Water Quality Data Report
For
NR13 Watershed
September 2011 through March 2012

A look upstream of Branchville Brook before it enters the Norwalk River

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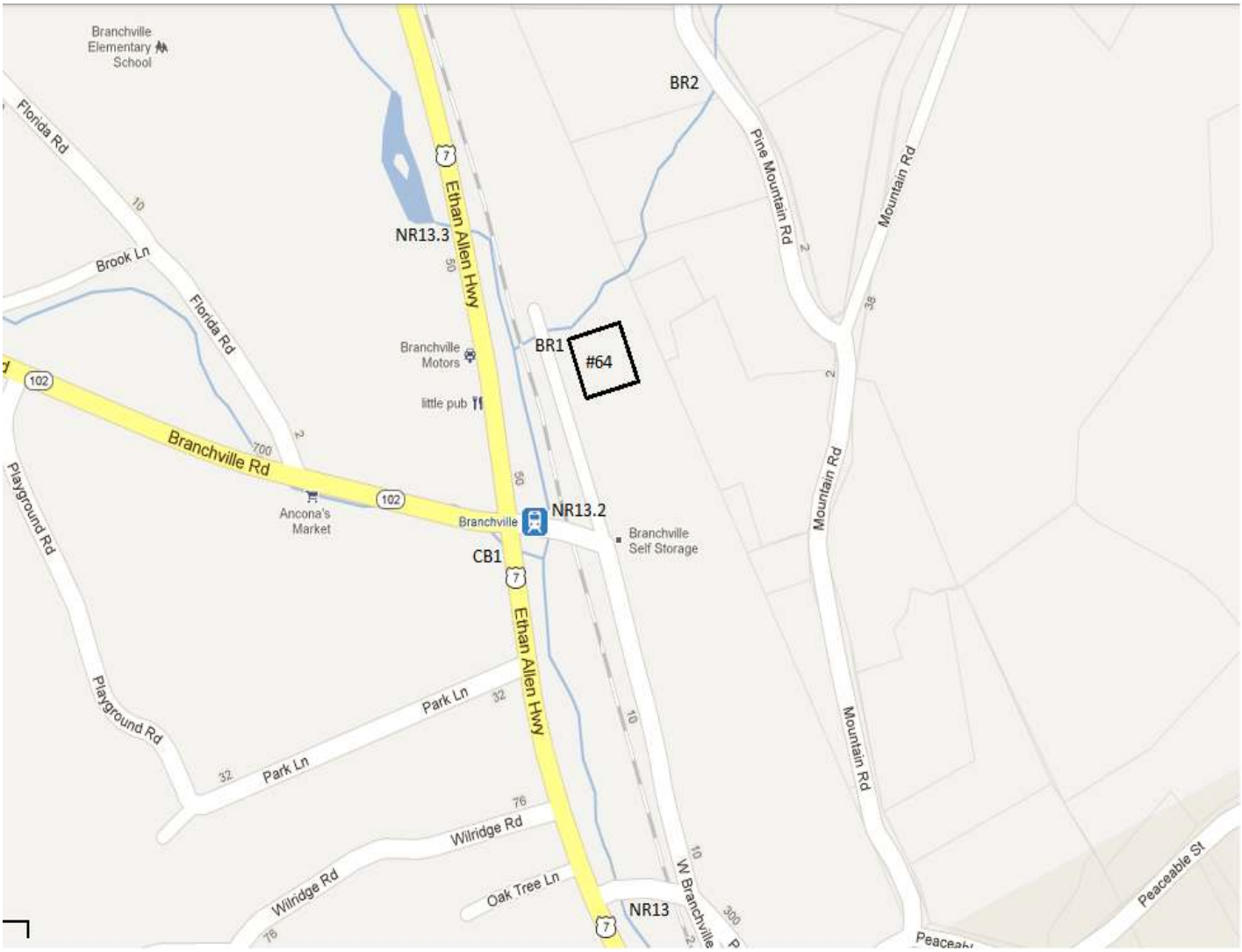
Introduction: The Harbor Watch program of Earthplace, The Nature Discovery Center in Westport, CT has been monitoring the Norwalk River year round since 1998. During the May through September 2011 monitoring period, elevated bacteria counts were observed at site NR13. These observed counts were the highest in the river during the monitoring period and above normal for this particular site. It was determined that further testing around the site would be necessary to pinpoint the pollution source. A group of high school volunteers from Wilton High School were assigned to monitor four sites with the intention of adding more sites as necessary during their participation in the Environmental Education Student Internship Program. These students, under the supervision of trained Harbor Watch employees, monitored the four sites, and added an additional 6 temporary sites while they determined the pollution source.

The monitoring sites are centered around the Branchville Train Station (Figure 1) and are located on the Norwalk River and two tributaries, Cooper Brook and Branchville Brook. This monitoring program is supported by funding from the Long Island Sound Futures Fund.

Figure 1 Location of six monitoring sites for the NR13 watershed



Site Coordinates

NR13.3	N 41º 16‘ 12.8“ W 073º 26‘ 34.1“
BR2	N 41º 16‘ 12.9“ W 073º 26‘ 23.2“
BR1	N 41º 16‘ 07.5“ W 073º 26‘ 29.0“
NR13.2	N 41º 16‘ 03.7“ W 073º 26‘ 28.8“
CB1	N 41º 16‘ 02.5“ W 073º 26‘ 30.2“
NR13	N 41º 15‘ 55.7“ W 073º 26‘ 26.6“

Methods and Procedures: Water monitoring is carried out under Quality Assurance Project Plan (QAPP) RFA#10160 approved by CT DEEP and EPA on 9/10/10 for five years. Monitoring teams leave Earthplace in Westport at 3:00pm and return at 5:00pm. The team is comprised of a fully trained Harbor Watch employee and three high school volunteers. Water samples are collected at 6 (Figure 1) monitoring sites along the length of the river. These sites, which represent the more impacted sites and developed areas, were selected in concert with the CT DEEP, because results from the first year’s study consistently demonstrated elevated fecal coliform bacteria counts at these locations.

The following tests are run *in situ*: dissolved oxygen (QAPP Appendix A3.2) and conductivity (QAPP Appendix A3.3). Water and air temperatures, as well as general observations and storm events are also recorded at each site visit. Observations are recorded (QAPP Appendix 5) on the HW data sheet.

Upon return to the lab, fecal coliform bacteria membrane filtration tests (QAPP Appendix A3.5) are performed and *E. coli* testing is carried out according to Standard Methods, 21st edition (9222D & 9222G) and recorded (QAPP Appendix 5) on the HW bacteria log. From September through December, the sites were monitored on a weekly basis. From January through March, the sites were monitored twice a month.

E. coli bacteria will be evaluated using the criteria published in the CT DEEP Surface Water Quality Standards, 2/25/11. The CT DEEP *E. coli* criterion for Class AA, A, and B water is established at three levels (Table 1).

The Norwalk River is classified for “all other recreational uses” because people do not bathe in or drink the river water and it is too shallow for swimming. The report will focus on *E. coli* bacteria levels, because it is the indicator bacteria of choice by the CT DEEP.

Table 1 CT DEEP criterion for *E. coli* bacteria levels as applied to recreational use, effective 2/25/11

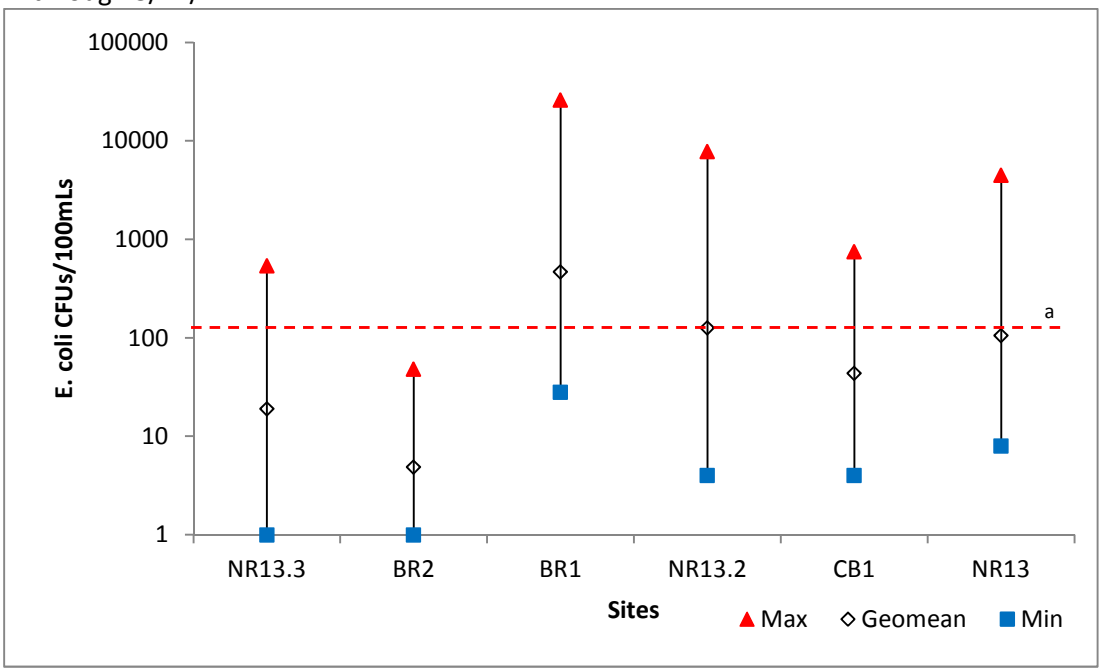
Designated Use **Recreation**	Class	Indicator	Criteria
Designated Swimming	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100; Single Sample Maximum 235/100
Non-designated Swimming	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100; Single Sample Maximum 410/100
All Other Recreational Uses	AA, A, B	*Escherichia coli*	Geometric Mean less than 126/100; Single Sample Maximum 576/100

Results: Observed *E. coli* geomeans at two of the six monitoring sites exceeded the CT DEEP criterion for a class B river of <126CFUs/100mLs (Figure 2). Four of the six sites exceeded the CT DEEP single sample maximum (SSM) of <10% over 576 CFU/100mL for a Class B river (Table 2).

All observed dissolved oxygen means met the CT DEEP minimum criterion of 5mg/L for a class B river. All individual readings met the criterion as well (Figure 3).

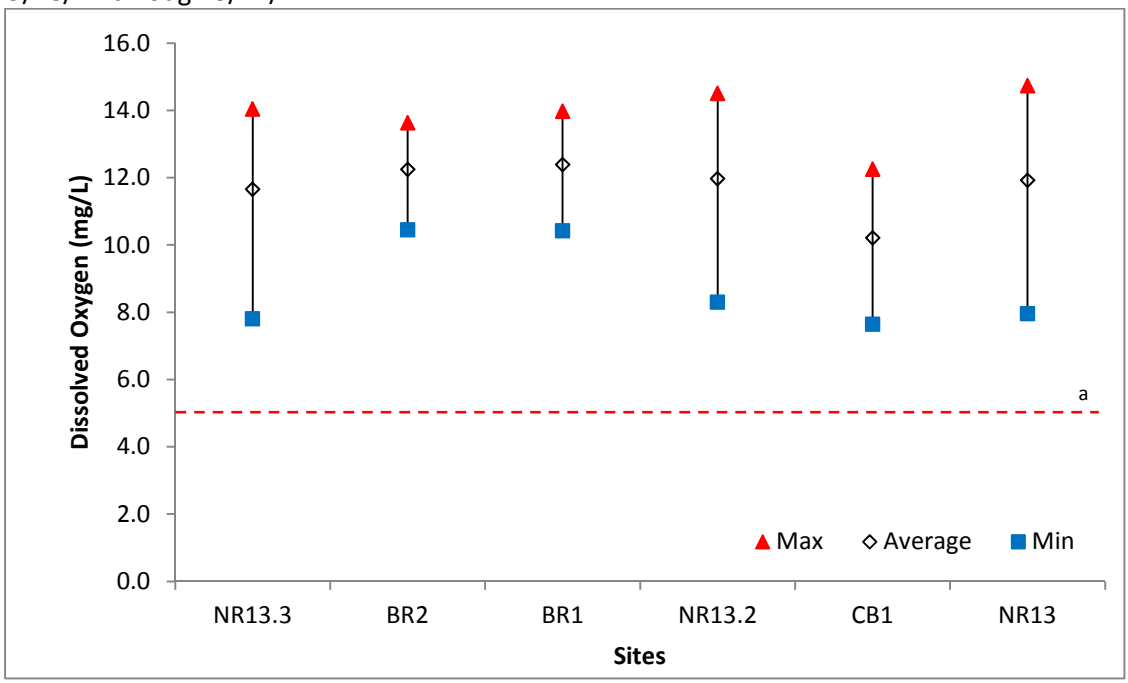
Conductivity means range from a minimum of 99µS at BR2 and a maximum of 430µS at site NR13.3. Conductivity ranges are widest at sites NR13.3, 150µS, NR13.2, 142µS, and NR13, 222µS. The narrowest ranges were seen at sites BR1, 43µS, and BR2 and CB1, 55µS (Table 4, Figure 4).

Figure 2 Maximum, geomean, and minimum *E. coli* values for six sites in the NR13 watershed from 9/28/11 through 3/21/12



[a] CT DEEP geomean maximum for a Class B river

Figure 3 Maximum, average, and minimum dissolved oxygen values for six sites in the NR13 watershed from 9/28/11 through 3/21/12



[a] CT DEEP minimum criterion for dissolved oxygen for Class B river

Figure 4 Maximum, average, and minimum conductivity values for six sites in the NR13 watershed from 9/28/11 through 3/21/12

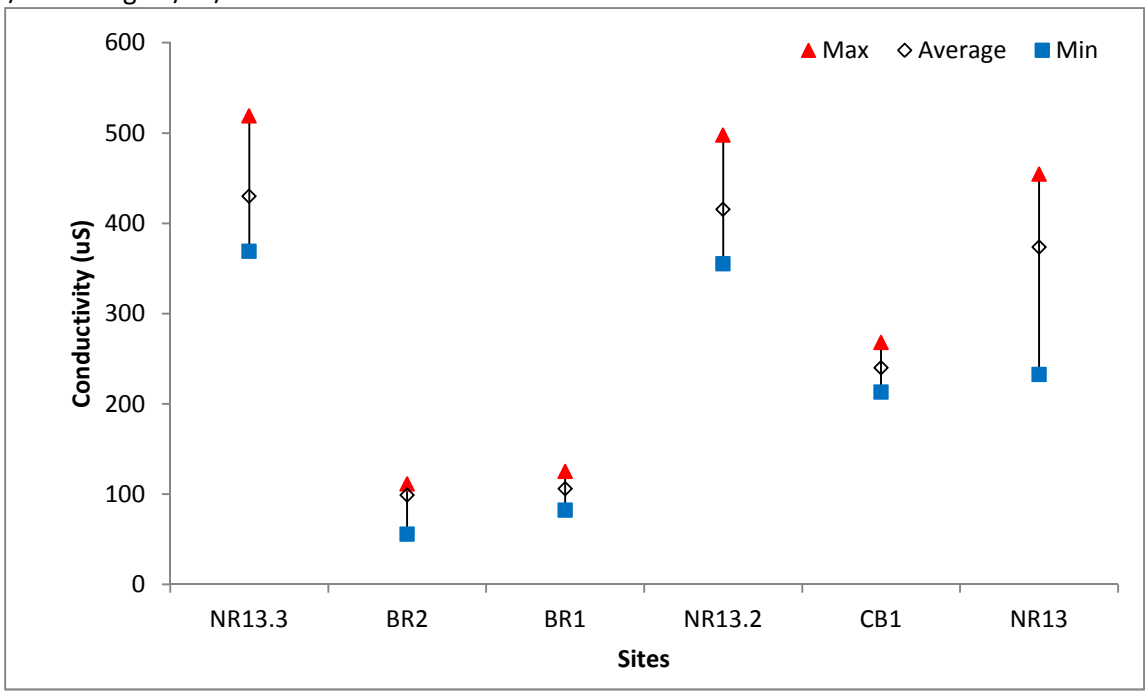


Table 2 Observed *E. coli* counts on each sampling date, geomeans, and % frequency exceeding 576 CFUs/100mLs for each site in the NR13 watershed during the September 2011 through May 2012 monitoring period

	9/28/2011	10/5/2011	10/12/2011	10/19/2011	10/26/2011	11/2/2011	11/9/2011	11/16/2011	11/18/2011	11/30/2011	12/7/2011
NR13.3	540	48	76	240	8	60	32	1		106	112
BR2									1	1	48
BR1						220	>7000	2700	300	2000	320
NR13.2	7800	264	124	220	92	84	248	168		232	150
CB1	750	32	24	300	24	40	4	20			
NR13	4500	100	108	260	32	80	180	264		128	180
Rain (in)	1.42	0.48	0.00	0.56	0.68	0.98	0.00	0.72	0.76	0.93	1.57
Days Prior	0	2	7	0	7	3	7	0	2	7	0

	12/14/2011	12/21/2011	1/11/2012	1/25/2012	2/8/2012	2/29/2012	3/7/2012	3/21/2012	Geomean	% Frequency over 576 CFUs/100mLs
NR13.3		2	18	20	1	6	1	16	19	6%
BR2	1	28	4	42	1		34	1	5	0%
BR1	256	170	250	340	1020	172	28	26000	470	36%
NR13.2		40	32	76	34	20	4	3000	126	12%
CB1									44	13%
NR13		56	120	56	14	14	8	1240	106	12%
Rain (in)	0.28	0.27	0	0.47	0.08	0.34	0.24	0.02		
Days Prior	6	0	7	2	7	0	4	5		

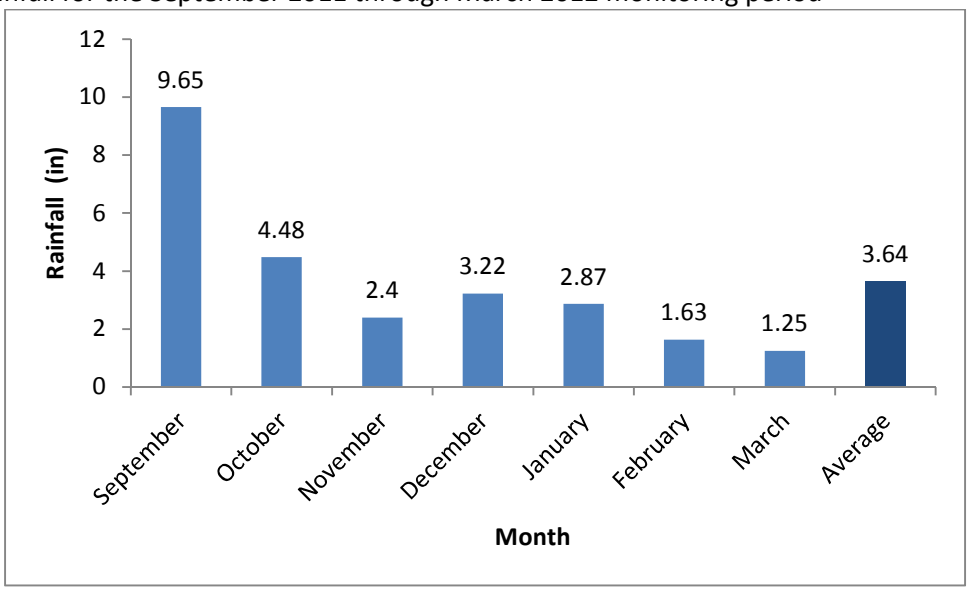
Table 3 *E. coli* values of temporary sites on Branchville Brook on three dates

Date	Site	E.coli CFU/100mLs
12/14/2011	A	0
	B	4
	C	4
12/21/2011	D	2
1/11/2012	D	0

Table 4 Conductivity ranges for six sites in the NR13 watershed from 9/28/11 through 3/21/12

	NR13.3	BR2	BR1	NR13.2	CB1	NR13
Max	519	111	125	498	268	454
Average	430	99	106	416	240	374
Min	369	56	82	355	213	233
Range	150	55	43	142	55	222

Figure 5 Rainfall for the September 2011 through March 2012 monitoring period



Discussion: Monthly rainfall averaged 3.64 inches from September through March which is below the normal monthly average of 4.5 inches. September was the only month which reached the normal monthly average (Figure 5). Elevated *E.coli* counts were observed on days that saw rainfall, but even on dry days, elevated *E. coli* counts were observed at BR1 (Table 2).

For the first month of monitoring, only four sites were tested in order to collect baseline data on the area. As predicted from summer testing, site NR13 had observed elevated bacteria counts. Site NR13.2 had observed counts higher than site NR13, and site NR13.3 showed *E.* coli counts much lower than those observed at site NR13.2 which is only a half mile upstream (Figure 1, Table 2). Monitoring at site BR1 began on 11/2/11 after discovering Branchville Brook was a tributary to the Norwalk River emptying above site NR13.2 and below site NR13.3, just above the north end of the Branchville Train Station parking lot (Figure 1). On many monitoring days a foul septic odor was apparent at site BR1 but no discoloration in the water or leaking from the river bank was apparent. Repeated testing indicated that Branchville Brook was the vehicle for pollution to enter the Norwalk River between site NR13.2 and site NR13.3. *E. coli* counts were observed over 7,000 CFUs on 11/9 and 2,700 CFUs on 11/16 (Table 2).

A second site, BR2, was added to the monitoring regime on 11/18/11 to segment Branchville Brook (Figure 1). Over the ten testing days between November and March, not once did BR2 have observed counts exceeding 48 CFUs (Table 2, Figure 2). On 12/14, the team decided to intensively break down Branchville Brook into sections in order to pinch off possible areas of pollution input. Three additional sites were added to the already established BR1 and BR2 on Branchville Brook. These temporary sites were strategically added at points just below a home on the river bank (site C) and at two drainage pipes

(sites A and B). Sites BR2, A, B, and C, all had *E. coli* results below 5 while site BR1 had a count of 256 CFUs (Table 2, Table 3). The next week, site D was added at a natural pool in the brook beside home 64 W Branchville Rd 40 feet above site BR1. The two days site D was tested resulted in *E. coli* counts of 2 CFUs and 0 CFUs on 12/21 and 1/11 respectively (Table 2). Site BR1 on those two dates had observed counts of 170 CFUs and 250 CFUs respectively (Table 2).

*E. coli b*acteria levels support the hypothesis that human bacteria sources are present opposed to the contamination being solely natural sources such as animal waste or background levels.

Dissolved oxygen means and all individual readings met the CT DEEP minimum criterion of 5mg/L on each sampling day (Figure 3). Even with limited rainfall during the monitoring period, the Norwalk River, Cooper Brook, and Branchville Brook continued to have a constant strong flow. Branchville Brook in particular has a very steep rise which enables the strong flow to be continuous even in times of low rainfall.

Conductivity ranges in the Norwalk River are wide with the maximum range of 222µS at site NR13 (Table 4). This wide range in the main river is expected because the headwaters are affected by the presence of limestone beds on the river banks in Ridgefield. As the river flows to the harbor, the conductivity is diluted by the low conductivity of the tributaries like Cooper Brook. Cooper Brook and Branchville Brook both have narrow conductivity ranges which indicate little impact to the Norwalk River from these tributaries (Figure 4). Branchville Brook and Cooper Brook flow through moderately developed residential neighborhoods. Much of the riverbank is protected by riparian buffer which filters pollutants. Site BR1 has a range of 43µS which reflects a watershed with minimal development.

Conclusion: On January 9, 2012, Harbor Watch contacted Amy Pardee, M.A., Inland Wetlands Agent, at the Ridgefield Inland Wetlands Board to inform her of the data that had been collected and the conclusions that could be drawn. Aimee Pardee further investigated the area on January 11, 2012 and spoke to a tenant living in house 64 W Branchville Rd who admitted to seeing “material oozing” into the river on days of low water which suggests that the cesspool might be failing (Appendix B). A memorandum was issued to the Ridgefield Health Director to work with the owner to eliminate this source of pollution to the Norwalk River (Appendix B). A few weeks later, Ms. Pardee returned to the area to see if any corrections had been made to the cesspool. Along with finding no advancements on remediation, Ms. Pardee noticed another home (58 W Branchville Rd) had a pipe leading from the house discharging directly above a storm drain (Appendix A). After talking to the tenant of house #58, she discovered that the pipe leaks often when using appliances in the home. She also noticed that the Venezia Custom Marble and Granite workshop was allowing marble dust to enter the river through the storm drains (Appendix A). The workers would not make any comments when spoken to by Ms. Pardee. House #58 and the Venezia Custom Marble and Granite workshop are attached buildings. Chris Gerke, Environmental Analyst II Permitting Enforcement and Remediation Division for the CT DEEP, was notified of this and subsequently made an inspection of the premises. Venezia is now under CT DEEP orders to filter the marble dust from the waste water.

The town of Ridgefield has ordered both homes to put in septic systems, effective immediately. Until remediation efforts are completed, it is unknown as to whether the cesspool at house number 64 located on the riverbank, the pipe emptying into the storm drain at number 58, and the discharge of marble dust are the only pollution sources. Summer 2012 research efforts will continue to monitor the Norwalk River on a weekly basis which should indicate if the search for pollution in that area has been completed or if further investigation is needed. Harbor Watch, Ridgefield Health Department, and the

CT DEEP will continue to monitor the area for remediation and pollution inputs. Appropriate actions will be taken with all new information that arises.

Appendix A

Suspected percolation test for replacing the cesspool at house number 64. Photo taken on 4/10/12.

Pipe connected to 58 W Branchville Rd that drains into the storm drain. Photo taken on 5/7/12.

Marble Company and its proximity to storm drain system. Photo taken on 4/10/12.

Appendix B

Copy of memorandum sent to the Ridgefield Health Director urging him to contact the homeowner.

TOWN OF RIDGEFIELD
Inland Wetlands Board

MEMORANDUM

TO: Edward Briggs, Director of Health

CC: Betty Brosius, Director of Planning
Richard Baldelli, ZEO
Dick Harris, Riverwatch/Norwalk River Watershed Association

FROM: Aimee Pardee, M.A., Inland Wetlands Agent

SUBJECT: 64 West Branchville Road, Ridgefield, CT

DATE: January 11, 2012

Ed,

As you will recall, I spoke to Dick Harris on Monday, January 9th regarding water test results from the Norwalk River and its tributaries near the Branchville Railroad Station. The test results indicated the presence of *E. coli* and suggested that the source was the Branchville Brook north of a dwelling at 64 West Branchville Road; Mr. Harris also stated that, on several occasions, there had been a strong "septic smell" in the vicinity of that property.

Richard Baldelli, Zoning Enforcement Officer, and I met with the owner of the property, Steve Lavatori, this morning on site. Mr. Lavatori stated that the dwelling on site is served by a cesspool that is located at the edge of the Branchville Brook. He said that he has observed material "oozing" out of the riverbank in that area and suggested that the cesspool may have failed.

I am bringing this issue to your attention in the hope that you will work with the property owner to eliminate this source of river contamination; please let me know if you have any questions that I can help with.

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