

Memo

HAMMOND RIVER

H O L D I N G S

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

From: Dan Guest, Hammond River Holdings Ltd.

Cc: Paul Vanderlaan, P.Eng. – Director of the Environmental Impact Assessment Branch, New Brunswick Department of Environment and Local Government

Date: January 15, 2021

Subject: Monthly Report – Upham East Gypsum Quarry, Surface Water Sampling – December 2020

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 December 2020, in accordance with conditions of the Approval to Operate I-10936. As required by the approval to operate, surface water sampling of the watercourse that crosses the site and in the Hammond River began immediately. Refer to the December 2019, and January through November 2020 reports for previous water quality results.

Weekly compliance monitoring in December was conducted as per the following:

- Week 1: December 2, 2020
- Week 2: December 7, 2020
- Week 3: December 15, 2020
- Week 4: December 23, 2020
- Week 5: December 31, 2020

In December there were two additional samples collected within a day of heavy rain events where there was 25 mm or more of rain over a 24-hour period. These samples were collected on December 1, 2020 and December 28, 2020.

Surface Water Sampling – Field Methods

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

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

- PDP-1 was collected at the discharge point from the site, which is located before the confluence with the unnamed tributary to the Hammond River. This is the point of compliance;
- SW3 was the background sample. It was collected within the unnamed tributary approximately 100 m upstream from the PDP-1;
- SW5 was collected within the unnamed tributary approximately 100m downstream from PDP-1

Quarterly samples were collected, as per the EMP (Dillon 2020), on December 2, 2020. Quarterly sampling include recording additional field parameters (pH and dissolved oxygen) and analysis of additional laboratory parameters (alkalinity, calcium, chloride, hardness, magnesium, potassium, sodium, sulphate, total phosphorus and total dissolved solids). In addition, samples were collected from two locations in the Hammond River (H1 and H2).

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

Compliance Monitoring Results

Results of the surface water compliance monitoring are provided in **Table 1**. Analytical certificates are attached. Results for pH were within the CCME guidelines for the protection of aquatic life. All results for chloride were below the CCME guideline. 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**.

Conductivity was not recorded on December 31; however, it is likely conductivity would have been similar to the results recorded on December 28, as previous conductivity results are within a narrow range.

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 December water sampling program on December 1 and 7, 2020. The RPD results ranged from 0% to 29% (**Table 3**). Therefore, the data satisfies the quality objectives for the monitoring program.

Environmental Accidents and Malfunctions

During the December 2020 monitoring period there were no spills or environmental accidents.

Ambient Air Quality Monitoring – Total Suspended Particulate

Once the quarry moved into the operational stage, a 24-hour air sample had to be 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 December there were 6 air quality monitoring events, December 1, 7, 13, 19, 25, and 31; the results are provided in **Table 4**. None of the air samples collected in December exceed the 120 µg/m³ maximum permissible ground level concentration of total suspended particulate that is specified in Schedule B of the *New Brunswick Air Quality Regulation – Clean Air Act*.

Blasting

In December there two blasts, December 7 and 14. There were no exceedances of Approval to Operate limits for maximum velocity and sound pressure. Blast reports are attached.

Public Complaints

Hammond River Holdings did not receive any public complaints during the June 2020 monitoring period.

Summary

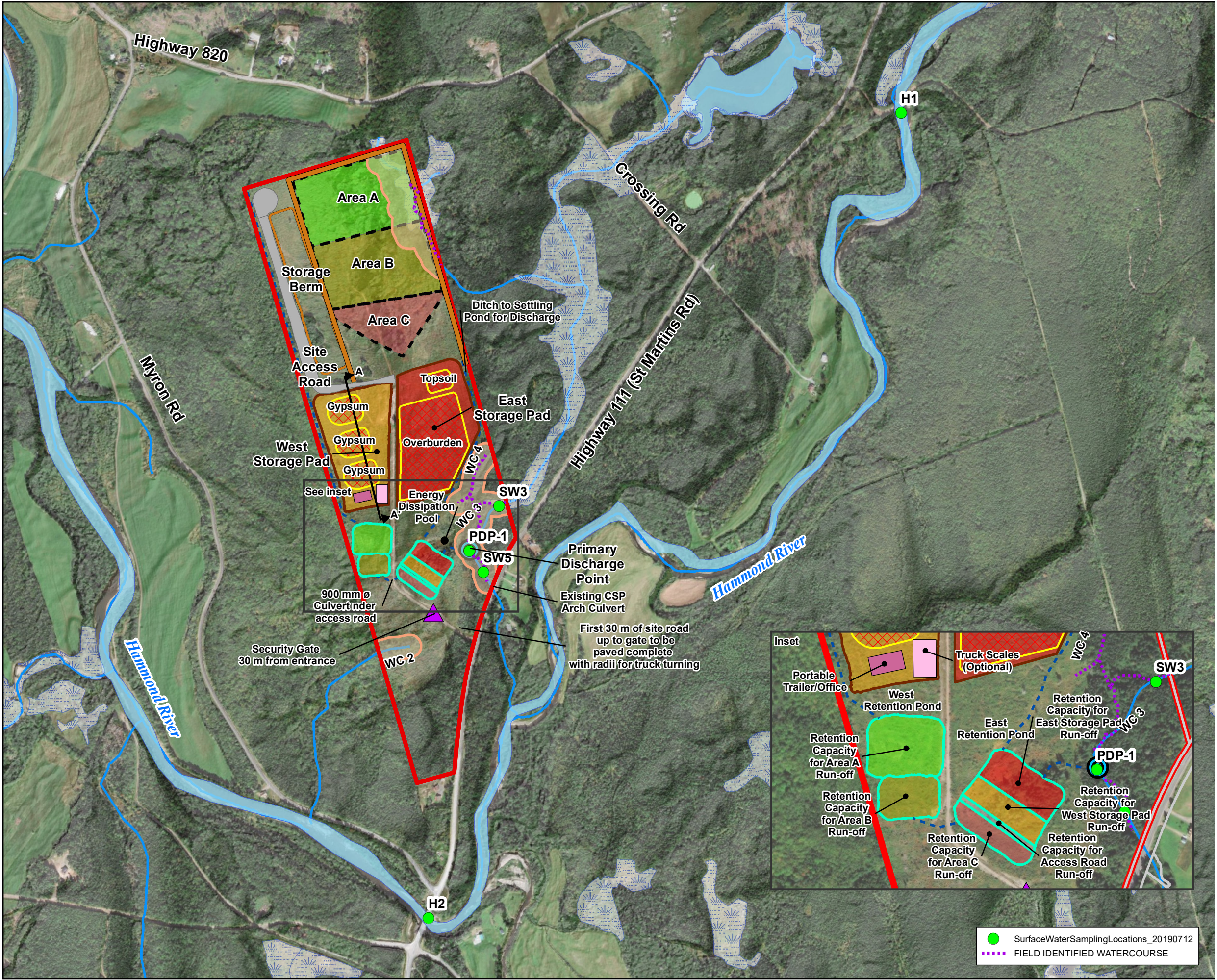
The water chemistry at the discharge point into WC3 is comparable to background. Based on the results provided in **Table 1**, the gypsum extraction activities being conducted on site have not had a negative impact on WC3 and subsequently the Hammond River. All air quality monitoring and blast monitoring returned results below the guidelines for each.

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
 - STOCKPILE
 - 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

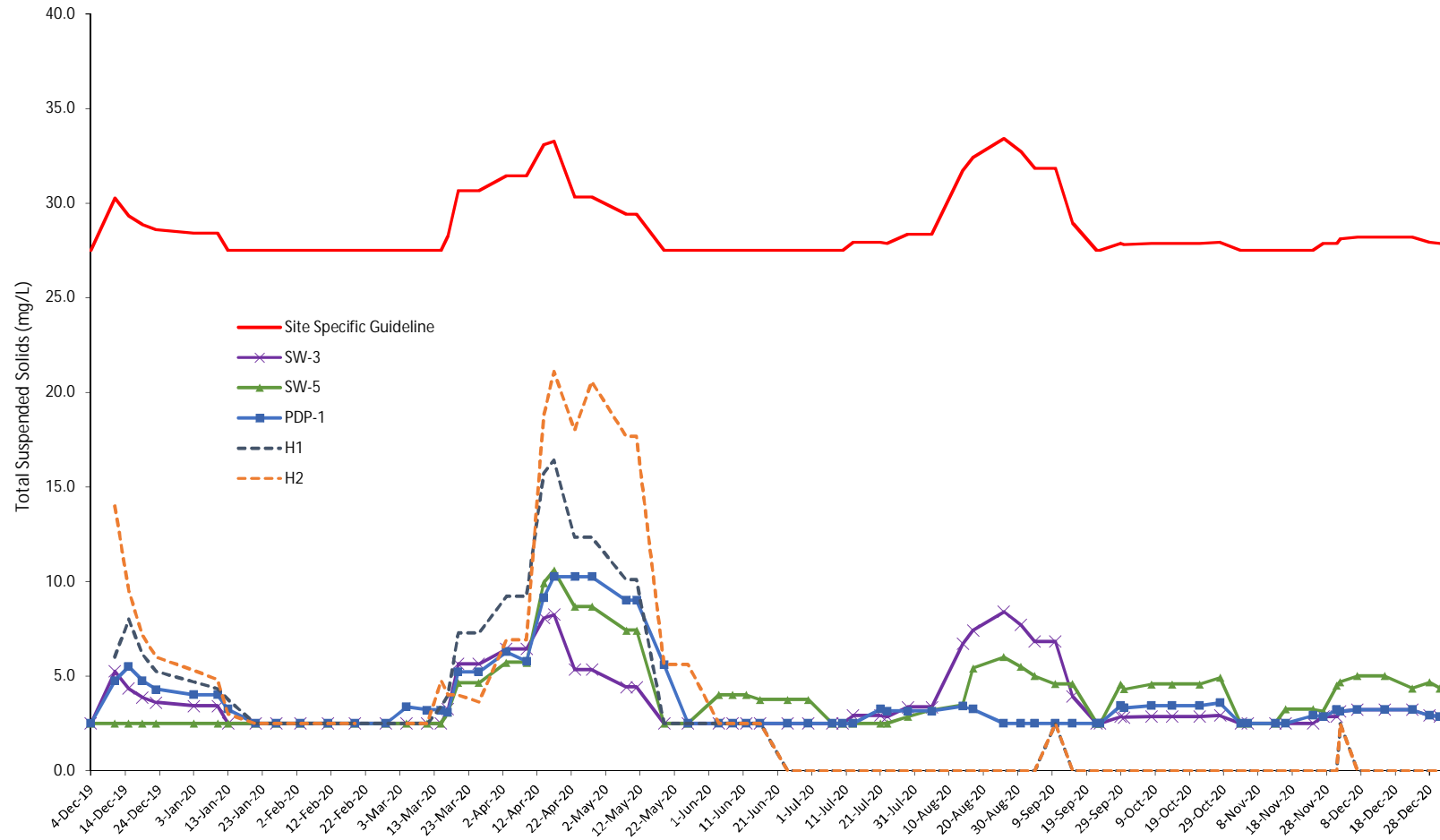
MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED, CANVEC
SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, INTERMAP, INCREMENT
P CORP, GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, KADASTER NL,
ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISS
TOPO, OPENSTREETMAP CONTRIBUTORS,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



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	Field Parameters					General Chemistry										
				pH	Water Temperature	Specific Conductivity	Dissolved Oxygen	Turbidity	Alkalinity (as CaCO ₃)	Calcium	Chloride	Hardness	Magnesium	Potassium	Sodium	Sulphate	Total Phosphorous	Total Dissolved Solids	Total Suspended Solids ^c
Units		°C	mm	-	°C	mS/cm	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	
CCME PAL ^d				6.5 - 9.0	-	-	-	-	-	-	640 (short term) 120 (long term)	-	-	-	-	-	-	-	-
Sample ID	Date																		
SW3	01-Dec-20	13.40	95.50		8.30	0.810		10.46										<5	
SW5	01-Dec-20				8.70	0.109		20.30										12	
PDP-1	01-Dec-20				8.60	0.167		11.90										5	
SW15 (FD)	01-Dec-20				8.70	0.109		20.30										9	
H1	02-Dec-20	8.60	Missing Data ^e		8.39	9.61	0.027	14.63	102.00	6	4.09	4.1	11.8	0.39	0.56	2.19	<1	52	45
H2	02-Dec-20				8.45	9.76	0.039	24.25	97.40	5	4.93	4.6	14.0	0.42	0.62	2.28	3	54	57
SW3	02-Dec-20				8.45	10.11	0.088	31.49	15.00	5	14.2	4.3	37.6	0.51	0.65	2.35	37	87	5
PDP-1	02-Dec-20				8.11	10.08	0.087	17.61	15.80	5	14.7	4.3	38.9	0.65	0.68	2.43	36	88	<5
SW5	02-Dec-20				8.10	10.09	0.120	21.94	16.10	5	21.2	4.5	55.6	0.54	0.69	2.58	47	107	6
SW3	07-Dec-20	0.40	Missing Data ^e		4.60	0.210		2.79								0.020		<5	
SW5	07-Dec-20				4.60	0.304		2.95								0.018		<5	
SW15 (FD)	07-Dec-02				4.60	0.304		2.95								0.019		<5	
PDP-1	07-Dec-20				4.60	0.269		1.95								0.018		<5	
SW3	15-Dec-20	-3.40	3.90		1.70	0.273		1.53										<5	
SW5	15-Dec-20				1.50	0.353		1.15										<5	
PDP-1	15-Dec-20				1.60	0.338		6.03										<5	
SW3	23-Dec-20	-5.10	Missing Data ^e		0.10	0.234		6.94										<5	
SW5	23-Dec-20				0.20	0.289		3.65										<5	
PDP-1	23-Dec-20				0.00	0.260		7.39										<5	
SW3	28-Dec-20	2.40	1.00		2.24	0.231		5.70										<5	
SW5	28-Dec-20				2.45	0.465		9.00										<5	
PDP-1	28-Dec-20				3.11	1.340		12.10										<5	
SW3	31-Dec-20	4.00	Missing Data ^e		1.42			6.30										<5	
SW5	31-Dec-20				1.48			1.40										<5	
PDP-1	31-Dec-20				1.58			4.30										<5	

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

b) Precipitation based on data from the climate station at the Saint John airport. Data available at: 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.

e) Precipitation data from the government of Canada climate station in Saint John is missing

Total phosphorus was collected on December 7 as it was excluded from the December 2 quarterly sampling.

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
3-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
3-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
5-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
3-Apr-20	31.4	9.2	6.9	6.4	5.7	6.3
9-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
8-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
4-Jun-20	27.5	2.5	2.5	2.5	10.0	2.5
8-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
7-Jul-20	27.5	-	-	2.5	2.5	2.5
10-Jul-20	27.5	-	-	2.5	2.5	2.5

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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
5-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
4-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
8-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
3-Nov-20	27.5	-	-	2.5	2.5	2.5
5-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
1-Dec-20	27.9	-	-	2.9	4.5	3.2
2-Dec-20	28.1	2.5	2.5	3.1	4.7	3.1
7-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

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		Total Phosphorus	Total Suspended Solids
Units		mg/L	mg/L
Sample ID	Date		
SW5	01-Dec-20		12
SW15	01-Dec-20		9
RPD value			29%
SW5	07-Dec-20	0.018	<5
SW15	07-Dec-20	0.019	<5
RPD value		5%	0%
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/m ³)	Site Guideline (µg/m ³)
2020-07-22	14:51	24 hours	16.7	24.05	752	20.3	14.8415	14.8645	23000	39.8475	120
2020-07-28	23:59	24 hours	16.46	23.7	747	24.4	14.8261	14.8278	1700	2.9887	120
2020-08-04	13:55	24 hours	16.66	23.99	753	22.8	14.8264	14.8295	3100	5.3842	120
2020-08-09	23:59	24 hours	16.74	24.1	752	21.2	14.8422	14.8444	2200	3.8036	120
2020-08-15	23:59	24 hours	16.88	24.3	754	19.8	14.8243	14.8359	11600	19.8903	120
2020-08-21	23:59	24 hours	16.87	24.3	749	17.9	14.8394	14.8415	2100	3.6008	120
2020-08-27	23:59	24 hours	17.06	24.57	743	12.4	14.8233	14.845	21700	36.7996	120
2020-09-02	23:59	24 hours	16.75	24.12	747	18.8	14.8417	14.8614	19700	34.0312	120
2020-09-08	23:59	24 hours	17.02	24.51	759	19.1	14.8585	14.8706	12100	20.5698	120
2020-09-14	23:59	24 hours	17.62	25.37	756	8	14.8275	14.8368	9300	15.2739	120
2020-09-20	23:59	24 hours	18.03	25.97	764	4.8	14.8349	14.852	17100	27.4355	120
2020-09-26	23:59	24 hours	17.1	24.62	753	15.3	14.8561	14.8594	3300	5.5849	120
2020-10-02	23:59	24 hours	14.43	25.1	753	9.6	14.9721	14.9593	-12800	-21.2483	120
2020-10-08	23:59	24 hours	17.69	25.48	748	3.8	14.8606	14.8894	28800	47.0958	120
2020-10-14	23:59	24 hours	17.56	25.29	753	7.8	14.8828	14.8911	8300	13.6747	120
2020-10-20	23:59	19:31	17.63	20.66	760	9.1	14.8749	14.8578	-17100	-34.4869	120
2020-10-23	23:59	21:55	17.34	22.82	750	10.1	14.8592	14.8648	5600	10.2249	120
2020-10-26	23:59	21:02	17.71	22.35	752	4.8	14.8541	14.8642	10100	18.8292	120
2020-11-01	23:59	24 hours	17.19	24.75	732	5.9	14.8729	14.8802	7300	12.2896	120
2020-11-07	23:59	24 hours	17.84	25.68	759	5.9	14.8692	14.8723	3100	5.0299	120
2020-11-13	23:59	24 hours	17.79	25.62	748	1.9	14.86	14.8606	600	0.9758	120
2020-11-19	23:59	24 hours	17.63	25.22	756	7.3	14.8476	14.8498	2200	3.6347	120
2020-11-25	23:59	24 hours	17.83	25.68	756	4.4	14.8496	14.8563	6700	10.8710	120
2020-12-01	23:59	24 hours	17.48	25.18	748	7	14.8427	14.861	18300	30.2820	120
2020-12-07	23:59	24 hours	17.88	25.75	740	-2.1	14.8343	14.8362	1900	3.0744	120
2020-12-13	23:59	24 hours	17.98	25.9	746	-1.3	14.8306	14.8389	8300	13.3526	120
2020-12-19	23:59	24 hours	18.37	26.45	756	-3.6	14.8373	14.843	5700	8.9792	120
2020-12-25	23:59	24 hours	17.34 ^a	22.82 ^a	753 ^a	12.3 ^a	14.84	14.85	10000	18.2588	120
2020-12-31	23:59	24 hours	18.58	26.76	759	-5.8	14.8452	14.85	4800	7.4738	120
2021-01-06	23:59	24 hours	18	24.73	744	-2.7	14.836	14.8523	16300	27.4633	120
2021-01-12	23:59	24 hours	16.7	24.74	749	-6.7	14.8542	14.8724	18200	30.6521	120
2021-01-18	23:59	24 hours	17.52	25.52	737	-0.8	14.8681	14.8767	8600	14.0413	120
2021-01-24									0	#DIV/0!	120
2021-01-30									0	#DIV/0!	120
2021-02-05									0	#DIV/0!	120
2021-02-11									0	#DIV/0!	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 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.

December 7, 2020

Project No.: 20S072.00

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

Re: Blast Vibration Monitoring – Blast No. 2020-12 – 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 14:08 on December 7, 2020.

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. 2020-12 – December 7, 2020

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)	14:08	1,383 m S	< 0.5 mm/s	< 120	Units were not triggered
2. Civic No. 4126 Route 111 (PW-10)		946 m S	< 0.5 mm/s	< 120	
3. Civic No. 4150 Route 111 (PW-13)		800 m S	< 0.5 mm/s	< 120	
4. Civic No. 2447 Route 820 (PW-07)		904 m NE	0.89 mm/s @ 32 Hz	114	-
5. PW-03 - Route 820		581 m N	0.70 mm/s @ 57 Hz	119	-
6. Civic No. 2341 Route 820 (PW-05)		614 m NW	1.21 mm/s @ 30 Hz	119	-
7. Civic No. 50 Myron Road (PW-15)		854 m NW	0.83 mm/s @ 73 Hz	114	-
8. Civic No. 86 Myron Road (PW-16)		812 m W	1.52 mm/s @ 28 Hz	<100	Microphone malfunction
9. Civic No. 220 Myron Road (PW-01)		1,394 m S	< 0.5 mm/s	< 120	Unit was not triggered
10. Civic No. 4140 Route 111 (PW-12)		875 m S	0.57 mm/s @ 39 Hz	118	-
11. Civic No. 2337 Route 820 (PW-04)		663 m NW	0.51 mm/s @ 43 Hz	116	-
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 LTD.



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

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Reports

BLAST RECORD

Project Name:	Upham Gypsum Quarry	Date of Blast:	Dec. 7, 2020
Project No.:	20S072.00	Time of Blast:	14:08
Inspector:	K. Harris	Blast No.:	2020-12
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	Blaster's Name:	Daniel Blanchard
Blast Location:	N 45°28'54.6" E 65°38'01.5"		
Type of Rock:	Gypsum	Est. Vol. or Tonnage:	17,900 tonnes
Weather at time of Blast:	Overcast with flurries	Air Temp.:	2°C
Est. Wind Speed :	≈15 km/h	Wind Direction:	WNW
Cloud Cover:	Overcast	Precipitation:	Flurries

BLAST DESIGN:

Total No. Holes:	122	Hole Diameter:	5.5"
Average Depth:	4.0 m to 7.6 m	Spacing:	12 ft x 12 ft
No. Holes per Delay:	3	Collar Length:	8 ft
Delay between Holes:	25 ms	Delay between Rows:	17 & 42 ms
Initiation Method:	Non-electric		
Weight of Explosives per Delay:	Max.: 186 kg		
Type and weight of Explosives for Blast:	6,740 kg Titan XL1000		

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

BLAST RECORD

Project Name: Upham Gypsum Quarry
Project No.: 20S072.00
Inspector: K. Harris
Client: Hammond River Holdings

Date of Blast: Dec. 7, 2020
Time of Blast: 14:08
Blast No.: 2020-12

BLAST MONITORING

Distance to the Nearest Structure: 580 m
Direction to the Nearest Structure: North
Structure Type: Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay): 42.5

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.

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 7, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:08</u>
Inspector:	<u>K. Harris</u>	Blast No.:	<u>2020-12</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5676</u>
Calibration Date:	<u>February 26, 2020</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,383 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial # 5371</u>
Calibration Date:	<u>June 24, 2020</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>946 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 7, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:08</u>
Inspector:	<u>K. Harris</u>	Blast No.:	<u>2020-12</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5635</u>
Calibration Date:	<u>March 26, 2020</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>800 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial # 21349</u>
Calibration Date:	<u>June 12, 2020</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>904 m Northeast</u>
Transverse Particle Velocity:	<u>0.76 mm/s @ 32 Hz</u>
Vertical Particle Velocity:	<u>0.38 mm/s @ 51 Hz</u>
Longitudinal Particle Velocity:	<u>0.89 mm/s @ 32 Hz</u>
Peak Particle Velocity:	<u>0.89 mm/s @ 32 Hz</u>
Maximum Airblast:	<u>114 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 7, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:08</u>
Inspector:	<u>K. Harris</u>	Blast No.:	<u>2020-12</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial # 5960</u>
Calibration Date:	<u>May 15, 2020</u>
Location of seismograph:	<u>PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>581 m North</u>
Transverse Particle Velocity:	<u>0.70 mm/s @ 24 Hz</u>
Vertical Particle Velocity:	<u>0.70 mm/s @ 57 Hz</u>
Longitudinal Particle Velocity:	<u>0.64 mm/s @ 23 Hz</u>
Peak Particle Velocity:	<u>0.70 mm/s @ 57 Hz</u>
Maximum Airblast:	<u>119 dB(L)</u>

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5487</u>
Calibration Date:	<u>March 26, 2020</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>614 m Northwest</u>
Transverse Particle Velocity:	<u>1.14 mm/s @ 73 Hz</u>
Vertical Particle Velocity:	<u>0.83 mm/s @ 51 Hz</u>
Longitudinal Particle Velocity:	<u>1.21 mm/s @ 30 Hz</u>
Peak Particle Velocity:	<u>1.21 mm/s @ 30 Hz</u>
Maximum Airblast:	<u>119 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 7, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:08</u>
Inspector:	<u>K. Harris</u>	Blast No.:	<u>2020-12</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial # 5632</u>
Calibration Date:	<u>October 22, 2020</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>854 m Northwest</u>
Transverse Particle Velocity:	<u>0.51 mm/s @ 28 Hz</u>
Vertical Particle Velocity:	<u>0.83 mm/s @ 73 Hz</u>
Longitudinal Particle Velocity:	<u>0.70 mm/s @ 57 Hz</u>
Peak Particle Velocity:	<u>0.83 mm/s @ 73 Hz</u>
Maximum Airblast:	<u>114 dB(L)</u>

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial # 5673</u>
Calibration Date:	<u>February 28, 2020</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>812 m West</u>
Transverse Particle Velocity:	<u>1.08 mm/s @ 27 Hz</u>
Vertical Particle Velocity:	<u>1.02 mm/s @ 26 Hz</u>
Longitudinal Particle Velocity:	<u>1.52 mm/s @ 28 Hz</u>
Peak Particle Velocity:	<u>1.52 mm/s @ 28 Hz</u>
Maximum Airblast:	<u><100 dB(L) (problem with the microphone)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 7, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:08</u>
Inspector:	<u>K. Harris</u>	Blast No.:	<u>2020-12</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial # 5372</u>
Calibration Date:	<u>June 24, 2020</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,394 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5489</u>
Calibration Date:	<u>May 15, 2020</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>875 m South</u>
Transverse Particle Velocity:	<u>0.32 mm/s @ 51 Hz</u>
Vertical Particle Velocity:	<u>0.57 mm/s @ 39 Hz</u>
Longitudinal Particle Velocity:	<u>0.25 mm/s @ 64 Hz</u>
Peak Particle Velocity:	<u>0.57 mm/s @ 39 Hz</u>
Maximum Airblast:	<u>118 dB(L)</u>

BLAST RECORD

Project Name: Upham Gypsum Quarry
Project No.: 20S072.00
Inspector: K. Harris
Client: Hammond River Holdings

Date of Blast: Dec. 7, 2020
Time of Blast: 14:08
Blast No.: 2020-12

Data Collection – Seismometer #11

Make, Model and Serial # of unit: Instantel Mini Mate, Serial # 21348
Calibration Date: June 12, 2020
Location of seismograph: Civic No. 2337 Route 820 (PW-04)
Distance and Direction from Blast: 663 m Northwest
Transverse Particle Velocity: 0.38 mm/s @ 57 Hz
Vertical Particle Velocity: 0.51 mm/s @ 43 Hz
Longitudinal Particle Velocity: 0.51 mm/s @ 57 Hz
Peak Particle Velocity: 0.51 mm/s @ 43 Hz
Maximum Airblast: 116 dB(L)

Blast and Seismograph Location Plan
Blast No: 2020-12
Upham East Gypsum Quarry, Upham, NB



Date: December 7, 2020
CEL Project No.: 20S072.00

Date/Time Long at 14:08:13 December 7, 2020
Trigger Source Geo: 0.510 mm/s, Mic: 124.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 4.75 sec (Auto=4Sec) at 1024 sps

Serial Number BE21349 V 10.72-1.1 Minimate Blaster
Battery Level 6.2 Volts
Unit Calibration June 12, 2020 by InstanTel
File Name W349IR4S.LP0
Post Event Notes
 Location of Seismograph: 2447 Route 820 (PW-07)
 Blast No.: 2020-12
 CEL Project No.: 20S072.00

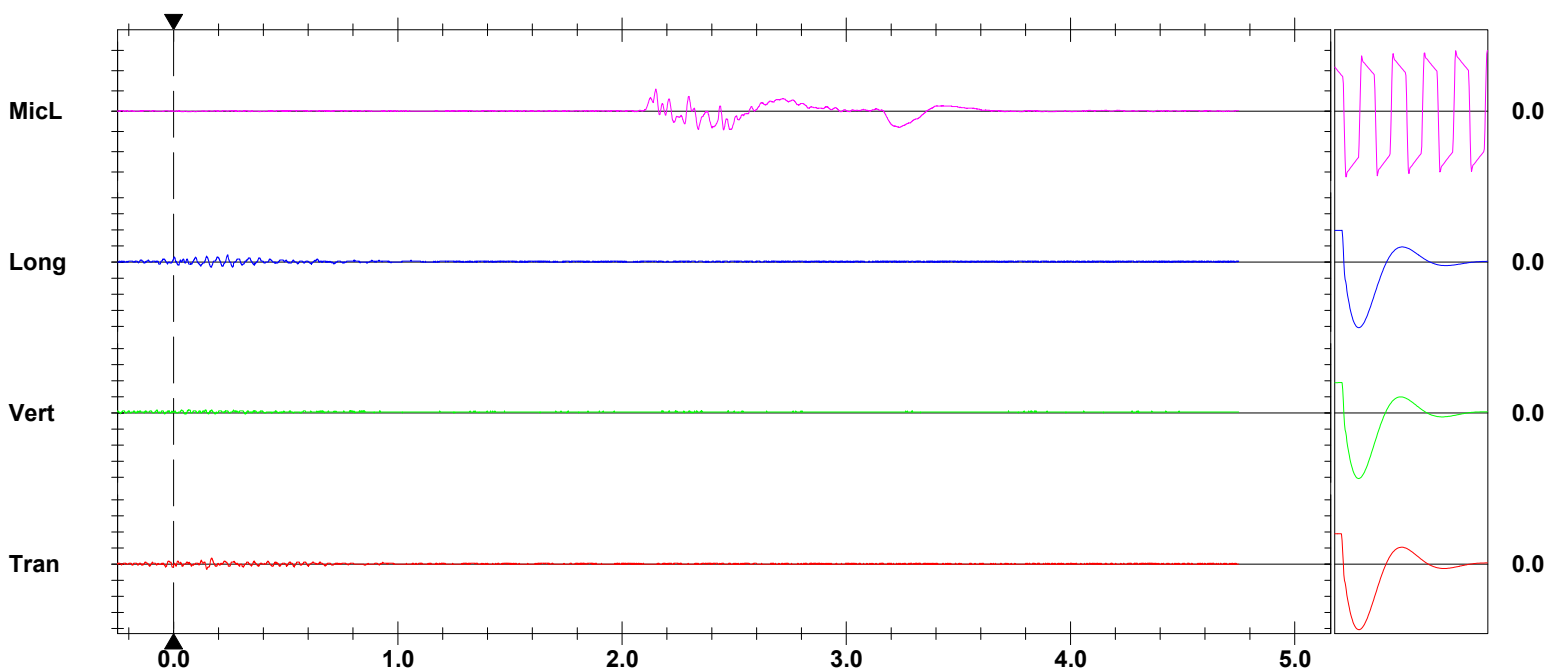
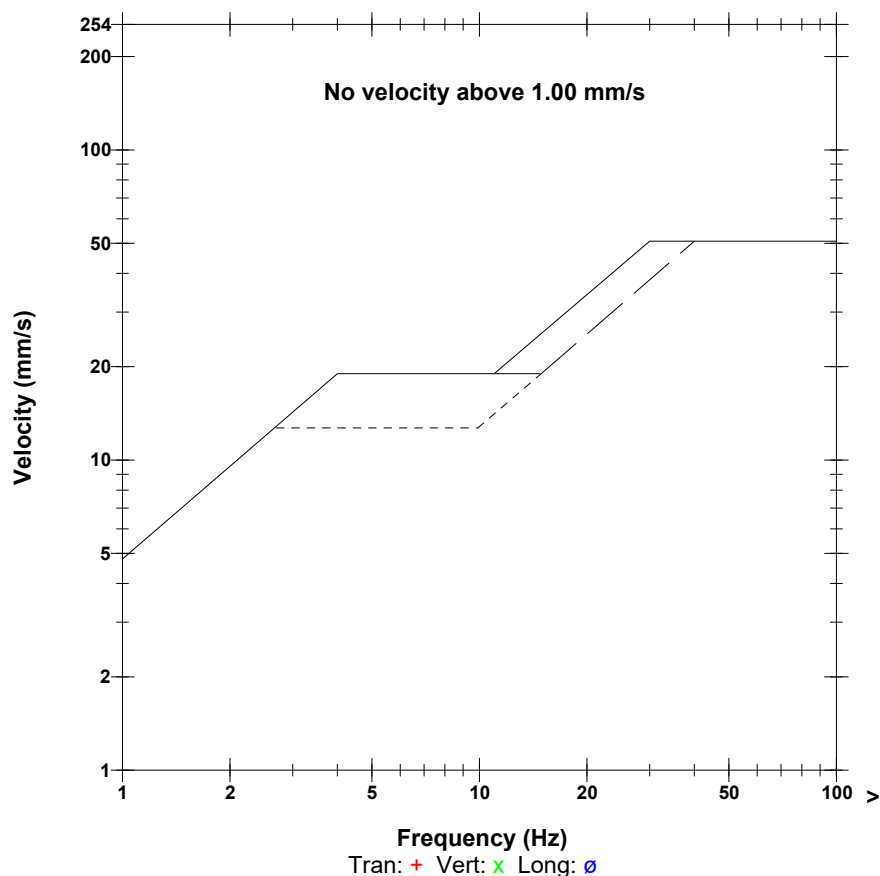
Notes

Microphone Linear Weighting
PSPL 114.8 dB(L) 11.00 pa.(L) at 2.150 sec
ZC Freq 7.6 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 716 mv)

	Tran	Vert	Long	
PPV	0.762	0.381	0.889	mm/s
ZC Freq	32	51	32	Hz
Time (Rel. to Trig)	0.168	-0.076	0.239	sec
Peak Acceleration	0.027	0.013	0.027	g
Peak Displacement	0.004	0.002	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.3	7.5	7.2	Hz
Overswing Ratio	3.9	4.1	4.3	

Peak Vector Sum 1.063 mm/s at 0.168 sec

USBM RI8507 And OSMRE



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

Date/Time Vert at 14:08:24 December 7, 2020
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

Serial Number 5960 V 2.61 MiniMate
Battery Level 5.9 Volts
Unit Calibration May 15, 2020 by InstanTel
File Name G960IR6N.A00
Post Event Notes
 Location of Seismograph: PW-03 - Route 820
 Blast No.: 2020-12
 CEL Project No.: 20S072.00

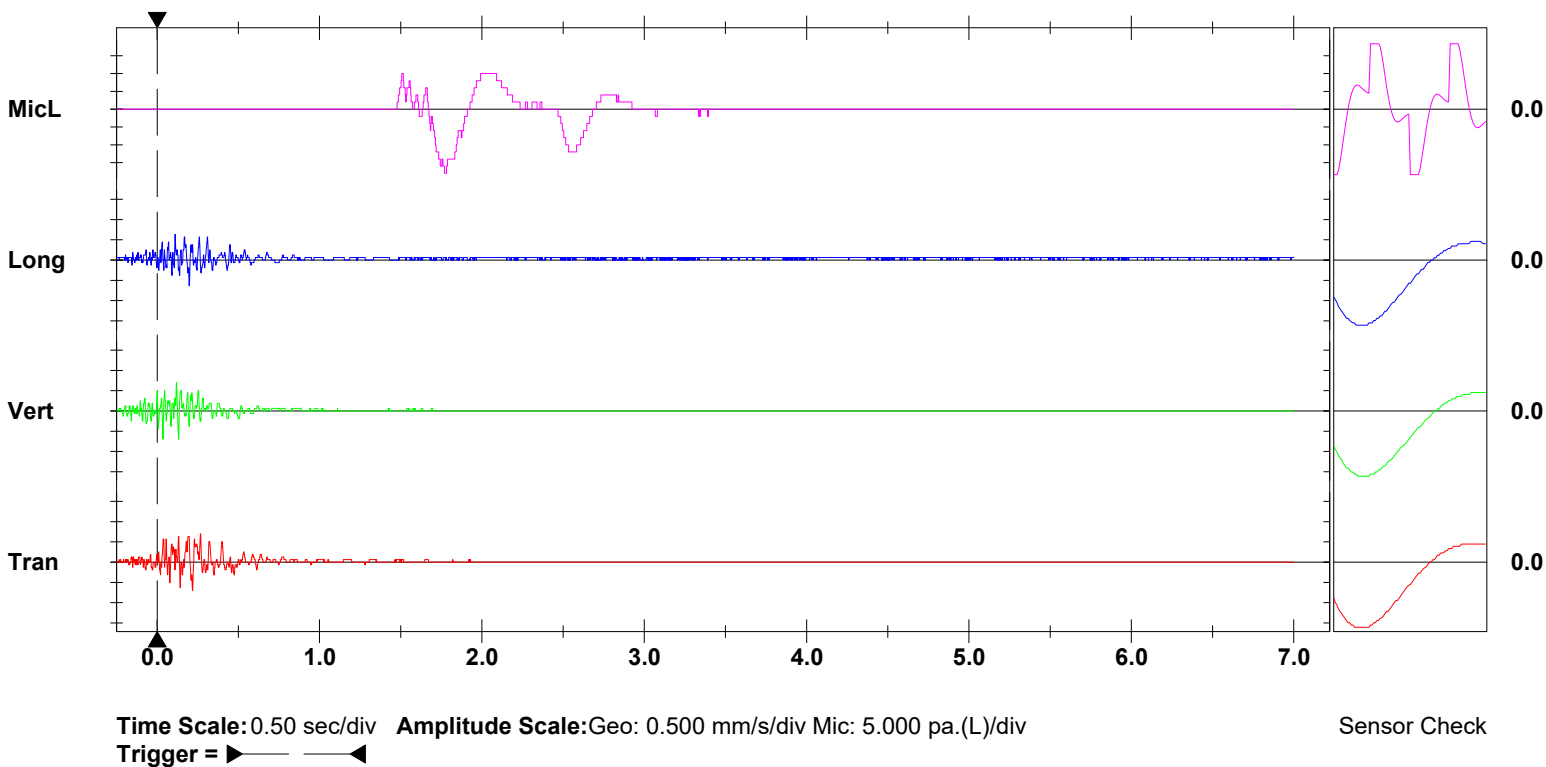
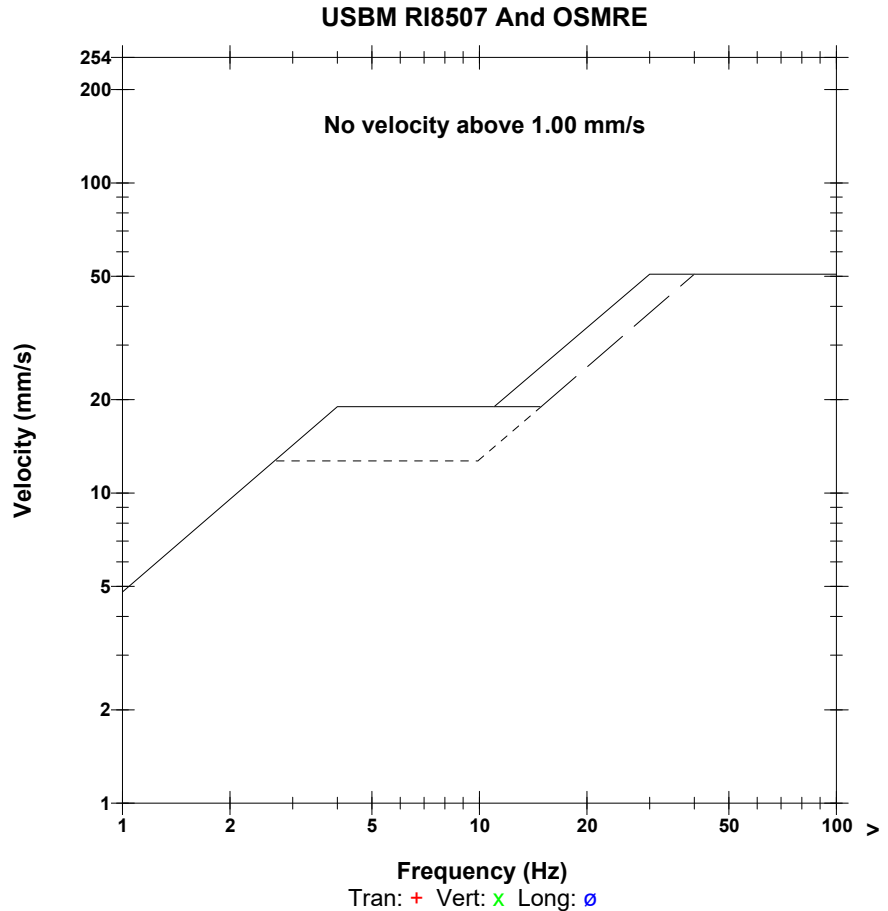
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 Location:
 Client:
 User Name:
 Converted: December 7, 2020 16:27:51 (V8.01)

Extended Notes

Microphone Linear Weighting
PSPL 119.1 dB(L) 18.00 pa.(L) at 1.771 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 297 mv)

	Tran	Vert	Long	
PPV	0.699	0.699	0.635	mm/s
ZC Freq	24	57	23	Hz
Time (Rel. to Trig)	0.218	0.037	0.110	sec
Peak Acceleration	0.020	0.027	0.027	g
Peak Displacement	0.006	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.6	7.8	Hz
Overswing Ratio	3.7	3.7	4.0	

Peak Vector Sum 0.984 mm/s at 0.134 sec



Date/Time Vert at 14:08:25 December 7, 2020
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

Serial Number 5487 V 2.61 MiniMate
Battery Level 6.0 Volts
Unit Calibration March 26, 2020 by InstanTel
File Name G487IR6N.A10

Notes
 Location:
 Client:
 User Name:
 Converted: December 7, 2020 16:41:03 (V8.01)

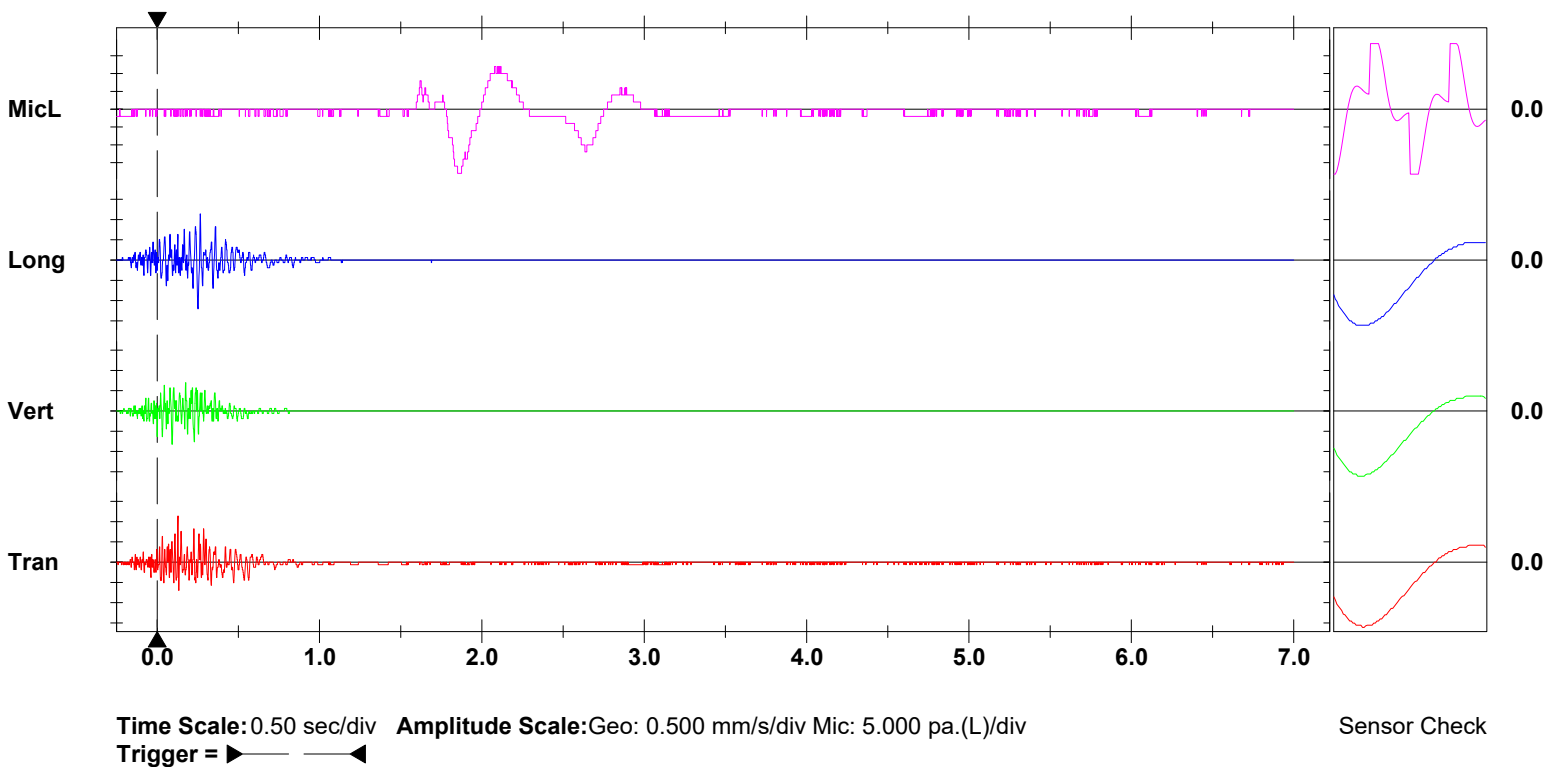
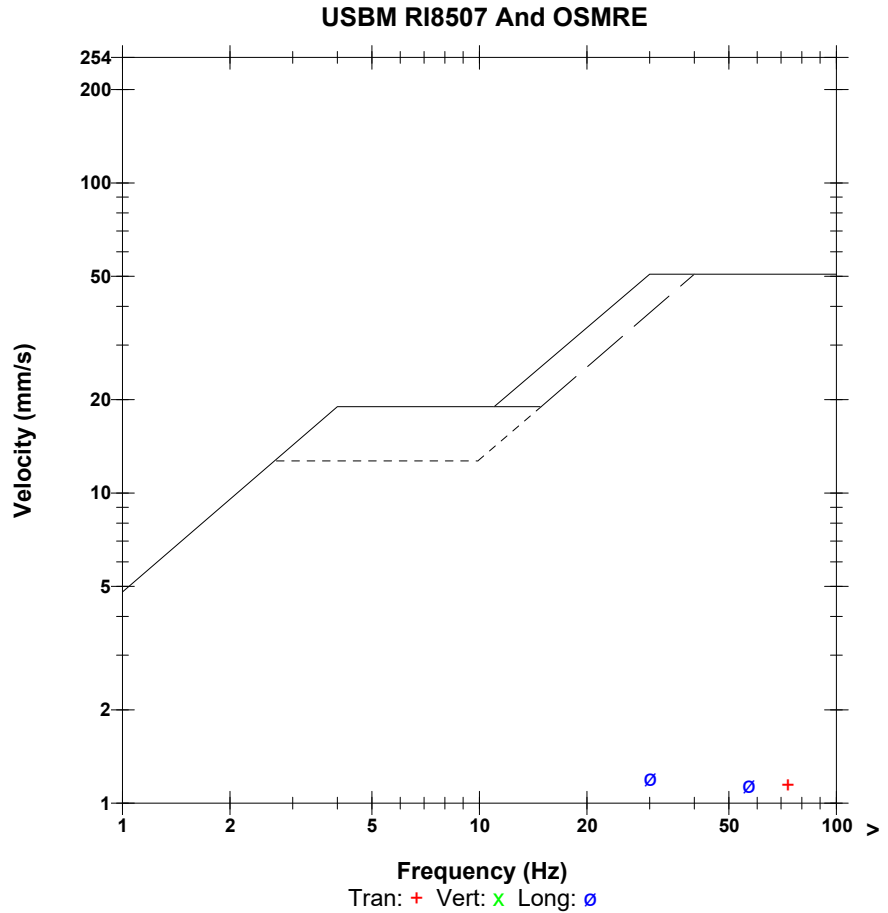
Post Event Notes
 Location of Seismograph: 2341 Route 820 (PW-05)
 Blast No.: 2020-12
 CEL Project No.: 20S072.00

Extended Notes

Microphone Linear Weighting
PSPL 119.1 dB(L) 18.00 pa.(L) at 1.851 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 286 mv)

	Tran	Vert	Long	
PPV	1.143	0.826	1.207	mm/s
ZC Freq	73	51	30	Hz
Time (Rel. to Trig)	0.129	0.093	0.252	sec
Peak Acceleration	0.046	0.033	0.033	g
Peak Displacement	0.003	0.003	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.7	Hz
Overswing Ratio	3.5	3.8	3.8	

Peak Vector Sum 1.302 mm/s at 0.129 sec



Date/Time Vert at 14:08:24 December 7, 2020
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

Serial Number 5632 V 2.61 MiniMate
Battery Level 5.9 Volts
Unit Calibration October 22, 2020 by InstanTel
File Name G632IR6N.A00
Post Event Notes
 Location of Seismograph: 50 Myron Road (PW-15)
 Blast No.: 2020-12
 CEL Project No.: 20S072.00

Notes

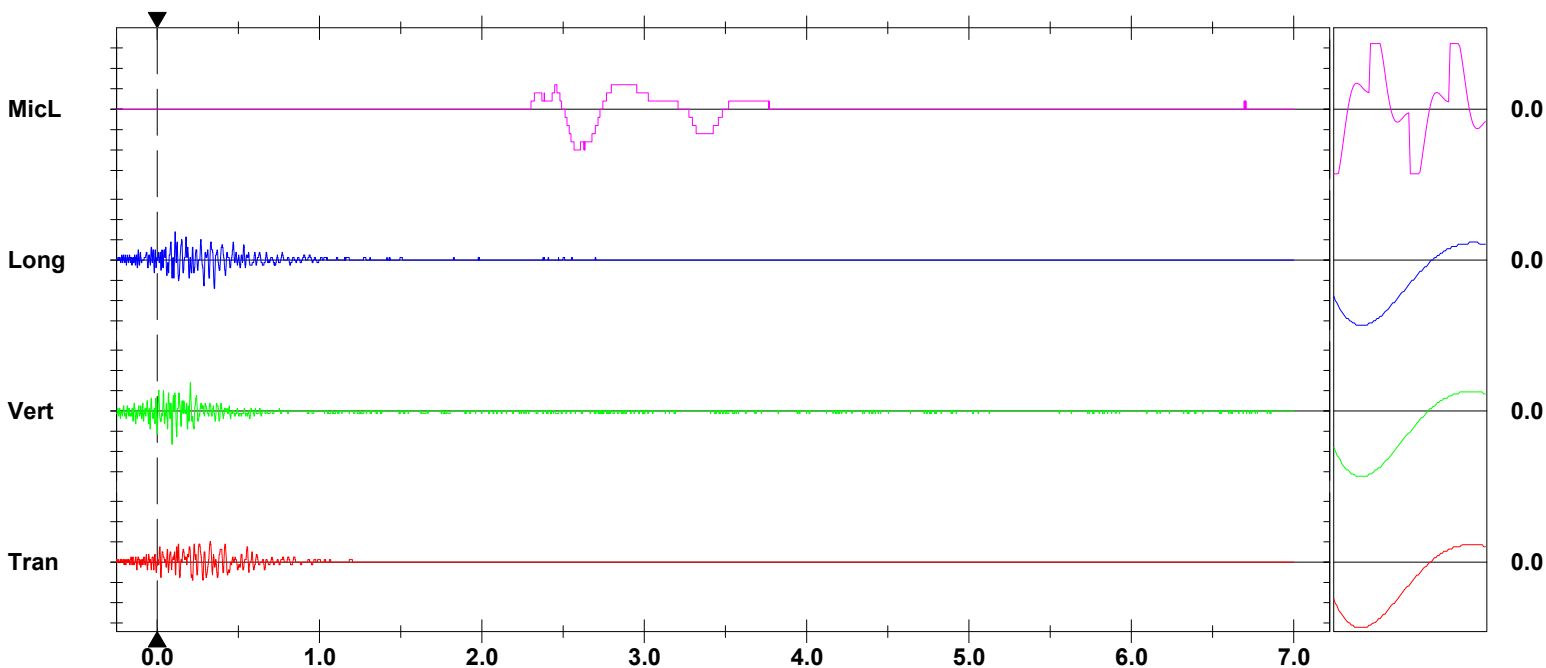
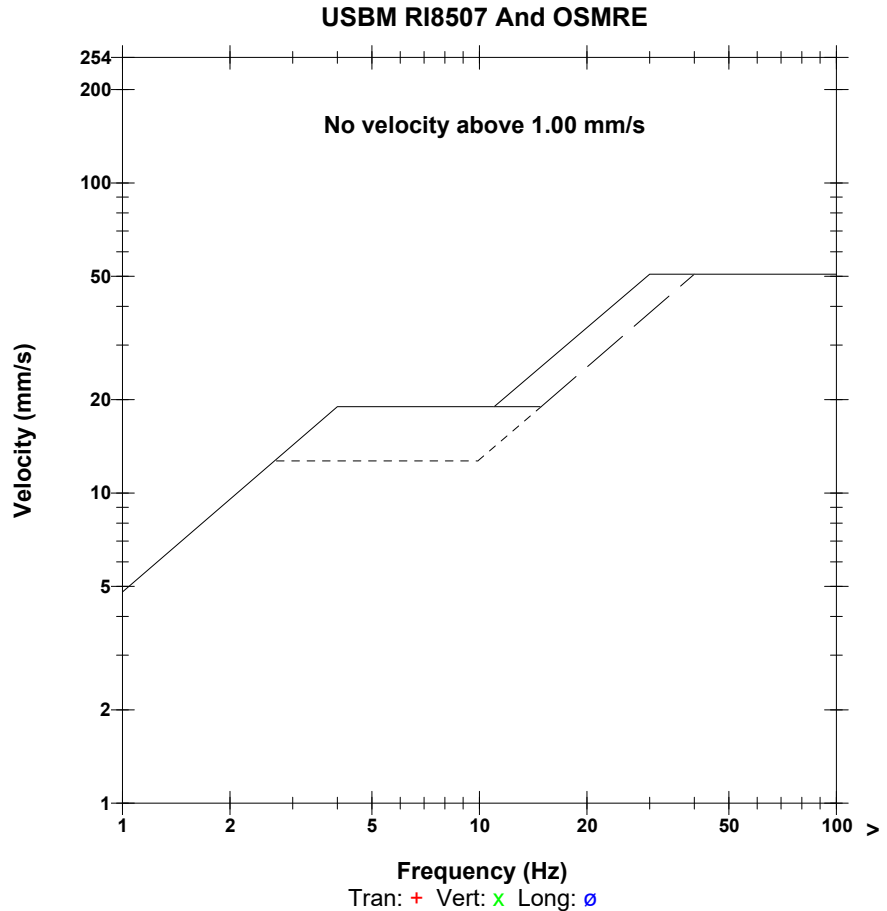
Location:
 Client:
 User Name:
 Converted: December 7, 2020 16:42:49 (V8.01)

Extended Notes

Microphone Linear Weighting
PSPL 114.0 dB(L) 10.000 pa.(L) at 2.568 sec
ZC Freq 2.0 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 298 mv)

	Tran	Vert	Long	
PPV	0.508	0.826	0.699	mm/s
ZC Freq	28	73	57	Hz
Time (Rel. to Trig)	0.326	0.093	0.111	sec
Peak Acceleration	0.020	0.033	0.020	g
Peak Displacement	0.003	0.002	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	8.2	7.8	Hz
Overswing Ratio	3.8	3.6	3.7	

Peak Vector Sum 0.937 mm/s at 0.093 sec



Sensor Check

Date/Time Vert at 14:08:23 December 7, 2020
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

Serial Number 5673 V 2.61 MiniMate
Battery Level 6.2 Volts
Unit Calibration February 28, 2020 by Instantel
File Name G673IR6N.9Z0

Notes
 Location:
 Client:
 User Name:
 Converted: December 7, 2020 16:22:12 (V8.01)

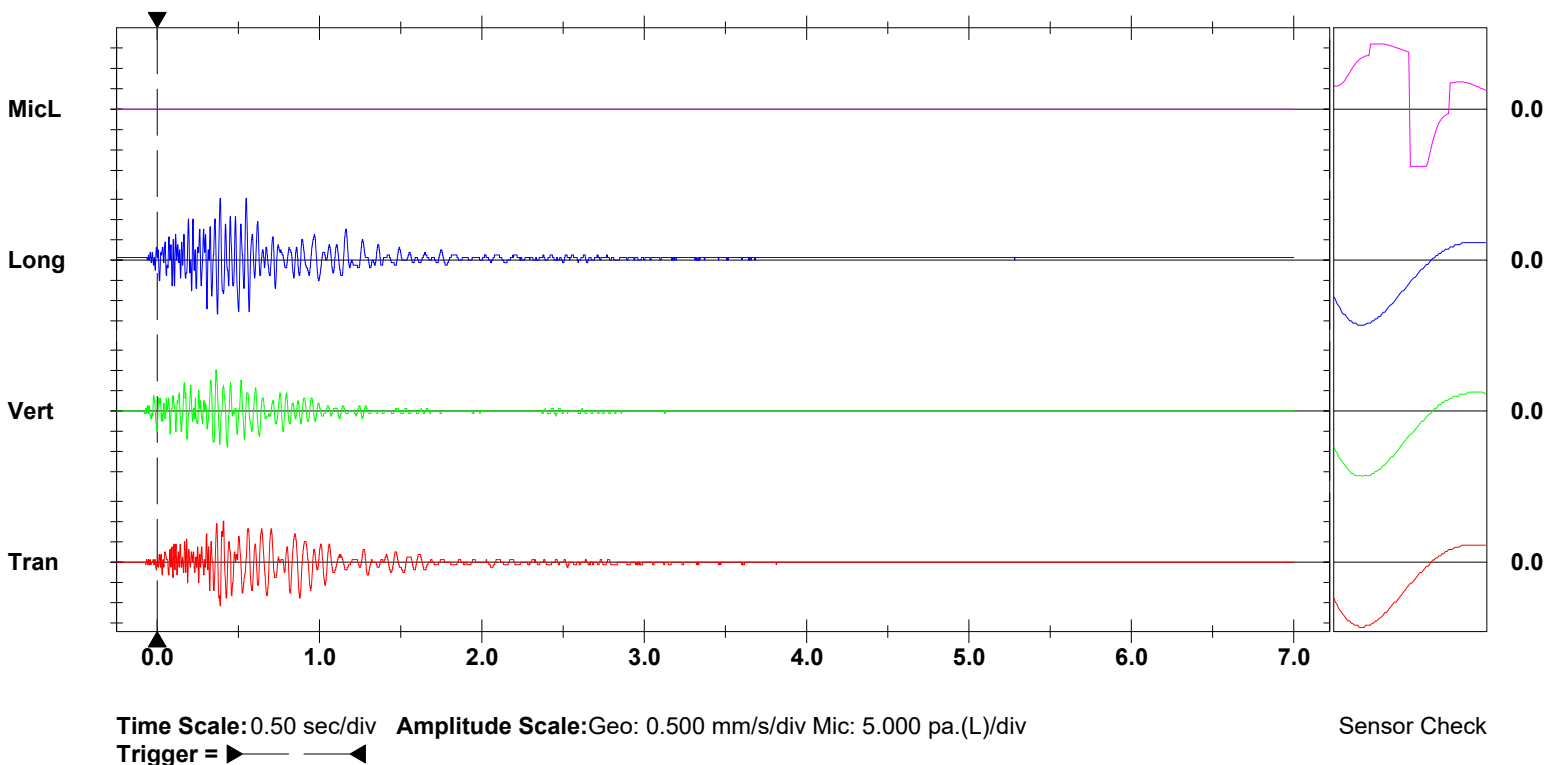
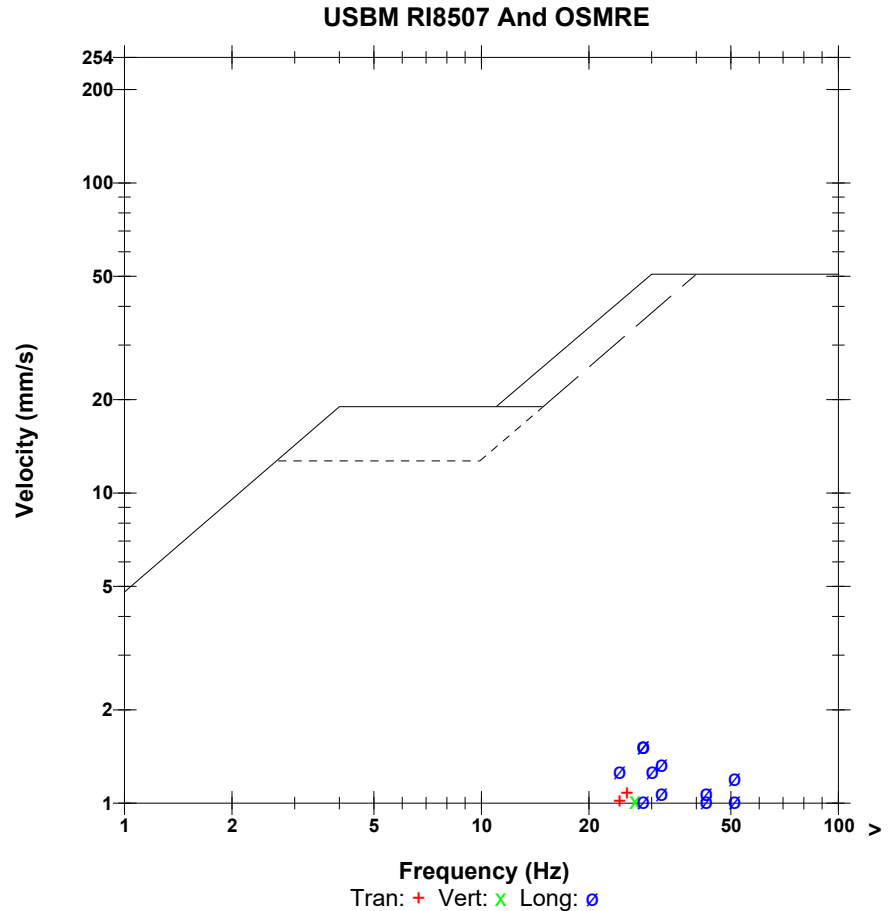
Post Event Notes
 Location of Seismograph: 86 Myron Road (PW-16)
 Blast No.: 2020-12
 CEL Project No.: 20S072.00

Extended Notes

Microphone Linear Weighting
PSPL <100 dB(L) <2.00 pa.(L)
ZC Freq N/A
Channel Test Check (Freq = 0.0 Hz Amp = 291 mv)

	Tran	Vert	Long	
PPV	1.080	1.016	1.524	mm/s
ZC Freq	27	26	28	Hz
Time (Rel. to Trig)	0.389	0.363	0.389	sec
Peak Acceleration	0.033	0.033	0.033	g
Peak Displacement	0.008	0.006	0.009	mm
Sensor Check	Passed	Passed	Passed	
Frequency	8.0	7.8	8.0	Hz
Overswing Ratio	3.9	3.6	3.8	

Peak Vector Sum 2.000 mm/s at 0.389 sec
 N/A: Not Applicable



Date/Time Vert at 14:08:18 December 7, 2020
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

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.0 Volts
Unit Calibration May 15, 2020 by InstanTel
File Name G489IR6N.9U0

Notes
 Location:
 Client:
 User Name:
 Converted: December 7, 2020 16:25:01 (V8.01)

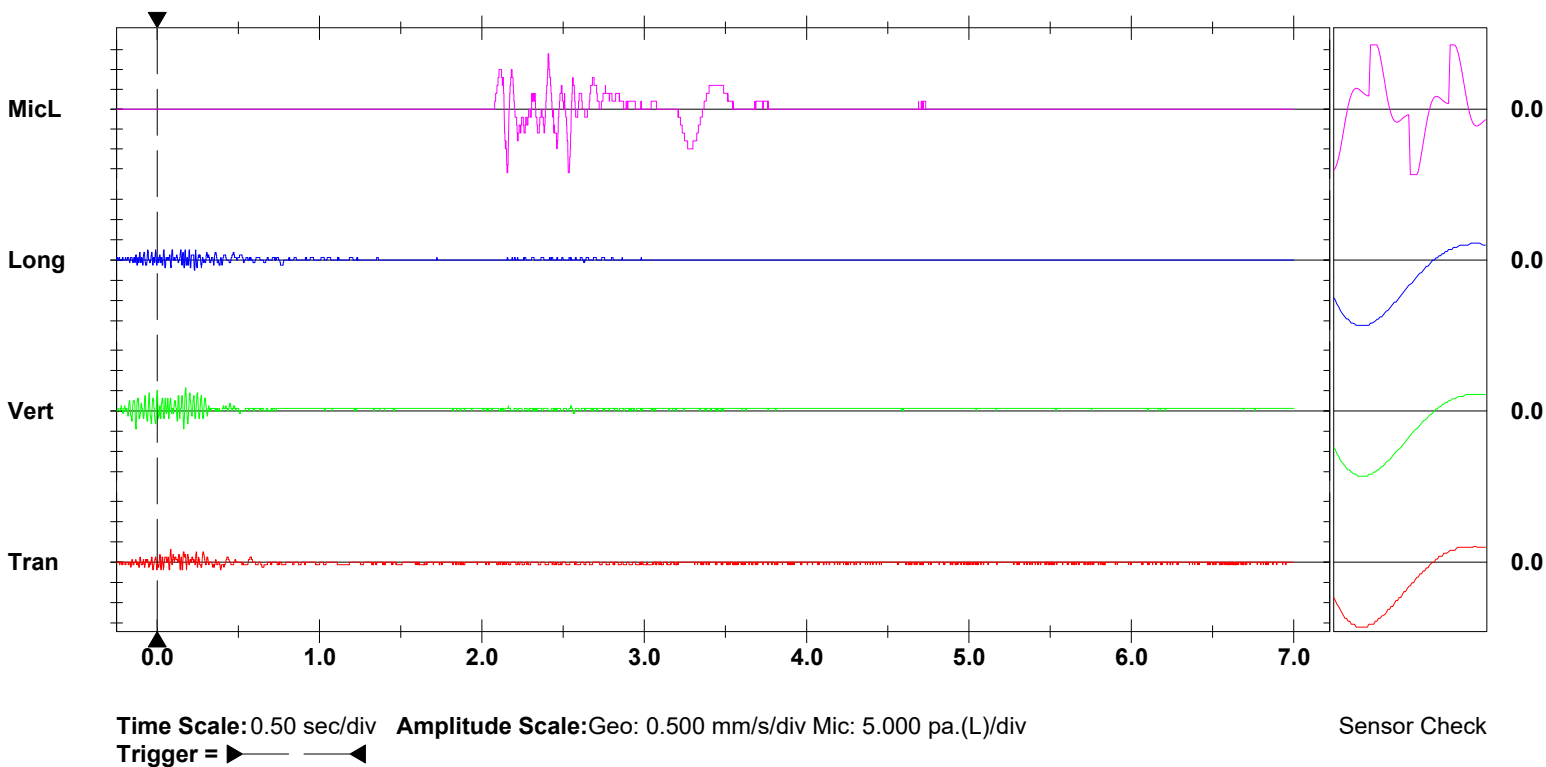
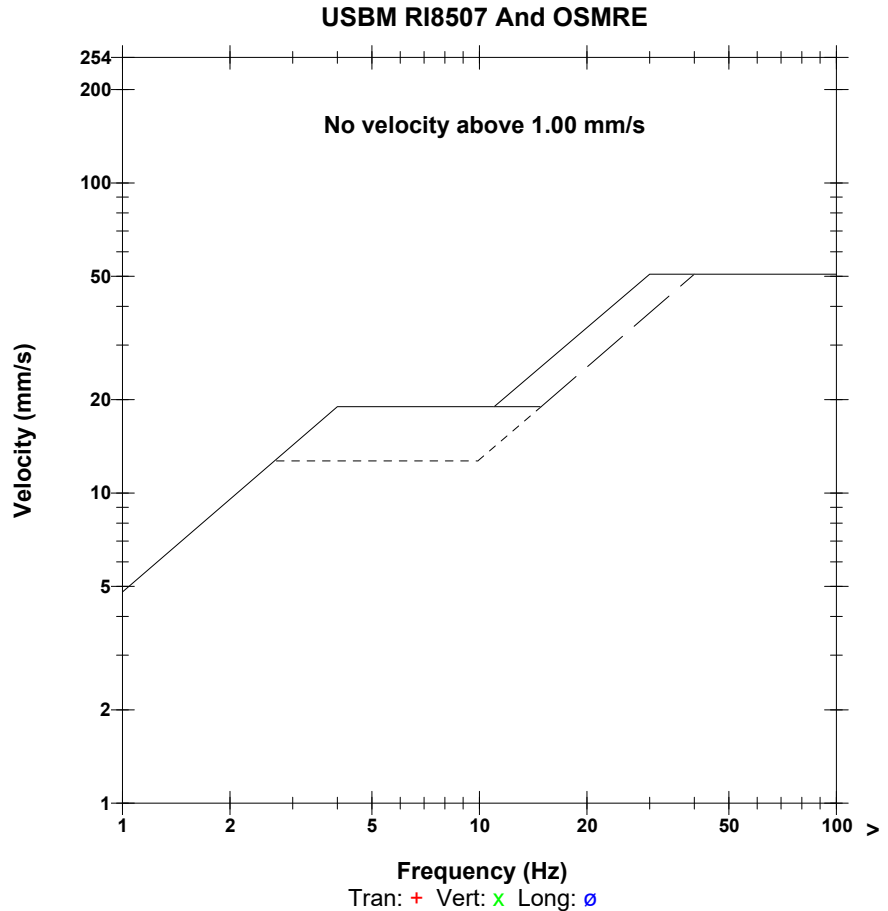
Post Event Notes
 Location of Seismograph: 4140 Route 111 (PW-13)
 Blast No.: 2020-12
 CEL Project No.: 20S072.00

Extended Notes

Microphone Linear Weighting
PSPL 118.1 dB(L) 16.00 pa.(L) at 2.155 sec
ZC Freq 17 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 272 mv)

	Tran	Vert	Long	
PPV	0.318	0.572	0.254	mm/s
ZC Freq	51	39	64	Hz
Time (Rel. to Trig)	0.083	0.176	-0.009	sec
Peak Acceleration	0.013	0.020	0.013	g
Peak Displacement	0.001	0.002	0.000	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.7	7.7	7.7	Hz
Overswing Ratio	4.1	4.0	3.9	

Peak Vector Sum 0.603 mm/s at 0.174 sec



Date/Time Long at 14:08:00 December 7, 2020
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 4.25 sec (Auto=4Sec) at 1024 sps

Serial Number BE21348 V 10.72-1.1 Minimate Blaster
Battery Level 6.1 Volts
Unit Calibration June 12, 2020 by InstanTel
File Name W348IR4S.LC0
Post Event Notes
 Location of Seismograph: 2337 Route 820 (PW-04)
 Blast No.: 2020-12
 CEL Project No.: 20S072.00

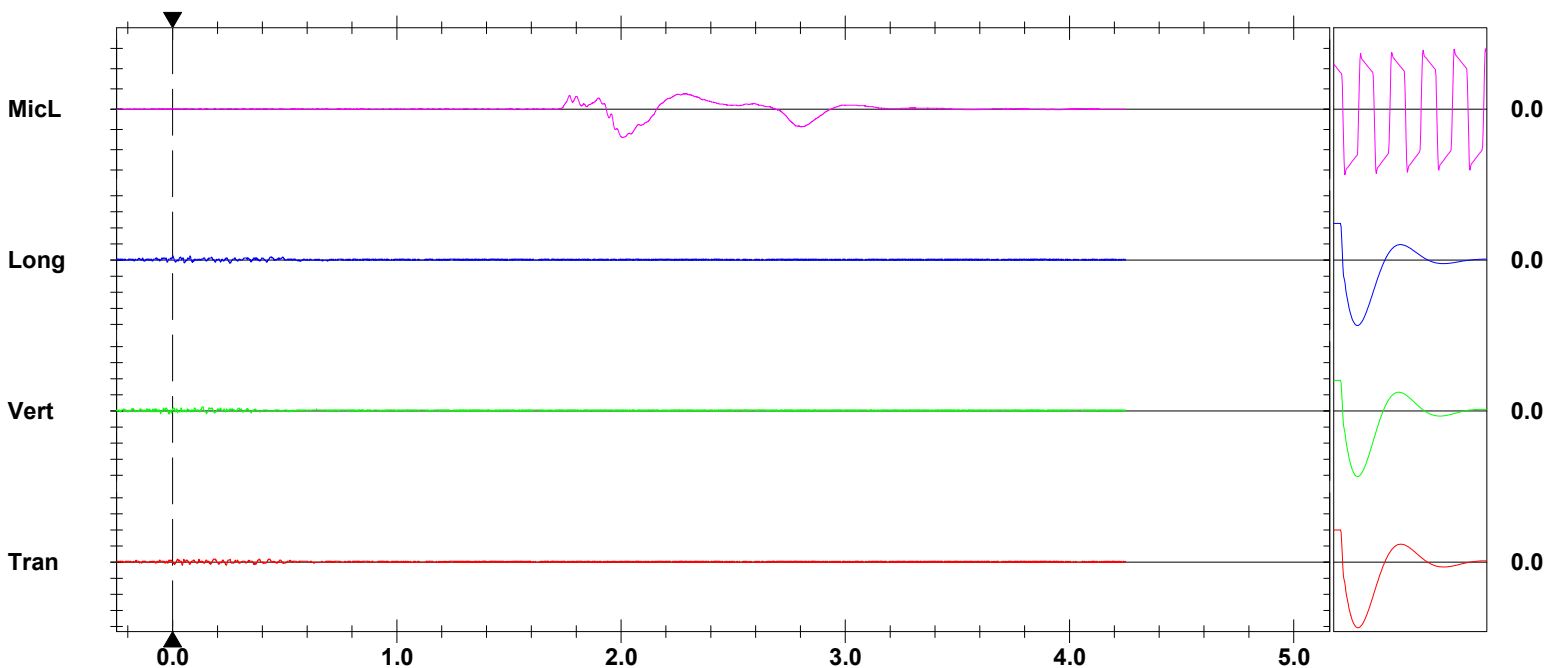
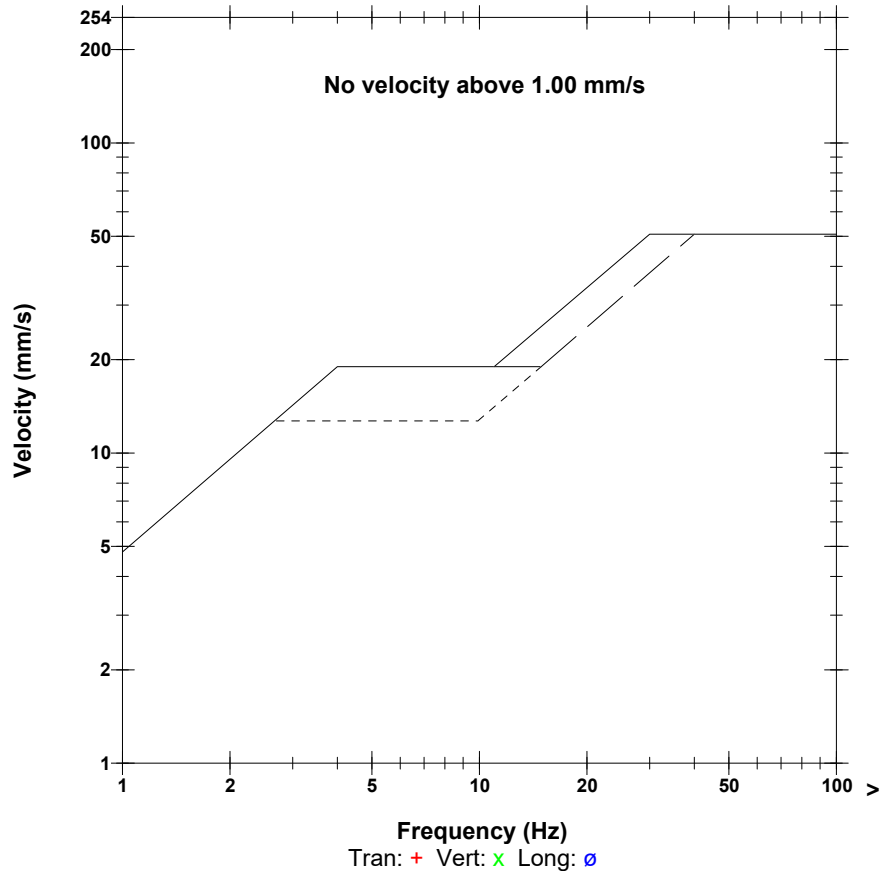
Notes

Microphone Linear Weighting
PSPL 116.9 dB(L) 14.00 pa.(L) at 2.004 sec
ZC Freq 2.2 Hz
Channel Test Passed (Freq = 19.7 Hz Amp = 713 mv)

	Tran	Vert	Long	
PPV	0.381	0.508	0.508	mm/s
ZC Freq	57	43	51	Hz
Time (Rel. to Trig)	0.021	0.131	0.000	sec
Peak Acceleration	0.013	0.027	0.027	g
Peak Displacement	0.003	0.003	0.003	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.4	7.6	7.3	Hz
Overswing Ratio	3.7	3.5	4.3	

Peak Vector Sum 0.648 mm/s at 0.002 sec

USBM RI8507 And OSMRE



Time Scale: 0.20 sec/div **Amplitude Scale:** Geo: 2.000 mm/s/div Mic: 10.000 pa.(L)/div
Trigger =

Sensor Check

December 20, 2020

Project No.: 20S072.00

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

Re: Blast Vibration Monitoring – Blast No. 2020-13 – 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 14:04 on December 18, 2020.

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. 2020-13 – December 18, 2020

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)	14:04	1,320 m S	< 0.5 mm/s	< 120	Unit was not triggered
2. Civic No. 4126 Route 111 (PW-10)		876 m S	0.64 mm/s @ 34 Hz	110	-
3. Civic No. 4150 Route 111 (PW-13)		701 m S	< 0.5 mm/s	< 120	Units were not triggered
4. Civic No. 2447 Route 820 (PW-07)		887 m NE	< 0.5 mm/s	< 120	
5. PW-03 - Route 820		678 m N	< 0.5 mm/s	< 120	
6. Civic No. 2341 Route 820 (PW-05)		704 m NW	< 0.5 mm/s	< 120	
7. Civic No. 50 Myron Road (PW-15)		973 m NW	< 0.5 mm/s	< 120	
8. Civic No. 86 Myron Road (PW-16)		874 m W	0.63 mm/s @ 32 Hz	113	-
9. Civic No. 220 Myron Road (PW-01)		1,370 m S	< 0.5 mm/s	< 120	Units were not triggered
10. Civic No. 4140 Route 111 (PW-12)		778 m S	< 0.5 mm/s	< 120	
11. Civic No. 2337 Route 820 (PW-04)		773 m NW	< 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,
CONQUEST ENGINEERING LTD.

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

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

Attachments: Blast Record
Blast and Seismograph Location Plan
Event Reports

BLAST RECORD

Project Name:	Upham Gypsum Quarry	Date of Blast:	Dec. 18, 2020
Project No.:	20S072.00	Time of Blast:	14:04
Inspector:	B. Fillmore	Blast No.:	2020-13
Client:	Hammond River Holdings		

IDENTIFICATION:

Blasting Contractor:	Gulf Operators Ltd.		
Blaster's Certification No.:	1318	Blaster's Name:	Daniel Blanchard
Blast Location:	N 45°28'52.6" E 65°37'56.9"		
Type of Rock:	Gypsum	Est. Vol. or Tonnage:	10,677 tonnes
Weather at time of Blast:	Cloudy to overcast	Air Temp.:	-3°C
Est. Wind Speed :	≈15 km/h	Wind Direction:	N
Cloud Cover:	Yes	Precipitation:	No

BLAST DESIGN:

Total No. Holes:	81	Hole Diameter:	4.5"
Average Depth:	6 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.: 230 kg		
Type and weight of Explosives for Blast:	4,415 kg Titan XL1000		

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

BLAST RECORD

Project Name: Upham Gypsum Quarry
Project No.: 20S072.00
Inspector: B. Fillmore
Client: Hammond River Holdings

Date of Blast: Dec. 18, 2020
Time of Blast: 14:04
Blast No.: 2020-13

BLAST MONITORING

Distance to the Nearest Structure: 678 m
Direction to the Nearest Structure: North
Structure Type: Cottage
Scaled Distance Factor: (distance / sq. rt. of max. wt. per delay): 44.7

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.

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 18, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:04</u>
Inspector:	<u>B. Fillmore</u>	Blast No.:	<u>2020-13</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #1

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5632</u>
Calibration Date:	<u>October 22, 2020</u>
Location of seismograph:	<u>Civic Number 4079 Route 111 (PW-09)</u>
Distance and Direction from Blast:	<u>1,320 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #2

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5489</u>
Calibration Date:	<u>May 15, 2020</u>
Location of seismograph:	<u>Civic Number 4126 Route 111 (PW-10)</u>
Distance and Direction from Blast:	<u>876 m South</u>
Transverse Particle Velocity:	<u>0.32 mm/s @ 30 Hz</u>
Vertical Particle Velocity:	<u>0.64 mm/s @ 34 Hz</u>
Longitudinal Particle Velocity:	<u>0.64 mm/s @ 37 Hz</u>
Peak Particle Velocity:	<u>0.64 mm/s @ 34 Hz</u>
Maximum Airblast:	<u>110 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 18, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:04</u>
Inspector:	<u>B. Fillmore</u>	Blast No.:	<u>2020-13</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #3

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5487</u>
Calibration Date:	<u>March 26, 2020</u>
Location of seismograph:	<u>Civic Number 4150 Route 111 (PW-13)</u>
Distance and Direction from Blast:	<u>701 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #4

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5673</u>
Calibration Date:	<u>February 28, 2020</u>
Location of seismograph:	<u>Civic Number 2447 Route 820 (PW-07)</u>
Distance and Direction from Blast:	<u>887 m Northeast</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 18, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:04</u>
Inspector:	<u>B. Fillmore</u>	Blast No.:	<u>2020-13</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #5

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5676</u>
Calibration Date:	<u>February 26, 2020</u>
Location of seismograph:	<u>PW-03 - Route 820</u>
Distance and Direction from Blast:	<u>678 m North</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #6

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5635</u>
Calibration Date:	<u>March 26, 2020</u>
Location of seismograph:	<u>Civic Number 2341 Route 820 (PW-05)</u>
Distance and Direction from Blast:	<u>704 m Northwest</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 18, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:04</u>
Inspector:	<u>B. Fillmore</u>	Blast No.:	<u>2020-13</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #7

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21349</u>
Calibration Date:	<u>June 12, 2020</u>
Location of seismograph:	<u>Civic Number 50 Myron Road (PW-15)</u>
Distance and Direction from Blast:	<u>973 m Northwest</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #8

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #21348</u>
Calibration Date:	<u>June 12, 2020</u>
Location of seismograph:	<u>Civic Number 86 Myron Road (PW-16)</u>
Distance and Direction from Blast:	<u>874 m West</u>
Transverse Particle Velocity:	<u>0.51 mm/s @ 20 Hz</u>
Vertical Particle Velocity:	<u>0.64 mm/s @ 32 Hz</u>
Longitudinal Particle Velocity:	<u>0.51 mm/s @ 22 Hz</u>
Peak Particle Velocity:	<u>0.64 mm/s @ 32 Hz</u>
Maximum Airblast:	<u>113 dB(L)</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 18, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:04</u>
Inspector:	<u>B. Fillmore</u>	Blast No.:	<u>2020-13</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #9

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial # 5372</u>
Calibration Date:	<u>June 24, 2020</u>
Location of seismograph:	<u>Civic Number 220 Myron Road (PW-01)</u>
Distance and Direction from Blast:	<u>1,370 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Data Collection – Seismometer #10

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5960</u>
Calibration Date:	<u>May 15, 2020</u>
Location of seismograph:	<u>Civic Number 4140 Route 111 (PW-12)</u>
Distance and Direction from Blast:	<u>778 m South</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

BLAST RECORD

Project Name:	<u>Upham Gypsum Quarry</u>	Date of Blast:	<u>Dec. 18, 2020</u>
Project No.:	<u>20S072.00</u>	Time of Blast:	<u>14:04</u>
Inspector:	<u>B. Fillmore</u>	Blast No.:	<u>2020-13</u>
Client:	<u>Hammond River Holdings</u>		

Data Collection – Seismometer #11

Make, Model and Serial # of unit:	<u>Instantel Mini Mate, Serial #5371</u>
Calibration Date:	<u>June 24, 2020</u>
Location of seismograph:	<u>Civic No. 2337 Route 820 (PW-04)</u>
Distance and Direction from Blast:	<u>773 m Northwest</u>
Transverse Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Vertical Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Longitudinal Particle Velocity:	<u><0.5 mm/s – Unit was not triggered</u>
Peak Particle Velocity:	<u>N/A</u>
Maximum Airblast:	<u><120 dB(L) – Unit was not triggered</u>

Blast and Seismograph Location Plan
Blast No: 2020-13
Upham East Gypsum Quarry, Upham, NB



Date: December 18, 2020
CEL Project No.: 20S072.00

Date/Time Vert at 14:04:25 December 18, 2020
Trigger Source Geo: 0.508 mm/s, Mic: 119.6 dB(L)
Range Geo: 127.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number 5489 V 2.61 MiniMate
Battery Level 6.1 Volts
Unit Calibration May 15, 2020 by InstanTel
File Name G489IRR0.FD0

Notes
 Location:
 Client:
 User Name:
 Converted: December 18, 2020 16:08:55 (V8.01)

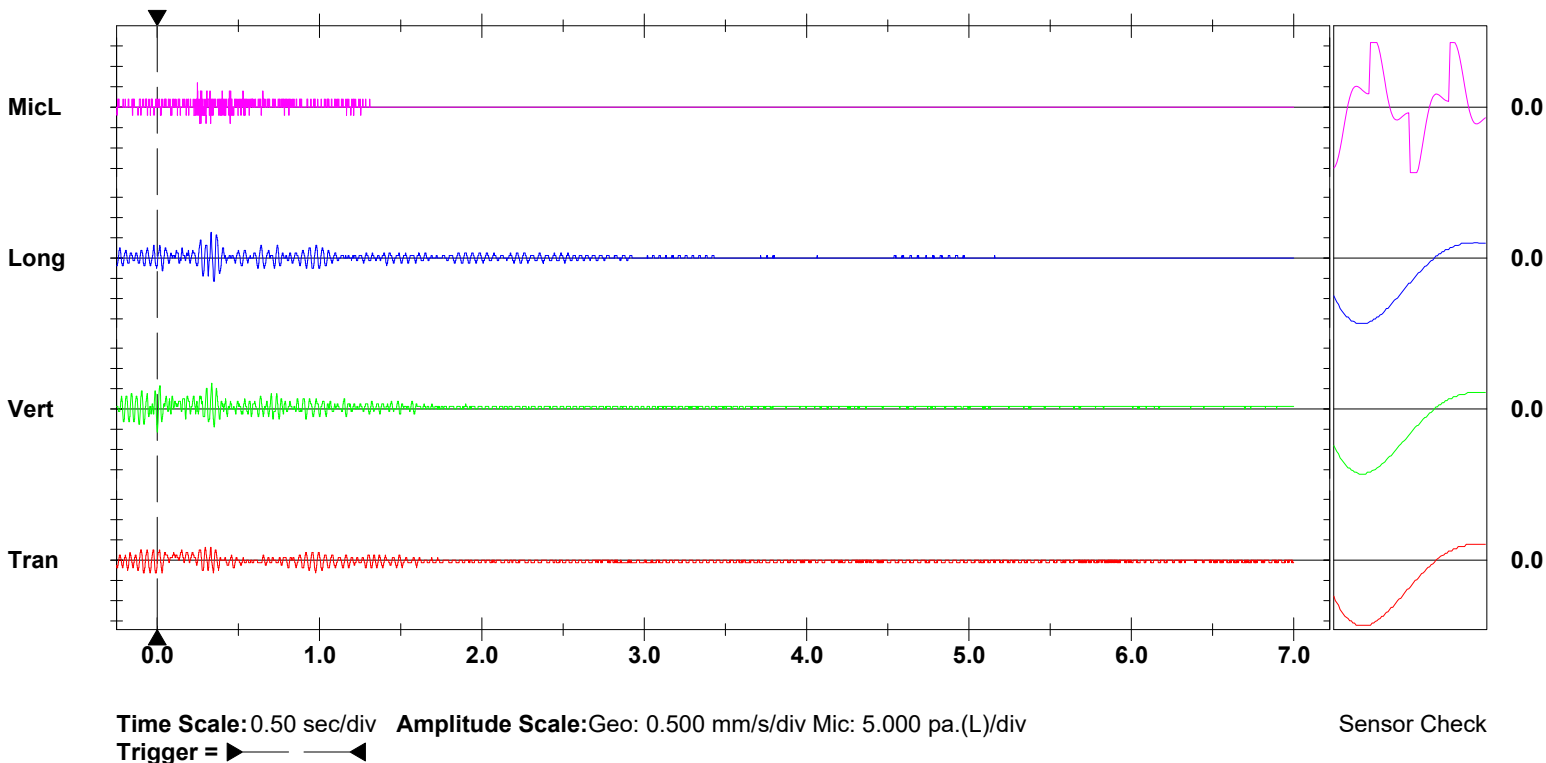
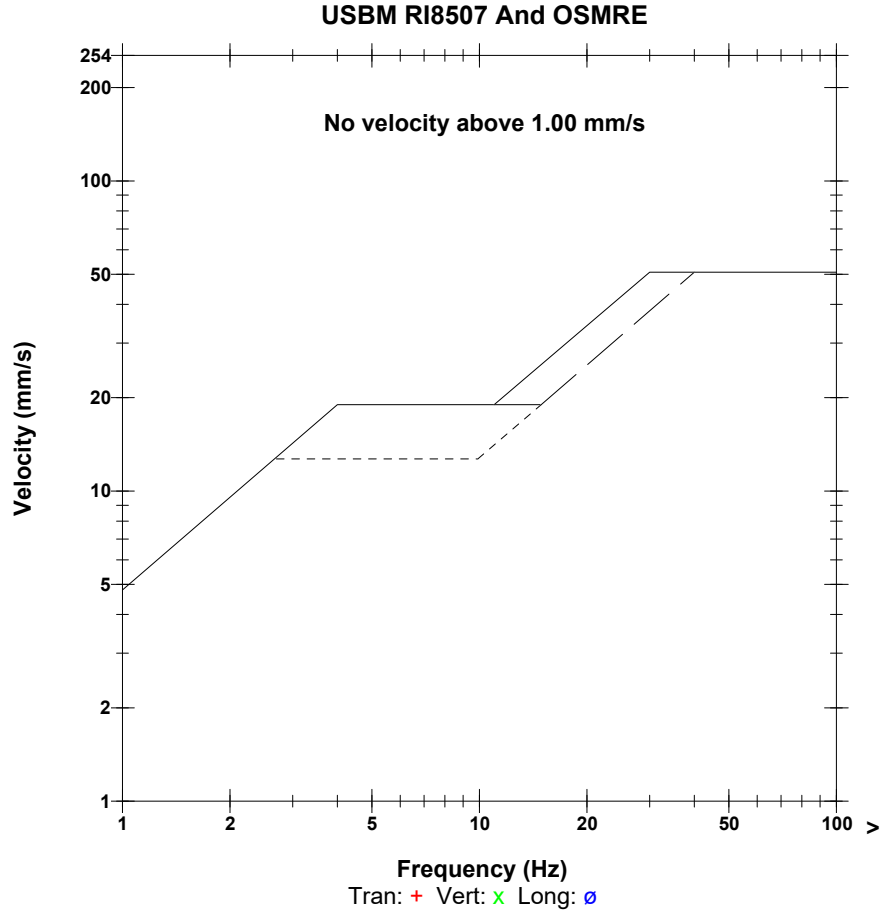
Post Event Notes
 Location of Seismograph: 4126 Route 111 (PW-10)
 Blast No.: 2020-13
 CEL Project No.: 20S072.00

Extended Notes

Microphone Linear Weighting
PSPL 109.5 dB(L) 6.000 pa.(L) at 0.249 sec
ZC Freq 85 Hz
Channel Test Passed (Freq = 20.0 Hz Amp = 270 mv)

	Tran	Vert	Long	
PPV	0.318	0.635	0.635	mm/s
ZC Freq	30	34	37	Hz
Time (Rel. to Trig)	-0.005	0.336	0.332	sec
Peak Acceleration	0.013	0.020	0.020	g
Peak Displacement	0.002	0.003	0.004	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.6	7.7	7.7	Hz
Overswing Ratio	4.0	4.0	4.1	

Peak Vector Sum 0.810 mm/s at 0.333 sec



Date/Time Vert at 14:01:39 December 18, 2020
Trigger Source Geo: 0.510 mm/s, Mic: 120.0 dB(L)
Range Geo: 254.0 mm/s
Record Time 7.0 sec at 1024 sps

Serial Number BE21348 V 10.72-1.1 Minimate Blaster
Battery Level 5.9 Volts
Unit Calibration June 12, 2020 by InstanTel
File Name W348IRP5.MR0
Post Event Notes
 Location of Seismograph: 86 Myron Road (PW-15)
 Blast No.: 2020-13
 CEL Project No.: 20S072.00

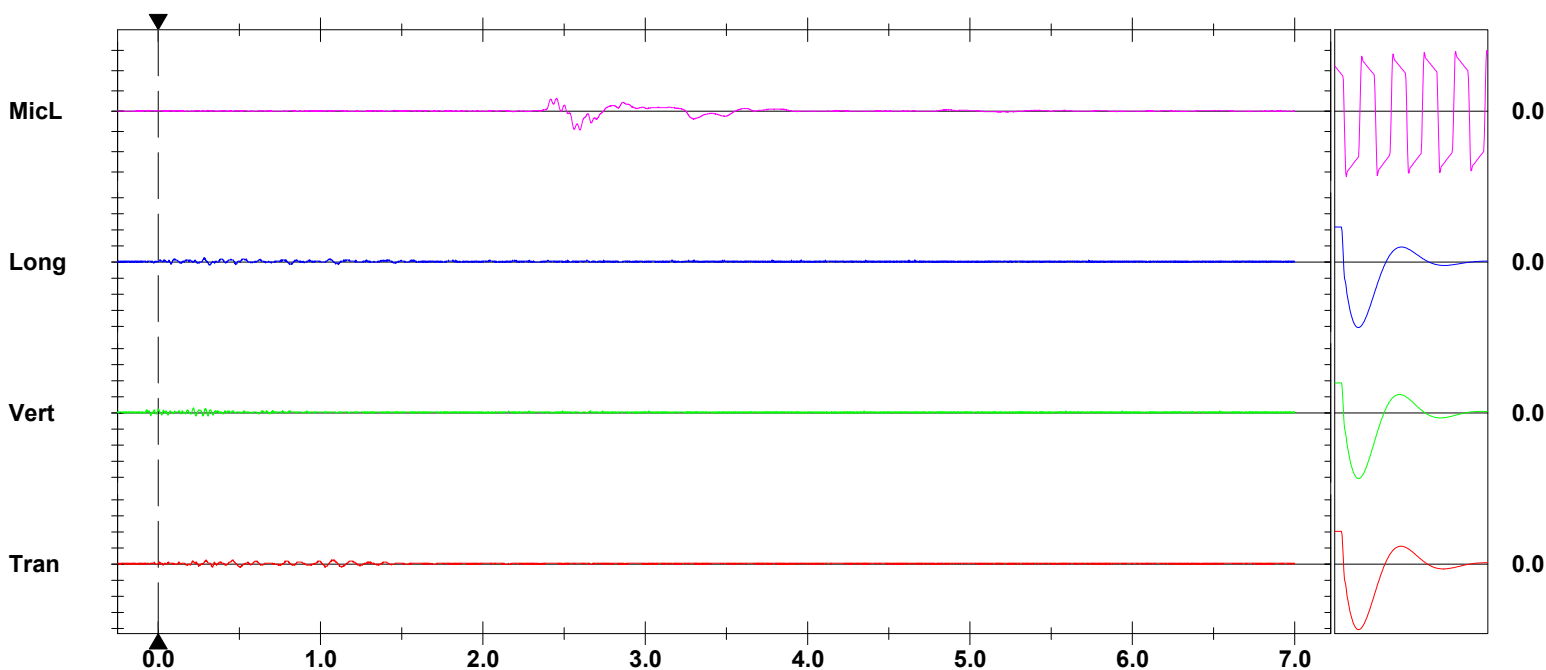
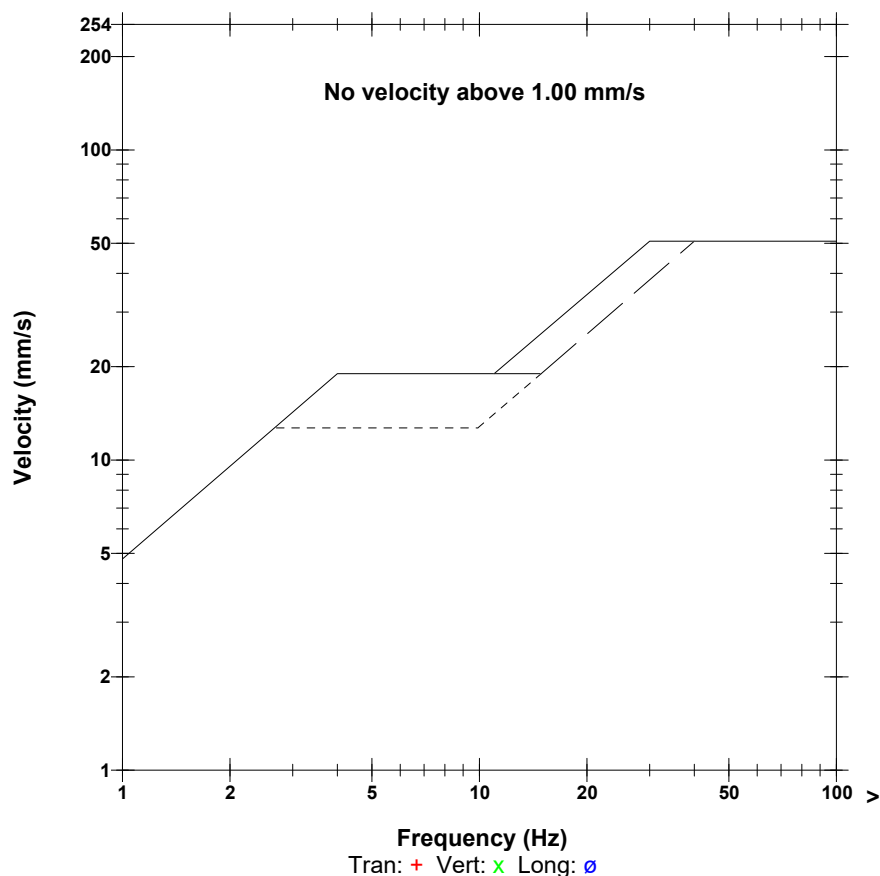
Notes

Microphone Linear Weighting
PSPL 113.3 dB(L) 9.250 pa.(L) at 2.596 sec
ZC Freq 2.3 Hz
Channel Test Passed (Freq = 20.1 Hz Amp = 735 mv)

	Tran	Vert	Long	
PPV	0.508	0.635	0.508	mm/s
ZC Freq	20	32	22	Hz
Time (Rel. to Trig)	0.294	0.216	0.280	sec
Peak Acceleration	0.013	0.027	0.027	g
Peak Displacement	0.009	0.003	0.006	mm
Sensor Check	Passed	Passed	Passed	
Frequency	7.5	7.7	7.3	Hz
Overswing Ratio	3.7	3.6	4.4	

Peak Vector Sum 0.762 mm/s at 0.294 sec

USBM RI8507 And OSMRE



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

Sensor Check

Report ID: 378225-IAS
Report Date: 16-Dec-20
Date Received: 07-Dec-20

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: Justin Ferguson

Project #: 17-5121

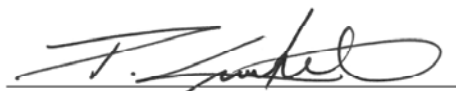
Location: Upham

Analysis of Water

RPC Sample ID:	378225-1	378225-2	378225-3	378225-4	378225-5
Client Sample ID:	SW3	SW5	PDP-1	H1	H2
Date Sampled:	2-Dec-20	2-Dec-20	2-Dec-20	2-Dec-20	2-Dec-20
Analytes	Units	RL			
Alkalinity (as CaCO ₃)	mg/L	2	5	5	5
Chloride	mg/L	0.5	4.3	4.5	4.6
Sulfate	mg/L	1	37	47	3
Solids - Total Dissolved	mg/L	5	87	107	54
Solids - Total Suspended	mg/L	5	5	6	57
Hardness (as CaCO ₃)	mg/L	0.2	37.6	55.6	14.0

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: 378225-IAS
Report Date: 16-Dec-20
Date Received: 07-Dec-20

CERTIFICATE OF ANALYSIS

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



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

Attention: Justin Ferguson

Project #: 17-5121

Location: Upham

Analysis of Metals in Water

RPC Sample ID:			378225-1	378225-2	378225-3	378225-4	378225-5
Client Sample ID:			SW3	SW5	PDP-1	H1	H2
Date Sampled:			2-Dec-20	2-Dec-20	2-Dec-20	2-Dec-20	2-Dec-20
Analytes	Units	RL					
Calcium	mg/L	0.05	14.2	21.2	14.7	4.09	4.93
Magnesium	mg/L	0.01	0.51	0.65	0.54	0.39	0.42
Potassium	mg/L	0.02	0.65	0.69	0.68	0.56	0.62
Sodium	mg/L	0.05	2.35	2.53	2.43	2.19	2.28

Report ID: 378225-IAS
Report Date: 16-Dec-20
Date Received: 07-Dec-20

CERTIFICATE OF ANALYSIS

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



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

Methods

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

Report ID: 378230-IAS
Report Date: 14-Dec-20
Date Received: 07-Dec-20

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: Justin Ferguson

Project #: 17-5121

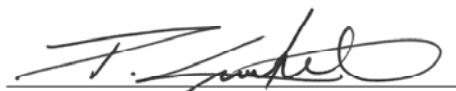
Location: Upham

Analysis of Water

RPC Sample ID:	378230-1	378230-2	378230-3	378230-4
Client Sample ID:	SW3	SW5	PDP-1	SW15
Date Sampled:	1-Dec-20	1-Dec-20	1-Dec-20	1-Dec-20
Analytes	Units	RL		
Solids - Total Suspended	mg/L	5	< 5	12
			5	9

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



Krista Skinner
Chemical Technician
Inorganic Analytical Chemistry

Report ID: 378230-IAS
Report Date: 14-Dec-20
Date Received: 07-Dec-20

CERTIFICATE OF ANALYSIS

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



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

Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 378629-IAS
Report Date: 17-Dec-20
Date Received: 09-Dec-20

CERTIFICATE OF ANALYSIS

for
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Saint John, NB E2J 0A9



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www.rpc.ca

Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:	378629-1	378629-2	378629-3	378629-4
Client Sample ID:	SW3	SW5	PDP-1	SW15
Date Sampled:	7-Dec-20	7-Dec-20	7-Dec-20	7-Dec-20
Analytes	Units	RL		
Phosphorus - Total	mg/L	0.002	0.020	0.018
Solids - Total Suspended	mg/L	5	< 5	< 5

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

WATER CHEMISTRY
Page 1 of 2

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 378629-IAS
Report Date: 17-Dec-20
Date Received: 09-Dec-20

CERTIFICATE OF ANALYSIS

for
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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Phosphorus - Total	4.M17	APHA 4500-P E	Digestion, Manual Colourimetry
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 379685-IAS
Report Date: 30-Dec-20
Date Received: 18-Dec-20

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
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Tel: 506.452.1212
Fax: 506.452.0594
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Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:			379685-1	379685-2	379685-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			15-Dec-20	15-Dec-20	15-Dec-20
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: 379685-IAS
Report Date: 30-Dec-20
Date Received: 18-Dec-20

CERTIFICATE OF ANALYSIS

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 380286-IAS
Report Date: 11-Jan-21
Date Received: 29-Dec-20

CERTIFICATE OF ANALYSIS

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



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Tel: 506.452.1212
Fax: 506.452.0594
www.rpc.ca

Attention: Brian Sponagle

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:			380286-1	380286-2	380286-3
Client Sample ID:			SW3	SW5	PDP-1
Date Sampled:			28-Dec-20	28-Dec-20	28-Dec-20
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: 380286-IAS
Report Date: 11-Jan-21
Date Received: 29-Dec-20

CERTIFICATE OF ANALYSIS

for
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274 Sydney Street, Suite 200
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Fax: 506.452.0594
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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 380477-IAS
Report Date: 11-Jan-21
Date Received: 30-Dec-20

CERTIFICATE OF ANALYSIS

for
Hammond River Holdings Limited
30 Jervis Lane
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Tel: 506.452.1212
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Attention: Daniel Guest

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:	380477-1	380477-2	380477-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	23-Dec-20	23-Dec-20	23-Dec-20
Analytes	Units	RL	
Solids - Total Suspended	mg/L	5	< 5

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

RL = Reporting Limit

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

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 380477-IAS
Report Date: 11-Jan-21
Date Received: 30-Dec-20

CERTIFICATE OF ANALYSIS

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry

Report ID: 380900-IAS
Report Date: 13-Jan-21
Date Received: 06-Jan-21

CERTIFICATE OF ANALYSIS

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

Attention: Brandon Kirk

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:			380900-1	380900-2	380900-3
Client Sample ID:			SW 3	SW 5	PDP-1
Date Sampled:			31-Dec-20	31-Dec-20	31-Dec-20
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: 380900-IAS
Report Date: 13-Jan-21
Date Received: 06-Jan-21

CERTIFICATE OF ANALYSIS

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Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Solids - Total Suspended	4.M05	APHA 2540 D	Filtration, Gravimetry