

Memo

To: Mike Cormier, P.Eng. – Director, Authorizations Branch, New Brunswick Department of Environment and Local Government

From: Daniel Guest, Hammond River Holdings Ltd.

Cc: Justin Chase – Environmental Impact Assessment Branch, New Brunswick Department of Environment and Local Government

Date: May 12, 2023

Subject: Monthly Monitoring Report – Upham East Gypsum Quarry – March 2023

Our File: File # 21-3049

Introduction

This monthly report details activities associated with the Upham East Gypsum Quarry operations for the month of March 2023, in accordance with the Approval to Operate I-10936 conditions. Activities included surface water monitoring, groundwater monitoring, air quality monitoring, and blasting. For previous monthly activities, refer to the monthly reports provided from December 2019 through February 2023.

Surface Water Sampling

Weekly compliance surface water monitoring in March was conducted as per the following:

- Week 1: March 17, 2023
- Week 2: March 24, 2023
- Week 3: March 30, 2023

Attempts were made on March 5 and March 11, 2023 to collect surface water samples; however, due to frozen watercourse conditions, surface water samples were unable to be retrieved.

Field Methods

Field parameters were measured using a calibrated turbidity meter and probe. Field parameters are temperature, conductivity, and turbidity. These parameters were measured at three sampling locations as per the Environmental Management Plan (EMP) for Operation (Dillon 2020). All samples were submitted for lab analysis of total suspended solids (TSS).

Surface water samples were collected from three locations (Figure 1). They are as follows:

- PDP-1 was collected at the discharge point from the site, which is located before the confluence with the unnamed tributary to the Hammond River. This is the point of compliance;

- SW3 was the background sample. It was collected within the unnamed tributary approximately 100 m upstream from the PDP-1;
- SW5 was collected within the unnamed tributary approximately 100m downstream from PDP-1

Quarterly samples were also collected, as per the EMP (Dillon 2020), on March 14, 2023. Quarterly sampling included recording additional field parameters (pH) and analysis of additional laboratory parameters (alkalinity, calcium, chloride, hardness, magnesium, potassium, sodium, sulphate, total phosphorus and total dissolved solids). In addition to the sites described above, another sample was collected from one other location in the Hammond River (H1). A sample was not collected at H2 on March 14, 2023, as the river conditions at this location were unsafe to sample.

Surface water samples were collected using laboratory supplied bottles. The bottles were rinsed three times in the watercourse and then submerged below the water surface. The samples were submitted to the Research Productivity Council (RPC) in Fredericton, NB. RPC is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for each of the laboratory analytical methods utilized and have in-house QA/QC programs to govern sample analysis and analytical data quality assurance.

Compliance Monitoring Results

Surface water compliance monitoring results are provided in Table 1. Analytical certificates are attached. The monthly average of grab samples for TSS was calculated for each site, presented in Table 2. The monthly averages for TSS were all below the site-specific guideline for each site laid out in the Approval to Operate, displayed in Figure 2.

A QA/QC program was implemented to evaluate whether the data collected was of suitable quality to characterize the surface water conditions observed. This program required the collection of field duplicates and the calculation of the relative percent difference (RPD). The calculation method and acceptance level of 40% are discussed in CCME (2016). Two duplicate samples were collected during the March water sampling program. The RPD results could not be calculated due to one of the results being below the laboratory detection limit. Therefore, the data satisfies the quality objectives for the monitoring program.

Groundwater Monitoring

Groundwater samples were collected from the perimeter monitoring wells on March 13 and 14, 2023. Results of the previous groundwater sampling programs can be found in the *Groundwater Report – Upham East Gypsum Quarry* (2021 and 2022).

Water levels were collected from perimeter monitoring wells and three potable wells on March 13 and 14, 2023 (Figure 3). The dataloggers allow for continuous coverage of water levels in the wells. Data was retrieved from the dataloggers on a regular basis and depicted as time-series plots.

Methodology

Perimeter Monitoring Well Sampling

The depth to groundwater from surface was measured using an electronic interface probe.

Representative water samples were being collected from the aquifer via macro purge methodology using dedicated wterra tubing and foot valve from a dedicated reference point at the top of casing (TOC). All samples were submitted to RPC for general chemistry and metals analysis.

Datalogger Downloads

Data logger was retrieved via Solinst Levelogger Software 4.5, as part of the monthly groundwater monitoring program. The dataloggers were then reset to continue to record the water level every 5 minutes.

Monitoring Results

Perimeter Monitoring Well Sampling

The results of the groundwater monitoring program are provided in Table 3. Analytical certificates are attached. The results were compared to the Health Canada Drinking Water Quality Summary Table (2022), which include a maximum allowable concentration (MAC) guideline that is health based, and an aesthetic objective (AO) that is based on taste, odour, staining of plumbing fixtures, etc., and is not health based.

Manganese and fluoride were above the MAC in MW20-02S; manganese, boron, fluoride and strontium were above the MAC for MW20-02D. Arsenic was above the MAC for MW20-04D and MW20-04DS. Iron, manganese, pH, sulphate, iron and total dissolved solids were above the AO in at least one monitoring well.

Water Level Results

The data from the dataloggers were downloaded on a regular basis. The data for perimeter monitoring wells (Figure 4) and potable monitoring wells (Figures 5, 6 and 7) are presented as time series plots. Total precipitation (mm) is also presented within each figure, representing periods of recharge. The overall trend in almost all of the perimeter monitoring wells has remained consistent with seasonal fluctuations. The potable wells all experienced short-term fluctuations, as is expected with normal well use and predictable longer-term fluctuations typical of seasonal variations. Based on the available data as described for the March monitoring period, there does not appear to be a negative impact on water levels in perimeter and potable wells as a result of quarry operations.

Environmental Accidents and Malfunctions

There were no reported environmental accidents or malfunctions during the March 2023 monitoring period.

Ambient Air Quality Monitoring – Total Suspended Particulate

24-hour air samples are collected every 6 days in accordance with the National Air Pollution Surveillance (NAPS) schedule. The air quality monitor used to conduct the monitoring is a BGI PQ100 air sampler, a high-volume sampler for total suspended particulate matter. In March, there were 5 air quality monitoring events, March 3, 9, 15, 21, and 27, 2023. The results are provided in Table 3. There were no exceedances of the 120 µg/m³ maximum permissible ground level concentration of total suspended particulate that is specified in Schedule B of the New Brunswick *Air Quality Regulation – Clean Air Act*.

Blasting

Two blasts occurred during the March 2023 monitoring period, occurring on March 6 and 17, 2023. There were no exceedances of the Approval to Operate limits for maximum velocity and sound pressure for the blasting events. Blast reports are attached.

Public Complaints

There were no complaints received during the March 2023 monitoring period.

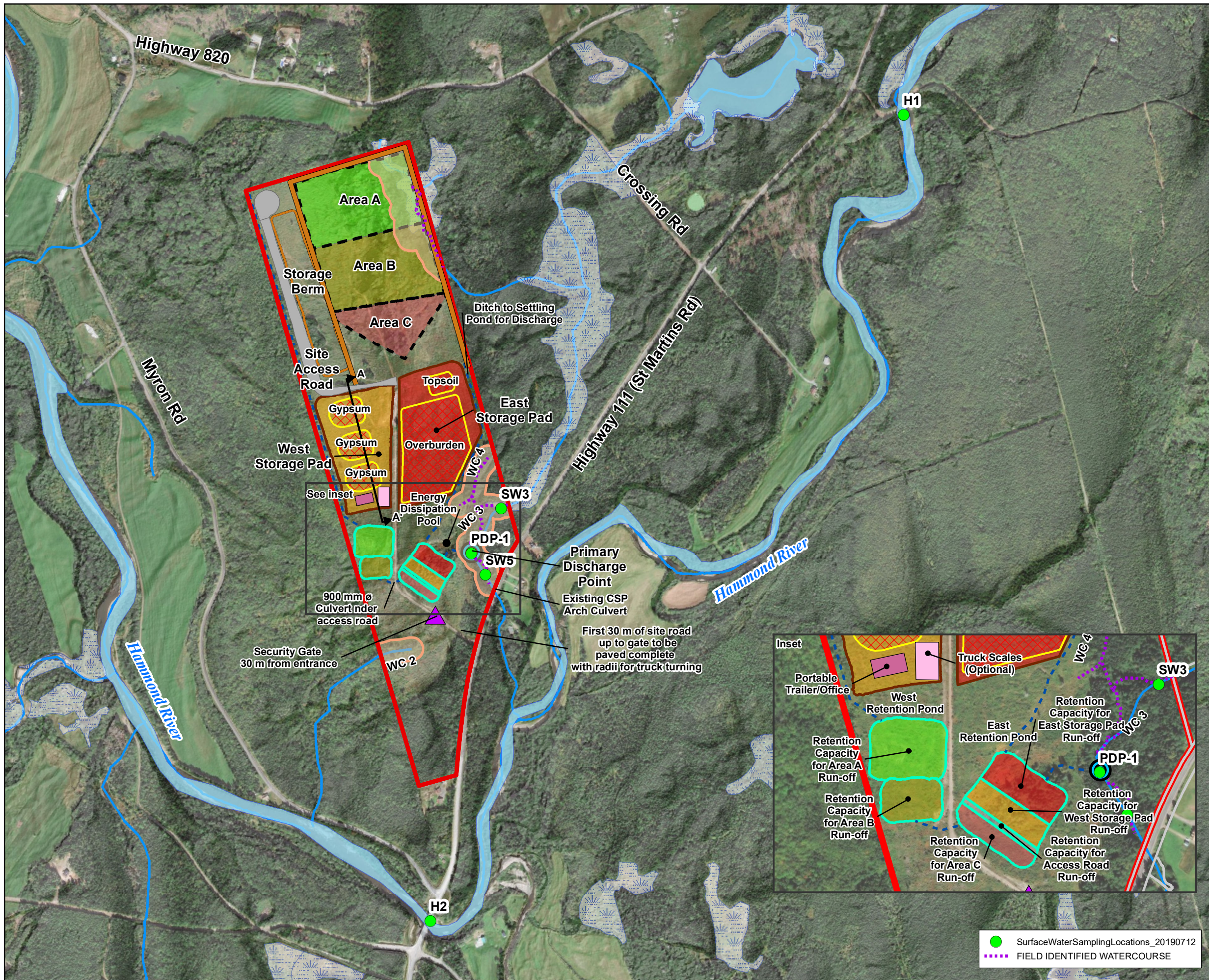
Summary

Since extraction activities began in July 2020 at the Upham East Gypsum Quarry, the water chemistry at the discharge point into the unnamed tributary has remained comparable to background, groundwater measured in the perimeter monitoring wells remains comparable to pre-operation conditions, air quality monitoring has remained below guidelines, and decibel levels have remained generally below guidelines.

References

Canadian Council of Ministers of the Environment (CCME). 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment: Volume 1 Guidance Manual. Canadian environmental quality guidelines. ISBN 978-1-77202-026-7.

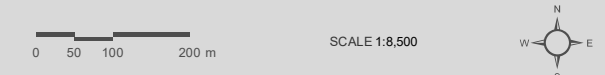
Dillon (Dillon Consulting Limited). 2020 Environmental Management Plan (EMP) for Operation. Upham East Gypsum Quarry Project, Upham New Brunswick. Prepared for Hammond River Holdings Limited by Dillon Consulting Limited, Fredericton, New Brunswick. Project 18-8346. June 2020.



HAMMOND RIVER HOLDINGS LIMITED
PROPOSED UPHAM EAST GYPSUM QUARRY

SURFACE WATER SAMPLING LOCATIONS
FIGURE 1

- PROPERTY BOUNDARY
 - PROJECT DEVELOPMENT AREA
 - WATERBODY
 - WATERCOURSE
 - REGULATED WETLAND
 - 30 METRE WETLAND/WATERCOURSE BUFFER
- PROPOSED SITE FEATURES**
- DITCH
 - TRUCK SCALE (OPTIONAL)
 - SITE AREAS
 - DISCHARGE POINT
 - SECURITY GATE
 - PORTABLE TRAILER/OFFICE
 - ACCESS ROAD
 - STORAGE PAD
 - STOCKPILE
 - RETENTION POND
 - CROSS SECTION
 - QUARRY BERM CONSTRUCTED FROM TOPSOIL AND OVERBURDEN (OFFSET MINIMUM 7m FROM PROPERTY BOUNDARY)
 - HATCHING INDICATES MATERIAL STOCKPILE AREA ON TOP OF STORAGE PAD



MAP DRAWING INFORMATION:
 DATA PROVIDED BY DILLON CONSULTING LIMITED, CANVEC SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISS TOPO, OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
 MAP CREATED BY: JH
 MAP REVISED BY: JO
 MAP CHECKED BY: GA
 MAP PROJECTION: NAD_1983_CSRS_NEW_BRUNSWICK_STEREOGRAPHIC

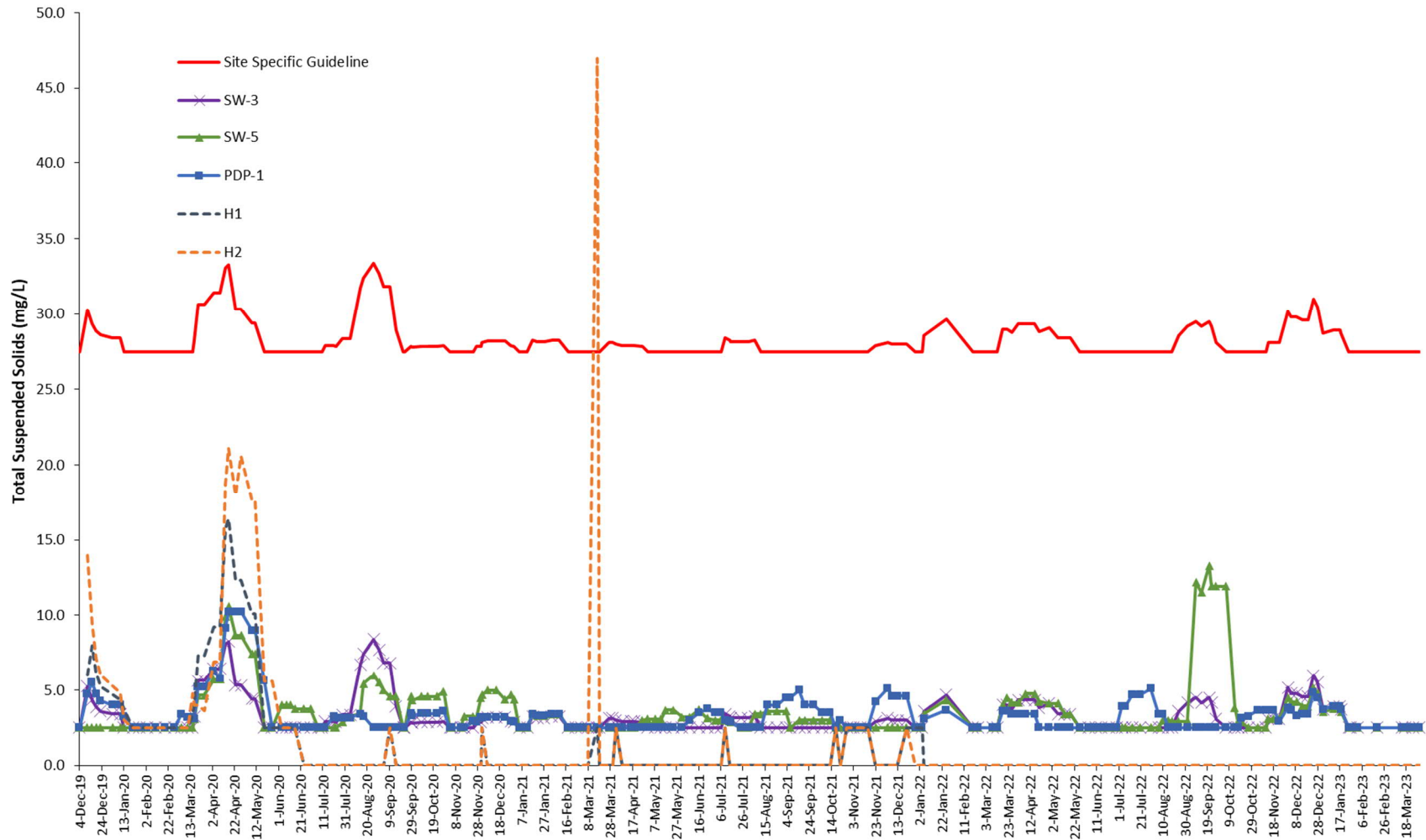
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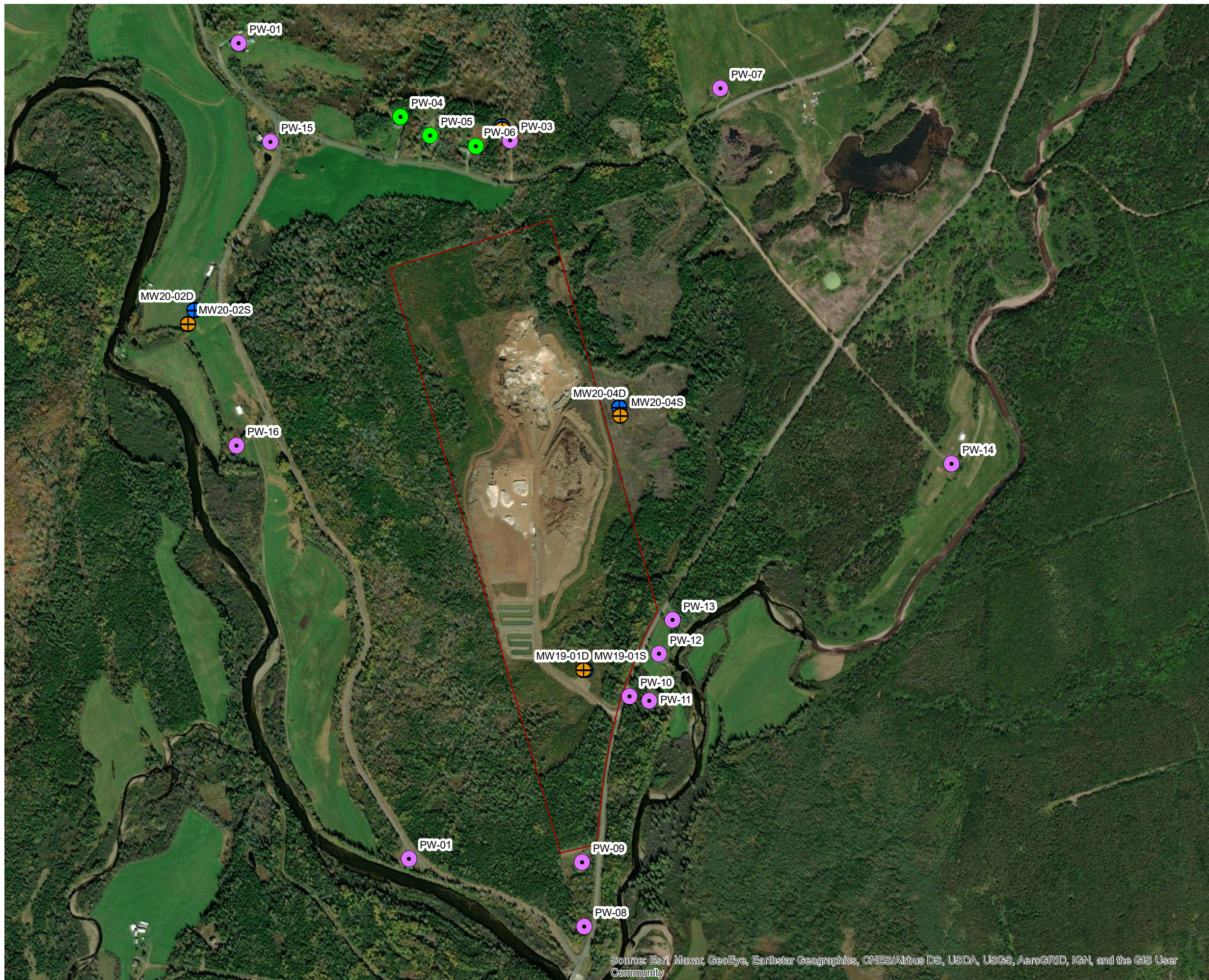
- SurfaceWaterSamplingLocations_20190712
- FIELD IDENTIFIED WATERCOURSE



PROJECT: 18-8346
 STATUS: DRAFT
 DATE: 2020/01/06

Figure 2: TSS Monthly Average





HAMMOND RIVER HOLDINGS
UPHAM EAST GYPSUM QUARRY

GROUNDWATER MONITORING LOCATIONS
FIGURE 3

- Potable Wells - No Levelloggers
- Potable Wells - With Levelloggers
- ⊕ Deep Perimeter Monitoring Well
- ⊕ Shallow Perimeter Monitoring Well
- Upham_Outline

SCALE 1:10000

MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR

MAP CREATED BY: JTO
MAP CHECKED BY: GA
MAP PROJECTION: NB DOUBLE STEREOGRAPHIC

FILE LOCATION: \\DILLON\CAD\DILLON_DFS\LONDON\LONDON CAD\GIS\VISUAL COMMUNICATIONS DIMXD TEMPLATES\BEIGE - 11X17 LANDSCAPE - LEGEND RIGHT.MXD



PROJECT: 21-3049
STATUS: DRAFT
DATE: 06/15/2021

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 4: Upham East - Perimeter Monitoring Water Levels

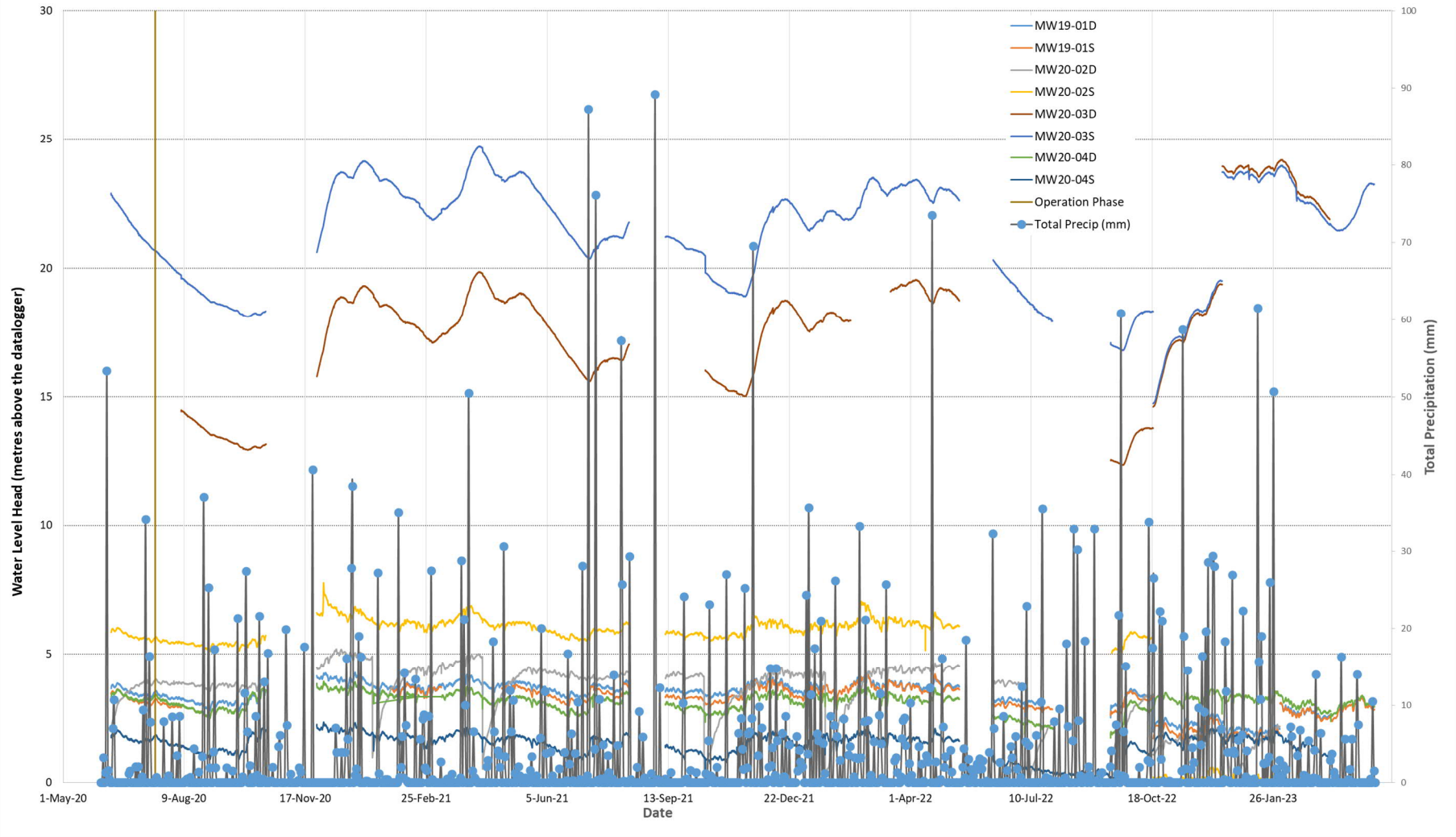


Figure 5: PW-04 Water Levels

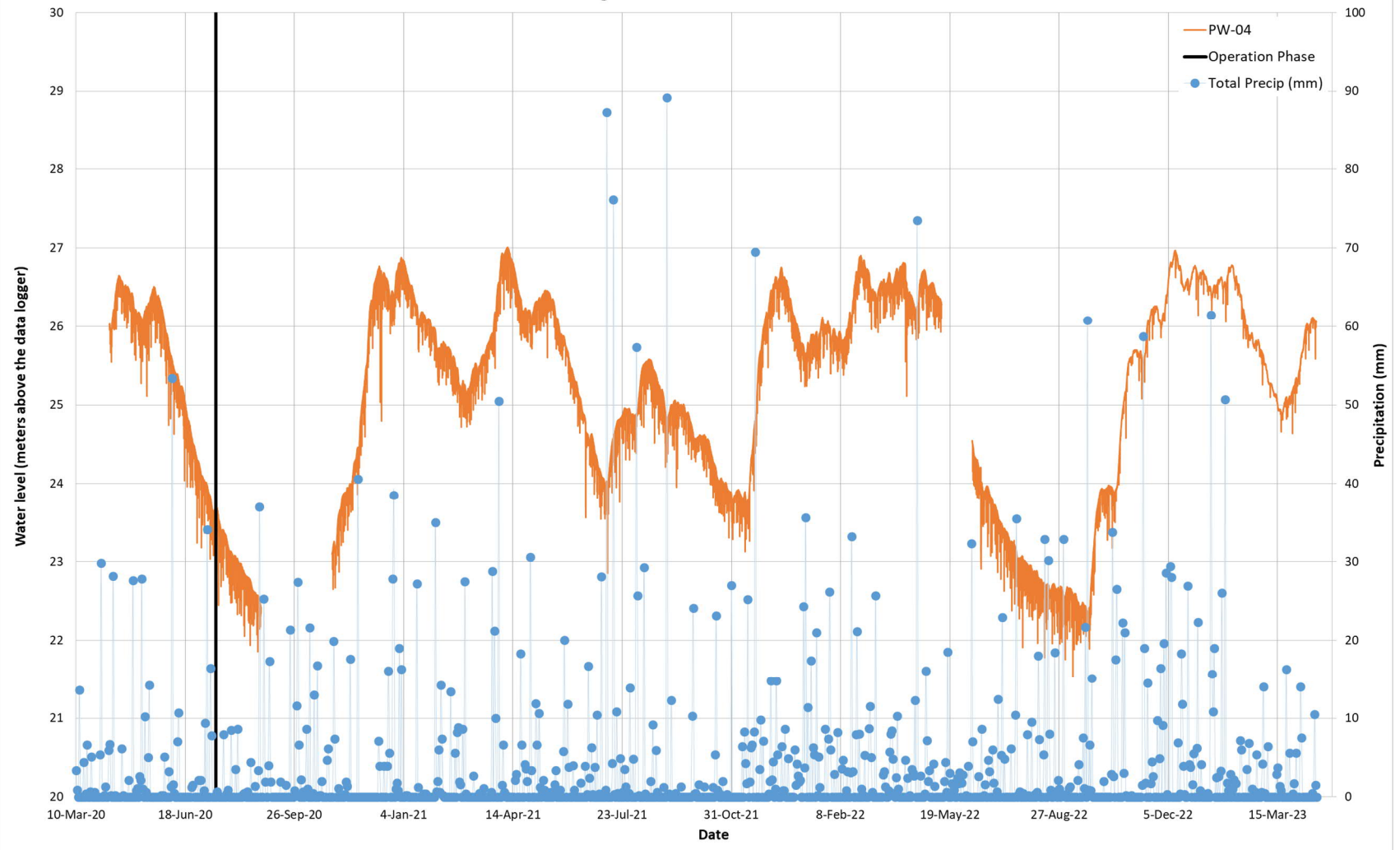


Figure 6: PW-06 Water Levels

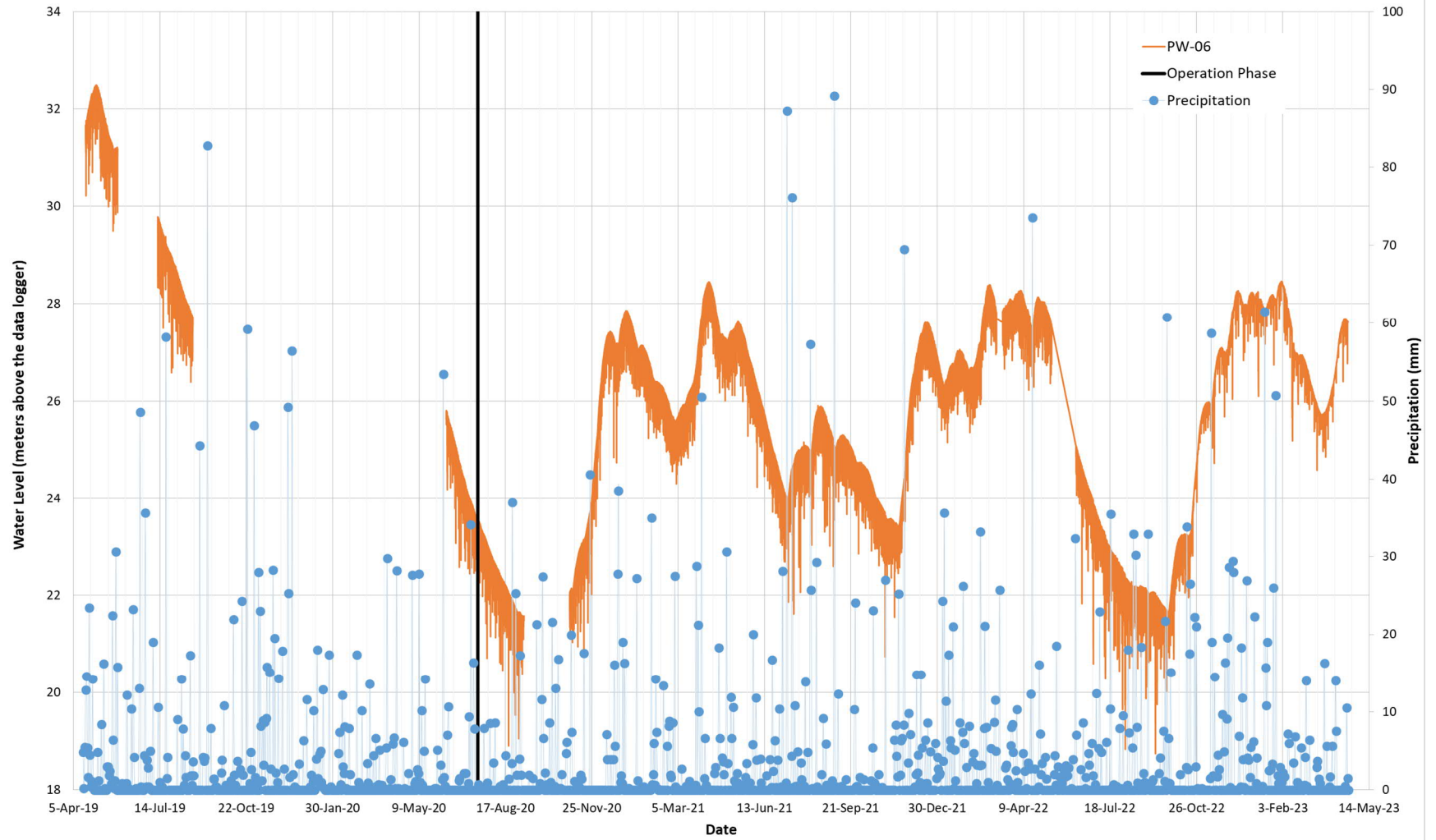


Figure 7: PW-05 Water Levels

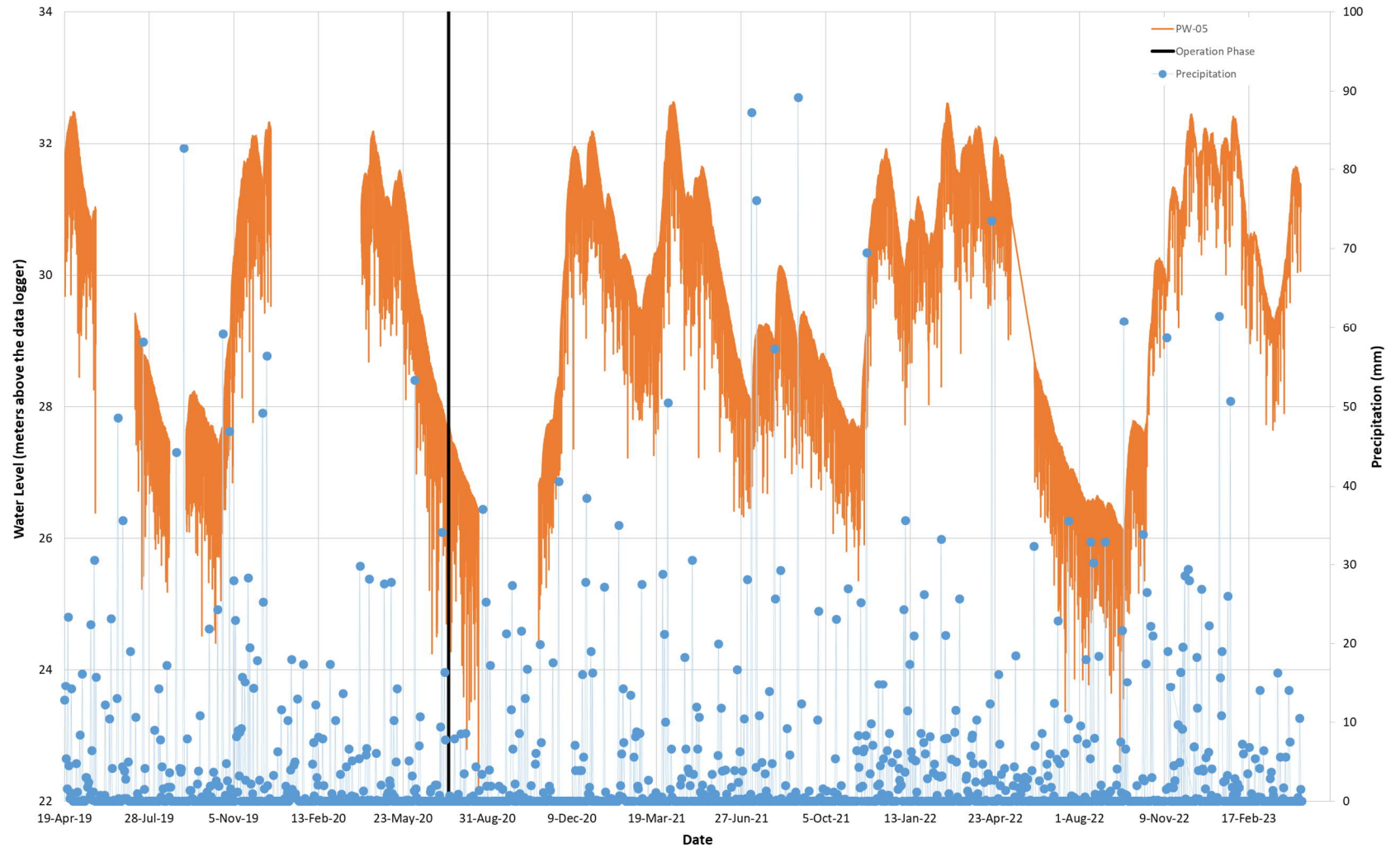


Table 1
Surface Water Monitoring
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

| Parameter | Ambient Air Temperature ^a | Precipitation 48 hours prior to sample collection ^b | Field Results | | | | Laboratory Results | | | | | | | | | | | | | |
|------------|--------------------------------------|--|---------------|-------------------|-----------------------|-----------|-------------------------------------|------------------------------------|---------|----------|----------------------------------|-----------|------------|-----------|--------|----------|------------------------|-----|--|--|
| | | | pH | Water Temperature | Specific Conductivity | Turbidity | Total Suspended Solids ^c | Alkalinity (as CaCO ₃) | Calcium | Chloride | Hardness (as CaCO ₃) | Magnesium | Phosphorus | Potassium | Sodium | Sulphate | Total Dissolved Solids | | | |
| Units | °C | mm | - | °C | mS/cm | NTU | mg/L | | | | | | | | | | | | | |
| Sample ID | Date | | | | | | | | | | | | | | | | | | | |
| PDP-1 | 14-Mar-2023 | 1.5 | 0.0 | 7.2 | -0.89 | 0.456 | 4.6 | <5 | 27 | 102 | 32.1 | 264 | 2.19 | 0.013 | 0.66 | 14.8 | 230 | 404 | | |
| PDP-1 (FD) | | | | | | | | | | | | | | | | | | | | |
| H1 | | | | | | | | | | | | | | | | | | | | |
| SW3 | 17-Mar-2023 | 4.6 | 3.7 | - | 2.2 | 643 | 1.43 | <5 | - | - | - | - | - | - | - | - | - | - | | |
| PDP-1 | | | | | | | | | | | | | | | | | | | | |
| SW5 | | | | | | | | | | | | | | | | | | | | |
| SW3 | 24-Mar-2023 | 2.1 | 16.3 | - | 2.4 | 443 | 2.63 | <5 | - | - | - | - | - | - | - | - | - | - | | |
| PDP-1 | | | | | | | | | | | | | | | | | | | | |
| PDP-1 (FD) | | | | | | | | | | | | | | | | | | | | |
| SW5 | | | | | | | | | | | | | | | | | | | | |
| SW3 | 30-Mar-2023 | -1.6 | 2.1 | - | 2.6 | 392 | 6.04 | <5 | - | - | - | - | - | - | - | - | - | - | | |
| PDP-1 | | | | | | | | | | | | | | | | | | | | |
| SW5 | | | | | | | | | | | | | | | | | | | | |

a) Temperature based on data from the climate station at the Saint John airport. Temperature is the value recorded at 12:00pm on the day of sampling. Data available at: https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

b) Precipitation based on data from the climate station at the Saint John airport. Data available at: https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

| Date | Site Specific Guideline | Monthly Average | | | | |
|-----------|-------------------------|-----------------|------|-----|-------|------|
| | | H1 | H2 | SW3 | PDP-1 | SW5 |
| 04-Dec-19 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 11-Dec-19 | 30.3 | 6.0 | 14.0 | 5.3 | 4.8 | 2.5 |
| 15-Dec-19 | 29.3 | 8.0 | 9.5 | 4.3 | 5.5 | 2.5 |
| 19-Dec-19 | 28.9 | 6.2 | 7.2 | 3.9 | 4.8 | 2.5 |
| 23-Dec-20 | 28.6 | 5.3 | 6.0 | 3.6 | 4.3 | 2.5 |
| 03-Jan-20 | 28.4 | 4.7 | 5.3 | 3.4 | 4.0 | 2.5 |
| 10-Jan-20 | 28.4 | 4.3 | 4.8 | 3.4 | 4.0 | 2.5 |
| 13-Jan-20 | 27.5 | 3.8 | 3.0 | 2.5 | 3.3 | 2.5 |
| 21-Jan-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 27-Jan-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 03-Feb-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 11-Feb-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 19-Feb-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 28-Feb-20 | 27.5 | 2.5 | 0.0 | 2.5 | 2.5 | 2.5 |
| 05-Mar-20 | 27.5 | 2.5 | 2.5 | 2.5 | 3.4 | 2.5 |
| 11-Mar-20 | 27.5 | 2.5 | 2.5 | 2.5 | 3.2 | 2.5 |
| 15-Mar-20 | 27.5 | 3.4 | 4.8 | 2.5 | 3.2 | 2.5 |
| 17-Mar-20 | 28.3 | 4.0 | 4.0 | 3.3 | 3.1 | 3.1 |
| 20-Mar-20 | 30.6 | 7.3 | 4.0 | 5.6 | 5.2 | 4.6 |
| 26-Mar-20 | 30.6 | 7.3 | 3.6 | 5.6 | 5.2 | 4.6 |
| 03-Apr-20 | 31.4 | 9.2 | 6.9 | 6.4 | 6.3 | 5.7 |
| 09-Apr-20 | 31.4 | 9.2 | 6.9 | 6.4 | 5.8 | 5.7 |
| 14-Apr-20 | 33.1 | 15.7 | 18.8 | 8.1 | 9.1 | 9.9 |
| 17-Apr-20 | 33.3 | 16.4 | 21.1 | 8.3 | 10.3 | 10.6 |
| 23-Apr-20 | 30.3 | 12.3 | 18.0 | 5.3 | 10.3 | 8.7 |
| 28-Apr-20 | 30.3 | 12.3 | 20.6 | 5.3 | 10.3 | 8.7 |
| 08-May-20 | 29.1 | 9.0 | 15.5 | 4.1 | 9.0 | 6.7 |
| 11-May-20 | 29.1 | 9.0 | 15.5 | 4.1 | 8.1 | 6.7 |
| 19-May-20 | 27.5 | 2.5 | 5.1 | 2.5 | 5.1 | 2.5 |
| 26-May-20 | 27.5 | 2.5 | 5.1 | 2.5 | 2.5 | 2.5 |
| 04-Jun-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 10.0 |
| 08-Jun-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 12-Jun-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 16-Jun-20 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| 24-Jun-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 30-Jun-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 07-Jul-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 10-Jul-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 13-Jul-20 | 27.9 | - | - | 5.0 | 2.5 | 2.5 |
| 21-Jul-20 | 27.9 | - | - | 2.5 | 7.0 | 2.5 |
| 23-Jul-20 | 27.8 | - | - | 2.5 | 2.5 | 2.5 |
| 29-Jul-20 | 28.3 | - | - | 6 | 2.5 | 5 |
| 05-Aug-20 | 28.4 | - | - | 3.4 | 3.1 | 3.2 |
| 14-Aug-20 | 31.7 | - | - | 6.7 | 3.4 | 3.5 |

Table 2
 Total Suspended Solids - Monthly Average
 Upham East Gypsum Project
 Upham, New Brunswick
 Project No. 21-3049

| Date | Site Specific Guideline | Monthly Average | | | | |
|-----------|-------------------------|-----------------|------|-----|-------|-----|
| | | H1 | H2 | SW3 | PDP-1 | SW5 |
| 17-Aug-20 | 32.4 | - | - | 7.4 | 3.3 | 5.4 |
| 26-Aug-20 | 33.4 | - | - | 8.4 | 2.5 | 6.0 |
| 31-Aug-20 | 32.7 | - | - | 7.7 | 2.5 | 5.5 |
| 04-Sep-20 | 31.8 | - | - | 6.8 | 2.5 | 5.0 |
| 10-Sep-20 | 31.8 | 2.5 | 2.5 | 6.8 | 2.5 | 4.6 |
| 15-Sep-20 | 28.9 | - | - | 3.9 | 2.5 | 4.6 |
| 22-Sep-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 23-Sep-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 29-Sep-20 | 27.9 | - | - | 2.9 | 3.4 | 4.6 |
| 30-Sep-20 | 27.8 | - | - | 2.8 | 3.3 | 4.3 |
| 08-Oct-20 | 27.9 | - | - | 2.5 | 2.5 | 2.5 |
| 14-Oct-20 | 27.9 | - | - | 2.5 | 2.5 | 2.5 |
| 22-Oct-20 | 27.9 | - | - | 2.5 | 2.5 | 2.5 |
| 28-Oct-20 | 27.9 | - | - | 2.5 | 2.5 | 2.5 |
| 03-Nov-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 05-Nov-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 13-Nov-20 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 16-Nov-20 | 27.5 | - | - | 2.5 | 2.5 | 7.0 |
| 24-Nov-20 | 27.5 | - | - | 2.5 | 5.0 | 2.5 |
| 27-Nov-20 | 27.9 | - | - | 5 | 2.5 | 2.5 |
| 01-Dec-20 | 27.9 | - | - | 2.9 | 3.2 | 4.5 |
| 02-Dec-20 | 28.1 | 2.5 | 2.5 | 3.1 | 3.1 | 4.7 |
| 07-Dec-20 | 28.2 | - | - | 3.2 | 3.2 | 5.0 |
| 15-Dec-20 | 28.2 | - | - | 3.2 | 3.2 | 5.0 |
| 23-Dec-20 | 28.2 | - | - | 3.2 | 3.2 | 4.4 |
| 28-Dec-20 | 27.9 | - | - | 2.9 | 2.9 | 4.7 |
| 31-Dec-20 | 27.9 | - | - | 2.9 | 2.9 | 4.4 |
| 05-Jan-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 12-Jan-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 17-Jan-21 | 28.3 | - | - | 3.3 | 3.4 | 3.4 |
| 21-Jan-21 | 28.1 | - | - | 3.1 | 3.3 | 3.3 |
| 27-Jan-21 | 28.1 | - | - | 3.1 | 3.3 | 3.3 |
| 03-Feb-21 | 28.3 | - | - | 3.3 | 3.4 | 3.4 |
| 10-Feb-21 | 28.3 | - | - | 3.3 | 3.4 | 3.4 |
| 18-Feb-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 25-Feb-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 02-Mar-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 08-Mar-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 16-Mar-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 18-Mar-21 | 27.5 | 2.5 | - | 2.5 | - | 2.5 |
| 26-Mar-21 | 27.5 | - | 47.0 | - | 2.5 | - |
| 27-Mar-21 | 28.1 | - | - | 3.1 | 2.5 | 2.5 |
| 30-Mar-21 | 28.1 | - | - | 3.1 | 2.5 | 2.5 |
| 02-Apr-21 | 28.0 | - | - | 3.0 | 2.5 | 2.5 |

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

| Date | Site Specific Guideline | Monthly Average | | | | |
|-----------|-------------------------|-----------------|-----|-----|-------|------|
| | | H1 | H2 | SW3 | PDP-1 | SW5 |
| 08-Apr-21 | 27.9 | - | - | 2.9 | 2.5 | 2.5 |
| 16-Apr-21 | 27.9 | - | - | 2.9 | 2.5 | 2.5 |
| 19-Apr-21 | 27.9 | - | - | 2.9 | 2.5 | 2.5 |
| 26-Apr-21 | 27.9 | - | - | 2.9 | 2.5 | 3.0 |
| 01-May-21 | 27.5 | - | - | 2.5 | 2.5 | 3.1 |
| 08-May-21 | 27.5 | - | - | 2.5 | 2.5 | 3.1 |
| 13-May-21 | 27.5 | - | - | 2.5 | 2.5 | 3.1 |
| 17-May-21 | 27.5 | - | - | 2.5 | 2.5 | 3.7 |
| 24-May-21 | 27.5 | - | - | 2.5 | 2.5 | 3.7 |
| 01-Jun-21 | 27.5 | - | - | 2.5 | 2.5 | 3.2 |
| 08-Jun-21 | 27.5 | - | - | 2.5 | 3.0 | 3.2 |
| 16-Jun-21 | 27.5 | - | - | 2.5 | 3.5 | 3.7 |
| 24-Jun-21 | 27.5 | - | - | 2.5 | 3.8 | 3.1 |
| 01-Jul-21 | 27.5 | - | - | 2.5 | 3.5 | 3.0 |
| 06-Jul-21 | 27.5 | - | - | 2.5 | 3.5 | 3.0 |
| 10-Jul-21 | 28.4 | - | - | 3.4 | 3.0 | 3.0 |
| 14-Jul-21 | 28.3 | - | - | 3.3 | 2.9 | 2.9 |
| 15-Jul-21 | 28.1 | - | - | 3.1 | 2.9 | 2.9 |
| 24-Jul-21 | 28.1 | - | - | 3.1 | 2.5 | 2.5 |
| 31-Jul-21 | 28.1 | - | - | 3.1 | 2.5 | 2.5 |
| 6-Aug-21 | 28.3 | - | - | 3.3 | 2.5 | 2.5 |
| 11-Aug-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 17-Aug-21 | 27.5 | - | - | 2.5 | 4.0 | 10.0 |
| 26-Aug-21 | 27.5 | - | - | 2.5 | 4.0 | 2.5 |
| 3-Sep-21 | 27.5 | - | - | 2.5 | 4.5 | 5.0 |
| 7-Sep-21 | 27.5 | - | - | 2.5 | 4.5 | 2.5 |
| 15-Sep-21 | 27.5 | - | - | 2.5 | 5.0 | 5.0 |
| 20-Sep-21 | 27.5 | - | - | 2.5 | 4.0 | 5.0 |
| 28-Sep-21 | 27.5 | - | - | 2.5 | 4.0 | 2.5 |
| 6-Oct-21 | 27.5 | - | - | 2.5 | 3.5 | 2.5 |
| 13-Oct-21 | 27.5 | 2.5 | 2.5 | 2.5 | 3.5 | 2.5 |
| 18-Oct-21 | 27.5 | - | - | 2.5 | 3.0 | 2.5 |
| 22-Oct-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 28-Oct-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 01-Nov-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 03-Nov-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 09-Nov-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 16-Nov-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 23-Nov-21 | 27.9 | - | - | 2.9 | 4.3 | 2.5 |
| 4-Dec-21 | 28.1 | - | - | 3.1 | 5.1 | 2.5 |
| 8-Dec-21 | 28.0 | - | - | 3.0 | 4.6 | 2.5 |
| 13-Dec-21 | 28.0 | - | - | 3.0 | 4.6 | 2.5 |
| 21-Dec-21 | 28.0 | - | - | 3.0 | 4.6 | 2.5 |
| 29-Dec-21 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

| Date | Site Specific Guideline | Monthly Average | | | | |
|-----------|-------------------------|-----------------|-----|-----|-------|-----|
| | | H1 | H2 | SW3 | PDP-1 | SW5 |
| 4-Jan-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 6-Jan-22 | 28.6 | - | - | 9.0 | 6.0 | 8.0 |
| 26-Jan-22 | 29.7 | 2.5 | 2.5 | - | - | - |
| 19-Feb-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 24-Feb-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 9-Mar-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 13-Mar-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 18-Mar-22 | 29.0 | - | - | 4.0 | 4.0 | 3.6 |
| 22-Mar-22 | 29.0 | - | - | 4.0 | 4.5 | 3.6 |
| 26-Mar-22 | 28.8 | - | - | 3.8 | 4.2 | 3.4 |
| 1-Apr-22 | 29.3 | - | - | 4.3 | 3.4 | 4.2 |
| 8-Apr-22 | 29.3 | - | - | 4.3 | 3.4 | 4.8 |
| 16-Apr-22 | 29.3 | - | - | 4.3 | 3.4 | 4.8 |
| 20-Apr-22 | 28.8 | - | - | 3.8 | 2.5 | 4.3 |
| 29-Apr-22 | 29.1 | - | - | 4.1 | 2.5 | 4.1 |
| 7-May-22 | 28.4 | - | - | 2.5 | 2.5 | 2.5 |
| 13-May-22 | 28.4 | - | - | 2.5 | 2.5 | 2.5 |
| 18-May-22 | 28.4 | - | - | 2.5 | 2.5 | 2.5 |
| 27-May-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 4-Jun-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 10-Jun-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 15-Jun-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 22-Jun-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 29-Jun-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 04-Jul-22 | 27.5 | 2.5 | 2.5 | 2.5 | 2.5 | 3.9 |
| 7-Jul-22 | 27.5 | - | - | 2.5 | 2.5 | 3.9 |
| 13-Jul-22 | 27.5 | - | - | 2.5 | 2.5 | 4.7 |
| 20-Jul-22 | 27.5 | - | - | 2.5 | 2.5 | 4.7 |
| 30-Jul-22 | 27.5 | - | - | 2.5 | 2.5 | 5.1 |
| 6-Aug-22 | 27.5 | - | - | 2.5 | 3.4 | 2.5 |
| 10-Aug-22 | 27.5 | - | - | 2.5 | 3.4 | 3.0 |
| 15-Aug-22 | 27.5 | - | - | 2.5 | 2.5 | 3.0 |
| 18-Aug-22 | 27.5 | - | - | 2.5 | 2.5 | 2.9 |
| 24-Aug-22 | 28.6 | - | - | 3.6 | 2.5 | 2.9 |

Table 2
 Total Suspended Solids - Monthly Average
 Upham East Gypsum Project
 Upham, New Brunswick
 Project No. 21-3049

| Date | Site Specific Guideline | Monthly Average | | | | |
|-----------|-------------------------|-----------------|-----|-----|-------|------|
| | | H1 | H2 | SW3 | PDP-1 | SW5 |
| 1-Sep-22 | 29.2 | - | - | 4.2 | 2.5 | 2.9 |
| 9-Sep-22 | 29.5 | - | - | 4.5 | 2.5 | 12.2 |
| 14-Sep-22 | 29.2 | 2.5 | 2.5 | 4.2 | 2.5 | 11.5 |
| 21-Sep-22 | 29.5 | - | - | 4.5 | 2.5 | 13.3 |
| 23-Sep-22 | 29.2 | - | - | 4.2 | 2.5 | 11.9 |
| 27-Sep-22 | 28.1 | - | - | 3.1 | 2.5 | 11.9 |
| 06-Oct-22 | 27.5 | - | - | 2.5 | 2.5 | 11.9 |
| 14-Oct-22 | 27.5 | - | - | 2.5 | 2.5 | 3.8 |
| 17-Oct-22 | 27.5 | - | - | 2.5 | 2.5 | 2.9 |
| 20-Oct-22 | 27.5 | - | - | 2.5 | 3.1 | 2.9 |
| 26-Oct-22 | 27.5 | - | - | 2.5 | 3.3 | 2.5 |
| 4-Nov-22 | 27.5 | - | - | 2.5 | 5.0 | 2.5 |
| 11-Nov-22 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 13-Nov-22 | 28.1 | - | - | 3.1 | 2.5 | 3.1 |
| 18-Nov-22 | 28.1 | - | - | 3.1 | 2.5 | 3.1 |
| 23-Nov-22 | 28.1 | - | - | 3.1 | 2.5 | 3.1 |
| 1-Dec-22 | 30.2 | - | - | 5.2 | 3.8 | 4.5 |
| 4-Dec-22 | 29.8 | - | - | 4.8 | 3.6 | 4.2 |
| 9-Dec-22 | 29.8 | 2.5 | - | 4.8 | 3.3 | 4.2 |
| 14-Dec-22 | 29.6 | - | - | 4.6 | 3.4 | 3.9 |
| 19-Dec-22 | 29.6 | - | - | 4.6 | 3.4 | 3.9 |
| 24-Dec-22 | 31.0 | - | - | 6.0 | 4.8 | 5.2 |
| 28-Dec-22 | 30.5 | - | - | 5.5 | 4.5 | 4.8 |
| 2-Jan-23 | 28.7 | - | - | 3.7 | 3.7 | 3.6 |
| 11-Jan-23 | 28.9 | - | - | 3.9 | 3.9 | 3.8 |
| 17-Jan-23 | 28.9 | - | - | 3.9 | 3.9 | 3.8 |
| 18-Jan-23 | 28.7 | - | - | 3.7 | 3.7 | 3.6 |
| 25-Jan-23 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 27-Jan-23 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 2-Feb-23 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 20-Feb-23 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 14-Mar-23 | 27.5 | 2.5 | - | 2.5 | 2.5 | 2.5 |
| 17-Mar-23 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 24-Mar-23 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |
| 30-Mar-23 | 27.5 | - | - | 2.5 | 2.5 | 2.5 |

Notes:

The detection limit for TSS is 5 mg/L; for results <5 mg/L, half the detection limit was used.

Dashed line indicates monthly average could not be calculated.

Site specific guideline is 25 mg/L above the monthly average.

Monthly average is calculated based on results from the previous 30 days.

The background sample is SW3.

Samples above the site specific guideline are **bolded in red**.

Table 4
Air Quality Reporting
Upham East Gypsum Quarry
Upham, New Brunswick
Project No. 21-3049

| Test Start | Duration | Flow Rate | Air Volume | Pressure | Temperature | Initial Filter Weight | Final Filter Weight | TSP Mass | TSP | Site Guideline |
|------------|----------|--------------------|--------------------|------------------|-------------------|-----------------------|---------------------|----------|----------------------|----------------------|
| | | (L/min) | (m ³) | (mm Hg) | (°C) | (g) | (g) | (µg) | (µg/m ³) | (µg/m ³) |
| 2020-07-22 | 24 hours | 16.70 | 24.05 | 752 | 20.3 | 14.842 | 14.865 | 23000 | 39.85 | 120 |
| 2020-07-28 | 24 hours | 16.46 | 23.70 | 747 | 24.4 | 14.826 | 14.828 | 1700 | 2.99 | 120 |
| 2020-08-04 | 24 hours | 16.66 | 23.99 | 753 | 22.8 | 14.826 | 14.830 | 3100 | 5.38 | 120 |
| 2020-08-09 | 24 hours | 16.74 | 24.10 | 752 | 21.2 | 14.842 | 14.844 | 2200 | 3.80 | 120 |
| 2020-08-15 | 24 hours | 16.88 | 24.30 | 754 | 19.8 | 14.824 | 14.836 | 11600 | 19.89 | 120 |
| 2020-08-21 | 24 hours | 16.87 | 24.30 | 749 | 17.9 | 14.839 | 14.842 | 2100 | 3.60 | 120 |
| 2020-08-27 | 24 hours | 17.06 | 24.57 | 743 | 12.4 | 14.823 | 14.845 | 21700 | 36.80 | 120 |
| 2020-09-02 | 24 hours | 16.75 | 24.12 | 747 | 18.8 | 14.842 | 14.861 | 19700 | 34.03 | 120 |
| 2020-09-08 | 24 hours | 17.02 | 24.51 | 759 | 19.1 | 14.859 | 14.871 | 12100 | 20.57 | 120 |
| 2020-09-14 | 24 hours | 17.62 | 25.37 | 756 | 8.0 | 14.828 | 14.837 | 9300 | 15.27 | 120 |
| 2020-09-20 | 24 hours | 18.03 | 25.97 | 764 | 4.8 | 14.835 | 14.852 | 17100 | 27.44 | 120 |
| 2020-09-26 | 24 hours | 17.10 | 24.62 | 753 | 15.3 | 14.856 | 14.859 | 3300 | 5.59 | 120 |
| 2020-10-02 | 24 hours | 14.43 | 25.10 | 753 | 9.6 | 14.972 | 14.959 | -12800 | -21.25 | 120 |
| 2020-10-08 | 24 hours | 17.69 | 25.48 | 748 | 3.8 | 14.861 | 14.889 | 28800 | 47.10 | 120 |
| 2020-10-14 | 24 hours | 17.56 | 25.29 | 753 | 7.8 | 14.883 | 14.891 | 8300 | 13.68 | 120 |
| 2020-10-20 | 19:31 | 17.63 | 20.66 | 760 | 9.1 | 14.875 | 14.858 | -17100 | -34.49 | 120 |
| 2020-10-23 | 21:55 | 17.34 | 22.82 | 750 | 10.1 | 14.859 | 14.865 | 5600 | 11.20 | 120 |
| 2020-10-26 | 21:02 | 17.71 | 22.35 | 752 | 4.8 | 14.854 | 14.864 | 10100 | 21.52 | 120 |
| 2020-11-01 | 24 hours | 17.19 | 24.75 | 732 | 5.9 | 14.873 | 14.880 | 7300 | 12.29 | 120 |
| 2020-11-07 | 24 hours | 17.84 | 25.68 | 759 | 5.9 | 14.869 | 14.872 | 3100 | 5.03 | 120 |
| 2020-11-13 | 24 hours | 17.79 | 25.62 | 748 | 1.9 | 14.860 | 14.861 | 600 | 0.98 | 120 |
| 2020-11-19 | 24 hours | 17.63 | 25.22 | 756 | 7.3 | 14.848 | 14.850 | 2200 | 3.64 | 120 |
| 2020-11-25 | 24 hours | 17.83 | 25.68 | 756 | 4.4 | 14.850 | 14.856 | 6700 | 10.87 | 120 |
| 2020-12-01 | 24 hours | 17.48 | 25.18 | 748 | 7.0 | 14.843 | 14.861 | 18300 | 30.28 | 120 |
| 2020-12-07 | 24 hours | 17.88 | 25.75 | 740 | -2.1 | 14.834 | 14.836 | 1900 | 3.07 | 120 |
| 2020-12-13 | 24 hours | 17.98 | 25.90 | 746 | -1.3 | 14.831 | 14.839 | 8300 | 13.35 | 120 |
| 2020-12-19 | 24 hours | 18.37 | 26.45 | 756 | -3.6 | 14.837 | 14.843 | 5700 | 8.98 | 120 |
| 2020-12-25 | 24 hours | 17.34 ^a | 22.82 ^a | 753 ^a | 12.3 ^a | 14.840 | 14.850 | 10000 | 18.26 | 120 |
| 2020-12-31 | 24 hours | 18.58 | 26.76 | 759 | -5.8 | 14.845 | 14.850 | 4800 | 7.47 | 120 |
| 2021-01-06 | 24 hours | 18.00 | 24.73 | 744 | -2.7 | 14.836 | 14.852 | 16300 | 27.46 | 120 |
| 2021-01-12 | 24 hours | 16.70 | 24.74 | 749 | -6.7 | 14.854 | 14.872 | 18200 | 30.65 | 120 |
| 2021-01-18 | 24 hours | 17.52 | 25.52 | 737 | -0.8 | 14.868 | 14.877 | 8600 | 14.04 | 120 |
| 2021-01-24 | 24 hours | 16.70 | 24.03 | 737 | -8.0 | 14.823 | 14.827 | 4200 | 7.28 | 120 |
| 2021-01-30 | 24 hours | 16.70 | 24.03 | 750 | -11.2 | 14.829 | 14.833 | 3600 | 6.24 | 120 |
| 2021-02-05 | 24 hours | 17.90 | 25.80 | 744 | -0.9 | 14.850 | 14.866 | 15800 | 25.52 | 120 |
| 2021-02-11 | 24 hours | 16.70 | 24.05 | 750 | -12.6 | 14.829 | 14.834 | 5300 | 9.18 | 120 |
| 2021-02-17 | 24 hours | 16.70 | 24.05 | 755 | -9.9 | 14.818 | 14.821 | 2800 | 4.85 | 120 |
| 2021-02-23 | 24 hours | 17.70 | 25.49 | 737 | -0.6 | 14.891 | 14.897 | 6000 | 9.81 | 120 |
| 2021-03-01 | 24 hours | 17.87 | 25.74 | 741 | -1.6 | 14.858 | 14.866 | 7700 | 12.46 | 120 |

Table 4
Air Quality Reporting
Upham East Gypsum Quarry
Upham, New Brunswick
Proejct No. 21-3049

| Test Start | Duration | Flow Rate | Air Volume | Pressure | Temperature | Initial Filter Weight | Final Filter Weight | TSP Mass | TSP | Site Guideline |
|-------------------------|----------|-----------|-------------------|----------|-------------|-----------------------|---------------------|----------|----------------------|----------------------|
| | | (L/min) | (m ³) | (mm Hg) | (°C) | (g) | (g) | (µg) | (µg/m ³) | (µg/m ³) |
| 2021-03-07 | 24 hours | 16.70 | 24.05 | 753 | -8.9 | 14.840 | 14.851 | 11800 | 20.44 | 120 |
| 2021-03-13 | 24 hours | 17.92 | 25.81 | 743 | -1.3 | 14.828 | 14.835 | 6900 | 11.14 | 120 |
| 2021-03-19 | 24 hours | 16.70 | 24.05 | 750 | -5.3 | 14.819 | 14.823 | 4600 | 7.97 | 120 |
| 2021-03-25 | 24 hours | 17.52 | 24.23 | 754 | 8.9 | 14.820 | 14.826 | 6100 | 10.49 | 120 |
| 2021-03-31 | 24 hours | 16.70 | 24.05 | 756 | 6.8 | 14.823 | 14.831 | 8600 | 14.90 | 120 |
| 2021-04-06 | 24 hours | 16.70 | 24.05 | 746 | 4.1 | 14.822 | 14.835 | 13400 | 23.22 | 120 |
| 2021-04-12 | 24 hours | 17.64 | 25.55 | 749 | 5.2 | 14.812 | 14.817 | 5100 | 8.32 | 120 |
| 2021-04-18 | 24 hours | 16.70 | 24.05 | 742 | 2.6 | 14.815 | 14.825 | 10000 | 17.33 | 120 |
| 2021-04-24 | 24 hours | 17.27 | 24.05 | 743 | 8.8 | 14.815 | 14.826 | 10400 | 18.02 | 120 |
| 2021-04-30 | 24 hours | 17.24 | 24.82 | 735 | 6.4 | 14.814 | 14.921 | 107000 | 11.75 | 120 |
| 2021-05-06 ^b | 21.08 | 17.42 | 21.08 | 750 | 8.8 | 14.840 | 14.850 | 10100 | 19.96 | 120 |
| 2021-05-12 ^b | - | 17.49 | 25.19 | 748 | 7.1 | 14.822 | 14.830 | 7800 | 12.90 | 120 |
| 2021-05-18 ^b | 19.21 | 17.53 | 20.35 | 757 | 9.8 | 14.830 | 14.838 | 8700 | 17.81 | 120 |
| 2021-05-27 ^c | - | - | - | - | - | - | - | - | - | 120 |
| 2021-05-31 | 24 hours | 16.70 | 24.05 | 753 | 14.2 | 14.829 | 14.835 | 5800 | 10.05 | 120 |
| 2021-06-04 | 33.46 | 16.79 | 34.02 | 746 | 18.1 | 14.831 | 14.839 | 7900 | 9.68 | 120 |
| 2021-06-10 | 24 hours | 17.42 | 25.09 | 754 | 10.4 | 14.840 | 14.844 | 4300 | 7.14 | 120 |
| 2021-06-16 | 24 hours | 17.48 | 25.18 | 743 | 5.6 | 14.849 | 14.854 | 5600 | 9.27 | 120 |
| 2021-06-22 ^d | 24 hours | 17.23 | 24.82 | 744 | 9.7 | 14.870 | 14.879 | 9100 | 15.28 | 120 |
| 2021-06-24 | 24 hours | 17.94 | 25.83 | 762 | 5.4 | 14.846 | 14.847 | 1200 | 1.94 | 120 |
| 2021-06-30 | 24 hours | 17.01 | 24.29 | 746 | 14.4 | 14.885 | 14.889 | 4200 | 7.20 | 120 |
| 2021-07-06 | 24 hours | 17.30 | 24.91 | 746 | 9.3 | 14.866 | 14.868 | 1700 | 2.84 | 120 |
| 2021-07-12 | 24 hours | 17.60 | 24.05 | 759 | 9.5 | 14.848 | 14.851 | 3000 | 5.20 | 120 |
| 2021-07-18 | 24 hours | 16.70 | 24.05 | 753 | 11.8 | 14.847 | 14.852 | 5200 | 9.01 | 120 |
| 2021-07-24 | 24 hours | 17.51 | 25.21 | 753 | 8.8 | 14.831 | 14.838 | 6900 | 11.40 | 120 |
| 2021-07-30 | 24 hours | 17.43 | 25.10 | 742 | 5.6 | 14.830 | 14.840 | 10000 | 16.60 | 120 |
| 2021-08-05 | 24 hours | 17.47 | 25.15 | 755 | 10.0 | 14.821 | 14.835 | 13900 | 23.03 | 120 |
| 2021-08-10 | 24 hours | 17.21 | 24.78 | 753 | 13.5 | 14.822 | 14.830 | 8100 | 13.62 | 120 |
| 2021-08-11 | 24 hours | 17.18 | 23.42 | 752 | 13.6 | 14.878 | 14.890 | 12000 | 21.35 | 120 |
| 2021-08-17 | 24 hours | 17.43 | 24.05 | 756 | 11.2 | 14.825 | 14.836 | 10200 | 17.67 | 120 |
| 2021-08-23 | 24 hours | 17.19 | 24.75 | 750 | 12.4 | 14.844 | 14.859 | 14500 | 24.41 | 120 |
| 2021-08-29 | 24 hours | 17.49 | 25.18 | 755 | 9.8 | 14.824 | 14.830 | 6100 | 10.09 | 120 |
| 2021-09-04 | 24 hours | 16.70 | 24.05 | 745 | 3.1 | 14.822 | 14.832 | 10600 | 18.36 | 120 |
| 2021-09-09 | 24 hours | 17.15 | 24.70 | 747 | 11.9 | 14.818 | 14.824 | 5600 | 9.45 | 120 |
| 2021-09-16 | 24 hours | 18.05 | 24.05 | 759 | 2.7 | 14.844 | 14.859 | 15700 | 27.20 | 120 |
| 2021-09-22 | 24 hours | 18.68 | 25.46 | 757 | 7.4 | 14.821 | 14.832 | 11700 | 19.15 | 120 |
| 2021-09-28 | 24 hours | 17.45 | 25.13 | 746 | 7.2 | 14.821 | 14.830 | 9100 | 15.09 | 120 |
| 2021-10-04 | 24 hours | 18.30 | 26.35 | 755 | -2.6 | 14.820 | 14.824 | 3700 | 5.85 | 120 |
| 2021-10-10 | 24 hours | 17.98 | 25.89 | 757 | 2.7 | 14.818 | 14.823 | 5000 | 8.05 | 120 |

Table 4
Air Quality Reporting
Upham East Gypsum Quarry
Upham, New Brunswick
Project No. 21-3049

| Test Start | Duration | Flow Rate | Air Volume | Pressure | Temperature | Initial Filter Weight | Final Filter Weight | TSP Mass | TSP | Site Guideline |
|-------------------------|-----------|-----------|-------------------|----------|-------------|-----------------------|---------------------|----------|----------------------|----------------------|
| | | (L/min) | (m ³) | (mm Hg) | (°C) | (g) | (g) | (µg) | (µg/m ³) | (µg/m ³) |
| 2021-10-16 | 24 hours | 17.16 | 24.70 | 747 | 12.1 | 14.815 | 14.822 | 6600 | 11.13 | 120 |
| 2021-10-22 | 24 hours | 17.10 | 24.63 | 747 | 13.2 | 14.816 | 14.820 | 3200 | 5.41 | 120 |
| 2021-10-28 | 24 hours | 17.61 | 25.36 | 749 | 5.8 | 14.837 | 14.838 | 1200 | 1.97 | 120 |
| 2021-11-03 | 24 hours | 18.17 | 26.17 | 754 | -1.1 | 14.825 | 14.835 | 10000 | 15.92 | 120 |
| 2021-11-09 | 24 hours | 17.76 | 25.58 | 751 | 3.6 | 14.821 | 14.836 | 14400 | 23.46 | 120 |
| 2021-11-15 | 24 hours | 17.67 | 25.45 | 739 | 0.8 | 14.831 | 14.837 | 5700 | 9.33 | 120 |
| 2021-11-21 | 24 hours | 17.06 | 25.72 | 756 | 3.9 | 14.834 | 14.838 | 3800 | 6.16 | 120 |
| 2021-11-27 | 24 hours | 17.98 | 25.90 | 737 | -4.7 | 14.839 | 14.846 | 7400 | 11.90 | 120 |
| 2021-12-03 | 24 hours | 18.26 | 26.29 | 742 | -6.8 | 14.840 | 14.849 | 9800 | 15.53 | 120 |
| 2021-12-09 | 24 hours | 19.23 | 27.69 | 755 | -15.9 | 14.823 | 14.824 | 1000 | 1.50 | 120 |
| 2021-12-15 | 24 hours | 18.55 | 26.72 | 760 | -4.7 | 14.626 | 14.841 | 215300 | 335.73 ^e | 120 |
| 2021-12-17 | 24 hours | 17.98 | 25.89 | 748 | -0.6 | 14.819 | 14.829 | 9600 | 15.45 | 120 |
| 2021-12-23 | 24 hours | 18.90 | 27.22 | 747 | -14.2 | 14.835 | 14.839 | 3800 | 5.82 | 120 |
| 2021-12-29 | 24 hours | 18.23 | 26.25 | 750 | -3.6 | 14.842 | 14.850 | 7700 | 12.22 | 120 |
| 2022-01-04 | 24 hours | 18.89 | 27.20 | 755 | -11.2 | 14.843 | 14.853 | 10300 | 15.78 | 120 |
| 2022-01-10 | 24 hours | 19.19 | 27.63 | 749 | -17.2 | 14.825 | 14.831 | 6600 | 9.95 | 120 |
| 2022-01-16 | 24 hours | 18.70 | 26.08 | 755 | -19.9 | 14.842 | 14.865 | 23300 | 37.23 | 120 |
| 2022-01-22 | 24 hours | 19.18 | 25.97 | 752 | -15.5 | 14.829 | 14.851 | 21300 | 34.17 | 120 |
| 2022-01-28 | 24 hours | 18.59 | 26.78 | 753 | -7.8 | 14.833 | 14.861 | 28600 | 44.50 | 120 |
| 2022-02-03 | 24 hours | 18.24 | 26.26 | 755 | -1.7 | 14.894 | 14.940 | 45300 | 71.88 | 120 |
| 2022-02-09 | 24 hours | 18.11 | 26.07 | 748 | -2.5 | 14.856 | 14.858 | 2100 | 3.36 | 120 |
| 2022-02-15 | 24 hours | 19.70 | 28.37 | 762 | -19.5 | 14.843 | 14.844 | 1700 | 2.50 | 120 |
| 2022-02-21 ^c | 9.5 hours | - | - | - | - | - | - | - | - | 120 |
| 2022-02-23 | 24 hours | 18.41 | 26.51 | 749 | -6.4 | 14.837 | 14.844 | 7100 | 11.16 | 120 |
| 2022-03-01 | 24 hours | 18.43 | 26.28 | 751 | -5.9 | 14.827 | 14.831 | 3300 | 5.23 | 120 |
| 2022-03-08 | 24 hours | 18.37 | 26.45 | 748 | -6.2 | 14.834 | 14.834 | 500 | 0.79 | 120 |
| 2022-03-14 | 24 hours | 18.11 | 26.08 | 756 | 0.2 | 14.814 | 14.818 | 4300 | 6.87 | 120 |
| 2022-03-20 | 24 hours | 17.53 | 25.24 | 741 | 3.9 | 14.830 | 14.833 | 3800 | 6.27 | 120 |
| 2022-03-26 | 24 hours | 17.51 | 25.22 | 735 | 2.0 | 14.839 | 14.847 | 7500 | 12.39 | 120 |
| 2022-04-01 | 24 hours | 17.34 | 24.98 | 735 | 4.4 | 14.847 | 14.852 | 5200 | 8.67 | 120 |
| 2022-04-07 | 24 hours | 17.77 | 25.59 | 753 | 4.4 | 14.848 | 14.849 | 200 | 0.33 | 120 |
| 2022-04-13 | 24 hours | 17.59 | 25.53 | 752 | 6.6 | 14.855 | 14.856 | 600 | 0.98 | 120 |
| 2022-04-19 | 24 hours | 17.69 | 25.47 | 746 | 3.4 | 14.840 | 14.872 | 31700 | 51.86 | 120 |
| 2022-04-25 | 24 hours | 17.65 | 25.42 | 757 | 7.8 | 14.831 | 14.845 | 14800 | 24.26 | 120 |
| 2022-05-01 | 24 hours | 17.84 | 25.70 | 754 | 3.7 | 14.825 | 14.848 | 22700 | 36.80 | 120 |
| 2022-05-07 | 24 hours | 17.82 | 25.67 | 755 | 4.4 | 14.823 | 14.832 | 9600 | 15.58 | 120 |
| 2022-05-13 | 24 hours | 17.06 | 24.57 | 754 | 16.3 | 14.821 | 14.857 | 36200 | 61.39 | 120 |
| 2022-05-19 | 24 hours | 17.20 | 24.77 | 749 | 12.0 | 14.816 | 14.829 | 13300 | 22.37 | 120 |

Table 4
Air Quality Reporting
Upham East Gypsum Quarry
Upham, New Brunswick
Project No. 21-3049

| Test Start | Duration | Flow Rate | Air Volume | Pressure | Temperature | Initial Filter Weight | Final Filter Weight | TSP Mass | TSP | Site Guideline |
|------------|----------|-----------|-------------------|----------|-------------|-----------------------|---------------------|----------|----------------------|----------------------|
| | | (L/min) | (m ³) | (mm Hg) | (°C) | (g) | (g) | (µg) | (µg/m ³) | (µg/m ³) |
| 2022-05-25 | 24 hours | 17.44 | 25.11 | 760 | 12.4 | 14.828 | 14.829 | 700 | 1.16 | 120 |
| 2022-05-31 | 24 hours | 17.46 | 25.14 | 751 | 8.8 | 14.850 | 14.851 | 900 | 1.49 | 120 |
| 2022-06-06 | 24 hours | 17.39 | 25.04 | 753 | 10.5 | 14.813 | 14.826 | 13800 | 22.96 | 120 |
| 2022-06-12 | 24 hours | 16.92 | 24.36 | 752 | 18.3 | 14.825 | 14.833 | 7200 | 12.32 | 120 |
| 2022-06-18 | 24 hours | 16.81 | 24.21 | 739 | 15.2 | 14.843 | 14.848 | 5600 | 9.64 | 120 |
| 2022-06-24 | 24 hours | 16.93 | 24.38 | 751 | 17.4 | 14.828 | 14.858 | 30300 | 51.78 | 120 |
| 2022-06-30 | 24 hours | 16.95 | 24.41 | 752 | 18.0 | 14.826 | 14.839 | 12900 | 22.02 | 120 |
| 2022-07-06 | 24 hours | 17.10 | 24.63 | 747 | 13.0 | 14.829 | 14.829 | 400 | 0.68 | 120 |
| 2022-07-12 | 24 hours | 16.59 | 24.29 | 750 | 17.7 | 14.826 | 14.836 | 9200 | 15.78 | 120 |
| 2022-07-18 | 24 hours | 16.57 | 23.85 | 746 | 22.1 | 14.821 | 14.840 | 18500 | 32.32 | 120 |
| 2022-07-24 | 24 hours | 16.70 | 24.05 | 749 | 24.4 | 14.861 | 14.862 | 1500 | 2.60 | 120 |
| 2022-07-30 | 24 hours | 16.73 | 24.10 | 749 | 20.4 | 14.831 | 14.832 | 1000 | 1.73 | 120 |
| 2022-08-05 | 24 hours | 16.66 | 24 | 755 | 23.9 | 14.8283 | 14.8427 | 14400 | 25.00 | 120 |
| 2022-08-11 | 24 hours | 16.76 | 24.13 | 750 | 19.9 | 14.8321 | 14.8358 | 3700 | 6.39 | 120 |
| 2022-08-17 | 24 hours | 16.95 | 24.41 | 749 | 16.5 | 14.8601 | 14.8771 | 17000 | 29.02 | 120 |
| 2022-08-23 | 24 hours | 16.89 | 24.33 | 749 | 17.2 | 14.8649 | 14.8726 | 7700 | 13.19 | 120 |
| 2022-08-29 | 24 hours | 16.7 | 24.05 | 753 | 17.3 | 14.8706 | 14.8811 | 10500 | 18.19 | 120 |
| 2022-09-04 | 24 hours | 17.11 | 24.64 | 755 | 16.2 | 14.8635 | 14.8653 | 1800 | 3.04 | 120 |
| 2022-09-10 | 24 hours | 17.03 | 24.52 | 755 | 17.6 | 14.8454 | 14.8544 | 9000 | 15.29 | 120 |
| 2022-09-16 | 24 hours | 17.32 | 24.95 | 749 | 10.3 | 14.8614 | 14.8654 | 4000 | 6.68 | 120 |
| 2022-09-22 | 24 hours | 16.93 | 24.38 | 741 | 13.6 | 14.8603 | 14.8822 | 21900 | 37.43 | 120 |
| 2022-09-28 | 24 hours | 17.12 | 24.65 | 750 | 13.9 | 14.8503 | 14.8595 | 9200 | 15.55 | 120 |
| 2022-10-04 | 24 hours | 17.89 | 25.76 | 757 | 4.3 | 14.8573 | 14.8668 | 9500 | 15.37 | 120 |
| 2022-10-10 | 24 hours | 17.92 | 25.8 | 755 | 2.7 | 14.8456 | 14.8551 | 9500 | 15.34 | 120 |
| 2022-10-16 | 24 hours | 17.04 | 24.54 | 749 | 14.8 | 14.8455 | 14.8589 | 13400 | 22.75 | 120 |
| 2022-10-22 | 24 hours | 17.75 | 25.56 | 758 | 6.6 | 14.859 | 14.8611 | 2100 | 3.42 | 120 |
| 2022-10-28 | 24 hours | 18.17 | 26.17 | 762 | 1.6 | 14.8436 | 14.8609 | 17300 | 27.54 | 120 |
| 2022-11-03 | 24 hours | 17.95 | 25.85 | 758 | 3.8 | 14.8588 | 14.8684 | 9600 | 15.47 | 120 |
| 2022-11-09 | 24 hours | 18.24 | 26.27 | 762 | 0.7 | 14.8484 | 14.857 | 8600 | 13.64 | 120 |
| 2022-11-15 | 24 hours | 18.38 | 26.42 | 759 | -2 | 14.8242 | 14.8295 | 5300 | 8.36 | 120 |
| 2022-11-21 | 24 hours | 18.51 | 26.66 | 752 | -7.2 | 14.8173 | 14.8216 | 4300 | 6.72 | 120 |
| 2022-11-27 | 24 hours | 17.89 | 25.66 | 743 | 0.1 | 14.8212 | 14.8304 | 9200 | 14.94 | 120 |
| 2022-12-03 | 24 hours | 18.02 | 25.95 | 756 | 1.9 | 14.8070 | 14.8185 | 11500 | 18.46 | 120 |
| 2022-12-09 | 24 hours | 18.36 | 26.16 | 753 | -1.5 | 14.8096 | 14.8232 | 13600 | 21.66 | 120 |
| 2022-12-15 | 24 hours | 18.25 | 26.36 | 752 | -3.2 | 14.8244 | 14.8284 | 4000 | 6.32 | 120 |
| 2022-12-21 | 24 hours | 18.65 | 26.86 | 763 | -5.4 | 14.8111 | 14.8211 | 10000 | 15.51 | 120 |
| 2022-12-27 | 24 hours | 18.5 | 26.05 | 752 | -8.1 | 14.8281 | 14.838 | 9900 | 15.83 | 120 |
| 2023-01-02 | 24 hours | 18.14 | 26.12 | 749 | -2.5 | 14.8257 | 14.8346 | 8900 | 14.1973 | 120 |

Table 4
Air Quality Reporting
Upham East Gypsum Quarry
Upham, New Brunswick
Project No. 21-3049

| Test Start | Duration | Flow Rate | Air Volume | Pressure | Temperature | Initial Filter Weight | Final Filter Weight | TSP Mass | TSP | Site Guideline |
|------------|----------|-----------|-------------------|----------|-------------|-----------------------|---------------------|----------|----------------------|----------------------|
| | | (L/min) | (m ³) | (mm Hg) | (°C) | (g) | (g) | (µg) | (µg/m ³) | (µg/m ³) |
| 2023-01-08 | 24 hours | 18.65 | 26.85 | 752 | -9.2 | 14.8261 | 14.8401 | 14000 | 21.7256 | 120 |
| 2023-01-14 | 24 hours | 18 | 25.05 | 745 | -2.3 | 14.8136 | 14.8289 | 15300 | 25.4491 | 120 |
| 2023-01-20 | 24 hours | 18.1 | 26.05 | 743 | -4.2 | 14.8156 | 14.8251 | 9500 | 15.1951 | 120 |
| 2023-01-26 | 25 hours | 17.76 | 25.57 | 740 | -0.2 | 14.8216 | 14.8254 | 3800 | 6.1922 | 120 |
| 2023-02-01 | 26 hours | 17.93 | 25.83 | 742 | -17 | 14.8256 | 14.8318 | 6200 | 10.0013 | 120 |
| 2023-02-07 | 27 hours | 18.05 | 26.86 | 756 | -7.5 | 14.8227 | 14.8464 | 23700 | 36.7647 | 120 |
| 2023-02-13 | 28 hours | 18.2 | 26.05 | 744 | -5.3 | 14.8097 | 14.8137 | 4000 | 6.3980 | 120 |
| 2023-02-19 | 29 hours | 18.43 | 26.53 | 757 | -4 | 14.8066 | 14.8448 | 38200 | 59.9950 | 120 |
| 2022-02-25 | 30 hours | 19.29 | 27.77 | 757 | -15.8 | 14.8061 | 14.8096 | 3500 | 5.2515 | 120 |
| 2022-03-03 | 31 hours | 18.29 | 26.33 | 745 | -5.8 | 14.8121 | 14.8128 | 700 | 1.1077 | 120 |
| 2022-03-09 | 32 hours | 18.15 | 26.13 | 750 | -2.4 | 14.8113 | 14.8218 | 10500 | 16.7432 | 120 |
| 2022-03-15 | 33 hours | 17.75 | 25.56 | 736 | -1.1 | 14.8158 | 14.8232 | 7400 | 12.0631 | 120 |
| 2022-03-21 | 34 hours | 18.14 | 26.12 | 755 | -0.1 | 14.8191 | 14.821 | 1900 | 3.0309 | 120 |
| 2023-03-27 | 35 hours | 17.97 | 25.87 | 750 | 0 | 14.8189 | 14.8275 | 8600 | 13.8513 | 120 |

Notes

24 hour sample collected by BGI PQ-100 air sampler every sixth day for the duration of the quarry operation each year.

- a) Values were not recorded; temperature and pressure calculated based on Environment Canada data recorded at the Saint John airport weather station. Flow rate and Air Volume were approximated based on a previous day's recording with similar temperature and pressure.
- b) Battery was low in machine, full run was not completed.
- c) Run was not completed. Battery was replaced.
- d) 24 hour air sample recorded at 2349 Route 820, Upham, NB.
- e) Result was above the maximum allowable limit due to operator error. The sample was recollected on December 17, 2021.

Report ID: 476764-IAS
 Report Date: 24-Mar-23
 Date Received: 16-Mar-23

CERTIFICATE OF ANALYSIS

for
 Hammond River Holdings Limited
 30 Jarvis Lane
 Saint John, NB E2J 0A9



921 College Hill Rd
 Fredericton NB
 Canada E3B 6Z9
 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Daniel Guest
Project #: 21-3049-1002
 Location: Upham

Analysis of Water

| RPC Sample ID: | | | 476764-1 | 476764-2 | 476764-3 |
|-------------------------------------|-------|-------|-----------|-----------|-----------|
| Client Sample ID: | | | MW19-01S | MW19-01D | MW20-02S |
| Date Sampled: | | | 13-Mar-23 | 13-Mar-23 | 13-Mar-23 |
| Analytes | Units | RL | | | |
| Sodium | mg/L | 0.05 | 11.4 | 14.7 | 13.0 |
| Potassium | mg/L | 0.02 | 1.22 | 1.65 | 1.94 |
| Calcium | mg/L | 0.05 | 57.5 | 70.7 | 508. |
| Magnesium | mg/L | 0.01 | 16.7 | 2.85 | 11.2 |
| Iron | mg/L | 0.02 | < 0.02 | < 0.02 | 6.08 |
| Manganese | mg/L | 0.001 | 0.007 | 0.095 | 0.747 |
| Copper | mg/L | 0.001 | 0.002 | < 0.001 | < 0.002 |
| Zinc | mg/L | 0.001 | 0.016 | 0.001 | < 0.002 |
| Ammonia (as N) | mg/L | 0.05 | < 0.05 | 0.19 | < 0.05 |
| pH | units | - | 6.6 | 8.0 | 6.6 |
| Alkalinity (as CaCO ₃) | mg/L | 2 | 48 | 136 | 26 |
| Chloride | mg/L | 0.5 | 110 | 47.1 | 7.8 |
| Sulfate | mg/L | 1 | 43 | 37 | 1380 |
| Nitrate + Nitrite (as N) | mg/L | 0.05 | 0.93 | < 0.05 | < 0.25 |
| o-Phosphate (as P) | mg/L | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| r-Silica (as SiO ₂) | mg/L | 0.1 | 13.0 | 15.0 | 1.2 |
| Carbon - Total Organic | mg/L | 0.5 | < 0.5 | < 0.5 | 0.7 |
| Turbidity | NTU | 0.1 | 1.2 | 0.5 | 139 |
| Conductivity | µS/cm | 1 | 537 | 469 | 2150 |
| Calculated Parameters | | | | | |
| Bicarbonate (as CaCO ₃) | mg/L | - | 48.0 | 135. | 26.0 |
| Carbonate (as CaCO ₃) | mg/L | - | 0.018 | 1.27 | 0.010 |
| Hydroxide (as CaCO ₃) | mg/L | - | 0.002 | 0.050 | 0.002 |
| Cation Sum | meq/L | - | 4.77 | 4.46 | 27.2 |
| Anion Sum | meq/L | - | 5.02 | 4.82 | 29.5 |
| Percent Difference | % | - | -2.57 | -3.84 | -3.93 |
| Theoretical Conductivity | µS/cm | - | 525 | 457 | 2630 |
| Hardness (as CaCO ₃) | mg/L | 0.2 | 212 | 188 | 1310 |
| Ion Sum | mg/L | - | 286 | 272 | 1940 |
| Saturation pH (5°C) | units | - | 8.2 | 7.7 | 7.7 |
| Langelier Index (5°C) | - | - | -1.61 | 0.34 | -1.13 |

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

Matthew Norman
 Interim Director
 Inorganic Analytical Chemistry

Brannen Burhoe
 Supervisor
 Inorganic Analytical Services

Report ID: 476764-IAS
 Report Date: 24-Mar-23
 Date Received: 16-Mar-23

CERTIFICATE OF ANALYSIS

for
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 Saint John, NB E2J 0A9



921 College Hill Rd
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 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Daniel Guest
Project #: 21-3049-1002
 Location: Upham

Analysis of Water

| RPC Sample ID: | | | 476764-4 | 476764-5 | 476764-6 |
|-------------------------------------|-------|-------|-----------|-----------|-----------|
| Client Sample ID: | | | MW20-02D | MW20-03S | MW20-03D |
| Date Sampled: | | | 13-Mar-23 | 13-Mar-23 | 13-Mar-23 |
| Analytes | Units | RL | | | |
| Sodium | mg/L | 0.05 | 94.4 | 5.08 | 10.6 |
| Potassium | mg/L | 0.02 | 4.7 | 0.95 | 0.91 |
| Calcium | mg/L | 0.05 | 618. | 39.6 | 4.23 |
| Magnesium | mg/L | 0.01 | 28.0 | 3.72 | 1.05 |
| Iron | mg/L | 0.02 | < 0.1 | < 0.02 | < 0.02 |
| Manganese | mg/L | 0.001 | 0.357 | < 0.001 | < 0.001 |
| Copper | mg/L | 0.001 | < 0.005 | < 0.001 | < 0.001 |
| Zinc | mg/L | 0.001 | < 0.005 | 0.001 | < 0.001 |
| Ammonia (as N) | mg/L | 0.05 | 0.28 | < 0.05 | 0.07 |
| pH | units | - | 8.5 | 8.1 | 9.2 |
| Alkalinity (as CaCO ₃) | mg/L | 2 | 58 | 110 | 25 |
| Chloride | mg/L | 0.5 | 144 | 8.4 | 11.6 |
| Sulfate | mg/L | 1 | 1620 | 4 | 2 |
| Nitrate + Nitrite (as N) | mg/L | 0.05 | < 0.25 | 1.15 | < 0.05 |
| o-Phosphate (as P) | mg/L | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| r-Silica (as SiO ₂) | mg/L | 0.1 | 0.8 | 9.8 | < 0.1 |
| Carbon - Total Organic | mg/L | 0.5 | 1.7 | < 0.5 | < 0.5 |
| Turbidity | NTU | 0.1 | 47.8 | 0.2 | 29.2 |
| Conductivity | µS/cm | 1 | 2890 | 259 | 88 |
| Calculated Parameters | | | | | |
| Bicarbonate (as CaCO ₃) | mg/L | - | 56.2 | 109. | 21.1 |
| Carbonate (as CaCO ₃) | mg/L | - | 1.67 | 1.29 | 3.14 |
| Hydroxide (as CaCO ₃) | mg/L | - | 0.158 | 0.063 | 0.792 |
| Cation Sum | meq/L | - | 37.4 | 2.53 | 0.787 |
| Anion Sum | meq/L | - | 38.9 | 2.60 | 0.868 |
| Percent Difference | % | - | -2.03 | -1.40 | -4.89 |
| Theoretical Conductivity | µS/cm | - | 3380 | 242 | 88 |
| Hardness (as CaCO ₃) | mg/L | 0.2 | 1660 | 114 | 14.9 |
| Ion Sum | mg/L | - | 2540 | 144 | 46 |
| Saturation pH (5°C) | units | - | 7.3 | 8.0 | 9.6 |
| Langelier Index (5°C) | - | - | 1.16 | 0.13 | -0.39 |

Report ID: 476764-IAS
 Report Date: 24-Mar-23
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CERTIFICATE OF ANALYSIS

for
 Hammond River Holdings Limited
 30 Jervis Lane
 Saint John, NB E2J 0A9



921 College Hill Rd
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 Canada E3B 6Z9
 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Daniel Guest

Project #: 21-3049-1002

Location: Upham

Analysis of Water

| RPC Sample ID: | | 476764-7 | 476764-8 | 476764-9 | |
|-------------------------------------|-------|-----------|-----------|-----------|---------|
| Client Sample ID: | | MW20-04S | MW20-04D | MW18-07D | |
| Date Sampled: | | 14-Mar-23 | 14-Mar-23 | 13-Mar-23 | |
| Analytes | Units | RL | | | |
| Sodium | mg/L | 0.05 | 5.81 | 4.66 | 14.6 |
| Potassium | mg/L | 0.02 | 1.21 | 1.20 | 1.62 |
| Calcium | mg/L | 0.05 | 41.3 | 41.0 | 77.2 |
| Magnesium | mg/L | 0.01 | 1.42 | 1.45 | 2.84 |
| Iron | mg/L | 0.02 | < 0.02 | < 0.02 | < 0.02 |
| Manganese | mg/L | 0.001 | 0.009 | 0.006 | 0.096 |
| Copper | mg/L | 0.001 | < 0.001 | 0.002 | < 0.001 |
| Zinc | mg/L | 0.001 | 0.002 | 0.003 | 0.001 |
| Ammonia (as N) | mg/L | 0.05 | < 0.05 | < 0.05 | 0.19 |
| pH | units | - | 8.1 | 8.1 | 8.0 |
| Alkalinity (as CaCO ₃) | mg/L | 2 | 100 | 110 | 140 |
| Chloride | mg/L | 0.5 | 3.0 | 2.9 | 48.7 |
| Sulfate | mg/L | 1 | 12 | 12 | 41 |
| Nitrate + Nitrite (as N) | mg/L | 0.05 | < 0.05 | 0.63 | < 0.05 |
| o-Phosphate (as P) | mg/L | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| r-Silica (as SiO ₂) | mg/L | 0.1 | 15.0 | 13.9 | 15.3 |
| Carbon - Total Organic | mg/L | 0.5 | < 0.5 | < 0.5 | < 0.5 |
| Turbidity | NTU | 0.1 | 1.4 | 2.4 | 0.4 |
| Conductivity | µS/cm | 1 | 239 | 235 | 469 |
| Calculated Parameters | | | | | |
| Bicarbonate (as CaCO ₃) | mg/L | - | 98.8 | 109. | 139. |
| Carbonate (as CaCO ₃) | mg/L | - | 1.17 | 1.29 | 1.30 |
| Hydroxide (as CaCO ₃) | mg/L | - | 0.063 | 0.063 | 0.050 |
| Cation Sum | meq/L | - | 2.46 | 2.40 | 4.78 |
| Anion Sum | meq/L | - | 2.33 | 2.57 | 5.02 |
| Percent Difference | % | - | 2.69 | -3.54 | -2.50 |
| Theoretical Conductivity | µS/cm | - | 229 | 236 | 482 |
| Hardness (as CaCO ₃) | mg/L | 0.2 | 109 | 108 | 204 |
| Ion Sum | mg/L | - | 141 | 147 | 287 |
| Saturation pH (5°C) | units | - | 8.0 | 7.9 | 7.6 |
| Langelier Index (5°C) | - | - | 0.11 | 0.15 | 0.38 |

Report ID: 476764-IAS
Report Date: 24-Mar-23
Date Received: 16-Mar-23

CERTIFICATE OF ANALYSIS

for

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www.rpc.ca

Attention: Daniel Guest

Project #: 21-3049-1002

Location: Upham

Analysis of Water

| | | | | | |
|--------------------------|--------------|-----------|-----------|------|------|
| RPC Sample ID: | 476764-1 | 476764-2 | 476764-3 | | |
| Client Sample ID: | MW19-01S | MW19-01D | MW20-02S | | |
| Date Sampled: | 13-Mar-23 | 13-Mar-23 | 13-Mar-23 | | |
| Analytes | Units | RL | | | |
| Fluoride | mg/L | 0.05 | 0.21 | 0.25 | 0.92 |
| Solids - Total Suspended | mg/L | 5 | 14 | < 5 | 40 |

Report ID: 476764-IAS
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Attention: Daniel Guest

Project #: 21-3049-1002

Location: Upham

Analysis of Water

| | | | | | |
|--------------------------|--------------|-----------|-----------|-----------|-----------|
| RPC Sample ID: | | | 476764-4 | 476764-5 | 476764-6 |
| Client Sample ID: | | | MW20-02D | MW20-03S | MW20-03D |
| Date Sampled: | | | 13-Mar-23 | 13-Mar-23 | 13-Mar-23 |
| Analytes | Units | RL | | | |
| Fluoride | mg/L | 0.05 | 3.6 | 0.11 | 0.09 |
| Solids - Total Suspended | mg/L | 5 | 32 | < 5 | 52 |

Report ID: 476764-IAS
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Attention: Daniel Guest

Project #: 21-3049-1002

Location: Upham

Analysis of Water

| | | | | | |
|--------------------------|--------------|-----------|-----------|-----------|-----------|
| RPC Sample ID: | | | 476764-7 | 476764-8 | 476764-9 |
| Client Sample ID: | | | MW20-04S | MW20-04D | MW18-07D |
| Date Sampled: | | | 14-Mar-23 | 14-Mar-23 | 13-Mar-23 |
| Analytes | Units | RL | | | |
| Fluoride | mg/L | 0.05 | 0.36 | 0.39 | 0.22 |
| Solids - Total Suspended | mg/L | 5 | < 5 | 7 | < 5 |

Report ID: 476764-IAS
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Attention: Daniel Guest
Project #: 21-3049-1002
 Location: Upham

Analysis of Metals in Water

| | | | | |
|-------------------|--------------|-----------|-----------|-----------|
| RPC Sample ID: | | 476764-1 | 476764-2 | 476764-3 |
| Client Sample ID: | | MW19-01S | MW19-01D | MW20-02S |
| Date Sampled: | | 13-Mar-23 | 13-Mar-23 | 13-Mar-23 |
| Analytes | Units | RL | | |
| Aluminum | µg/L | 1 | 3 | 1 |
| Antimony | µg/L | 0.1 | < 0.1 | < 0.1 |
| Arsenic | µg/L | 1 | < 1 | < 1 |
| Barium | µg/L | 1 | 182 | 147 |
| Beryllium | µg/L | 0.1 | < 0.1 | < 0.1 |
| Bismuth | µg/L | 1 | < 1 | < 1 |
| Boron | µg/L | 1 | 21 | 477 |
| Cadmium | µg/L | 0.01 | 0.11 | < 0.01 |
| Calcium | µg/L | 50 | 57500 | 70700 |
| Chromium | µg/L | 1 | < 1 | < 1 |
| Cobalt | µg/L | 0.1 | < 0.1 | < 0.1 |
| Copper | µg/L | 1 | 2 | < 1 |
| Iron | µg/L | 20 | < 20 | < 20 |
| Lead | µg/L | 0.1 | 0.2 | < 0.1 |
| Lithium | µg/L | 0.1 | 12.6 | 16.0 |
| Magnesium | µg/L | 10 | 16700 | 2850 |
| Manganese | µg/L | 1 | 7 | 95 |
| Mercury | µg/L | 0.025 | < 0.025 | < 0.025 |
| Molybdenum | µg/L | 0.1 | < 0.1 | < 0.1 |
| Nickel | µg/L | 1 | 2 | < 1 |
| Potassium | µg/L | 20 | 1220 | 1650 |
| Rubidium | µg/L | 0.1 | 1.4 | 2.7 |
| Selenium | µg/L | 1 | < 1 | < 1 |
| Silver | µg/L | 0.1 | < 0.1 | < 0.1 |
| Sodium | µg/L | 50 | 11400 | 14700 |
| Strontium | µg/L | 1 | 210 | 1400 |
| Tellurium | µg/L | 0.1 | < 0.1 | < 0.1 |
| Thallium | µg/L | 0.1 | < 0.1 | < 0.1 |
| Tin | µg/L | 0.1 | < 0.1 | < 0.1 |
| Uranium | µg/L | 0.1 | < 0.1 | < 0.1 |
| Vanadium | µg/L | 1 | < 1 | < 1 |
| Zinc | µg/L | 1 | 16 | 1 |

Report ID: 476764-IAS
 Report Date: 24-Mar-23
 Date Received: 16-Mar-23

CERTIFICATE OF ANALYSIS

for
 Hammond River Holdings Limited
 30 Jarvis Lane
 Saint John, NB E2J 0A9



921 College Hill Rd
 Fredericton NB
 Canada E3B 6Z9
 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Daniel Guest

Project #: 21-3049-1002

Location: Upham

Analysis of Metals in Water

| RPC Sample ID: | | 476764-4 | 476764-5 | 476764-6 |
|-------------------|-------|-----------|-----------|-----------|
| Client Sample ID: | | MW20-02D | MW20-03S | MW20-03D |
| Date Sampled: | | 13-Mar-23 | 13-Mar-23 | 13-Mar-23 |
| Analytes | Units | RL | | |
| Aluminum | µg/L | 1 | < 5 | < 1 |
| Antimony | µg/L | 0.1 | < 0.5 | < 0.1 |
| Arsenic | µg/L | 1 | < 5 | 1 |
| Barium | µg/L | 1 | < 5 | 182 |
| Beryllium | µg/L | 0.1 | < 0.5 | < 0.1 |
| Bismuth | µg/L | 1 | < 5 | < 1 |
| Boron | µg/L | 1 | 45600 | 30 |
| Cadmium | µg/L | 0.01 | < 0.05 | < 0.01 |
| Calcium | µg/L | 50 | 618000 | 39600 |
| Chromium | µg/L | 1 | < 5 | < 1 |
| Cobalt | µg/L | 0.1 | < 0.5 | < 0.1 |
| Copper | µg/L | 1 | < 5 | < 1 |
| Iron | µg/L | 20 | < 100 | < 20 |
| Lead | µg/L | 0.1 | < 0.5 | < 0.1 |
| Lithium | µg/L | 0.1 | 158. | 6.0 |
| Magnesium | µg/L | 10 | 28000 | 3720 |
| Manganese | µg/L | 1 | 357 | < 1 |
| Mercury | µg/L | 0.025 | < 0.025 | < 0.025 |
| Molybdenum | µg/L | 0.1 | 5.1 | 0.3 |
| Nickel | µg/L | 1 | < 5 | < 1 |
| Potassium | µg/L | 20 | 4700 | 950 |
| Rubidium | µg/L | 0.1 | 5.3 | 0.4 |
| Selenium | µg/L | 1 | < 5 | < 1 |
| Silver | µg/L | 0.1 | < 0.5 | < 0.1 |
| Sodium | µg/L | 50 | 94400 | 5080 |
| Strontium | µg/L | 1 | 11100 | 298 |
| Tellurium | µg/L | 0.1 | < 0.5 | < 0.1 |
| Thallium | µg/L | 0.1 | < 0.5 | < 0.1 |
| Tin | µg/L | 0.1 | < 0.5 | < 0.1 |
| Uranium | µg/L | 0.1 | < 0.5 | 0.8 |
| Vanadium | µg/L | 1 | < 5 | 1 |
| Zinc | µg/L | 1 | < 5 | 1 |

Report ID: 476764-IAS
 Report Date: 24-Mar-23
 Date Received: 16-Mar-23

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 Saint John, NB E2J 0A9



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 Fax: 506.452.0594
 www.rpc.ca

Attention: Daniel Guest

Project #: 21-3049-1002

Location: Upham

Analysis of Metals in Water

| RPC Sample ID: | | 476764-7 | 476764-8 | 476764-9 |
|-------------------|-------|-----------|-----------|-----------|
| Client Sample ID: | | MW20-04S | MW20-04D | MW18-07D |
| Date Sampled: | | 14-Mar-23 | 14-Mar-23 | 13-Mar-23 |
| Analytes | Units | RL | | |
| Aluminum | µg/L | 1 | 2 | 2 |
| Antimony | µg/L | 0.1 | < 0.1 | 0.3 |
| Arsenic | µg/L | 1 | 17 | 20 |
| Barium | µg/L | 1 | 115 | 125 |
| Beryllium | µg/L | 0.1 | < 0.1 | < 0.1 |
| Bismuth | µg/L | 1 | < 1 | < 1 |
| Boron | µg/L | 1 | 122 | 91 |
| Cadmium | µg/L | 0.01 | < 0.01 | < 0.01 |
| Calcium | µg/L | 50 | 41300 | 41000 |
| Chromium | µg/L | 1 | < 1 | < 1 |
| Cobalt | µg/L | 0.1 | < 0.1 | < 0.1 |
| Copper | µg/L | 1 | < 1 | 2 |
| Iron | µg/L | 20 | < 20 | < 20 |
| Lead | µg/L | 0.1 | < 0.1 | < 0.1 |
| Lithium | µg/L | 0.1 | 8.3 | 7.8 |
| Magnesium | µg/L | 10 | 1420 | 1450 |
| Manganese | µg/L | 1 | 9 | 6 |
| Mercury | µg/L | 0.025 | < 0.025 | < 0.025 |
| Molybdenum | µg/L | 0.1 | 2.0 | 2.7 |
| Nickel | µg/L | 1 | < 1 | < 1 |
| Potassium | µg/L | 20 | 1210 | 1200 |
| Rubidium | µg/L | 0.1 | 1.1 | 1.0 |
| Selenium | µg/L | 1 | < 1 | < 1 |
| Silver | µg/L | 0.1 | < 0.1 | < 0.1 |
| Sodium | µg/L | 50 | 5810 | 4660 |
| Strontium | µg/L | 1 | 424 | 502 |
| Tellurium | µg/L | 0.1 | < 0.1 | < 0.1 |
| Thallium | µg/L | 0.1 | < 0.1 | < 0.1 |
| Tin | µg/L | 0.1 | < 0.1 | < 0.1 |
| Uranium | µg/L | 0.1 | 3.7 | 4.3 |
| Vanadium | µg/L | 1 | 1 | 2 |
| Zinc | µg/L | 1 | 2 | 3 |

Report ID: 476764-IAS
Report Date: 24-Mar-23
Date Received: 16-Mar-23

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Saint John, NB E2J 0A9



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Fax: 506.452.0594
www.rpc.ca

Methods

| <u>Analyte</u> | <u>RPC SOP #</u> | <u>Method Reference</u> | <u>Method Principle</u> |
|------------------------------------|------------------|-----------------------------|--|
| Ammonia | IAS-M47 | APHA 4500-NH ₃ G | Phenate Colourimetry |
| pH | IAS-M03 | APHA 4500-H ⁺ B | pH Electrode - Electrometric |
| Alkalinity (as CaCO ₃) | IAS-M43 | EPA 310.2 | Methyl Orange Colourimetry |
| Chloride | IAS-M44 | APHA 4500-CL E | Ferricyanide Colourimetry |
| Fluoride | IAS-M30 | APHA 4500-F- D | SPADNS Colourimetry |
| Sulfate | IAS-M45 | APHA 4500-SO ₄ E | Turbidimetry |
| Nitrate + Nitrite (as N) | IAS-M48 | APHA 4500-NO ₃ H | Hydrazine Red., Derivatization, Colourimetry |
| o-Phosphate (as P) | IAS-M50 | APHA 4500-P F | Molybdate/Ascorbic Acid Colourimetry |
| r-Silica (as SiO ₂) | IAS-M46 | APHA 4500-SI F | Heteropoly Blue Colourimetry |
| Carbon - Total Organic | IAS-M57 | APHA 5310 B | Combustion/NDIR |
| Turbidity | IAS-M06 | APHA 2130 B | Nephelometry |
| Conductivity | IAS-M04 | APHA 2510 B | Conductivity Meter - Electrode |
| Solids - Total Suspended | IAS-M05 | APHA 2540 D | Filtration, Gravimetry |
| Trace Metals | IAS-M01/IAS-M29 | EPA 200.8/EPA 200.7 | ICP-MS/ICP-ES |
| Mercury | IAS-M52 | EPA 245.1 | Cold Vapor AAS |

Report ID: 476768-IAS
Report Date: 24-Mar-23
Date Received: 16-Mar-23

CERTIFICATE OF ANALYSIS

for
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30 Jervis Lane
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Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Water

| | | | | | |
|------------------------------------|--------------|-----------|-----------|-----------|-------|
| RPC Sample ID: | | 476768-1 | 476768-2 | 476768-3 | |
| Client Sample ID: | | SW9 | PDP-1 | H1 | |
| Date Sampled: | | 14-Mar-23 | 14-Mar-23 | 14-Mar-23 | |
| Analytes | Units | RL | | | |
| Alkalinity (as CaCO ₃) | mg/L | 2 | 27 | 27 | 24 |
| Chloride | mg/L | 0.5 | 32.3 | 32.1 | 9.0 |
| Sulfate | mg/L | 1 | 230 | 230 | 22 |
| Phosphorus - Total | mg/L | 0.002 | 0.012 | 0.013 | 0.007 |
| Solids - Total Dissolved | mg/L | 5 | 408 | 404 | 78 |
| Solids - Total Suspended | mg/L | 5 | < 5 | < 5 | < 5 |
| Hardness (as CaCO ₃) | mg/L | 0.2 | 257. | 264. | 45.3 |

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit



Matthew Norman
Interim Director
Inorganic Analytical Chemistry



Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 476768-IAS
Report Date: 24-Mar-23
Date Received: 16-Mar-23

CERTIFICATE OF ANALYSIS

for
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30 Jervis Lane
Saint John, NB E2J 0A9



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Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Metals in Water

| | | | | | |
|-------------------|--------------|-----------|-----------|-----------|-----------|
| RPC Sample ID: | | | 476768-1 | 476768-2 | 476768-3 |
| Client Sample ID: | | | SW9 | PDP-1 | H1 |
| Date Sampled: | | | 14-Mar-23 | 14-Mar-23 | 14-Mar-23 |
| Analytes | Units | RL | | | |
| Calcium | mg/L | 0.05 | 99.6 | 102. | 16.7 |
| Magnesium | mg/L | 0.01 | 2.13 | 2.19 | 0.88 |
| Potassium | mg/L | 0.02 | 0.64 | 0.66 | 0.44 |
| Sodium | mg/L | 0.05 | 14.7 | 14.8 | 5.12 |

Report ID: 476768-IAS
Report Date: 24-Mar-23
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Methods

| <u>Analyte</u> | <u>RPC SOP #</u> | <u>Method Reference</u> | <u>Method Principle</u> |
|------------------------------------|------------------|-----------------------------|--------------------------------|
| Alkalinity (as CaCO ₃) | IAS-M43 | EPA 310.2 | Methyl Orange Colourimetry |
| Chloride | IAS-M44 | APHA 4500-CL E | Ferricyanide Colourimetry |
| Sulfate | IAS-M45 | APHA 4500-SO ₄ E | Turbidimetry |
| Phosphorus - Total | IAS-M17 | APHA 4500-P E | Digestion, Manual Colourimetry |
| Solids - Total Suspended | IAS-M05 | APHA 2540 D | Filtration, Gravimetry |
| Solids - Total Dissolved | - | APHA 2540 G | Evaporation, Gravimetry |
| Trace Metals | IAS-M01/IAS-M29 | EPA 200.8/EPA 200.7 | ICP-MS/ICP-ES |

Report ID: 477141-IAS
Report Date: 24-Mar-23
Date Received: 21-Mar-23

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
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Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Water

| | | | |
|--------------------------|--------------|-----------|-----------|
| RPC Sample ID: | 477141-1 | 477141-2 | 477141-3 |
| Client Sample ID: | SW3 | SW5 | PDP-1 |
| Date Sampled: | 17-Mar-23 | 17-Mar-23 | 17-Mar-23 |
| Analytes | Units | RL | |
| Solids - Total Suspended | mg/L | 5 | < 5 |

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit



Matthew Norman
Interim Director
Inorganic Analytical Chemistry



Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 477141-IAS
Report Date: 24-Mar-23
Date Received: 21-Mar-23

CERTIFICATE OF ANALYSIS

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Methods

| <u>Analyte</u> | <u>RPC SOP #</u> | <u>Method Reference</u> | <u>Method Principle</u> |
|--------------------------|------------------|-------------------------|-------------------------|
| Solids - Total Suspended | IAS-M05 | APHA 2540 D | Filtration, Gravimetry |

Report ID: 477837-IAS
Report Date: 03-Apr-23
Date Received: 28-Mar-23

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
Saint John, NB E2J 0A9



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Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Water

| | | | | |
|--------------------------|--------------|-----------|-----------|-----------------|
| RPC Sample ID: | 477837-1 | 477837-2 | 477837-3 | 477837-4 |
| Client Sample ID: | SW3 | SW5 | PDP-1 | PDP-1 Duplicate |
| Date Sampled: | 24-Mar-23 | 24-Mar-23 | 24-Mar-23 | 24-Mar-23 |
| Analytes | Units | RL | | |
| Solids - Total Suspended | mg/L | 5 | < 5 | < 5 |

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit

Matthew Norman
Interim Director
Inorganic Analytical Chemistry

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 477837-IAS
Report Date: 03-Apr-23
Date Received: 28-Mar-23

CERTIFICATE OF ANALYSIS

for
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30 Jervis Lane
Saint John, NB E2J 0A9



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Methods

| <u>Analyte</u> | <u>RPC SOP #</u> | <u>Method Reference</u> | <u>Method Principle</u> |
|--------------------------|------------------|-------------------------|-------------------------|
| Solids - Total Suspended | IAS-M05 | APHA 2540 D | Filtration, Gravimetry |

Report ID: 478253-IAS
Report Date: 05-Apr-23
Date Received: 31-Mar-23

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
Saint John, NB E2J 0A9

rpc

921 College Hill Rd
Fredericton NB
Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Water

| | | | |
|--------------------------|--------------|-----------|-----------|
| RPC Sample ID: | 478253-1 | 478253-2 | 478253-3 |
| Client Sample ID: | SW3 | SW5 | PDP-1 |
| Date Sampled: | 30-Mar-23 | 30-Mar-23 | 30-Mar-23 |
| Analytes | Units | RL | |
| Solids - Total Suspended | mg/L | 5 | < 5 |

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit



Matthew Norman
Interim Director
Inorganic Analytical Chemistry



Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 478253-IAS
Report Date: 05-Apr-23
Date Received: 31-Mar-23

CERTIFICATE OF ANALYSIS

for
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30 Jervis Lane
Saint John, NB E2J 0A9



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Methods

| <u>Analyte</u> | <u>RPC SOP #</u> | <u>Method Reference</u> | <u>Method Principle</u> |
|--------------------------|------------------|-------------------------|-------------------------|
| Solids - Total Suspended | IAS-M05 | APHA 2540 D | Filtration, Gravimetry |



March 7, 2023

Project No.: 234601.00

Mr. Daniel Guest

Hammond River Holdings

Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2023-06 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated by Gulf Operators Ltd. at 14:00 on March 6, 2023. For the monitoring we positioned eleven (11) digital seismographs in the area.

The location of each monitoring point is noted in the following table.

Blast No. 2023-06 – March 6, 2023

| Seismograph Location | Time | Approx. dist. from shot to seismograph (m) | Maximum Velocity (mm/s) | Sound Pressure (dB(L)) | Remarks |
|--|-------|--|-------------------------|------------------------|--------------------------|
| 1. Civic No. 4079 Route 111 (PW-09) | 14:00 | 1,390 m S | < 0.5 mm/s | <120 | Units were not triggered |
| 2. Civic No. 4126 Route 111 (PW-10) | | 959 m S | < 0.5 mm/s | <120 | |
| 3. Civic No. 4150 Route 111 (PW-13) | | 792 m SE | < 0.5 mm/s | <120 | |
| 4. Civic No. 2447 Route 820 (PW-07) | | 856 m NE | < 0.5 mm/s | <120 | |
| 5. PW-03 - Cottage Route 820 | | 555 m N | < 0.5 mm/s | <120 | |
| 6. Civic No. 2341 Route 820 (PW-05) | | 618 m N | < 0.5 mm/s | <120 | |
| 7. Civic No. 50 Myron Road (PW-15) | | 893 m NW | < 0.5 mm/s | <120 | |
| 8. Civic No. 86 Myron Road (PW-16) | | 858 m W | 0.78 mm/s @ 18 Hz | 104 | - |
| 9. Civic No. 220 Myron Road (PW-01) | | 1,430 m SW | < 0.5 mm/s | <120 | Units were not triggered |
| 10. Civic No. 2337 Route 820 (PW-04) | | 699 m NW | < 0.5 mm/s | <120 | |
| 11. Civic No. 4140 Route 111 (PW-12) | | 882 m SE | < 0.5 mm/s | <120 | |
| maximum limits as per Approval to Operate | | | 12.5 mm/s | 128 dB | |

Mr. Daniel Guest – Hammond River Holdings

March 7, 2023

Project No.: 234601.00 – Blast No.: 2023-06

The monitors did not detect any vibrations that exceeded the maximum allowable peak particle velocity of 12.5 mm/s (1.25 cm/s) or the maximum air overpressure of 128 dB(L) as established in the Approval to Operate (I-10936).

We trust this information is sufficient at this time. If you have any questions, please do not hesitate to contact us.

Best regards,
CBCL Limited

A handwritten signature in blue ink, appearing to read "Robert Y. Cyr", with a stylized flourish at the end.

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Technical Specialist

Attachments: Blast Record
Blast and Seismograph Location Plan
Blast Event Report

Project No: 234601.00

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

Attachment A

Blast Record

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

IDENTIFICATION:

| | | | |
|-------------------------------------|--|------------------------------|-------------------------|
| Blasting Contractor: | <u>Gulf Operators Ltd.</u> | | |
| Blaster's Certification No.: | <u>1318</u> | Blaster's Name: | <u>Daniel Blanchard</u> |
| Blast Location: | <u>N 45°28'55.32" W 65°37'58.75" (see attached sketch)</u> | | |
| Type of Rock: | <u>Anhydrate/Gypsum</u> | Est. Vol. or Tonnage: | <u>6,383 tonnes</u> |
| Weather at time of Blast: | <u>Snow</u> | Air Temp.: | <u>0°C</u> |
| Est. Wind Speed : | <u>≈20 km/h</u> | Wind Direction: | <u>SE</u> |
| Cloud Cover: | <u>Yes</u> | Precipitation: | <u>Yes - snow</u> |

BLAST DESIGN:

| | | | |
|---|---------------------------------|----------------------------|----------------------|
| Total No. Holes: | <u>53</u> | Hole Diameter: | <u>4.5"</u> |
| Average Depth: | <u>6.1 m – 7.3 m</u> | Spacing: | <u>10 ft x 10 ft</u> |
| No. Holes per Delay: | <u>3</u> | Collar Length: | <u>7 ft</u> |
| Delay between Holes: | <u>25 ms</u> | Delay between Rows: | <u>84 ms</u> |
| Initiation Method: | <u>Non-Electric</u> | | |
| Weight of Explosives per Delay: | <u>Max.: 118 kg</u> | | |
| Type and weight of Explosives for Blast: | <u>2,465 kg – Titan XL-1000</u> | | |

Sketch of shot location, hole layout, timing sequence, free face etc. if available.



BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

BLAST MONITORING

| | |
|--|----------------|
| Distance to the Nearest Structure: | <u>555 m</u> |
| Direction to the Nearest Structure: | <u>North</u> |
| Structure Type: | <u>Cottage</u> |
| Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay): | <u>51.1</u> |

SAFETY:

| | |
|---|--------------|
| Type of Warning Signal Used: | <u>Siren</u> |
| Blasting Mats Used (yes or no): | <u>No</u> |
| Airblast Measurement (yes or no): | <u>Yes</u> |
| Vibration Measurement (yes or no): | <u>Yes</u> |
| Warning Signs Posted (yes or no): | <u>Yes</u> |
| Accesses Guarded (yes or no): | <u>Yes</u> |
| Flyrock Damage (yes or no): | <u>No</u> |
| If Yes, Describe: | <u></u> |
| <hr/> | |
| Misfire (yes or no): | <u>No</u> |

Reviewed By: Robert Y. Cyr, M.A.Sc., P.Eng.

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #1

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #20204</u> |
| Calibration Date: | <u>May 31, 2022</u> |
| Location of seismograph: | <u>Civic Number 4079 Route 111 (PW-09)</u> |
| Distance and Direction from Blast: | <u>1,390 m South</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #2

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #21349</u> |
| Calibration Date: | <u>July 20, 2022</u> |
| Location of seismograph: | <u>Civic Number 4126 Route 111 (PW-10)</u> |
| Distance and Direction from Blast: | <u>959 m South</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #3

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #21348</u> |
| Calibration Date: | <u>July 23, 2022</u> |
| Location of seismograph: | <u>Civic Number 4150 Route 111 (PW-13)</u> |
| Distance and Direction from Blast: | <u>792 m Southeast</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #4

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Minimate, Serial #5489</u> |
| Calibration Date: | <u>April 25, 2022</u> |
| Location of seismograph: | <u>Civic Number 2447 Route 820 (PW-07)</u> |
| Distance and Direction from Blast: | <u>856 m Northeast</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #5

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Mini Mate, Serial #5673</u> |
| Calibration Date: | <u>April 8, 2022</u> |
| Location of seismograph: | <u>Cottage - PW-03 - Route 820</u> |
| Distance and Direction from Blast: | <u>555 m North</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #6

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Mini Mate, Serial #5632</u> |
| Calibration Date: | <u>November 16, 2022</u> |
| Location of seismograph: | <u>Civic Number 2341 Route 820 (PW-05)</u> |
| Distance and Direction from Blast: | <u>618 m North</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #7

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #20203</u> |
| Calibration Date: | <u>May 31, 2022</u> |
| Location of seismograph: | <u>Civic Number 50 Myron Road (PW-15)</u> |
| Distance and Direction from Blast: | <u>893 m Northwest</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #8

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #18187</u> |
| Calibration Date: | <u>May 5, 2022</u> |
| Location of seismograph: | <u>Civic Number 86 Myron Road (PW-16)</u> |
| Distance and Direction from Blast: | <u>858 m West</u> |
| Transverse Particle Velocity: | <u>0.54 mm/s @ 10 Hz</u> |
| Vertical Particle Velocity: | <u>0.57 mm/s @ 13 Hz</u> |
| Longitudinal Particle Velocity: | <u>0.78 mm/s @ 18 Hz</u> |
| Peak Particle Velocity: | <u>0.78 mm/s @ 18 Hz</u> |
| Maximum Airblast: | <u>104 dB(L)</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #9

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #20206</u> |
| Calibration Date: | <u>May 31, 2022</u> |
| Location of seismograph: | <u>Civic Number 220 Myron Road (PW-01)</u> |
| Distance and Direction from Blast: | <u>1,430 m Southwest</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #10

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #21348</u> |
| Calibration Date: | <u>July 23, 2022</u> |
| Location of seismograph: | <u>Civic Number 2337 Route 820 (PW-04)</u> |
| Distance and Direction from Blast: | <u>699 m Northwest</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |



BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 6, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Costa</u> | Blast No.: | <u>2023-06</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #11

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #18193</u> |
| Calibration Date: | <u>April 11, 2022</u> |
| Location of seismograph: | <u>Civic Number 4140 Route 111 (PW-12)</u> |
| Distance and Direction from Blast: | <u>882 m Southeast</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan

Blast No: 2023-06

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay



Date: March 6, 2023
Project No.: 234601.00



Attachment C

Blast Event Report

Date/Time Long at 14:00:02 March 6, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/factory.MMB

Serial Number UM18187 V 10-90GC Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration May 5, 2022 by InstanTel
File Name UM18187_20230306140002.IDFW

Notes
 Location:
 Client:
 User Name:
 General:

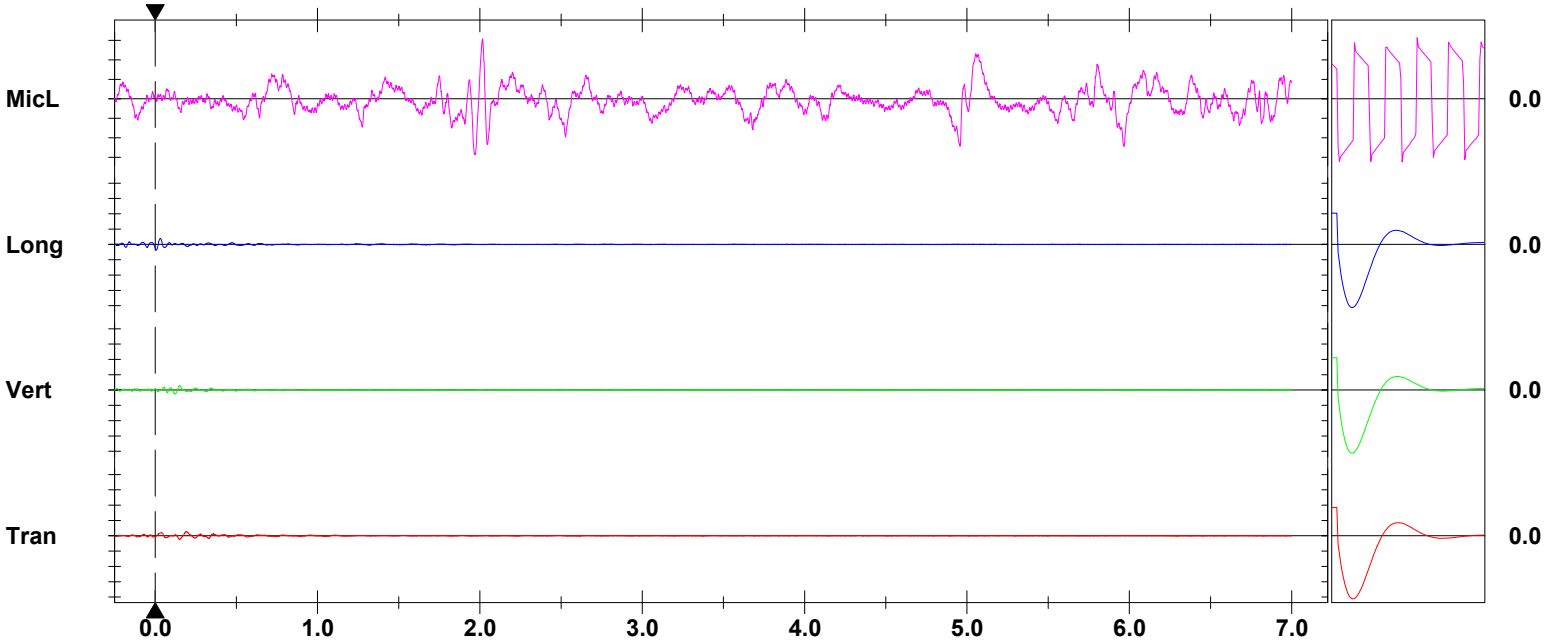
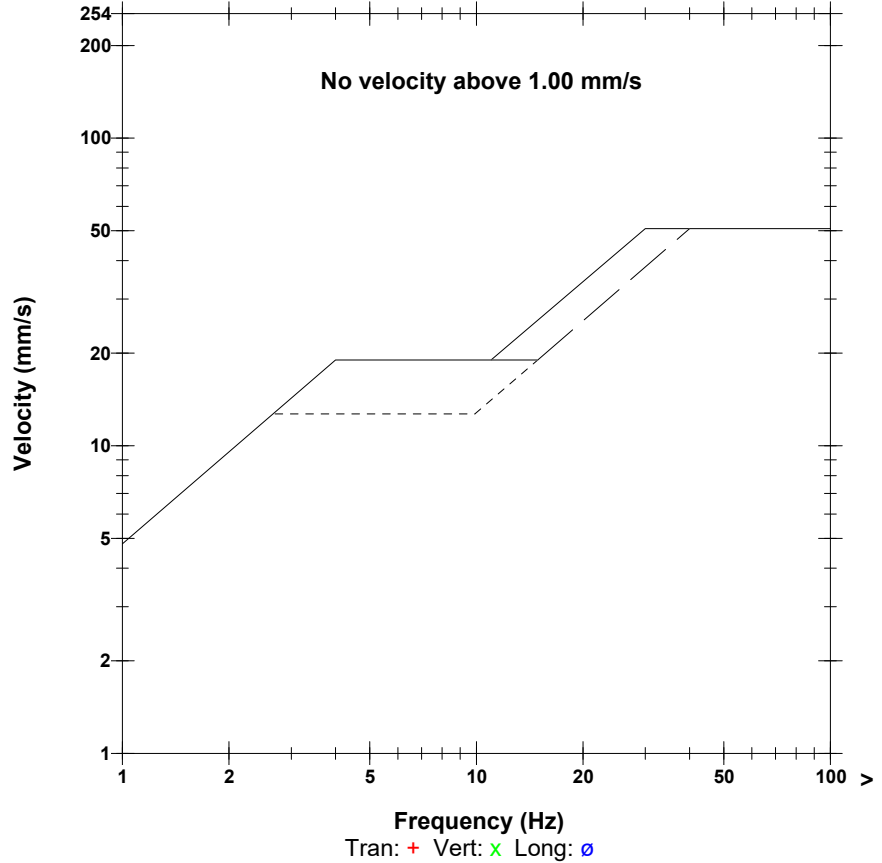
Post Event Notes
 Location: Civic Number 86 Myron Road (PW-16)
 Blast No.: 2023-06
 Project No: 234601.00

Microphone Linear Weighting
PSPL 103.7 dB(L) 3.072 pa.(L) at 2.017 sec
ZC Freq 13 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1709 mv)

| | Tran | Vert | Long | |
|---------------------|--------|--------|--------|------|
| PPV | 0.544 | 0.575 | 0.780 | mm/s |
| PPV | 45.71 | 46.20 | 48.85 | dB |
| ZC Freq | 9.8 | 13 | 18 | Hz |
| Time (Rel. to Trig) | 0.192 | 0.150 | 0.032 | sec |
| Peak Acceleration | 0.013 | 0.011 | 0.013 | g |
| Peak Displacement | 0.008 | 0.005 | 0.007 | mm |
| Sensor Check | Passed | Passed | Passed | |
| Frequency | 7.1 | 7.3 | 7.5 | Hz |
| Overswing Ratio | 4.8 | 4.7 | 4.5 | |

Peak Vector Sum 0.861 mm/s at 0.032 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

Sensor Check

March 20, 2023

Project No.: 234601.00

Mr. Daniel Guest

Hammond River Holdings

Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2023-07 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated by Gulf Operators Ltd. at 14:00 on March 17, 2023. For the monitoring we positioned eleven (11) digital seismographs in the area.

The location of each monitoring point is noted in the following table.

Blast No. 2023-07 – March 17, 2023

| Seismograph Location | Time | Approx. dist. from shot to seismograph (m) | Maximum Velocity (mm/s) | Sound Pressure (dB(L)) | Remarks |
|--|-------|--|-------------------------|------------------------|--------------------------|
| 1. Civic No. 4079 Route 111 (PW-09) | 14:00 | 1,300 m S | < 0.5 mm/s | <120 | Unit was not triggered |
| 2. Civic No. 4126 Route 111 (PW-10) | | 860 m S | 0.99 mm/s @ 51 Hz | 104 | - |
| 3. Civic No. 4150 Route 111 (PW-13) | | 690 m SE | 1.99 mm/s @ 57 Hz | 103 | - |
| 4. Civic No. 2447 Route 820 (PW-07) | | 888 m NE | < 0.5 mm/s | <120 | Units were not triggered |
| 5. PW-03 - Cottage Route 820 | | 685 m N | < 0.5 mm/s | <120 | |
| 6. Civic No. 2341 Route 820 (PW-05) | | 720 m N | < 0.5 mm/s | <120 | |
| 7. Civic No. 50 Myron Road (PW-15) | | 980 m NW | < 0.5 mm/s | <120 | |
| 8. Civic No. 86 Myron Road (PW-16) | | 900 m W | < 0.5 mm/s | <120 | |
| 9. Civic No. 220 Myron Road (PW-01) | | 1,350 m SW | < 0.5 mm/s | <120 | |
| 10. Civic No. 2337 Route 820 (PW-04) | | 830 m NW | < 0.5 mm/s | <120 | |
| 11. Civic No. 4140 Route 111 (PW-12) | | 770 m SE | 0.69 mm/s @ 51 Hz | 102 | |
| maximum limits as per Approval to Operate | | | 12.5 mm/s | 128 dB | |

Mr. Daniel Guest – Hammond River Holdings
March 20, 2023
Project No.: 234601.00 – Blast No.: 2023-07

The monitors did not detect any vibrations that exceeded the maximum allowable peak particle velocity of 12.5 mm/s (1.25 cm/s) or the maximum air overpressure of 128 dB(L) as established in the Approval to Operate (I-10936).

We trust this information is sufficient at this time. If you have any questions, please do not hesitate to contact us.

Best regards,
CBCL Limited

A handwritten signature in blue ink, appearing to read "Robert Y. Cyr", with a stylized flourish at the end.

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Technical Specialist

Attachments: Blast Record
Blast and Seismograph Location Plan
Blast Event Reports

Project No: 234601.00

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

Attachment A

Blast Record

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

IDENTIFICATION:

| | | | |
|-------------------------------------|--|------------------------------|-------------------------|
| Blasting Contractor: | <u>Gulf Operators Ltd.</u> | | |
| Blaster's Certification No.: | <u>1318</u> | Blaster's Name: | <u>Daniel Blanchard</u> |
| Blast Location: | <u>N 45°28.873' W 65°37.935' (see attached sketch)</u> | | |
| Type of Rock: | <u>Anhydrate/Gypsum</u> | Est. Vol. or Tonnage: | <u>8,868 tonnes</u> |
| Weather at time of Blast: | <u>Clear</u> | Air Temp.: | <u>5°C</u> |
| Est. Wind Speed : | <u>≈5 km/h</u> | Wind Direction: | <u>NE</u> |
| Cloud Cover: | <u>No</u> | Precipitation: | <u>No</u> |

BLAST DESIGN:

| | | | |
|---|---------------------------------|----------------------------|---------------------------|
| Total No. Holes: | <u>95</u> | Hole Diameter: | <u>4.5"</u> |
| Average Depth: | <u>4.5 m – 8.4 m</u> | Spacing: | <u>10 ft x 10 ft</u> |
| No. Holes per Delay: | <u>2</u> | Collar Length: | <u>7 ft</u> |
| Delay between Holes: | <u>25 ms</u> | Delay between Rows: | <u>42, 59 & 84 ms</u> |
| Initiation Method: | <u>Non-Electric</u> | | |
| Weight of Explosives per Delay: | <u>Max.: 100 kg</u> | | |
| Type and weight of Explosives for Blast: | <u>3,659 kg – Titan XL-1000</u> | | |

Sketch of shot location, hole layout, timing sequence, free face etc. if available.



BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

BLAST MONITORING

| | |
|--|----------------|
| Distance to the Nearest Structure: | <u>685 m</u> |
| Direction to the Nearest Structure: | <u>North</u> |
| Structure Type: | <u>Cottage</u> |
| Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay): | <u>68.5</u> |

SAFETY:

| | |
|---|--------------|
| Type of Warning Signal Used: | <u>Siren</u> |
| Blasting Mats Used (yes or no): | <u>No</u> |
| Airblast Measurement (yes or no): | <u>Yes</u> |
| Vibration Measurement (yes or no): | <u>Yes</u> |
| Warning Signs Posted (yes or no): | <u>Yes</u> |
| Accesses Guarded (yes or no): | <u>Yes</u> |
| Flyrock Damage (yes or no): | <u>No</u> |
| If Yes, Describe: | <u></u> |
| <hr/> | |
| Misfire (yes or no): | <u>No</u> |

Reviewed By: Robert Y. Cyr, M.A.Sc., P.Eng.

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #1

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #21348</u> |
| Calibration Date: | <u>July 23, 2022</u> |
| Location of seismograph: | <u>Civic Number 4079 Route 111 (PW-09)</u> |
| Distance and Direction from Blast: | <u>1,300 m South</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #2

| | |
|------------------------------------|--|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #20206</u> |
| Calibration Date: | <u>May 31, 2022</u> |
| Location of seismograph: | <u>Civic Number 4126 Route 111 (PW-10)</u> |
| Distance and Direction from Blast: | <u>860 m South</u> |
| Transverse Particle Velocity: | <u>0.99 mm/s @ 51 Hz</u> |
| Vertical Particle Velocity: | <u>0.98 mm/s @ 51 Hz</u> |
| Longitudinal Particle Velocity: | <u>0.57 mm/s @ 57 Hz</u> |
| Peak Particle Velocity: | <u>0.99 mm/s @ 51 Hz</u> |
| Maximum Airblast: | <u>104 dB(L)</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #3

| | |
|------------------------------------|--|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #20205</u> |
| Calibration Date: | <u>May 31, 2022</u> |
| Location of seismograph: | <u>Civic Number 4150 Route 111 (PW-13)</u> |
| Distance and Direction from Blast: | <u>690 m Southeast</u> |
| Transverse Particle Velocity: | <u>1.05 mm/s @ 47 Hz</u> |
| Vertical Particle Velocity: | <u>1.99 mm/s @ 57 Hz</u> |
| Longitudinal Particle Velocity: | <u>1.64 mm/s @ 39 Hz</u> |
| Peak Particle Velocity: | <u>1.99 mm/s @ 57 Hz</u> |
| Maximum Airblast: | <u>103 dB(L)</u> |

Data Collection – Seismometer #4

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Minimate, Serial #5673</u> |
| Calibration Date: | <u>April 8, 2022</u> |
| Location of seismograph: | <u>Civic Number 2447 Route 820 (PW-07)</u> |
| Distance and Direction from Blast: | <u>888 m Northeast</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #5

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Minimate, Serial #5487</u> |
| Calibration Date: | <u>January 16, 2023</u> |
| Location of seismograph: | <u>Cottage - PW-03 - Route 820</u> |
| Distance and Direction from Blast: | <u>685 m North</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #6

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #18187</u> |
| Calibration Date: | <u>May 5, 2022</u> |
| Location of seismograph: | <u>Civic Number 2341 Route 820 (PW-05)</u> |
| Distance and Direction from Blast: | <u>720 m North</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #7

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #18193</u> |
| Calibration Date: | <u>April 11, 2022</u> |
| Location of seismograph: | <u>Civic Number 50 Myron Road (PW-15)</u> |
| Distance and Direction from Blast: | <u>980 m Northwest</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #8

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #20203</u> |
| Calibration Date: | <u>May 31, 2022</u> |
| Location of seismograph: | <u>Civic Number 86 Myron Road (PW-16)</u> |
| Distance and Direction from Blast: | <u>900 m West</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #9

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Minimate, Serial #5489</u> |
| Calibration Date: | <u>April 25, 2022</u> |
| Location of seismograph: | <u>Civic Number 220 Myron Road (PW-01)</u> |
| Distance and Direction from Blast: | <u>1,350 m Southwest</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |

Data Collection – Seismometer #10

| | |
|------------------------------------|---|
| Make, Model and Serial # of unit: | <u>Instantel Micromate, Serial #21349</u> |
| Calibration Date: | <u>July 20, 2022</u> |
| Location of seismograph: | <u>Civic Number 2337 Route 820 (PW-04)</u> |
| Distance and Direction from Blast: | <u>830 m Northwest</u> |
| Transverse Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Vertical Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Longitudinal Particle Velocity: | <u><0.5 mm/s – Unit was not triggered</u> |
| Peak Particle Velocity: | <u>N/A</u> |
| Maximum Airblast: | <u><120 dB(L) – Unit was not triggered</u> |



BLAST RECORD

| | | | |
|----------------------|-------------------------------|-----------------------|-----------------------|
| Project Name: | <u>Upham Gypsum Quarry</u> | Date of Blast: | <u>March 17, 2023</u> |
| Project No.: | <u>234601.00</u> | Time of Blast: | <u>14:00</u> |
| Inspector: | <u>C. Buckley</u> | Blast No.: | <u>2023-07</u> |
| Client: | <u>Hammond River Holdings</u> | | |

Data Collection – Seismometer #11

| | |
|------------------------------------|--|
| Make, Model and Serial # of unit: | <u>InstanTel Micromate, Serial #20204</u> |
| Calibration Date: | <u>May 31, 2022</u> |
| Location of seismograph: | <u>Civic Number 4140 Route 111 (PW-12)</u> |
| Distance and Direction from Blast: | <u>770 m Southeast</u> |
| Transverse Particle Velocity: | <u>0.43 mm/s @ 47 Hz</u> |
| Vertical Particle Velocity: | <u>0.69 mm/s @ 51 Hz</u> |
| Longitudinal Particle Velocity: | <u>0.32 mm/s @ 39 Hz</u> |
| Peak Particle Velocity: | <u>0.69 mm/s @ 51 Hz</u> |
| Maximum Airblast: | <u>102 dB(L)</u> |

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan

Blast No: 2023-07

Upham East Gypsum Quarry

Upham, NB

PLS-CADD Overlay

Legend

- ★ Blast 2023-07
- Seismograph Location



Date: March 17, 2023
Project No.: 234601.00



Attachment C

Blast Event Reports

Date/Time Vert at 14:00:44 March 17, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/GAYTON.mmb

Serial Number UM20206 V 10-90GC Micromate ISEE
Battery Level 3.5 Volts
Unit Calibration May 31, 2022 by InstanTel
File Name UM20206_20230317140044.IDFW

Post Event Notes

Location: Civic Number 4126 Route 111 (PW-10)
 Blast No.: 2023-07
 Project No: 234601.00

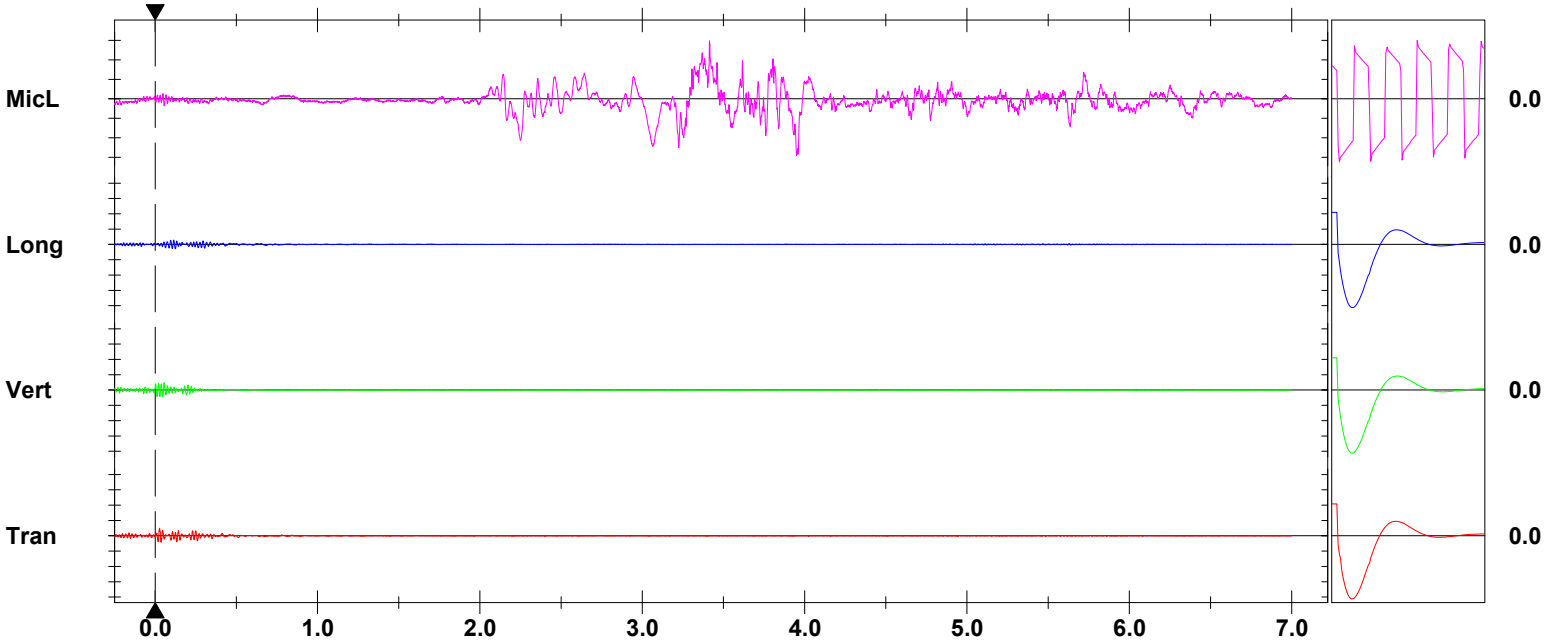
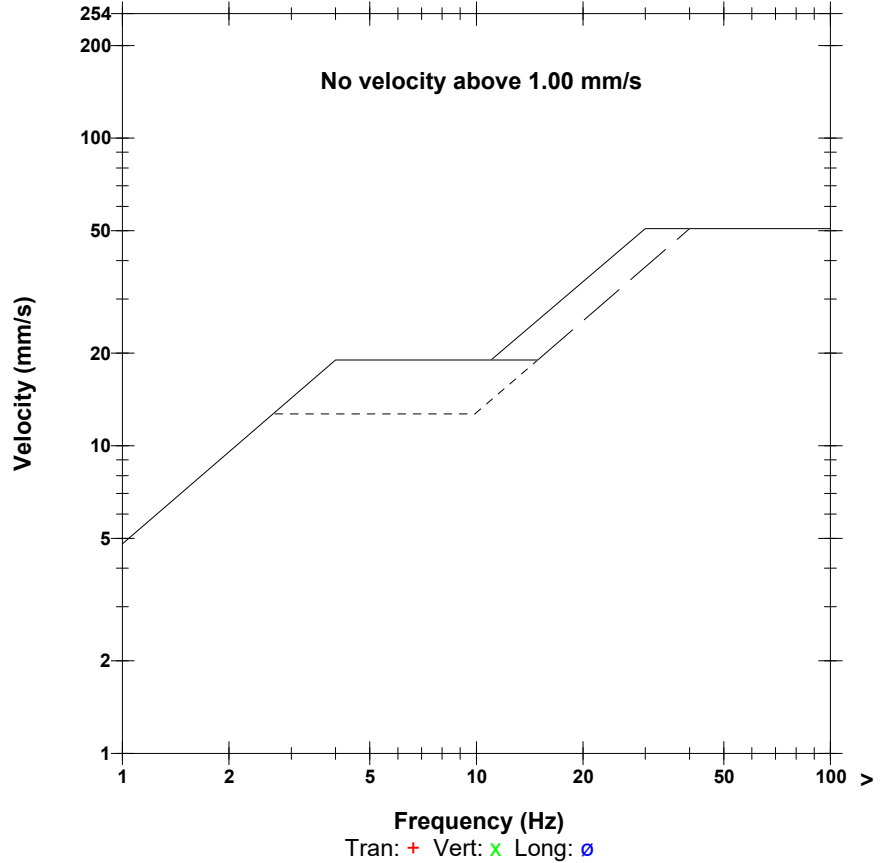
Notes

Microphone Linear Weighting
PSPL 103.5 dB(L) 2.979 pa.(L) at 3.414 sec
ZC Freq 2.8 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1460 mv)

| | Tran | Vert | Long | |
|---------------------|--------|--------|--------|------|
| PPV | 0.993 | 0.977 | 0.567 | mm/s |
| PPV | 50.94 | 50.80 | 46.08 | dB |
| ZC Freq | 51 | 51 | 57 | Hz |
| Time (Rel. to Trig) | 0.027 | 0.056 | 0.114 | sec |
| Peak Acceleration | 0.059 | 0.049 | 0.021 | g |
| Peak Displacement | 0.003 | 0.003 | 0.002 | mm |
| Sensor Check | Passed | Passed | Passed | |
| Frequency | 7.5 | 7.3 | 7.5 | Hz |
| Overswing Ratio | 4.4 | 4.5 | 4.3 | |

Peak Vector Sum 1.246 mm/s at 0.028 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:00:44 March 17, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/GAYTON.mmb

Serial Number UM20205 V 10-90GC Micromate ISEE
Battery Level 3.5 Volts
Unit Calibration May 31, 2022 by InstanTel
File Name UM20205_20230317140044.IDFW

Post Event Notes

Location: Civic Number 4150 Route 111 (PW-13)
 Blast No.: 2023-07
 Project No: 234601.00

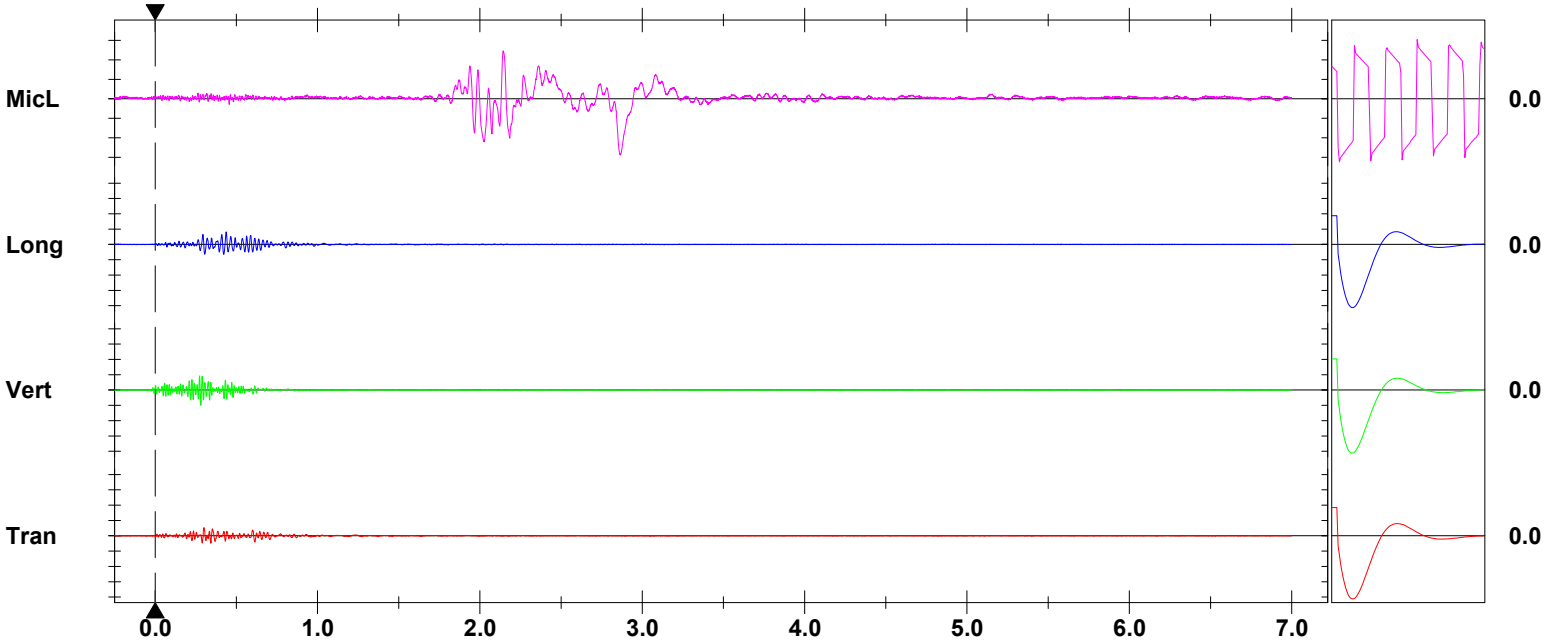
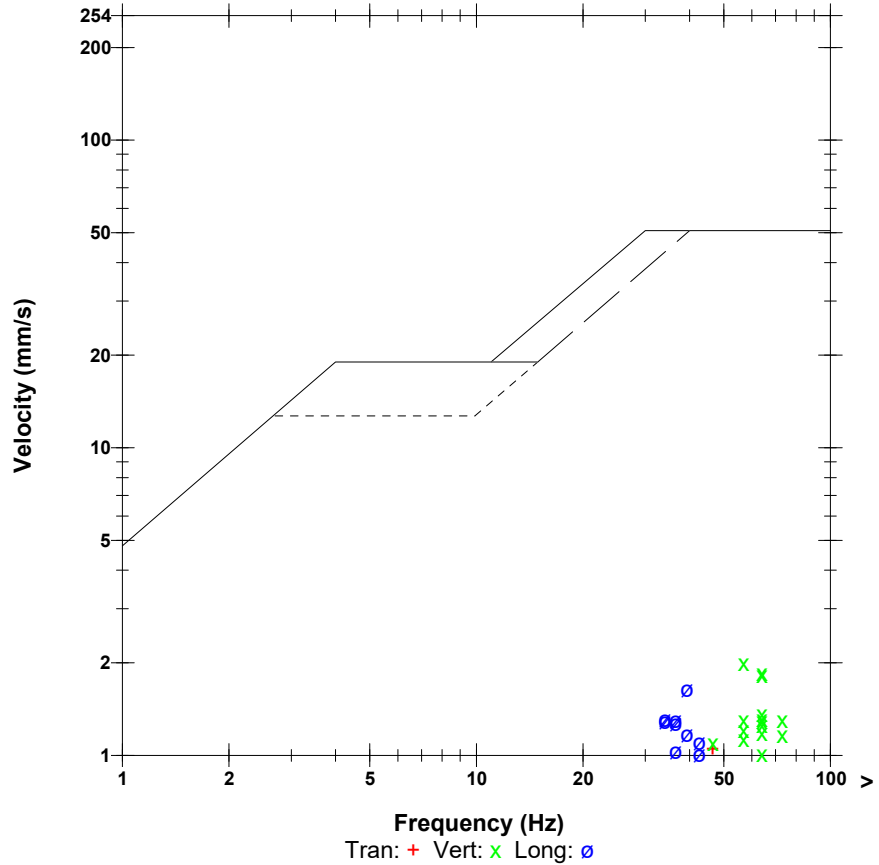
Notes

Microphone Linear Weighting
PSPL 103.2 dB(L) 2.886 pa.(L) at 2.864 sec
ZC Freq 3.3 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1516 mv)

| | Tran | Vert | Long | |
|---------------------|--------|--------|--------|------|
| PPV | 1.048 | 1.994 | 1.639 | mm/s |
| PPV | 51.41 | 56.99 | 55.29 | dB |
| ZC Freq | 47 | 57 | 39 | Hz |
| Time (Rel. to Trig) | 0.301 | 0.281 | 0.437 | sec |
| Peak Acceleration | 0.063 | 0.089 | 0.053 | g |
| Peak Displacement | 0.004 | 0.005 | 0.007 | mm |
| Sensor Check | Passed | Passed | Passed | |
| Frequency | 7.3 | 7.3 | 7.3 | Hz |
| Overswing Ratio | 5.2 | 5.4 | 5.0 | |

Peak Vector Sum 2.157 mm/s at 0.290 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:00:44 March 17, 2023
Trigger Source Geo: 0.500 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Operator/Setup: Operator/GAYTON.mmb

Serial Number UM20204 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration May 31, 2022 by Instatel
File Name UM20204_20230317140044.IDFW

Notes

Post Event Notes

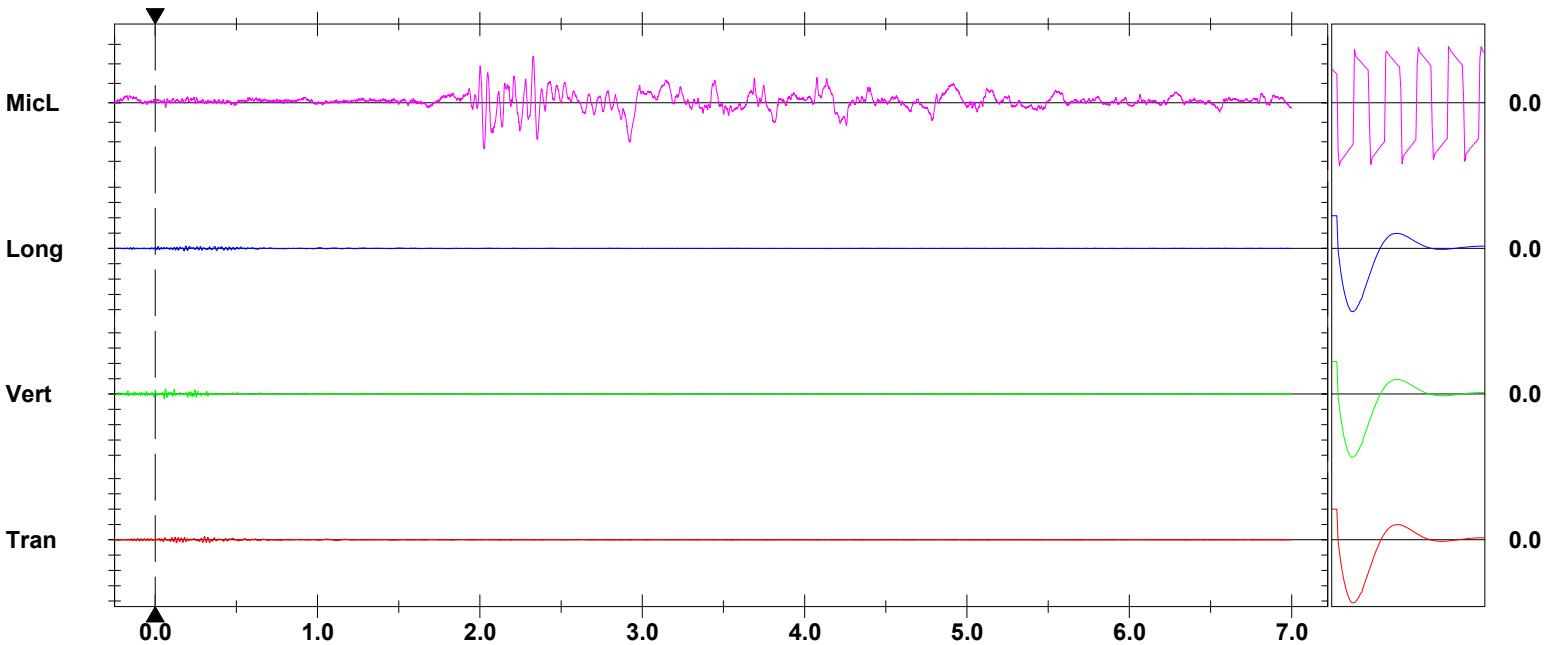
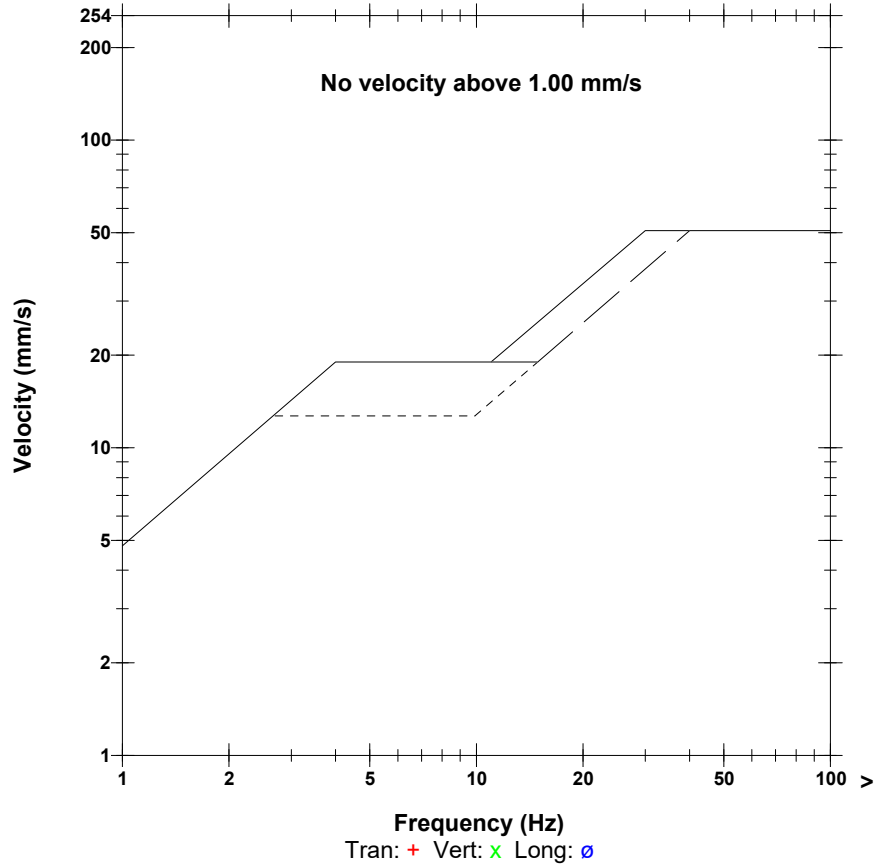
Location: Civic Number 4140 Route 111 (PW-12)
 Blast No.: 2023-07
 Project No: 234601.00

Microphone Linear Weighting
PSPL 101.5 dB(L) 2.389 pa.(L) at 2.327 sec
ZC Freq 19 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1533 mv)

| | Tran | Vert | Long | |
|---------------------|--------|--------|--------|------|
| PPV | 0.426 | 0.686 | 0.315 | mm/s |
| PPV | 43.58 | 47.72 | 40.97 | dB |
| ZC Freq | 47 | 51 | 39 | Hz |
| Time (Rel. to Trig) | 0.304 | 0.063 | 0.178 | sec |
| Peak Acceleration | 0.026 | 0.030 | 0.017 | g |
| Peak Displacement | 0.002 | 0.002 | 0.001 | mm |
| Sensor Check | Passed | Passed | Passed | |
| Frequency | 7.3 | 7.5 | 7.5 | Hz |
| Overswing Ratio | 4.2 | 4.3 | 4.2 | |

Peak Vector Sum 0.700 mm/s at 0.063 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 1.000 pa.(L)/div
Trigger =

Sensor Check