Memo

HAMMOND RIVER HOLDINGS

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: September 29, 2022

Subject: Monthly Monitoring Report – Upham East Gypsum Quarry – August 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 August 2022, in accordance with conditions of the Approval to Operate I-10936. Activities included surface water 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 July 2022.

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

- Week 1: August 6, 2022
- Week 2: August 10, 2022
- Week 3: August 18, 2022
- Week 4: August 24, 2022

The August 10 and August 18 sampling events were conducted in conduction with heavy rain events, defined as more than 25 mm of rain over a 24-hour period. One additional sampling event was conducted on August 15, 2022 due to a heavy rain event.

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

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 August 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.

Environmental Accidents and Malfunctions

There were no reported environmental accidents or malfunctions during the August 2022 monitoring period.

Ambient Air Quality Monitoring – Total Suspended Particulate

24-hour air samples are collected every 6 days in accordance with the National Air Pollution Surveillance (NAPS) schedule. The air quality monitor used to conduct the monitoring is a BGI PQ100 air sampler, a high-volume sampler for total suspended particulate matter. In July there were 5 air quality monitoring events, August 5, 11, 17, 23, and 29, 2022. The results are provided in **Table 3**. There were no exceedances of the 120 µg/m^3 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 August 2022 monitoring period, occurring on August 3, 8, 10, 17, and 29, 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.

The blast on August 10 occurred without monitoring by CBCL Limited as required in the Approval to Operate I-10396. As described in a memo provided by CBCL Limited (attached), the conditions were similar to the August 3 blast and therefore, exceedances in maximum velocity and sound pressure are not expected.

Public Complaints

There was a complaint during the August 2022 monitoring period regarding the unannounced blast on August 10. Hammond River Holdings responded immediately with notifications to the public and NBDELG. An investigation was conducted following the incident. It was determined that communication broke down between subcontractors/general contractors and Hammond River Holdings. Protocols were reviewed with all parties to ensure incidents like this will not happen again. An Engineering memo was prepared by CBCL Limited that discusses what the potential vibrations would have been given the blast conditions on August 10, 2022.

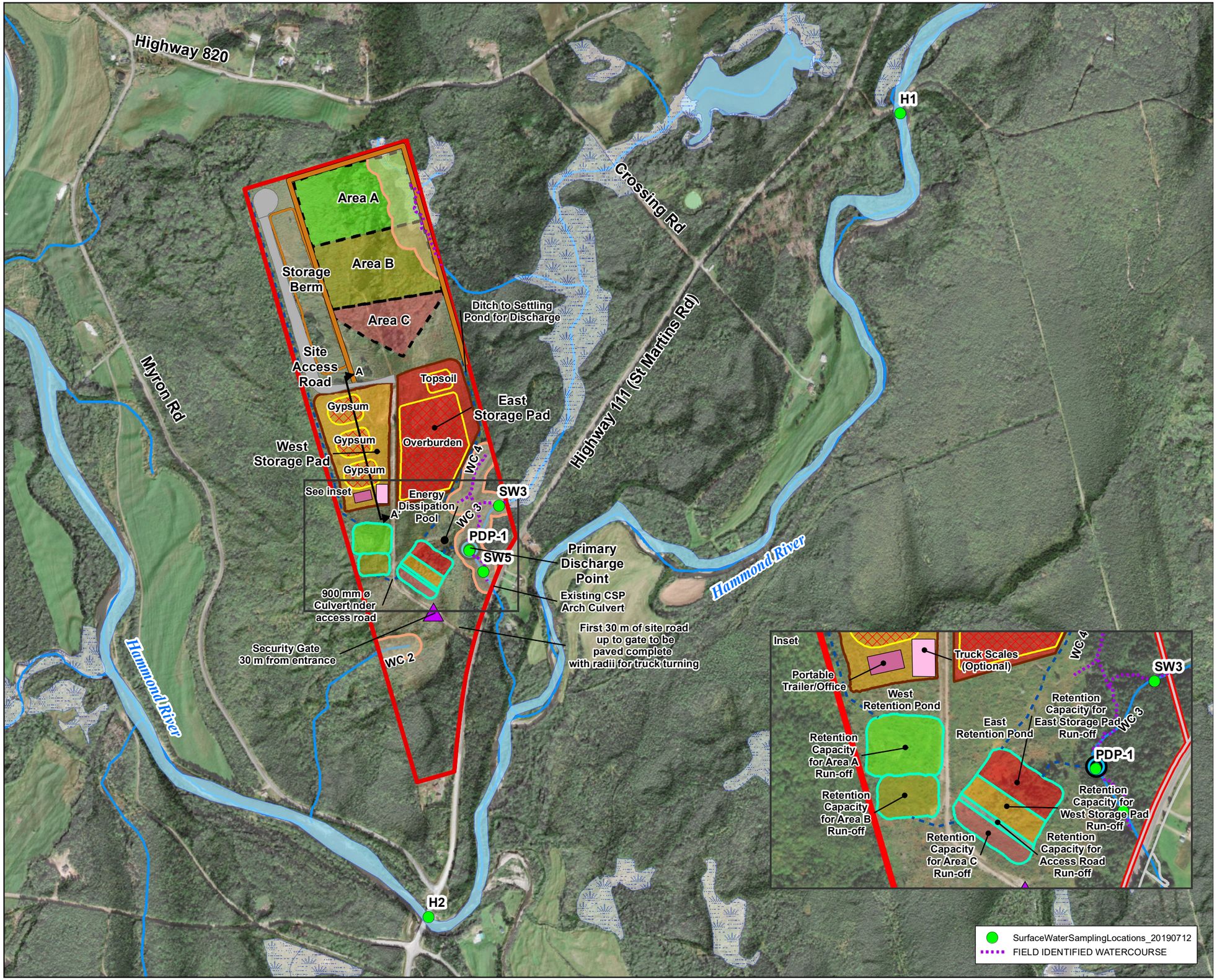
Summary

Since extraction activities began in July 2020 at the Upham East Gypsum Quarry, the water chemistry at the discharge point into the unnamed tributary has remained comparable to background, 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

0 50 100 200 m

SCALE 1:8,500

N W E S

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

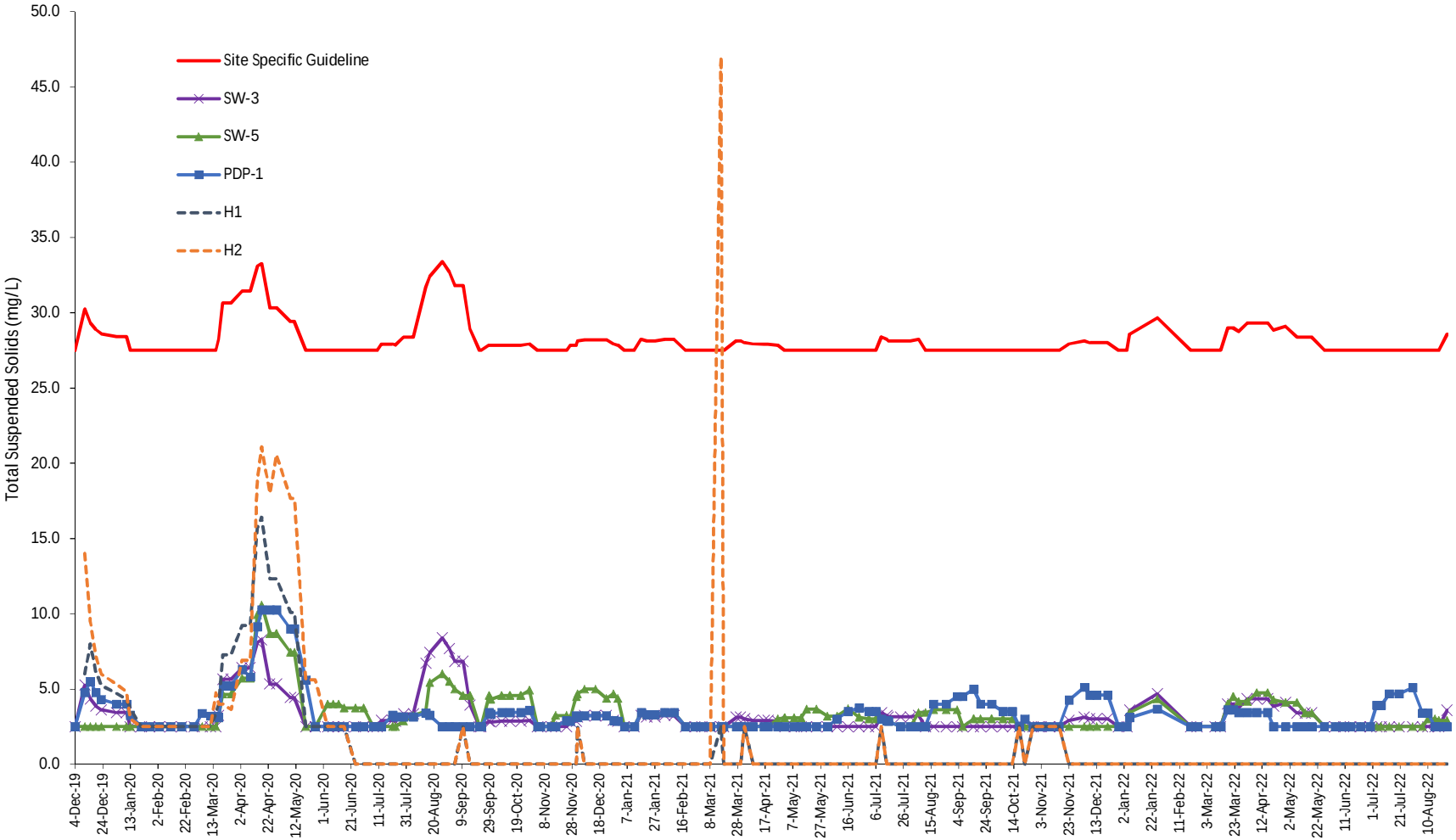
MAP CREATED BY: JH
MAP REVISED BY: JO
MAP CHECKED BY: GA
MAP PROJECTION: NAD_1983_CSRS_NEW_BRUNSWICK_STEREOGRAPHIC

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

DILLON CONSULTING

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]	Water Temperature	Specific Conductivity	Turbidity	Total Suspended Solids[c]
Units		°C	mm	°C	mS/cm	NTU	mg/L
Sample ID	Date						
SW3	6-Aug-22	27.7	0.3	18.6	2116	0.87	<5
PDP-1	6-Aug-22			19.6	2226	0.34	<5
SW5	6-Aug-22			19.1	2211	0.67	<5
PDP-1 FD	6-Aug-22			19.6	2228	0.40	<5
SW3	10-Aug-22	19.2	25.3	18.1	890	1.65	<5
PDP-1	10-Aug-22			17.9	998	4.07	<5
SW5	10-Aug-22			17.7	959	1.89	5
SW3	15-Aug-22	24.3	38.3	18.2	536	1.46	<5
PDP-1	15-Aug-22			18.1	642	0.74	<5
SW5	15-Aug-22			18.2	631	1.35	<5
SW3	18-Aug-22	17.2	30.2	18.2	550	1.43	<5
PDP-1	18-Aug-22			17.9	870	1.15	<5
PDP-1 FD	18-Aug-22			17.9	865	1.21	<5
SW5	18-Aug-22			18.0	896	1.83	<5
SW3	24-Aug-22	22	19.5	17.6	991	2.60	9
PDP-1	24-Aug-22			17.6	1157	0.22	<5
SW5	24-Aug-22			17.8	1145	0.75	<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) Preciptitation based on data from the climate station at the Saint John airport. Data available at:
https://climate.weather.gc.ca/historical_data/search_historic_data_e.html

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

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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

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
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/m3)	(µg/m^3)
2020-07-22	24 hours	16.70	24.05	752	20.3	14.842	14.865	23000	39.85	120
2020-07-28	24 hours	16.46	23.70	747	24.4	14.826	14.828	1700	2.99	120
2020-08-04	24 hours	16.66	23.99	753	22.8	14.826	14.830	3100	5.38	120
2020-08-09	24 hours	16.74	24.10	752	21.2	14.842	14.844	2200	3.80	120
2020-08-15	24 hours	16.88	24.30	754	19.8	14.824	14.836	11600	19.89	120
2020-08-21	24 hours	16.87	24.30	749	17.9	14.839	14.842	2100	3.60	120
2020-08-27	24 hours	17.06	24.57	743	12.4	14.823	14.845	21700	36.80	120
2020-09-02	24 hours	16.75	24.12	747	18.8	14.842	14.861	19700	34.03	120
2020-09-08	24 hours	17.02	24.51	759	19.1	14.859	14.871	12100	20.57	120
2020-09-14	24 hours	17.62	25.37	756	8.0	14.828	14.837	9300	15.27	120
2020-09-20	24 hours	18.03	25.97	764	4.8	14.835	14.852	17100	27.44	120
2020-09-26	24 hours	17.10	24.62	753	15.3	14.856	14.859	3300	5.59	120
2020-10-02	24 hours	14.43	25.10	753	9.6	14.972	14.959	-12800	-21.25	120
2020-10-08	24 hours	17.69	25.48	748	3.8	14.861	14.889	28800	47.10	120
2020-10-14	24 hours	17.56	25.29	753	7.8	14.883	14.891	8300	13.68	120
2020-10-20	19:31	17.63	20.66	760	9.1	14.875	14.858	-17100	-34.49	120
2020-10-23	21:55	17.34	22.82	750	10.1	14.859	14.865	5600	11.20	120
2020-10-26	21:02	17.71	22.35	752	4.8	14.854	14.864	10100	21.52	120
2020-11-01	24 hours	17.19	24.75	732	5.9	14.873	14.880	7300	12.29	120
2020-11-07	24 hours	17.84	25.68	759	5.9	14.869	14.872	3100	5.03	120
2020-11-13	24 hours	17.79	25.62	748	1.9	14.860	14.861	600	0.98	120
2020-11-19	24 hours	17.63	25.22	756	7.3	14.848	14.850	2200	3.64	120
2020-11-25	24 hours	17.83	25.68	756	4.4	14.850	14.856	6700	10.87	120
2020-12-01	24 hours	17.48	25.18	748	7.0	14.843	14.861	18300	30.28	120
2020-12-07	24 hours	17.88	25.75	740	-2.1	14.834	14.836	1900	3.07	120
2020-12-13	24 hours	17.98	25.90	746	-1.3	14.831	14.839	8300	13.35	120
2020-12-19	24 hours	18.37	26.45	756	-3.6	14.837	14.843	5700	8.98	120
2020-12-25	24 hours	17.34[a]	22.82[a]	753[a]	12.3[a]	14.840	14.850	10000	18.26	120
2020-12-31	24 hours	18.58	26.76	759	-5.8	14.845	14.850	4800	7.47	120
2021-01-06	24 hours	18.00	24.73	744	-2.7	14.836	14.852	16300	27.46	120
2021-01-12	24 hours	16.70	24.74	749	-6.7	14.854	14.872	18200	30.65	120
2021-01-18	24 hours	17.52	25.52	737	-0.8	14.868	14.877	8600	14.04	120
2021-01-24	24 hours	16.70	24.03	737	-8.0	14.823	14.827	4200	7.28	120
2021-01-30	24 hours	16.70	24.03	750	-11.2	14.829	14.833	3600	6.24	120
2021-02-05	24 hours	17.90	25.80	744	-0.9	14.850	14.866	15800	25.52	120
2021-02-11	24 hours	16.70	24.05	750	-12.6	14.829	14.834	5300	9.18	120
2021-02-17	24 hours	16.70	24.05	755	-9.9	14.818	14.821	2800	4.85	120
2021-02-23	24 hours	17.70	25.49	737	-0.6	14.891	14.897	6000	9.81	120
2021-03-01	24 hours	17.87	25.74	741	-1.6	14.858	14.866	7700	12.46	120
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

Table 3
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/m3)	(µg/m^3)
2021-04-06	24 hours	16.70	24.05	746	4.1	14.822	14.835	13400	23.22	120
2021-04-12	24 hours	17.64	25.55	749	5.2	14.812	14.817	5100	8.32	120
2021-04-18	24 hours	16.70	24.05	742	2.6	14.815	14.825	10000	17.33	120
2021-04-24	24 hours	17.27	24.05	743	8.8	14.815	14.826	10400	18.02	120
2021-04-30	24 hours	17.24	24.82	735	6.4	14.814	14.921	107000	11.75	120
2021-05-06[b]	21.08	17.42	21.08	750	8.8	14.840	14.850	10100	19.96	120
2021-05-12[b]	-	17.49	25.19	748	7.1	14.822	14.830	7800	12.90	120
2021-05-18[b]	19.21	17.53	20.35	757	9.8	14.830	14.838	8700	17.81	120
2021-05-27[c]	-	-	-	-	-	-	-	-	-	120
2021-05-31	24 hours	16.70	24.05	753	14.2	14.829	14.835	5800	10.05	120
2021-06-04	33.46	16.79	34.02	746	18.1	14.831	14.839	7900	9.68	120
2021-06-10	24 hours	17.42	25.09	754	10.4	14.840	14.844	4300	7.14	120
2021-06-16	24 hours	17.48	25.18	743	5.6	14.849	14.854	5600	9.27	120
2021-06-22[d]	24 hours	17.23	24.82	744	9.7	14.870	14.879	9100	15.28	120
2021-06-24	24 hours	17.94	25.83	762	5.4	14.846	14.847	1200	1.94	120
2021-06-30	24 hours	17.01	24.29	746	14.4	14.885	14.889	4200	7.20	120
2021-07-06	24 hours	17.30	24.91	746	9.3	14.866	14.868	1700	2.84	120
2021-07-12	24 hours	17.60	24.05	759	9.5	14.848	14.851	3000	5.20	120
2021-07-18	24 hours	16.70	24.05	753	11.8	14.847	14.852	5200	9.01	120
2021-07-24	24 hours	17.51	25.21	753	8.8	14.831	14.838	6900	11.40	120
2021-07-30	24 hours	17.43	25.10	742	5.6	14.830	14.840	10000	16.60	120
2021-08-05	24 hours	17.47	25.15	755	10.0	14.821	14.835	13900	23.03	120
2021-08-10	24 hours	17.21	24.78	753	13.5	14.822	14.830	8100	13.62	120
2021-08-11	24 hours	17.18	23.42	752	13.6	14.878	14.890	12000	21.35	120
2021-08-17	24 hours	17.43	24.05	756	11.2	14.825	14.836	10200	17.67	120
2021-08-23	24 hours	17.19	24.75	750	12.4	14.844	14.859	14500	24.41	120
2021-08-29	24 hours	17.49	25.18	755	9.8	14.824	14.830	6100	10.09	120
2021-09-04	24 hours	16.70	24.05	745	3.1	14.822	14.832	10600	18.36	120
2021-09-09	24 hours	17.15	24.70	747	11.9	14.818	14.824	5600	9.45	120
2021-09-16	24 hours	18.05	24.05	759	2.7	14.844	14.859	15700	27.20	120
2021-09-22	24 hours	18.68	25.46	757	7.4	14.821	14.832	11700	19.15	120
2021-09-28	24 hours	17.45	25.13	746	7.2	14.821	14.830	9100	15.09	120
2021-10-04	24 hours	18.30	26.35	755	-2.6	14.820	14.824	3700	5.85	120
2021-10-10	24 hours	17.98	25.89	757	2.7	14.818	14.823	5000	8.05	120
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

Table 3
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/m3)	(µg/m^3)
2021-12-09	24 hours	19.23	27.69	755	-15.9	14.823	14.824	1000	1.50	120
2021-12-15	24 hours	18.55	26.72	760	-4.7	14.626	14.841	215300	335.73[e]	120
2021-12-17	24 hours	17.98	25.89	748	-0.6	14.819	14.829	9600	15.45	120
2021-12-23	24 hours	18.90	27.22	747	-14.2	14.835	14.839	3800	5.82	120
2021-12-29	24 hours	18.23	26.25	750	-3.6	14.842	14.850	7700	12.22	120
2022-01-04	24 hours	18.89	27.20	755	-11.2	14.843	14.853	10300	15.78	120
2022-01-10	24 hours	19.19	27.63	749	-17.2	14.825	14.831	6600	9.95	120
2022-01-16	24 hours	18.70	26.08	755	-19.9	14.842	14.865	23300	37.23	120
2022-01-22	24 hours	19.18	25.97	752	-15.5	14.829	14.851	21300	34.17	120
2022-01-28	24 hours	18.59	26.78	753	-7.8	14.833	14.861	28600	44.50	120
2022-02-03	24 hours	18.24	26.26	755	-1.7	14.894	14.940	45300	71.88	120
2022-02-09	24 hours	18.11	26.07	748	-2.5	14.856	14.858	2100	3.36	120
2022-02-15	24 hours	19.70	28.37	762	-19.5	14.843	14.844	1700	2.50	120
2022-02-21[c]	9.5 hours	-	-	-	-	-	-	-	-	120
2022-02-23	24 hours	18.41	26.51	749	-6.4	14.837	14.844	7100	11.16	120
2022-03-01	24 hours	18.43	26.28	751	-5.9	14.827	14.831	3300	5.23	120
2022-03-08	24 hours	18.37	26.45	748	-6.2	14.834	14.834	500	0.79	120
2022-03-14	24 hours	18.11	26.08	756	0.2	14.814	14.818	4300	6.87	120
2022-03-20	24 hours	17.53	25.24	741	3.9	14.830	14.833	3800	6.27	120
2022-03-26	24 hours	17.51	25.22	735	2.0	14.839	14.847	7500	12.39	120
2022-04-01	24 hours	17.34	24.98	735	4.4	14.847	14.852	5200	8.67	120
2022-04-07	24 hours	17.77	25.59	753	4.4	14.848	14.849	200	0.33	120
2022-04-13	24 hours	17.59	25.53	752	6.6	14.855	14.856	600	0.98	120
2022-04-19	24 hours	17.69	25.47	746	3.4	14.840	14.872	31700	51.86	120
2022-04-25	24 hours	17.65	25.42	757	7.8	14.831	14.845	14800	24.26	120
2022-05-01	24 hours	17.84	25.70	754	3.7	14.825	14.848	22700	36.80	120
2022-05-07	24 hours	17.82	25.67	755	4.4	14.823	14.832	9600	15.58	120
2022-05-13	24 hours	17.06	24.57	754	16.3	14.821	14.857	36200	61.39	120
2022-05-19	24 hours	17.20	24.77	749	12.0	14.816	14.829	13300	22.37	120
2022-05-25	24 hours	17.44	25.11	760	12.4	14.828	14.829	700	1.16	120
2022-05-31	24 hours	17.46	25.14	751	8.8	14.850	14.851	900	1.49	120
2022-06-06	24 hours	17.39	25.04	753	10.5	14.813	14.826	13800	22.96	120
2022-06-12	24 hours	16.92	24.36	752	18.3	14.825	14.833	7200	12.32	120
2022-06-18	24 hours	16.81	24.21	739	15.2	14.843	14.848	5600	9.64	120
2022-06-24	24 hours	16.93	24.38	751	17.4	14.828	14.858	30300	51.78	120
2022-06-30	24 hours	16.95	24.41	752	18.0	14.826	14.839	12900	22.02	120
2022-07-06	24 hours	17.10	24.63	747	13.0	14.829	14.829	400	0.68	120
2022-07-12	24 hours	16.59	24.29	750	17.7	14.826	14.836	9200	15.78	120
2022-07-18	24 hours	16.57	23.85	746	22.1	14.821	14.840	18500	32.32	120
2022-07-24	24 hours	16.70	24.05	749	24.4	14.861	14.862	1500	2.60	120
2022-07-30	24 hours	16.73	24.10	749	20.4	14.831	14.832	1000	1.73	120
2022-08-05	24 hours	16.66	24	755	23.9	14.8283	14.8427	14400	25.00	120
2022-08-11	24 hours	16.76	24.13	750	19.9	14.8321	14.8358	3700	6.39	120
2022-08-17	24 hours	16.95	24.41	749	16.5	14.8601	14.8771	17000	29.02	120
2022-08-23	24 hours	16.89	24.33	749	17.2	14.8649	14.8726	7700	13.19	120
2022-08-29	24 hours	16.7	24.05	753	17.3	14.8706	14.8811	10500	18.19	120

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: 452407-IAS
Report Date: 15-Aug-22
Date Received: 09-Aug-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:			452407-1	452407-2	452407-3	452407-4
Client Sample ID:			SW3	SW5	PDP-1	PDP-1 Duplicate
Date Sampled:			6-Aug-22	6-Aug-22	6-Aug-22	6-Aug-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

Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 452407-IAS
Report Date: 15-Aug-22
Date Received: 09-Aug-22

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 452927-IAS
Report Date: 22-Aug-22
Date Received: 12-Aug-22

CERTIFICATE OF ANALYSIS

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

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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:			452927-1	452927-2	452927-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			10-Aug-22	10-Aug-22	10-Aug-22
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	5	< 5

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

RL = Reporting Limit

Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 452927-IAS
Report Date: 22-Aug-22
Date Received: 12-Aug-22

CERTIFICATE OF ANALYSIS

for
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Canada E3B 6Z9
Tel: 506.452.1212
Fax: 506.452.0594
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 453658-IAS
Report Date: 26-Aug-22
Date Received: 17-Aug-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:			453658-1	453658-2	453658-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			15-Aug-22	15-Aug-22	15-Aug-22
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	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

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 453658-IAS
Report Date: 26-Aug-22
Date Received: 17-Aug-22

CERTIFICATE OF ANALYSIS

for
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30 Jervis Lane
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Canada E3B 6Z9
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www.rpc.ca

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 454014-IAS
Report Date: 31-Aug-22
Date Received: 19-Aug-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:			454014-1	454014-2	454014-3	454014-4
Client Sample ID:			SW3	SW5	PDP-1	PDP-1 DUPLICATE
Date Sampled:			18-Aug-22	18-Aug-22	18-Aug-22	18-Aug-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: 454014-IAS
Report Date: 31-Aug-22
Date Received: 19-Aug-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

Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 454941-IAS
Report Date: 08-Sep-22
Date Received: 26-Aug-22

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Fax: 506.452.0594
www.rpc.ca

Attention: Daniel Guest
Project #: 17-5121
Location: Upham

Analysis of Water

RPC Sample ID:			454941-1	454941-2	454941-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			24-Aug-22	24-Aug-22	24-Aug-22
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	9	< 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: 454941-IAS
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Methods

Analyte	RPC SOP #	Method Reference	Method Principle
Solids - Total Suspended	IAS-M05	APHA 2540 D	Filtration, Gravimetry

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August 4, 2022

Project No.: 22S001.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-24 – 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 (c/o Gulf Operators Ltd.) at 13:27 on August 3, 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. 2022-24 – August 3, 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)	13:27	1,360 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		951 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		799 m SE	0.13 mm/s @ >100 Hz	120	Triggered by microphone
4. Civic No. 2447 Route 820 (PW-07)		944 m NE	< 0.5 mm/s	<120	Unit was not triggered
5. PW-03 - Cottage Route 820		634 m N	0.50 mm/s @ 23 Hz	118	-
6. Civic No. 2341 Route 820 (PW-05)		620 m N	1.08 mm/s @ 47 Hz	122	-
7. Civic No. 50 Myron Road (PW-15)		828 m NW	0.13 mm/s @ >100 Hz	120	Triggered by microphone
8. Civic No. 86 Myron Road (PW-16)		757 m W	1.08 mm/s @ 57 Hz	121	-
9. Civic No. 220 Myron Road (PW-01)		1,350 m S	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 4140 Route 111 (PW-12)		885 m SE	< 0.5 mm/s	<120	
11. Civic No. 2337 Route 820 (PW-04)		703 m N	0.06 mm/s @ NA	122	Triggered by microphone
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

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

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

Attachment A

Blast Record

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Archibald Drilling & Blasting c/o Gulf Operators Ltd.		
Blaster's Certification No.:	1297	**Blaster's Name:**	Anthony Wallace
Blast Location:	N 45º28'53.61" W 65º38'03.85" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	9,558 tonnes
Weather at time of Blast:	Sunny	**Air Temp.:**	29ºC
Est. Wind Speed :	≈10 km/h	**Wind Direction:**	SW
Cloud Cover:	No	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	246	**Hole Diameter:**	4.5"
Average Depth:	13.4 ft	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	2	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	17, 42 ms
Initiation Method:	Non-Electric		
Weight of Explosives per Delay:	Max.: 72 kg		
Type and weight of Explosives for Blast:	8,950 kg – Titan XL 1000		

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	620 m
Direction to the Nearest Structure:	N
Structure Type:	House
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	73.1

SAFETY:

Type of Warning Signal Used:	Siren
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No

If Yes, Describe:

Misfire (yes or no):	No

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20204
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,360 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	July 23, 2022
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	951 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	November 15, 2021
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	799 m Southeast
Transverse Particle Velocity:	0.06 mm/s @ NA
Vertical Particle Velocity:	0.06 mm/s @ NA
Longitudinal Particle Velocity:	0.13 mm/s @ >100 Hz
Peak Particle Velocity:	0.13 mm/s @ >100 Hz
Maximum Airblast:	120 dB(L)

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18193
Calibration Date:	April 11, 2022
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	944 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20203
Calibration Date:	May 31, 2022
Location of seismograph:	Cottage - PW-03 - Route 820
Distance and Direction from Blast:	634 m North
Transverse Particle Velocity:	0.32 mm/s @ 30 Hz
Vertical Particle Velocity:	0.37 mm/s @ 43 Hz
Longitudinal Particle Velocity:	0.50 mm/s @ 23 Hz
Peak Particle Velocity:	0.50 mm/s @ 23 Hz
Maximum Airblast:	118 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5372
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	620 m North
Transverse Particle Velocity:	0.64 mm/s @ >100 Hz
Vertical Particle Velocity:	0.76 mm/s @ 73 Hz
Longitudinal Particle Velocity:	1.08 mm/s @ 47 Hz
Peak Particle Velocity:	1.08 mm/s @ 47 Hz
Maximum Airblast:	122 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	April 25, 2022
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	828 m Northwest
Transverse Particle Velocity:	0.06 mm/s @ NA
Vertical Particle Velocity:	0.13 mm/s @ >100 Hz
Longitudinal Particle Velocity:	0.06 mm/s @ NA
Peak Particle Velocity:	0.13 mm/s @ >100 Hz
Maximum Airblast:	120 dB(L)

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5675
Calibration Date:	February 28, 2022
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	757 m West
Transverse Particle Velocity:	1.08 mm/s @ 57 Hz
Vertical Particle Velocity:	0.83 mm/s @ 64 Hz
Longitudinal Particle Velocity:	1.02 mm/s @ 51 Hz
Peak Particle Velocity:	1.08 mm/s @ 57 Hz
Maximum Airblast:	121 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20206
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,350 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	July 27, 2022
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	885 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	703 m North
Transverse Particle Velocity:	0.06 mm/s @ NA
Vertical Particle Velocity:	0.06 mm/s @ NA
Longitudinal Particle Velocity:	0.06 mm/s @ NA
Peak Particle Velocity:	0.06 mm/s @ NA
Maximum Airblast:	122 dB(L)

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan
Blast No: 2022-24
Upham East Gypsum Quarry
Upham, NB

Date: August 3, 2022
Project No.: 22S001.00

Attachment C

Blast Event Reports

Event Report

Date/Time MicL at 13:27:29 August 3, 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

Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:15:23 (V10.72.1)

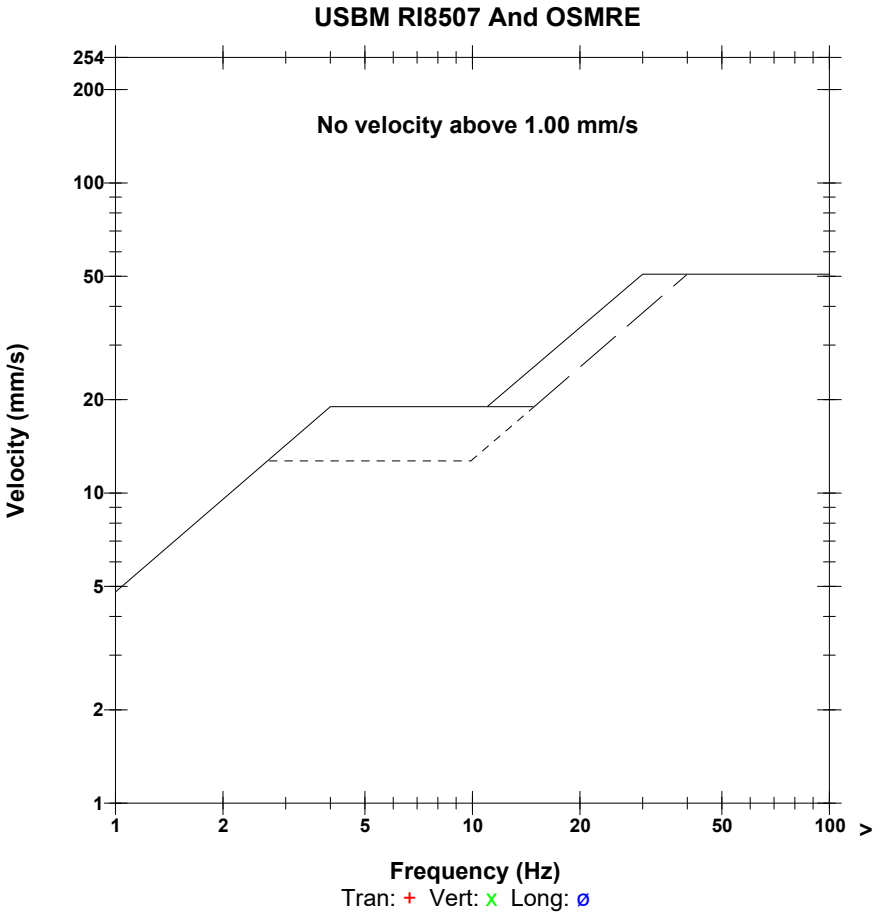
Serial Number 5632 V 2.61 MiniMate
Battery Level 6.0 Volts
Unit Calibration November 15, 2021 by Instantel
File Name G632JM94.1T0
Post Event Notes
Location: 4150 Route 111 (PW-13)
Blast No.: 2022-24
Project No: 22S001.00

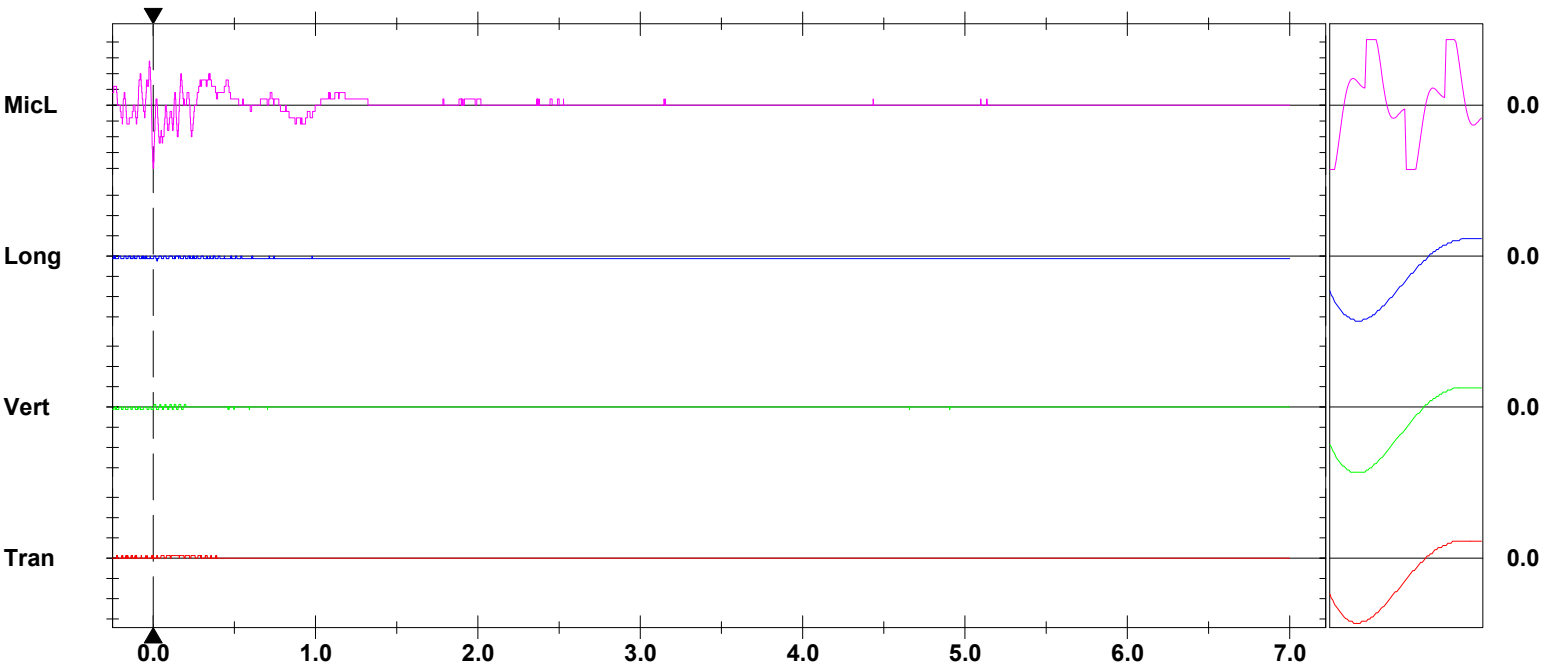
Extended Notes

Microphone Linear Weighting
PSPL 120.0 dB(L) 20.00 pa.(L) at 0.003 sec
ZC Freq 20 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 298 mv)

	Tran	Vert	Long	
PPV	0.064	0.064	0.127	mm/s
PPV	27.06	27.06	33.08	dB
ZC Freq	N/A	N/A	>100	Hz
Time (Rel. to Trig)	0.000	0.002	0.025	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	8.2	7.8	Hz
Overswing Ratio	3.9	3.3	3.8	

Peak Vector Sum 0.159 mm/s at 0.025 sec
N/A: Not Applicable





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

Event Report

Date/Time Long at 13:26:50 August 3, 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

Notes
Location:
Client:
User Name:
General:

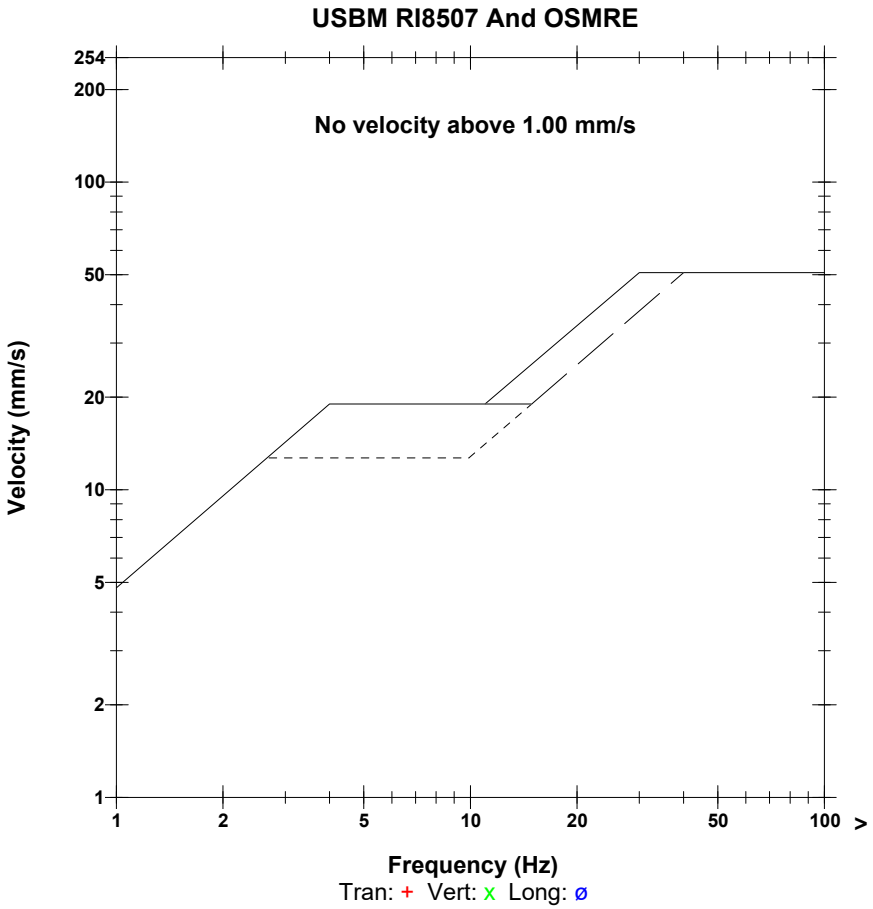
Serial Number UM20203 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20203_20220803132650.IDFW

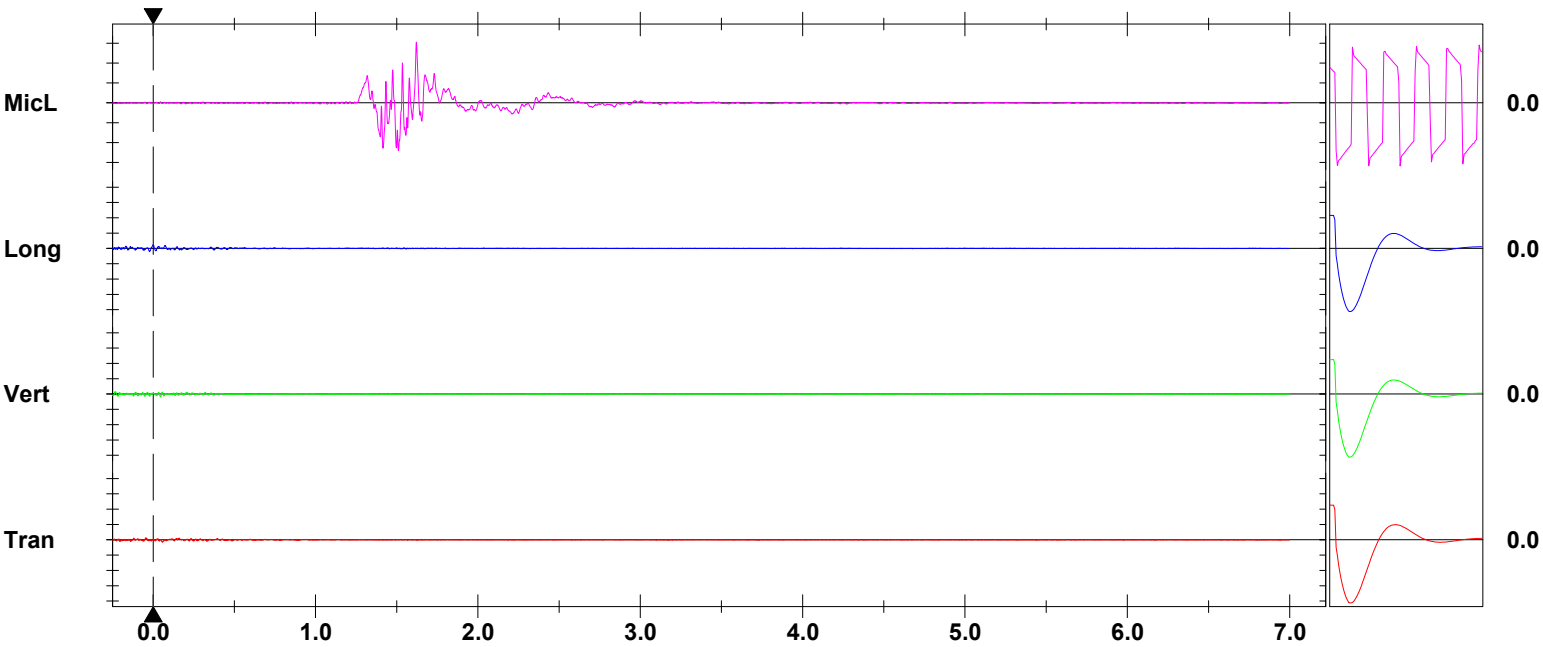
Post Event Notes
Location: Cottage - Route 820 - PW-03
Blast No.: 2022-24
Project No: 22S001.00

Microphone Linear Weighting
PSPL 117.7 dB(L) 15.30 pa.(L) at 1.621 sec
ZC Freq 16 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1219 mv)

	Tran	Vert	Long	
PPV	0.315	0.370	0.497	mm/s
PPV	40.97	42.37	44.92	dB
ZC Freq	30	43	23	Hz
Time (Rel. to Trig)	0.057	0.046	0.000	sec
Peak Acceleration	0.016	0.013	0.016	g
Peak Displacement	0.002	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.2	4.5	4.2	

Peak Vector Sum 0.501 mm/s at 0.000 sec





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

Event Report

Date/Time Vert at 13:27:12 August 3, 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

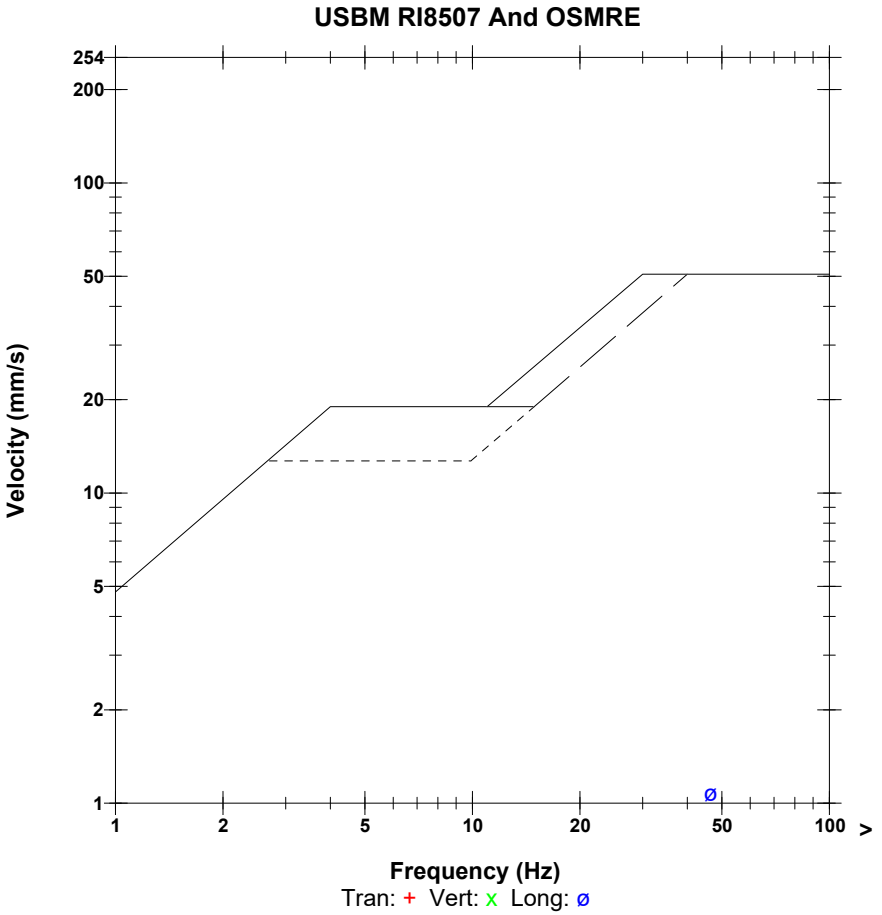
Notes
Location: .
Client: UUUTUUUUUUUUU
User Name: UUUUU
Converted: August 3, 2022 15:13:50 (V10.72.1)

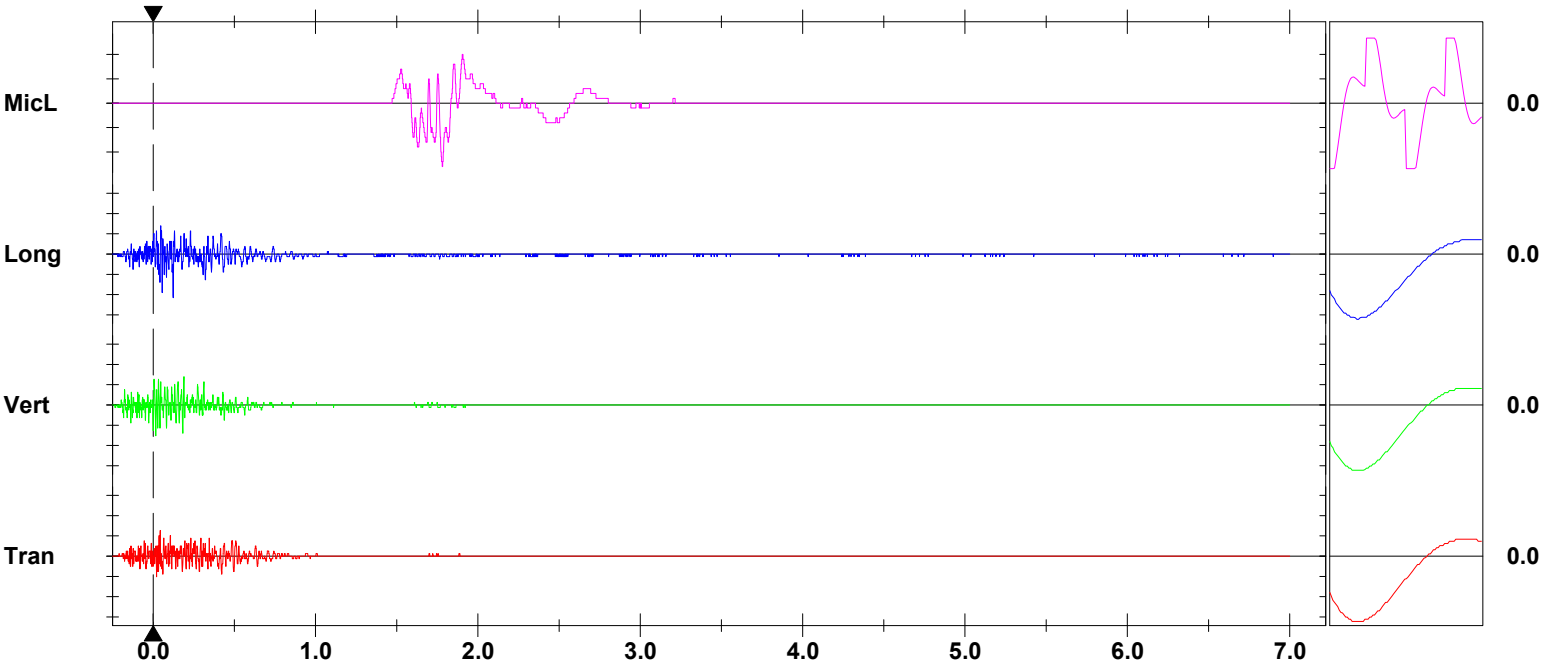
Serial Number 5372 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 18, 2022 by Instantel
File Name G372JM94.1C0
Post Event Notes
Location: 2341 Route 820 (PW-05)
Blast No.: 2022-24
Project No: 22S001.00

Microphone Linear Weighting
PSPL 122.3 dB(L) 26.00 pa.(L) at 1.781 sec
ZC Freq 7.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 292 mv)

	Tran	Vert	Long	
PPV	0.635	0.762	1.080	mm/s
PPV	47.06	48.64	51.66	dB
ZC Freq	>100	73	47	Hz
Time (Rel. to Trig)	0.045	0.017	0.124	sec
Peak Acceleration	0.040	0.053	0.053	g
Peak Displacement	0.001	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	7.6	Hz
Overswing Ratio	3.5	3.6	3.9	

Peak Vector Sum 1.127 mm/s at 0.124 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time MicL at 13:26:38 August 3, 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

Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:18:40 (V10.72.1)

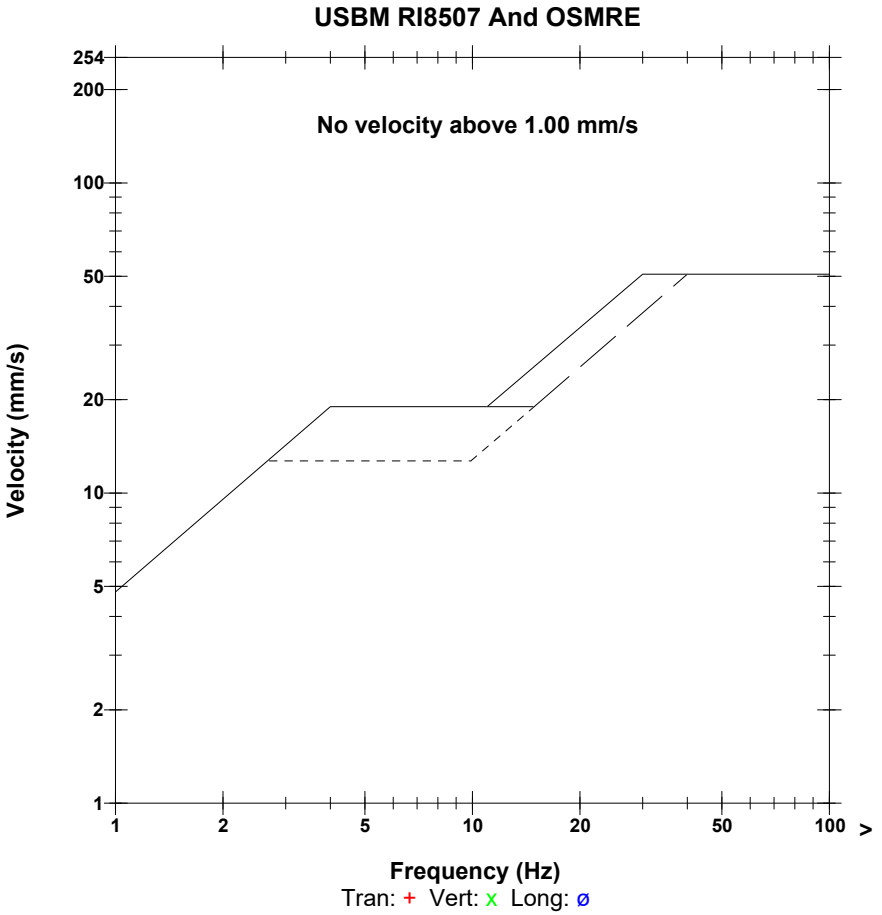
Extended Notes

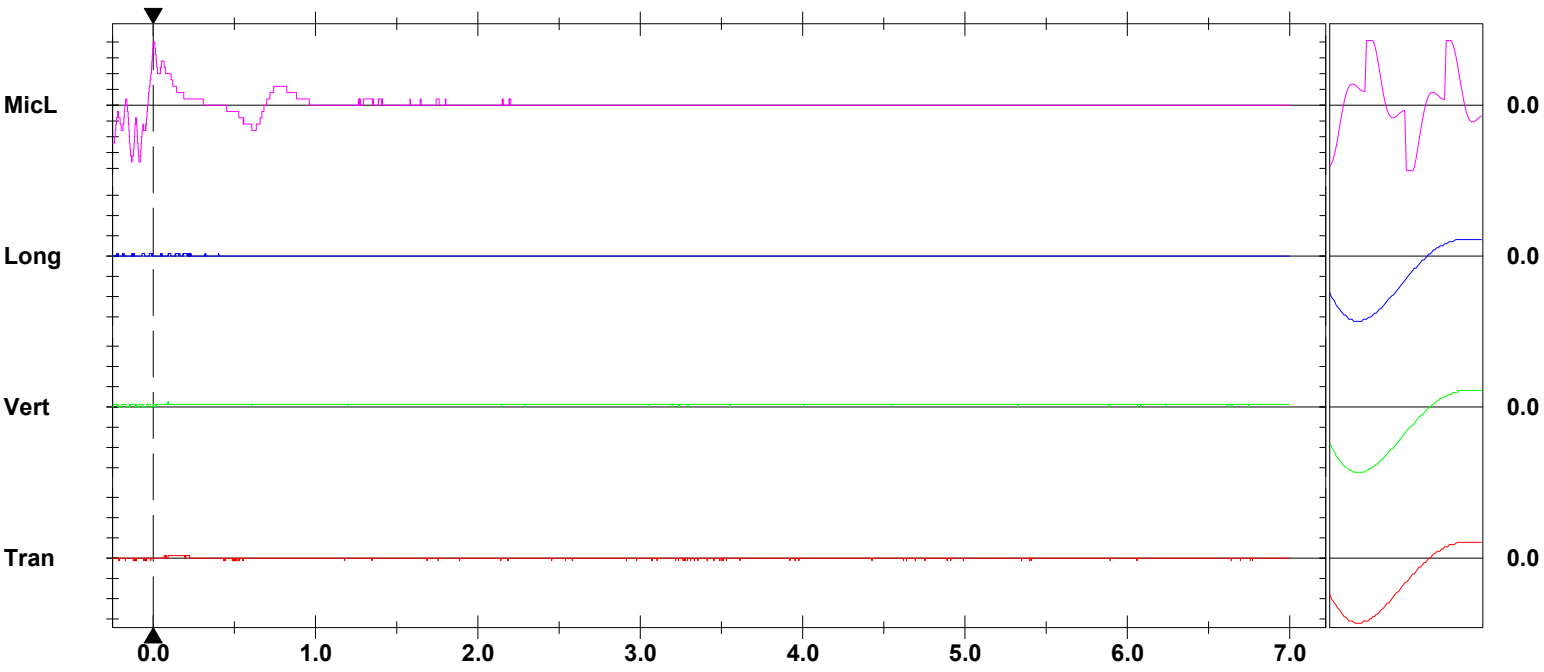
Microphone Linear Weighting
PSPL 120.0 dB(L) 20.00 pa.(L) at 0.010 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 273 mv)

	Tran	Vert	Long	
PPV	0.064	0.127	0.064	mm/s
PPV	27.06	33.08	27.06	dB
ZC Freq	N/A	>100	N/A	Hz
Time (Rel. to Trig)	-0.015	0.092	-0.002	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.7	8.0	Hz
Overswing Ratio	4.0	4.0	4.0	

Peak Vector Sum 0.159 mm/s at 0.094 sec
N/A: Not Applicable

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration April 25, 2022 by Instantel
File Name G489JM94.0E0
Post Event Notes
Location: 50 Myron Road (PW-15)
Blast No.: 2022-24
Project No: 22S001.00





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

Event Report

Date/Time Vert at 13:26:15 August 3, 2022
Trigger Source Geo: 0.492 mm/s
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:17:16 (V10.72.1)

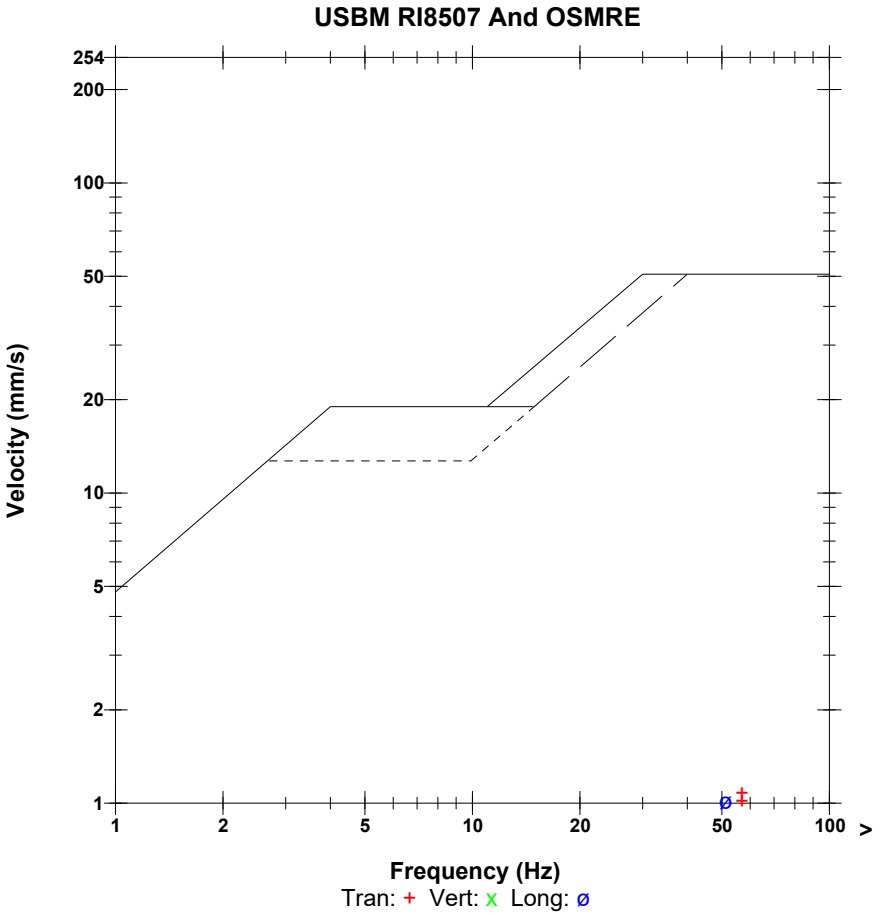
Serial Number 5676 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 28, 2022 by Instantel
File Name G676JM93.ZR0
Post Event Notes
Location: 86 Myron Road (PW-16)
Blast No.: 2022-24
Project No: 22S001.00

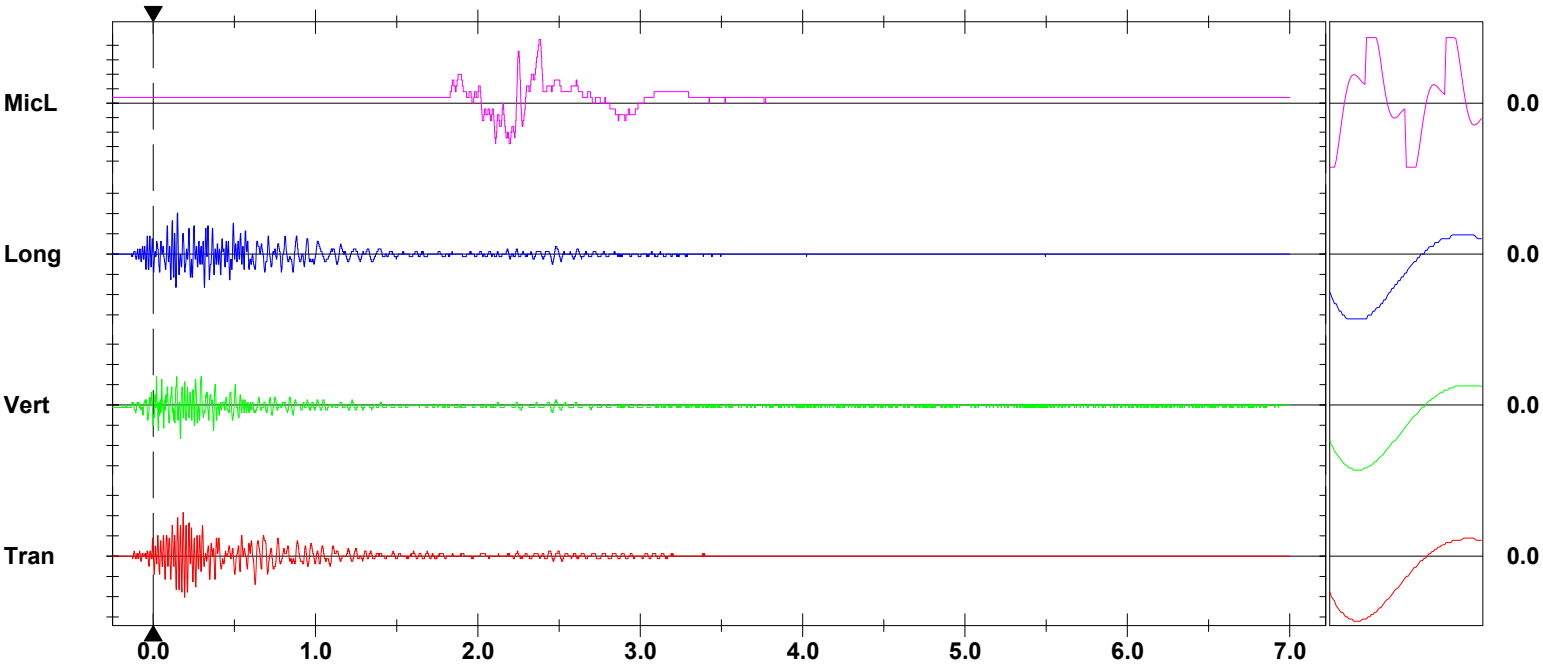
Extended Notes

Microphone Linear Weighting
PSPL 120.8 dB(L) 22.00 pa.(L) at 2.377 sec
ZC Freq N/A
Channel Test Passed (Freq = 20.0 Hz Amp = 298 mv)

	Tran	Vert	Long	
PPV	1.080	0.826	1.016	mm/s
PPV	51.66	49.33	51.14	dB
ZC Freq	57	64	51	Hz
Time (Rel. to Trig)	0.186	0.169	0.150	sec
Peak Acceleration	0.040	0.027	0.040	g
Peak Displacement	0.004	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	8.1	8.2	Hz
Overswing Ratio	3.7	3.4	3.6	

Peak Vector Sum 1.413 mm/s at 0.151 sec
N/A: Not Applicable





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

Event Report

Date/Time	MicL at 13:26:35 August 3, 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	5487 V 2.61 MiniMate
Battery Level	6.3 Volts
Unit Calibration	February 18, 2022 by Instantel
File Name	G487JM94.0B0

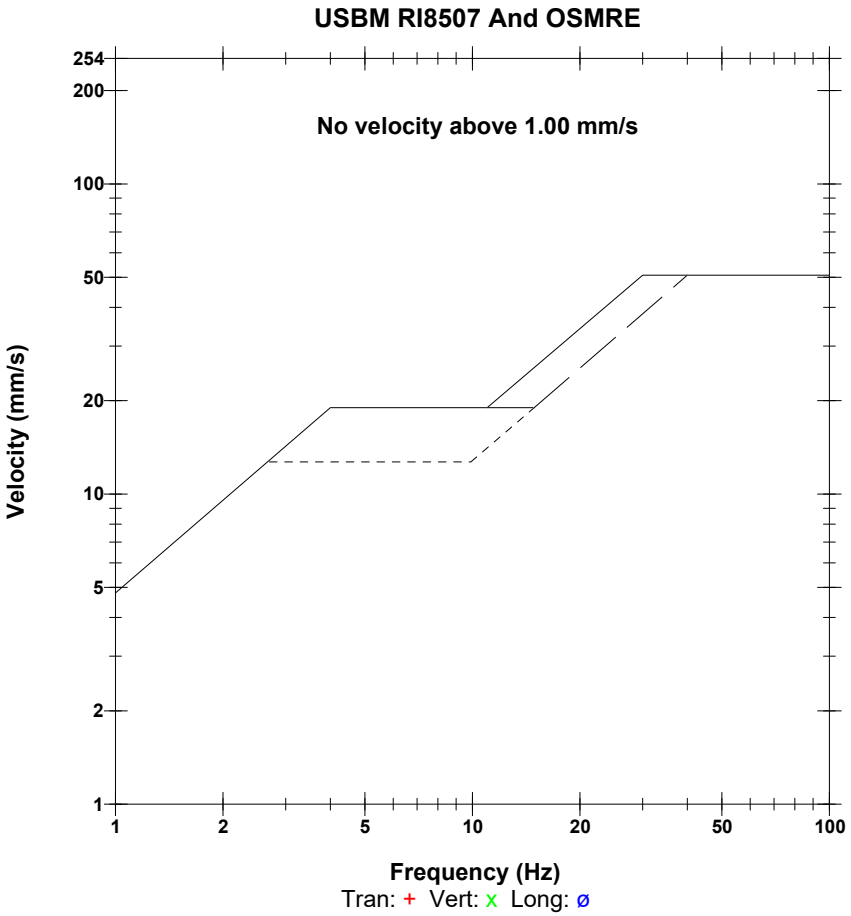
Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:20:13 (V10.72.1)

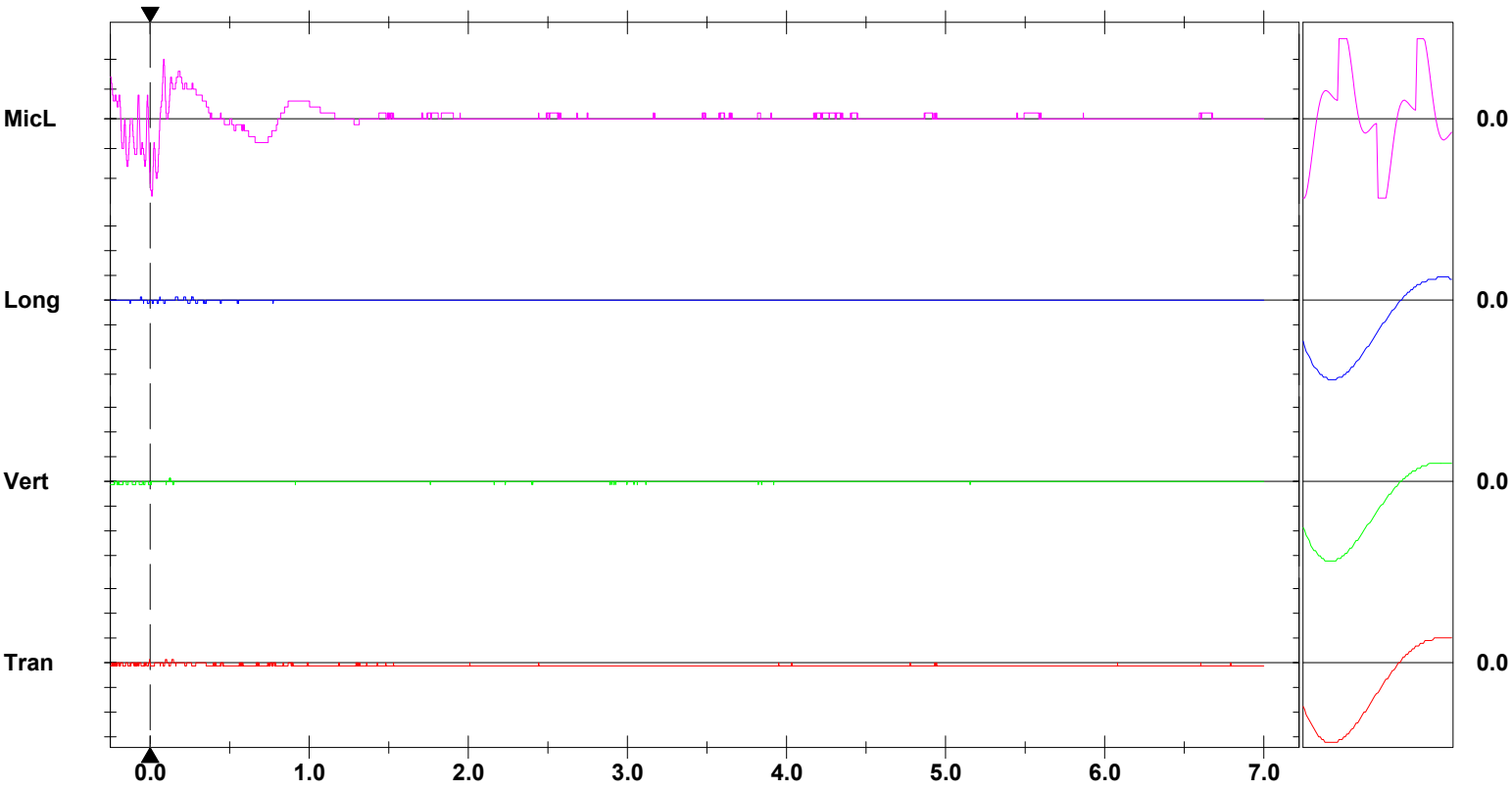
Extended Notes

Microphone	Linear Weighting
PSPL	122.3 dB(L) 26.00 pa.(L) at 0.013 sec
ZC Freq	7.0 Hz
Channel Test	Passed (Freq = 20.0 Hz Amp = 287 mv)

	Tran	Vert	Long	
PPV	0.064	0.064	0.064	mm/s
PPV	27.06	27.06	27.06	dB
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	-0.003	0.002	-0.006	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.7	7.7	Hz
Overswing Ratio	3.4	3.8	3.6	

Peak Vector Sum 0.111 mm/s at -0.056 sec
N/A: Not Applicable





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check
Trigger =

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August 8, 2022

Project No.: 22S001.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-25 – Upham East Gypsum Quarry, Upham, N.B.

Following are the results of the vibration monitoring carried out on behalf of Hammond River Holdings for the blast detonated by Gulf Operators Ltd.) at 11:29 on August 8, 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. 2022-25 – August 8, 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)	11:29	1,250 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		845 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		710 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		1,020 m NE	< 0.5 mm/s	<120	
5. PW-03 - Cottage Route 820		675 m N	0.57 mm/s @ >100 Hz	110	-
6. Civic No. 2341 Route 820 (PW-05)		722 m N	0.83 mm/s @ 27 Hz	106	-
7. Civic No. 50 Myron Road (PW-15)		932 m NW	0.71 mm/s @ 64 Hz	104	-
8. Civic No. 86 Myron Road (PW-16)		741 m W	0.84 mm/s @ 10 Hz	106	-
9. Civic No. 220 Myron Road (PW-01)		1,270 m S	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 4140 Route 111 (PW-12)		784 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**	

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

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

Attachment A

Blast Record

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45°28'50.58" W 65°38'02.60" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	10,969 tonnes
Weather at time of Blast:	Rain	**Air Temp.:**	17°C
Est. Wind Speed :	≈10 km/h	**Wind Direction:**	SW
Cloud Cover:	Yes – overcast	**Precipitation:**	Yes

BLAST DESIGN:

Total No. Holes:	103	**Hole Diameter:**	4.5"
Average Depth:	3.6 m to 6.7 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	3	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	42 ms
Initiation Method:	Non-Electric		
Weight of Explosives per Delay:	Max.: 99 kg		
Type and weight of Explosives for Blast:	3,215 kg – Titan XL 1000		

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	675 m
Direction to the Nearest Structure:	N
Structure Type:	Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	67.8

SAFETY:

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

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18187
Calibration Date:	May 5, 2022
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,250 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20205
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	845 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20203
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	710 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5676
Calibration Date:	February 28, 2022
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	1,020 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	April 25, 2022
Location of seismograph:	Cottage - PW-03 - Route 820
Distance and Direction from Blast:	675 m North
Transverse Particle Velocity:	0.32 mm/s @ NA
Vertical Particle Velocity:	0.25 mm/s @ 85 Hz
Longitudinal Particle Velocity:	0.57 mm/s @ >100 Hz
Peak Particle Velocity:	0.57 mm/s @ >100 Hz
Maximum Airblast:	110 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	July 27, 2022
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	722 m North
Transverse Particle Velocity:	0.70 mm/s @ 27 Hz
Vertical Particle Velocity:	0.38 mm/s @ 57 Hz
Longitudinal Particle Velocity:	0.83 mm/s @ 27 Hz
Peak Particle Velocity:	0.83 mm/s @ 27 Hz
Maximum Airblast:	106 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20204
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	932 m Northwest
Transverse Particle Velocity:	0.71 mm/s @ 64 Hz
Vertical Particle Velocity:	0.19 mm/s @ 85 Hz
Longitudinal Particle Velocity:	0.39 mm/s @ 73 Hz
Peak Particle Velocity:	0.71 mm/s @ 64 Hz
Maximum Airblast:	104 dB(L)

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20206
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	741 m West
Transverse Particle Velocity:	0.84 mm/s @ 10 Hz
Vertical Particle Velocity:	0.49 mm/s @ 13 Hz
Longitudinal Particle Velocity:	0.52 mm/s @ 21 Hz
Peak Particle Velocity:	0.84 mm/s @ 10 Hz
Maximum Airblast:	106 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,270 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	July 21, 2022
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	784 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 8, 2022
Project No.:	22S001.00	**Time of Blast:**	11:29
Inspector:	C. Costa	**Blast No.:**	2022-25
Client:	Hammond River Holdings		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5372
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	790 m North
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan
Blast No: 2022-25
Upham East Gypsum Quarry
Upham, NB

Date: August 8, 2022
Project No.: 22S001.00

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Attachment C

Blast Event Reports

Event Report

Date/Time Long at 12:28:58 August 8, 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

Notes
Location:
Client:
User Name:
Converted: August 8, 2022 15:49:02 (V10.72.1)

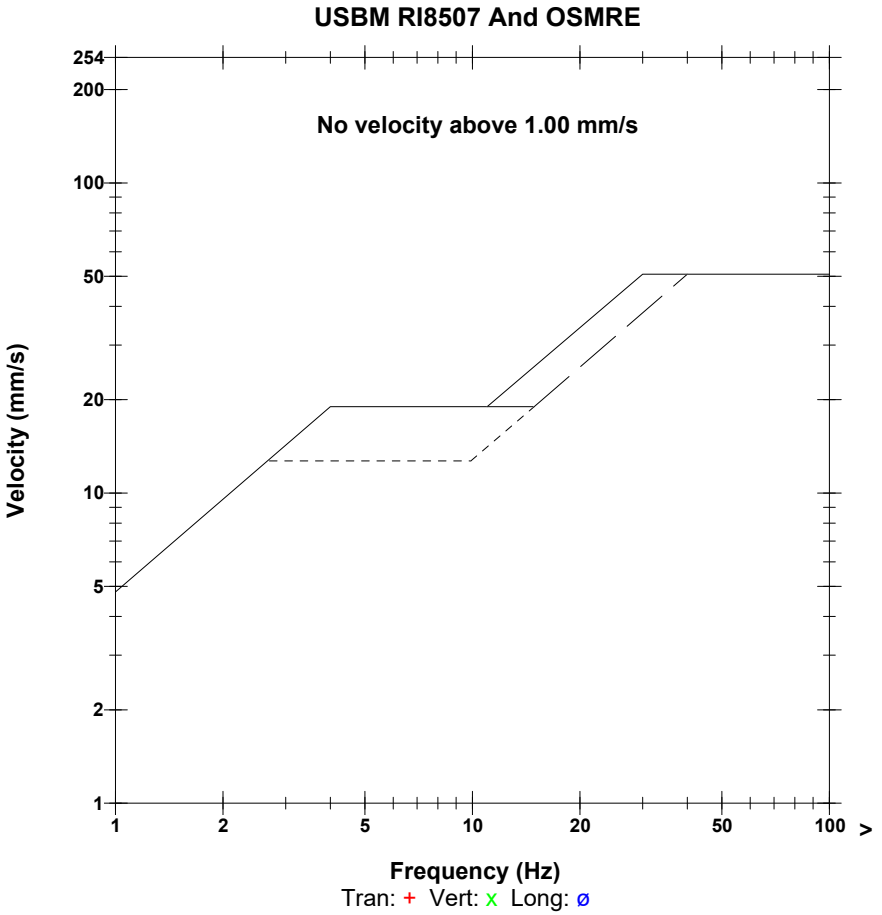
Extended Notes

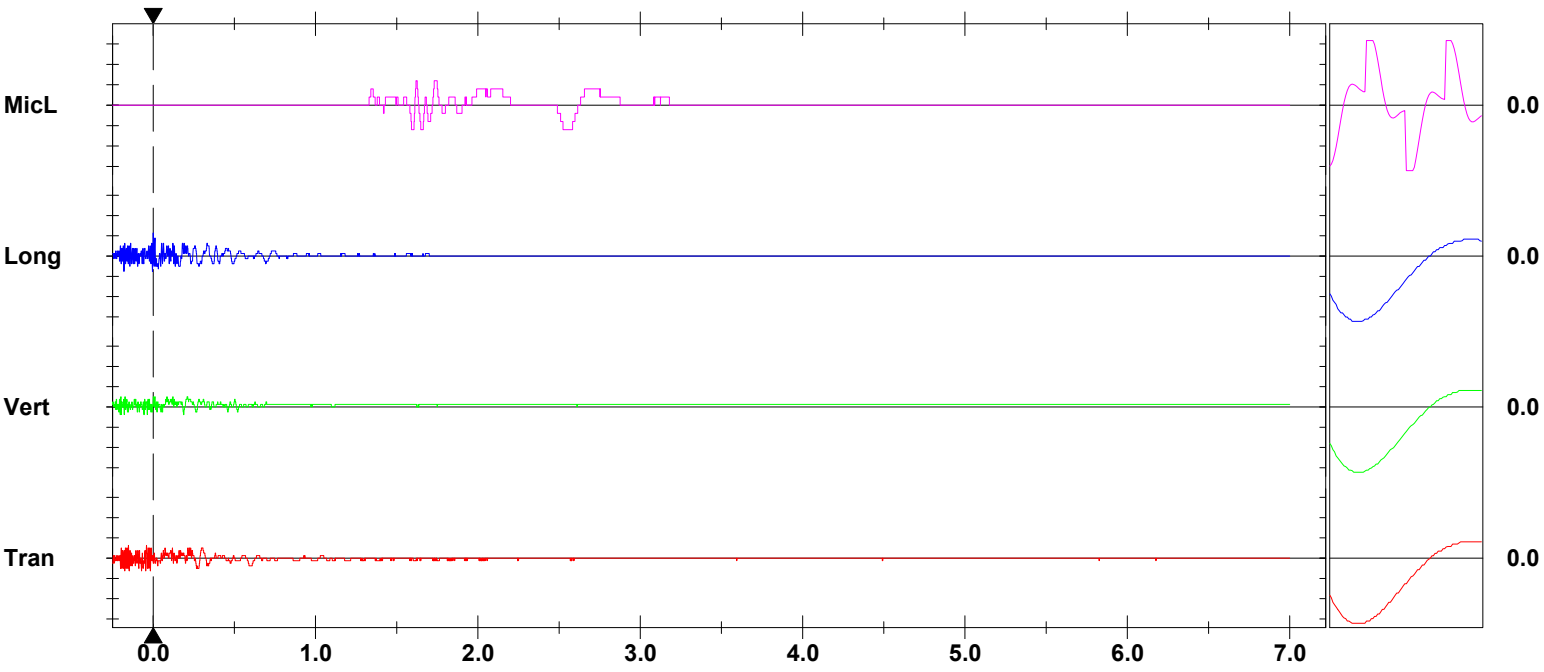
Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 1.592 sec
ZC Freq 17 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 271 mv)

	Tran	Vert	Long	
PPV	0.318	0.254	0.572	mm/s
PPV	41.03	39.10	46.14	dB
ZC Freq	N/A	85	>100	Hz
Time (Rel. to Trig)	-0.017	0.002	0.001	sec
Peak Acceleration	0.020	0.020	0.033	g
Peak Displacement	0.002	0.001	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.7	7.7	Hz
Overswing Ratio	3.8	4.0	3.9	

Peak Vector Sum 0.619 mm/s at 0.001 sec
N/A: Not Applicable

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.1 Volts
Unit Calibration April 25, 2022 by Instantel
File Name G489JMIA.OA0
Post Event Notes
Location: Cottage - Route 820 (PW-03)
Blast No.: 2022-25
Project No: 22S001.00





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

Event Report

Date/Time Long at 12:29:29 August 8, 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

Notes
Location:
Client:
User Name:
Converted: August 8, 2022 15:35:57 (V10.72.1)

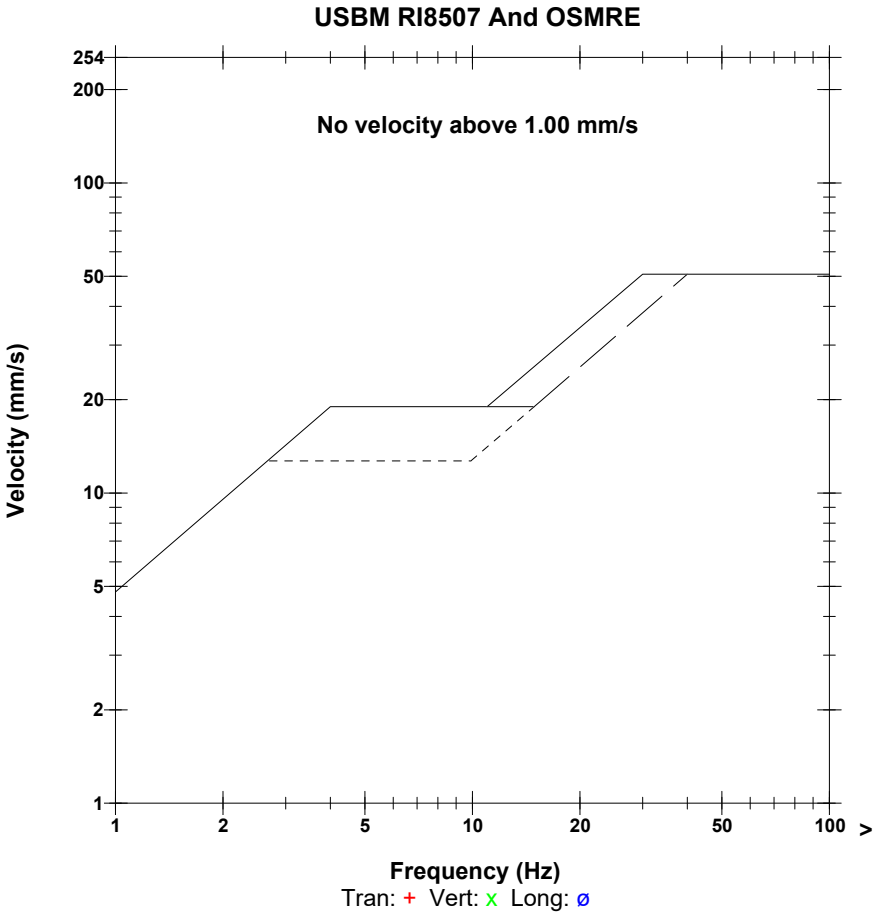
Extended Notes

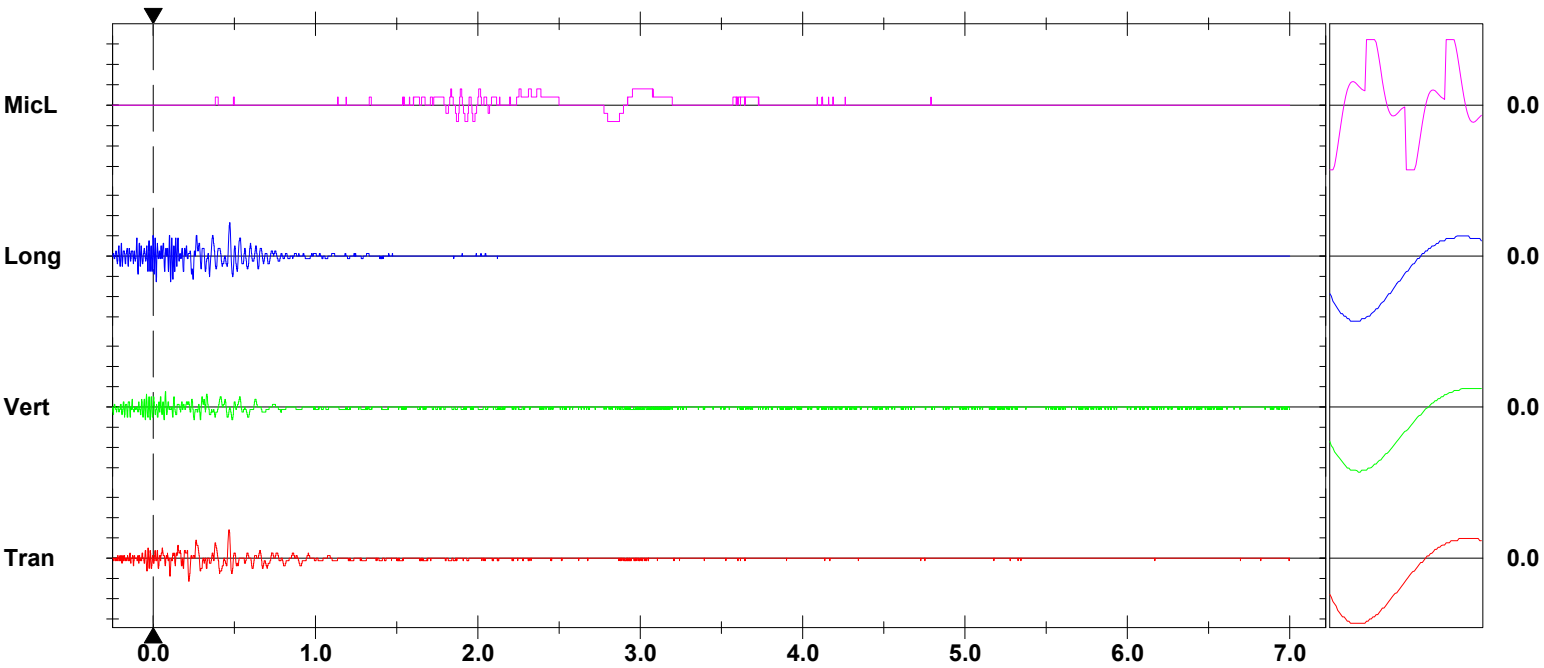
Microphone Linear Weighting
PSPL 106.0 dB(L) 4.000 pa.(L) at 1.833 sec
ZC Freq 22 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 303 mv)

	Tran	Vert	Long	
PPV	0.699	0.381	0.826	mm/s
PPV	47.88	42.62	49.33	dB
ZC Freq	27	57	27	Hz
Time (Rel. to Trig)	0.467	0.076	0.472	sec
Peak Acceleration	0.013	0.020	0.027	g
Peak Displacement	0.004	0.001	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.5	Hz
Overswing Ratio	3.5	3.7	3.4	

Peak Vector Sum 1.048 mm/s at 0.472 sec

Serial Number 5371 V 2.61 MiniMate
Battery Level 5.9 Volts
Unit Calibration July 27, 2022 by Instantel
File Name G371JMIA.P50
Post Event Notes
Location: 2341 Route 820 (PW-05)
Blast No.: 2022-25
Project No: 22S001.00





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

Event Report

Date/Time	Tran at 12:29:09 August 8, 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

Notes
Location:
Client:
User Name:
General:

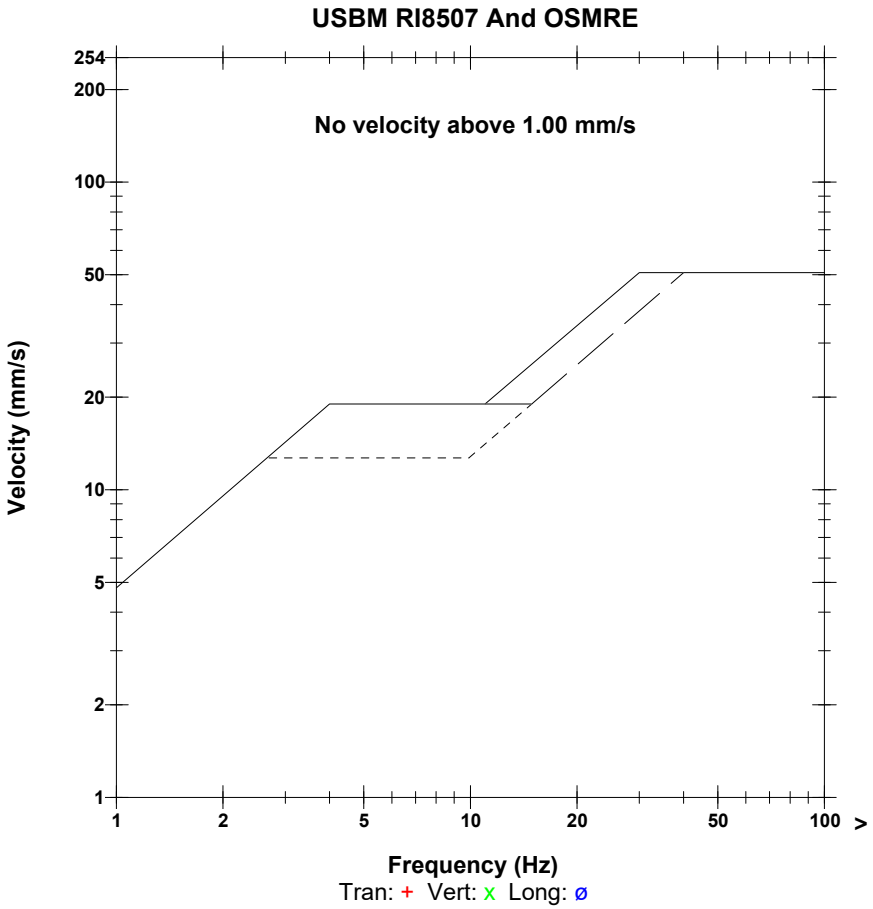
Serial Number	UM20204 V 10-90GC Micromate ISEE
Battery Level	3.8 Volts
Unit Calibration	May 31, 2022 by Instantel
File Name	UM20204_20220808122909.IDFW

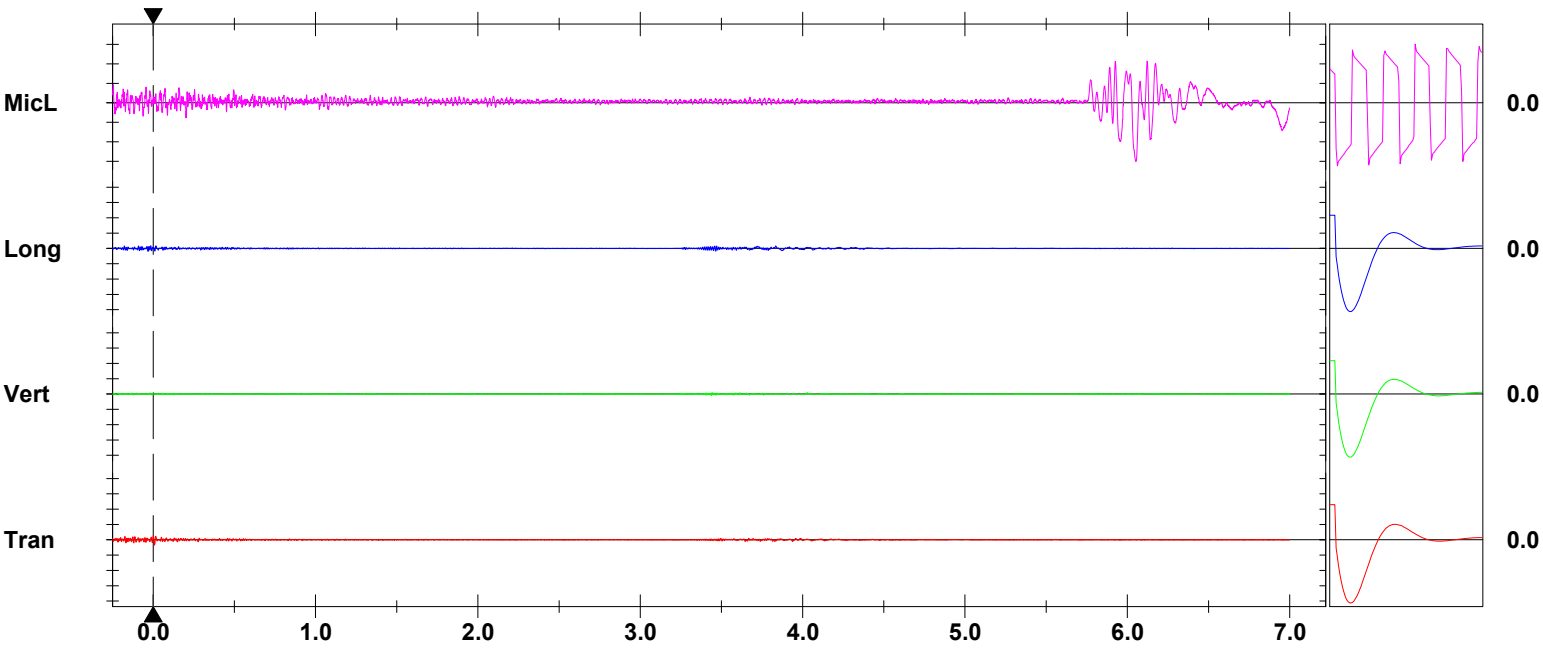
Post Event Notes
Location: 50 Myron Road (PW-15)
Blast No.: 2022-25
Project No: 22S001.00

Microphone	Linear Weighting
PSPL	103.6 dB(L) 3.010 pa.(L) at 6.053 sec
ZC Freq	12 Hz
Channel Test	Passed (Freq = 20.5 Hz Amp = 1418 mv)

	Tran	Vert	Long	
PPV	0.709	0.189	0.394	mm/s
PPV	48.02	36.54	42.91	dB
ZC Freq	64	85	73	Hz
Time (Rel. to Trig)	0.008	3.437	-0.032	sec
Peak Acceleration	0.048	0.018	0.032	g
Peak Displacement	0.002	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.5	7.7	Hz
Overswing Ratio	4.1	4.3	4.0	

Peak Vector Sum 0.736 mm/s at 0.008 sec





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

Event Report

Date/Time Long at 12:29:13 August 8, 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

Notes
Location:
Client:
User Name:
General:

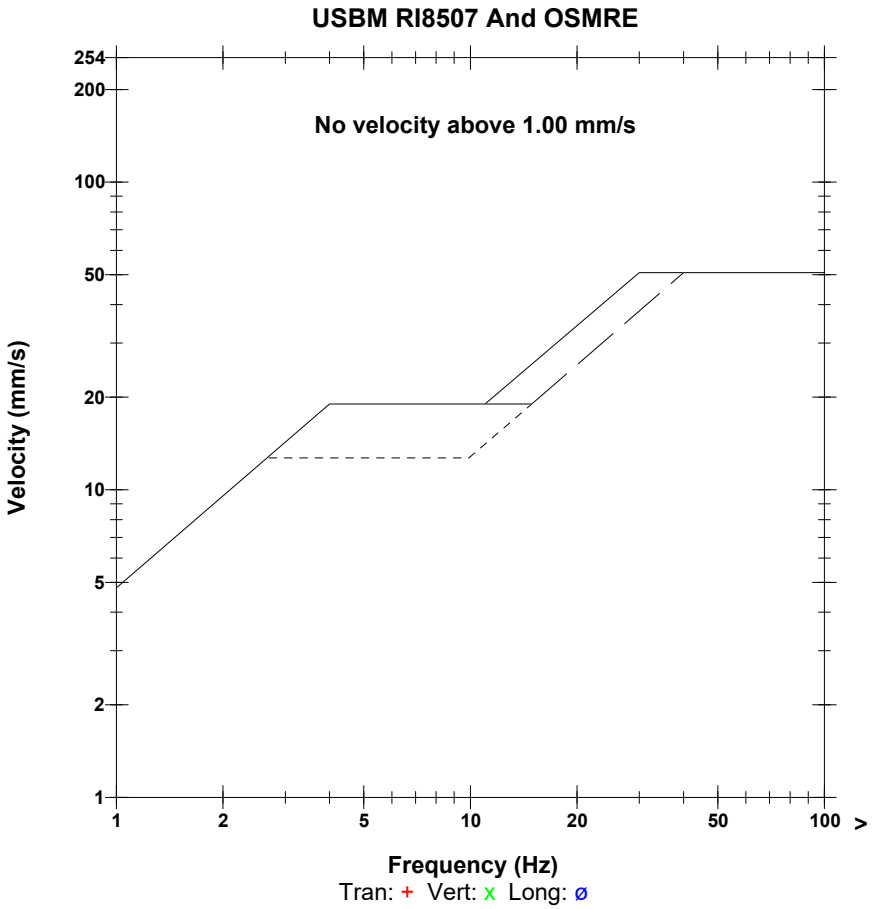
Serial Number UM20206 V 10-90GC Micromate ISEE
Battery Level 3.5 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20206_20220808122913.IDFW

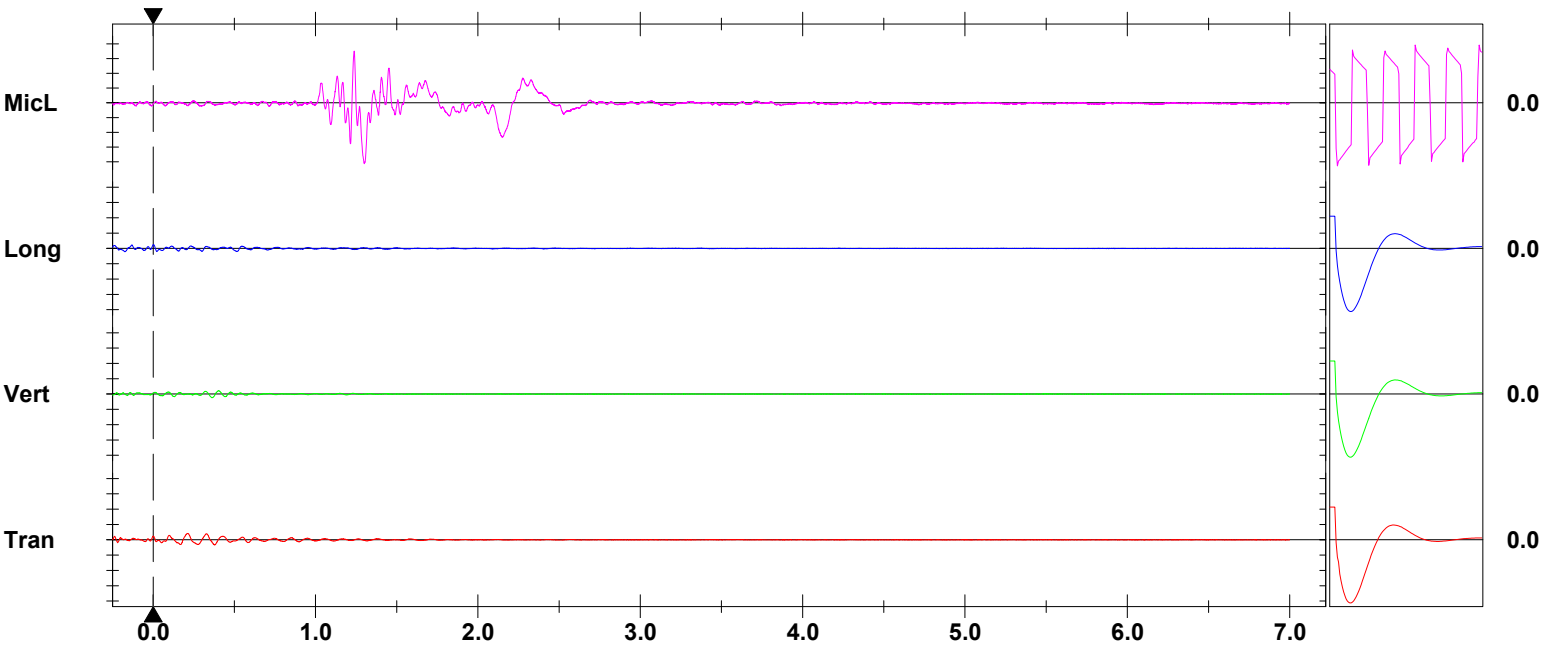
Post Event Notes
Location: 86 Myron Road (PW-16)
Blast No.: 2022-25
Project No: 22S001.00

Microphone Linear Weighting
PSPL 106.3 dB(L) 4.127 pa.(L) at 1.300 sec
ZC Freq 5.1 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1431 mv)

	Tran	Vert	Long	
PPV	0.835	0.489	0.520	mm/s
PPV	49.44	44.78	45.32	dB
ZC Freq	9.8	13	21	Hz
Time (Rel. to Trig)	0.211	0.362	0.002	sec
Peak Acceleration	0.012	0.012	0.009	g
Peak Displacement	0.013	0.006	0.007	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.3	7.3	Hz
Overswing Ratio	4.3	4.5	4.3	

Peak Vector Sum 0.897 mm/s at 0.326 sec





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

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August 11, 2022

Project No.: 22S001.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Dan,

Re: Blast No. 2022-26 – August 10, 2022, by Archibald Drilling & Blasting
Upham East Gypsum Quarry, Upham, N.B.

As requested, we have reviewed the blasting information obtained from Archibald Drilling & Blasting for the blast detonated on August 10, 2022 (@ 13h00). The blast detonated on August 10, 2022, was not monitored by CBCL Limited on behalf of the quarry operator (Hammond River Holdings Limited) as required in the Approval to Operate I-10396 (Schedule A – Section B – Condition 14 ("*The Approval Holder shall monitor all blasts for ground vibration and air blast in accordance with the most recent Blast Control and Monitoring Plan"*)). Blast monitoring was not carried out due to miscommunication from the blasting contractor (Archibald Drilling & Blasting).

CBCL Limited reviewed the Blast: Daily Shot Reports provided by Archibald Drilling & Blasting for the blasts detonated on August 3, 2022 (see Appendix A – Blast No.: 2022-24) and August 10, 2022 (see Appendix B – Blast No.: 2022-26).

We understand that the blast area (Aug. 10) was adjacent and to the north of the blast detonated on August 3, 2022, therefore, the distance between each monitoring location to the blast is relatively similar. Other than distance and subsurface condition (which would also be similar), the maximum ground vibration is a function of the maximum weight (charge) per delay, which was slightly less on the August 10 blast (64 kg) compared to the August 3 blast (72 kg). Ground vibration would be expected to increase when the distance is decreased and the maximum weight per delay is increased.

Since the distance between the monitoring point and the blast area along with the maximum weight (charge) of explosive per delay are comparable, it is our professional opinion that the resulting maximum ground vibration from the August 10 blast would have been of the same order of magnitude as the August 3 blast. The maximum ground vibration recorded for the August 3 blast was 1.08 mm/s; therefore, the August 10 blast is expected to have been of the same order of magnitude, which is well below the maximum allowable vibration of 12.5 mm/s (1.25 cm/s) as stated in the Approval to Operate I-10396 (Schedule A – Section B – Condition 5 ("*The Approval Holder shall conduct blasting such that ground vibration at each building, residence, and/or structure subject to blast effects, does not exceed a peak particle velocity of 1.25 cm/sec and that the air blast does not exceed 128 decibels on the linear scale."*)).

The maximum air blast (sound pressure) from August 10 is also be expected to be in the same order of magnitude as that on August 3, since the minimum stemming height, depth of holes and weather were similar. The maximum air blast (sound pressure) recorded for the August 3 blast was 122 dB(L), therefore the August 10 blast is expected to have been of the same magnitude, which is well below the maximum allowable air blast of 128 dB(L) as stated in the Approval to Operate I-10396 (Schedule A – Section B – Condition 5 ("*The Approval Holder shall conduct blasting such that ground vibration at each building, residence, and/or structure subject to blast effects, does not exceed a peak particle velocity of 1.25 cm/sec and that the air blast does not exceed 128 decibels on the linear scale.")).*

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

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

Attachments: Archibald Drilling & Blasting – Blast: Daily Shot Report – August 3, 2022 (Blast No. 2022-24)
Archibald Drilling & Blasting – Blast: Daily Shot Report – August 10, 2022 (Blast No. 2022-26)
CBCL Limited – Blast Report – Blast No. 2022-24 – August 3, 2022

Project No: 22S001.00

Attachment A

Archibald Drilling & Blasting – Blast: Daily Shot Report – August 3, 2022 (Blast No. 2022-24)

ARCHIBALD DRILLING & BLASTING
86 PARKWAY DRIVE, TRURO HEIGHTS, NS B6L 1N8
902-897-2673

Blast: Daily Shot Report

Label	
	Upham Gypsum (22-249)
	Thursday, August 4th 2022, 12:46 PM (ADT -03:00)

Job Details

Job Number - Blast Number	*22-249-01*
Customer	*Gulf Operators*
Blast Location	*Upham Gypsum*

Prepared By

- **Tony Wallace (ADB)**

Certificate Number	*1297*
Blast Date	*August 3, 2022*
Blast Time	*1:27 PM*
Which magazine was product used from?	*No comments*

Drillers

Driller(s)

- **Trevor Rogerson (NS) (ADB)**

Blaster Helpers

Helper(s)

- **Rick Canning (NS) (ADB)**
- **Perry Bennett (NB) (ADB)**
- **Roger Libby (NB) (ADB)**

Excavator Operator - MATTING

Pattern and Diameter

Number of Holes	*248*
Diameter (in)	*4.5*

Burden (ft)	*10*
Spacing (ft)	*10*

Additional Blast Information

Type of Blast

Mine/Quarry - production

Average Hole Depth (ft)	*13.4*
Max Hole Depth (ft)	*16.6*
Min Hole Depth (ft)	*11*
Sub-drill (ft)	*2*
Stemming Material & Size:	*1/2" clean stone*
Average Stemming Height (ft)	*7*
Max Stemming Height (ft)	*8*
Min Stemming Height (ft)	*6*

Initiation Method

Non-electric

Resistance (ohms)	*No comments*
Total # of Detonators	*248*
# Holes per Delay	*2*

YES NO N/A **Decking**

# Charge per Hole	*2*
Max Charge/Delay (kg)	*72*
Total Weight (kg)	*8950*
Blast Tonnage (t)	*25329*
Powder Factor (kg/t)	*No comments*
Blast Volume (m3)	*9558*
Powder Factor (kg/m3)	*0.94*

Safety Measures

YES NO N/A **Blasting Mats Used**

YES NO N/A	**Warning Signs Used**	
YES NO N/A	**Guards Posted**	
YES NO N/A	**Radios**	
YES NO **N/A**	**Traffic Control**	
YES NO N/A	**Warning Signal Used**	
Type of Warning Signal		*Truck siren*
YES NO N/A	**Blast Video**	

Detonators

Product & Length

9m Handidet (ORICA)

Unit of Measure

Each

Delivered	*300*
Returned	*79*
Used	*221*
KGs	*No comments*

Detonators

Product & Length

12m Handidet (ORICA)

Unit of Measure

Each

Delivered	*50*
Returned	*23*
Used	*27*
KGs	*No comments*

Connectors

Product & Length

6m Connectadet (ORICA)

Unit of Measure

Each

Delivered	*81*
Returned	

	39
Used	*42*
KGs	*No comments*

Boosters

Product Type & Size

Pentex BC 12oz (340g) - ORICA

Unit of Measure

Each

Delivered	*300*
Returned	*52*
Used	*248*
KGs	*No comments*

Cartridge

Product Type & Size

Unit of Measure

Delivered	*No comments*
Returned	*No comments*
Used	*No comments*
KGs	*No comments*

Blasting Agents

Product Type

Unit of Measure

Delivered	*No comments*
Returned	*No comments*
Used	*No comments*
KGs	*No comments*

Miscellaneous

Product Type

Nonel Leadline - ORICA

Unit of Measure	
Roll	
Used	*1*

Seismograph

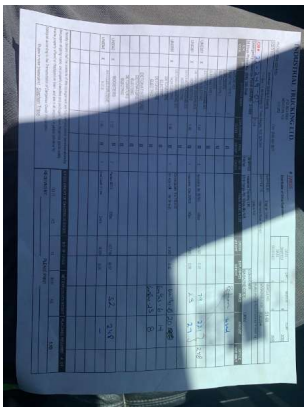
Location Description	*Civic No. 2341 Route 820 (PW-05)*
Distance to Blast (m)	*620*
Peak Particle Velocity (mm/s)	*1.08*
Peak Sound Level (db)	*122*

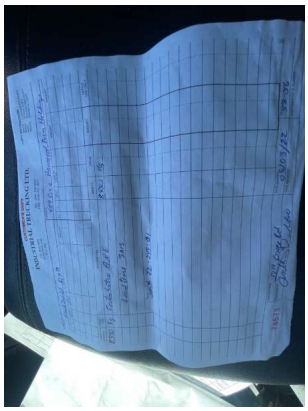
Post-Blast Inspection

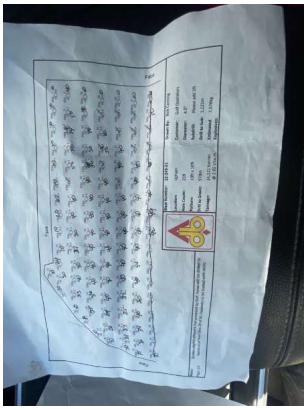
YES NO N/A	**Misfire**
YES NO N/A	**Flying Material**
YES NO N/A	**Face Venting**
YES NO N/A	**Stemming Ejection**
YES NO N/A	**Excessive Backbreak**
YES NO N/A	**Injury/Property Damage**
YES NO N/A	**Safety Concerns**
✓ ⊗ N/A	**Has the blaster reviewed the blast video?**

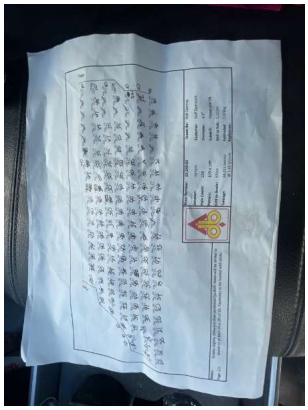
***If there are ongoing safety concerns resulting from the blast, please explain**

No comments









Rick Canning (NS) (ADB),
Project Engineer
August 4th 2022, 12:46 PM (ADT -03:00)

44.9281311, -63.5394609

Tony Wallace (ADB), *No title*
August 5th 2022, 9:27 AM (ADT -03:00)

Attachment B

Archibald Drilling & Blasting – Blast: Daily Shot Report – August 10, 2022 (Blast No. 2022-26)

ARCHIBALD DRILLING & BLASTING
86 PARKWAY DRIVE, TRURO HEIGHTS, NS B6L 1N8
902-897-2673

Blast: Daily Shot Report

Label	22-249-02
	Upham Gypsum (22-249)
	Wednesday, August 10th 2022, 5:27 PM (ADT -03:00)

Job Details

Job Number - Blast Number	*22-249-02*
Customer	*Gulf Operators*
Blast Location	*Upham, NB*

Prepared By

- **Tony Wallace (ADB)**

Certificate Number	*1297*
Blast Date	*August 10, 2022*
Blast Time	*01:00 PM*
Which magazine was product used from?	*ITL Moncton Delivery & POW Magazine*

Drillers

Driller(s)

- **Trevor Rogerson (NS) (ADB)**

Blaster Helpers

Helper(s)

- **Rick Canning (NS) (ADB)**
- **Perry Bennett (NB) (ADB)**

1 Helper from ITL

Excavator Operator - MATTING

Pattern and Diameter

Number of Holes	*190*
Diameter (in)	

	4.5
Burden (ft)	*10*
Spacing (ft)	*10*

Additional Blast Information

Type of Blast

Mine/Quarry - production

Average Hole Depth (ft)	*15.74*
Max Hole Depth (ft)	*15.71*
Min Hole Depth (ft)	*11.78*
Sub-drill (ft)	*2*
Stemming Material & Size:	*1/2 Clean Stone*
Average Stemming Height (ft)	*8*
Max Stemming Height (ft)	*12*
Min Stemming Height (ft)	*7*

Initiation Method

Non-electric

Resistance (ohms)	*No comments*
Total # of Detonators	*190*
# Holes per Delay	*2*

YES NO N/A **Decking**

# Charge per Hole	*1*
Max Charge/Delay (kg)	*64*
Total Weight (kg)	*5020*
Blast Tonnage (t)	*19766*
Powder Factor (kg/t)	*0.254*
Blast Volume (m3)	*7459*
Powder Factor (kg/m3)	*0.673*

Safety Measures

YES	NO	N/A	**Blasting Mats Used**
YES	NO	N/A	**Warning Signs Used**
YES	NO	N/A	**Guards Posted**
YES	NO	N/A	**Radios**
YES	NO	N/A	**Traffic Control**
YES	NO	N/A	**Warning Signal Used**

Type of Warning Signal

Truck Mounted Siren

YES	NO	N/A	**Blast Video**

Detonators

Product & Length

9m Handidet (ORICA)

Unit of Measure

Each

Delivered

188

Returned

12

Used

176

KGs

No comments

Detonators

Product & Length

7m Handidet (ORICA)

Unit of Measure

Each

Delivered

24

Returned

10

Used

14

KGs

No comments

Connectors

Product & Length

6m Connectadet (ORICA)

Unit of Measure

Each

Delivered

94

Returned	*55*
Used	*39*
KGs	*No comments*

Boosters

Product Type & Size

Pentex BC 12oz (340g) - ORICA

Unit of Measure

Each

Delivered	*148*
Returned	*10*
Used	*138*
KGs	*46.92*

Boosters

Product Type & Size

Trojan Spartan 12oz (350g) - DYNO

Unit of Measure

Each

Delivered	*52*
Returned	*0*
Used	*52*
KGs	*18.2*

Cartridge

Product Type & Size

Fortel Pro - 90 x 400 (3.13kg) - ORICA

Unit of Measure

Stick

Delivered	*34*
Returned	*19*
Used	*15*

KGs	*46.875*

Blasting Agents

Miscellaneous

Product Type

> **Nonel Leadline - ORICA**

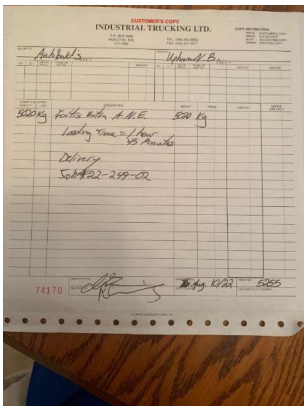
Unit of Measure

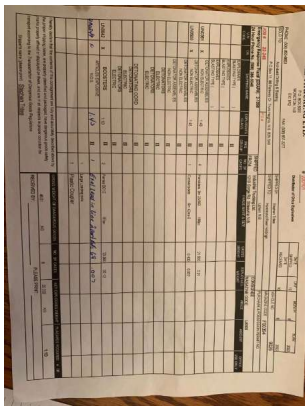
> **Roll**

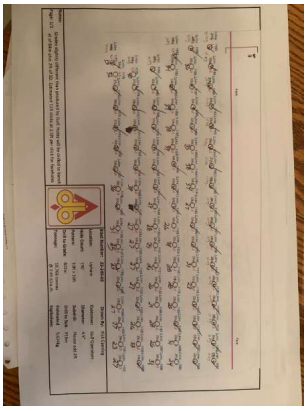
Used	*1*

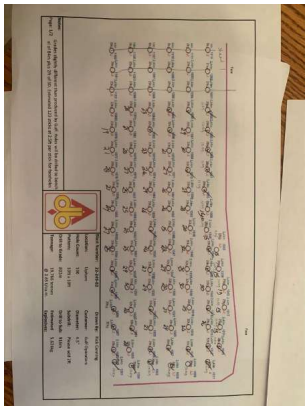
Seismograph

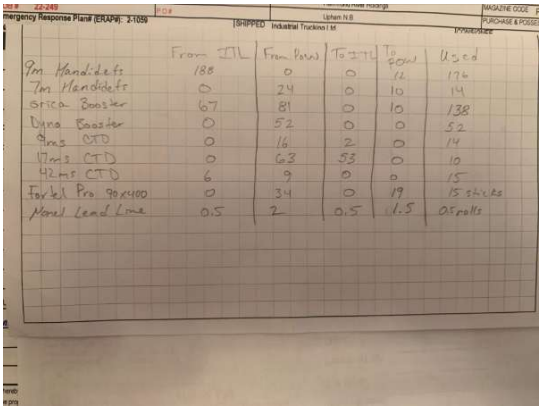
Post-Blast Inspection

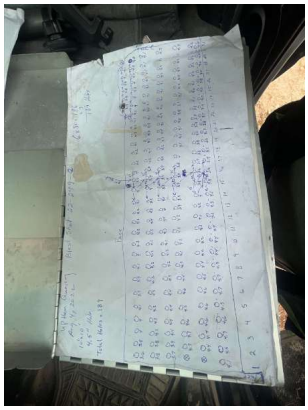












Rick Canning (NS) (ADB),
Project Engineer
August 10th 2022, 5:27 PM (ADT -03:00)

Attachment C

CBCL Limited – Blast Report – Blast No. 2022-24 – August 3, 2022

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August 4, 2022

Project No.: 22S001.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-24 – 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 (c/o Gulf Operators Ltd.) at 13:27 on August 3, 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. 2022-24 – August 3, 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)	13:27	1,360 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		951 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		799 m SE	0.13 mm/s @ >100 Hz	120	Triggered by microphone
4. Civic No. 2447 Route 820 (PW-07)		944 m NE	< 0.5 mm/s	<120	Unit was not triggered
5. PW-03 - Cottage Route 820		634 m N	0.50 mm/s @ 23 Hz	118	-
6. Civic No. 2341 Route 820 (PW-05)		620 m N	1.08 mm/s @ 47 Hz	122	-
7. Civic No. 50 Myron Road (PW-15)		828 m NW	0.13 mm/s @ >100 Hz	120	Triggered by microphone
8. Civic No. 86 Myron Road (PW-16)		757 m W	1.08 mm/s @ 57 Hz	121	-
9. Civic No. 220 Myron Road (PW-01)		1,350 m S	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 4140 Route 111 (PW-12)		885 m SE	< 0.5 mm/s	<120	
11. Civic No. 2337 Route 820 (PW-04)		703 m N	0.06 mm/s @ NA	122	Triggered by microphone
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

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

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

Attachment A

Blast Record

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Archibald Drilling & Blasting c/o Gulf Operators Ltd.		
Blaster's Certification No.:	1297	**Blaster's Name:**	Anthony Wallace
Blast Location:	N 45º28'53.61" W 65º38'03.85" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	9,558 tonnes
Weather at time of Blast:	Sunny	**Air Temp.:**	29ºC
Est. Wind Speed :	≈10 km/h	**Wind Direction:**	SW
Cloud Cover:	No	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	246	**Hole Diameter:**	4.5"
Average Depth:	13.4 ft	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	2	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	17, 42 ms
Initiation Method:	Non-Electric		
Weight of Explosives per Delay:	Max.: 72 kg		
Type and weight of Explosives for Blast:	8,950 kg – Titan XL 1000		

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	620 m
Direction to the Nearest Structure:	N
Structure Type:	House
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	73.1

SAFETY:

Type of Warning Signal Used:	Siren
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No

If Yes, Describe:

Misfire (yes or no):	No

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20204
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,360 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	July 23, 2022
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	951 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	November 15, 2021
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	799 m Southeast
Transverse Particle Velocity:	0.06 mm/s @ NA
Vertical Particle Velocity:	0.06 mm/s @ NA
Longitudinal Particle Velocity:	0.13 mm/s @ >100 Hz
Peak Particle Velocity:	0.13 mm/s @ >100 Hz
Maximum Airblast:	120 dB(L)

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18193
Calibration Date:	April 11, 2022
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	944 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20203
Calibration Date:	May 31, 2022
Location of seismograph:	Cottage - PW-03 - Route 820
Distance and Direction from Blast:	634 m North
Transverse Particle Velocity:	0.32 mm/s @ 30 Hz
Vertical Particle Velocity:	0.37 mm/s @ 43 Hz
Longitudinal Particle Velocity:	0.50 mm/s @ 23 Hz
Peak Particle Velocity:	0.50 mm/s @ 23 Hz
Maximum Airblast:	118 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5372
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	620 m North
Transverse Particle Velocity:	0.64 mm/s @ >100 Hz
Vertical Particle Velocity:	0.76 mm/s @ 73 Hz
Longitudinal Particle Velocity:	1.08 mm/s @ 47 Hz
Peak Particle Velocity:	1.08 mm/s @ 47 Hz
Maximum Airblast:	122 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	April 25, 2022
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	828 m Northwest
Transverse Particle Velocity:	0.06 mm/s @ NA
Vertical Particle Velocity:	0.13 mm/s @ >100 Hz
Longitudinal Particle Velocity:	0.06 mm/s @ NA
Peak Particle Velocity:	0.13 mm/s @ >100 Hz
Maximum Airblast:	120 dB(L)

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5675
Calibration Date:	February 28, 2022
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	757 m West
Transverse Particle Velocity:	1.08 mm/s @ 57 Hz
Vertical Particle Velocity:	0.83 mm/s @ 64 Hz
Longitudinal Particle Velocity:	1.02 mm/s @ 51 Hz
Peak Particle Velocity:	1.08 mm/s @ 57 Hz
Maximum Airblast:	121 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20206
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,350 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	July 27, 2022
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	885 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 3, 2022
Project No.:	22S001.00	**Time of Blast:**	13:27
Inspector:	J. Yuzda	**Blast No.:**	2022-24
Client:	Hammond River Holdings		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	703 m North
Transverse Particle Velocity:	0.06 mm/s @ NA
Vertical Particle Velocity:	0.06 mm/s @ NA
Longitudinal Particle Velocity:	0.06 mm/s @ NA
Peak Particle Velocity:	0.06 mm/s @ NA
Maximum Airblast:	122 dB(L)

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan
Blast No: 2022-24
Upham East Gypsum Quarry
Upham, NB

Date: August 3, 2022
Project No.: 22S001.00

Attachment C

Blast Event Reports

Event Report

Date/Time MicL at 13:27:29 August 3, 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

Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:15:23 (V10.72.1)

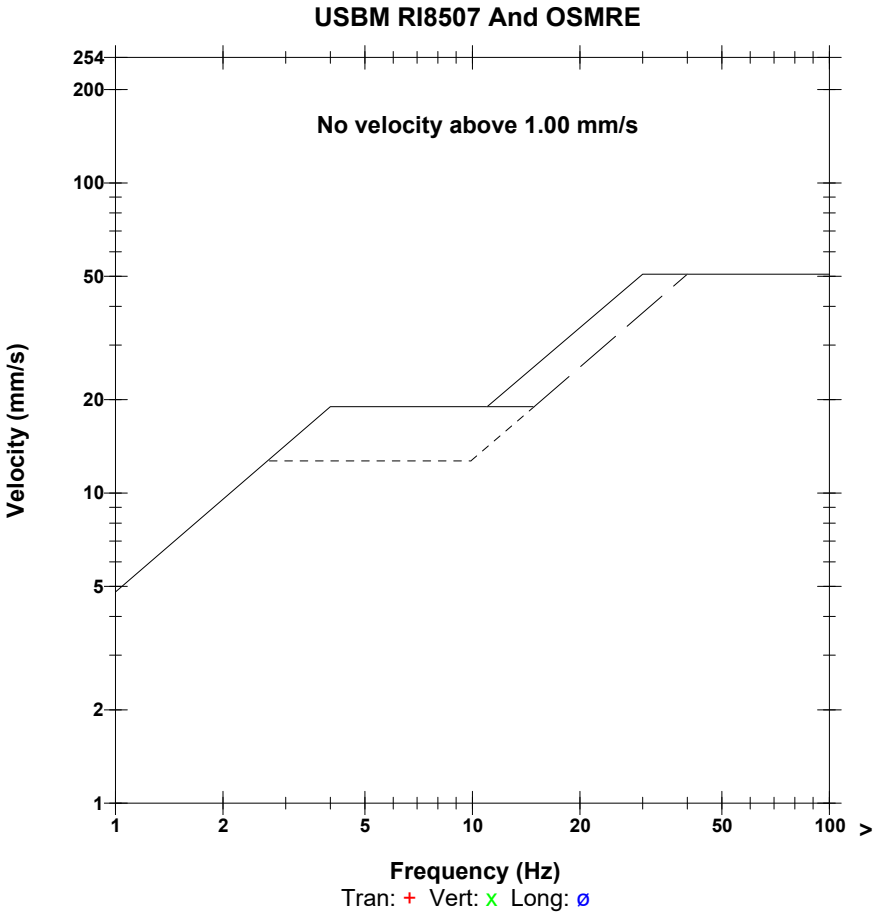
Serial Number 5632 V 2.61 MiniMate
Battery Level 6.0 Volts
Unit Calibration November 15, 2021 by Instantel
File Name G632JM94.1T0
Post Event Notes
Location: 4150 Route 111 (PW-13)
Blast No.: 2022-24
Project No: 22S001.00

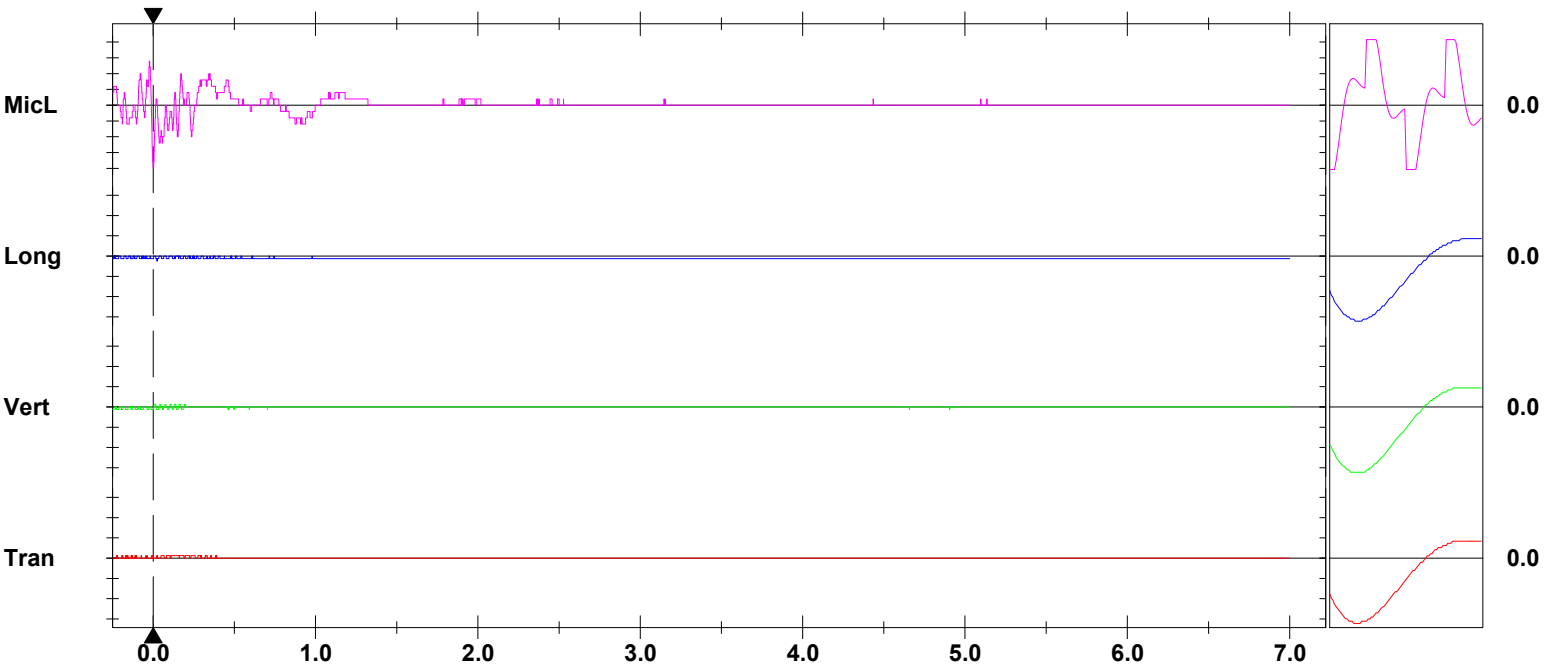
Extended Notes

Microphone Linear Weighting
PSPL 120.0 dB(L) 20.00 pa.(L) at 0.003 sec
ZC Freq 20 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 298 mv)

	Tran	Vert	Long	
PPV	0.064	0.064	0.127	mm/s
PPV	27.06	27.06	33.08	dB
ZC Freq	N/A	N/A	>100	Hz
Time (Rel. to Trig)	0.000	0.002	0.025	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	8.2	7.8	Hz
Overswing Ratio	3.9	3.3	3.8	

Peak Vector Sum 0.159 mm/s at 0.025 sec
N/A: Not Applicable





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

Event Report

Date/Time Long at 13:26:50 August 3, 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

Notes
Location:
Client:
User Name:
General:

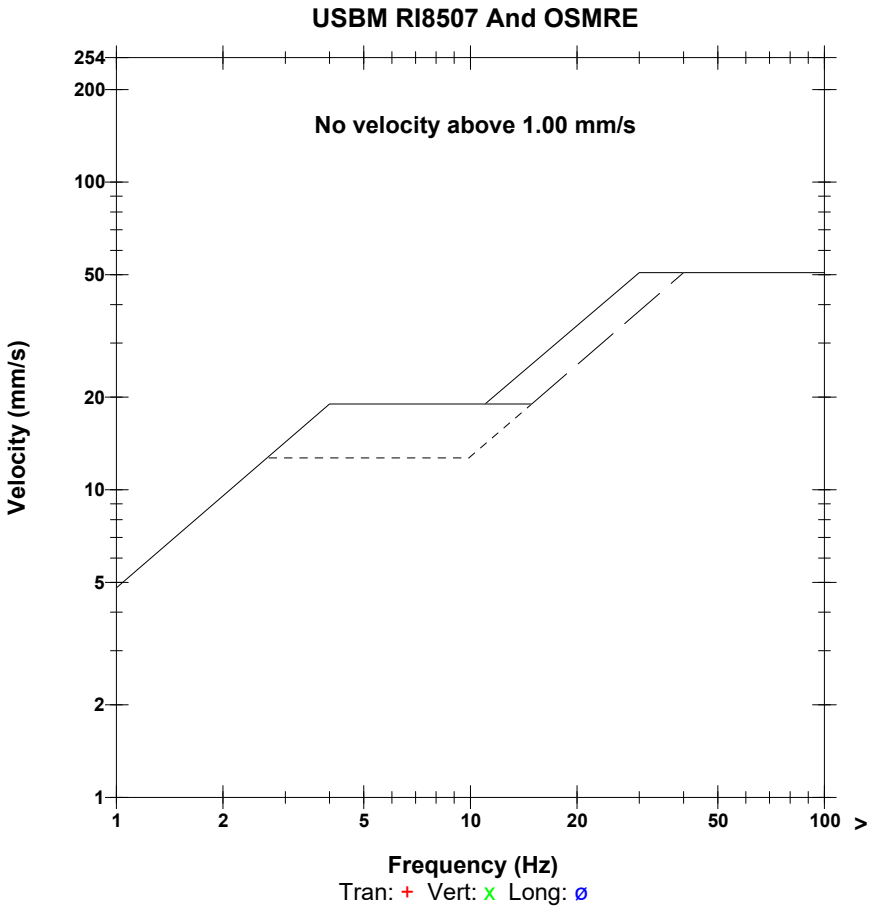
Serial Number UM20203 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20203_20220803132650.IDFW

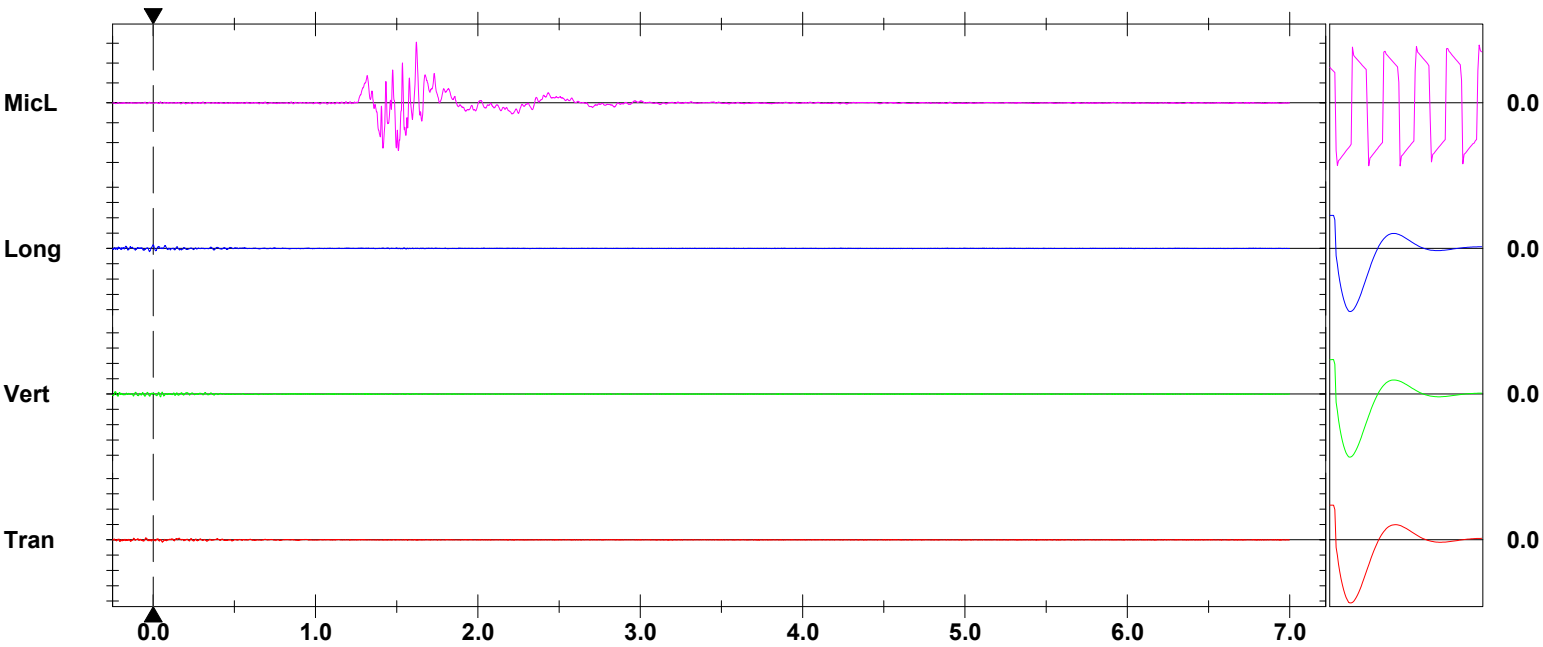
Post Event Notes
Location: Cottage - Route 820 - PW-03
Blast No.: 2022-24
Project No: 22S001.00

Microphone Linear Weighting
PSPL 117.7 dB(L) 15.30 pa.(L) at 1.621 sec
ZC Freq 16 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1219 mv)

	Tran	Vert	Long	
PPV	0.315	0.370	0.497	mm/s
PPV	40.97	42.37	44.92	dB
ZC Freq	30	43	23	Hz
Time (Rel. to Trig)	0.057	0.046	0.000	sec
Peak Acceleration	0.016	0.013	0.016	g
Peak Displacement	0.002	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.2	4.5	4.2	

Peak Vector Sum 0.501 mm/s at 0.000 sec





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

Event Report

Date/Time Vert at 13:27:12 August 3, 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

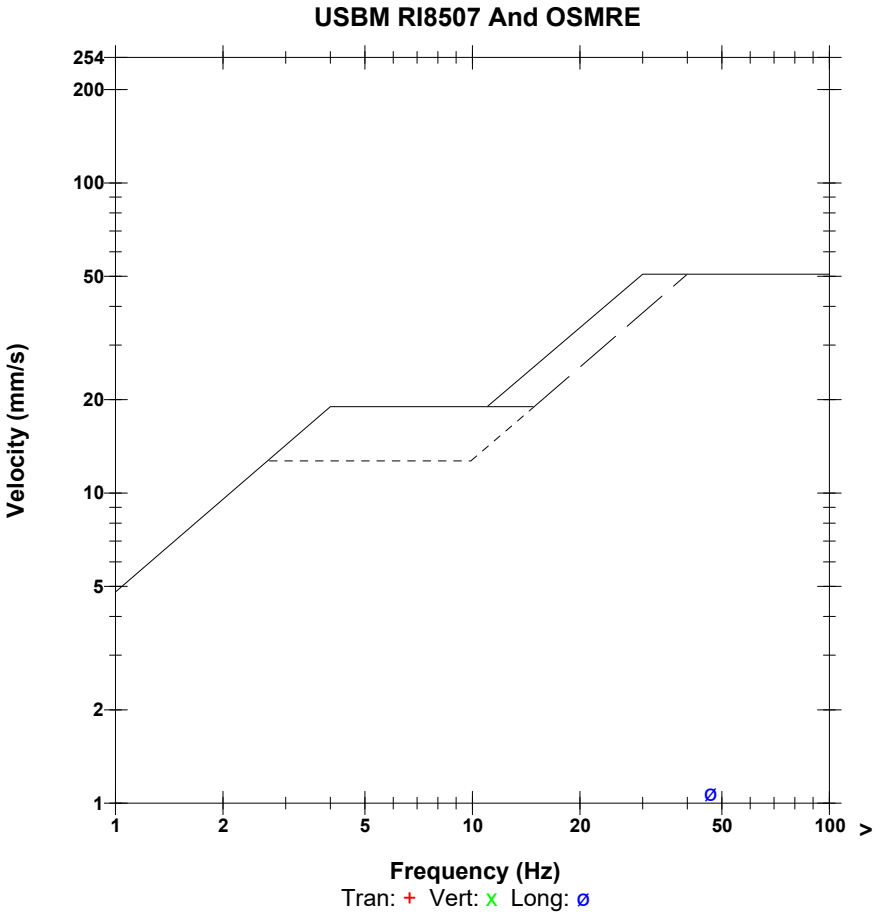
Notes
Location: .
Client: UUUTUUUUUUUUU
User Name: UUUUU
Converted: August 3, 2022 15:13:50 (V10.72.1)

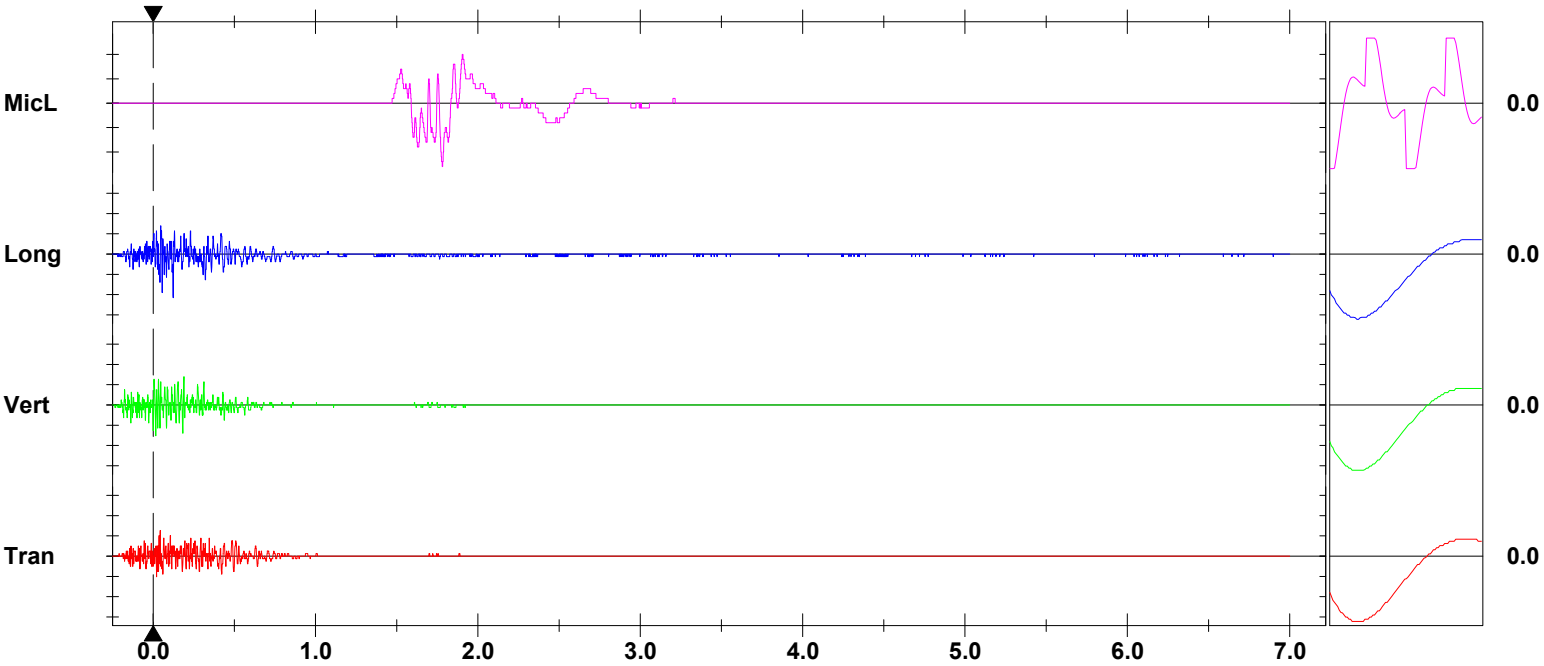
Serial Number 5372 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 18, 2022 by Instantel
File Name G372JM94.1C0
Post Event Notes
Location: 2341 Route 820 (PW-05)
Blast No.: 2022-24
Project No: 22S001.00

Microphone Linear Weighting
PSPL 122.3 dB(L) 26.00 pa.(L) at 1.781 sec
ZC Freq 7.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 292 mv)

	Tran	Vert	Long	
PPV	0.635	0.762	1.080	mm/s
PPV	47.06	48.64	51.66	dB
ZC Freq	>100	73	47	Hz
Time (Rel. to Trig)	0.045	0.017	0.124	sec
Peak Acceleration	0.040	0.053	0.053	g
Peak Displacement	0.001	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	7.6	Hz
Overswing Ratio	3.5	3.6	3.9	

Peak Vector Sum 1.127 mm/s at 0.124 sec





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time MicL at 13:26:38 August 3, 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

Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:18:40 (V10.72.1)

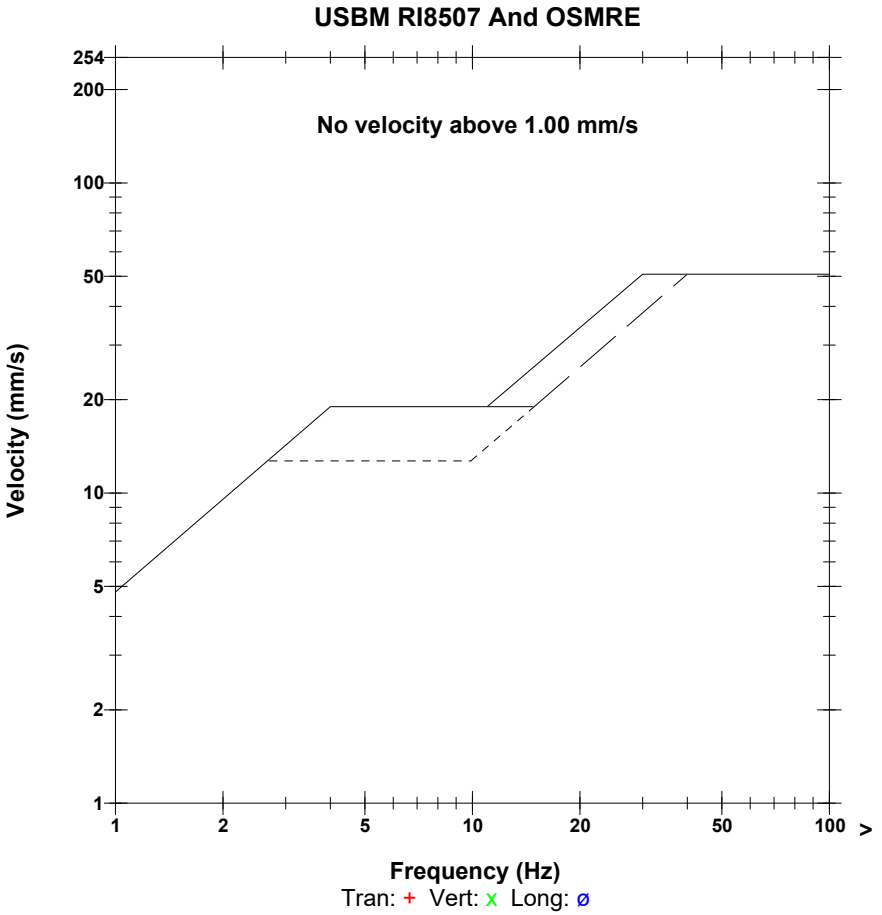
Extended Notes

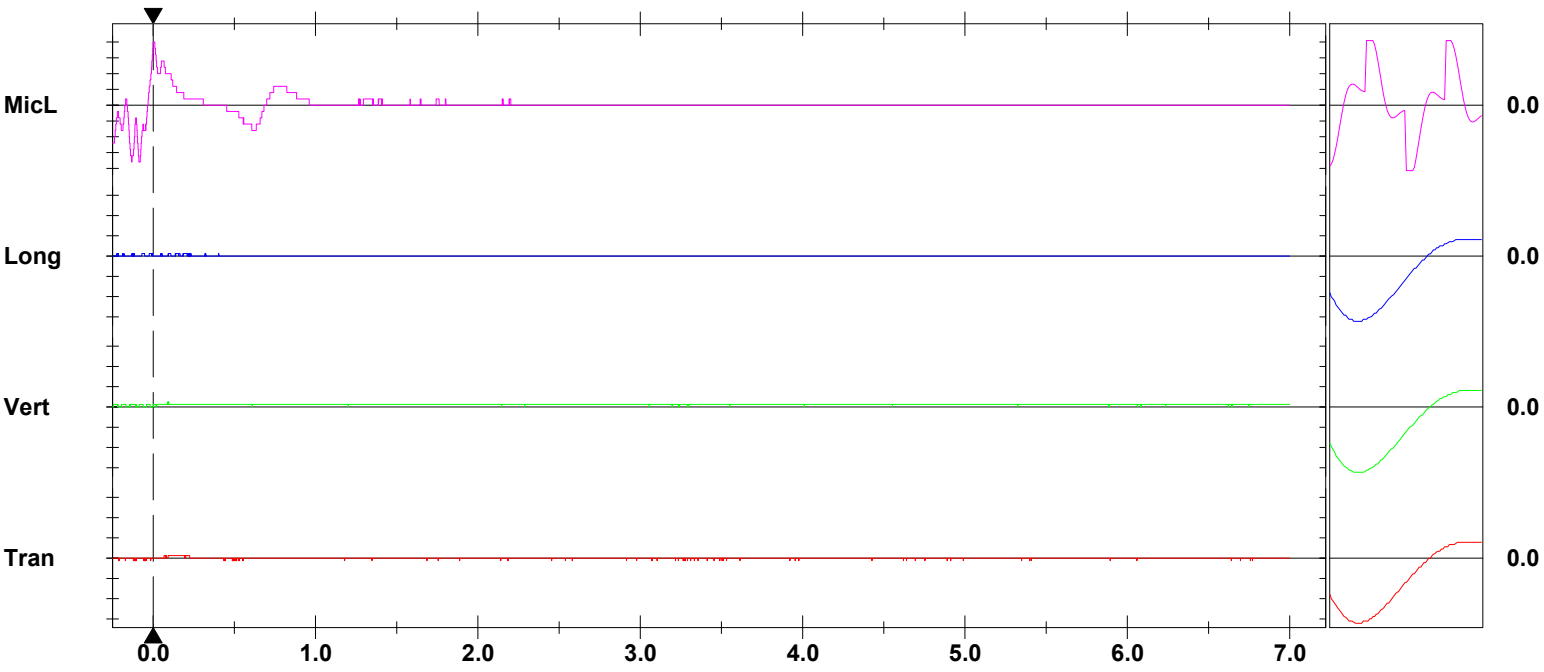
Microphone Linear Weighting
PSPL 120.0 dB(L) 20.00 pa.(L) at 0.010 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 273 mv)

	Tran	Vert	Long	
PPV	0.064	0.127	0.064	mm/s
PPV	27.06	33.08	27.06	dB
ZC Freq	N/A	>100	N/A	Hz
Time (Rel. to Trig)	-0.015	0.092	-0.002	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.7	8.0	Hz
Overswing Ratio	4.0	4.0	4.0	

Peak Vector Sum 0.159 mm/s at 0.094 sec
N/A: Not Applicable

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration April 25, 2022 by Instantel
File Name G489JM94.0E0
Post Event Notes
Location: 50 Myron Road (PW-15)
Blast No.: 2022-24
Project No: 22S001.00





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

Event Report

Date/Time Vert at 13:26:15 August 3, 2022
Trigger Source Geo: 0.492 mm/s
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:17:16 (V10.72.1)

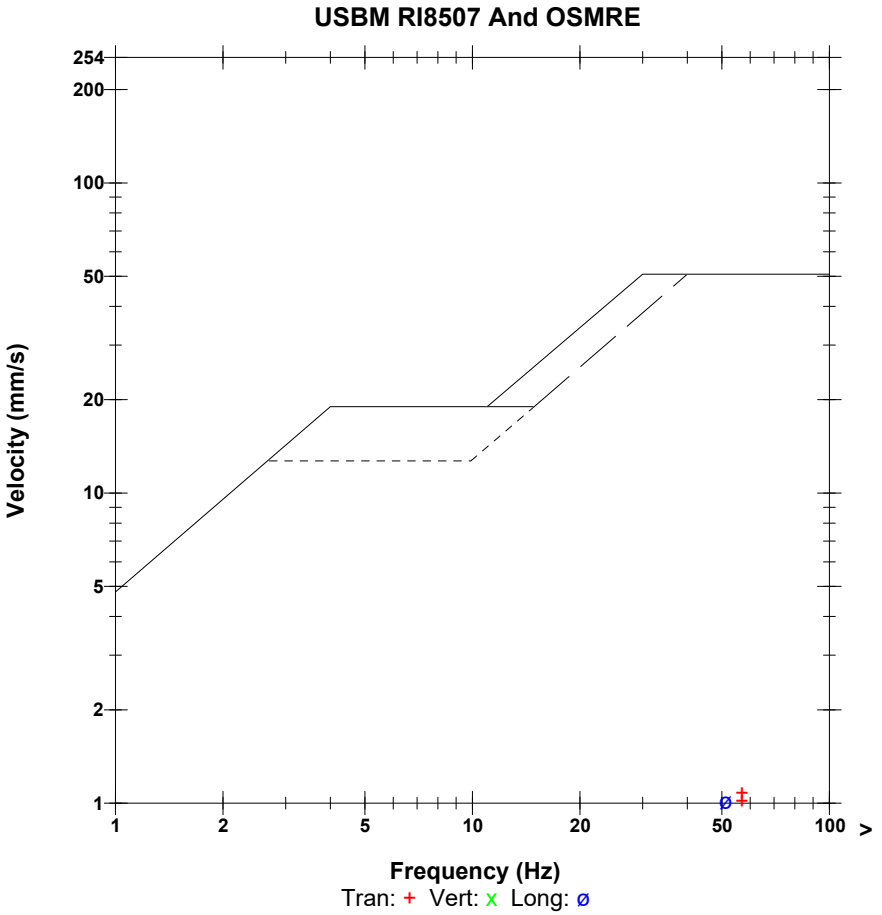
Serial Number 5676 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 28, 2022 by Instantel
File Name G676JM93.ZR0
Post Event Notes
Location: 86 Myron Road (PW-16)
Blast No.: 2022-24
Project No: 22S001.00

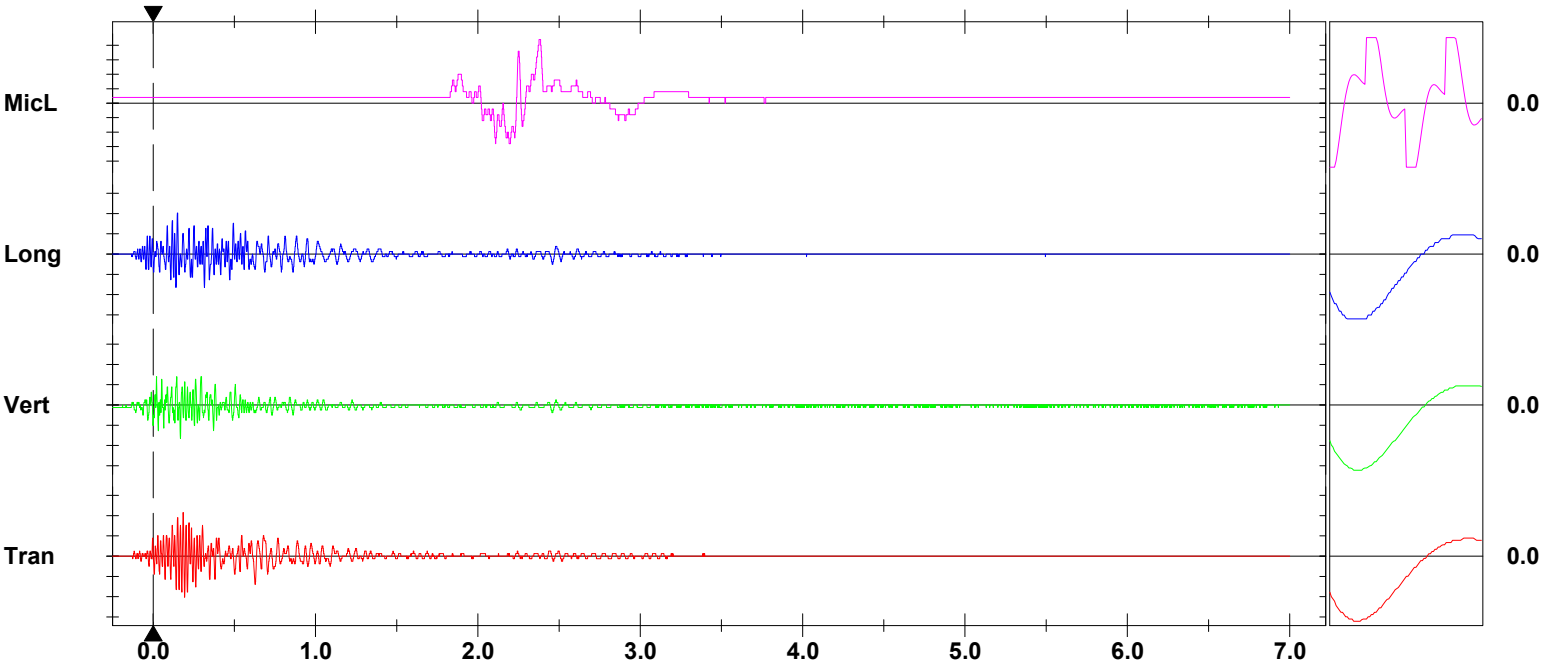
Extended Notes

Microphone Linear Weighting
PSPL 120.8 dB(L) 22.00 pa.(L) at 2.377 sec
ZC Freq N/A
Channel Test Passed (Freq = 20.0 Hz Amp = 298 mv)

	Tran	Vert	Long	
PPV	1.080	0.826	1.016	mm/s
PPV	51.66	49.33	51.14	dB
ZC Freq	57	64	51	Hz
Time (Rel. to Trig)	0.186	0.169	0.150	sec
Peak Acceleration	0.040	0.027	0.040	g
Peak Displacement	0.004	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	8.1	8.2	Hz
Overswing Ratio	3.7	3.4	3.6	

Peak Vector Sum 1.413 mm/s at 0.151 sec
N/A: Not Applicable





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

Event Report

Date/Time	MicL at 13:26:35 August 3, 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	5487 V 2.61 MiniMate
Battery Level	6.3 Volts
Unit Calibration	February 18, 2022 by Instantel
File Name	G487JM94.0B0

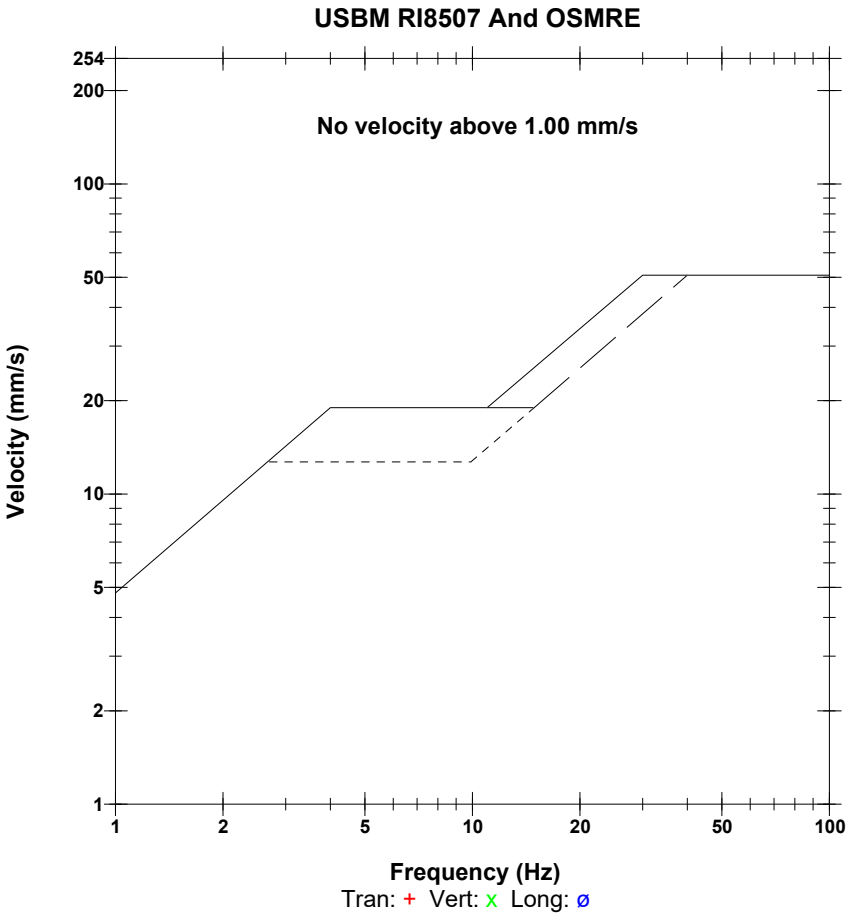
Notes
Location:
Client:
User Name:
Converted: August 3, 2022 15:20:13 (V10.72.1)

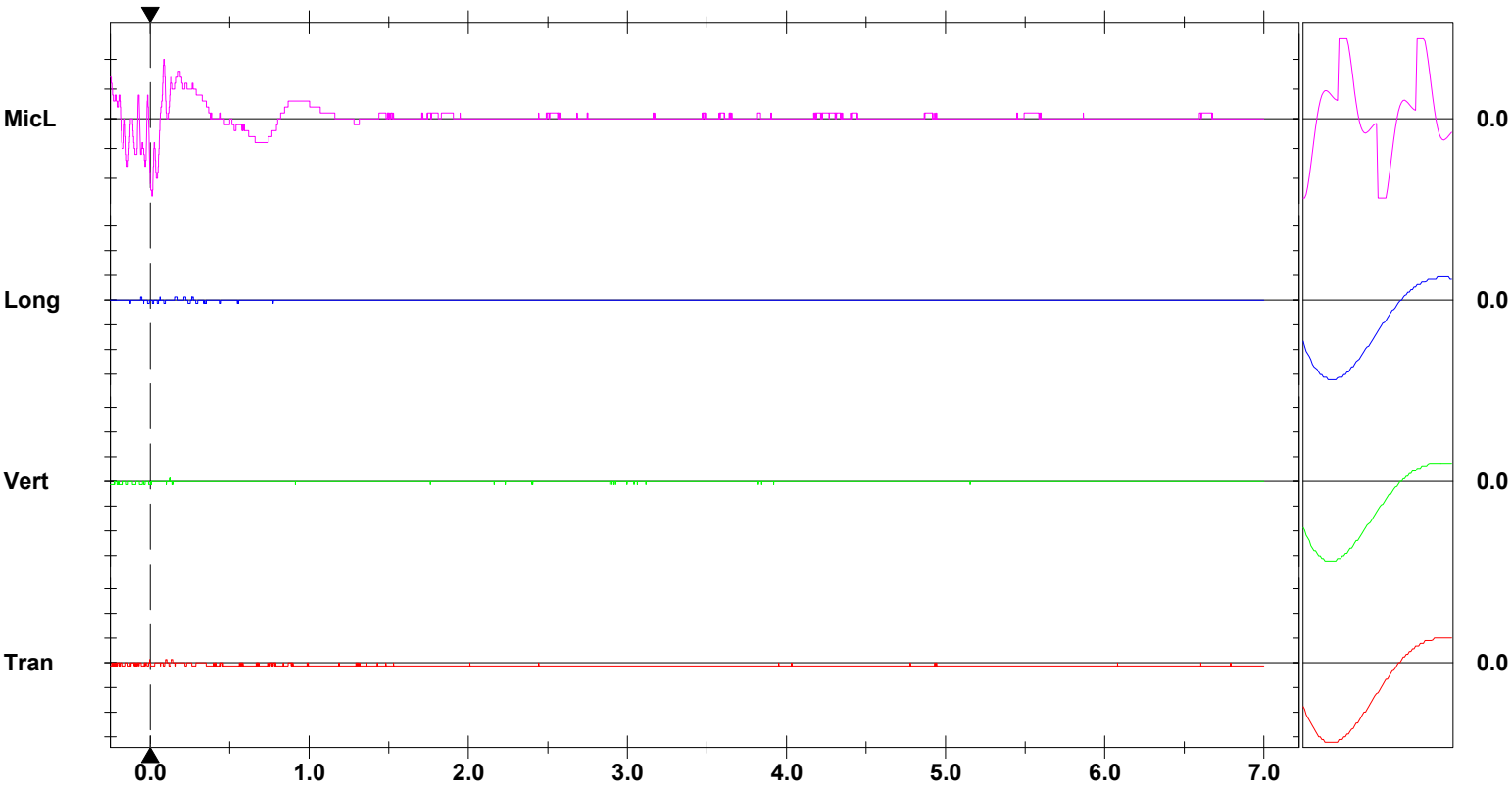
Extended Notes

Microphone	Linear Weighting
PSPL	122.3 dB(L) 26.00 pa.(L) at 0.013 sec
ZC Freq	7.0 Hz
Channel Test	Passed (Freq = 20.0 Hz Amp = 287 mv)

	Tran	Vert	Long	
PPV	0.064	0.064	0.064	mm/s
PPV	27.06	27.06	27.06	dB
ZC Freq	N/A	N/A	N/A	Hz
Time (Rel. to Trig)	-0.003	0.002	-0.006	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.8	7.7	7.7	Hz
Overswing Ratio	3.4	3.8	3.6	

Peak Vector Sum 0.111 mm/s at -0.056 sec
N/A: Not Applicable





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check
Trigger =

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August 18, 2022

Project No.: 22S001.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-27 – 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 (c/o Gulf Operators Ltd.) at 14:05 on August 17, 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. 2022-27 – August 17, 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)	14:05	1,250 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		831 m S	0.51 mm/s @ 64 Hz	116	-
3. Civic No. 4150 Route 111 (PW-13)		675 m SE	0.84 mm/s @ 57 Hz	120	-
4. Civic No. 2447 Route 820 (PW-07)		983 m NE	< 0.5 mm/s	<120	Unit was not triggered
5. PW-03 - Cottage Route 820		735 m N	0.13 mm/s @ 85 Hz	124	Triggered by Sound Pressure
6. Civic No. 2341 Route 820 (PW-05)		739 m N	0.08 mm/s @ 37 Hz	122	
7. Civic No. 50 Myron Road (PW-15)		952 m NW	< 0.5 mm/s	<120	Unit was not triggered
8. Civic No. 86 Myron Road (PW-16)		805 m W	1.14 mm/s @ 51 Hz	119	-
9. Civic No. 220 Myron Road (PW-01)		1,270 m S	< 0.5 mm/s	<120	Unit was not triggered
10. Civic No. 4140 Route 111 (PW-12)		761 m SE	0.95 mm/s @ 64 Hz	118	-
11. Civic No. 2337 Route 820 (PW-04)		824 m N	< 0.5 mm/s	<120	Unit was not triggered
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

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

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

Attachment A

Blast Record

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Archibald Drilling & Blasting		
Blaster's Certification No.:	1297	**Blaster's Name:**	Anthony Wallace
Blast Location:	N 45º28'50.34" W 65º38'00.45" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	16,728 tonnes
Weather at time of Blast:	Rain	**Air Temp.:**	19ºC
Est. Wind Speed :	≈25 km/h	**Wind Direction:**	NE
Cloud Cover:	Yes	**Precipitation:**	Yes

BLAST DESIGN:

Total No. Holes:	138	**Hole Diameter:**	4.5"
Average Depth:	4.0 m to 9.2 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	2	**Collar Length:**	8 ft
Delay between Holes:	25 ms	**Delay between Rows:**	17 ms
Initiation Method:	Non-Electric		
Weight of Explosives per Delay:	Max.: 101 kg		
Type and weight of Explosives for Blast:	5,560 kg – Emulsion		

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

BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	675 m
Direction to the Nearest Structure:	SE
Structure Type:	House
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	67.2

SAFETY:

Type of Warning Signal Used:	Siren
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No

If Yes, Describe:

Misfire (yes or no):	No

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	November 15, 2021
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,250 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5635
Calibration Date:	March 1, 2022
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	831 m South
Transverse Particle Velocity:	0.32 mm/s @ 39 Hz
Vertical Particle Velocity:	0.45 mm/s @ 57 Hz
Longitudinal Particle Velocity:	0.51 mm/s @ 64 Hz
Peak Particle Velocity:	0.51 mm/s @ 64 Hz
Maximum Airblast:	116 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18193
Calibration Date:	April 11, 2022
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	675 m Southeast
Transverse Particle Velocity:	0.84 mm/s @ 57 Hz
Vertical Particle Velocity:	0.71 mm/s @ 85 Hz
Longitudinal Particle Velocity:	0.50 mm/s @ 64 Hz
Peak Particle Velocity:	0.84 mm/s @ 57 Hz
Maximum Airblast:	120 dB(L)

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	April 25, 2022
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	983 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5372
Calibration Date:	February 18, 2022
Location of seismograph:	Cottage - PW-03 - Route 820
Distance and Direction from Blast:	735 m North
Transverse Particle Velocity:	0.06 mm/s @ NA
Vertical Particle Velocity:	0.13 mm/s @ 85 Hz
Longitudinal Particle Velocity:	0.13 mm/s @ >100 Hz
Peak Particle Velocity:	0.13 mm/s @ 85 Hz
Maximum Airblast:	124 dB(L) (Triggered by microphone)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18187
Calibration Date:	May 5, 2022
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	739 m North
Transverse Particle Velocity:	0.05 mm/s @ 73 Hz
Vertical Particle Velocity:	0.08 mm/s @ 37 Hz
Longitudinal Particle Velocity:	0.06 mm/s @ 37 Hz
Peak Particle Velocity:	0.08 mm/s @ 37 Hz
Maximum Airblast:	122 dB(L) (Triggered by microphone)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20206
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	952 m Northwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20203
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	805 m West
Transverse Particle Velocity:	1.13 mm/s @ 37 Hz
Vertical Particle Velocity:	0.89 mm/s @ 57 Hz
Longitudinal Particle Velocity:	1.14 mm/s @ 51 Hz
Peak Particle Velocity:	1.14 mm/s @ 51 Hz
Maximum Airblast:	119 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,270 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	July 27, 2022
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	761 m Southeast
Transverse Particle Velocity:	0.76 mm/s @ 73 Hz
Vertical Particle Velocity:	0.57 mm/s @ 64 Hz
Longitudinal Particle Velocity:	0.95 mm/s @ 64 Hz
Peak Particle Velocity:	0.95 mm/s @ 64 Hz
Maximum Airblast:	118 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 17, 2022
Project No.:	22S001.00	**Time of Blast:**	14:05
Inspector:	J. Yuzda	**Blast No.:**	2022-27
Client:	Hammond River Holdings		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	July 23, 2022
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	824 m North
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan
Blast No: 2022-27
Upham East Gypsum Quarry
Upham, NB

Date: August 17, 2022
Project No.: 22S001.00

Attachment C

Blast Event Reports

Event Report

Date/Time Long at 14:05:22 August 17, 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

Notes
Location:
Client:
User Name:
Converted: August 17, 2022 15:50:56 (V10.72.1)

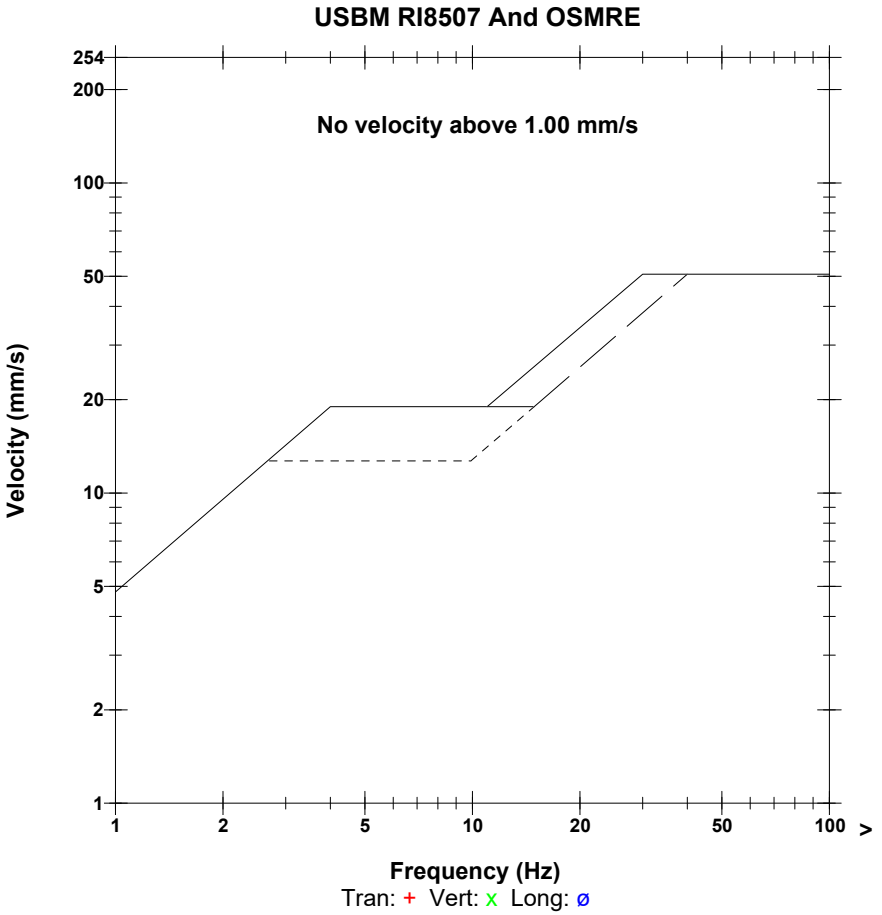
Extended Notes

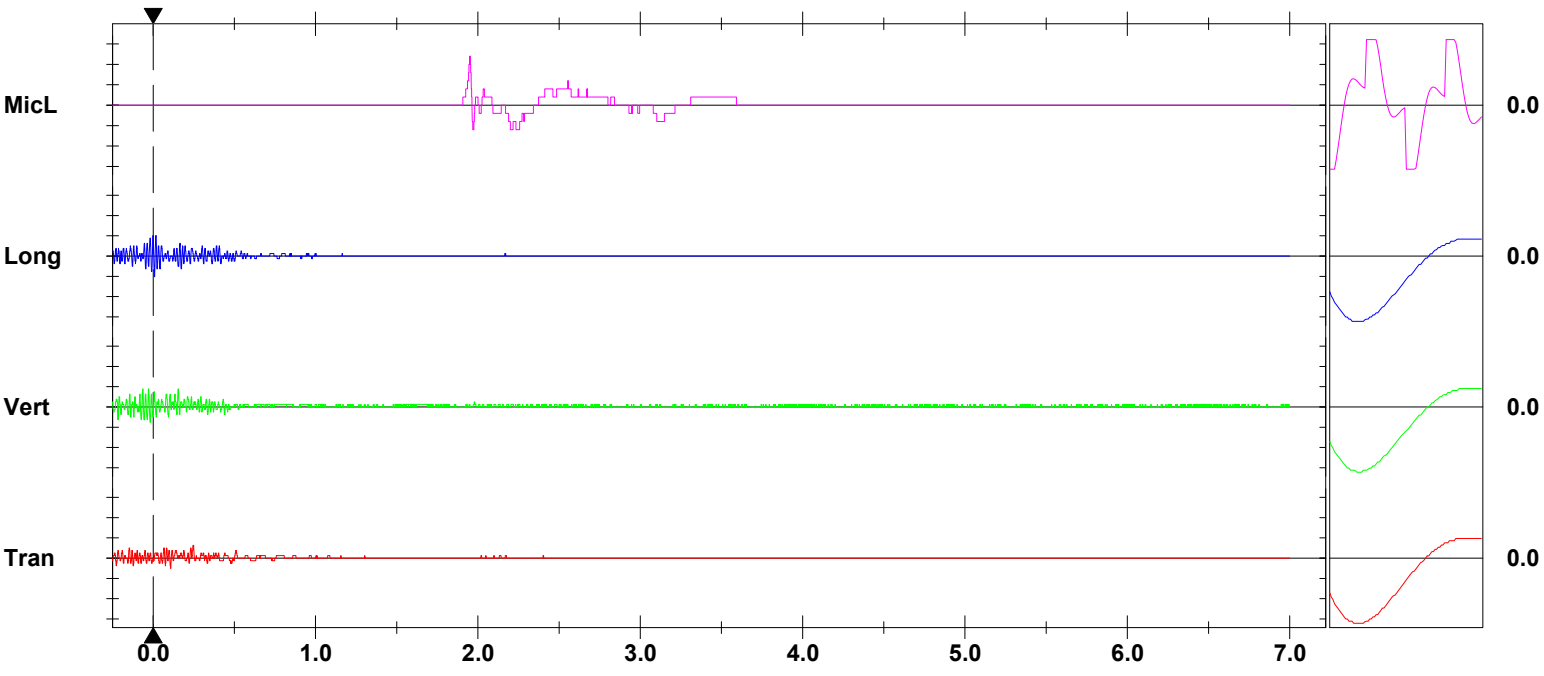
Serial Number 5635 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration March 1, 2022 by Instantel
File Name G635JMZ3.4Y0
Post Event Notes
Location: 4126 Route 111 (PW-10)
Blast No.: 2022-27
Project No: 22S001.00

Microphone Linear Weighting
PSPL 115.6 dB(L) 12.00 pa.(L) at 1.949 sec
ZC Freq 9.1 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 297 mv)

	Tran	Vert	Long	
PPV	0.318	0.445	0.508	mm/s
PPV	41.03	43.96	45.12	dB
ZC Freq	39	57	64	Hz
Time (Rel. to Trig)	0.246	-0.027	0.000	sec
Peak Acceleration	0.013	0.020	0.020	g
Peak Displacement	0.001	0.001	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	7.8	Hz
Overswing Ratio	3.2	3.7	3.9	

Peak Vector Sum 0.603 mm/s at 0.008 sec





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

Event Report

Date/Time Vert at 14:04:55 August 17, 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

Notes
Location:
Client:
User Name:
General:

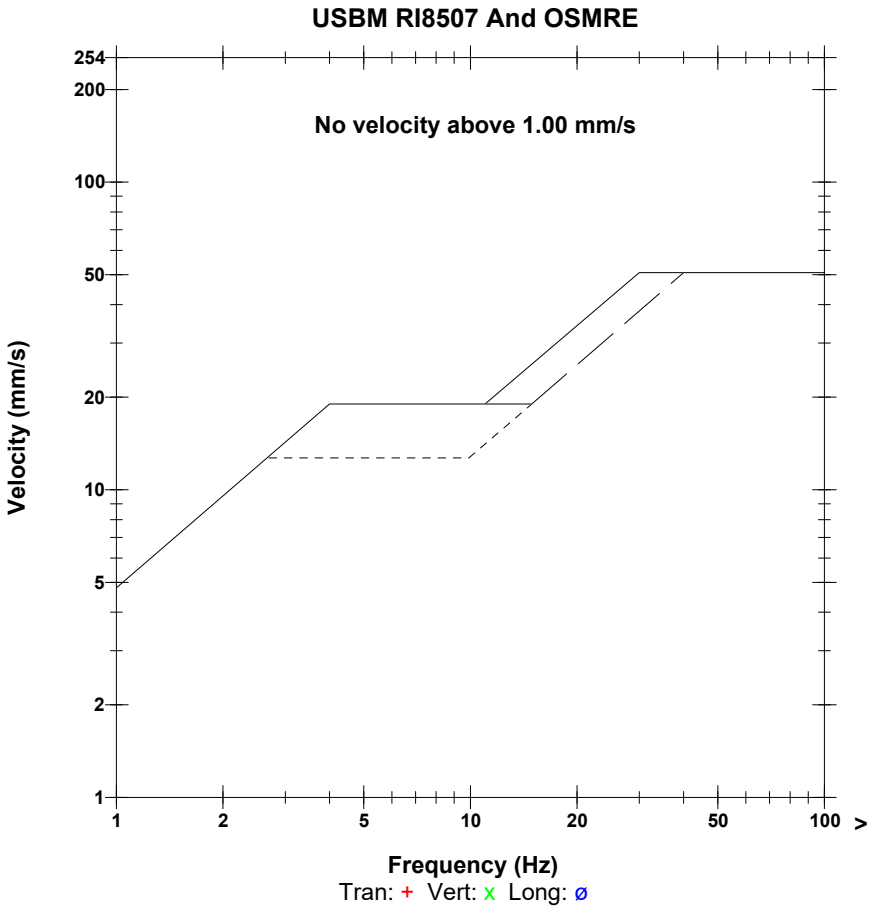
Serial Number UM18193 V 10-90GC Micromate ISEE
Battery Level 3.7 Volts
Unit Calibration April 11, 2022 by Instantel
File Name UM18193_20220817140455.IDFW

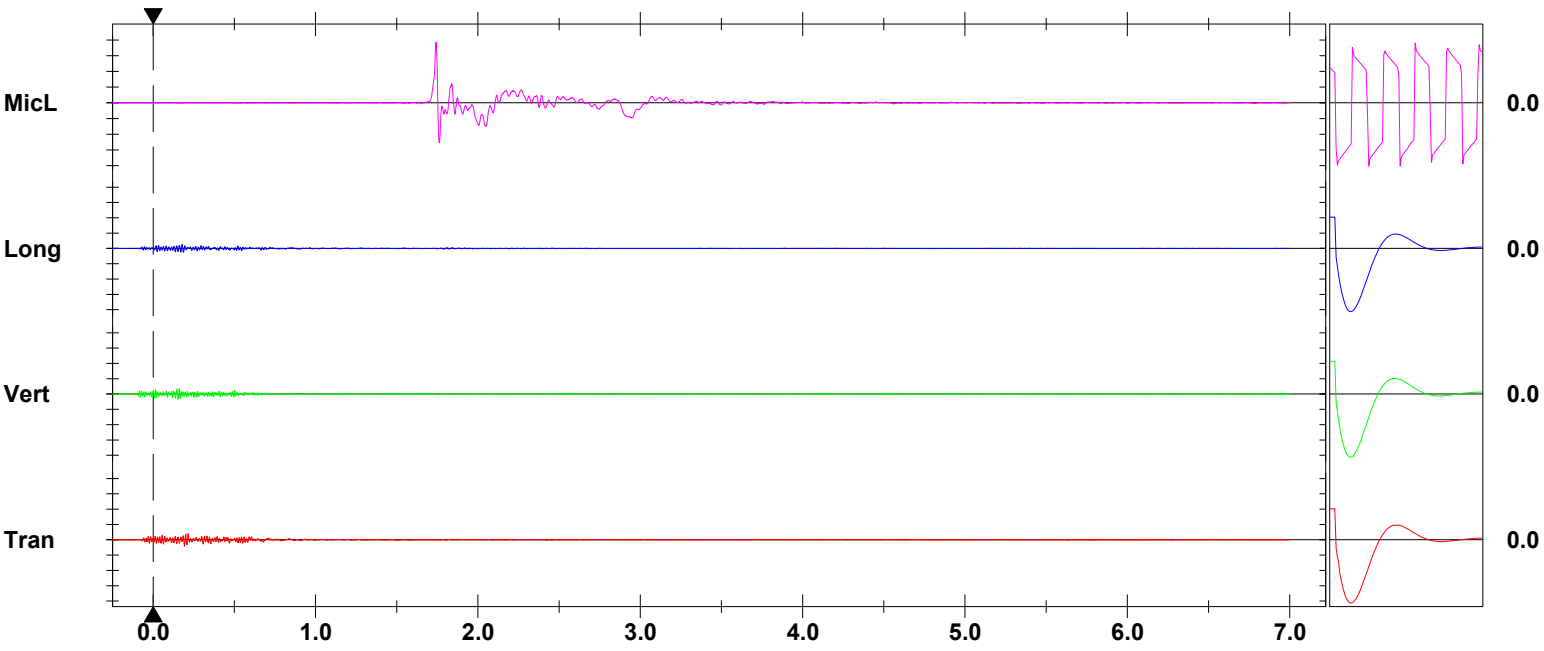
Post Event Notes
Location: 4150 Route 111 (PW-13)
Blast No.: 2022-27
Project No: 22S001.00

Microphone Linear Weighting
PSPL 119.7 dB(L) 19.36 pa.(L) at 1.742 sec
ZC Freq 6.3 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1384 mv)

	Tran	Vert	Long	
PPV	0.843	0.709	0.504	mm/s
PPV	49.52	48.02	45.06	dB
ZC Freq	57	85	64	Hz
Time (Rel. to Trig)	0.192	0.160	0.178	sec
Peak Acceleration	0.063	0.052	0.036	g
Peak Displacement	0.002	0.002	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.3	Hz
Overswing Ratio	4.3	4.1	4.4	

Peak Vector Sum 0.893 mm/s at 0.160 sec





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

Event Report

Date/Time MicL at 14:05:44 August 17, 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

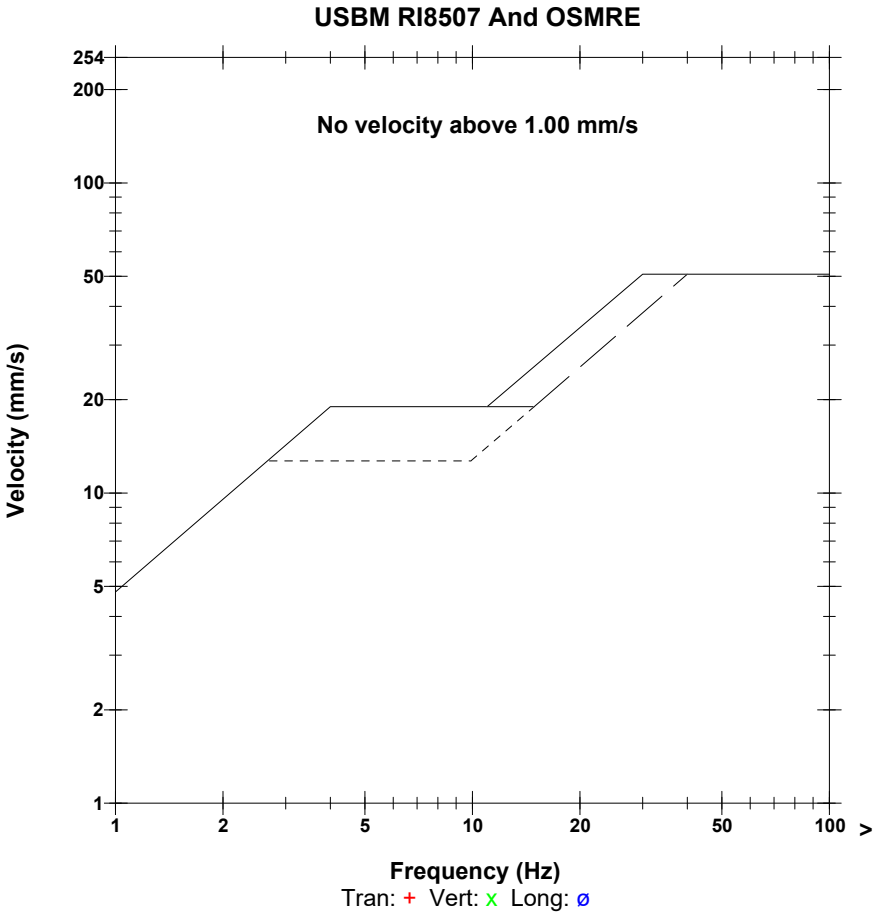
Notes
Location: .
Client: UUUTUUUUUUUUU
User Name: UUUUU
Converted: August 17, 2022 15:47:21 (V10.72.1)

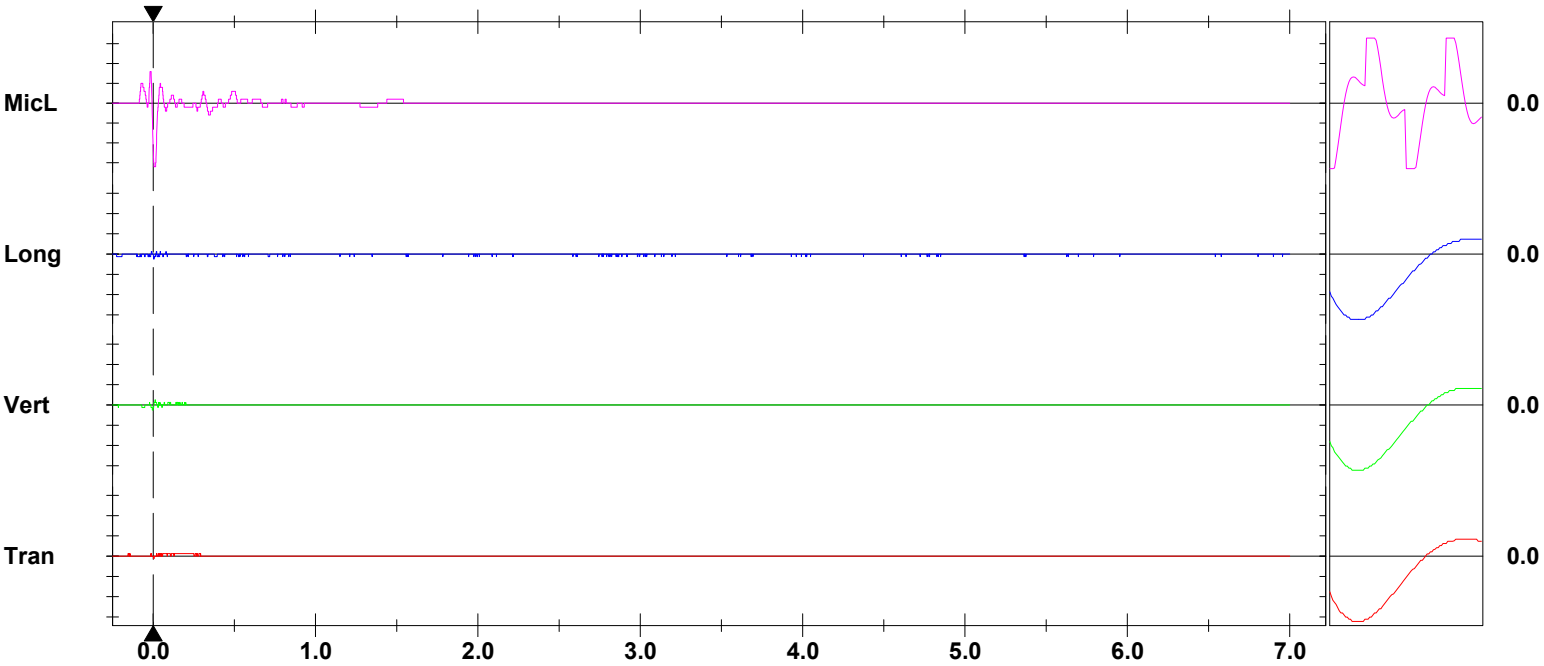
Serial Number 5372 V 2.61 MiniMate
Battery Level 5.9 Volts
Unit Calibration February 18, 2022 by Instantel
File Name G372JMZ3.5K0
Post Event Notes
Location: Cottage - Route 820 (PW-03)
Blast No.: 2022-27
Project No: 22S001.00

Microphone Linear Weighting
PSPL 124.1 dB(L) 32.00 pa.(L) at 0.015 sec
ZC Freq 13 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 292 mv)

	Tran	Vert	Long	
PPV	0.064	0.127	0.127	mm/s
PPV	27.06	33.08	33.08	dB
ZC Freq	N/A	85	>100	Hz
Time (Rel. to Trig)	-0.011	-0.001	0.005	sec
Peak Acceleration	0.007	0.007	0.007	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	7.6	Hz
Overswing Ratio	3.5	3.6	3.8	

Peak Vector Sum 0.143 mm/s at 0.005 sec
N/A: Not Applicable





Time Scale: 0.50 sec/div **Amplitude Scale:** Geo: 0.500 mm/s/div Mic: 10.000 pa.(L)/div Sensor Check
Trigger =

Event Report

Date/Time MicL at 14:05:09 August 17, 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/factory.MMB

Notes
Location:
Client:
User Name:
General:

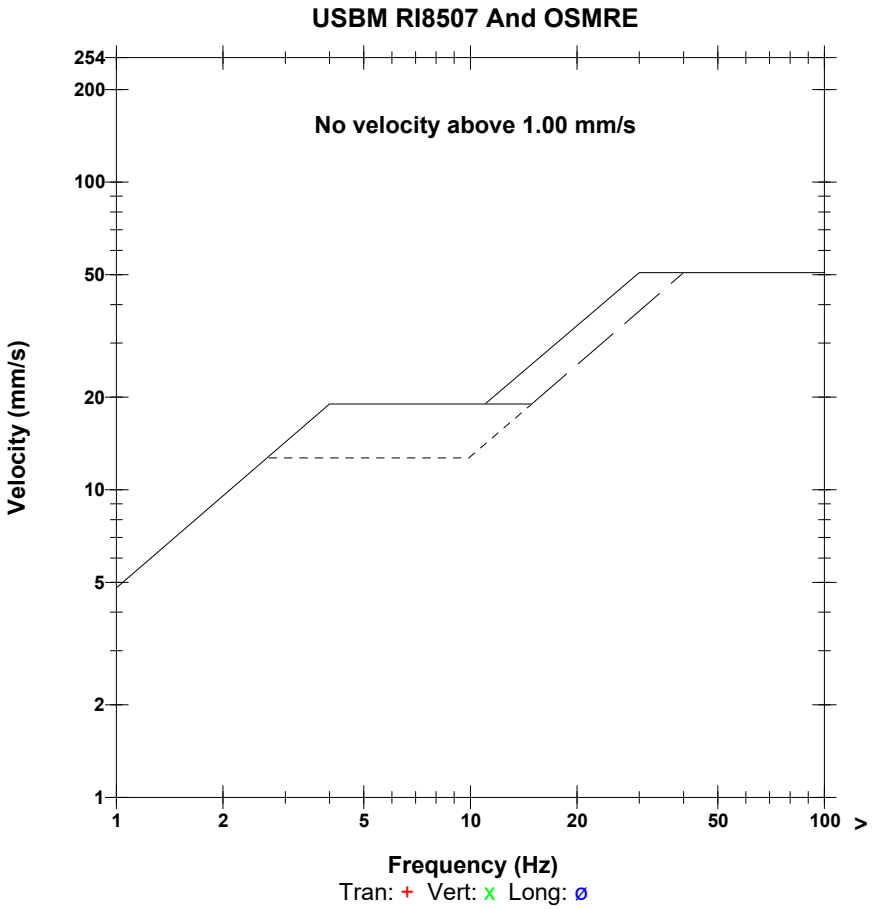
Serial Number UM18187 V 10-90GC Micromate ISEE
Battery Level 3.8 Volts
Unit Calibration May 5, 2022 by Instantel
File Name UM18187_20220817140509.IDFW

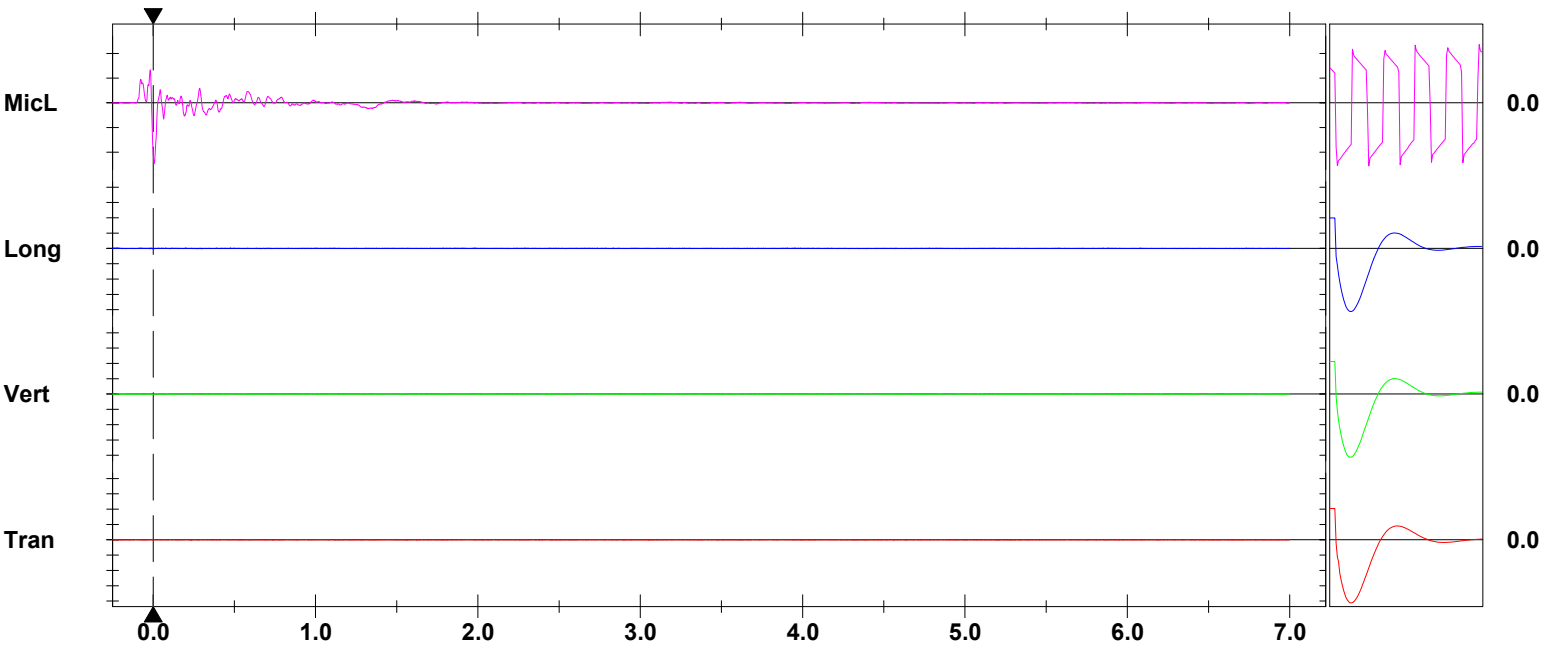
Post Event Notes
Location: 2341 Route 820 (PW-05)
Blast No.: 2022-27
Project No: 22S001.00

Microphone Linear Weighting
PSPL 121.8 dB(L) 24.64 pa.(L) at 0.006 sec
ZC Freq 13 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1392 mv)

	Tran	Vert	Long	
PPV	0.047	0.079	0.055	mm/s
PPV	24.50	28.93	25.83	dB
ZC Freq	73	37	37	Hz
Time (Rel. to Trig)	0.037	-0.010	-0.002	sec
Peak Acceleration	0.005	0.006	0.005	g
Peak Displacement	0.000	0.000	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.1	7.5	7.5	Hz
Overswing Ratio	4.6	4.1	4.1	

Peak Vector Sum 0.086 mm/s at -0.010 sec





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

Event Report

Date/Time Vert at 14:05:05 August 17, 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

Notes
Location:
Client:
User Name:
General:

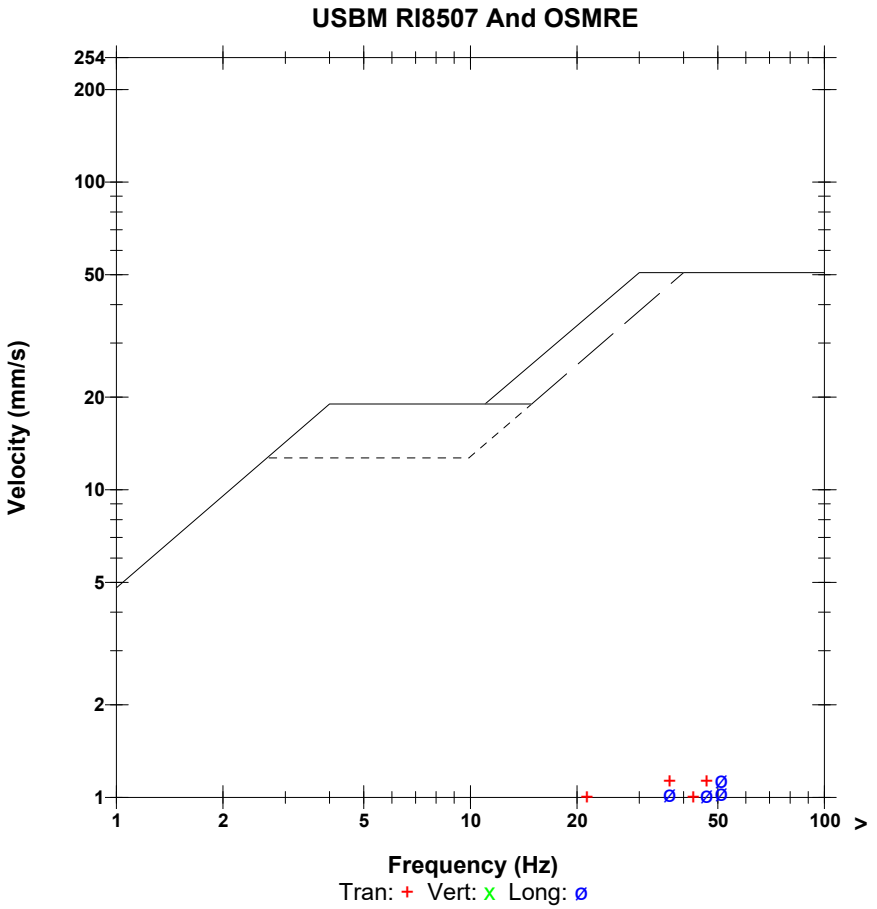
Serial Number UM20203 V 10-90GC Micromate ISEE
Battery Level 3.7 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20203_20220817140505.IDFW

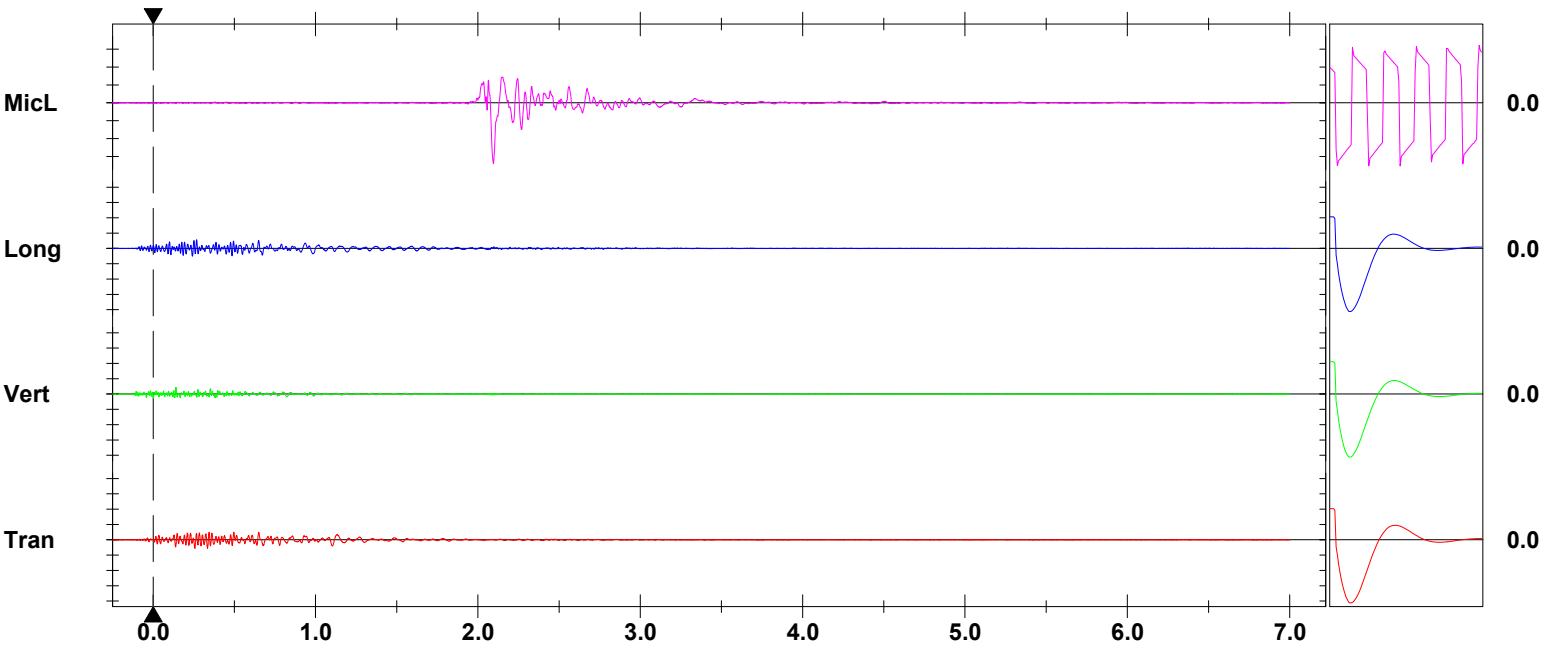
Post Event Notes
Location: 86 Myron Road (PW-16)
Blast No.: 2022-27
Project No: 22S001.00

Microphone Linear Weighting
PSPL 118.6 dB(L) 16.99 pa.(L) at 2.096 sec
ZC Freq 9.3 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1400 mv)

	Tran	Vert	Long	
PPV	1.127	0.891	1.135	mm/s
PPV	52.04	49.99	52.10	dB
ZC Freq	37	57	51	Hz
Time (Rel. to Trig)	0.257	0.141	0.268	sec
Peak Acceleration	0.063	0.055	0.057	g
Peak Displacement	0.008	0.003	0.008	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.4	4.7	4.4	

Peak Vector Sum 1.444 mm/s at 0.268 sec





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

Event Report

Date/Time Vert at 14:05:41 August 17, 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

Notes
Location:
Client:
User Name:
Converted: August 17, 2022 15:48:54 (V10.72.1)

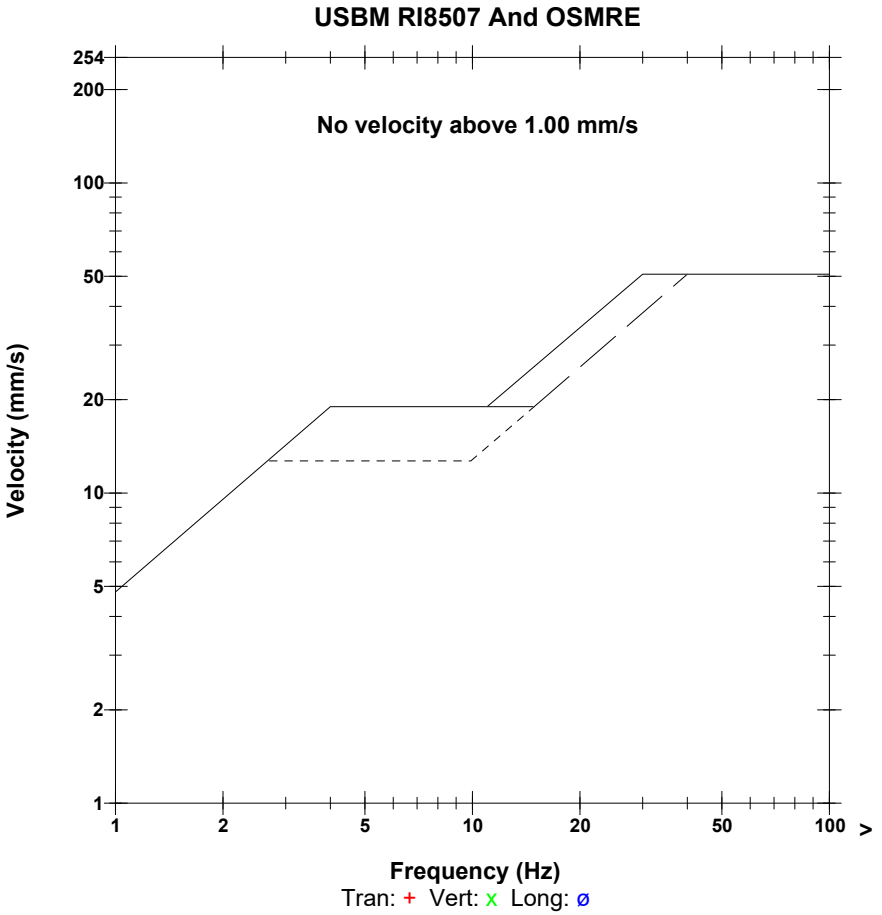
Extended Notes

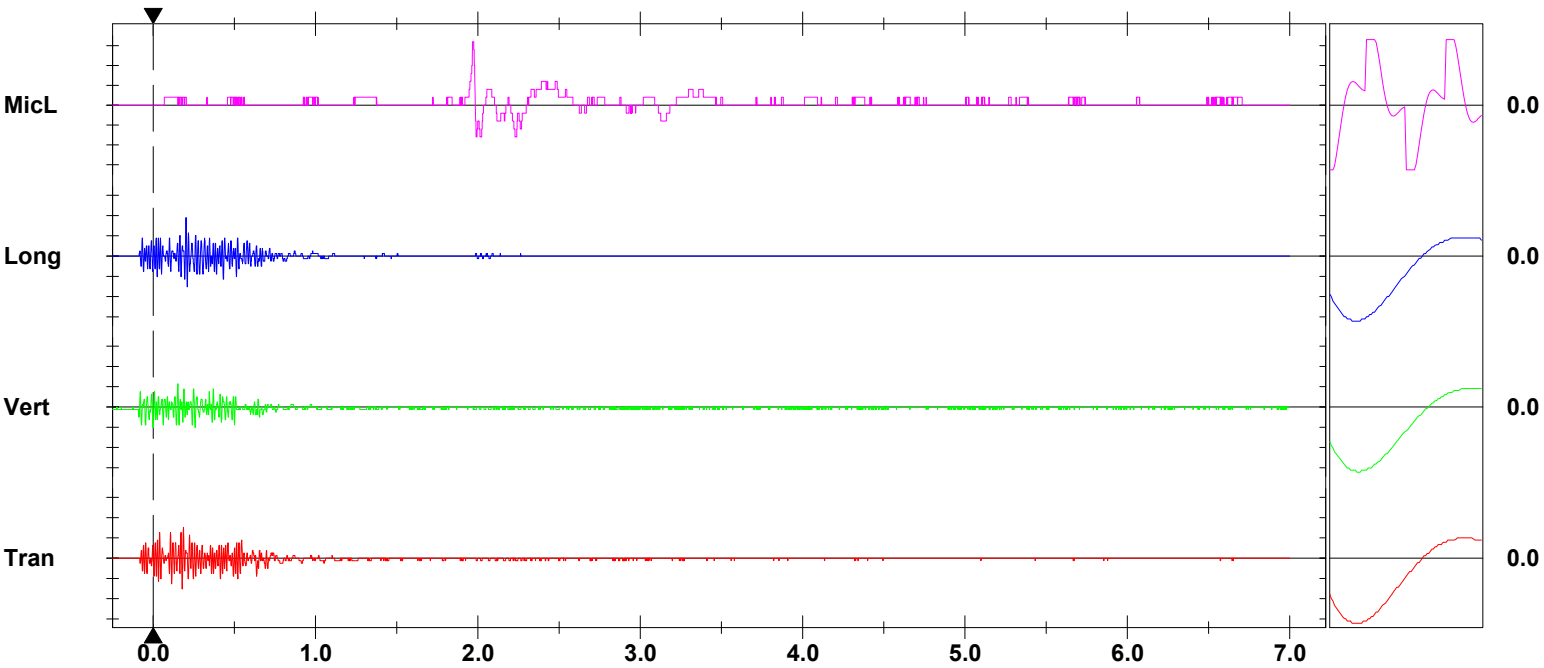
Microphone Linear Weighting
PSPL 118.1 dB(L) 16.00 pa.(L) at 1.968 sec
ZC Freq 8.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 302 mv)

	Tran	Vert	Long	
PPV	0.762	0.572	0.953	mm/s
PPV	48.64	46.14	50.58	dB
ZC Freq	73	64	64	Hz
Time (Rel. to Trig)	0.180	0.152	0.203	sec
Peak Acceleration	0.033	0.027	0.040	g
Peak Displacement	0.002	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.3	7.8	8.3	Hz
Overswing Ratio	3.4	3.7	3.7	

Peak Vector Sum 0.968 mm/s at 0.203 sec

Serial Number 5371 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration July 27, 2022 by Instantel
File Name G371JMZ3.5H0
Post Event Notes
Location: 4140 Route 111 (PW-12)
Blast No.: 2022-27
Project No: 22S001.00





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

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August 29, 2022

Project No.: 22S001.00

Mr. Daniel Guest
Hammond River Holdings
Via email: Guest.Daniel@AtlanticWallboard.com

Re: Blast Vibration Monitoring – Blast No. 2022-28 – 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 (c/o Gulf Operators Ltd.) at 14:38 on August 29, 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. 2022-28 – August 29, 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)	14:38	1,400 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		975 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		832 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		582 m N	0.64 mm/s @ 43 Hz	110	-
6. Civic No. 2341 Route 820 (PW-05)		576 m N	1.64 mm/s @ 51 Hz	109	-
7. Civic No. 50 Myron Road (PW-15)		810 m NW	< 0.5 mm/s	<120	Unit was not triggered
8. Civic No. 86 Myron Road (PW-16)		768 m W	0.89 mm/s @ 85 Hz	108	-
9. Civic No. 220 Myron Road (PW-01)		1,390 m S	< 0.5 mm/s	<120	Units were not triggered
10. Civic No. 4140 Route 111 (PW-12)		919 m SE	< 0.5 mm/s	<120	
11. Civic No. 2337 Route 820 (PW-04)		643 m N	0.51 mm/s @ 64 Hz	111	-
maximum limits as per Approval to Operate			**12.5 mm/s**	**128 dB**	

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

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

Attachment A

Blast Record

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Archibald Drilling & Blasting		
Blaster's Certification No.:	1297	**Blaster's Name:**	Anthony Wallace
Blast Location:	N 45º28'55.04" W 65º38'03.97" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	16,548 tonnes
Weather at time of Blast:	Clear	**Air Temp.:**	24ºC
Est. Wind Speed :	≈15 km/h	**Wind Direction:**	SW
Cloud Cover:	No	**Precipitation:**	Yes

BLAST DESIGN:

Total No. Holes:	165	**Hole Diameter:**	4.5"
Average Depth:	4.4 m to 4.5 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	1	**Collar Length:**	9 – 11 ft
Delay between Holes:	25 ms	**Delay between Rows:**	59 & 84 ms
Initiation Method:	Non-Electric		
Weight of Explosives per Delay:	Max.: 30 kg		
Type and weight of Explosives for Blast:	4,360 kg – Emulsion		

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	576 m
Direction to the Nearest Structure:	SE
Structure Type:	House
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	105.2

SAFETY:

Type of Warning Signal Used:	Siren
Blasting Mats Used (yes or no):	No
Airblast Measurement (yes or no):	Yes
Vibration Measurement (yes or no):	Yes
Warning Signs Posted (yes or no):	Yes
Accesses Guarded (yes or no):	Yes
Flyrock Damage (yes or no):	No

If Yes, Describe:

Misfire (yes or no):	No

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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18193
Calibration Date:	April 11, 2022
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,400 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18187
Calibration Date:	May 5, 2022
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	911 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5635
Calibration Date:	March 1, 2022
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	832 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20204
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	925 m Northeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	July 27, 2022
Location of seismograph:	Cottage - PW-03 - Route 820
Distance and Direction from Blast:	582 m North
Transverse Particle Velocity:	0.64 mm/s @ 43 Hz
Vertical Particle Velocity:	0.64 mm/s @ 43 Hz
Longitudinal Particle Velocity:	0.64 mm/s @ 73 Hz
Peak Particle Velocity:	0.64 mm/s @ 43 Hz
Maximum Airblast:	110 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #20203
Calibration Date:	May 31, 2022
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	576 m North
Transverse Particle Velocity:	1.55 mm/s @ 51 Hz
Vertical Particle Velocity:	1.52 mm/s @ 51 Hz
Longitudinal Particle Velocity:	1.64 mm/s @ 51 Hz
Peak Particle Velocity:	1.64 mm/s @ 51 Hz
Maximum Airblast:	109 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	810 m Northwest
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	July 23, 2022
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	768 m West
Transverse Particle Velocity:	0.64 mm/s @ 73 Hz
Vertical Particle Velocity:	0.51 mm/s @ 73 Hz
Longitudinal Particle Velocity:	0.89 mm/s @ 85 Hz
Peak Particle Velocity:	0.89 mm/s @ 85 Hz
Maximum Airblast:	108 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5372
Calibration Date:	February 18, 2022
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,390 m South
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	April 25, 2022
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	919 m Southeast
Transverse Particle Velocity:	<0.5 mm/s – Unit was not triggered
Vertical Particle Velocity:	<0.5 mm/s – Unit was not triggered
Longitudinal Particle Velocity:	<0.5 mm/s – Unit was not triggered
Peak Particle Velocity:	N/A
Maximum Airblast:	<120 dB(L) – Unit was not triggered

BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 29, 2022
Project No.:	22S001.00	**Time of Blast:**	14:38
Inspector:	L. Collins	**Blast No.:**	2022-28
Client:	Hammond River Holdings		

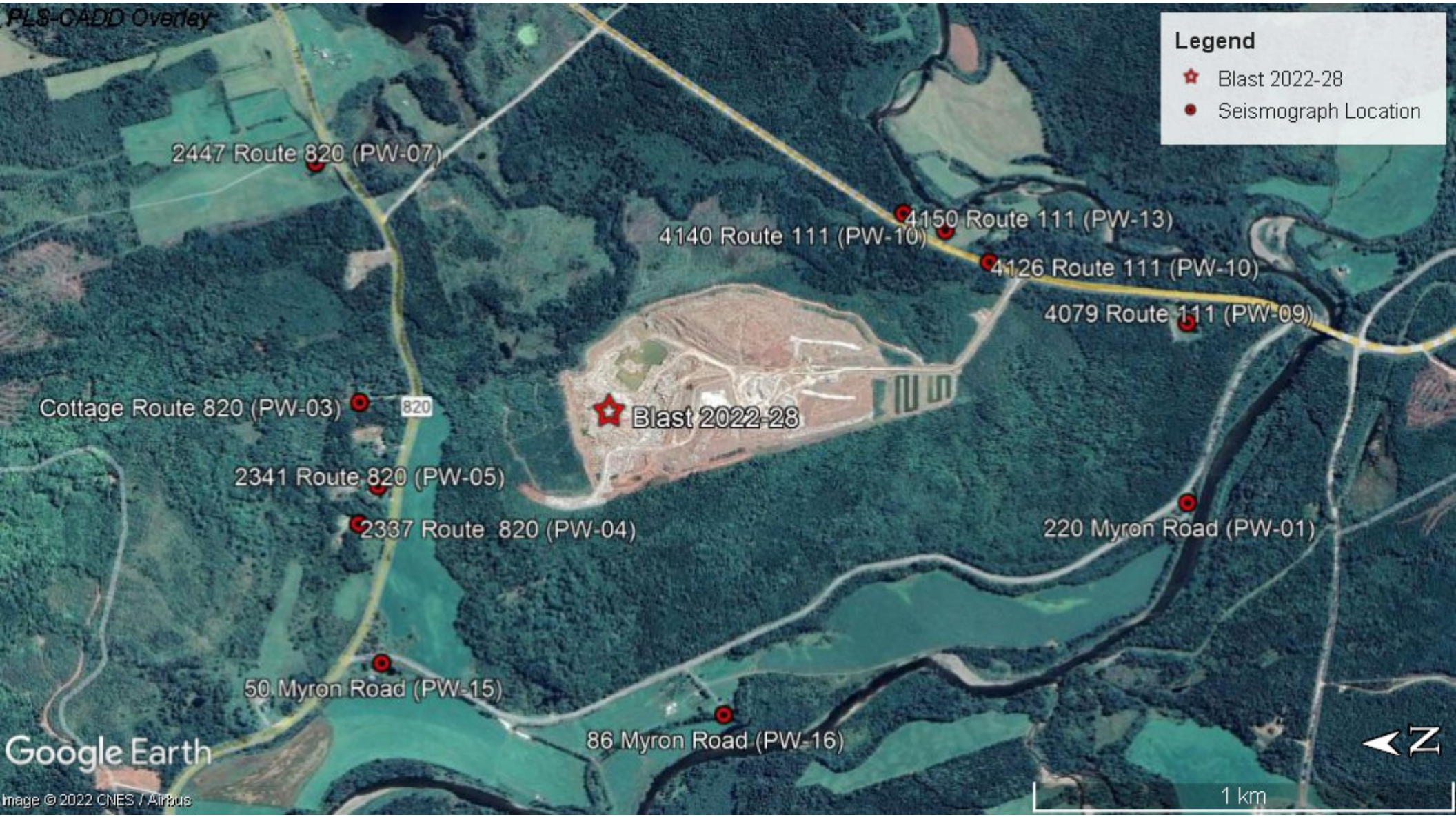
Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	July 20, 2022
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	643 m North
Transverse Particle Velocity:	0.51 mm/s @ 64 Hz
Vertical Particle Velocity:	0.25 mm/s @ >100 Hz
Longitudinal Particle Velocity:	0.51 mm/s @ 73 Hz
Peak Particle Velocity:	0.51 mm/s @ 64 Hz
Maximum Airblast:	111 dB(L)

Attachment B

Blast and Seismograph Location Plan

Blast and Seismograph Location Plan
Blast No: 2022-28
Upham East Gypsum Quarry
Upham, NB



Date: August 29, 2022
Project No.: 22S001.00

Attachment C

Blast Event Reports

Event Report

Date/Time Vert at 14:39:40 August 29, 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

Notes
Location:
Client:
User Name:
Converted: August 29, 2022 17:20:31 (V10.72.1)

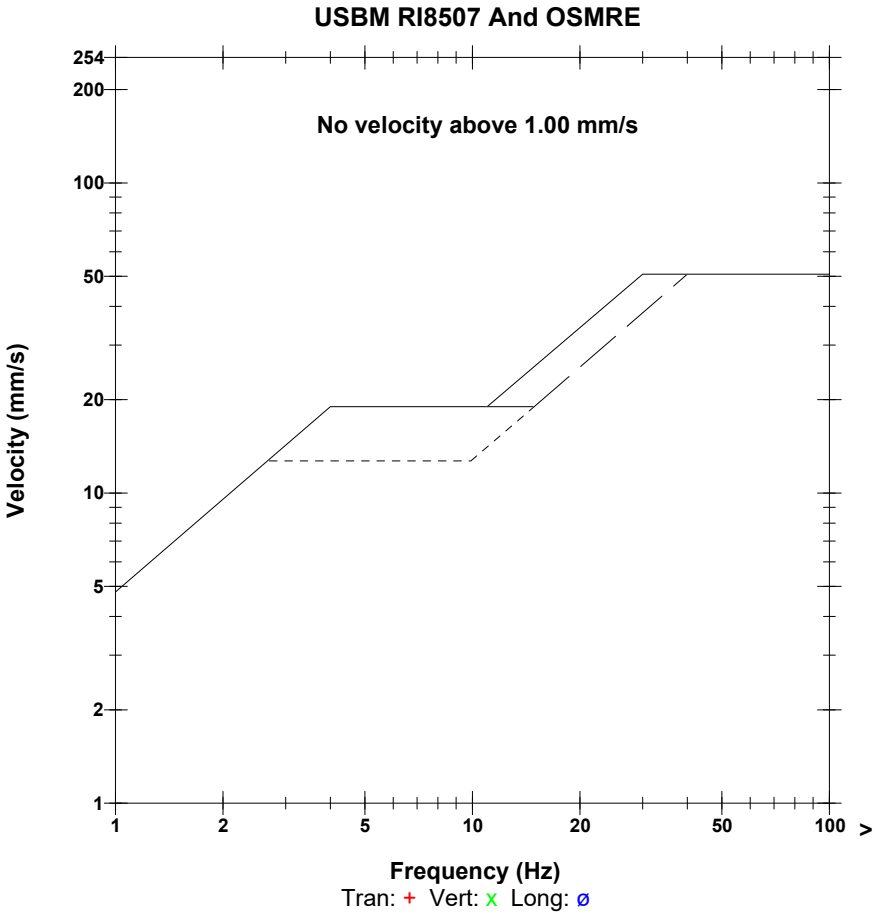
Extended Notes

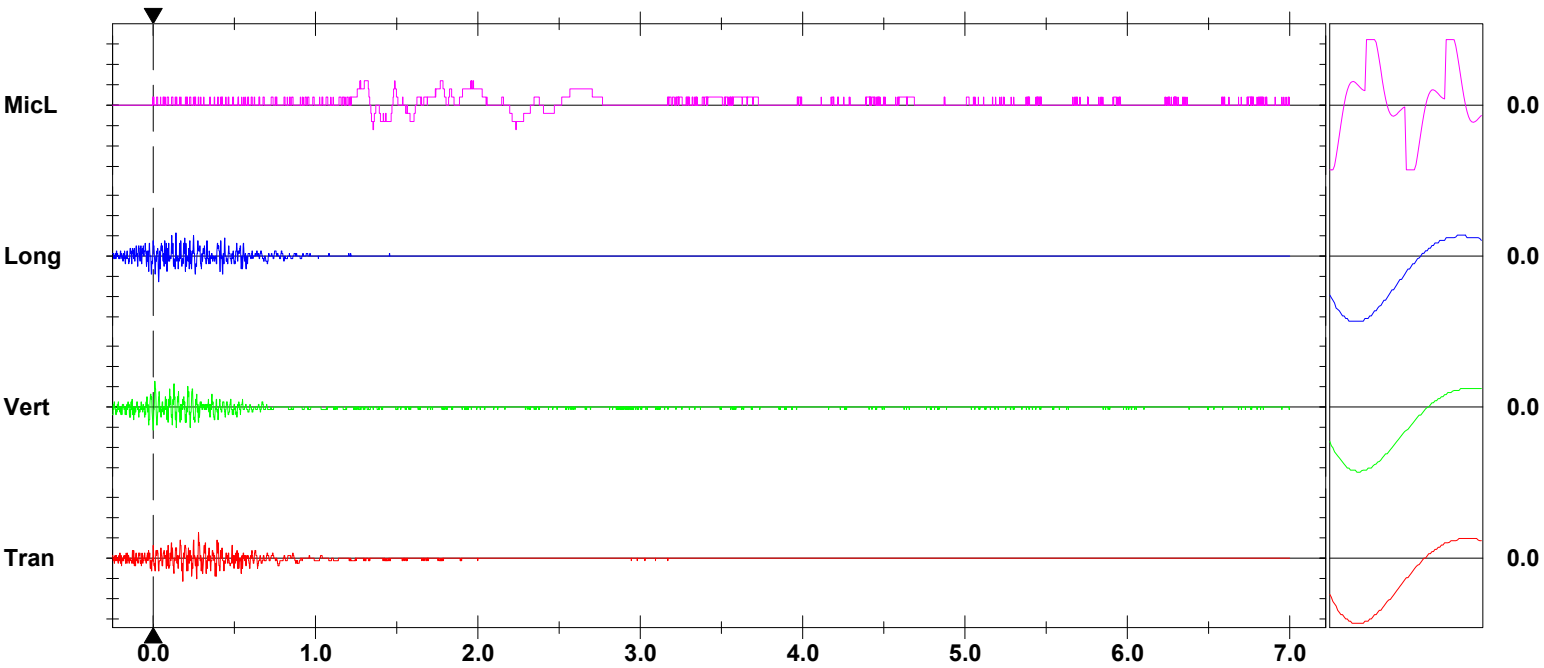
Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 1.275 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 302 mv)

	Tran	Vert	Long	
PPV	0.635	0.635	0.635	mm/s
PPV	47.06	47.06	47.06	dB
ZC Freq	43	43	73	Hz
Time (Rel. to Trig)	0.280	0.011	0.035	sec
Peak Acceleration	0.033	0.027	0.033	g
Peak Displacement	0.002	0.002	0.002	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.5	Hz
Overswing Ratio	3.5	3.7	3.3	

Peak Vector Sum 0.762 mm/s at 0.001 sec

Serial Number 5371 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration July 27, 2022 by Instantel
File Name G371JNLC.Q40
Post Event Notes
Location: Cottage - Route 820 (PW-03)
Blast No.: 2022-28
Project No: 22S001.00





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

Event Report

Date/Time Vert at 14:38:35 August 29, 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

Notes
Location:
Client:
User Name:
General:

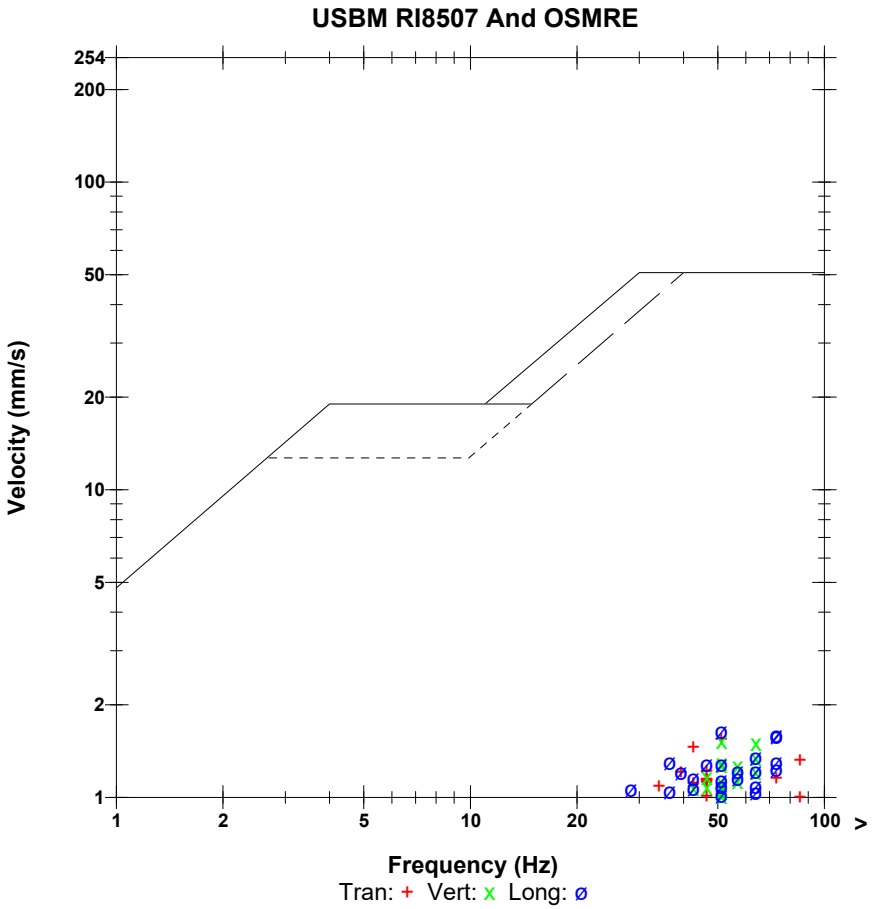
Serial Number UM20203 V 10-90GC Micromate ISEE
Battery Level 3.6 Volts
Unit Calibration May 31, 2022 by Instantel
File Name UM20203_20220829143835.IDFW

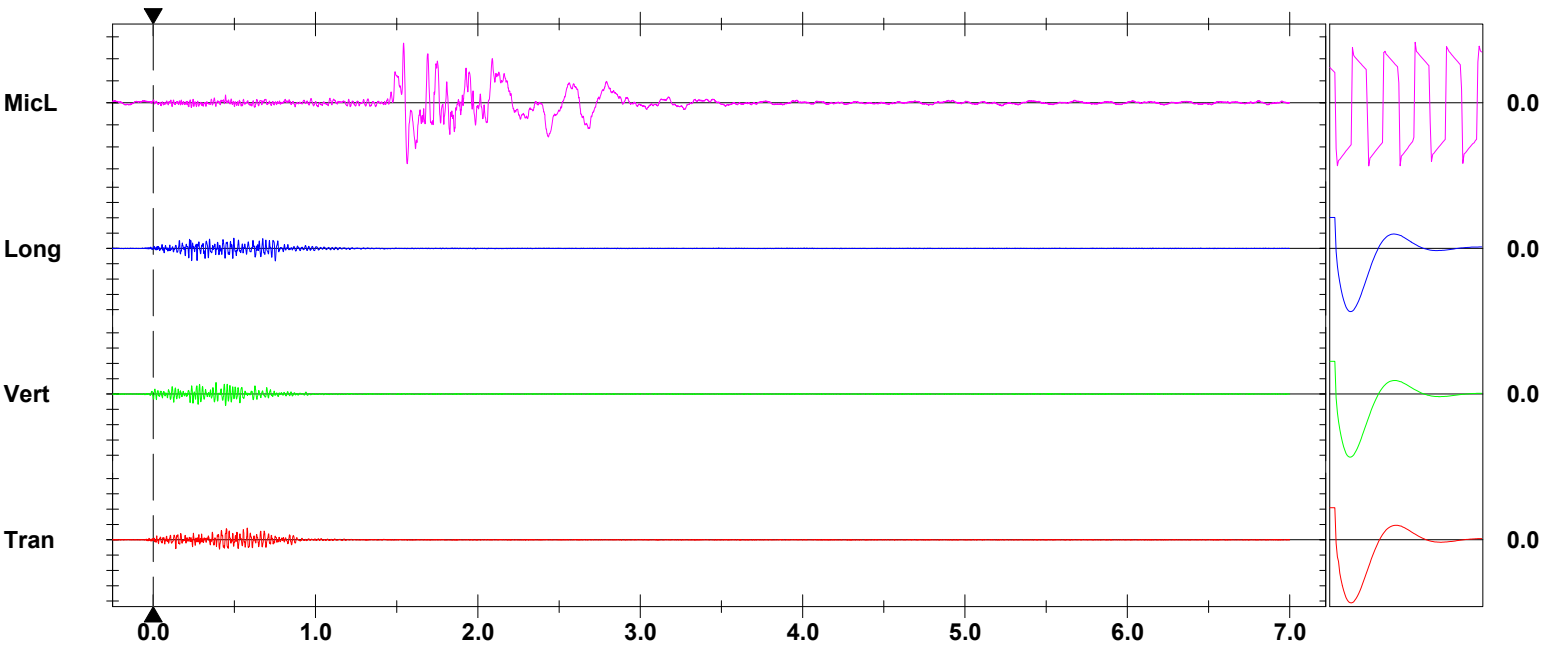
Post Event Notes
Location: 2341 Route 820 (PW-05)
Blast No.: 2022-28
Project No: 22S001.00

Microphone Linear Weighting
PSPL 108.8 dB(L) 5.523 pa.(L) at 1.565 sec
ZC Freq 3.9 Hz
Channel Test Passed (Freq = 20.5 Hz Amp = 1323 mv)

	Tran	Vert	Long	
PPV	1.545	1.521	1.639	mm/s
PPV	54.78	54.64	55.29	dB
ZC Freq	51	51	51	Hz
Time (Rel. to Trig)	0.579	0.388	0.752	sec
Peak Acceleration	0.117	0.112	0.083	g
Peak Displacement	0.005	0.004	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.5	Hz
Overswing Ratio	4.4	4.7	4.4	

Peak Vector Sum 1.931 mm/s at 0.237 sec





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

Event Report

Date/Time Long at 14:37:10 August 29, 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

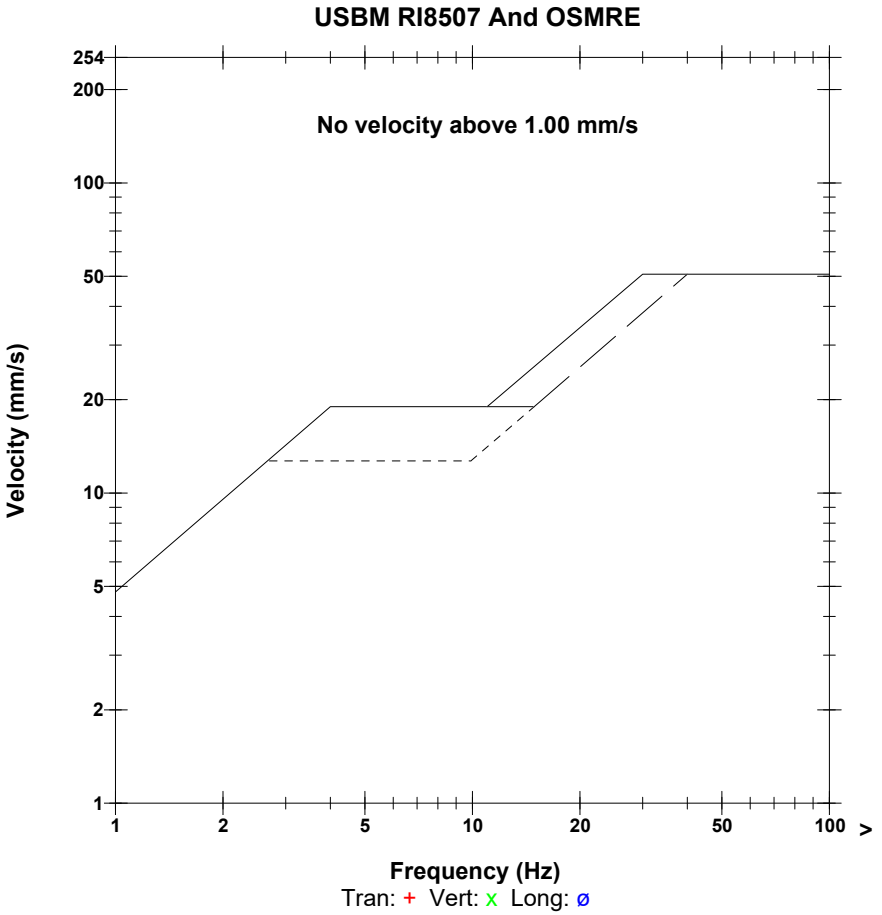
Notes

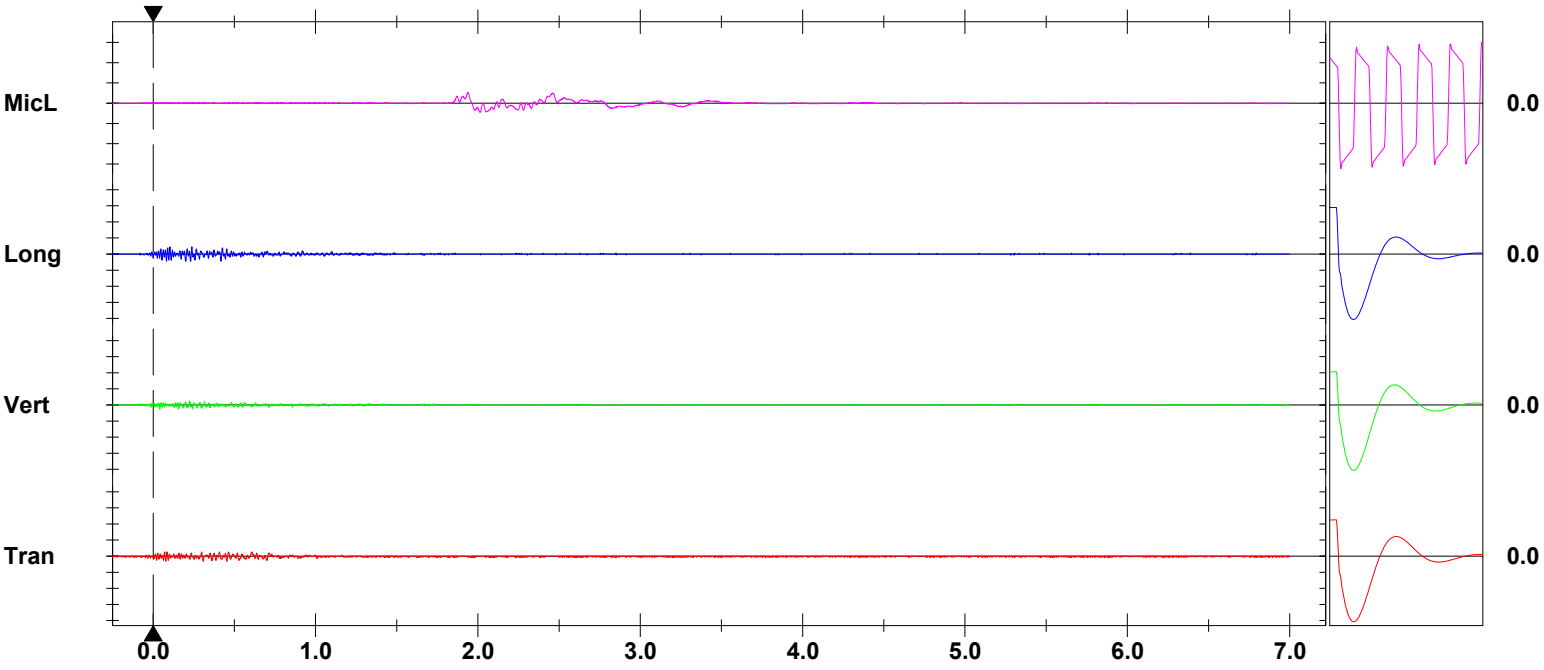
Serial Number BE21348 V 10.72-1.1 Minimate Blaster
Battery Level 6.3 Volts
Unit Calibration July 21, 2022 by Instantel
File Name W348JNJH.XY0
Post Event Notes
Location: 86 Myron Road (PW-16)
Blast No.: 2022-28
Project No: 22S001.00

Microphone Linear Weighting
PSPL 108.4 dB(L) 5.250 pa.(L) at 1.938 sec
ZC Freq 4.3 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 480 mv)

	Tran	Vert	Long	
PPV	0.635	0.508	0.889	mm/s
PPV	47.06	45.12	49.98	dB
ZC Freq	73	73	85	Hz
Time (Rel. to Trig)	0.076	0.041	0.082	sec
Peak Acceleration	0.027	0.027	0.040	g
Peak Displacement	0.003	0.001	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.5	Hz
Overswing Ratio	3.4	3.3	3.8	

Peak Vector Sum 0.967 mm/s at 0.418 sec





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

Sensor Check

Event Report

Date/Time Long at 14:38:22 August 29, 2022
Trigger Source Geo: 0.510 mm/s, Mic: 135.6 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 W349JNJH.ZY0

Notes
Location:
Client:
User Name:
General:

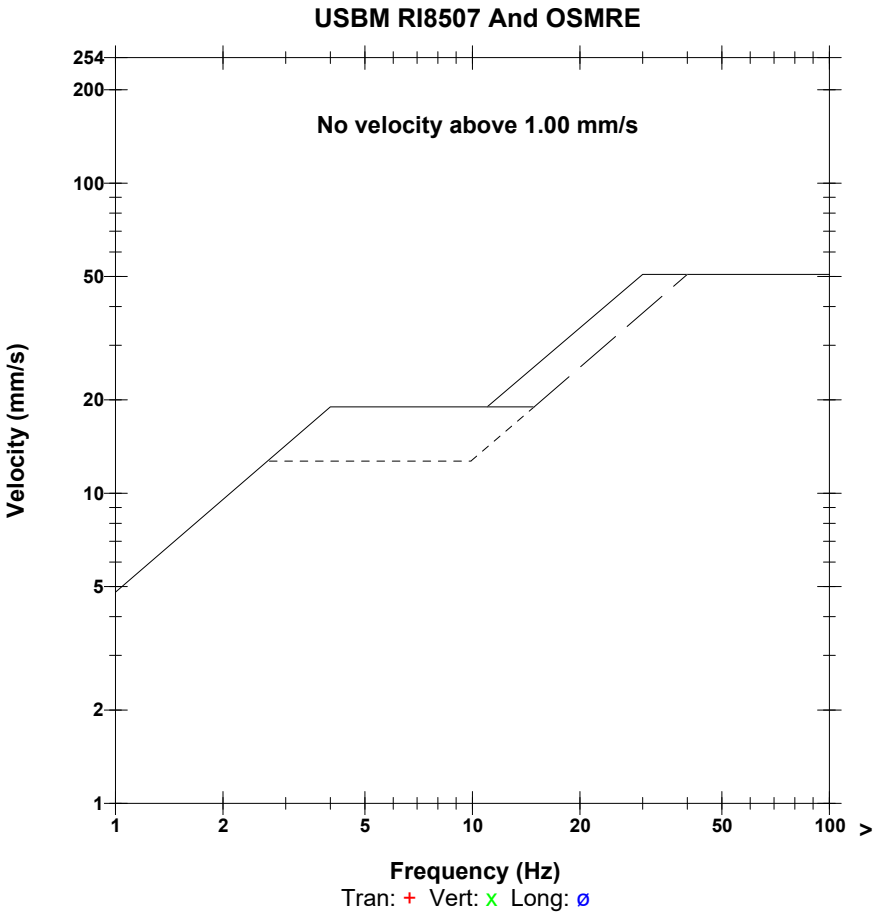
Post Event Notes
Location: 2337 Route 820 (PW-04)
Blast No.: 2022-28
Project No: 22S001.00

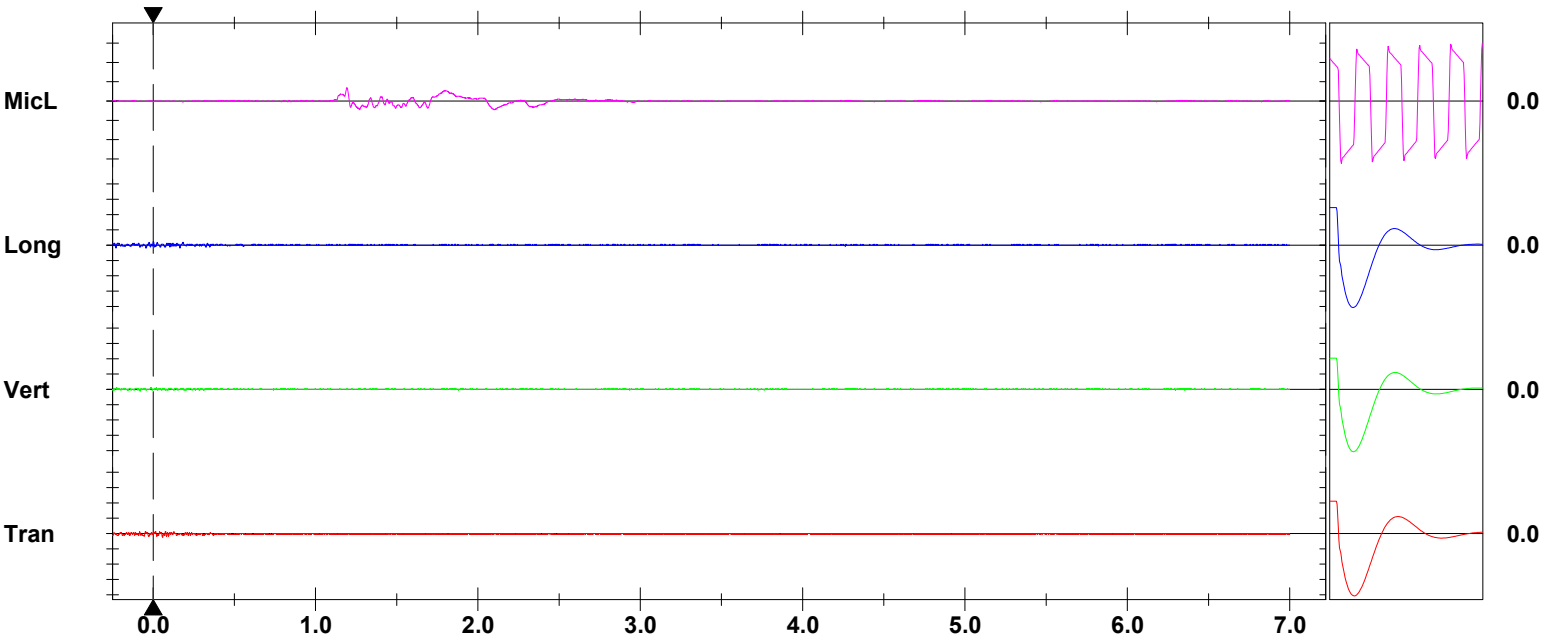
Extended Notes

Microphone Linear Weighting
PSPL 110.9 dB(L) 7.000 pa.(L) at 1.192 sec
ZC Freq 5.2 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 532 mv)

	Tran	Vert	Long	
PPV	0.508	0.254	0.508	mm/s
PPV	45.12	39.10	45.12	dB
ZC Freq	64	>100	73	Hz
Time (Rel. to Trig)	0.058	-0.225	0.000	sec
Peak Acceleration	0.027	0.027	0.027	g
Peak Displacement	0.002	0.000	0.001	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.2	7.6	7.7	Hz
Overswing Ratio	3.7	3.7	3.8	

Peak Vector Sum 0.539 mm/s at -0.025 sec





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