PLANNING COMMISSION EXHIBIT 124

REMA

• Soil & Wetland Studies
• Ecology • Application Reviews
• Listed Species Surveys • GPS
• Environmental Planning & Management
• Ecological Restoration & Habitat Mitigation
• Expert Testimony • Permitting

February 16, 2011

Town of Old Saybrook,
Planning Commission and Staff
302 Main Street
Old Saybrook, CT 06475-1741

RE: Ecological Communities in Ingham Hill and West PRD

Dear Commissioners and Planners:

Because we received response documents to our report dated January 15th only this afternoon, time constraints prevent our responding to most points in writing. Following are primarily bullets pertaining to water quality impacts.

- We stand by our statement in the January 19th report that adverse impacts from nutrient enrichment to *aquatic communities* (in-pool, in-stream, & down-stream) are indeed likely.

- However, after finding and reviewing the species lists for Wetland 4, Wetland 6, and Wetland 9, we do agree with Dr. Luce's letter provided by Mr. Gometz that the floristic community is *not* likely to be impacted.

- We note that none of the reviewers disagreed with our statement that only 40% to 60% of septic leachate is treated in a code-compliant septic system.

- Nor did anyone challenge our statement that shallow bedrock increased the proportion of leachate that is discharged as shallow groundwater into headwaters seeps and streams.

- No reviewer challenged our statements regarding the >10-fold lower threshold for aquatic impairment by nitrate-nitrogen, based on USEPA criteria, relative to the 10 mg/l human health standard to which septic system are designed.

- It was pointed out that denitrification and uptake by plants in riparian buffers can remove substantial nitrogen, but as pointed out in the Paul Heisig paper cited in our previous report, this nutrient removal mechanism is *seasonal.* The wetlands downgradient of the Ingham Hill pod lack broad bordering lowland terraces, where large amounts of denitrification could occur.

- Dr. Luce disagreed that all headwater wetlands and watercourses have low dilution capacity, but did not go so far as to state that dilution would be low at this site. It is obvious that a pool with low throughflow and first order headwater streams provide substantially less dilution than higher order brooks and rivers, or sizable lakes.

- The upgradient watershed area and soil types are key determinants of dilution potential. Information on existing nitrate-N concentrations is also needed, but never did the applicant now or in the past supplied such critical baseline data. The more refined type of dilution analysis (CTDEP 2006) that REMA recommended in our 1-17-11 report is one that applicants are increasingly asked by town commissions to provide, in our experience, when septic systems are proposed upgradient of sensitive resources.

- EPS pointed out, that home densities were several times higher in the Croton Watershed study of headwaters ground-water-fed streams than at this site. The point of that study was to show that in unsewered residential neighborhoods, nitrate-N does make its way into streams. Different soil types and landforms can accommodate different home densities before impairment begins. Again note that all of the reviewed sites, including the Ingham Hill Road proposal, are characterized by shallow to bedrock soils.

- The EPS report stated that the Heisig study (March 2000) lacked water quality data. The study did indeed include analyzed water quality data in graphical form. I do encourage you to download this USGS paper from the internet. If you have trouble feel free to contact REMA, and we shall e-mail the document. We attach water quality data from another headwaters CT stream in a bedrock-controlled landscape, in Oxford, CT, as an example of low concentrations of nitrate-nitrogen. Based on our substantial data set, this is repeated over and over again throughout CT in similar landforms and dominant soils.

- We will respond to Dr. Klemens' comments regarding vernal pools verbally. However, it should be noted that we never used the "conserved" "non-conserved" designations in our reporting. We also did review the 2005 data he produced. The reference to the 2004 data is an error.

- We should also note that the vernal pool inventory data referred to by Mr. Klein is not in the list of exhibits for this hearing. Without being able to review this data we cannot agree that Vernal Pool #37 is a sink vernal pool of no conservation value.

Respectfully submitted,

REMA ECOLOGICAL SERVICES, LLC

Sigrun N. Gadwa, MS, PWS
Professional Wetland Scientist
Registered Soil Scientist
Principal Ecologist

George T. Logan, MS, PWS, CE
Professional Wetland Scientist
Registered Soil Scientist
Certified Ecologist

VIA HAND-DELIVERY

WATER QUALITY DATA

FROM NINE CONNECTICUT SITES (PAST REMA PROJECT SITES)

WITH SAMPLING LOCATIONS, CHAIN OF CUSTODY FORMS, & LAB RESULTS SHEETS

80 Larkey Road, Oxford, Connecticut, – May 2008

Great Brook, Groton – January 2006

Old Clark Hill Road, East Hampton – January 2007

Orchard Road, East Haddam – April 2008

Dundee Drive, Cheshire – April 2008

Park Road Extension, Middlebury April 2007

Russell Road & Perimeter Road, East Granby, CT April 2008

Compiled by Sigrun N. Gadwa at the request of the Oxford IWWC. Includes pristine headwaters streams and pools, as well as watercourse set within largely developed landscapes

Fig. 1: Site Locus; 80 Larkey Rd, Oxford, CT & Downgradient Stream

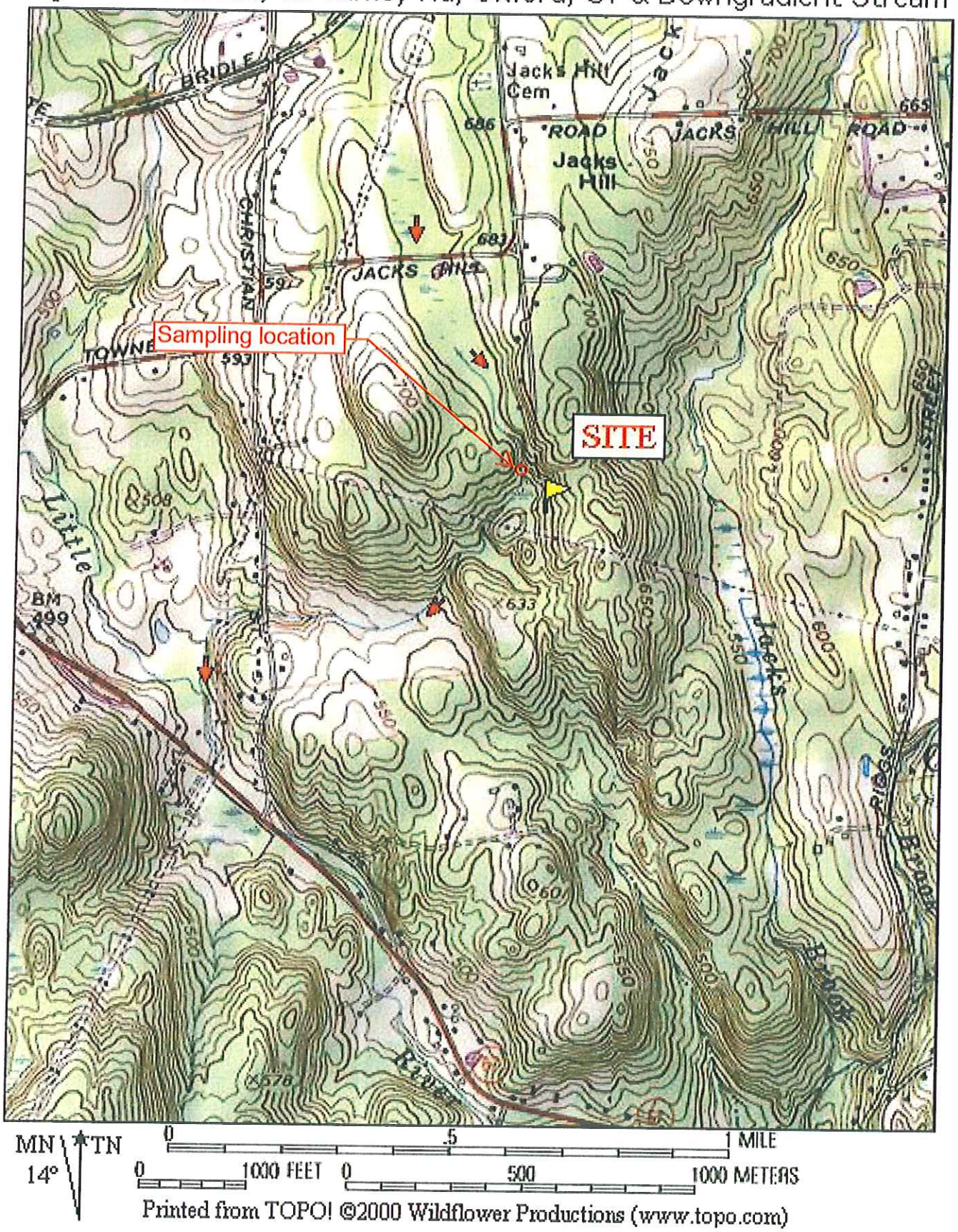

Table 2. Surface water analytical results for a first order unnamed perennial stream 70 Larkey Road, Oxford, Connecticut. Stream is a south-flowing tributary of the Little River in the Naugatuck River branch of the Housatonic River Drainage Basin (Basin #6920). Site is underlain by Chatfield-Charlton soils, relatively shallow to bedrock. Stream begins ~1000 feet to the north in an ~20 acre swamp. Upgradient upland land use is low-density single-family residential with septic systems and >60% forest cover. Sampled by REMA Ecological Services, LLC on April 22, 2008, under dry weather conditions. Last rain: 0.57", 9 days prior.

Sampling Station	***Ox1:*** *First order perennial stream in bedrock controlled landscape at base of moderate-gradient riffle, just upgradient of braided stream stretch through low-gradient wetland*	*Standards*
Sampling Date:	***4/22/08***	
Sampling Time:	***11:30 AM***	
Dissolved Oxygen (mg/l)	–	5
Conductivity (uS/cm)**	92	NE
Temperature (° C)	–	
pH	6.71	as naturally occurs[1]
Nitrate/Nitrite-N (mg/l)*	<0.01	0.31[2]
Ammonia as Nitrogen	0.07	
Total Kjeldahl Nitrogen (TKN) mg/l	0.45	
Total nitrogen (TN)(calculated)	0.45	0.61[2] ,
Total Phosphorus as P (mg/l)***	0.05	only of natural origin[1] ; 0.023 [2]

NOTES:

N/A = Not applicable

- = No data collected Nitrate-N **bolded** for data comparison

NE = No standard established

mg/L = milligrams per Liter; ug/L = micrograms per Liter

[1] The State of Connecticut

[2] EPA Nutrient Criteria (draft) for EcoRegion 1V , Legel 11 Ecoregion 59 (coastal New England)

[3] State of CT. Freshwater Aquatic Criteria

Nutrients, conductivity, and pH tested by Phoenix Laboratories, Manchester, CT. Samples kept on ice until delivery to the laboratory, within seven hours of sample collection

* Nitrate-N and Nitrite-N results were combined for convenient comparison with EPA criterion. Nitrite-N results is almost always <0.01 mg/l in surface-water samples.

** Note that specific conductivity is expected to be seomwhat higher in a perennial stream than in a headwaters pool or intermittent stream even without added nitrate-N other stormwater constituents.

PHOENIX
Environmental Laboratories, Inc.

CHAIN OF CUSTODY RECORD

587 East Middle Tu.., .ke, P.O. Box 370, Manchester, CT 06040
Email: service@phoenixlabs.com Fax (860) 645-0823
Client Services (860) 645-8726

Temp 10 of

Data Delivery:
☐ Fax #: 860.783.3997
☐ Email:

Customer: Pomeroy Ecological Services
Address: 164 E Center St

Project: Larkin Rd, Review for Town of Oxford
Report to: Sig Riemer, N. Gadue REMA
Invoice to:

Project P.O:
Phone #:
Fax #:

Client Sample - Information - Identification

Sampler's Signature: N. Gadue Date: 4-22-08

Matrix Code:
DW=drinking water WW=wastewater S=soil/solid O=other Surface water SW
GW=groundwater SL=sludge A=air

Analysis Request

Phoenix Sample #	Customer Sample Identification	Sample Matrix	Date Sampled	Time Sampled	Nitrate-N/Nitrite-N	Total Phosphorus	TKN	pH	Conductivity	Ammonia-N	Soil VOA [ ] Methanol [ ] S. Bisulfate [ ] H20	GL Soil container ( ) oz	GL Soil container ( ) oz	40 ml VOA Vial [ ] As is [ ] HCl	GL Amber 1000ml [ ] As is [ ] H2SO4	PL As is [ ] 250ml [ ] 500ml [ ] 1000ml	PL H2SO4 [ ] 250ml [ ] 500ml [ ] 1000ml	PL HNO3 250ml	PL NaOH 250ml	Bacteria Bottle
12385	Larkin Rd, Oxford	SW	4-22-08	11:30	-	-	-	-	-	-								2		

Relinquished by:	Accepted by:	Date:	Time:
N. Gadue		4/22/08	1595

Comments, Special Requirements or Regulations:
Acidify as needed.

Turnaround:
☐ 1 Day*
☐ 2 Days*
☐ 3 Days*
☒ Standard
☐ Other

* SURCHARGE APPLIES

CT/RI
☐ RCP Cert.
☐ GW Protect.
☐ GA Mobility
☐ GB Mobility
☐ SW Protect.
☐ Res. Vol.
☐ Ind. Vol.
☐ Res. Criteria
☐ Other

MA
☐ MCP Cert.
☐ GW-1
☐ GW-2
☐ GW-3
☐ S-1
☐ S-2
☐ S-3
☐ MWRA eSMART
☐ Other

State where samples were collected: CT

Data Format
☐ Excel
☐ PDF
☐ GIS/Key
☐ EQuIS
☐ Other

Data Package
☐ ASP-A
☐ NJ Reduced Deliv. *
☐ NJ Hazsite EDD
☐ Phoenix Std Report
☐ Other

PHOENIX
Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06040
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Analysis Report

April 30, 2008

FOR: Attn: Ms. Sigrun Gadwe
Rema Ecological Services
164 East Center Street
Suite 2
Manchester CT 06040

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:	SG	04/22/08	11:30
Location Code:	REMA	Received by:	LB	04/22/08	15:45
Rush Request:		Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG I.D.: GAQ21235
Phoenix I.D.: AQ21235

Client ID: LARKIN RD., REVIEW

Parameter	Result	RL	Units	Date	Time	By	Reference
Conductivity	91.5	2.0	umhos/cm	04/22/08		JR/EG	SM2510B
Ammonia as Nitrogen	0.07	0.02	mg/L	04/30/08		WM	350.1
Nitrite-N	< 0.01	0.01	mg/L	04/22/08	22:14	EW	E353.2
Nitrate-N	< 0.01	0.01	mg/L	04/22/08	22:14	EW	E353.2
	6.71	0.10	pH	04/22/08		JR/EG	4500-H B/9045
Nitrogen Tot Kjeldahl	0.45	0.1	mg/L	04/30/08		WM	E351.1
Phosphorus, as P	0.05	0.05	mg/L	04/24/08		JL	SM4500P E

Comments:

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.
ND=Not detected BDL=Below Detection Limit RL=Reporting Limit

Phyllis Shiller, Laboratory Director
April 30, 2008