Board of Health

AGENDA & NOTICE OF MEETING

Tuesday, November 14, 2017 ~ 7:30 pm
112 Algonquin Road

1. Call to Order & Roll Call
2. Public Comments
3. [Vote] Minutes September 5, 2017
4. 315 Ridge Road Storm Water - Continued
5. 2017 Water Quality Report
6. Adjournment

Chairman: Gwynne Johnston

NOTICE AS POSTED

VILLAGE OF BARRINGTON HILLS
BOARD OF HEALTH MEETING
September 5, 2017

The regular meeting of the Village of Barrington Hills Board of Health was called to order at 7:30 p.m. by Chairman Johnston.

Board of Health Members Present:	Gwynne Johnston, Chairman Shirley Conibear, M.D. Anne Majewski, M.D. Gary Gabriel Frank Konicek (Arrived at 7:32)
Others Present:	Paula Jacobsen, Village Trustee Robert Kosin, Village Administrator Dan Strahan, Village Engineer Mary Dickson, Village Attorney Dave Eitel, St. Mark's Church Linda Cools, Resident Pauline Boyle, Resident *(Other members of Public- See Sign-in Sheet)*

PUBLIC COMMENT: No public comment was given.

APPROVAL OF MINUTES: Dr. Majewski made a motion to approve the minutes of the August 8, 2017 meeting of the Board of Health, as amended to reflect that Ms. Linda Cools was present at the meeting. The motion was seconded by Mr. Gabriel and approved unanimously.

315 RIDGE ROAD STORM WATER - CONTINUED: Discussion continued regarding the subject of runoff from 337 & 339 Ridge Road and other properties to the pond at 335 Ridge and flooding onto 315 Ridge. Mr. Strahan summarized a report prepared to address items requested by the Board of Health at the August meeting. These items included a meeting held on church property on August 16, 2017 to review the existing septic systems and drainage, a meeting held with Mr. Salka at 335 Ridge on August 9, 2017, a review of potential drainage improvements that would be needed to address the lack of an outlet for the pond at 335 Ridge, and a review of existing easements in the area. Mr. Strahan also presented the results of surface water testing that had occurred on Monday, August 28, 2017.

After discussion and comments from Ms. Boyle, the Board requested the following items be completed prior to the next Board of Health meeting:

- GHA to complete follow up discussions between St Marks Church and Mr./Mrs. Salka re swale or berm or curb on the south boundary between the two properties to limit sheet flow off the parking lot onto the Salka property.

- GHA to visit St Marks property and review as-built drawings to (1) ensure compliance with building approval for patio and screened porch on the rectory (2) re-arrangements of down-spouts for discharge to a rain garden or depression.
- Bond Dickson to provide a written opinion, based on Illinois law, statutes and case law re timing, definition and possible obligations of St Marks pertaining to a material change in water flow direction, as described in presentations and documentation provided by Mrs. Boyle.
- GHA to pursue collection and analysis of water samples from standing water on 315 Ridge and 335 Ridge after a rainfall. Note additional requests to specify testing for E. coli in addition to fecal coliforms.
- Mrs. Boyle to contact Lake County and investigate availability of funding for water flow or surface water management projects.
- GHA & Mr. Kosin to seek Village approval and funding for soil boring samples within 315 Ridge, 335 Ridge and 337 Ridge Roads to establish if soil conditions are suitable for one or more shallow dry wells.
- GHA to establish approval from residents (verbal approval given at the meeting) and establish a testing protocol to add dies or tracers to adjacent septic fields to establish (1) operational integrity of the septic fields, and (2) possible cause and effect contamination from water flow from septic fields into standing water in adjacent properties.

ADJOURNMENT: Dr. Majewski motioned to adjourn at 9:13 PM. Dr. Conibear seconded the motion. All present said aye.

GHA GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS
625 Forest Edge Drive, Vernon Hills, IL 60061
TEL 847.478.9700 ■ FAX 847.478.9701
www.gha-engineers.com

MEMORANDUM

To: Robert Kosin, Village of Barrington Hills
Board of Health Members

From: Dan Strahan, P.E., CFM
Gewalt Hamilton Associates

Date: November 9, 2017

Re: Ridge Road Depressional Area
Board of Health Meeting Follow-up

On Tuesday, August 8, 2017, Ms. Pauline Boyle made a presentation to the Board of Health regarding storm water drainage and septic system conditions at 337 Ridge Road affecting her property at 315 Ridge Road. Following that meeting Village staff followed up with St. Mark's Church as well as the neighboring property owner Mr. Salka (335 Ridge), and information was discussed at the next Board of Health meeting on Tuesday, September 5, 2017. At the September meeting, the Barrington Hills Board of Health requested the following items be completed by GHA prior to the November Board of Health meeting:

1. Conduct follow up discussions with St. Mark's Church to pursue site improvements (swale, berm, or curb) along the south property line to limit sheet flow onto the Salka property.
2. Inspection of St. Mark's property to (1) ensure compliance with building approval for patio and screened porch on the rectory, and (2) re-arrangements of down-spouts for discharge to a rain garden or depression.
3. Collection and analysis on 315 Ridge and 335 Ridge after a rainfall, with additional testing for E. Coli in addition to fecal coliform.
4. Seek Village Approval fand funding for soil boring samples at 315 Ridge, 335 Ridge, and 337 Ridge to establish if soil conditions are suitable for one or more shallow dry wells.
5. Establish approval from residents and a testing protocol to add dies or tracers to adjacent septic fields.

This memo presents a summary of our efforts to pursue the items identified by the Board of Health.

St. Mark's Church- Parking Lot Sheet Flow

On Thursday, November 2, 2017, Bob Kosin, Anna Paul, and I met with Dave Eitel and Rick Cavenaugh, representatives of St. Mark's Church, on the church property to review the results of the soil borings (discussed further below) and review the requests regarding surface drainage. I shared with Mr. Eitel and Mr. Cavenaugh the concerns that Mr. Salka had expressed regarding sheet flow from the parking lot and encouraged them to pursue one of the options discussed at the September Board of Health meeting (parking lot curb, swale, or berm to direct runoff east and west). Mr. Cavenaugh noted that curb had been considered in the past, but due to the high cost was not installed. The representatives also noted this would increase the runoff volume where it currently exits the site at the east and west ends of the property. I had noted this previously to Mr. Salka and he confirmed his preference to eliminate the sheet flow along the length of the parking lot.

During the meeting Village staff also discussed item #2 listed above, regarding the potential to redirect downspouts into a patio into a rain garden or depression. Mr. Eitel and Mr. Cavenaugh noted the financial limitations of the church and were unable to confirm at the meeting whether any drainage modifications were planned along the south parking lot boundary or to accommodate the redirection of gutter downspouts.

6601 Stephens Station Road, Unit 107, Columbia, MO 65202 ■ TEL 573.397.6900 ■ FAX 573.397.6901

Follow-up Surface Water Testing

As the Board of Health requested, GHA collected surface post-rainfall water samples from the pond at 335 Ridge, the downstream end of the swale south of the church rectory, and the other ponds throughout the Village that had been tested previously to provide context for the results. The first set of additional samples were gathered on the afternoon of Wednesday October 11, 2017, after 2.04" of rain fell based on measurements taken at the Village Hall weather station for October 10th and the morning of October 11th. The results for fecal coliform were higher at all locations following this significant rainfall total. E. Coli measurements were also taken and are tabulated below.

A second set of samples was taken on Monday, October 30, 2017 at the request of Village staff. Approximately 1.7" of rain had fallen over the course of three days the previous week, but only trace precipitation was measured over the five days preceding the test. These results were generally significantly lower than the October 11, 2017 test results, except for the sample taken at 30 Old Hart Road. GHA staff observed a large number of geese within and around this pond at the time of testing, and speculated that this may have caused the higher levels during this test.

The test results indicate that both fecal coliform and E. Coli were encountered regularly in surface waters in Barrington Hills, and encountered in larger amounts immediately after significant rainfall events.

Location	Pond Tributary Area (Acres)	Pond Surface Area (Acres)	Fecal Coliform (cfu/100 mL) 8/28/17	Fecal Coliform (cfu/100 mL) 10/11/17	E. Coli (MPN/100 mL) 10/11/17	Fecal Coliform (cfu/100 mL) 10/30/17	E. Coli (MPN/100 mL) 10/30/17
335 Ridge	29.9	0.52	20	310	435.2	10 EST*	16.9
337 Ridge-Swale	NA	NA	NA	3400 EST*	>2419.2	<10	6.3
30 Old Hart	27.4	2.83	<10	770	1119.9	1,100	1,986.30
40 Steeplechase	19.4	1.52	40	2000	>2419.2	120 EST*	104.6
Mirror Lake (Donlea Road)	43.2	6.31	<10	370	195.6	80 EST*	111.9
Chapel Road Wetland	35.2	5.33	<10	230	201.4	<10	17.3

Figure 1- Tabulated Surface Water Testing Results

Soil Boring Samples

In consultation with Village staff, GHA solicited and approved a proposal from Soil & Material Consultants to complete soil borings in three locations at St. Mark's Church to explore the feasibility of dry well catch basins or similar measures to enhance infiltration. The borings were completed in October and the associated report is attached. At two of the three boring locations a sand layer was encountered that had relatively high permeability; however, this layer was found at depths of 17.5' and 19.0' below the surface. These results were provided to the church for their consideration.

Dye Testing

Concurrent with the water sampling, GHA conducted dye testing at both septic systems located on St. Mark's Church property. Approximately 5 ounces of fluorescent dye was flushed down toilets at St. Mark's Church (Yellow/Green) and the Rectory (Orange). After the initial dye test on October 11th, 3.5" or rain fell on October 14-15th. GHA visited the site on Monday, October 16th and did not observe any dye leaking out of the septic fields or in the ponds. We also spoke with Mr. Salka that week and advised him that the dye had been placed. He had not observed any dye and to date we have not heard from him that dye has been observed within his pond or anywhere on the property.

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October 11, 2017
File No. 23562

Mr. Daniel J. Strahan, P.E., CEM
Gewalt Hamilton Associates, Inc.
825 Forest Edge Drive
Vernon Hills, IL 60061

Re: Geotechnical Investigation
337/339 Ridge Road
Barrington Hills, Illinois

Dear Mr. Strahan:

The following is our report of findings for the geotechnical investigation completed at the above referenced sites in the Village of Barrington Hills, Illinois.

The investigation was requested to determine current subsurface soil and water conditions at select boring locations. The findings of the field investigation and the results of laboratory testing are intended to assist in determining the feasibility of potential measures to increase infiltration at the property.

SCOPE OF THE INVESTIGATION

The field investigation included obtaining 3 borings at the locations requested and as indicated on the enclosed location sketch. The boring locations were established using field taping methods and accuracy. Surface elevations were determined using the temporary benchmark indicated on the location sketch.

We auger drilled the 3 borings to depths of 20.0 feet below existing surface elevations. Soil samples were obtained using a split barrel sampler advanced utilizing an automatic SPT hammer. Soil profiles were determined in the field and soil samples returned to our laboratory for additional testing including determination of moisture content. Cohesive soils obtained by split barrel sampling were tested further to determine dry unit weight and unconfined compressive strength.

The results of all field determinations and laboratory testing are included in summary with this report.

RESULTS OF THE INVESTIGATION

Enclosed are boring logs indicating the soil conditions encountered at each location. Site surface conditions include the existing structures, pavement areas, vegetation, topsoil and fill soil conditions. The topsoil is classified as dark brown silt/clay mixtures with traces of roots.

Fill soil conditions were encountered at boring B-3. Composition of the fill includes the presence of silt/gravel mixtures extending to a depth of 1.5 feet. The limits of fill placement were not determined within the scope of this investigation. Larger debris may also be present within the fill but was not encountered during the investigation.

Underlying natural soil conditions include the presence of cohesive soils. These are classified as tough to hard clay/silt mixtures with lesser portions of sand and gravel. Non-cohesive soils were also encountered as indicated. These include very loose to medium dense silt/sand, sand, sand/gravel, and silt/clay mixtures often in a very damp to saturated condition. The non-cohesive soils generally consist of a high percentage of silt with cleaner sand/gravel mixtures encountered at the bottom of borings B-1 and B-3. Cobbles and boulders may be present within the site soils at any elevation, although none were encountered while drilling.

SUBSURFACE WATER

The boring logs indicate subsurface water was not encountered in the bore holes at the time of the drilling operations and during the period of these readings. It is expected that fluctuations from the water levels recorded will occur over a period of time due to variations in rainfall, temperature, subsurface soil conditions, soil permeability and other factors not evident at the time of the water level measurements.

DISCUSSION

It is our understanding that drywells or other means are being considered to assist in surface drainage on this property. Grain-size analysis testing was performed on selected samples to determine USDA soil classifications. The soils encountered above the sand/gravel mixtures present at the bottom of borings B-1 and B-3 consisted of Silty Loam and Silty Clay soils. The Silty Loam and Silty Clay soils have low design infiltration rates of approximately 0.13 in./hr. and 0.07 in./hr. respectively due to the high percentages of clay and silt.

Borings B-1 and B-3 encountered sand/gravel mixtures below 17.5 feet and 19.0 feet respectively. The design infiltration rates of these soils are estimated to be 3.0 in./hr. Drywells installed at these two locations that extend into the sand/gravel soils could help with the drainage of the site. Boring 2 did not encounter the sand/gravel mixture however they could be present at deeper elevations.

CONCLUSION

The information within this report is intended to provide initial information concerning subsurface soil and water conditions on the site. Variations in subsurface conditions are expected to be present between boring locations due to naturally changing and filled soil conditions.

Our understanding of the proposed improvements is based on limited information available to us at the writing of this report. The findings of the investigation and the recommendations presented are not considered applicable to significant changes in the scope of the

improvements or applicable to alternate site uses. Obtaining additional soil borings may be warranted to further define the depth and limits of restrictive subsurface conditions.

If you have any questions concerning the findings or recommendations presented in this report, please let me know.

Very truly yours,

SOIL AND MATERIAL CONSULTANTS, INC.

Thomas P. Johnson, P.E.
President

TPJ:ek
Enc.

N

SMC	SOIL AND MATERIAL CONSULTANTS, INC.	LOCATION SKETCH
Client:	GEWALT HAMILTON ASSOCIATES, INC.	
Project:	337/339 RIDGE ROAD	
Location:	BARRINGTON HILLS, LLINOIS	
File No. 23562	Date: 10-5-17	Scale: NONE

SOIL AND MATERIAL CONSULTANTS, INC.
8 W. COLLEGE DR. • SUITE C • ARLINGTON HEIGHTS, IL 60004

SOIL BORING LOG 1

Logged By: DA Page: 1 of 1

Client: Gewalt Hamilton Associates, Inc.

File No. 23562 Date Drilled: 10/5/17

Reference: 337/339 Ridge Road
Barrington Hills, IL

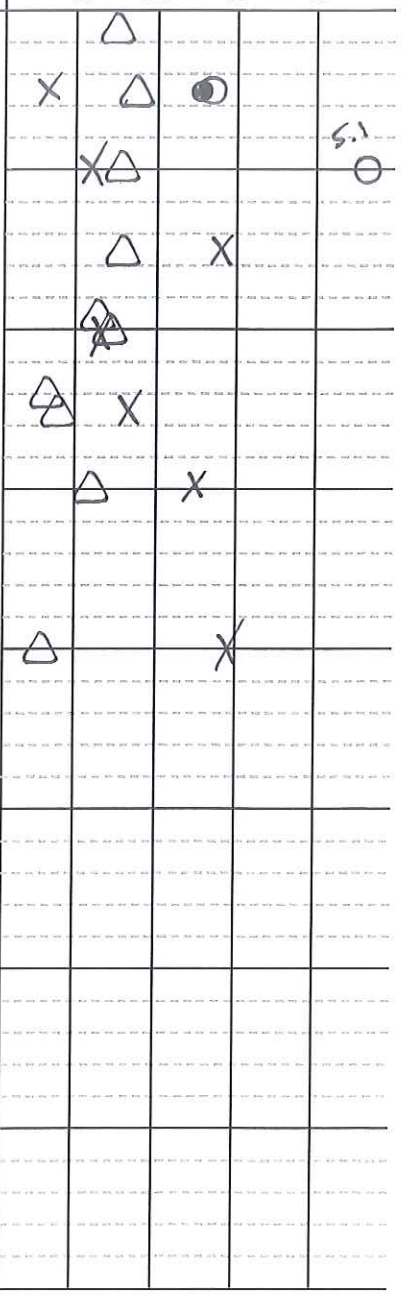
Comments:

Equipment: ☒CME 45B ☐CME 55 ☐Hand Auger ☐Other

depth, ft.	CLASSIFICATION Elevation 107.0' Existing Surface	standard penetration ×	moisture content Δ	dry unit weight lbs./cu.ft. ɣ	unconfined compressive strengh ○
	Dark brown silt,some fine sand,trace clay & roots,damp (topsoil)		14.5		
	Brown clay,some silt,trace sand,damp, very tough	6	18.7	104.8	2.6
5	Brown clay,some silt,trace sand & gravel damp,hard	12	14.5	121.3	5.1
	Brown silt,some sand & gravel,damp, medium dense	28	15.4		
10	Brown silt,some sand,trace clay,damp, medium dense (a) see below	13	12.2 13.9		
	Brown silt,some sand,trace clay & gravel damp,medium dense	16 25	7.4 9.3 10.5		
15					
	Brown fine-medium sand & gravel,some coarse sand,damp,medium dense				
20		29	5.1		
	End of Boring				
	(a) Brown fine sand,trace medium-coarse sand & gravel,damp,medium dense				
25					
30					
35					
40					

○ unconfined compressive strength, tons/sq. ft.
● penetrometer reading, tons/sq. ft.
1.0 2.0 3.0 4.0

× standard penetration "N", blows/ft.
Δ moisture content, %
10 20 30 40



Water encountered at dry feet during drilling operations (W.D.)
Water recorded at dry feet on completion of drilling operations (A.D.)
Water recorded at feet hours after completion of drilling operations (A.D.)

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SOIL BORING LOG 2

Logged By: DA Page: 1 of 1

Client: Gewalt Hamilton Associates, Inc.

File No. 23562 Date Drilled: 10/5/17

Reference: 337/339 Ridge Road
Barrington Hills, IL

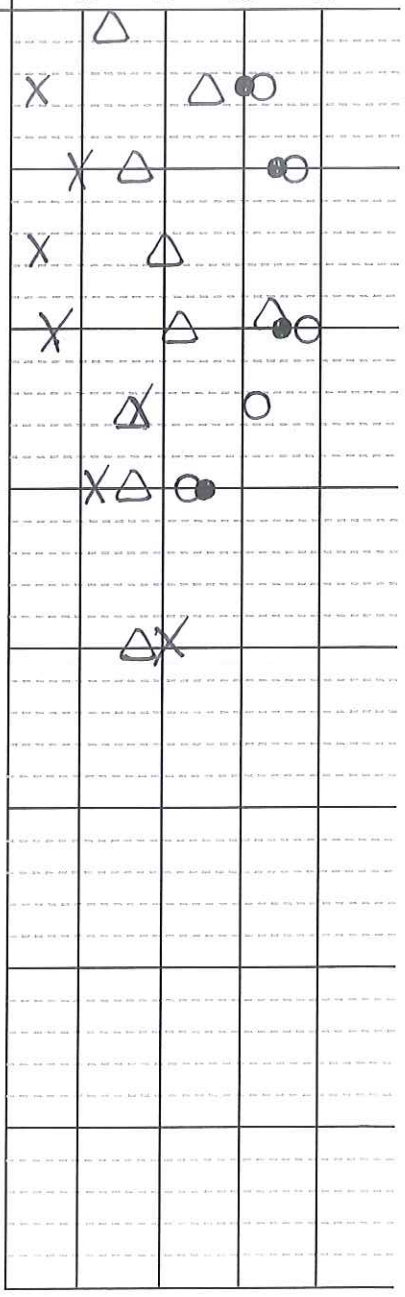
Comments:

Equipment: ☒CME 45B ☐CME 55 ☐Hand Auger ☐Other

depth, ft.	CLASSIFICATION Elevation 96.5' Existing Surface	standard penetration ×	moisture content △	dry unit weight lbs./cu.ft. ɣ	unconfined compressive strengh ○
	(a) see below		13.2		
	Brown clay,some silt,trace sand & gravel damp,very tough	3	25.4	93.6	3.2
5	Brown clay & silt,trace sand,damp,very tough	9	15.5	118.2	3.7
	Brown silt,some clay,trace fine sand, damp-very damp,very loose	4	20.1		
			32.6		
10	Brown clay,some silt,trace sand & gravel damp,very tough	5	21.2	110.3	3.9
		17	15.8	117.9	3.1
15	Gray clay,some silt,trace sand & gravel, damp,very tough	12	15.9	119.7	2.3
20	(b) see below	21	18.4		
	End of Boring				
	(a) Dark brown silt,some fine sand,trace clay & roots,damp (topsoil)				
25	(b) Brown silt,little sand,trace clay & gravel,damp-very damp,medium dense				
30					
35					
40					

○ unconfined compressive strength, tons/sq. ft.
● penetrometer reading, tons/sq. ft.
1.0 2.0 3.0 4.0

× standard penetration "N", blows/ft.
△ moisture content, %
10 20 30 40



Water encountered at dry feet during drilling operations (W.D.)
Water recorded at dry feet on completion of drilling operations (A.D.)
Water recorded at feet hours after completion of drilling operations (A.D.)

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SOIL BORING LOG 3

Logged By: DA Page: 1 of 1

Client: Gewalt Hamilton Associates, Inc.

File No. 23562 Date Drilled: 10/5/17

Reference: 337/339 Ridge Road
Barrington Hills, IL

Comments:

Equipment: ☒CME 45B ☐CME 55 ☐Hand Auger ☐Other

depth, ft.	CLASSIFICATION Elevation 93.2' Existing Surface	standard penetration ×	moisture content Δ	dry unit weight lbs./cu.ft. ϒ	unconfined compressive strength ○
	Brown sand & silt,some gravel,trace roots,damp - Fill		8.0		
	Brown clay,some silt,trace sand & gravel damp,hard	8	20.9	99.2	4.6
5	Brown silt,some clay,trace fine sand, damp,medium dense	22	17.5		
	(a) see below	16	16.0 9.2		
	Brown clay,some silt,trace sand & gravel				
10	damp,hard	18	17.6	114.3	6.3
	Brown clay,some silt,trace sand & gravel damp,very tough to hard	13	18.3	108.1	2.9
15		15	16.9	113.2	5.3
	(b) see below	18	5.8		
20	End of Boring				
	(a) Brown sand,some silt & gravel,damp, medium dense				
25	(b) Brown fine-medium sand & gravel, some coarse sand,damp,medium dense				
30					
35					
40					

○ unconfined compressive strength, tons/sq. ft.
● penetrometer reading, tons/sq. ft.
1.0 2.0 3.0 4.0

× standard penetration "N", blows/ft.
Δ moisture content, %
10 20 30 40

Water encountered at dry feet during drilling operations (W.D.)
Water recorded at dry feet on completion of drilling operations (A.D.)
Water recorded at feet hours after completion of drilling operations (A.D.)

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GENERAL NOTES

SAMPLE CLASSIFICATION

Soil sample classification is based on the Unified Soil Classification System, the Standard Practice for Description and Identification Soils (Visual-Manual Procedure), ASTM D-2488, the Standard Test Method for Classification of Soils for Engineering Purposes, ASTM D-2487 (when applicable), and the modifiers noted below.

CONSISTENCY OF COHESIVE SOILS

Term	Qu-tons.sq.ft.	N (unreliable)
Very soft	0.00 – 0.25	0 – 2
Soft	0.26 – 0.49	3 – 4
Stiff	0.50 – 0.99	5 – 8
Tough	1.00 – 1.99	9 –15
Very Tough	2.00 – 3.99	16 – 30
Hard	4.00 – 7.99	30 +
Very Hard	8.00 +	

RELATIVE DENSITY OF GRANULAR SOILS

Term	N – blows/foot
Very Loose	0 – 4
Loose	5 – 9
Medium Dense	10 – 29
Dense	30 – 49
Very Dense	50 +

IDENTIFICATION AND TERMINOLOGY

Term	Size Range
Boulder	over 8 in.
Cobble	3 in. to 8 in.
Gravel - coarse	1 in. to 3 in.
- medium	3/8 in. to 1 in.
- fine	#4 sieve to 3/8 in.
Sand - coarse	#10 sieve to #4 sieve
- medium	#40 sieve to #10 sieve
- fine	#200 sieve to #40 sieve
Silt	0.002 mm to #200 sieve
Clay	smaller than 0.002mm

Modifying Term	Percent by Weight
Trace	1 – 10
Little	11 – 20
Some	21 – 35
And	36 – 50

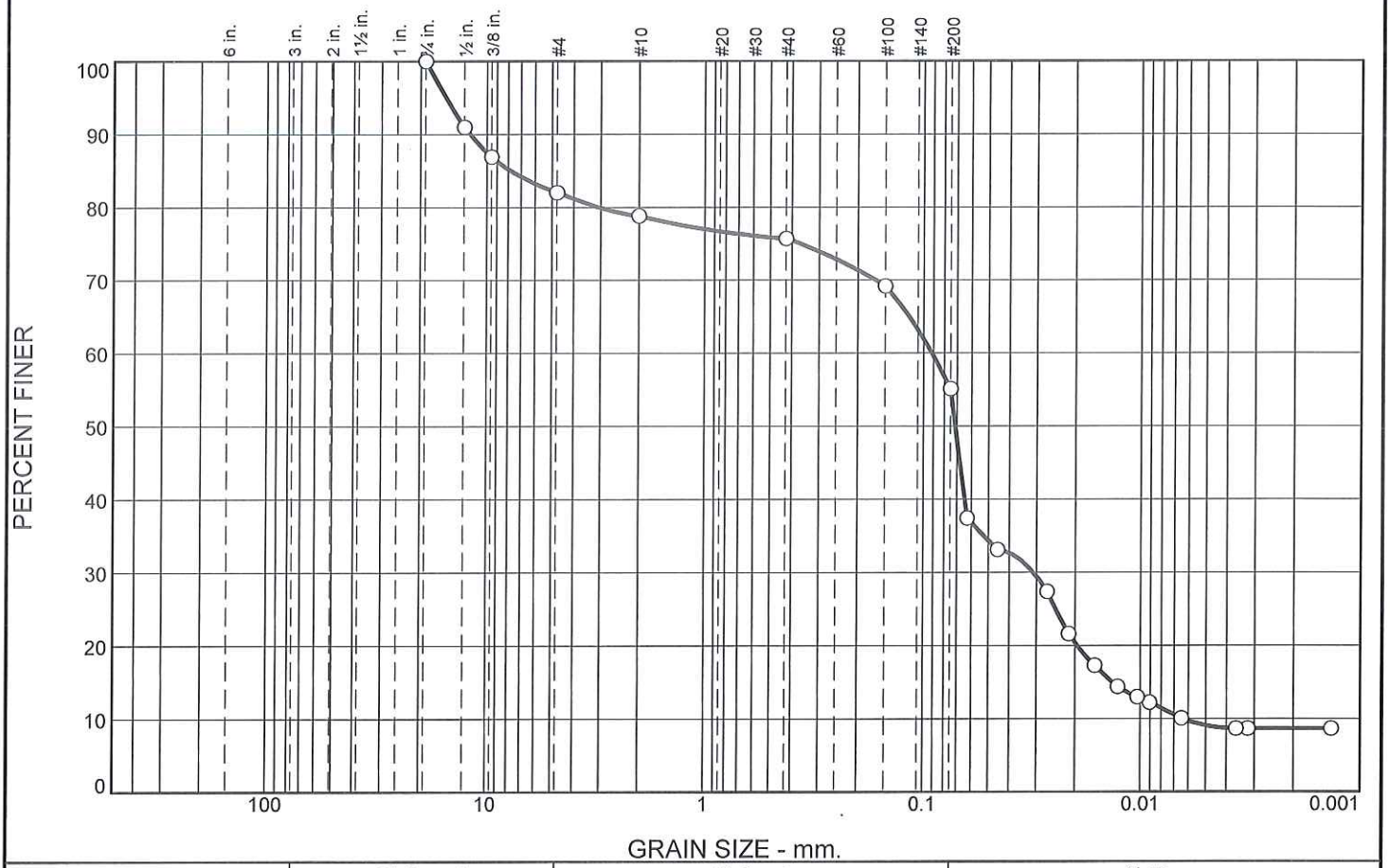
Moisture Content

Dry
Damp
Very Damp
Saturated

DRILLING, SAMPLING & SOIL PROPERY SYMBOLS

- CF - Continuous Flight Auger
- HS - Hollow Stem Auger
- HA - Hand Auger
- RD - Rotary Drilling
- AX - Rock Core, 1-3/16 in. diameter
- BX - Rock Core, 1-5/8 in. diameter
- NX - Rock Core, 2-1/8 in. diameter
- S - Sample Number
- T - Type of Sample
- J - Jar
- AS - Auger Sample
- SS - Split Spoon (2 in. O.D. with 1-3/8 in. I.D.)
- ST - Shelby Tube (2 in. O.D. w/ith1-7/8 in. I. D.)
- R - Recovery Length, in.
- B - Blows/6 in. interval, Standard Penetration Test (SPT)
- N - Blows/foot to drive 2 in. O.D. split-spoon sampler with 140 lb. hammer falling 30 in., (STP)
- Pen. - Pocket Penetrometer readings, tons/sq.ft.
- W - Water Content, % dry weight
- Uw - Dry Unit Weight of soil, lbs./cu.ft.
- Qu - Unconfined Compressive Strength, tons/sq.ft.
- Str - % Strain at Qu.
- WL - Water Level
- WD - While Drilling
- AD - After Drilling
- DCI - Dry Cave-in.
- WCI - Wet Cave-in.
- LL - Liquid Limit, %
- PL - Plastic Limit, %
- PI - Plasticity Index (LL-PL)
- LI - Liquidity Index [(W-PL)/PI]

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	18.0	3.2	3.1	20.6	46.5	8.6

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	91.0		
3/8	86.9		
#4	82.0		
#10	78.8		
#40	75.7		
#100	69.2		
#200	55.1		

* (no specification provided)

Material Description

Silty Loam

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 11.9813 D_{85}= 7.8065 D_{60}= 0.0917
D_{50}= 0.0714 D_{30}= 0.0311 D_{15}= 0.0135
D_{10}= 0.0064 C_u= 14.40 C_c= 1.66

Classification

USCS= AASHTO=

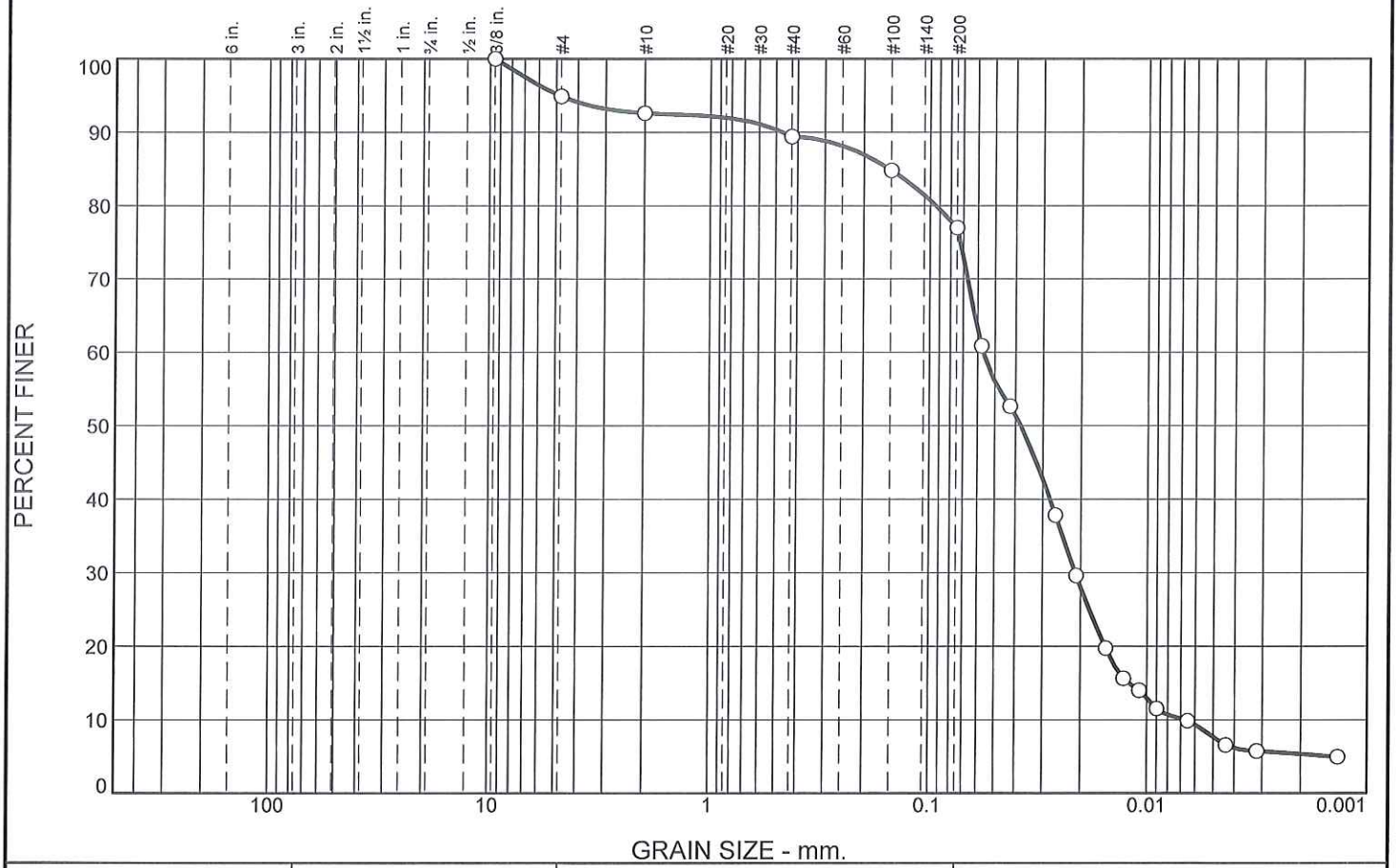
Remarks

Location: Boring 1
Sample Number: 4 **Depth:** 6.5' - 7.5' **Date:** 10/11/2017

SOIL AND MATERIAL CONSULTANTS, INC.

Client: GEWALT HAMILTON ASSOCIATES, IL
Project: 337/339 Ridge Road
Barrington Hills, IL
Project No: 23562 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	5.1	2.3	3.2	12.4	71.6	5.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/8	100.0		
#4	94.9		
#10	92.6		
#40	89.4		
#100	84.8		
#200	77.0		

* (no specification provided)

Material Description

Silty Loam

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.4700 D_{85}= 0.1536 D_{60}= 0.0564
D_{50}= 0.0379 D_{30}= 0.0212 D_{15}= 0.0121
D_{10}= 0.0067 C_u= 8.47 C_c= 1.19

Classification

USCS= AASHTO=

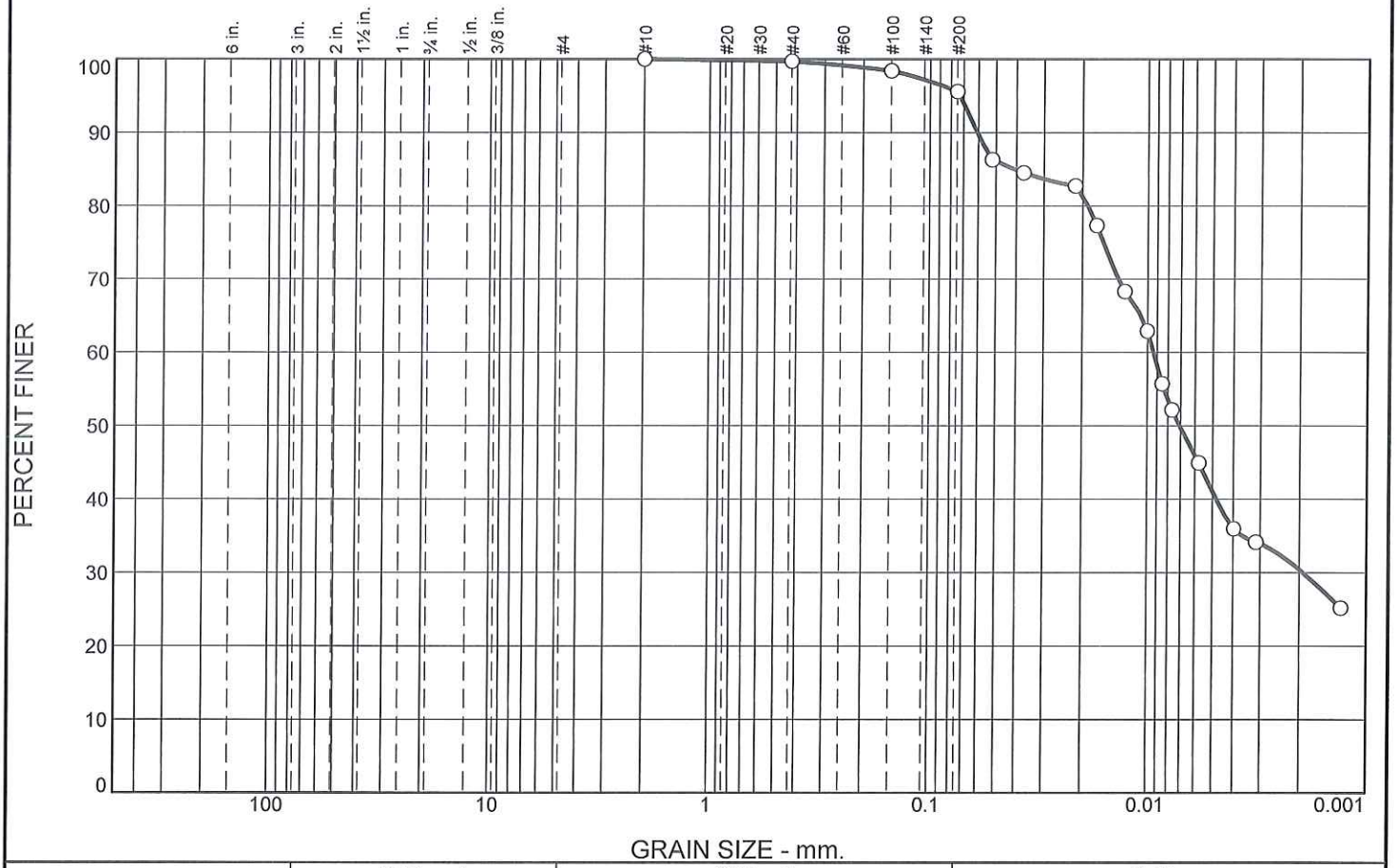
Remarks

Location: Boring 2
Sample Number: 9 **Depth:** 19.0' - 20.0' **Date:** 10/11/2017

SOIL AND MATERIAL CONSULTANTS, INC.

Client: GEWALT HAMILTON ASSOCIATES, IL
Project: 337/339 Ridge Road
Barrington Hills, IL
Project No: 23562 **Figure**

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.3	4.1	65.2	30.4

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#10	100.0		
#40	99.7		
#100	98.4		
#200	95.6		

* (no specification provided)

Material Description

Silty Clay

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.0606 D_{85}= 0.0410 D_{60}= 0.0094
D_{50}= 0.0071 D_{30}= 0.0019 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Location: Boring 3
Sample Number: 3 **Depth:** 4.0' - 5.0' **Date:** 10/11/2017

SOIL AND MATERIAL CONSULTANTS, INC.

Client: GEWALT HAMILTON ASSOCIATES, IL
Project: 337/339 Ridge Road
Barrington Hills, IL
Project No: 23562 **Figure**

Data: Illinois Sees 10th-Wettest October on Record This Year
Nov. 3, 2017, at 12:35 p.m.

CHAMPAIGN, Ill. (AP) — Illinois climate experts say the state saw the tenth-wettest October since 1895 this year thanks to average statewide precipitation of nearly 5 inches.

Illinois state climatologist Jim Angel of the Illinois State Water Survey says that's 1.7 inches above normal. The Chicago suburb of Glen Ellyn had the largest monthly rainfall total at 15.0 inches. Several weather monitoring sites in northern and central Illinois reported snow Oct. 28, but most had flurries.

The statewide average temperature during October was 57.7 degrees, 3.3 degrees above normal. The water survey says the first 21 days of October were about 7 degree above normal. The last ten days were 7 degree below normal. The coldest temperature recorded in Illinois last month was 19 degrees on Oct. 29 in Perry.

GEWALT HAMILTON ASSOCIATES, INC.
CONSULTING ENGINEERS
625 Forest Edge Drive, Vernon Hills, IL 60061
Tel 847.478.9700 ▪ Fax 847.478.9701
www.gha-engineers.com

November 8, 2017

Mr. Robert Kosin
Director of Administration
Village of Barrington Hills
112 Algonquin Road
Barrington Hills, IL 60010

Dear Mr. Kosin,

We are enclosing the results of the water quality monitoring performed by Environmental Monitoring & Technologies, Inc. This annual monitoring is performed to ensure that the Village of Barrington Hills remains in compliance with the requirements of the National Pollutant Discharge Elimination System (NPDES) General Stormwater Permit ILR40 for discharges from Small Municipal Separate Storm Sewer Systems (MS4s).

The updated ILR40 Permit became effective on March 1, 2016, which requires that monitoring of storm water discharges "shall be performed within 48 hours of a precipitation event greater than or equal to one quarter inch in a 24-hour period." All water quality samples were taken after a precipitation event greater than or equal to 0.25 inches to accurately represent the pollution load from stormwater. Therefore, the tested parameters may be present in higher concentrations than in previous years' results.

Annual monitoring helps determine if the best management practices (BMPs) being performed by the Village are helping to improve water quality within the receiving waters. Also enclosed is a summary report produced by Gewalt Hamilton Associates, Inc. (GHA) containing maps of the monitoring sites, a comparison between annual results, summary graphs, and BMP recommendations to improve the quality of stormwater runoff within the Village.

Should you have any questions, please do not hesitate to contact me at cburke@gha-engineers.com or at (847) 821-6256.

Sincerely,

GEWALT HAMILTON ASSOCIATES, INC.

Caitlin Burke

Caitlin Burke, CWS
Environmental Consultant

WATER QUALITY REPORT
October 2017

Village of Barrington Hills
GHA Project No. 9355.090

Prepared by
Gewalt Hamilton Associates, Inc.
625 Forest Edge Drive
Vernon Hills, IL 60061
847.478.9700
www.gha-engineers.com

TABLE OF CONTENTS

Section 1

Executive Summary

BACKGROUND

This water quality test analysis was developed for the Village of Barrington Hills for the purpose of demonstrating compliance with the minimum standards required by the Illinois Environmental Protection Agency (IEPA) General Storm Water Permit ILR40 for discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The most recent version of the ILR40 permit expired on March 31, 2014, but has been administratively continued by the IEPA. NOTE: The new updated version of the permit states that: "At a minimum, analysis shall include the following parameters: total suspended solids, total nitrogen, total phosphorus, fecal coliform, and chlorides, and oil and grease".

Test results obtained through this project were compared against the Water Quality Standards (WQS) established by the Illinois Pollution Control Board (IPCB) under Title 35 of the Illinois Administrative Code; *Standard Methods for the Examination of Water and Wastewater*, a joint publication of the American Public Health Association (APHA), American Water Works Association (AWWA), and the Water Environment Federation (WEF); or *Volunteer Stream Monitoring: A Methods Manual*, published by the United States Environmental Protection Agency, Office of Water.

Parameters

Lab Analyses

1. Chloride
2. Fluoride
3. Fecal Coliform
4. Oil/Grease
5. Total Kjeldahl Nitrogen
6. Total Phosphorous
7. Total Suspended Solids (TSS)

Locations

Six (6) sites within the Village of Barrington Hills were tested, at locations upstream and downstream of the MS4 discharge:

- Spring Creek North
- Spring Creek South
- Flint Creek North
- Flint Creek Old Hart
- Flint Creek Lake Cook
- Flint Creek South

A map of these locations is included in Section 3.

Section 2

Program Overview

PURPOSE

The purpose of water quality testing analysis is to demonstrate compliance with the minimum standards required by the Illinois Environmental Protection Agency (IEPA) General Storm Water Permit ILR40 for discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The permit requires annual monitoring of receiving waters upstream and downstream of the MS4 discharges, use of indicators to gauge the effects of storm water discharges on the physical/habitat-related aspects of the receiving waters and/or monitoring of the effectiveness of the Best Management Practices (BMPs). MS4 components include the conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, gutters, ditches, swales, manmade channels or storm sewers. Storm water run-off naturally contains numerous constituents; however, urbanization and urban activities (including municipal activities) typically increase concentrations to levels that may impact water quality. Pollutants associated with storm water include sediment, nutrients, bacteria and viruses, oil and grease, metals, organics, pesticides and gross pollutants.

Water pollution control programs are designed to protect the beneficial uses of the water resources within the state. Each state has the responsibility to set water quality standards (WQS) that protect these beneficial uses, commonly referred to as "designated uses". In Illinois, waters are designated for various uses including aquatic life, wildlife, agricultural use, primary contact (e.g., swimming, water skiing), secondary contact (e.g., boating, fishing), industrial use, drinking water, food-processing water supply and aesthetic quality. Illinois' WQS provide the basis for assessing whether the beneficial uses of the state's waters are being attained. The purpose of this study is to assess the quality of receiving waters and provide recommendations for BMPs that will target the identified areas of concern.

TESTING METHODS AND PARAMETERS

For proper analysis, water samples are taken at locations upstream and downstream of the MS4 discharge and kept on ice during transport to the laboratory for processing. Upstream and downstream results are compared to determine if MS4 discharges are contributing to water pollution in receiving waters.

Water quality test results are also compared against published water quality standards. The purposes of these standards are to protect existing uses of all waters of the State of Illinois, maintain above standard water quality, and prevent unnecessary deterioration of waters of the State. A majority of the standards referred to in this report have been established by the Illinois Pollution Control Board (IPCB), and can be found in the Illinois Administrative Code Title 35, Environmental Protection; Subtitle C, Water Pollution; Chapter I, Pollution Control Board; Part 302, Water Quality Standards, or Part 304, Effluent Standards (http://www.ipcb.state.il.us/SLR/IPCBandIEPAEnvironmentalRegulations-Title35.asp).

The IPCB has not established standards for one of the parameters measured (Total Kjeldahl Nitrogen). For purposes of this report, the standards for these parameters have been established as follows:

- Total Kjeldahl Nitrogen – As published in *Standard Methods for the Examination of Water and Wastewater*, a joint publication of the American Public Health Association (APHA), American Water Works Association (AWWA), and the Water Environment Federation (WEF) (http://www.standardmethods.org/).

Parameter	Description	Standards/Accepted Limits	Source
Chloride	May enter a water system from rocks, agricultural run-off, industrial wastewater, oil well wastes, wastewater treatment plant effluents, and road salts. Chloride in large quantities has negative impacts on aquatic life.	500.0 mg/L	IPCB Title 35, Subtitle C, Chapter 1, Part 302, Subpart C: *Public and Food Processing Water Supply Standards*
Fluoride	Often added to drinking water for dental health but high concentrations are associated with toxicity in aquatic organisms. Fluoride is naturally occurring and often comes from manufacturing emissions and agricultural runoff.	1.4 mg/L	IPCB Title 35, Subtitle C, Chapter 1, Part 302, Subpart D: *Secondary Contact and Indigenous Aquatic Life Standards*
Fecal Coliform	Bacteria found in the digestive systems of warm blooded organisms. It does not pose a health threat but can lead serve as an indicator for bacteria that cause illnesses in both humans and aquatic life.	200 CFU per 100 mL	IPCB Title 35, Subtitle C, Chapter 1, Part 304, Subpart B: *Temporary Effluent Standards*
Oil & Grease	Sources of oil and grease include used fuel, motor oil, hydraulic fluids, and cooking oil. Most oil and grease is insoluble in water. Low levels of pollution can reduce aquatic organisms' ability to reproduce and survive. Toxicity varies among different types. Refined oils are generally more toxic than crude oils.	15 mg/L	IPCB Title 35, Subtitle C, Chapter 1, Part 302, Subpart B: *Temporary Effluent Standards*
Total Kjeldahl Nitrogen (TKN)	TKN is the sum of organic nitrogen, ammonia (NH_3^+), and ammonium ($NH4^+$) of soil, water or wastewater. Various compounds of nitrogen are found in storm water runoff from fertilizers, animal wastes, and plant decay. Once nitrite is broken down to nitrate, if it is in excess it will cause extreme algal growth ultimately lowering the DO levels.	<20.0 mg/L	*Standard Methods for the Examination of Water and Wastewater*

Parameter	Description	Standards/Accepted Limits	Source
Total Phosphorous	A key element in animal and plant growth. Rainfall causes varying amounts of phosphorus and phosphates to wash away from farm soils and certain pesticides into waterways in the form of runoff. Excess phosphates can cause eutrophication which is an excessive amount of algae growth that is consuming large amounts of oxygen.	0.05 mg/L	IPCB Title 35, Subtitle C, Chapter 1, Part 302, Subpart B: *General Use Water Quality Standards*
Total Suspended Solids (TSS)	Both organic and inorganic solid materials that have low density and are too small to settle such as silt, plankton, mud, and industrial wastes. As TSS increases the transparency of the water and DO levels decrease making it hard for some forms of life to exist.	15.0-30.0 mg/L	IPCB Title 35, Subtitle C, Chapter 1, Part 304, Section 124: *Additional Contaminants*

Section 3

Testing Locations

In the Village of Barrington Hills, five (5) sites were selected for testing:

1. **Spring Creek North**

   This test site is located where Spring Creek passes underneath Algonquin Road, just east of Braeburn Road and west of Plum Tree Road. This site is considered a downstream location.

2. **Spring Creek South**

   The test site is located at the point where Spring Creek passes underneath IL Route 59. At Regency Boulevard, just south of the Barrington Hills Village boundary in Hoffman Estates. This site is considered the upstream location for Spring Creek.

3. **Flint Creek North**

   The test site is located on the west side of Flint Creek, north of Merri-Oaks Lane where it intersects W. Cuba Road in Barrington Hills. In this report, the site is considered a downstream location for Flint Creek.

4. **Flint Creek Old Hart**

   The test site is located on the south side of Flint Creek, east of Old Hart Road north of the Oak Knoll Road intersection. In this report, the site is considered a downstream location for Flint Creek.

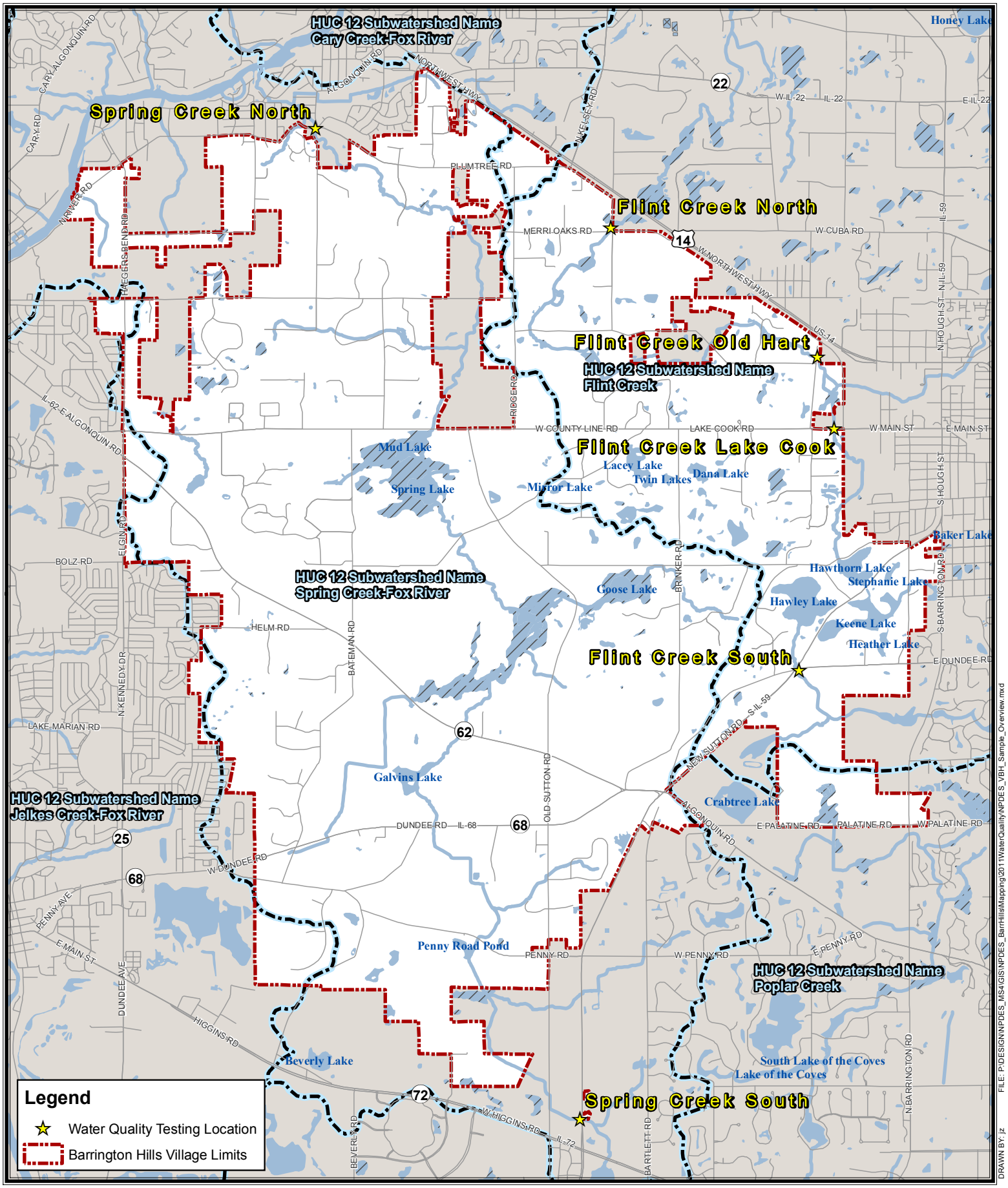
5. **Flint Creek Lake Cook**

   The test site is located on the west side of Flint Creek, north of Lake Cook Road and west of Hart Road, in Barrington. In this report, the site is considered an upstream location for Flint Creek (downstream of Flint Creek South, only).

6. **Flint Creek South**

   The test site is located on the east side of Flint Creek at the southeast corner of Dundee Road and IL Route 59 in Barrington Hills. This site is the most upstream location for Flint Creek.

Maps showing the approximate locations of the sample site are included on the following pages.



Sources: BAGIS

N

Feet 0 5,000

1 inch = 5,000 feet

National Pollutant Discharge Elimination System
Water Sampling Locations
Village of Barrington Hills, IL

GEWALT HAMILTON ASSOCIATES, INC.

Project: 9355.090
Map Code: 21038x11
DATE: 5/31/2011

FILE: P:\DESIGN\NPDES_MS4\GIS\NPDES_BarrHills\Mapping\2011WaterQuality\NPDES_VBH_Sample_Overview.mxd

DRAWN BY: jz

Sources: BAGIS, Google Earth imagery Date: 05/27/2010

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0 100

1 inch = 100 feet

NPDES Water Sampling Locations
Village of Barrington Hills, Illinois
Location: SpringCreek_N

GEWALT HAMILTON ASSOCIATES, INC.

DATE: 10/28/2011
Project: 9355.090
Map Code: 375711x8

DRAWN BY: DAR

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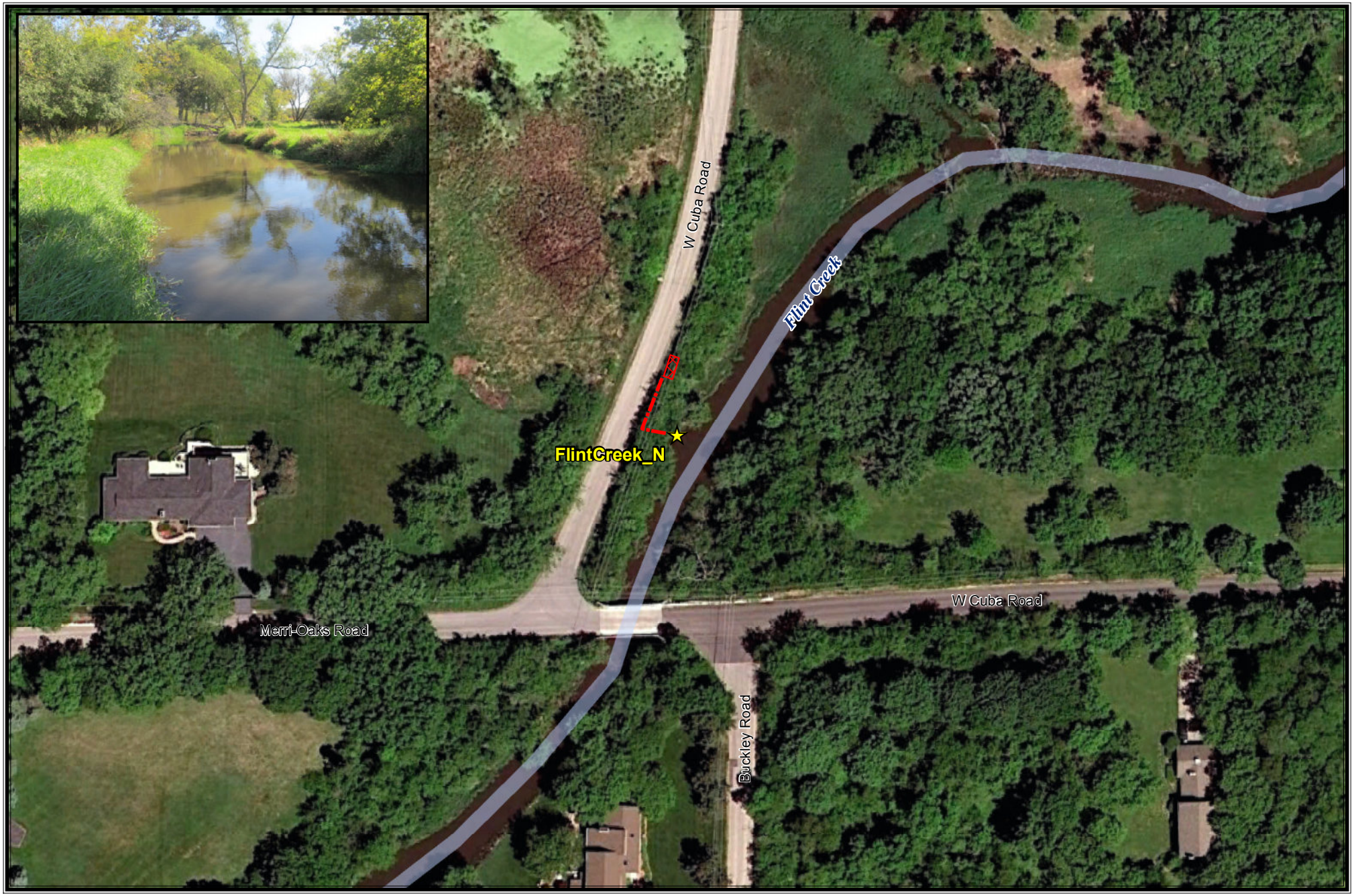

Sources: BAGIS, Google Earth Imagery Date: 05/27/2010

N

0 100

1 inch = 100 feet

NPDES Water Sampling Locations
Village of Barrington Hills, Illinois
Location: FlintCreek_N

GEWALT HAMILTON ASSOCIATES, INC.

DATE: 10/27/2011
Project: 9355.090
Map Code: 375511x8

DRAWN BY: DAR

FILE: P:\DESIGN\NPDES_MS4\GIS\NPDES_BarrHills\Mapping\2010WaterQuality\NPDES_SampleLocations_FlintCreek_N.mxd

Sources: BAGIS, Lake County Imagery Date: 2010

N

0 100

1 inch = 100 feet

NPDES Water Sampling Locations
Village of Barrington Hills, Illinois
Location: FlintCreek_OldHart

GEWALT HAMILTON ASSOCIATES, INC.

DATE: 10/28/2011
Project: 9355.090
Map Code: 440311x8

DRAWN BY: DAR

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Sources: BAGIS, Google Earth Imagery Date: 5/27/2010

N

0 100

1 inch = 100 feet

NPDES Water Sampling Locations
Village of Barrington Hills, Illinois
Location: FlintCreek_LakeCook

GEWALT HAMILTON ASSOCIATES, INC.

DATE: 10/27/2011
Project: 9355.090
Map Code: 440211x8

DRAWN BY: DAR

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Sources: BAGIS, Google Earth Imagery Date: 05/27/2010

N

0 100

1 inch = 100 feet

NPDES Water Sampling Locations
Village of Barrington Hills, Illinois
Location: FlintCreek_S

GEWALT HAMILTON ASSOCIATES, INC.

DATE: 10/28/2011
Project: 9355.090
Map Code: 375611x8

DRAWN BY: DAR

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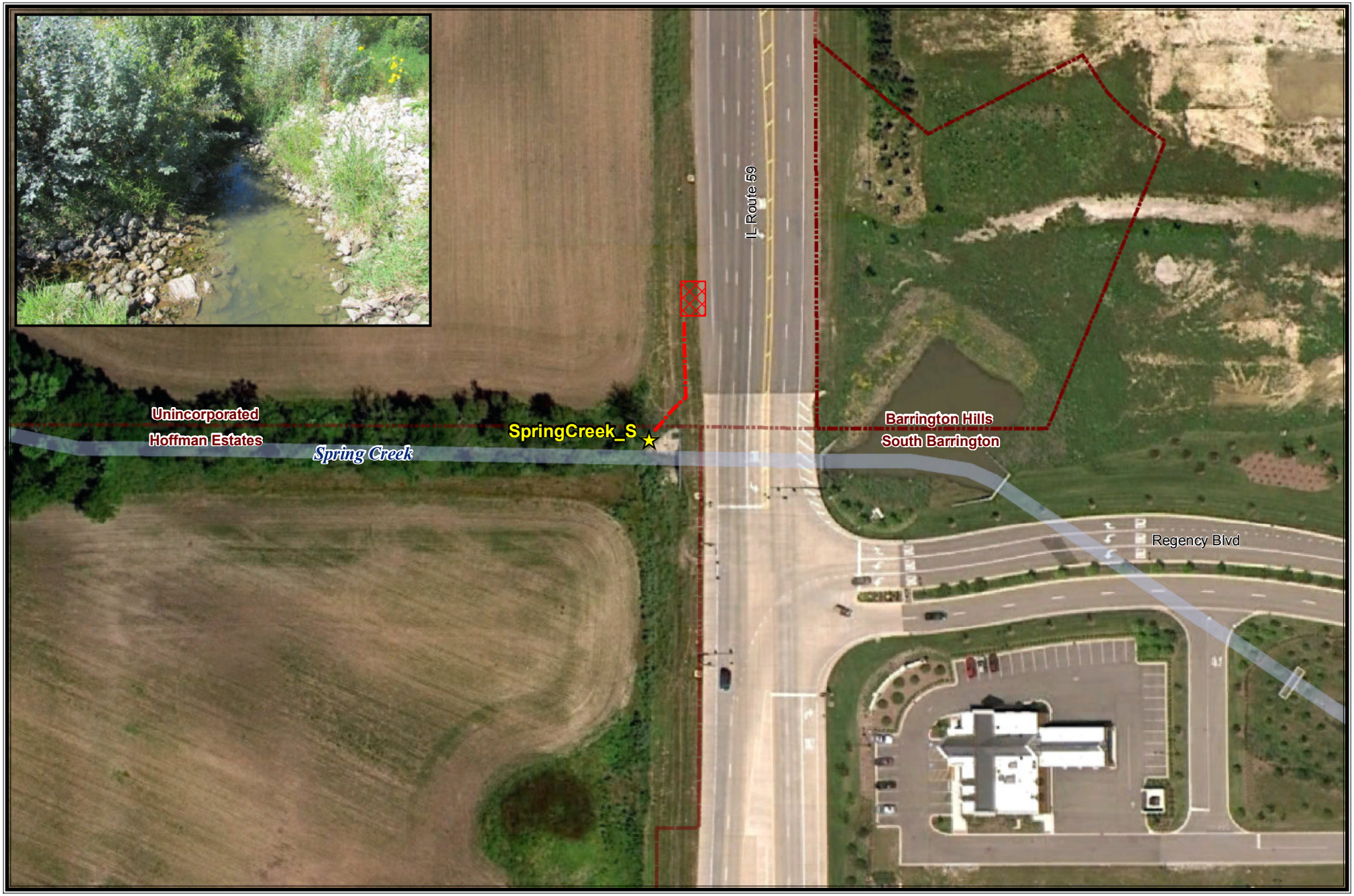

Sources: BAGIS, Google Earth Imagery Date: 05/27/2010

N

0 100

1 inch = 100 feet

NPDES Water Sampling Locations
Village of Barrington Hills, Illinois
Location: SpringCreek_S

GEWALT HAMILTON
ASSOCIATES, INC.

DATE: 10/28/2011
Project: 9355.090
Map Code: 375811x8

DRAWN BY: DAR

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Section 4

Results and Recommendations

TEST RESULTS

Test results were reviewed to detect changes between upstream and downstream sampling points and also against generally accepted standards. A summary table of all results is located in the Appendix. See pages 5-7 above for further description of the tested parameters.

The following table summarizes only the parameters which were above the accepted limits:

Testing Site	Location	Parameter	Accepted Limits	Test Results
Flint Creek Lake Cook	Upstream	Fecal Coliform	200 CFU/10mL	400 EST
		Total Phosphorous	0.05 mg/L	0.262
		Total Suspended Solids	15.0-30.0 mg/L	67.0
Flint Creek Old Hart	Downstream	Fecal Coliform	200 CFU/10mL	770
		Total Phosphorous	0.05 mg/L	1.41
Flint Creek North	Downstream	Fecal Coliform	200 CFU/10mL	3,100 EST
		Total Phosphorous	0.05 mg/L	0.750
		Total Suspended Solids	15.0-30.0 mg/L	53.0
Spring Creek South	Upstream	Fecal Coliform	200 CFU/10mL	750 EST
		Total Phosphorous	0.05 mg/L	0.083
		Total Suspended Solids	15.0-30.0 mg/L	74.0

This analysis is in no way intended to identify violations of the IPCB Standards.

POTENTIAL CAUSES

The fecal coliform levels are high for the Flint Creek North and Spring Creek South sites. Fecal coliform does not pose a threat to humans unless ingested. High levels could indicate a problem with local sewage treatment plants or pipes that carry the water; however, these levels are not high enough to indicate a sewage issue. The fecal coliform levels present here could be from geese or other animals upstream.

The main source of excess phosphorous is fertilizer, pesticides and insecticides used on lawns in residential and commercial areas, as well as household and commercial detergent and cleansers. Fertilizer should also not be applied in close proximity to a waterway or prior to a heavy precipitation event.

The total suspended solids (TSS) levels are high, which may cause cloudiness in the water. These particles are sometimes a result of erosion upstream or turbulence from stormwater during a heavy precipitation event.

BEST MANAGEMENT PRACTICES

The Village of Barrington Hills can work with upstream communities and users to find solutions for reducing stormwater pollution sources. We recommend using stormwater BMPs as outlined in the Village's Stormwater Management Program Plan (SMPP) in order to reduce adverse effects of stormwater runoff on the Village's water quality. Additional educational materials to increase public awareness of pollution sources and ways to reduce these are critical to cooperative reduction in pollutants into the environment. Understanding sources of pollutants including pet waste, detergents and cleansers, fertilizers and pesticides will help residents, commercial and industry

make informed choices. Supplying ideas on ways to reduce these problems and enforcing them will assist in long term reductions.

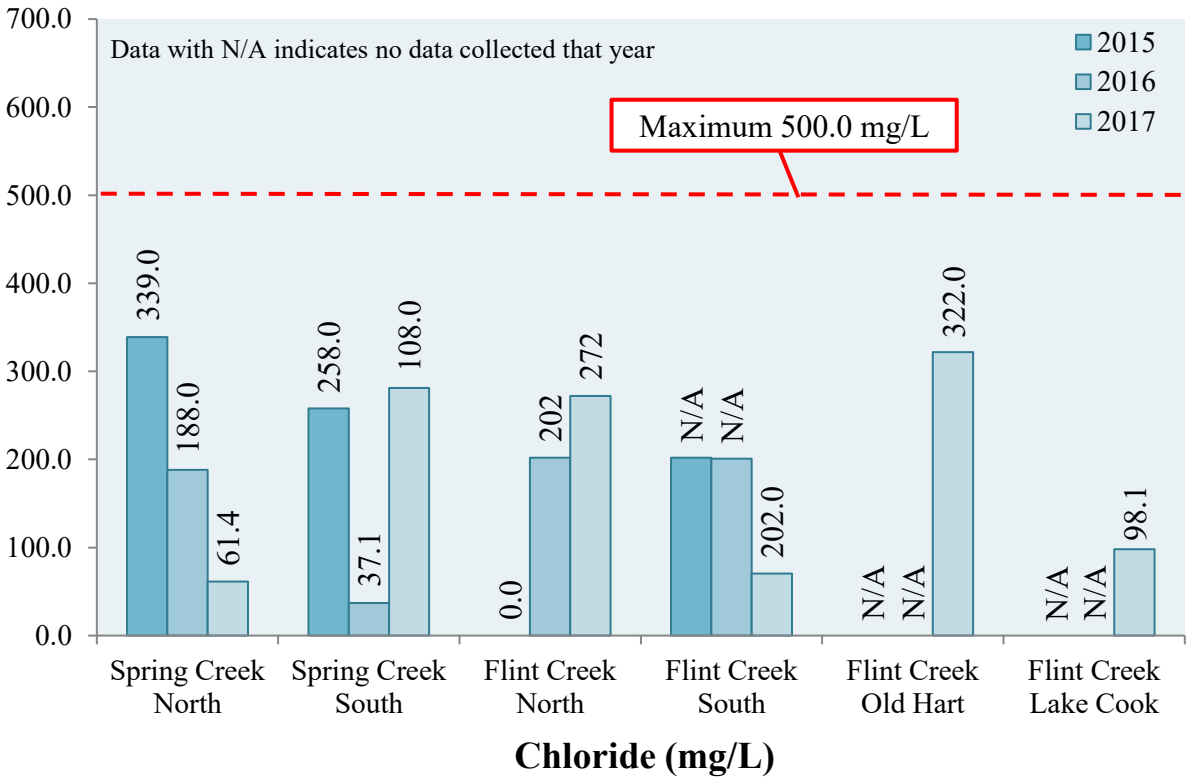
For residents, these include using native landscape plantings, rain gardens, rain barrels, reducing fertilizers and lawn watering, and reducing de-icing materials. Lake County promotes a P-Free Fertilizer Initiative to reduce the use of phosphorus for residential land use. Residents along the river can incorporate natural shorelines to prevent shoreline erosion and to create a filtration buffer between the lawn and the waterway.

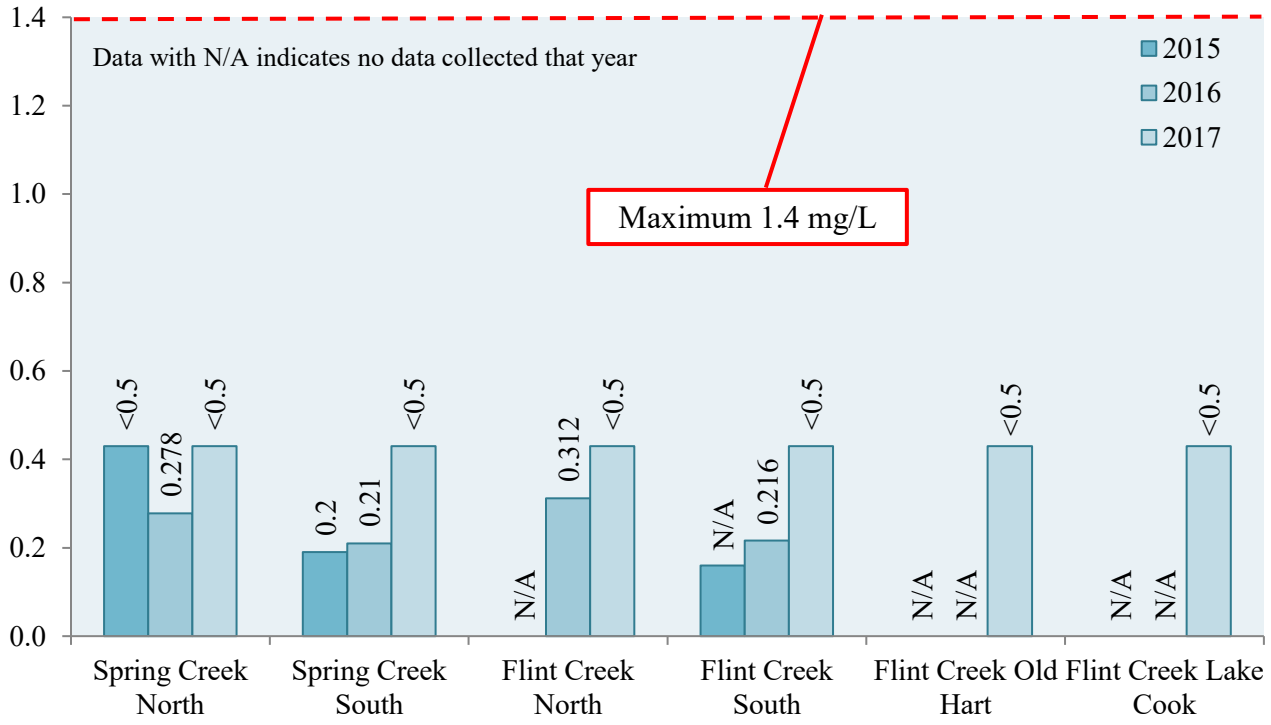
For farmers and agricultural land owners, the Illinois Council on Best Management Practices provides resources to promote BMPs through nitrogen management, modified harvesting practices, creation of buffers along the waterways, drain tile management, etc. The Village may consider coordinating with the Natural Resources Conservation Service (NRCS), the Illinois Institute for Rural Affairs (IIRA), and/or the U.S. Department of Agriculture (USDA) to promote their programs and educate the agricultural community.

For commercial, office and industrial, reducing de-icing salts or use of alternative materials, native landscaping, reducing or eliminating irrigation, using grey water, incorporating bioswales, rain gardens, filter strips, encouraging carpooling are ways to reduce pollutants.

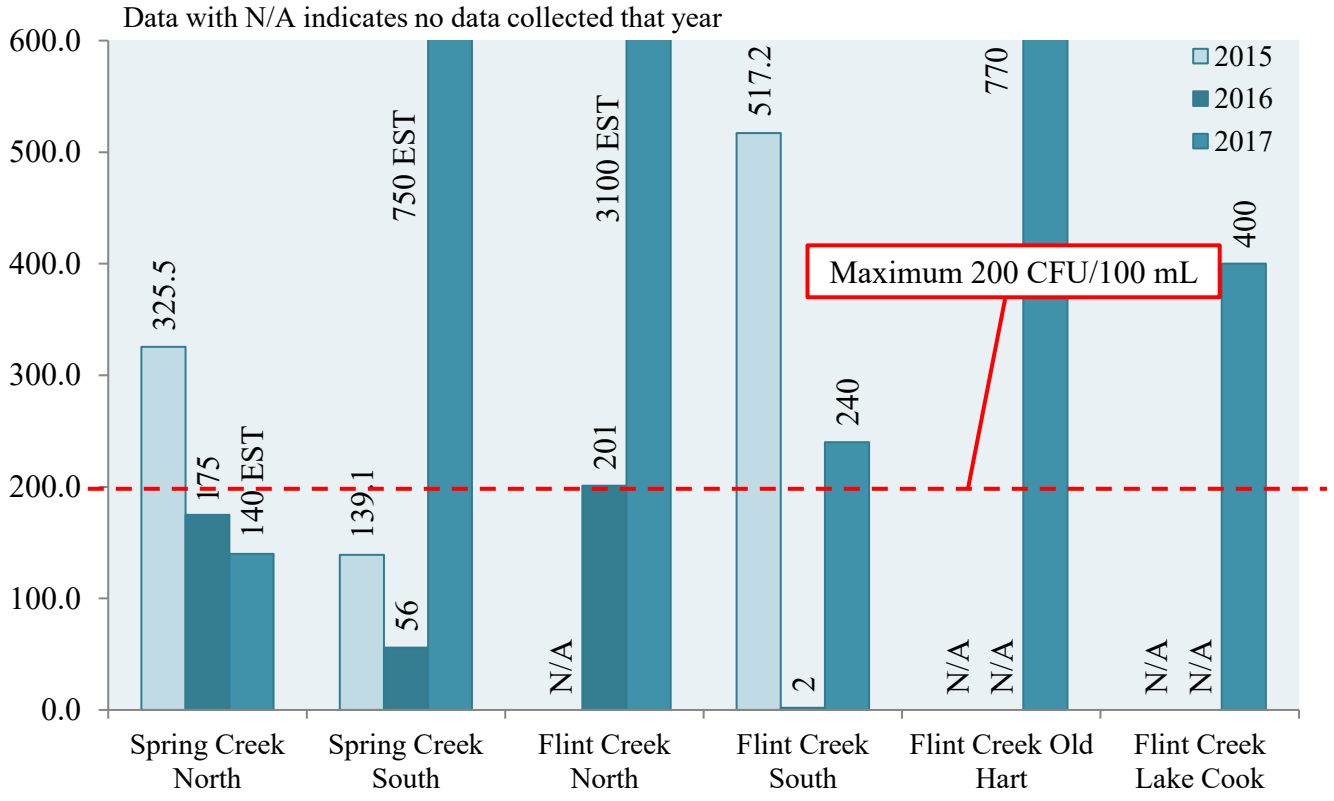
Lastly, the Village should continue to compare water quality test results each year to determine if the BMPs performed by the Village are improving water quality in the receiving waters within the Village of Barrington Hills.

Graphs for each parameter are included on the following pages, which compare results from year to year.

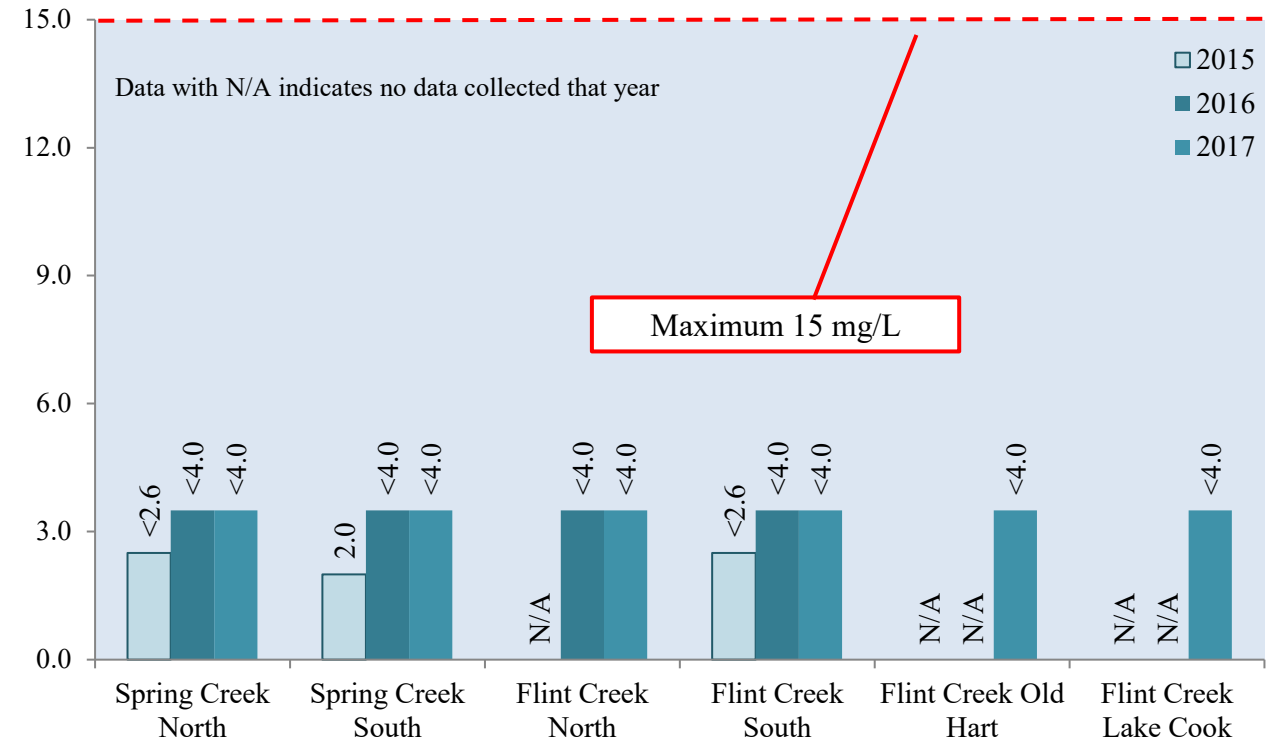




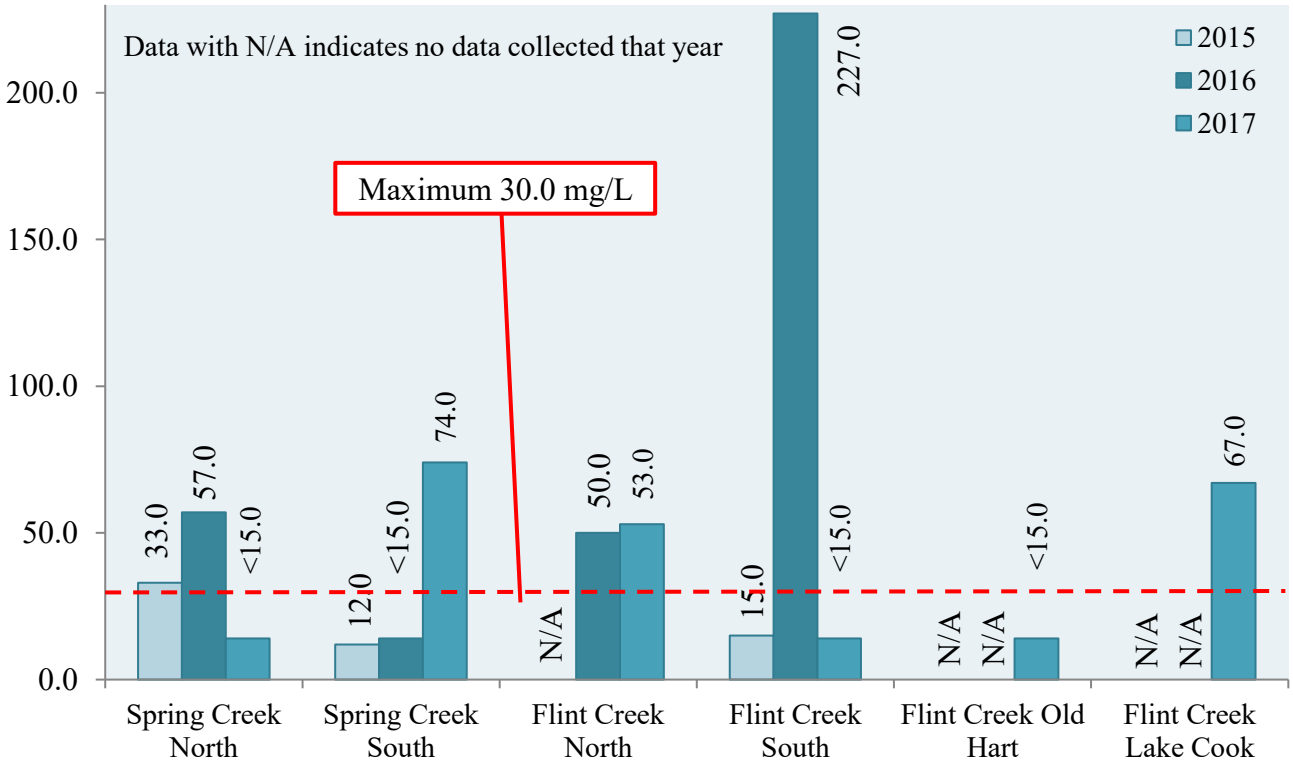
Fluoride (mg/L)



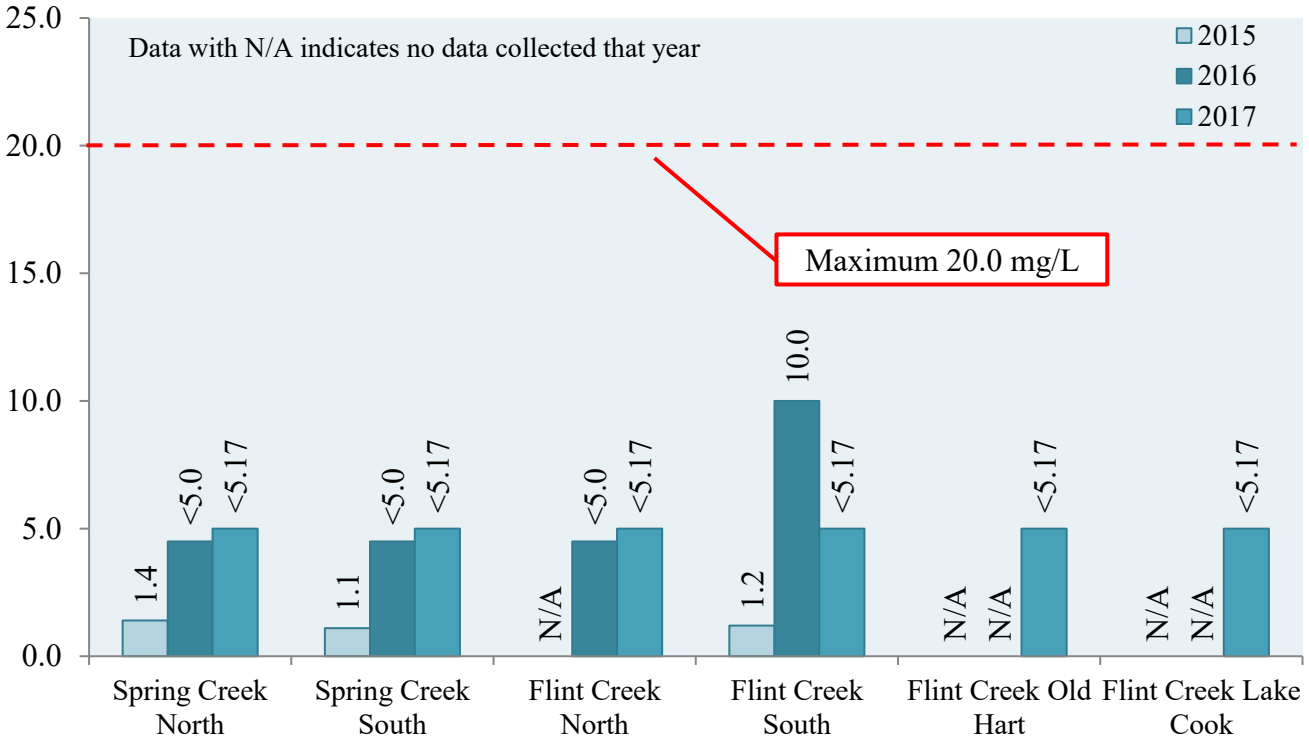
Fecal Coliform (200 CFU/100 mL)



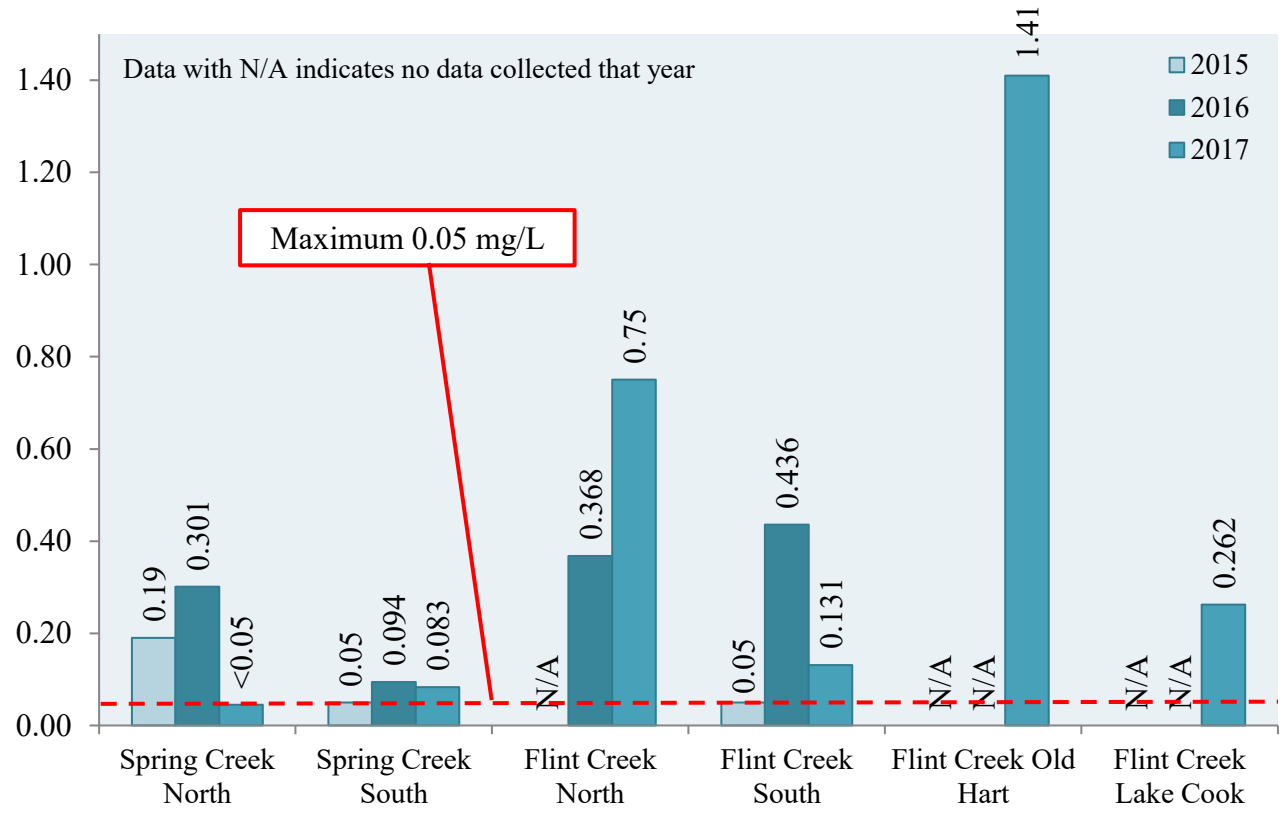
Oil & Grease (mg/L)



Total Suspended Solids (mg/L)



Total Kjeldahl Nitrogen (mg/L)



Total Phosphorous (mg/L)

Section 5

Appendix

APPENDICES

1. GHA summary of lab results (1 page)

2. Environmental Monitoring & Technologies, Inc. analytical report (25 pages)

Village of Barrington Hills Water Quality Results 2017

	Illinois Water Pollution Control Board WQS*	IPCB Standards or Accepted Limits in mg/L	Flint Creek Lake Cook	Flint Creek Old Hart	Flint Creek North	Flint Creek South	Spring Creek South	Spring Creek North
Date Tested: **8/29/17**								
Lab Analyses								
Chloride	302.304	500.0	98.1	322.0	272.0	70.4	281.0	61.4
Fluoride	302.407	1.4	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Fecal Coliform	302.209	200 CFU/100mL	**400 EST**	**770.0**	**3100 EST**	**240.0**	**750 EST**	140 EST
Oil & Grease	302.407	15	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Total Kjedahl Nitrogen	Standard Methods for the Examination of Water and Wastewater	<20.0	<5.17	<5.17	<5.17	<5.17	<5.17	<5.17
Phosphorous, Total	302.205	0.05	**0.262**	**1.41**	**0.750**	**0.131**	**0.083**	<0.05
Total Suspended Solids	304 Effluent Standards	15-30.0	**67.0**	<15.0	**53.0**	<15.0	**74.0**	<15.0

*Title 35 Part 302 Water Quality Standards unless otherwise noted.

**Extrapolated from number of colonies per 10mL

CFU = Colony Forming Unit

Environmental Monitoring and Technologies, Inc.

Analytical Report

September 7, 2017

Environmental Monitoring and Technologies, Inc.

8100 N. Austin Avenue Morton Grove, IL 60053-3203 P 847.967.6666 800.246.0663 F 847.967.6735 www.emt.com

Analytical Report

Caitlin Burke
Gewalt Hamilton Associates
625 Forest Edge Drive
Vernon Hills, IL 60060

September 07, 2017

Work Order: 17H0746

RE: MS4 2017- Barrington Hills

Dear Caitlin Burke:

Enclosed are the analytical reports for the EMT Work Order listed. Also included with this analytical report is a copy of the chain of custody associated with these samples. If you have any questions, please contact me.

Sincerely,

Mark Steuer
Project Manager
847.967.6666
MSteuer@emt.com
Approved for release: 9/6/2017 4:27:38PM

Approved by,

Matthew Gregory
Technical Manager

State of Illinois, NELAP Accredited Lab No. 100256, Cert No. 003674

Table of Contents

Environmental Monitoring and Technologies, Inc.

8100 N. Austin Avenue Morton Grove, IL 60053-3203 **P** 847.967.6666 800.246.0663 **F** 847.967.6735 www.emt.com

Sample Summary

Sample ID	Sub Lab	Laboratory ID	Matrix	Date Sampled	Date Received
Flint Creek Lake Cook		17H0746-01	Water	08/29/17 08:30	08/29/17 14:30
Flint Creek Old Hart		17H0746-02	Water	08/29/17 08:44	08/29/17 14:30
Flint Creek North		17H0746-03	Water	08/29/17 09:01	08/29/17 14:30
Spring Creek South		17H0746-04	Water	08/29/17 07:35	08/29/17 14:30
Spring Crrek North		17H0746-05	Water	08/29/17 09:15	08/29/17 14:30
Flient Creek		17H0746-06	Water	08/29/17 08:00	08/29/17 14:30
Flint Creek Lake Cook	Lake County Health Departme	17H0746-01	Water	08/29/17 08:30	08/29/17 14:30
Flint Creek Old Hart	Lake County Health Departme	17H0746-02	Water	08/29/17 08:44	08/29/17 14:30
Flint Creek North	Lake County Health Departme	17H0746-03	Water	08/29/17 09:01	08/29/17 14:30
Spring Creek South	Lake County Health Departme	17H0746-04	Water	08/29/17 07:35	08/29/17 14:30
Spring Crrek North	Lake County Health Departme	17H0746-05	Water	08/29/17 09:15	08/29/17 14:30
Flient Creek	Lake County Health Departme	17H0746-06	Water	08/29/17 08:00	08/29/17 14:30

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Case Narrative

Client: Gewalt Hamilton Associates **Date:** 09/07/2017

Project: MS4 2017- Barrington Hills

Work Order: 17H0746

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

Sample results only relate to the sample(s) received at the laboratory and analytes of interest tested.

Work Order: 17H0746

The samples were received on08/29/17 14:30. The samples arrived in good condition and properly preserved. The temperature of the cooler at receipt was

Cooler	Temp C°
Default Cooler	2.0

Some of the analyses for this work order were subcontracted. Subcontract data and receipt information is provided. Please also refer to subcontract lab narrative as needed.

Refer to Qualifiers and Definitions for quality and analytical clarifications or deviations.

Environmental Monitoring and Technologies, Inc.

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Client Sample Results

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills
Work Order: 17H0746

Client Sample ID: Flint Creek Lake Cook
Report Date: 09/07/2017
Collection Date: 08/29/2017 08:30
Matrix: Water
Lab ID: 17H0746-01

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Anions by Ion Chromatography								
Method: E300								
Chloride	**98.1**	30.0		mg/L		08/30/17 23:23	B7H1079	NB1
Fluoride	< 0.500	5.00		mg/L	0.500	08/30/17 23:23	B7H1079	NB1
Wet Chemistry								
Method: E1664A								
Oil and Grease (HEM)	< 4.00	4.00		mg/L		09/01/17 10:10	B7H1138	DP1
Method: SM2540D								
Suspended Solids (Residue, Non-filterable)	**67.0**	15.0		mg/L		08/31/17 14:48	B7H1169	CP1
Method: SM4500-Norg B / SM4500-NH3 BC								
Nitrogen, Kjeldahl, Total	< 5.17	5.17		mg/L		09/01/17 10:10	B7I0001	SK2
Method: SM4500-P E / SW3015								
Phosphorus, Total (As P)	**0.262**	0.0500		mg/L		08/30/17 13:41	B7H1072	SK2

Lake County Health Department, Subcontract

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Subcontracted Analyses								
Method: SM9222D								
Fecal Coliform	**400 EST**	1		cfu/100 ml		08/29/17 08:30	17H0746-01	

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Client Sample Results

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills
Work Order: 17H0746

Client Sample ID: Flint Creek Old Hart
Report Date: 09/07/2017
Collection Date: 08/29/2017 08:44
Matrix: Water
Lab ID: 17H0746-02

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Anions by Ion Chromatography								
Method: E300								
Chloride	**322**	30.0		mg/L		08/30/17 23:51	B7H1079	NB1
Fluoride	< 0.500	5.00		mg/L	0.500	08/30/17 23:51	B7H1079	NB1
Wet Chemistry								
Method: E1664A								
Oil and Grease (HEM)	< 4.00	4.00		mg/L		09/01/17 10:12	B7H1138	DP1
Method: SM2540D								
Suspended Solids (Residue, Non-filterable)	< 15.0	15.0		mg/L		08/31/17 14:48	B7H1169	CP1
Method: SM4500-Norg B / SM4500-NH3 BC								
Nitrogen, Kjeldahl, Total	< 5.17	5.17		mg/L		09/01/17 10:10	B7I0001	SK2
Method: SM4500-P E / SW3015								
Phosphorus, Total (As P)	**1.41**	0.500		mg/L		08/30/17 13:41	B7H1072	SK2

Lake County Health Department, Subcontract

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Subcontracted Analyses								
Method: SM9222D								
Fecal Coliform	**770**	1		cfu/100 ml		08/29/17 08:44	17H0746-02	

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Client Sample Results

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills
Work Order: 17H0746

Client Sample ID: Flint Creek North
Report Date: 09/07/2017
Collection Date: 08/29/2017 09:01
Matrix: Water
Lab ID: 17H0746-03

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Anions by Ion Chromatography								
Method: E300								
Chloride	**272**	30.0		mg/L		08/31/17 00:20	B7H1079	NB1
Fluoride	< 0.500	5.00		mg/L	0.500	08/31/17 00:20	B7H1079	NB1
Wet Chemistry								
Method: E1664A								
Oil and Grease (HEM)	< 4.00	4.00		mg/L		09/01/17 10:14	B7H1138	DP1
Method: SM2540D								
Suspended Solids (Residue, Non-filterable)	**53.0**	15.0		mg/L		08/31/17 14:48	B7H1169	CP1
Method: SM4500-Norg B / SM4500-NH3 BC								
Nitrogen, Kjeldahl, Total	< 5.17	5.17		mg/L		09/01/17 10:10	B7I0001	SK2
Method: SM4500-P E / SW3015								
Phosphorus, Total (As P)	**0.750**	0.500		mg/L		08/30/17 13:41	B7H1072	SK2

Lake County Health Department, Subcontract

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Subcontracted Analyses								
Method: SM9222D								
Fecal Coliform	**3100 EST**	1		cfu/100 ml		08/29/17 09:01	17H0746-03	

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Client Sample Results

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills
Work Order: 17H0746

Client Sample ID: Spring Creek South
Report Date: 09/07/2017
Collection Date: 08/29/2017 07:35
Matrix: Water
Lab ID: 17H0746-04

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Anions by Ion Chromatography								
Method: E300								
Chloride	**281**	30.0		mg/L		08/31/17 00:48	B7H1079	NB1
Fluoride	< 0.500	5.00		mg/L	0.500	08/31/17 00:48	B7H1079	NB1
Wet Chemistry								
Method: E1664A								
Oil and Grease (HEM)	< 4.00	4.00		mg/L		09/01/17 10:16	B7H1138	DP1
Method: SM2540D								
Suspended Solids (Residue, Non-filterable)	**74.0**	15.0		mg/L		08/31/17 14:48	B7H1169	CP1
Method: SM4500-Norg B / SM4500-NH3 BC								
Nitrogen, Kjeldahl, Total	< 5.17	5.17		mg/L		09/01/17 10:10	B7I0001	SK2
Method: SM4500-P E / SW3015								
Phosphorus, Total (As P)	**0.0830**	0.0500		mg/L		08/30/17 13:41	B7H1072	SK2

Lake County Health Department, Subcontract

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Subcontracted Analyses								
Method: SM9222D								
Fecal Coliform	**750 EST**	1		cfu/100 ml		08/29/17 07:35	17H0746-04	

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Client Sample Results

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills
Work Order: 17H0746

Client Sample ID: Spring Crrek North
Report Date: 09/07/2017
Collection Date: 08/29/2017 09:15
Matrix: Water
Lab ID: 17H0746-05

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Anions by Ion Chromatography								
Method: E300								
Chloride	**61.4**	30.0		mg/L		08/31/17 13:25	B7H1148	NB1
Fluoride	< 0.500	5.00		mg/L	0.500	08/31/17 13:25	B7H1148	NB1
Wet Chemistry								
Method: E1664A								
Oil and Grease (HEM)	< 4.00	4.00		mg/L		09/01/17 10:18	B7H1138	DP1
Method: SM2540D								
Suspended Solids (Residue, Non-filterable)	< 15.0	15.0		mg/L		08/31/17 14:48	B7H1169	CP1
Method: SM4500-Norg B / SM4500-NH3 BC								
Nitrogen, Kjeldahl, Total	< 5.17	5.17		mg/L		09/01/17 10:10	B7I0001	SK2
Method: SM4500-P E / SW3015								
Phosphorus, Total (As P)	< 0.0500	0.0500		mg/L		08/30/17 13:41	B7H1072	SK2

Lake County Health Department, Subcontract

Subcontracted Analyses								
Method: SM9222D								
Fecal Coliform	**140 EST**	1		cfu/100 ml		08/29/17 09:15	17H0746-05	

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Client Sample Results

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills
Work Order: 17H0746

Client Sample ID: Flient Creek South
Report Date: 09/07/2017
Collection Date: 08/29/2017 08:00
Matrix: Water
Lab ID: 17H0746-06

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Anions by Ion Chromatography								
Method: E300								
Chloride	**70.4**	30.0		mg/L		08/31/17 13:53	B7H1148	NB1
Fluoride	< 0.500	5.00		mg/L	0.500	08/31/17 13:53	B7H1148	NB1
Wet Chemistry								
Method: E1664A								
Oil and Grease (HEM)	< 4.00	4.00		mg/L		09/01/17 10:20	B7H1138	DP1
Method: SM2540D								
Suspended Solids (Residue, Non-filterable)	< 15.0	15.0		mg/L		08/31/17 14:48	B7H1169	CP1
Method: SM4500-Norg B / SM4500-NH3 BC								
Nitrogen, Kjeldahl, Total	< 5.17	5.17		mg/L		09/01/17 10:10	B7I0001	SK2
Method: SM4500-P E / SW3015								
Phosphorus, Total (As P)	**0.131**	0.0500		mg/L		08/30/17 13:41	B7H1072	SK2

Lake County Health Department, Subcontract

Analyses	Result	EMT Reporting Limit	Qual	Units		Date/Time Analyzed	Batch	Analyst
Subcontracted Analyses								
Method: SM9222D								
Fecal Coliform	**240**	1		cfu/100 ml		08/29/17 08:00	17H0746-06	

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Dates Report

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills

Report Date: 09/07/2017

Work Order: 17H0746

Sample ID	Client Sample ID	Collection	Matrix	Test Name	Leached Prep Date	Prep Date	Analysis Date	Batch ID	Sequence
17H0746-01	Flint Creek Lake Cook	08/29/17	Water	Coliform, Fecal (in cfu/ml)		08/29/17 08:30	08/29/17 08:30	17H0746-01	
				Phosphorous, Total (Manual)		08/30/17 06:52	08/30/17 13:41	B7H1072	S7H0554
				Chloride, Anions by Ion Chromatography		08/30/17 09:21	08/30/17 23:23	B7H1079	S7H0581
				Fluoride, Anions by Ion Chromatography		08/30/17 09:21	08/30/17 23:23		
				HEM		08/31/17 10:00	09/01/17 10:10	B7H1138	
				Solids, Total Suspended (TSS)		08/31/17 14:48	08/31/17 14:48	B7H1169	
				Nitrogen, Total Kjeldahl (TKN)		09/01/17 06:58	09/01/17 10:10	B7I0001	
17H0746-02	Flint Creek Old Hart	08/29/17		Coliform, Fecal (in cfu/ml)		08/29/17 08:44	08/29/17 08:44	17H0746-02	
				Phosphorous, Total (Manual)		08/30/17 06:52	08/30/17 13:41	B7H1072	S7H0554
				Chloride, Anions by Ion Chromatography		08/30/17 09:21	08/30/17 23:51	B7H1079	S7H0581
				Fluoride, Anions by Ion Chromatography		08/30/17 09:21	08/30/17 23:51		
				HEM		08/31/17 10:00	09/01/17 10:12	B7H1138	
				Solids, Total Suspended (TSS)		08/31/17 14:48	08/31/17 14:48	B7H1169	
				Nitrogen, Total Kjeldahl (TKN)		09/01/17 06:58	09/01/17 10:10	B7I0001	
17H0746-03	Flint Creek North	08/29/17		Coliform, Fecal (in cfu/ml)		08/29/17 09:01	08/29/17 09:01	17H0746-03	
				Phosphorous, Total (Manual)		08/30/17 06:52	08/30/17 13:41	B7H1072	S7H0554
				Chloride, Anions by Ion Chromatography		08/30/17 09:21	08/31/17 00:20	B7H1079	S7H0581
				Fluoride, Anions by Ion Chromatography		08/30/17 09:21	08/31/17 00:20		
				HEM		08/31/17 10:00	09/01/17 10:14	B7H1138	
				Solids, Total Suspended (TSS)		08/31/17 14:48	08/31/17 14:48	B7H1169	
				Nitrogen, Total Kjeldahl (TKN)		09/01/17 06:58	09/01/17 10:10	B7I0001	
17H0746-04	Spring Creek South	08/29/17		Coliform, Fecal (in cfu/ml)		08/29/17 07:35	08/29/17 07:35	17H0746-04	
				Phosphorous, Total (Manual)		08/30/17 06:52	08/30/17 13:41	B7H1072	S7H0554
				Chloride, Anions by Ion Chromatography		08/30/17 09:21	08/31/17 00:48	B7H1079	S7H0581
				Fluoride, Anions by Ion Chromatography		08/30/17 09:21	08/31/17 00:48		
				HEM		08/31/17 10:00	09/01/17 10:16	B7H1138	
				Solids, Total Suspended (TSS)		08/31/17 14:48	08/31/17 14:48	B7H1169	
				Nitrogen, Total Kjeldahl (TKN)		09/01/17 06:58	09/01/17 10:10	B7I0001	
17H0746-05	Spring Crrek North	08/29/17		Coliform, Fecal (in cfu/ml)		08/29/17 09:15	08/29/17 09:15	17H0746-05	
				Phosphorous, Total (Manual)		08/30/17 06:52	08/30/17 13:41	B7H1072	S7H0554
				HEM		08/31/17 10:00	09/01/17 10:18	B7H1138	
				Chloride, Anions by Ion Chromatography		08/31/17 10:57	08/31/17 13:25	B7H1148	S7I0033
				Fluoride, Anions by Ion Chromatography		08/31/17 10:57	08/31/17 13:25		
				Solids, Total Suspended (TSS)		08/31/17 14:48	08/31/17 14:48	B7H1169	
				Nitrogen, Total Kjeldahl (TKN)		09/01/17 06:58	09/01/17 10:10	B7I0001	
17H0746-06	Flient Creek	08/29/17		Coliform, Fecal (in cfu/ml)		08/29/17 08:00	08/29/17 08:00	17H0746-06	
				Phosphorous, Total (Manual)		08/30/17 06:52	08/30/17 13:41	B7H1072	S7H0554
				HEM		08/31/17 10:00	09/01/17 10:20	B7H1138	
				Chloride, Anions by Ion Chromatography		08/31/17 10:57	08/31/17 13:53	B7H1148	S7I0033
				Fluoride, Anions by Ion Chromatography		08/31/17 10:57	08/31/17 13:53		

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Dates Report

(Continued)

Client: Gewalt Hamilton Associates

Project: MS4 2017- Barrington Hills

Report Date: 09/07/2017

Work Order: 17H0746

Sample ID	Client Sample ID	Collection	Matrix	Test Name	Leached Prep Date	Prep Date	Analysis Date	Batch ID	Sequence
17H0746-06	Flient Creek	08/29/17	Water	Solids, Total Suspended (TSS)		08/31/17 14:48	08/31/17 14:48	B7H1169	
				Nitrogen, Total Kjeldahl (TKN)		09/01/17 06:58	09/01/17 10:10	B7I0001	

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Quality Control

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills

Report Date: 09/07/2017
Matrix: Water

Work Order: 17H0746

Anions by Ion Chromatography

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch: B7H1079										
Blank (B7H1079-BLK1)				*Prepared: 08/30/2017 09:21*		*Analyzed: 08/30/2017 10:03*				
Chloride	< 0.300	0.300	mg/L							
Fluoride	0.00700	0.0500	mg/L							J
LCS (B7H1079-BS1)				*Prepared: 08/30/2017 09:21*		*Analyzed: 08/30/2017 11:00*				
Chloride	0.208	0.300	mg/L	0.2000		104	90-110			
Fluoride	0.208	0.0500	mg/L	0.2000		104	90-110			
LCS (B7H1079-BS2)				*Prepared: 08/30/2017 09:21*		*Analyzed: 08/30/2017 11:29*				
Chloride	5.26	0.300	mg/L	5.000		105	90-110			
Fluoride	5.28	0.0500	mg/L	5.000		106	90-110			
Matrix Spike (B7H1079-MS1)		**Source: 17H0925-01**		*Prepared: 08/30/2017 09:21*		*Analyzed: 08/30/2017 18:09*				
Chloride	375	30.0	mg/L	250.0	119	102	80-120			
Fluoride	274	5.00	mg/L	250.0	ND	110	80-120			
Matrix Spike (B7H1079-MS2)		**Source: 17H0745-03**		*Prepared: 08/30/2017 09:21*		*Analyzed: 08/30/2017 13:23*				
Chloride	412	30.0	mg/L	250.0	160	101	80-120			
Fluoride	274	5.00	mg/L	250.0	ND	109	80-120			
Matrix Spike (B7H1079-MS3)		**Source: 17H0680-01**		*Prepared: 08/30/2017 09:21*		*Analyzed: 08/31/2017 02:14*				
Chloride	25.3	3.00	mg/L	25.00	ND	101	80-120			
Fluoride	27.0	0.500	mg/L	25.00	0.0500	108	80-120			
Matrix Spike Dup (B7H1079-MSD1)		**Source: 17H0925-01**		*Prepared: 08/30/2017 09:21*		*Analyzed: 08/30/2017 18:37*				
Chloride	372	30.0	mg/L	250.0	119	101	80-120	0.776	20	
Fluoride	275	5.00	mg/L	250.0	ND	110	80-120	0.291	20	
Matrix Spike Dup (B7H1079-MSD2)		**Source: 17H0745-03**		*Prepared: 08/30/2017 09:21*		*Analyzed: 08/30/2017 13:52*				
Chloride	408	30.0	mg/L	250.0	160	99.1	80-120	0.976	20	
Fluoride	272	5.00	mg/L	250.0	ND	109	80-120	0.623	20	
Matrix Spike Dup (B7H1079-MSD3)		**Source: 17H0680-01**		*Prepared: 08/30/2017 09:21*		*Analyzed: 08/31/2017 02:43*				
Chloride	25.8	3.00	mg/L	25.00	ND	103	80-120	1.68	20	
Fluoride	27.5	0.500	mg/L	25.00	0.0500	110	80-120	1.83	20	
Batch: B7H1148										
Blank (B7H1148-BLK1)				*Prepared: 08/31/2017 10:57*		*Analyzed: 08/31/2017 11:34*				
Chloride	< 0.300	0.300	mg/L							
Fluoride	< 0.00500	0.0500	mg/L							

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Quality Control

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills

Report Date: 09/07/2017
Matrix: Water

Work Order: 17H0746

Anions by Ion Chromatography

(Continued)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch: B7H1148 *(Continued)*										
LCS (B7H1148-BS1)				*Prepared: 08/31/2017 10:57*			*Analyzed: 08/31/2017 12:57*			
Chloride	0.203	0.300	mg/L	0.2000		101	90-110			
Fluoride	0.194	0.0500	mg/L	0.2000		96.8	90-110			
LCS (B7H1148-BS2)				*Prepared: 08/31/2017 10:57*			*Analyzed: 08/31/2017 12:29*			
Chloride	4.92	0.300	mg/L	5.000		98.5	90-110			
Fluoride	5.06	0.0500	mg/L	5.000		101	90-110			
Matrix Spike (B7H1148-MS1)		**Source: 17H0748-04**		*Prepared: 08/31/2017 10:57*			*Analyzed: 08/31/2017 19:27*			
Chloride	81.3	3.00	mg/L	25.00	56.9	97.8	80-120			
Fluoride	25.8	0.500	mg/L	25.00	0.0540	103	80-120			
Matrix Spike (B7H1148-MS2)		**Source: 17H0750-02**		*Prepared: 08/31/2017 10:57*			*Analyzed: 09/01/2017 02:25*			
Chloride	81.7	3.00	mg/L	25.00	58.0	94.6	80-120			
Fluoride	25.6	0.500	mg/L	25.00	0.209	101	80-120			
Matrix Spike Dup (B7H1148-MSD1)		**Source: 17H0748-04**		*Prepared: 08/31/2017 10:57*			*Analyzed: 08/31/2017 19:55*			
Chloride	81.7	3.00	mg/L	25.00	56.9	99.0	80-120	0.380	20	
Fluoride	25.7	0.500	mg/L	25.00	0.0540	103	80-120	0.306	20	
Matrix Spike Dup (B7H1148-MSD2)		**Source: 17H0750-02**		*Prepared: 08/31/2017 10:57*			*Analyzed: 09/01/2017 02:53*			
Chloride	82.6	3.00	mg/L	25.00	58.0	98.4	80-120	1.16	20	
Fluoride	25.6	0.500	mg/L	25.00	0.209	102	80-120	0.242	20	

Environmental Monitoring and Technologies, Inc.

8100 N. Austin Avenue Morton Grove, IL 60053-3203 P 847.967.6666 800.246.0663 F 847.967.6735 www.emt.com

Quality Control

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills
Report Date: 09/07/2017
Matrix: Water

Work Order: 17H0746

Wet Chemistry

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch: B7H1072 - SW3015										
Blank (B7H1072-BLK1)				*Prepared: 08/30/2017 06:52*			*Analyzed: 08/30/2017 13:41*			
Phosphorus, Total (As P)	< 0.0500	0.0500	mg/L							
LCS (B7H1072-BS1)				*Prepared: 08/30/2017 06:52*			*Analyzed: 08/30/2017 13:41*			
Phosphorus, Total (As P)	0.246	0.0500	mg/L	0.2500		98.4	85-115			
LCS (B7H1072-BS2)				*Prepared: 08/30/2017 06:52*			*Analyzed: 08/30/2017 13:41*			
Phosphorus, Total (As P)	0.470	0.0500	mg/L	0.5000		94.0	85-115			
Matrix Spike (B7H1072-MS1)		**Source: 17H0743-01**		*Prepared: 08/30/2017 06:52*			*Analyzed: 08/30/2017 13:41*			
Phosphorus, Total (As P)	0.297	0.0500	mg/L	0.2500	0.0340	105	80-120			
Matrix Spike Dup (B7H1072-MSD1)		**Source: 17H0743-01**		*Prepared: 08/30/2017 06:52*			*Analyzed: 08/30/2017 13:41*			
Phosphorus, Total (As P)	0.298	0.0500	mg/L	0.2500	0.0340	106	80-120	0.336	10	
Batch: B7H1138										
Blank (B7H1138-BLK1)				*Prepared: 08/31/2017 10:00*			*Analyzed: 09/01/2017 10:00*			
Oil and Grease (HEM)	< 4.00	4.00	mg/L							
LCS (B7H1138-BS1)				*Prepared: 08/31/2017 10:00*			*Analyzed: 09/01/2017 10:02*			
Oil and Grease (HEM)	32.2	4.00	mg/L	40.14		80.3	78-114			
LCS Dup (B7H1138-BSD1)				*Prepared: 08/31/2017 10:00*			*Analyzed: 09/01/2017 10:04*			
Oil and Grease (HEM)	33.1	4.00	mg/L	40.14		82.5	78-114	2.72	18	
Batch: B7H1169										
Blank (B7H1169-BLK1)				*Prepared: 08/31/2017 14:48*			*Analyzed: 08/31/2017 14:48*			
Suspended Solids (Residue, Non-filterable)	< 15.0	15.0	mg/L							
LCS (B7H1169-BS1)				*Prepared: 08/31/2017 14:48*			*Analyzed: 08/31/2017 14:48*			
Suspended Solids (Residue, Non-filterable)	910	15.0	mg/L	1000		91.0	84.2-106			
Duplicate (B7H1169-DUP1)		**Source: 17H0746-01**		*Prepared: 08/31/2017 14:48*			*Analyzed: 08/31/2017 14:48*			
Suspended Solids (Residue, Non-filterable)	64.0	15.0	mg/L		67.0			4.58	5	
Duplicate (B7H1169-DUP2)		**Source: 17H0932-01**		*Prepared: 08/31/2017 14:48*			*Analyzed: 08/31/2017 14:48*			
Suspended Solids (Residue, Non-filterable)	573	15.0	mg/L		562			1.94	5	

Environmental Monitoring and Technologies, Inc.

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Quality Control

(Continued)

Client: Gewalt Hamilton Associates
Project: MS4 2017- Barrington Hills

Report Date: 09/07/2017
Matrix: Water

Work Order: 17H0746

Wet Chemistry

(Continued)

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch: B7H1169 *(Continued)*										
Batch: B7I0001										
Blank (B7I0001-BLK1)				*Prepared: 09/01/2017 06:58*			*Analyzed: 09/01/2017 10:10*			
Nitrogen, Kjeldahl, Total	< 5.17	5.17	mg/L							
LCS (B7I0001-BS1)				*Prepared: 09/01/2017 06:58*			*Analyzed: 09/01/2017 10:10*			
Nitrogen, Kjeldahl, Total	10.1	5.17	mg/L	10.00		101	87.3-114			
Duplicate (B7I0001-DUP1)		**Source: 17H0745-02**		*Prepared: 09/01/2017 06:58*			*Analyzed: 09/01/2017 10:10*			
Nitrogen, Kjeldahl, Total	1.07	5.17	mg/L		1.02			5.26	20	

Environmental Monitoring and Technologies, Inc.

8100 N. Austin Avenue Morton Grove, IL 60053-3203 **P** 847.967.6666 800.246.0663 **F** 847.967.6735 www.emt.com

Certified Analyses included in this Report

Analyte	CAS #	Certifications
E1664A in Water		
Oil and Grease (HEM)		DoD,ILEPA,LELAP,WDNR,NJDEP
E300 in Water		
Chloride	16887-00-6	DoD,ILEPA,WDNR,NJDEP
Fluoride	16984-48-8	DoD,ILEPA,WDNR,NJDEP
SM2540D in Water		
Suspended Solids (Residue, Non-filterable)		DoD,ILEPA,WDNR
SM4500-Norg B / SM4500-NH3 BC in Water		
Nitrogen, Kjeldahl, Total	7727-37-9	DoD,ILEPA
SM4500-P E in Water		
Phosphorus, Total (As P)	7723-14-0	DoD,ILEPA,WDNR

List of Certifications

Code	Description	Number	Expires
AKDEC	State of Alaska, Dept. Environmental Conservation	UST-105	07/16/2017
CPSC	US Consumer Product Safety Commission, Accredited by PJLA Lab No. 1050	L14-56	04/30/2018
DoD	Department of Defense, Accredited by PJLA	L14-55	04/30/2018
ILEPA	State of Illinois, NELAP Accredited Lab No. 100256	003674	08/08/2018
ISO	ISO/IEC 17025, Accredited by PJLA	L14-56	04/30/2018
LELAP	State of Louisiana, NELAP Accredited Lab No. 171344	05015	06/30/2017
NJDEP	State of New Jersey, NELAP Accredited Lab No. IL010	NLC160001	06/30/2017
WDNR	State of Wisconsin Dept of Natural Resources	999888890	08/31/2017

Environmental Monitoring and Technologies, Inc.

8100 N. Austin Avenue Morton Grove, IL 60053-3203 **P** 847.967.6666 800.246.0663 **F** 847.967.6735 www.emt.com

Qualifiers and Definitions

Item	Description
J	Estimated Value
%Rec	Percent Recovery

Environmental Monitoring and Technologies, Inc.

CHAIN OF CUSTODY

Environmental Monitoring and Technologies, Inc
8100 Austin Ave
Morton Grove
IL, 60053-3203
Phone: 800-246-0663
Fax: 847-967-67-35

17H0746

Lab Work Order Number : **17H0746**

Client Name	Project Name
Gewalt Hamilton Associates	MS4 2017- Barrington Hills
Client Contact	**Project Number**
Caitlin Burke	[none]
Address	**Project Description**
625 Forest Edge Drive	
City	**PO Number**
Vernon Hills	
State/Zip	**Shipped By**
IL, 60060-	
Phone / Fax	**Tracking Number**
(847) 478-9700 / (847) 478-9701	
Sampler	**Sampler Signature**
~~Adam Szafran~~ Brian Kennedy	

Sample Name or Field ID	Sampled Date	Sampled Time	Sample Type Code	Matrix Code	Container Count	Preservation Code										Sample Comments
						G::5	P::1	AG::2	P::2	SC::9				TEMP	pH	
Flint Creek Lake Cook	08/29	0830	GRAB	W	6	1	1	1	1	2						01ABCD
Flint Creek Old Hart	08/29	0844	GRAB	W	6	1	1	1	1	2						02ABCD
Flint Creek North	08/29	0901	GRAB	W	6	1	1	1	1	2						03ABCD
Spring Creek South	08/29	0735	GRAB	W	6	1	1	1	1	2						04ABCD
Spring Crrek North	08/29	0915	GRAB	W	6	1	1	1	1	2						05ABCD
Flient Creek	08/29	0800	GRAB	W	6	1	1	1	1	2						06ABCD

Requested Analyses	Requested Turn Around
1664_FOG_HEM 2540D_TSS::300_IC_CL::300_IC_F 4500_PHOS-E::4500_TKN 4500_PHOS-E::4500_TKN 9222D_FECALCOLIFORM_SUBBED	Rush requests subject to additional charge. Rush requests subject to lab approval. Standard (days) Expedited (days) Due Date

Relinquished By	Date/Time	Received By	Date/Time
	8/29 1430		
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received By	Date/Time
			8/29/17 14:30
Cooler Numbers and Temperatures	2.0		

Comments

Matrix Codes: W=Water

Preserv. Codes: 1=No Preservative, Store at 4 C,2=Sulfuric acid (H2SO4) pH <2, Store at 4 C,5=Hydrochloric acid (HCl) pH <2, Store at 4 C,9=Sodium thiosulfate (Na2S2O3), Store at 4 C

Cont. Codes: AG=32 oz amber glass, 1:1 H2SO4 to pH <2,G=32 oz FOG, glass, 1:1 HCL to pH <2,P=16 oz HDPE,P=32 oz HDPE, 1:1 H2SO4 to pH <2,SC=100 ml HDPE sterile, Na2S2O3 tablet (Coliforms)

Table of Contents

17H0746

LakeCounty
Department of Public Works

LakeCounty
Health Department and
Community Health Center

September 01, 2017

Matt Gregory
Enviromental Monitoring and Technologies
8100 N. Austin Ave.
Morton Grove, IL 60053

Dear Matt Gregory:

Enclosed are the results of analyses for samples received by our laboratory on 8/29/2017 and logged in under work order(s) 17H0582. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of Lake County Public Environmental Laboratory.
If you have any questions regarding this report, please feel free to contact me.

Sincerely,

Monica Bofani.

Monica Bofani
Lake County Environmental Laboratory
HD Lab Supervisor
(847) 377-8017

NELAP ACCREDITED TNI LABORATORY

LakeCounty
Department of Public Works

LakeCounty
Health Department and
Community Health Center

Enviromental Monitoring and Technologies 8100 N. Austin Ave. Morton Grove, IL 60053	**Reported:** 09/01/2017 13:00

PDFFileStart [TOCPAGEMARKER] PDFFileEnd

LakeCounty
Department of Public Works

LakeCounty
Health Department and
Community Health Center

Enviromental Monitoring and Technologies
8100 N. Austin Ave.
Morton Grove, IL 60053

Reported:
09/01/2017 13:00

Analytical Results

Lake County Environmental Laboratory

Sample: 17H0582-01
Name: Flint Creek Lake Cook
Matrix: Surface Water **Type:** Grab

Sampled: 08/29/17 08:30
Received: 08/29/17 10:05
Collected By: FO

Parameter	Result	Unit	RL	Qualifier	Analyzed	Analyst	Method
Fecal Coliform (01)	**400 EST**	CFU/100 ml	1.00		08/29/2017 11:00	TCS	SM-9222-D-Rev 2006, 22nd Ed

Sample: 17H0582-02
Name: Flint Creek Old Hart
Matrix: Surface Water **Type:** Grab

Sampled: 08/29/17 08:44
Received: 08/29/17 10:05
Collected By: FO

Parameter	Result	Unit	RL	Qualifier	Analyzed	Analyst	Method
Fecal Coliform (02)	**770**	CFU/100 ml	1.00		08/29/2017 11:00	TCS	SM-9222-D-Rev 2006, 22nd Ed

Sample: 17H0582-03
Name: Flint Creeek North
Matrix: Surface Water **Type:** Grab

Sampled: 08/29/17 09:01
Received: 08/29/17 10:05
Collected By: FO

Parameter	Result	Unit	RL	Qualifier	Analyzed	Analyst	Method
Fecal Coliform (03)	**3100 EST**	CFU/100 ml	1.00		08/29/2017 11:00	TCS	SM-9222-D-Rev 2006, 22nd Ed

Sample: 17H0582-04
Name: Spring Creek South
Matrix: Surface Water **Type:** Grab

Sampled: 08/29/17 07:35
Received: 08/29/17 10:05
Collected By: FO

Parameter	Result	Unit	RL	Qualifier	Analyzed	Analyst	Method
Fecal Coliform (04)	**750 EST**	CFU/100 ml	1.00		08/29/2017 11:00	TCS	SM-9222-D-Rev 2006, 22nd Ed

LakeCounty
Department of Public Works

LakeCounty
Health Department and
Community Health Center

Enviromental Monitoring and Technologies
8100 N. Austin Ave.
Morton Grove, IL 60053

Reported:
09/01/2017 13:00

Analytical Results (Continued)

Lake County Environmental Laboratory

Sample: 17H0582-05
Name: Spring Creek North
Matrix: Surface Water **Type:** Grab

Sampled: 08/29/17 09:15
Received: 08/29/17 10:05
Collected By: FO

Parameter	Result	Unit	RL	Qualifier	Analyzed	Analyst	Method
Fecal Coliform (05)	**140 EST**	CFU/100 ml	1.00		08/29/2017 11:00	TCS	SM-9222-D-Rev 2006, 22nd Ed

Sample: 17H0582-06
Name: Flint Creek
Matrix: Surface Water **Type:** Grab

Sampled: 08/29/17 08:00
Received: 08/29/17 10:05
Collected By: FO

Parameter	Result	Unit	RL	Qualifier	Analyzed	Analyst	Method
Fecal Coliform (06)	**240**	CFU/100 ml	1.00		08/29/2017 11:00	TCS	SM-9222-D-Rev 2006, 22nd Ed

LakeCounty
Department of Public Works

LakeCounty
Health Department and
Community Health Center

Enviromental Monitoring and Technologies
8100 N. Austin Ave.
Morton Grove, IL 60053

Reported:
09/01/2017 13:00

Notes and Qualifier Definitions

Qualifiers

*	Value exceeds Maximum Contaminant Level
A	Absent
B	Analyte detected in the associated Method Blank
E	Estimated, detected above calibration quantitation range
EST	Estimated calculated value
G	Refer to case narrative page for specific comments
H	Holding time for preparation or analysis exceeded
J	Analyte below quantitation limit
MCL	Maximum Contaminant Level
ND	Not Detected at the Reporting Limit (RL)
P	Present
S	Satisfactory
QR	RPD outside accepted recovery limits
QS	Spike Recovery outside accepted recovery limits
V	EPA Requires field analysis/filtration. Lab analysis would be considered past hold time
X	Analyte not in scope of accreditation

Certifications

Lake County Environmental Laboratory participates in the following laboratory accreditation and certification programs. Endorsement by the State of Illinois is not implied.
TNI Accreditation for Drinking Water and Wastewater through IL EPA Lab No. 100267
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17541

Monica Bofani
Lake County Environmental Laboratory
HD Lab Supervisor

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203

847-967-6666
FAX: 847-967-6735
www.emt.com

Chain of Custody Record

TURNAROUND TIME:
☐ RUSH
____ day turnaround
☐ ROUTINE

Due Date: ____-____-____ COC #: 212054

Company: EMT
Address: 8100 Austin Ave
Morton Grove IL

Phone #: (____) ____-____ Fax #: (____) ____-____
P.O. #: 60723 Proj. #: ____-____
Client Contact: Matt Gregory
Project ID / Location: Barrington Hills

Sample Type:
1. Waste Water 4. Sludge 7. Groundwater (filtered)
2. Drinking Water 5. Oil 8. Other Surface
3. Soil 6. Groundwater

Container Type:
P - Plastic V - VOC Vial O - Other
G - Glass B - Tedlar Bag ____

Preservative:
1. None 4. NaOH 7. Zn Ace
2. H_2SO_4 5. HCl 8. Other Sodium Thiosulfate
3. HNO_3 6. MeOH

Analyses

Sample I.D.	Sample Type	Container Size	Container Type	Container No.	Sampling By	Sampling Date	Sampling Time	pH	Temp.	Preservation Field	Preservation Lab	Fecal Coli. Fecal	EMT USE ONLY / EMT WORKORDER #
Flint Creek Lake Ct	S	120 ml	P	1	BK	08/29/17	0830	/	/	4		X	17H0582-01
Flint Creek old Hart	S	"	"	1	BK	8/29/17	0844	/	/	8		X	17H0582-02
Flint Creek North	S	"	"	1	BK	8/29/17	0901	/	/	8		X	17H0582-03
Spring Creek South	S	"	"	1	BK	8/29/17	0735	/	/	8		X	17H0582-04
Spring Creek North	S	"	"	1	BK	8/29/17	0915	/	/	8		X	17H0582-05
Flint Creek	S	"	"	1	BK	8/29/17	0800	/	/	8		X	17H0582-06

Relinquished By:	Date: 08-29-17 Time: 10:05	Received By:	Date: 8-29-17 Time: 10:05	EMT USE ONLY Client Code:
Relinquished By:	Date: - - Time: :	Received By:	Date: - - Time: :	EMT Project I.D.
Relinquished By:	Date: - - Time: :	Received For Lab By:	Date: - - Time: :	Jar Lot No.

☐ SAMPLE RECEIVED ON ICE
☐ TEMPERATURE

EMT SAMPLE RETURN POLICY ON BACK

SPECIAL INSTRUCTIONS:

batch# BRH0439 start 11:00 8/29/17 MB/MBD

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