved Organic Carbon: Holding time already past upon reception.: JH4746
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4747
Real Color: Holding time already past upon reception.: JH4747
Total Suspended Solids: Holding time already past upon reception.: JH4747
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4747
pH: Holding time already past upon reception.: JH4747
pH Measured @ 15° C: Holding time already past upon reception.: JH4747
Ortho Phosphate: Holding time already past upon reception.: JH4747

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Total Dissolved Solids: Holding time already past upon reception.: JH4747
Turbidity: Holding time already past upon reception.: JH4747
Dissolved Oxygen: Holding time already past upon reception.: JH4747
Dissolved Organic Carbon: Holding time already past upon reception.: JH4747
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4748
Real Color: Holding time already past upon reception.: JH4748
Total Suspended Solids: Holding time already past upon reception.: JH4748
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4748
pH: Holding time already past upon reception.: JH4748
pH Measured @ 15° C: Holding time already past upon reception.: JH4748
Ortho Phosphate: Holding time already past upon reception.: JH4748
Total Dissolved Solids: Holding time already past upon reception.: JH4748
Turbidity: Holding time already past upon reception.: JH4748
Dissolved Oxygen: Holding time already past upon reception.: JH4748
Dissolved Organic Carbon: Holding time already past upon reception.: JH4748
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4749
Real Color: Holding time already past upon reception.: JH4749
Total Suspended Solids: Holding time already past upon reception.: JH4749
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4749
pH: Holding time already past upon reception.: JH4749
pH Measured @ 15° C: Holding time already past upon reception.: JH4749
Ortho Phosphate: Holding time already past upon reception.: JH4749
Total Dissolved Solids: Holding time already past upon reception.: JH4749
Turbidity: Holding time already past upon reception.: JH4749
Dissolved Oxygen: Holding time already past upon reception.: JH4749
Dissolved Organic Carbon: Holding time already past upon reception.: JH4749
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4750
Real Color: Holding time already past upon reception.: JH4750
Total Suspended Solids: Holding time already past upon reception.: JH4750
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4750
pH: Holding time already past upon reception.: JH4750
pH Measured @ 15° C: Holding time already past upon reception.: JH4750
Ortho Phosphate: Holding time already past upon reception.: JH4750
Total Dissolved Solids: Holding time already past upon reception.: JH4750
Turbidity: Holding time already past upon reception.: JH4750
Dissolved Oxygen: Holding time already past upon reception.: JH4750
Dissolved Organic Carbon: Holding time already past upon reception.: JH4750
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JH4751
Real Color: Holding time already past upon reception.: JH4751
Total Suspended Solids: Holding time already past upon reception.: JH4751
Nitrate and/or Nitrite: Holding time already past upon reception.: JH4751
pH: Holding time already past upon reception.: JH4751
pH Measured @ 15° C: Holding time already past upon reception.: JH4751
Ortho Phosphate: Holding time already past upon reception.: JH4751
Total Dissolved Solids: Holding time already past upon reception.: JH4751
Turbidity: Holding time already past upon reception.: JH4751
Dissolved Oxygen: Holding time already past upon reception.: JH4751
Dissolved Organic Carbon: Holding time already past upon reception.: JH4751

Mercury analysis: Samples received at the analyzing laboratory at a temperature above 10 C. Analysis performed with client's consent.

Results relate only to the items tested.

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2201411	CLO	QC Standard	Orthophosphate (P)	2021/06/25		99	%
2201411	CLO	Spiked Blank	Orthophosphate (P)	2021/06/25		96	%
2201411	CLO	Method Blank	Orthophosphate (P)	2021/06/25	<0.050		mg/L
2201437	MPS	QC Standard	pH (15° C)	2021/06/25		99	%
2201437	MPS	Spiked Blank	pH (15° C)	2021/06/25		99	%
2201486	ZEO	Spiked Blank	Aluminum (Al)	2021/06/28		105	%
			Antimony (Sb)	2021/06/28		103	%
			Silver (Ag)	2021/06/28		103	%
			Arsenic (As)	2021/06/28		100	%
			Barium (Ba)	2021/06/28		100	%
			Beryllium (Be)	2021/06/28		102	%
			Bismuth (Bi)	2021/06/28		106	%
			Boron (B)	2021/06/28		109	%
			Cadmium (Cd)	2021/06/28		98	%
			Calcium (Ca)	2021/06/28		100	%
			Chromium (Cr)	2021/06/28		92	%
			Cobalt (Co)	2021/06/28		98	%
			Copper (Cu)	2021/06/28		95	%
			Tin (Sn)	2021/06/28		106	%
			Iron (Fe)	2021/06/28		103	%
			Magnesium (Mg)	2021/06/28		102	%
			Manganese (Mn)	2021/06/28		102	%
			Mercury (Hg)	2021/06/28		96	%
			Molybdenum (Mo)	2021/06/28		105	%
			Nickel (Ni)	2021/06/28		91	%
			Total phosphorous	2021/06/28		98	%
			Lead (Pb)	2021/06/28		99	%
			Potassium (K)	2021/06/28		100	%
			Selenium (Se)	2021/06/28		100	%
			Sodium (Na)	2021/06/28		101	%
			Strontium (Sr)	2021/06/28		105	%
			Thallium (Tl)	2021/06/28		96	%
			Titanium (Ti)	2021/06/28		105	%
			Uranium (U)	2021/06/28		102	%
			Vanadium (V)	2021/06/28		101	%
			Zinc (Zn)	2021/06/28		95	%
2201486	ZEO	Method Blank	Aluminum (Al)	2021/06/28	<10		ug/L
			Antimony (Sb)	2021/06/28	<1.0		ug/L
			Silver (Ag)	2021/06/28	<1.0		ug/L
			Arsenic (As)	2021/06/28	<1.0		ug/L
			Barium (Ba)	2021/06/28	<2.0		ug/L
			Beryllium (Be)	2021/06/28	<2.0		ug/L
			Bismuth (Bi)	2021/06/28	<1.0		ug/L
			Boron (B)	2021/06/28	<50		ug/L
			Cadmium (Cd)	2021/06/28	<0.20		ug/L
			Calcium (Ca)	2021/06/28	<500		ug/L
			Chromium (Cr)	2021/06/28	<5.0		ug/L
			Cobalt (Co)	2021/06/28	<1.0		ug/L
			Copper (Cu)	2021/06/28	<1.0		ug/L
			Total Hardness (CaCO3)	2021/06/28	<1000		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Tin (Sn)	2021/06/28	<2.0		ug/L
			Iron (Fe)	2021/06/28	<60		ug/L
			Magnesium (Mg)	2021/06/28	<100		ug/L
			Manganese (Mn)	2021/06/28	<1.0		ug/L
			Mercury (Hg)	2021/06/28	<0.10		ug/L
			Molybdenum (Mo)	2021/06/28	<1.0		ug/L
			Nickel (Ni)	2021/06/28	<2.0		ug/L
			P2O5	2021/06/28	<25		ug/L
			Total phosphorous	2021/06/28	<10		ug/L
			Lead (Pb)	2021/06/28	<0.50		ug/L
			Potassium (K)	2021/06/28	<500		ug/L
			Selenium (Se)	2021/06/28	<3.0		ug/L
			Sodium (Na)	2021/06/28	<500		ug/L
			Strontium (Sr)	2021/06/28	<2.0		ug/L
			Thallium (Tl)	2021/06/28	<2.0		ug/L
			Titanium (Ti)	2021/06/28	<10		ug/L
			Uranium (U)	2021/06/28	<1.0		ug/L
			Vanadium (V)	2021/06/28	<2.0		ug/L
			Zinc (Zn)	2021/06/28	<7.0		ug/L
2201522	EGL	Spiked Blank	Turbidity	2021/06/26		98	%
2201522	EGL	Method Blank	Turbidity	2021/06/26	<0.10		NTU
2201670	AHK	Spiked Blank	Dissolved organic carbon	2021/06/28		100	%
2201670	AHK	Method Blank	Dissolved organic carbon	2021/06/28	<0.20		mg/L
2201789	TGU	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/06/29		108	%
			Nitrates (N-NO3-)	2021/06/29		108	%
			Nitrites (N-NO2-)	2021/06/29		109	%
2201789	TGU	Method Blank	Nitrate (N) and Nitrite(N)	2021/06/29	<0.020		mg/L
			Nitrates (N-NO3-)	2021/06/29	<0.020		mg/L
			Nitrites (N-NO2-)	2021/06/29	<0.020		mg/L
2201790	TGU	Spiked Blank	Chloride (Cl)	2021/06/29		110	%
			Sulfates (SO4)	2021/06/29		110	%
2201790	TGU	Method Blank	Chloride (Cl)	2021/06/29	<0.050		mg/L
			Sulfates (SO4)	2021/06/29	<0.50		mg/L
2201889	LMB	Spiked Blank	Real Color	2021/06/28		98	%
2201889	LMB	Method Blank	Real Color	2021/06/28	<2.0		UCV
2202050	ANB	Spiked Blank	pH	2021/06/28		101	%
2202053	ANB	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/06/28		100	%
			Carbonate (CO3 as CaCO3)	2021/06/28		100	%
2202053	ANB	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/06/28	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2021/06/28	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2021/06/28	<1.0		mg/L
2202054	ANB	Spiked Blank	Conductivity	2021/06/28		102	%
2202054	ANB	Method Blank	Conductivity	2021/06/28	<0.0010		mS/cm
2202062	ANB	Spiked Blank	pH	2021/06/28		101	%
2202064	ANB	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/06/28		100	%
			Carbonate (CO3 as CaCO3)	2021/06/28		100	%
2202064	ANB	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/06/28	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2021/06/28	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2021/06/28	<1.0		mg/L
2202067	ANB	Spiked Blank	Conductivity	2021/06/28		102	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2202067	ANB	Method Blank	Conductivity	2021/06/28	<0.0010		mS/cm
2202327	PS5	Spiked Blank	Total suspended solids (TSS)	2021/06/30		94	%
2202327	PS5	Method Blank	Total suspended solids (TSS)	2021/06/30	<2.0		mg/L
2202339	PS5	Spiked Blank	Total Dissolved Solids	2021/06/30		99	%
2202339	PS5	Method Blank	Total Dissolved Solids	2021/06/30	<10		mg/L
2202564	AJ1	Spiked Blank	Phenols-4AAP	2021/06/30		95	%
2202564	AJ1	Method Blank	Phenols-4AAP	2021/06/30	<0.0020		mg/L
2202831	CLO	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/06/30		106	%
2202831	CLO	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/06/30	<0.020		mg/L
2203091	AJ1	Spiked Blank	TKN Total Kjeldahl Nitrogen	2021/07/01		102	%
2203091	AJ1	Method Blank	TKN Total Kjeldahl Nitrogen	2021/07/01	<0.40		mg/L
2203482	éCO	Matrix Spike [JH4749-07]	Mercury (Hg)	2021/06/30		98	%
2203482	éCO	Spiked Blank	Mercury (Hg)	2021/06/30		98	%
2203482	éCO	Method Blank	Mercury (Hg)	2021/06/30	<0.01		ug/L
2203583	EMT	Matrix Spike	Reactive silica (SiO2)	2021/06/30		92	%
2203583	EMT	Spiked Blank	Reactive silica (SiO2)	2021/06/30		97	%
2203583	EMT	Method Blank	Reactive silica (SiO2)	2021/06/30	<0.50		mg/L
2203584	EMT	Matrix Spike	Reactive silica (SiO2)	2021/06/30		NC	%
2203584	EMT	Spiked Blank	Reactive silica (SiO2)	2021/06/30		97	%
2203584	EMT	Method Blank	Reactive silica (SiO2)	2021/06/30	<0.50		mg/L
2203706	CLO	Spiked Blank	Sulfides (S2-)	2021/07/02		93	%
2203706	CLO	Method Blank	Sulfides (S2-)	2021/07/02	<0.020		mg/L

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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Lab BV Job #: C131163
Report Date: 2021/07/09

TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUATERLY SURFACE WATER
Site Location: NL SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: AC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

<Original signed by>

Brad Newman, Scientific Specialist

<Original signed by>

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

<Original signed by>

Jonathan Fauvel, B.Sc., Chemist, Montreal, Manager of Inorganics

<Original signed by>

Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

<Original signed by>

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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For Service Group specific validation please refer to the Validation Signature Page.

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Your Project #: HOWSE QUARTELY SURFACE WATER
Your C.O.C. #: C832297-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/07/29
Report #: R2677527
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C135523
Received: 2021/07/15, 09:00

Sample Matrix: Surface Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	9	N/A	2021/07/19	STL SOP-00038	SM 23 2320-B m
Anions	2	N/A	2021/07/17	STL SOP-00014	MA.300–Ions 1.3 R3 m
Anions	5	N/A	2021/07/18	STL SOP-00014	MA.300–Ions 1.3 R3 m
Anions	2	N/A	2021/07/20	STL SOP-00014	MA.300–Ions 1.3 R3 m
Real Color	9	N/A	2021/07/19	STL SOP-00046	MA103 - Col. 2.0 R4m
Conductivity	9	N/A	2021/07/19	STL SOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	9	2021/07/16	2021/07/17	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	2	2021/07/16	2021/07/19	STL SOP-00015	MA.104–S.S. 2.0 m
Total Suspended Solids	7	2021/07/23	2021/07/24	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	8	2021/07/20	2021/07/23	STL SOP-00062	MA.200–Mét. 1.2 R7
Total Extractable Metals by ICP	1	2021/07/20	2021/07/24	STL SOP-00062	MA.200–Mét. 1.2 R7
Ammonia Nitrogen	9	N/A	2021/07/20	STL SOP-00040	MA.300–N 2.0 R2 m
Nitrate and/or Nitrite	2	N/A	2021/07/17	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	5	N/A	2021/07/18	STL SOP-00014	MA.300–Ions 1.3 R3 m
Nitrate and/or Nitrite	2	N/A	2021/07/20	STL SOP-00014	MA.300–Ions 1.3 R3 m
Dissolved Oxygen	9	N/A	2021/07/15	STL SOP-00008	MA.315–DBO 1.1 R3 m
pH	9	N/A	2021/07/19	STL SOP-00038	MA.100–pH 1.1 R3 m
pH Measured @ 15° C	9	N/A	2021/07/16	STL SOP-00016	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP	9	2021/07/20	2021/07/20	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	9	N/A	2021/07/15	STL SOP-00003	MA.303–P 1.1 R2 m
Total Phosphorus	9	N/A	2021/07/15	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Sulfides (as S2-)	9	2021/07/20	2021/07/20	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	9	2021/07/16	2021/07/19	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Total Nitrogen	9	2021/07/21	2021/07/21	STL SOP-00077	MOE:TOTNUT-E3516v1.3
Turbidity	9	N/A	2021/07/15	STL SOP-00022	MA.103–Tur. 1.0 R5 m
Un-ionized Ammonia as N @ 15° C	9	N/A	2021/07/21	STL SOP-00040	MA.300 – N 2.0 R1 m
Total Extractable Mercury - Cold Vapour (1)	9	2021/07/21	2021/07/21	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	9	2021/07/21	2021/07/22	ATL SOP 00022	EPA 366.0 m

Remarks:

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Your Project #: HOWSE QUARTELY SURFACE WATER
Your C.O.C. #: C832297-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/07/29
Report #: R2677527
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C135523
Received: 2021/07/15, 09:00

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga via Montreal
(2) This test was performed by Bureau Veritas Bedford via Montreal
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201
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BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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RESULTS OF ANALYSES OF SURFACE WATER

Lab BV ID		JJ9031	JJ9032	JJ9033	JJ9034		
Sampling Date		2021/07/09 11:25	2021/07/09 11:39	2021/07/09 11:56	2021/07/09 12:42		
COC Number		C832297-01-01	C832297-01-01	C832297-01-01	C832297-01-01		
	Units	HOW-SW5-Q2-2021	HOW-SWBC-Q2-2021	HOW-SWTL-Q2-2021	HOW-SWBL-Q2-2021	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	0.72	3.2	4.7	5.8	0.50	2211613
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	<0.01	0.01	2210959

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Lab BV ID		JJ9036	JJ9037	JJ9038	JJ9039		
Sampling Date		2021/07/09 13:50	2021/07/09 14:00	2021/07/09 14:56	2021/07/09 15:02		
COC Number		C832297-01-01	C832297-01-01	C832297-01-01	C832297-01-01		
	Units	HOW-SW4-Q2-2021	HOW-SW1-Q2-2021	HOW-SW3-Q2-2021	HOW-SW2-Q2-2021	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	3.9	4.4	1.5	3.7	0.50	2211613
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	<0.01	0.01	2210959

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Lab BV ID		JJ9040		
Sampling Date		2021/07/09 17:29		
COC Number		C832297-01-01		
	Units	HOW-SWML-Q2-2021	RDL	QC Batch
INORGANICS				
Reactive silica (SiO2) †	mg/L	1.3	0.50	2211613
METALS				
Mercury (Hg) †	ug/L	<0.01	0.01	2210959

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JJ9031	JJ9032	JJ9033	JJ9034		
Sampling Date		2021/07/09 11:25	2021/07/09 11:39	2021/07/09 11:56	2021/07/09 12:42		
COC Number		C832297-01-01	C832297-01-01	C832297-01-01	C832297-01-01		
	Units	HOW-SW5-Q2-2021	HOW-SWBC-Q2-2021	HOW-SWTL-Q2-2021	HOW-SWBL-Q2-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	11	150	<10	<10	10	2210215
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Barium (Ba)	ug/L	<2.0	2.2	2.5	<2.0	2.0	2210215
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Boron (B) †	ug/L	<50	<50	<50	<50	50	2210215
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2210215
Calcium (Ca) †	ug/L	<500	<500	2800	4200	500	2210215
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2210215
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Total Hardness (CaCO3) ††	ug/L	1400	1700	16000	22000	1000	2210215
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Iron (Fe)	ug/L	<60	140	<60	<60	60	2210215
Magnesium (Mg) †	ug/L	170	300	2100	2900	100	2210215
Manganese (Mn)	ug/L	4.2	11	4.9	2.4	1.0	2210215
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2210215
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
P2O5 ††	ug/L	<25	<25	<25	<25	25	2210215
Total phosphorous	ug/L	<10	<10	<10	<10	10	2210215
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2210215
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2210215
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2210215
Sodium (Na)	ug/L	<500	<500	600	760	500	2210215
Strontium (Sr) †	ug/L	<2.0	<2.0	5.5	6.1	2.0	2210215
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2210215
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Zinc (Zn)	ug/L	7.3	<7.0	<7.0	<7.0	7.0	2210215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JJ9036	JJ9037	JJ9038	JJ9039		
Sampling Date		2021/07/09 13:50	2021/07/09 14:00	2021/07/09 14:56	2021/07/09 15:02		
COC Number		C832297-01-01	C832297-01-01	C832297-01-01	C832297-01-01		
	Units	HOW-SW4-Q2-2021	HOW-SW1-Q2-2021	HOW-SW3-Q2-2021	HOW-SW2-Q2-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	10	12	55	80	10	2210215
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Barium (Ba)	ug/L	<2.0	<2.0	<2.0	2.9	2.0	2210215
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Boron (B) †	ug/L	<50	<50	<50	<50	50	2210215
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2210215
Calcium (Ca) †	ug/L	1900	2300	<500	<500	500	2210215
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2210215
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Total Hardness (CaCO3) ††	ug/L	12000	13000	<1000	1400	1000	2210215
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Iron (Fe)	ug/L	<60	<60	150	230	60	2210215
Magnesium (Mg) †	ug/L	1700	1800	130	180	100	2210215
Manganese (Mn)	ug/L	1.6	3.4	10	43	1.0	2210215
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2210215
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
P2O5 ††	ug/L	<25	<25	<25	<25	25	2210215
Total phosphorous	ug/L	<10	<10	<10	<10	10	2210215
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2210215
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2210215
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2210215
Sodium (Na)	ug/L	530	600	<500	<500	500	2210215
Strontium (Sr) †	ug/L	4.9	5.2	<2.0	2.7	2.0	2210215
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2210215
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2210215
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2210215
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	7.0	2210215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JJ9040		
Sampling Date		2021/07/09 17:29		
COC Number		C832297-01-01		
	Units	HOW-SWML-Q2-2021	RDL	QC Batch
METALS				
Aluminum (Al)	ug/L	56	10	2210215
Antimony (Sb)	ug/L	<1.0	1.0	2210215
Silver (Ag)	ug/L	<1.0	1.0	2210215
Arsenic (As)	ug/L	<1.0	1.0	2210215
Barium (Ba)	ug/L	<2.0	2.0	2210215
Beryllium (Be)	ug/L	<2.0	2.0	2210215
Bismuth (Bi) ††	ug/L	<1.0	1.0	2210215
Boron (B) †	ug/L	<50	50	2210215
Cadmium (Cd)	ug/L	<0.20	0.20	2210215
Calcium (Ca) †	ug/L	1600	500	2210215
Chromium (Cr)	ug/L	<5.0	5.0	2210215
Cobalt (Co)	ug/L	<1.0	1.0	2210215
Copper (Cu)	ug/L	<1.0	1.0	2210215
Total Hardness (CaCO3) ††	ug/L	8500	1000	2210215
Tin (Sn)	ug/L	<2.0	2.0	2210215
Iron (Fe)	ug/L	110	60	2210215
Magnesium (Mg) †	ug/L	1100	100	2210215
Manganese (Mn)	ug/L	6.8	1.0	2210215
Mercury (Hg)	ug/L	<0.10	0.10	2210215
Molybdenum (Mo)	ug/L	<1.0	1.0	2210215
Nickel (Ni)	ug/L	<2.0	2.0	2210215
P2O5 ††	ug/L	<25	25	2210215
Total phosphorous	ug/L	<10	10	2210215
Lead (Pb)	ug/L	<0.50	0.50	2210215
Potassium (K) †	ug/L	<500	500	2210215
Selenium (Se)	ug/L	<3.0	3.0	2210215
Sodium (Na)	ug/L	<500	500	2210215
Strontium (Sr) †	ug/L	3.6	2.0	2210215
Thallium (Tl)	ug/L	<2.0	2.0	2210215
Titanium (Ti) ††	ug/L	<10	10	2210215
Uranium (U) ††	ug/L	<1.0	1.0	2210215
Vanadium (V)	ug/L	<2.0	2.0	2210215
Zinc (Zn)	ug/L	<7.0	7.0	2210215

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JJ9031	JJ9031		JJ9032		
Sampling Date		2021/07/09 11:25	2021/07/09 11:25		2021/07/09 11:39		
COC Number		C832297-01-01	C832297-01-01		C832297-01-01		
	Units	HOW-SW5-Q2-2021	HOW-SW5-Q2-2021 Lab-Dup	QC Batch	HOW-SWBC-Q2-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0042	N/A	2209544	0.0064	0.0010	2209544
Dissolved organic carbon †	mg/L	1.5	N/A	2209248	7.4	0.20	2209248
Dissolved oxygen †	mg/L	7.9	N/A	2208436	7.7	1.0	2208436
Nitrate (N) and Nitrite(N)	mg/L	<0.020	N/A	2209247	<0.020	0.020	2209247
Nitrates (N-NO3-)	mg/L	<0.020	N/A	2209247	<0.020	0.020	2209247
Nitrites (N-NO2-)	mg/L	<0.020	N/A	2209247	<0.020	0.020	2209247
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	2209962	<0.020	0.020	2209962
Orthophosphate (P)	mg/L	<0.050	<0.050	2208628	<0.050	0.050	2208628
pH	pH	6.10	N/A	2209541	5.36	N/A	2209541
pH (15° C) †	pH	6.47	N/A	2209164	5.27	N/A	2209164
Phenols-4AAP	mg/L	<0.0020	N/A	2210028	<0.0020	0.0020	2210028
Real Color	UCV	6.0	N/A	2209779	56	2.0	2209779
Sulfides (S2-)	mg/L	<0.020	N/A	2210007	<0.020	0.020	2210007
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	2210722	<0.40	0.40	2210722
Turbidity	NTU	0.45	N/A	2208507	0.36	0.10	2208507
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	2208332	<0.0005	0.0005	2208332
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.9	N/A	2209542	<1.0	1.0	2209542
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.9	N/A	2209542	<1.0	1.0	2209542
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	2209542	<1.0	1.0	2209542
Chloride (Cl)	mg/L	0.074	N/A	2209249	0.059	0.050	2209249
Sulfates (SO4)	mg/L	<0.50	N/A	2209249	<0.50	0.50	2209249
Total Dissolved Solids	mg/L	11	N/A	2208928	22	10	2208928
Total suspended solids (TSS)	mg/L	9.0	N/A	2208935	2.0	2.0	2211733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JJ9032		JJ9033	JJ9034		
Sampling Date		2021/07/09 11:39		2021/07/09 11:56	2021/07/09 12:42		
COC Number		C832297-01-01		C832297-01-01	C832297-01-01		
	Units	HOW-SWBC-Q2-2021 Lab-Dup	QC Batch	HOW-SWTL-Q2-2021	HOW-SWBL-Q2-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0064	2209544	0.035	0.050	0.0010	2209544
Dissolved organic carbon †	mg/L	N/A	2209248	1.5	1.3	0.20	2209248
Dissolved oxygen †	mg/L	N/A	2208436	8.0	8.2	1.0	2208436
Nitrate (N) and Nitrite(N)	mg/L	N/A	2209247	0.77	<0.020	0.020	2209661
Nitrates (N-NO3-)	mg/L	N/A	2209247	0.77	<0.020	0.020	2209661
Nitrites (N-NO2-)	mg/L	N/A	2209247	<0.020	<0.020	0.020	2209661
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	N/A	2209962	<0.020	<0.020	0.020	2209962
Orthophosphate (P)	mg/L	N/A	2208628	<0.050	<0.050	0.050	2208628
pH	pH	5.32	2209541	6.43	6.58	N/A	2209541
pH (15° C) †	pH	N/A	2209164	7.05	7.06	N/A	2209164
Phenols-4AAP	mg/L	N/A	2210028	<0.0020	<0.0020	0.0020	2210028
Real Color	UCV	N/A	2209779	6.5	4.1	2.0	2209779
Sulfides (S2-)	mg/L	N/A	2210007	<0.020	<0.020	0.020	2210007
TKN Total Kjeldahl Nitrogen	mg/L	N/A	2210722	<0.40	<0.40	0.40	2210722
Turbidity	NTU	N/A	2208507	0.33	0.14	0.10	2208507
Un-ionized Ammonia at 15°C †	mg/L	N/A	2208332	<0.0005	<0.0005	0.0005	2208332
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	<1.0	2209542	15	24	1.0	2209542
Bicarbonates (HCO3 as CaCO3) †	mg/L	<1.0	2209542	15	24	1.0	2209542
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2209542	<1.0	<1.0	1.0	2209542
Chloride (Cl)	mg/L	N/A	2209249	0.29	0.16	0.050	2209647
Sulfates (SO4)	mg/L	N/A	2209249	2.4	1.8	0.50	2209647
Total Dissolved Solids	mg/L	N/A	2208928	32	40	10	2208928
Total suspended solids (TSS)	mg/L	N/A	2211733	3.0	5.0	2.0	2211733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JJ9036	JJ9036		JJ9037		
Sampling Date		2021/07/09 13:50	2021/07/09 13:50		2021/07/09 14:00		
COC Number		C832297-01-01	C832297-01-01		C832297-01-01		
	Units	HOW-SW4-Q2-2021	HOW-SW4-Q2-2021 Lab-Dup	QC Batch	HOW-SW1-Q2-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.028	N/A	2209544	0.030	0.0010	2209544
Dissolved organic carbon †	mg/L	1.5	N/A	2209248	1.4	0.20	2209248
Dissolved oxygen †	mg/L	8.0	N/A	2208436	8.0	1.0	2208436
Nitrate (N) and Nitrite(N)	mg/L	0.15	N/A	2209247	0.12	0.020	2209247
Nitrates (N-NO3-)	mg/L	0.15	N/A	2209247	0.12	0.020	2209247
Nitrites (N-NO2-)	mg/L	<0.020	N/A	2209247	<0.020	0.020	2209247
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	2209962	<0.020	0.020	2209962
Orthophosphate (P)	mg/L	<0.050	N/A	2208628	<0.050	0.050	2208628
pH	pH	6.57	N/A	2209541	6.29	N/A	2209541
pH (15° C) †	pH	6.86	N/A	2209164	7.00	N/A	2209164
Phenols-4AAP	mg/L	<0.0020	N/A	2210028	<0.0020	0.0020	2210028
Real Color	UCV	7.4	N/A	2209779	7.2	2.0	2209779
Sulfides (S2-)	mg/L	<0.020	N/A	2210007	<0.020	0.020	2210007
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	2210722	<0.40	0.40	2210722
Turbidity	NTU	1.2	0.96	2208507	0.56	0.10	2208507
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	2208332	<0.0005	0.0005	2208332
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	10	N/A	2209542	12	1.0	2209542
Bicarbonates (HCO3 as CaCO3) †	mg/L	10	N/A	2209542	12	1.0	2209542
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	2209542	<1.0	1.0	2209542
Chloride (Cl)	mg/L	0.25	N/A	2209249	0.27	0.050	2209249
Sulfates (SO4)	mg/L	2.5	N/A	2209249	2.0	0.50	2209249
Total Dissolved Solids	mg/L	25	N/A	2208928	27	10	2208928
Total suspended solids (TSS)	mg/L	2.0	N/A	2211733	4.0	2.0	2208935

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JJ9038	JJ9038		JJ9039		
Sampling Date		2021/07/09 14:56	2021/07/09 14:56		2021/07/09 15:02		
COC Number		C832297-01-01	C832297-01-01		C832297-01-01		
	Units	HOW-SW3-Q2-2021	HOW-SW3-Q2-2021 Lab-Dup	QC Batch	HOW-SW2-Q2-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0044	N/A	2209544	0.0051	0.0010	2209544
Dissolved organic carbon †	mg/L	4.6	N/A	2209248	4.7	0.20	2209248
Dissolved oxygen †	mg/L	7.5	N/A	2208436	8.0	1.0	2208436
Nitrate (N) and Nitrite(N)	mg/L	<0.020	N/A	2209247	<0.020	0.020	2209247
Nitrates (N-NO3-)	mg/L	<0.020	N/A	2209247	<0.020	0.020	2209247
Nitrites (N-NO2-)	mg/L	<0.020	N/A	2209247	<0.020	0.020	2209247
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	2209962	<0.020	0.020	2209962
Orthophosphate (P)	mg/L	<0.050	N/A	2208628	<0.050	0.050	2208628
pH	pH	5.56	N/A	2209541	5.63	N/A	2209541
pH (15° C) †	pH	5.54	N/A	2209164	5.64	N/A	2209164
Phenols-4AAP	mg/L	<0.0020	N/A	2210028	<0.0020	0.0020	2210028
Real Color	UCV	30	N/A	2209779	31	2.0	2209779
Sulfides (S2-)	mg/L	<0.020	N/A	2210007	<0.020	0.020	2210007
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	2210722	<0.40	0.40	2210722
Turbidity	NTU	0.37	N/A	2208555	0.59	0.10	2208507
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	2208332	<0.0005	0.0005	2208332
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	<1.0	N/A	2209542	<1.0	1.0	2209542
Bicarbonates (HCO3 as CaCO3) †	mg/L	<1.0	N/A	2209542	<1.0	1.0	2209542
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	2209542	<1.0	1.0	2209542
Chloride (Cl)	mg/L	<0.050	N/A	2209249	0.078	0.050	2209249
Sulfates (SO4)	mg/L	<0.50	N/A	2209249	<0.50	0.50	2209249
Total Dissolved Solids	mg/L	13	N/A	2208928	14	10	2208928
Total suspended solids (TSS)	mg/L	3.0	N/A	2211733	2.0	2.0	2211733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JJ9040	JJ9040		
Sampling Date		2021/07/09 17:29	2021/07/09 17:29		
COC Number		C832297-01-01	C832297-01-01		
	Units	HOW-SWML-Q2-2021	HOW-SWML-Q2-2021 Lab-Dup	RDL	QC Batch
CONVENTIONALS					
Conductivity	mS/cm	0.020	N/A	0.0010	2209544
Dissolved organic carbon †	mg/L	2.1	N/A	0.20	2209248
Dissolved oxygen †	mg/L	7.9	N/A	1.0	2208436
Nitrate (N) and Nitrite(N)	mg/L	<0.020	N/A	0.020	2209247
Nitrates (N-NO3-)	mg/L	<0.020	N/A	0.020	2209247
Nitrites (N-NO2-)	mg/L	<0.020	N/A	0.020	2209247
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	0.020	2209962
Orthophosphate (P)	mg/L	<0.050	N/A	0.050	2208628
pH	pH	6.26	N/A	N/A	2209541
pH (15° C) †	pH	6.77	N/A	N/A	2209164
Phenols-4AAP	mg/L	<0.0020	N/A	0.0020	2210028
Real Color	UCV	15	15	2.0	2209779
Sulfides (S2-)	mg/L	<0.020	N/A	0.020	2210007
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	0.40	2210722
Turbidity	NTU	4.7	N/A	0.10	2208507
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	0.0005	2208332
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	6.0	N/A	1.0	2209542
Bicarbonates (HCO3 as CaCO3) †	mg/L	6.0	N/A	1.0	2209542
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	1.0	2209542
Chloride (Cl)	mg/L	<0.050	N/A	0.050	2209249
Sulfates (SO4)	mg/L	2.5	N/A	0.50	2209249
Total Dissolved Solids	mg/L	21	N/A	10	2208928
Total suspended solids (TSS)	mg/L	3.0	N/A	2.0	2211733

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
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GENERAL COMMENTS

Real Color: Holding time already past upon reception.: JJ9031
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9031
pH: Holding time already past upon reception.: JJ9031
pH Measured @ 15° C: Holding time already past upon reception.: JJ9031
Ortho Phosphate: Holding time already past upon reception.: JJ9031
Turbidity: Holding time already past upon reception.: JJ9031
Dissolved Oxygen: Holding time already past upon reception.: JJ9031
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9031
Real Color: Holding time already past upon reception.: JJ9032
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9032
pH: Holding time already past upon reception.: JJ9032
pH Measured @ 15° C: Holding time already past upon reception.: JJ9032
Ortho Phosphate: Holding time already past upon reception.: JJ9032
Turbidity: Holding time already past upon reception.: JJ9032
Dissolved Oxygen: Holding time already past upon reception.: JJ9032
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9032
Real Color: Holding time already past upon reception.: JJ9033
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9033
pH: Holding time already past upon reception.: JJ9033
pH Measured @ 15° C: Holding time already past upon reception.: JJ9033
Ortho Phosphate: Holding time already past upon reception.: JJ9033
Turbidity: Holding time already past upon reception.: JJ9033
Dissolved Oxygen: Holding time already past upon reception.: JJ9033
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9033
Real Color: Holding time already past upon reception.: JJ9034
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9034
pH: Holding time already past upon reception.: JJ9034
pH Measured @ 15° C: Holding time already past upon reception.: JJ9034
Ortho Phosphate: Holding time already past upon reception.: JJ9034
Turbidity: Holding time already past upon reception.: JJ9034
Dissolved Oxygen: Holding time already past upon reception.: JJ9034
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9034
Real Color: Holding time already past upon reception.: JJ9036
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9036
pH: Holding time already past upon reception.: JJ9036
pH Measured @ 15° C: Holding time already past upon reception.: JJ9036
Ortho Phosphate: Holding time already past upon reception.: JJ9036
Turbidity: Holding time already past upon reception.: JJ9036
Dissolved Oxygen: Holding time already past upon reception.: JJ9036
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9036
Real Color: Holding time already past upon reception.: JJ9037
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9037
pH: Holding time already past upon reception.: JJ9037
pH Measured @ 15° C: Holding time already past upon reception.: JJ9037
Ortho Phosphate: Holding time already past upon reception.: JJ9037
Turbidity: Holding time already past upon reception.: JJ9037
Dissolved Oxygen: Holding time already past upon reception.: JJ9037
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9037
Real Color: Holding time already past upon reception.: JJ9038
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9038
pH: Holding time already past upon reception.: JJ9038
pH Measured @ 15° C: Holding time already past upon reception.: JJ9038
Ortho Phosphate: Holding time already past upon reception.: JJ9038
Turbidity: Holding time already past upon reception.: JJ9038

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Dissolved Oxygen: Holding time already past upon reception.: JJ9038
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9038
Real Color: Holding time already past upon reception.: JJ9039
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9039
pH: Holding time already past upon reception.: JJ9039
pH Measured @ 15° C: Holding time already past upon reception.: JJ9039
Ortho Phosphate: Holding time already past upon reception.: JJ9039
Turbidity: Holding time already past upon reception.: JJ9039
Dissolved Oxygen: Holding time already past upon reception.: JJ9039
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9039
Real Color: Holding time already past upon reception.: JJ9040
Nitrate and/or Nitrite: Holding time already past upon reception.: JJ9040
pH: Holding time already past upon reception.: JJ9040
pH Measured @ 15° C: Holding time already past upon reception.: JJ9040
Ortho Phosphate: Holding time already past upon reception.: JJ9040
Turbidity: Holding time already past upon reception.: JJ9040
Dissolved Oxygen: Holding time already past upon reception.: JJ9040
Dissolved Organic Carbon: Sample received > 24hrs after sampling, filtered and preserved in the lab.: JJ9040

CONVENTIONAL PARAMETERS (SURFACE WATER)

Dissolved Oxygen: Sample container contained head space.: JJ9031, JJ9036, JJ9039 and JJ9040
Total Suspended solids: Holding time not respected for JJ9032, JJ9033, JJ9034, JJ9036, JJ9038, JJ9039 and JJ9040.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2208507	MPS	Spiked Blank	Turbidity	2021/07/15		101	%
2208507	MPS	Method Blank	Turbidity	2021/07/15	<0.10		NTU
2208555	MPS	Spiked Blank	Turbidity	2021/07/15		99	%
2208555	MPS	Method Blank	Turbidity	2021/07/15	<0.10		NTU
2208628	CLO	Spiked Blank	Orthophosphate (P)	2021/07/15		91	%
2208628	CLO	Method Blank	Orthophosphate (P)	2021/07/15	<0.050		mg/L
2208928	SKL	Spiked Blank	Total Dissolved Solids	2021/07/19		98	%
2208928	SKL	Method Blank	Total Dissolved Solids	2021/07/19	<10		mg/L
2208935	PS5	Spiked Blank	Total suspended solids (TSS)	2021/07/19		97	%
2208935	PS5	Method Blank	Total suspended solids (TSS)	2021/07/19	<2.0		mg/L
2209164	ZDI	QC Standard	pH (15° C)	2021/07/16		102	%
2209164	ZDI	Spiked Blank	pH (15° C)	2021/07/16		102	%
2209247	VPA	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/07/17		103	%
			Nitrates (N-NO3-)	2021/07/17		104	%
			Nitrites (N-NO2-)	2021/07/17		101	%
2209247	VPA	Method Blank	Nitrate (N) and Nitrite(N)	2021/07/17	<0.020		mg/L
			Nitrates (N-NO3-)	2021/07/17	<0.020		mg/L
			Nitrites (N-NO2-)	2021/07/17	<0.020		mg/L
2209248	AHK	Spiked Blank	Dissolved organic carbon	2021/07/17		101	%
2209248	AHK	Method Blank	Dissolved organic carbon	2021/07/17	<0.20		mg/L
2209249	VPA	Spiked Blank	Chloride (Cl)	2021/07/17		101	%
			Sulfates (SO4)	2021/07/17		100	%
2209249	VPA	Method Blank	Chloride (Cl)	2021/07/17	<0.050		mg/L
			Sulfates (SO4)	2021/07/17	<0.50		mg/L
2209541	YAZ	Spiked Blank	pH	2021/07/19		101	%
2209542	YAZ	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/07/19		102	%
			Carbonate (CO3 as CaCO3)	2021/07/19		102	%
2209542	YAZ	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/07/19	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2021/07/19	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2021/07/19	<1.0		mg/L
2209544	YAZ	Spiked Blank	Conductivity	2021/07/19		106	%
2209544	YAZ	Method Blank	Conductivity	2021/07/19	<0.0010		mS/cm
2209647	ABT	Spiked Blank	Chloride (Cl)	2021/07/20		101	%
			Sulfates (SO4)	2021/07/20		99	%
2209647	ABT	Method Blank	Chloride (Cl)	2021/07/20	<0.050		mg/L
			Sulfates (SO4)	2021/07/20	<0.50		mg/L
2209661	ABT	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/07/20		102	%
			Nitrates (N-NO3-)	2021/07/20		103	%
			Nitrites (N-NO2-)	2021/07/20		101	%
2209661	ABT	Method Blank	Nitrate (N) and Nitrite(N)	2021/07/20	<0.020		mg/L
			Nitrates (N-NO3-)	2021/07/20	<0.020		mg/L
			Nitrites (N-NO2-)	2021/07/20	<0.020		mg/L
2209779	LMB	Spiked Blank	Real Color	2021/07/19		98	%
2209779	LMB	Method Blank	Real Color	2021/07/19	<2.0		UCV
2209962	CLO	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/07/20		100	%
2209962	CLO	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/07/20	<0.020		mg/L
2210007	EPW	Spiked Blank	Sulfides (S2-)	2021/07/20		92	%
2210007	EPW	Method Blank	Sulfides (S2-)	2021/07/20	<0.020		mg/L
2210028	AJ1	QC Standard	Phenols-4AAP	2021/07/20		96	%
2210028	AJ1	Spiked Blank	Phenols-4AAP	2021/07/20		107	%
2210028	AJ1	Method Blank	Phenols-4AAP	2021/07/20	<0.0020		mg/L
2210215	MZS	Spiked Blank	Aluminum (Al)	2021/07/23		98	%
			Antimony (Sb)	2021/07/23		109	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Silver (Ag)	2021/07/23		110	%
			Arsenic (As)	2021/07/23		106	%
			Barium (Ba)	2021/07/23		109	%
			Beryllium (Be)	2021/07/23		103	%
			Bismuth (Bi)	2021/07/23		105	%
			Boron (B)	2021/07/23		120	%
			Cadmium (Cd)	2021/07/23		102	%
			Calcium (Ca)	2021/07/23		97	%
			Chromium (Cr)	2021/07/23		98	%
			Cobalt (Co)	2021/07/23		98	%
			Copper (Cu)	2021/07/23		95	%
			Tin (Sn)	2021/07/23		110	%
			Iron (Fe)	2021/07/23		100	%
			Magnesium (Mg)	2021/07/23		95	%
			Manganese (Mn)	2021/07/23		104	%
			Mercury (Hg)	2021/07/23		113	%
			Molybdenum (Mo)	2021/07/23		104	%
			Nickel (Ni)	2021/07/23		98	%
			Total phosphorous	2021/07/23		98	%
			Lead (Pb)	2021/07/23		101	%
			Potassium (K)	2021/07/23		99	%
			Selenium (Se)	2021/07/23		90	%
			Sodium (Na)	2021/07/23		97	%
			Strontium (Sr)	2021/07/23		107	%
			Thallium (Tl)	2021/07/23		101	%
			Titanium (Ti)	2021/07/23		105	%
			Uranium (U)	2021/07/23		104	%
			Vanadium (V)	2021/07/23		102	%
			Zinc (Zn)	2021/07/23		97	%
2210215	MZS	Method Blank	Aluminum (Al)	2021/07/23	<10		ug/L
			Antimony (Sb)	2021/07/23	<1.0		ug/L
			Silver (Ag)	2021/07/23	<1.0		ug/L
			Arsenic (As)	2021/07/23	<1.0		ug/L
			Barium (Ba)	2021/07/23	<2.0		ug/L
			Beryllium (Be)	2021/07/23	<2.0		ug/L
			Bismuth (Bi)	2021/07/23	<1.0		ug/L
			Boron (B)	2021/07/23	<50		ug/L
			Cadmium (Cd)	2021/07/23	<0.20		ug/L
			Calcium (Ca)	2021/07/23	<500		ug/L
			Chromium (Cr)	2021/07/23	<5.0		ug/L
			Cobalt (Co)	2021/07/23	<1.0		ug/L
			Copper (Cu)	2021/07/23	<1.0		ug/L
			Total Hardness (CaCO3)	2021/07/23	<1000		ug/L
			Tin (Sn)	2021/07/23	<2.0		ug/L
			Iron (Fe)	2021/07/23	<60		ug/L
			Magnesium (Mg)	2021/07/23	<100		ug/L
			Manganese (Mn)	2021/07/23	<1.0		ug/L
			Mercury (Hg)	2021/07/23	<0.10		ug/L
			Molybdenum (Mo)	2021/07/23	<1.0		ug/L
			Nickel (Ni)	2021/07/23	<2.0		ug/L
			P2O5	2021/07/23	<25		ug/L
			Total phosphorous	2021/07/23	<10		ug/L
			Lead (Pb)	2021/07/23	<0.50		ug/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Potassium (K)	2021/07/23	<500		ug/L
			Selenium (Se)	2021/07/23	<3.0		ug/L
			Sodium (Na)	2021/07/23	<500		ug/L
			Strontium (Sr)	2021/07/23	<2.0		ug/L
			Thallium (Tl)	2021/07/23	<2.0		ug/L
			Titanium (Ti)	2021/07/23	<10		ug/L
			Uranium (U)	2021/07/23	<1.0		ug/L
			Vanadium (V)	2021/07/23	<2.0		ug/L
			Zinc (Zn)	2021/07/23	<7.0		ug/L
2210722	VPA	Spiked Blank	TKN Total Kjeldahl Nitrogen	2021/07/21		112	%
2210722	VPA	Method Blank	TKN Total Kjeldahl Nitrogen	2021/07/21	<0.40		mg/L
2210959	éCV	Matrix Spike	Mercury (Hg)	2021/07/21		95	%
2210959	éCV	Spiked Blank	Mercury (Hg)	2021/07/21		95	%
2210959	éCV	Method Blank	Mercury (Hg)	2021/07/21	<0.01		ug/L
2211613	EMT	Matrix Spike	Reactive silica (SiO2)	2021/07/22		97	%
			Reactive silica (SiO2)	2021/07/22		97	%
2211613	EMT	Spiked Blank	Reactive silica (SiO2)	2021/07/23		92	%
			Reactive silica (SiO2)	2021/07/23		92	%
2211613	EMT	Method Blank	Reactive silica (SiO2)	2021/07/22	<0.50		mg/L
			Reactive silica (SiO2)	2021/07/22	<0.50		mg/L
2211733	PS5	Spiked Blank	Total suspended solids (TSS)	2021/07/24		99	%
2211733	PS5	Method Blank	Total suspended solids (TSS)	2021/07/24	<2.0		mg/L

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

<Original signed by>

Anastassia Hamanov, Scientific Service Specialist

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Frederic Arnau, B.Sc., Chemist, Montreal, Scientific Service Specialist

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Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

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Jonathan Fauvel, B.Sc., Chemist, Montreal, Manager of Inorganics

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Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

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Michelina Cinquino, Analyst II

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Shu Yang, B.Sc. Chemist, Montreal, Analyst II

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The analytical data and all QC contained in this report were reviewed and validated by:

Bureau Veritas Proprietary Software
Logiciel Propriétaire de Bureau Veritas

Automated Statchk

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Your P.O. #: 3000000997
Your Project #: HOWSE QUARTELY SURFACE WATER
Site#: 00025
Your C.O.C. #: 835364-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/09/15
Report #: R2689791
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C145368
Received: 2021/08/30, 12:00

Sample Matrix: Surface Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	9	N/A	2021/08/31	STL SOP-00038	SM 23 2320-B m
Anions	9	N/A	2021/08/31	STL SOP-00014	MA.300–Ions 1.3 R3 m
Real Color	9	N/A	2021/08/31	STL SOP-00046	MA103 - Col. 2.0 R4m
Conductivity	9	N/A	2021/08/31	STL SOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	9	2021/09/02	2021/09/02	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	9	2021/08/31	2021/09/01	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	9	2021/08/31	2021/09/08	STL SOP-00062	MA.200–Mét. 1.2 R7
Ammonia Nitrogen	9	N/A	2021/09/04	STL SOP-00040	MA.300–N 2.0 R2 m
Nitrate and/or Nitrite	9	N/A	2021/08/31	STL SOP-00014	MA.300–Ions 1.3 R3 m
Dissolved Oxygen	9	N/A	2021/08/31	STL SOP-00008	MA.315–DBO 1.1 R3 m
pH	9	N/A	2021/08/31	STL SOP-00038	MA.100–pH 1.1 R3 m
pH Measured @ 15° C	9	N/A	2021/08/30	STL SOP-00016	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP	9	2021/09/02	2021/09/02	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	9	N/A	2021/08/31	STL SOP-00003	MA.303–P 1.1 R2 m
Total Phosphorus	9	N/A	2021/08/30	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Sulfides (as S2-)	9	2021/09/08	2021/09/08	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	9	2021/08/31	2021/09/02	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Total Nitrogen	9	2021/09/02	2021/09/02	STL SOP-00077	MOE:TOTNUT-E3516v1.3
Turbidity	9	N/A	2021/08/30	STL SOP-00022	MA.103–Tur. 1.0 R5 m
Un-ionized Ammonia as N @ 15° C	9	N/A	2021/09/04	STL SOP-00040	MA.300 – N 2.0 R1 m
Total Extractable Mercury - Cold Vapour (1)	9	2021/09/03	2021/09/03	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	6	2021/09/03	2021/09/03	ATL SOP 00022	EPA 366.0 m
Reactive Silica(SiO2) (2)	3	2021/09/03	2021/09/07	ATL SOP 00022	EPA 366.0 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are

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Your P.O. #: 3000000997
Your Project #: HOWSE QUARTELY SURFACE WATER
Site#: 00025
Your C.O.C. #: 835364-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/09/15
Report #: R2689791
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C145368
Received: 2021/08/30, 12:00

reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga via Montreal
(2) This test was performed by Bureau Veritas Bedford via Montreal
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201

==========

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Lab BV Job #: C145368
Report Date: 2021/09/15

TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTELY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JFD

RESULTS OF ANALYSES OF SURFACE WATER

Lab BV ID		JP3169	JP3170		JP3171		
Sampling Date		2021/08/14 14:08	2021/08/14 15:04		2021/08/14 14:59		
COC Number		835364-01-01	835364-01-01		835364-01-01		
	Units	HOW-SW1-Q3-2021	HOW-SW2-Q3-2021	QC Batch	HOW-SW3-Q3-2021	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	5.1	5.6	2227508	1.9	0.50	2227545
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	2227050	<0.01	0.01	2227048

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Lab BV ID		JP3172		JP3173		JP3174		
Sampling Date		2021/08/14 13:41		2021/08/14 10:53		2021/08/14 11:14		
COC Number		835364-01-01		835364-01-01		835364-01-01		
	Units	HOW-SW4-Q3-2021	QC Batch	HOW-SW5-Q3-2021	QC Batch	HOW-BC-Q3-2021	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	5.2	2227508	1.0	2227508	5.0	0.50	2227508
METALS								
Mercury (Hg) †	ug/L	<0.01	2227050	<0.01	2227048	<0.01	0.01	2227050

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Lab BV ID		JP3175		JP3176		JP3177		
Sampling Date		2021/08/14 12:45		2021/08/14 11:50		2021/08/14 17:18		
COC Number		835364-01-01		835364-01-01		835364-01-01		
	Units	HOW-BL-Q3-2021	QC Batch	HOW-TL-Q3-2021	QC Batch	HOW-ML-Q3-2021	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	5.8	2227508	5.0	2227545	<0.50	0.50	2227545
METALS								
Mercury (Hg) †	ug/L	<0.01	2227050	<0.01	2227050	<0.01	0.01	2227048

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTELY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JFD

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JP3169	JP3170	JP3171	JP3172		
Sampling Date		2021/08/14 14:08	2021/08/14 15:04	2021/08/14 14:59	2021/08/14 13:41		
COC Number		835364-01-01	835364-01-01	835364-01-01	835364-01-01		
	Units	HOW-SW1-Q3-2021	HOW-SW2-Q3-2021	HOW-SW3-Q3-2021	HOW-SW4-Q3-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	22 (1)	69 (1)	86 (1)	<11 (1)	11	2225086
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Barium (Ba)	ug/L	<2.0	4.0	2.5	<2.0	2.0	2225086
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Boron (B) †	ug/L	<50	<50	<50	<50	50	2225086
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2225086
Calcium (Ca) †	ug/L	3000	690	<500	2400	500	2225086
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2225086
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Total Hardness (CaCO3) ††	ug/L	16000	3300	1300	14000	1000	2225086
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Iron (Fe)	ug/L	72	1900	750	<60	60	2225086
Magnesium (Mg) †	ug/L	2100	390	150	1900	100	2225086
Manganese (Mn)	ug/L	5.0	250	37	1.2	1.0	2225086
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2225086
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
P2O5 ††	ug/L	<25	<25	<25	<25	25	2225086
Total phosphorous	ug/L	<10	<10	<10	<10	10	2225086
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2225086
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2225086
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2225086
Sodium (Na)	ug/L	640	600	<500	580	500	2225086
Strontium (Sr) †	ug/L	6.2	5.9	2.3	6.2	2.0	2225086
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2225086
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited
(1) The detection limit was raised due to instrumentation.

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTELY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JFD

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JP3169	JP3170	JP3171	JP3172		
Sampling Date		2021/08/14 14:08	2021/08/14 15:04	2021/08/14 14:59	2021/08/14 13:41		
COC Number		835364-01-01	835364-01-01	835364-01-01	835364-01-01		
	Units	HOW-SW1-Q3-2021	HOW-SW2-Q3-2021	HOW-SW3-Q3-2021	HOW-SW4-Q3-2021	RDL	QC Batch
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	7.0	2225086

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JP3173	JP3174	JP3175	JP3176		
Sampling Date		2021/08/14 10:53	2021/08/14 11:14	2021/08/14 12:45	2021/08/14 11:50		
COC Number		835364-01-01	835364-01-01	835364-01-01	835364-01-01		
	Units	HOW-SW5-Q3-2021	HOW-BC-Q3-2021	HOW-BL-Q3-2021	HOW-TL-Q3-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	13 (1)	130 (1)	<11 (1)	<11 (1)	11	2225086
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Barium (Ba)	ug/L	<2.0	3.2	4.6	2.9	2.0	2225086
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Boron (B) †	ug/L	<50	<50	<50	<50	50	2225086
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2225086
Calcium (Ca) †	ug/L	<500	<500	4800	3700	500	2225086
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2225086
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Copper (Cu)	ug/L	<1.0	1.2	<1.0	<1.0	1.0	2225086
Total Hardness (CaCO3) ††	ug/L	1400	2600	25000	20000	1000	2225086
Tin (Sn)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Iron (Fe)	ug/L	87	220	<60	<60	60	2225086
Magnesium (Mg) †	ug/L	190	380	3100	2700	100	2225086
Manganese (Mn)	ug/L	6.3	25	2.3	5.3	1.0	2225086
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2225086
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086
Nickel (Ni)	ug/L	<2.0	<2.0	2.9	<2.0	2.0	2225086
P2O5 ††	ug/L	<25	<25	<25	<25	25	2225086
Total phosphorous	ug/L	<10	<10	<10	<10	10	2225086
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2225086
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2225086
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2225086
Sodium (Na)	ug/L	<500	<500	770	650	500	2225086
Strontium (Sr) †	ug/L	<2.0	2.7	6.8	6.8	2.0	2225086
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2225086
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2225086

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited
(1) The detection limit was raised due to instrumentation.

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTELY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JFD

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JP3173	JP3174	JP3175	JP3176		
Sampling Date		2021/08/14 10:53	2021/08/14 11:14	2021/08/14 12:45	2021/08/14 11:50		
COC Number		835364-01-01	835364-01-01	835364-01-01	835364-01-01		
	Units	HOW-SW5-Q3-2021	HOW-BC-Q3-2021	HOW-BL-Q3-2021	HOW-TL-Q3-2021	RDL	QC Batch
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2225086
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	7.0	2225086

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

889 Montée de Liesse, Ville St-Laurent, Québec, Canada H4T 1P5 Tel: (514) 448-9001 Fax: (514) 448-9199 Ligne sans frais : 1-877-462-9926

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JP3177		
Sampling Date		2021/08/14 17:18		
COC Number		835364-01-01		
	Units	HOW-ML-Q3-2021	RDL	QC Batch
METALS				
Aluminum (Al)	ug/L	30 (1)	11	2225086
Antimony (Sb)	ug/L	<1.0	1.0	2225086
Silver (Ag)	ug/L	<1.0	1.0	2225086
Arsenic (As)	ug/L	<1.0	1.0	2225086
Barium (Ba)	ug/L	<2.0	2.0	2225086
Beryllium (Be)	ug/L	<2.0	2.0	2225086
Bismuth (Bi) ††	ug/L	<1.0	1.0	2225086
Boron (B) †	ug/L	<50	50	2225086
Cadmium (Cd)	ug/L	<0.20	0.20	2225086
Calcium (Ca) †	ug/L	1700	500	2225086
Chromium (Cr)	ug/L	<5.0	5.0	2225086
Cobalt (Co)	ug/L	<1.0	1.0	2225086
Copper (Cu)	ug/L	<1.0	1.0	2225086
Total Hardness (CaCO3) ††	ug/L	9700	1000	2225086
Tin (Sn)	ug/L	<2.0	2.0	2225086
Iron (Fe)	ug/L	<60	60	2225086
Magnesium (Mg) †	ug/L	1300	100	2225086
Manganese (Mn)	ug/L	6.7	1.0	2225086
Mercury (Hg)	ug/L	<0.10	0.10	2225086
Molybdenum (Mo)	ug/L	<1.0	1.0	2225086
Nickel (Ni)	ug/L	<2.0	2.0	2225086
P2O5 ††	ug/L	<25	25	2225086
Total phosphorous	ug/L	<10	10	2225086
Lead (Pb)	ug/L	<0.50	0.50	2225086
Potassium (K) †	ug/L	<500	500	2225086
Selenium (Se)	ug/L	<3.0	3.0	2225086
Sodium (Na)	ug/L	<500	500	2225086
Strontium (Sr) †	ug/L	4.1	2.0	2225086
Thallium (Tl)	ug/L	<2.0	2.0	2225086
Titanium (Ti) ††	ug/L	<10	10	2225086
Uranium (U) ††	ug/L	<1.0	1.0	2225086

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited
(1) The detection limit was raised due to instrumentation.

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JP3177		
Sampling Date		2021/08/14 17:18		
COC Number		835364-01-01		
	Units	**HOW-ML-Q3-2021**	**RDL**	**QC Batch**
Vanadium (V)	ug/L	<2.0	2.0	2225086
Zinc (Zn)	ug/L	<7.0	7.0	2225086

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JP3169	JP3169	JP3170		
Sampling Date		2021/08/14 14:08	2021/08/14 14:08	2021/08/14 15:04		
COC Number		835364-01-01	835364-01-01	835364-01-01		
	Units	HOW-SW1-Q3-2021	HOW-SW1-Q3-2021 Lab-Dup	HOW-SW2-Q3-2021	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.036	N/A	0.0089	0.0010	2225177
Dissolved organic carbon †	mg/L	0.50	N/A	3.3	0.20	2226369
Dissolved oxygen †	mg/L	10	N/A	9.9	1.0	2225015
Nitrate (N) and Nitrite(N)	mg/L	0.18	0.18	<0.020	0.020	2224958
Nitrates (N-NO3-)	mg/L	0.18	0.18	<0.020	0.020	2224958
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	<0.020	0.020	2224958
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	<0.020	0.020	2226824
Orthophosphate (P)	mg/L	<0.050	N/A	<0.050	0.050	2224953
pH	pH	7.12	N/A	6.43	N/A	2225167
pH (15° C) †	pH	7.13	N/A	6.48	N/A	2224957
Phenols-4AAP	mg/L	<0.0020	N/A	<0.0020	0.0020	2226223
Real Color	UCV	4.3	N/A	58	2.0	2225074
Sulfides (S2-)	mg/L	<0.020	N/A	<0.020	0.020	2227787
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	<0.40	0.40	2226109
Turbidity	NTU	0.18	N/A	1.7	0.10	2224949
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	<0.0005	0.0005	2224679
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	14	N/A	3.6	1.0	2225168
Bicarbonates (HCO3 as CaCO3) †	mg/L	14	N/A	3.6	1.0	2225168
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	<1.0	1.0	2225168
Chloride (Cl)	mg/L	0.34	0.35	0.091	0.050	2224959
Sulfates (SO4)	mg/L	2.2	2.2	<0.50	0.50	2224959
Total Dissolved Solids	mg/L	16	N/A	23	10	2225031
Total suspended solids (TSS)	mg/L	<2.0	N/A	3.0	2.0	2225030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JP3171		JP3172	JP3172		
Sampling Date		2021/08/14 14:59		2021/08/14 13:41	2021/08/14 13:41		
COC Number		835364-01-01		835364-01-01	835364-01-01		
	Units	HOW-SW3-Q3-2021	QC Batch	HOW-SW4-Q3-2021	HOW-SW4-Q3-2021 Lab-Dup	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0037	2225177	0.030	0.030	0.0010	2225177
Dissolved organic carbon †	mg/L	4.2	2226369	0.58	N/A	0.20	2226369
Dissolved oxygen †	mg/L	9.2	2225015	10	N/A	1.0	2225015
Nitrate (N) and Nitrite(N)	mg/L	<0.020	2224958	0.31	N/A	0.020	2224958
Nitrates (N-NO3-)	mg/L	<0.020	2224958	0.31	N/A	0.020	2224958
Nitrites (N-NO2-)	mg/L	<0.020	2224958	<0.020	N/A	0.020	2224958
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2226824	<0.020	N/A	0.020	2226824
Orthophosphate (P)	mg/L	<0.050	2224953	<0.050	N/A	0.050	2225178
pH	pH	5.69	2225167	6.95	6.97	N/A	2225167
pH (15° C) †	pH	5.79	2224957	6.99	N/A	N/A	2224957
Phenols-4AAP	mg/L	<0.0020	2226243	<0.0020	N/A	0.0020	2226223
Real Color	UCV	53	2225074	2.9	N/A	2.0	2225074
Sulfides (S2-)	mg/L	<0.020	2227787	<0.020	N/A	0.020	2227787
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	2226109	<0.40	N/A	0.40	2226109
Turbidity	NTU	0.70	2224949	0.37	N/A	0.10	2224949
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	2224679	<0.0005	N/A	0.0005	2224679
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.1	2225168	11	11	1.0	2225168
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.1	2225168	11	11	1.0	2225168
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2225168	<1.0	<1.0	1.0	2225168
Chloride (Cl)	mg/L	0.050	2224959	0.45	N/A	0.050	2224959
Sulfates (SO4)	mg/L	<0.50	2224959	2.0	N/A	0.50	2224959
Total Dissolved Solids	mg/L	24	2225031	21	N/A	10	2225031
Total suspended solids (TSS)	mg/L	2.0	2225030	<2.0	N/A	2.0	2225030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JP3173		JP3174	JP3174		
Sampling Date		2021/08/14 10:53		2021/08/14 11:14	2021/08/14 11:14		
COC Number		835364-01-01		835364-01-01	835364-01-01		
	Units	HOW-SW5-Q3-2021	QC Batch	HOW-BC-Q3-2021	HOW-BC-Q3-2021 Lab-Dup	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.0039	2225177	0.0062	N/A	0.0010	2225177
Dissolved organic carbon †	mg/L	1.3	2226369	4.6	N/A	0.20	2226369
Dissolved oxygen †	mg/L	9.7	2225015	9.6	N/A	1.0	2225015
Nitrate (N) and Nitrite(N)	mg/L	<0.020	2224958	<0.020	N/A	0.020	2224958
Nitrates (N-NO3-)	mg/L	<0.020	2224958	<0.020	N/A	0.020	2224958
Nitrites (N-NO2-)	mg/L	<0.020	2224958	<0.020	N/A	0.020	2224958
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2226824	<0.020	N/A	0.020	2226824
Orthophosphate (P)	mg/L	<0.050	2224953	<0.050	<0.050	0.050	2224953
pH	pH	6.36	2225167	5.84	N/A	N/A	2225167
pH (15° C) †	pH	6.52	2224957	5.86	N/A	N/A	2224957
Phenols-4AAP	mg/L	<0.0020	2226223	<0.0020	N/A	0.0020	2226223
Real Color	UCV	7.2	2225074	33	N/A	2.0	2225074
Sulfides (S2-)	mg/L	<0.020	2227787	<0.020	N/A	0.020	2227787
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	2226109	<0.40	N/A	0.40	2226109
Turbidity	NTU	0.62	2224950	0.44	N/A	0.10	2224949
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	2224679	<0.0005	N/A	0.0005	2224679
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	1.7	2225168	1.7	N/A	1.0	2225168
Bicarbonates (HCO3 as CaCO3) †	mg/L	1.7	2225168	1.7	N/A	1.0	2225168
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2225168	<1.0	N/A	1.0	2225168
Chloride (Cl)	mg/L	0.068	2224959	0.12	N/A	0.050	2224959
Sulfates (SO4)	mg/L	<0.50	2224959	<0.50	N/A	0.50	2224959
Total Dissolved Solids	mg/L	12	2225031	19	N/A	10	2225031
Total suspended solids (TSS)	mg/L	2.0	2225030	<2.0	N/A	2.0	2225030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JP3175		JP3176		JP3176	
Sampling Date		2021/08/14 12:45		2021/08/14 11:50		2021/08/14 11:50	
COC Number		835364-01-01		835364-01-01		835364-01-01	
	Units	HOW-BL-Q3-2021	QC Batch	HOW-TL-Q3-2021	RDL	HOW-TL-Q3-2021 Lab-Dup	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.048	2225177	0.041	0.0010	N/A	2225177
Dissolved organic carbon †	mg/L	0.35	2226369	0.71	0.20	N/A	2226369
Dissolved oxygen †	mg/L	9.8	2225015	9.9	1.0	N/A	2225015
Nitrate (N) and Nitrite(N)	mg/L	<0.020	2224958	0.053	0.020	N/A	2224958
Nitrates (N-NO3-)	mg/L	<0.020	2224958	0.053	0.020	N/A	2224958
Nitrites (N-NO2-)	mg/L	<0.020	2224958	<0.020	0.020	N/A	2224958
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2226824	<0.020	0.020	N/A	2226824
Orthophosphate (P)	mg/L	<0.050	2224953	<0.050	0.050	N/A	2225178
pH	pH	7.11	2225167	7.33	N/A	N/A	2225167
pH (15° C) †	pH	7.06	2224957	7.27	N/A	7.26	2224957
Phenols-4AAP	mg/L	<0.0020	2226243	<0.0020	0.0020	N/A	2226243
Real Color	UCV	<2.0	2225074	3.3	2.0	N/A	2225074
Sulfides (S2-)	mg/L	<0.020	2227787	<0.020	0.020	N/A	2227787
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	2226107	<0.40	0.40	N/A	2226109
Turbidity	NTU	0.21	2224949	0.27	0.10	N/A	2224950
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	2224679	<0.0005	0.0005	N/A	2224679
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	25	2225168	18	1.0	N/A	2225168
Bicarbonates (HCO3 as CaCO3) †	mg/L	25	2225168	18	1.0	N/A	2225168
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2225168	<1.0	1.0	N/A	2225168
Chloride (Cl)	mg/L	0.15	2224959	0.23	0.050	N/A	2224959
Sulfates (SO4)	mg/L	1.8	2224959	2.3	0.50	N/A	2224959
Total Dissolved Solids	mg/L	39	2225031	28	10	N/A	2225031
Total suspended solids (TSS)	mg/L	<2.0	2225030	2.0	2.0	N/A	2225030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JP3177	JP3177		
Sampling Date		2021/08/14 17:18	2021/08/14 17:18		
COC Number		835364-01-01	835364-01-01		
	Units	HOW-ML-Q3-2021	HOW-ML-Q3-2021 Lab-Dup	RDL	QC Batch
CONVENTIONALS					
Conductivity	mS/cm	0.020	N/A	0.0010	2225177
Dissolved organic carbon †	mg/L	1.8	N/A	0.20	2226369
Dissolved oxygen †	mg/L	10	N/A	1.0	2225015
Nitrate (N) and Nitrite(N)	mg/L	<0.020	N/A	0.020	2224958
Nitrates (N-NO3-)	mg/L	<0.020	N/A	0.020	2224958
Nitrites (N-NO2-)	mg/L	<0.020	N/A	0.020	2224958
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	0.020	2226824
Orthophosphate (P)	mg/L	<0.050	N/A	0.050	2224953
pH	pH	6.95	N/A	N/A	2225167
pH (15° C) †	pH	7.01	N/A	N/A	2224957
Phenols-4AAP	mg/L	<0.0020	N/A	0.0020	2226223
Real Color	UCV	7.5	N/A	2.0	2225074
Sulfides (S2-)	mg/L	<0.020	N/A	0.020	2227787
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	0.40	2226109
Turbidity	NTU	0.88	N/A	0.10	2224949
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	0.0005	2224679
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	6.3	N/A	1.0	2225168
Bicarbonates (HCO3 as CaCO3) †	mg/L	6.3	N/A	1.0	2225168
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	1.0	2225168
Chloride (Cl)	mg/L	0.053	N/A	0.050	2224959
Sulfates (SO4)	mg/L	2.8	N/A	0.50	2224959
Total Dissolved Solids	mg/L	16	N/A	10	2225031
Total suspended solids (TSS)	mg/L	2.0	N/A	2.0	2225030

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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GENERAL COMMENTS

Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3169
Real Color: Holding time already past upon reception.: JP3169
Total Suspended Solids: Holding time already past upon reception.: JP3169
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3169
pH: Holding time already past upon reception.: JP3169
pH Measured @ 15° C: Holding time already past upon reception.: JP3169
Ortho Phosphate: Holding time already past upon reception.: JP3169
Total Dissolved Solids: Holding time already past upon reception.: JP3169
Turbidity: Holding time already past upon reception.: JP3169
Dissolved Oxygen: Holding time already past upon reception.: JP3169
Dissolved Organic Carbon: Holding time already past upon reception.: JP3169
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3170
Real Color: Holding time already past upon reception.: JP3170
Total Suspended Solids: Holding time already past upon reception.: JP3170
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3170
pH: Holding time already past upon reception.: JP3170
pH Measured @ 15° C: Holding time already past upon reception.: JP3170
Ortho Phosphate: Holding time already past upon reception.: JP3170
Total Dissolved Solids: Holding time already past upon reception.: JP3170
Turbidity: Holding time already past upon reception.: JP3170
Dissolved Oxygen: Holding time already past upon reception.: JP3170
Dissolved Organic Carbon: Holding time already past upon reception.: JP3170
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3171
Real Color: Holding time already past upon reception.: JP3171
Total Suspended Solids: Holding time already past upon reception.: JP3171
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3171
pH: Holding time already past upon reception.: JP3171
pH Measured @ 15° C: Holding time already past upon reception.: JP3171
Ortho Phosphate: Holding time already past upon reception.: JP3171
Total Dissolved Solids: Holding time already past upon reception.: JP3171
Turbidity: Holding time already past upon reception.: JP3171
Dissolved Oxygen: Holding time already past upon reception.: JP3171
Dissolved Organic Carbon: Holding time already past upon reception.: JP3171
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3172
Real Color: Holding time already past upon reception.: JP3172
Total Suspended Solids: Holding time already past upon reception.: JP3172
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3172
pH: Holding time already past upon reception.: JP3172
pH Measured @ 15° C: Holding time already past upon reception.: JP3172
Ortho Phosphate: Holding time already past upon reception.: JP3172
Total Dissolved Solids: Holding time already past upon reception.: JP3172
Turbidity: Holding time already past upon reception.: JP3172
Dissolved Oxygen: Holding time already past upon reception.: JP3172
Dissolved Organic Carbon: Holding time already past upon reception.: JP3172
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3173
Real Color: Holding time already past upon reception.: JP3173
Total Suspended Solids: Holding time already past upon reception.: JP3173
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3173
pH: Holding time already past upon reception.: JP3173
pH Measured @ 15° C: Holding time already past upon reception.: JP3173
Ortho Phosphate: Holding time already past upon reception.: JP3173
Total Dissolved Solids: Holding time already past upon reception.: JP3173

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Turbidity: Holding time already past upon reception.: JP3173
Dissolved Oxygen: Holding time already past upon reception.: JP3173
Dissolved Organic Carbon: Holding time already past upon reception.: JP3173
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3174
Real Color: Holding time already past upon reception.: JP3174
Total Suspended Solids: Holding time already past upon reception.: JP3174
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3174
pH: Holding time already past upon reception.: JP3174
pH Measured @ 15° C: Holding time already past upon reception.: JP3174
Ortho Phosphate: Holding time already past upon reception.: JP3174
Total Dissolved Solids: Holding time already past upon reception.: JP3174
Turbidity: Holding time already past upon reception.: JP3174
Dissolved Oxygen: Holding time already past upon reception.: JP3174
Dissolved Organic Carbon: Holding time already past upon reception.: JP3174
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3175
Real Color: Holding time already past upon reception.: JP3175
Total Suspended Solids: Holding time already past upon reception.: JP3175
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3175
pH: Holding time already past upon reception.: JP3175
pH Measured @ 15° C: Holding time already past upon reception.: JP3175
Ortho Phosphate: Holding time already past upon reception.: JP3175
Total Dissolved Solids: Holding time already past upon reception.: JP3175
Turbidity: Holding time already past upon reception.: JP3175
Dissolved Oxygen: Holding time already past upon reception.: JP3175
Dissolved Organic Carbon: Holding time already past upon reception.: JP3175
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3176
Real Color: Holding time already past upon reception.: JP3176
Total Suspended Solids: Holding time already past upon reception.: JP3176
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3176
pH: Holding time already past upon reception.: JP3176
pH Measured @ 15° C: Holding time already past upon reception.: JP3176
Ortho Phosphate: Holding time already past upon reception.: JP3176
Total Dissolved Solids: Holding time already past upon reception.: JP3176
Turbidity: Holding time already past upon reception.: JP3176
Dissolved Oxygen: Holding time already past upon reception.: JP3176
Dissolved Organic Carbon: Holding time already past upon reception.: JP3176
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JP3177
Real Color: Holding time already past upon reception.: JP3177
Total Suspended Solids: Holding time already past upon reception.: JP3177
Nitrate and/or Nitrite: Holding time already past upon reception.: JP3177
pH: Holding time already past upon reception.: JP3177
pH Measured @ 15° C: Holding time already past upon reception.: JP3177
Ortho Phosphate: Holding time already past upon reception.: JP3177
Total Dissolved Solids: Holding time already past upon reception.: JP3177
Turbidity: Holding time already past upon reception.: JP3177
Dissolved Oxygen: Holding time already past upon reception.: JP3177
Dissolved Organic Carbon: Holding time already past upon reception.: JP3177

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2224949	MPS	Spiked Blank	Turbidity	2021/08/30		97	%
2224949	MPS	Method Blank	Turbidity	2021/08/30	<0.10		NTU
2224950	MPS	Spiked Blank	Turbidity	2021/08/30		96	%
2224950	MPS	Method Blank	Turbidity	2021/08/30	<0.10		NTU
2224953	HZU	Spiked Blank	Orthophosphate (P)	2021/08/31		99	%
2224953	HZU	Method Blank	Orthophosphate (P)	2021/08/31	<0.050		mg/L
2224957	MPS	QC Standard	pH (15° C)	2021/08/30		99	%
2224957	MPS	Spiked Blank	pH (15° C)	2021/08/30		102	%
2224958	SF5	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/08/31		98	%
			Nitrates (N-NO3-)	2021/08/31		99	%
			Nitrites (N-NO2-)	2021/08/31		98	%
2224958	SF5	Method Blank	Nitrate (N) and Nitrite(N)	2021/08/31	<0.020		mg/L
			Nitrates (N-NO3-)	2021/08/31	<0.020		mg/L
			Nitrites (N-NO2-)	2021/08/31	<0.020		mg/L
2224959	SF5	Spiked Blank	Chloride (Cl)	2021/08/31		98	%
			Sulfates (SO4)	2021/08/31		101	%
2224959	SF5	Method Blank	Chloride (Cl)	2021/08/31	<0.050		mg/L
			Sulfates (SO4)	2021/08/31	<0.50		mg/L
2225030	PS5	Spiked Blank	Total suspended solids (TSS)	2021/09/01		96	%
2225030	PS5	Method Blank	Total suspended solids (TSS)	2021/09/01	<2.0		mg/L
2225031	MQI	Spiked Blank	Total Dissolved Solids	2021/09/02		101	%
2225031	MQI	Method Blank	Total Dissolved Solids	2021/09/02	<10		mg/L
2225074	EPW	Spiked Blank	Real Color	2021/08/31		103	%
2225074	EPW	Method Blank	Real Color	2021/08/31	<2.0		UCV
2225086	LV2	Spiked Blank	Aluminum (Al)	2021/09/04		97	%
			Antimony (Sb)	2021/09/04		116	%
			Silver (Ag)	2021/09/04		105	%
			Arsenic (As)	2021/09/04		108	%
			Barium (Ba)	2021/09/04		108	%
			Beryllium (Be)	2021/09/04		109	%
			Bismuth (Bi)	2021/09/04		107	%
			Boron (B)	2021/09/04		103	%
			Cadmium (Cd)	2021/09/04		104	%
			Calcium (Ca)	2021/09/04		108	%
			Chromium (Cr)	2021/09/04		100	%
			Cobalt (Co)	2021/09/04		102	%
			Copper (Cu)	2021/09/04		102	%
			Tin (Sn)	2021/09/04		117	%
			Iron (Fe)	2021/09/04		112	%
			Magnesium (Mg)	2021/09/04		91	%
			Manganese (Mn)	2021/09/04		110	%
			Mercury (Hg)	2021/09/04		97	%
			Molybdenum (Mo)	2021/09/04		111	%
			Nickel (Ni)	2021/09/04		102	%
			Total phosphorous	2021/09/04		106	%
			Lead (Pb)	2021/09/04		106	%
			Potassium (K)	2021/09/04		91	%
			Selenium (Se)	2021/09/04		106	%
			Sodium (Na)	2021/09/04		107	%
			Strontium (Sr)	2021/09/04		113	%
			Thallium (Tl)	2021/09/04		76 (1)	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Titanium (Ti)	2021/09/04		107	%
			Uranium (U)	2021/09/04		108	%
			Vanadium (V)	2021/09/04		104	%
			Zinc (Zn)	2021/09/04		101	%
2225086	LV2	Method Blank	Aluminum (Al)	2021/09/04	<11 (2)		ug/L
			Antimony (Sb)	2021/09/04	<1.0		ug/L
			Silver (Ag)	2021/09/04	<1.0		ug/L
			Arsenic (As)	2021/09/04	<1.0		ug/L
			Barium (Ba)	2021/09/04	<2.0		ug/L
			Beryllium (Be)	2021/09/04	<2.0		ug/L
			Bismuth (Bi)	2021/09/04	<1.0		ug/L
			Boron (B)	2021/09/04	<50		ug/L
			Cadmium (Cd)	2021/09/04	<0.20		ug/L
			Calcium (Ca)	2021/09/04	<500		ug/L
			Chromium (Cr)	2021/09/04	<5.0		ug/L
			Cobalt (Co)	2021/09/04	<1.0		ug/L
			Copper (Cu)	2021/09/04	<1.0		ug/L
			Total Hardness (CaCO3)	2021/09/04	<1000		ug/L
			Tin (Sn)	2021/09/04	<2.0		ug/L
			Iron (Fe)	2021/09/04	<60		ug/L
			Magnesium (Mg)	2021/09/04	<100		ug/L
			Manganese (Mn)	2021/09/04	<1.0		ug/L
			Mercury (Hg)	2021/09/04	<0.10		ug/L
			Molybdenum (Mo)	2021/09/04	<1.0		ug/L
			Nickel (Ni)	2021/09/04	<2.0		ug/L
			P2O5	2021/09/04	<25		ug/L
			Total phosphorous	2021/09/04	<10		ug/L
			Lead (Pb)	2021/09/04	<0.50		ug/L
			Potassium (K)	2021/09/04	<500		ug/L
			Selenium (Se)	2021/09/04	<3.0		ug/L
			Sodium (Na)	2021/09/04	<500		ug/L
			Strontium (Sr)	2021/09/04	<2.0		ug/L
			Thallium (Tl)	2021/09/04	<2.0		ug/L
			Titanium (Ti)	2021/09/04	<10		ug/L
			Uranium (U)	2021/09/04	<1.0		ug/L
			Vanadium (V)	2021/09/04	<2.0		ug/L
			Zinc (Zn)	2021/09/04	<7.0		ug/L
2225167	ANB	Spiked Blank	pH	2021/08/31		101	%
2225168	ANB	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/08/31		105	%
			Carbonate (CO3 as CaCO3)	2021/08/31		105	%
2225168	ANB	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/08/31	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2021/08/31	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2021/08/31	<1.0		mg/L
2225177	ANB	Spiked Blank	Conductivity	2021/08/31		102	%
2225177	ANB	Method Blank	Conductivity	2021/08/31	<0.0010		mS/cm
2225178	HZU	QC Standard	Orthophosphate (P)	2021/08/31		99	%
2225178	HZU	Spiked Blank	Orthophosphate (P)	2021/08/31		99	%
2225178	HZU	Method Blank	Orthophosphate (P)	2021/08/31	<0.050		mg/L
2226107	VPA	Spiked Blank	TKN Total Kjeldahl Nitrogen	2021/09/02		103	%
2226107	VPA	Method Blank	TKN Total Kjeldahl Nitrogen	2021/09/02	<0.40		mg/L
2226109	VPA	Spiked Blank	TKN Total Kjeldahl Nitrogen	2021/09/02		103	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2226109	VPA	Method Blank	TKN Total Kjeldahl Nitrogen	2021/09/02	<0.40		mg/L
2226223	AJ1	QC Standard	Phenols-4AAP	2021/09/02		98	%
2226223	AJ1	Spiked Blank	Phenols-4AAP	2021/09/02		102	%
2226223	AJ1	Method Blank	Phenols-4AAP	2021/09/02	<0.0020		mg/L
2226243	AJ1	Spiked Blank	Phenols-4AAP	2021/09/02		100	%
2226243	AJ1	Method Blank	Phenols-4AAP	2021/09/02	<0.0020		mg/L
2226369	HZU	Spiked Blank	Dissolved organic carbon	2021/09/02		99	%
2226369	HZU	Method Blank	Dissolved organic carbon	2021/09/02	<0.20		mg/L
2226824	HZU	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/09/04		108	%
2226824	HZU	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/09/04	<0.020		mg/L
2227048	éCV	Matrix Spike	Mercury (Hg)	2021/09/03		102	%
2227048	éCV	Spiked Blank	Mercury (Hg)	2021/09/03		104	%
2227048	éCV	Method Blank	Mercury (Hg)	2021/09/03	<0.01		ug/L
2227050	éCV	Matrix Spike	Mercury (Hg)	2021/09/03		88	%
2227050	éCV	Spiked Blank	Mercury (Hg)	2021/09/03		95	%
2227050	éCV	Method Blank	Mercury (Hg)	2021/09/03	<0.01		ug/L
2227508	EMT	Matrix Spike	Reactive silica (SiO2)	2021/09/03		102	%
2227508	EMT	Spiked Blank	Reactive silica (SiO2)	2021/09/03		106	%
2227508	EMT	Method Blank	Reactive silica (SiO2)	2021/09/03	<0.50		mg/L
2227545	éC7	Matrix Spike	Reactive silica (SiO2)	2021/09/07		NC	%
2227545	éC7	Spiked Blank	Reactive silica (SiO2)	2021/09/07		98	%
2227545	éC7	Method Blank	Reactive silica (SiO2)	2021/09/07	<0.50		mg/L
2227787	AZM	Spiked Blank	Sulfides (S2-)	2021/09/08		103	%
2227787	AZM	Method Blank	Sulfides (S2-)	2021/09/08	<0.020		mg/L

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

(1) Recovery or relative percent difference (RPD) for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria

(2) The detection limit was raised due to instrumentation.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

<Original signed by>

Brad Newman, Scientific Specialist

<Original signed by>

Eric Dearman, Scientific Specialist

<Original signed by>

Faouzi Sarsi, B.Sc. Chemist, Montréal, SR Analyst

<Original signed by>

Miryam Assayag, B.Sc. Chemist, Montréal, Team Leader

<Original signed by>

Michelina Cinquino, Analyst II

<Original signed by>

Shu Yang, B.Sc. Chemist, Montreal, Analyst II

Bureau Veritas Proprietary Software
Logiciel Propriétaire de Bureau Veritas

Automated Statchk

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The analytical data and all QC contained in this report were reviewed and validated by:

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Your P.O. #: 3000000997
Your Project #: HOWSE QUARTERLY SURFACE WATER
Site#: NL SURFACE WATER
Your C.O.C. #: 846491-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/12/23
Report #: R2724075
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C160054
Received: 2021/11/04, 08:00

Sample Matrix: Surface Water
Samples Received: 9

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Alkalinity (pH end point 4.5)	1	N/A	2021/11/18	STL SOP-00038	SM 23 2320-B m
Total Alkalinity (pH end point 4.5)	8	N/A	2021/11/08	STL SOP-00038	SM 23 2320-B m
Anions	9	N/A	2021/11/18	STL SOP-00014	MA.300–Ions 1.3 R3 m
Real Color	9	N/A	2021/11/05	STL SOP-00046	MA103 - Col. 2.0 R4m
Conductivity	1	N/A	2021/11/18	STL SOP-00038	SM 23 2510-B m
Conductivity	8	N/A	2021/11/08	STL SOP-00038	SM 23 2510-B m
Dissolved Organic Carbon (3)	9	2021/11/10	2021/11/11	STL SOP-00243	SM 23 5310-B m
Total Suspended Solids	9	2021/11/06	2021/11/10	STL SOP-00015	MA.104–S.S. 2.0 m
Total Extractable Metals by ICP	9	2021/11/11	2021/11/18	STL SOP-00062	MA.200–Mét. 1.2 R7
Ammonia Nitrogen	9	N/A	2021/11/13	STL SOP-00040	MA.300–N 2.0 R2 m
Nitrate and/or Nitrite	9	N/A	2021/11/18	STL SOP-00014	MA.300–Ions 1.3 R3 m
Dissolved Oxygen	9	N/A	2021/11/05	STL SOP-00008	MA.315–DBO 1.1 R3 m
pH	1	N/A	2021/11/18	STL SOP-00038	MA.100–pH 1.1 R3 m
pH	8	N/A	2021/11/08	STL SOP-00038	MA.100–pH 1.1 R3 m
pH Measured @ 15° C	9	N/A	2021/11/15	STL SOP-00016	MA.100–pH 1.1 R3 m
Total Phenols by 4-AAP	9	2021/11/11	2021/11/11	STL SOP-00033	MA404–I.Phé 2.2 R2 m
Ortho Phosphate	9	N/A	2021/11/10	STL SOP-00003	MA.303–P 1.1 R2 m
Total Phosphorus	9	N/A	2021/11/05	STL SOP-00062	MA.200–Mét. 1.2 R5 m
Sulfides (as S2-)	9	2021/11/19	2021/11/19	STL SOP-00005	MA. 300 – S 1.2 R3 m
Total Dissolved Solids	9	2021/11/06	2021/11/08	STL SOP-00050	MA.115–S.D. 1.0 R4 m
Total Nitrogen	9	2021/11/11	2021/11/11	STL SOP-00077	MOE:TOTNUT-E3516v1.3
Turbidity	9	N/A	2021/12/22	STL SOP-00022	MA.103–Tur. 1.0 R5 m
Un-ionized Ammonia as N @ 15° C	9	N/A	2021/11/16	STL SOP-00040	MA.300 – N 2.0 R1 m
Total Extractable Mercury - Cold Vapour (1)	9	2021/11/09	2021/11/10	CAM SOP-00453	EPA 7470 m
Reactive Silica(SiO2) (2)	9	2021/11/09	2021/11/10	ATL SOP 00022	EPA 366.0 m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

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Your P.O. #: 3000000997
Your Project #: HOWSE QUARTERLY SURFACE WATER
Site#: NL SURFACE WATER
Your C.O.C. #: 846491-01-01

Attention: Mariana Trindade

TATA STEEL MINERALS CANADA
1000, RUE SHERBROOKE OUEST
BUREAU 1120
MONTRÉAL, QC
CANADA H3A 3G4

Report Date: 2021/12/23
Report #: R2724075
Version: 1 - Final

CERTIFICATE OF ANALYSIS

LAB BV JOB #: C160054

Received: 2021/11/04, 08:00

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
Note: RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd. , Mississauga, ON, L5N 2L8
(2) This test was performed by Bureau Veritas Bedford, Suit 105, 200 Bluewater Rd. , Bedford, NS, B4B1G9
(3) DOC present in the sample should be considered as non-purgeable DOC

Note: All parameters included in the present certificate are accredited by the MELCC unless stated otherwise.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Martine Lepage, Project Manager and Account Manager
Email: Martine.LEPAGE@bureauveritas.com
Phone# (418)543-3788 Ext:7066201

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Lab BV Job #: C160054
Report Date: 2021/12/23

TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTERLY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JM

RESULTS OF ANALYSES OF SURFACE WATER

Lab BV ID		JX4471	JX4613	JX4615	JX4616		
Sampling Date		2021/10/24 13:09	2021/10/24 13:39	2021/10/24 14:02	2021/10/24 14:50		
COC Number		846491-01-01	846491-01-01	846491-01-01	846491-01-01		
	Units	HOW-SWBL-Q4-2021	HOW-SWBC-Q4-2021	HOW-SWTL-Q4-2021	HOW-SW5-Q4-2021	RDL	QC Batch
INORGANICS							
Reactive silica (SiO2) †	mg/L	5.9	5.1	5.0	1.3	0.50	2250643
METALS							
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	<0.01	0.01	2250741

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Lab BV ID		JX4617	JX4618	JX4619		JX4620		
Sampling Date		2021/10/24 15:46	2021/10/24 16:19	2021/10/25 11:08		2021/10/25 11:29		
COC Number		846491-01-01	846491-01-01	846491-01-01		846491-01-01		
	Units	HOW-SW4-Q4-2021	HOW-SW1-Q4-2021	HOW-SW3-Q4-2021	QC Batch	HOW-SW2-Q4-2021	RDL	QC Batch
INORGANICS								
Reactive silica (SiO2) †	mg/L	4.6	5.1	2.9	2250643	5.7	0.50	2250643
METALS								
Mercury (Hg) †	ug/L	<0.01	<0.01	<0.01	2250741	<0.01	0.01	2250740

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable

Lab BV ID		JX4620		JX4621		
Sampling Date		2021/10/25 11:29		2021/10/25 11:57		
COC Number		846491-01-01		846491-01-01		
	Units	HOW-SW2-Q4-2021 Lab-Dup	QC Batch	HOW-SWML-Q4-2021	RDL	QC Batch
INORGANICS						
Reactive silica (SiO2) †	mg/L	N/A	2250643	0.96	0.50	2250643
METALS						
Mercury (Hg) †	ug/L	<0.01	2250740	<0.01	0.01	2250741

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
† Parameter is not accreditable
N/A = Not Applicable

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JX4471	JX4613	JX4615	JX4616		
Sampling Date		2021/10/24 13:09	2021/10/24 13:39	2021/10/24 14:02	2021/10/24 14:50		
COC Number		846491-01-01	846491-01-01	846491-01-01	846491-01-01		
	Units	HOW-SWBL-Q4-2021	HOW-SWBC-Q4-2021	HOW-SWTL-Q4-2021	HOW-SW5-Q4-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	<10	140	12	11	10	2251244
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Barium (Ba)	ug/L	<2.0	2.5	2.9	<2.0	2.0	2251244
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Boron (B) †	ug/L	<50	<50	<50	<50	50	2251244
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2251244
Calcium (Ca) †	ug/L	4800	<500	3500	<500	500	2251244
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2251244
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Total Hardness (CaCO3) ††	ug/L	25000	1900	19000	1400	1000	2251244
Tin (Sn)	ug/L	2.1	<2.0	<2.0	<2.0	2.0	2251244
Iron (Fe)	ug/L	62	190	<60	<60	60	2251244
Magnesium (Mg) †	ug/L	3100	280	2500	200	100	2251244
Manganese (Mn)	ug/L	6.9	19	4.1	2.2	1.0	2251244
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2251244
Molybdenum (Mo)	ug/L	<1.0	<1.0	8.6	<1.0	1.0	2251244
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244
P2O5 ††	ug/L	<25	<25	<25	<25	25	2251244
Total phosphorous	ug/L	<10	<10	<10	<10	10	2251244
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2251244
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2251244
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2251244
Sodium (Na)	ug/L	780	520	810	630	500	2251244
Strontium (Sr) †	ug/L	7.2	2.3	6.4	<2.0	2.0	2251244
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2251244
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
†† Parameter is not accreditable
† Parameter is not accredited

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTERLY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JM

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JX4471	JX4613	JX4615	JX4616		
Sampling Date		2021/10/24 13:09	2021/10/24 13:39	2021/10/24 14:02	2021/10/24 14:50		
COC Number		846491-01-01	846491-01-01	846491-01-01	846491-01-01		
	Units	**HOW-SWBL-Q4-2021**	**HOW-SWBC-Q4-2021**	**HOW-SWTL-Q4-2021**	**HOW-SW5-Q4-2021**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	7.0	2251244

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTERLY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JM

TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JX4617	JX4618	JX4619	JX4620		
Sampling Date		2021/10/24 15:46	2021/10/24 16:19	2021/10/25 11:08	2021/10/25 11:29		
COC Number		846491-01-01	846491-01-01	846491-01-01	846491-01-01		
	Units	HOW-SW4-Q4-2021	HOW-SW1-Q4-2021	HOW-SW3-Q4-2021	HOW-SW2-Q4-2021	RDL	QC Batch
METALS							
Aluminum (Al)	ug/L	15	12	56	68	10	2251244
Antimony (Sb)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Silver (Ag)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Arsenic (As)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Barium (Ba)	ug/L	<2.0	<2.0	<2.0	3.1	2.0	2251244
Beryllium (Be)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244
Bismuth (Bi) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Boron (B) †	ug/L	<50	<50	<50	<50	50	2251244
Cadmium (Cd)	ug/L	<0.20	<0.20	<0.20	<0.20	0.20	2251244
Calcium (Ca) †	ug/L	2200	2800	<500	<500	500	2251244
Chromium (Cr)	ug/L	<5.0	<5.0	<5.0	<5.0	5.0	2251244
Cobalt (Co)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Copper (Cu)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Total Hardness (CaCO3) ††	ug/L	13000	15000	<1000	2100	1000	2251244
Tin (Sn)	ug/L	2.0	<2.0	<2.0	<2.0	2.0	2251244
Iron (Fe)	ug/L	<60	68	81	680	60	2251244
Magnesium (Mg) †	ug/L	1900	1900	120	240	100	2251244
Manganese (Mn)	ug/L	1.4	4.6	12	130	1.0	2251244
Mercury (Hg)	ug/L	<0.10	<0.10	<0.10	<0.10	0.10	2251244
Molybdenum (Mo)	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Nickel (Ni)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244
P2O5 ††	ug/L	<25	<25	<25	<25	25	2251244
Total phosphorous	ug/L	<10	<10	<10	<10	10	2251244
Lead (Pb)	ug/L	<0.50	<0.50	<0.50	<0.50	0.50	2251244
Potassium (K) †	ug/L	<500	<500	<500	<500	500	2251244
Selenium (Se)	ug/L	<3.0	<3.0	<3.0	<3.0	3.0	2251244
Sodium (Na)	ug/L	580	650	<500	550	500	2251244
Strontium (Sr) †	ug/L	5.3	5.6	<2.0	3.7	2.0	2251244
Thallium (Tl)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244
Titanium (Ti) ††	ug/L	<10	<10	<10	<10	10	2251244
Uranium (U) ††	ug/L	<1.0	<1.0	<1.0	<1.0	1.0	2251244
Vanadium (V)	ug/L	<2.0	<2.0	<2.0	<2.0	2.0	2251244

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JX4617	JX4618	JX4619	JX4620		
Sampling Date		2021/10/24 15:46	2021/10/24 16:19	2021/10/25 11:08	2021/10/25 11:29		
COC Number		846491-01-01	846491-01-01	846491-01-01	846491-01-01		
	Units	**HOW-SW4-Q4-2021**	**HOW-SW1-Q4-2021**	**HOW-SW3-Q4-2021**	**HOW-SW2-Q4-2021**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	<7.0	<7.0	<7.0	7.0	2251244

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JX4621		
Sampling Date		2021/10/25 11:57		
COC Number		846491-01-01		
	Units	HOW-SWML-Q4-2021	RDL	QC Batch
METALS				
Aluminum (Al)	ug/L	59	10	2251244
Antimony (Sb)	ug/L	<1.0	1.0	2251244
Silver (Ag)	ug/L	<1.0	1.0	2251244
Arsenic (As)	ug/L	<1.0	1.0	2251244
Barium (Ba)	ug/L	<2.0	2.0	2251244
Beryllium (Be)	ug/L	<2.0	2.0	2251244
Bismuth (Bi) ††	ug/L	<1.0	1.0	2251244
Boron (B) †	ug/L	<50	50	2251244
Cadmium (Cd)	ug/L	<0.20	0.20	2251244
Calcium (Ca) †	ug/L	1800	500	2251244
Chromium (Cr)	ug/L	<5.0	5.0	2251244
Cobalt (Co)	ug/L	<1.0	1.0	2251244
Copper (Cu)	ug/L	<1.0	1.0	2251244
Total Hardness (CaCO3) ††	ug/L	9900	1000	2251244
Tin (Sn)	ug/L	<2.0	2.0	2251244
Iron (Fe)	ug/L	130	60	2251244
Magnesium (Mg) †	ug/L	1300	100	2251244
Manganese (Mn)	ug/L	5.6	1.0	2251244
Mercury (Hg)	ug/L	<0.10	0.10	2251244
Molybdenum (Mo)	ug/L	<1.0	1.0	2251244
Nickel (Ni)	ug/L	<2.0	2.0	2251244
P2O5 ††	ug/L	<25	25	2251244
Total phosphorous	ug/L	<10	10	2251244
Lead (Pb)	ug/L	<0.50	0.50	2251244
Potassium (K) †	ug/L	<500	500	2251244
Selenium (Se)	ug/L	<3.0	3.0	2251244
Sodium (Na)	ug/L	<500	500	2251244
Strontium (Sr) †	ug/L	4.2	2.0	2251244
Thallium (Tl)	ug/L	<2.0	2.0	2251244
Titanium (Ti) ††	ug/L	<10	10	2251244
Uranium (U) ††	ug/L	<1.0	1.0	2251244
Vanadium (V)	ug/L	<2.0	2.0	2251244

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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TOTAL EXTRACTABLE METALS (SURFACE WATER)

Lab BV ID		JX4621		
Sampling Date		2021/10/25 11:57		
COC Number		846491-01-01		
	Units	**HOW-SWML-Q4-2021**	**RDL**	**QC Batch**
Zinc (Zn)	ug/L	<7.0	7.0	2251244

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JX4471	JX4471		JX4613		
Sampling Date		2021/10/24 13:09	2021/10/24 13:09		2021/10/24 13:39		
COC Number		846491-01-01	846491-01-01		846491-01-01		
	Units	HOW-SWBL-Q4-2021	HOW-SWBL-Q4-2021 Lab-Dup	QC Batch	HOW-SWBC-Q4-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.054	N/A	2249643	0.0068	0.0010	2249643
Dissolved organic carbon †	mg/L	0.71	N/A	2250523	4.9	0.20	2250523
Dissolved oxygen †	mg/L	12	N/A	2249016	12	1.0	2249016
Nitrate (N) and Nitrite(N)	mg/L	<0.020	<0.020	2253646	<0.020	0.020	2253646
Nitrates (N-NO3-)	mg/L	<0.020	<0.020	2253646	<0.020	0.020	2253646
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	2253646	<0.020	0.020	2253646
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	N/A	2252147	<0.020	0.020	2252147
Orthophosphate (P)	mg/L	<0.050	N/A	2250685	<0.050	0.050	2250685
pH	pH	6.78	N/A	2249634	5.60	N/A	2249634
pH (15° C) †	pH	6.87	6.88	2252653	5.60	N/A	2252653
Phenols-4AAP	mg/L	<0.0020	N/A	2251281	<0.0020	0.0020	2251281
Real Color	UCV	6.2	N/A	2249070	42	2.0	2249070
Sulfides (S2-)	mg/L	<0.020	N/A	2254189	<0.020	0.020	2254189
TKN Total Kjeldahl Nitrogen	mg/L	<0.40	N/A	2251178	<0.40	0.40	2251131
Turbidity	NTU	0.18	N/A	2260488	0.34	0.10	2260488
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	N/A	2248228	<0.0005	0.0005	2248228
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	28	N/A	2249640	1.1	1.0	2249640
Bicarbonates (HCO3 as CaCO3) †	mg/L	28	N/A	2249640	1.1	1.0	2249640
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	N/A	2249640	<1.0	1.0	2249640
Chloride (Cl)	mg/L	0.21	0.20	2253627	0.37	0.050	2253627
Sulfates (SO4)	mg/L	2.8	2.6	2253627	<0.50	0.50	2253627
Total Dissolved Solids	mg/L	56	N/A	2249147	31	10	2249147
Total suspended solids (TSS)	mg/L	3.0	N/A	2249146	2.0	2.0	2249146

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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TATA STEEL MINERALS CANADA
Client Project #: HOWSE QUARTERLY SURFACE WATER
Your P.O. #: 3000000997
Sampler Initials: JM

CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JX4615	JX4616	JX4616		
Sampling Date		2021/10/24 14:02	2021/10/24 14:50	2021/10/24 14:50		
COC Number		846491-01-01	846491-01-01	846491-01-01		
	Units	HOW-SWTL-Q4-2021	HOW-SW5-Q4-2021	HOW-SW5-Q4-2021 Lab-Dup	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	0.041	0.0046	0.0045	0.0010	2249643
Dissolved organic carbon †	mg/L	0.77	1.1	N/A	0.20	2250523
Dissolved oxygen †	mg/L	12	12	N/A	1.0	2249016
Nitrate (N) and Nitrite(N)	mg/L	0.096	<0.020	N/A	0.020	2253646
Nitrates (N-NO3-)	mg/L	0.096	<0.020	N/A	0.020	2253646
Nitrites (N-NO2-)	mg/L	<0.020	<0.020	N/A	0.020	2253646
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	N/A	0.020	2252147
Orthophosphate (P)	mg/L	<0.050	<0.050	N/A	0.050	2250685
pH	pH	6.77	6.20	6.27	N/A	2249634
pH (15° C) †	pH	7.16	6.42	N/A	N/A	2252653
Phenols-4AAP	mg/L	<0.0020	<0.0020	N/A	0.0020	2251281
Real Color	UCV	7.8	6.7	N/A	2.0	2249070
Sulfides (S2-)	mg/L	<0.020	<0.020	N/A	0.020	2254189
TKN Total Kjeldahl Nitrogen	mg/L	0.65	0.59	<0.40	0.40	2251131
Turbidity	NTU	0.22	0.44	N/A	0.10	2260488
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	<0.0005	N/A	0.0005	2248228
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	20	2.2	1.9	1.0	2249640
Bicarbonates (HCO3 as CaCO3) †	mg/L	20	2.2	1.9	1.0	2249640
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	<1.0	<1.0	1.0	2249640
Chloride (Cl)	mg/L	0.32	0.11	N/A	0.050	2253627
Sulfates (SO4)	mg/L	2.4	<0.50	N/A	0.50	2253627
Total Dissolved Solids	mg/L	40	15	N/A	10	2249147
Total suspended solids (TSS)	mg/L	8.0	3.0	N/A	2.0	2249146

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JX4617		JX4618	JX4619		
Sampling Date		2021/10/24 15:46		2021/10/24 16:19	2021/10/25 11:08		
COC Number		846491-01-01		846491-01-01	846491-01-01		
	Units	HOW-SW4-Q4-2021	QC Batch	HOW-SW1-Q4-2021	HOW-SW3-Q4-2021	RDL	QC Batch
CONVENTIONALS							
Conductivity	mS/cm	0.030	2253925	0.033	0.0042	0.0010	2249643
Dissolved organic carbon †	mg/L	0.66	2250523	0.56	3.2	0.20	2250523
Dissolved oxygen †	mg/L	12	2249016	12	12	1.0	2249016
Nitrate (N) and Nitrite(N)	mg/L	0.19	2253646	0.19	<0.020	0.020	2253646
Nitrates (N-NO3-)	mg/L	0.19	2253646	0.19	<0.020	0.020	2253646
Nitrites (N-NO2-)	mg/L	<0.020	2253646	<0.020	<0.020	0.020	2253646
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	2252147	<0.020	<0.020	0.020	2252147
Orthophosphate (P)	mg/L	<0.050	2250685	<0.050	<0.050	0.050	2250685
pH	pH	6.89	2253923	6.88	5.59	N/A	2249634
pH (15° C) †	pH	7.07	2252653	7.02	5.68	N/A	2252653
Phenols-4AAP	mg/L	<0.0020	2251281	<0.0020	<0.0020	0.0020	2251281
Real Color	UCV	6.7	2249070	6.3	24	2.0	2249070
Sulfides (S2-)	mg/L	<0.020	2254189	<0.020	<0.020	0.020	2254189
TKN Total Kjeldahl Nitrogen	mg/L	0.47	2251131	<0.40	<0.40	0.40	2251131
Turbidity	NTU	0.24	2260488	0.12	0.35	0.10	2260488
Un-ionized Ammonia at 15°C †	mg/L	<0.0005	2248228	<0.0005	<0.0005	0.0005	2248228
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	10	2253924	12	<1.0	1.0	2249640
Bicarbonates (HCO3 as CaCO3) †	mg/L	10	2253924	12	<1.0	1.0	2249640
Carbonate (CO3 as CaCO3) †	mg/L	<1.0	2253924	<1.0	<1.0	1.0	2249640
Chloride (Cl)	mg/L	0.32	2253627	0.34	0.19	0.050	2253627
Sulfates (SO4)	mg/L	2.8	2253627	2.4	<0.50	0.50	2253627
Total Dissolved Solids	mg/L	31	2249147	38	29	10	2249147
Total suspended solids (TSS)	mg/L	<2.0	2249146	<2.0	<2.0	2.0	2249146

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
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N/A = Not Applicable

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CONVENTIONAL PARAMETERS (SURFACE WATER)

Lab BV ID		JX4619	JX4620	JX4621		
Sampling Date		2021/10/25 11:08	2021/10/25 11:29	2021/10/25 11:57		
COC Number		846491-01-01	846491-01-01	846491-01-01		
	Units	HOW-SW3-Q4-2021 Lab-Dup	HOW-SW2-Q4-2021	HOW-SWML-Q4-2021	RDL	QC Batch
CONVENTIONALS						
Conductivity	mS/cm	N/A	0.0062	0.022	0.0010	2249643
Dissolved organic carbon †	mg/L	N/A	3.0	1.5	0.20	2250523
Dissolved oxygen †	mg/L	N/A	13	12	1.0	2249016
Nitrate (N) and Nitrite(N)	mg/L	N/A	<0.020	<0.020	0.020	2253646
Nitrates (N-NO3-)	mg/L	N/A	<0.020	<0.020	0.020	2253646
Nitrites (N-NO2-)	mg/L	N/A	<0.020	<0.020	0.020	2253646
Nitrogen ammonia (N-NH4+ and N-NH3)	mg/L	<0.020	<0.020	<0.020	0.020	2252147
Orthophosphate (P)	mg/L	N/A	<0.050	<0.050	0.050	2250685
pH	pH	N/A	5.96	6.75	N/A	2249634
pH (15° C) †	pH	N/A	6.03	6.50	N/A	2252653
Phenols-4AAP	mg/L	N/A	<0.0020	<0.0020	0.0020	2251281
Real Color	UCV	N/A	43	29	2.0	2249070
Sulfides (S2-)	mg/L	N/A	<0.020	<0.020	0.020	2254189
TKN Total Kjeldahl Nitrogen	mg/L	N/A	0.45	<0.40	0.40	2251131
Turbidity	NTU	N/A	0.59	2.9	0.10	2260488
Un-ionized Ammonia at 15°C †	mg/L	N/A	<0.0005	<0.0005	0.0005	2248228
Alkalinity Total (as CaCO3) pH 4.5 †	mg/L	N/A	1.8	7.2	1.0	2249640
Bicarbonates (HCO3 as CaCO3) †	mg/L	N/A	1.8	7.2	1.0	2249640
Carbonate (CO3 as CaCO3) †	mg/L	N/A	<1.0	<1.0	1.0	2249640
Chloride (Cl)	mg/L	N/A	0.26	0.13	0.050	2253627
Sulfates (SO4)	mg/L	N/A	<0.50	2.9	0.50	2253627
Total Dissolved Solids	mg/L	N/A	33	31	10	2249147
Total suspended solids (TSS)	mg/L	N/A	3.0	3.0	2.0	2249146

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable
† Parameter is not accreditable

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GENERAL COMMENTS

Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4471
Anions: Holding time already past upon reception.: JX4471
Real Color: Holding time already past upon reception.: JX4471
Conductivity: Holding time already past upon reception.: JX4471
Total Suspended Solids: Holding time already past upon reception.: JX4471
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4471
pH: Holding time already past upon reception.: JX4471
pH Measured @ 15° C: Holding time already past upon reception.: JX4471
Ortho Phosphate: Holding time already past upon reception.: JX4471
Total Dissolved Solids: Holding time already past upon reception.: JX4471
Turbidity: Holding time already past upon reception.: JX4471
Reactive Silica(SiO2): Holding time already past upon reception.: JX4471
Dissolved Oxygen: Holding time already past upon reception.: JX4471
Dissolved Organic Carbon: Holding time already past upon reception.: JX4471
Ammonia Nitrogen: Holding time already past upon reception.: JX4471
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4471
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4613
Anions: Holding time already past upon reception.: JX4613
Real Color: Holding time already past upon reception.: JX4613
Conductivity: Holding time already past upon reception.: JX4613
Total Suspended Solids: Holding time already past upon reception.: JX4613
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4613
pH: Holding time already past upon reception.: JX4613
pH Measured @ 15° C: Holding time already past upon reception.: JX4613
Ortho Phosphate: Holding time already past upon reception.: JX4613
Total Dissolved Solids: Holding time already past upon reception.: JX4613
Turbidity: Holding time already past upon reception.: JX4613
Reactive Silica(SiO2): Holding time already past upon reception.: JX4613
Dissolved Oxygen: Holding time already past upon reception.: JX4613
Dissolved Organic Carbon: Holding time already past upon reception.: JX4613
Ammonia Nitrogen: Holding time already past upon reception.: JX4613
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4613
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4615
Anions: Holding time already past upon reception.: JX4615
Real Color: Holding time already past upon reception.: JX4615
Conductivity: Holding time already past upon reception.: JX4615
Total Suspended Solids: Holding time already past upon reception.: JX4615
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4615
pH: Holding time already past upon reception.: JX4615
pH Measured @ 15° C: Holding time already past upon reception.: JX4615
Ortho Phosphate: Holding time already past upon reception.: JX4615
Total Dissolved Solids: Holding time already past upon reception.: JX4615
Turbidity: Holding time already past upon reception.: JX4615
Reactive Silica(SiO2): Holding time already past upon reception.: JX4615
Dissolved Oxygen: Holding time already past upon reception.: JX4615
Dissolved Organic Carbon: Holding time already past upon reception.: JX4615
Ammonia Nitrogen: Holding time already past upon reception.: JX4615
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4615
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4616
Anions: Holding time already past upon reception.: JX4616
Real Color: Holding time already past upon reception.: JX4616
Conductivity: Holding time already past upon reception.: JX4616

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Total Suspended Solids: Holding time already past upon reception.: JX4616
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4616
pH: Holding time already past upon reception.: JX4616
pH Measured @ 15° C: Holding time already past upon reception.: JX4616
Ortho Phosphate: Holding time already past upon reception.: JX4616
Total Dissolved Solids: Holding time already past upon reception.: JX4616
Turbidity: Holding time already past upon reception.: JX4616
Reactive Silica(SiO2): Holding time already past upon reception.: JX4616
Dissolved Oxygen: Holding time already past upon reception.: JX4616
Dissolved Organic Carbon: Holding time already past upon reception.: JX4616
Ammonia Nitrogen: Holding time already past upon reception.: JX4616
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4616
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4617
Anions: Holding time already past upon reception.: JX4617
Real Color: Holding time already past upon reception.: JX4617
Conductivity: Holding time already past upon reception.: JX4617
Total Suspended Solids: Holding time already past upon reception.: JX4617
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4617
pH: Holding time already past upon reception.: JX4617
pH Measured @ 15° C: Holding time already past upon reception.: JX4617
Ortho Phosphate: Holding time already past upon reception.: JX4617
Total Dissolved Solids: Holding time already past upon reception.: JX4617
Turbidity: Holding time already past upon reception.: JX4617
Reactive Silica(SiO2): Holding time already past upon reception.: JX4617
Dissolved Oxygen: Holding time already past upon reception.: JX4617
Dissolved Organic Carbon: Holding time already past upon reception.: JX4617
Ammonia Nitrogen: Holding time already past upon reception.: JX4617
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4617
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4618
Anions: Holding time already past upon reception.: JX4618
Real Color: Holding time already past upon reception.: JX4618
Conductivity: Holding time already past upon reception.: JX4618
Total Suspended Solids: Holding time already past upon reception.: JX4618
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4618
pH: Holding time already past upon reception.: JX4618
pH Measured @ 15° C: Holding time already past upon reception.: JX4618
Ortho Phosphate: Holding time already past upon reception.: JX4618
Total Dissolved Solids: Holding time already past upon reception.: JX4618
Turbidity: Holding time already past upon reception.: JX4618
Reactive Silica(SiO2): Holding time already past upon reception.: JX4618
Dissolved Oxygen: Holding time already past upon reception.: JX4618
Dissolved Organic Carbon: Holding time already past upon reception.: JX4618
Ammonia Nitrogen: Holding time already past upon reception.: JX4618
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4618
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4619
Anions: Holding time already past upon reception.: JX4619
Real Color: Holding time already past upon reception.: JX4619
Conductivity: Holding time already past upon reception.: JX4619
Total Suspended Solids: Holding time already past upon reception.: JX4619
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4619
pH: Holding time already past upon reception.: JX4619
pH Measured @ 15° C: Holding time already past upon reception.: JX4619
Ortho Phosphate: Holding time already past upon reception.: JX4619
Total Dissolved Solids: Holding time already past upon reception.: JX4619
Turbidity: Holding time already past upon reception.: JX4619

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Reactive Silica(SiO2): Holding time already past upon reception.: JX4619
Dissolved Oxygen: Holding time already past upon reception.: JX4619
Dissolved Organic Carbon: Holding time already past upon reception.: JX4619
Ammonia Nitrogen: Holding time already past upon reception.: JX4619
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4619
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4620
Anions: Holding time already past upon reception.: JX4620
Real Color: Holding time already past upon reception.: JX4620
Conductivity: Holding time already past upon reception.: JX4620
Total Suspended Solids: Holding time already past upon reception.: JX4620
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4620
pH: Holding time already past upon reception.: JX4620
pH Measured @ 15° C: Holding time already past upon reception.: JX4620
Ortho Phosphate: Holding time already past upon reception.: JX4620
Total Dissolved Solids: Holding time already past upon reception.: JX4620
Turbidity: Holding time already past upon reception.: JX4620
Reactive Silica(SiO2): Holding time already past upon reception.: JX4620
Dissolved Oxygen: Holding time already past upon reception.: JX4620
Dissolved Organic Carbon: Holding time already past upon reception.: JX4620
Ammonia Nitrogen: Holding time already past upon reception.: JX4620
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4620
Total Alkalinity (pH end point 4.5): Holding time already past upon reception.: JX4621
Anions: Holding time already past upon reception.: JX4621
Real Color: Holding time already past upon reception.: JX4621
Conductivity: Holding time already past upon reception.: JX4621
Total Suspended Solids: Holding time already past upon reception.: JX4621
Nitrate and/or Nitrite: Holding time already past upon reception.: JX4621
pH: Holding time already past upon reception.: JX4621
pH Measured @ 15° C: Holding time already past upon reception.: JX4621
Ortho Phosphate: Holding time already past upon reception.: JX4621
Total Dissolved Solids: Holding time already past upon reception.: JX4621
Turbidity: Holding time already past upon reception.: JX4621
Reactive Silica(SiO2): Holding time already past upon reception.: JX4621
Dissolved Oxygen: Holding time already past upon reception.: JX4621
Dissolved Organic Carbon: Holding time already past upon reception.: JX4621
Ammonia Nitrogen: Holding time already past upon reception.: JX4621
Total Extractable Metals by ICP: Arrived unpreserved, preserved upon reception at the laboratory.: JX4621

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2249070	JHW	Spiked Blank	Real Color	2021/11/05		102	%
2249070	JHW	Method Blank	Real Color	2021/11/05	<2.0		UCV
2249146	PS5	Spiked Blank	Total suspended solids (TSS)	2021/11/10		96	%
2249146	PS5	Method Blank	Total suspended solids (TSS)	2021/11/10	<2.0		mg/L
2249147	MQI	Spiked Blank	Total Dissolved Solids	2021/11/08		98	%
2249147	MQI	Method Blank	Total Dissolved Solids	2021/11/08	<10		mg/L
2249634	LI	Spiked Blank	pH	2021/11/08		102	%
2249640	LI	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/11/08		102	%
			Carbonate (CO3 as CaCO3)	2021/11/08		102	%
2249640	LI	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/11/08	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2021/11/08	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2021/11/08	<1.0		mg/L
2249643	LI	Spiked Blank	Conductivity	2021/11/08		102	%
2249643	LI	Method Blank	Conductivity	2021/11/08	<0.0010		mS/cm
2250523	SD2	Spiked Blank	Dissolved organic carbon	2021/11/11		102	%
2250523	SD2	Method Blank	Dissolved organic carbon	2021/11/11	<0.20		mg/L
2250643	EMT	Matrix Spike	Reactive silica (SiO2)	2021/11/10		89	%
2250643	EMT	Spiked Blank	Reactive silica (SiO2)	2021/11/10		91	%
2250643	EMT	Method Blank	Reactive silica (SiO2)	2021/11/10	<0.50		mg/L
2250685	HZU	Spiked Blank	Orthophosphate (P)	2021/11/10		90	%
2250685	HZU	Method Blank	Orthophosphate (P)	2021/11/10	<0.050		mg/L
2250740	éCY	Matrix Spike	Mercury (Hg)	2021/11/10		100	%
			Mercury (Hg)	2021/11/10		100	%
2250740	éCY	Spiked Blank	Mercury (Hg)	2021/11/10		101	%
			Mercury (Hg)	2021/11/10		101	%
2250740	éCY	Method Blank	Mercury (Hg)	2021/11/10	<0.01		ug/L
			Mercury (Hg)	2021/11/10	<0.01		ug/L
2250741	éCY	Matrix Spike	Mercury (Hg)	2021/11/10		101	%
2250741	éCY	Spiked Blank	Mercury (Hg)	2021/11/10		101	%
2250741	éCY	Method Blank	Mercury (Hg)	2021/11/10	<0.01		ug/L
2251131	AJ1	Spiked Blank	TKN Total Kjeldahl Nitrogen	2021/11/11		102	%
2251131	AJ1	Method Blank	TKN Total Kjeldahl Nitrogen	2021/11/11	<0.40		mg/L
2251178	AJ1	Spiked Blank	TKN Total Kjeldahl Nitrogen	2021/11/11		107	%
2251178	AJ1	Method Blank	TKN Total Kjeldahl Nitrogen	2021/11/11	<0.40		mg/L
2251244	DZE	Spiked Blank	Aluminum (Al)	2021/11/18		100	%
			Antimony (Sb)	2021/11/18		110	%
			Silver (Ag)	2021/11/18		99	%
			Arsenic (As)	2021/11/18		102	%
			Barium (Ba)	2021/11/18		104	%
			Beryllium (Be)	2021/11/18		105	%
			Bismuth (Bi)	2021/11/18		102	%
			Boron (B)	2021/11/18		108	%
			Cadmium (Cd)	2021/11/18		100	%
			Calcium (Ca)	2021/11/18		95	%
			Chromium (Cr)	2021/11/18		86	%
			Cobalt (Co)	2021/11/18		94	%
			Copper (Cu)	2021/11/18		89	%
			Tin (Sn)	2021/11/18		108	%
			Iron (Fe)	2021/11/18		95	%
			Magnesium (Mg)	2021/11/18		93	%
			Manganese (Mn)	2021/11/18		98	%

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
			Mercury (Hg)	2021/11/18		92	%
			Molybdenum (Mo)	2021/11/18		105	%
			Nickel (Ni)	2021/11/18		93	%
			Total phosphorous	2021/11/18		91	%
			Lead (Pb)	2021/11/18		98	%
			Potassium (K)	2021/11/18		100	%
			Selenium (Se)	2021/11/18		108	%
			Sodium (Na)	2021/11/18		93	%
			Strontium (Sr)	2021/11/18		106	%
			Thallium (Tl)	2021/11/18		101	%
			Titanium (Ti)	2021/11/18		98	%
			Uranium (U)	2021/11/18		97	%
			Vanadium (V)	2021/11/18		98	%
			Zinc (Zn)	2021/11/18		88	%
2251244	DZE	Method Blank	Aluminum (Al)	2021/11/18	<10		ug/L
			Antimony (Sb)	2021/11/18	<1.0		ug/L
			Silver (Ag)	2021/11/18	<1.0		ug/L
			Arsenic (As)	2021/11/18	<1.0		ug/L
			Barium (Ba)	2021/11/18	<2.0		ug/L
			Beryllium (Be)	2021/11/18	<2.0		ug/L
			Bismuth (Bi)	2021/11/18	<1.0		ug/L
			Boron (B)	2021/11/18	<50		ug/L
			Cadmium (Cd)	2021/11/18	<0.20		ug/L
			Calcium (Ca)	2021/11/18	<500		ug/L
			Chromium (Cr)	2021/11/18	<5.0		ug/L
			Cobalt (Co)	2021/11/18	<1.0		ug/L
			Copper (Cu)	2021/11/18	<1.0		ug/L
			Total Hardness (CaCO3)	2021/11/18	<1000		ug/L
			Tin (Sn)	2021/11/18	<2.0		ug/L
			Iron (Fe)	2021/11/18	<60		ug/L
			Magnesium (Mg)	2021/11/18	<100		ug/L
			Manganese (Mn)	2021/11/18	<1.0		ug/L
			Mercury (Hg)	2021/11/18	<0.10		ug/L
			Molybdenum (Mo)	2021/11/18	<1.0		ug/L
			Nickel (Ni)	2021/11/18	<2.0		ug/L
			P2O5	2021/11/18	<25		ug/L
			Total phosphorous	2021/11/18	<10		ug/L
			Lead (Pb)	2021/11/18	<0.50		ug/L
			Potassium (K)	2021/11/18	<500		ug/L
			Selenium (Se)	2021/11/18	<3.0		ug/L
			Sodium (Na)	2021/11/18	<500		ug/L
			Strontium (Sr)	2021/11/18	<2.0		ug/L
			Thallium (Tl)	2021/11/18	<2.0		ug/L
			Titanium (Ti)	2021/11/18	<10		ug/L
			Uranium (U)	2021/11/18	<1.0		ug/L
			Vanadium (V)	2021/11/18	<2.0		ug/L
			Zinc (Zn)	2021/11/18	<7.0		ug/L
2251281	AJ1	Spiked Blank	Phenols-4AAP	2021/11/11		96	%
2251281	AJ1	Method Blank	Phenols-4AAP	2021/11/11	<0.0020		mg/L
2252147	CLO	Spiked Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/11/13		105	%
2252147	CLO	Method Blank	Nitrogen ammonia (N-NH4+ and N-NH3)	2021/11/13	<0.020		mg/L

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	Units
2252653	AZM	QC Standard	pH (15° C)	2021/11/15		98	%
2252653	AZM	Spiked Blank	pH (15° C)	2021/11/15		101	%
2253627	VPA	Spiked Blank	Chloride (Cl)	2021/11/18		93	%
			Sulfates (SO4)	2021/11/18		95	%
2253627	VPA	Method Blank	Chloride (Cl)	2021/11/18	<0.050		mg/L
			Sulfates (SO4)	2021/11/18	<0.50		mg/L
2253646	VPA	Spiked Blank	Nitrate (N) and Nitrite(N)	2021/11/18		97	%
			Nitrates (N-NO3-)	2021/11/18		93	%
			Nitrites (N-NO2-)	2021/11/18		100	%
2253646	VPA	Method Blank	Nitrate (N) and Nitrite(N)	2021/11/18	<0.020		mg/L
			Nitrates (N-NO3-)	2021/11/18	<0.020		mg/L
			Nitrites (N-NO2-)	2021/11/18	<0.020		mg/L
2253923	YAZ	Spiked Blank	pH	2021/11/18		102	%
2253924	YAZ	Spiked Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/11/18		96	%
			Carbonate (CO3 as CaCO3)	2021/11/18		96	%
2253924	YAZ	Method Blank	Alkalinity Total (as CaCO3) pH 4.5	2021/11/18	<1.0		mg/L
			Bicarbonates (HCO3 as CaCO3)	2021/11/18	<1.0		mg/L
			Carbonate (CO3 as CaCO3)	2021/11/18	<1.0		mg/L
2253925	YAZ	Spiked Blank	Conductivity	2021/11/18		99	%
2253925	YAZ	Method Blank	Conductivity	2021/11/18	<0.0010		mS/cm
2254189	AZM	Spiked Blank	Sulfides (S2-)	2021/11/19		96	%
2254189	AZM	Method Blank	Sulfides (S2-)	2021/11/19	<0.020		mg/L
2260488	JHW	Spiked Blank	Turbidity	2021/12/22		96	%
2260488	JHW	Method Blank	Turbidity	2021/12/22	<0.10		NTU

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

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Appendix 2 Wetland Water Levels Results

GroupeHemispheres

Howse Wetlands Monitoring - 2018

Tata Steel Minerals Canada Ltd.

Preliminary Technical Draft

N/D : PR185-38-18
V/D : 2200002065

December 20, 2018

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Revisions and publication		
Number	**Date**	**Modification or publication data**
00	2018-12-20	Preliminary report

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This document should be cited as:

Groupe Hémisphères (2018) *Howse Wetlands Monitoring - 2018.* Preliminary technical report drafted for Tata Steel Minerals Canada, 12 p. and 2 appendices.

SCOPE AND LIMITATIONS

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1 CONTEXT

Tata Steel Minerals Canada (TSMC) is developing an open-pit iron ore mine in Newfoundland and Labrador. About 46 Mt of iron ore will be extracted over the course of the Howse Property Iron Mine Project's lifespan (Howse Project), or about 15 years.

In 2014, an environmental assessment of the Howse Project was conducted in accordance with the requirements of the Canadian Environmental Assessment Act, 2012. As a result the Howse Project was accepted with several requirements. TSMC, in compliance with the migratory Birds Convention Act, 1994 and with the Species at Risk Act, must ensure that migratory bird populations and their habitat are in no way negatively impacted by the Howse Project implantation, operation and decommission.

In this regard and among other requirements, TSMC and Groupe Hémisphères developed a follow-up program to monitor and detect any adverse environmental effects of the Howse Project on wetland functions that support migratory birds, and to determine the effectiveness of the proposed mitigation measures.

This document presents the work mandated to Groupe Hémisphères by TSMC on wetlands characterization and water level. As a first survey that takes place prior to the Howse Project development, the specific objectives was to characterize wetlands vegetation and measures the natural water level and water level variation of wetlands in a way that enables a follow-up during the Howse Project..

2 METHODOLOGY

2.1 Wetlands Selection

Wetlands were selected based on a previous mapping done in the area. Wetlands were separated in two categories. The first category is those that may be affected by the Howse Project. Those wetlands are located close to the future installations. The second category is control wetlands, those that are located far enough from the installations that they should not be affected. This distinction was done in order to detect seasonal local changes like drought or flooding that may not be attributed to the Howse Project.

Table 1 presents a description of the ecotype in which monitoring was carried out.

Table 1. Wetland Ecotype Description

Ecotype	Wetland Type	Short Name	Description
MSF08	Swamp	Black Spruce / Tamarack Forested Swamp	Found on slopes or on flat expanses. These wetlands are not connected hydrologically. Soils are characterized by humic gleysol, with an organic horizon of less than 30 cm thickness and a water-retentive horizon (composed of silt and clay). Black Spruce dominates the arboreal stratum, along with Tamarack. The shrub layer is diverse, with Cloudberry being the most common. The herb layer is diverse.
MSF10	Bog	Black Spruce Bog	This type of wetland is hydrologically fed by precipitation and runoff only. These bogs occur in isolation or as part of larger wetland complexes. The soils are relatively thick organic soils with little decomposition. Some bogs are found on an underlaying of boulders and rocks. Trees are present but sparse, with Black Spruce being the dominant species. The shrub layer is diverse and composed of several willows and ericaceous species. Sedges are the main herbaceous species.
MSF12	Fen	Uniform Herb Fen	These fens are found on wide plains and are not generally connected to a watercourse but are usually inundated. Soils are always organic and usually fibric. Trees are absent from this fen. Black Spruce and Tamarack may be present in shrub form. Shrubs are mostly composed of ericaceous species. Sedge species dominate the herb layer.
MSF15	Fen	Uniform Fluvial Shrub Fen	This ecotype is found exclusively adjacent to water courses. It is a rich ecosystem which is enriched by inundation of the watercourse. Soils are regosol or humic gleysol. The arboreal layer is absent or negligible. The shrub layer is dense and composed of willows, Glandular Birch and the Sweet. The herb layer is diverse.

2.2 Wetland delineation

A wetland delineation was done in 2016 (Groupe Hémisphères, 2018). The limits of the wetland complex was verified during summer 2018 and wetland complex that were not previously delineated were done in 2018. The wetland delineation is shown on Figure 2.

2.3 Water Level Monitoring

2.3.1 Wells Installation

A total of 21 wells were installed in the wetlands located near the Howse project. The Table 2 details each well, Figure 1 present its components and the Figure 2 presents their locations.

A motorized soil auger (0.10 m drill; 1.25 m shaft) was used to dig into the organic matter up to the mineral and solid layers. The piezometers (0.04 m * 1.71 m) were then inserted in the holes and fixed with silica sand. A cap of bentonite was then added to limit surface water infiltration.

Finally, to limit vertical movement of the well in organic matter (ice, waterlogging, etc.), the piezometers were fixed to a 2 m rugged steel bar inserted in the mineral soil.

Table 2. Wetland Monitoring Wells Location

Well	Ecotype	Ecotype – Short Name	Depth (m)	Coordinates (NAD83/UTM 19N)	
				Latitude	Longitude
WMW01	MSF10	Black Spruce Bog	0.81	-67.10885338	54.90773052
WMW02	MSF15	Uniform Fluvial Shrub Fen	0.84	-67.11485149	54.90998019
WMW03	MSF12	Uniform Herb Fen	1.20	-67.12086831	54.91097017
WMW04	MSF12	Uniform Herb Fen	0.82	-67.12374799	54.91043943
WMW05	MSF12	Uniform Herb Fen	1.11	-67.12509565	54.90796152
WMW06	MSF12	Uniform Herb Fen	0.91	-67.12535378	54.90535409
WMW08	MSF15	Uniform Fluvial Shrub Fen	1.02	-67.1232684	54.8986742
WMW11	MSF08	Black Spruce / Tamarack Forested Swamp	0.81	-67.13570858	54.91896816
WMW12	MSF12	Uniform Herb Fen	1.22	-67.13841801	54.92031465
WMW13	MSF08	Black Spruce / Tamarack Forested Swamp	1.22	-67.1374291	54.9165781
WMW16	MSF08	Black Spruce / Tamarack Forested Swamp	0.79	-67.14139278	54.91830951
WMW18	MSF08	Black Spruce / Tamarack Forested Swamp	1.22	-67.14525253	54.91819127
WMW19	MSF08	Black Spruce / Tamarack Forested Swamp	0.71	-67.14418076	54.91726997
WMW21	MSF08	Black Spruce / Tamarack Forested Swamp	0.91	-67.14070469	54.9161988
WMW22	MSF08	Black Spruce / Tamarack Forested Swamp	0.84	-67.1457973	54.91606758
WMW24	MSF08	Black Spruce / Tamarack Forested Swamp	0.76	-67.14966342	54.91591623
WMW25	MSF12	Uniform Herb Fen	0.71	-67.15224653	54.91588043
WMW26	MSF10	Black Spruce Bog	0.81	-67.15663506	54.91741914
WMW27	MSF12	Uniform Herb Fen	1.22	-67.14865967	54.92205759
WMW29	MSF15	Uniform Fluvial Shrub Fen	0.69	-67.15529406	54.92833714
WMW30	MSF10	Black Spruce Bog	0.81	-67.15680867	54.92880363

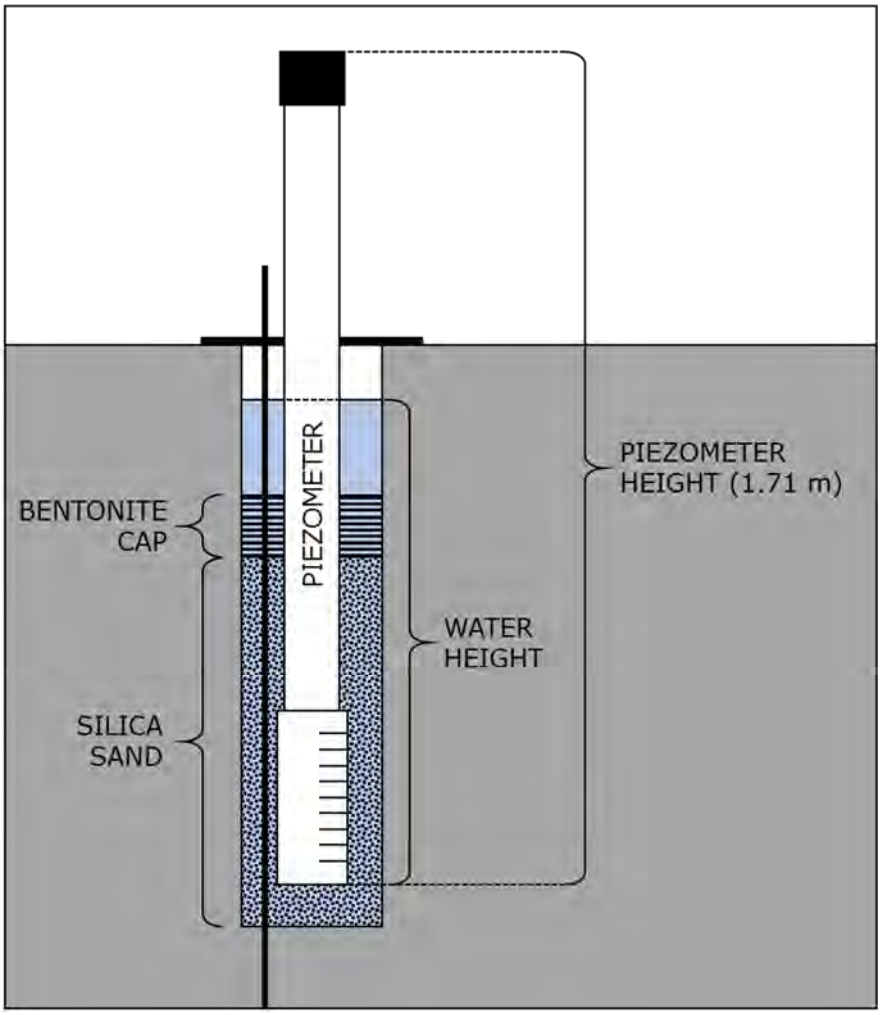


Figure 1. Sketch of a well

2.3.2 Water Level Measurements

The bottom of the well, which is fixed in the deep mineral soil was used to monitor changes in wetlands water levels. Indeed, the surface of the soil in wetlands is not at a constant altitude: it expands and swells as it is waterlogged. Hence, using the soil level next to the well as a reference altitude would give inaccurate data. While the measures using the bottom of the wells can't be used to compare levels between wells, it is the only way to assure a precise interannual comparison.

Up to four measures were taken in each well between August 17th and October 3rd to assess the natural water level variation within wetlands. The measurements were taken at least one week after the installation to make sure the water level was stabilized following the boring.

2.4 Wetland Vegetation Survey

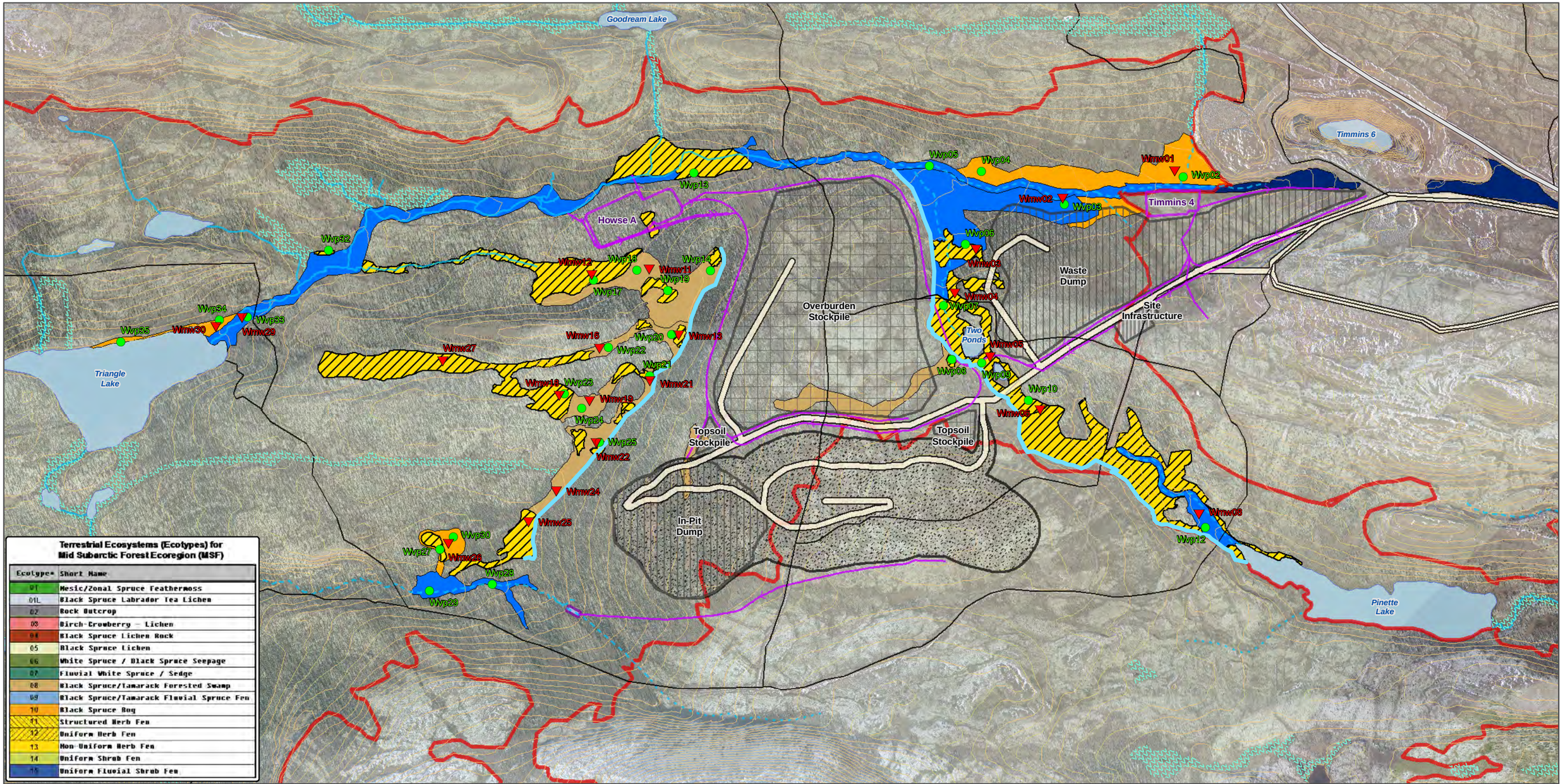
In the event that the local hydrology is affected by the Howse Project, it may have an effect on wetland vegetation. Herbs cover and species composition would be where the shift would first be detected. In order to detect a long-term change, 29 permanent vegetation survey point were implemented in wetlands close to the future installations as well as in wetlands that will not be affected.

For each permanent vegetation survey point, a marker was installed in a nearby tree. Distance and angle to the survey point were noted, so it could be revisited during periodically during the project. Table 3 presents the location of survey point.

Site and ecosystem were first described. Low vegetation (small shrubs, herbs, moss and lichen) were sampled in a 1 m^2 plot. Species were identified, and their cover percentage was noted.

Table 3. Wetland Vegetation Survey Point Location

Station	Ecotype	Ecotype – Short Name	Coordinates (NAD83/UTM 19N)	
			Latitude	Longitude
WVP02	MSF10	Black Spruce Bog	-67.1087525	54.9073847
WVP03	MSF15	Uniform Fluvial Shrub Fen	-67.1150303	54.9097968
WVP04	MSF10	Black Spruce Bog	-67.1170855	54.9127609
WVP05	MSF15	Uniform Fluvial Shrub Fen	-67.1190738	54.9142474
WVP06	MSF12	Uniform Herb Fen	-67.1210609	54.9113755
WVP07	MSF12	Uniform Herb Fen	-67.1247678	54.9104409
WVP08	MSF12	Uniform Herb Fen	-67.1268306	54.9089107
WVP09	MSF12	Uniform Herb Fen	-67.1256956	54.9080426
WVP10	MSF12	Uniform Herb Fen	-67.1253977	54.9059099
WVP12	MSF15	Uniform Fluvial Shrub Fen	-67.123564	54.8981871
WVP13	MSF12	Uniform Herb Fen	-67.1294545	54.9201857
WVP14	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1331222	54.91735
WVP17	MSF12	Uniform Herb Fen	-67.1385522	54.9201654
WVP18	MSF08	Black Spruce / Tamarack Forested Swamp	-67.136273	54.9192713
WVP19	MSF12	Uniform Herb Fen	-67.1358511	54.9179795
WVP20	MSF08	Black Spruce / Tamarack Forested Swamp	-67.137662	54.9167924
WVP21	MSF12	Uniform Herb Fen	-67.1404672	54.9163355
WVP22	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1409567	54.9181145
WVP23	MSF12	Uniform Herb Fen	-67.1449198	54.918118
WVP24	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1448411	54.9173103
WVP25	MSF08	Black Spruce / Tamarack Forested Swamp	-67.1455879	54.9160162
WVP27	MSF12	Uniform Herb Fen	-67.157233	54.9175224
WVP28	MSF15	Uniform Fluvial Shrub Fen	-67.1565827	54.915297
WVP29	MSF15	Uniform Fluvial Shrub Fen	-67.1595474	54.9167695
WVP30	MSF10	Black Spruce Bog	-67.1561195	54.9174682
WVP32	MSF12	Uniform Herb Fen	-67.1485404	54.9277659
WVP33	MSF15	Uniform Fluvial Shrub Fen	-67.1550156	54.9282191
WVP34	MSF10	Black Spruce Bog	-67.156345	54.9288842
WVP35	MSF10	Black Spruce Bog	-67.1615262	54.9309



Terrestrial Ecosystems (Ecotypes) for Mid Subarctic Forest Ecoregion (MSF)

Ecotype	Short Name
01	Mesic/Zonal Spruce Feathermoss
01L	Black Spruce Labrador Tea Lichen
02	Rock Outcrop
03	Birch-Crowberry – Lichen
04	Black Spruce Lichen Rock
05	Black Spruce Lichen
06	White Spruce / Black Spruce Seepage
07	Fluvial White Spruce / Sedge
08	Black Spruce/Tamarack Forested Swamp
09	Black Spruce/Tamarack Fluvial Spruce Fen
10	Black Spruce Bog
11	Structured Herb Fen
12	Uniform Herb Fen
13	Non-Uniform Herb Fen
14	Uniform Shrub Fen
15	Uniform Fluvial Shrub Fen

LEGEND

Wetland survey
- Wetland vegetation point
- Active piezometer
- Wetland Delineation

Basemap
- Contour Line (5m)
- Ecoregion Boundary
- Existing Road

Howse Proposed Infrastructures
- Proposed Howse Pit
- Proposed Topsoil/Overburden Stockpile
- Proposed Waste Dump/In-Pit Dump
- Proposed Site Infrastructure
- Proposed Sedimentation Pond
- Proposed Dissipation Pool
- Haul Road
- Proposed Ditch and Outlet

Hydrography
- Permanent Watercourse
- Intermittent Watercourse
- Storm Runoff
- Water Body
- Other Wetland

FILE, PROJECT, DATE, AUTHOR:
GH-0917 , PR185-38-18, 2018-12-20, jfbrisard

N

0 150 300 450 600
Meters

UTM 19N NAD 83 SCALE: 1:15 000

SOURCES:
Basemap
Government of Canada, NTDB, 1:50,000, 1979 Government of NL and government of Quebec, Boundary used for claims
SNC Lavalin, Groupe Hémisphères, Hydrology update, 2013

Infrastructure and Mining Components
New Millennium Capital Corp., Mining sites and roads
Howse Minerals Limited/ MET-CHEM Howse Deposit Design for General Layout, 2015

HOWSE PROPERTY PROJECT

Wetlands monitoring stations

Follow Up Program

Groupe Hemispheres
1001, rue De l'Eglise, Suite 208, Québec (QC) Canada, G1V 3V7
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 2

3 RESULTS

3.1 Water Levels

The Table 4 shows the water height in each wells and Figure 3 presents mean height with minimum and maximum value for each wells.

Table 4. Wells readings – 2018

Wells	Water Height (m)									
	08/17	09/09	09/10	09/15	09/16	09/28	09/30	10/01	10/02	10/03
WMW01	-	0.60	-	-	0.76	-	0.82	-	-	-
WMW02	-	0.62	-	-	0.59	-	0.67	-	-	-
WMW03	1.21	1.20	-	1.18	-	-	1.19	-	-	-
WMW04	0.66	0.63	-	0.58	-	-	0.65	-	-	-
WMW05	1.03	0.92	-	1.12	-	-	1.12	-	-	-
WMW06	-	0.59	-	0.79	-	-	0.83	-	-	-
WMW08	-	-	-	-	0.94	-	-	1.02	-	-
WMW11	-	-	0.55	-	0.59	-	-	-	-	0.59
WMW12	-	-	1.12	-	1.08	-	-	-	-	1.11
WMW13	-	-	0.55	-	0.61	-	-	-	-	0.71
WMW16	-	-	0.70	-	0.67	-	-	-	-	0.71
WMW18	-	-	0.98	-	0.95	-	-	-	-	-
WMW19	-	-	0.67	-	0.56	-	-	-	-	-
WMW21	-	-	0.78	-	0.75	-	-	-	-	-
WMW22	-	0.67	-	-	0.71	-	-	-	0.74	-
WMW24	-	0.67	-	-	0.64	-	-	-	-	-
WMW25	-	0.49	-	-	0.53	-	-	-	0.53	-
WMW26	-	0.74	-	-	0.70	-	-	0.74	-	-
WMW27	-	-	1.17	-	1.15	-	-	-	1.17	-
WMW29	-	-	0.94	-	0.87	0.88	-	-	-	-
WMW30	-	-	0.72	-	0.68	0.85	-	-	-	-

During the month of august and the beginning of September, water level seemed lower throughout the area. It was higher during the measurements in late September and beginning of October. Those observations are consistent with the conditions noted during fieldwork.

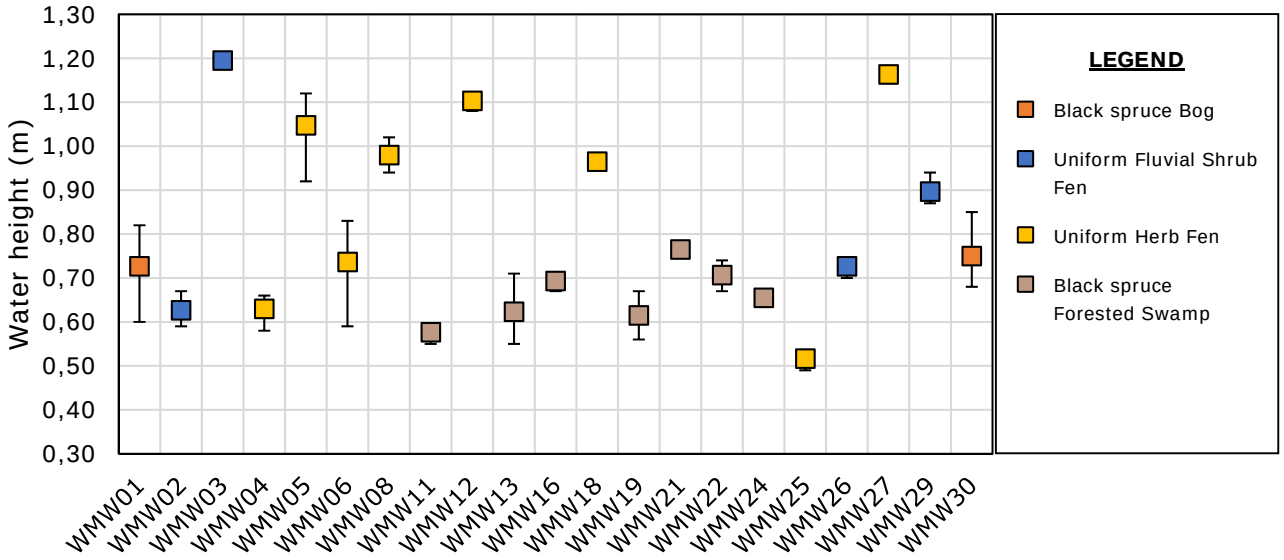


Figure 3. Wetland water height natural variation – Summer 2018

3.2 Wetland Vegetation Characterization

Appendix I presents the results of the wetland vegetation survey. These are considered to be the reference for the future monitoring. It will be possible to compare species richness and cover between each station. Table 5 presents species distribution for each station per ecotype. Wetland status have been extracted from the proposed lists for arctic and subarctic species (FloraQuebeca, 2018).

Number and proportion on species for each class of wetland status will be one of the results that will be used to compare vegetation evolution following the subsequent monitoring. Comparison of species cover will also be used.

Table 5. Species distribution per wetland status

Ecotype	Station	Species wetland status						Total
		NI		FAC		OBL		
		number	%	number	%	number	%	
MSF08	WVP14	9	56.3	5	31.3	2	12.5	16
	WVP18	7	46.7	5	33.3	3	20.0	15
	WVP20	1	6.7	9	60.0	5	33.3	15
	WVP22	3	30.0	4	40.0	3	30.0	10
	WVP24	2	20.0	3	30.0	5	50.0	10
	WVP25	3	23.1	4	30.8	6	46.2	13
	Mean	**4.2**	**31.6**	**5**	**38.0**	**4**	**30.4**	**13.2**
MSF10	WVP02	3	33.3	3	33.3	3	33.3	9
	WVP04	2	14.3	7	50.0	5	35.7	14
	WVP30	5	41.7	5	41.7	2	16.7	12
	WVP34	2	15.4	5	38.5	6	46.2	13
	WVP35	13	68.4	4	21.1	2	10.5	19
	Mean	**5**	**37.3**	**4.8**	**35.8**	**3.6**	**26.9**	**13.4**

Ecotype	Station	Species wetland status						Total
		NI		FAC		OBL		
		number	%	number	%	number	%	
MSF12	WVP06			2	33.3	4	66.7	6
	WVP07	2	14.3	7	50.0	5	35.7	14
	WVP08	3	30.0	3	30.0	4	40.0	10
	WVP09	6	40.0	4	26.7	5	33.3	15
	WVP10			3	42.9	4	57.1	7
	WVP13	2	25.0	3	37.5	3	37.5	8
	WVP17			3	37.5	5	62.5	8
	WVP19	4	26.7	6	40.0	5	33.3	15
	WVP21	2	14.3	6	42.9	6	42.9	14
	WVP23			2	33.3	4	66.7	6
	WVP32	2	28.6	3	42.9	2	28.6	7
	Mean	**3.0**	**30.0**	**3.8**	**38.2**	**4.3**	**42.7**	**10.0**
MSF15	WVP03	4	25.0	7	43.8	5	31.3	16
	WVP05	4	30.8	7	53.8	2	15.4	13
	WVP12	6	85.7	1	14.3			7
	WVP27	2	22.2	3	33.3	4	44.4	9
	WVP28	7	46.7	5	33.3	3	20.0	15
	WVP29	4	33.3	6	50.0	2	16.7	12
	WVP33	7	46.7	6	40.0	2	13.3	15
	Mean	**4.9**	**39.1**	**5**	**40.2**	**3**	**24.1**	**12.4**

NI: Species not indicator of wetland
FAC: Species facultative of wetland
OBL Species obligated of wetland

4 DISCUSSION & CONCLUSION

The decision statement established several conditions that must be respected prior and throughout the Howse Project. As part of those conditions, and as a first survey, wetlands vegetation was characterized, and wetlands natural water level was measured.

To assess a possible dewatering of wetlands, groundwater level in each wetland piezometer should be measured every month prior to the operation phase and then every two weeks during operations. As explained in section 2.3.2, since the piezometer's length is known, a **simple measure of the distance from the top of the PVC tube to the surface of water** should be recorded and substracted from total length, as shown in Figure 1. There is an example of how to record water level in Appendix II.

Regarding wetland vegetation, the next survey must be conducted in five years, in 2023, to assess any change in wetland functions. The same protocol should be followed to limit bias.

5 QUALITY ASSURANCE

Groupe Hémisphères possesses an internal quality control program which is derived from ISO 9001 standards. This is based on a review and approval of all concepts and document production by a senior professional. The program considers the management, the control of documentation, the personnel's continuous training, as well as the quality assurance of the deliverables. The system also includes a tight control of the field work and the prevention and safety measures specific to the project.

6 BIBLIOGRAPHY

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Groupe Hémisphères (2016) *DSO3 and DSO4 Wetland management report.* Technical report for Tata Steel Minerals of Canada, 19 p. and 2 appendices.

APPENDIX

Appendix I

Wetland Vegetation Station

WVP02	
	
Marker position	**Quadrat**
Marker position :	Marker in a tamarack
Quadrat position :	12,40 m at 34 °

Site description	
Ecotype	FSM10 - Black Spruce Bog
Drainage	Poorly drained
Surficial material	Fibric over Boulders, Silt, Sand
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny willow	40		
Rubus arcticus subsp.arcticus	Arctic rasberry	4		
Viola macloskeyi	Small white violet		25	
Calamagrostis canadensis	Bluejoint reedgrass		20	
Carex magellanica	Boreal bog sedge		15	
Juncus effusus	Soft rush		5	
Agrostis mertensii	Northern bentgrass		4	
Sphagnum sp.	Sphagnum			98
Polytrichum sp.	Hollyfern			1

WVP03

Marker position

Quadrat

Marker position :	Marker in a tamarack
Quadrat position :	8,50 m at 250 °

Site description	
Ecotype	FSM15 - Uniform Fluvial Shrub Fen
Drainage	Poorly drained
Surficial material	Mesic over Boulders, Silt
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny willow	10		
Betula glandulosa	Glandular birch	7		
Salix pedicellaris	Bog willow	5		
Larix laricina	Tamarack	4		
Kalmia polifolia	Pale bog laurel	2		
Lonicera villosa	Mountain fly honeysuckle	1		
Rubus chamaemorus	Cloudberry	1		
Deschampsia cespitosa	Tufted hairgrass		7	
Trichophorum cespitosum	Tufted clubrush		7	
Carex pauciflora	Few-flower sedge		5	
Eurybia radula	Low rough aster		3	
Calamagrostis canadensis	Bluejoint reedgrass		2	
Coptis trifolia	Goldthread		1	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Hollyfern			3
Tomentypnum nitens	Golden fuzzy fen moss			3

WVP04	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	4,90 m at 182 °

Site description	
Ecotype	FSM10 – Black Spruce Bog
Drainage	Poorly drained
Surficial material	Mesicover Boulders, Silt , Sand
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Rubus chamaemorus	Cloudberry	20		
Betula glandulosa	Glandular birch	15		
Larix laricina	Tamarack	10		
Kalmia polifolia	Pale bog laurel	4		
Lonicera villosa	Mountain fly honeysuckle	1		
Salix pellita	Satiny willow	1		
Vaccinium oxycoccos	Small cranberry	0,1		
Carex limosa	Mud sedge		5	
Carex pauciflora	Few-flower sedge		5	
Equisetum sylvaticum	Woodland horsetail		5	
Eurybia radula	Low rough aster		4	
Juncus effusus	Soft rush		3	
Sphagnum sp.	Sphagnum			99
Polytrichum sp.	Hollyfern			1

WVP05	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	5,35 m at 225 °

Site description	
Ecotype	FSM15 - Uniform Fluvial Shrub Fen
Drainage	Poorly drained
Surficial material	Mesic over Boulders, Silt
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny willow	40		
Betula glandulosa	Glandular birch	35		
Lonicera villosa	Mountain fly honeysuckle	4		
Rubus arcticus subsp.arcticus	Arctic rasberry	3		
Deschampsia cespitosa	Tufted hairgrass		5	
Equisetum sylvaticum	Woodland horsetail		5	
Petasites frigidus var. palmatus	Palmate coltsfoot		5	
Solidago macrophylla	Large-leaved goldenrod		5	
Eurybia radula	Low rough aster		4	
Coptis trifolia	Goldthread		1	
Sphagnum sp.	Sphagnum			80
Polytrichum sp.	Hollyfern			15
Tomentypnum nitens	Golden fuzzy fen moss			5

WVP06	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	16,50 m at 250 °

Site description	
Ecotype	FSM 12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale bog laurel	7		
Vaccinium oxycoccos	Small cranberry	0,1		
Trichophorum cespitosum	Tufted clubrush		30	
Carex limosa	Mud sedge		20	
Carex rostrata	Swollen beaked sedge		4	
Sphagnum sp.	Sphagnum			90

WVP07

Marker position

Quadrat

Marker position :	Marker in a tamarack
Quadrat position :	14,40 m at 290 °

Site description	
Ecotype	FSM 12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	5		
Larix laricina	Tamarack	3		
Kalmia polifolia	Pale bog laurel	1		
Rubus arcticus subsp.arcticus	Arctic rasberry	1		
Rubus chamaemorus	Cloudberry	1		
Carex limosa	Mud sedge		10	
Juncus effusus	Soft rush		10	
Coptis trifolia	Goldthread		7	
Carex oligosperma	Few-feeded sedge		5	
Trichophorum cespitosum	Tufted clubrush		5	
Carex aquatilis	Water sedge		3	
Maianthemum trifolium	Three-leaved false Solomon's-seal		1	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden fuzzy fen moss			2

WVP08	
	
Marker position	**Quadrat**
Marker position :	Marker in a tamarack
Quadrat position :	X m at X °

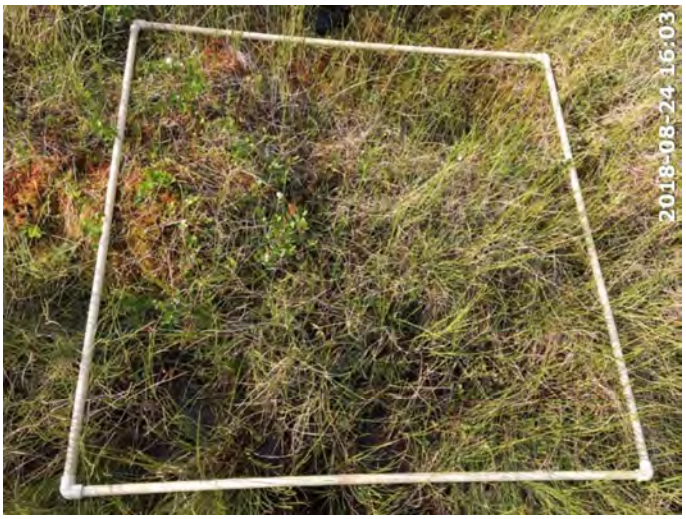
Site description	
Ecotype	FSM12 - Uniform Herb Fen
Drainage	Poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	2		
Rubus chamaemorus	Cloudberry	1		
Vaccinium oxycoccos	Small cranberry	0,1		
Trichophorum cespitosum	Tufted clubrush		20	
Juncus effusus	Soft rush		15	
Carex pauciflora	Few-flower sedge		10	
Coptis trifolia	Goldthread		10	
Carex aquatilis	Water sedge		2	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Hollyfern			0,5

WVP09

Marker position



Quadrat

Marker position :	Marker in a tamarack
Quadrat position :	8,80 m at 180 °

Site description	
Ecotype	FSM12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	5		
Kalmia polifolia	Pale bog laurel	3		
Vaccinium uliginosum	Alpine bilberry	3		
Larix laricina	Tamarack	2		
Empetrum nigrum	Black crowberry	1		
Vaccinium oxycoccos	Small cranberry	0,5		
Carex limosa	Mud sedge		20	
Carex oligosperma	Few-feeded sedge		15	
Carex pauciflora	Few-flower sedge		10	
Coptis trifolia	Goldthread		10	
Trichophorum cespitosum	Tufted clubrush		10	
Lysimachia borealis	Northern starflower		3	
Sphagnum sp.	Sphagnum			80
Mousse sp.	Moss			3
Tomentypnum nitens	Golden fuzzy fen moss			1

WVP10	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	13,80 m at 195 °

Site description	
Ecotype	FSM12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale bog laurel	3		
Vaccinium oxycoccos	Small cranberry	0,1		
Carex limosa	Mud sedge		25	
Carex rostrata	Swollen beaked sedge		15	
Trichophorum cespitosum	Tufted clubrush		10	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden fuzzy fen moss			2

WVP12

Marker position

Quadrat

Marker position :	Marker in a black spruce
Quadrat position :	9 m at 330 °

Site description	
Ecotype	MSF15 - Uniform Fluvial Shrub Fen
Drainage	Imperfectly drained
Surficial material	Mesic over Boulders, Silt, Sand
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	40		
Deschampsia cespitosa	Tufted hairgrass		70	
Solidago macrophylla	Large-leaved goldenrod		20	
Coptis trifolia	Goldthread		5	
Chamaenerion angustifolium	Fireweed		2	
Pleurozium schreberi	Schreber's big red stem moss			30
Polytrichum sp.	Hollyfern			5

WVP13	
	
Marker position	**Quadrat**
Marker position :	Marker in a tamarack
Quadrat position :	12,50 m at 13 °

Site description	
Ecotype	MSF12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny willow	30		
Betula glandulosa	Glandular birch	10		
Kalmia polifolia	Pale bog laurel	3		
Carex aquatilis	Water sedge		20	
Carex limosa	Mud sedge		10	
Sphagnum sp.	Sphagnum			90
Tomentypnum nitens	Golden fuzzy fen moss			7
Polytrichum sp.	Hollyfern			3
Salix pellita	Satiny willow	30		

WVP14

Marker position

Quadrat

Marker position :	Marker in a black spruce
Quadrat position :	3,58 m at 345 °

Site description	
Ecotype	MSF08 - Black Spruce / Tamarack Forested Swamp
Drainage	Poorly drained
Surficial material	Mesic over Silt, Sand
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine bilberry	25		
Rhododendron groenlandicum	Common Labrador tea	5		
Salix pedicellaris	Bog willow	5		
Betula glandulosa	Glandular birch	4		
Empetrum nigrum	Black crowberry	2		
Vaccinium vitis-idaea	Mountain cranberry	0,5		
Equisetum sylvaticum	Woodland horsetail		10	
Carex canescens	Hoary sedge		5	
Petasites frigidus var. palmatus	Palmate coltsfoot		5	
Calamagrostis canadensis	Bluejoint reedgrass		3	
Cornus canadensis	Bunchberry		3	
Solidago macrophylla	Large-leaved goldenrod		2	
Coptis trifolia	Goldthread		1	
Deschampsia cespitosa	Tufted hairgrass		1	
Lycopodium annotinum	Stiff clubmoss		1	
Sphagnum sp.	Sphagnum			100

WVP17	
	
Marker position	**Quadrat**
Marker position :	Marker in a tamarack
Quadrat position :	10,95 m at 9 °

Site description	
Ecotype	MSF12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Andromeda polifolia var. latifolia	Glaucous-leaved bog rosemary	7		
Kalmia polifolia	Pale bog laurel	2		
Vaccinium oxycoccos	Small cranberry	0,5		
Carex limosa	Mud sedge		25	
Trichophorum cespitosum	Tufted clubrush		15	
Carex oligosperma	Few-feeded sedge		5	
Sphagnum sp.	Sphagnum			70
Tomentypnum nitens	Golden fuzzy fen moss			15

WVP18	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	5,60 m at 232 °

Site description	
Ecotype	MSF08 - Black Spruce / Tamarack Forested Swamp
Drainage	Poorly drained
Surficial material	Mesic over Silt, Sand
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	10		
Salix pedicellaris	Bog willow	10		
Salix pellita	Satiny willow	5		
Petasites frigidus var. palmatus	Palmate coltsfoot		10	
Viola macloskeyi	Small white violet		7	
Calamagrostis canadensis	Bluejoint reedgrass		5	
Linnaea borealis	Twinflower		5	
Coptis trifolia	Goldthread		4	
Equisetum sylvaticum	Woodland horsetail		4	
Chamaenerion angustifolium	Fireweed		3	
Deschampsia cespitosa	Tufted hairgrass		3	
Cornus canadensis	Bunchberry		2	
Solidago macrophylla	Large-leaved goldenrod		2	
Sphagnum sp.	Sphagnum			90
Tomentypnum nitens	Golden fuzzy fen moss			5

WVP19

Marker position

Quadrat

Marker position :	Marker in a black spruce
Quadrat position :	8,80 m at 203 °

Site description	
Ecotype	MSF12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine bilberry	8		
Lonicera villosa	Mountain fly honeysuckle	5		
Kalmia polifolia	Pale bog laurel	4		
Vaccinium oxycoccos	Small cranberry	0,5		
Trichophorum cespitosum	Tufted clubrush		20	
Carex limosa	Mud sedge		15	
Eurybia radula	Low rough aster		15	
Maianthemum trifolium	Three-leaved false Solomon's-seal		15	
Deschampsia cespitosa	Tufted hairgrass		10	
Lysimachia borealis	Northern starflower		1	
Agrostis mertensii	Northern bentgrass		0,5	
Coptis trifolia	Goldthread		0,5	
Sphagnum sp.	Sphagnum			80
Scorpidium scorpioides	Scorpion feather moss			5
Tomentypnum nitens	Golden fuzzy fen moss			5

WVP20	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	7,45 m at 126 °

Site description	
Ecotype	MSF08 - Black Spruce / Tamarack Forested Swamp
Drainage	Very poorly drained
Surficial material	Fibric over Silt , Sand , Boulders
Soil class	Humic Gleysol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	3		
Lonicera villosa	Mountain fly honeysuckle	3		
Kalmia polifolia	Pale bog laurel	2		
Rubus chamaemorus	Cloudberry	2		
Vaccinium oxycoccos	Small cranberry	0,5		
Trichophorum cespitosum	Tufted clubrush		30	
Maianthemum trifolium	Three-leaved false Solomon's-seal		7	
Carex pauciflora	Few-flower sedge		5	
Equisetum sylvaticum	Woodland horsetail		4	
Juncus effusus	Soft rush		4	
Petasites frigidus var. palmatus	Palmate coltsfoot		4	
Carex aquatilis	Water sedge		3	
Tomentypnum nitens	Golden fuzzy fen moss			25
Scorpidium scorpioides	Scorpion feather moss			15

WVP21

Marker position

Quadrat

Marker position :	Marker in a tamarack
Quadrat position :	6,75 m at 9 °

Site description	
Ecotype	MSF12 - Uniform Herb Fen
Drainage	Poorly drained
Surficial material	Mesic over Silt, Sand
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Lonicera villosa	Mountain fly honeysuckle	5		
Vaccinium uliginosum	Alpine bilberry	3		
Kalmia polifolia	Pale bog laurel	2		
Vaccinium oxycoccos	Small cranberry	1		
Trichophorum cespitosum	Tufted clubrush		20	
Carex limosa	Mud sedge		15	
Eriophorum virginicum	Tawny cottongrass		5	
Deschampsia cespitosa	Tufted hairgrass		3	
Carex pauciflora	Few-flower sedge		2	
Coptis trifolia	Goldthread		2	
Platanthera dilatata	Tall white bog orchid		1	
Viola macloskeyi	Small white violet		0,5	
Sphagnum sp.	Sphagnum			80
Tomentypnum nitens	Golden fuzzy fen moss			2

WVP22	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	6,30 m at 21 °

Site description	
Ecotype	MSF08 - Black Spruce / Tamarack Forested Swamp
Drainage	Poorly drained
Surficial material	Fibric over Silt, Sand
Soil class	Humic Gleysol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	8		
Kalmia polifolia	Pale bog laurel	4		
Larix laricina	Tamarack	4		
Vaccinium oxycoccos	Small cranberry	0,5		
Juncus effusus	Soft rush		10	
Carex limosa	Mud sedge		5	
Coptis trifolia	Goldthread		5	
Carex pauciflora	Few-flower sedge		3	
Lysimachia borealis	Northern starflower		1	
Sphagnum sp.	Sphagnum			95

WVP23	
	
Marker position	**Quadrat**
Marker position :	Marker in a tamarack
Quadrat position :	11,40 m at 34 °

Site description	
Ecotype	MSF12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric over Boulders
Soil class	Fibrisol
Texture	Fibric

Vegetation description

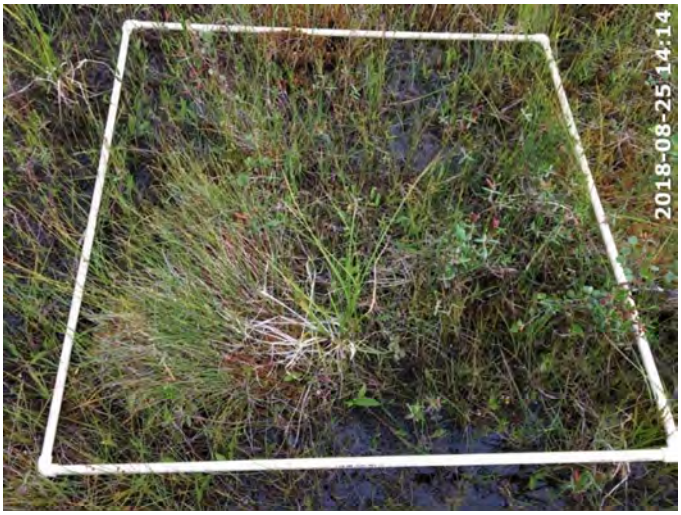
Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale bog laurel	2		
Vaccinium oxycoccos	Small cranberry	1		
Carex limosa	Mud sedge		20	
Maianthemum trifolium	Three-leaved false Solomon's-seal		10	
Eriophorum russeolum	Russet cottongrass		5	
Sphagnum sp.	Sphagnum			95

WVP24	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	8,40 m at 272 °

Site description	
Ecotype	MSF08 - Black Spruce / Tamarack Forested Swamp
Drainage	Very poorly drained
Surficial material	Fibric over Silt , Boulders, Sand
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Larix laricina	Tamarack	15		
Andromeda polifolia var. latifolia	Glaucous-leaved bog rosemary	4		
Kalmia polifolia	Pale bog laurel	4		
Vaccinium oxycoccos	Small cranberry	1		
Vaccinium uliginosum	Alpine bilberry	1		
Carex limosa	Mud sedge		25	
Trichophorum cespitosum	Tufted clubrush		25	
Carex pauciflora	Few-flower sedge		5	
Mousse sp.	Moss			25
Sphagnum sp.	Sphagnum			20

WVP25	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	6,60 m at 225 °

Site description	
Ecotype	MSF08 - Black Spruce / Tamarack Forested Swamp
Drainage	Very poorly drained
Surficial material	Fibric over Silt, Boulders, Sand
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Kalmia polifolia	Pale bog laurel	7		
Betula glandulosa	Glandular birch	3		
Picea mariana	Black spruce	2		
Vaccinium oxycoccos	Small cranberry	1		
Carex limosa	Mud sedge		10	
Maianthemum trifolium	Three-leaved false Solomon's-seal		10	
Trichophorum cespitosum	Tufted clubrush		10	
Juncus effusus	Soft rush		5	
Carex rostrata	Swollen beaked sedge		3	
Eriophorum russeolum	Russet cottongrass		3	
Sphagnum sp.	Sphagnum			40
Tomentypnum nitens	Golden fuzzy fen moss			2
Polytrichum sp.	Hollyfern			0,5

WVP27

Marker position

Quadrat

Marker position :	Marker in a tamarack
Quadrat position :	13,3 m at 75 °

Site description	
Ecotype	MSF10 - Black Spruce Bog
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Vaccinium uliginosum	Alpine bilberry	2		
Betula glandulosa	Glandular birch	1		
Kalmia polifolia	Pale bog laurel	1		
Rubus chamaemorus	Cloudberry	1		
Vaccinium oxycoccos	Small cranberry	0,5		
Carex limosa	Mud sedge		40	
Carex oligosperma	Few-feeded sedge		20	
Maianthemum trifolium	Three-leaved false Solomon's-seal		2	
Sphagnum sp.	Sphagnum			100

WVP28	
	
Marker position	**Quadrat**
Marker position :	Marker in a tamarack
Quadrat position :	2,60 m at 60 °

Site description	
Ecotype	MSF15 - Uniform Fluvial Shrub Fen
Drainage	Very poorly drained
Surficial material	Mesic over Boulders, Silt
Soil class	Fibrisol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	15		
Salix pellita	Satiny willow	5		
Rubus chamaemorus	Cloudberry	4		
Rubus arcticus subsp.arcticus	Arctic rasberry	2		
Petasites frigidus var. palmatus	Palmate coltsfoot		20	
Carex trisperma	Three-seeded sedge		10	
Cornus canadensis	Bunchberry		5	
Solidago macrophylla	Large-leaved goldenrod		5	
Viola macloskeyi	Small white violet		5	
Carex limosa	Mud sedge		3	
Calamagrostis canadensis	Bluejoint reedgrass		2	
Coptis trifolia	Goldthread		2	
Chamaenerion angustifolium	Fireweed		1	
Galium triflorum	Three-flowered bedstraw		1	
Sphagnum sp.	Sphagnum			95

WVP29	
	
Marker position	**Quadrat**
Marker position :	Marker in a tamarack
Quadrat position :	1,5 m at 330 °

Site description	
Ecotype	MSF15 - Uniform Fluvial Shrub Fen
Drainage	Poorly drained
Surficial material	Mesic over Boulders, Silt, Sand
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny willow	80		
Betula glandulosa	Glandular birch	10		
Lonicera villosa	Mountain fly honeysuckle	5		
Rubus arcticus subsp.arcticus	Arctic rasberry	2		
Carex trisperma	Three-seeded sedge		40	
Deschampsia cespitosa	Tufted hairgrass		5	
Viola macloskeyi	Small white violet		5	
Calamagrostis canadensis	Bluejoint reedgrass		3	
Chamaenerion angustifolium	Fireweed		3	
Petasites frigidus var. palmatus	Palmate coltsfoot		2	
Galium triflorum	Three-flowered bedstraw		1	
Sphagnum sp.	Sphagnum			100

WVP30

Marker position

Quadrat

Marker position :	Marker in a black spruce
Quadrat position :	0,80 m at 50 °

Site description	
Ecotype	MSF10 - Black Spruce Bog
Drainage	Poorly drained
Surficial material	Mesic over Silt, Sand, Boulders
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Rubus chamaemorus	Cloudberry	70		
Kalmia polifolia	Pale bog laurel	20		
Betula glandulosa	Glandular birch	15		
Larix laricina	Tamarack	8		
Vaccinium vitis-idaea	Mountain cranberry	1		
Vaccinium oxycoccos	Small cranberry	0,5		
Carex pauciflora	Few-flower sedge		1	
Sphagnum sp.	Sphagnum			95
Polytrichum sp.	Hollyfern			3
Cladonia sp.	Reindeer lichen			1
Pleurozium schreberi	Schreber's big red stem moss			1
Tomentypnum nitens	Golden fuzzy fen moss			1

WVP32

Marker position

Quadrat

Marker position :	Marker in a black spruce
Quadrat position :	6,60 m at 260 °

Site description	
Ecotype	MSF12 - Uniform Herb Fen
Drainage	Very poorly drained
Surficial material	Fibric
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny willow	40		
Rubus arcticus subsp.arcticus	Arctic rasberry	3		
Carex aquatilis	Water sedge		35	
Calamagrostis canadensis	Bluejoint reedgrass		5	
Sphagnum sp.	Sphagnum			85
Tomentypnum nitens	Golden fuzzy fen moss			3
Mnium sp.	Leafy moss			2

WVP33	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	10,10 m at 5 °

Site description	
Ecotype	MSF15 - Uniform Fluvial Shrub Fen
Drainage	Poorly drained
Surficial material	Mesic over Boulders, Silt, Sand
Soil class	Humic Gleysol
Texture	Mesic

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pellita	Satiny willow	95		
Lonicera villosa	Mountain fly honeysuckle	0,5		
Carex sp.	Sedge		15	
Solidago macrophylla	Large-leaved goldenrod		15	
Equisetum sylvaticum	Woodland horsetail		5	
Fragaria vesca subsp. americana	American woodland strawberry		5	
Petasites frigidus var. palmatus	Palmate coltsfoot		5	
Calamagrostis canadensis	Bluejoint reedgrass		3	
Mitella nuda	Naked mitrewort		3	
Achillea borealis	Wooly yarrow		2	
Chamaenerion angustifolium	Fireweed		1	
Luzula parviflora	Small-flowered woodrush		1	
Viola macloskeyi	Small white violet		1	
Coptis trifolia	Goldthread		0,5	
Pleurozium schreberi	Schreber's big red stem moss			40

WVP34

Marker position

Quadrat

Marker position :	Marker in a tamarack
Quadrat position :	12 m at 220 °

Site description	
Ecotype	MSF10 - Black Spruce Bog
Drainage	Poorly drained
Surficial material	Fibric over Boulders
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Salix pedicellaris	Bog willow	7		
Betula glandulosa	Glandular birch	4		
Larix laricina	Tamarack	3		
Kalmia polifolia	Pale bog laurel	2		
Vaccinium uliginosum	Alpine bilberry	1		
Vaccinium oxycoccos	Small cranberry	0,5		
Carex aquatilis	Water sedge		25	
Carex limosa	Mud sedge		5	
Carex pauciflora	Few-flower sedge		3	
Juncus effusus	Soft rush		1	
Maianthemum trifolium	Three-leaved false Solomon's-seal		1	
Sphagnum sp.	Sphagnum			70
Tomentypnum nitens	Golden fuzzy fen moss			10

WVP35	
	
Marker position	**Quadrat**
Marker position :	Marker in a black spruce
Quadrat position :	8,70 m at 35 °

Site description	
Ecotype	MSF10 - Black Spruce Bog
Drainage	Poorly drained
Surficial material	Fibric over Boulders
Soil class	Fibrisol
Texture	Fibric

Vegetation description

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Betula glandulosa	Glandular birch	25		
Salix pellita	Satiny willow	25		
Rubus arcticus subsp.arcticus	Arctic rasberry	1		
Solidago macrophylla	Large-leaved goldenrod		40	
Agrostis mertensii	Northern bentgrass		15	
Cerastium alpinum	Alpine chickweed		15	
Viola macloskeyi	Small white violet		7	
Deschampsia cespitosa	Tufted hairgrass		5	
Luzula parviflora	Small-flowered woodrush		5	
Coptis trifolia	Goldthread		3	
Petasites frigidus var. palmatus	Palmate coltsfoot		3	
Calamagrostis canadensis	Bluejoint reedgrass		2	
Cornus canadensis	Bunchberry		1	
Equisetum arvense	Field horsetail		1	
Phleum alpinum	Alpine thimothy		1	
Veronica wormskjoldii	Wormskjold's alpine speedwell		0,5	
Mousse sp.	Moss			40

Latin Name	English Name	% of Cover		
		Shrubs	Herbs	Moss
Mnium sp.	Leafy moss			5
Pleurozium schreberi	Schreber's big red stem moss			1

Appendix II

Example of wetland monitoring wells data table

Well	Date (AA/MM/DD)	Time (HH:MM)	Observer	A	B	Water level = (B – A)
				Measure (m)	PVC Length (m)	
WMW01					1.71	
WMW02					1.71	
WMW03					1.71	
WMW04					1.71	
WMW05					1.71	
WMW06					1.71	
WMW08					1.71	
WMW11					1.71	
WMW12					1.71	
WMW13					1.71	
WMW16					1.71	
WMW18					1.71	
WMW19					1.71	
WMW21					1.71	
WMW22					1.71	
WMW24					1.71	
WMW25					1.71	
WMW26					1.71	
WMW27					1.71	
WMW29					1.71	
WMW30					1.71	

HOWSE WETLAND WELLS WATER LEVELS DATA 2021

Well	Date (AA/MM/DD)	Time (HH:MM)	Observer	Measure (ft)	Measure (m)	PVC Length (m)	Water Level = (B - A)
WMW01	2021-07-03	15:36	JFD, JMcG	3.14	0.96	**1.71**	0.75
WMW02	2021-07-03	15:50	JFD, JMcG	4.07	1.24	**1.71**	0.47
WMW03	2021-07-03	16:39	JFD, JMcG	2.165	0.66	**1.71**	1.05
WMW04	2021-07-03	16:33	JFD, JMcG	3.89	1.19	**1.71**	0.52
WMW05	2021-07-03	16:12	JFD, JMcG	2.185	0.67	**1.71**	1.04
WMW06	2021-07-03	16:20	JFD, JMcG	2.18	0.66	**1.71**	1.05
WMW08	2021-07-03	17:02	JFD, JMcG	2.4	0.73	**1.71**	0.98
WMW11	2021-07-03	11:00	JFD, JMcG	3.775	1.15	**1.71**	0.56
WMW12	2021-07-03	11:57	JFD, JMcG	2.105	0.64	**1.71**	1.07
WMW13	2021-07-03	10:48	JFD, JMcG	2.095	0.64	**1.71**	1.07
WMW16	2021-07-03	11:10	JFD, JMcG	3.29	1.00	**1.71**	0.71
WMW18	2021-07-03	11:22	JFD, JMcG	2.94	0.90	**1.71**	0.81
WMW19	2021-07-03	10:25	JFD, JMcG	1.89	0.58	**1.71**	1.13
WMW21	2021-07-03	10:38	JFD, JMcG	3.27	1.00	**1.71**	0.71
WMW22	2021-07-03	10:13	JFD, JMcG	3.32	1.01	**1.71**	0.70
WMW24	2021-07-03	10:01	JFD, JMcG	3.775	1.15	**1.71**	0.56
WMW25	2021-07-03	9:54	JFD, JMcG	5.53	1.69	**1.71**	0.02
WMW26	2021-07-03	9:22	JFD, JMcG	3.4	1.04	**1.71**	0.67
WMW27	2021-07-03	11:38	JFD, JMcG	2.35	0.72	**1.71**	0.99
WMW29	2021-07-03	12:45	JFD, JMcG	2.62	0.80	**1.71**	0.91
WMW30	2021-07-03	12:51	JFD, JMcG	3.57	1.09	**1.71**	0.62