

Memo

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, Environmental Impact Assessment Branch, New Brunswick Department of Environment and Local Government

Date: November 25, 2020

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

Our File: File # 18-8346

This monthly report details activities associated with the operation of the Upham East Gypsum Quarry for the month of **October 2020**, in accordance with conditions of the Approval to Operate I-10936.

Introduction

After the mining lease was obtained on July 16, 2020; the project transitioned into the operational stage and gypsum extraction activities began. These activities include drilling, blasting, crushing, and stockpiling of gypsum. Gypsum extraction as well as overburden stripping is ongoing.

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 September 2020 reports for previous water quality results.

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

- Week 1: October 8, 2020;
- Week 2: October 14, 2020;
- Week 3: October 22, 2020;
- Week 4: October 28, 2020;

There was no heavy rain event in October that exceeded the 25mm during a 24-hour period threshold to require an additional sampling event.

Surface Water Sampling - Field Methods

Field parameters were measured using a calibrated turbidity meter and probe. Field parameters are temperature, conductivity and turbidity, these parameters were measured at 3 sampling locations as stated in the Environmental Management Plan 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; and
- SW5 was collected within the unnamed tributary approximately 100m downstream from PDP-1

In addition, 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.

Surface Water Sampling - Compliance Monitoring Results

Results of the surface water 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 well below the site-specific guideline for each site laid out in the Approval to Operate.

A QA/QC program was implemented to evaluate whether the data collected was of suitable quality to characterize the surface water conditions observed. This program required the collection of field duplicates and the calculation of the relative percent difference (RPD). The calculation method and acceptance level of 40% are discussed in CCME (2016). Two duplicate samples were collected during the September water sampling program on September 4 and 23, 2020. The RPD results were 0%. (**Table 3**). Therefore, the data satisfies the quality objectives for the monitoring program.

Environmental Accidents and Malfunctions

During the October 2020 monitoring period there were 2 spills on-site. They occurred on October 2 and 8. The spills were cleaned up and spill reports for all spills were submitted to the NBDELG. No additional information or follow up action was requested by NBDELG. Spill reports are attached.

Ambient Air Quality Monitoring – Total Suspended Particulate

A 24-hour air sample is 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 October there were 6 air quality monitoring events, October 2, 8, 14, 20, 23 and 26; the results are provided in **Table 4**. None of the air samples collected in October 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*.

The air monitor malfunctioned during its runs on October 2 and 20, 23 and 26. For the run on October 2, the final weight of the filter was less than the initial, resulting in a negative TSP value. It is believed that this was due to different scales being used to weigh the filter before and after the completed run. Despite both scales being calibrated, there was an error which resulted in a weight loss of the filter which is impossible. For all other tests, the same scale will be used to weigh the filter before and after each run to prevent this issue from reoccurring.

The malfunction on October 20 was due to the filter becoming saturated with water. When the filter becomes saturated it restricts air flow, causing the pump to run faster to meet the programmed flow rate. The filter was so saturated that it caused the pump to reach its maximum speed limit and as a result shut itself off prematurely to prevent pump damage. All water traps, valves and O-rings were in

place and in good condition, indicating no water should have reached the filter. It is possible that there was tampering with the monitor causing water to get inside. As a result, this run was discarded, and an additional run was added on October 23.

The additional run on October 23 was also cut short, this time due to the battery on the air monitor dying before completing the 24-hour run. Typically, if the battery does not have sufficient charge to complete the programmed run it displays an error message “Battery Voltage Too Low”. As this message was not displayed prior to the run, something occurred during the run that caused the battery to lose charge at a higher than normal rate. It was determined that the battery lost its charge at a faster rate than normal, likely due to the colder temperatures. This occurred once again during the run on October 26.

The air monitor run on October 23 ended after 22 hours and the October 26 run ended after 21 hours. For these interrupted runs, the air monitor was running during the operating hours of the quarry, it was not interrupted until after 7pm. When calculating the TSP for the interrupted runs, the TSP mass will be divided by the duration of their respective run rather than the usual full 24 hours run time to account for the monitor not running for 24 hours.

To avoid having this issue in the future, HRH is sourcing an additional battery for the monitor so that this problem does not persist in the coming winter months.

Blasting

In October there were two blasts, the first occurred on October 6, 2020 and the second on October 22, 2020. There were no exceedances of the 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 October 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 earthworks 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.

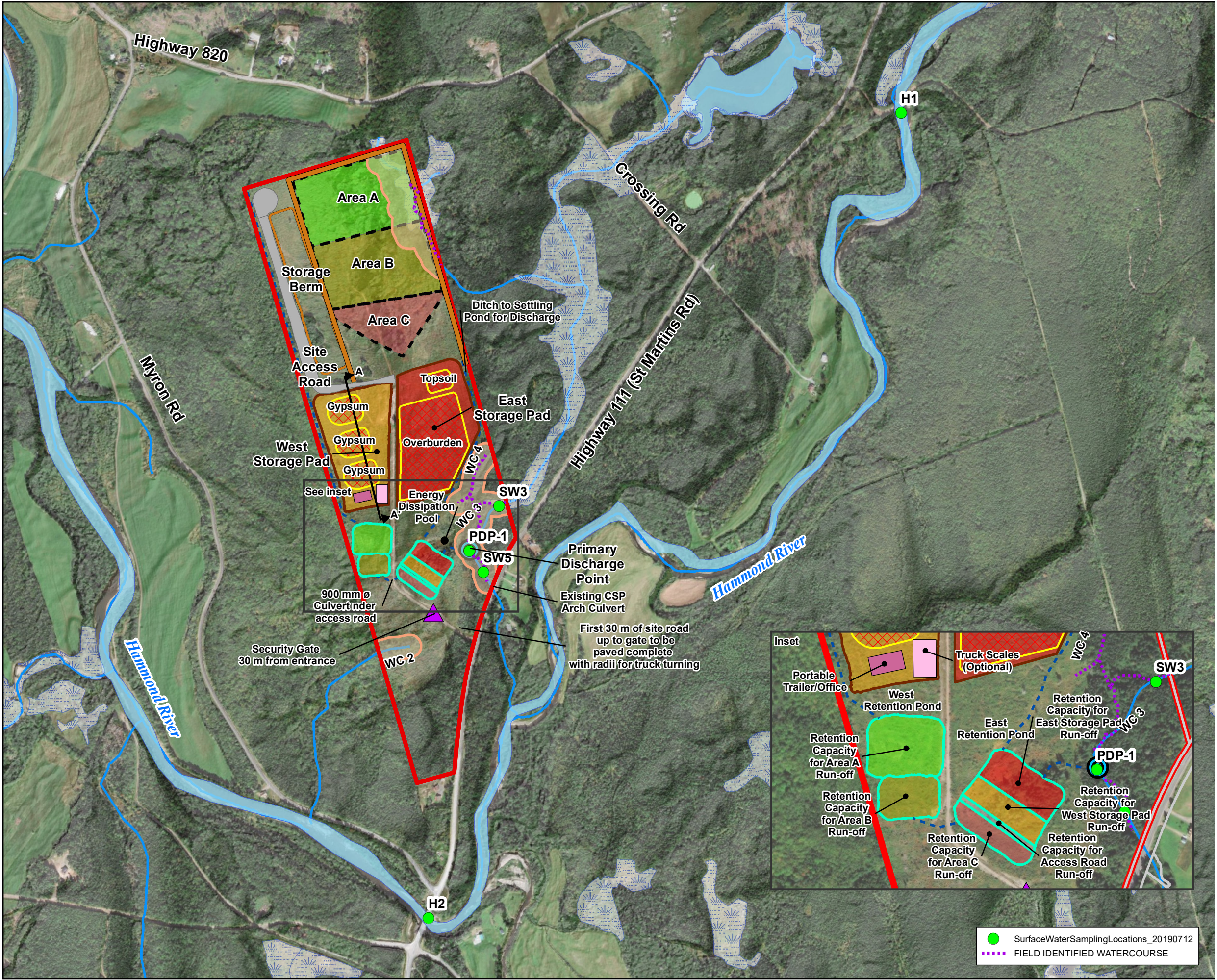
References

Canadian Council of Ministers of the Environment (CCME). 2015. Canadian environmental quality guidelines. Available online at: <http://cegg-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.

New Brunswick Regulation 97-133, (1997). Clean Air Act, O.C 97-923.



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

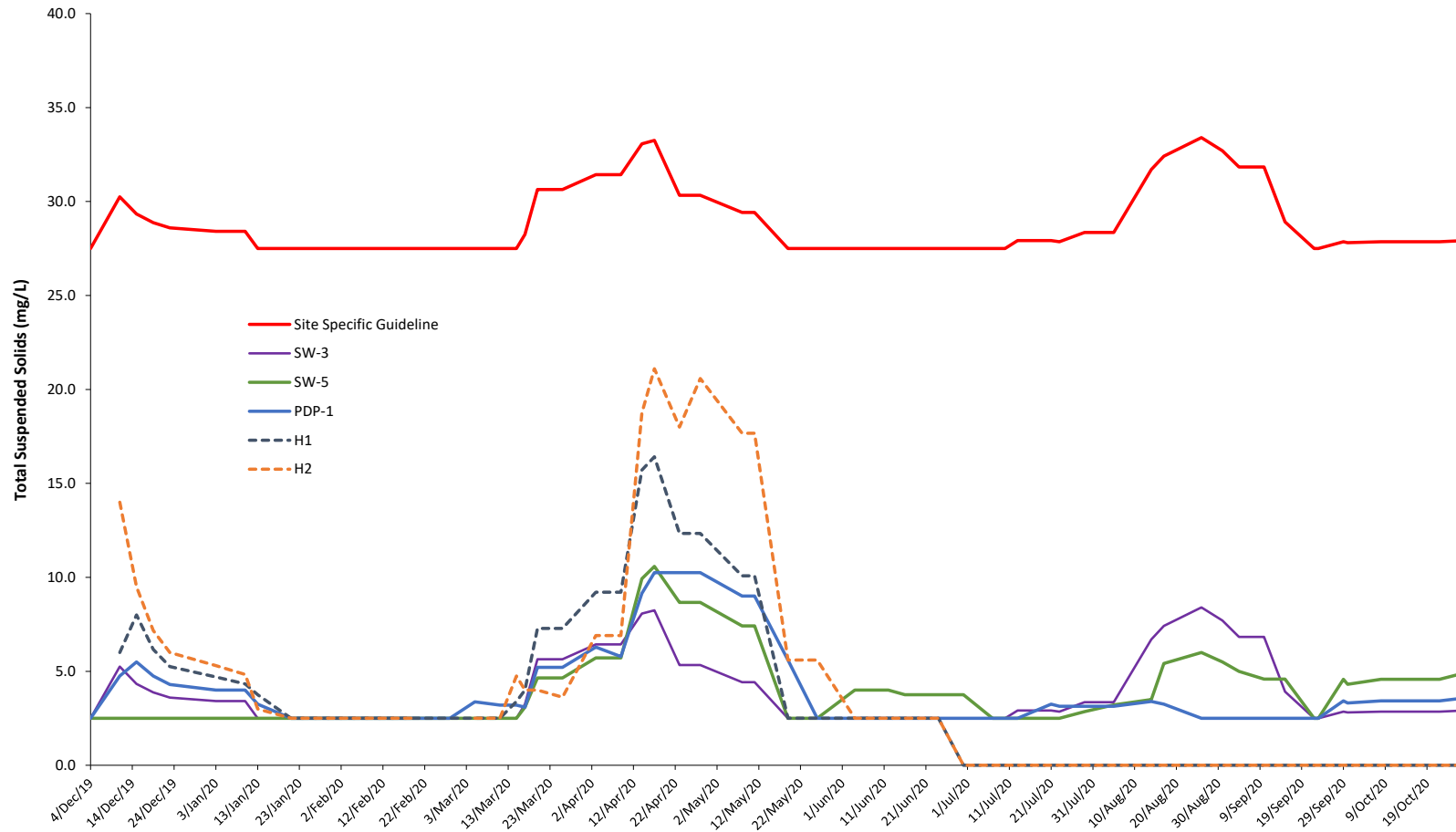
MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED, CANVEC
SERVICE LAYER CREDITS: ESRI, HERE, GARMIN, INTERMAP, INCREMENT
P CORP, GEBCO, USGS, FAO, NPS, NRCAN, GEBCO, IGN, KADASTER NL,
ORDNANCE SURVEY, ESRI JAPAN, METI, ESRI CHINA (HONG KONG), SWISS
TOPO, OPENSTREETMAP CONTRIBUTORS, 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				Total Suspended Solids ^c	
			Water Temperature	Specific Conductivity	Turbidity		
Units	°C	mm	°C	mS/cm	NTU	mg/L	
CCME PAL ^d			-	-	-	-	
Sample ID	Date						
SW3	8-Oct-20	11.30	9.60	15.80	0.222	8.52	<5
SW5	8-Oct-20			16.30	0.585	6.88	<5
PDP-1	8-Oct-20			16.10	0.46	7.06	<5
SW3	14-Oct-20	13.80	13.50	10.50	0.476	11.38	<5
SW5	14-Oct-20			10.90	0.749	3.63	<5
SW15 (FD)	14-Oct-20			10.90	0.749	3.63	<5
PDP-1	14-Oct-20			10.90	0.732	0.132	<5
SW3	22-Oct-20	15.10	2.20	12.00	0.409	0.69	<5
SW5	22-Oct-20			11.80	0.416	0.65	<5
PDP-1	22-Oct-20			11.80	0.445	0.34	<5
PDP-2 (FD)	22-Oct-20			11.80	0.45	0.34	<5
SW3	28-Oct-20	0.90	10.80	4.90	0.327	1.09	<5
SW5	28-Oct-20			4.80	0.366	0.01	<5
PDP-1	28-Oct-20			4.80	0.380	0.96	<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.

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
4-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
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

Notes:
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 Suspended Solids
Units		mg/L
Sample ID	Date	
SW5	14-Oct-20	<5
SW15	14-Oct-20	<5
RPD value		0%
PDP-1	22-Oct-20	<5
PDP-2	22-Oct-20	<5
RPD value		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)
10/2/2020	23:59	24 hours	14.43	25.1	753	9.6	14.9721	14.9593	-12800	-21.2483	120
10/8/2020	23:59	24 hours	17.69	25.48	748	3.8	14.8606	14.8894	28800	47.0958	120
10/14/2020	23:59	24 hours	17.56	25.29	753	7.8	14.8828	14.8911	8300	13.6747	120
10/23/2020	23:59	21:55	17.34	22.82	750	10.1	14.8592	14.8648	5600	11.1952	120
10/26/2020	23:59	21:02	17.71	22.35	752	4.8	14.8541	14.8642	10100	21.5191	120

Report ID: 371690-IAS
Report Date: 26-Oct-20
Date Received: 14-Oct-20

CERTIFICATE OF ANALYSIS

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



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

Attention: Jonathan Oliver

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:	371690-1	371690-2	371690-3
Client Sample ID:	SW-3	SW-5	PDP-1
Date Sampled:	8-Oct-20	8-Oct-20	8-Oct-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: 371690-IAS
Report Date: 26-Oct-20
Date Received: 14-Oct-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: 372103-IAS
Report Date: 29-Oct-20
Date Received: 19-Oct-20

CERTIFICATE OF ANALYSIS

for
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Tel: 506.452.1212
Fax: 506.452.0594
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Attention: Jonathan Oliver

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:	372103-1	372103-2	372103-3	372103-4
Client Sample ID:	SW-3	SW-5	SW-15	PDP-1
Date Sampled:	14-Oct-20	14-Oct-20	14-Oct-20	14-Oct-20
Analytes	Units	RL		
Solids - Total Suspended	mg/L	5	< 5	< 5

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

RL = Reporting Limit

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

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 372103-IAS
Report Date: 29-Oct-20
Date Received: 19-Oct-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: 372989-IAS
Report Date: 05-Nov-20
Date Received: 26-Oct-20

CERTIFICATE OF ANALYSIS

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

Attention: Jonathan Oliver

Project #: 17-5121

Location: Upham

Analysis of Water

RPC Sample ID:	372989-1	372989-2	372989-3	372989-4
Client Sample ID:	SW3	SW5	PDP-1	PDP-2
Date Sampled:	22-Oct-20	22-Oct-20	22-Oct-20	22-Oct-20
Analytes	Units	RL		
Solids - Total Suspended	mg/L	5	< 5	< 5

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

RL = Reporting Limit

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

Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 372989-IAS
Report Date: 05-Nov-20
Date Received: 26-Oct-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: 374064-IAS
Report Date: 12-Nov-20
Date Received: 03-Nov-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:	374064-1	374064-2	374064-3
Client Sample ID:	SW3	SW5	PDP-1
Date Sampled:	28-Oct-20	28-Oct-20	28-Oct-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.
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Brannen Burhoe
Supervisor
Inorganic Analytical Services

Report ID: 374064-IAS
Report Date: 12-Nov-20
Date Received: 03-Nov-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