

S E A

S E A CONSULTANTS INC.
Scientists/Engineers/Architects

April 29, 2008

Ms. Ann Herrick – CIP
U.S. Environmental Protection Agency – Region 1
1 Congress Street, Suite 1100
Boston, MA 02114-2023

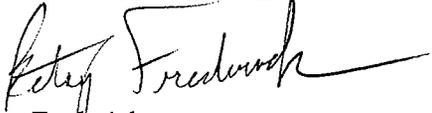
RE: Town of Ipswich Year 5 NPDES Annual Report
S E A Reference No.: 2003008.05-A

Dear Ms. Herrick:

Please find enclosed one copy of the Town of Ipswich Year 5 NPDES Annual Report, in conformance with the Town's NPDES MS4 General Permit. If you have any questions about the enclosed report, please contact either Mr. Robert Gravino, Ipswich Department of Public Works (at 978-356-6679) or Betsy Frederick, S E A Consultants Inc. (at 520-603-5768).

Respectfully yours,

S E A CONSULTANTS INC.



Betsy Frederick
Project Manager

cc: Robert Gravino, DPW
file

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Municipality/Organization: Town of Ipswich, MA

EPA NPDES Permit Number: MA041199

MaDEP Transmittal Number: _____

**Annual Report Number
& Reporting Period:** No. 5: April 07 - March 08

8
5/1/08

NPDES PII Small MS4 General Permit Annual Report

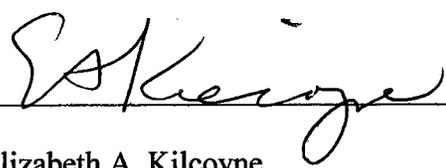
Part I. General Information

Contact Person: Mr. Robert Gravino **Title:** Director, Dept. of Public Works

Telephone #: 978-356-6612 **Email:** robertg@town.ipswich.ma.us

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: 

Printed Name: Elizabeth A. Kilcoyne

Title: Chair, Board of Selectmen

Date: April 28, 2008

Part II. Self-Assessment

The Town of Ipswich has completed the required self-assessment and has determined that our municipality is in compliance with most but not all of the permit conditions. Specifically, the Town recognizes the following non-compliance:

Part II.A.2 - The Town failed to implement all elements of the Storm Water Management Program by the expiration date of the permit. Specifically, the Town did not pass the necessary by-laws required under the permit. Several of the other BMP's were dependent upon final form of the by-laws, and consequently may have been only partially addressed within this permit period (e.g. development of regulations). Additional information regarding the efforts to date to implement this permit condition is provided in the Annual Report.

Although the following does not constitute a non-complying condition, additional consideration was given to the following:

Part I. D. 4 - The Town of Ipswich is familiar with the state's Draft TMDL for pathogens/bacteria in the Ipswich River. The Town will consider measures to address bacteria as a pollutant of concern in subsequent permit periods. In the interim, the Town is exploring structural and non-structural BMPs for implementation in the Farley Brook sub-basin, which drains downtown Ipswich, discharges to the Ipswich River, and has been demonstrated to contribute pollutants to the river. A report summarizing investigation results and recommended BMP's was submitted to the Massachusetts Office of Coastal Zone Management (CZM) under the Coastal Pollutant Remediation (CPR) grant program. Project implementation may be dependent upon funding under the CZM program.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 6
1-1	Procurement/Development of educational material	DPW Director	Procure or adapt four brochures for distribution and posting in subsequent permit years.	The Town Stormwater Committee conducted public outreach through newspaper articles about the Stormwater Bylaw, public meetings, presentations to the Board of Selectmen and Finance Committee, a brochure describing the Bylaw, and Rotary and other community organizations.	Use Metropolitan Area Planning Commission grant to educate the community about importance of Stormwater. Reconsideration will be given to a comprehensive public education campaign in partnership with other public or non-profit agencies within the Town and the watershed.
Revised			Will post through existing stormwater page with link through Cons. Commission		
				The Town continued several additional educational programs. The Town publishes an Annual Recycling Calendar. In the calendar, information is provided regarding household hazardous waste days and other general information regarding appropriate management of household wastes. The Ipswich Recycling Committee contributes a weekly column to the local newspaper on issues of environmental concern. Finally, the DPW provides news releases to the local news media regarding issues of household waste management, recycling and stormwater.	Continue to provide public information on environmental issues that impact water quality.

2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 6
2-1	Conduct joint Household Hazardous Waste and Oil/Paint Collection Day	BOH with DPW Director	Conduct one joint day annually and an additional oil-based paint (plus tires, batteries, fluorescent bulbs) collection day conducted by DPW alone.	Conducted one joint collection day, and one DPW collection day in the Permit year. DPW initiated a Mercury Recovery Program in the Permit year that collects thermostats, mercury switches, thermometers and button cell batteries.	Household hazardous waste collection days are scheduled annually in the Spring and Fall. Continue to operate the Mercury Recovery Program.

3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 6
3-1	Map outfalls and receiving waters	DPW Director with Utilities Director	Develop system for informing all public departments of changes in MS4 resulting from new development or re-dev.; field verify ICPCC mapping and Parker River Watershed Outfall Mapping.	BMP completed in Year 4. See prior reports.	Incremental mapping of comprehensive drainage system to include catch basins, manholes, and other drainage assets will be incorporated into major capital projects.
Revised					
3-2	Detect and eliminate illicit discharges	DPW Director	Develop Illicit Discharge Detection and Elimination Plan; dry weather discharge evaluation of the top priority area.	Wet and dry weather sampling completed for Farley Brook. Potential illicit connection was identified to be further investigated.	Additional priority sub-basins will be identified for infrastructure mapping and condition assessment, including determination of illicit connections or discharges. This is a continuous program expected to be completed over several years.
Revised					

3-4	Develop Bylaw Prohibiting Illegal Dumping of Non-SW into MS4	DPW Director	Develop Draft By-law.	The Town Stormwater Committee, chaired by the Chairman of the Conservation Commission, developed and proposed a comprehensive stormwater management by-law for consideration at Fall 2007 Special Town Meeting. The by-law was not passed.	The Town sought and was awarded a grant from the Metropolitan Area Planning Commission to educate the community about why such by-laws are important. It is the Town's intent to implement the public education campaign and re-submit the comprehensive by-law at a Fall 2008 Special Town Meeting.
Revised					
3-5	Develop Regulations and Policies to Enforce By-law	DPW Director	Policies and Regulations	Until the Committee completes its task, rules and regulations can not be developed.	To be determined.
Revised					

4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 6
4-1	Revise Site Plan Review By-law	Planning Director	Draft amendment to the Site Plan Review section of the Zoning By-law for review of projects > 1 acre.	See BMP 3-4. The Town has opted to pursue a comprehensive stormwater management by-law which incorporates all three major by-law and regulatory enforcement requirements of the NPDES General Permit. Site Plan Review Rules and Regulations already require compliance with the Massachusetts Stormwater Standards.	See BMP 3-4 above.
Revised			PB intends to draft by-law that will address projects of < 1 acre as well.		
4-2	Improve Site Plan Review Process	DPW Director	Draft revised process and tracking tool.	No additional activity this period. BMP was essentially complete after Year 4.	Continue to implement the new process and improve upon as experience provides opportunities.
Revised					
4-3	Procedures for Receipt of Public Information	Planning Director	Review existing procedures for consideration of improvements or compliance with Phase II.	No additional activity this period.	To be determined.
Revised					

5. Post-Construction Stormwater Management in New Development and Redevelopment

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 6
5-1	Post-Construction Run-off By-law	Planning Director	Complete Draft by-law by end of Permit Year 2. Develop associated regulations and guidance in year 3.	See BMP 3-4 above.	See BMP 3-4.
5-2.1	DPW Review of Structural BMPs	DPW Director	Draft procedure for evaluation of BMP's from O& M perspective.	The Town converted to a 100% salt policy and no longer is using sand for road treatment. The DPW has found that it has significantly reduced the sediment build-up in catch basins and the sediment build-up at outfall locations.	Town will be looking at ecological or other habitat impacts associated with use of 100% salt for road treatment.
Revised					
5-2.2	Establish Funding Mechanism for O&M of structural BMPs.	DPW Director	Investigation of potential funding mechanisms.	This issue has been combined with development of the comprehensive by-law. See BMP 3-4 for additional information.	See BMP 3-4.
Revised					

6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 6
6-1	Educate Municipal Employees	DPW Director	Annual Storm Water Training Sessions	The Town sent two Highway Department personnel to an Essex County Highway Association seminar this year. The topic was Stormwater management.	To be determined.
Revised					
6-2	Develop and Implement Municipal Operations Stormwater Plan	DPW Director	Develop and Adopt the plan by the end of Permit Year 2.	Asset management software has been purchased and is now in use. Database is being developed to assist Director with operational schedules and costs. No formal plan has yet been developed. The Town has determined to eliminate sand as part of road treatment as a result of historical sediment and total solids water quality issues. See BMP 5-2.1 above.	The Town will continue to map drainage infrastructure, perform condition assessments, and revise operating plans in accordance with findings. The operations stormwater plan will be a dynamic document that is continually updated.

7. BMPs for Meeting Total Maximum Daily Load (TMDL) Waste Load Allocations (WLA)

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 6
	Not Applicable – No TMDL’s have been approved for any Waters within the Town of Ipswich.				
Revised	<i>A Draft Report for bacteria/pathogen TMDLs in the Ipswich River Basin has recently been submitted for review and comment to USEPA. Implications of the TMDL will be addressed in the next 5-year permit program.</i>			The Town will work with regulators and watershed stakeholders to develop appropriate goals for the next five year permit term.	

Part IV. Summary of Information Collected and Analyzed

Summarize the results of information or data, if any, that was collected and analyzed during Permit Year 5, but was not included elsewhere in the annual report or requires further elaboration. Information and data could include results/trends from any storm or receiving water quality monitoring, assessment of particular BMP performance, or financial impact of program implementation.

Farley Brook Watershed Assessment Project

Summary of Data Collection Activities

Global positioning survey (GPS) and drainage structure inspection were performed in the initial stages of the watershed assessment. This data provided the means to determine the connectivity of the stormwater conveyance system, an inventory of structures, and provided a means to identify potentially problematic areas within the conveyance system. The data was used in tandem with land use data and potential pollutant sources.

For the structures inventory there was a total of 756 total stormwater structures identified, including 506 catch basins, 222 manholes and 28 end structures (outfalls & culverts). In addition, approximately 12,000 linear feet of networked stormwater conveyance piping was identified. One of the major problematic issues in the conveyance system is the catch basin to catch basin connection, which potentially produces hydraulic tailwater conditions within the conveyance pipe. This tailwater condition could potentially result in surcharging the drainage structure and flooding roads. In addition, the transport of sediment is likely to be increased under a catch basin to catch basin connection.

Three water quality monitoring events were proposed as part of the monitoring plan; one dry weather sample event and then two wet weather sample events. A water quality sampling and analysis plan and addendum were prepared by S E A and implemented in the Spring of 2007. The sampling plan provided procedures for sample collection, equipment, and quality control.

In an effort to present areas of concern within the watershed that may pose a higher potential pollution loading, also known as “Hot Spot”, an Environmental Sensitive Areas Plan was developed. A few examples of a “hot spot” are a gas station, commercial parking lot with high intensity use, or vehicle maintenance facility.

Summary of Monitoring Activities and Results

The water quality monitoring commenced on April 24, 2007 with the collection of the dry weather sample event. As presented in the summary of the dry weather analytical testing in Table 1, sample location FB-4 encountered elevated concentrations of all Fecal Coliform, Enterococcus, and Surfactants. The sample taken during the dry weather event was obtained from an outfall pipe northwest of the catch basin sample location due to access constraints at the original sample location. The field engineer observed noticeable chemical odor at the outfall location during the dry weather sample event. Low concentrations of Enterococcus were found in sample FB-2, FB-3, FB-5 and low concentration of Fecal Coliform was observed in FB-2.

Table 1
Water Quality Analytical Results - Dry Weather Event

Parameters	Sample Location				
	FB-1	FB-2	FB-3	FB-4	FB-5
Coliform, Fecal (col/100mL)	4.6	3.0	ND	56,000	ND
Enterococcus (col/100mL)	ND	11	7.0	>200,000	5.0
Oil & Grease, Hem-Grav (mg/L)	ND	ND	ND	33	ND
Surfactants, MBAS (mg/L)	5.0	0.05	ND	7.7	ND

Note: ND refers to No Detection.

On May 11, 2007 the first wet weather sample event was performed. Analytical results are summarized in Table 2. Significant effort was made to collect the second wet weather "First Flush", however we were unable to capture the second wet weather sample event. The schedule constraints of the grant-funded project required that we proceed with conceptual design on the basis of results obtained to date.

The wet weather analytical results indicate elevated levels of Enterococcus was encountered in all six sample locations. Low concentration of Fecal Coliform was observed at sample location FB-2 and FB-3 with higher concentrations encountered at FB-1 and FB-5. Total petroleum hydrocarbons (TPH) were encountered at all locations except FB-3. The highest concentration of TPH was encountered at FB-2, with the next highest levels observed at FB-5.

Table 2
Water Quality Analytical Results - Wet Weather event

Parameters	Sample Location					
	FB-1	FB-2	FB-3	FB-4	FB-5	FB-7
Coliform, Fecal (col/100mL)	3,100	510	2,000	2,400	3,000	520
Enterococcus (col/100mL)	2,000	3,000	1,200	2,000	5,900	1,200
Total Petroleum Hydrocarbon (ug/L)	974	2,240	ND	966	1,130	621
Salinity (SU)	ND	ND	ND	ND	ND	ND
Total Suspended Solids (mg/L)	660	47	8.7	NT	810	43
Oil & Grease, Hem-Grav (mg/L)	NT	NT	NT	NT	NT	NT
Surfactants, MBAS (mg/L)	NT	NT	NT	NT	NT	NT

*Note: ND refers to No Detection.
NT refers to Not Tested.*

Water Quality Monitoring Conclusions

In terms of specific areas of concern, the dry weather monitoring result indicates sample location FB-4 is a potential area of interest. In review of the dry weather test data, in combination with field observation (i.e. observed chemical odor), the elevated concentrations strongly suggests an illicit discharge has recently happened or is presently an ongoing issue at or upstream of the sample location FB-4. The dry weather monitoring data from FB-5 would indicate that the source of the illicit discharge is not likely to have come from the western portion of the watershed. Although a fair amount of flow was observed from FB-5 monitoring outfall during the dry weather sampling round, this flow is believed to be linked to groundwater infiltration. Te Town should perform further investigation into

the detection of illicit discharges before implementing any best management practices in this area. The disconnection of an illicit discharge is a more effective means to improve water quality.

The wet weather monitoring data does not provide any specific pattern of contamination or plume, which could readily identify any specific source of contamination. In general, the analytical data indicates the constituents of concern to be total petroleum hydrocarbons (TPH), fecal coliform and enterococcus bacteria. All constituents of concern (COC) are found at similar concentrations at each of the watershed monitoring locations. Therefore it is difficult to define a priority discharge location based on the wet weather analytical results. The similar concentration of COC indicates the source of the contaminants to be wide spread within the watershed and/or conveyance system. A possible source or combination of sources of the contaminants could range anywhere from leaky sanitary sewer to failing septic systems, to wildlife and/or household pets.

Wet weather test results indicate there is more of a total suspended solid (TSS) issue coming from the residential area located in the western portion of the watershed, upstream of sample point FB-5. The more urban (downtown) areas indicate lower TSS concentration likely due to greater degree of pavement surface and the deposition of coarser sediment as a result. This coarser sediment drops out of the runoff flow quicker, thereby reducing the turbidity in the water.

Part V. Program Outputs & Accomplishments (OPTIONAL)

Programmatic

Stormwater management position created/staffed	(y/n)	No
Annual program budget/expenditures	(\$)	\$35,000

Education, Involvement, and Training

Estimated number of residents reached by education program(s)	(# or %)	
Stormwater management committee established	(y/n)	Yes
Stream teams established or supported	(# or y/n)	Yes
Shoreline clean-up participation or quantity of shoreline miles cleaned	(y/n or mi.)	Yes
Household Hazardous Waste Collection Days		
▪ days sponsored	(#)	2/yr
▪ community participation	(%)	
▪ material collected	(tons or gal)	
School curricula implemented	(y/n)	No

Legal/Regulatory

	In Place Prior to Phase II	Under Review	Drafted	Adopted
Regulatory Mechanism Status (indicate with "X")				
▪ Illicit Discharge Detection & Elimination			Yes	No
▪ Erosion & Sediment Control			Yes	No
▪ Post-Development Stormwater Management			Yes	No
Accompanying Regulation Status (indicate with "X")				
▪ Illicit Discharge Detection & Elimination				
▪ Erosion & Sediment Control				
▪ Post-Development Stormwater Management				

Mapping and Illicit Discharges

Outfall mapping complete	(%)	100%
Estimated or actual number of outfalls	(#)	
System-Wide mapping complete	(%)	
Mapping method(s)		
▪ Paper/Mylar	(%)	
▪ CADD	(%)	
▪ GIS	(%)	100%
Outfalls inspected/screened	(# or %)	50%
Illicit discharges identified	(#)	0
Illicit connections removed	(#) (est. gpd)	0
% of population on sewer	(%)	
% of population on septic systems	(%)	

Construction

Number of construction starts (>1-acre)	(#)	
Estimated percentage of construction starts adequately regulated for erosion and sediment control	(%)	
Site inspections completed	(# or %)	
Tickets/Stop work orders issued	(# or %)	
Fines collected	(# and \$)	
Complaints/concerns received from public	(#)	

Post-Development Stormwater Management

Estimated percentage of development/redevelopment projects adequately regulated for post-construction stormwater control	(%)	
Site inspections completed	(# or %)	
Estimated volume of stormwater recharged	(gpy)	

Operations and Maintenance

Average frequency of catch basin cleaning (non-commercial/non-arterial streets)	(times/yr)	1
Average frequency of catch basin cleaning (commercial/arterial or other critical streets)	(times/yr)	1
Total number of structures cleaned	(#)	
Storm drain cleaned	(LF or mi.)	
Qty. of screenings/debris removed from storm sewer infrastructure	(lbs. or tons)	
Disposal or use of sweepings (landfill, POTW, compost, recycle for sand, beneficial use, etc.)		
Cost of screenings disposal	(\$)	

Average frequency of street sweeping (non-commercial/non-arterial streets)	(times/yr)	2/yr
Average frequency of street sweeping (commercial/arterial or other critical streets)	(times/yr)	28/yr
Qty. of sand/debris collected by sweeping	(lbs. or tons)	
Disposal of sweepings (landfill, POTW, compost, beneficial use, etc.)	(location)	
Cost of sweepings disposal	(\$)	
Vacuum street sweepers purchased/leased	(#)	
Vacuum street sweepers specified in contracts	(y/n)	

Reduction in application on public land of: (“N/A” = never used; “100%” = elimination)		
▪ Fertilizers	(lbs. or %)	
▪ Herbicides	(lbs. or %)	
▪ Pesticides	(lbs. or %)	

Anti-/De-Icing products and ratios	% NaCl % CaCl ₂ % MgCl ₂ % CMA % Kac % KCl % Sand	
Pre-wetting techniques utilized	(y/n)	
Manual control spreaders used	(y/n)	
Automatic or Zero-velocity spreaders used	(y/n)	
Estimated net reduction in typical year salt application	(lbs. or %)	
Salt pile(s) covered in storage shed(s)	(y/n)	
Storage shed(s) in design or under construction	(y/n)	