

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: October 31, 2022

Subject: Monthly Monitoring Report – Upham East Gypsum Quarry – September 2022

Our File: File # 21-3049

Introduction

This monthly report details activities associated with the operation of the Upham East Gypsum Quarry for the month of September 2022, in accordance with conditions of the Approval to Operate I-10936. Activities included surface water monitoring, groundwater monitoring, air monitoring, and blasting. Details of environmental malfunctions and public complaints are also provided. For previous monthly activities, refer to the monthly reports provided from December 2019 through August 2022.

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

- Week 1: September 1, 2022
- Week 2: September 9, 2022
- Week 3: September 15, 2022
- Week 4: September 21, 2022
- Week 5: September 27, 2022

There was one additional sampling event conducted on September 23, 2022 due to a heavy rain event, defined as more than 25 mm of rain over a 24-hour period.

Surface Water Sampling

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 collected, as per the EMP (Dillon 2020), on September 4, 2022. Quarterly sampling included recording additional field parameters (pH and dissolved oxygen) 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, samples were collected from two locations in the Hammond River (H1 and H2).

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

Results of the surface water compliance monitoring 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 September water sampling program. The RPD results could not be calculated due to both 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 September 14, 2022 (**Figure 3**). Results of the previous groundwater sampling programs can be found in the *Groundwater Report – Upham East Gypsum Quarry* (2021 and 2022).

Field Methods

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 wattera 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.

Monitoring Results

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

A QA/QC program was implemented to evaluate whether the data collected was of suitable quality to characterize the groundwater 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). The RPD was not calculated or calculated parameters. Calculated parameters can be the sum of, the difference of, or the percentage of several different parameters, many of which are reported as measured values (e.g. pH and alkalinity). Therefore, the discussion of variability should pertain to the measured parameters only. RPDs were also not calculated if one or both the results were less than the analytical detection limit, or one or both of the results were within 5x the detection limit. One duplicate sample was collected from MW20-02S during the September sampling program. The RPD results ranged from 0 to 62% (**Table 4**). The one exceedance was observed for boron; the boron results were elevated for MW20-02S and the duplicate sample, which caused the laboratory to raise the detection limit. The raising of the detection limit likely resulted in the discrepancy between the two samples. Previous sampling events did not experience an exceedance of the RPD for boron when the detection limit was not adjusted. Therefore, the data satisfies the quality objectives for the monitoring program.

The analytical results are consistent with baseline samples, as presented in the *Groundwater Report – Upham East Gypsum Quarry*, submitted in 2021 and 2022. Therefore, operations at the Upham East Gypsum Quarry do not appear to negatively impact the groundwater, as observed in the perimeter monitoring wells.

Environmental Accidents and Malfunctions

There was one reported environmental accident resulting in 10 litres of hydraulic oil leaking from a piece of heavy equipment. The leak was promptly contained and cleanup. The leak did not occur within 100m of a watercourse or potable well.

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 September there were 5 air quality monitoring events, September 4, 10, 16, 22, and 28, 2022. The results are provided in **Table 5**. 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

Five blasts occurred during the September 2022 monitoring period, occurring on September 2, 9, 16, 21, and 27, 2022. There were no exceedances of the Approval to Operate limits for maximum velocity and sound pressure for both blasting events. Blast reports are attached.

Public Complaints

There were no public complaints during the September 2022 monitoring period.

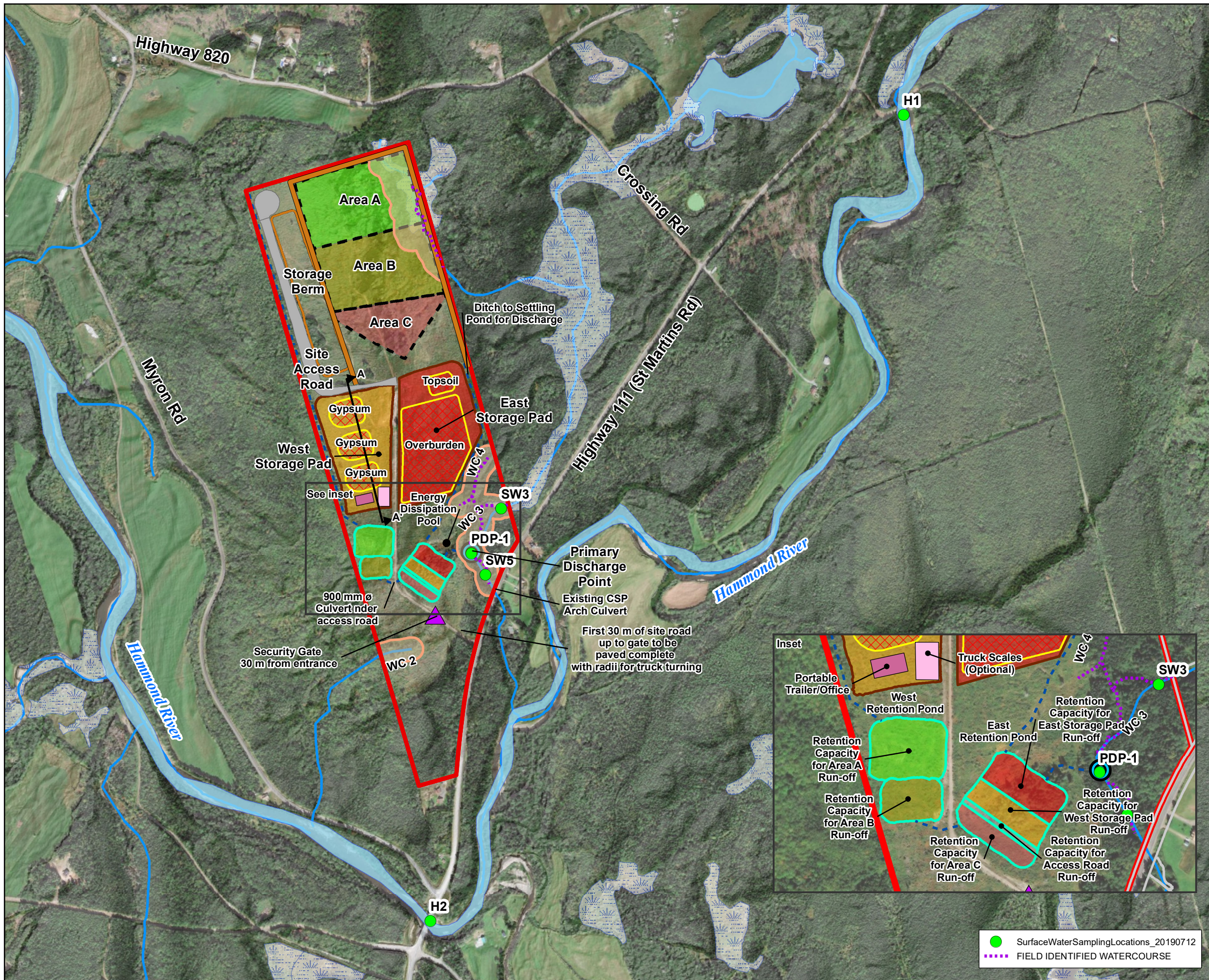
Summary

Since extraction activities began in September 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 below guidelines for blasting.

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.

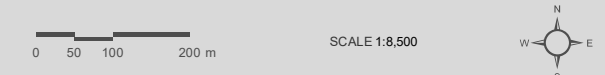
Dillon (Dillon Consulting Limited). 2020 Environmental Management Plan (EMP) for Operation. Upham East Gypsum Quarry Project, Upham New Brunswick. Prepared for Hammond River Holdings Limited by Dillon Consulting Limited, Fredericton, New Brunswick. Project 18-8346. June 2020.



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
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MAP PROJECTION: NAD_1983_CSRS_NEW_BRUNSWICK_STEREOGRAPHIC

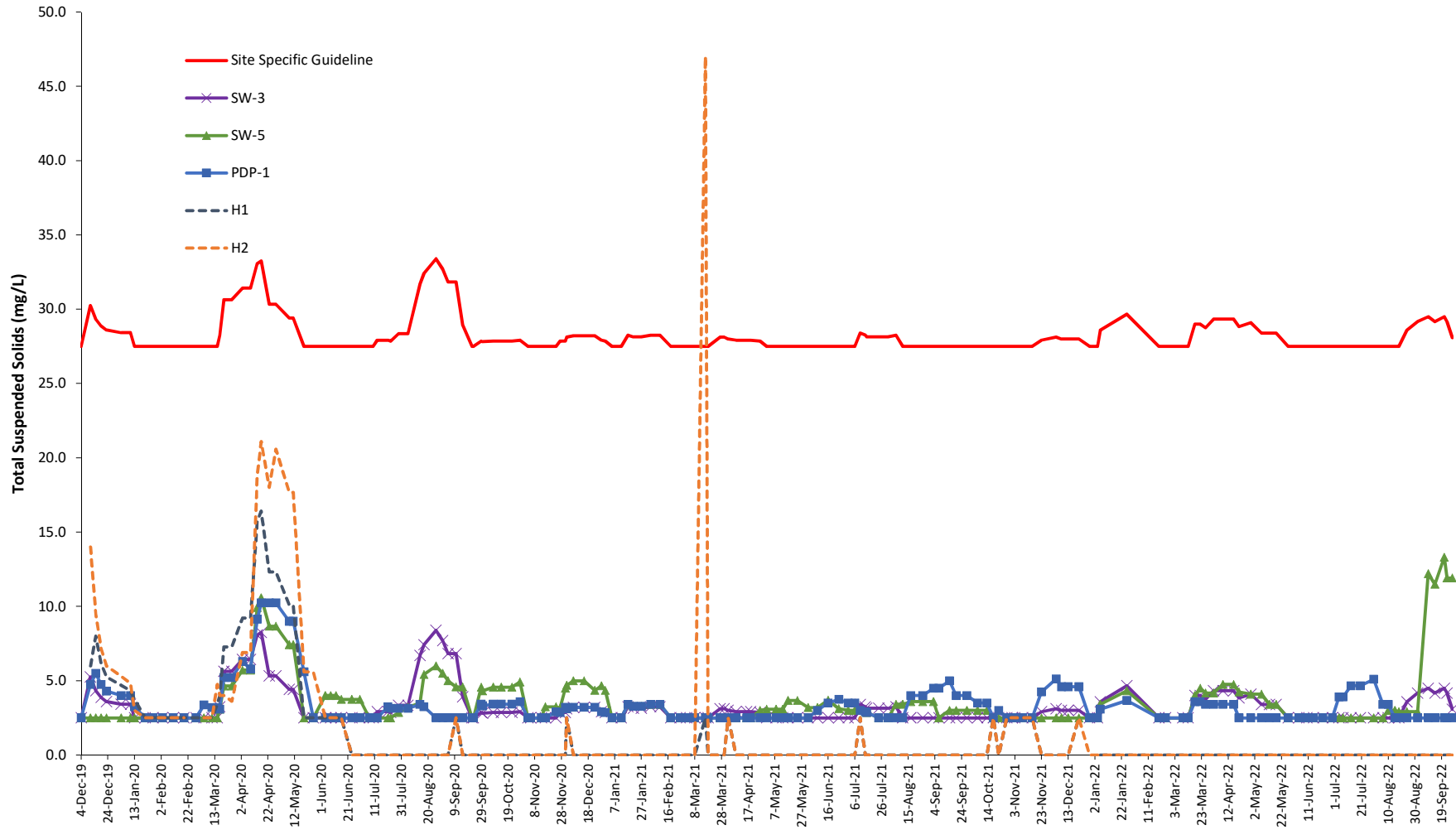
FILE LOCATION: \\DILLON.CAD\DILLON_DFS\FREDERICTON\FREDERICTON CAD\CAD\GIS\188346 UPHAM GYPSUM QUARRY\MXD

- SurfaceWaterSamplingLocations_20190712
- FIELD IDENTIFIED WATERCOURSE



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

Figure 2: TSS Monthly Average



Notes:

The detection limit for TSS is 5 mg/L; for results <5 mg/L, half the detection limit was used.
 Monthly average is calculated based on results from the previous 30 days.
 Site specific guideline is 25 mg/L above the monthly average.

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												
			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	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
Sample ID	Date																	
SW3	1-Sep-22	22.2	33.2	17.7	417	2.93	6	-	-	-	-	-	-	-	-	-	-	
PDP-1	1-Sep-22			17.8	614	1.38	<5	-	-	-	-	-	-	-	-	-	-	-
SW5	1-Sep-22			17.9	669	3.28	<5	-	-	-	-	-	-	-	-	-	-	-
SW3	9-Sep-22	23.5	0.0	14.4	1,151	1.13	<5	-	-	-	-	-	-	-	-	-	-	
PDP-1	9-Sep-22			14.3	1,364	0.80	<5	-	-	-	-	-	-	-	-	-	-	-
PDP-1 FD	9-Sep-22			14.4	1,378	0.80	<5	-	-	-	-	-	-	-	-	-	-	-
SW5	9-Sep-22			14.1	1,405	1.60	51	-	-	-	-	-	-	-	-	-	-	-
SW3	14-Sep-22	15.5	6.2	18.3	272	7.00	<5	38	53.1	5.7	137	1.04	0.01	1.41	4.5	92	210	
PDP-1	14-Sep-22			17.3	1,350	6.40	<5	33	286	90	762	11.6	0.007	3.21	45	640	1,180	
SW5	14-Sep-22			17.3	1,400	3.90	8	30	288	91.8	769	12.2	0.024	3.29	45.2	650	1,200	
H1	14-Sep-22			18.9	185	19.80	<5	32	29.5	9	79.3	1.36	0.01	0.73	6.14	40	114	
H2	14-Sep-22			18.9	165	21.90	<5	34	24.4	11.1	66.2	1.28	0.005	0.64	5.57	34	92	
SW3	21-Sep-22	17.4	22.8	13.6	800	1.47	<5	-	-	-	-	-	-	-	-	-	-	
PDP-1	21-Sep-22			13.1	822	1.42	<5	-	-	-	-	-	-	-	-	-	-	-
SW5	21-Sep-22			13.0	860	1.42	<5	-	-	-	-	-	-	-	-	-	-	-
SW3	23-Sep-22	11.7	60.8	13.7	119	6.59	<5	-	-	-	-	-	-	-	-	-	-	
PDP-1	23-Sep-22			13.5	301	6.96	<5	-	-	-	-	-	-	-	-	-	-	-
PDP-1 FD	23-Sep-22			13.4	302	6.73	<5	-	-	-	-	-	-	-	-	-	-	-
SW5	23-Sep-22			13.4	421	6.08	5	-	-	-	-	-	-	-	-	-	-	-
SW3	27-Sep-22	20.3	15.9	14.5	345	1.99	<5	-	-	-	-	-	-	-	-	-	-	
PDP-1	27-Sep-22			14.4	916	1.18	<5	-	-	-	-	-	-	-	-	-	-	-
SW5	27-Sep-22			14.2	1,075	2.18	<5	-	-	-	-	-	-	-	-	-	-	-

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:

c) Site specific guideline, TSS cannot exceed 25 mg/L above the background monthly average.

d) Canadian Council of Ministers of Environment (CCME) for the Protection of Aquatic Life.

SW3 is the background sample for Watercourse 3.

'-' denotes no guideline, not analyzed, not available, or not applicable; FD = field duplicate.

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	43803.0	2.5
11-Dec-19	30.3	6.0	14.0	5.3	43810.0	2.5
15-Dec-19	29.3	8.0	9.5	4.3	43814.0	2.5
19-Dec-19	28.9	6.2	7.2	3.9	43818.0	2.5
23-Dec-20	28.6	5.3	6.0	3.6	43822.0	2.5
03-Jan-20	28.4	4.7	5.3	3.4	43833.0	2.5
10-Jan-20	28.4	4.3	4.8	3.4	43840.0	2.5
13-Jan-20	27.5	3.8	3.0	2.5	43843.0	2.5
21-Jan-20	27.5	2.5	2.5	2.5	43851.0	2.5
27-Jan-20	27.5	2.5	2.5	2.5	43857.0	2.5
03-Feb-20	27.5	2.5	2.5	2.5	43864.0	2.5
11-Feb-20	27.5	2.5	2.5	2.5	43872.0	2.5
19-Feb-20	27.5	2.5	2.5	2.5	43880.0	2.5
28-Feb-20	27.5	2.5	0.0	2.5	43889.0	2.5
05-Mar-20	27.5	2.5	2.5	2.5	43895.0	2.5
11-Mar-20	27.5	2.5	2.5	2.5	43901.0	2.5
15-Mar-20	27.5	3.4	4.8	2.5	43905.0	2.5
17-Mar-20	28.3	4.0	4.0	3.3	43907.0	3.1
20-Mar-20	30.6	7.3	4.0	5.6	43910.0	4.6
26-Mar-20	30.6	7.3	3.6	5.6	43916.0	4.6
03-Apr-20	31.4	9.2	6.9	6.4	43924.0	5.7
09-Apr-20	31.4	9.2	6.9	6.4	43930.0	5.7
14-Apr-20	33.1	15.7	18.8	8.1	43935.0	9.9
17-Apr-20	33.3	16.4	21.1	8.3	43938.0	10.6
23-Apr-20	30.3	12.3	18.0	5.3	43944.0	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	8.1	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
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

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 3
General Chemistry and Trace Metals - Perimeter Monitoring Wells
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Parameter	Units	GCDWQ 2022 ¹		MW19-01S	MW19-01D	MW20-02S	MW20-02D	MW20-03S	MW20-03D	MW20-04S	MW20-04D
		MAC	AO	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	26-Sep-22	14-Sep-22
General Chemistry											
Sodium	mg/L	-	200	9.06	17.5	10.2	128	4.99	10.2	4.54	4.69
Potassium	mg/L	-	-	1.07	1.78	1.9	5.5	0.84	0.93	1.27	1.18
Calcium	mg/L	-	-	41.7	72.9	582	601	28.9	6.36	37.5	43.6
Magnesium	mg/L	-	-	10.5	2.82	10.9	32.2	3.17	1.93	1.25	1.47
Iron	mg/L	-	0.3	<0.02	<0.02	<0.1	<0.1	<0.02	<0.02	<0.02	<0.02
Manganese	mg/L	0.12	0.02	0.008	<u>0.081</u>	<u>0.569</u>	<u>0.357</u>	0.001	<0.001	0.013	0.008
Copper	mg/L	2	1	0.003	<0.001	<0.005	<0.005	<0.001	<0.001	0.001	0.003
Zinc	mg/L	-	5	0.018	0.002	<0.005	<0.005	0.001	<0.001	0.002	0.002
Ammonia (as N)	mg/L	-	-	<0.05	0.18	<0.05	0.32	<0.05	0.11	<0.05	<0.05
pH	units	-	7.0 - 10.5	<u>6.6</u>	8.0	7.5	8.2	8.1	8.6	8.0	8.0
Alkalinity (as CaCO ₃)	mg/L	-	-	49	140	140	57	88	30	100	120
Chloride	mg/L	-	250	55.8	41.9	3.8	183	2.9	10.8	2.8	2.8
Flouride	mg/L	1.5	-	0.19	0.16	0.71	<u>2.5</u>	0.22	0.10	0.24	0.42
Sulphate	mg/L	-	500	48	35	<u>1,400</u>	<u>1,600</u>	6	6	10	11
Nitrate (as nitrate - nitrogen)	mg/L	10	-	1.20	<0.05	<0.05	<0.05	0.16	<0.05	1.21	0.53
o-Phosphate (as P)	mg/L	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01
r-Silica (as SiO ₂)	mg/L	-	-	13.1	14.5	14.1	1.4	9.1	<0.1	12.2	13.7
Total Organic Carbon	mg/L	-	-	<0.5	<0.5	<0.5	2.7	<0.5	<0.5	1.2	< 0.5
Turbidity ²	NTU	-	-	3.3	0.3	9.5	43.1	5.7	73.1	28.5	4.2
Solids - Total Suspended	mg/L	-	-	9	< 5	7	21	17	94	53	15
Conductivity	µS/cm	-	-	390	433	2250	3100	179	104	220	235
Calculated Parameters											
Bicarbonate as CaCO ₃	mg/L	-	-	49.0	139	140	56.1	86.9	28.7	99.0	119
Carbonate as CaCO ₃	mg/L	-	-	0.018	1.30	0.415	0.836	1.03	1.07	0.931	1.12
Hydroxide as CaCO ₃	mg/L	-	-	0.002	0.050	0.016	0.079	0.063	0.199	0.050	0.050
Cation sum	meq/L	-	-	3.37	4.69	30.5	38.4	1.94	0.952	2.20	2.53
Anion sum	meq/L	-	-	3.64	4.71	32.1	39.6	1.98	1.03	2.37	2.74
% difference	%	-	-	-3.87	-0.16	-2.56	-1.57	-0.89	-3.89	-3.65	-4.04
Theoretical Conductivity	µS/cm	-	-	378	458	2,820	3,440	185	104	218	248
Hardness (as CaCO ₃)	mg/L	-	-	147	194	1,500	1,630	85.2	23.8	98.8	115
Total Dissolved Solids (calculated)	mg/L	-	500	214	272	<u>2,110</u>	<u>2,590</u>	110	55	136	154
Saturation pH (@ 5C)	-	-	-	8.3	7.6	6.9	7.3	8.2	9.3	8.0	7.9
Langelier Index (@ 5C)	-	-	-	-1.71	0.36	0.55	0.85	-0.08	-0.68	-0.02	0.11

Table 3
General Chemistry and Trace Metals - Perimeter Monitoring Wells
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Parameter	Units	GCDWQ 2022 ¹		MW19-01S	MW19-01D	MW20-02S	MW20-02D	MW20-03S	MW20-03D	MW20-04S	MW20-04D
		MAC	AO	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	26-Sep-22	14-Sep-22
Trace Metals											
Aluminum	µg/L	-	-	2	2	< 5	< 5	2	< 1	<u>7</u>	3
Antimony	µg/L	6	-	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	0.5	0.3
Arsenic	µg/L	10	-	<1	<1	<5	<5	2	<1	39	19
Barium	µg/L	1,000	-	130	130	5	<5	184	3	126	106
Beryllium	µg/L	-	-	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1
Bismuth	µg/L	-	-	<1	<1	<5	<5	<1	<1	<1	<1
Boron	µg/L	5,000	-	26	490	1,760	53,700	23	22	76	110
Cadmium	µg/L	7	-	0.27	<0.01	<0.05	<0.05	<0.01	<0.01	<0.01	<0.01
Calcium	µg/L	-	-	41,700	72,900	582,000	601,000	28,900	6,360	37,500	43,600
Chromium	µg/L	50	-	<1	<1	<5	<5	<1	<1	<1	<1
Cobalt	µg/L	-	-	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1
Copper	µg/L	2,000	1,000	3	<1	<5	<5	<1	<1	1	3
Iron	µg/L	-	300	<20	<20	<100	<100	<20	<20	<20	<20
Lead	µg/L	5	-	1.9	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1
Lithium	µg/L	-	-	11.3	15.4	12.4	215	5.6	4.4	6.2	7.9
Magnesium	µg/L	-	-	10500	2820	10900	32200	3170	1930	1250	1470
Manganese	µg/L	120	20	8	<u>81</u>	<u>569</u>	<u>357</u>	1	<1	13	8
Mercury	µg/L	1	-	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Molybdenum	µg/L	-	-	<0.1	<0.1	1.4	6.9	0.7	1.4	1.2	2.9
Nickel	µg/L	-	-	1	<1	<5	<5	<1	<1	<1	<1
Potassium	µg/L	-	-	1,070	1,780	1,900	5,500	840	930	1,270	1,180
Rubidium	µg/L	-	-	1.3	2.4	< 0.5	6.4	0.3	0.3	1.0	0.9
Selenium	µg/L	50	-	<1	<1	<5	<5	<1	<1	<1	<1
Silver	µg/L	-	-	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1
Sodium	µg/L	-	200,000	9,060	17,500	10,200	128,000	4,990	10,200	4,540	4,690
Strontium	µg/L	7,000	-	158	1,210	4,320	10,700	214	30	350	468
Tellurium	µg/L	-	-	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1
Thallium	µg/L	-	-	0.3	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1
Tin	µg/L	-	-	<0.1	<0.1	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1
Uranium	µg/L	20	-	<0.1	<0.1	2.1	<0.5	1.0	<0.1	2.9	4.5
Vanadium	µg/L	-	-	<1	<1	<5	<5	<1	<1	1	2
Zinc	µg/L	-	5,000	18	2	<5	<5	1	<1	2	2

Notes:

1. Health Canada. 2022. Guidelines for Canadian Drinking Water Quality Summary Table. Prepared in collaboration with the Federal-Provincial-Territorial Committee on Drinking Water of the Federal-Provincial-Territorial Committee on Health and the Environment.

2. Guideline dependant on treatment of individual filters.

Underline - indicates value is above the AO.

Bolded - indicates value is above the MAC.

' - ' denotes no guideline, not analyzed, or not applicable

MAC = maximum allowable concentration; AO = aesthetic objective; mg/L = milligrams per litre; µS/cm = microsiemens per centimetre.

Table 4
General Chemistry and Trace Metals - Perimeter Monitoring Wells
Upham East Gypsum Project
Upham, New Brunswick
Project No. 21-3049

Parameter	Units	Laboratory Detection Limit	MW20-02S		RPD
			Original Sample	Field Duplicate	
			14-Sep-22	14-Sep-22	
General Chemistry					
Sodium	mg/L	0.05	10.2	10.2	0%
Potassium	mg/L	0.02	1.9	1.9	0%
Calcium	mg/L	0.05	582	582	0%
Magnesium	mg/L	0.01	10.9	10.8	1%
Iron	mg/L	0.02	<0.1	<0.1	NA
Manganese	mg/L	0.001	0.569	0.573	1%
Copper	mg/L	0.001	<0.005	<0.005	NA
Zinc	mg/L	0.001	<0.005	<0.005	NA
Ammonia (as N)	mg/L	0.05	<0.05	<0.05	NA
pH	units	-	7.5	7.4	1%
Alkalinity (as CaCO3)	mg/L	2	140	110	24%
Chloride	mg/L	0.5	3.8	3.7	3%
Flouride	mg/L	0.05	0.71	0.73	3%
Sulphate	mg/L	1	1,400	1,430	2%
Nitrate + Nitrite (as N)	mg/L	0.05	<0.05	<0.05	NA
o-Phosphate (as P)	mg/L	0.01	<0.01	<0.01	NA
r-Silica (as SiO2)	mg/L	0.1	14.1	14.4	2%
Total Organic Carbon	mg/L	0.5	<0.5	<0.5	NA
Turbidity ²	NTU	0.1	9.5	11.7	21%
Solids - Total Suspended	mg/L	5	7	8	NA
Conductivity	µS/cm	1	2,250	2,240	0%
Trace Metals					
Aluminum	µg/L	1	<5	<5	NA
Antimony	µg/L	0.1	<0.5	<0.5	NA
Arsenic	µg/L	1	<5	<5	NA
Barium	µg/L	1	5	5	0%
Beryllium	µg/L	0.1	<0.5	<0.5	NA
Bismuth	µg/L	1	<5	<5	NA
Boron	µg/L	1	1,760	922	62%
Cadmium	µg/L	0.01	<0.05	<0.05	NA
Calcium	µg/L	50	582,000	582,000	0%
Chromium	µg/L	1	<5	<5	NA
Cobalt	µg/L	0.1	<0.5	<0.5	NA
Copper	µg/L	1	<5	<5	NA
Iron	µg/L	20	<100	<100	NA
Lead	µg/L	0.1	<0.5	<0.5	NA
Lithium	µg/L	0.1	12.4	12.5	1%
Magnesium	µg/L	10	10,900	10,800	1%
Manganese	µg/L	1	569	573	1%
Mercury	µg/L	0.025	<0.025	<0.025	NA
Molybdenum	µg/L	0.1	1.4	2	35%
Nickel	µg/L	1	<5	<5	NA
Potassium	µg/L	20	1,900	1,900	0%
Rubidium	µg/L	0.1	<0.5	<0.5	NA
Selenium	µg/L	1	<5	<5	NA
Silver	µg/L	0.1	<0.5	<0.5	NA
Sodium	µg/L	50	10,200	10,200	0%
Strontium	µg/L	1	4,320	4,340	0%
Tellurium	µg/L	0.1	<0.5	<0.5	NA
Thallium	µg/L	0.1	<0.5	<0.5	NA
Tin	µg/L	0.1	<0.5	<0.5	NA
Uranium	µg/L	0.1	2.1	2.3	NA
Vanadium	µg/L	1	<5	<5	NA
Zinc	µg/L	1	<5	<5	NA

Notes:

Bolded - indicates the RPD is above the 40% threshold criteria (CCME, 2016).

NA = RPD could not be calculated because either one or both results were below the detection limit, one or both of the results were within 5x the detection limit, or the result is a calculated value.

RPD = relative percent difference; mg/L = milligrams per litre; µS/cm = microsiemens per centimetre; - = not applicable.

Table 5
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)
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

Table 5
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)
2021-02-05	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
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

Table 5
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)
2021-08-29	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
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

Table 5
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)
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
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	25.0000	120
2022-08-11	24 hours	16.76	24.13	750	19.9	14.8321	14.8358	3700	6.3890	120
2022-08-17	24 hours	16.95	24.41	749	16.5	14.8601	14.8771	17000	29.0182	120
2022-08-23	24 hours	16.89	24.33	749	17.2	14.8649	14.8726	7700	13.1867	120
2022-08-29	24 hours	16.7	24.05	753	17.3	14.8706	14.8811	10500	18.1913	120
2022-09-04	24 hours	17.11	24.64	755	16.2	14.8635	14.8653	1800	3.0438	120
2022-09-10	24 hours	17.03	24.52	755	17.6	14.8454	14.8544	9000	15.2936	120
2022-09-16	24 hours	17.32	24.95	749	10.3	14.8614	14.8654	4000	6.6800	120
2022-09-22	24 hours	16.93	24.38	741	13.6	14.8603	14.8822	21900	37.4282	120
2022-09-28	24 hours	17.12	24.65	750	13.9	14.8503	14.8595	9200	15.5510	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: 455890-IAS
Report Date: 15-Sep-22
Date Received: 02-Sep-22

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

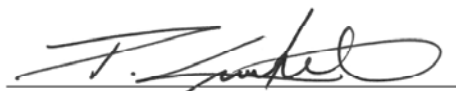
Location: Upham

Analysis of Water

RPC Sample ID:	455890-1	455890-2	455890-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	1-Sep-22	1-Sep-22	1-Sep-22
Analytes	Units	RL	
Solids - Total Suspended	mg/L	5	6 < 5 < 5

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

RL = Reporting Limit



Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry



Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 455890-IAS
Report Date: 15-Sep-22
Date Received: 02-Sep-22

CERTIFICATE OF ANALYSIS

for
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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: 456936-IAS
Report Date: 20-Sep-22
Date Received: 12-Sep-22

CERTIFICATE OF ANALYSIS

for
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Attention: Daniel Guest

Project #: 17-5121

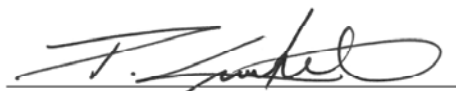
Location: Upham

Analysis of Water

RPC Sample ID:	456936-1	456936-2	456936-3	456936-4		
Client Sample ID:	SW3	SW5	PDP-1	PDP-1 Duplicate		
Date Sampled:	9-Sep-22	9-Sep-22	9-Sep-22	9-Sep-22		
Analytes	Units	RL				
Solids - Total Suspended	mg/L	5	< 5	51	< 5	< 5

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

RL = Reporting Limit



Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry



Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 456936-IAS
Report Date: 20-Sep-22
Date Received: 12-Sep-22

CERTIFICATE OF ANALYSIS

for
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30 Jervis Lane
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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: 457878-IAS
Report Date: 03-Oct-22
Date Received: 16-Sep-22

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
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Attention: Daniel Guest

Project #: 17-5121

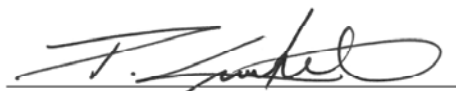
Location: Upham

Analysis of Water

RPC Sample ID:	457878-1	457878-2	457878-3	457878-4	457878-5		
Client Sample ID:	SW-3	SW-5	PDP-1	H1	H2		
Date Sampled:	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22		
Analytes	Units	RL					
Alkalinity (as CaCO ₃)	mg/L	2	38	30	33	32	34
Chloride	mg/L	0.5	5.7	91.8	90.0	9.0	11.1
Sulfate	mg/L	1	92	650	640	40	34
Phosphorus - Total	mg/L	0.002	0.010	0.024	0.007	0.010	0.005
Solids - Total Dissolved	mg/L	5	210	1200	1180	114	92
Solids - Total Suspended	mg/L	5	< 5	8	< 5	< 5	< 5
Hardness (as CaCO ₃)	mg/L	0.2	137.	769.	762.	79.3	66.2

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

RL = Reporting Limit



Peter Crowhurst, B.Sc., C.Chem.
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Inorganic Analytical Chemistry



Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 457878-IAS
 Report Date: 03-Oct-22
 Date Received: 16-Sep-22

CERTIFICATE OF ANALYSIS

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 Saint John, NB E2J 0A9



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Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Metals in Water

RPC Sample ID:			457878-1	457878-2	457878-3	457878-4	457878-5
Client Sample ID:			SW-3	SW-5	PDP-1	H1	H2
Date Sampled:			14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22	14-Sep-22
Analytes	Units	RL					
Calcium	mg/L	0.05	53.1	288.	286.	29.5	24.4
Magnesium	mg/L	0.01	1.04	12.2	11.6	1.36	1.28
Potassium	mg/L	0.02	1.41	3.29	3.21	0.73	0.64
Sodium	mg/L	0.05	4.50	45.2	45.0	6.14	5.57

Report ID: 457878-IAS
Report Date: 03-Oct-22
Date Received: 16-Sep-22

CERTIFICATE OF ANALYSIS

for
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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: 458458-IAS
Report Date: 04-Oct-22
Date Received: 22-Sep-22

CERTIFICATE OF ANALYSIS

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

rpc

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

Attention: Daniel Guest

Project #: 17-5121

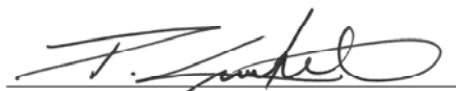
Location: Upham

Analysis of Water

RPC Sample ID:	458458-1	458458-2	458458-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	21-Sep-22	21-Sep-22	21-Sep-22
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



Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry



Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 458458-IAS
Report Date: 04-Oct-22
Date Received: 22-Sep-22

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
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: 458682-IAS
Report Date: 05-Oct-22
Date Received: 26-Sep-22

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

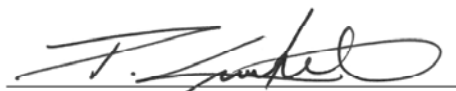
Location: Upham

Analysis of Water

RPC Sample ID:	458682-1	458682-2	458682-3	458682-4		
Client Sample ID:	SW3	SW5	PDP-1	PDP-1 Duplicate		
Date Sampled:	23-Sep-22	23-Sep-22	23-Sep-22	23-Sep-22		
Analytes	Units	RL				
Solids - Total Suspended	mg/L	5	< 5	5	< 5	< 5

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

RL = Reporting Limit



Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry



Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 458682-IAS
Report Date: 05-Oct-22
Date Received: 26-Sep-22

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for
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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: 459195-IAS
Report Date: 11-Oct-22
Date Received: 28-Sep-22

CERTIFICATE OF ANALYSIS

for
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Attention: Daniel Guest

Project #: 17-5121

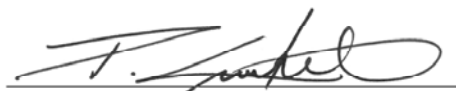
Location: Upham

Analysis of Water

RPC Sample ID:	459195-1	459195-2	459195-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	27-Sep-22	27-Sep-22	27-Sep-22
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



Peter Crowhurst, B.Sc., C.Chem.
Director
Inorganic Analytical Chemistry



Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 459195-IAS
Report Date: 11-Oct-22
Date Received: 28-Sep-22

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: 457876-IAS
 Report Date: 28-Sep-22
 Date Received: 16-Sep-22

CERTIFICATE OF ANALYSIS

for
 Dillon Consulting Ltd
 274 Sydney Street, Suite 200
 Saint John, NB E2L 0A8



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 Tel: 506.452.1212
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Attention: Brandon Kirk
Project #: 20-3571-6000
 Location: Upham

Analysis of Water

RPC Sample ID:			457876-1	457876-2	457876-3
Client Sample ID:			MW19-01D	MW19-01S	MW20-02D
Date Sampled:			14-Sep-22	14-Sep-22	14-Sep-22
Analytes	Units	RL			
Sodium	mg/L	0.05	17.5	9.06	128.
Potassium	mg/L	0.02	1.78	1.07	5.5
Calcium	mg/L	0.05	72.9	41.7	601.
Magnesium	mg/L	0.01	2.82	10.5	32.2
Iron	mg/L	0.02	< 0.02	< 0.02	< 0.1
Manganese	mg/L	0.001	0.081	0.008	0.357
Copper	mg/L	0.001	< 0.001	0.003	< 0.005
Zinc	mg/L	0.001	0.002	0.018	< 0.005
Ammonia (as N)	mg/L	0.05	0.18	< 0.05	0.32
pH	units	-	8.0	6.6	8.2
Alkalinity (as CaCO ₃)	mg/L	2	140	49	57
Chloride	mg/L	0.5	41.9	55.8	183
Fluoride	mg/L	0.05	0.16	0.19	2.5
Sulfate	mg/L	1	35	48	1600
Nitrate + Nitrite (as N)	mg/L	0.05	< 0.05	1.20	< 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	14.5	13.1	1.4
Carbon - Total Organic	mg/L	0.5	< 0.5	< 0.5	2.7
Turbidity	NTU	0.1	0.3	3.3	43.1
Solids - Total Suspended	mg/L	5	< 5	9	21
Conductivity	µS/cm	1	433	390	3100
Calculated Parameters					
Bicarbonate (as CaCO ₃)	mg/L	-	139.	49.0	56.1
Carbonate (as CaCO ₃)	mg/L	-	1.30	0.018	0.836
Hydroxide (as CaCO ₃)	mg/L	-	0.050	0.002	0.079
Cation Sum	meq/L	-	4.69	3.37	38.4
Anion Sum	meq/L	-	4.71	3.64	39.6
Percent Difference	%	-	-0.16	-3.87	-1.57
Theoretical Conductivity	µS/cm	-	458	378	3440
Hardness (as CaCO ₃)	mg/L	0.2	194	147	1630
Ion Sum	mg/L	-	272	214	2590
Saturation pH (5°C)	units	-	7.6	8.3	7.3
Langelier Index (5°C)	-	-	0.36	-1.71	0.85

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
 Senior Chemist
 Inorganic Analytical Chemistry

Brannen Burhoe
 Supervisor
 Inorganic Analytical Services

Report ID: 457876-IAS
 Report Date: 28-Sep-22
 Date Received: 16-Sep-22

CERTIFICATE OF ANALYSIS

for

Dillon Consulting Ltd
 274 Sydney Street, Suite 200
 Saint John, NB E2L 0A8



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 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Brandon Kirk
Project #: 20-3571-6000
 Location: Upham

Analysis of Water

RPC Sample ID:		457876-4	457876-5	457876-6	
Client Sample ID:		MW20-02S	MW20-03D	MW20-03S	
Date Sampled:		14-Sep-22	14-Sep-22	14-Sep-22	
Analytes	Units	RL			
Sodium	mg/L	0.05	10.2	10.2	4.99
Potassium	mg/L	0.02	1.9	0.93	0.84
Calcium	mg/L	0.05	582.	6.36	28.9
Magnesium	mg/L	0.01	10.9	1.93	3.17
Iron	mg/L	0.02	< 0.1	< 0.02	< 0.02
Manganese	mg/L	0.001	0.569	< 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	< 0.05	0.11	< 0.05
pH	units	-	7.5	8.6	8.1
Alkalinity (as CaCO ₃)	mg/L	2	140	30	88
Chloride	mg/L	0.5	3.8	10.8	2.9
Fluoride	mg/L	0.05	0.71	0.10	0.22
Sulfate	mg/L	1	1400	6	6
Nitrate + Nitrite (as N)	mg/L	0.05	< 0.05	< 0.05	0.16
o-Phosphate (as P)	mg/L	0.01	< 0.01	< 0.01	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	14.1	< 0.1	9.1
Carbon - Total Organic	mg/L	0.5	< 0.5	< 0.5	< 0.5
Turbidity	NTU	0.1	9.5	73.1	5.7
Solids - Total Suspended	mg/L	5	7	94	17
Conductivity	µS/cm	1	2250	104	179
Calculated Parameters					
Bicarbonate (as CaCO ₃)	mg/L	-	140.	28.7	86.9
Carbonate (as CaCO ₃)	mg/L	-	0.415	1.07	1.03
Hydroxide (as CaCO ₃)	mg/L	-	0.016	0.199	0.063
Cation Sum	meq/L	-	30.5	0.952	1.94
Anion Sum	meq/L	-	32.1	1.03	1.98
Percent Difference	%	-	-2.56	-3.89	-0.89
Theoretical Conductivity	µS/cm	-	2820	104	185
Hardness (as CaCO ₃)	mg/L	0.2	1500	23.8	85.2
Ion Sum	mg/L	-	2110	55	110
Saturation pH (5°C)	units	-	6.9	9.3	8.2
Langelier Index (5°C)	-	-	0.55	-0.68	-0.08

Report ID: 457876-IAS
 Report Date: 28-Sep-22
 Date Received: 16-Sep-22

CERTIFICATE OF ANALYSIS

for

Dillon Consulting Ltd
 274 Sydney Street, Suite 200
 Saint John, NB E2L 0A8



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

Attention: Brandon Kirk
Project #: 20-3571-6000
 Location: Upham

Analysis of Water

RPC Sample ID:		457876-7	457876-8
Client Sample ID:		MW20-04D	MW10-10S
Date Sampled:		14-Sep-22	14-Sep-22
Analytes	Units	RL	
Sodium	mg/L	0.05	4.69
Potassium	mg/L	0.02	1.18
Calcium	mg/L	0.05	43.6
Magnesium	mg/L	0.01	1.47
Iron	mg/L	0.02	< 0.02
Manganese	mg/L	0.001	0.008
Copper	mg/L	0.001	0.003
Zinc	mg/L	0.001	0.002
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	8.0
Alkalinity (as CaCO ₃)	mg/L	2	120
Chloride	mg/L	0.5	2.8
Fluoride	mg/L	0.05	0.42
Sulfate	mg/L	1	11
Nitrate + Nitrite (as N)	mg/L	0.05	0.53
o-Phosphate (as P)	mg/L	0.01	< 0.01
r-Silica (as SiO ₂)	mg/L	0.1	13.7
Carbon - Total Organic	mg/L	0.5	< 0.5
Turbidity	NTU	0.1	4.2
Solids - Total Suspended	mg/L	5	15
Conductivity	µS/cm	1	235
			2240
Calculated Parameters			
Bicarbonate (as CaCO ₃)	mg/L	-	119.
Carbonate (as CaCO ₃)	mg/L	-	1.12
Hydroxide (as CaCO ₃)	mg/L	-	0.050
Cation Sum	meq/L	-	2.53
Anion Sum	meq/L	-	2.74
Percent Difference	%	-	-4.04
Theoretical Conductivity	µS/cm	-	248
Hardness (as CaCO ₃)	mg/L	0.2	115
Ion Sum	mg/L	-	154
Saturation pH (5°C)	units	-	7.9
Langelier Index (5°C)	-	-	0.11
			0.35

Report ID: 457876-IAS
 Report Date: 28-Sep-22
 Date Received: 16-Sep-22

CERTIFICATE OF ANALYSIS

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 274 Sydney Street, Suite 200
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 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Brandon Kirk

Project #: 20-3571-6000

Location: Upham

Analysis of Metals in Water

RPC Sample ID:		457876-1	457876-2	457876-3	
Client Sample ID:		MW19-01D	MW19-01S	MW20-02D	
Date Sampled:		14-Sep-22	14-Sep-22	14-Sep-22	
Analytes	Units	RL			
Aluminum	µg/L	1	2	2	< 5
Antimony	µg/L	0.1	< 0.1	< 0.1	< 0.5
Arsenic	µg/L	1	< 1	< 1	< 5
Barium	µg/L	1	130	130	< 5
Beryllium	µg/L	0.1	< 0.1	< 0.1	< 0.5
Bismuth	µg/L	1	< 1	< 1	< 5
Boron	µg/L	1	490	26	53700
Cadmium	µg/L	0.01	< 0.01	0.27	< 0.05
Calcium	µg/L	50	72900	41700	601000
Chromium	µg/L	1	< 1	< 1	< 5
Cobalt	µg/L	0.1	< 0.1	< 0.1	< 0.5
Copper	µg/L	1	< 1	3	< 5
Iron	µg/L	20	< 20	< 20	< 100
Lead	µg/L	0.1	< 0.1	1.9	< 0.5
Lithium	µg/L	0.1	15.4	11.3	215.
Magnesium	µg/L	10	2820	10500	32200
Manganese	µg/L	1	81	8	357
Mercury	µg/L	0.025	< 0.025	< 0.025	< 0.025
Molybdenum	µg/L	0.1	< 0.1	< 0.1	6.9
Nickel	µg/L	1	< 1	1	< 5
Potassium	µg/L	20	1780	1070	5500
Rubidium	µg/L	0.1	2.4	1.3	6.4
Selenium	µg/L	1	< 1	< 1	< 5
Silver	µg/L	0.1	< 0.1	< 0.1	< 0.5
Sodium	µg/L	50	17500	9060	128000
Strontium	µg/L	1	1210	158	10700
Tellurium	µg/L	0.1	< 0.1	< 0.1	< 0.5
Thallium	µg/L	0.1	< 0.1	0.3	< 0.5
Tin	µg/L	0.1	< 0.1	< 0.1	< 0.5
Uranium	µg/L	0.1	< 0.1	< 0.1	< 0.5
Vanadium	µg/L	1	< 1	< 1	< 5
Zinc	µg/L	1	2	18	< 5

Report ID: 457876-IAS
 Report Date: 28-Sep-22
 Date Received: 16-Sep-22

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 Tel: 506.452.1212
 Fax: 506.452.0594
 www.rpc.ca

Attention: Brandon Kirk
Project #: 20-3571-6000
 Location: Upham

Analysis of Metals in Water

RPC Sample ID:		457876-4	457876-5	457876-6	
Client Sample ID:		MW20-02S	MW20-03D	MW20-03S	
Date Sampled:		14-Sep-22	14-Sep-22	14-Sep-22	
Analytes	Units	RL			
Aluminum	µg/L	1	< 5	< 1	2
Antimony	µg/L	0.1	< 0.5	< 0.1	< 0.1
Arsenic	µg/L	1	< 5	< 1	2
Barium	µg/L	1	5	3	184
Beryllium	µg/L	0.1	< 0.5	< 0.1	< 0.1
Bismuth	µg/L	1	< 5	< 1	< 1
Boron	µg/L	1	1760	22	23
Cadmium	µg/L	0.01	< 0.05	< 0.01	< 0.01
Calcium	µg/L	50	582000	6360	28900
Chromium	µg/L	1	< 5	< 1	< 1
Cobalt	µg/L	0.1	< 0.5	< 0.1	< 0.1
Copper	µg/L	1	< 5	< 1	< 1
Iron	µg/L	20	< 100	< 20	< 20
Lead	µg/L	0.1	< 0.5	< 0.1	< 0.1
Lithium	µg/L	0.1	12.4	4.4	5.6
Magnesium	µg/L	10	10900	1930	3170
Manganese	µg/L	1	569	< 1	1
Mercury	µg/L	0.025	< 0.025	< 0.025	< 0.025
Molybdenum	µg/L	0.1	1.4	1.4	0.7
Nickel	µg/L	1	< 5	< 1	< 1
Potassium	µg/L	20	1900	930	840
Rubidium	µg/L	0.1	< 0.5	0.3	0.3
Selenium	µg/L	1	< 5	< 1	< 1
Silver	µg/L	0.1	< 0.5	< 0.1	< 0.1
Sodium	µg/L	50	10200	10200	4990
Strontium	µg/L	1	4320	30	214
Tellurium	µg/L	0.1	< 0.5	< 0.1	< 0.1
Thallium	µg/L	0.1	< 0.5	< 0.1	< 0.1
Tin	µg/L	0.1	< 0.5	< 0.1	< 0.1
Uranium	µg/L	0.1	2.1	< 0.1	1.0
Vanadium	µg/L	1	< 5	< 1	< 1
Zinc	µg/L	1	< 5	< 1	1

Report ID: 457876-IAS
 Report Date: 28-Sep-22
 Date Received: 16-Sep-22

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 274 Sydney Street, Suite 200
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 Tel: 506.452.1212
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 www.rpc.ca

Attention: Brandon Kirk

Project #: 20-3571-6000

Location: Upham

Analysis of Metals in Water

RPC Sample ID:		457876-7	457876-8
Client Sample ID:		MW20-04D	MW10-10S
Date Sampled:		14-Sep-22	14-Sep-22
Analytes	Units	RL	
Aluminum	µg/L	1	3 < 5
Antimony	µg/L	0.1	0.3 < 0.5
Arsenic	µg/L	1	19 < 5
Barium	µg/L	1	106 5
Beryllium	µg/L	0.1	< 0.1 < 0.5
Bismuth	µg/L	1	< 1 < 5
Boron	µg/L	1	110 922
Cadmium	µg/L	0.01	< 0.01 < 0.05
Calcium	µg/L	50	43600 582000
Chromium	µg/L	1	< 1 < 5
Cobalt	µg/L	0.1	< 0.1 < 0.5
Copper	µg/L	1	3 < 5
Iron	µg/L	20	< 20 < 100
Lead	µg/L	0.1	< 0.1 < 0.5
Lithium	µg/L	0.1	7.9 12.5
Magnesium	µg/L	10	1470 10800
Manganese	µg/L	1	8 573
Mercury	µg/L	0.025	< 0.025 < 0.025
Molybdenum	µg/L	0.1	2.9 2.0
Nickel	µg/L	1	< 1 < 5
Potassium	µg/L	20	1180 1900
Rubidium	µg/L	0.1	0.9 < 0.5
Selenium	µg/L	1	< 1 < 5
Silver	µg/L	0.1	< 0.1 < 0.5
Sodium	µg/L	50	4690 10200
Strontium	µg/L	1	468 4340
Tellurium	µg/L	0.1	< 0.1 < 0.5
Thallium	µg/L	0.1	< 0.1 < 0.5
Tin	µg/L	0.1	< 0.1 < 0.5
Uranium	µg/L	0.1	4.5 2.3
Vanadium	µg/L	1	2 < 5
Zinc	µg/L	1	2 < 5

Report ID: 457876-IAS
Report Date: 28-Sep-22
Date Received: 16-Sep-22

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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: 458926-IAS
 Report Date: 06-Oct-22
 Date Received: 27-Sep-22

CERTIFICATE OF ANALYSIS

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



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 Tel: 506.452.1212
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 www.rpc.ca

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

Analysis of Water

RPC Sample ID:			458926-1
Client Sample ID:			MW20-04S
Date Sampled:			26-Sep-22
Analytes	Units	RL	
Sodium	mg/L	0.05	4.54
Potassium	mg/L	0.02	1.27
Calcium	mg/L	0.05	37.5
Magnesium	mg/L	0.01	1.25
Iron	mg/L	0.02	< 0.02
Manganese	mg/L	0.001	0.013
Copper	mg/L	0.001	0.001
Zinc	mg/L	0.001	0.002
Ammonia (as N)	mg/L	0.05	< 0.05
pH	units	-	8.0
Alkalinity (as CaCO ₃)	mg/L	2	100
Chloride	mg/L	0.5	2.8
Fluoride	mg/L	0.05	0.24
Sulfate	mg/L	1	10
Nitrate + Nitrite (as N)	mg/L	0.05	1.21
o-Phosphate (as P)	mg/L	0.01	0.01
r-Silica (as SiO ₂)	mg/L	0.1	12.2
Carbon - Total Organic	mg/L	0.5	1.2
Turbidity	NTU	0.1	28.5
Solids - Total Suspended	mg/L	5	53
Conductivity	µS/cm	1	220
Calculated Parameters			
Bicarbonate (as CaCO ₃)	mg/L	-	99.0
Carbonate (as CaCO ₃)	mg/L	-	0.931
Hydroxide (as CaCO ₃)	mg/L	-	0.050
Cation Sum	meq/L	-	2.20
Anion Sum	meq/L	-	2.37
Percent Difference	%	-	-3.65
Theoretical Conductivity	µS/cm	-	218
Hardness (as CaCO ₃)	mg/L	0.2	98.8
Ion Sum	mg/L	-	136
Saturation pH (5°C)	units	-	8.0
Langelier Index (5°C)	-	-	-0.02

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.

Peter Crowhurst, B.Sc., C.Chem.
 Director
 Inorganic Analytical Chemistry

Brannen Burhoe
 Supervisor
 Inorganic Analytical Services

Report ID: 458926-IAS
 Report Date: 06-Oct-22
 Date Received: 27-Sep-22

CERTIFICATE OF ANALYSIS

for
 Hammond River Holdings Limited
 30 Jervis 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:			458926-1
Client Sample ID:			MW20-04S
Date Sampled:			26-Sep-22
Analytes	Units	RL	
Aluminum	µg/L	1	7
Antimony	µg/L	0.1	0.5
Arsenic	µg/L	1	39
Barium	µg/L	1	126
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	76
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	37500
Chromium	µg/L	1	< 1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	1
Iron	µg/L	20	< 20
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	6.2
Magnesium	µg/L	10	1250
Manganese	µg/L	1	13
Mercury	µg/L	0.025	< 0.025
Molybdenum	µg/L	0.1	1.2
Nickel	µg/L	1	< 1
Potassium	µg/L	20	1270
Rubidium	µg/L	0.1	1.0
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	4540
Strontium	µg/L	1	350
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	2.9
Vanadium	µg/L	1	1
Zinc	µg/L	1	2

Report ID: 458926-IAS
Report Date: 06-Oct-22
Date Received: 27-Sep-22

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis 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

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

SPILL REPORT FORM

IDENTIFICATION

Spill Date: 09/09/2022	Time: 10:40
Location: Upham East	:
Civic Address of Incident: 4119 Route 111 Upperton NB	
Field Contact: Rick Hatty	Phone Number: (506) 647-3730

SPILL NOTIFICATION

<input checked="" type="checkbox"/> Supervisor (During working hours) - Name (specify):
<input checked="" type="checkbox"/> Department of Environment (During working hours) Saint John Region – 506.658.2558
<input type="checkbox"/> Coast Guard – 800.565.1633

SPILL INFORMATION

Product Spilled:	<input type="checkbox"/> Transformer Oil <input checked="" type="checkbox"/> Hydraulic Fluid <input type="checkbox"/> Other (specify):	Quantity (L):	
		Quantity (L):	
		Quantity (L):	
Equipment:	<input type="checkbox"/> Pole-top transformer	Serial / ID1 Number:	
	<input checked="" type="checkbox"/> Heavy Equipment	BH 755	
	<input type="checkbox"/> Vehicle	*Year of Manufacture:	
	<input type="checkbox"/> Other (specify):		
Environmental Impact:		YES	NO
	Watercourse within 100 m	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	Domestic well within 100 m	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cause and additional detail:	A hydraulic hose failed resulting in 10L of hydraulic oil spilling on the ground. Oil was first contained and then cleaned up along with any soil that had been contaminated. material was sent to ...		
Samples sent to RPC laboratory for analysis (Address: 921 College Hill Rd, Fredericton, 506.452.1212)			
<input type="checkbox"/> Oil (from equipment): _____ ppm			
<input type="checkbox"/> Soil (unable to sample equipment): _____ ppm			
<input type="checkbox"/> Other (watercourse): _____ ppm			

SEQUENCE OF EVENTS

Date	Time	Description of Action Taken

ADDITIONAL INFORMATION

	YES	NO
Is source of spill stopped?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is spill contained?	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is spill cleaned-up?	<input checked="" type="checkbox"/>	<input type="checkbox"/>

EXTERNAL RESOURCES / INSPECTORS (if applicable)

	YES	NO	If "yes", indicate Name, Date and Time
Environment Inspector on-site	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Contractor used for clean-up	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Site Professional used for remediation support	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

APPROVAL AND REVIEW

Initiator	Signature: Daniel Guest	Date Prepared: 09/12/2022
Supervisor/Manager	Signature: Daniel Guest Comments: Spill kit and spill response supplies replenished?	Date Reviewed: 09/12/2022 <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
EMS Coordinator	Signature:	Date Completed:

September 6, 2022

Project No.: 22S001.00

Mr. Daniel Guest

Hammond River Holdings

Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-29 – 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 Archibald Drilling & Blasting at 14:01 on September 2, 2022. 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. 2022-29 – September 2, 2022

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)	14:01	1360 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		891 m S	0.50 mm/s @ 51 Hz	107	-
3. Civic No. 4150 Route 111 (PW-13)		728 m SE	1.36 mm/s @ 68 Hz	N/A	Air blast did not record-
4. Civic No. 2447 Route 820 (PW-07)		905 m NE	0.89 mm/s @ 9 Hz	110	-
5. PW-03 - Cottage Route 820		622 m N	2.41 mm/s @ 43 Hz	117	-
6. Civic No. 2341 Route 820 (PW-05)		683 m N	1.32 mm/s @ 10 Hz	115	-
7. Civic No. 50 Myron Road (PW-15)		945 m NW	< 0.5 mm/s	<120	Units were not triggered
8. Civic No. 86 Myron Road (PW-16)		850 m W	< 0.5 mm/s	<120	
9. Civic No. 220 Myron Road (PW-01)		1,360 m S	< 0.5 mm/s	<120	
10. Civic No. 4140 Route 111 (PW-12)		815 m SE	1.02 mm/s @ 64 Hz	116	-
11. Civic No. 2337 Route 820 (PW-04)		762 m N	0.76 mm/s @ 10 Hz	114	-
maximum limits as per Approval to Operate			12.5 mm/s	128 dB	

Mr. Daniel Guest – Hammond River Holdings
September 6, 2022
Project No.: 22S001.00 – Blast No.: 2022-29

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: 22S001.00

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>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

IDENTIFICATION:

Blasting Contractor:	<u>Archibald Drilling & Blasting</u>		
Blaster's Certification No.:	<u>1297</u>	Blaster's Name:	<u>Anthony Wallace</u>
Blast Location:	<u>N 45°28'53.05" W 65°37'58.48" (see attached sketch)</u>		
Type of Rock:	<u>Gypsum</u>	Est. Vol. or Tonnage:	<u>18,135 tonnes</u>
Weather at time of Blast:	<u>Clear</u>	Air Temp.:	<u>20°C</u>
Est. Wind Speed :	<u>≈15 km/h</u>	Wind Direction:	<u>SE</u>
Cloud Cover:	<u>No</u>	Precipitation:	<u>No</u>

BLAST DESIGN:

Total No. Holes:	<u>122</u>	Hole Diameter:	<u>4.5"</u>
Average Depth:	<u>20 ft</u>	Spacing:	<u>10 ft x 10 ft</u>
No. Holes per Delay:	<u>2</u>	Collar Length:	<u>8 ft</u>
Delay between Holes:	<u>25 ms</u>	Delay between Rows:	<u>62 & 92 ms</u>
Initiation Method:	<u>Non-Electric</u>		
Weight of Explosives per Delay:	<u>Max.: 108 kg</u>		
Type and weight of Explosives for Blast:	<u>6,310 kg – Emulsion</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>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

BLAST MONITORING

Distance to the Nearest Structure:	<u>622 m</u>
Direction to the Nearest Structure:	<u>N</u>
Structure Type:	<u>House</u>
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	<u>59.9</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>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5676</u>
Calibration Date:	<u>February 28, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,320 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 Mini Mate, Serial #20204</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>891 m South</u>
Transverse Particle Velocity:	<u>0.50 mm/s @ 51 Hz</u>
Vertical Particle Velocity:	<u>0.45 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.30 mm/s @ 34 Hz</u>
Peak Particle Velocity:	<u>0.50 mm/s @ 51 Hz</u>
Maximum Airblast:	<u>107 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>728 m Southeast</u>
Transverse Particle Velocity:	<u>1.17 mm/s @ 68 Hz</u>
Vertical Particle Velocity:	<u>1.10 mm/s @ 51 Hz</u>
Longitudinal Particle Velocity:	<u>1.36 mm/s @ 68 Hz</u>
Peak Particle Velocity:	<u>1.36 mm/s @ 68 Hz</u>
Maximum Airblast:	<u>N/A</u>

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>905 m Northeast</u>
Transverse Particle Velocity:	<u>0.76 mm/s @ 10 Hz</u>
Vertical Particle Velocity:	<u>0.51 mm/s @ 32 Hz</u>
Longitudinal Particle Velocity:	<u>0.89 mm/s @ 9 Hz</u>
Peak Particle Velocity:	<u>0.89 mm/s @ 9 Hz</u>
Maximum Airblast:	<u>110 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5635</u>
Calibration Date:	<u>March 1, 2022</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>622 m North</u>
Transverse Particle Velocity:	<u>1.21 mm/s @ 51 Hz</u>
Vertical Particle Velocity:	<u>1.02 mm/s @ 27 Hz</u>
Longitudinal Particle Velocity:	<u>2.41 mm/s @ 43 Hz</u>
Peak Particle Velocity:	<u>2.41 mm/s @ 43 Hz</u>
Maximum Airblast:	<u>117 dB(L)</u>

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #18193</u>
Calibration Date:	<u>April 11, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>683 m North</u>
Transverse Particle Velocity:	<u>1.32 mm/s @ 10 Hz</u>
Vertical Particle Velocity:	<u>1.20 mm/s @ 37 Hz</u>
Longitudinal Particle Velocity:	<u>1.06 mm/s @ 9 Hz</u>
Peak Particle Velocity:	<u>1.32 mm/s @ 10 Hz</u>
Maximum Airblast:	<u>115 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5632</u>
Calibration Date:	<u>November 15, 2021</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>945 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 Mini Mate, Serial #5486</u>
Calibration Date:	<u>April 25, 2022</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>850 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>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5487</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,360 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 #10

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>815 m Southeast</u>
Transverse Particle Velocity:	<u>0.89 mm/s @ 73 Hz</u>
Vertical Particle Velocity:	<u>1.02 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.64 mm/s @ 64 Hz</u>
Peak Particle Velocity:	<u>1.02 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>116 dB(L)</u>



BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 2, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:01</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-29</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5371</u>
Calibration Date:	<u>July 22, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>762 m North</u>
Transverse Particle Velocity:	<u>0.57 mm/s @ 14 Hz</u>
Vertical Particle Velocity:	<u>0.51 mm/s @ 20 Hz</u>
Longitudinal Particle Velocity:	<u>0.76 mm/s @ 10 Hz</u>
Peak Particle Velocity:	<u>0.76 mm/s @ 10 Hz</u>
Maximum Airblast:	<u>114 dB(L)</u>

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan

Blast No: 2022-29

Upham East Gypsum Quarry
Upham, NB

PLS-CADD Overlay



Date: September 2, 2022
Project No.: 22S001.00



Attachment C

Blast Event Reports

Date/Time Tran at 14:01:16 September 2, 2022
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 3.6 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20204_20220902140116.IDFW

Notes

Location:
 Client:
 User Name:
 General:

Post Event Notes

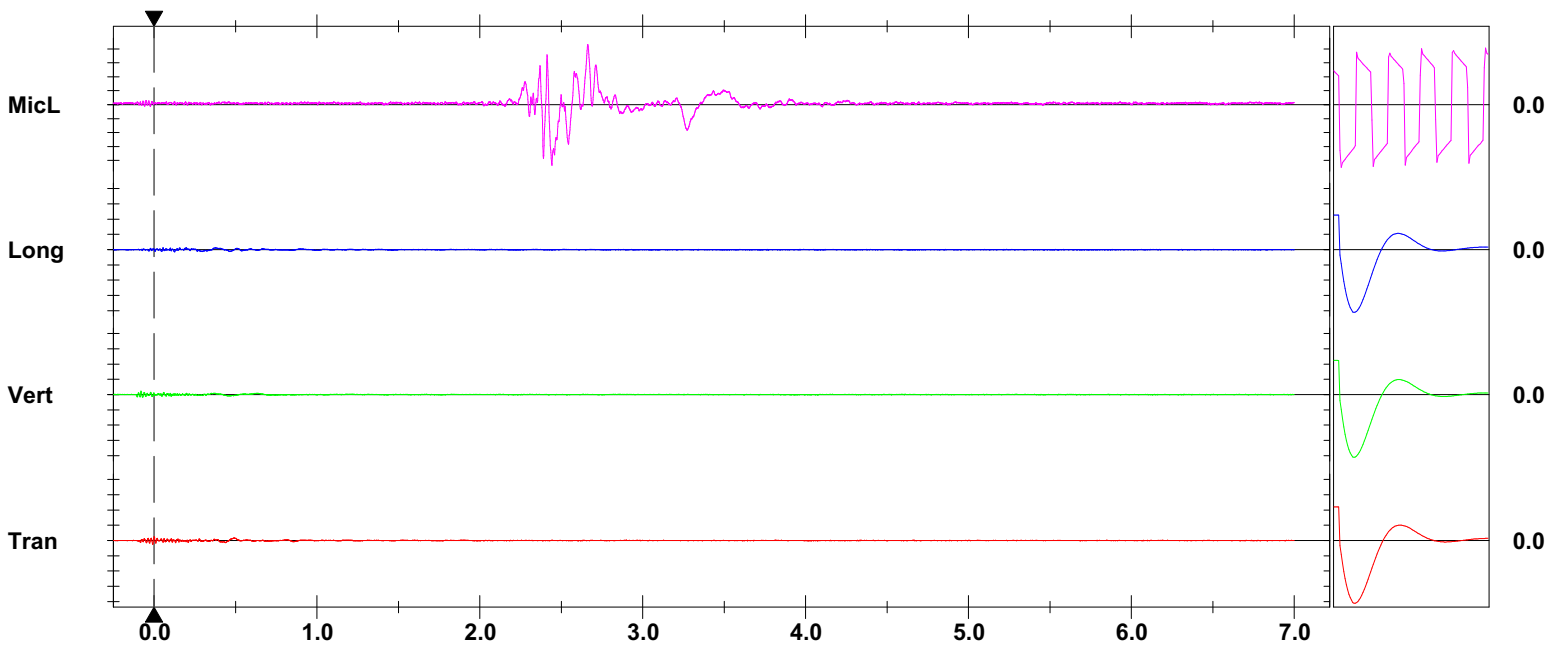
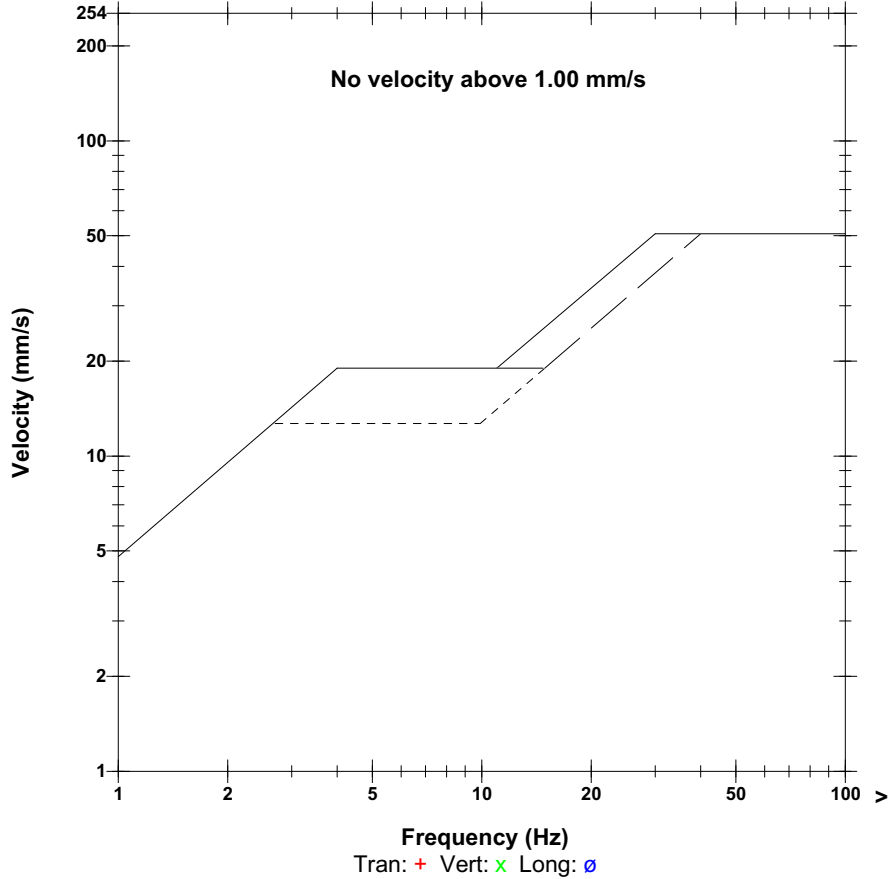
Location: 4126 Route 111 (PW-10)
 Blast No.: 2022-29
 Project No: 22S001.00

Microphone Linear Weighting
PSPL 106.7 dB(L) 4.344 pa.(L) at 2.441 sec
ZC Freq 7.1 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1276 mv)

	Tran	Vert	Long	
PPV	0.497	0.449	0.300	mm/s
PPV	44.92	44.05	40.53	dB
ZC Freq	51	57	34	Hz
Time (Rel. to Trig)	0.000	-0.080	0.125	sec
Peak Acceleration	0.025	0.021	0.019	g
Peak Displacement	0.006	0.006	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.7	Hz
Overswing Ratio	4.1	4.2	3.9	

Peak Vector Sum 0.538 mm/s at -0.001 sec

USBM R18507 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 14:01:13 September 2, 2022
Trigger Source Geo: 0.500 mm/s
Range Geo: 254.0 mm/s
Record Time 3.333 sec (Auto=3Sec) at 2048 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_20220902140113.IDFW

Post Event Notes

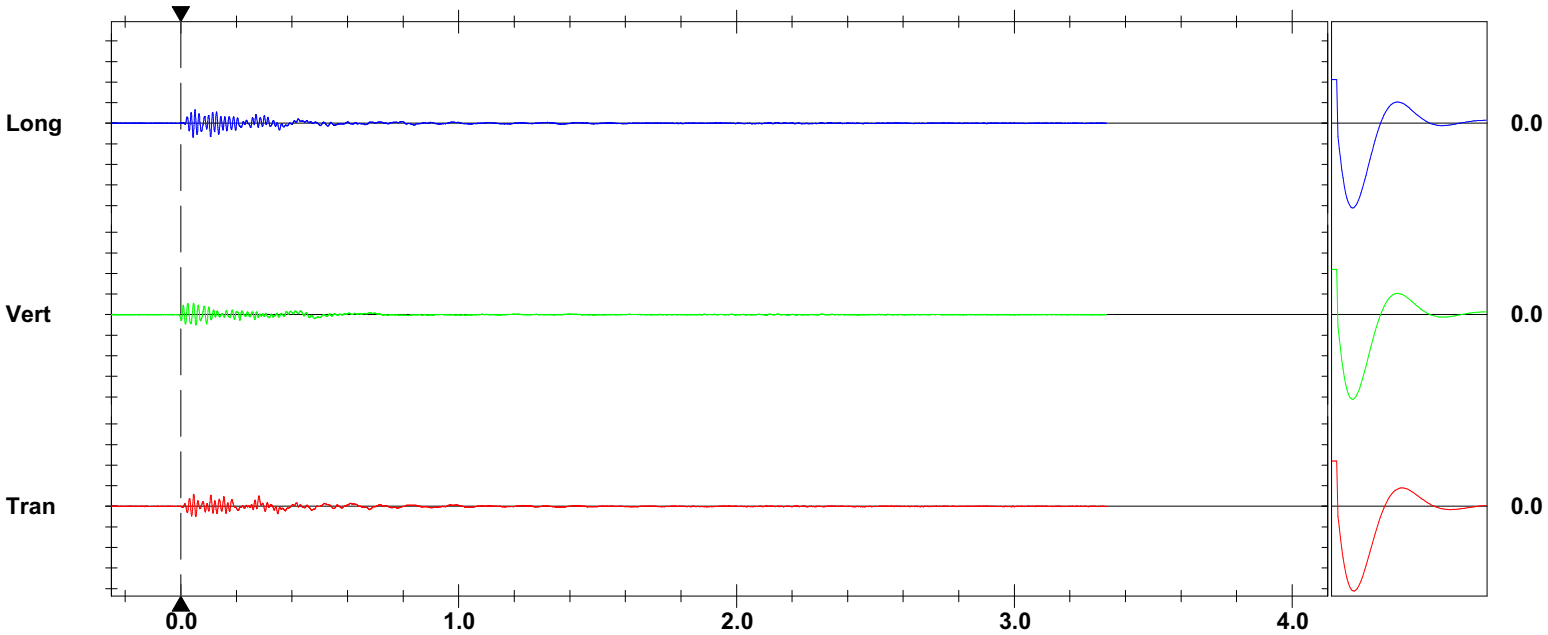
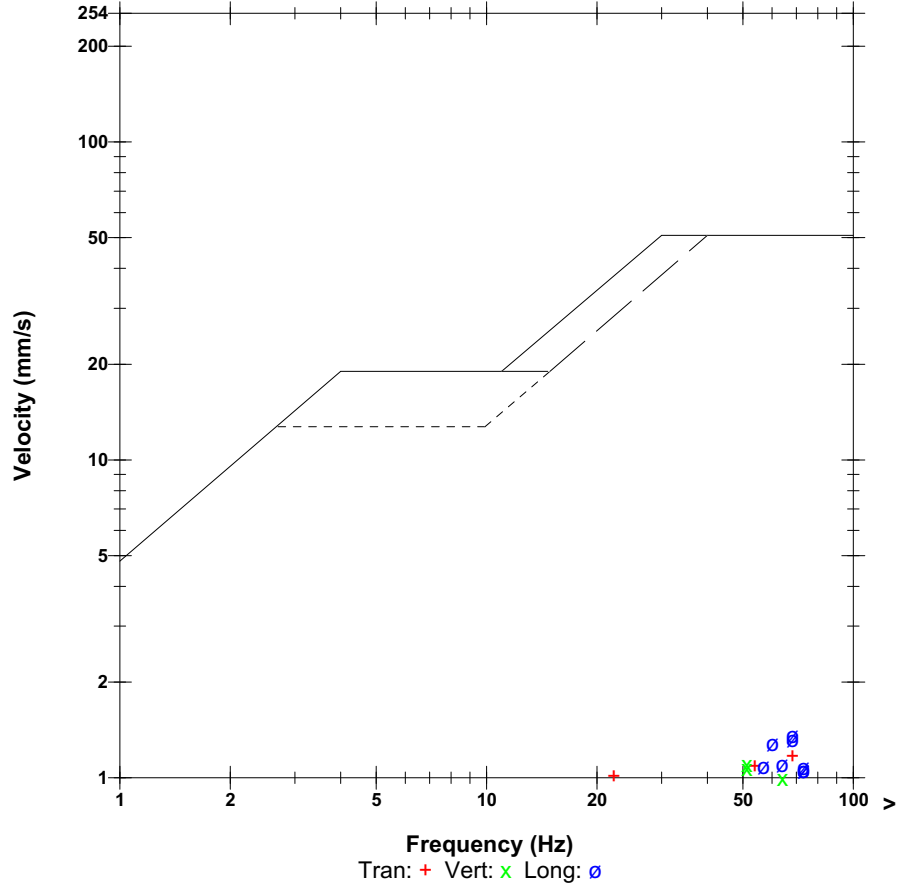
Location: 4150 Route 111 (PW-13)
 Blast No.: 2022-29
 Project No: 22S001.00

Notes
 Location:
 Client:
 User Name:
 General:

	Tran	Vert	Long	
PPV	1.174	1.103	1.364	mm/s
PPV	52.40	51.86	53.69	dB
ZC Freq	68	51	68	Hz
Time (Rel. to Trig)	0.046	0.046	0.044	sec
Peak Acceleration	0.049	0.067	0.079	g
Peak Displacement	0.007	0.007	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	6.9	7.5	7.5	Hz
Overswing Ratio	4.7	4.0	4.0	

Peak Vector Sum 1.927 mm/s at 0.045 sec

USBM RI8507 And OSMRE



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div
Trigger =

Sensor Check

Date/Time Long at 14:01:08 September 2, 2022
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number BE21348 V 10.72-1.1 Minimate Blaster
Battery Level 6.2 Volts
Unit Calibration July 21, 2022 by InstanTel
File Name W348JNQU.XW0

Notes

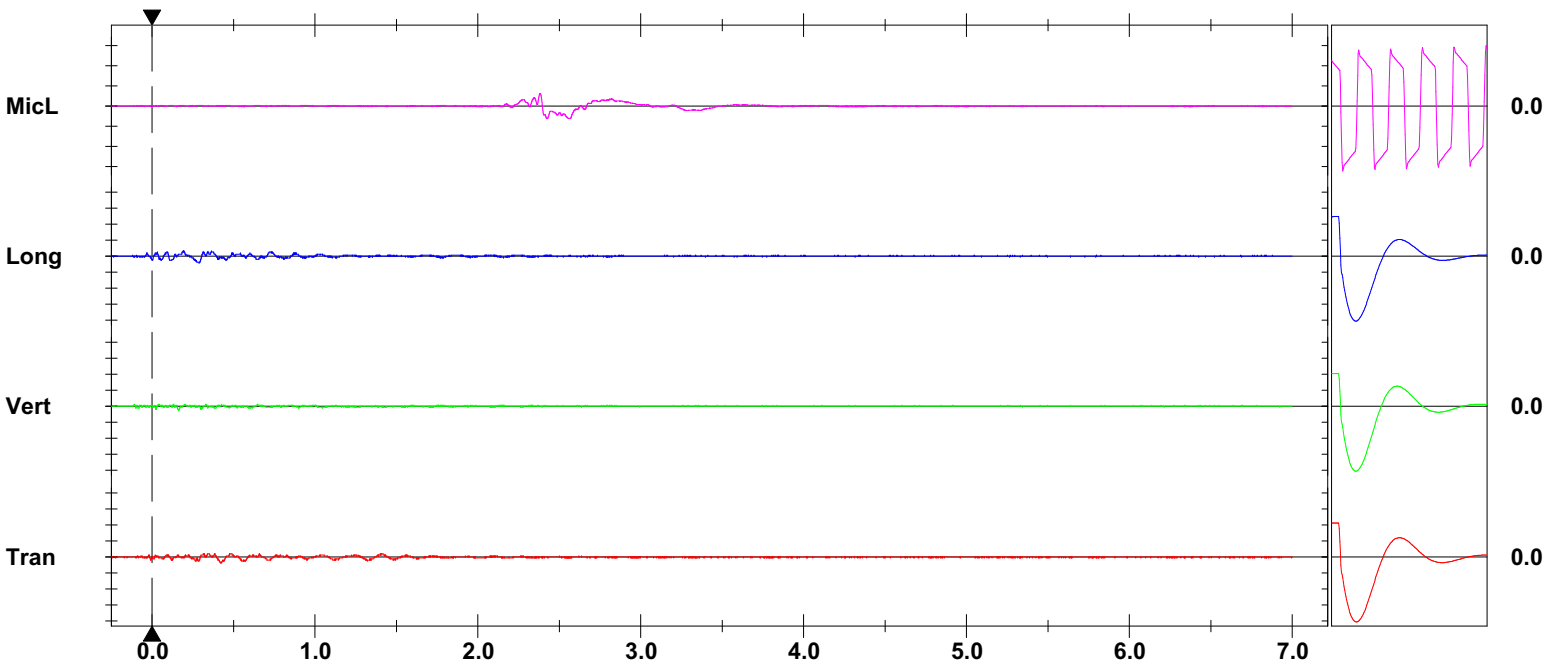
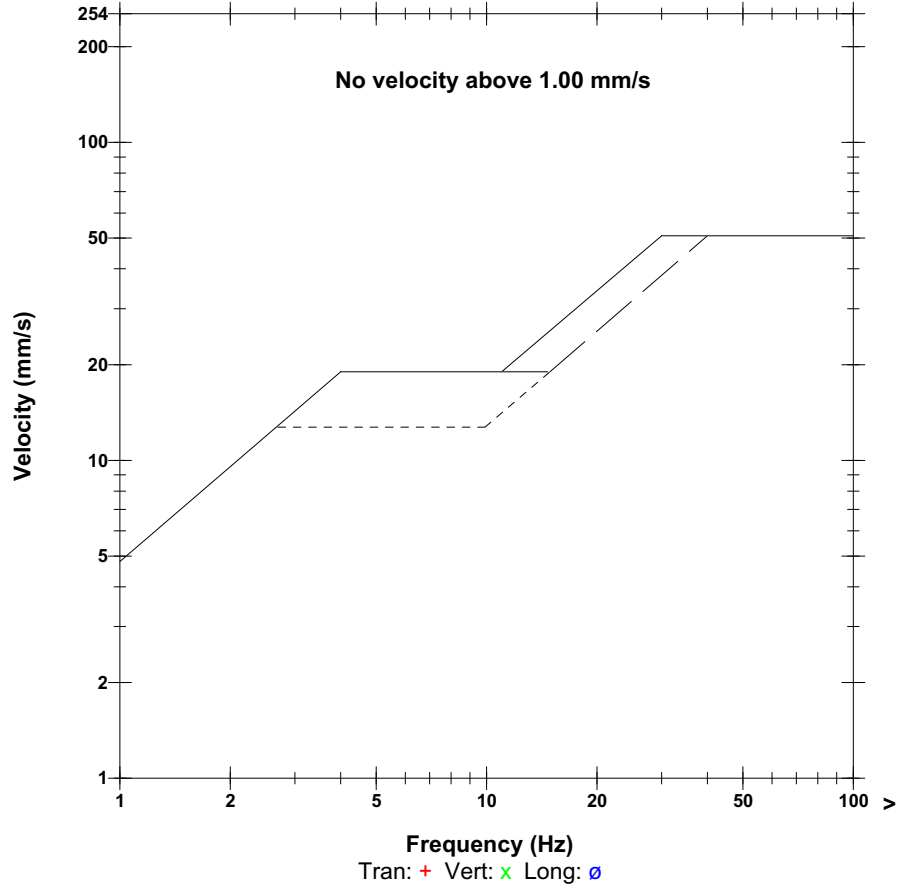
Post Event Notes
 Location: 2447 Route 820 (PW-07)
 Blast No.: 2022-29
 Project No: 22S001.00

Microphone Linear Weighting
PSPL 109.9 dB(L) 6.250 pa.(L) at 2.381 sec
ZC Freq 6.8 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 495 mv)

	Tran	Vert	Long	
PPV	0.762	0.508	0.889	mm/s
PPV	48.64	45.12	49.98	dB
ZC Freq	9.8	32	8.5	Hz
Time (Rel. to Trig)	0.420	0.162	0.289	sec
Peak Acceleration	0.013	0.027	0.027	g
Peak Displacement	0.012	0.003	0.015	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.7	7.4	Hz
Overswing Ratio	3.4	3.3	4.0	

Peak Vector Sum 0.976 mm/s at 0.289 sec

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger = ▶ ◀

Sensor Check

Date/Time Vert at 14:01:17 September 2, 2022
Trigger Source Geo: 0.492 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5635 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration March 1, 2022 by InstanTel
File Name G635JNSP.M50

Notes
 Location:
 Client:
 User Name:
 Converted: September 2, 2022 17:02:29 (V10.72.1)

Post Event Notes
 Location: Cootage - Route 820 (PW-03)
 Blast No.: 2022-29
 Project No: 22S001.00

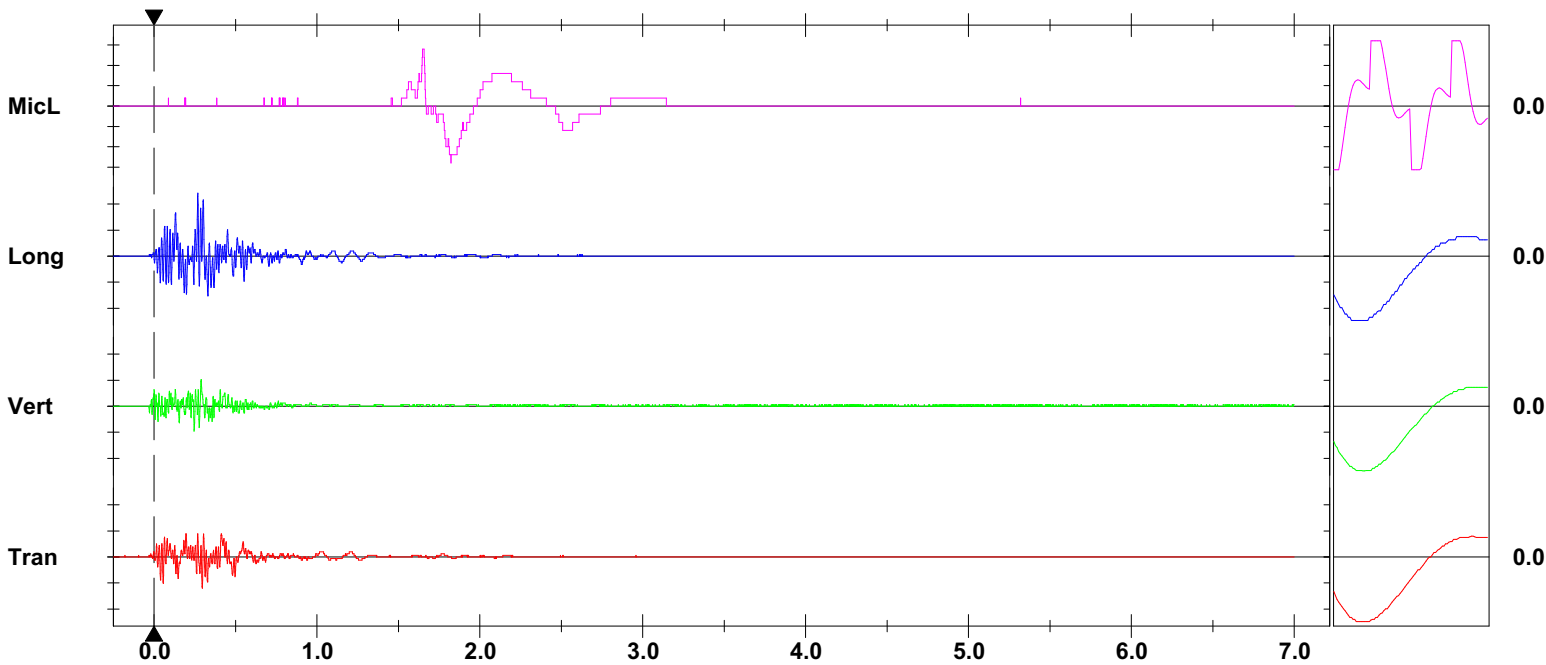
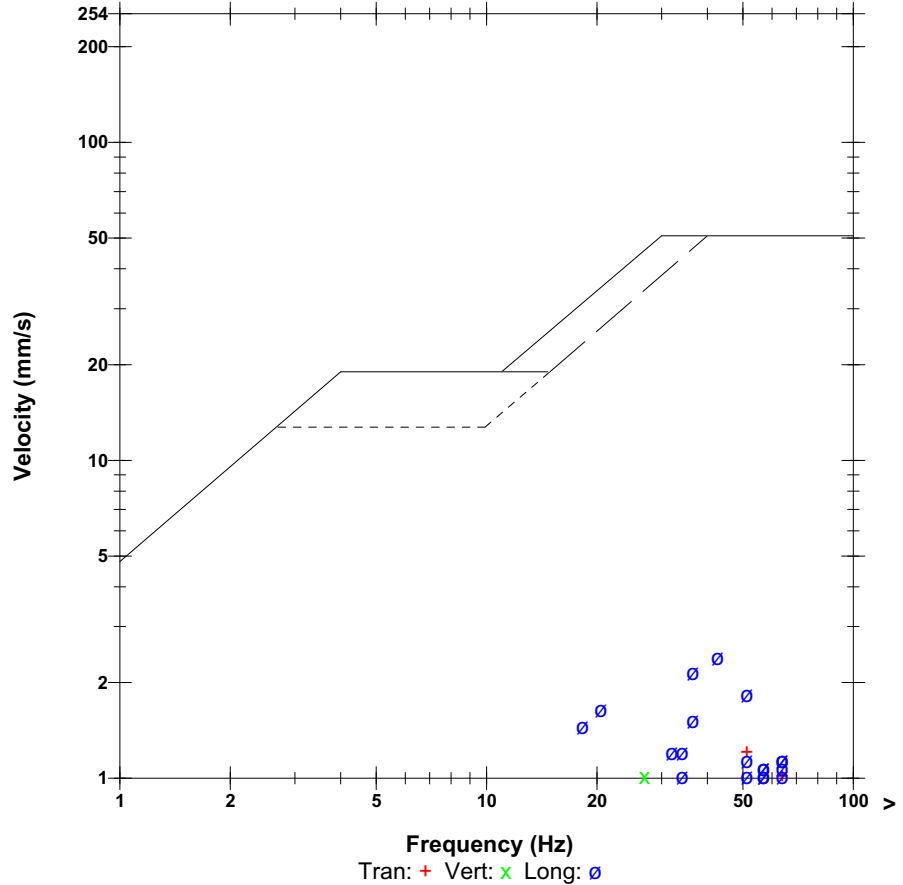
Extended Notes

Microphone Linear Weighting
PSPL 116.9 dB(L) 14.00 pa.(L) at 1.649 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 297 mv)

	Tran	Vert	Long	
PPV	1.207	1.016	2.413	mm/s
PPV	52.63	51.14	58.65	dB
ZC Freq	51	27	43	Hz
Time (Rel. to Trig)	0.297	0.289	0.270	sec
Peak Acceleration	0.046	0.040	0.066	g
Peak Displacement	0.008	0.005	0.011	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	8.0	8.5	Hz
Overswing Ratio	3.1	3.6	3.7	

Peak Vector Sum 2.572 mm/s at 0.270 sec

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 1.000 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:01:16 September 2, 2022
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/BATHURST.MMB

Serial Number UM18193 V 10-90GC Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration April 11, 2022 by InstanTel
File Name UM18193_20220902140116.IDFW

Notes
 Location:
 Client:
 User Name:
 General:

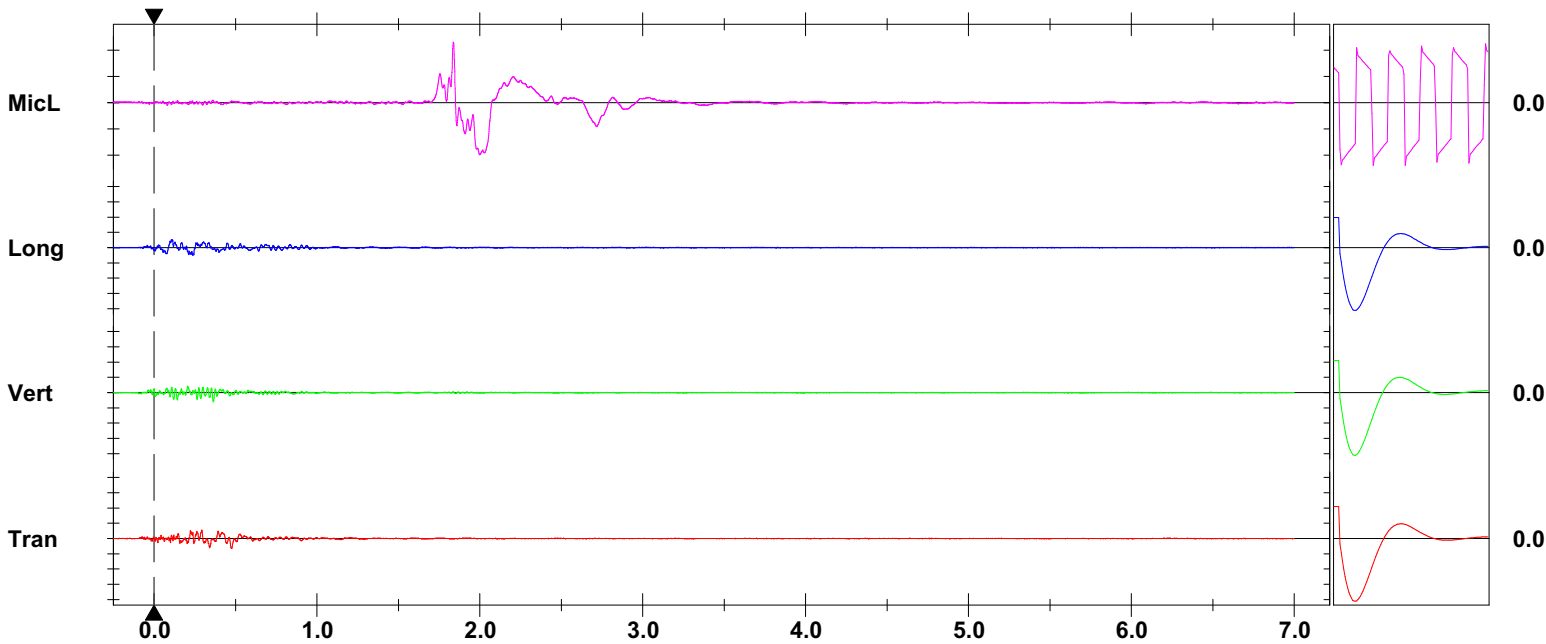
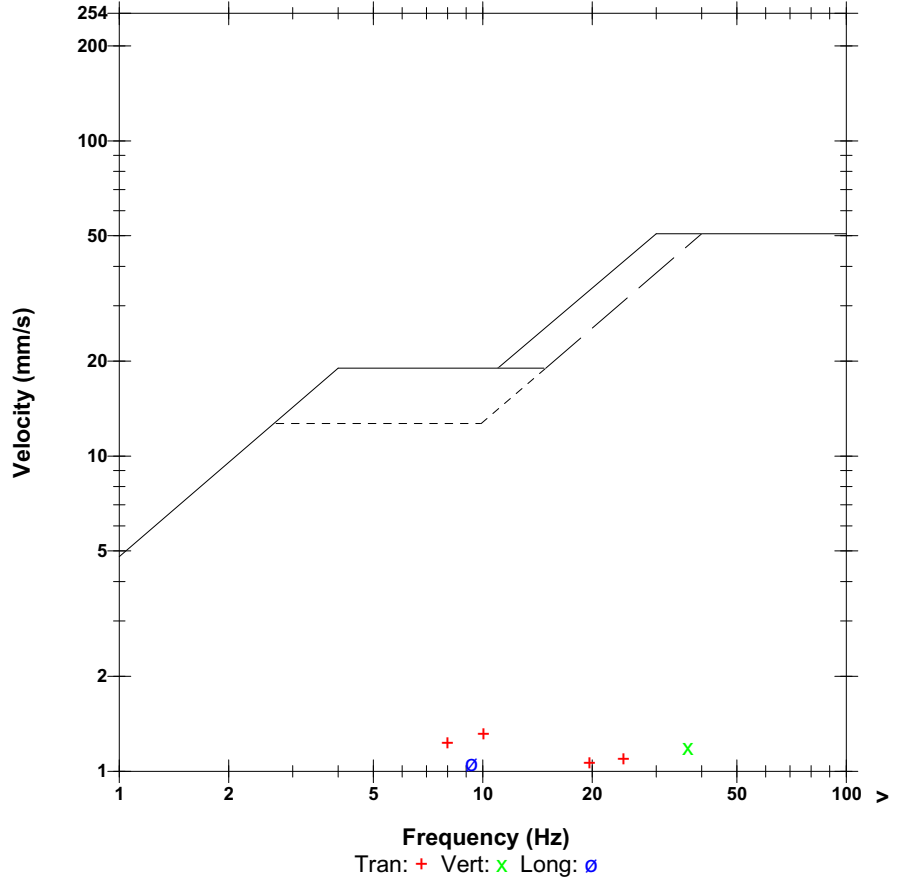
Post Event Notes
 Location: 2341 Route 820 (PW-05)
 Blast No.: 2022-29
 Project No: 22S001.00

Microphone Linear Weighting
PSPL 115.2 dB(L) 11.51 pa.(L) at 1.837 sec
ZC Freq 3.4 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1399 mv)

	Tran	Vert	Long	
PPV	1.316	1.198	1.064	mm/s
PPV	53.39	52.57	51.54	dB
ZC Freq	10	37	9.3	Hz
Time (Rel. to Trig)	0.475	0.363	0.106	sec
Peak Acceleration	0.049	0.049	0.046	g
Peak Displacement	0.015	0.005	0.016	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.3	4.1	4.5	

Peak Vector Sum 1.454 mm/s at 0.341 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:01:12 September 2, 2022
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Job Number: 1

Serial Number BE21349 V 10.72-1.1 Minimate Blaster
Battery Level 6.2 Volts
Unit Calibration July 20, 2022 by InstanTEL
File Name W349JNQU.Y00

Notes

Location:
 Client:
 User Name:
 General:

Post Event Notes

Location: 4140 Route 111 (PW-12)
 Blast No.: 2022-29
 Project No: 22S001.00

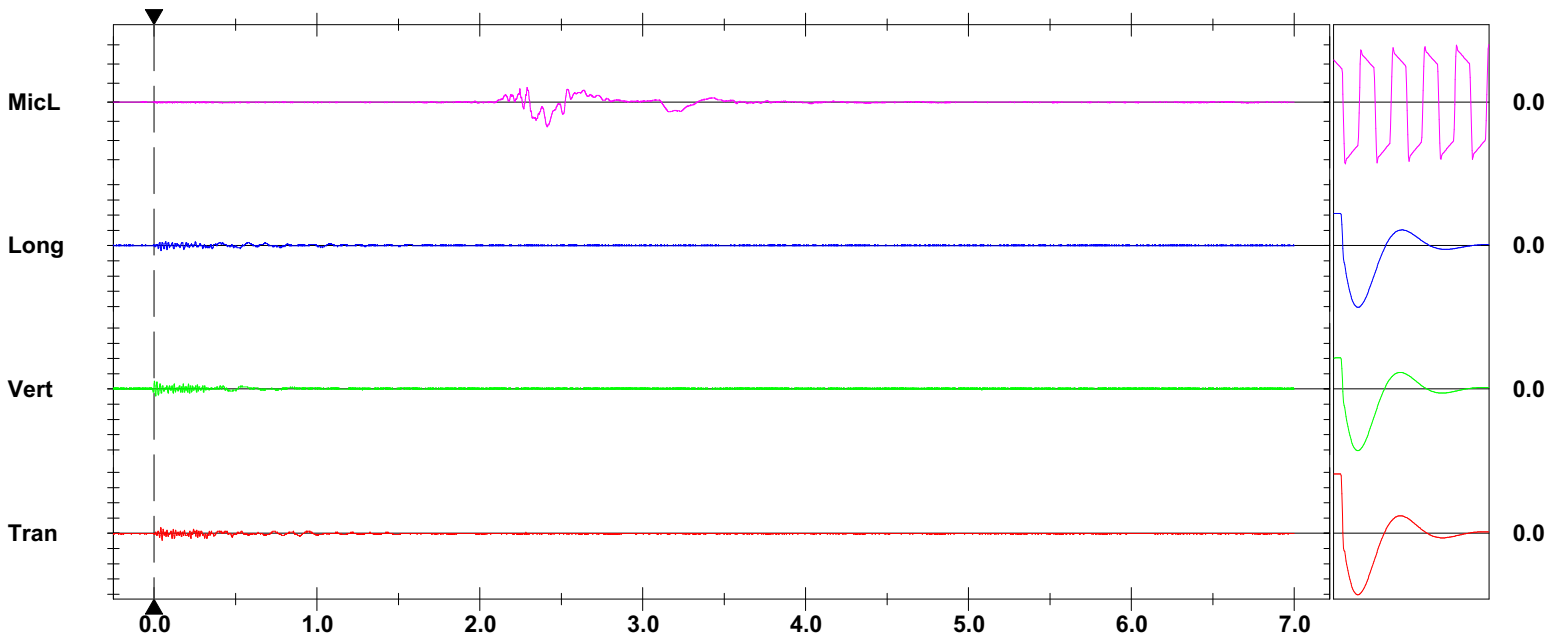
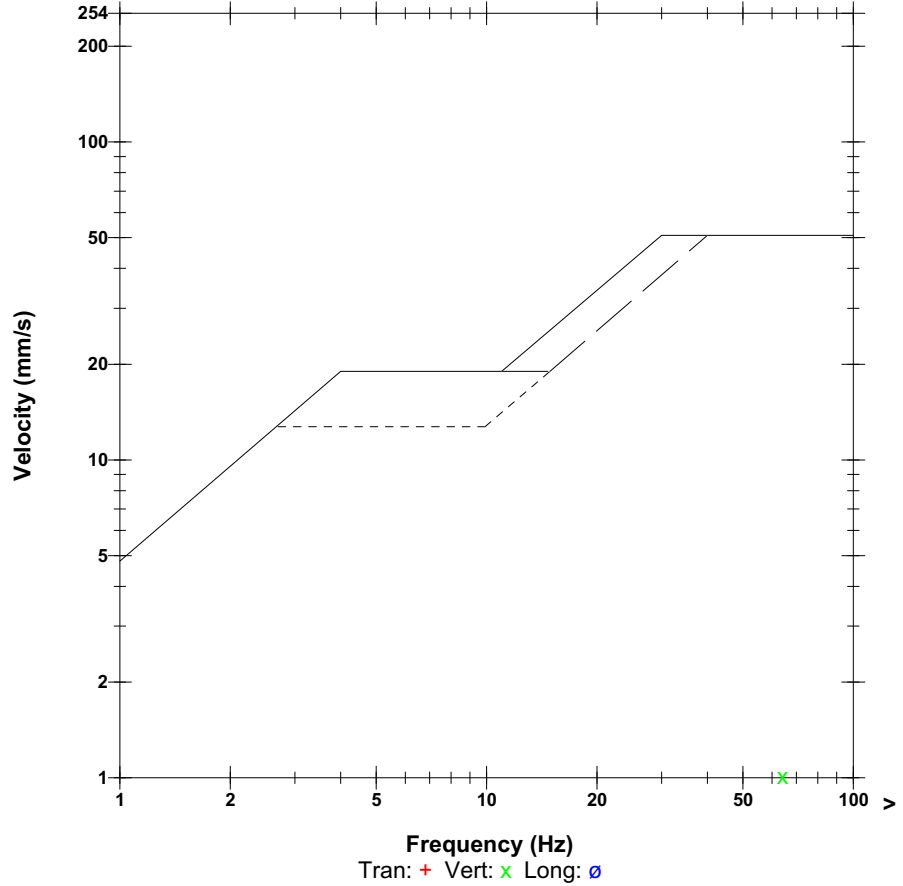
Extended Notes

Microphone Linear Weighting
PSPL 116.1 dB(L) 12.75 pa.(L) at 2.413 sec
ZC Freq 2.3 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 532 mv)

	Tran	Vert	Long	
PPV	0.889	1.016	0.635	mm/s
PPV	49.98	51.14	47.06	dB
ZC Freq	73	64	64	Hz
Time (Rel. to Trig)	0.048	0.002	0.041	sec
Peak Acceleration	0.040	0.053	0.040	g
Peak Displacement	0.004	0.008	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.5	7.3	Hz
Overswing Ratio	3.6	3.8	4.0	

Peak Vector Sum 1.024 mm/s at 0.002 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Long at 14:01:20 September 2, 2022
Trigger Source Geo: 0.492 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5371 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 27, 2022 by InstanTel
File Name G371JNSP.M80

Notes
 Location:
 Client:
 User Name:
 Converted: September 2, 2022 16:57:51 (V10.72.1)

Post Event Notes
 Location: 2337 Route 820 (PW-04)
 Blast No.: 2022-29
 Project No: 22S001.00

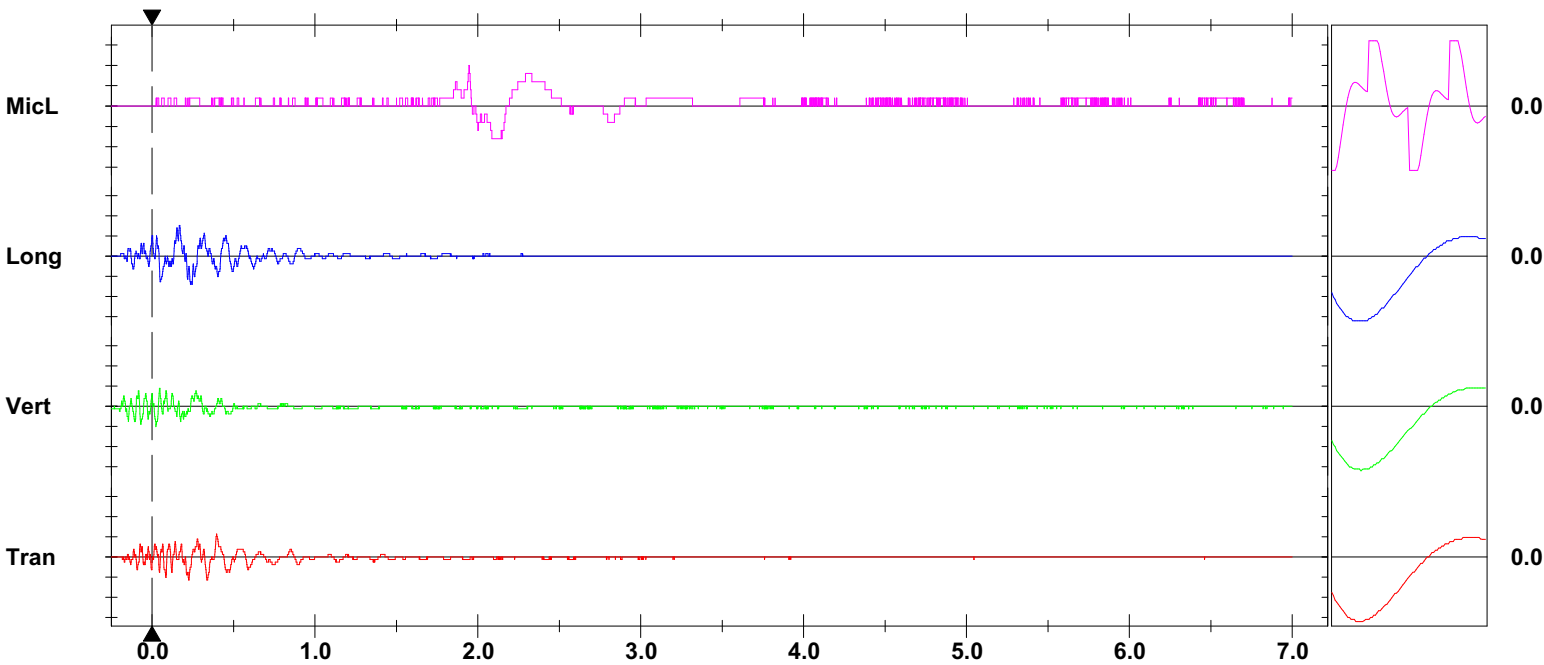
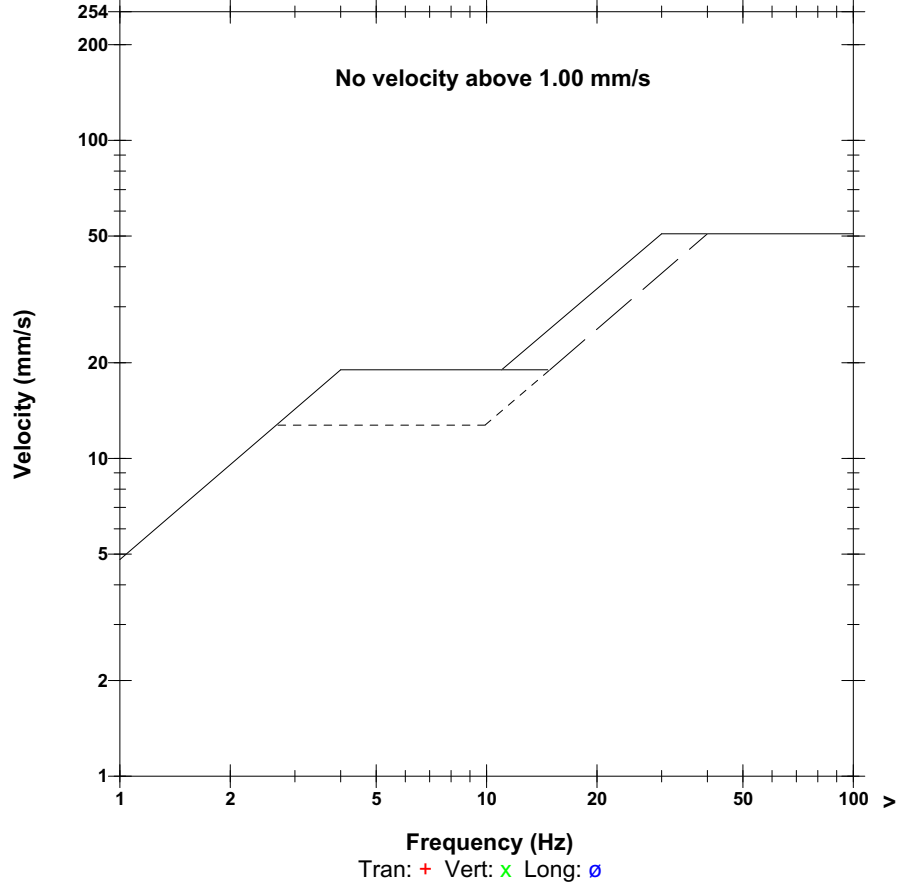
Extended Notes

Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 1.945 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 303 mv)

	Tran	Vert	Long	
PPV	0.572	0.508	0.762	mm/s
PPV	46.14	45.12	48.64	dB
ZC Freq	14	20	10	Hz
Time (Rel. to Trig)	0.225	0.024	0.168	sec
Peak Acceleration	0.013	0.013	0.013	g
Peak Displacement	0.006	0.004	0.014	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.2	Hz
Overswing Ratio	3.5	3.7	3.5	

Peak Vector Sum 0.794 mm/s at 0.170 sec

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

September 10, 2022

Project No.: 22S001.00

Mr. Daniel Guest

Hammond River Holdings

Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-30 – 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 Archibald Drilling & Blasting at 14:00 on September 9, 2022. 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. 2022-30 – September 9, 2022

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	1340 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		919 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)		945 m NE	< 0.5 mm/s	<120	
5. PW-03 - Cottage Route 820		640 m N	< 0.5 mm/s	<120	
6. Civic No. 2341 Route 820 (PW-05)		630 m N	< 0.5 mm/s	<120	-
7. Civic No. 50 Myron Road (PW-15)		862 m NW	0.73 mm/s @ 47 Hz	104	
8. Civic No. 86 Myron Road (PW-16)		777 m W	0.77 mm/s @ 51 Hz	113	-
9. Civic No. 220 Myron Road (PW-01)		1,355 m S	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 4140 Route 111 (PW-12)		859 m SE	< 0.5 mm/s	<120	
11. Civic No. 2337 Route 820 (PW-04)		710 m N	< 0.5 mm/s	<120	
maximum limits as per Approval to Operate			12.5 mm/s	128 dB	

Mr. Daniel Guest - Hammond River Holdings

September 10, 2022

Project No.: 22S001.00 - Blast No.: 2022-30

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".

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

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

Project No: 22S001.00

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Attachment A

Blast Record

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

IDENTIFICATION:

Blasting Contractor:	<u>Archibald Drilling & Blasting</u>		
Blaster's Certification No.:	<u>1297</u>	Blaster's Name:	<u>Anthony Wallace</u>
Blast Location:	<u>N 45°28.889' W 65°38.053' (see attached sketch)</u>		
Type of Rock:	<u>Gypsum</u>	Est. Vol. or Tonnage:	<u>16,928 tonnes</u>
Weather at time of Blast:	<u>Clear</u>	Air Temp.:	<u>24°C</u>
Est. Wind Speed :	<u>≈10 km/h</u>	Wind Direction:	<u>SE</u>
Cloud Cover:	<u>No</u>	Precipitation:	<u>No</u>

BLAST DESIGN:

Total No. Holes:	<u>160</u>	Hole Diameter:	<u>4.5"</u>
Average Depth:	<u>4.5 m</u>	Spacing:	<u>10 ft x 10 ft</u>
No. Holes per Delay:	<u>1</u>	Collar Length:	<u>8.5 ft - 10 ft</u>
Delay between Holes:	<u>25 ms</u>	Delay between Rows:	<u>59 & 88 ms</u>
Initiation Method:	<u>Non-Electric</u>		
Weight of Explosives per Delay:	<u>Max.: 35 kg</u>		
Type and weight of Explosives for Blast:	<u>4,990 kg Fortex – Emulsion</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>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

BLAST MONITORING

Distance to the Nearest Structure:	<u>630 m</u>
Direction to the Nearest Structure:	<u>N</u>
Structure Type:	<u>House</u>
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	<u>106.5</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>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>InstanTel Mini Mate, Serial #5676</u>
Calibration Date:	<u>February 28, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,340 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 Mini Mate, Serial #5489</u>
Calibration Date:	<u>April 25, 2022</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>919 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>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #20204</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>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 Mini Mate, Serial #5632</u>
Calibration Date:	<u>November 15, 2021</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>945 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>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #20203</u>
Calibration Date:	<u>May 31, 2022</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>640 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 #5372</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>630 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>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #20205</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>862 m Northwest</u>
Transverse Particle Velocity:	<u>0.54 mm/s @ 47 Hz</u>
Vertical Particle Velocity:	<u>0.64 mm/s @ 47 Hz</u>
Longitudinal Particle Velocity:	<u>0.73 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>0.73 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>104 dB(L)</u>

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #18193</u>
Calibration Date:	<u>April 11, 2022</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>777 m West</u>
Transverse Particle Velocity:	<u>0.57 mm/s @ 28 Hz</u>
Vertical Particle Velocity:	<u>0.43 mm/s @ 32 Hz</u>
Longitudinal Particle Velocity:	<u>0.77 mm/s @ 51 Hz</u>
Peak Particle Velocity:	<u>0.77 mm/s @ 51 Hz</u>
Maximum Airblast:	<u>113 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,355 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 #10

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5371</u>
Calibration Date:	<u>July 22, 2022</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>859 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>



BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 9, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:00</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-30</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>710 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>

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan

Blast No: 2022-30

Upham East Gypsum Quarry

Upham, NB



Date: September 9, 2022
Project No.: 22S001.00



Attachment C

Blast Event Reports

Date/Time Vert at 14:00:22 September 9, 2022
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 3.7 Volts
Unit Calibration May 31, 2022 by InstanTel
File Name UM20205_20220909140022.IDFW

Notes
 Location:
 Client:
 User Name:
 General:

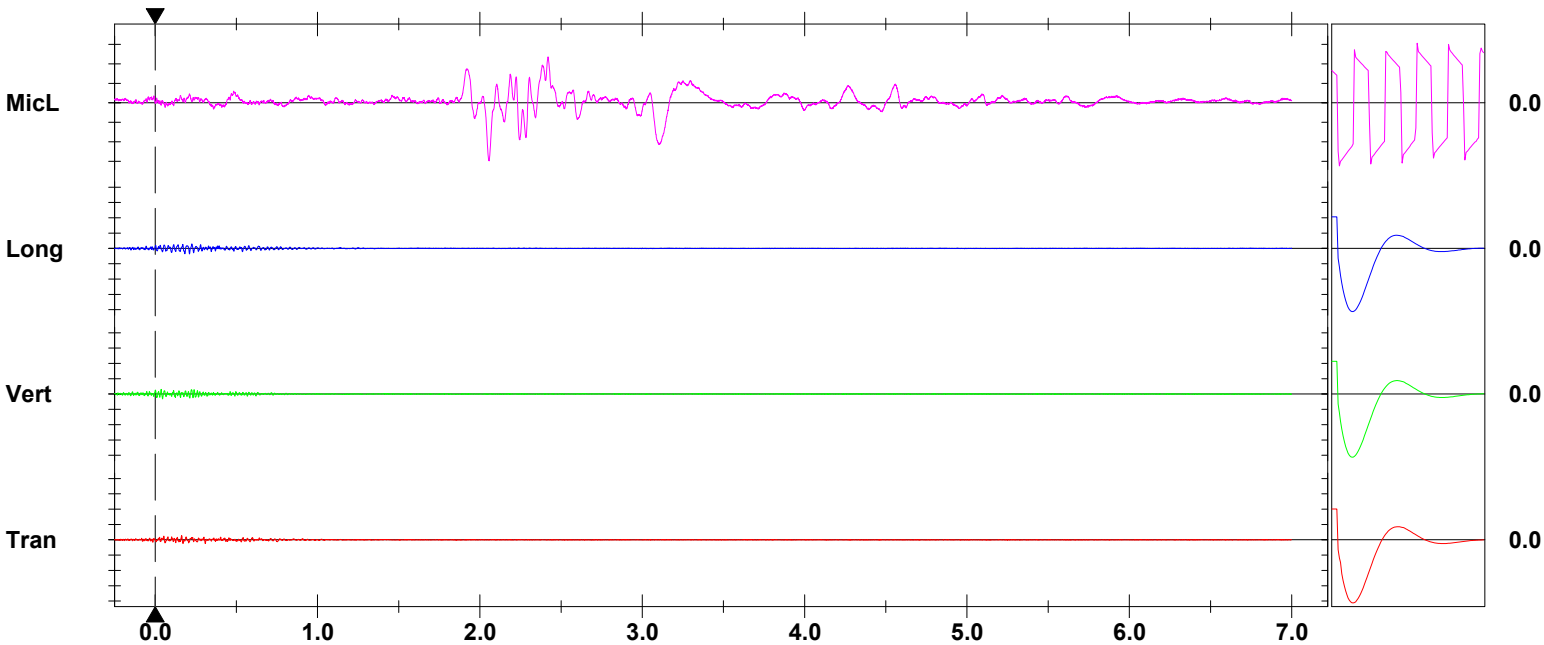
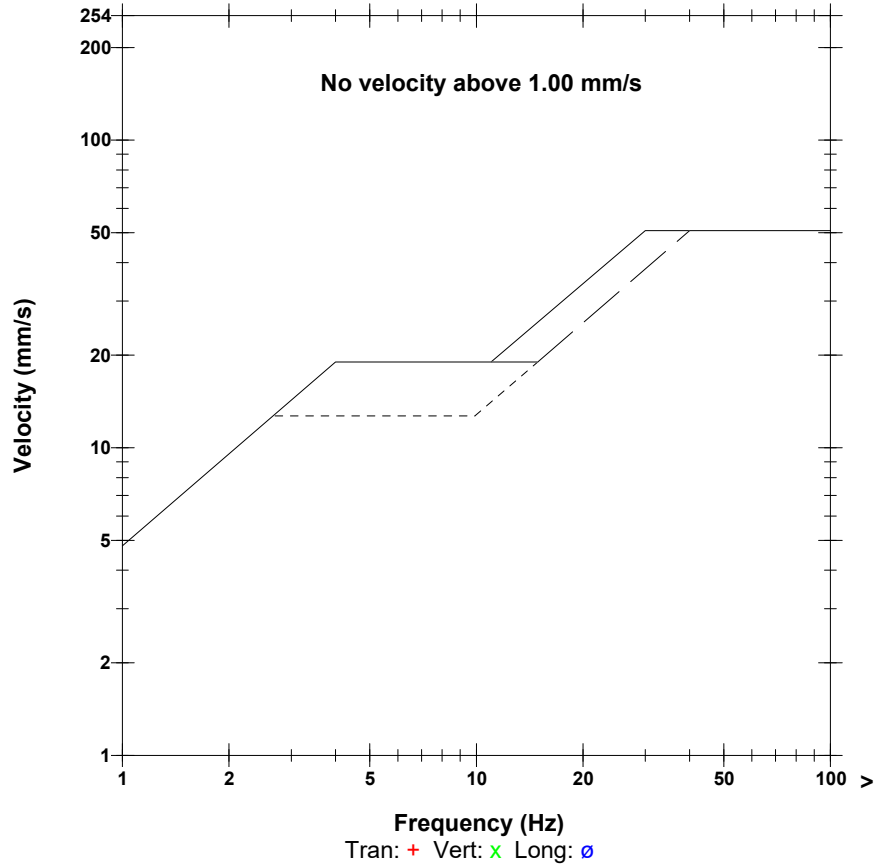
Post Event Notes
 Location: 50 Myron Road (PW-15)
 Blast No.: 2022-30
 Project No: 22S001.00

Microphone Linear Weighting
PSPL 103.5 dB(L) 2.979 pa.(L) at 2.056 sec
ZC Freq 7.8 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1269 mv)

	Tran	Vert	Long	
PPV	0.544	0.638	0.725	mm/s
PPV	45.71	47.10	48.21	dB
ZC Freq	47	47	47	Hz
Time (Rel. to Trig)	0.163	0.046	0.211	sec
Peak Acceleration	0.036	0.032	0.024	g
Peak Displacement	0.002	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.3	7.3	Hz
Overswing Ratio	4.8	4.7	4.8	

Peak Vector Sum 0.886 mm/s at 0.211 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 Long at 14:00:22 September 9, 2022
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/BATHURST.MMB

Serial Number UM18193 V 10-90GC Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration April 11, 2022 by InstanTel
File Name UM18193_20220909140022.IDFW

Post Event Notes

Location: 86 Myron Road (PW-16)
 Blast No.: 2022-30
 Project No: 22S001.00

Notes

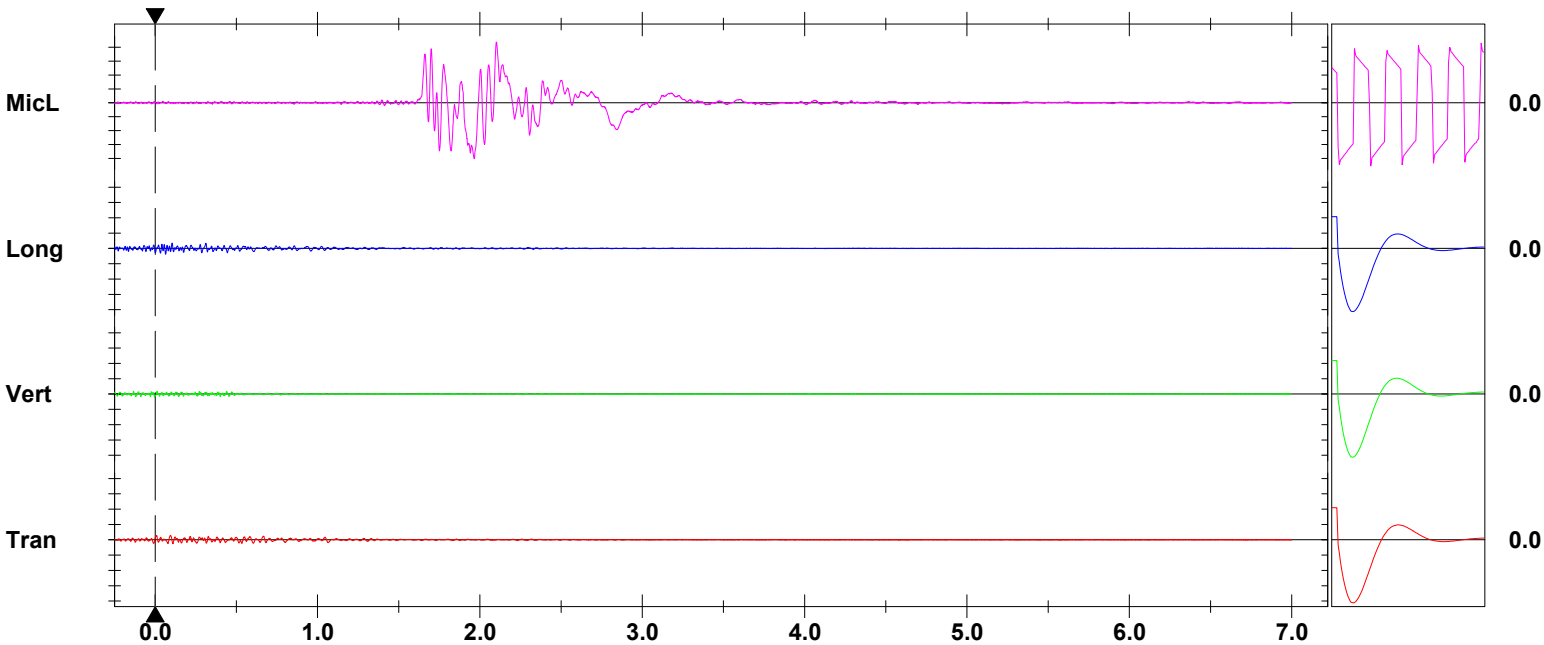
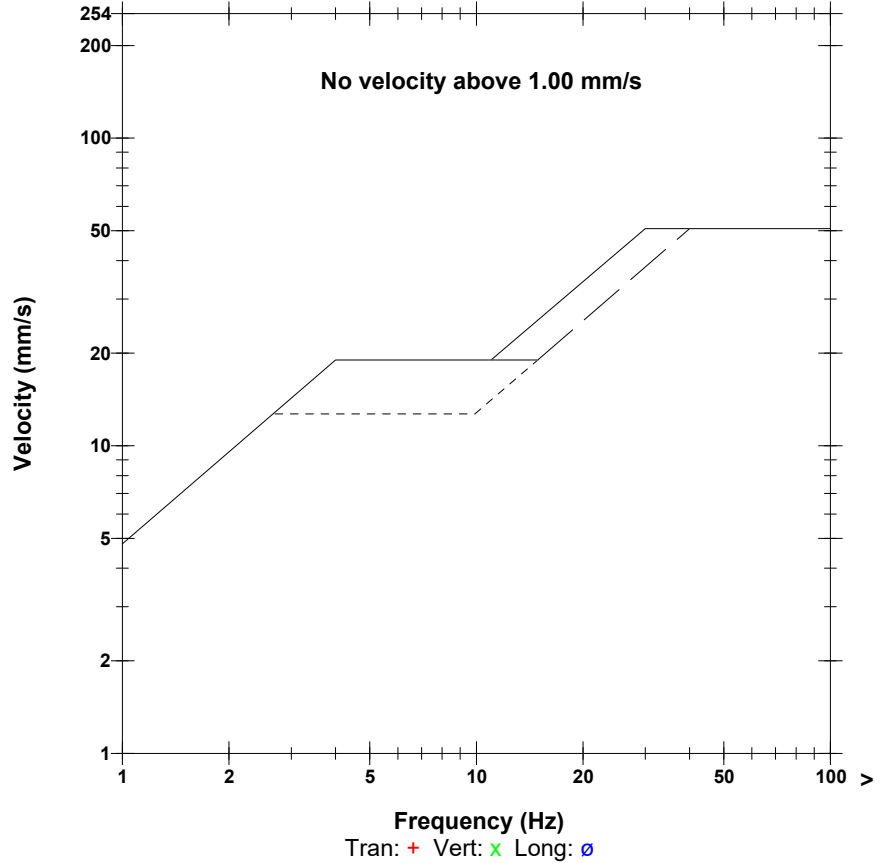
Location:
 Client:
 User Name:
 General:

Microphone Linear Weighting
PSPL 112.8 dB(L) 8.735 pa.(L) at 2.102 sec
ZC Freq 4.4 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1240 mv)

	Tran	Vert	Long	
PPV	0.567	0.426	0.765	mm/s
PPV	46.08	43.58	48.67	dB
ZC Freq	28	32	51	Hz
Time (Rel. to Trig)	0.008	-0.005	0.064	sec
Peak Acceleration	0.028	0.021	0.025	g
Peak Displacement	0.004	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.2	4.0	4.4	

Peak Vector Sum 0.777 mm/s at 0.313 sec

USBM RI8507 And OSMRE



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

Sensor Check

September 19, 2022

Project No.: 22S001.00

Mr. Daniel Guest

Hammond River Holdings

Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-31 – 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 Archibald Drilling & Blasting at 13:30 on September 16, 2022. 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. 2022-31 – September 16, 2022

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)	13:30	1,250 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		850 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		715 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		970 m NE	< 0.5 mm/s	<120	
5. PW-03 - Cottage Route 820		730 m N	< 0.5 mm/s	<120	
6. Civic No. 2341 Route 820 (PW-05)		700 m N	< 0.5 mm/s	<120	-
7. Civic No. 50 Myron Road (PW-15)		940 m NW	0.83 mm/s @ 64 Hz	112	
8. Civic No. 86 Myron Road (PW-16)		790 m W	< 0.5 mm/s	<120	Units were not triggered
9. Civic No. 220 Myron Road (PW-01)		1,315 m S	< 0.5 mm/s	<120	
10. Civic No. 4140 Route 111 (PW-12)		800 m SE	< 0.5 mm/s	<120	
11. Civic No. 2337 Route 820 (PW-04)		790 m N	< 0.5 mm/s	<120	
maximum limits as per Approval to Operate			12.5 mm/s	128 dB	

Mr. Daniel Guest – Hammond River Holdings

September 19, 2022

Project No.: 22S001.00 – Blast No.: 2022-31

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".

Robert Y. Cyr, M.A.Sc., P.Eng.

Senior Technical Specialist

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

Project No: 22S001.00

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>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

IDENTIFICATION:

Blasting Contractor:	<u>Archibald Drilling & Blasting</u>		
Blaster's Certification No.:	<u>1297</u>	Blaster's Name:	<u>Anthony Wallace</u>
Blast Location:	<u>N 45°28.858' W 65°38.015' (see attached sketch)</u>		
Type of Rock:	<u>Anhydrate/Gypsum</u>	Est. Vol. or Tonnage:	<u>22,422 tonnes</u>
Weather at time of Blast:	<u>Clear</u>	Air Temp.:	<u>14°C</u>
Est. Wind Speed :	<u>≈30 km/h</u>	Wind Direction:	<u>SE</u>
Cloud Cover:	<u>No</u>	Precipitation:	<u>No</u>

BLAST DESIGN:

Total No. Holes:	<u>143</u>	Hole Diameter:	<u>4.5"</u>
Average Depth:	<u>21 ft</u>	Spacing:	<u>10 ft x 10 ft</u>
No. Holes per Delay:	<u>2</u>	Collar Length:	<u>8.5 ft - 12 ft</u>
Delay between Holes:	<u>25 ms</u>	Delay between Rows:	<u>26 & 69 ms</u>
Initiation Method:	<u>Non-Electric</u>		
Weight of Explosives per Delay:	<u>Max.: 134 kg</u>		
Type and weight of Explosives for Blast:	<u>8,490 kg Fortex – Emulsion</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>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

BLAST MONITORING

Distance to the Nearest Structure:	<u>700 m</u>
Direction to the Nearest Structure:	<u>N</u>
Structure Type:	<u>House</u>
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	<u>60.5</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>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #18193</u>
Calibration Date:	<u>April 11, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,250 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 Mini Mate, Serial #5635</u>
Calibration Date:	<u>March 1, 2022</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>850 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>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>715 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 Mini Mate, Serial #5371</u>
Calibration Date:	<u>July 27, 2022</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>970 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>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5372</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>730 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 #5487</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>700 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>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5489</u>
Calibration Date:	<u>April 25, 2022</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>940 m Northwest</u>
Transverse Particle Velocity:	<u>0.70 mm/s @ 64 Hz</u>
Vertical Particle Velocity:	<u>0.83 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.51 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>0.83 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5632</u>
Calibration Date:	<u>November 15, 2021</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>790 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>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5676</u>
Calibration Date:	<u>February 28, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,315 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 #10

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>800 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>



BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 16, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:30</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-31</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>790 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>

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan

Blast No: 2022-31

Upham East Gypsum Quarry
Upham, NB

PLS-CADD Overlay



Date: September 16, 2022
Project No.: 22S001.00



Attachment C

Blast Event Report

Date/Time Tran at 13:30:01 September 16, 2022
Trigger Source Geo: 0.492 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration April 25, 2022 by InstanTel
File Name G489JOIL.110
Post Event Notes
 Location: 50 Myron Road (PW-15)
 Blast No.: 2022-31
 Project No: 22S001.00

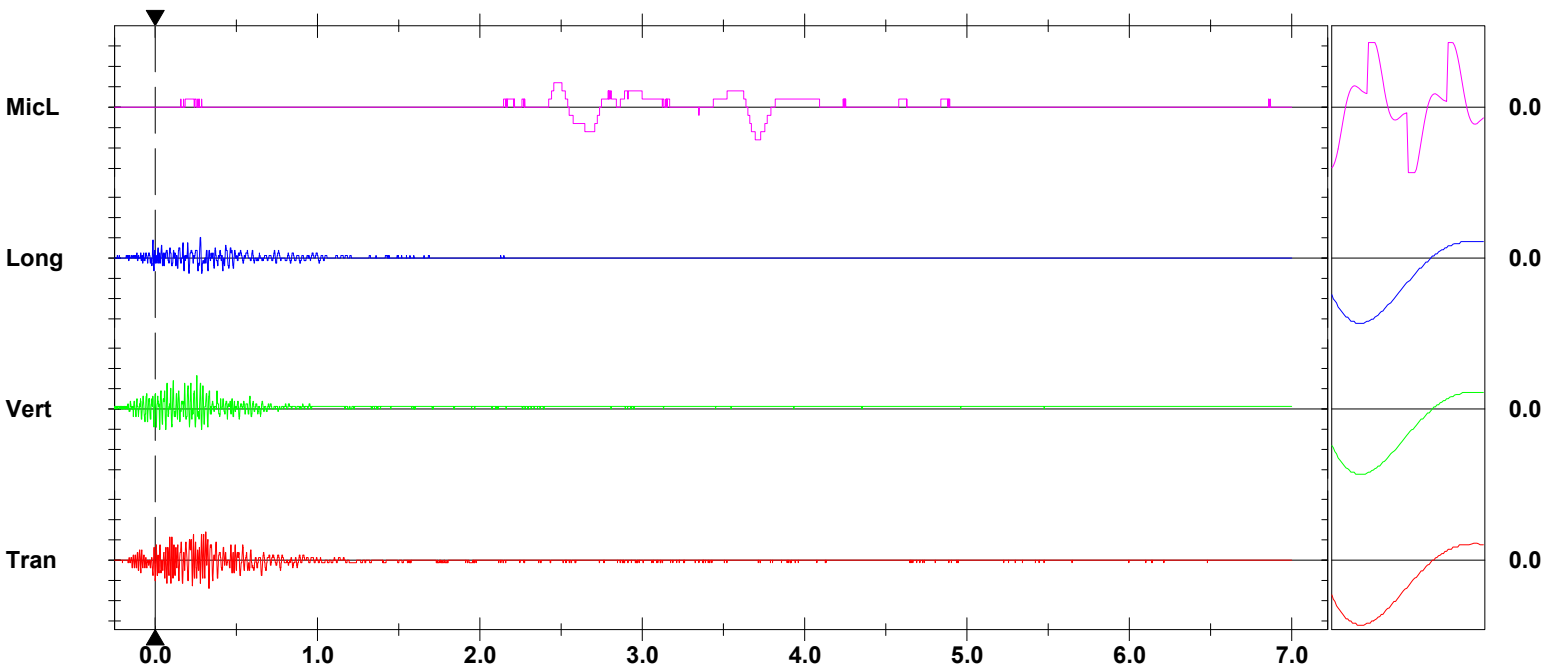
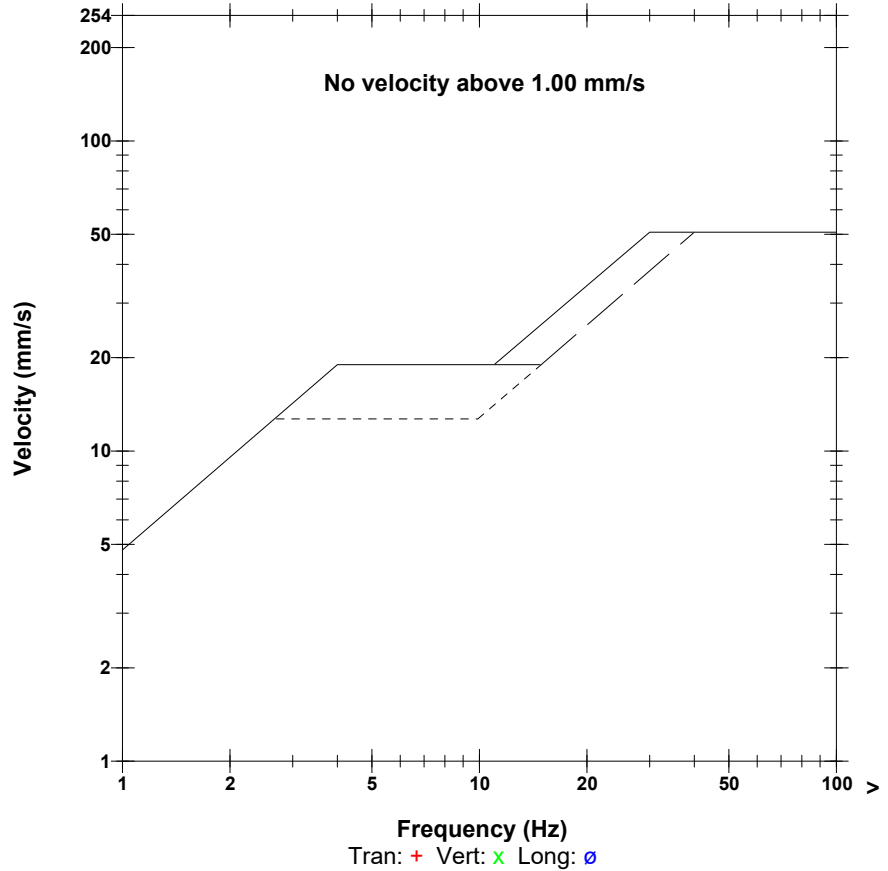
Notes
 Location:
 Client: WUUUUUUUUUUUUUUUU
 User Name: UWUUU
 Converted: September 16, 2022 16:37:27 (V10.72.1)

Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 3.696 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 272 mv)

	Tran	Vert	Long	
PPV	0.699	0.826	0.508	mm/s
PPV	47.88	49.33	45.12	dB
ZC Freq	64	64	47	Hz
Time (Rel. to Trig)	0.313	0.258	0.278	sec
Peak Acceleration	0.033	0.027	0.020	g
Peak Displacement	0.003	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.8	Hz
Overswing Ratio	3.8	4.0	4.0	

Peak Vector Sum 1.000 mm/s at 0.279 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger = ▶ ◀ ◀

Sensor Check



September 27, 2022

Project No.: 22S001.00

Mr. Daniel Guest

Hammond River HoldingsVia email: Guest.Daniel@AtlanticWallboard.com**Re: Blast Vibration Monitoring – Blast No. 2022-33 – 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 Archibald Drilling & Blasting at 13:43 on September 27, 2022. For the monitoring we positioned ten (10) digital seismographs in the area.

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

Blast No. 2022-33 – September 27, 2022

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)	13:43	1,280 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		860 m S	0.70 mm/s @ 51 Hz	106	-
3. Civic No. 4150 Route 111 (PW-13)		712 m SE	1.02 mm/s @ 64 Hz	106	-
4. Civic No. 2447 Route 820 (PW-07)		972 m NE	0.51 mm/s @ 30 Hz	114	-
5. PW-03 - Cottage Route 820		653 m N	1.14 mm/s @ 57 Hz	114	-
6. Civic No. 2341 Route 820 (PW-05)		706 m N	0.89 mm/s @ 64 Hz	112	-
7. Civic No. 50 Myron Road (PW-15)		939 m NW	0.95 mm/s @ 47 Hz	108	-
8. Civic No. 86 Myron Road (PW-16)		790 m W	0.89 mm/s @ 18 Hz	105	-
9. Civic No. 220 Myron Road (PW-01)		1,310 m S	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 2337 Route 820 (PW-04)		779 m N	< 0.5 mm/s	<120	
maximum limits as per Approval to Operate			12.5 mm/s	128 dB	

Mr. Daniel Guest – Hammond River Holdings

September 27, 2022

Project No.: 22S001.00 – Blast No.: 2022-33

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: 22S001.00

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>September 27, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:43</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-33</u>
Client:	<u>Hammond River Holdings</u>		

IDENTIFICATION:

Blasting Contractor:	<u>Archibald Drilling & Blasting</u>		
Blaster's Certification No.:	<u>1297</u>	Blaster's Name:	<u>Anthony Wallace</u>
Blast Location:	<u>N 45°28'51.61" W 65°38'00.58" (see attached sketch)</u>		
Type of Rock:	<u>Gypsum</u>	Est. Vol. or Tonnage:	<u>19,700 tonnes</u>
Weather at time of Blast:	<u>Sunny</u>	Air Temp.:	<u>19°C</u>
Est. Wind Speed :	<u>≈10 km/h</u>	Wind Direction:	<u>NE</u>
Cloud Cover:	<u>No</u>	Precipitation:	<u>No</u>

BLAST DESIGN:

Total No. Holes:	<u>131</u>	Hole Diameter:	<u>4.5"</u>
Average Depth:	<u>6.1 m</u>	Spacing:	<u>10 ft x 10 ft</u>
No. Holes per Delay:	<u>1</u>	Collar Length:	<u>10 ft</u>
Delay between Holes:	<u>25 ms</u>	Delay between Rows:	<u>59 & 84 ms</u>
Initiation Method:	<u>Non-Electric</u>		
Weight of Explosives per Delay:	<u>Max.: 60 kg</u>		
Type and weight of Explosives for Blast:	<u>6,441 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>September 27, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:43</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-33</u>
Client:	<u>Hammond River Holdings</u>		

BLAST MONITORING

Distance to the Nearest Structure:	<u>653 m</u>
Direction to the Nearest Structure:	<u>N</u>
Structure Type:	<u>House</u>
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	<u>84.3</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>September 27, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:43</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-33</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5372</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,280 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 Mini Mate, Serial #5676</u>
Calibration Date:	<u>February 28, 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>0.70 mm/s @ 51 Hz</u>
Vertical Particle Velocity:	<u>0.64 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.57 mm/s @ 64 Hz</u>
Peak Particle Velocity:	<u>0.70 mm/s @ 51 Hz</u>
Maximum Airblast:	<u>106 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 27, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:43</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-33</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5635</u>
Calibration Date:	<u>March 1, 2022</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>712 m Southeast</u>
Transverse Particle Velocity:	<u>0.57 mm/s @ 39 Hz</u>
Vertical Particle Velocity:	<u>1.02 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.64 mm/s @ 57 Hz</u>
Peak Particle Velocity:	<u>1.02 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>106 dB(L)</u>

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, 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>972 m Northeast</u>
Transverse Particle Velocity:	<u>0.51 mm/s @ 30 Hz</u>
Vertical Particle Velocity:	<u>0.19 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.25 mm/s @ 28 Hz</u>
Peak Particle Velocity:	<u>0.51 mm/s @ 30 Hz</u>
Maximum Airblast:	<u>114 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 27, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:43</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-33</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5632</u>
Calibration Date:	<u>November 15, 2021</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>653 m North</u>
Transverse Particle Velocity:	<u>1.14 mm/s @ 57 Hz</u>
Vertical Particle Velocity:	<u>0.83 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.83 mm/s @ 57 Hz</u>
Peak Particle Velocity:	<u>1.14 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>114 dB(L)</u>

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5487</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>706 m North</u>
Transverse Particle Velocity:	<u>0.51 mm/s @ 85 Hz</u>
Vertical Particle Velocity:	<u>0.89 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.76 mm/s @ 39 Hz</u>
Peak Particle Velocity:	<u>0.89 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>112 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 27, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:43</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-33</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, 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>939 m Northwest</u>
Transverse Particle Velocity:	<u>0.95 mm/s @ 47 Hz</u>
Vertical Particle Velocity:	<u>0.55 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.76 mm/s @ 43 Hz</u>
Peak Particle Velocity:	<u>0.95 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>108 dB(L)</u>

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>790 m West</u>
Transverse Particle Velocity:	<u>0.89 mm/s @ 18 Hz</u>
Vertical Particle Velocity:	<u>0.51 mm/s @ 64 Hz</u>
Longitudinal Particle Velocity:	<u>0.76 mm/s @ 57 Hz</u>
Peak Particle Velocity:	<u>0.89 mm/s @ 18 Hz</u>
Maximum Airblast:	<u>105 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 27, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>13:43</u>
Inspector:	<u>C. Costa</u>	Blast No.:	<u>2022-33</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,310 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 #10

Make, Model and Serial # of unit	<u>Instantel Mini Mate, Serial #5371</u>
Calibration Date:	<u>July 27, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>779 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>

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan

Blast No: 2022-33

Upham East Gypsum Quarry
Upham, NB

PLS-CADD Overlay



Date: September 27, 2022
Project No.: 22S001.00



Attachment C

Blast Event Reports

Date/Time Vert at 13:43:23 September 27, 2022
Trigger Source Geo: 0.492 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5676 V 2.61 MiniMate
Battery Level 6.1 Volts
Unit Calibration February 28, 2022 by InstanTel
File Name G676JP2Z.GB0

Notes
 Location:
 Client:
 User Name:
 Converted: September 27, 2022 16:27:58 (V10.72.1)

Post Event Notes
 Location: 4126 Route 111 (PW-10)
 Blast No.: 2022-33
 Project No: 22S001.00

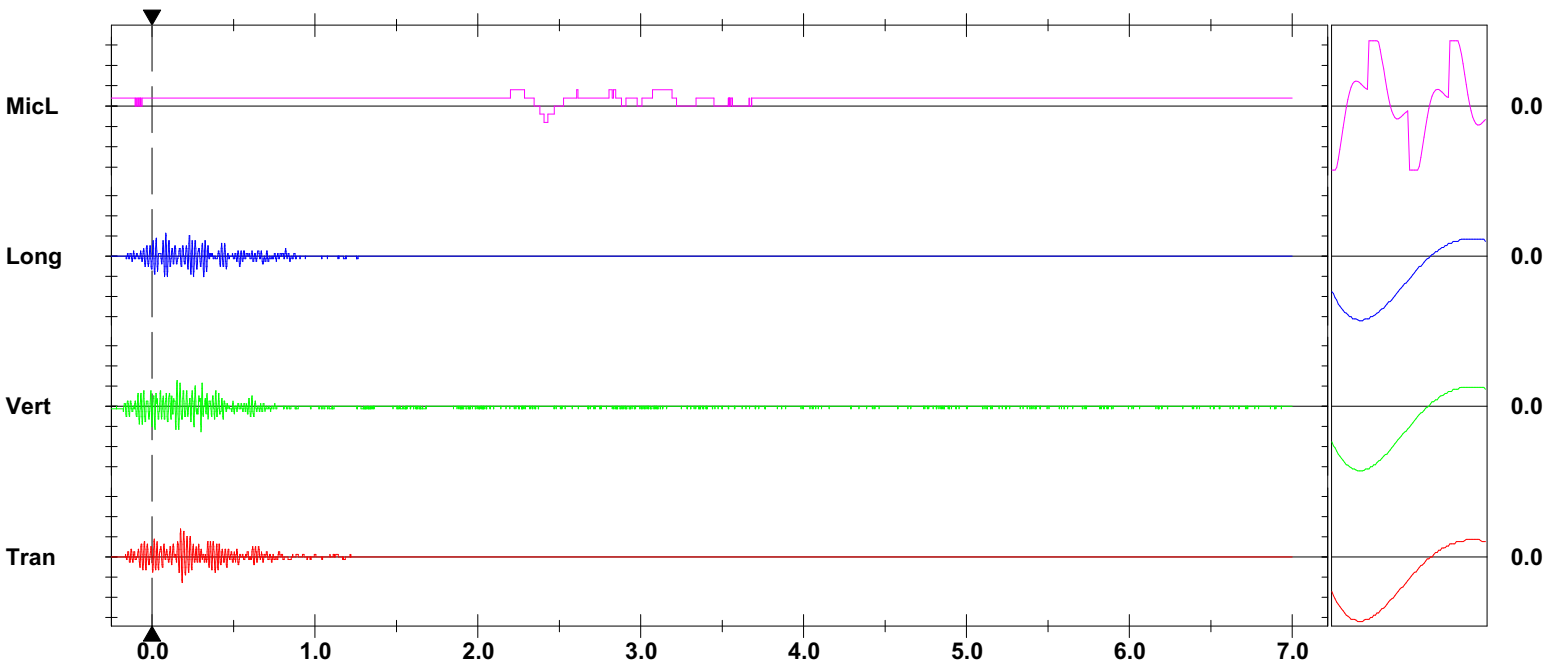
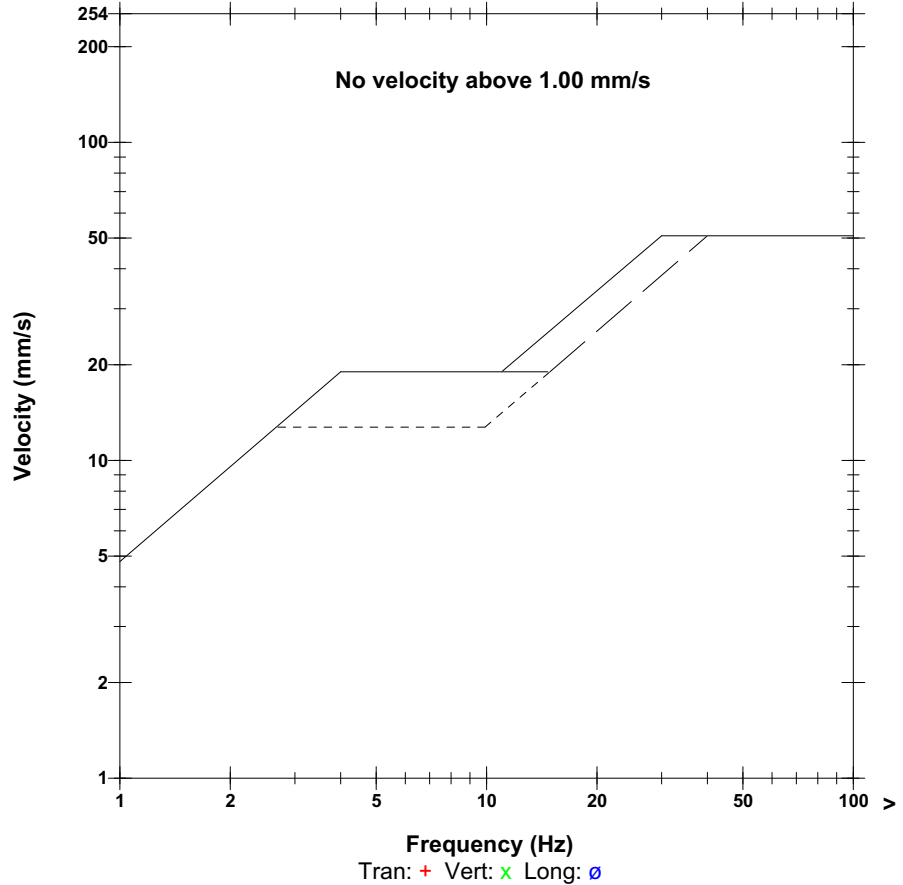
Extended Notes

Microphone Linear Weighting
PSPL 106.0 dB(L) 4.000 pa.(L) at 2.200 sec
ZC Freq N/A
Channel Test Passed (Freq = 20.0 Hz Amp = 301 mv)

	Tran	Vert	Long	
PPV	0.699	0.635	0.572	mm/s
PPV	47.88	47.06	46.14	dB
ZC Freq	51	64	64	Hz
Time (Rel. to Trig)	0.176	0.153	0.086	sec
Peak Acceleration	0.027	0.033	0.020	g
Peak Displacement	0.002	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	8.1	8.0	Hz
Overswing Ratio	3.8	3.3	3.9	

Peak Vector Sum 0.762 mm/s at 0.174 sec
N/A: Not Applicable

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 13:43:26 September 27, 2022
Trigger Source Geo: 0.492 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5635 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration March 1, 2022 by InstanTel
File Name G635JP2Z.GEO

Notes
 Location:
 Client:
 User Name:
 Converted: September 27, 2022 16:46:18 (V10.72.1)

Post Event Notes
 Location: 4150 Route 111 (PW-13)
 Blast No.: 2022-33
 Project No: 22S001.00

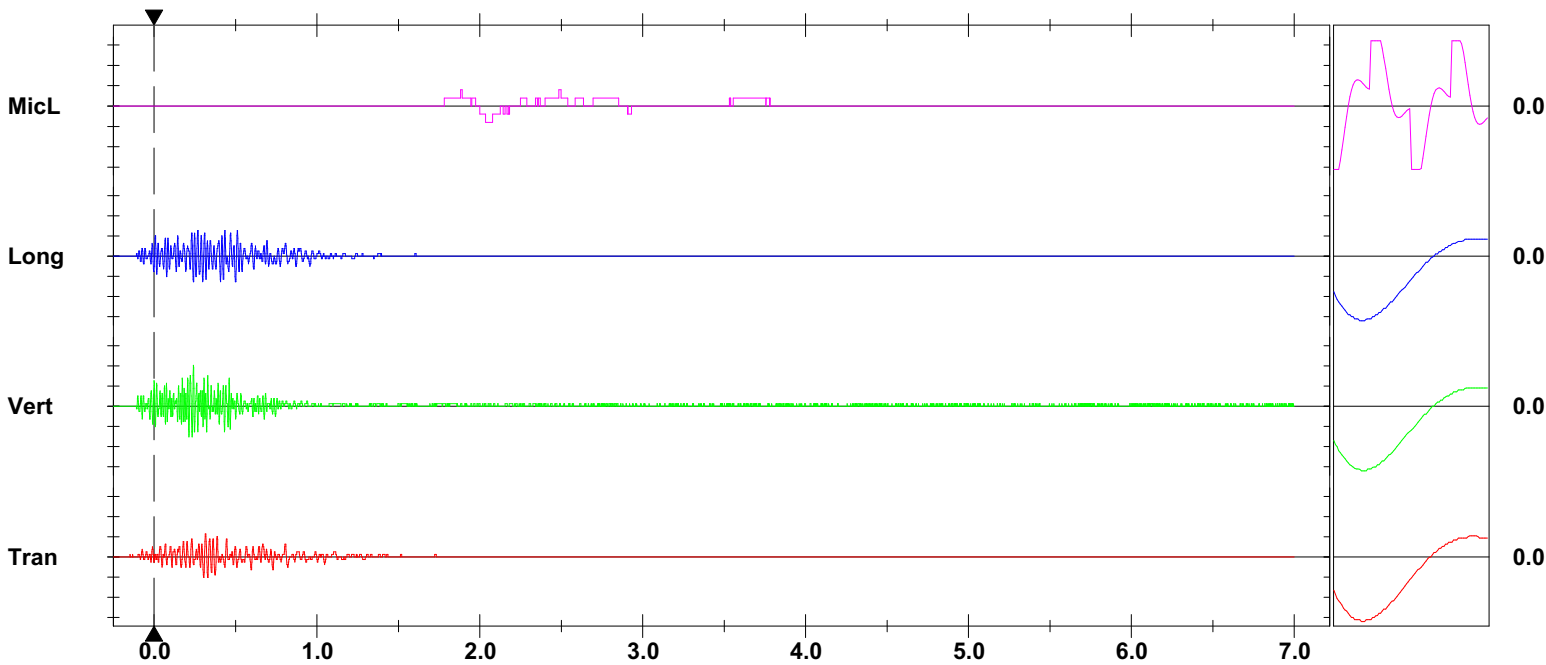
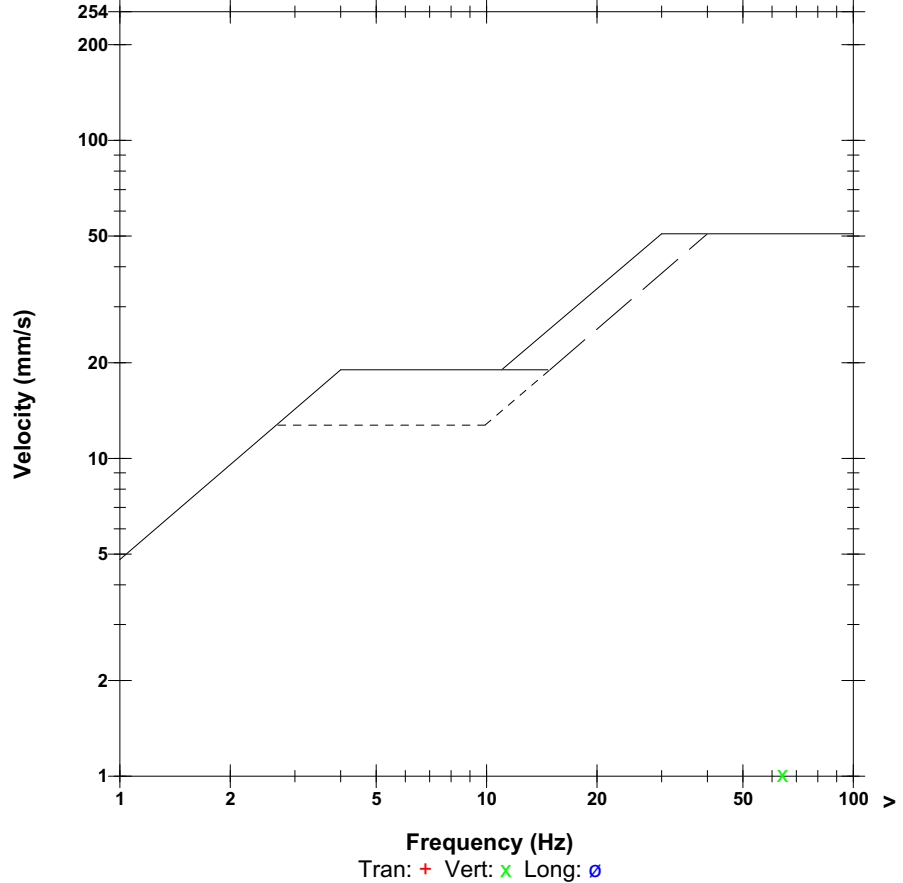
Extended Notes

Microphone Linear Weighting
PSPL 106.0 dB(L) 4.000 pa.(L) at 1.883 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 297 mv)

	Tran	Vert	Long	
PPV	0.572	1.016	0.635	mm/s
PPV	46.14	51.14	47.06	dB
ZC Freq	39	64	57	Hz
Time (Rel. to Trig)	0.315	0.242	0.241	sec
Peak Acceleration	0.020	0.040	0.027	g
Peak Displacement	0.002	0.003	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	7.8	Hz
Overswing Ratio	3.1	3.7	3.9	

Peak Vector Sum 1.207 mm/s at 0.242 sec

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Tran at 13:43:31 September 27, 2022
Trigger Source Geo: 0.492 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 5.0 sec at 1024 sps

Serial Number 5489 V 2.61 MiniMate
Battery Level 5.9 Volts
Unit Calibration April 25, 2022 by InstanTel
File Name G489JP2Z.GJ0

Notes
 Location:
 Client:
 User Name:
 Converted: September 27, 2022 16:39:50 (V10.72.1)

Post Event Notes
 Location: 2447 Route 820 (PW-07)
 Blast No.: 2022-33
 Project No: 22S001.00

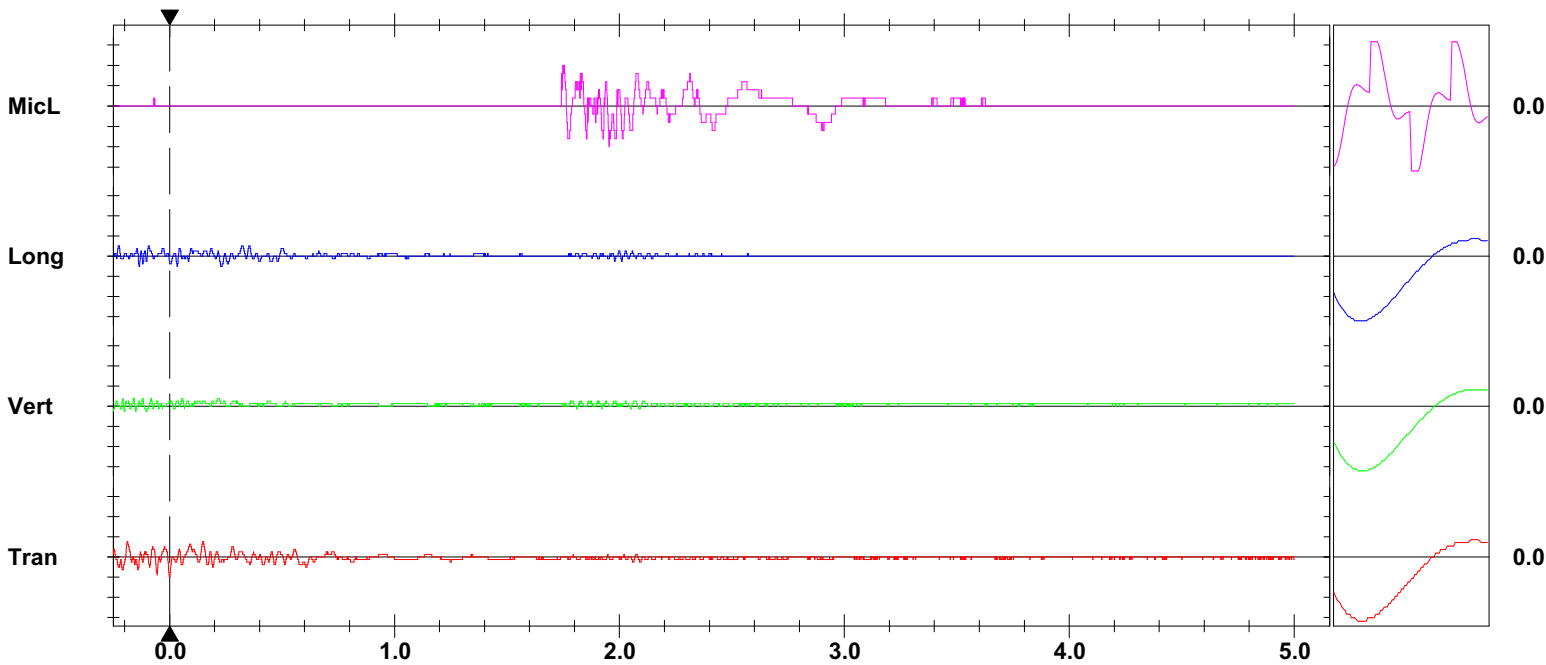
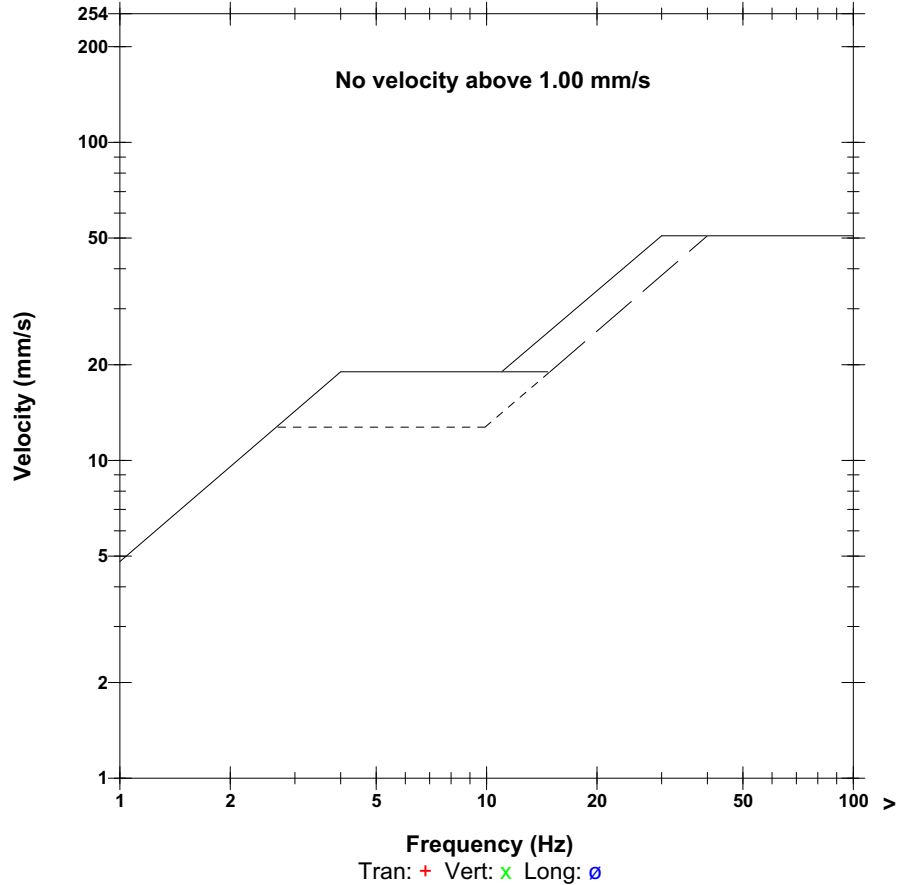
Extended Notes

Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 1.749 sec
ZC Freq 21 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 272 mv)

	Tran	Vert	Long	
PPV	0.508	0.191	0.254	mm/s
PPV	45.12	36.60	39.10	dB
ZC Freq	30	57	28	Hz
Time (Rel. to Trig)	0.002	-0.080	-0.091	sec
Peak Acceleration	0.013	0.007	0.013	g
Peak Displacement	0.002	0.000	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.8	8.0	Hz
Overswing Ratio	3.9	4.0	3.8	

Peak Vector Sum 0.556 mm/s at 0.002 sec

USBM R18507 And OSMRE



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Tran at 13:43:03 September 27, 2022
Trigger Source Geo: 0.508 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5632 V 2.61 MiniMate
Battery Level 5.9 Volts
Unit Calibration November 15, 2021 by InstanTel
File Name G632JP2Z.FR0

Notes
 Location:
 Client:
 User Name:
 Converted: September 27, 2022 16:42:39 (V10.72.1)

Post Event Notes
 Location: Cottage Route 820 (PW-03)
 Blast No.: 2022-33
 Project No: 22S001.00

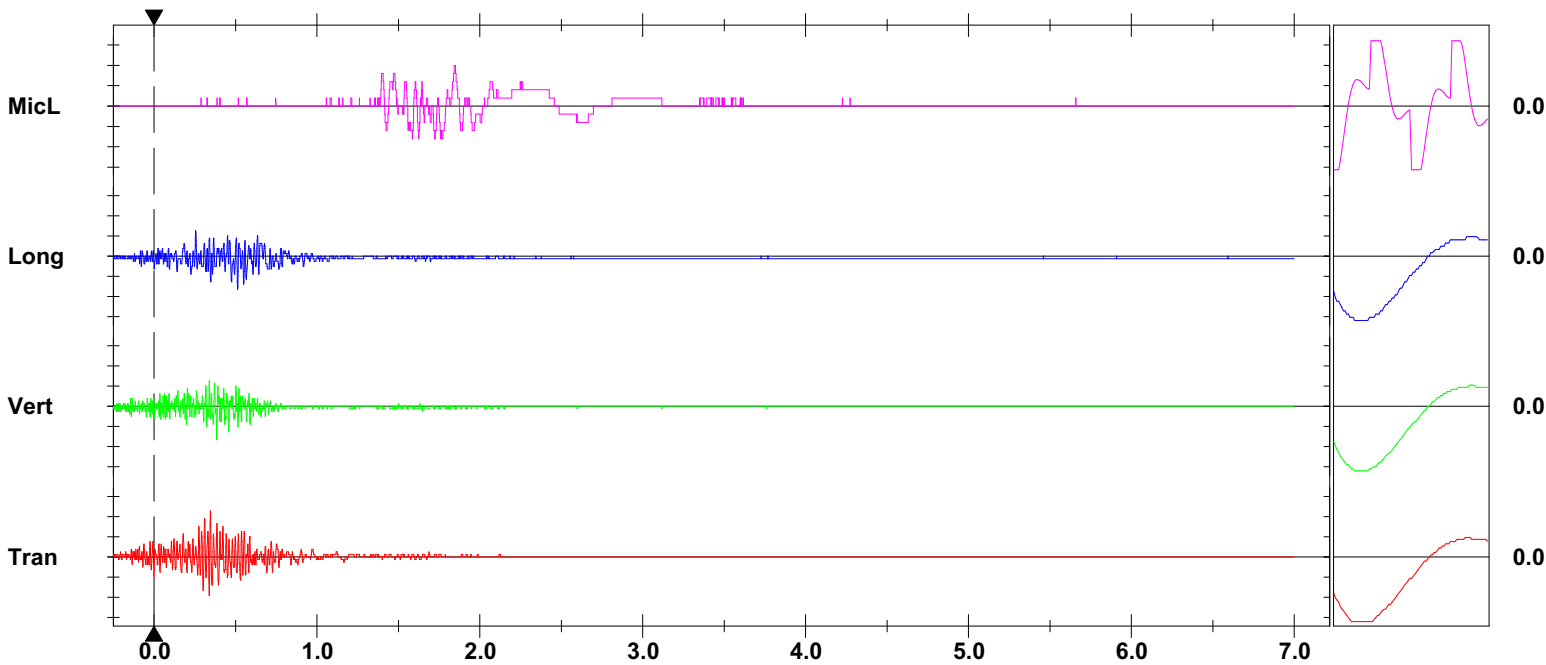
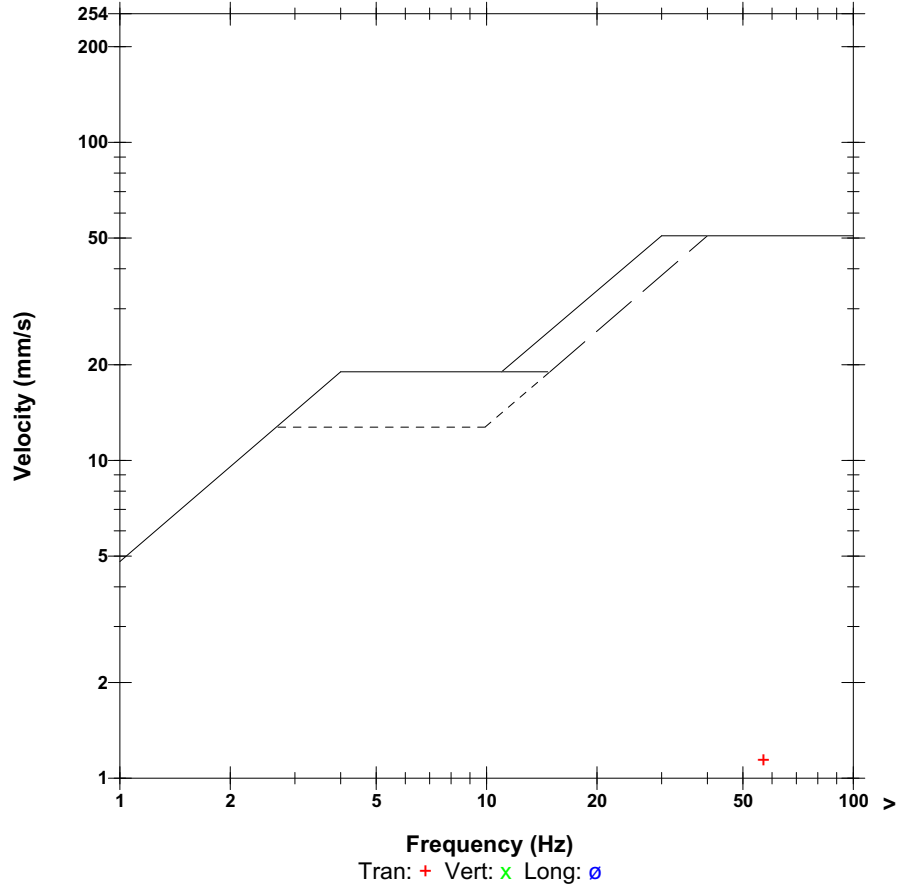
Extended Notes

Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 1.843 sec
ZC Freq 10 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 297 mv)

	Tran	Vert	Long	
PPV	1.143	0.826	0.826	mm/s
PPV	52.16	49.33	49.33	dB
ZC Freq	57	57	57	Hz
Time (Rel. to Trig)	0.347	0.385	0.514	sec
Peak Acceleration	0.046	0.040	0.027	g
Peak Displacement	0.003	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.2	8.2	8.2	Hz
Overswing Ratio	3.5	3.1	3.7	

Peak Vector Sum 1.286 mm/s at 0.347 sec

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
 Trigger =

Sensor Check

Date/Time Vert at 13:43:34 September 27, 2022
Trigger Source Geo: 0.492 mm/s
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5487 V 2.61 MiniMate
Battery Level 6.0 Volts
Unit Calibration February 18, 2022 by Instantel
File Name G487JP2Z.GM0

Notes
 Location:
 Client:
 User Name:
 Converted: September 27, 2022 16:34:13 (V10.72.1)

Post Event Notes
 Location: 2341 Route 820 (PW-05)
 Blast No.: 2022-33
 Project No: 22S001.00

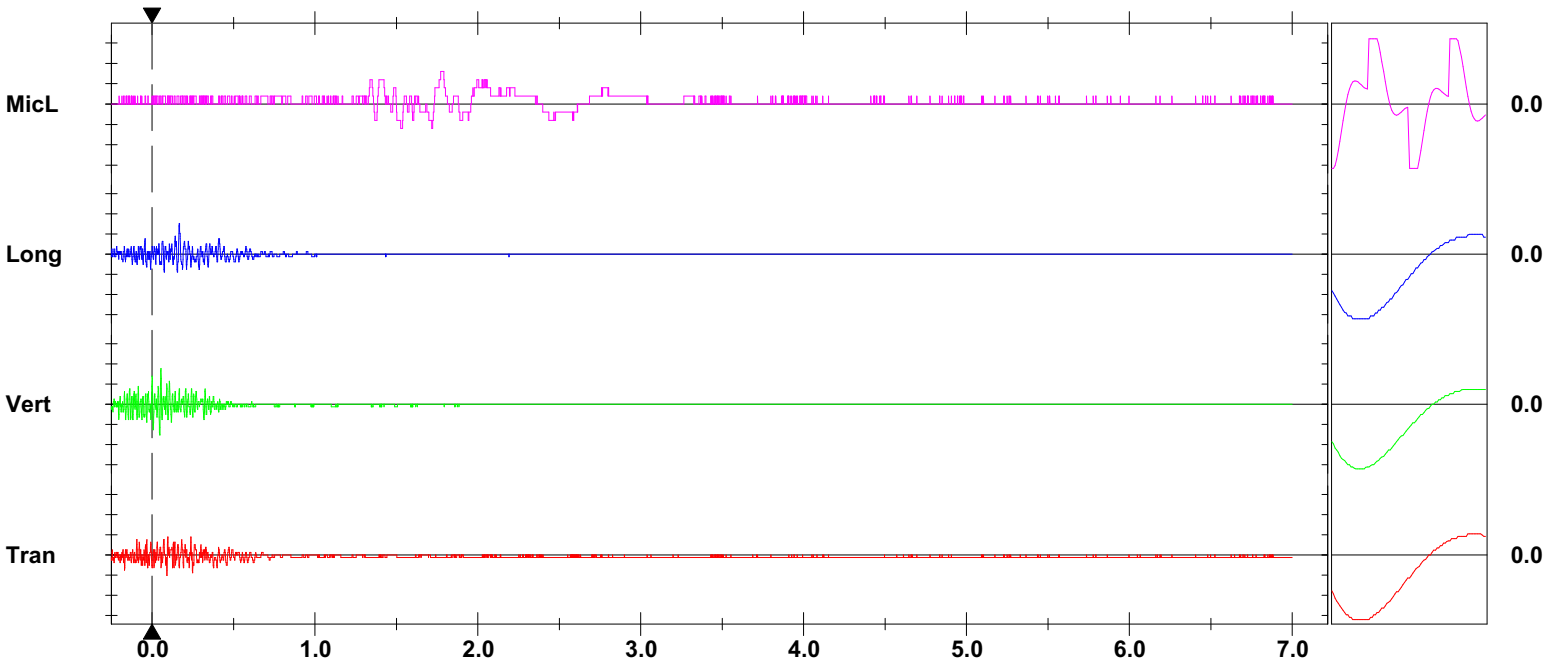
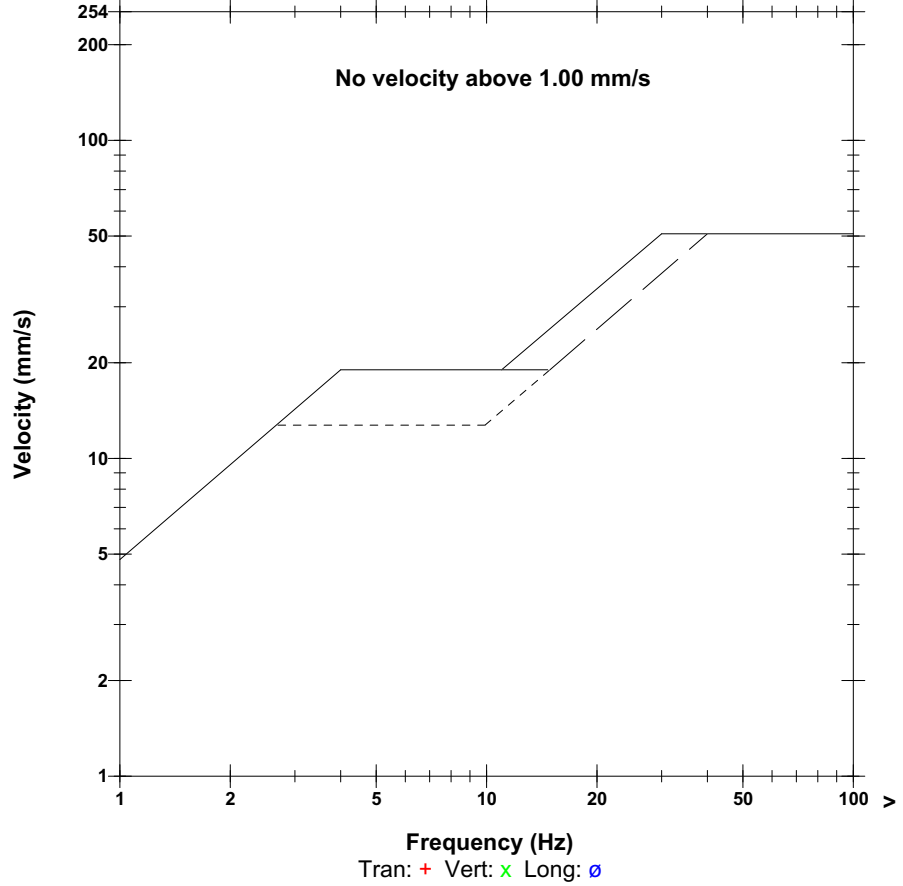
Extended Notes

Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 1.773 sec
ZC Freq 6.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 286 mv)

	Tran	Vert	Long	
PPV	0.508	0.889	0.762	mm/s
PPV	45.12	49.98	48.64	dB
ZC Freq	85	64	39	Hz
Time (Rel. to Trig)	0.092	0.055	0.167	sec
Peak Acceleration	0.033	0.040	0.027	g
Peak Displacement	0.001	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.7	8.0	Hz
Overswing Ratio	3.3	4.1	3.7	

Peak Vector Sum 0.937 mm/s at 0.055 sec

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Long at 13:43:30 September 27, 2022
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/CARVER.MMB

Serial Number UM18193 V 10-90GC Micromate ISEE
Battery Level 3.7 Volts
Unit Calibration April 11, 2022 by InstanTel
File Name UM18193_20220927134330.IDFW

Notes
 Location:
 Client:
 User Name:
 General:

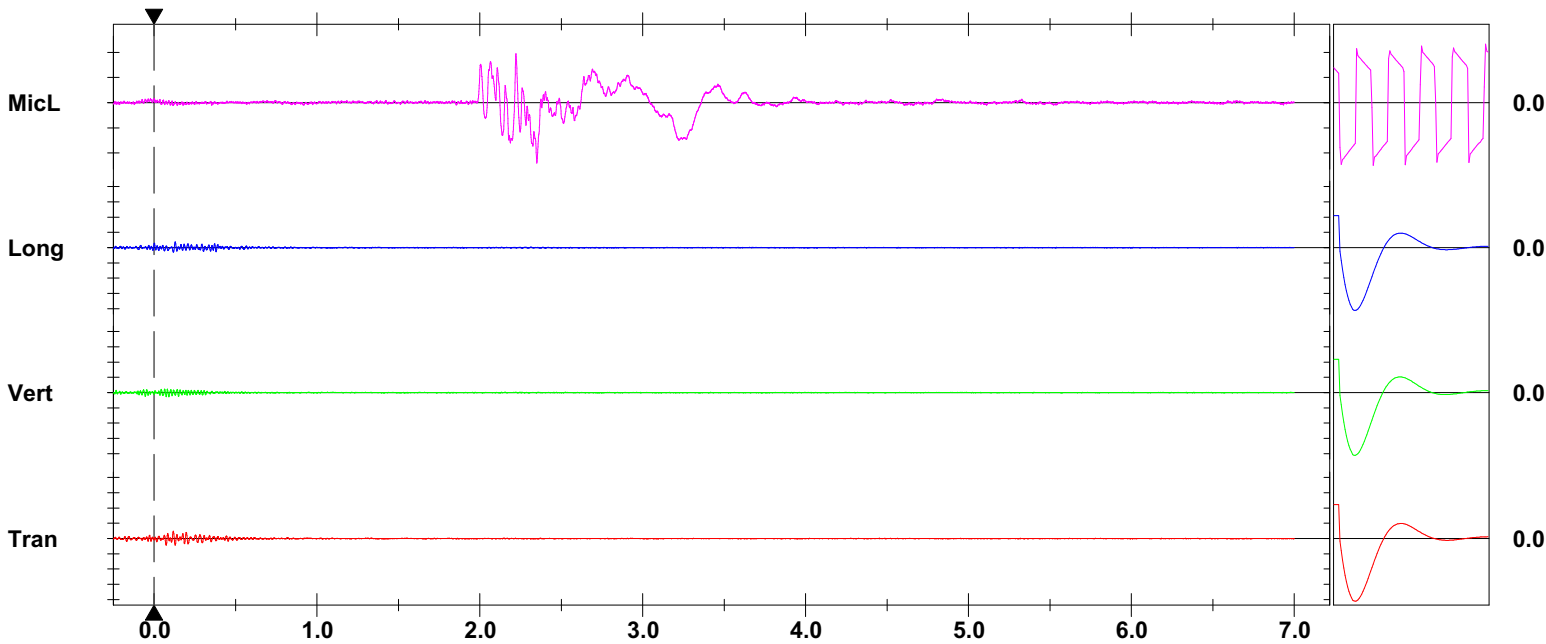
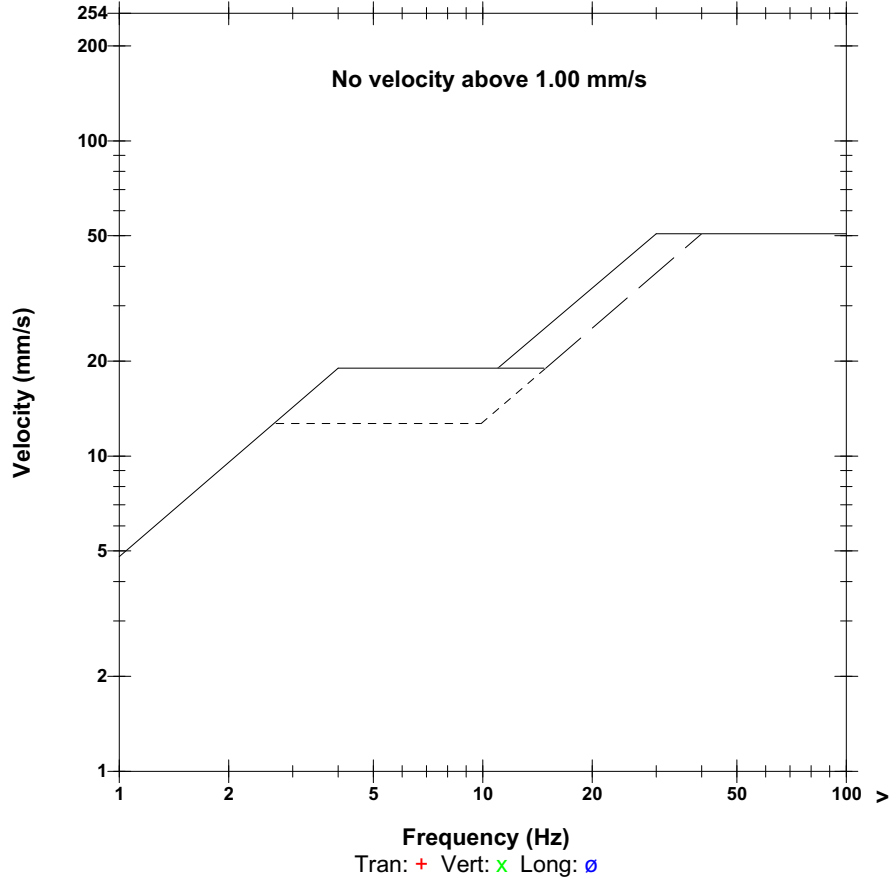
Post Event Notes
 Location: 50 Myron Road (PW-15)
 Blast No.: 2022-33
 Project No: 22S001.00

Microphone Linear Weighting
PSPL 107.6 dB(L) 4.810 pa.(L) at 2.350 sec
ZC Freq 5.1 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1297 mv)

	Tran	Vert	Long	
PPV	0.954	0.552	0.757	mm/s
PPV	50.59	45.83	48.58	dB
ZC Freq	47	57	43	Hz
Time (Rel. to Trig)	0.118	0.073	0.130	sec
Peak Acceleration	0.045	0.021	0.029	g
Peak Displacement	0.004	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.2	4.0	4.3	

Peak Vector Sum 1.179 mm/s at 0.130 sec

USBM R18507 And OSMRE



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

Sensor Check

Date/Time Long at 13:40:22 September 27, 2022
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number BE21348 V 10.72-1.1 Minimate Blaster
Battery Level 6.0 Volts
Unit Calibration July 21, 2022 by InstanTel
File Name W348JP14.NA0

Notes

Post Event Notes

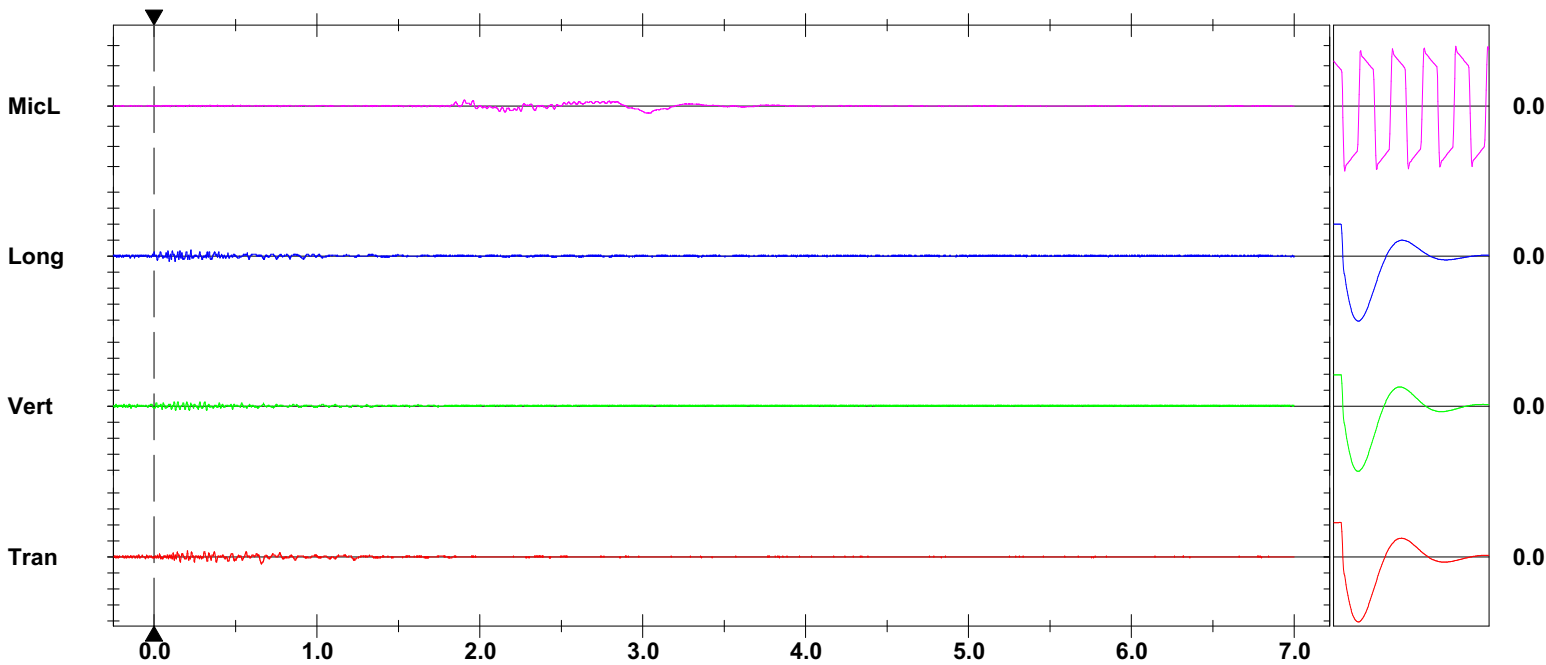
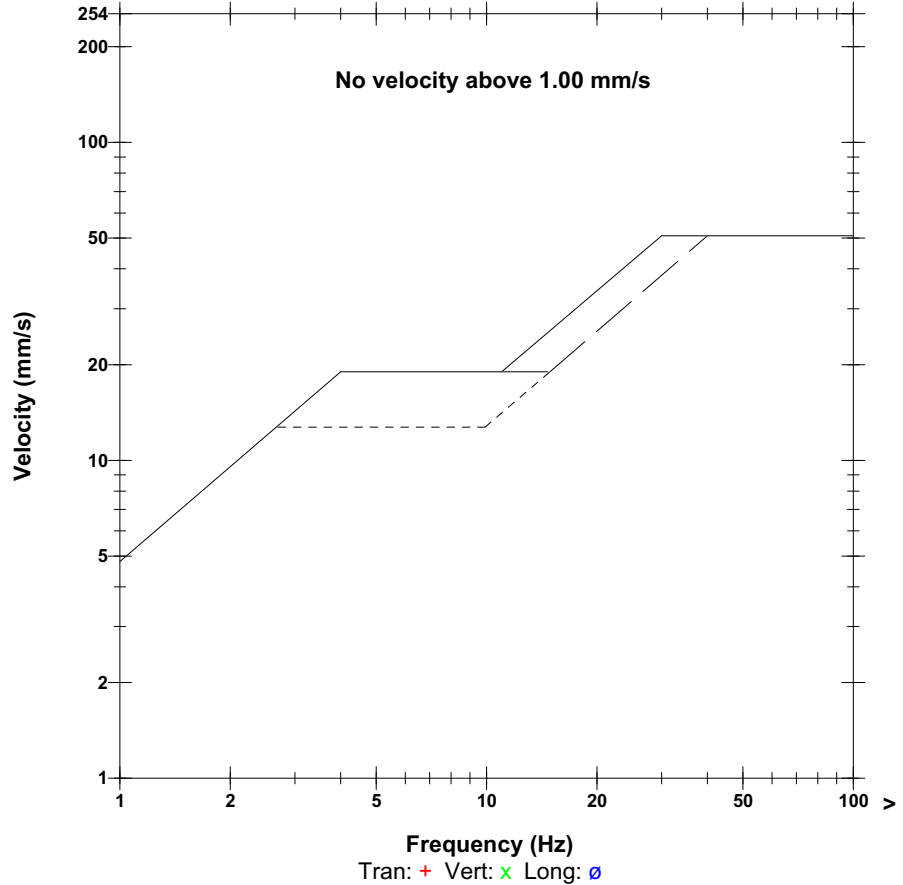
Location: 86 Myron Road (PW-16)
 Blast No.: 2022-33
 Project No: 22S001.00

Microphone Linear Weighting
PSPL 104.9 dB(L) 3.500 pa.(L) at 3.021 sec
ZC Freq 1.8 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 558 mv)

	Tran	Vert	Long	
PPV	0.889	0.508	0.762	mm/s
PPV	49.98	45.12	48.64	dB
ZC Freq	18	64	57	Hz
Time (Rel. to Trig)	0.658	0.122	0.225	sec
Peak Acceleration	0.027	0.027	0.040	g
Peak Displacement	0.008	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.6	7.2	Hz
Overswing Ratio	3.5	3.4	4.1	

Peak Vector Sum 0.907 mm/s at 0.659 sec

USBM R18507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

September 22, 2022

Project No.: 22S001.00

Mr. Daniel Guest

Hammond River Holdings

Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-32 – 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 Archibald Drilling & Blasting at 14:48 on September 21, 2022. 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. 2022-32 – September 21, 2022

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)	14:48	1,490 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		1,100 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		966 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		925 m NE	< 0.5 mm/s	<120	
5. PW-03 - Cottage Route 820		515 m N	1.40 mm/s @ 64 Hz	116	-
6. Civic No. 2341 Route 820 (PW-05)		470 m N	3.75 mm/s @ 57 Hz	116	-
7. Civic No. 50 Myron Road (PW-15)		690 m NW	1.33 mm/s @ 47 Hz	110	-
8. Civic No. 86 Myron Road (PW-16)		704 m W	0.95 mm/s @ 34 Hz	117	-
9. Civic No. 220 Myron Road (PW-01)		1,470 m S	< 0.5 mm/s	<120	Unit was not triggered
10. Civic No. 4140 Route 111 (PW-12)		550 m SE	1.14 mm/s @ 64 Hz	114	-
11. Civic No. 2337 Route 820 (PW-04)		1,050 m N	< 0.5 mm/s	<120	Unit was not triggered
maximum limits as per Approval to Operate			12.5 mm/s	128 dB	

Mr. Daniel Guest – Hammond River Holdings
September 22, 2022
Project No.: 22S001.00 – Blast No.: 2022-32

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: 22S001.00

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>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

IDENTIFICATION:

Blasting Contractor:	<u>Archibald Drilling & Blasting</u>		
Blaster's Certification No.:	<u>1243</u>	Blaster's Name:	<u>Perry Bennet</u>
Blast Location:	<u>N 45°28.961' W 65°38.139' (see attached sketch)</u>		
Type of Rock:	<u>Gypsum</u>	Est. Vol. or Tonnage:	<u>29,069 tonnes</u>
Weather at time of Blast:	<u>Overcast</u>	Air Temp.:	<u>13°C</u>
Est. Wind Speed :	<u>≈10 km/h</u>	Wind Direction:	<u>N</u>
Cloud Cover:	<u>Yes - overcast</u>	Precipitation:	<u>No</u>

BLAST DESIGN:

Total No. Holes:	<u>156</u>	Hole Diameter:	<u>4.5"</u>
Average Depth:	<u>6.1 m</u>	Spacing:	<u>10 ft x 10 ft</u>
No. Holes per Delay:	<u>3</u>	Collar Length:	<u>10 ft</u>
Delay between Holes:	<u>25 ms</u>	Delay between Rows:	<u>59 & 84 ms</u>
Initiation Method:	<u>Non-Electric</u>		
Weight of Explosives per Delay:	<u>Max.: 137 kg</u>		
Type and weight of Explosives for Blast:	<u>8,350 kg Orica – Emulsion</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>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

BLAST MONITORING

Distance to the Nearest Structure:	<u>470 m</u>
Direction to the Nearest Structure:	<u>N</u>
Structure Type:	<u>House</u>
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	<u>40.2</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>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5372</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,490 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 Mini Mate, Serial #21348</u>
Calibration Date:	<u>July 23, 2022</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>1,100 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>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #18193</u>
Calibration Date:	<u>April 11, 2022</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>966 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 Mini Mate, 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>925 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>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5487</u>
Calibration Date:	<u>February 18, 2022</u>
Location of seismograph:	<u>Cottage - PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>515 m North</u>
Transverse Particle Velocity:	<u>1.40 mm/s @ 64 Hz</u>
Vertical Particle Velocity:	<u>1.02 mm/s @ 32 Hz</u>
Longitudinal Particle Velocity:	<u>1.27 mm/s @ 51 Hz</u>
Peak Particle Velocity:	<u>1.40 mm/s @ 64 Hz</u>
Maximum Airblast:	<u>116 dB(L)</u>

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5632</u>
Calibration Date:	<u>November 15, 2021</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>470 m North</u>
Transverse Particle Velocity:	<u>2.67 mm/s @ 43 Hz</u>
Vertical Particle Velocity:	<u>2.10 mm/s @ 47 Hz</u>
Longitudinal Particle Velocity:	<u>3.75 mm/s @ 57 Hz</u>
Peak Particle Velocity:	<u>3.75 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>116 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5635</u>
Calibration Date:	<u>March 1, 2022</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>690 m Northwest</u>
Transverse Particle Velocity:	<u>1.33 mm/s @ 47 Hz</u>
Vertical Particle Velocity:	<u>1.02 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>1.14 mm/s @ 39 Hz</u>
Peak Particle Velocity:	<u>1.33 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>110 dB(L)</u>

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5676</u>
Calibration Date:	<u>February 28, 2022</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>704 m West</u>
Transverse Particle Velocity:	<u>0.95 mm/s @ 34 Hz</u>
Vertical Particle Velocity:	<u>0.70 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.95 mm/s @ 39 Hz</u>
Peak Particle Velocity:	<u>0.95 mm/s @ 34 Hz</u>
Maximum Airblast:	<u>117 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5371</u>
Calibration Date:	<u>July 27, 2022</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,470 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 #10

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21349</u>
Calibration Date:	<u>July 20, 2022</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>550 m Southeast</u>
Transverse Particle Velocity:	<u>0.76 mm/s @ 57 Hz</u>
Vertical Particle Velocity:	<u>0.51 mm/s @ 73 Hz</u>
Longitudinal Particle Velocity:	<u>1.14 mm/s @ 47 Hz</u>
Peak Particle Velocity:	<u>1.14 mm/s @ 47 Hz</u>
Maximum Airblast:	<u>114 dB(L)</u>



BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>September 21, 2022</u>
Project No.:	<u>22S001.00</u>	Time of Blast:	<u>14:48</u>
Inspector:	<u>C. Buckley</u>	Blast No.:	<u>2022-32</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>InstanTel Mini Mate, Serial #18187</u>
Calibration Date:	<u>May 5, 2022</u>
Location of seismograph:	<u>Civic Number 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>1,050 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>

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan

Blast No: 2022-32

Upham East Gypsum Quarry

Upham, NB



Date: September 21, 2022
Project No.: 22S001.00



Attachment C

Blast Event Report

Date/Time Long at 14:49:24 September 21, 2022
Trigger Source Geo: 1.000 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5487 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 18, 2022 by InstanTel
File Name G487JORY.IC0
Post Event Notes
 Location: Cottage - Route 820 (PW-03)
 Blast No.: 2022-32
 Project No: 22S001.00

Notes
 Location:
 Client:
 User Name:
 Converted: September 21, 2022 17:28:59 (V10.72.1)

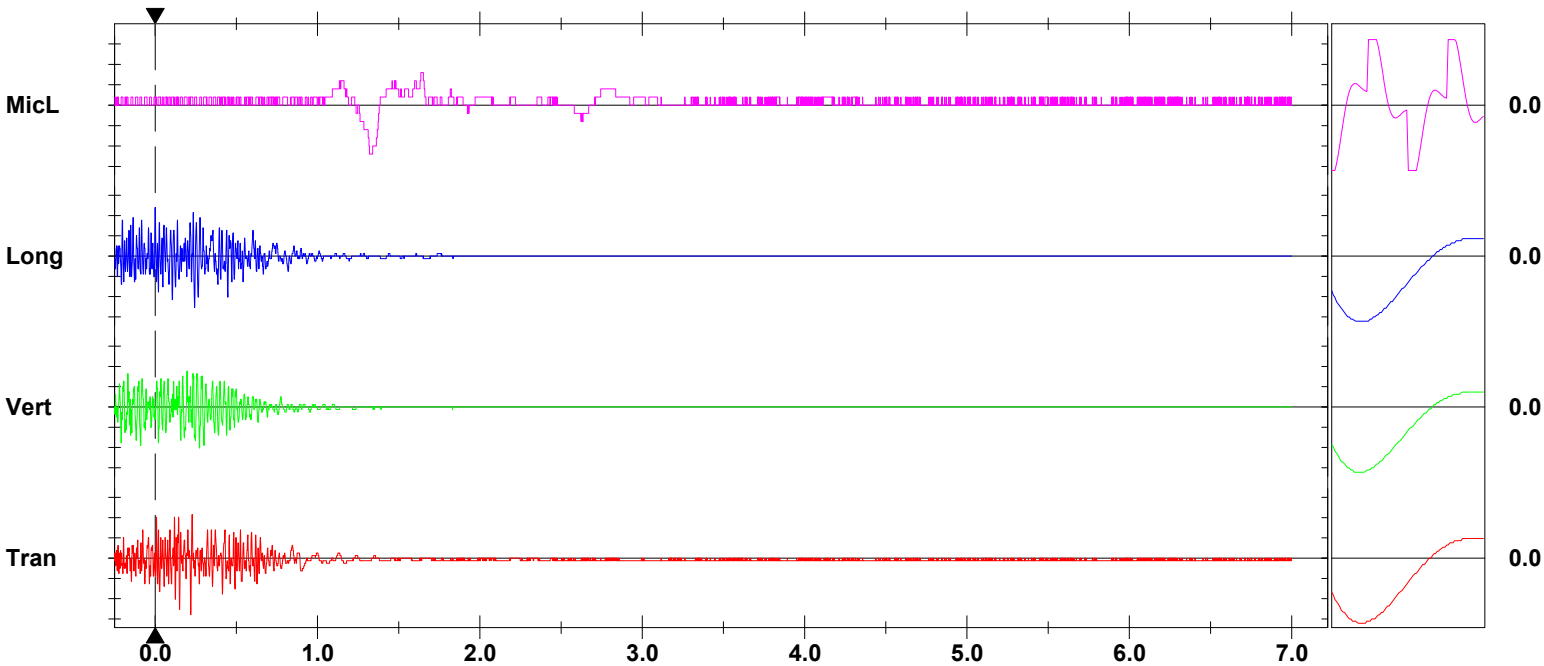
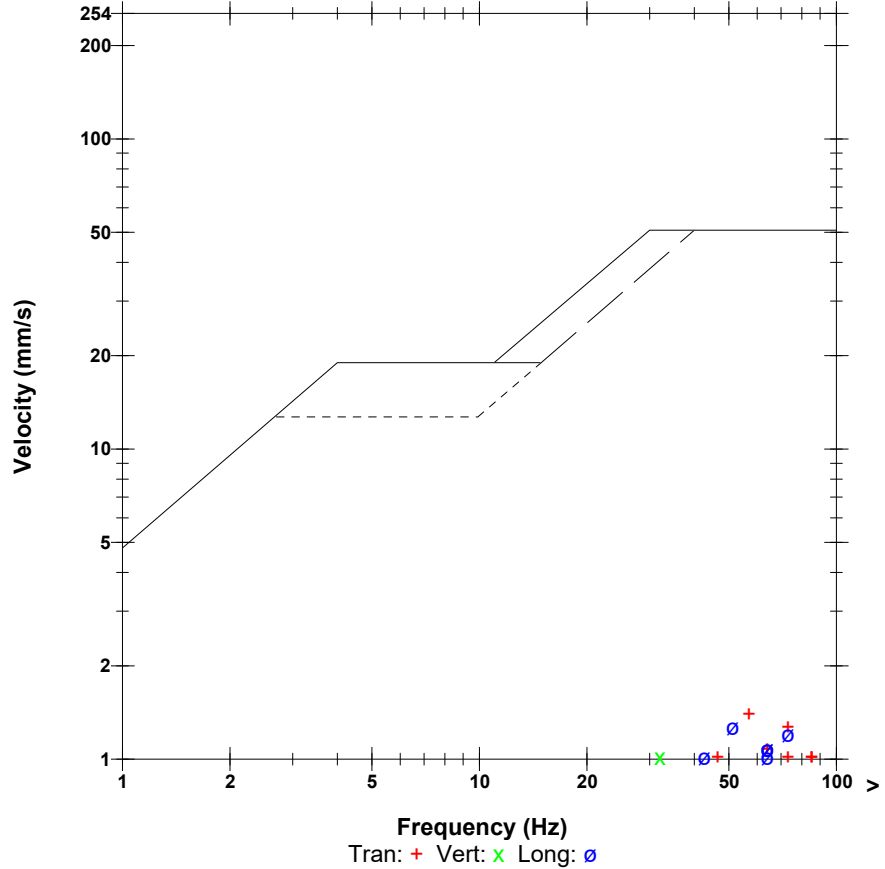
Extended Notes

Microphone Linear Weighting
PSPL 115.6 dB(L) 12.00 pa.(L) at 1.321 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 287 mv)

	Tran	Vert	Long	
PPV	1.397	1.016	1.270	mm/s
PPV	53.90	51.14	53.08	dB
ZC Freq	64	32	51	Hz
Time (Rel. to Trig)	0.220	0.273	0.244	sec
Peak Acceleration	0.066	0.046	0.046	g
Peak Displacement	0.003	0.004	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.7	7.7	Hz
Overswing Ratio	3.5	4.2	3.8	

Peak Vector Sum 1.492 mm/s at 0.220 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:49:10 September 21, 2022
Trigger Source Geo: 0.508 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5632 V 2.61 MiniMate
Battery Level 6.1 Volts
Unit Calibration November 15, 2021 by InstanTel
File Name G632JORY.HY0
Post Event Notes
 Location: 2341 Route 820 (PW-05)
 Blast No.: 2022-32
 Project No: 22S001.00

Notes
 Location:
 Client:
 User Name:
 Converted: September 21, 2022 17:21:57 (V10.72.1)

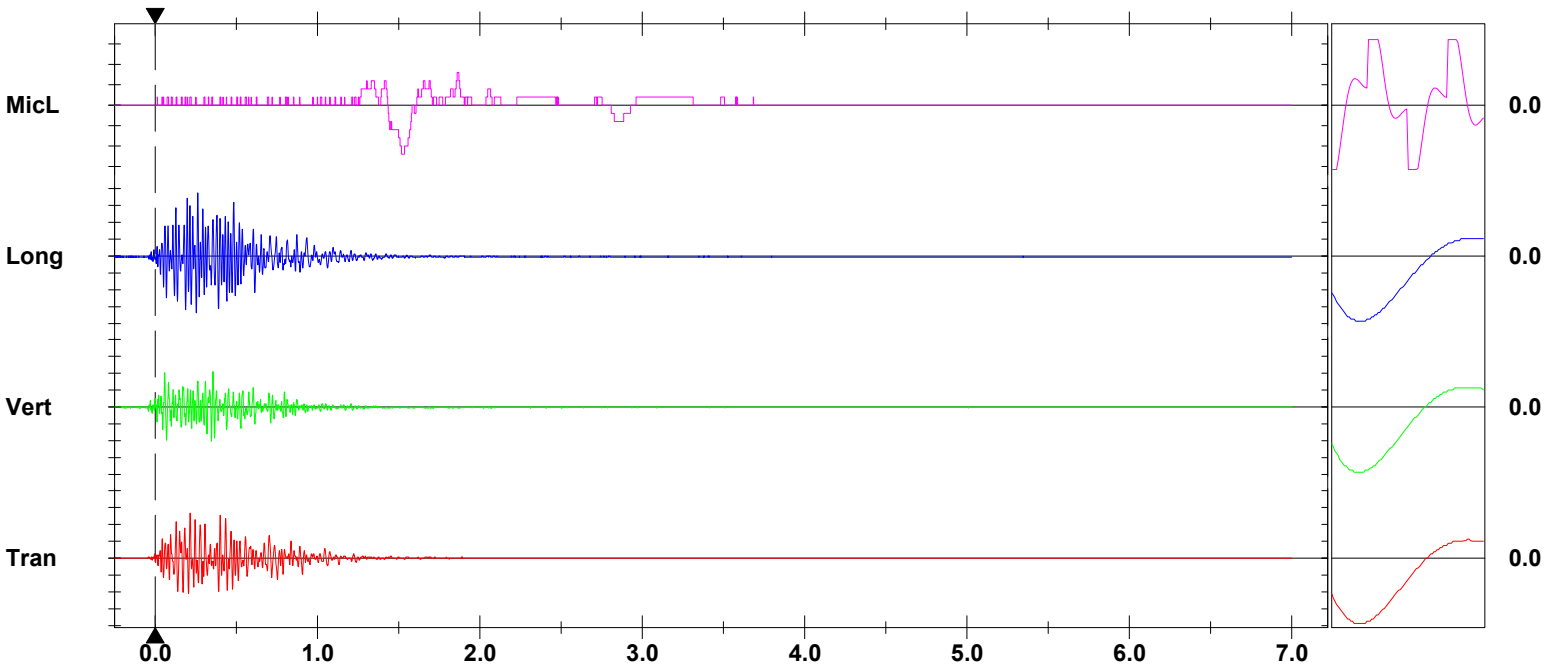
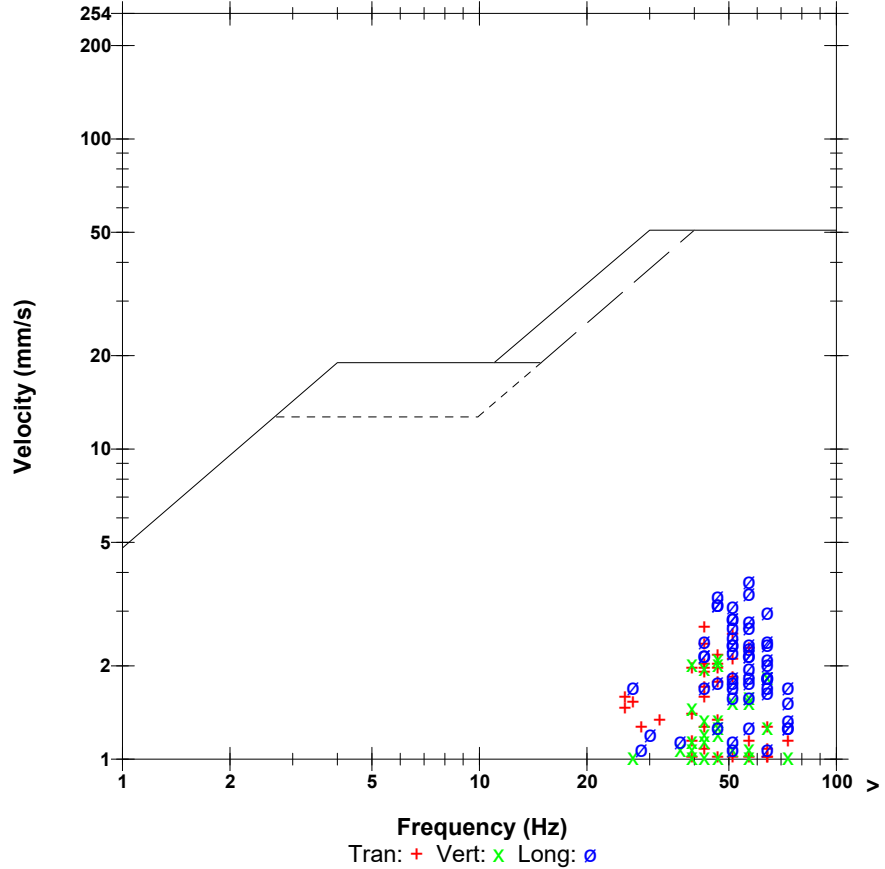
Extended Notes

Microphone Linear Weighting
PSPL 115.6 dB(L) 12.00 pa.(L) at 1.518 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 296 mv)

	Tran	Vert	Long	
PPV	2.667	2.096	3.747	mm/s
PPV	59.52	57.43	62.47	dB
ZC Freq	43	47	57	Hz
Time (Rel. to Trig)	0.216	0.357	0.264	sec
Peak Acceleration	0.080	0.073	0.133	g
Peak Displacement	0.009	0.007	0.011	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	8.2	7.8	Hz
Overswing Ratio	3.6	3.3	3.8	

Peak Vector Sum 4.128 mm/s at 0.264 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 1.000 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Tran at 14:49:18 September 21, 2022
Trigger Source Geo: 1.000 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5635 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration March 1, 2022 by Instatel
File Name G635JORY.I60

Notes
 Location:
 Client:
 User Name:
 Converted: September 21, 2022 17:34:07 (V10.72.1)

Post Event Notes
 Location: 50 Myron Road (PW-15)
 Blast No.: 2022-32
 Project No: 22S001.00

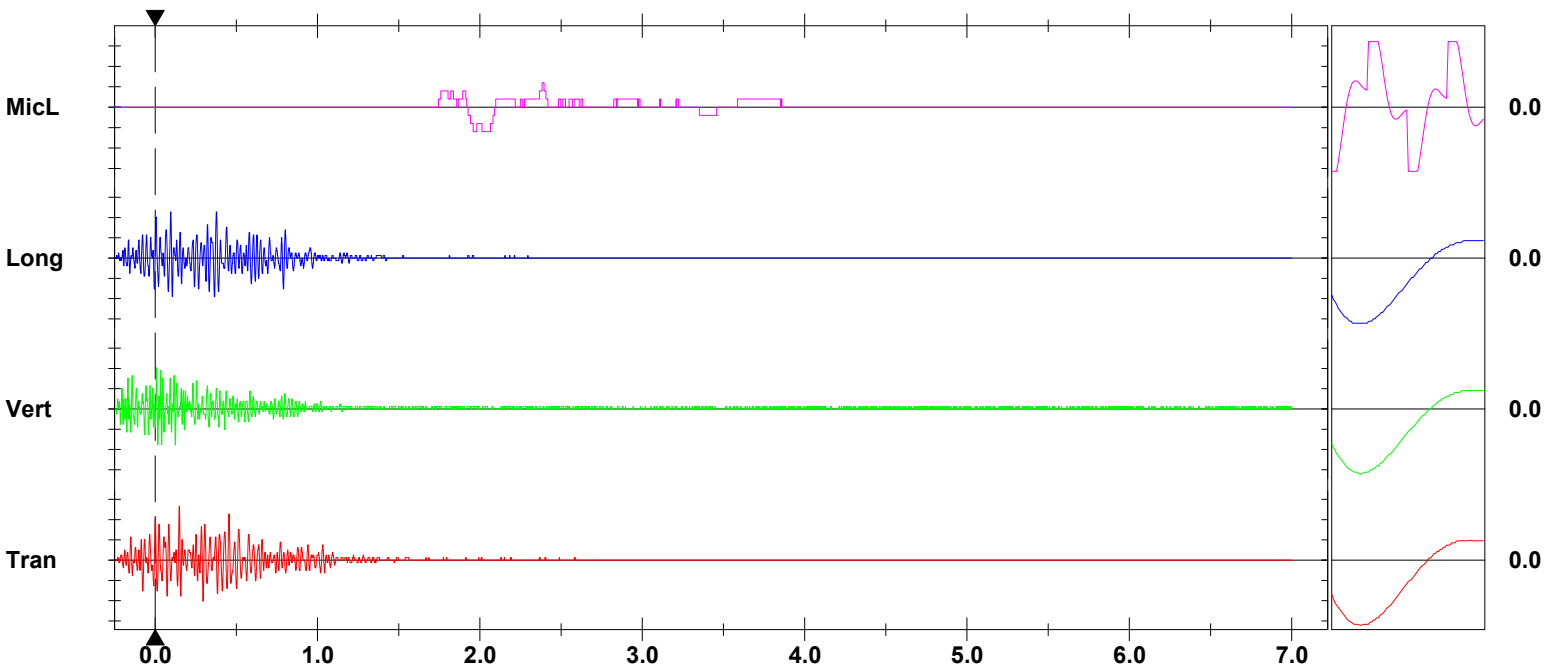
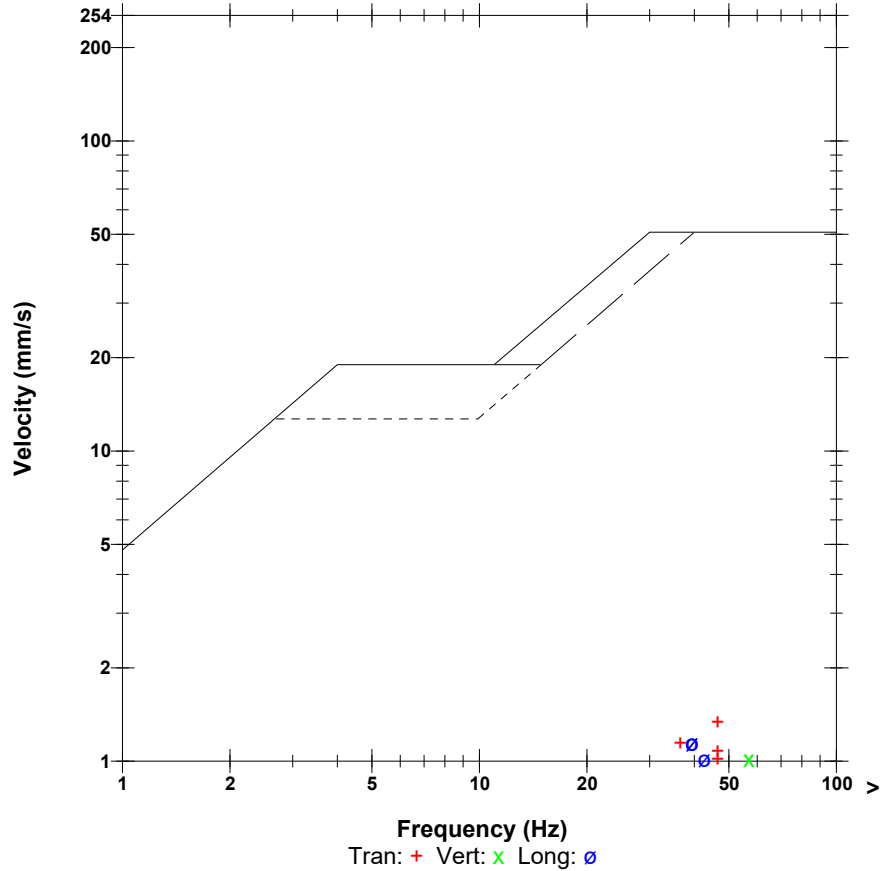
Extended Notes

Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 1.959 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 296 mv)

	Tran	Vert	Long	
PPV	1.334	1.016	1.143	mm/s
PPV	53.50	51.14	52.16	dB
ZC Freq	47	57	39	Hz
Time (Rel. to Trig)	0.149	0.009	0.097	sec
Peak Acceleration	0.040	0.046	0.040	g
Peak Displacement	0.005	0.003	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	7.7	Hz
Overswing Ratio	3.2	3.7	3.8	

Peak Vector Sum 1.349 mm/s at 0.150 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:40:11 September 21, 2022
Trigger Source Geo: 0.492 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5676 V 2.61 MiniMate
Battery Level 6.0 Volts
Unit Calibration February 28, 2022 by InstanTel
File Name G676JORY.2Z0
Post Event Notes
 Location: 86 Myron Road (PW-16)
 Blast No.: 2022-32
 Project No: 22S001.00

Notes
 Location:
 Client:
 User Name:
 Converted: September 21, 2022 17:32:20 (V10.72.1)

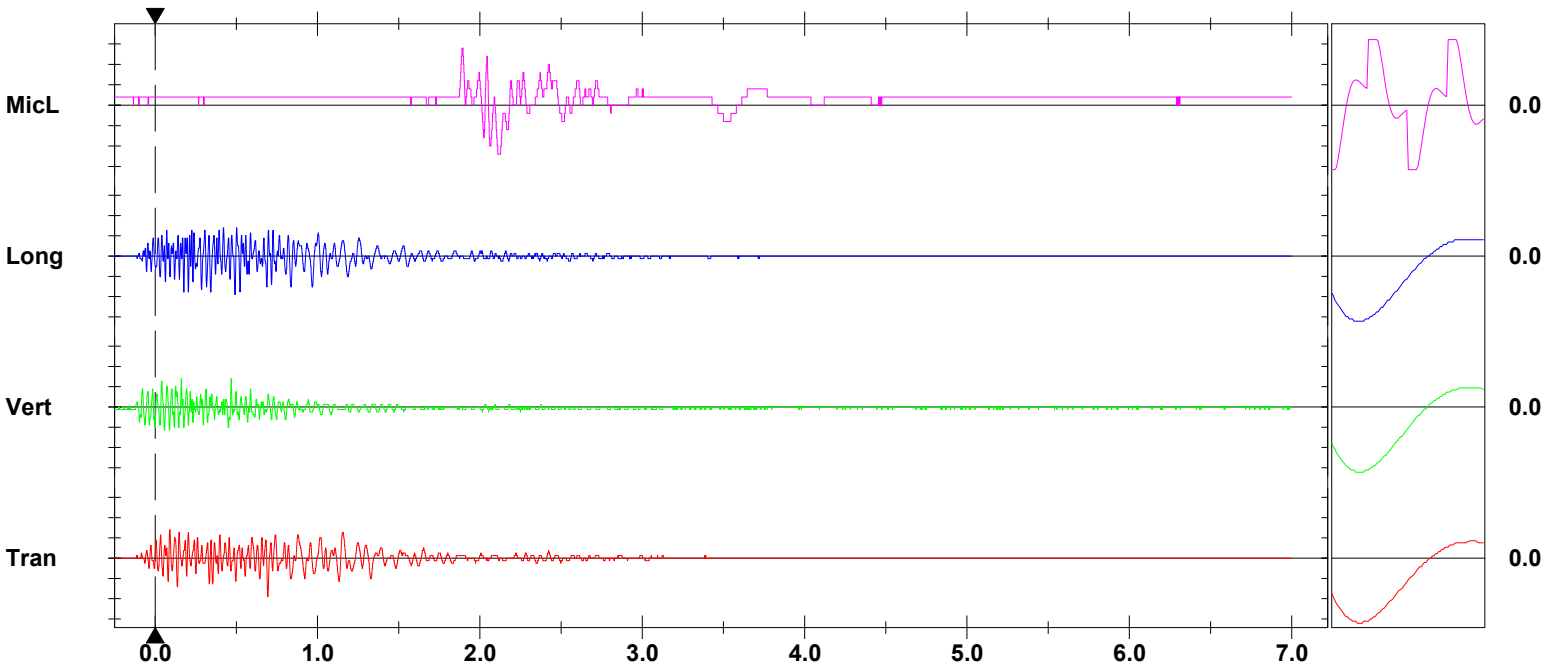
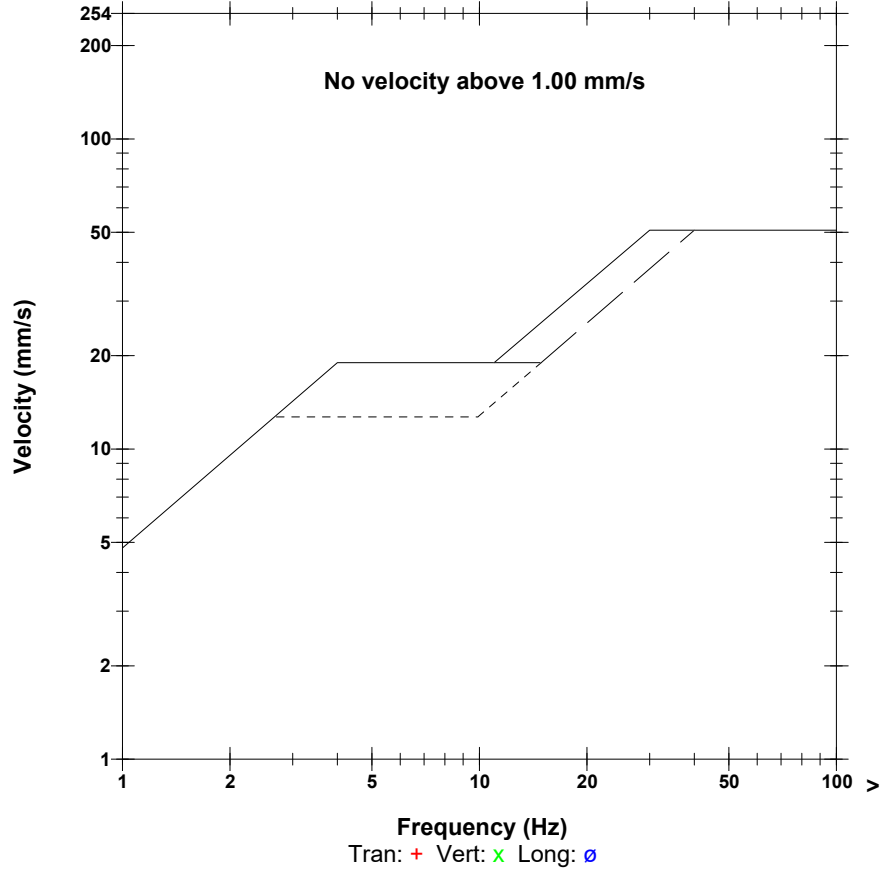
Extended Notes

Microphone Linear Weighting
PSPL 116.9 dB(L) 14.00 pa.(L) at 1.891 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 300 mv)

	Tran	Vert	Long	
PPV	0.953	0.699	0.953	mm/s
PPV	50.58	47.88	50.58	dB
ZC Freq	34	57	39	Hz
Time (Rel. to Trig)	0.694	0.162	0.492	sec
Peak Acceleration	0.027	0.027	0.033	g
Peak Displacement	0.006	0.003	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	8.1	8.0	Hz
Overswing Ratio	3.8	3.5	3.8	

Peak Vector Sum 1.175 mm/s at 0.205 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 5.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:48:10 September 21, 2022
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps
Job Number: 1

Serial Number BE21349 V 10.72-1.1 Minimate Blaster
Battery Level 6.3 Volts
Unit Calibration July 20, 2022 by InstanTel
File Name W349JQ3.SA0

Post Event Notes

Location: 2337 Route 820 (PW-04)
 Blast No.: 2022-32
 Project No: 22S001.00

Notes

Location:
 Client:
 User Name:
 General:

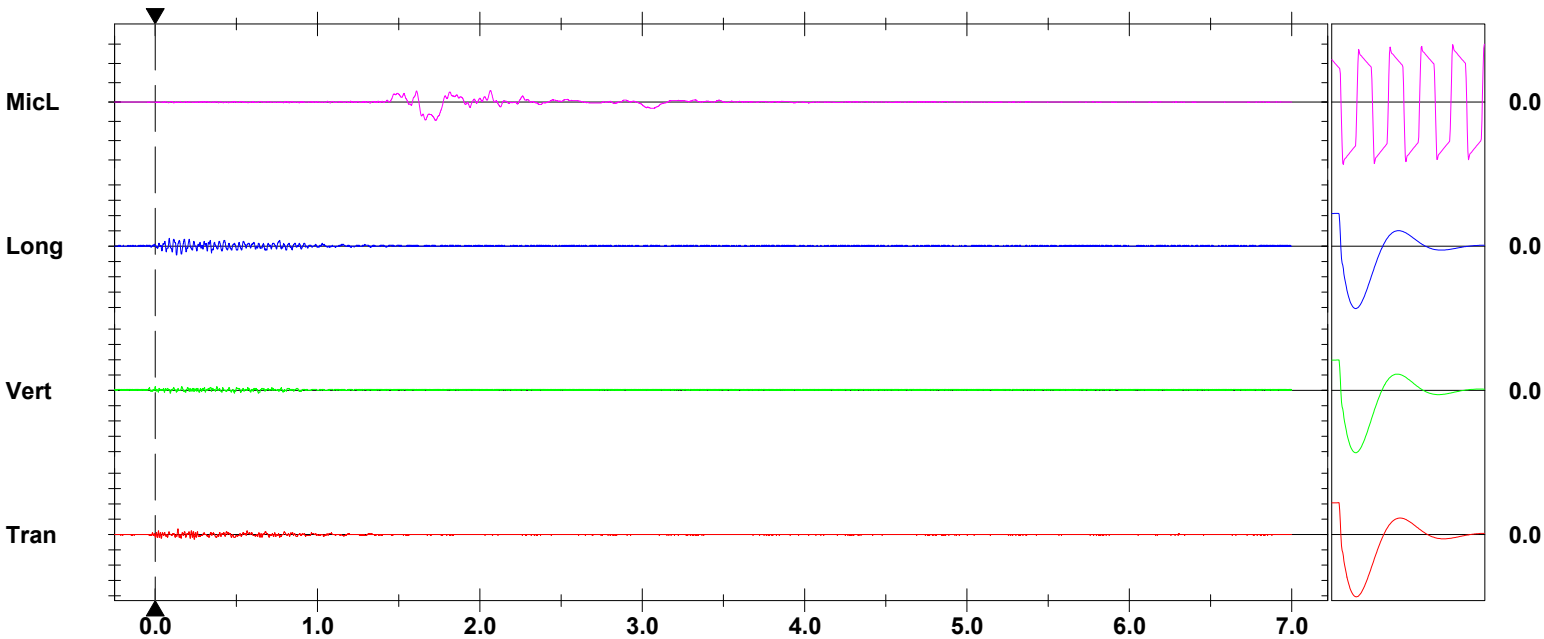
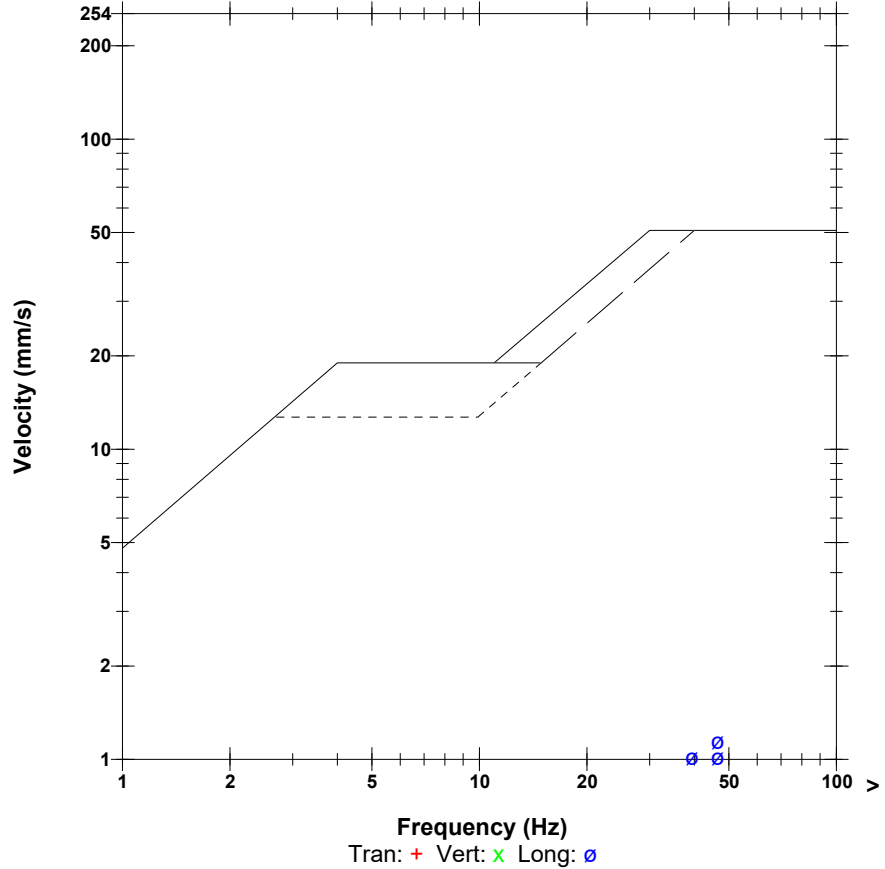
Extended Notes

Microphone Linear Weighting
PSPL 113.5 dB(L) 9.500 pa.(L) at 1.725 sec
ZC Freq 3.4 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 560 mv)

	Tran	Vert	Long	
PPV	0.762	0.508	1.143	mm/s
PPV	48.64	45.12	52.16	dB
ZC Freq	57	73	47	Hz
Time (Rel. to Trig)	0.141	0.000	0.131	sec
Peak Acceleration	0.027	0.040	0.040	g
Peak Displacement	0.003	0.002	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.4	Hz
Overswing Ratio	3.8	3.9	4.0	

Peak Vector Sum 1.178 mm/s at 0.131 sec

USBM RI8507 And OSMRE



Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check