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engineering and environmental consultants

BARR

June 22, 2020

VIA E-MAIL

Mr. John Iacoangeli, Principal
Beckett & Raeder, Inc.
535 West William, Suite 101
Ann Arbor, MI 48013

RE: MAY 2020 RESULTS
POST-CONSTRUCTION ACME CREEK MONITORING
GRAND TRAVERSE TOWN CENTER, ACME, MICHIGAN

Dear Mr. Iacoangeli:

The purpose of this letter is to transmit the results of post-construction surface water monitoring of Acme Creek completed by Barr Engineering (Barr) in May 2020 on behalf of the Village at Grand Traverse, LLC (VGT) at the Grand Traverse Town Center (GTTC) site in Acme Township, Grand Traverse County, Michigan. As you are aware, post-construction monitoring activities were initiated in September 2015. This report presents the results of the first semi-annual event of the fifth year following completion of construction of the storm water management infrastructure at the site (Year 5/Semi-Annual 1).

Post-construction stream sampling recommendations were outlined in the site development plan for the GTTC (Site Plan Approval for Phase I of the SUP)[1] and later incorporated into a site inspection, monitoring, and maintenance plan submitted to the Township in September 2015 (Monitoring Plan).[2] The goal of the post-construction monitoring program is to evaluate water quality in Acme Creek over time. To facilitate the monitoring program, two fixed testing locations--one at the upstream point where Acme Creek enters the property and one at the downstream point where Acme Creek leaves the site--have been established (see Figure 1). Baseline (pre-construction) water quality samples were collected from both locations on July 26, 2011.

The Monitoring Plan calls for the receiving water for the GTTC site (Acme Creek) to be monitored for dissolved oxygen concentration, water temperature, specific conductivity, pH, volatile organic compounds (VOCs), total organic carbon (TOC), e. Coli, total dissolved solids (TDS), total suspended solids (TSS), water velocity and elevation. The monitoring was performed on a monthly basis for a period of one year following the completion of construction, on a quarterly basis during post-construction years 2 through 4, and will

[1] The Village at Grand Traverse Phase 1, Stormwater Management Recommendations, King & MacGregor Environmental, Inc., December 22, 2011
[2] Inspection, Monitoring and Maintenance Plan for the Storm Water Management System, Horizon Environmental Corporation, September 2015

be performed on a semi-annual basis for post-construction years 5 and beyond. This was the first semi-annual (Year 5, Semi-Annual 1) post-construction monitoring event, and was completed on May 13, 2020. The results of this sampling event along with the results of the pre-construction (baseline) and prior post-construction sampling events are provided on Table 1.

DATA SUMMARY/EVALUATION

Dissolved oxygen, water temperature, specific conductivity and pH were measured at both of the stream gauges using an YSI 556 multi-parameter water quality meter. The data collected at each stream gauge were compared to available water quality standards in the Part 4 Water Quality Standards of Part 31, Water Resources Protection (MCL 324.3101) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 4). The following provides a summary of these results:

- The dissolved oxygen concentrations at both the upstream (13.3 mg/L) and downstream (13.7 mg/L) stream gauges were higher than the minimum standard of 7.0 mg/L specified under Part 4.

- The water temperature at both the upstream (43.3°F) and downstream (43.0°F) stream gauges were nearly identical. Both readings are below the maximum temperature in May specified under Part 4 for streams supporting cold water fish (65°F).

- The pH readings at both the upstream (7.98 S.U.) and downstream (7.87 S.U.) stream gauges were both within the pH range of 6.5 to 9.0 S.U specified under Part 4.

Stream samples were also collected for laboratory analyses of VOCs, TOC, TDS, TSS, e. Coli, and turbidity at both the upstream and downstream stream gauges. Laboratory data sheets are provided in Attachment I. A summary of the results compared to available water quality standards under Part 4 is provided as follows:

- VOCs were below laboratory detection limits at both the upstream and downstream gauges.

- The TDS concentrations at both the upstream (240 mg/L) and downstream (240 mg/L) stream gauges were significantly lower than the maximum TDS standard of 500 mg/L specified under Part 4.

- The upstream e. Coli concentration (17 colonies/100ml) and downstream e. Coli concentrations (11 colonies/100ml) were lower than maximum (300 colonies/100 ml) e.Coli concentration for total body contact.

- There was no significant difference in the TOC, TSS, and turbidity levels observed at the upstream and downstream locations.

Additional stream data, including water velocity and water elevation, were collected as part of this monitoring event. Stream velocities were measured using a Flo-Mate Model 2000 flowmeter. The results of the additional data collected are summarized on Table 1.

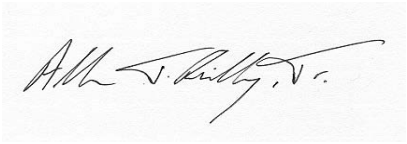
CONCLUSIONS

The results of this quarterly post-construction monitoring event (Year 5/Semi-Annual 1) indicate that water quality in Acme Creek adjacent to the GTTC site meets or exceeds the Part 4 Water Quality Standards prescribed under Part 31 of the Water Resources Protection Section of NREPA (MCL 324.3101).

If you have questions or require additional information regarding this sampling event, please contact me at 616-512-7000.

Sincerely,

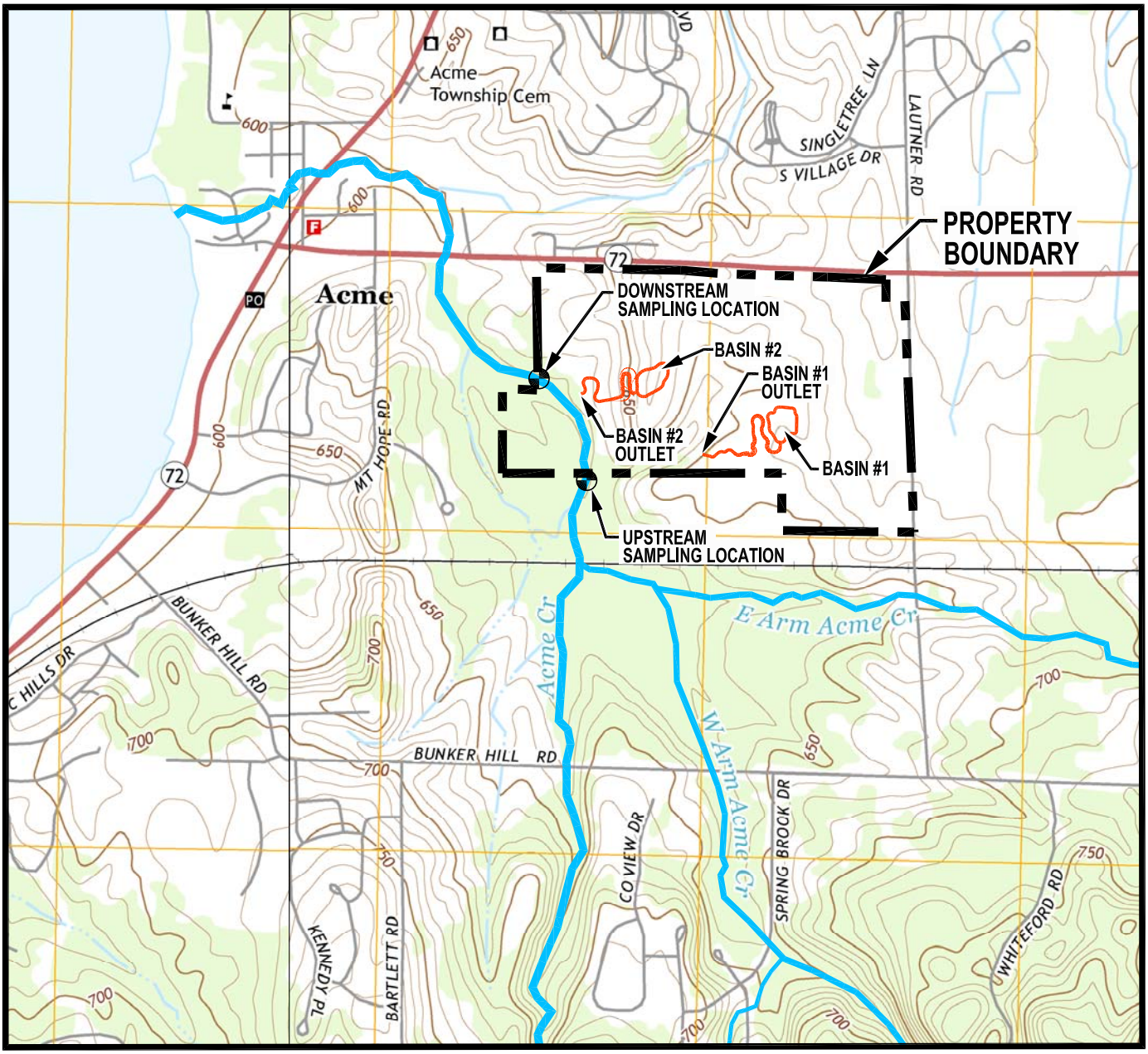
BARR ENGINEERING

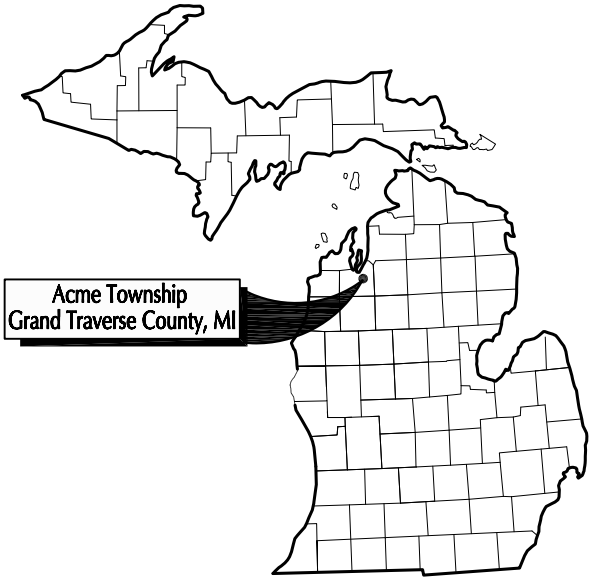


Allen J. Reilly, Jr.
Project Manager

cc: D. White, Acme Township
S. Feringa, GTBEDC
S. Schooler, GTBEDC

enclosures





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TAKEN FROM 7.5 MINUTE SERIES TOPOGRAPHIC MAP
TRAVERSE CITY SE AND WILLIAMSBURG 2014 QUADRANGLES
NORTH AMERICAN VERTICAL DATUM OF 1988
SCALE APPROX. 1" = 1600'

LEGEND:

– CREEK SAMPLING LOCATION

Figure 1

SITE LOCATION MAP

Village at Grand Traverse
Acme Township, Grand
Traverse County, Michigan

BARR

4771 50th Street SE
Grand Rapids, MI 49512

TABLE 1
ACME CREEK MONITORING RESULTS
GRAND TRAVERSE TOWN CENTER SITE
ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN

		July 26, 2011 Baseline Pre-Construction		September 18, 2015 Post-Construction (Year 1/Month 1)		October 13, 2015 Post-Construction (Year 1/Month 2)		November 16, 2015 Post-Construction (Year 1/Month 3)		December 4, 2015 Post-Construction (Year 1/Month 4)		January 29, 2016 Post-Construction (Year 1/Month 5)		February 18, 2016 Post-Construction (Year 1/Month 6)	
Study Parameter	Part 4 Water Quality Standards	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Macroinvertebrates	NA	-5													
e Coli (colonies/100 ml)	(1)	100	72	55	81	129	53	29	17	22	27	20	36	33	31
Dissolved Oxygen (mg/L)	7 (minimum)	11.4[(2)]	11.6[(2)]	12.4	12.4	11.0	11.2	10.9	11.3	11.5	11.5	13.8	13.7	13.4	14.3
Water Temperature (°F)	(3)	56.1	55.6	49.1	49.0	50.2	50.9	46.3	46.0	42.9	42.8	39.0	39.0	36.1	35.8
Specific Conductivity (µs/cm)	NA	334	334	294	293	343	432	345	358	339	341	346	346	338	330
pH (S.U.)	6.5 to 9.0	8.36	8.39	7.70	6.95	8.24	8.23	8.81	8.82	8.21	8.05	8.03	8.08	8.05	7.33
Volatile Organic Compounds	Various	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Total Organic Carbon (mg/L)	NA	1.3	1	<1.0	1.0	1.6	1.5	1.6	1.4	1.4	1.4	1.4	1.4	<1.0	<1.0
Total Dissolved Solids (mg/L)	500	204	180	250	260	240	230	240	240	240	240	210	240	240	230
Total Suspended Solids (mg/L)	Visual Standard	11.2	4.4	<5.0	<5.0	8	7	4	5	5	6	5	4	6	9
Turbidity (NTU)	Visual Standard			1.99	1.48	3.06	3.10	2.3	1.7	3.0	2.4	0.93	0.98	1.52	1.61
Water Velocity (ft/sec)	NA	1.3	1.2	0.9	1.6	1.4	3.2	3.1	2.8	1.9	2.0	1.7	1.8	1.8	1.6
Water Elevation (NAVD 88)	NA	609.97	606.04	610.01	606.11	610.12	606.17	610.09	606.22	610.10	606.23	610.08	606.23	610.04	606.13

Notes:
1) Parial body contact maximum value 1,000 colonies per 100 ml (November 1 through April 30) and total body contact maximum value 300 colonies per 100 ml (May 1 through October 31)
2) Baseline sample reported as percent saturation. Value converted to mg/L utilizing reported temperature, specific conductivity and standard barometric pressure
3) Temperature varies seasonally
4) EPA 8260 scan. All compounds below laboratory detection limits

TABLE 1
ACME CREEK MONITORING RESULTS
GRAND TRAVERSE TOWN CENTER SITE
ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN

Study Parameter	Part 4 Water Quality Standards	July 26, 2011 Baseline Pre-Construction		March 16, 2016 Post-Construction (Year 1/Month 7)		April 21, 2016 Post-Construction (Year 1/Month 8)		May 26, 2016 Post-Construction (Year 1/Month 9)		June 22, 2016 Post-Construction (Year 1/Month 10)		July 20, 2016 Post-Construction (Year 1/Month 11)		August 24, 2016 Post-Construction (Year 1/Month 12)	
		Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Macroinvertebrates	NA	-5													
e Coli (colonies/100 ml)	(1)	100	72	86	126	43	21	16	243	19	30[5]	57	60[5]	66	75[5]
Dissolved Oxygen (mg/L)	7 (minimum)	11.4[2]	11.6[2]	11.4	11.7	11.3	11.3	11.8	12.1	10.9	10.8	10.1	9.7	11.2	11.3
Water Temperature (°F)	(3)	56.1	55.6	44.2	44.0	47.6	47.5	54	53.6	56.5	55.5	57.8	59.4	56.8	57.9
Specific Conductivity (µs/cm)	NA	334	334	482	534	345	324	234	326	422	433	219	220	284	287
pH (S.U.)	6.5 to 9.0	8.36	8.39	7.69	7.69	7.64	7.89	8.55	8.42	8.42	8.15	8.18	8.01	8.48	8.37
Volatile Organic Compounds	Various	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Total Organic Carbon (mg/L)	NA	1.3	1	3.5	3.6	1.2	1.3	0.8	0.7	1.0	1.6	1.3	1.2	0.9	1.0
Total Dissolved Solids (mg/L)	500	204	180	220	220	240	240	240	240	240	230	250	250	260	260
Total Suspended Solids (mg/L)	Visual Standard	11.2	4.4	20	33	7	4	2	4	4	6	4	5	9	8
Turbidity (NTU)	Visual Standard			10.4	12.9	2.0	2.9	1.0	3.0	2.8	2.6	2.6	2.2	2.2	2.0
Water Velocity (ft/sec)	NA	1.3	1.2	3.67	3.04	3.3	3.1	2.4	2.0	2.5	2.2	2.5	2.1	2.2	2.3
Water Elevation (NAVD 88)	NA	609.97	606.04	610.30	606.44	610.09	606.17	610.05	606.11	610.01	605.65	610	605.67	610.01	605.69

Notes:
1) Parial body contact maximum value 1,000 colonies per 100 ml (November 1 through April 30) and total body contact maximum value 300 colonies per 100 ml (May 1 through October 31)
2) Baseline sample reported as percent saturation. Value converted to mg/L utilizing reported temperature, specific conductivity and standard barometric pressure
3) Temperature varies seasonally
4) EPA 8260 scan. All compounds below laboratory detection limits
5) E coli. value reports the geometric mean of three samples collected at the downstream location (left, center, and right)

TABLE 1
ACME CREEK MONITORING RESULTS
GRAND TRAVERSE TOWN CENTER SITE
ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN

		July 26, 2011 Baseline Pre-Construction		November 1, 2016 Post-Construction (Year 2/Quarter 1)		February 23, 2017 Post-Construction (Year 2/Quarter 2)		May 31, 2017 Post-Construction (Year 2/Quarter 3)		August 30, 2017 Post-Construction (Year 2/Quarter 4)		November 13, 2017 Post-Construction (Year 3/Quarter 1)		February 13, 2018 Post-Construction (Year 3/Quarter 2)	
Study Parameter	Part 4 Water Quality Standards	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Macroinvertebrates	NA	-5													
e Coli (colonies/100 ml)	(1)	100	72	39	18[5]	23	31	45	53	31	38	41	73	10	6
Dissolved Oxygen (mg/L)	7 (minimum)	11.4[2]	11.6[2]	10.5	10.5	9.9	9.7	9.4	10.1	9.6	9.7	11.8	11.7	13.8	14.1
Water Temperature (°F)	(3)	56.1	55.6	51.4	50.5	43.8	44.0	50.2	50.0	53.8	54.1	43.5	44.2	36.8	36.8
Specific Conductivity (µs/cm)	NA	334	334	740	740	330	353	474	497	209	208	306	359	355	324
pH (S.U.)	6.5 to 9.0	8.36	8.39	8.10	8.13	8.79	8.58	7.98	7.96	8.47	8.46	7.92	7.27	7.76	7.88
Volatile Organic Compounds	Various	(4)	(4)	Toluene 2[4]	Toulene 3[4]	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Total Organic Carbon (mg/L)	NA	1.3	1	1.4	1.5	1.8	1.8	1.6	1.7	0.6	0.5	0.9	1.3	18	25
Total Dissolved Solids (mg/L)	500	204	180	240	240	240	250	240	250	240	240	250	240	240	250
Total Suspended Solids (mg/L)	Visual Standard	11.2	4.4	5	5	6	4	4	7	4	4	8	7	5	6
Turbidity (NTU)	Visual Standard			0.3	1.2	2.0	2.0	1.7	1.8	2.6	3.0	3.3	3.2	5.4	8.5
Water Velocity (ft/sec)	NA	1.3	1.2	2.11	1.91	2.31	2.01	1.78	2.28	2.4	2.3	0.87	0.48	0.86	0.42
Water Elevation (NAVD 88)	NA	609.97	606.04	610.11	605.81	610.08	605.77	610.00	605.69	609.96	605.65	610.08	606.24	610.00	606.10

Notes:
1) Parial body contact maximum value 1,000 colonies per 100 ml (November 1 through April 30) and total body contact maximum value 300 colonies per 100 ml (May 1 through October 31)
2) Baseline sample reported as percent saturation. Value converted to mg/L utilizing reported temperature, specific conductivity and standard barometric pressure
3) Temperature varies seasonally
4) EPA 8260 scan. All compounds below laboratory detection limits except as noted.
5) E coli. value reports the geometric mean of three samples collected at the downstream location (left, center, and right)

TABLE 1
ACME CREEK MONITORING RESULTS
GRAND TRAVERSE TOWN CENTER SITE
ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN

		July 26, 2011 Baseline Pre-Construction		May 1, 2018 Post-Construction (Year 3/Quarter 3)		August 20, 2018 Post-Construction (Year 3/Quarter 4)		November 5, 2018 Post-Construction (Year 4/Quarter 1)		March 7, 2019 Post-Construction (Year 4/Quarter 2)		May 15, 2019 Post-Construction (Year 4/Quarter 3)		September 16, 2019 Post-Construction (Year 4/Quarter 4)	
Study Parameter	Part 4 Water Quality Standards	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Macroinvertebrates	NA	-5													
e Coli (colonies/100 ml)	(1)	100	72	43	58	40	36	39	53	40	20	15	19	117	96
Dissolved Oxygen (mg/L)	7 (minimum)	11.4[(2)]	11.6[(2)]	21.7	23.7	13.4	13.4	11.2	11.0	13.7	13.8	11.2	11.3	10.1	10.0
Water Temperature (°F)	63[(3)]	56.1	55.6	47.0	46.9	53.8	53.6	46.2	46.0	37.8	37.6	49.3	48.7	52.5	52.7
Specific Conductivity (µs/cm)	NA	334	334	334	341	285	285	338	343	298	303	610	623	290	303
pH (S.U.)	6.5 to 9.0	8.36	8.39	8.10	7.89	8.72	8.70	7.49	7.47	7.29	6.66	7.63	7.42	7.89	8.13
Volatile Organic Compounds	Various	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)	(4)
Total Organic Carbon (mg/L)	NA	1.3	1	1.5	1.7	0.96	0.82	1.9	1.5	1.7	3.2	1.3	1.4	3.2	6
Total Dissolved Solids (mg/L)	500	204	180	240	250	250	250	250	250	250	250	250	250	240	240
Total Suspended Solids (mg/L)	Visual Standard	11.2	4.4	4	4	6	5	2	3	3	2	5	4	8	9
Turbidity (NTU)	Visual Standard			1.5	1.0	1.2	2.1	0.8	0.4	1.3	1.2	2.3	2.5	2.9	2.8
Water Velocity (ft/sec)	NA	1.3	1.2	0.68	0.74	0.81	0.53	1.2	1.2	1.2	0.96	1.4	0.70	0.83	0.78
Water Elevation (NAVD 88)	NA	609.97	606.04	610.01	606.13	609.92	605.96	610.11	606.23	609.97	606.06	610.01	606.09	610.01	607.77

Notes:

1) Parial body contact maximum value 1,000 colonies per 100 ml (November 1 through April 30) and total body contact maximum value 300 colonies per 100 ml (May 1 through October 31)

2) Baseline sample reported as percent saturation. Value converted to mg/L utilizing reported temperature, specific conductivity and standard barometric pressure

3) Temperature varies seasonally

4) EPA 8260 scan. All compounds below laboratory detection limits except as noted.

TABLE 1
ACME CREEK MONITORING RESULTS
GRAND TRAVERSE TOWN CENTER SITE
ACME TOWNSHIP, GRAND TRAVERSE COUNTY, MICHIGAN

		July 26, 2011 Baseline Pre-Construction		May 13, 2018 Post-Construction (Year 5/Semi-Annual 1)											
Study Parameter	Part 4 Water Quality Standards	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream
Macroinvertebrates	NA	-5													
e Coli (colonies/100 ml)	(1)	100	72	17	11										
Dissolved Oxygen (mg/L)	7 (minimum)	11.4[2]	11.6[2]	13.3	13.7										
Water Temperature (°F)	65[3]	56.1	55.6	43.3	43.0										
Specific Conductivity (µs/cm)	NA	334	334	330	334										
pH (S.U.)	6.5 to 9.0	8.36	8.39	7.98	7.87										
Volatile Organic Compounds	Various	(4)	(4)	(4)	(4)										
Total Organic Carbon (mg/L)	NA	1.3	1	2.5	2.5										
Total Dissolved Solids (mg/L)	500	204	180	240	240										
Total Suspended Solids (mg/L)	Visual Standard	11.2	4.4	4	1										
Turbidity (NTU)	Visual Standard			1.5	1.4										
Water Velocity (ft/sec)	NA	1.3	1.2	1.17	1.68										
Water Elevation (NAVD 88)	NA	609.97	606.04	610.02	606.08										

Notes:

1) Parial body contact maximum value 1,000 colonies per 100 ml (November 1 through April 30) and total body contact maximum value 300 colonies per 100 ml (May 1 through October 31)

2) Baseline sample reported as percent saturation. Value converted to mg/L utilizing reported temperature, specific conductivity and standard barometric pressure

3) Temperature varies seasonally (May Value Shown)

4) EPA 8260 scan. All compounds below laboratory detection limits except as noted.

ATTACHMENT I

LABORATORY DATA SHEETS

CUSTODY TRANSFER RECORD

SOS ANALYTICAL
4125 Cedar Run Road, Suite B
Traverse City, MI 49684
Phone: (231) 946-6767 Fax: (231) 946-8741
Email: shanna@sosanalytical.com www.sosanalytical.com

SOS Project ID # 202061

Cooler Temp (°C) 5.8 ONICE Page ____ of ____

Quote # : PO # :

Miscellaneous Information :

Client / Company Name : BARR ENGINEERING

Site Address : VGT

Project # / WSSN # :

Sampling Company : BARR

Sampler's Name : Mike Potter

Send Results To : JAMIE EDELYN

Address : 4771 50TH ST SE GRAND RAPIDS, MI 49512

Phone : Fax / E-mail : JEDELYN@BARR.com

Invoice To :

Address :

Analysis Information

Sample Identification	Collection Information Date	Time	# of Containers	Matrix DW, WW, GW, Soil, Oil, Sludge	Comments / Other Analysis	HCL HNO_3 H_2SO_4 NaOH MEOH TOC, S	HCL HNO_3 H_2SO_4 NaOH MEOH SCT, SCT	HCL HNO_3 H_2SO_4 NaOH MEOH E-coli	HCL HNO_3 H_2SO_4 NaOH MEOH UVO, S	HCL HNO_3 H_2SO_4 NaOH MEOH	HCL HNO_3 H_2SO_4 NaOH MEOH	HCL HNO_3 H_2SO_4 NaOH MEOH	HCL HNO_3 H_2SO_4 NaOH MEOH	HCL HNO_3 H_2SO_4 NaOH MEOH	RUSH Due : Call To Schedule
1 ACME DOWNSTREAM 1	5-13-2020	1120 AM/PM	5	SW Grab/Comp		X	X	X	X						
2 ACME UPSTREAM 2	5-13-2020	1130 AM/PM	5	SW Grab/Comp		X	X	X	X						
3		AM/PM		Grab/Comp											
4		AM/PM		Grab/Comp											
5		AM/PM		Grab/Comp											
6		AM/PM		Grab/Comp											
7		AM/PM		Grab/Comp											
8		AM/PM		Grab/Comp											
9		AM/PM		Grab/Comp											
10		AM/PM		Grab/Comp											
11		AM/PM		Grab/Comp											
12		AM/PM		Grab/Comp											
13		AM/PM		Grab/Comp											
14		AM/PM		Grab/Comp											
15		AM/PM		Grab/Comp											

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
MPott	5-13-2020	AM/PM			AM/PM
Relinquished by:	Date:	Time:	Received in lab by: SShea	Date: 5.13.2020	Time: 12:45 AM/PM

SOS ANALYTICAL

4125 Cedar Run Rd., Suite B
Traverse City, MI 49684
Phone 231-946-6767
Fax 231-946-8741
www.sosanalytical.com

COMPANY: BARR ENGINEERING

NAME:
PROJECT NO: VGT
WSSN:
WELL PERMIT:
TAX ID:
LOCATION:

MI
COUNTY:
TWP:

SOS PROJECT NO: 202061
SAMPLED BY: MIKE POTTER/BARR ENGINEERING

DATE SAMPLED: 5/13/2020
TIME SAMPLED:

SAMPLE MATRIX: SURFACE WATER
DATE RECEIVED: 5/13/2020
TIME RECEIVED: 12:45 PM

INORGANICS

No:	Analysis	Concentration	LOD	Units	Analyst	Date Completed	Drinking Water Reg Limit(MCL)
SAMPLE ID: ACME DOWNSTREAM (11:20 AM)							
1	E.COLI SM9223-B MPN	11		Colonies/100 mL	CG	5/15/2020	
1	RESIDUE, FILTERABLE(TDS)/SM2540C	240	10	mg/L (PPM)	JS	5/14/2020	
1	RESIDUE, NON-FILTERABLE(TSS)/SM2540D	1	1	mg/L (PPM)	AD	5/15/2020	
1	TOTAL ORGANIC CARBON EPA 415.1	2.5	0.5	mg/L (PPM)	ALS	5/29/2020	
SAMPLE ID: ACME UPSTREAM (11:30 AM)							
2	E.COLI SM9223-B MPN	17		Colonies/100 mL	CG	5/15/2020	
2	RESIDUE, FILTERABLE(TDS)/SM2540C	240	10	mg/L (PPM)	JS	5/14/2020	
2	RESIDUE, NON-FILTERABLE(TSS)/SM2540D	4	1	mg/L (PPM)	AD	5/15/2020	
2	TOTAL ORGANIC CARBON EPA 415.1	2.5	0.5	mg/L (PPM)	ALS	5/29/2020	

ND = NOT DETECTED
LOD = LIMIT OF DETECTION
SMCL = FEDERAL NON-ENFORCEABLE LIMIT
MCL = MAXIMUM CONTAMINANT LEVEL
s.u. = STANDARD pH UNITS REPORTED AT 25 C
DISS = DISSOLVED

APPROVED BY: _____
SHANNA SHEA
LAB MANAGER

SOS ANALYTICAL

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Traverse City, MI 49684
Phone 231-946-6767
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COMPANY:	BARR ENGINEERING	SOS PROJECT NO:	202061 - 1
NAME:		DATE SAMPLED:	5/13/2020
PROJECT NO:	VGT	TIME SAMPLED:	
WSSN:		SAMPLE MATRIX:	SURFACE WATER
LOCATION:		SAMPLE ID:	ACME DOWNSTREAM (11:20 AM)
		DATE RECEIVED:	5/13/2020
SAMPLED BY:	MIKE POTTER/BARR ENGINEERING	TIME RECEIVED:	12:45 PM

EPA 8260 VOLATILE ORGANICS

Units= ug/L (PPB) **Analyst=** SW/MM **Date Extracted=** **Date Completed=** 5/18/2020 **Prep Method=** EPA 5030B

Analyte	Concentration	LOD	Analyte	Concentration	LOD
ACETONE	ND	5	cis-1,3-DICHLOROPROPENE	ND	1
BENZENE	ND	1	trans-1,3-DICHLOROPROPENE	ND	1
BROMOBENZENE	ND	1	DIETHYL ETHER	ND	5
BROMOCHLOROMETHANE	ND	1	ETHYLBENZENE	ND	1
BROMODICHLOROMETHANE	ND	1	IODOMETHANE	ND	1
BROMOFORM	ND	1	ISOPROPYLBENZENE	ND	1
BROMOMETHANE	ND	1	ISOPROPYLTOLUENE	ND	1
n-BUTYLBENZENE	ND	1	METHYL ETHYL KETONE	ND	5
s-BUTYLBENZENE	ND	1	METHYL-t-BUTYL ETHER	ND	5
t-BUTYLBENZENE	ND	1	METHYLENE CHLORIDE	ND	5
CARBON DISULFIDE	ND	1	MIBK	ND	5
CARBON TETRACHLORIDE	ND	1	2-METHYLNAPHTHALENE	ND	5
CHLOROBENZENE	ND	1	NAPHTHALENE	ND	5
CHLOROFORM	ND	1	n-PROPYLBENZENE	ND	1
CHLOROETHANE	ND	1	STYRENE	ND	1
CHLOROMETHANE	ND	1	1,1,1,2-TETRACHLOROETHANE	ND	1
DIBROMOCHLOROMETHANE	ND	1	1,1,2,2-TETRACHLOROETHANE	ND	1
DIBROMOMETHANE	ND	1	TETRACHLOROETHENE	ND	1
1,2-DIBROMO3CHLOROPROPANE	ND	5	TOLUENE	ND	1
1,2-DIBROMOETHANE	ND	1	1,2,3-TRICHLOROBENZENE	ND	1
1,2-DICHLOROBENZENE	ND	1	1,2,4-TRICHLOROBENZENE	ND	1
1,3-DICHLOROBENZENE	ND	1	1,1,1-TRICHLOROETHANE	ND	1
1,4-DICHLOROBENZENE	ND	1	1,1,2-TRICHLOROETHANE	ND	1
DICHLORODIFLUOROMETHANE	ND	1	TRICHLOROETHENE	ND	1
1,1-DICHLOROETHANE	ND	1	TRICHLORFLUOROMETHANE	ND	1
1,2-DICHLOROETHANE	ND	1	1,2,3-TRICHLOROPROPANE	ND	1
1,1-DICHLOROETHENE	ND	1	1,2,4-TRIMETHYLBENZENE	ND	1
cis-1,2-DICHLOROETHENE	ND	1	1,3,5-TRIMETHYLBENZENE	ND	1
trans-1,2-DICHLOROETHENE	ND	1	VINYL CHLORIDE	ND	1
1,2-DICHLOROPROPANE	ND	1	XYLENE (TOTAL)	ND	3

ND = NOT DETECTED
LOD = LIMIT OF DETECTION

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COMPANY:	BARR ENGINEERING	SOS PROJECT NO:	202061 - 2
NAME:		DATE SAMPLED:	5/13/2020
PROJECT NO:	VGT	TIME SAMPLED:	
WSSN:		SAMPLE MATRIX:	SURFACE WATER
LOCATION:		SAMPLE ID:	ACME UPSTREAM (11:30 AM)
		DATE RECEIVED:	5/13/2020
SAMPLED BY:	MIKE POTTER/BARR ENGINEERING	TIME RECEIVED:	12:45 PM

EPA 8260 VOLATILE ORGANICS

Units= ug/L (PPB) **Analyst=** SW/MM **Date Extracted=** **Date Completed=** 5/18/2020 **Prep Method=** EPA 5030B

Analyte	Concentration	LOD
ACETONE	ND	5
BENZENE	ND	1
BROMOBENZENE	ND	1
BROMOCHLOROMETHANE	ND	1
BROMODICHLOROMETHANE	ND	1
BROMOFORM	ND	1
BROMOMETHANE	ND	1
n-BUTYLBENZENE	ND	1
s-BUTYLBENZENE	ND	1
t-BUTYLBENZENE	ND	1
CARBON DISULFIDE	ND	1
CARBON TETRACHLORIDE	ND	1
CHLOROBENZENE	ND	1
CHLOROFORM	ND	1
CHLOROETHANE	ND	1
CHLOROMETHANE	ND	1
DIBROMOCHLOROMETHANE	ND	1
DIBROMOMETHANE	ND	1
1,2-DIBROMO3CHLOROPROPANE	ND	5
1,2-DIBROMOETHANE	ND	1
1,2-DICHLOROBENZENE	ND	1
1,3-DICHLOROBENZENE	ND	1
1,4-DICHLOROBENZENE	ND	1
DICHLORODIFLUOROMETHANE	ND	1
1,1-DICHLOROETHANE	ND	1
1,2-DICHLOROETHANE	ND	1
1,1-DICHLOROETHENE	ND	1
cis-1,2-DICHLOROETHENE	ND	1
trans-1,2-DICHLOROETHENE	ND	1
1,2-DICHLOROPROPANE	ND	1

Analyte	Concentration	LOD
cis-1,3-DICHLOROPROPENE	ND	1
trans-1,3-DICHLOROPROPENE	ND	1
DIETHYL ETHER	ND	5
ETHYLBENZENE	ND	1
IODOMETHANE	ND	1
ISOPROPYLBENZENE	ND	1
ISOPROPYLTOLUENE	ND	1
METHYL ETHYL KETONE	ND	5
METHYL-t-BUTYL ETHER	ND	5
METHYLENE CHLORIDE	ND	5
MIBK	ND	5
2-METHYLNAPHTHALENE	ND	5
NAPHTHALENE	ND	5
n-PROPYLBENZENE	ND	1
STYRENE	ND	1
1,1,1,2-TETRACHLOROETHANE	ND	1
1,1,2,2-TETRACHLOROETHANE	ND	1
TETRACHLOROETHENE	ND	1
TOLUENE	ND	1
1,2,3-TRICHLOROBENZENE	ND	1
1,2,4-TRICHLOROBENZENE	ND	1
1,1,1-TRICHLOROETHANE	ND	1
1,1,2-TRICHLOROETHANE	ND	1
TRICHLOROETHENE	ND	1
TRICHLORFLUOROMETHANE	ND	1
1,2,3-TRICHLOROPROPANE	ND	1
1,2,4-TRIMETHYLBENZENE	ND	1
1,3,5-TRIMETHYLBENZENE	ND	1
VINYL CHLORIDE	ND	1
XYLENE (TOTAL)	ND	3

ND = NOT DETECTED
LOD = LIMIT OF DETECTION

APPROVED BY: SHANNA SHEA / LAB MANAGER