Memo

HAMMOND RIVER HOLDINGS

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

From: Dan Guest, Hammond River Holdings Ltd.

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

Date: September 28, 2021

Subject: Monthly Monitoring Report – Upham East Gypsum Quarry – August 2021

Our File: File # 18-8346

Introduction

This monthly report details activities associated with the operation of the Upham East Gypsum Quarry for the month of August 2021, in accordance with conditions of the Approval to Operate I-10936. Activities include surface water monitoring, air monitoring, and blasting. Details of environmental malfunctions and public complaints are also provided. Refer to the December 2019, January through December 2020, and January through July 2021 reports for previous monthly activity results.

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

- Week 1: August 6, 2021
- Week 2: August 11, 2021
- Week 3: August 17, 2021
- Week 4: August 26, 2021

There was no additional sampling events required due to a heavy rain event, defined as more than 25 mm of rain over a 24-hour period.

Surface Water Sampling

Field Methods

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

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

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

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

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). One duplicate sample was collected during the August water sampling program. The RPD result was 11%, well below the 40% acceptance level (Table 3). Therefore, the data satisfies the quality objectives for the monitoring program.

Environmental Accidents and Malfunctions

There was one spill during the month of August 2021. Less than one litre of hydraulic fluid leaked from an excavator on August 17, 2021. The cause was determined to be a crack in a solder joint. Spills pads were deployed, the leak was contained, and the crack was fixed. The spill did not occur within 100m of a watercourse or domestic well. A spill report is attached.

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 June there were 6 air quality monitoring events, August 5, 11, 17, 23, and 29 ; one additional air sample was collected at the residence located at 2349 Route 820, Upham, NB on August 10, 2021. The results are provided in Table 4. 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

In August there were three blasts, August 5, 19, and 31, 2021. There were no exceedances of Approval to Operate limits for maximum velocity and sound pressure. Blast reports are attached.

Public Complaints

There was one public complaint during the August 2021 monitoring period. On August 4, 2021 a complaint was received by phone call of a truck driver crossing the yellow line while driving on a blind corner. The incident occurred on July 30th, 2021.

Summary

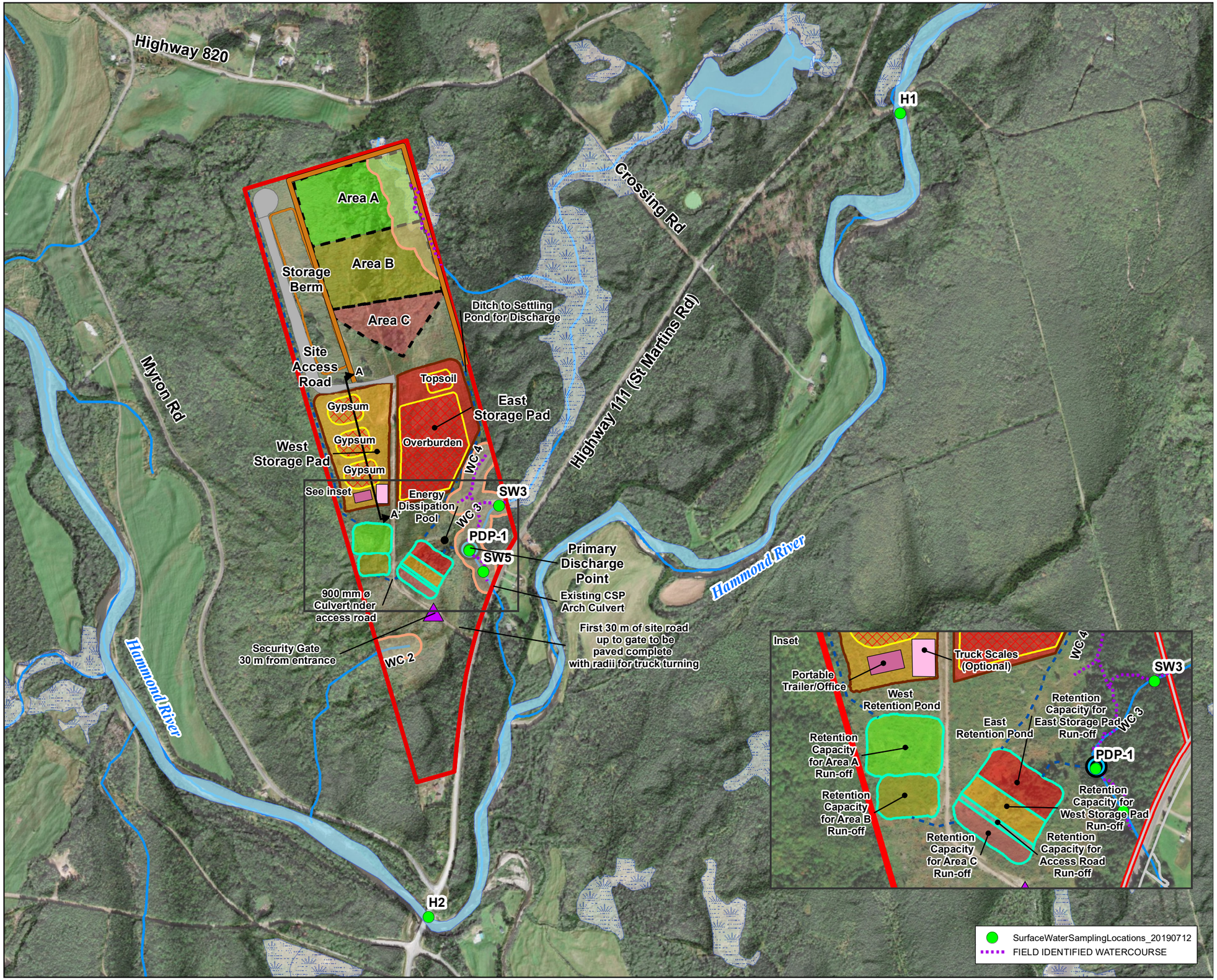
Since extraction activities began in July 2020 at the Upham East Gypsum Quarry, the water chemistry at the discharge point into WC3 has remained comparable to background, the groundwater chemistry of the perimeter monitoring wells is comparable to the baseline groundwater chemistry, air quality monitoring has remained below guidelines, and decibel levels have remained below guidelines for blasting.

References

Canadian Council of Ministers of the Environment (CCME). 2015. Canadian environmental quality guidelines. Available online at: http://ceqg-rcqe.ccme.ca/en/index.html#void

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

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

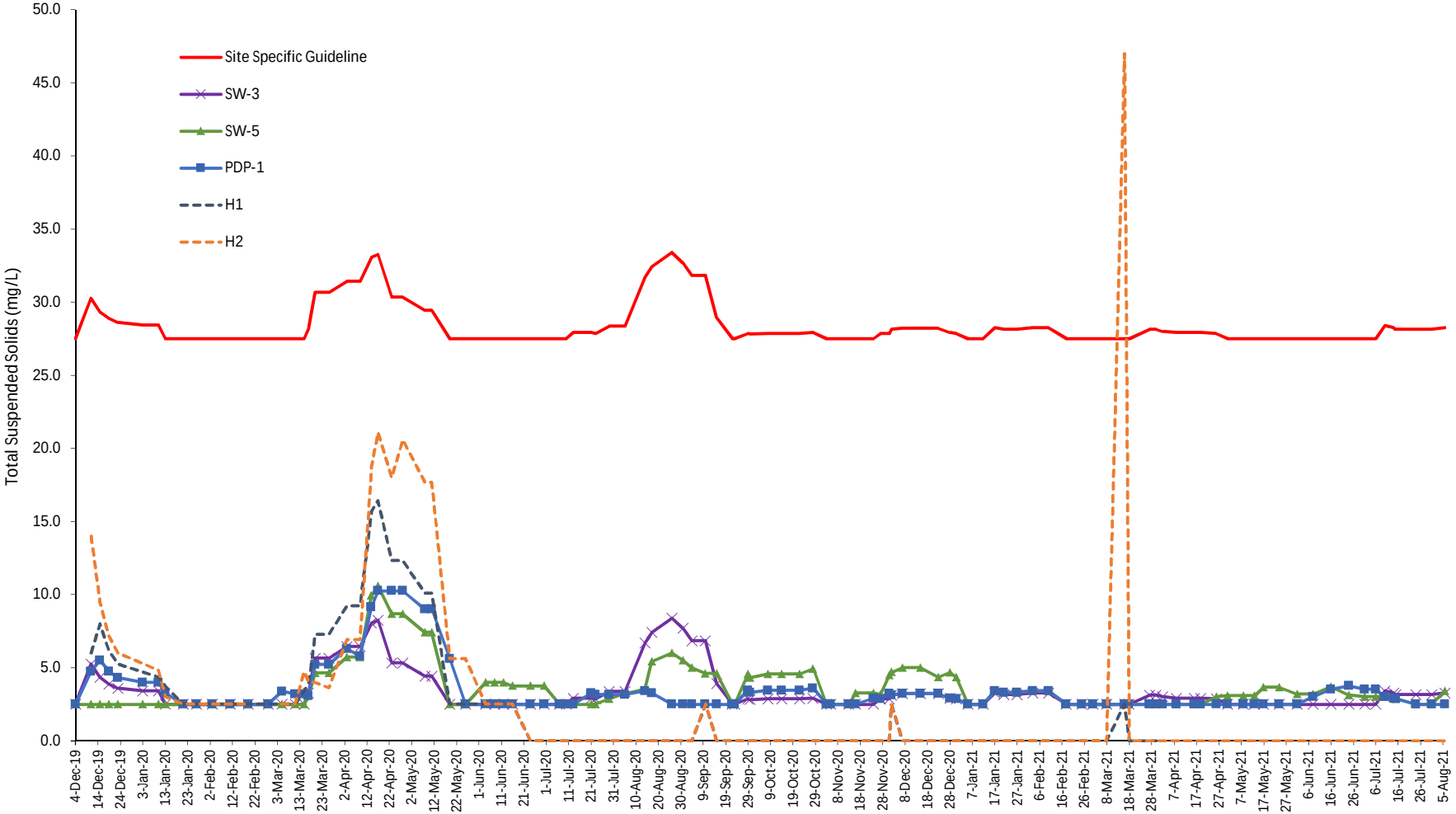
MAP CREATED BY: JH
MAP REVISED BY: JO
MAP CHECKED BY: GA
MAP PROJECTION: NAD_1983_CSRS_NEW_BRUNSWICK_STEREOGRAPHIC

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. 18-8346

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	06-Aug-21	17.3	57.3	16.6	578	10.52	<5
PDP-1	06-Aug-21			16.6	519	11.2	<5
SW5	06-Aug-21			16.7	200	9.06	8
SW3	11-Aug-21	20.7	0.0	20.50	386.000	2.01	<5
PDP-1	11-Aug-21			20.10	533.000	0.24	<5
SW5	11-Aug-21			20.10	536.000	0.13	<5
SW3	17-Aug-21	24.5	0.0	17.4	560	-7.37	<5
PDP-1	17-Aug-21			17.9	1591	1.48	10
PDP-1 FD	17-Aug-21			17.8	1586	1.52	9
SW-5	17-Aug-21			18	1691	0.94	<5
SW3	26-Aug-21	27.2	0.6	18.3	988	0.77	<5
PDP-1	26-Aug-21			18.3	998	0.23	<5
SW5	26-Aug-21			18.4	1011	1.36	<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, or not applicable; FD = field duplicate.

75 bold/shaded value denotes concentration exceeds CCME criteria or TSS background.

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 18-8346

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

Table 2
Total Suspended Solids - Monthly Average
Upham East Gypsum Project
Upham, New Brunswick
Project No. 18-8346

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	SW5	PDP-1
13-Jul-20	27.9	-	-	5.0	2.5	2.5
21-Jul-20	27.9	-	-	2.5	2.5	7.0
23-Jul-20	27.8	-	-	2.5	2.5	2.5
29-Jul-20	28.3	-	-	6	5	2.5
05-Aug-20	28.4	-	-	3.4	3.2	3.1
14-Aug-20	31.7	-	-	6.7	3.5	3.4
17-Aug-20	32.4	-	-	7.4	5.4	3.3
26-Aug-20	33.4	-	-	8.4	6.0	2.5
31-Aug-20	32.7	-	-	7.7	5.5	2.5
04-Sep-20	31.8	-	-	6.8	5.0	2.5
10-Sep-20	31.8	2.5	2.5	6.8	4.6	2.5
15-Sep-20	28.9	-	-	3.9	4.6	2.5
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	4.6	3.4
30-Sep-20	27.8	-	-	2.8	4.3	3.3
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	7.0	2.5
24-Nov-20	27.5	-	-	2.5	2.5	5.0
27-Nov-20	27.9	-	-	5	2.5	2.5
01-Dec-20	27.9	-	-	2.9	4.5	3.2
02-Dec-20	28.1	2.5	2.5	3.1	4.7	3.1
07-Dec-20	28.2	-	-	3.2	5.0	3.2
15-Dec-20	28.2	-	-	3.2	5.0	3.2
23-Dec-20	28.2	-	-	3.2	4.4	3.2
28-Dec-20	27.9	-	-	2.9	4.7	2.9
31-Dec-20	27.9	-	-	2.9	4.4	2.9
05-Jan-21	27.5	-	-	2.5	2.5	2.5
12-Jan-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. 18-8346

Date	Site Specific Guideline	Monthly Average				
		H1	H2	SW3	SW5	PDP-1
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
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	3.0	2.5
01-May-21	27.5	-	-	2.5	3.1	2.5
08-May-21	27.5	-	-	2.5	3.1	2.5
13-May-21	27.5	-	-	2.5	3.1	2.5
17-May-21	27.5	-	-	2.5	3.7	2.5
24-May-21	27.5	-	-	2.5	3.7	2.5
01-Jun-21	27.5	-	-	2.5	3.2	2.5
08-Jun-21	27.5	-	-	2.5	3.2	3.0
16-Jun-21	27.5	-	-	2.5	3.7	3.5
24-Jun-21	27.5	-	-	2.5	3.1	3.8
01-Jul-21	27.5	-	-	2.5	3.0	3.5
06-Jul-21	27.5	-	-	2.5	3.0	3.5
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	3.4	2.5
11-Aug-21	27.5	-	-	2.5	3.4	2.5
26-Aug-21	27.5	-	-	2.5	3.6	4.0
17-Aug-21	27.5	-	-	2.5	3.6	4.0

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
Surface Water Monitoring - QA/QC Results
Upham East Gypsum Project
Upham, New Brunswick
Project No. 18-8346

Parameter Units		Total Suspended Solids mg/L
Sample ID	Date	
PDP-1	17-Aug-21	10
PDP-1 FD	17-Aug-21	9
RPD value		11%

Notes:
RPD calculations and acceptance criteria based on CCME (2016).
' - ' denotes RPD could not be calculated because one or more parameters was below detection limit.
75 bold/shaded value denotes RPD above criteria of 40%.

Table 4
Air Quality Reporting
Upham East Gypsum Quarry

Test Start	Time	Duration	Flow Rate (L/min)	Air Volume (m^3)	Pressure (mm Hg)	Temperature (°C)	Initial Filter Weight (g)	Final Filter Weight (g)	TSP Mass (µg)	TSP (µg/m3)	Site Guideline (µg/m^3)
2020-07-22	14:51	24 hours	16.7	24.05	752	20.3	14.8415	14.8645	23000	39.85	120
2020-07-28	23:59	24 hours	16.46	23.7	747	24.4	14.8261	14.8278	1700	2.99	120
2020-08-04	13:55	24 hours	16.66	23.99	753	22.8	14.8264	14.8295	3100	5.38	120
2020-08-09	23:59	24 hours	16.74	24.1	752	21.2	14.8422	14.8444	2200	3.80	120
2020-08-15	23:59	24 hours	16.88	24.3	754	19.8	14.8243	14.8359	11600	19.89	120
2020-08-21	23:59	24 hours	16.87	24.3	749	17.9	14.8394	14.8415	2100	3.60	120
2020-08-27	23:59	24 hours	17.06	24.57	743	12.4	14.8233	14.845	21700	36.80	120
2020-09-02	23:59	24 hours	16.75	24.12	747	18.8	14.8417	14.8614	19700	34.03	120
2020-09-08	23:59	24 hours	17.02	24.51	759	19.1	14.8585	14.8706	12100	20.57	120
2020-09-14	23:59	24 hours	17.62	25.37	756	8	14.8275	14.8368	9300	15.27	120
2020-09-20	23:59	24 hours	18.03	25.97	764	4.8	14.8349	14.852	17100	27.44	120
2020-09-26	23:59	24 hours	17.1	24.62	753	15.3	14.8561	14.8594	3300	5.59	120
2020-10-02	23:59	24 hours	14.43	25.1	753	9.6	14.9721	14.9593	-12800	-21.25	120
2020-10-08	23:59	24 hours	17.69	25.48	748	3.8	14.8606	14.8894	28800	47.10	120
2020-10-14	23:59	24 hours	17.56	25.29	753	7.8	14.8828	14.8911	8300	13.68	120
2020-10-20	23:59	19:31	17.63	20.66	760	9.1	14.8749	14.8578	-17100	-34.49	120
2020-10-23	23:59	21:55	17.34	22.82	750	10.1	14.8592	14.8648	5600	11.20	120
2020-10-26	23:59	21:02	17.71	22.35	752	4.8	14.8541	14.8642	10100	21.52	120
2020-11-01	23:59	24 hours	17.19	24.75	732	5.9	14.8729	14.8802	7300	12.29	120
2020-11-07	23:59	24 hours	17.84	25.68	759	5.9	14.8692	14.8723	3100	5.03	120
2020-11-13	23:59	24 hours	17.79	25.62	748	1.9	14.86	14.8606	600	0.98	120
2020-11-19	23:59	24 hours	17.63	25.22	756	7.3	14.8476	14.8498	2200	3.64	120
2020-11-25	23:59	24 hours	17.83	25.68	756	4.4	14.8496	14.8563	6700	10.87	120
2020-12-01	23:59	24 hours	17.48	25.18	748	7	14.8427	14.861	18300	30.28	120
2020-12-07	23:59	24 hours	17.88	25.75	740	-2.1	14.8343	14.8362	1900	3.07	120
2020-12-13	23:59	24 hours	17.98	25.9	746	-1.3	14.8306	14.8389	8300	13.35	120
2020-12-19	23:59	24 hours	18.37	26.45	756	-3.6	14.8373	14.843	5700	8.98	120
2020-12-25	23:59	24 hours	17.34[a]	22.82[a]	753[a]	12.3[a]	14.84	14.85	10000	18.26	120
2020-12-31	23:59	24 hours	18.58	26.76	759	-5.8	14.8452	14.85	4800	7.47	120
2021-01-06	23:59	24 hours	18	24.73	744	-2.7	14.836	14.8523	16300	27.46	120
2021-01-12	23:59	24 hours	16.7	24.74	749	-6.7	14.8542	14.8724	18200	30.65	120
2021-01-18	23:59	24 hours	17.52	25.52	737	-0.8	14.8681	14.8767	8600	14.04	120
2021-01-24	23:59	24 hours	16.7	24.03	737	-8	14.8231	14.8273	4200	7.28	120
2021-01-30	23:59	24 hours	16.7	24.03	750	-11.2	14.829	14.8326	3600	6.24	120
2021-02-05	23:59	24 hours	17.9	25.8	744	-0.9	14.850	14.866	15800	25.52	120
2021-02-11	23:59	24 hours	16.7	24.05	750	-12.6	14.829	14.834	5300	9.18	120
2021-02-17	9:59	24 hours	16.7	24.05	755	-9.9	14.818	14.821	2800	4.85	120
2021-02-23	23:59	24 hours	17.7	25.49	737	-0.6	14.891	14.897	6000	9.81	120
2021-03-01	23:59	24 hours	17.87	25.74	741	-1.6	14.858	14.866	7700	12.46	120
2021-03-07	23:59	24 hours	16.7	24.05	753	-8.9	14.840	14.851	11800	20.44	120
2021-03-13	23:59	24 hours	17.92	25.81	743	-1.3	14.828	14.835	6900	11.14	120

Table 4
Air Quality Reporting
Upham East Gypsum Quarry

Test Start	Time	Duration	Flow Rate (L/min)	Air Volume (m^3)	Pressure (mm Hg)	Temperature (°C)	Initial Filter Weight (g)	Final Filter Weight (g)	TSP Mass (µg)	TSP (µg/m3)	Site Guideline (µg/m^3)
2021-03-19	23:59	24 hours	16.7	24.05	750	-5.3	14.819	14.823	4600	7.97	120
2021-03-25	23:59	24 hours	17.52	24.23	754	8.9	14.820	14.826	6100	10.49	120
2021-03-31	23:59	24 hours	16.7	24.05	756	6.8	14.823	14.831	8600	14.90	120
2021-04-06	23:59	24 hours	16.7	24.05	746	4.1	14.822	14.835	13400	23.22	120
2021-04-12	23:59	24 hours	17.64	25.55	749	5.2	14.812	14.817	5100	8.32	120
2021-04-18	23:59	24 hours	16.7	24.05	742	2.6	14.815	14.825	10000	17.33	120
2021-04-24	23:59	24 hours	17.27	24.05	743	8.8	14.815	14.826	10400	18.02	120
2021-04-30	23:59	24 hours	17.24	24.82	735	6.4	14.814	14.921	107000	11.75	120
2021-05-06[b]	23:59	21.08	17.42	21.08	750	8.8	14.84	14.8501	10100	19.96	120
2021-05-12[b]	23:59	-	17.49	25.19	748	7.1	14.8223	14.8301	7800	12.90	120
2021-05-18[b]	23:59	19.21	17.53	20.35	757	9.8	14.8296	14.8383	8700	17.81	120
2021-05-27[c]	-	-	-	-	-	-	-	-	-	-	120
2021-05-31	10:56	24 hours	16.7	24.05	753	14.2	14.8288	14.8346	5800	10.05	120
2021-06-04	11:46	33.46	16.79	34.02	746	18.1	14.831	14.8389	7900	9.68	120
2021-06-10	9:58	24 hours	17.42	25.09	754	10.4	14.8396	14.8439	4300	7.14	120
2021-06-16	10:22	24 hours	17.48	25.18	743	5.6	14.8488	14.8544	5600	9.27	120
2021-06-22[d]	16:45	24 hours	17.23	24.82	744	9.7	14.8697	14.8788	9100	15.28	120
2021-06-24	13:45	24 hours	17.94	25.83	762	5.4	14.8455	14.8467	1200	1.94	120
2021-06-30	8:20	24 hours	17.01	24.29	746	14.4	14.885	14.8892	4200	7.20	120
2021-07-06	13:08	24 hours	17.3	24.91	746	9.3	14.8659	14.8676	1700	2.84	120
2021-07-12	11:03	24 hours	17.6	24.05	759	9.5	14.8475	14.8505	3000	5.20	120
2021-07-18	9:33	24 hours	16.7	24.05	753	11.8	14.8467	14.8519	5200	9.01	120
2021-07-24	9:55	24 hours	17.51	25.21	753	8.8	14.8314	14.8383	6900	11.40	120
2021-07-30	8:44	24 hours	17.43	25.1	742	5.6	14.8297	14.8397	10000	16.60	120
2021-08-05	8:53	24 hours	17.47	25.15	755	10	14.8206	14.8345	13900	23.03	120
2021-08-10	8:51	24 hours	17.21	24.78	753	13.5	14.822	14.8301	8100	13.62	120
2021-08-11	11:37	24 hours	17.18	23.42	752	13.6	14.8782	14.8902	12000	21.35	120
2021-08-17	11:31	24 hours	17.43	24.05	756	11.2	14.8254	14.8356	10200	17.67	120
2021-08-23	11:34	24 hours	17.19	24.75	750	12.4	14.8441	14.8586	14500	24.41	120
2021-08-29	7:32	24 hours	17.49	25.18	755	9.8	14.8238	14.8299	6100	10.09	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.

Report ID: 408331-IAS
Report Date: 25-Aug-21
Date Received: 12-Aug-21

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:			408331-1	408331-2	408331-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			6-Aug-21	6-Aug-21	6-Aug-21
Analytes	**Units**	**RL**			
Solids - Total Suspended	mg/L	5	< 5	8	< 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: 408331-IAS
Report Date: 25-Aug-21
Date Received: 12-Aug-21

CERTIFICATE OF ANALYSIS

for
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Canada E3B 6Z9
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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: 408330-IAS
Report Date: 23-Aug-21
Date Received: 12-Aug-21

CERTIFICATE OF ANALYSIS

for
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Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

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

Analysis of Water

RPC Sample ID:			408330-1	408330-2	408330-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			11-Aug-21	11-Aug-21	11-Aug-21
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

Krista Skinner
Chemical Technician
Inorganic Analytical Chemistry

Report ID: 408330-IAS
Report Date: 23-Aug-21
Date Received: 12-Aug-21

CERTIFICATE OF ANALYSIS

for
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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: 409250-IAS
Report Date: 30-Aug-21
Date Received: 19-Aug-21

CERTIFICATE OF ANALYSIS

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

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

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

Analysis of Water

RPC Sample ID:			409250-1	409250-2	409250-3	409250-4
Client Sample ID:			SW3	SW5	PDP-1	PDP-1(2) Duplicate
Date Sampled:			17-Aug-21	17-Aug-21	17-Aug-21	17-Aug-21
Analytes	**Units**	**RL**				
Solids - Total Suspended	mg/L	5	< 5	< 5	10	9

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: 409250-IAS
Report Date: 30-Aug-21
Date Received: 19-Aug-21

CERTIFICATE OF ANALYSIS

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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: 410535-IAS
Report Date: 10-Sep-21
Date Received: 27-Aug-21

CERTIFICATE OF ANALYSIS

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

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

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

Analysis of Water

RPC Sample ID:			410535-1	410535-2	410535-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			26-Aug-21	26-Aug-21	26-Aug-21
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

Matthew Norman
Senior Chemist
Inorganic Analytical Chemistry

Report ID: 410535-IAS
Report Date: 10-Sep-21
Date Received: 27-Aug-21

CERTIFICATE OF ANALYSIS

for
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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

SPILL REPORT FORM

IDENTIFICATION

Spill Date: 08/17/2021	**Time:** 8:30AM	
Location: Upham East Quarry	:	
Civic Address of Incident: 2119 route 111 Upperton NB		
Field Contact: Rick Hatty	**Phone Number:** (506) 647-3730	

SPILL NOTIFICATION

☑ **Supervisor** (During working hours) - **Name (specify):** Cory Beyea/Daniel Guest
☑ **Department of Environment** (During working hours) **Saint John Region – 506.658.2558**
☐ **Coast Guard – 800.565.1633**

SPILL INFORMATION

Product Spilled:	☐ Transformer Oil	Quantity (L):	
	☑ Hydraulic Fluid	Quantity (L): <1 L	
	☐ Other (specify):	Quantity (L):	
Equipment:	☐ Pole-top transformer	**Serial / ID1 Number:**	
	☑ Heavy Equipment	BH759	
	☐ Vehicle	***Year of Manufacture:**	
	☐ Other (specify):		
Environmental Impact:		**YES**	**NO**
	Watercourse within 100 m	☐	☑
	Domestic well within 100 m	☐	☑
Cause and additional detail:	Cracked Solder Joint on hard line.		

Samples sent to RPC laboratory for analysis (Address: 921 College Hill Rd, Fredericton, 506.452.1212)

☐ Oil (from equipment): _____ ppm
☐ Soil (unable to sample equipment): _____ ppm
☐ Other (watercourse): _____ ppm

SEQUENCE OF EVENTS

Date	Time	Description of Action Taken
08/17/2021	8:25	Notice oil drips during pre-trip inspection
08/17/2021	8:30	Deployed spill pads and containment
08/17/2021	8:35	Placed contaminated material in storage for future transportation off site

ADDITIONAL INFORMATION

	YES	NO
Is source of spill stopped?	☑	☐
Is spill contained?	☑	☐
Is spill cleaned-up?	☑	☐

EXTERNAL RESOURCES / INSPECTORS (if applicable)

	YES	NO	If "yes", indicate Name, Date and Time
Environment Inspector on-site	☐	☑	
Contractor used for clean-up	☑	☐	Gulf Operators
Site Professional used for remediation support	☐	☑	

APPROVAL AND REVIEW

Initiator	**Signature:** Daniel Guest	**Date Prepared:** 8/19/21
Supervisor/Manager	**Signature:** Daniel Guest **Comments:**	**Date Reviewed:** 8/19/21
	Spill kit and spill response supplies replenished?	☑ **YES** ☐ **NO**
EMS Coordinator	**Signature:**	**Date Completed:**

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Saint John
Moncton
Fredericton
Bedford

August 5, 2021

Project No.: 21S003.00

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

Re: Blast Vibration Monitoring – Blast No. 2021-19 – 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 at 15:14 on August 5, 2021. 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. 2021-19 – August 5, 2021

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)	15:14	1,330 m S	< 0.5 mm/s	<120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		968 m S	0.76 mm/s @ 26 Hz	114	-
3. Civic No. 4150 Route 111 (PW-13)		809 m SE	0.76 mm/s @ >100 Hz	94	-
4. Civic No. 2447 Route 820 (PW-07)		930 m NE	< 0.5 mm/s	<120	Unit was not triggered
5. PW-03 - Route 820		596 m N	1.59 mm/s @ 64 Hz	114	-
6. Civic No. 2341 Route 820 (PW-05)		587 m N	1.29 mm/s @ 64 Hz	110	-
7. Civic No. 50 Myron Road (PW-15)		838 m NW	< 0.5 mm/s	<120	Unit was not triggered
8. Civic No. 86 Myron Road (PW-16)		690 m W	0.83 mm/s @ 32 Hz	118	-
9. Civic No. 220 Myron Road (PW-01)		1,360 m S	< 0.5 mm/s	<120	Unit was not triggered
10. Civic No. 4140 Route 111 (PW-12)		888 m S	< 0.5 mm/s	<120	Unit was not triggered
11. Civic No. 2337 Route 820 (PW-04)		633 m N	0.84 mm/s @ 73 Hz	113	-
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,
CONQUEST ENGINEERING
A division of CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Geotechnical Engineer

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Reports

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28'54.03" W 65º37'59.79" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	31,624 tonnes
Weather at time of Blast:	Cloudy (overcast)	**Air Temp.:**	20ºC
Est. Wind Speed :	≈10 km/h	**Wind Direction:**	S
Cloud Cover:	Yes – overcast	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	222	**Hole Diameter:**	4.5"
Average Depth:	3.6 – 9.8 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	4	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	42 ms
Initiation Method:	Non -Electric		
Weight of Explosives per Delay:	Max.: 250 kg		
Type and weight of Explosives for Blast:	11,084 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 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	624 m
Direction to the Nearest Structure:	North
Structure Type:	Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	39.5

SAFETY:

Type of Warning Signal Used:	Air horn
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 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	June 23, 2021
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,370 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 #5676
Calibration Date:	February 19, 2021
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	938 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 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5635
Calibration Date:	March 23, 2021
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	775 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 #5673
Calibration Date:	March 12, 2021
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	890 m Northeast
Transverse Particle Velocity:	1.14 mm/s @ 39 Hz
Vertical Particle Velocity:	0.57 mm/s @ 43 Hz
Longitudinal Particle Velocity:	1.59 mm/s @ 26 Hz
Peak Particle Velocity:	1.59 mm/s @ 26 Hz
Maximum Airblast:	112 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	May 17, 2021
Location of seismograph:	PW-03 - Route 820
Distance and Direction from Blast:	624 m North
Transverse Particle Velocity:	1.33 mm/s @ 37 Hz
Vertical Particle Velocity:	1.08 mm/s @ 57 Hz
Longitudinal Particle Velocity:	0.89 mm/s @ 28 Hz
Peak Particle Velocity:	1.33 mm/s @ 37 Hz
Maximum Airblast:	114 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	July 13, 2021
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	632 m North
Transverse Particle Velocity:	2.03 mm/s @ 28 Hz
Vertical Particle Velocity:	1.72 mm/s @ 51 Hz
Longitudinal Particle Velocity:	1.78 mm/s @ 37 Hz
Peak Particle Velocity:	2.03 mm/s @ 28 Hz
Maximum Airblast:	114 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	October 22, 2020
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	889 m Northwest
Transverse Particle Velocity:	0.83 mm/s @ 64 Hz
Vertical Particle Velocity:	0.70 mm/s @ 64 Hz
Longitudinal Particle Velocity:	0.70 mm/s @ 64 Hz
Peak Particle Velocity:	0.83 mm/s @ 64 Hz
Maximum Airblast:	112 dB(L)

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 17, 2021
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	814 m West
Transverse Particle Velocity:	1.27 mm/s @ 24 Hz
Vertical Particle Velocity:	0.83 mm/s @ 32 Hz
Longitudinal Particle Velocity:	1.33 mm/s @ 43 Hz
Peak Particle Velocity:	1.33 mm/s @ 43 Hz
Maximum Airblast:	117 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21348
Calibration Date:	June 23, 2020
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 #5372
Calibration Date:	February 8, 2021
Location of seismograph:	Civic Number 4140 Route 111 (PW-12)
Distance and Direction from Blast:	847 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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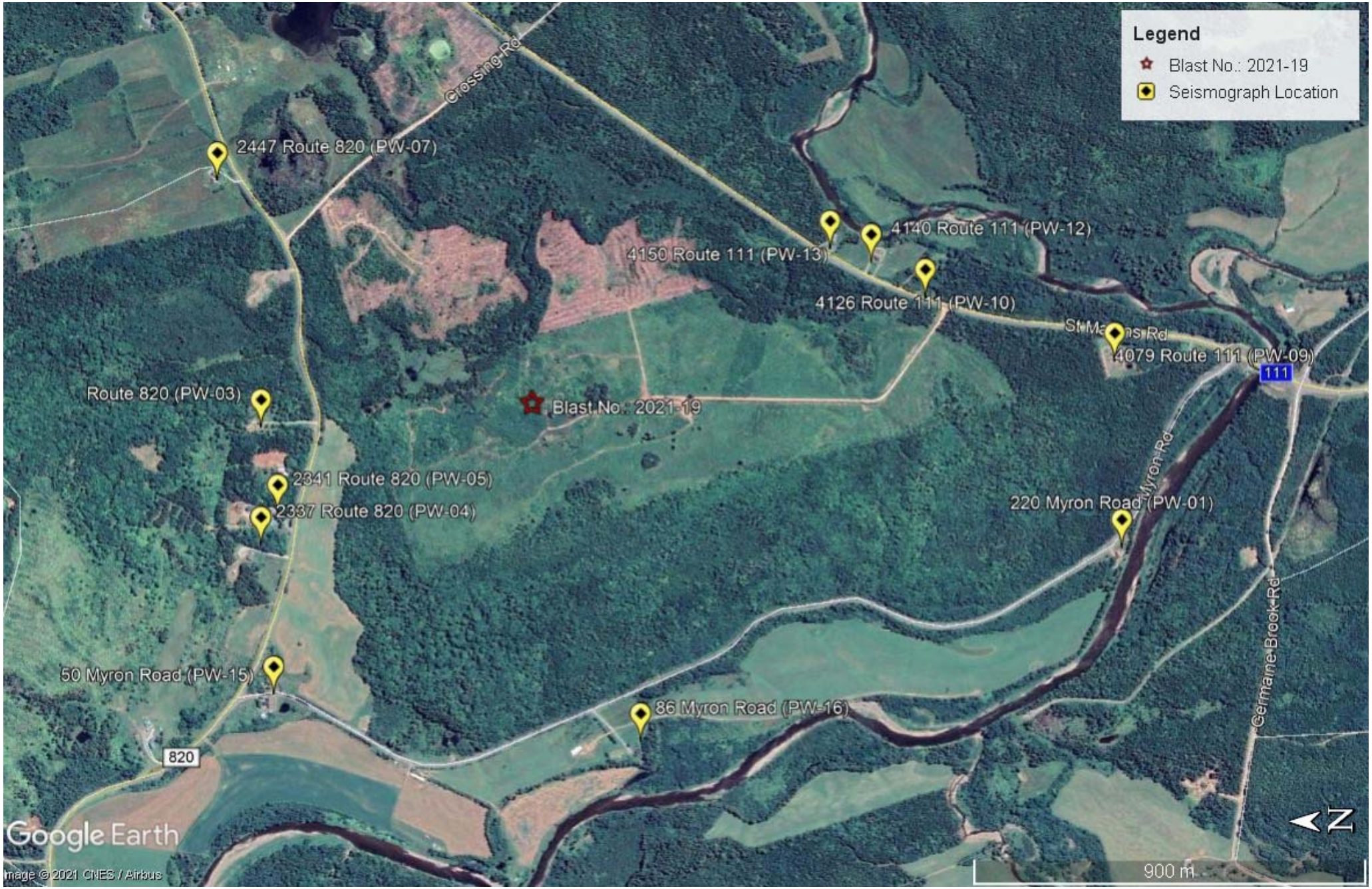
BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 5, 2021
Project No.:	21S003.00	**Time of Blast:**	15:14
Inspector:	B. Fillmore	**Blast No.:**	2021-19
Client:	Hammond River Holdings		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5960
Calibration Date:	May 17, 2021
Location of seismograph:	Civic Number 2337 Route 820 (PW-04)
Distance and Direction from Blast:	699 m North
Transverse Particle Velocity:	0.13 mm/s @ N/A
Vertical Particle Velocity:	0.45 mm/s @ 30 Hz
Longitudinal Particle Velocity:	0.64 mm/s @ 28 Hz
Peak Particle Velocity:	0.64 mm/s @ 28 Hz
Maximum Airblast:	116 dB(L)

Blast and Seismograph Location Plan
Blast No: 2021-19
Upham East Gypsum Quarry, Upham, NB



Date: August 5, 2021
CE Project No.: 21S003.00

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Event Report

Date/Time Long at 15:14:28 August 5, 2021
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 5, 2021 17:23:28 (V10.72.1)

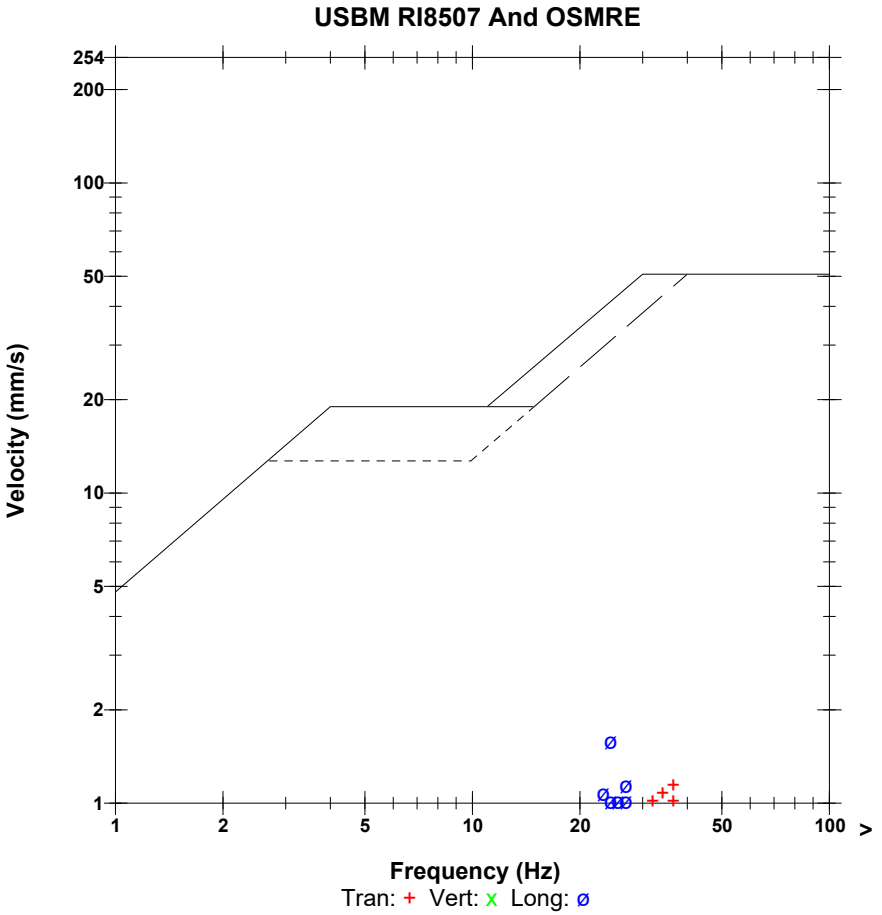
Extended Notes

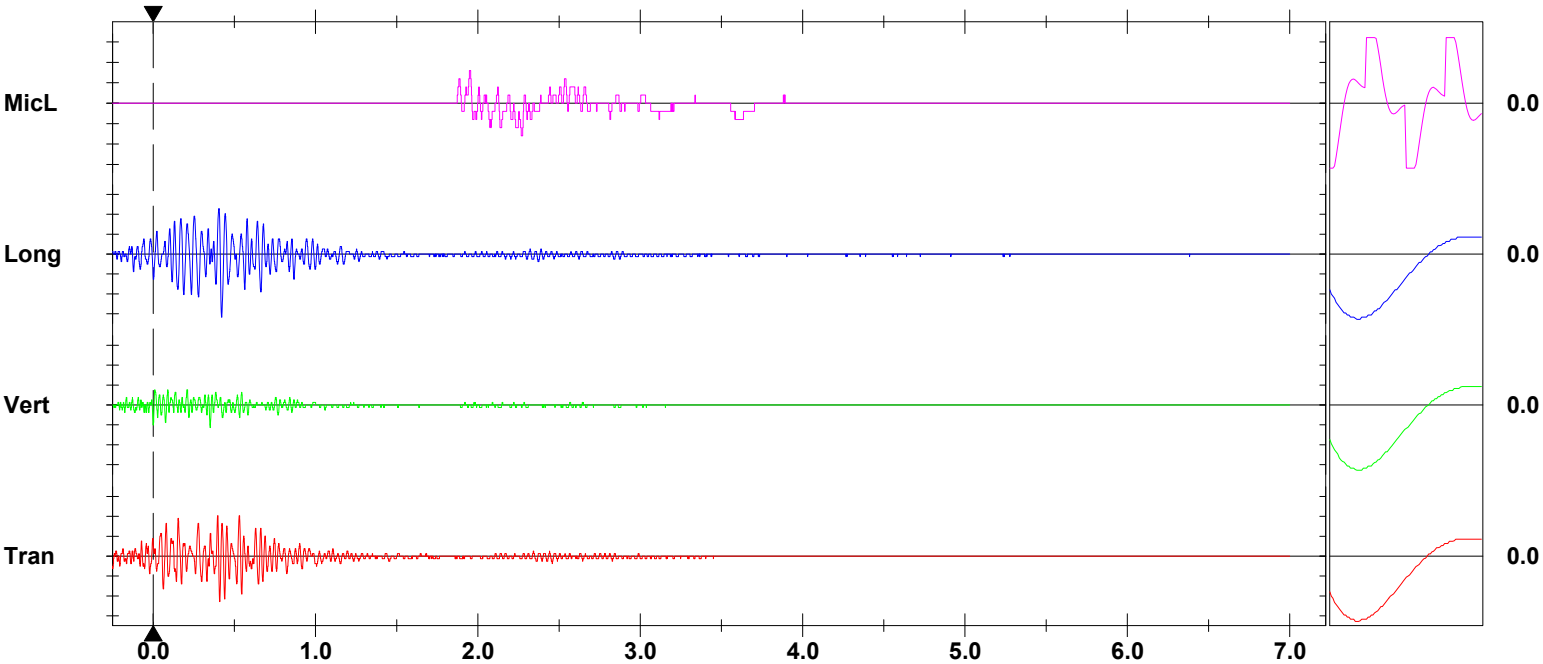
Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 1.948 sec
ZC Freq 12 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 307 mv)

	Tran	Vert	Long	
PPV	1.143	0.572	1.588	mm/s
ZC Freq	39	43	26	Hz
Time (Rel. to Trig)	0.410	0.353	0.422	sec
Peak Acceleration	0.033	0.013	0.033	g
Peak Displacement	0.005	0.002	0.010	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	7.8	Hz
Overswing Ratio	3.9	3.7	3.9	

Peak Vector Sum 1.778 mm/s at 0.423 sec

Serial Number 5673 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration March 12, 2021 by Instantel
File Name G673J3L1.040
Post Event Notes
Location of Seismograph: Civic Number 2447 Route 820 (PW-07)
Blast No.: 2021-19
CE Project Number: 21S003.00





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 15:14:31 August 5, 2021
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 5, 2021 17:29:14 (V10.72.1)

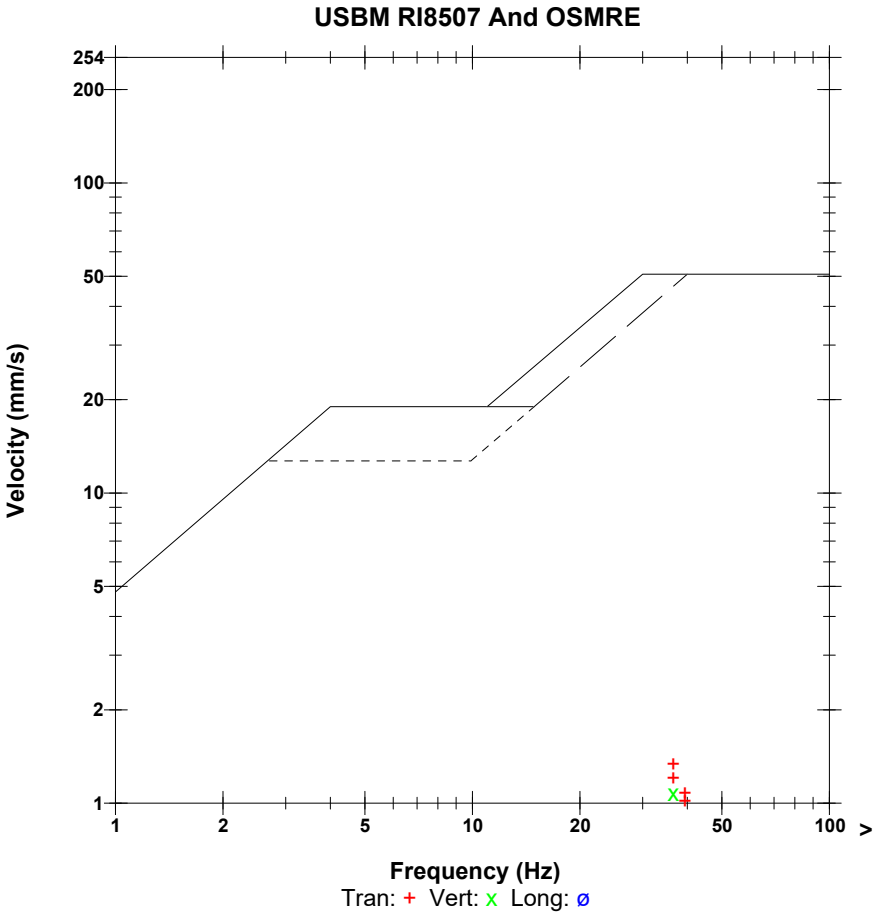
Extended Notes

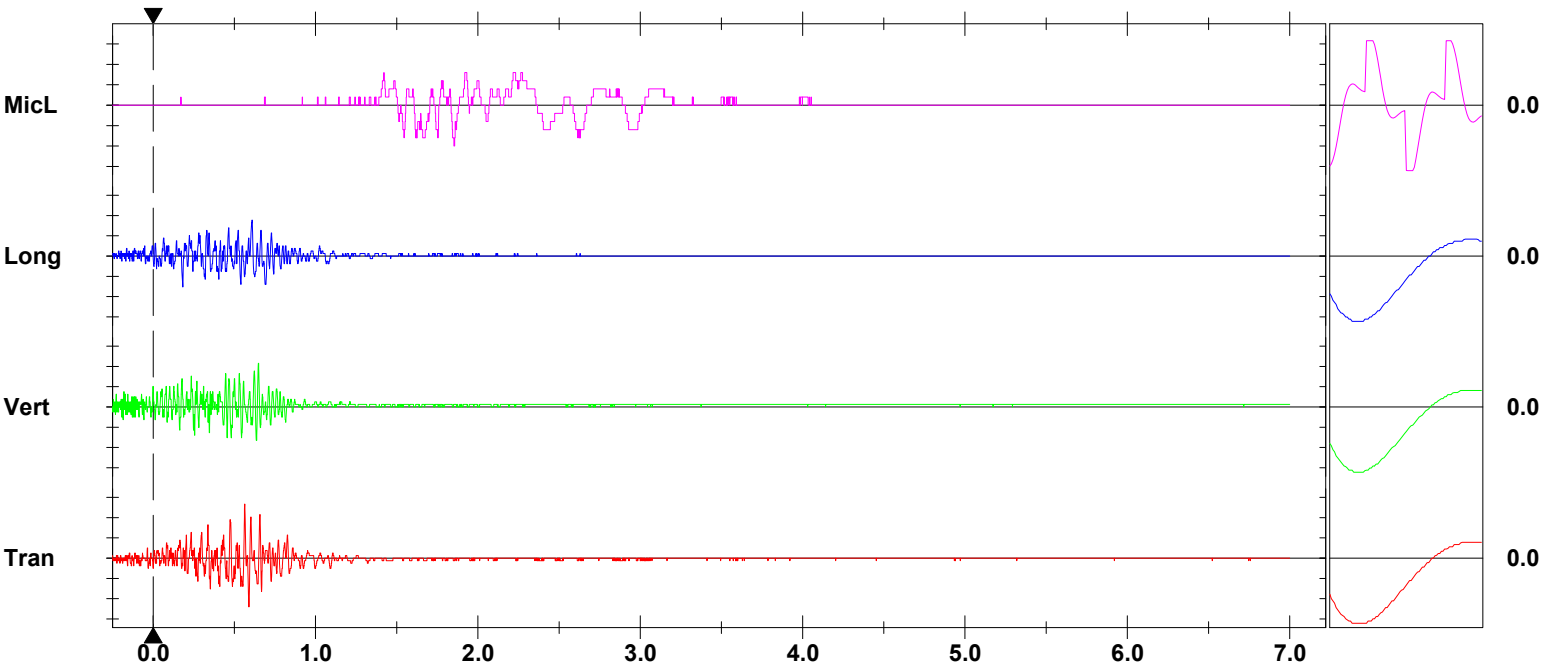
Serial Number 5489 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration May 17, 2021 by Instantel
File Name G489J3L1.070
Post Event Notes
Location of Seismograph: Cottage - Route 820 (PW-03)
Blast No.: 2021-19
CE Project Number: 21S003.00

Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 1.853 sec
ZC Freq 11 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 272 mv)

	Tran	Vert	Long	
PPV	1.334	1.080	0.889	mm/s
ZC Freq	37	37	28	Hz
Time (Rel. to Trig)	0.564	0.648	0.609	sec
Peak Acceleration	0.033	0.033	0.033	g
Peak Displacement	0.006	0.004	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.7	Hz
Overswing Ratio	4.0	4.0	3.9	

Peak Vector Sum 1.429 mm/s at 0.564 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 15:14:35 August 5, 2021
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 5, 2021 17:33:23 (V10.72.1)

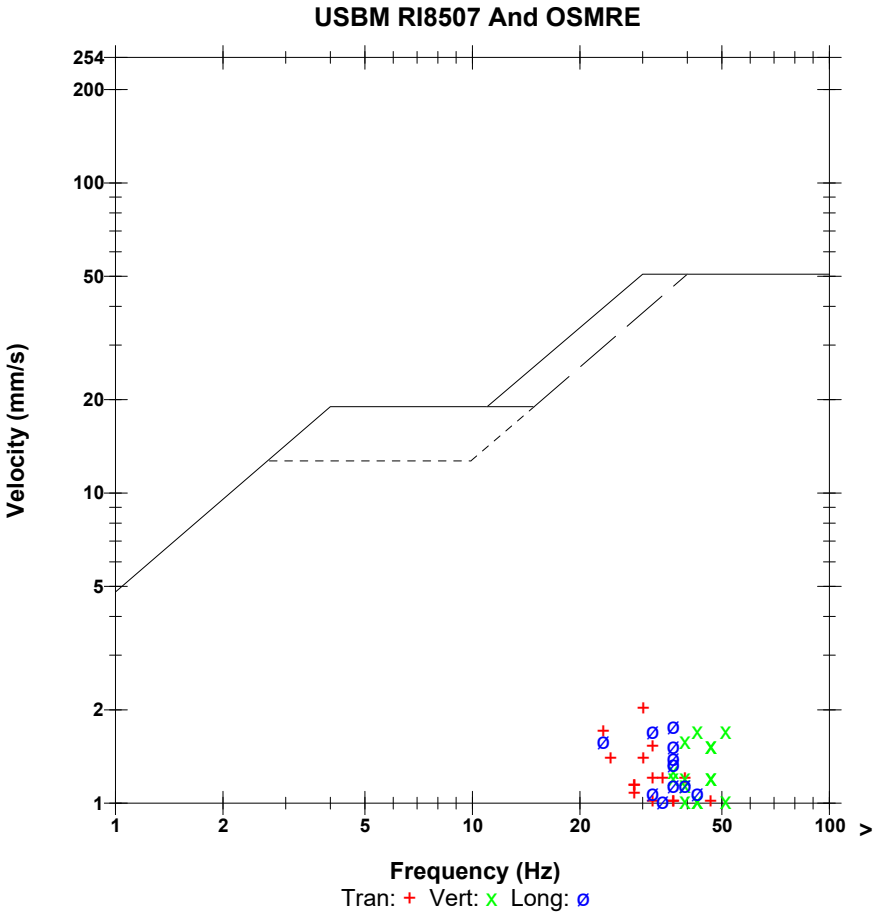
Extended Notes

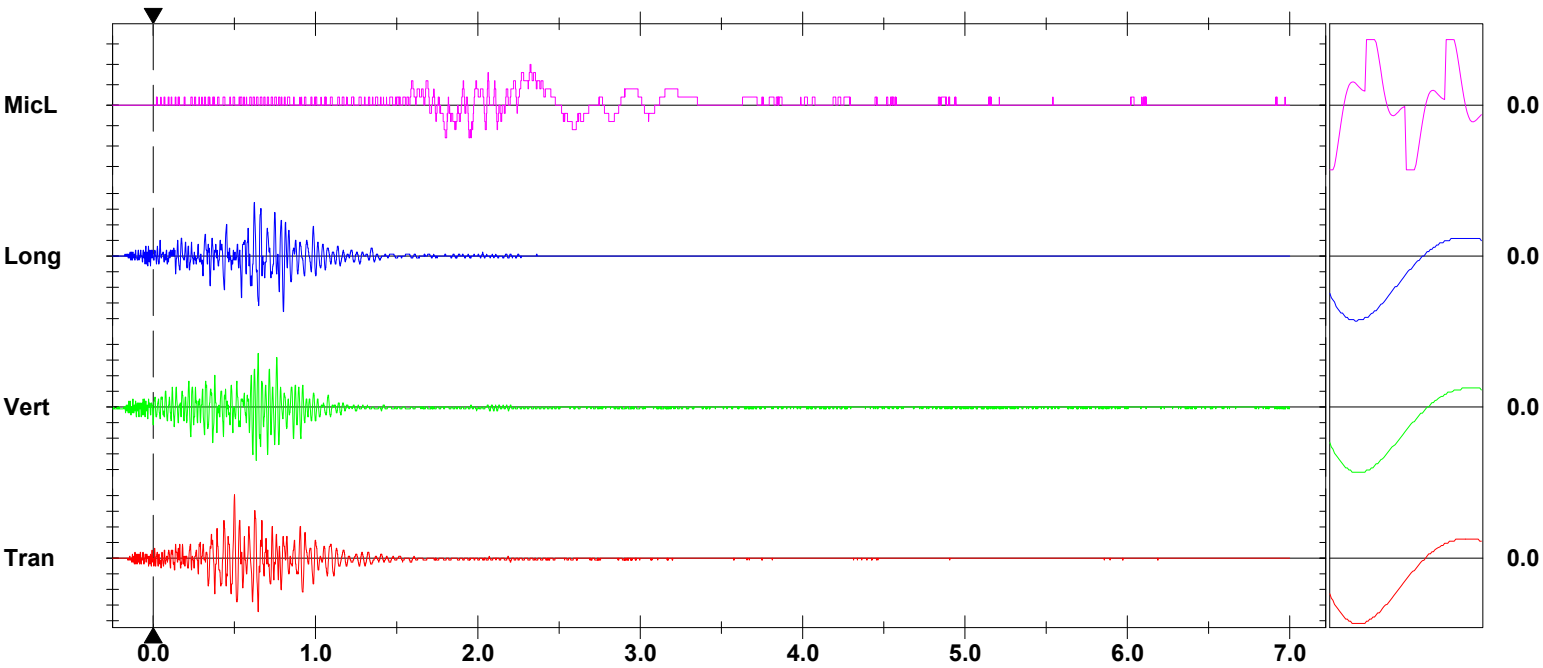
Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 2.322 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 304 mv)

	Tran	Vert	Long	
PPV	2.032	1.715	1.778	mm/s
ZC Freq	28	51	37	Hz
Time (Rel. to Trig)	0.502	0.636	0.803	sec
Peak Acceleration	0.046	0.066	0.060	g
Peak Displacement	0.009	0.006	0.010	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.2	Hz
Overswing Ratio	3.6	3.6	3.7	

Peak Vector Sum 2.826 mm/s at 0.647 sec

Serial Number 5371 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration July 13, 2021 by Instantel
File Name G371J3L1.0B0
Post Event Notes
Location of Seismograph: Civic Number 2341 Route 820 (PW-05)
Blast No.: 2021-19
CE Project Number: 21S003.00





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 15:14:30 August 5, 2021
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 5, 2021 17:14:59 (V10.72.1)

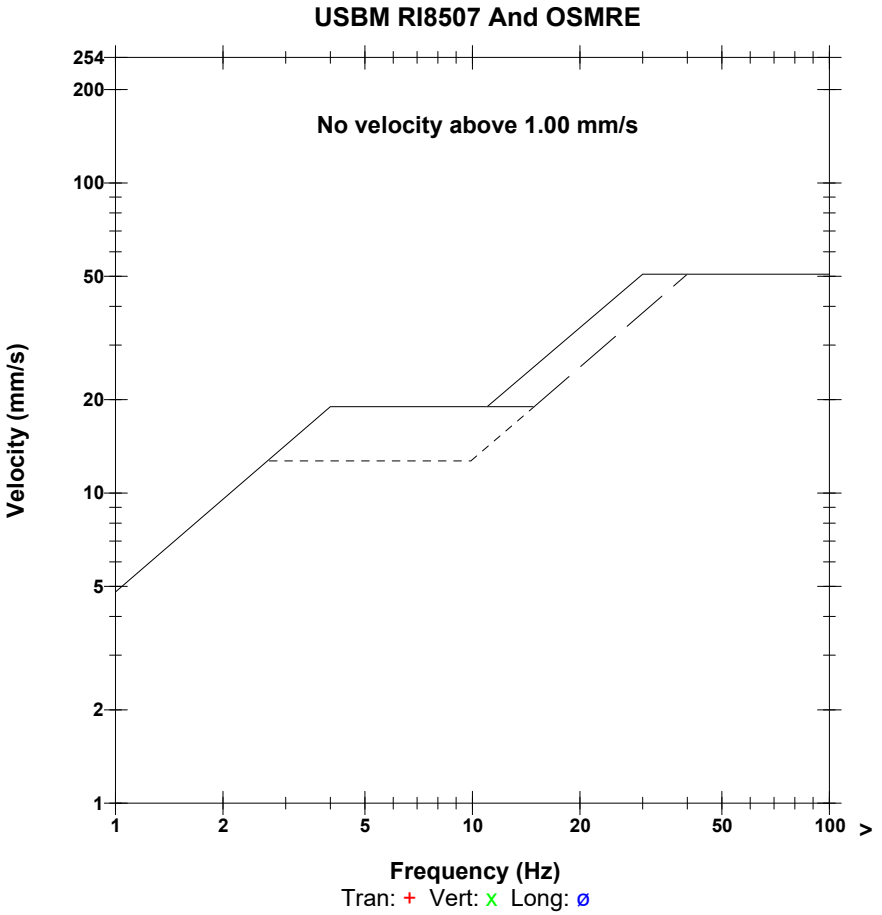
Extended Notes

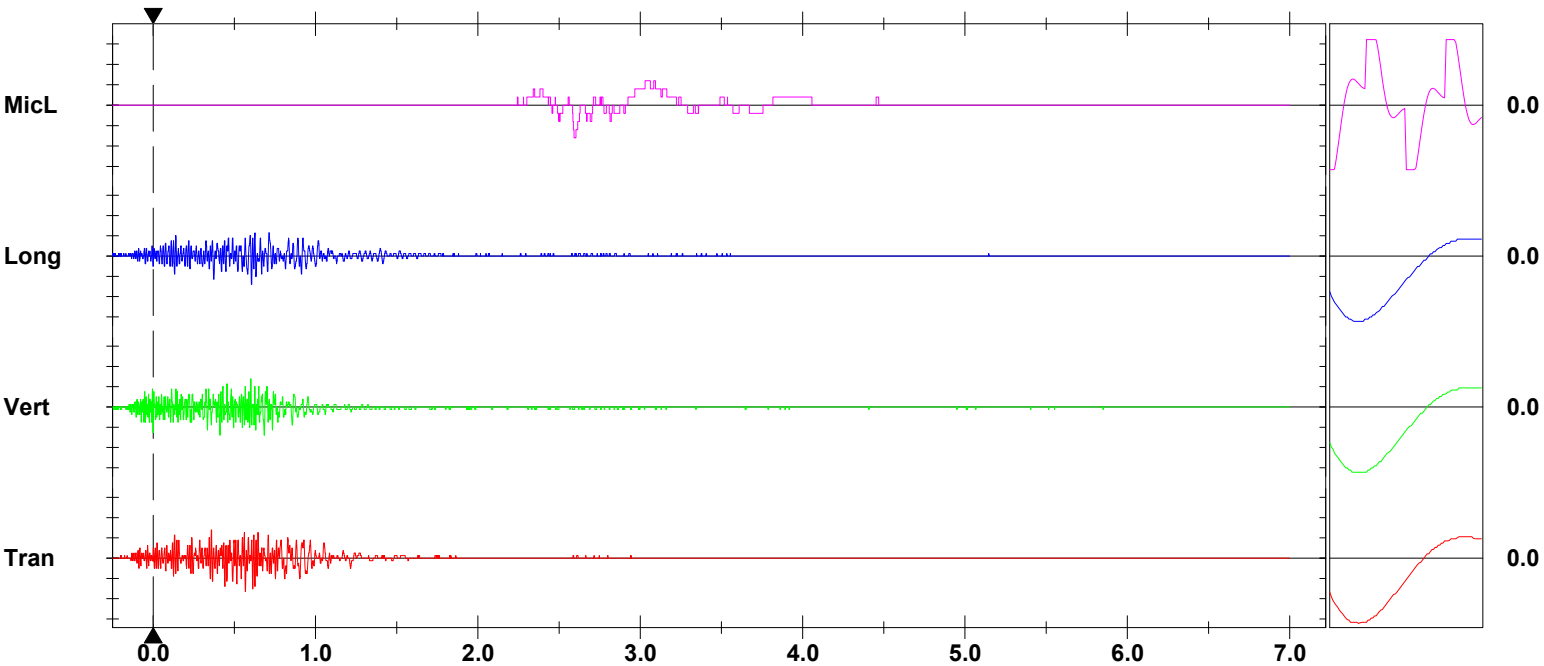
Serial Number 5632 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration October 22, 2020 by Instantel
File Name G632J3L1.060
Post Event Notes
Location of Seismograph: Civic Number 50 Myron Road (PW-15)
Blast No.: 2021-19
CE Project Number: 21S003.00

Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 2.593 sec
ZC Freq 11 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 297 mv)

	Tran	Vert	Long	
PPV	0.826	0.699	0.699	mm/s
ZC Freq	64	64	64	Hz
Time (Rel. to Trig)	0.569	0.412	0.606	sec
Peak Acceleration	0.033	0.046	0.027	g
Peak Displacement	0.003	0.003	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.2	8.0	7.8	Hz
Overswing Ratio	3.1	3.6	3.9	

Peak Vector Sum 1.016 mm/s at 0.568 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 Long at 15:14:32 August 5, 2021
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 5, 2021 17:27:05 (V10.72.1)

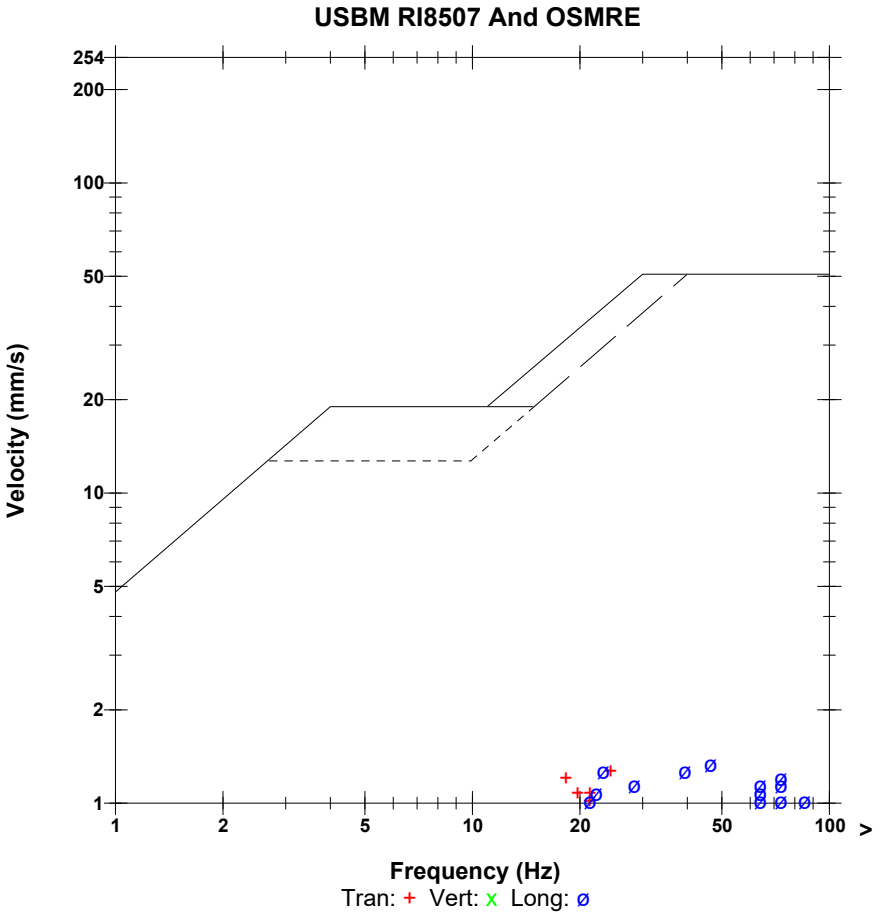
Extended Notes

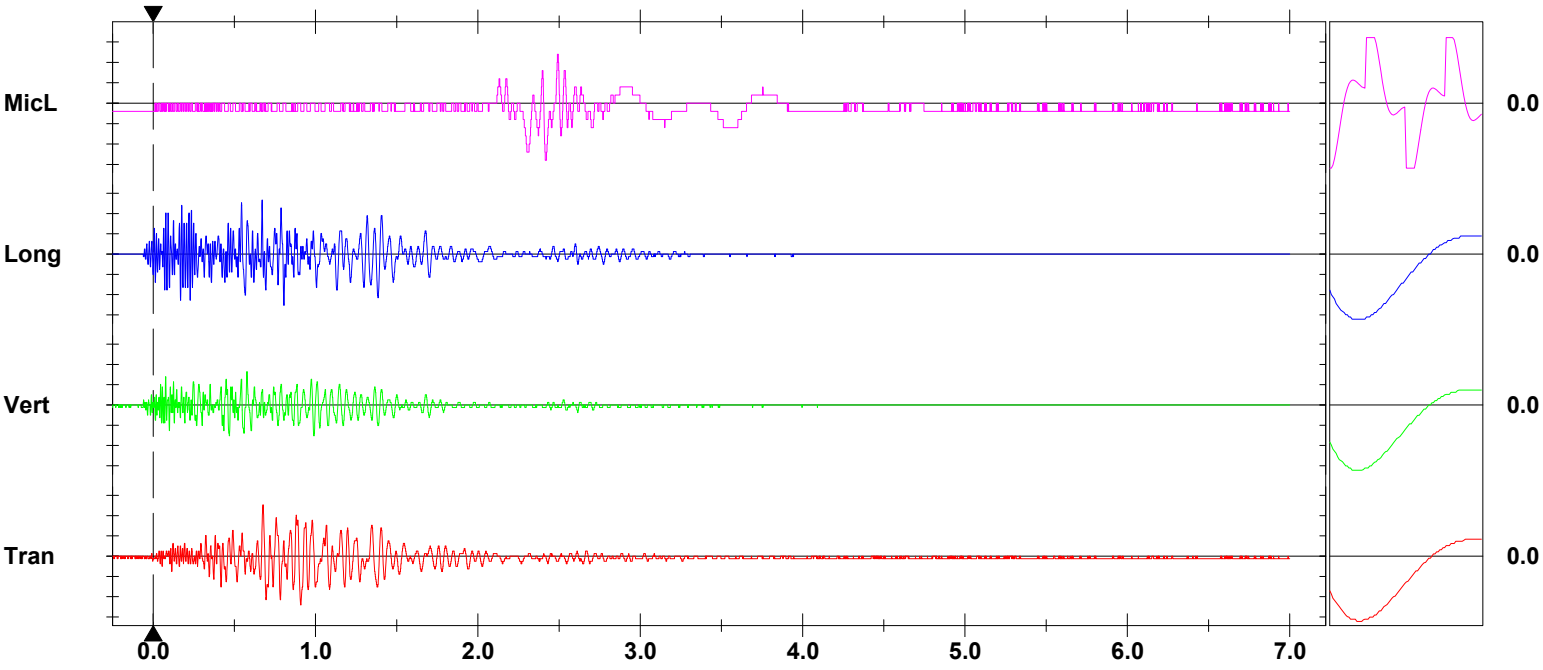
Serial Number 5487 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration February 17, 2021 by Instantel
File Name G487J3L1.080
Post Event Notes
Location of Seismograph: Civic Number 86 Myron Road (PW-16)
Blast No.: 2021-19
CE Project Number: 21S003.00

Microphone Linear Weighting
PSPL 116.9 dB(L) 14.00 pa.(L) at 2.416 sec
ZC Freq 8.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 286 mv)

	Tran	Vert	Long	
PPV	1.270	0.826	1.334	mm/s
ZC Freq	24	32	43	Hz
Time (Rel. to Trig)	0.677	0.578	0.672	sec
Peak Acceleration	0.027	0.033	0.053	g
Peak Displacement	0.011	0.004	0.008	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.7	Hz
Overswing Ratio	3.5	4.1	3.7	

Peak Vector Sum 1.619 mm/s at 0.673 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 Long at 15:14:26 August 5, 2021
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 5, 2021 16:44:40 (V10.72.1)

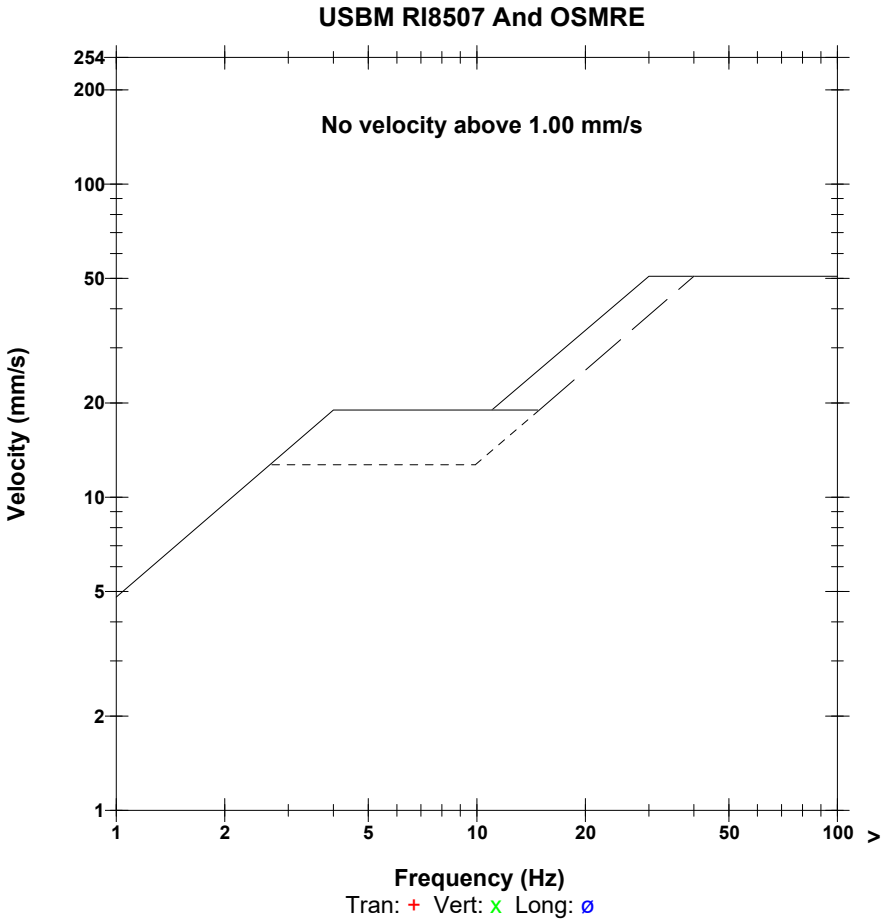
Extended Notes

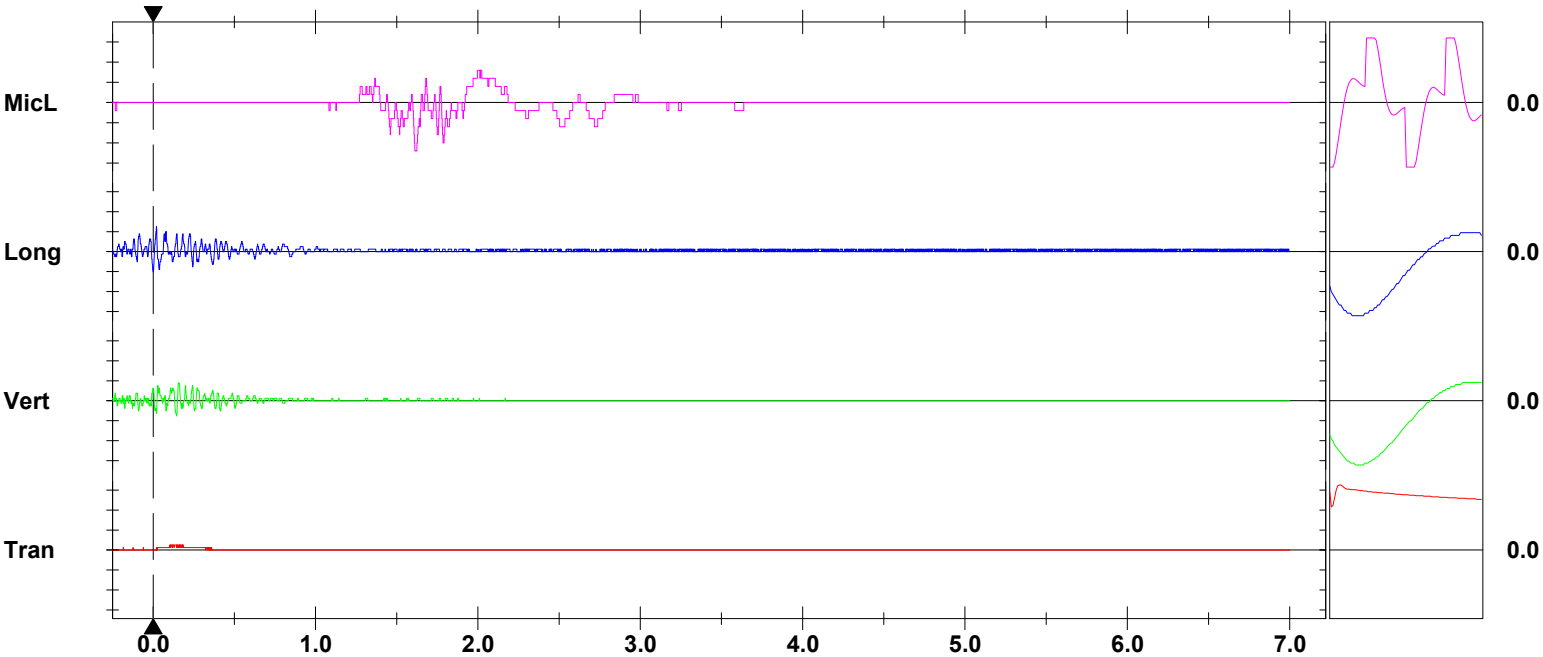
Microphone Linear Weighting
PSPL 115.6 dB(L) 12.00 pa.(L) at 1.612 sec
ZC Freq 10 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 297 mv)

	Tran	Vert	Long	
PPV	0.127	0.445	0.635	mm/s
ZC Freq	N/A	30	28	Hz
Time (Rel. to Trig)	0.104	0.155	0.021	sec
Peak Acceleration	0.007	0.013	0.013	g
Peak Displacement	0.000	0.003	0.004	mm
Sensor Check	Check	Passed	Passed	
Frequency	0.0	7.7	8.0	Hz
Overswing Ratio	1.0	3.7	3.8	

Peak Vector Sum 0.714 mm/s at 0.021 sec
N/A: Not Applicable

Serial Number 5960 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration May 17, 2021 by Instantel
File Name G960J3L1.020
Post Event Notes
Location of Seismograph: Civic Number 2337 Route 820 (PW-04)
Blast No.: 2021-19
CE Project Number: 21S003.00





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 20, 2021

Project No.: 21S003.00

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

Re: Blast Vibration Monitoring – Blast No. 2021-20 – 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 at 13:59 on August 19, 2021. For the monitoring we positioned nine (9) digital seismographs in the area. The location of each monitoring point is noted in the following table.

Blast No. 2021-20 – August 19, 2021

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)	13:59	1,255 m S	< 0.5 mm/s	<120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		882 m S	< 0.5 mm/s	<120	
3. Civic No. 4150 Route 111 (PW-13)		742 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		974 m NE	< 0.5 mm/s	<120	
5. PW-03 - Route 820		693 m N	< 0.5 mm/s	<120	
6. Civic No. 2341 Route 820 (PW-05)		706 m N	< 0.5 mm/s	<120	
7. Civic No. 50 Myron Road (PW-15)		918 m NW	< 0.5 mm/s	<120	
8. Civic No. 86 Myron Road (PW-16)		740 m W	0.95 mm/s @ 57 Hz	110	-
9. Civic No. 220 Myron Road (PW-01)		1,285 m S	< 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,
CONQUEST ENGINEERING
A division of CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Geotechnical Engineer

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Report

Blast Record
Blast No. 2021-20

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 19, 2021
Project No.:	21S003.00	**Time of Blast:**	13:59
Inspector:	M. McLeese	**Blast No.:**	2021-20
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28'51.42" W 65º38'03.24" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	13,999 tonnes
Weather at time of Blast:	Sunny with few clouds	**Air Temp.:**	29ºC
Est. Wind Speed :	≈5 km/h	**Wind Direction:**	E
Cloud Cover:	Few	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	140	**Hole Diameter:**	4.5"
Average Depth:	3.6 – 5.5 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	4	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	42 ms
Initiation Method:	Non -Electric		
Weight of Explosives per Delay:	Max.: 128 kg		
Type and weight of Explosives for Blast:	3,856 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 19, 2021
Project No.:	21S003.00	**Time of Blast:**	13:59
Inspector:	M. McLeese	**Blast No.:**	2021-20
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	693 m
Direction to the Nearest Structure:	North
Structure Type:	Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	61.3

SAFETY:

Type of Warning Signal Used:	Air horn
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 19, 2021
Project No.:	21S003.00	**Time of Blast:**	13:59
Inspector:	M. McLeese	**Blast No.:**	2021-20
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	October 22, 2020
Location of seismograph:	Civic Number 4079 Route 111 (PW-09)
Distance and Direction from Blast:	1,255 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 14, 2021
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	882 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 19, 2021
Project No.:	21S003.00	**Time of Blast:**	13:59
Inspector:	M. McLeese	**Blast No.:**	2021-20
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #18193
Calibration Date:	May 14, 2021
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	742 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 #21348
Calibration Date:	June 23, 2021
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	974 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 19, 2021
Project No.:	21S003.00	**Time of Blast:**	13:59
Inspector:	M. McLeese	**Blast No.:**	2021-20
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5635
Calibration Date:	March 23, 2021
Location of seismograph:	PW-03 - Route 820
Distance and Direction from Blast:	693 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

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #21349
Calibration Date:	June 23, 2021
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	706 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

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 19, 2021
Project No.:	21S003.00	**Time of Blast:**	13:59
Inspector:	M. McLeese	**Blast No.:**	2021-20
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	May 17, 2021
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	918 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 #5673
Calibration Date:	March 12, 2021
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	740 m West
Transverse Particle Velocity:	0.70 mm/s @ 32 Hz
Vertical Particle Velocity:	0.45 mm/s @ 51 Hz
Longitudinal Particle Velocity:	0.95 mm/s @ 57 Hz
Peak Particle Velocity:	0.95 mm/s @ 57 Hz
Maximum Airblast:	110 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 19, 2021
Project No.:	21S003.00	**Time of Blast:**	13:59
Inspector:	M. McLeese	**Blast No.:**	2021-20
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5676
Calibration Date:	February 19, 2021
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
Distance and Direction from Blast:	1,285 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

Blast and Seismograph Location Plan
Blast No. 2021-20

Blast and Seismograph Location Plan
Blast No: 2021-20
Upham East Gypsum Quarry, Upham, NB

Date: August 19, 2021
CE Project No.: 21S003.00

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Blast Event Report
Blast No. 2021-20

Event Report

Date/Time Long at 13:59:44 August 19, 2021
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 19, 2021 15:58:58 (V10.72.1)

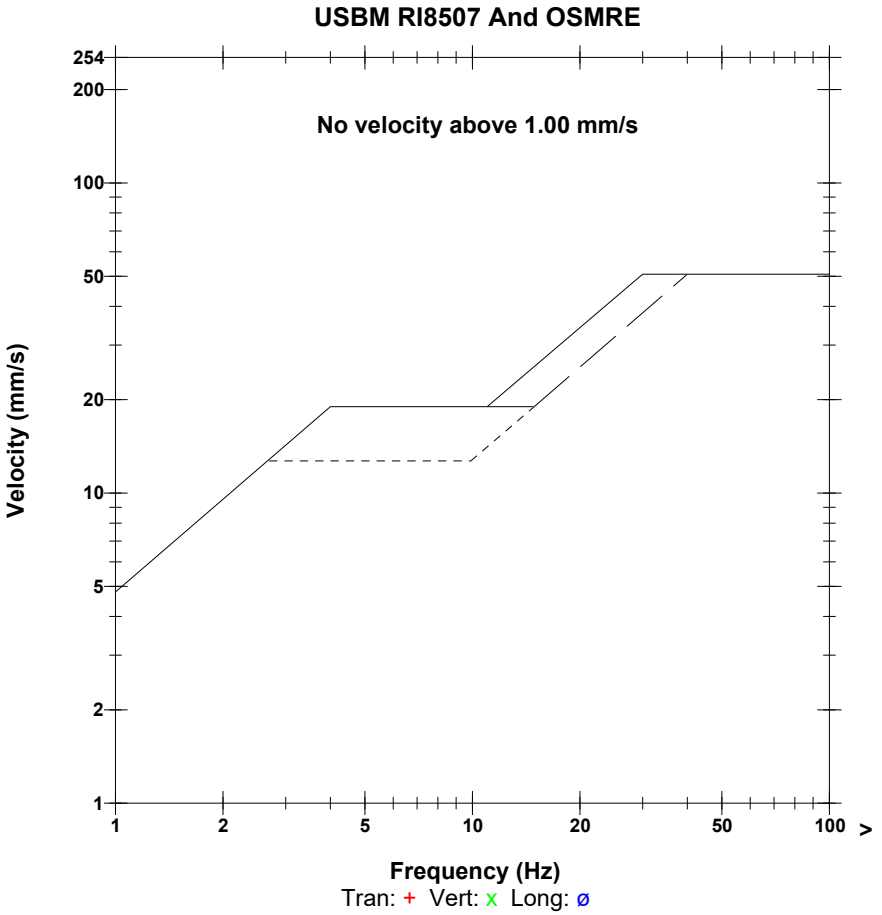
Extended Notes

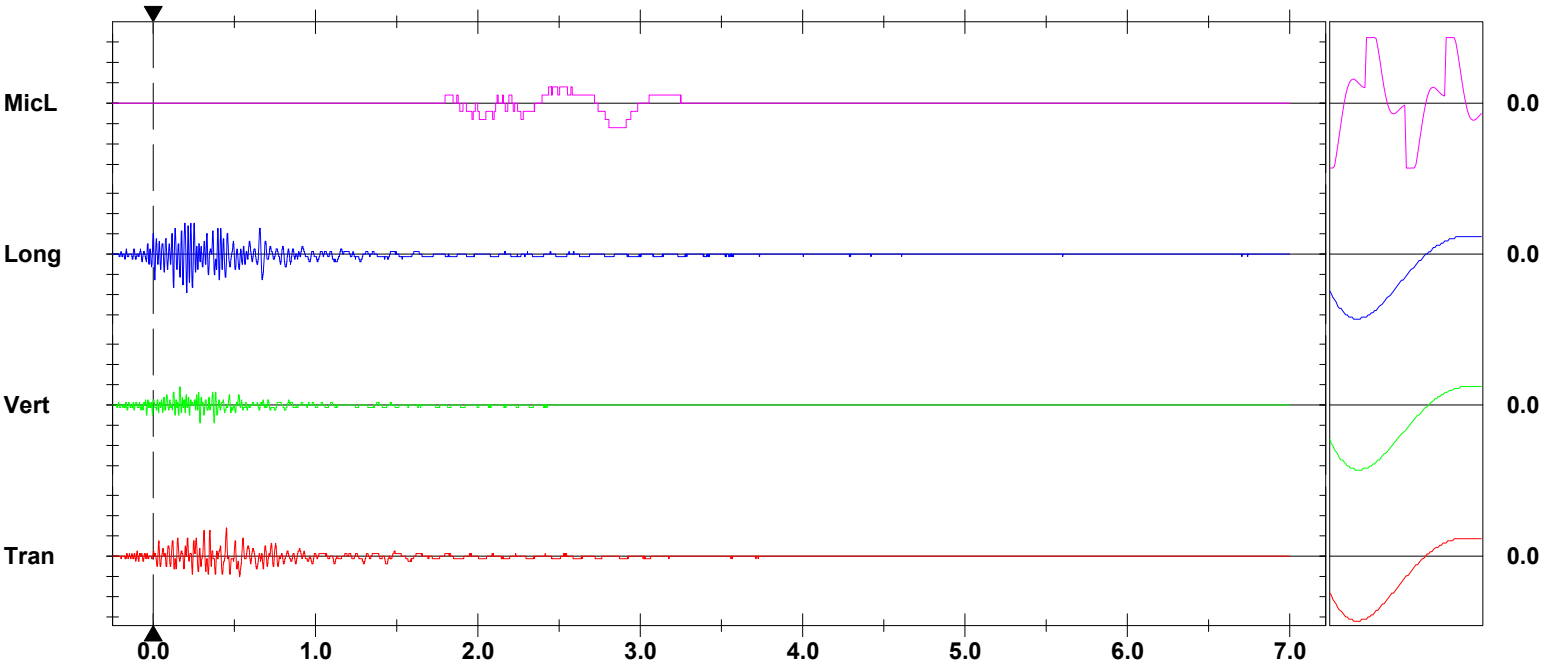
Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 2.808 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 306 mv)

	Tran	Vert	Long	
PPV	0.699	0.445	0.953	mm/s
ZC Freq	32	51	57	Hz
Time (Rel. to Trig)	0.451	0.165	0.207	sec
Peak Acceleration	0.020	0.020	0.033	g
Peak Displacement	0.004	0.001	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	7.8	8.0	Hz
Overswing Ratio	3.8	3.7	3.8	

Peak Vector Sum 0.968 mm/s at 0.208 sec

Serial Number 5673 V 2.61 MiniMate
Battery Level 6.4 Volts
Unit Calibration March 12, 2021 by Instantel
File Name G673J4AU.VK0
Post Event Notes
Location of Seismograph: Civic Number 86 Myron Road (PW-16)
Blast No.: 2021-20
CE Project Number: 21S003.00





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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September 1, 2021

Project No.: 21S003.00

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

Re: Blast Vibration Monitoring – Blast No. 2021-21 – 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 at 14:00 on August 31, 2021. For the monitoring we positioned nine (9) digital seismographs in the area. The location of each monitoring point is noted in the following table.

Blast No. 2021-21 – August 31, 2021

Seismograph Location	Time	Approx. dist. from shot to seismograph (m)	Maximum Velocity (mm/s)	Sound Pressure (dB(L))	Remarks
1. Civic No. 4079 Route 111 (PW-09)	14:00	1,400 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)		829 m SE	< 0.5 mm/s	<120	
4. Civic No. 2447 Route 820 (PW-07)		894 m NE	< 0.5 mm/s	<120	
5. PW-03 - Route 820		576 m N	0.83 mm/s @ 32 Hz	114	-
6. Civic No. 2341 Route 820 (PW-05)		581 m N	1.91 mm/s @ 32 Hz	112	-
7. Civic No. 50 Myron Road (PW-15)		834 m NW	< 0.5 mm/s	<120	Unit was not triggered
8. Civic No. 86 Myron Road (PW-16)		770 m W	0.95 mm/s @ 27 Hz	106	-
9. Civic No. 220 Myron Road (PW-01)		1,400 m S	< 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,
CONQUEST ENGINEERING
A division of CBCL Limited

Robert Y. Cyr, M.A.Sc., P.Eng.
Senior Geotechnical Engineer

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Reports

Blast Record
Blast No. 2021-21

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 31, 2021
Project No.:	21S003.00	**Time of Blast:**	14:00
Inspector:	S. Byers	**Blast No.:**	2021-21
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	**Blaster's Name:**	Daniel Blanchard
Blast Location:	N 45º28'55.0" W 65º38'03.0" (see attached sketch)		
Type of Rock:	Gypsum	**Est. Vol. or Tonnage:**	19,528 tonnes
Weather at time of Blast:	Sunny with clouds	**Air Temp.:**	25ºC
Est. Wind Speed :	≈20 km/h	**Wind Direction:**	SW
Cloud Cover:	Some	**Precipitation:**	No

BLAST DESIGN:

Total No. Holes:	157	**Hole Diameter:**	4.5"
Average Depth:	3.6 – 8.8 m	**Spacing:**	10 ft x 10 ft
No. Holes per Delay:	4	**Collar Length:**	7 ft
Delay between Holes:	25 ms	**Delay between Rows:**	42 ms
Initiation Method:	Non -Electric		
Weight of Explosives per Delay:	Max.: 218 kg		
Type and weight of Explosives for Blast:	7,086 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 31, 2021
Project No.:	21S003.00	**Time of Blast:**	14:00
Inspector:	S. Byers	**Blast No.:**	2021-21
Client:	Hammond River Holdings		

BLAST MONITORING

Distance to the Nearest Structure:	576 m
Direction to the Nearest Structure:	North
Structure Type:	Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay):	39.0

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 31, 2021
Project No.:	21S003.00	**Time of Blast:**	14:00
Inspector:	S. Byers	**Blast No.:**	2021-21
Client:	Hammond River Holdings		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5487
Calibration Date:	February 17, 2021
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 #5635
Calibration Date:	March 23, 2021
Location of seismograph:	Civic Number 4126 Route 111 (PW-10)
Distance and Direction from Blast:	975 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 31, 2021
Project No.:	21S003.00	**Time of Blast:**	14:00
Inspector:	S. Byers	**Blast No.:**	2021-21
Client:	Hammond River Holdings		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5489
Calibration Date:	May 17, 2021
Location of seismograph:	Civic Number 4150 Route 111 (PW-13)
Distance and Direction from Blast:	829 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 #21349
Calibration Date:	June 23, 2021
Location of seismograph:	Civic Number 2447 Route 820 (PW-07)
Distance and Direction from Blast:	894 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 31, 2021
Project No.:	21S003.00	**Time of Blast:**	14:00
Inspector:	S. Byers	**Blast No.:**	2021-21
Client:	Hammond River Holdings		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5673
Calibration Date:	March 12, 2021
Location of seismograph:	PW-03 - Route 820
Distance and Direction from Blast:	576 m North
Transverse Particle Velocity:	0.70 mm/s @ N/A Hz
Vertical Particle Velocity:	0.83 mm/s @ 39 Hz
Longitudinal Particle Velocity:	0.83 mm/s @ 32 Hz
Peak Particle Velocity:	0.83 mm/s @ 32 Hz
Maximum Airblast:	114 dB(L)

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5371
Calibration Date:	July 13, 2021
Location of seismograph:	Civic Number 2341 Route 820 (PW-05)
Distance and Direction from Blast:	581 m North
Transverse Particle Velocity:	1.21 mm/s @ 37 Hz
Vertical Particle Velocity:	1.78 mm/s @ 51 Hz
Longitudinal Particle Velocity:	1.91 mm/s @ 32 Hz
Peak Particle Velocity:	1.91 mm/s @ 32 Hz
Maximum Airblast:	112 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 31, 2021
Project No.:	21S003.00	**Time of Blast:**	14:00
Inspector:	S. Byers	**Blast No.:**	2021-21
Client:	Hammond River Holdings		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5632
Calibration Date:	October 22, 2020
Location of seismograph:	Civic Number 50 Myron Road (PW-15)
Distance and Direction from Blast:	834 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 #5372
Calibration Date:	February 8, 2021
Location of seismograph:	Civic Number 86 Myron Road (PW-16)
Distance and Direction from Blast:	770 m West
Transverse Particle Velocity:	0.95 mm/s @ 27 Hz
Vertical Particle Velocity:	0.57 mm/s @ 32 Hz
Longitudinal Particle Velocity:	0.76 mm/s @ 28 Hz
Peak Particle Velocity:	0.95 mm/s @ 27 Hz
Maximum Airblast:	106 dB(L)

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BLAST RECORD

Project Name:	Upham Gypsum Quarry	**Date of Blast:**	August 31, 2021
Project No.:	21S003.00	**Time of Blast:**	14:00
Inspector:	S. Byers	**Blast No.:**	2021-21
Client:	Hammond River Holdings		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	Instantel Mini Mate, Serial #5676
Calibration Date:	February 19, 2021
Location of seismograph:	Civic Number 220 Myron Road (PW-01)
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

Blast and Seismograph Location Plan
Blast No. 2021-21

Blast and Seismograph Location Plan
Blast No: 2021-21
Upham East Gypsum Quarry, Upham, NB

Date: August 31, 2021
CE Project No.: 21S003.00

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Blast Event Reports
Blast No. 2021-21

Event Report

Date/Time Vert at 14:00:09 August 31, 2021
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 31, 2021 16:01:50 (V 10.74)

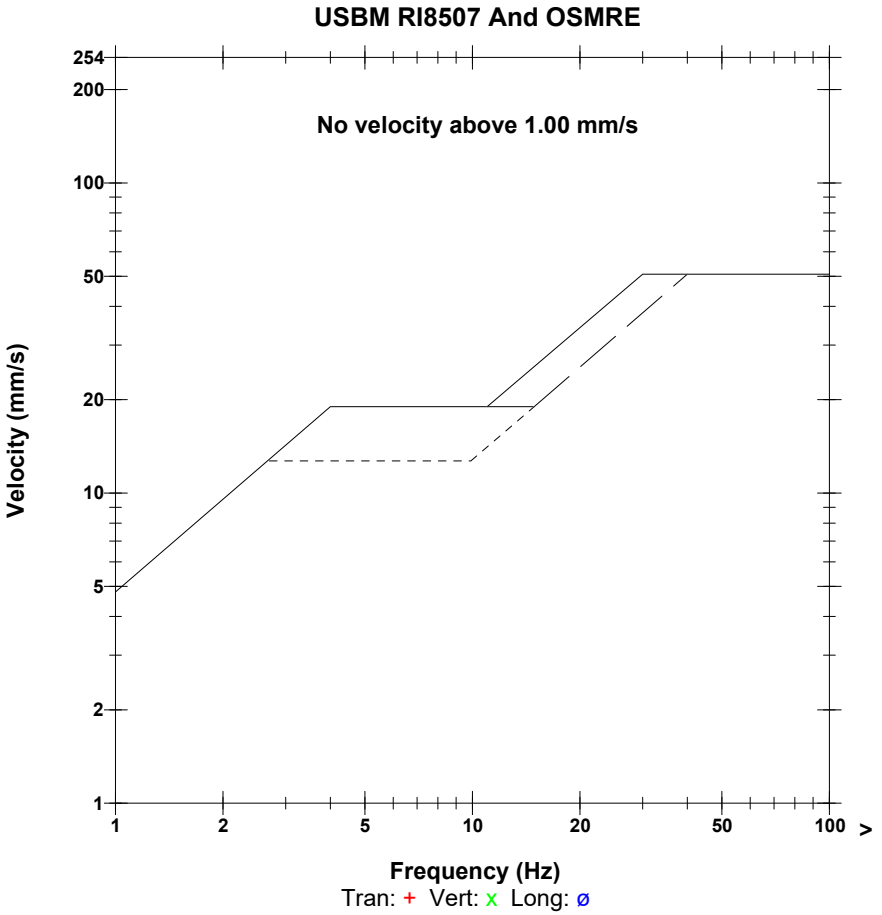
Extended Notes

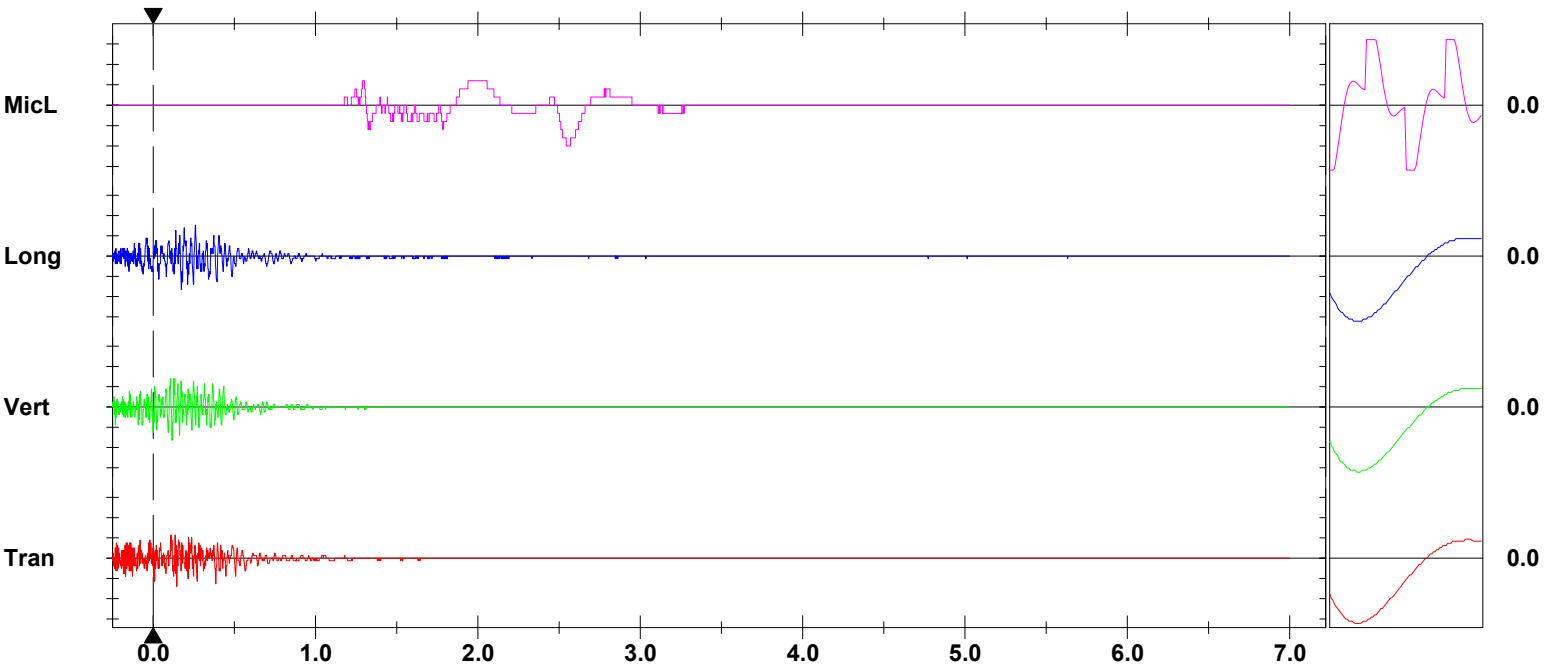
Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 2.545 sec
ZC Freq 3.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 306 mv)

	Tran	Vert	Long	
PPV	0.699	0.826	0.826	mm/s
ZC Freq	N/A	39	32	Hz
Time (Rel. to Trig)	0.146	0.117	0.175	sec
Peak Acceleration	0.046	0.046	0.033	g
Peak Displacement	0.002	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	8.0	Hz
Overswing Ratio	3.6	3.7	3.8	

Peak Vector Sum 1.048 mm/s at 0.249 sec
N/A: Not Applicable

Serial Number 5673 V 2.61 MiniMate
Battery Level 5.9 Volts
Unit Calibration March 12, 2021 by Instantel
File Name G673J4X2.W90
Post Event Notes
Location of Seismograph: Cottage on Route 820 (PW-03)
Blast No.: 2021-21
CE Project Number: 21S003.00





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 14:00:13 August 31, 2021
Trigger Source Geo: 0.492 mm/s, Mic: 120.0 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Notes
Location:
Client:
User Name:
Converted: August 31, 2021 16:03:15 (V 10.74)

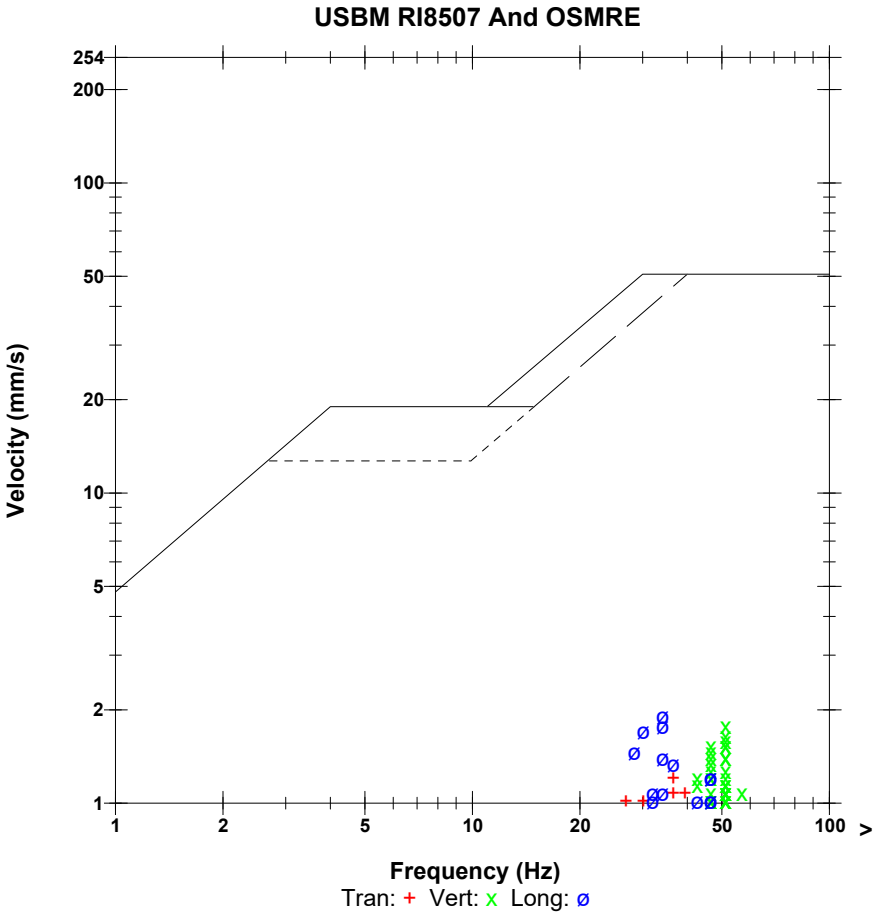
Extended Notes

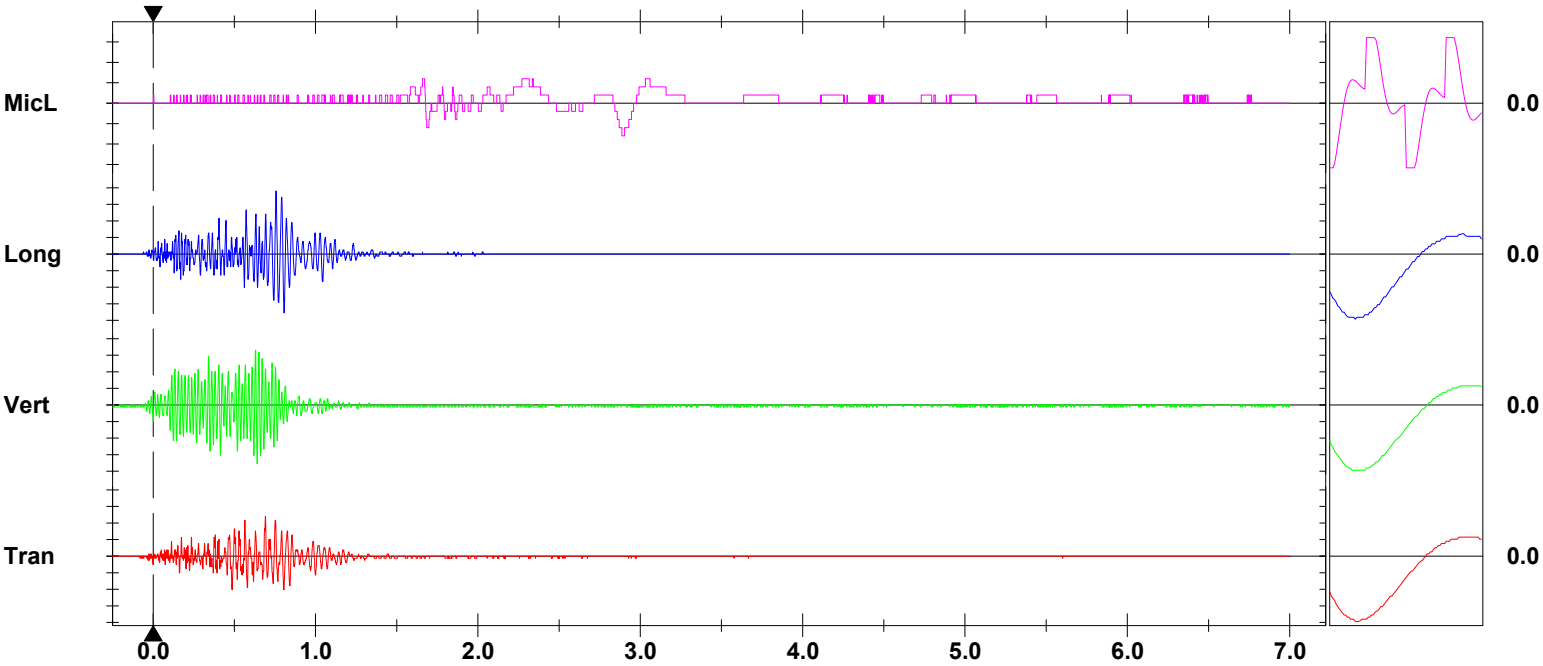
Serial Number 5371 V 2.61 MiniMate
Battery Level 6.0 Volts
Unit Calibration July 13, 2021 by Instantel
File Name G371J4X2.WD0
Post Event Notes
Location of Seismograph: Civic Number 2341 Route 820 (PW-05)
Blast No.: 2021-21
CE Project Number: 21S003.00

Microphone Linear Weighting
PSPL 112.0 dB(L) 8.000 pa.(L) at 2.888 sec
ZC Freq 4.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 304 mv)

	Tran	Vert	Long	
PPV	1.207	1.778	1.905	mm/s
ZC Freq	37	51	32	Hz
Time (Rel. to Trig)	0.692	0.642	0.757	sec
Peak Acceleration	0.040	0.053	0.040	g
Peak Displacement	0.005	0.006	0.009	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.1	8.0	8.5	Hz
Overswing Ratio	3.6	3.6	3.3	

Peak Vector Sum 2.207 mm/s at 0.756 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 14:00:13 August 31, 2021
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 31, 2021 16:04:19 (V 10.74)

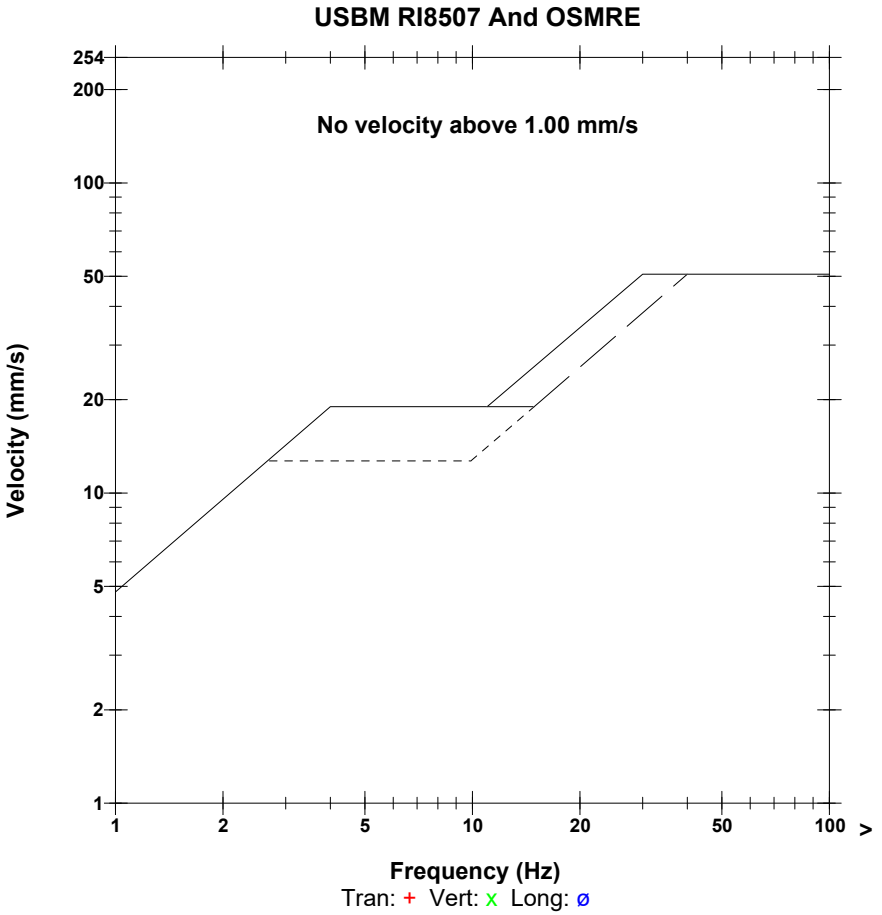
Extended Notes

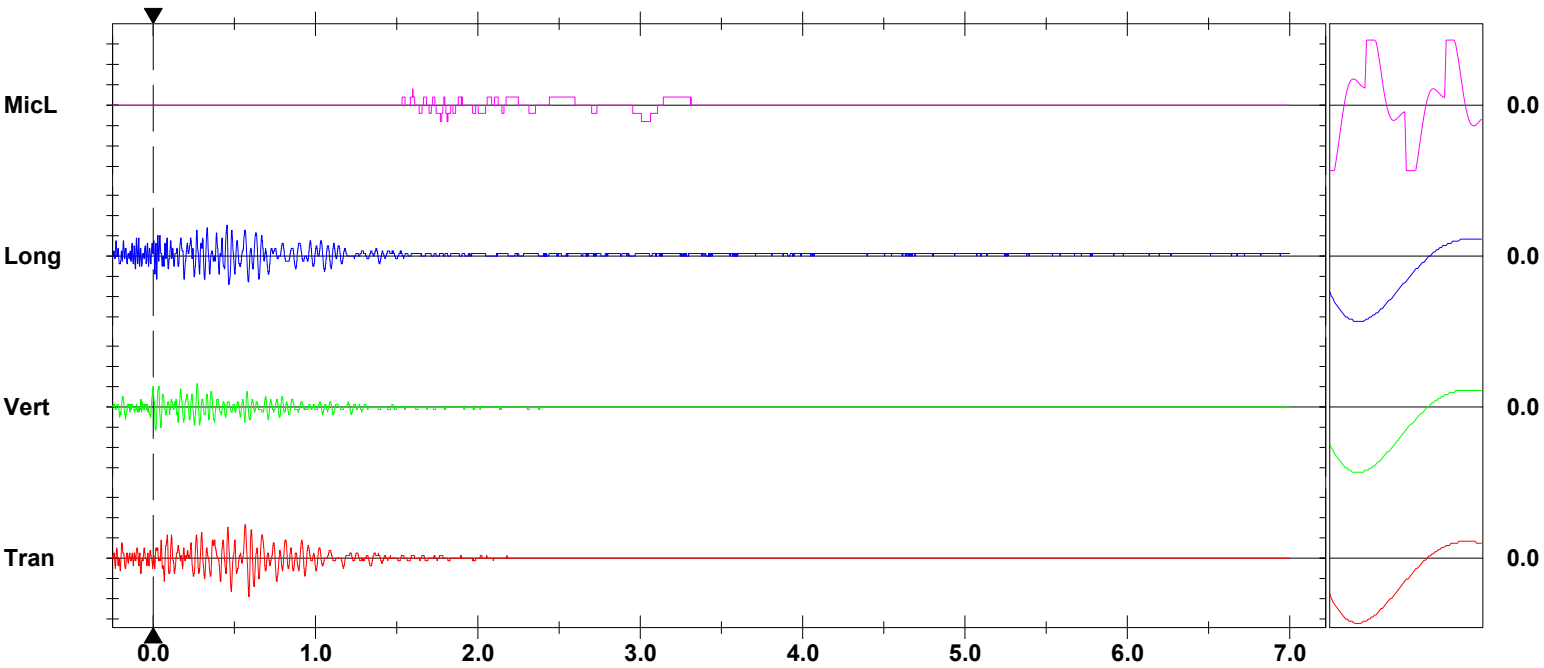
Microphone Linear Weighting
PSPL 106.0 dB(L) 4.000 pa.(L) at 1.600 sec
ZC Freq 18 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 292 mv)

	Tran	Vert	Long	
PPV	0.953	0.572	0.762	mm/s
ZC Freq	27	32	28	Hz
Time (Rel. to Trig)	0.591	0.014	0.454	sec
Peak Acceleration	0.020	0.020	0.027	g
Peak Displacement	0.006	0.003	0.005	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	7.7	Hz
Overswing Ratio	3.5	3.6	3.9	

Peak Vector Sum 1.111 mm/s at 0.566 sec

Serial Number 5372 V 2.61 MiniMate
Battery Level 6.3 Volts
Unit Calibration February 8, 2021 by Instantel
File Name G372J4X2.WD0
Post Event Notes
Location of Seismograph: Civic Number 86 Myron Road (PW-16)
Blast No.: 2021-21
CE Project Number: 21S003.00





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