PHASE II STORM WATER MANAGEMENT PROGRAM PLAN

TOWN OF COVENTRY
Coventry, RI

March 2004

EXECUTIVE SUMMARY

The Town of Coventry currently implements many of the elements of a successful Storm Water Management Program. In order to fully comply with the RIPDES General Permit issued by RIDEM, the Town must implement additional measures. The following table (also found in Appendix L) outlines those measures, identifies the responsible parties, measurable goals, and provides a schedule for implementation over the five year permit term. The listed measures were identified through several workshops conducted with the Town's Storm Water Committee. Technical Memorandums (TMs) were prepared for each of the six minimum control measures. At these workshops the TMs were reviewed and implementation alternatives were discussed. Where possible, the measurable goals are identified as quantifiable measures. In other instances the measurable goals are presented as discrete activities. For these, the conduct of the activity is intended to serve as the goal.

EXECUTIVE SUMMARY
STORM WATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
TOWN OF COVENTRY
Coventry, Rhode Island

This table identifies how the Plan complies with the General Permit (RIR040000) requirements for the six minimum best management practices. While this report identifies many alternatives, the items that the Town has committed to are specified in this table.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.G.1	Submit Annual Report to RIDEM	Town Council,	Annual Report completed	March 10 of every permit year (commencing 2005)	As discussed in Section 11.2 of the SWMPP. Annual Report Template included in Appendix M
1.	**Public Education and Outreach**				
IV.B.1.b.1 and 5	Distribute Storm Water Awareness Package (Neighbor to Neighbor)	Storm Water Committee, DPW	Materials complied. Information distributed. Number of packages distributed (distributed with Recycle Bins, copies at Town Hall and Library).	Start distributing media by: 3/10/2005	As discussed in Section 4.4 of the SWMPP. Example educational materials for potential use included in Appendix B.
IV.B.1.b.1 and 5	Distribute storm water flyer to residents in urbanized areas.	Storm Water Committee	Flyer distributed annually.	Media distributed by: 3/10/2005	As discussed in Section 4.0 of the SWMPP. Example educational materials for potential use included in Appendix B.
IV.B.1.b.1 and 5	Continue school programs and meet with local school officials annually to identify past activities and upcoming curriculum.	Storm Water Committee	Annual meeting.	Meeting held by January each permit year	Continue educational programs as discussed in Section 4.2 of the SWMPP.
IV.B.1.b.1 and 5	Make the Storm Water Management Plan available to the General Public	Storm Water Committee	Make plan available at Town Hall and in schools. Consider putting the plan on the Town's web site.	Make copy of SWMPP and NOI available in 2004	
IV.B.1.b.2	Develop strategies to inform public (visitors, employees, residents) on how to become involved in storm water program. Develop strategy for topics and media to be used.	Storm Water Committee	Strategy decided, information packaged for chosen media(s). Information distributed to the public.	Strategy developed by: 3/10/2005 and implemented in following years.	Opportunities are discussed in Section 5.2 of the SWMPP.
IV.B.1.b.2	Develop strategies to utilize partnerships with other governmental and non-governmental entities.	Storm Water Committee	Meeting(s) held with other community groups (governmental and non-governmental). Strategy developed.	Strategy developed by: 3/10/2005 and implemented in following years	Potential partners discussed in Section 5.2 of the SWMPP.
IV.B.1.b.3	Potential target audiences are described in Section 4.3.2 of the SWMPP.	Storm Water Committee	List developed.	Developed by: 3/10/2004 and reviewed annually	
IV.B.1.b.4	Potential target pollutant sources are discussed in Section 4.3.3 of the SWMPP.	Storm Water Committee	List developed.	Developed by 3/10/2004 and reviewed annually	
IV.B.1.b.7	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March 10 of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
2.	**Public Participation**				
IV.B.2.b.1	SWMPP was developed by storm water committee that included Town Council, Planning Board, and DPW representatives. Plan was also made available to public comment and public noticed. A public meeting was held with the Town Council (11/13/2002) during the preparation of the SWMPP.	Storm Water Committee	SWMPP available for review	SWMPP available for review prior to submission to RIDEM	Copy of Public Notice available from Town Planner or the DPW Director.
IV.B.2.b.2.i	Potential target audiences are described in Section 4.3.2 of the SWMPP.	Storm Water Committee	List developed.	Developed by: 3/10/2004 and reviewed annually.	
IV.B.2.b.2.ii	Include public involvement in the Town's storm water program.	Storm Water Committee	Community groups contacted. Number of public activities.	Review annually	Section 5.2 includes current public involvement activities that exist within the Town
IV.B.2.b.2.ii	Develop local storm water committee to continue to develop and implement the Plan.	Town Council	Committee developed and maintained.	Developed by 9/10/2004	
IV.B.2.b.2.ii	Conduct annual Storm Water Plan meeting for the public.	Storm Water Committee	Conduct annual meeting.	Meeting conducted prior to March of every permit year (commencing 2005).	
IV.B.2.b.2.ii	Develop storm drain stenciling program in urbanized areas.	Storm Water Committee	Program developed, volunteers organized, basins stenciled.	Organize program by 2004 Begin stenciling by 2005	
IV.B.2.b.2.ii	Sponsor and support cleanup projects.	Storm Water Committee	Program developed, volunteers organized,	Organize program by 2004 Begin cleanups by 2005	
IV.B.2.b.2.iii	Provide adequate public notice prior to submitting the annual report. Allow the public to comment and review report.	Town Council, Storm Water Committee	Annual Report made available at a specified community location. Public meeting held annually.	Meeting conducted prior to March of every permit year (commencing 2005).	
IV.B.2.b.2.iii	Provide a written summary of responses for all significant comments.	Town Council, Storm Water Committee	Comments reviewed, written response made available to public (if necessary)	As needed	
IV.B.2.b.4	Evaluate the success of this minimum measure.	Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005).	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
3	**Illicit Discharge Detection and Elimination**				
IV.B.3.b.1	Complete an outfall map including locations of all outfalls (GPS) and names of receiving waters in the urbanized areas.	DPW	Mapping completed, consider integration of asset management system. Identify names and locations of all receiving waters.	Developed by: 12/2006	As discussed in Section 6.2 and Section 6.4 of the SWMPP.
IV.B.3.b.2	Implement outfall tagging program to identify and number outfall pipes in urbanized areas (optional if GIS mapping is available for all outfalls in MS4).	DPW	Number of outfalls tagged. Survey of outfalls completed. Number of outfall tags maintained (if installed).	Implemented by: 12/2006	As discussed in Section 4.4.1 and Section 6.4 of the SWMPP.
IV.B.3.b.3	Additional elements shall be recorded on an on-going basis. At a minimum, field notes will be made on municipal plat maps to plot the location of additional elements that will also be used to prepare outfall mapping. These additional elements will be recorded during maintenance of drainage structures, dry weather surveys and installation of new storm drains in the urbanized areas.	DPW	Procedures developed and implemented.	Procedures developed by 12/2006	Mapping discussed in Section 6.2 and Section 6.4 of the SWMPP.
IV.B.3.b.4	Develop and introduce an ordinance or other regulatory mechanism to effectively prohibit and enforce unauthorized non storm water discharges into the system. Section 6.3 and Section 6.4 of the SWMPP identifies alternatives for the Town to accomplish this.	Town Council	Draft language and legal review. Conduct informational meetings as necessary.	Developed and introduced by: 12/2004	As discussed in Section 6.3 of the SWMPP. Potential model ordinances are included in Appendix C and Appendix D.
IV.B.3.b.4	Adopt an ordinance or other regulatory mechanism to effectively prohibit and enforce unauthorized non storm water discharges into the system.	Town Council	Submit and schedule for vote at Town Meeting. Regulatory mechanism in place.	Adopted by: 12/2005	As discussed in Section 6.3 of the SWMPP. Potential model ordinance included in Appendix C and Appendix D.
IV.B.3.b.5.i.	Urbanized area will be the priority for illicit discharge investigation and elimination. Given the limited extent of urbanized areas, no additional prioritization is proposed with the exception of responding to complaints or other findings indicating a problem with illicit discharges.	DPW	Investigations identified, prioritized, conducted. Suspected illicit connections investigated. Source identified and scheduled for removal. Enforcement actions taken or referred to other entity such as police or RIDEM.	Program implemented by: 12/2007	As discussed in Section 6.4 of the SWMPP.
IV.B.3.b.5.ii	Complaints associated with illicit discharges will be directed to the DPW where these complaints will be logged. DPW will review these complaints upon receipt and determine the appropriate action to take.	DPW	Number of complaints logged and responded to.	Complaint procedures implemented by: 12/2006.	
IV.B.3.b.iii	Procedures for tracing sources of illicit discharges are detailed in Section 6.4 of the SWMPP.	DPW	Number of illicit connections detected.	Procedures completed	

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.3.b.iv	The process for removing illicit discharges will be defined by the mechanism that will be used to prohibit and enforce illicit discharges.	DPW	Sources identified and removed.	Adopted by: 12/2005	The regulatory mechanism will define this process which must be approved as part of its adoption.
IV.B.3.b.v	The illicit discharge and detection program will be evaluated and assessed annually prior to the preparation of the Annual Report. This will consist of reviewing the areas evaluated, findings, whether changes in procedures and priorities need to be made. A summary of this evaluation will be included in the Annual Report.	DPW	Completion of annual review.	March of every permit year (commencing 2005).	
IV.B.3.b.5.vi	Inspect all catch basins in the Town's urbanized area at least once. Maintain records of all inspections and corrective actions required and completed. This activity will be coordinated with the recording requirements as stipulated in IV.B.3.b.3 and cleaning activities required in IV.B.6. During these inspections, odors or flow and any other observations will be noted and reported for the purposes of determining whether illicit discharges should be investigated discharging to those structures.	DPW	Number of catch basins inspected. Records maintained. Number of corrective measures required and completed.	Inspections completed by: 12/2007	
IV.B.3.b.5.vii	Perform dry weather surveys in accordance with procedures established in Section 6.4 of the report. Perform a minimum of two surveys in accordance with standards stipulated in the General Permit.	DPW	Two sampling events completed.	Surveys completed by: 12/2007	
IV.B.3.b.7	If illicit discharges are detected from other physically interconnected MS4s, the Town will report the finding to the owner of the illicit discharge.	DPW	Number of illicit discharges reported to other MS4 owners.	Process in place by: 12/2006	
IV.B.3.b.8	Unauthorized non-storm water discharges that are deemed appropriate to continue discharging to the storm drain system will be referred to the RIPDES program for appropriate action. Process will follow procedures developed by the RIPDES program for such a review.	DPW	Number of illicit discharges referred to RIDEM.	Process in place by: 12/2006.	
IV.B.3.b.9	Public education and municipal employee training programs will inform about hazards associated with illegal discharges and improper disposal of waste. Coordinate with Minimum Measure #1 and 6.	Storm Water Committee	Ensure that educational materials developed include illicit discharge awareness. Materials developed and distributed.	Materials selected, distribution commenced 12/2007	As discussed in Section 4.0 and Section 6.4 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.3.b.10	All actions taken to detect and address illicit discharges will be recorded in both field notes as well as on outfall mapping prepared for IV.B.3.b.1.	DPW	Submittal of findings in Annual Report.	March of every permit year (commencing 2005).	
IV.B.3.b.12	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
4	**Construction Site Runoff Control**				
IV.B.4.b.1 and 3	Develop and introduce an ordinance or other regulatory mechanism to require sediment and erosion control and control of other wastes at construction sites. Section 7.3 and Section 7.4 of the SWMPP identifies alternatives for the Town to accomplish this. The Rhode Island Soil Erosion and Sediment Control Handbook (as amended) will serve as the minimum standard.	Town Council	Draft language and legal review. Conduct informational meetings as necessary.	Developed and introduced by: 12/2004	
IV.B.4.b.1	Adopt an ordinance or other regulatory mechanism to require sediment and erosion control and control of other wastes at construction sites.	Town Council	Submit and schedule for vote at Town Meeting. Regulatory mechanism in place.	Adopted by: 12/2005	As discussed in Section 7.3 of the SWMPP.
IV.B.4.b.2	Issue and track permits for all construction projects resulting in land disturbance of greater than 1 acre in urbanized areas to ensure compliance with erosion and sediment control ordinance. Permit issuance procedures will be defined in the ordinance. Current tracking procedures will be reviewed and amended as necessary to comply with this program.	Building Official	Review current procedures. Improved procedure developed and implemented. Number of permits issued and tracked.	Developed by: 12/2005	As discussed in Section 7.2 and Section 7.3 of the SWMPP.
IV.B.4.b.4	Procedures for reviewing plans and SWPPPs for construction projects resulting in land disturbance of 1-5 acres, not reviewed by other State programs will be defined in the ordinance developed to comply with IV.B.4.b.1 and 2.	DPW, Town Council, Storm Water Committee	Ordinance developed. Number of plans and SWPPPs reviewed.	Develop by: 12/2004 100% reviewed by: 12/2006	As discussed in Section 7.3 and Section 7.4 of the SWMPP
IV.B.4.b.5	Develop procedures for coordination of site plan and SWPPP review when relying on State program review of construction activity.	DPW, Town Council, Storm Water Committee	Procedure developed.	Procedures implemented by: 12/2005	
IV.B.4.b.6	Public comment and information regarding new development projects and construction runoff related impacts will be directed to the Building Department where these complaints will be logged. The Building Department will review these complaints upon receipt and determine the appropriate action to take. Develop procedures for receipt and consideration of information submitted by the public.	Building Department	Procedure developed. Number of complaints logged and responded to.	Complaint procedures implemented by: 12/2006.	

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.4.b.7	Procedures for site inspection and enforcement of erosion and sediment control measures and other measures for control of wastes at construction sites will be defined in the ordinance developed to comply with IV.B.4.b.1 and 2.	Town Council,	Review current procedures. Improved procedure developed and implemented.	Procedures implemented by: 12/2005	As discussed in Section 7.3 and Section 7.4.4 of the SWMPP. A sample of a contractor self-inspection report is included in Appendix E.
IV.B.4.b.7	Inspect 100% construction sites located within the urbanized area twice (1st during construction, 2nd after final stabilization)	Building Department	Staff trained, Number of construction sites inspect and number of occurrences per site.	Start: 12/2005	
IV.B.4.b.8	Develop procedures for referral to the State of non-compliant construction site operators.	DPW, Town Council, Storm Water Committee	Procedure developed. Number of non-compliant construction sites referred to RIDEM.	Process in place by: 12/2005	
IV.B.4.b.10	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March 10th of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
5	**Post-Construction Runoff Control**				
IV.B.5.b.1, 2 and 8	The Town will rely on the State of Rhode Island Stormwater Design and Installation Manual (as amended) as a standard to address storm water runoff from new development and redevelopment projects. At this time, no additional modifications are proposed especially since the new manual is soon to be released by RIDEM.	Town Planner	Program developed, priority areas specified.	Program in place by: 12/2005	As discussed in Section 8.0. A model watershed management plan is included in Appendix F.
IV.B.5.b.3	Procedures for pre-application meetings and site plan review (coordinate IV.B.4.b.4) will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Town Planner	Procedures developed, number of pre-application meetings held.	Process in place by: 12/2005	
IV.B.5.b.4	Review 100% of plans and SWPPPs for development projects located in the urbanized area resulting in land disturbance greater than 1 acre, not reviewed by other State programs (coordinate with IV.B.4.b.4). Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Town Planner	Number of plans and SWPPPs reviewed.	Start: 12/2005	
IV.B.5.b.5	Procedures for coordination of local and State post-construction storm water management reviews. Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	DPW, Town Council, Storm Water Committee	Procedures developed.	Process in place by: 12/2005	
IV.B.5.b.6	New industrial discharges proposed to discharge to discharge to the storm drain system will be referred to the RIPDES program for review and approval. Process will follow procedures developed by the RIPDES program for such a review.	DPW, Town Council, Storm Water Committee	Number of activities referred to RIDEM.	Process in place by: 12/2005	
IV.B.5.b.7	When the Town's Comprehensive Plan of Development is updated, opportunities for smart growth such as in-fill development, direct growth to identified areas, and protect sensitive areas will be identified. Additionally, non-structural BMPs as described in the State of Rhode Island Stormwater Design and Installation Manual (as amended) will be considered. Public education will include discussion of ways to limit runoff.	DPW, Town Council, Storm Water Committee	Items developed and distributed.	Materials selected, distribution commenced by 12/2007	As discussed in Section 4.0 and Section 8.3.

EXECUTIVE SUMMARY
STORM WATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
TOWN OF COVENTRY
Coventry, Rhode Island

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.5.b.7 and 9	Develop and introduce an ordinance or other regulatory mechanism to address post construction runoff from new development and redevelopment projects. State standards will be included by reference. Section 8.3 and Section 8.4 of the SWMPP identifies alternatives for the Town to accomplish this.	Town Council,	Draft language and legal review. Conduct informational meetings as necessary.	Developed and introduced by: 12/2004	As discussed in Section 8.2, Section 8.3, and Section 8.4.2. Model ordinance is included in Appendix G.
IV.B.5.b.9	Adopt an ordinance or other regulatory mechanism to address post construction runoff from new development and redevelopment projects.	Town Council	Submit and schedule for vote at Town Meeting. Regulatory mechanism in place.	Adopted by: 12/2005	As discussed in Section 8.2, Section 8.3, and Section 8.4.2. Model ordinance is included in Appendix G.
IV.B.5.b.10	Inspect 100% construction sites after final stabilization (coordinate with IV.B.4.b.7). Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Building Department	Number of construction sites inspected.	Start: 12/2005	As discussed in Section 8.3.
IV.B.5.b.11-12	Adopt by-law or regulations with language and enforceable mechanism for long term operation and maintenance of post-construction runoff controls. Include language will provide DPW authority to ensure proper operation and maintenance of all BMPs tributary to the storm sewer system in urbanized area. Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Town Council,	By-law or regulation developed. Submit and schedule for vote at Town Meeting. Voted and adopted.	Adopted by: 12/2005	As discussed in Section 8.3 and Section 8.4.3. Suggested BMP operation and maintenance guidelines are included in Appendix I.
IV.B.5.b.14	Evaluate the success of this minimum measure.	Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
6	**Pollution Prevention and Good Housekeeping in Municipal Operations**				
IV.B.6.b.1.i	Identify and list locations and description of all structural BMPs owned or operated by the MS4 within the urbanized area.	DPW	Number of structures identified.	Initial list: 3/2004 Update: March 10th of every year.	As discussed in Section 9.2.2 of the SWMPP.
IV.B.6.b.1.ii	Formalize procedures for inspections, cleaning and repair of detention/retention basins, storm sewers, and catch basins. The Town is already conducting these tasks.	DPW	Identify the structures tributary to the system. Conduct a catch basin sediment accumulation pilot program. Establish a routine inspection and maintenance program. Maintain records of inspections conducted, number of structures cleaned, approximate volume of material collected.	Developed: 12/2005	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.1.iii	Formalize current catch basin inspection and cleaning program. All catch basins will be inspected annually and cleaned as necessary unless documentation supporting a different frequency of cleaning is submitted to RIDEM as part of the Annual Report.	DPW	Formalized existing program. Number of catch basins inspected and number cleaned.	Developed by: 12/2005 Annually commencing 12/2006	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.1.iv	DPW staff will observe road shoulders during road work projects. If erosion is observed, the crew will report it to its manager. DPW will then schedule repairs and appropriate methods for stabilization including riprap or vegetative stabilization.	DPW	Procedures implemented developed	Developed by: 12/2005	
IV.B.6.b.1.vi	Formalize current street and road sweeping program. Town will continue to sweep all roads and streets once per year.	DPW	Maintain records of curb-miles swept, approximate volume of material collected.	Formalized by: 12/2006 Annually commencing 12/2006	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.1.vii	Develop program for controls to reduce floatables and other pollutants from the MS4. This program will be based on a review of current catch basin grates and their ability to bypass flows to a curb inlet, as well as observation of outfalls to determine locations with the greatest potential for floatables. A pilot program is proposed to evaluate the effectiveness of any floatable reduction strategy.	DPW	Program developed, volume of wastes collected and disposed.	Program developed by: 12/2005.	
IV.B.6.b.1.viii	Town will continue to dispose of wastes removed from the MS4 in accordance with applicable State requirements.	DPW, Storm Water Committee	Waste disposed of properly.	Reviewed annually	As discussed in Section 9.6 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.6.b.2	Operations under MS4s legal control that have the potential to introduce pollutants into the storm water system are addressed in Section 8.0.	DPW, Storm Water Committee		Completed by: 3/2004	
IV.B.6.b.3	Industrial facilities owned and operated by MS4s that have storm water discharges associated with industrial activities have been listed on the NOI.	DPW, Storm Water Committee	Facilities identified on NOI.	Completed by: 3/2004	
IV.B.6.b.4	Operation and maintenance and good housekeeping practices and BMPs for municipal operations have been identified in Section 8.0.	DPW, Storm Water Committee	Continue to implement	Implementation by: 3/2006	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.6	Incorporate storm water awareness training into existing training for equipment operators and mechanics (Heath & Safety, Right to Know)	DPW, Town Council	Training completed. Educational materials distributed.	Procedures developed: 12/2006	As discussed in Section 9.6.
IV.B.6.b.7	Develop procedures to incorporate water quality improvements into flow management projects.	DPW, Town Council	Procedures developed	Procedures developed: 12/2007	
IV.B.6.b.8	Develop procedures for implementing proper erosion and sediment and water quality controls for all construction projects undertaken by the Town.	DPW, Town Council	Procedures developed	Procedures developed: 12/2006	
IV.B.6.b.8	Include a list of planned capital improvements in the Annual Report.	DPW, Town Council, Storm Water Committee	Meeting held to discuss municipality's needs. Improvements assessed and listed.	March of every permit year (commencing 2005)	
IV.B.6.b.10	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

PHASE II STORM WATER MANAGEMENT PROGRAM PLAN
Town of Coventry

TABLE OF CONTENTS

SECTION	PAGES
EXECUTIVE SUMMARY	12

SECTION	PAGE
1.0 INTRODUCTION	1
2.0 WATERSHED INVENTORY	2
2.1 Existing Water Resources	2
2.2 Impaired Waters	3
2.3 Sole Source Aquifers	4
2.4 Special Resource Protection Waters	5
2.5 Wellhead Protection Areas	5
2.6 Wetlands	6
2.7 State Licensed Beaches	7
2.8 Rare Species Habitat	7
3.0 LAND USE	9
3.1 Implementation Alternatives	11
4.0 PUBLIC EDUCATION AND OUTREACH	13
4.1 State and Federal Regulatory Requirements	13
4.2 Available Resources	13
4.2.1 School Programs	13
4.2.2 Citizen's Groups	19
4.2.3 Regional, State and National Resources	22
4.3 Educational Targets	28
4.3.1 Subwatersheds	28
4.3.2 Diverse Audiences	28
4.3.3 Sources of Pollution	29
4.4 Implementation Alternatives	30
4.4.1 Provide General Education	30
4.4.2 School Programs	33
4.4.3 Target Specific Areas and Issues	33
5.0 PUBLIC PARTICIPATION/INVOLVEMENT	35
5.1 State and Federal Regulatory Requirements	35
5.2 Available Resources	35
5.2.1 School Programs	35
5.2.2 Boy and Girl Scouts of America	35

PHASE II STORM WATER MANAGEMENT PROGRAM PLAN
Town of Coventry

TABLE OF CONTENTS
(continued)

SECTION **PAGE**

5.2.3 Citizen's Groups 37
5.2.4 Regional, State and National Resources 38
5.2.5 Local Media Resources 40
5.3 Implementation Alternatives 42

6.0 ILLICIT DISCHARGE DETECTION AND ELIMINATION 45
6.1 State and Federal Regulatory Requirements 45
6.2 Mapping 47
6.3 Municipal Regulations 47
6.4 Recommendations 50

7.0 CONSTRUCTION SITE RUNOFF CONTROL 55
7.1 State and Federal Regulatory Requirements 55
7.2 Existing Municipal Ordinances 56
7.2.1 Subdivision and Land Development Regulations 57
7.2.2 Zoning Ordinance 57
7.2.3 Soil Erosion and Sediment Control 58
7.2.4 Enforcement 60
7.3 Recommended Modifications 61
7.4 Implementation Alternatives 66
7.4.1 Soil Erosion and Sediment Control Regulations 66
7.4.2 Site Plan Review Procedures 66
7.4.3 Management of Information Submitted by the Public 67
7.4.4 Construction Site Inspection Procedures 67

8.0 POST-CONSTRUCTION RUNOFF CONTROL 69
8.1 State and Federal Regulatory Requirements 69
8.2 Existing Ordinances 69
8.2.1 Subdivision and Land Development Regulations 69
8.2.2 Zoning Ordinance 70
8.2.3 Soil Erosion and Sediment Control 71
8.2.4 Enforcement 72
8.3 Recommended Modifications 72
8.4 Implementation Alternatives 78
8.4.1 Develop and Implement Storm Water Strategies 79
8.4.2 Post-Construction Runoff Control Regulations 79
8.4.3 Ensure Adequate Long-Term Operation of BMPs 80

9.0 POLLUTION PREVENTION /GOOD HOUSEKEEPING 81

PHASE II STORM WATER MANAGEMENT PROGRAM PLAN
Town of Coventry

TABLE OF CONTENTS
(continued)

SECTION **PAGE**

9.1 State and Federal Regulatory Requirements 81
9.2 Department of Public Works 81
9.2.1 Public Street and Parking Lot Sweeping 82
9.2.2 Storm Water System Inspection and Cleaning 82
9.2.3 Fleet Vehicle Maintenance 83
9.2.4 Winter Road and Lot Maintenance 83
9.2.5 Solid Waste Removal and Handling 84
9.2.6 Hazardous Materials Handling and Storage 85
9.2.7 Tree Management 85
9.2.8 Cemeteries 85
9.2.9 Spill Response 86
9.2.10 Personnel Training Program 86
9.3 Recreation and Parks Department 86
9.3.1 Cutting and Clearing 86
9.3.2 Fertilizer and Pesticide Application 86
9.3.3 Solid Waste Removal and Handling 87
9.3.4. Pet and Bird Waste 87
9.3.5 Spill Response 88
9.3.6 Personnel Training Program 88
9.4 School Department 88
9.4.1 Landscaping and Athletic Field Maintenance 88
9.4.2. Winter Lot Maintenance 88
9.4.3 Vehicle Maintenance 89
9.4.4 Waste Disposal 89
9.4.5 Spill Response 89
9.4.6 Personnel Training Program 89
9.5 Fire Department 89
9.5.1 Vehicle Maintenance 90
9.5.2 Spill Response & Personnel Training Program 90
9.6 Implementation Alternatives 90

10.0 PLAN SUMMARY/IMPLEMENTATION MEASURES 95

11.0 PROGRAM EVALUATION 96
11.1 Revisions to Storm Water Management Program 96
11.2 Annual Report 97
11.3 Record Keeping 98

PHASE II STORM WATER MANAGEMENT PROGRAM PLAN
Town of Coventry

TABLE OF CONTENTS
(continued)

TABLES **PAGE**

Table 2.1	Impaired Waters	4
Table 2.2	Rare/Endangered Species	8
Table 3.1	Land Use	10
Table 3.2	Critical Land Uses	11
Table 4.1	Sample Public Curriculum	32
Table 4.2	Regulated Industries	34
Table 6.1	Examples of Sources of Illicit Connections	48
Table 6.2	Allowable Non-Storm Water Discharges	48
Table 8.1	BMP Monitoring Parameters and Water Quality Goals	80

FIGURES **END OF TEXT**

1. Urban Areas
2. Impaired Waters
3. Wetlands
4. Natural Resources
5. Land Uses
6. Potential Target Areas

APPENDICES **END OF TEXT**

A	Preliminary Inventory of Water Resources in Coventry – Applied Bio-Systems, Inc.
B	Education and Outreach
C	Model Illicit Discharge and Connection Stormwater Ordinance (NEIWPCC)
D	Alternate Model Illicit Discharge Connection Ordinances
E	Contractor Self-Inspection Form
F	Town of Waterford, Connecticut. Jordan Brook Watershed Management Plan
G	Draft Model Stormwater Control Ordinance
H	Model Post-Construction Storm Water Runoff Control Ordinance
I	Stormwater Best Management Practices (BMPs) Operation and Maintenance Guidelines
J	New Development Inspection Form
K	Pollution Prevention/Good Housekeeping
L	Storm Water Management Plan and Schedule
M	Annual Report Template

1.0 INTRODUCTION

On December 8, 1999, the U.S. Environmental Protection Agency (USEPA) promulgated Phase II of its National Pollution Discharge Elimination System (NPDES) storm water regulations. Phase I of the USEPA storm water program established regulations for storm Water discharges from municipal separate storm sewer systems (MS4s) in municipalities with populations of 100,000 or greater, construction activities disturbing five or more acres of land, and ten categories of industrial facilities. The Phase II Final Rule expands the Phase I program by requiring smaller communities with MS4s in urbanized areas to implement programs and practices to control polluted storm Water runoff through the use of NPDES permits. Urbanized areas are based on the 2000 census.

The Town of Coventry is one of thirty-two Rhode Island municipalities located completely or partially in an Urbanized Area automatically designated under the Phase II program. In Rhode Island, Phase II regulated communities will be required to apply for a Rhode Island Pollutant Discharge Elimination System (RIPDES) permit which will be issued by Rhode Island Department of Environmental Management (RIDEM). These communities will be required to reduce the discharge of pollutants from their storm sewer systems to the "maximum extent practicable" to protect water quality.

As part of the permitting process, these regulated municipalities are required to prepare and submit Storm Water Management Plans that address how the regulated MS4 will comply with six minimum control measures. These six minimum measures include:

Public Education and Outreach
Public Participation/Involvement
Illicit Discharge Detection and Elimination
Construction Site Runoff Control
Post-Construction Runoff Control
Good Housekeeping/Pollution Prevention

Chapters 2 and 3 of this Plan provide a discussion of the water resources and land uses in the community as potential targets or prioritization of activities to address the six minimum control measures. Chapters 4 through 9 provide a discussion of the existing programs and practices for each of the minimum control measures. This includes a section of "Implementation Alternatives". These are modifications to existing programs or activities or additional measures which could be used to satisfy the permit requirements. Chapter 10 presents the selected alternatives for implementation. This includes a summary of the elements, responsible parties for implementation, as well as the measurable goals for each measure. This also includes a schedule for implementation. Chapter 11 provides a discussion of standard permit requirements.

2.0 WATERSHED INVENTORY

2.1 Existing Water Resources

Four watersheds drain through Coventry: the Big, Flat, Pawtuxet, and Wood River Watersheds. The Pawtuxet River is one of the main tributaries flowing into Narragansett Bay, draining an area of approximately 150,000 acres (234 square miles).

A watershed is the area of land where all of the water that is under it or drains off of it migrates to a common location. A watershed generally includes lakes, rivers, estuaries, wetlands, streams, and the surrounding landscape. Groundwater recharge areas are also considered. Watersheds are nature's boundaries, which transcend political, social, and economic boundaries.

Because watersheds are defined by natural hydrology, they represent the most logical basis for managing water resources. A Watershed Protection Approach is, therefore, a viable strategy for effectively protecting and restoring aquatic ecosystems and protecting human health. Rhode Island supports this approach through the RI Watershed Partnership, which coordinates what have traditionally been separate government programs. Major features of a Watershed Protection Approach are: targeting priority problems, promoting a high level of stakeholder involvement, integrated solutions that make use of the expertise and authority of multiple agencies, and measuring success through monitoring and other data gathering. A watershed framework offers many opportunities to simplify and streamline the workload between involved parties, thus generating cost efficiencies. Each watershed presents unique opportunities and challenges. More importantly, they present an opportunity for partnering with watershed advocates, academic institutions, industry, private landowners, neighboring communities, or state agencies to achieve mutual beneficial goals.

While a significant amount of the Town has been developed, a number of water resources exist that should be the focus of future storm water management activities in Coventry. These resources include rivers, streams, and ponds.

Significant water resources in the Town of Coventry include:

- Moosup River is classified as a pristine river with wild and natural flows. Valuable for its wilderness character, it provides wildlife habitat area and a valued resource for fishing.

- The North Branch of the Pawtuxet River has been impacted by failing septic systems, and improvements need to be maintained. Its resource value consists of open space, several historical mills and villages, two riverwalks and industrial areas.

- The South Branch of the Pawtuxet River from the Flat River Reservoir to the Quidnick Dye Mill is suitable for contact recreational activities.

- Flat River is a pristine natural river with high habitat value.

- Roaring Brook from the Moosup River to Arnold, Little Grass, Great Grass, and Whitford Ponds is designated as pristine and has habitat resource values.

- The Flat River Reservoir (Johnson Pond) has a boat launch ramp and is designated suitable for swimming and fishing. It is the largest lake in Coventry, 647-acres.

- Tiogue Lake is a 234-acre lake suitable for swimming and boating. It is also considered a good bird habitat.

- Coventry Reservoir (Stump Pond) contains a warm water fishery.

The following lists other significant water resources in Coventry. It should be noted that this list does not include a number of small, unnamed ponds, watercourses and wetlands. Some of these are isolated while others are located along stream lengths:

Nooseneck River
Mishnock River
Warwick Brook
Bucks Horn Brook
Turkey Meadow Brook
Negro Sawmill Brook
Whaley Brook
Pine Swamp Brook
Bear Brook
McCuster Brook
Pierce Brook
Boyd Brook
Poor Farm Brook
Quidneck Brook
Old Hickory Brook
Burlingame Brook
Black Rock Brook
Quidnick Reservoir
Carbuncle Pond
Upper Dam Pond
Waterman Pond (Sisson Pond)

2.2 Impaired Waters

The Office of Water Resources of the Rhode Island Department of Environmental Management (RIDEM) has prepared a list of impaired waters in Rhode Island in compliance with section 303(d) of the federal Clean Water Act (CWA). These impaired waters are defined as those that do not meet State of Rhode Island Water Quality standards. Total maximum daily loads (TMDLs) are planned to be developed for each of these waters. The purpose of the TMDLs is to identify the capacity of a surface water to assimilate pollutants without impacting its designated uses (e.g., fishable, swimmable) as well as meet the State Water Quality Standards.

While many of the TMDLs are anticipated to focus on point sources of pollution, future TMDLs may require more intensive storm water controls to more aggressively reduce sources of storm water pollution from what was intended for the Phase II program.

The surface waters within Coventry identified on the State's 303(d) list, issued November 21, 2000 and amended June 15, 2001, are: (1) Pawtuxet River-North Branch; (2) Pawtuxet River-South Branch; and (3) Quidnick Reservoir. The cause of the impairment, TMDL level of implementation, and the TMDL priority ranking for these waters is summarized in Table 2.1 and depicted in Figure 2-Impaired Waters.

TABLE 2.1
IMPAIRED WATERS

Waterbody Name (Identification #)	**Cause**	**Group** [a]	**TMDL Priority Ranking** [b]
Pawtuxet River-North Branch (RI0006016R-06)	Lead (Pb)	2	Medium
	Cadmium (Cd)	3	
Pawtuxet River-South Branch (RI0006014R-04)	Lead (Pb)	2	Medium
	Cadmium (Cd)	3	
Quidnick Reservoir (RI0006013L-04)	Mercury (Hg) in fish tissue	2	Low

[a]
Group 1 Waters not meeting RI WQ standards and TMDL is currently under way
Group 2 Waters not meeting RI WQ standards and TMDL is planned for the future
Group 3 Changes in metals reporting criteria require additional sampling is required.
Group 4 Insufficient data and/or data is old. Further monitoring is required.
Group 5 TMDL or equivalent has been developed. WQ standards to be met within 2 years.

[b] Anticipated dates for TMDL implementation based on priority ranking

Low	2010+	High	2003-2005
Medium	2005-2010	Targeted	2000-2002

2.3 Sole Source Aquifers

The Town of Coventry contains small portions of two Sole Source Aquifers (SSAs). The Pawcatuck Basin Aquifer System is located in the southwest corner of town. It was defined as a SSA by the USEPA on May 13, 1988. The second is the Hunt-Annaquatucket-Pettaquamscutt (HAP) located in the southeast corner and was defined on May 26, 1988. The USEPA defines a SSA as one that supplies at least 50% of the drinking water consumed in the area overlying the aquifer. USEPA guidelines also require that these areas have no alternative drinking water sources(s), which could physically, legally, and economically supply water to all who depend on the aquifer for drinking water.

Given the critical nature of these aquifers, the Town should consider the following four factors:

- Encourage infiltration to replenish aquifer water supply;

- Enhanced controls to protect groundwater by ensuring recharge water quality;
- Focus infiltration efforts in areas with highly permeable soils and low amounts of higher risk land uses;
- Proper protection of wellhead areas.

2.4 Special Resource Protection Waters

The Town of Coventry contains a body of water considered a Special Resource Protection Waters (SRPW): Mishnock Swamp. SRPWs are high quality surface waters identified by RIDEM as having significant ecological or recreational uses, which may include but is not limited to: wildlife refuge or management areas; public drinking water supplies; State and Federal parks; State and Federal designated Estuarine Sanctuary Areas; and water bodies containing critical habitats.

SRPWs were designated as such by utilizing criteria stated in the Rhode Island Water Quality Regulations and information compiled from the review and analyses of recommendations and documents by federal and state agencies and private non-profit organizations. Additional information on SRPWs is available from RIDEM, Water Resources and the RIDEM Natural Heritage Program.

Under Tier 2 of the Antidegradation Provisions, Protection of Water Quality for SRPWs, the State cannot allow any measurable degradation of the existing water quality necessary to protect the characteristic(s) that cause the water body to be designated a SRPW. A new or increased discharge or activity will not be allowed unless it can be proved that specific pollution controls and/or other mitigation measures and BMPs will completely eliminate any measurable impacts to water quality necessary to protect the water body.

2.5 Wellhead Protection Areas

The Rhode Island Wellhead Protection Program is an important element in the state's effort to protect groundwater resources and maintain safe drinking water supplies. The RIDEM in recognition of groundwater's importance developed this program. Presently, most of the state's groundwater is of good to excellent quality and continuing this status depends on establishing protection measures to assure the long-term viability of this resource.

The Wellhead Protection Program was established for the protection of recharge areas contributing to pubic water supply wells under the state Ground Water Protection Act (1985). The wellhead protection areas in Coventry were delineated by RIDEM includes twelve areas (see Figure 2-Impaired Waters):

- An area on Route 14 (Plainfield Pike), southwest of Fairbanks Corner;
- An area on Route 102 (Victory Highway), south of its intersection with Maple Valley Road;
- An area east of Route 102 (Victory Highway), near intersection with Flat River Road;
- A multiple wellhead area near Gortons Corner (off of Harkney Hill Road);
- An area south of the previous wellhead area, near Weaver Hill Road;

- An area south of Maple Valley Road and west of Hammer Road (near Potterville);
- A larger multiple wellhead area located near the Coventry Reservoir;
- A multiple wellhead area near the Flat River Reservoir;
- A multiple wellhead area located between Route 3 and Hopkins Hill Road and extending to the town line;
- A multiple wellhead area near the intersection of Harkney Hill Road and Fish Hill Road;
- An multiple wellhead area located east of Read School House Road and south of Hope Furnace Road; and
- A larger area located west of Hopkins Hill Road extending from the intersection of Hopkins Hill Road and Route 3 (Tiogue Ave) to the town line.

Municipalities that have wellhead protection areas are required to conduct an inventory of known and potential sources of groundwater contamination within the wellhead protection area and prepare a wellhead protection plan. Focusing on these areas could maximize protection of the sole source aquifers and other groundwater resources, and thus, Coventry's drinking water quality.

2.6 Wetlands

The sizable wetland system in the southeastern portion of the town (surrounding the Mishnock River) and the forested areas surrounding Waterman Pond and a larger area in the western section of town (Arcadia Management Area) are important biodiversity resources located in the Town of Coventry as depicted on Figure 3-Wetlands. As well as being designated by the Rhode Island Natural Heritage Program (RIDEM: Division of Planning and Development) as natural heritage sites (critical habitats), there is considerable public interest for resource protection of these areas because of their fish and wildlife, environmental quality and socio-economic values. These areas receive this distinction of being a natural heritage site because of the presence of rare or endangered species

Applied Bio-Systems, Inc. completed an initial assessment of sensitive wetlands in the Town of Coventry. A total of 17 wetland areas or wetland complexes have been mapped based on existing data sources. These complexes include several vernal pools. A vernal pool is a small (less than ¼ acre), isolated, temporary (late winter to early or mid-summer) body of water normally located within forested areas. They are significant habitat areas for amphibians (i.e., salamanders, frogs, toads) during the early spring breeding cycle of their life histories as they are normally devoid of natural predators. It is extremely important to maintain the pristine water quality of these pools to insure the success of the juveniles. In addition, the forested upland habitat surrounding the pools needs to be preserved. Research has documented that a distance of approximately 300 meters (1,000 feet) surrounding the pools is used by the salamanders, wood frogs, etc. as foraging and den areas during the remainder of the year. If some of this surrounding area is not preserved, the habitat value of the vernal pools will diminish. Water quality may decline, food sources will be limited, it may invite predators, and amphibians will have difficultly sustaining their numbers regardless of the vernal pool's quality.

Each wetland area in the report was given a rapid assessment to identify the predominant functions and values of these resources. It was determined that the wetland areas located near

pristine waters and those located in the eastern, more developed, portion of town should be given priority as they are particularly susceptible to damage due to new or additional storm water inputs.

It should be noted that Applied Bio-Systems' review is not a definitive assessment and should not be used for regulatory purposes. See Appendix A for the complete report.

2.7 State Licensed Beaches

There are four licensed bathing beaches in the Town of Coventry. These beaches are monitored under the Rhode Island Department of Health Beach Monitoring Program to provide real-time water quality and safety information. This program allows the Department of Health to minimize public health risks associated with swimming in contaminated waters. In Coventry, there has been one water sample (7/21/98, Briar Point Beach) collected that exceeded the State's limits for fecal coliform since the inception of the program in 1995.

2.8 Rare Species Habitat

It is important to note where storm water discharges are likely to impact habitats. According to available RIGIS data there are areas identified as rare species habitats in the following locations. These areas are also depicted on Figure 4-Natural Resources.

- A large area and three point locations surrounding and including Arcadia Park
- A point location near Arnold Pond
- A point location near Roaring Brook and Arnold Pond
- Two point locations near Whitford and Great Grass Pond
- An area surrounding Waterman Pond
- Two point locations near Summit
- Six point locations north of Flat Road and east of Victory Highway
- A point location south of Harkney Hill Road and east of Weaver Hill Road
- A point location at the southern tip of the Flat River Reservoir
- A larger area including Misknock Swamp
- A point location near Coventry Air Park
- A point location at the southern tip of Tiogue Lake

The rare or endangered species, location of sighting within the Town of Coventry, and their current Natural Heritage status are summarized in Table 2.2. Note: Identification of species locations is based on status as "currently extant"; i.e., observed within the last 20 years.

TABLE 2.2
RARE/ENDANGERED SPECIES

Species	**Location**	**Status** [a]
Wild Lupine (*Lupinus perennis*)	Arcadia Park, Whitford and Great Grass Pond	C
Goat's Rue (*Tephrosia virginiana*)	Arcadia Park	C
Climbing Fern (*Lygodium palmatum*)	Arcadia Park	C
Buck Moth (*Hemileuca maia*)	Arcadia Park	C
Frosted Elfin (*Incisalia irus*)	Arcadia Park	C
Hoary Elfin (*Incisalia polia*)	Arcadia Park	C
Pine Barrens Tiger Beetle (*Cicindela Formosa*)	Arcadia Park	C
Blunt-leaved Milkweed (*Asclepias amplexicaulis*)	Whitford and Great Grass Pond	C
Grass-leaved Arrowhead (*Sagittaria graminea*)	Whitford and Great Grass Pond	C
Water Lobelia (*Lobelia dortmanna*)	Whitford and Great Grass Pond	C
Small Purple-fringed Orchid (*Platanthera psycodes*)	Waterman Pond	C
Spikenard (*Aralia racemosa*)	Waterman Pond	C
Round-leaved Violet (*Viola rotundifolia*)	Waterman Pond	ST
Red-bellied Snake (*Storeria occipitomaculata*)	Waterman Pond	C
Wood Turtle (*Clemmys insculpta*)	Waterman Pond	C
Worm-eating Warbler (*Helmitheros vermivorus*)	Waterman Pond	C
Long Beech Fern (*Dryopteris connectilis*)	Near Summit	ST
Pink Tickseed (*Coreopsis rosea*)	Southern tip of Flat River Reservoir	C
Henry's Elfin (*Incisalia henrici*)	Misknock Swamp	C
Swamp Pink (*Arethusa bulbosa*)	Misknock Swamp	SE

[a] SE State Endangered
ST State Threatened
C Concern

3.0 LAND USE

Land use directly affects the potential for storm water pollution and the types of pollutants found in storm water. Different land uses expose different pollutants to storm water. For example, residential land uses often result in higher nutrient (nitrogen and phosphorous) concentrations in runoff due to the use of fertilizers while metals concentrations are often higher in runoff from commercial areas due to traffic.

Based on RIGIS mapping, much of eastern Coventry consists of medium to high density residential land uses. Significant areas in the western portions of Coventry consist of low-density land uses and forest and brushland. Large commercial and industrial developments also exist in town, including development along the Pawtuxet River and surrounding Tiogue Lake and the Flat River Reservoir. Given the location of the developed areas of Coventry, along an impaired water in the town, there is significant potential for storm water quality impacts.

In order to design an effective storm water management plan, it is essential to describe the land uses and percentages thereof, for the land uses in the town. Table 3.1 and Figure 5-Land Use identifies the land uses in Coventry based on data available from RIGIS.

TABLE 3.1
LAND USE

Land Use	Acreage	Percent of Total Land
Airports	19	<0.1
Beaches	1	<0.1
Brushland	271	0.7
Cemeteries	63	0.2
Commercial	401	1
Commercial/Industrial Mixed	15	<0.1
Confined Feeding Operations	5	<0.1
Cropland	677	1.7
Deciduous Forest	13,785	34.5
Developed Recreation	220	0.6
Evergreen Forest	2,281	5.7
High Density Residential	314	0.8
Idle Agriculture	75	0.2
Industrial	227	0.6
Institutional	100	0.3
Low Density Residential	403	1
Med. Density Residential	2,422	6.1
Med. High Density Residential	3,119	7.8
Med. Low Density Residential	572	1.4
Mines, Quarries, Gravel Pits	737	1.8
Mixed Deciduous Forest	2,532	6.3
Mixed Evergreen Forest	3,197	8
Orchards, Groves, Nurseries	116	0.3
Other Transportation	15	<0.1
Pasture	664	1.7
Power Lines	22	0.1
Sandy Areas (not beaches)	6	<0.1
Transitional Areas (urban open)	138	0.3
Vacant Land	57	0.1
Waste Disposal	44	0.1
Water	2,040	5.1
Water and Sewage Treatment	15	<0.1
Wetlands	5,393	13.5
TOTAL	**39,946**	**100%**

High-risk land uses are those that have a higher potential risk or actual presence of pollutants such as sediment, metals, nutrients, and pathogens. The highest risk areas are those that contain a high percentage of impervious area, activities using dangerous chemicals, and high human activity thus creating a higher degree of human impacts (including automotive impacts). These areas would have industrial, commercial, commercial/industrial, transportation, quarries, and

waste disposal land use designations. Industrial and commercial land uses can contribute solids, and oils and grease from high volume parking areas. They may also contribute toxics and metals dependent upon the activities conducted at the site from areas associated with manufacturing and waste disposal. Transportation related land uses have the potential to degrade water quality from vehicular spills (oils, grease, antifreeze), salting and sanding, and particulate deposition. Higher concentration of metals can also be found due to tire wear, brake pads, and body wear. These areas are particularly dangerous when located on highly permeable soils, as the pollutants are easily accepted into the groundwater.

Medium risk areas are those that contain a considerable amount of impervious area and human impacts (including pet waste impacts). These areas consist of high density and medium density land use designations. Residential land uses can be significant sources of nutrients and pathogens. Improper lawn care can contribute excess nutrients to the storm drainage system. Sanitary systems that are not properly designed, constructed, or maintained can be significant sources of nutrients, pathogens, and organic contaminants. Residential land uses may be a source of toxic contaminants due to improper disposal of household hazardous wastes.

The agricultural lands are associated with fertilizer and pesticide runoff pollution. We have included in this group cemeteries, cropland, orchards, developed recreation (golf courses), pasture, and idle agriculture land uses.

Table 3.2 identifies the priority, higher risk, land uses in the Town of Coventry. Figure 6-Potential Target Areas depicts the proximity of higher risk land uses to critical or significant water resources such as wellhead protection areas and impaired waters within in the Town of Coventry.

TABLE 3.2
PRIORITY LAND USE

Land Use	Acreage	Percent of Total Land
High Risk:	1,577	4.0
Medium Risk:	6,784	17.0
Agriculture:	1,596	4.0
TOTAL	**9,957**	**25.0%**

3.1 Implementation Alternatives

The Town of Coventry, given the current environmental and land use conditions, has the opportunity to prevent further storm water impacts and preserve the current, almost unspoiled, conditions. In order to prevent damage from storm water runoff, the Town should consider focusing their efforts on the following:

- Preserve the largely untouched western portions of Town. Consider achieving this through the Coventry Land Trust, low impact design strategies and programs such as the

Rhode Island Rural Lands Coalition and the Green Cities Initiative through the Trust for Public Lands (TPL). See http://www.epa.gov/nps/lidnatl.pdf and www.tpl.org for additional programs and information on the USEPA Low Impact Design Manual and TPL, respectively.

- Focus commercial and industrial educational programs on companies located along the North and South Branches of the Pawtuxet and surrounding the Quidnick Reservoir. These programs should include discussions of proper hazardous waste disposal and suggestions for technological upgrades. Voluntary audits of these industries may be beneficial to determine current practices.

- Ensure that runoff from roadways surrounding the Town's impaired waters are properly treated with appropriate BMPs to deter further degradation from solid loads.

- Focus on an aggressive town-wide educational program to change current behaviors to protect and preserve the water quality in Coventry. Topics that should be included are proper septic system maintenance and pet and solid waste management.

4.0 PUBLIC EDUCATION AND OUTREACH

4.1 State and Federal Regulatory Requirements

The success of any storm water management program hinges on educating the public about the impacts of certain behaviors and practices on surface water quality in their watershed. In addition, public education will improve the Town's ability to gain support to implement this program as well as secure required funding. For this reason, the United States Environmental Protection Agency (USEPA) has included public education and outreach as a minimum control measure of the Phase II regulations. The requirements to satisfy this minimum control measure are:

1. Implement a public education and outreach program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of storm water discharges on local water bodies and the steps that can be taken to reduce storm water pollution; and

2. Determine the appropriate Best Management Practices (BMPs) and measurable goals for this minimum control measure.

4.2 Available Resources

There are a number of resources and public education currently available or in-place to assist Coventry to achieve the requirements of this minimum control measure. Examples of education and outreach materials are provided in Appendix B. The following is a list of the groups or programs that represent opportunities for education and outreach to the public.

4.2.1 School Programs

The following summarizes existing environmental education or non-point source pollution education programs that are taught in Coventry public schools. While Coventry Public Schools do not currently emphasize the issue of storm water management, it does address issues related to the value of the water environment and its protection.

The Coventry School system is presently in the second year of a three-year revision process for the district wide science curriculum (K-8). For grades K-8, the students use the National Science Foundation funded science kits as the core component of the curriculum. There are three strands of kits: earth, life, and physical science. At the high school levels, a more traditional approach is taken to the science curriculum, offering standard courses with a few additional special topics within the coursework. The following is a description the existing environmental education or non-point source pollution education programs:

Kindergarten:

- Seasons & Weather - Students discuss, observe, collect and record information on various weather features including precipitation.

Grade 2:

- Pebbles, Sand, and Silt – This module introduces students to several kinds of rocks and soil types. Throughout activities, students sort, wash, compare, seriate rocks, and investigate clay and soil.

Grade 4:

- Earth Materials – At this time, a detailed description is not available.

Grade 5:

- Environmental Health - At this time, a detailed description is not available.

Grade 6:

- Ecosystems – The students come to understand the interdependence of living and non-living elements in their environment by building, observing, and experimenting with ecosystems. Using two-liter bottles, students build a terrarium and an aquarium, which they later connect as an ecocolumn. Students simulate the effects of some common pollutants – road salt, fertilizer runoff, and acid rain – on their ecosystems. The students broaden their perspectives to consider the Chesapeake Bay as a model ecosystem, the class divides and represents different points of view including a waterman, dairy farmer, land developer, recreational boater, and a watershed resident. As each group present its needs and its impacts on the environment, the students come to see the complexity or environmental issues. They then propose possible solutions and reach compromises, while realizing that each person can help in some way to solve environmental problems.
- Natural Resources – At this time, a detailed description is not available.

Grade 7:

- Properties of Matter – At this time, a detailed description is not available.

Grade 8:

- Oceanography - At this time, a detailed description is not available.

The AWEsome! Program (discussed further in Section 3.2.2 Citizen's Groups) is used in Coventry Schools and provided by the Southern Rhode Island Conservation District (SRICD).

At the high school level, the district offers traditional physics, biology, and chemistry courses including advanced placement (AP) chemistry. The AP chemistry and general chemistry classes, taught by Kathleen Sullivan participate in water quality sampling and surveying at three locations in Coventry: Laurel Avenue; Sandybottom Road; and Upper Quidnick (behind Town Hall). The students collect data in the fall and spring for pH, dissolved oxygen, temperature (both water and air), nitrates, and phosphates. They also survey for litter (quantity and type) and physical parameters including a description of the canopy, soil type, vegetation, and soil erosion (if present). Additionally, the students in the AP class choose one item to research in depth (ex. nitrates) and interview members of the community and water quality professionals regarding this topic. The research paper that is drafted from this project is presented to the public using a power point presentation at its completion (approximately 120 parents and interested citizens per year). This sampling program began 8 years. Much of the equipment for

this program was purchased with funding provide by a Wal-Mart Environmental grant. Ms. Sullivan indicated that if a tainted sample were collected (ex. high fecal coliform levels), she would contact the PRA/PRWC for assistance and further action.

The AP chemistry class also takes an annual field trip to the Warwick Sewage Treatment Plant. During this field trip, employees discuss their responsibility in maintaining clean water and the chemistry behind wastewater treatment. The Warwick Plant also analyzes samples collected by the class for a variety of compounds including heavy metals and presents this data and its significance to the students.

In addition to the traditional courses, the Coventry High School has a Science Club (also lead by Ms. Sullivan). This club was established with funding from an USEPA grant. Beginning in the spring of 2002, with the assistance of wetland scientists, the club started collecting data pertaining to wetland water quality and health. During the club's visits to local wetland locations they collect data about the soils, vegetation, and overall health of the area. Currently the club does not produce an environmental newsletter.

Available Teaching Resources

Teachers in the Coventry school system have a number of resources and periodicals available to them that focus on environmental issues including water quality. Some of these resources are:

USEPA Environmental Education Center (EEC)

The on-line EEC provides teachers with technical background, curriculum and activities information, and workshops on a variety of environmental topics. This resource is useful in providing educators with the tools to teach students in grades K-12. The EEC web page is www.epa.gov/teachers. More information on educational resources, including having USEPA employees provide talks and presentations at public events or in schools, may be obtained from the USEPA Region 1 (New England) office located at 1 Congress Street, Suite 1100, Boston, MA 02114-2023, (888) 372-7341.

The Environmental Education Grant Program was developed to provide financial support for projects that "design, demonstrate or disseminate environmental education practices, methods or techniques." Organizations eligible to apply for grant funds are:

- A local or tribal government education agency, college, or university; a state education or environmental agency; a 501(c)(3) not-for-profit organization; or a noncommercial educational broadcasting entity is eligible.
- A teacher's school district, an educator's not-for-profit organization, or a faculty member's college or university may apply, but an individual teacher is not eligible.
- The primary applicant must be based in the U.S.; partner organizations and project activities may be located outside the U.S.

USEPA Student Center

USEPA's Student Center web site provides information and activities for students to learn more about surface water ecosystems, environmental laws, and pollution. The site is located at www.epa.gov/students. There is also the Explorers' Club web page for younger students with games, activities and documents on the basics of environmental education. The Explorers' Club is found at www.epa.gov/kids.

President's Environmental Youth Awards

The President's Environmental Youth Awards is a program that recognizes young people across America for projects that demonstrate their commitment to the environment. Winners of regional certificates in the program are evaluated against winners in other USPEPA regions. The national winner receives a plaque issued by the President of the United States at an USEPA awards ceremony. Participants of completed projects will receive a certificate signed by the President. Projects can include a variety topics focused on environmental issues and environmental science. Participation in this awards program can be a mechanism to promote student interest in other education or participation programs.

Green Teacher

This magazine is produced by and for educators to enhance environmental and global education at all grade levels. It is produced four times per year and contains approximately fifty pages of ideas, activities, perspective articles, reports of what successful teachers, parents, and schools are doing, activities for various grade levels, evaluations of new books, kits, games and other resources. Green Teacher may be contacted at P.O. Box 452, Niagara Falls, NY 14304-0452, e-mail: greentea@web.net, (416) 960-1244.

EARTHWATCH

This magazine is produced bimonthly by the organization of the same name to link business, science, and the community in search of environmental solutions. Contact information: 680 Mt. Auburn Street, P.O. Box 403, Watertown, MA 02272, (800) 776-0188.

Earth Preservers

Earth Preservers is an "environmental newspaper" for kids in grades 3-9 published monthly during the academic season. Contact information: P.O. Box 6, Westfield, NJ 07090.

EE-Link

EE-Link is an on-line environmental education resource guide that can assist educators in locating materials and information for class study guides, activities, and programs (www.eelink.net).

Blackstone Valley Rivers Project

The Blackstone Valley Rivers Project is a non-profit organization that consists of three teachers from Woonsocket High School and two teachers from Mount Saint Charles Academy, also in Woonsocket. This is, however, independent of the Woonsocket Education Department. They run teacher workshops every summer showing teachers on how to incorporate river education into their science curriculums. Topics covered in the Woonsocket High School's Blackstone River Studies course are taught at these workshops. In the last three years over sixty teachers have been trained. The Rivers Project follows-up with workshop participants and maintains a website that teachers can use as a resource for additional information. This program is provided to districts outside of the City of Woonsocket. For more information please contact Mike Ferry at (401) 767-4703 or (401) 767-4738 or view the Rivers Project website at www.siue.edu/OSME/river.

Project WET

Project WET (Water Education for Teachers) is a national nonprofit water education program for educators and young people located on the campus of Montana State University. The goal of Project WET is to facilitate and promote the awareness, appreciation, knowledge and stewardship of water resources through the development and distribution of classroom ready teaching aids and through the establishment of Project WET programs. It is active in all 50 states, the District of Columbia, the U.S. islands and select provinces of Canada.

Certified Project WET facilitators conduct free workshops where educators, community leaders and natural resource managers receive instruction in the use of Project WET materials. A workshop lasts six hours and participants receive the highly acclaimed Project WET Curriculum and Activity Guide. Workshop participants are then encouraged to integrate activities from the Guide into the existing school curriculum or other appropriate forums. This guide is a 500-page publication filled with over 90 innovative, interdisciplinary activities for grades K – 12, most of which are hands-on. Designed to coincide with state and national standards, the Guide addresses the following content areas:

- Water has unique physical and chemical characteristics.
- Water is essential for all life to exist.
- Water connects all Earth systems.
- Water is a natural resource.
- Water resources are managed.
- Water resources exist within social contexts.
- Water resources exist within cultural contexts.

Please contact the Audubon's Environmental Education Center, (401) 245-7500**,** or Christine Dudley of RIDEM, (401) 789-7481 and 0281, for more information about this program.

Healthy Water, Healthy People

Healthy Water, Healthy People is an innovative water quality education program sponsored by Project WET and the Hach Scientific Foundation, which offers hands-on activity guides, testing kits, and training. Healthy Water, Healthy People is for anyone interested in learning and teaching about contemporary water quality education topics. The goal of the program is to raise the awareness and understanding of water quality topics and issues and their relationship to personal, public, and environmental health. The program attempts to provide a clear understanding of these relationships, the connection between water quality and land uses, and the process of analyzing and interpreting data. Healthy Water, Healthy People will help educators address science standards through interactive activities that interpret water quality concepts and promote diverse learning styles, with foundations in the scientific method.

The program comes with educator guides for the fourth grade through university level age students as well as testing kits and manuals. The Healthy Water, Healthy People Testing Kits yield in-depth information about eleven water quality parameters. The water quality testing kits include all materials and equipment needed for field and classroom analysis of water samples for chemical, physical, and biological parameters. Healthy Water, Healthy People Testing Kits are available for a variety of parameters, grade levels, skills, and prices.

For more information about the Healthy Water, Healthy People program visit their website at www.healthywater.org.

Catch the Science Bug

Catch the Science Bug was created by Kim Bent as a traveling science program, bringing hands-on science activities to Boston-area elementary schools. The program has since expanded to include most of Massachusetts and a few schools in New Jersey. Kim Bent would be willing and able to bring this program to Rhode Island as well. The program's mission is to excite and educate students about science and how it affects everyday aspects of life. The traveling programs feature interactive inquiry-based methods of presentation to enable students to take part in the learning process. Students learn by predicting outcomes, observing, comparing, experimenting and drawing conclusions through hands-on activities. Appropriate math concepts are also integrated. All programs are designed in accordance with the National Science Standards, the Massachusetts Science and Technology Curriculum Frameworks, and the Benchmarks on the Way to Environmental Literacy.

Catch The Science Bug offers five programs, which range across a variety of science topics. Environmental Programs include:

- "Clean-Up an Oil Spill" This is a two hour program that challenges students to design the clean up of a hypothetical oil spill.
- "All Eyes on Earth" combines four different programs including catch the recycling bug, where do you get your drinking water from, protecting our land and water resources, and contaminant hydrogeology.

- "Watersheds" addresses several topics directly related to storm water pollution prevention. Students learn how to define a watershed using a topographic map and are given different cards describing everyday activities that take place in a watershed. Participants each model a different everyday business or residential activity, which when acted out together, shows how various land-uses affect water quality.
- "Protecting our Land and Water Resources" includes explanation of non-point source pollution and storm water.
- "Where Do You Get Your Drinking Water" addressed pollution prevention and preserving surface water supplies through the use of a model. The model shows different non-point sources of pollution and shows how these sources affect both the ground water and surface water supplies.

These programs are also available to youth organizations such as scouting troops and church groups.

Catch the Science Bug will soon offer a children's show to be televised over the Web at FreeNetTV. The show will feature a different science expert each week and will allow time for Kim to respond to questions that children send by e-mail while the show is "on the air." More information about available education programs can be found at www.catchthesciencebug.com and by contacting (508) 854-1681 or sciencebug@charter.net.

4.2.2 Citizen's Groups

Several organizations exist that either currently provide public education resources on storm water quality issues or could provide a public outreach avenue in developing storm water awareness and developing partnerships with the public. The organizations that have the best potential to support future storm water education programs in Coventry are the following:

Audubon Society of Rhode Island (ASRI)

Since 1897, the Audubon Society of Rhode Island (ASRI) has maintained and cherished a century-long tradition of excellence in environmental advocacy, education and conservation. Due to ASRI's efforts, thousands of acres of state land are secure as wildlife refuges and thousands of children benefit from educational programs and nature camps. As environmental problems do not discriminate, the policies and programs of ASRI seek to better the environmental health of Rhode Island and all of its inhabitants by reaching out to children, concerned citizens, and the government. The ASRI has many partnerships including ones with the RI Conservation Districts, RIDEM, USEPA, Woonasquatucket Watershed Council, Water Use Stakeholders Group, Wood-Pawcatuck Watershed Association, Environmental Council, Sierra Club and Clean Water Action.

The ASRI offers many programs at various locations throughout the state. These programs can be adapted to meet the needs of any age group. From 1997-2000, 20,000 RI students participated and in 2001 alone this number increased to 23,000 students. A few of the applicable student programs offered are:

- "Bay Animals Like It Clean and Salty" which focuses on the Narragansett Bay and how pollution affects the plants and animals that live in it,
- "Watershed Walks" where students will learn the basics about a watershed and of the importance of water. This program includes that sampling of a watershed,
- "Everything's Connected" which investigates the connections between all living things. The students learn how the earth recycles and our connection to the earth's health.

The ASRI education staff also offers teacher workshops on various natural science topics. "Project WET, Water Education for Teachers" is a nationally acclaimed workshop, presented by Christine Dudley of RIDEM, which offers teachers and educators free curriculum on ecology, habitats, and environmental issues.

The ASRI with the national Oceanic and Atmospheric Administration (NOAA) and RIDEM also offers education programs through the Narragansett Bay National Estuarine Research Reserve (NBNERR).

The Audubon's Environmental Education Center is located at 1401 Hope Street, Bristol, RI 02809, (401) 245-7500, and their headquarters are located at 12 Sanderson Road, Smithfield, RI 02917, (401) 949-5454, www.asri.org.

Southern Rhode Island Conservation District (SRICD)

Southern Rhode Island Conservation District (SRICD) provides a variety of environmental services such as site plan review, mapping, educator resources and several other services. SRICD assesses hourly and flat fees depending on the program or service. The program of particular interest for this minimum control measure is the Active Watershed Education (AWEsome!) program. The program is offered to teachers for a fee of $45. This curriculum includes discussion of the following applicable topics:

- **"What is a Watershed?"** demonstrates now water enters and flows through a watershed. Students learn how to read topographic maps and delineate watershed boundaries, and locate locations of interest (i.e., home, school, etc.). They follow the course of a raindrop from its point of impact on the watershed to the exit point as it flows into the ocean.
- **"Water Resources"** demonstrates the importance of ground and surface water. Experiments illustrate how an aquifer supplies water to wells and reservoirs. The session also emphasizes the interconnection between wetlands, groundwater, and surface water.
- **"Effects of Land Use on the Watershed"** uses discussion and demonstrations to illustrate how different land uses impact the watershed. Through the use of a model, students see how infiltration and runoff of rainwater are affected by three different land uses: pavement, row crops and pasture.
- **"Cultural Resources in the Watershed"** introduces the students to the history of the watershed and how land use in the watershed has changed through time. Visitors from local Indian tribes and historical societies provide the students with different perspectives of how human presence has influenced the landscape, and how water resources have influenced human activities.

- **"Introduction to Water Quality Issues"** uses a current development proposal that could adversely impact the watershed to introduce students to environmental issues. Students are assigned to one of many interest groups supporting various sides of the issue. Students are responsible for contacting their assigned interest group to explore all perspectives of the proposal and its impact on the watershed.
- **"Non-point Sources of Pollution"** defines and identifies major sources of non-point source pollution in the watershed. A discussion of best management practices (BMP's) to control non-point source pollution is followed by a field trip to local farms and shopping areas where BMP's have been implemented.
- **"Farms In The Watershed: A Field Trip"** demonstrates best management practices to minimize non-point source pollution from farms. Students are taken to a variety of farms, including dairy, poultry, turf, and organic vegetable operations.

SRICD is located at 60 Quaker Lane, Suite 46, Warwick, RI, 02886-0114 and has a website at http://ri.nacdnet.org/sricd_web/index.htm. For more information on SRICD educational programs contact Susan Letendre, Education and Outreach, at (401) 822-8832 or via email at susan@sricd.org. Board Meetings are the 2nd Monday of the month at 6:30 PM and are open to the public.

New England Wild Flower Society (NEWFS)

The New England Wild Flower Society (NEWFS) is the oldest plant conservation organization in the United States, promoting the conservation of temperate North American plants through key programs: Conservation, Education, Research, Horticulture. They do not focus their efforts on any one watershed or town, but are an available resource for New England towns. NEWFS's offers many education programs that are informative to both children and adults. There were 2,000 people register for their fall session. A total of four sessions are offered each year. A portion of their education programs cover wetlands and courses include "Wetland Identification and Delineation," "Wetland Species", and "Vernal Pool Ecology." The Rhode Island Chapter, known as the "Rhode Island Wild Plant Society" is coordinated by Erin Fournier at P.O. Box 114 Peace Dale, RI 02883-0114, (401) 783-5895 (phone), (401) 789-6056 (fax), office@riwps.org. Their website is located at www.riwps.org.

Pawtuxet River Watershed Council (PRWC)

The Rhode Island Rivers Council designated this citizen action group as the watershed council for the Pawtuxet River watershed. The Pawtuxet River Watershed Council (PRWC) (formally the Pawtuxet River Authority (PRA)) works with the citizens of the watershed to increase awareness of the Pawtuxet River's historic and natural values and to improve water quality. They also offer a variety of education and outreach possibilities for residents that include free workshops for teachers, installation of watershed signage and kiosks (present at Phenix-Harris Riverwalk), and student education. The PRWC is currently working with local elementary schools to encourage river writing projects.

The PRWC also maintains publications, photos, slides, videotapes and computer programs about the Pawtuxet River, its watershed, and watershed restoration.

- Consistent messaging among all National Partners to state and local leaders of organizations, government agencies and companies.
- A connection between National Partners who have useful tools and coordinators of local watershed partnerships.
- A resource to share state activities and successes with state-level stakeholders in other states and regions.
- Encouragement for broad-based state-level partnerships that provide support to local watershed partnerships.
- A way to use and share processes and methods that have been found to work successfully for watershed coordinators.

For more information, please visit www.ctic.purdue.edu/KYW/nwn/nwn.html.

Natural Resources Conservation Service (NRCS)

The Natural Resources Conservation Service (NRCS) is a federal agency that works hand-in-hand with the people of Rhode Island to improve and protect their soil, water and other natural resources. For decades, private landowners have voluntarily worked with NRCS specialists to prevent erosion, improve water quality and promote sustainable agriculture. This includes helping landowners develop conservation plans, create and restore wetlands, restore and manage other natural ecosystems as well as advise on storm water remediation, nutrient and animal waste management, and watershed planning. NRCS is also an active participant in the "Year of Clean Water" Observance. NRCS provides has several educational resources including tip sheets on topics like nutrient management and multi-media information on topics like backyard conservation. Conservation Programs offered and assisted by NRCS include:

- **Environmental Quality Incentives Program (EQIP)** – Provides technical, educational, and financial assistance to farmers to help them comply with environmental laws while encouraging environmental enhancement.
- **Farmland Protection Program (FFP)** – Provides funds to purchase the development rights to farmland, thus preserving quality farmland for agricultural use.
- **Wildlife Habitat Incentives Program (WHIP)** – Provides both technical assistance and cost-share assistance for farmers who want to voluntarily improve fish and wildlife habitat and restore and managing natural ecosystems on their property.
- **Watershed and River Basin Planning and Installation (PL566)** – Provides technical and financial assistance in cooperation with local sponsoring organizations, state agencies, and others for watershed-based projects. NCRS cooperates on projects for watershed protection; flood prevention; water quality improvements; soil erosion reduction; rural, municipal and industrial water supply; irrigation water management; sedimentation control; fish and wildlife habitat enhancement and wetland restorations.
- **Resource Conservation and Development (RC&D)** – Provides local people with the means to solve natural resource problems and promote sustainable use of natural resources in rural areas. The program aims to improve the quality of life by providing practical solutions for community development, land conservation, environmental enhancement and water management.

PRWC holds an annual awards ceremony to recognize the contributions of individuals or groups to the protection of the Pawtuxet River and its watershed. PRWC awards issued include the PRWC Founder's Award, Education Award, Recreation Award, and Heritage Award. In 2001, the Town of Coventry won the protection award for preserving 53 acres at the contiguous Sandy Bottom and Whipple Property sites on the South Branch of the Pawtuxet River in three separate acquisitions since 1998 as well as fostering recreational and restoration planning for the area's future use by the public.

PRA is located at 334 Knight Street, Warwick, RI 02886, and may be reached at (401) 739-7635, via e-mail: pra@pawtuxet.org, or on-line at www.pawtuxet.org. The Pawtuxet River Watershed Council meets on the first Monday of each month at 7 PM, except holidays.

Friends of the Pawtuxet

Friends of the Pawtuxet is a local organization "promoting the health of the Pawtuxet River as a valuable resource and encouraging its responsible recreational use." Adding recreational components to a storm water program may promote participation in projects and increase education about the town's natural resources. This group was presented with PRA's Recreation Award in 2000 "for providing community members canoe rides and trail walks to foster enjoyment and relaxation on and along the Pawtuxet River." They may be contacted through PRA or online at www.friendsofthepawtuxet.org.

4.2.3 Regional, State and National Resources

There are a number of educational resources available for homeowners and businesses such as storm water guidance documents, programs for children, and educator training workshops. Many of the education and outreach materials developed can, in many cases, eliminate the need for Coventry to develop its own materials. Some of the available resources are listed below.

U.S. Environmental Protection Agency

The Office of Wastewater Management (OWM) provides technical resources to persons responsible for designing and implementing BMPs recommended to achieve the goals of the six minimum control measures. These resources are available electronically at USEPA web sites. While the resources provide some background to the development of the Phase II regulations, they are largely oriented to municipalities and organizations that are developing storm water management plans as opposed to the general public.

The Office of Water has created Adopt Your Watershed, a campaign to encourage citizens and groups to work at protecting and restoring surface and groundwater quality (www.epa.gov/adopt). The program provides a resource for communities or groups to network with other groups nationwide. This networking and watershed approach can enable a community to share, develop or Use successful strategies from existing programs. The resources available include training courses and publications offered by the Watershed Academy to assist with implementing storm water programs. These educational materials can

be used by educators, private groups that adopt a watershed, or by municipal employees responsible for implementing the program. The Watershed Academy also offers Academy 2000, an internet-based learning tool for distance learning (www.epa.gov/owow/watershed/wacademy).

New England Interstate Water Pollution Control Commission (NEIWPCC)

New England Interstate Water Pollution Control Commission (NEIWPCC) provides educational programs, promotes participation in water quality restoration programs, and supplies outreach materials. NEIWPCC is involved with many projects in the region that currently includes developing outreach strategies and products for the Narragansett Bay Estuary Program with RIDEM. Highlights of the NEIWPCC offerings are the NEIWPCC website, an Environmental Training Center, youth programs, newsletters such as L.U.S.T.LINE and Water Connection, informational brochures, workshops, and technical advice.

American Rivers

American Rivers is a national, non-profit, conservation organization dedicated to protecting and restoring healthy natural rivers and the variety of life they sustain for people, fish, and wildlife. They provide innovative solutions to improve river health; raise awareness among decision-makers; serve and mobilize the river conservation movement; and are collaborating with their partners to develop a national "river agenda." This will create a unified vision for improving river health across the country. Along with conservation efforts, they promote public awareness about why healthy rivers matter for fish and wildlife, kayakers, canoeists, and anglers, and for our communities as a whole. American Rivers works closely with grassroots river and watershed groups across the country. Staff members also collaborate with other conservation groups, local citizens and businesses, and various federal, state, and tribal agencies to build coalitions and provide technical support. Their website provides educational resources including a Lewis and Clark animation about how the Missouri River has changed, River ABC's for kids and teachers, and a tools and links page. American Rivers has also published a Draft River Threats List and a River Agenda, which is a plan for creating healthy rivers. For more information, please visit www.amrivers.org.

National Watershed Network (NWN)

The National Watershed Network (NWN) is a coordinated national effort to encourage the formation of local, voluntary watershed partnerships and help assure that these partnerships successfully attain their goals. More than 70 diverse National Partners representing private and public corporations, government agencies, and non-profit organizations sponsor the initiative. Each National Partner agrees to provide financial and/or in-kind support. The Conservation Technology Information Center (CTIC), a non-profit data and technology information transfer center coordinate the national effort. In addition to maintaining the watershed network, National Watershed Calendar, and many other on-going tools for watershed coordinators, NWN also provides the following:

- **National Resources Inventory (NRI)** – This is a compilation of natural resource information on non-federal land throughout the United States. It captures data on land cover and use, soil erosion, prime farmland, wetlands, habitat diversity, selected conservation practices and related resource attributes at more than 800,000 scientifically selected sample sites.
- **Emergency Watershed Protection Program (EWP)** – It is a disaster recovery program made available in emergency situations when neither the state nor the local community is able to repair a damaged watershed.
- **Earth Team Volunteer Program** – Provides volunteers with opportunities to use their talents on behalf of conservation. Earth Team volunteers do not receive a salary from NRCS but they perform services that are essential to the conservation mission of the agency. Anyone 14 years of age and older can join the Earth Team by calling a local NRCS office.
- **Rhode Island Wildlife Habitat Incentives Program –** Focuses on restoring habitats along coastal features, freshwater wetlands, upland grasslands, and forest edges to restore specific native species and to improve overall biodiversity in these areas.

More information about NRCS can be found at www.nrcs.usda.gov, while Rhode Island programs can be researched at www.ri.nrcs.usda.gov or by calling (401) 828-1300. Vicky Drew at (401) 822-8820 is the contact for the Rhode Island NRCS EQIP Program. She is located at 60 Quaker Lane, Suite 46 in Warwick, RI. Jeanne Comerford at (401) 822-8816 is the State Public Affairs Specialist.

Non-point Education for Municipal Officials (NEMO)

Non-point Education for Municipal Officials (NEMO) is an educational program for local land use officials that addresses the relationship of land use to natural resource protection. They believe that better land use decisions are the key to protecting the natural resources, community character, and long-term economic health of communities. Since proper land use is their focus, the people making land use decisions are the target audience. In the United States, this means local officials serving on land use boards at the county and municipal levels. NEMO provides research-based, non-advocacy professional outreach type education to these municipalities given that the local land use decision-making process is complex, political, and widely varying. Their education supplements state and federal regulations that push for better land use policies and practices. For more information, please visit their website at http://nemo.uconn.edu/. In Rhode Island, NEMO is also supported by URI. Please refer to URI's section, later in this document, to learn what NEMO offers within the state.

Grow Smart Rhode Island

Grow Smart Rhode Island seeks to bring together diverse interests to protect and improve Rhode Island's quality of life, economic vitality, and environmental health and the unique physical character created by the state's historic cities, towns, and villages and by its farms, forests and open spaces. They hope to achieve this by promoting business and residential growth in urban and town centers and advancing open land conservation and the preservation of rural character.

To achieve these goals, Grow Smart Rhode Island coordinates and encourages broad community participation in:

- examining the economic, environmental, and social impacts of Rhode Island's current development patterns;
- considering alternative options for development;
- cultivating a common vision for the state's future economic and physical growth;
- advocating programs and policies to achieve that common vision.

Their work is divided into four broad areas: policy analysis and advocacy; public education, and technical assistance; "watchdogging" major public projects; and building the capacity of state and local government to grow smart. This is to encourage responsible government, build strong, livable communities, promote economic growth, renew Rhode Island's traditional pattern of urban, town and village centers, prevent urban sprawl, preserve natural resources, and promote effective transportation systems.

Grow Smart Rhode Island sponsors a variety of informational meetings including "Revitalizing and Renewing Rhode Island: A Statewide Forum Highlighting New Opportunities and Tools for Urban and Town Center Redevelopment."

Grow Smart Rhode Island office are located at 345 South Main Street; Providence, Rhode Island 02903. For more information about this organization and its programs, visit Grow Smart's webpage at www.growsmartri.com or contact Sheila Brush, Program Director, at (401) 273-5711 or via email at sbrush@growsmartri.com.

Rhode Island Water Resources Board

The RI Water Resources Board and the RI Water Resources Board Corporate are established by Chapter §46-15 of the RI General Laws. The General Assembly recognized that Rhode Island's water resources are among the State's most valuable-if not the most valuable-of all its natural resources. Together, these two agencies of government support the proper development, protection, conservation and use of the state's water resources while providing for economic development and protection for the environment.

Working in conjunction with the RI Water Works Association (RIWWA), this agency has promoted education and outreach activities during RI Water Week. Along with RIWWA, staff participates in the State Science Fair each spring judging water supply-related science projects for high school and junior high school students. In 2001, Board staff worked with an interdisciplinary committee to produce a series of radio spots to promote water conservation. RI Water Resource Board prepared an environmental education grant to the US Environmental Protection Agency to expand the radio campaign in 2002.

The RI Water Resources Board also offer educational programs including The Water for Today and Tomorrow: An Integrated Unit Study for Third Grade Students and The Story of Drinking Water Workbook, which discusses the water cycle and water conservation.

The RI Water Resources Board Administrative Offices are located at 100 North Main Street, 5th Floor, Providence, RI, 02903. The RI Water Resources Board may be contacted at (401) 222-2217 ext. 2218

Environment Council of Rhode Island (ECRI)

The Environment Council of Rhode Island (ECRI), the Rhode Island affiliate of the National Wildlife Federation, is an association of groups and individuals that includes the Southern Rhode Island Conservation District, Save the Bay, Rhode Island Public Research Interest Group, and many others. They have established the ECRI Education Fund (EdFund) to "enhance the long-term stewardship of Rhode Island's natural resources." EdFund solicits and manages government and foundation grants to support its research and education initiatives that include developing media and programs to educate the public about environmental health and natural resource restoration.

ECRI generally meets the first Wednesday night of the month at 6:45 pm at the Audubon Society of RI headquarters located at 12 Sanderson Road in Smithfield. Members of the public are welcome to attend and participate in the meetings. ECRI may be contacted at P.O. Box 9061, Providence, RI 02940, (401) 621-8048 www.environmentcouncilri.org.

University of Rhode Island (URI)

There are several outreach programs offered by University of Rhode Island's (URI's) Cooperative Extension Service that may be beneficial to the Town for its storm water education and outreach program. The university's programs include:

- **URI Non-point Education for Municipal Officials**. This program offers training in the science, management, and regulation of water resources for community leaders and volunteer board members. Its goal is to provide decision makers with the skills and resources to identify local water quality problems and to adopt effective pollution controls. Educational programs are offered throughout the year, ranging from evening or one-day workshops to intensive, small group trainings that are tailored to meet the participants' interests and needs. Most programs can be brought to the municipality. Events are conducted in partnership with State planners and regulators, consulting professionals, the University community, and citizen groups. For more information contact Lorraine Joubert, URI NEMO at (401) 874-2138 or refer to their website at www.uri.edu/ce/wq/mtp/html/munitrai.html.
- **Rhode Island Home*A*Syst**. A consortium of educational projects in twenty-five states, this project focuses on educating and training residents in the community on environmental and health risks inside and outside their homes. The program includes topics on storm water management, hazardous material storage and handling, and yard and garden care. Informational materials are also available in the form of books, displays, educational models, fact sheets, and workbooks. Contact information: URI Cooperative Extension, Department of Natural Resources Science, 001D Coastal Institute, 1 Greenhouse Road, Kingston, RI 02881, (401) 874-5398 (www.uri.edu/ce/wq/has/html/has.html).

- **GreenShare**. This program provides training through seminars and workshops for professionals in the retail and service sectors of the landscaping industry at the Cooperative Extension Education Center (CEEC). Topics on environmentally sound methods of managing insects and diseases in urban and suburban landscapes are discussed at CEEC and its demonstration gardens. Target audiences include growers, landscapers, garden centers, and homeowners. GreenShare uses newsletters, newspapers, and television to communicate with the public (www.uri.edu/ce/ceec/greenshare.html). The Cooperative Extension Education Center is located at 3 East Alumni Avenue, Kingston, RI 02881, (401) 874-2900.

4.3 Educational Targets

While a future education program should be designed to offer a broad discussion of storm water quality issues, there are issues that should be targeted in every municipality as the focus of the program. These targets can include diverse audiences, subwatersheds and sources of pollution. Based on the current conditions and storm water quality issues in Coventry, several targets have been identified where a future educational program should be focused.

4.3.1 Subwatersheds

Critical subwatersheds in Coventry include those where surface water quality has already been impaired or where current land uses have greater potential for future water quality impacts.

Coventry is composed of the Big River, Flat River Reservoir, Hunt River, Pawtuxet River and Wood River watersheds. The Pawtuxet River is currently impaired for lead and cadmium. In addition to the river watersheds, the Quidnick Reservoir is also listed on Rhode Island's 303(d) list of impaired water bodies for mercury in fish tissue. These impairments are likely caused by both point and non-point sources and illicit discharges to storm sewer systems inside and outside of Coventry.

Critical land uses in Coventry that have greater potential for water quality impacts include the following:

- The area located west of the Flat River Reservoir and the Big River (including the Washington and Spring Lake area) where significant amounts of industrial, commercial, and high-density residential areas exist.

4.3.2 Diverse Audiences

Data obtained from the 2000 U.S. Census of Coventry indicates for persons over the age of 5 years, approximately 6.5% of the reporting population speaks a language other than English and 1.9% indicated they do not speak English very well. English literacy levels were not reported, so it cannot be determined what percentage of the population that can speak English "very well" can also read well. The ancestries reported by were quite varied, but the ethnic ancestral groups represented are listed in order of greatest number first as follows: Irish (23.5%), Italian (19.5%), French except Basque (19.5%), and English (17.8%). The percentages are relative to the total

population. The ancestry question allowed respondents to report one or more ancestry groups; however, only the first two responses were coded. The data presented in the census refer to the total number of ancestries reported (up to two) by people living in Coventry. In 2000, 385 persons of Hispanic origin resided in Coventry, representing 1.1% of the population. This demonstrates an increase of 125 or 48.1% from the 1990 Hispanic population of 180 while the Town's population increased by only about 8.32%.

Approximately 5.2% of the population was below the poverty level in 1999. We do not recommend targeting this population in the Town's storm water program at this time.

One way to reach diverse audiences, including the 5.2% that speak a language other than English and Spanish, is through advertising at local cultural centers or contacting religious leaders.

We do not recommend targeting diverse audiences or publishing materials in alternate languages at this time.

4.3.3 Sources of Pollution

Given the current conditions in Coventry, a future public education program should target the following sources of pollution.

- *Illicit discharges:* An education program could be targeted to both landowners and contractors in Coventry, about what defines illicit discharges and the importance and consequences of adhering to illicit discharge regulations. Proper septic system maintenance should also be discussed as a source of pathogens to local water bodies.

- *Pet waste management:* Another potentially significant source of pathogens is pet waste. An education program could be targeted to pet owners on the importance of proper disposal and collection of pet wastes. This can be accomplished by providing informational pamphlets to residents seeking dog licenses, through veterinarians, at pet supply stores, signs in public places such as parks, or through the general media.

- *Solid Waste disposal:* Improper waste disposal has been observed in watercourses by the river associations and their volunteer groups, even though the Town offers means for the proper disposal of these wastes. Every year, there are regularly scheduled clean-up efforts, such as Earth Day, to remove debris, ranging from litter to equipment parts, from Coventry's water bodies. An education program could be targeted to residents regarding proper waste disposal practices and outlining available waste disposal options (i.e. recycling and household hazardous waste collections).

- *Turf Management:* Target proper turf management education at the potential polluting land uses abutting Coventry's reservoirs. This is essential as excess fertilizer use increases nutrient loading and has been proven to promote eutrophication (oxygen depletion and algae growth) in impounded waters. Improper pesticide use can also

introduce toxic chemicals that can be harmful to aquatic species, wildlife, and humans. Pertinent educational materials are available through URI's GreenShare program.

4.4 Implementation Alternatives

The goal of a public education program in Coventry should include several elements as follows:

- Provide a general education to the public about storm water quality issues that will both improve their awareness, change habits that could impact water quality, and build support for funding of storm water quality programs.

- Develop school programs that will build long-term awareness and support for storm water programs.

- Target specific areas and issues where enhanced public education could provide significant benefits.

While a number of resources are available to Coventry for a future public education program on storm water quality, work still needs to be completed in actually organizing and implementing a formal program. The following outlines alternatives for implementing this minimum control measure.

4.4.1 Provide General Education

- Collaborate with neighboring municipalities (i.e., Cranston, Scituate, and West Greenwich) to build or to jointly request assistance from groups such as the Environment Council of Rhode Island and SRICD/NRICD to develop an educational campaign for this focus area. These campaigns should center on common themes in this region such as proper septic system maintenance, pet waste management, and proper turf management.

- Develop a "New Neighbor" welcoming program. This program would inform residents of the town's storm water program, BMPs, and information about storm water pollution and proper septic system maintenance. Provide simple, attractive pamphlets with the basic information necessary for new residents to determine how to prevent storm water pollution and the importance of citizen involvement including a list of community organizations. It may be beneficial to develop watershed specific programs that focus on the critical resources in that area, why the resource is important, how they can individually protect their watershed. The package should also include emergency phone numbers, such as RIDEM, a local storm water hotline, and the fire department, and what to do in the event of an accidental spill. The SRICD should be contacted to determine if they would want to coordinate this program. Materials that could be included to focus on local issues are:

    - *10 Simple Things You Can Do To Help Clean Rhode Island Waters* (RIDEM, Office of Water Resources)

- *Don't Trash Grass.* Oscar's Guide to Lawn Care (OSCAR)
- *Rhode Island Rural Lands Coalition* (SRICD)
- *Coventry Land Trust-Devoted to Preserving Coventry's Open Space* (Coventry Land Trust)
- Natural Resources Facts- *Maintaining Your Septic System*, Fact Sheet No. 96-1 (URI Cooperative Extension)
- Natural Resources Facts- *What is a Watershed?*, Fact Sheet No. 90-20 (URI Cooperative Extension)
- Water Quality Facts- *Drinking Water Wells,* Fact Sheet No. 94-6 (URI Cooperative Extension)
- Natural Resources Facts- *Lawn Care Simplified: Your Guide for a low-maintenance, high water quality landscape*, Fact Sheet No. 94-4 (URI Cooperative Extension)

- Urge municipal officers to attend programs from URI's non-point source education for municipal officers, so that they can make more informed storm water and land use management decisions. URI Cooperative Extension provides many of these programs at their campus and may be able to offer some presentations at Town facilities.

- Consider contacting Grow Smart Rhode Island to present their programs to Town officials. Assess the role this organization could play in the Town's current composition and for planning future development and redevelopment.

- Notify those in the local landscaping community of URI's GreenShare program. Additionally, provide URI pamphlets in "New Neighbor" packages and at public fertilizer providers. Proper pesticide and fertilizer use could greatly reduce the amount of excess nutrients that reach Coventry's water resources.

- Establish a Phase II Storm Water Committee of local stakeholders (ASRI, SRICD, PRWC/PRA, and member(s) from the Conservation Commission, Land Trust, and Planning Board). The purpose of the local committee would be to continue the work in planning and organizing public education events, coordinating with school curriculum committees and providing a potential source of speakers for a speakers' bureau. Media, such as newspapers (Kent County Daily Times, Coventry Courier) or the Town's website should be used to notify residents of the need for a committee and an organization meeting.

- Use groups such as the PRA/PRWC, Friends of the Pawtuxet, and ASRI to develop language for public kiosks and/or signage to be placed on public lands, which provide access to natural resources (i.e., at boat launches at the Flat River Reservoir and fishing locations at Bucks Horn Brook, Carbuncle Pond, Moosup River, Pawtuxet River (south branch), Tiogue Lake). They should provide information to the public about the significance of that water's quality, the effects of storm water, and conservation.

- Petition the State to place signs and passive interpretation to promote environmentally sensitive practices at state parks and on the Greenway.

- Identify and prioritize areas where storm drain outfalls have the greatest impacts (along the Pawtuxet (north branch), Tiogue Lake, Flat River Reservoir and near the town center) and then coordinate efforts to post signs at publicly accessible storm water outfalls identifying the outfall serial number and a phone number (usually the DPW) to call if problems are identified.

  Coventry Outfall # 43
  Call (401) 822-9183 to report any problems

  The Friends of the Pawtuxet, ASRI, PRWC/PRA, local Scouting Troops, and Coventry High School Science Club may be resources to assist in posting signs.

- Develop a storm water awareness exhibit to be displayed at Town Hall, the library(ies), schools, community events (ex. Coventry Pride Event), or even recreation facilities during youth sporting events. The display can be changed to address varying issues throughout the permit term, some recommended features include Year 1, general education (particularly focused on changing behaviors that negatively affect the quality of storm water), Year 2, ways to identify and remediate illicit discharges, Year 3, proper turf management.

- Develop a series of flyers to be distributed to the residents of Coventry. Newspaper releases and annual updates in the Coventry Courier or Kent County Daily Times may also be helpful to generate some interest with this issue. An example of a five year public education curriculum is as follows:

TABLE 4.1
SAMPLE PUBLIC CURRICULUM

Year	Focus Topic(s)
Year 1	General storm water/storm drain education, "What is a watershed?"
Year 2	Illicit discharge detection, Proper septic system maintenance
Year 3	Proper turf management
Year 4	Proper waste & pet waste management
Year 5	Plan for the future, low impact development, land trusts

- Expand the Town's current municipal website to include general storm water information, electronic copies of educational flyers, information included in the New Neighbor pack, links to water resource websites (URI, USEPA, RIDEM, etc.), schedules for educational workshops and presentations, location(s) of educational exhibits, and an electronic copy of this Storm Water Management Plan once completed.

- Use current educational materials to create a storm water pollution prevention based series of posters for display at pubic facilities.

4.4.2 School Programs

- Meet with school officials responsible for environmental/science curriculum development. Ensure that these officials are made aware or provided with copies of the educational resources presented herein. While water related topics are discussed at the K-Middle School levels, all levels of education could benefit from additional hands-on storm water related education. The SRICD, ASRI, and/or Catch the Science Bug can be contacted for more educational opportunities. And the school district should consider supplementing the current curriculum with programs such as AWEsome! and Project Wet provided by SRICD and ASRI respectively. At the High School level, the students would benefit from funding to introduce a heterogeneous environmental studies course.

- Assist the school district to support the High School's Science Club. This assistance could enhance the science curriculum with more hands-on activities like those offered by SRICD. It would also be beneficial for this group to publish a newsletter or adding a column to the high school's current newspaper educating the student body and community of local environmental news, achievements, volunteer opportunities and applicable education and conservation tips.

- It would be beneficial to order a subscription to the Green Teacher as a resource to be circulated throughout the system. Other resources discussed in this manual should be shared with local educators.

- Educate teachers by holding seminars for those interested. A consultant, URI, RIDEM, or other agency could host these seminars.

- Use current educational materials to create a storm water pollution prevention based series of posters for display within the pubic schools.

- Sponsor an annual environmental art contest for the school district. Provide the participating students with a recognition event and the winner with a prize. The artwork could then be displayed at Town Hall, the Town library(ies), and included in a storm water exhibit.

- To assist in the funding of these educational efforts, Environmental Educational Grants are available through the USEPA and National Science Foundation

4.4.3 Target Specific Areas and Issues

- Identify businesses in Coventry that have significant potential to impact water quality. These businesses could include significant commercial developments that generate large traffic volumes, and auto maintenance facilities that have potential for exposed materials and who handle hazardous wastes. Develop and distribute a mailer to these businesses

about pollution prevention, proper waste management, BMPs, and operation and maintenance issues. A volunteer audit of these facilities may also be proposed. Annual or biannual attendance at a Chamber of Commerce meeting may be a way to reach these businesses. An incentive program such as an annual award to most environmentally focused businesses that is advertised in the newspaper could encourage participation in the audit. Based on a review of federal and state databases the following regulated industries have been identified in Coventry:

TABLE 4.2
REGULATED INDUSTRIES

Type of Industry	Number in Town
Automotive repair, services & parking	1
Food store	1
Local & suburban transit & interurban highway passenger transportation	1
Nonclassifiable establishments	1
Petroleum refining & related industries	1
Unknown/other*	9

* These facilities are regulated as they store or handle hazardous waste.

5.0 PUBLIC PARTICIPATION/INVOLVEMENT

5.1 State and Federal Regulatory Requirements

The objective of this minimum control measure is to encourage public participation in the Town's storm water program. The anticipated benefits of public involvement and the success of the program are: free intellectual and labor resources; greater support for programs operated by citizen volunteers; faster implementation of minimum control measures (such as illicit discharge detection); fewer legal challenges; and a potential measure of program success. Involvement can include participating in public meetings, providing legislative activism, developing and implementing BMPs, or becoming an educator. To satisfy the requirements of this minimum control measure, the Town must:

1. Comply with applicable State, Tribal, and local public notice requirements; and

2. Determine the appropriate BMPs and measurable goals for this minimum control measure.

5.2 Available Resources

The following section describes some of the organizations and programs that may help the Town implement the public participation component of its storm water program. Encouraging public participation in existing volunteer programs that are offered by local and regional groups can minimize the need for creating new programs and allow the Town to focus its financial and human resources on outreach and sponsorship for these programs.

5.2.1 School Programs

Coventry High School's Science Club has volunteered at river clean up events throughout the Town. The chemistry classes also participate in water quality sampling activities.

5.2.2 Boy and Girl Scouts of America

Boys and girls may be involved in Scout programs from ages 5 through 17 and are supervised by adult volunteers. Scouts are involved in various community service projects and can be beneficial to implementing outfall identification, storm drain marking, and river cleanup projects or environmental awareness outreach programs.

Coordination with local Scout leaders is necessary to implement any activity with their group. The Boy Scouts have eight District Executives that meet monthly to discuss possible projects. Material about potential storm water related projects can be distributed at this meeting and then passed on to troop leaders. The Girl Scouts have Field Coordinators and Service Managers in every town. Information about potential projects can be shared with the Field Coordinators, who will in turn pass the information to the Service Managers and then the troops. Distributing information about the impacts of polluted storm water on our environment, the Town's Phase II

program, and the capacity in which Boy and Girl scouts can help their community are the first steps to promote participation.

The Boy Scouts provides its youth with a conservation program designed to be incorporated throughout the Scouting program and teaches awareness and understanding of conservation as a wise and intelligent management of natural resources. The conservation "Good Turn" program is an opportunity for scouts to join with conservation and environmental organizations (federal, state, local, and private) to carry out a conservation "Good Turn" in their home communities. The Boy Scouts also provide an outdoor adventures program of which their "Leave No Trace" policy plays a key role. This principles of this policy include planning ahead (not bringing materials that create waste and knowing the area to be explored), traveling and camping on durable surfaces (not trampling vegetated areas which can lead to erosion), dispose of waste properly (pack out what you pack in, dispose of wastewater far enough from surface water), leave what you find, minimize campfire impacts, respect wildlife, and be considerate of other visitors. A "Leave No Trace Awareness Award" is available to scouts who successfully follow these principles. In Rhode Island, scouts have participated in many activities in their communities including storm drain marking projects and Earth Day cleanups.

The Girl Scouts are offering a partnership initiative called Linking Girls to the Land. This partnership is between the Girl Scouts of the USA and nine natural resource conservation agencies including USDI Bureau of Land Management, USDA Forest Service and USDA Natural Resource Conservation Service. This initiative encourages girls to become involved in conservation and natural resource issues and careers on a national and local level. Most program activities fall into four areas: environmental education; volunteer service; outdoor skills development; and career awareness.

The Water Drop Patch, a facet of Linking Girls to the Land, is a project jointly developed by the United States Environmental Protection Agency and the Girl Scout Council of the Nation's Capital (GSCNC). The participants gain hands-on skills in water management and resource conservation by encouraging the girls to:

- Make a difference in their communities by becoming watershed and wetlands stewards;
- Use their skills and their knowledge to educate others in their community about the need to protect the nation's valuable water resources;
- Explore the natural world to gain an interest in science and math; and
- Use the Internet as a source of information.

For additional information about the Water Drop patch view the project booklet at www.epa.gov/adopt/patch/ or by calling the National Service Center for Environmental Publications at (800) 490-9198.

Funding for these can be acquired through the EarthPACT (Plant and Animal Conservation Team), which will award implementation grants to each council for up to $2,500. The EarthPACT encourages the formation of partnerships with local environmental education, nature, or science-related organizations, business or county government agencies.

The Girl Scouts are also offering a new program called GirlFACTS (Girls, Families, and Communities Together in Science). This program offers two related activities entitled "geology rocks" and "weather wise" which discuss the topics of the water cycle and acid rain. The topics of storm water runoff pollution and prevention could easily be added as a topic to these established programs.

The Girls Scouts have also been involved in Earth Day community clean-ups and storm drain stenciling. The Girl Scouts of Rhode Island office is located at 125 Charles Street, Providence, RI 02904, (401) 331-4500 or (800) 331-0149 and may be found at www.gsri.org. The field coordinator of the Coventry Girl Scouts program is Ms. Susan Santos at extension 414.

The Boy Scouts of America Narragansett Council office is located at 175 Broad Street, Providence, RI 02903 and may be found at www.narragansettbsa.org. The Executive Director of the area, which includes Coventry, is Mr. Mark Switzer (401) 351-8700 ext. 316. Mr. Switzer can provide contact information for group activities in Coventry.

5.2.3 Citizen's Groups

The groups outlined in the Public Education/Outreach minimum control measure may also provide opportunities for public involvement in a variety of watershed based or specific water body protection and cleanup projects. Some existing projects may help achieve Coventry's goals in their program with or without modification and, in some cases, new programs may need to be established. The following is a listing of groups and a summary of some of their current activities available to residents

Audubon Society of Rhode Island (ASRI)

Some of the current volunteer opportunities within the ASRI include helping at special events, working in the education department, participating in environmental projects, distributing mailings, maintaining wildlife refuges, being a part of a bird monitoring project, and designing artwork. They also offer student-volunteering opportunities for students who are interested in exploring career options in the conservation field, wildlife biology, and non-profit administration.

The ASRI joins an international effort every September with their "Get the Drift and Bag It" beach cleanup event. For 18 years, the ASRI has participates in the Ocean Conservancy's International Coastal Cleanup. The ASRI's participation for 2001 included 1,258 people, who collected 12,095 pounds of debris collected over 47 miles of Rhode Island beaches. This year the numbers increased to over 1,500 people at 56 locations who collected 15,741 pounds of debris.

ASRI also offers many membership options for the family, individual, student or non-profit organization. Current rates are $35, $25, $10 and $20 respectively. Members are eligible for benefits including discounts on trips, educational programs, hikes and workshops; discounts on all purchases from the Nature Shop at Powder Mill Ledges Refuge; and the bi-monthly newsletter, the *ASRI Report.*

For current volunteer opportunities contact Dot Mathurin, Volunteer Coordinator, at dmathurin@asri.org , or call (401) 949-5454.

Pawtuxet River Watershed Council (PRWC)

PRWC offers many opportunities for volunteers in the Pawtuxet River watershed. Activities range from wetland and watershed monitoring to internships and legislation. In Coventry, volunteers monitor the Big River at Harkney Hill Road and the Quidnick, Coventry and Flat River Reservoirs. They also monitor wetlands located at the Flat Reservoir at Potterville and on the South Branch of the Pawtuxet at Sandy Bottom. On October 18, 2002, the PRWC will participate in the Year of Clean Water National Water Monitoring Day, a day when volunteer monitoring programs, water quality agencies, student, and the general public are invited to test waters across the nation in celebration of the 30th Anniversary of the Clean Water Act. The samples will be tested for temperature, pH, dissolved oxygen, and turbidity and then entered into a national database.

PRWC also assists municipalities with implementing their storm water management plans, wastewater treatment upgrades, septic system improvements, participates Earth Day cleanups, and offers opportunities for students to intern with PRA.

For current volunteer opportunities contact Guy Lefebvre, Executive Director at (401) 739-7635 ext. 1.

Friends of the Pawtuxet

As previously outlined, Friends of the Pawtuxet promotes preservation and restoration of the Pawtuxet River for responsible recreational use. Recreational groups can often provide a resource to the town by promoting activities that offer exercise and fun while accomplishing significant tasks such as mapping outfalls.

5.2.4 Regional, State and National Resources

Adopt Your Watershed

As described in the public education and outreach section of this report, the USEPA has created this campaign to encourage citizens and groups to work at protecting and restoring surface and groundwater quality in their watershed. The networking and training resources available from this program can help educators, communities, or private citizens improve water quality and implement their local storm water program through education and participation.

Give Water a Hand

This is a national watershed education program of the University of Wisconsin Environmental Resources Center. Support for Give Water a Hand is provided by National Fish and Wildlife Foundation, the U.S. Department of Agriculture, CSREES and NRCS designed to involve

young people in local environmental service projects (www.uwex.edu/erc/gwah). The program provides guidance to students on how to complete an environmental service project and the basic information necessary to understand their watershed. Free guides are available on the internet, but printed copies require printing and shipping fees. The publications are the youth Action Guide (also in Spanish) and the teacher's Leader Guidebook.

URI Watershed Watch Program (URIWW)

The University of Rhode Island Watershed Watch Program (URIWW) works with local governments, watershed, tribal, and other organizations to assess water quality by recruiting and training volunteers to become citizen scientists. They offer several training programs with their main focus on performing water quality monitoring. These programs provide training, equipment, supplies, and analytical services to volunteers who record measurements and observations of water quality indicators on a weekly basis. Individual programs are outlined below.

The Water Quality Monitoring Program is a statewide volunteer sampling program. Trained monitors collect weekly measurements to provide current information on the water quality of surface water resources. The program emphasizes watershed scale monitoring to demonstrate how the water quality of surface water is impacted by the activities in the lands and waters upstream. Water quality monitoring requires one to two midday hours per week during most of the monitoring season (late April to early November) and a boat, if necessary, to get to the monitoring location. No prior experience is required and URIWW provides classroom and field training, equipment, supplies, and analytical services. Monitoring includes measuring the water clarity, surface and deep-water temperature, dissolved oxygen, chlorophyll analysis, and additional lab analysis.

URIWW also offers three supplemental training programs as part of their water quality program. These can be done independently, but are commonly done in conjunction with water quality monitoring. The Shoreline Survey Training teaches participants to observe water quality, natural and constructed features, identify sources of pollution, and how to record observations on large scale maps and standardized data sheets while along a section of the shore. Following training volunteers complete a survey and report results to the sponsoring organization approximately three times a year.

Aquatic Plant Identification and Mapping is a multi-session training course on identifying and mapping New England aquatic plants using field keys. Plant bed assessment and mapping are also taught. Aquatic plant monitoring is mainly performed in ponds, lakes, and reservoirs either annually or semi-annually during the mid to late summer.

Tributary Monitoring and Habitat Assessment is a multi-session training course on conducting intensive habitat assessments and monitoring of streams and rivers. Participants learn to observe water quality, natural and constructed stream features, identify various types of riparian habitats, measure stream flow, and how to record observations on maps and standardized field data sheets. This program follows the protocol established by the USEPA in Volunteer Stream Monitoring: A Methods Manual (USEPA 841-B-97-003). After the training, volunteers

complete assessments and report observations, often in conjunction with water quality monitoring.

The cost of each of these trainings and the water quality monitoring program varies but is often covered by a sponsor. More information about the URIWW Program is available on their website www.uri.edu/ce/wq/ww/html/ww.html. Interested individuals should contact either Linda Green, Program Director, at (401) 874-2905 or lgreen@uri.edu or Elizabeth Herron, Program Coordinator, at (401) 874-4552 or emh@uri.edu.

5.2.5 Local Media Resources

The local media can be a valuable asset to the Town of Coventry as part of their public education and outreach. There are several available resources for cable television and newspapers including:

The Providence Journal

The Providence Journal and affiliated website Projo.com, focuses on offering local and regional news, information, advertising and interactive opportunities for their Rhode Island audience. The Providence Journal has regional offices to address local issues. The applicable bureau for the Town of Coventry is the West Bay office.

The Provide Journal headquarters are located at 75 Fountain St., Providence, RI 02902. For information on the West Bay Bureau contact Jeanne Edwards, regional editor, at the Warwick office at (401) 737-3070 or via. email at wbnews@projo.com.

The Kent County Daily Times

The Kent County Daily Times is the regional newspaper covering activities in Kent County. This newspaper is published Monday through Saturday and serves as the main source of local news and advertising in Coventry. The paper also has an affiliate web page at www.kentcountytimes.com.

The Kent County Daily Times' headquarters are located at 1353 Main Street, West Warwick, Rhode Island 02893. For more information call (401) 821-7400 or email kceditor@ricentral.com.

The Coventry Courier

The Coventry Courier is a local newspaper that is published every Friday. This newspaper is an additional source of local news and advertising in Coventry. The paper also has an affiliate web page at www.coventrycourier.com that includes a community bulletin board with community news of the week.

The Coventry Courier's headquarters are located at 187 Main Street, Wakefield, Rhode Island, 02879. For more information contact Tammy Zink at (401) 789-9744 or at tzink@ricentral.com.

Town of Coventry Web Page – www.town.coventry.ri.us

The Town of Coventry created the web page to better serve their citizens through an electronic town hall. The website contains information on the town history, government and council, meeting dates, times and agendas, employment opportunities, the town calendar, municipal budget, contact information for town officials, and other electronic links that Coventry residents may find helpful. The website also includes information as to how and when residents can dispose of their yard waste.

This website could be an easy and cost-efficient way to notify the public about new town programs and, additionally, as a vehicle to educate the pubic about local clean ups, this storm water pollution prevention plan and its recommended educational topics.

Rhode Island Statewide Interconnect

In the Cox Communications service areas in Rhode Island, you can watch Interconnect on Channel 13 (Channel A), 14 (Channel B) and 23 (Interconnect C). Interconnect C is assigned programming from governmental, municipal and academic producers and institutions around the state. It also carries live programming from the Rhode Island Statehouse, produced through Capitol TV. Interconnect B carries religious programming from around Rhode Island. Interconnect A is programmed with public access programs, and those that do not fall into the B and C designations. Information about statewide interconnect can be found at www.patv18.com/interconnect.html or by contacting Cox Communications at (401) 383-7088 or Steve Martin, RI DPUC, at (401) 941-4500, ext. 131

Cox 3, Cox Connection, and the RI News Channel (Cox Communications channels 3 – 5)

These three cable channels are available for local broadcast and to provide information to Coventry cable subscribers.

Cox Communications Community Bulletin Boards

Community groups in the areas served by Cox Communications have the opportunity to promote non-profit, community events and services through PATV18's Community Bulletin Boards. Cox Communications staff updates some of the Community Bulletin Boards; others are maintained by municipal employees in areas where equipment was donated to towns and cities. The Town of Coventry currently does not have its own studio. For more information contact Yokasta Suero at the Warwick Studio by phone at (401) 383-7115.

5.3 Implementation Alternatives

To comply with this control measure, the Town must, at a minimum, conduct a public hearing on the Town's Phase II program to allow citizens an opportunity to provide input on the program that is ultimately implemented by the Town. However, it is recommended that the Town expand its public participation program to take advantage of the intellectual and labor resources of its citizens. Specific alternatives are as follows:

- Create a Phase II Storm Water Committee addressing the public education/outreach component of the program. The group should include member(s) from ASRI, SRICD, PRWC/PRA, and member(s) from the Conservation Commission, Land Trust and Planning Board. This committee could assist the Town with recruiting and coordinating resources, like the SRICD and PRW/PRA to implement recommended measures.

- Continue the storm drain stenciling program with the help of Save the Bay, students, businesses, and residents. Businesses may stencil their own catch basins or those located in their business district. A limited amount of storm drain stenciling may have already occurred in Coventry.

- Develop an Adopt a Street/Stream program to provide continuous clean up efforts for areas of particular debris build up. Provide participating business and groups with publicity for there efforts including listing on the Town's website and signage for display within there organization.

- Continue the water quality sampling projects being done by URI Watershed Watch, PRWC/PRA, and Coventry High School chemistry classes. An effective way to employ the program would be to initially screen storm water outfalls with dry weather discharges as part of the illicit discharge detection program.

- Coordinate with local Boy and Girl Scout organizations to discuss potential resources that they could contribute to the program (i.e., flyer distribution, storm drain stenciling).

- Inform local Girl Scout troops about the Water Drop Patch. Provide them with the information found herein and encourage them to participate as a means to foster environmental stewardship in Coventry. This program would not only benefit the scouts but also would provide an avenue for a broader public education, as the scouts become watershed and wetland stewards. The Boy Scouts could also be encouraged to Use their conservation "Good Turn" program in the Coventry area.

- Coordinate with existing regional organizations to discuss enhancing their recruiting efforts and targeting specific storm water related issues in Coventry.

- Use volunteers from the community and local organizations for simple tasks that would improve water quality as well as raise the public's awareness. Public participation will enhance the public education component of the storm water program with the following tasks:

- Stencil or otherwise mark catch basins with informational phrases such as, "NO DUMPING, DRAINS TO RIVER."
- Assist with installing and operating kiosks.
- Identify outfalls to Town waters.
- Clean-ups along recreational waters.
- Create local speakers panel to discuss the Town's storm water program and pollution prevention with targeted residents and businesses. Broadcast the discussions over a local cable station. The Town should consider contacting URI for possible speakers. The Town officials could be used for these speaking opportunities. Below are some sample speaking opportunities:

  - Water in my Community: Drinking water, Storm water, and Sewage - DPW
  - Municipal Government and Storm Water – Town Planner
  - Municipal Government and Illicit Discharge Detection – Town Engineer
  - BMPs in your Community: Form and Function – Town Engineer
  - Preventing Soil Erosion – Town Engineer
  - You, Your Pet, and Your Water – DPW or Parks and Recreation
  - Preservation of Open Space – Town Planner
  - Sound Tree and Shrub Management – Tree Warden
  - Your Land in Trust – Preserving Coventry's Open Space – Land Trust

- Expand the Town's current municipal website to include information pertaining to volunteering opportunities either through the Town itself or contact information for other non-profit organizations serving the area. The website should also include notices of upcoming stenciling and cleanup events (including those sponsored by groups other than the Town).

Specific tasks that could be completed as part of the public participation program include:

- Establish "neighborhood watershed" groups to encourage protection of surface waters and report spills and illegal dumping.

- Inventory storm water outfalls within the first year of this plan. This activity could be linked with recreational outings such as canoeing and kayaking.

- Sponsor or co-sponsor biannual cleanup projects that allow businesses, schools, volunteer organizations, and residents to get involved. Provide incentives to businesses by providing them with stickers or plaques to display at their businesses. Efforts should be initially targeted at publicly assessable streams that receive road runoff from Coventry and then expanded town wide.

- Establish partnerships with local businesses or community groups to remove litter from portions of streets and watercourses.

- Recruit volunteer educators to speak to business and industry owners through workshops. Local professionals may wish to contribute their time or resources for this task. URI may be contacted for possible speakers.

- Recruit local high school students to serve as environmental stewards for younger students. Coordinate with local community service programs and offer incentives to volunteers such as media recognition or trips to environmental science fairs.

- Contact the NRCS in regards to their Earth Team Volunteer Program for community environmental service projects. The Town should consider continuing their summer program to employ a few high school students during the summer months if this Earth Team program is not possible.

- Conduct public meetings annually to present the Town's annual report required by the permit. The annual report should also be posted on the town website and printed in the local paper.

6.0 ILLICIT DISCHARGE DETECTION AND ELIMINATION

Under this Minimum Control Measure, the Town is required to develop and implement a plan to detect and eliminate illicit discharges to its MS4, including development of a storm sewer outfall map showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls. The Town's plan should also provide effective mechanisms to prohibit illicit discharges into its MS4. This Minimum Control Measure also requires an education and outreach component that is addressed under the Public Education Minimum Control Measure (see Section 4.0). The potential for illicit discharges remains with illegal connections that are often the result of failing septic systems. The following sections detail the regulatory requirements for this effort, the Town's existing programs and controls to meet these requirements, and recommended measures for the Town to become fully compliant with these regulatory requirements.

6.1 State and Federal Regulatory Requirements

Commonly, municipal separate storm sewer system (MS4) discharges include wastes and other wastewaters from non-storm water sources that can significantly impact water quality. Sanitary sewage, process wastewater, floor drains and other wastewaters have been documented in MS4 systems throughout the country. A common impact is elevated levels of bacteria and pathogens as a result of improper sanitary connections. Because of these water quality impacts, these discharges must either be permitted or removed and connected to the municipal sanitary sewer system for treatment at a wastewater treatment plant. These non-storm water discharges are often more common in older storm sewer systems due to less awareness and enforcement in the past when these connections were made.

National Pollution Discharge Elimination System (NPDES) Phase II Storm Water Regulations define these discharges as "illicit discharges," which are further defined in Rhode Island Pollutant Discharge Elimination System (RIPDES) regulations. Rule 31(b) Definitions as:

"Illicit discharge means any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges from fire fighting activities."

Specific requirements of this program consist of the following:

1. Develop, if not already completed, a storm sewer system map showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls.

2. To the extent allowable under State, Tribal or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

3. Develop and implement a plan to detect and address non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

4. Inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste.

Table 6.1 provides examples of sources of common illicit discharges.

TABLE 6.1
EXAMPLES OF SOURCES OF ILLICIT DISCHARGES

Sanitary Wastes
Improper Oil Disposal
Radiator Flushing
Laundry Wastewaters
Automobile and Household Hazardous Wastes

The RIDEM regulations allow several categories of non-storm water discharges to an MS4 if they are not identified as significant contributors of pollutants in the system. Table 6.2 lists allowable non-storm water discharges, provided they do not adversely impact water quality.

TABLE 6.2
ALLOWABLE NON-STORM WATER DISCHARGES

Water Line Flushing
Landscape Irrigation
Diverted Stream Flows
Rising Ground Waters
Uncontaminated Ground Water Infiltration
Uncontaminated Pumped Groundwater
Discharges from Potable Water Sources
Foundation Drains
Air Conditioning Condensation
Irrigation Water
Springs
Water from Crawl Space Sumps
Footing Drains
Lawn Watering
Individual Residential Car Washing
Flows from Riparian Habitats and Wetlands
Dechlorinated Swimming Pool Discharges
Street Wash Water Discharges
Flows from Fire Fighting Activities

With the exception of discharges listed above, current RIPDES regulations prohibit non-storm water discharges to a storm sewer system without specific authorization from RIDEM in the form of a RIPDES permit. This is addressed in Rule 8 of the RIPDES regulations that prohibit any discharge of pollutants without a permit.

6.2 Mapping

Presently, the Town of Coventry does not have comprehensive mapping of its entire storm sewer system. DPW staff has a thorough working knowledge of the system, but there is no formal documentation. The Town's GIS coordinator and an assistant mapped eastern the eastern portions of Coventry during 2002 using the town-owned geographic positioning system (GPS) unit. Reportedly, the Town plans to continue this effort during the summer months of 2003 and in the future develop, in its entirety, a geographic information system (GIS) mapping for the Town. Accurately mapping the storm and sewer systems are major components of this project.

This element of the storm water management plan will likely be the most intensive component of the plan. As a result, it is recommended that the Town use a public participation program in an effort to minimize the costs to implement the program. In addition, it is recommended that the Town prioritize its efforts for waters of the state that have known water quality impacts that may be caused by illicit discharges. These waters are identified in the State of Rhode Island 303(d) list (discussed in Section 2.2).

6.3 Municipal Regulations

The Town does not currently have a municipal ordinance that expressly prohibits non-storm water discharges to watercourses or the Town's MS4. The following sections of the Town's existing ordinances and bylaws have been identified as regulating or otherwise controlling unauthorized discharges to the Town's MS4 and regulated water bodies.

Coventry Subdivision and Land Development Regulations

Article 1.0 Authority and Intent:

B This section discusses the regulations purposes including protecting and enhancing the natural resources of the Town.

Coventry Zoning Ordinance

Article 1 Introduction

111 This section discusses the regulations purposes including to promote the public health, safety and general welfare, to provide for the control, protection, and or abatement of water and groundwater pollution, and to provide for the protection of public investments in storm water management systems.

Article 2 Definitions

210 This section defines drainage systems as a means for preserving surface and ground waters.

Article 7 Industrial Performance Standards

7160 This section discusses the performance standards for sewage and water-borne wastes from industrial uses. It requires industries to provide all information to the Planning Commission concerning the management of wastewater and storm water. This section also prohibits certain discharges into any public or private sewage disposal system or stream.

This statement could be strengthened by also prohibiting the discharge of wastes to a storm drain and storm drain system.

Coventry Code of Ordinance

Part I Home Rule Charter
Article V Collection and Disposal of Sewage

Sec. 1 This section defines storm water as the runoff or discharge of rain and melted snow or other clean water from roofs, surfaces of public or private lands or elsewhere. "In general, it includes only water that is sufficiently clean and unpolluted to admit of being discharged, without treatment or purification, into any natural open stream or watercourse without offense."

Sec. 2 This section allows members of the sewer authority and their authorized agents to enter any premises within the Town to examine, inspect, or survey, whenever necessary for the performance of their duties of maintaining the sewer system.

Sec. 14 This section allows the sewer authority, after notice and public hearing, to prescribe rules and regulations relative to the regulation of, construction of, use of, discharge of substances into, and connections to the sewage works. These rules and regulations can cover the restriction of storm waters, wastes, which may or may not be discharged into the sewer system.

Part II Town Code
Chapter 2 Administration

Sec. 2-105 This section establishes the Conservation Commission's advisory role to the Town Council and Town Manager with the purpose of promoting and developing the natural resources, protecting the watershed resources, and to preserve natural aesthetics areas within the Town.

Chapter 17 Traffic and Motor Vehicles

Sec. 17-4 This section prohibits the washing, polishing, cleaning, or repairing of any motor vehicle or recreational vehicle within the confines of parks, recreational areas or exterior school property.

Chapter 18 Waste Management

Sec. 18-32 This section prohibits the littering of trash of any kind upon public or private property within the Town. This section also bestows enforcement authority to the local Police Department and mandates the penalty for littering. Any person found littering can be fined up to $100 or be imprisoned for a period no longer than thirty days.

Sec. 18-33 This section prohibits the transport of any solid wastes in any vehicle that permits the contents to blow, sift, leak or fall.

Sec. 18-177 This section provides for the protection of the Pawtuxet River. It states that the disposal of wastes along the banks of the Pawtuxet constitutes a hazard to public heath, safety, and water quality.

Sec. 18-321 This section defines public sewers as common sewers controlled by a governmental agency or public utility.

Sec. 18-322 This section makes it unlawful to place or deposit excrement, garbage or other objectionable waste in an unsanitary manner on public or private property. It also prohibits the discharge to any natural outlet or in any area under jurisdiction any wastewater or other polluted water except where proper treatment has been provided.

Sec. 18-324 This section prohibits uncovering, connecting to, altering or disturbing any public sewer without first obtaining a written permit. It also requires DPW permission before connecting roof drains, foundation drains, areaway drains or other source of surface runoff or groundwater to a building sewer or building drain, which eventually connects to the public sewer.

Sec. 18-325 This section requires that storm water and all other unpolluted drainage be discharges to a storm sewer or to a natural outlet approved by the DPW and other regulatory agencies.

Sec. 18-327 This section allows authorized DPW employees to enter private property for the purpose of inspecting, observing, measurement, sampling, and testing pertinent to the discharge to the wastewater facilities.

6.4 Recommendations

The following Potential Alternatives have been developed for the Town to fulfill the requirements under the Phase II storm water program.

Mapping

A plan has been developed for the Town to develop mapping to satisfy the following requirement under the Phase II program:

Develop, if not already completed, a storm sewer system map showing the location of all outfalls and the names and location of all waters of the United States that receive discharges from those outfalls.

This plan includes a program to compile a map of existing storm sewer outfalls in Coventry based on existing municipal mapping and its proposed geographic information system (GIS) project. This program includes the following elements:

- Review existing municipal records, drainage mapping, storm drain mapping, aerial photography, orthophotos, and field surveys to identify known outfall locations. This information will be supplemented with interviews with municipal DPW staff to identify outfall locations. These locations could be shown schematically on a GIS base map in order to provide general locations for outfall inspections.

- During the effort to inspect outfalls, the outfall should be located using the Town's geographic positioning system (GPS). This location could be recorded in a format compatible to the Town's proposed GIS system in order to develop a Storm Water Outfall data layer.

- Continue with the Town's GPS/GIS initiative to develop mapping for the entire Town. Storm water outfall investigation and survey should prioritize the urbanized portions of Town. Hiring additional summer interns or dedicating existing staff could expedite this process.

Municipal Regulations

A proposed amendment to the Town's ordinance has been identified to satisfy the following requirement under the Phase II program:

To the extent allowable under State, Tribal or local law, effectively prohibit, through ordinance, or other regulatory mechanism, non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

This draft model ordinance has been prepared by the New England Interstate Water Pollution Control Commission for adoption by communities to meet the requirements of this program

element. This ordinance is provided as Appendix C at the end of this report. Additional model ordinances prepared for the elimination of illicit discharges have been identified and are provided in Appendix D for the Town's consideration.

Illicit Discharge Detection and Elimination

A proposed strategy has been developed to satisfy the following requirement under the Phase II program:

Develop and implement a plan to detect and address non-storm water discharges into your storm sewer system and implement appropriate enforcement procedures and actions.

At least initially, it is recommended that the goal of this program not necessarily be to detect all illicit discharges to the MS4, but instead to focus on identifying the discharges that may actually impact water quality within the community. For example, this program is focused on eliminating illicit discharges that are actually observed to be discharged to waters of the state as opposed to all discharges that may evaporate or infiltrate prior to being discharged from the MS4.

The development of the storm sewer map as outlined in this plan will complete the initial step to detect non-storm water discharges by locating outfalls where there may be dry weather flow component. We have contacted RIDEM to determine the location of any known illicit discharges. The information available does not readily lend itself to finding these discharges in a specific community.

While dry weather flow could be groundwater infiltrating into the storm sewer, it is also potentially indicative of an illicit discharge. Once this initial step is completed, the following steps are recommended to first determine whether the observed flow is from an illicit discharge and, if so, to identify the source of the discharge.

- Inspect each outfall location (subject to the Town's ability to arrange for or provide access across private property as required) to document the following information on an outfall inspection report:

    - Observed dry weather flow (a digital photograph will be taken of each outfall),
    - Outfall size, material and condition,
    - Approximate height of outfall above receiving watercourse,
    - Outfall receiving watercourse,
    - Coordinate location as determined by GPS,
    - Any additional outfalls observed during the outfall inspections, and
    - Any other observations of the outfall and/or surrounding area (odor, turbidity, color, site conditions).

    To the extent possible, at least 72 hours of dry weather should precede any fieldwork associated with this program. These inspections should occur during dry weather such

that stream height will be lower to expose submerged outfalls as well as to better observe dry weather flows from outfalls that may be indicative of an illicit discharge.

In addition, each outfall should be numbered uniquely such that its data can be correlated with a location on the storm sewer base mapping to be developed. All collected data should be organized and reviewed by the person responsible for implementing this element of the program.

- Where dry weather flow is observed, collect samples to be analyzed for pH, temperature, specific conductivity, ammonia, surfactants and fecal coliform. If the results of these analyses indicate that a potential illicit discharge exists, the upgradient drainage system will be examined to identify the extent of the system where that dry weather flow exists. During these investigations, the following information will be collected on upstream structures:

  - Condition of the structure (including a digital photograph),
  - Pipe sizes, and
  - Specific conductivity of the flow as measured in the field.

  An outfall inspection report will be prepared to document the results of the investigations. This report will include the following:

  - a cost estimate and work plan to further identify the source(s) of the dry weather flow observed, and
  - an opinion of construction cost to correct the anticipated problems.

  Any required additional investigations or corrective activities will be completed during subsequent phases of this program.

In those outfalls identified as having a potential illicit discharge, the Town must identify sources of that discharge(s). The recommended approach to accomplish this task follows.

1. Delineate the drainage area of each outfall with a dry weather flow component to determine the extent of potential sources. This could be done by two methods.

   - Utilize TV inspection to identify sources of the dry weather flows. This inspection could identify the extent of the system where there is a dry weather flow component and identify connections to the storm sewer that are contributing dry weather flow.

   - Inspect the drainage system, structure by structure, to determine the extent of the system where there is a dry weather flow component. At this time, the system and its connections where a dry weather flow component was observed, should be mapped, or sketched a minimum. This should be the first task completed as it will limit the extent of the investigation.

2. Inventory the drainage area of each outfall of concern to evaluate the locations of potential pollutant sources. This will consist of reviewing land use and street maps to identify potential pollutant sources in the drainage area. In addition, water quality data from the outfall of concern should be reviewed to determine what the potential sources may be.

3. Conduct additional "targeted" wet or dry weather sampling at selected locations down-gradient of suspected pollutant sources to "bracket" sources of pollutants in the system. Sampling should include flow metering such that loads of pollutants of concern can be calculated and to minimize potential interferences from clean groundwater diluting the illicit discharge. Based on experience with past projects, this effort will also be able to specifically identify sources. Parameters monitored should be consistent with parameters observed in the discharge.

4. Conduct detailed field inventory. Field inventories should be performed on foot and via windshield surveys, beginning at the point discharge, and following the bracketed drainage system up-gradient. The purpose of the field inventories is to further define what the potential source(s) may be.

5. Conduct a site investigation for each suspected source. This can be completed via one of several methods to specifically identify a source. This can include the following methods:

    - TV inspection to find a specific connection that is contributing dry weather flow. In high groundwater conditions, this method will be less useful. Also, it may be difficult to pin point a specific source in densely developed areas.

    - Smoke testing could also be used to identify illicit connections. Neighborhoods would need to be warned prior to use of smoke testing in their area. Also, this method may not be effective if the illicit discharges are flowing full or are equipped with traps.

    - Dye testing would pinpoint a specific discharge. This would require access into buildings and inserting dye at all potential illicit discharges which will require the field staff to be thorough. Permission would be required to enter businesses.

6. Eliminate the illicit discharge once found.

7. Confirm elimination of illicit discharges by collecting appropriate confirmation samples. This could either be done at the outfall or just downstream of the eliminated discharge.

At least initially, it is recommended that the goal of this program not necessarily be to detect all illicit discharges to the MS4, but instead to focus on identifying the discharges that may actually impact water quality of receiving waters throughout the state. For example, this program is focused on eliminating illicit discharges that are actually observed to be discharged to waters of the state as opposed to all discharges that may evaporate or infiltrate prior to being discharged from the MS4.

Throughout the implementation of the above program, efforts should be made to maximize public participation. Depending on the success of the public participation program, interested citizens could provide a significant amount of labor to complete the fieldwork necessary to implement these program components. Public participation in this program will require organization and training of the volunteers to ensure the quality of work is adequate and defensible for any future corrective actions.

Outfalls where access could be hazardous or would require access onto private property will be investigated by Town or other contract employees and not members of the public. The Town of Coventry should identify the person or persons who will be responsible for implementing this program and any resources that will be available for this purpose. Assigned staff should receive appropriate training that includes Occupational Safety and Health Administration (OSHA) health and safety training as well as confined space entry training, if necessary.

Public Education

This following requirement under the Phase II program is addressed in the public education best management practice recommendations.

Inform public employees, businesses and the general public of hazards associated with illegal discharges and improper disposal of waste.

7.0 CONSTRUCTION SITE RUNOFF CONTROL

7.1 State and Federal Regulatory Requirements

Typical construction activities have significant potential to impact surface water quality in the State by creating the potential for sediment, construction materials, waste and other pollutants to be transported to surface waters by wind or storm water runoff. As a result, the USEPA promulgated construction site runoff control regulations as part of its Phase I storm water permitting program. This program focused on projects that disturb more than five acres of land (total project). As part of this program, these projects were required to secure a Rhode Island Pollutant Discharge Elimination System (RIPDES) permit and prepare a detailed Storm Water Pollution Control Plan that specifies soil erosion and sediment control as well as waste and product management practices to control potential impacts.

The Rhode Island Department of Environmental Management (RIDEM) currently regulates activities that disturb more than five acres of land through the use of a general permit for the RIPDES program. This general permit requires submittal of a Notice of Intent to RIDEM and the preparation of a Storm Water Pollution Prevention Plan (SWPPP) that must be certified by a professional such as a professional engineer.

The Phase II program that has been promulgated by the USEPA requires regulated municipalities to develop, implement, and enforce a program to reduce pollutants in storm water runoff to small municipal storm sewer system (MS4) from construction projects that result in a land disturbance of greater than or equal to one acre. Sites smaller than this would still require a permit if the land is part of a plan, such as a subdivision, that alters a total area greater than one acre. Small construction projects are eligible for waivers of permit requirements if either:

1. The value of the rainfall erosivity factor, "R," is less than 5 based on the revised Universal Soil Loss Equation during construction, or

2. A Total Maximum Daily Load (TMDL) establishes acceptable loads for pollutants of concern in impaired surface waters or an equivalent analysis, which determines that allocations of pollutants of concern for the project are not necessary to maintain water quality.

The Universal Soil Loss Equation is as follows:

$$A = R \times K \times L \times S \times C \times P$$

Where:

A = average annual soil loss (tons/acre/year)
R = rainfall (erosivity) and runoff factor
K = soil erodibility factor
L = slope length
S = steepness factor
C = cover and management factor
P = support practice factor

RIDEM or USEPA Region 1 office may designate small construction activities that disturb less than one acre of land if the activity contributes to a violation of water quality standards or for significant contribution of pollutants, such as Total Suspended Solids (TSS), to any surface water. Current drafts of the RIPDES Phase II Storm Water Regulations only require regulation of one acre or more of land development.

The specific state and federal requirements of the construction site runoff control minimum measures, which the town must develop and implement, are as follows:

1. An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law;

2. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices (BMPs);

3. Requirements for construction site operators to control construction wastes, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes at the construction site that may cause adverse impacts to water quality;

4. Procedures for site plan review which incorporate consideration of potential water quality impacts;

5. Procedures for receipt and consideration of information submitted by the public; and

6. Procedures for site inspection and enforcement of control measures.

7.2 Existing Municipal Ordinances

The Town of Coventry has several mechanisms that currently exist in municipal codes or ordinances with which the Town currently regulates construction site runoff. These mechanisms are included in the Town's Subdivision and Land Development Regulations and Zoning Ordinance.

7.2.1 Subdivision and Land Development Regulations

- Article XIII(F) requires that all land developments and subdivisions shall submit a soil erosion and sedimentation control plan as provided by the Soil Erosion and Sedimentation Ordinance (#2-93-0187).

- Article III(D) provides the Planning Commission with the authority to require the applicant to pay for an Environmental Review Team Report (ERT) prepared by the Rhode Island Resource Conservation and Development Council, Inc. This report will assess the potential short and long-term effects of the proposed subdivision or land development project. This report may also evaluate impacts to freshwater wetlands, soils, vegetation, and wildlife.

7.2.2 Zoning Ordinance

The Coventry Zoning Ordinance includes erosion and sedimentation control requirements in several sections for land use and development projects. The requirements in these bylaws specifically include the following:

- Article X discusses the requirements for site operation and restoration for an earth removal/sand and gravel extraction business. The applicable sections for soil and erosion control are listed below:

    - Section 1032 states that "Erosion control measures shall be employed throughout the development and operational phases of the extraction project. These may include the use of quick growing vegetation, mulching, screening, stabilization, siltation fences, or other means as deemed necessary by the Town Council." This section further states that "for safety reasons during excavation, the slope shall be no greater than two (2) feet horizontal to one (1) foot vertical (2:1)."

    - Section 1033 discusses site restoration and states that as "sections of the extraction operation are completed, temporary site restoration shall proceed to minimize erosion until the comprehensive restoration plan is implemented."

- Article XII, Section 1203(B) states that "porous paving material may be allowed as a special-use permit" for parking lots and loading facilities. This option serves as a non-structural BMP and eliminates some storm water runoff by allowing water to infiltrate into the ground.

- Article XIII, Section 1331 discusses the application requirements for a Residential Cluster Development (RCD). Part I requires that any proposed removal of vegetation at the site is located and described on a plan. Part O states that proposed "storm water drainage systems, (and) temporary or permanent erosion control structures" are also located and described on a plan

- Article XIV, Section 1435(9) requires the submittal of "mathematical computations by a Registered Professional Engineer establishing that proposed drainage structures will result in zero (0) net increase in run-off from the development."

- Article XVI details the Development Plan Review process. Projects subject to development plan review include the "construction of any residential project not requiring subdivision approval that exceeds six (6) dwelling units; construction or expansion of any commercial development; or construction or expansion of any industrial development; change in use; and applications for uses requiring a special-use permit, variance, zoning ordinance amendment, or zoning map change." Plans submitted for the development review must include information relating to the locations and descriptions of proposed drainage systems and temporary or permanent erosion control structures. Additionally, Section 1623 requires the submittal of a narrative report that describes erosion control practices and storm water management systems.

- Article XVII requires the submittal of a landscape plan that includes "mitigation measures employed for protecting existing vegetation during construction and a sediment control plan."

7.2.3 Soil Erosion and Sediment Control

Chapter 5, Article III of *The Code of Ordinances* for Coventry contains the ordinance entitled "Soil Erosion and Sediment Control." The ordinance appears to be based upon the model ordinance presented in the *Rhode Island Soil Erosion and Sediment Control Handbook*. The key elements of the ordinance include the following:

- § 5-42: The Building Official is responsible for the enforcement and administration of the ordinance and Chapter 45-46 of the General Laws of the State of Rhode Island entitled "Soil Erosion and Sediment Control."

- § 5-44(a): The Building Official responsible for the review of soil erosion and sediment control plans must be "a registered engineer, surveyor or landscape architect or a Soil and Water Conservation Society certified erosion and sediment control specialist, or shall have attended a soil erosion and sediment control training session sponsored by the United States Department of Agriculture Soil Conservation Service and Conservation District."

- § 5-45(a)(1): "It is unlawful for any person to disturb any existing vegetation, grades and contours of land in a manner which may increase the potential for soil erosion, without first applying for a determination of applicability from the Building Official."

- § 5-45(b)(2): "No determination of applicability shall be required for the following:

    a) Construction, alteration or use of any additions to existing single-family or duplex homes or related structures, provided that the grounds coverage of such addition is less than 1,000 square feet, and such construction, alteration and use

does not occur within 100 feet of any watercourse or coastal feature and the slopes at the site of land disturbance do not exceed 10%;

b) Use of a home garden in association with on-site residential use;

c) Accepted agricultural management practices, such as seasonal tilling and harvest activities, associated with property utilized for private and/or commercial agricultural or silvacultural purposes;

d) Excavations for improvements other than those described in Subsection (b)(2)a above which exhibit all of the following characteristics:

   1. Does not result in a total displacement of more than 50 cubic yards of material;

   2. Has no slopes steeper than 10 feet vertical in 100 feet horizontal or approximately 10%; and

   3. Has all disturbed surface areas promptly and effectively protected to prevent soil erosion and sedimentation.

e) Grading, as a maintenance measure or for landscaping purposes on existing developed land parcels or lots, provided that all bare surface is immediately seeded, sodded or otherwise protected from erosive actions and all of the following conditions are met:

   1. The aggregate area of such activity does not exceed 2,000 square feet.

   2. The change of elevation does not exceed two feet at any point.

   3. The grading does not involve a quantity of fill greater than 18 cubic yards; except where fill is excavated from another portion of the same parcel and the quantity does not exceed 50 cubic yards.

f) Grading, filling, removal or excavation activities and operations undertaken by the town under the direction and supervision of the Director of Public Works for work on streets, roads or rights-of-ways dedicated to public use; provided, however, that adequate and acceptable erosion and sediment controls are incorporated, in engineering plans and specifications, and employed. Appropriate controls shall apply during construction as well as after the completion of these activities. All such work shall be undertaken in accordance with the performance principles provided for in Section 5-51(c) and such standards and definitions as may be adopted to implement the performance principles."

- § 5-51(b): If a determination of applicability is deemed necessary and granted by the Building Official, an erosion and sediment control plan is required and should contain the following items:
  - "A narrative describing the proposed land disturbing activity and the soil erosion and sediment control measures and storm water management measures to be installed to control erosion;"
  - "Drawings illustrating in detail existing and proposed contours, drainage features and vegetation; limits of clearing and grading; the location of soil erosion and sediment control and storm water management measures;"
  - Clear indications that the minimization of steep slopes and grades was accomplished;
  - Calculations that show post-development runoff rates do not exceed pre-development runoff rates and all necessary drainage, retention or detention basins, seepage areas, subsurface drains or any technique utilized to control storm water runoff are shown and described; and
  - Locations and types of proposed temporary and permanent vegetation and/or mulching.
- § 5-52(a): This section requires that a performance bond is filed by the applicant/owner of a proposed land development project if the construction activity takes place "within 100 feet of any watercourse or coastal feature or within an identified flood hazard district or on slopes in excess of 10%." The Building Official may also require a performance bond for other projects before the soil erosion and sediment control plan is approved.
- § 5-54: "Maintenance of all erosion sediment control devices under this article shall be the responsibility of the owner. The erosion sediment control devices shall be maintained in good condition and working order on a continuing basis."

7.2.4 Enforcement

All soil erosion and sediment control plans submitted to the Planning Commission and Zoning Board as part of land development and subdivision applications are ultimately sent to, reviewed by, and approved/disapproved by the Planning Director's office. The Planning Director, as currently designated by the Building Official, conducts periodic inspections of soil erosion and sediment control measures on an approved construction control schedule and a permanent file of all inspections should be maintained in the Building Official's office.

If non-compliance to the approved erosion and sediment control plan is found during construction, the Planning Director will provide a written notice to the owner/applicant and set forth the nature of the corrections required and the time limit in which the corrections need to be made. The Planning Director reserves the right to stop work and/or revoke or suspend the erosion and sediment control plan if any condition of the plan or ordinance is violated or there is

a condition exists that constitutes a hazard or nuisance. Additionally, the Planning Director may place a lien on the property or apply a fine of $250 for each offense for each day the condition is in violation of the approved plan.

The Zoning Ordinance states that the Building Inspector and Zoning Enforcement Officer have the authority to correct any violations, order work to stop as a result of a zoning violation, collect required fees, inspect violations, and keep all records of compliance and non-compliance. An interview with the Planning Director revealed that the titles "Building Inspector" and "Building Official" refer to the same person. Any violation of the Zoning Ordinance may be subject to a fine of not more than $500 for each offense for each day. The Building Inspector or Zoning Enforcement Officer shall supply the owner/applicant a written notice of any violation and establish a compliance date between five (5) and thirty (30) days. If compliance is not achieved within the time period established, the Town Solicitor is authorized to make the appropriate action to prevent, abate or remove the violation. The Planning Director currently reviews the soil erosion and sediment control plans submitted to the Zoning Board of Review and conducts periodic inspections of erosion and sediment control measures employed at the site.

The Subdivision and Land Development Regulations are enforced and administered by the Planning Commission or Administrative Officer. The Planning Commission is comprised of volunteers from the citizens of the Town and the Administrative Officer may be a member of or chair of the Planning Commission, or an appointed official of the municipality. The Administrative Officer repots to the Planning Commission and is responsible for the following:

- Coordination of the review, approval, recording, and enforcement provisions of the Regulations;
- Coordination of the review and approval procedures for subdivision and land development projects with adjacent municipalities, if necessary; and
- Enforcement of these Regulations.

Violations to any of the regulations in the Subdivision and Land Development Regulations are subject to a penalty of not more than $500 dollars per lot, per day, per offense. The Planning Director currently reviews soil erosion and sedimentation control plans submitted to the Planning Commission and conducts periodic inspections of erosion and sediment control measures employed at the site.

7.3 Recommended Modifications

The Town's regulations include many of the components required for Phase II program requirements for construction site storm water runoff control. The following paragraphs identify recommended modifications to existing regulations and practices in order to comply with the Phase II rules.

1. *An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law.*

   The existing regulations include provisions that require erosion and sediment controls. However, several recommendations, as follows, have been identified to allow the Town to fully comply with Phase II requirements and to assist with the future implementation of these regulations.

   - Modify the reference made to the Erosion and Sediment Control Ordinance in Article XIII(F) of the Subdivision and Land Development Regulations from #2-93-0187 to its current location of Chapter 5, Article III of the Code of Ordinances. This will help to eliminate any confusion that may develop.

   - Consider changing Section 5-45(b)(2)(a) to read "construction, alteration, and use does not occur within 100 feet of any drainage feature or structure tributary to a wetland, watercourse or coastal feature…" This amendment would apply to the exemptions criteria for land developments and subdivisions under which an erosion control plan is not required.

   - Consider inclusion of an emergency action plan for wet weather, spills, or BMP failure, especially in locations that would be sensitive to a failure such as an adjacent surface water or storm drainage system.

   - Consider requiring the submittal of a construction schedule approved by the Zoning Enforcement Officer, Building Official or Town Engineer prior to construction. This is addressed in the Soil Erosion and Sedimentation Control Ordinance (§ 5-51(b)(2)), but not in the Land Development and Subdivision Regulations or Zoning Ordinance. This will assist the Town in scheduling future inspections.

   - Expand Article IV(C) to require phasing as a BMP for large land development projects in an effort to minimize land disturbances and reduce the potential for erosion and sedimentation.

   - Enforce the provisions of Article 10 – Earth Removal/Sand and Gravel Extraction to eliminate the extent of soils that are exposed in dormant and operating facilities. Operations should also employ BMPs to control soil erosion and sedimentation including, but not limited to, temporary vegetation.

   - Consider incorporating into the Subdivision and Land Development Regulations and the Zoning Ordinance the fact that the Building Official, or his/her designee, is the person responsible for the review of erosion and sedimentation control plans submitted to the Zoning Board of Review and the Planning Commission. By incorporating this into the regulations, confusion may be eliminated regarding who is responsible for the administration and enforcement of the municipal regulations and ordinances.

- Develop an overlay district and regulations in the Zoning Ordinance for the protection of Special Resource Protection Waters (SPRWs). Coventry has one SRPW in the town: Mishnock Swamp. As discussed in Section 2.5 of this report, a new or increased discharge or activity is not allowed in SPRWs unless specific pollution controls and/or other mitigation measures and BMPs will completely eliminate any measurable impacts to water quality under the Antidegradation Provisions of Rhode Island's Water Quality Regulations. The Town should consider the following recommendations in addition to developing other applicable regulatory requirements:

  - The overlay district should be consistent with the Mishnock Swamp watershed. Coordinate any requirements of the new Zoning Ordinance overlay district(s) with the Antidegradation Provisions.

  - Incorporate regulations to address specific development practices, such as clearing of large areas, or require SWPPPs for construction sites in these environmentally sensitive areas.

  - Require frequent inspections and reporting for projects that are allowed in these overlay districts.

  - Have trained Town staff conduct reviews of erosion and sedimentation controls for all projects allowed in these overlay districts with consideration to the potential water quality impacts that may be unique to a site (e.g. severe wind erosion).

2. *Requirements for construction site operators to implement appropriate erosion and sediment control best management practices (BMPs).*

   The regulations for the Town of Coventry include standards for erosion and sediment control and plan preparation requirements. These regulations currently require construction site operators to implement and maintain BMPs. The following modifications may be appropriate:

   - Consider incorporating other BMPs, if desired, into the performance principles that are not currently addressed, such as dewatering operations. The Town may also want to consider whether there are any BMPs that would be disallowed, such as chemical stabilizers (soil binders) in sensitive areas.

   - Consider modifying Article V(c)(1)(f) of the Subdivision and Land Development Regulations to read "Preapplication meetings should include a review of the physical character of the land, and any environmental or physical restraints to development, including soil erosion and sedimentation issues, storm water quality, etc." This may assist an owner/applicant to begin thinking about soil erosion issues and storm water runoff quality.

3. *Requirements for construction site operators to control construction wastes, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes at the construction site that may cause adverse impacts to water quality.*

   Current regulations do not address management of construction wastes. As a result, the following modifications are recommended:

   - Require erosion and sediment control plans to include provisions for controlling construction wastes, such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary wastes at the construction site that may cause adverse impacts to water quality. These controls should be described in the project narrative and site plans.

   - Section 1052(H) of Article X Earth Removal/Sand and Gravel Extraction, states that all "stumps, boulders and other debris resulting from the extraction operations or its related activities shall be removed from the site and disposed of by approved methods." Consider making this regulation universal to all land disturbance activities in the Town to avoid the disposal of any clearing and grubbing debris on-site.

4. *Procedures for site plan review, which incorporate consideration of potential water quality impacts.*

   The current subdivision and site plan review processes include review of erosion and sedimentation control plans for non-exempt projects by the Building Official or his/her designee. The following items are recommended to assist with the SESC review process:

   - Confirm that all personnel responsible for reviewing site plans to determine compliance with the Town's SESC ordinance have received proper training for erosion and sediment control practices and are knowledgeable of allowable exemptions.

   - Develop a checklist to assist reviewers with confirming minimum application requirements are met and appropriate use of BMPs.

5. *Procedures for receipt and consideration of information submitted by the public.*

   As with many communities, informal mechanisms for the public to comment on construction related impacts exist in Coventry. These largely consist of complaints to the Building Department, Town Engineer, or even Town Council. The following recommendations are proposed to formalize this process as stipulated in USEPA guidance documents.

   - Provide a form at the Zoning Enforcement Officer's office and Building Official's office to document public inquiries and comments for construction projects.

- Consider providing an internet-based method of communicating public comment such as e-mail or an editable website document. The Town's current website could be modified to provide these links.

- Adopt procedures to respond or address public inquiries or concerns once submitted to the Zoning Enforcement Officer. It is not USEPA's intention that Coventry should develop a burdensome process to respond to every public inquiry. The Zoning Enforcement Officer may log complaints and direct the concern to the inspector responsible for a particular site. The inspector may also prioritize inquiries based on the severity of the suspected violation and investigate accordingly.

6. *Procedures for site inspection and enforcement of control measures.*

   The Soil Erosion and Sediment Control Ordinance describes the procedure for periodic inspections during construction. The following items are recommended to improve the inspection and enforcement process:

   - Evaluate the need for additional staff to enforce the regulations and conduct appropriate inspections.

   - Consider the use of summer interns to assist with a SESC inspection program. After some initial training they could at a minimum assist Town staff in determining whether controls have been installed and determine if sedimentation is occurring in downgradient streams.

   - Prioritize inspections based on the scale of the construction project, sensitivity of nearby water resources, an approved construction phasing schedule, or potential impacts as determined by the scope of the project in order to conserve the need for inspectors.

   - Consider the development of an electronic database to track progress of construction, complaints and inspections. While adding some administrative commitment, this would also provide a readily accessible documentation of compliance with the regulations.

While not specifically required in the regulations, some contractor training may be appropriate if development pressure has made frequent inspections or monitoring a strain for Town staff. This training would be valuable in educating contractors and designers on the Town's regulations, the need for SESC, and the minimum requirements for both the application and construction processes. The process could consist of the use of mailers and brochures distributed to local contractors, developers and engineers as well as more formal training. Since a program of this type would provide a regional benefit, we would recommend that the State of Rhode Island, or other regional agency such as the Southern Rhode Island Conservation District (SRICD), consider developing this program.

7.4 Implementation Alternatives

This minimum control measure of the Phase II regulations requires the Town of Coventry to implement certain best management practices (BMPs) in its storm water program. While the required BMPs are established by RIDEM, the details and measurable goals of each BMP are left to the operator of the MS4. To assist the Town with selecting appropriate controls, we have prepared several implementation alternatives and measurable goals for each required BMP.

7.4.1 Soil Erosion and Sediment Control Regulations

The Town must have an ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law. These regulations must include requirements for the implementation of BMPs and the control of construction site wastes. To comply with this requirement, the Town should:

- Draft modifications to the existing municipal regulations as outlined by our recommendations in Section 6.3 Recommended Modifications. Additional ideas for modifications to the Town's existing regulations may be obtained from the Rhode Island Draft Model Stormwater Control Ordinance.

- The draft ordinance also may be adopted in its entirety, however, existing regulations will have to be slightly modified and, in some cases, deleted.

- Conduct legal review of proposed draft modifications.

- Hold meetings, to promote awareness and seek comments. If required, hold meetings to ratify regulatory changes.

- Record the approved amendments with the Town Clerk.

7.4.2 Site Plan Review Procedures

The Town must implement procedures for site plan review that incorporate consideration of potential water quality impacts. For this required BMP to be effective, the following components should be included:

- Create a formal training program for municipal employees responsible for site inspections and review of construction plans to ensure compliance with the Town's regulations. The program should assess current employee knowledge of soil erosion and sediment controls and the ability of staff to meet the labor demands required by plan reviews and site inspections. In developing this program, the Town should consider the following:

    - Administer training to all new employees responsible for site inspections and review of construction plans.

- Provide "refresher" training at least every two years and supplemental training as required by regulatory changes, technological advances, etc.

- Maintain all records and certificates of training in each employee's personnel file and in a consolidated training file of all employees who have attended each training event.

- Develop a checklist for designers and reviewers to confirm the minimum application requirements are met, potential water quality impacts are considered, and BMPs are used appropriately. The checklist can be compiled from the Town regulations and the Rhode Island Soil Erosion and Sediment Control Handbook.

7.4.3 Management of Information Submitted by the Public

The Town must develop procedures for the receipt and consideration of information submitted by the public. We recommend the following to comply with this requirement:

- Provide a form at the Zoning Official's office and Town Engineer's office to document public inquiries and comments for construction projects. Designate one Town official to consolidate this information.

- Provide a Storm Water page with a hyperlink to an e-mail address and/or editable document on the Town's current website to allow public comment. This method allows easy electronic database entry and access by inspectors or other officials.

- Adopt procedures to respond or address public inquiries or concerns once submitted to the Zoning Official. The Zoning Official may log complaints and direct the concern to the inspector responsible for a particular site. The inspector may also prioritize inquiries based on the severity of the suspected violation and investigate accordingly. Use of a database can help track complaints, schedule inspections, and issue notices of violation.

7.4.4 Construction Site Inspection Procedures

The Town must develop formal procedures for site inspections (e.g., inspection schedule, responsibilities of inspectors, reporting, etc.).

- Develop a standard inspection frequency based on disturbance threshold or site complexity. Each site should be inspected at least at the initial, interim, and final phase.

- Develop or modify an existing checklist to assist inspectors with identifying and documenting deficiencies in construction site BMPs for soil erosion and sediment control BMPs. Check list forms for common BMPs may be developed early and modified based on comments provided by inspectors and office personnel. Checklists for less common BMPs and new technologies can be developed with experience, educational training, and governmental agency and manufacturer guidance. An example

of a construction inspection policy may be found at the Delaware Division of Soil and Water Conservation internet website:

www.dnrec.state.de.us/dnrec2000/Divisions/Soil/Stormwater/Mgt/ConstRevPolicy.htm

- Develop an electronic filing system for inspections. Consider using database software that is able to store photos and is compatible with GIS software.

- Provide contractors with self-inspection reports with final plan approval. This strategy may promote contractor compliance and enable inspection officials to gauge the level of understanding of the design plan requirements and Town regulations. An example of a contractor self-inspection report has been provided in Appendix E.

8.0 POST-CONSTRUCTION RUNOFF CONTROL

8.1 State and Federal Regulatory Requirements

New development and redevelopment projects have significant potential to increase pollutant loadings to receiving surface waters. These pollutants include solids, nutrients, organics, metals as well as physical impacts such as increases in temperature. The USEPA Phase I storm water permitting program did not specifically address the post-development impacts from land development that were not classified as "industrial activities", but the RIPDES General Permit for storm water discharges associated with construction activities does include requirements for "post-construction storm water management" (Section IV.E.2.b). While requirements for post-construction management are not specifically detailed in the general permit, it does require that the SWPPP prepared for the site include "a description of measures that will be installed during the construction project to control pollutants in storm water discharges that will occur at the site after the construction operations have been completed." No specific standards or goals for these controls are specified in the general permit.

RIDEM's Phase II storm water management regulations require regulated municipalities to develop, implement, and enforce a program to address storm water runoff from new development and redevelopment projects that disturb one acre or more of land and discharge into the municipality's MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts. This program must include the following elements:

1. Develop and implement strategies that include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the community.

2. Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law;

3. Ensure adequate long-term operation and maintenance of BMPs.

8.2 Existing Ordinances

Coventry currently has standards in place with regulatory mechanisms that allow the Town's staff to address post-construction runoff control. While most regulatory standards focus on control of storm water quantity, there are some that specifically intend to minimize water quality impacts from storm water runoff. These mechanisms are described in the following paragraphs.

8.2.1 Subdivision and Land Development Regulations

The regulations in place to address post-construction runoff control of new development and redevelopment sites are primarily concerned with the rate of storm water runoff. However, the important components of the regulations are:

- Article III(A)(4) requires that "there will be no significant environmental impacts from the proposed development as shown on the final plan.".

- Article IV(A) provides for the creation of a Residential Cluster Development (RCD) to concentrate single or multi-family dwellings in a portion of a lot, maintaining the rest of the lot as open space for conservation, recreation, agricultural, or preservation uses. This section of the regulations provides for the use of a non-structural BMP for the control of erosion after construction.

- Article XIII(B)(14) provides landscaping standards for disturbed areas near street construction. This section states that landscaping may be required in "areas subject to regrading or stabilization for soil erosion and sediment control purposes." This section also requires that "slopes created in a subdivision, building lot, detention pond, etc. shall not be less than three (3) to one (1)." Both of these provisions act as non-structural BMPs and help to eliminate erosion and sedimentation that may occur after construction.

- Article XIII(D) provides regulations for the design of drainage systems for subdivisions and land development projects. A drainage plan must be included, where required, with subdivision and land development plans submitted to the Town of Coventry. The plans must include calculations of storm water runoff from the pre- and post-developed site and the proposed drainage system that shows that post-development runoff rates will not exceed pre-development runoff in either rate or volume. The plan must also indicate "all open watercourses will be seeded, sodded, or paved, depending on grades and soil types." Additionally the following is required in § XIII(D)(5)(h):

  "Where volume velocity of the surface run-off is high, the flow thereof shall be controlled by rip-rap, sediment basins, flow spreaders, or other applicable devices and/or techniques recommended in the Rhode Island Soil Erosion and Sediment Control Handbook."

- Article XIII(G) gives provisions for site and subdivision designs that minimize adverse impacts to the environment. The specific areas of mention in Article XIII(G)(3) include lands in the flood plain, steep slopes in excess of 20% unless appropriate engineering measures to control stability and erosion are employed and unique and/or fragile areas that include freshwater wetlands are protected.

8.2.2 Zoning Ordinance

- Article VII, Section 7165 states that "industrial uses shall develop a Storm Water Management Plan which is approved by the Planning Commission prior to receiving a building permit. The Management Plan shall specify how the industrial use will prevent the mixing of industrial wastes, oils, and greases, with storm water runoff."

- Article X, Section 1052(D) states that "all final site drainage shall be designed, sloped, revegetated, or shall employ other measures so that erosion and siltation of water courses and ponds are avoided."

- Article X, Section 1052(E) states that the "site shall be revegetated to control dust, erosion, and to restore natural features to the site. The soil shall be stabilized by planting, seeding, or sodding so as to create a complete ground cover. The landowner or facility operator shall maintain the vegetation for at least two (2) full growing seasons after its initial planting."

- Article X, Section 1052(G) states that after site restoration is accomplished, there shall be no "increase in drainage rate and volume leaving the site."

- Article XVI, Section 1640 discusses the criteria for approval of a Development Plan Application and requires conformance to the following:

    - "The development shall be integrated into the existing terrain and surrounding landscape, and shall be designed to protect abutting properties and community amenities" by minimizing "tree, vegetation and soil removal, grade changes and subsequent erosion."

    - The plan must attempt to "prevent depletion or degradation of public drinking water supplies by employing best management practices for erosion control, storm water management, wastewater disposal and landscaping."

    - The plan "shall show adequate measures to prevent pollution of surface or groundwater, to minimize erosion and sedimentation in conformance with Chapter 5, Article III – Soil Erosion and Sediment Control, of the Code of Ordinances of the Town." "Drainage shall be designed so that runoff shall not be increased, groundwater recharge shall be maximized, and neighboring properties shall not be adversely affected."

- Article XVII provides requirements for landscaped buffers "between potentially incompatible land uses in order to minimize and mitigate the potential impacts of…storm water runoff…"

8.2.3 Soil Erosion and Sediment Control

Post-construction controls of soil erosion and sedimentation are identified in the following sections of the Soil Erosion and Sediment Control Ordinance:

- § 5-51(c)(7): "All drainage provisions shall be of such a design and capacity so as to adequately handle storm water runoff, including runoff from tributary upstream areas which may be outside the locus of the project."

- § 5-51(c)(8): "Drainage facilities shall be installed as early as feasible during construction, prior to site clearance, if possible."

- § 5-51(c)(11): "Permanent vegetation shall be placed immediately following fine grading."

- § 5-51(c)(12): "Trees and other existing vegetation shall be retained whenever feasible."

- § 5-51(c)(13): "All areas damaged during construction shall be resodded, reseeded or otherwise restored. Monitoring and maintenance schedules, where required, shall be predetermined."

8.2.4 Enforcement

The Soil Erosion and Sediment Control Ordinances requires the completion of a final inspection once the owner/applicant notifies the Building Official, or an appointed designee, of completion of the work, including grading, installation of drainage, erosion and sediment control measures and devices and planting of vegetation and ground covers. The Planning Director will report the results of the inspection in a final report that will be retained permanently in the Department of Inspections and Department of Public Works files. The owner/applicant may request the release of the performance bond, if required, twelve months after the final report is issued.

The Planning Commission has been designated as the regulatory agency for enforcement of the Subdivision and Land Development Regulations. The Administrative Officer, acting as the Board's agent, is responsible for coordinating application, review, approval and construction phases of land development projects. Penalties for violations of the Subdivision and Land Development Regulations may be assessed in proportion to the violation but not to exceed $500 per lot, per day for each violation.

The Zoning Enforcement Officer and Building Inspector (Official) are responsible for the enforcement of the provisions of the Zoning Ordinance, which includes reviewing applications to the Zoning Board of Review, keeping records documenting land use compliance, inspecting suspected violations, issuing violation notices, and collecting fines. Penalties for violations of the Zoning Ordinance may be assessed in proportion to the violation but not to exceed $500 per day for each violation.

According to the information provided by the Engineering Department and contained in the Subdivision and Land Development Regulations, the Planning Director currently has the task of inspecting approved BMPs and storm water management systems to ensure that the facilities have been constructed in accordance with the approved development plans.

8.3 Recommended Modifications

While the Town's current regulations include provisions for controlling post-construction runoff, they are largely targeted to controlling runoff rates and volumes as opposed to water

quality. Several modifications are recommended to better focus these regulations on the water quality aspects of storm water management. The following paragraphs summarize recommendations to comply with the minimum requirements of this control measure.

1. *Develop and implement strategies, which include a combination of structural and/or non-structural best management practices (BMPs) appropriate for the community.*

   Currently, post-construction best management practices (BMPs) are proposed by developers and their engineers and reviewed by the Town during the development plan review process. No formal requirements or strategies on BMPs currently exist that would provide guidance to Town staff. The following identifies our recommendations to comply with this requirement.

   - Base required BMPs on the Rhode Island Stormwater Design and Installation Standards Manual, dated 1993. We do not recommend that the Town develop independent BMPs in order to allow it to be consistent with statewide practices that will improve implementation by engineers and developers. However, considering the range of BMPs that have been developed since this manual was prepared, it is also recommended that RIDEM update this manual. The update could address not only new technologies, such as sand filters and constructed wetlands, but could also provide data on expected pollutant removal efficiencies. This will allow municipalities to better determine compliance with minimum pollutant removal requirements.

   - Consider whether the Town, based on past experience, should expressly prohibit any BMPs. While BMPs are specified in the Rhode Island Stormwater Design and Installation Standards Manual, there are some controls such as infiltration trenches that, while commonly shown in BMP manuals, have limited application in the northeastern United States.

   - Consider an alternative approach to addressing post-construction runoff that determines an appropriate level of controls based on the risk to water quality that a development poses. This would result in a lower level of controls for projects that posed less risk and a greater level of controls for projects that posed greater risks. Appendix F includes one approach that was implemented in Waterford, Connecticut to innovatively control water quality impacts as well as costs for BMPs to developers. It outlines a matrix that defines three escalating tiers of controls that are based on location of sensitive receiving waters, land use, percent imperviousness and size of development. If desired by the Town, this approach could also be incorporated as part of a public participation program. This program should include both the regulated community as well as other stakeholders.

2. *Use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law.*

As with Construction Site Runoff Control, the Town should develop an overlay district and regulations for the Zoning Ordinance to protect Special Resource Protection Waters (SPRWs). The Town should consider the following recommendations in addition to developing other applicable regulations:

- Require reporting of long-term operation and maintenance for storm water management systems in the overlay districts. Overlay districts for other sensitive areas, such as Flat River Reservoir, Stump Pond, and Quidnick Reservoir.

- Incorporate regulations to address specific development practices or require SWPPPs for long-term operation of sites in areas of SPRWs.

- Prohibit land uses with higher pollution potential in areas of SPRWs.

- Require BMPs that are specifically designed to prevent pollutants of concern from entering a SPRW.

The existing regulations do not address a number of storm water quality issues that need to be addressed to comply with Phase II requirements. These include planning and design standards for BMPs such as those currently specified in the Rhode Island *Stormwater Design and Installation Manual* as well as long-term maintenance and monitoring requirements. The following is recommended to comply with this requirement.

- Since the Development Plan Review process and Subdivision and Land Development Regulations apply to all land development and redevelopment projects in Coventry, the amendments should be focused on these regulations. Two mechanisms exist that could be helpful to modifying these regulations including:

    i. A model storm water control ordinance that has been developed by the Rhode Island Department of Environmental Management (RIDEM). A copy of this ordinance is included in Appendix G for guidance in developing the Town's regulations. This would require incorporating a separate ordinance into the municipal code or it could be added to the current zoning by-laws or subdivision regulations.

    ii. Modify the current regulations to include specific provisions to address storm water quality. This could be completed by incorporating sections of the RIDEM model storm water control ordinance into the Subdivision and Land Development Regulations. At a minimum, the following components of the model ordinance should be incorporated:

        - Section 5.2 Performance Standards: An important component of this section is that an applicant must demonstrate that their

controls remove the average annual total suspended solids (TSS) by at least 80%.

- Section 5.5 Facilitation of Maintenance: This includes requirements that will result in designs that will minimize maintenance.

- Section 6 Maintenance Requirements: This includes minimum maintenance requirements that need to be specified for BMPs. More detailed maintenance requirements are addressed in this section of the report.

- Section 7.3(A) Site Plan Calculations and 7.4 Narrative Description: While the existing regulations currently include submittal requirements, future submittals are recommended to include detailed descriptions of BMPs, their effectiveness and maintenance in order to confirm that the selected BMPs will meet the intent of the Phase II regulations.

- Section 8 Maintenance Agreements and Section 9 Performance Surety: Maintenance is an important component of the long-term performance of any BMP. These two sections require regulated land development projects to enter into enforceable agreements to maintain their BMPs, with performance surety in place to ensure maintenance.

- Section 11 Enforcement: While some mechanisms exist for the Town to enforce its Subdivision and Land Development Regulations and Zoning Ordinance, we recommend incorporating this section as it provides a clearer mechanism for enforcement of non-reporting and maintenance issues.

o Implement regulatory modifications as part of a public participation program. At a minimum, this program will review proposed regulatory modifications with the public. However, the program can be expanded to form a committee of interested citizens, including other consulting engineers and developers, to develop final regulatory changes. This recommendation has benefits to the Public Education and Participation minimum control measure of Phase II.

Modify the Zoning Ordinance and Subdivision and Land Development Regulations to require that drainage facilities and structures are designed by a registered professional engineer consistent with the design criteria of the *Rhode Island Stormwater Design and Installation Standards Manual.* The manual addresses both water quantity and the minimum water quality standards established by CRMC and RIDEM.

3. *Ensure adequate long-term operation of BMPs.*

The Town of Coventry has an extensive network of wetlands distributed evenly throughout the Town. The final draft of the *Coventry Comprehensive Community Plan* prepared by BRW Inc. dated June 19, 2000 states the following:

"Coventry's wetlands are a vital component in the community's ecological system providing a buffer for groundwater recharge areas, serving in a retention capacity alleviating flooding and providing a habitat for much of the Town's wildlife."

The report goes on to state that there are over 1,600 acres of surface water bodies comprised of rivers, lakes, ponds, brooks and streams as well as "one of the state's most significant" groundwater resources. As the water resources within the Town are many and vital, they are in need of protection.

BRW, Inc. stated in their report that the "groundwater reservoir and its recharge area exist in constant threat of contamination, ISDS, erosion, storm water runoff, road deicing, and fertilization." The report stresses the importance of erosion control to the groundwater resources by stating the following:

"Erosion, dramatically exemplified by massive gravel pit operations in Coventry, is a major threat to the aquifer by altering natural drainage patterns as a result of eroding the land's surface and further depositing this material as sediment in surface water bodies."

Unless contained in specific conditions of local or RIDEM approval language, existing regulations do not include provisions to ensure adequate long-term operation of privately owned BMPs. As a result, the following recommendations are made.

- Amend the Zoning Ordinance and Subdivision and Land Development regulations to require long-term maintenance of all storm water facilities. An example of a post-construction model ordinance is provided in Appendix H of this report to assist the Town with developing appropriate language for establishing long-term maintenance and compliance through the use of maintenance agreements, record keeping, and inspections. This language should also include provisions for reimbursement to the Town for O&M performed by Town staff when the property owner defaults on these responsibilities.

- Consider development of an electronic database to track BMP maintenance, complaints and inspections. The administrative commitment could be part of that developed to track sites during construction and would also provide a readily accessible documentation of compliance with the regulations.

- Consider adding a post-construction reporting component for the public (e.g., internet-based, etc.) that is part of a plan to receive inquiries under the Construction Site minimum control measure. This could help the Town in identifying non-compliance of BMP maintenance requirements and sources of potential pollution discharge into the Town's MS4 or surface waters.

- Consider implementing a public education program dedicated to land developers and owners of commercial and industrial properties that addresses more detailed maintenance needs for specific BMPs. Suggested practices for specific BMPs are summarized in Appendix I of this report.

- Consider including requirements for long-term monitoring of BMPs. Influent and effluent grab samples could be collected from storm events that generate between 0.5 and 1.0 inch of rainfall during a 24-hour period. Before sampling, there should be at least a 72-hour period of no rainfall, and pre-treatment (influent) samples should be collected during the first flush of the storm. Runoff generated by the first half-inch or first inch of precipitation is typically considered the first flush. Post-treatment (effluent) samples should be collected after pre-treatment samples are collected with a delay in time equal to the time the water is detained in the treatment system during that storm. Initial and long-term post-construction monitoring of water quality controls is recommended.

  Initial Monitoring: Initial monitoring should be performed within one year following installation and initial startup of the control system to assess the system's design and short-term pollutant removal efficiency. Sampling of five separate storm events is recommended in order to make a statistically valid conclusion as to the effectiveness of the treatment system. The samples should be collected during early spring (April) and late summer (August) in order to examine seasonal variation of treatment performance. At least two storm events should be sampled during each season.

  Long-Term Monitoring: Biennial (i.e., once every two years) monitoring should be performed to provide information on the long-term pollutant removal efficiency and operation and maintenance of water quality controls for developments requiring secondary or tertiary controls. Biennial monitoring should be initiated following completion of the initial, first-year monitoring program.

  The parameters that are recommended for initial and long-term monitoring are listed in Table 8.1 below. Discharge quality goals are also listed for each parameter. The ultimate goal would be for discharge quality to not be acutely toxic to aquatic life, however, this sampling does not account for stream dilution that would affect actual toxicity. At a minimum, it is recommended that storm water discharges achieve the listed quality goals that are achievable with proper storm water controls.

TABLE 8.1
BMP MONITORING PARAMETERS AND QUALITY GOALS

Parameter	Quality Goal
Oil & Grease	5 mg/l
BOD_5	5 mg/l
COD	75 mg/l
Total Kjeldahl Nitrogen (TKN)	2.5 mg/l
Nitrate as Nitrogen	1.5 mg/l
Total Suspended Solids (TSS)	100 mg/l
Total Phosphorous	0.5 mg/l
Fecal Coliform	2000 /ml
pH	6 - 9

4. *Ensure controls are in place that would minimize water quality impacts.*

The Town's current development plan review process now ensures that controls are in place to control water quality impacts. With the proposed modifications to the regulations, specific requirements for these controls will be stipulated, thereby minimizing the opportunity for inappropriate controls to be implemented as part of a development or redevelopment project. However, the Town's ability to ensure compliance with approved plans is limited based on available staff. The following recommendations are offered.

- Require inclusion of storm water BMPs on as-built drawings for review by the Town Engineer for projects with complex systems or that pose substantial risks to water quality.

- Prioritize sites of concern and include those sites in periodic inspections (e.g., once every year) to ensure proper maintenance of implemented BMPs. As part of this, the Town could also require specified projects to submit annual maintenance records.

- Successful implementation of these efforts would require staff time for both enforcement as well as record keeping. This, with the additional Phase II requirements, will likely exceed available staff time. The Town could consider the use of a summer intern(s) to assist with this effort.

8.4 Implementation Alternatives

The Phase II regulations require the Town of Coventry to implement certain best management practices (BMPs) in its storm water program to address post-construction runoff for new developments and redevelopment projects.

We have described each of the requirements for the Post-Construction Runoff Control minimum control measure and have provided below, for the Town's use, several BMP alternatives with appropriate measurable goals.

8.4.1 Develop and Implement Storm Water Strategies

The Town must develop strategies that include structural and non-structural BMPs appropriate to the community. Coventry's geology and landscape require special consideration to prevent water quality impacts caused by development projects.

- Identify areas and resources where specific types of BMPs are most appropriate, such as watersheds of impaired waters or aquifer recharge areas. In aquifer recharge areas, development or redevelopment projects should infiltrate non-polluted runoff as part of a storm water management plan to maintain or improve pre-development recharge volumes. Restricting the size of impervious lot coverage and large, contiguous paved areas can also be effective BMPs in recharge areas. Thermal pollution should be considered when identifying areas where certain BMPs may affect the ability of surface water to sustain aquatic plants or wildlife.

- Prepare a map of areas where increased levels of controls and long-term monitoring will be required, such as those that are defined by the Overlay Districts and wetlands. Make the map a part of the current regulations and available to the public to raise awareness of required storm water controls in sensitive areas. Require proposed controls to be performance-based and able to achieve water quality goals.

- Implement a program similar to the one used by the Town of Waterford, Connecticut (see Appendix F of this report). This program uses a tiered approach to determine the appropriate controls that must be implemented at a site depending on the type and size of the development or redevelopment project, impact risks and environmental sensitivity of receiving waters.

- Prepare a list of BMPs appropriate for the community as part of its Storm water Plan. BMPs may include a low impact development strategy for sensitive resources and areas within watersheds of impaired and sensitive waters. Additional information about post-construction runoff control BMPs may be found at USEPA's website:

  http://cfpub.epa.gov/npdes/stormwater/menuofbmps/post.cfm.

8.4.2 Post-Construction Runoff Control Regulations

Coventry must use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, Tribal or local law. The Town should:

- Adopt RIDEM draft model storm water control ordinance or modify existing regulations to require storm water controls and BMPs to comply with the *Rhode Island Stormwater Design and Installation Standards Manual*. RIDEM has established these performance

standards and design guidelines for structural BMPs to control storm water runoff quantity and improve the quality of storm water discharges.

- Require the submittal of "as-built" drawings that show the locations of all watercourses, wetlands, environmentally sensitive areas, and implemented BMPs, including the design specifications of each BMP used. Require that the as-built drawings are stamped and signed by a registered professional engineer.

8.4.3 Ensure Adequate Long-Term Operation of BMPs

In order for the Town of Coventry to comply with the USEPA Phase II requirements, a program must be implemented that ensures the continued long-term operation of structural and non-structural BMPS.

- Develop a standard, long-term inspection schedule that requires inspection of implemented BMPs by a registered professional engineer. A sample inspection checklist is provided in Appendix J and additional checklists for different types of BMPs may be obtained on the internet at www.stormwatercenter.net. In sensitive areas, more frequent inspections and reporting may be warranted.

- Amend existing regulations to require long-term operation and maintenance. Regulations could require: annual inspection and maintenance reporting from BMP owners; recording storm water operation and maintenance plans to be recorded in land evidence with the property's deed; or agreements that allow the Town to perform emergency maintenance at the expense of the BMP owner.

- Develop a public participation program that allows neighbors of developed sites to comment on the perceived function or dysfunction of implemented BMPs. Educate Town citizens at public hearings and through mailings of their right to comment on how well the storm water management systems function after construction is complete. Provide them with information as to where they can direct their comments (internet, mail-in reply card, storm water telephone "hotline," etc.).

- Require that all maintenance and inspection records be forwarded to the Town Engineer, or other designated official trained in storm water controls, for review. Require that the records be maintained for a certain period of time (i.e., 5 years).

- Solicit the help of Town citizens in tracking the performance of BMPs by recruiting volunteers, such as school classes and scout troops, to sample storm water runoff, streams, and rivers in environmentally sensitive areas.

9.0 POLLUTION PREVENTION /GOOD HOUSEKEEPING

9.1 State and Federal Regulatory Requirements

The goal of this element of the storm water pollution prevention plan is twofold. The first is to minimize the pollutants that enter the Municipal Separate Storm Sewer System (MS4) prior to being discharged to surface waters of the state. This would consist of pollutants from land uses that drain to Coventry's MS4 as well as those pollutants that are swept from municipally owned streets, parking lots, and facilities. The second goal is to minimize pollution caused by activities at municipal owned facilities such as storage of materials and wastes where they are exposed to precipitation.

The Phase II program that has been promulgated by the RIDEM requires regulated municipalities to develop a pollution prevention/good housekeeping element that achieves the above referenced goals. This element largely consists of properly maintaining existing infrastructure such as roads and drainage structures as well as implementing appropriate pollution control practices at municipal facilities. Specific regulatory requirements for this element of the storm water pollution prevention plan are:

1. Develop and implement an operation and maintenance program with the goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system; and

2. Include employee training on incorporating pollution prevention/good housekeeping techniques into municipal operations such as landscaping, car and truck fleet maintenance, building and public works yard maintenance, new construction, land disturbances, and storm water system maintenance. Training materials available from the USEPA and RIDEM may be used to assist with this task.

The Town of Coventry currently implements a street and drainage system maintenance program with the goal of minimizing the pollutants that discharge from their MS4. Information regarding these current practices and responsibilities for pollution prevention and good housekeeping were obtained from questionnaires and personal interviews with staff from the Department of Public Works (DPW), Parks and Recreation, School, Police and Fire Departments. The following summarizes the pollution prevention and good housekeeping techniques and policies employed by the Town.

9.2 Department of Public Works

A site walk through was also conducted of Coventry's DPW facility, the transfer station, and compactor were found to be in a neat and orderly condition. Recommendations for improving these facilities follow in Section 9.6.

9.2.1 Public Street and Parking Lot Sweeping

Annual sweeping is performed on all public streets and parking lots with some areas receiving additional sweeping as necessary to remove excessive sediment buildup. Annual sweeping typically occurs in the spring with the majority of the work is completed by July 4th. Major streets may receive more frequent sweeping, such as Arnold Road (from Rt. 3 to Rt. 95), as those also carry high traffic loads requiring more sand and salt to maintain safe winter road conditions. The method for determining which streets receive more frequent sweeping is the experience of DPW managers and staff based on past practices.

There are no parking bans in effect during the street sweeping season, however a sweeping schedule is posted on the Town's website found at http://town.coventry.ri.us and in the local newspapers (Kent County Times and The Reminder) or may be obtained by calling the Public Works office. An example of a recent notification is provided in Appendix K. The DPW also attempts to minimize interference by sweeping during the day after most residents have moved their vehicles. Kent County Water Authority is responsible for hydrant flushing and do not coordinate their schedule with the DPW. There is minimal coordination between street sweeping and curbside waste pick-up.

Streets and municipal parking lots are swept using the one Town-owned mechanical brush-type Elgin sweepers approximately 4-5 years old. There are six Town employees certified to operate this equipment. Each year additional sweeping is provided by a contracted local business. The DPW has indicated that the contractor's sweeper equipment does not adequately remove pavement sediment. The present contractor does not meet the Town's sweeping needs. The sediment collected by the sweepers is either used as pipe underlay in drainage projects or disposed of at the Rhode Island Central Landfill in Johnston. The quantity of sediment collected is not tracked.

9.2.2 Storm Water System Inspection and Cleaning

The Town of Coventry has no knowledge of any connections they have with neighboring towns and believes the only storm water passing out of Coventry is by natural flow. The Town's illicit detection program is discussed further in Section 6.0.

There is currently no written cleaning program that targets specific areas or establishes schedules for cleaning the Town's catch basins, detention basins, or drainpipes. There are roughly 2,150 catch basins and 25 detention ponds in the Town of Coventry. The DPW has a record of where catch basins, detention/retention basins, water quality swales or ditches are located. These records are stored as layer on the Town's GIS system. Catch basins are cleaned solely by a contractor using a bucket truck. These activities occur annually in the spring, usually timed to follow the Town's road sweeping efforts. Reportedly, 99% of the catch basins are cleaned annually. The contractor marks each catch basin after it is cleaned. Catch basins located at the bottom of hills that receive heavier sanding and areas known for having chronic problems are given priority for inspection and cleaning. Often these catch basins are cleaned more frequently. The depth of sediment is not tracked at any of the catch basins.

If sediments appear to be contaminated in a structure, the DPW director is notified, and the problem is investigated. If the sediment appears to be untainted, the DPW staff will use this material in pipe underlay projects or transport it to the Central Landfill. The amount of sediment collected is not recorded.

Storm drain outfalls and catch basins are not typically inspected for erosion nor do they receive preventative maintenance. The DPW corrects problems as they are reported either by residents or by those cleaning the catch basin. The purpose of such inspections would be to identify whether debris must be removed from the drainage system or if temporary repairs are necessary.

According to the Town DPW, there are several detention basins in Coventry. The Town owned detention basins (wet) are cleaned typically when calls are received from the public requesting maintenance or when municipal staff observes flooding problems. Currently, it is the policy of the Town to maintain all structures in residential subdivisions regardless of Town ownership with the exception of residential compounds with private roads. All non-residential drainage structure maintenance is the responsibility of the owner. Additionally, there are no records available documenting maintenance practices or schedules for these facilities.

The Rhode Island Department of Transportation (RIDOT) and the Town of Coventry do not usually coordinate their efforts but have a good working relationship. If an issue with the State storm water system is noted, such as a clogged catch basin, then the DPW reports it to RIDOT who is responsive in correcting the problem. The State maintains their own roads and storm water systems, with the Town assuming some responsibility for the locations where they tie into the State system. The town/state line is not explicitly marked but DPW and RIDOT employees are aware of the boundaries through experience. There is no process to coordinate or approve access in utility right-of-ways.

9.2.3 Fleet Vehicle Maintenance

Maintenance and repairs of municipal vehicles are handled separately for all departments. The Fire, School and Police departments contract local mechanics for most of their maintenance needs. The DPW conducts all of the maintenance on their vehicles indoors at their garage. Reportedly, the DPW garage has no floor drains.

Most large Town vehicles are washed outside the Public Works garage on an equipment washing pad. The water from this pad drains into two catch basins. There are plans to upgrade this system to not only collect, but also recycle wash waters. Smaller municipal vehicles such as those from the DPW and Police Department are washed at a contracted local car wash facility.

9.2.4 Winter Road and Lot Maintenance

All public roads and parking lots in Town are maintained by the DPW. During a snowstorm, the DPW has 22 trucks at their disposal to plow and treat most roadways with a sand to salt mixture of 3 to 1 as necessary. The spreaders use speed-dependent applicators that are calibrated by the drivers. Upon a resident's request, only sand may be applied instead of the

sand/salt mixture. The DPW will mobilize in anticipation of icing conditions and apply deicing materials to arterials, busy intersections, and hills.

Sand and mix piles are stored uncovered outdoors in an area adjacent to the Public Works building. The Town of Coventry is currently in the bidding stage of constructing a covered area for the Town's salt mixture. There is currently no written plan for how deicing materials are to be prepared and applied. However, there may be more frequent applications to icing prone portions of Town. Application frequency and priority areas are determined by DPW employees' experience. The Highway Division maintains purchasing records to track the amount and type of material used.

9.2.5 Solid Waste Removal and Handling

The Town of Coventry provides weekly curbside Refuse and Recycling collection to 2,000 homes. The Town notified residents of this program through newsletters and on the Public Work's Internet web page (http://town.coventry.ri.us/works.htm#san) and through educational materials distributed with new recycling bins. Information on acceptable yard waste material, curbside storage, and pickup schedules are also presented in these media. Solid wastes are currently collected and compacted in Coventry at the DPW facility and then hauled to the Rhode Island Resource Recovery Corporation (RIRRC) facility in Johnston, Rhode Island. (Central / Johnston Landfill) Recyclable items are hauled directly to the recycling center (MRF). The amount of refuse and recycling collected is recorded separately using tipping slips from the Central Landfill and the recycling center, respectively. For more information about RIRRC, residents can call (401) 942-1430 x 775 or view their website at www.rirrc.org.

White goods (i.e., dryers, refrigerators, etc.) are collected at the DPW facility, inventoried and the hauled to the Central Landfill. The pickups of these items are done by appointment and usually on the residents normal trash pick up day. Additionally, any freon in these items is removed by a certified handler, Dan Croy, prior to transfer from the DPW facility. The Town is charged for this removal. Yard wastes are collected by the Town and then sent to the Richmond Composting Facility, a state certified facility.

The Town also provides curbside Christmas tree pick up to residents during the month of January. The trees are removed on the same day as trash collection. The Christmas trees are chipped and used for roadside projects and in Town parks.

The Highway Division is responsible for litter clean-up programs along Town roads, while RIDOT and RIDEM coordinate efforts along state roads and in state parks, respectively. The Town disposes of any litter collect at Central Landfill.

Despite the many programs for waste disposal in Coventry, there are many areas where illegal dumping is a chronic problem. The Town has an ordinance on this issue but is currently not effective in reducing the problem. An OSCAR (Ocean State Cleanup and Recycling) program was once available to the Town through funding from the RIDEM but they have recently discontinued the program due to budget cuts. Following this discontinuation, the Town has provided the funds needed for the program. The team of six area high school students collects

over 450 bags of garbage during the 9-week summer period. This garbage is collected from a variety of locations including waterfront properties, dams, rivers, and picnic areas. Garbage, tires, white goods, and mattresses are all materials disposed of in these areas. Guy Lefebvre, Director of Parks and Recreation, did indicate that many different groups do help with this clean up effort including the local scouting troops, athletic leagues, church groups, PRA and the SRICD, but believes that the OSCAR team is essential to reducing the amount of trash that discharges into Coventry water bodies.

9.2.6 Hazardous Materials Handling and Storage

The Highway Garage generates and controls a significant portion of the municipal hazardous waste generated in Coventry due to the nature of facility operations, such as automotive fleet maintenance.

Waste motor oil is stored outdoors in an oil Igloo. Advanced Liquid Recycling of Johnston, RI removes all automotive fluids from the garage property when necessary. The Town does not accept household waste oil. New oil and hydraulic fluids are stored in a shed with containment attached to the DPW garage. All paints and solvents are stored in an explosion proof sealed locker located at the DPW yard.

The Town does not have a household hazardous materials collection program and residents are requested to contact RIRRC's Eco-Depot for information. Eco-Depot is a free service for Rhode Islanders who wish to dispose of their household hazardous waste safely and properly. The service is available by appointment only or by going to a Household Hazardous Waste Collection day. For a list of collection dates and other pertinent information including the types of waste Eco-Depot accepts, please view their website at www.rirrc.org/site/ecodepot/eco_main.asp. To request an appointment, please e-mail ecodepot@rirrc.org and for questions, please call (401) 942-1430 x 241.

9.2.7 Tree Management

The Town has a tree warden that oversees tree management in Coventry. The tree warden's primary responsibility is to advise the public but has little power to direct the municipality or private citizens on proper pruning or tree removal. There is currently no explicit tree ordinance in place although the subject is mentioned in the subdivision regulations and soil erosion and sediment control ordinance.

9.2.8 Cemeteries

Coventry contracts a certified landscaping company to provide all yard work service to the Town's many cemeteries. The contractor simply mows all areas, mulching the clippings and leaving this material on the yard areas. No fertilizers or pesticides are used on cemetery locations.

9.2.9 Spill Response

The Fire Department is available to handle significant spills at the Highway Garage. Some materials, such as speedi-dry and absorbent pads (PIGS), are stored at the Highway Garage facility and on DPW trucks for incidental spills.

9.2.10 Personnel Training Program

There is no specific spill and storm water pollution prevention training for the mechanics or those working in the Highway Garage. However, spill response procedures are posted throughout municipal facilities (see Appendix K).

9.3 Recreation and Parks Department

The Recreation Department maintains facilities in Town such as the baseball fields, tennis and basketball courts and various beachfront properties and the Town bike path. There is a program to monitor all leagues and uses of the facilities. With the exception of a family or small group of friends, applications are required to schedule use of the Town's facilities. Charity or personal washing of vehicles is not allowed on any of the department's facilities. There are no floor drains at any of the facilities.

9.3.1 Cutting and Clearing

Cutting and clearing is performed by the Town staff only. Lawn clippings are not collected from park grounds. Leaves are raked and brought to the Town transfer station. Larger trimmings are chipped and reapplied on landscaped area. The chips from brush and trees are also used as erosion control in unmowable areas.

The Recreation Department owns several lawnmowers and other landscaping equipment that it stores at the two Parks and Recreation garages, in the basement of the Community Center or outdoors. Minor maintenance activities on Parks and Recreation equipment are performed at the Community Center or the Highway garage and if major repairs are needed a local mechanic is contracted. Waste oil is collected and disposed of in the Highway Garage's oil Igloo. Oil and additional maintenance fluids are stored inside the garage at the Community Center in flameproof containers.

9.3.2 Fertilizer and Pesticide Application

Parks and Recreation Department employees are responsible for spreading fertilizer, herbicide and pesticide (grub worm focused) on athletic fields usually once per year. Lime is also applied when needed, usually once every two years. The Department's staff treats fields and areas when it is necessary, when problems are noted. Currently the soils to be treated are occasionally tested by the staff. This testing is usually at new treatment locations to establish a baseline. The Parks and Recreation staff has extensive history of all treatment locations throughout the Town and they believe that this experience is sufficient given the time and cost of the testing alternative.

The Town uses granular fertilizer and pesticide spread by a tractor with associated spreader. The rate of application is regulated and adjustable. The department also uses a liquid weed killer. The department strives to use all of the landscaping products prepared for an area, therefore, there is very little storage of these products.

The Recreation Department maintains a file of all MSDS forms on all products used by the department. This binder includes storage locations and a copy is maintained with the Fire Marshal. Most chemicals used by the Department of Parks and Recreation are stored at the community center or central Coventry park garages. These chemicals are stored on pallets or platforms in rooms without floor drains.

9.3.3 Solid Waste Removal and Handling

The Parks and Recreation Department staff collects trash from uncovered 55 gallon barrels located throughout their operated grounds. Trash is removed weekly, or as needed, and is disposed of at the Town transfer station.

The Recreation Department performs regular litter pick-up at sites throughout the Town. These clean up efforts are primarily during the summer months using the Town's OSCAR team. Occasionally a community groups such as the Boy Scouts, Athletic Leagues, Church groups, PRA, Conservation Commission and school groups will assist with the clean up effort. There are also signs at some of the sites to discourage littering.

9.3.4. Pet and Bird Waste

The Director of Parks and Recreation has placed twelve signs throughout the town, notifying residents to leash and clean up after their dogs. The signs read "Please Leash, Curb and Cleanup after Your Dog. It's the Right Thing to Do." The Town is also in the process of purchasing dog bag dispensers to be places along the bike path and may be expanded in the future to include other problem areas.

The Town of Coventry also has an ordinance prohibiting the feeding of waterfowl. Signs are placed at many locations where there have been problems. These signs reference the ordinance but, reportedly, patrons of these locations do not seem to be influenced. Mr. Lafebvre believes that this activity will not change unless there is a clear message given to the residents. The local newspaper has been known to print pictures of people feeding the ducks on the front page, even with the "Do Not Feed the Ducks" sign within the frame.

Mr. Lefebvre considers a major problem in the Town of Coventry to be the excessive number of Canadian geese, which have a constant presence in the Town. These animals are particularly a problem at locations containing large fields. The staff has tried many plans to deter the geese including spraying fields with grape juice and "goose-be-gone" without success. They are currently trying a new plan of separating large fields into smaller areas to deter the geese from landing.

9.3.5 Spill Response

The Fire Department is available to handle significant spills at recreation facilities. Some materials, such as speedi-dry and absorbent pads (PIGS), are stored at various facilities for incidental spills. The Parks and Recreation Department keeps a written record with the Fire Marshal of all chemicals stored by the department. The record includes the MSDS forms and its exact location within department facilities. This record is updated as needed.

9.3.6 Personnel Training Program

There is no specific spill and storm water pollution prevention training for Parks and Recreation employees.

9.4 School Department

The School Department operates separately from the rest of the Town and takes care of most of their own maintenance needs. Floor drains can be found in restroom facilities within school buildings. These floor drains are connected to the facility's septic system. The School Department does not have a routine inspection or cleaning program for these structures. When a problem is observed the proper steps are taken by custodial staff to correct it.

9.4.1 Landscaping and Athletic Field Maintenance

The Coventry School System maintains the landscaped areas around all ten of their school campuses. Occasionally, a certified landscaping company, Alan Seed, is hired to assist with this effort. Fertilizers are regularly used on school fields such as the High School athletic fields. The fertilizers, in pellet form, are applied using rotary and drop spreaders. Soil samples are not collected before a lawn area is fertilized. An integrated pesticide program is used. There is one School Department employee that is a certified pesticide applicator.

Branches and leaves are raked and hauled by the School staff to the Town's transfer station. The school grounds are mowed as needed, usually weekly. Lawn clippings are not removed from field areas.

Lawn care chemicals and equipment including three larger and six smaller lawn mowers are stored at the High School athletic field's storage building. There is a minimal amount of pesticides and fertilizer stored at School facilities.

9.4.2. Winter Lot Maintenance

The School Department's utility crew provides snow removal from its parking lots, driveways, and sidewalks. Seven plows, seven trucks and three sanders are available to the utility crew. The School Department acquires their deicing materials from the Town as needed. A barrel filled with a sand and salt mix is placed inside each school facility. In the spring, sediment is raked, collected, and brought to the Town transfer station. In cooperation with the DPW staff, the schools' parking lots are swept every spring. The school utility staff is responsible for

sweeping all sediment found on the sidewalks into the parking lot and then the DPW sweeper collects the sediment from the parking lot.

9.4.3 Vehicle Maintenance

The School Department contracts Laidlaw Transportation for all of their busing needs. The maintenance of the buses is the responsibility of this company. The vehicles that the School department owns, various trucks and small vehicles, are maintained at the Physical Plant garage located on Wood Street. Occasionally a vehicle will require significant maintenance and the Town will contract a company to do that work. Waste oil and filters are stored inside in cabinets. There are no floor drains or catch basins located at the garage. School department vehicles are washed without soap products outside the Public Works garage on an equipment washing pad.

9.4.4 Waste Disposal

The School Department uses a private contractor, typically Tri State Trucking, to remove trash, and recyclables, from their facilities. Trash is picked up twice a week, while cans are removed once a week and cardboard is collected every other week. The amount of trash and recyclables collected from School facilities is recorded on tipping slips from the hauler and sent to the Town. Waste materials and fluids are brought to the Town's transfer station for further disposal. There is a recycling program in place throughout the school system, which is managed by the Facilities Director.

9.4.5 Spill Response

The Fire Department is available to handle significant spills at school facilities. The schools own spill kits for asbestos, PCB ballasts, and blood. However, mechanics lack spill kits for maintenance fluid spills.

9.4.6 Personnel Training Program

There is some training provided in the school department, including universal precaution training. There is no written protocol that specifically deals with storm water pollution prevention.

9.5 Fire Department

Coventry has seven fire stations located throughout the Town. Their locations are as follows:

- Central Coventry - located at 2847 Flat River Road.
- Coventry Fire - located at 571 Washington Street.
- Harris Fire - located at 701 Main Street
- Hopkins Hill Fire - located at 1 Bestwick Trail
- Tiogue Fire - located at 240 Arnold Road
- Washington Fire - located at 2 Station Street
- Western Coventry Fire - located at 2084 Plainfield Pike

Three of the fire stations, Central Coventry, Coventry and Western Coventry, have unblocked floor drains. The floor drains lead to leach fields located on station property. Coventry Fire District is the only station that explicitly uses their floor drains and this is for vehicle and equipment rinsing activities only (no detergents are used). The remaining stations either do not have floor drains or they have been closed.

9.5.1 Vehicle Maintenance

All vehicles are maintained in the station where they are assigned. This includes washing and daily fluid checks. A small amount of fluids, including motor oil and antifreeze, are stored in each station usually in a storage closet. Any major work on the fire department vehicles is contracted out to a certified mechanic

All stations except Coventry Fire District wash their vehicles outside on the stations driveway. The wash water from these activities drains into the street. Most stations indicated that a mild detergent was used during washing activities, in most cases, this soap was also biodegradable.

9.5.2 Spill Response & Personnel Training Program

The primary responder for any spill in the Town of Coventry is the local Fire Department. The training varies between fire departments and individual firefighters but most are hazardous material operators certified. Some firefighters are trained at the technician level. Firefighters are recertified for their titles annually. The different fire districts maintain various spill response kits ranging from speedi-dry to PIGS and other types of absorbent towels. The Coventry Fire District owns a foam truck that is dispatched for large hazardous waste spills. For spills of a significant size, RIDEM is notified and maintains the leadership role.

9.6 Implementation Alternatives

The Town of Coventry currently implements many of the elements of a successful operation and maintenance program. Critical to the success of this program, is the need to define specific responsibilities and to create a documented schedule for implemented controls. The following paragraphs describe ways to achieve compliance with the standards of the Pollution Prevention/Good Housekeeping minimum control measure.

1. *Develop and implement an operation and maintenance program with the goal of preventing or reducing pollutant runoff from municipal operations into the storm sewer system; and*

While the Town of Coventry has incorporated many of the elements of a successful operation and maintenance program, this report offers several alternatives for the Town to consider upgrading the effectiveness of its current programs. These suggestions have been divided into each of the principal operation and maintenance functions provided by the Town.

a) Public Street and Parking Lot Sweeping

- The Town of Coventry is responsible for sweeping all roadways within its borders. With the exception of state and private roads, the Town sweeps this pavement annually. The Town's DPW could increase these activities to two sweepings per year to collect both post-deicing wastes in the spring and leaf litter in the fall. The Town's DPW should consider having a dedicated crew to successfully complete this task along with all other DPW responsibilities. Establishing this may require the Town to hire additional employees.

- Formally identify streets that will be swept more frequently and develop a schedule for sweeping those streets.

- Develop sweeping records to allow the sweeping program to be evaluated and determine specifically what streets should be swept more frequently and at what intervals. These records could simply consist of noting the dates that the street was swept and the approximate volume of sediment removed. This data could be used to determine if more frequent sweeping should be conducted on some streets and less frequent sweeping on others. This data could also be used and compared to sand application data to determine the effectiveness of the sweeping program.

- Note areas that collect sediment or trash rapidly during sweeping operations as part of the record keeping process. These areas should then be further investigated to determine the source of the pollutants (e.g., erosion, poor waste handling operations, or construction activities).

- Enforce on-street parking bans or limit parking to one side of the street during the scheduled day of sweeping. This may only be necessary in more densely populated areas of Town. Sweeping effectiveness can be significantly enhanced if the sweepers have access to the curb.

- Consider purchasing an additional sweeper or hiring another contractor to assist in pavement sweeping activities. A tandem-sweeping program can enhance the sediment removal rate. Each piece of equipment should have at least two fully trained crews.

- Modify existing training program for equipment operators to include operation of equipment to prevent pollution, record keeping and proper storage of sweepings. This training should also include discussions of methods to detect and isolate polluted sediment.

b) Detention basin, catch basin and storm drain inspection and cleaning

- Consider purchasing a bucket or vacuum truck for catch basin, detention basin, and storm drain cleaning activities. Town owned equipment would allow for quicker response time and consistent and detailed reporting. A cost/benefit analysis should be completed before proceeding with this equipment purchase.

- Establish a documented inspection and cleaning schedule that prioritizes areas based on potential pollution and flooding impacts. Prior to establishing a formal storm drainage inspection and cleaning program, the Town should conduct a pilot program where they select several catch basins in various parts of the Town representing different land uses. These basins should be inspected monthly after cleaning for one year to determine how rapidly sediment accumulates in them. This pilot program should provide Coventry with a basis to determine appropriate regularly scheduled cleaning.

- Maintain electronic records of all cleaning and inspections for the Town's storm sewer system to allow easy reference by street and to identify potential problem areas.

- Develop a checklist for inspection procedures and a reporting mechanism to allow any necessary cleaning to be scheduled.

- In conjunction with planned roadway improvements, evaluate the need to replace or reconstruct catch basins, particularly in areas with chronic flooding problems or sedimentation in receiving waters.

c) Fleet vehicle maintenance

- Develop procedures for spill prevention and cleanup procedures. Appropriate staff, including drivers and "first responders," should receive annual training in these procedures to both raise awareness as well as to minimize the potential for a spill to enter the MS4.

- Complete the wash water collection and recycling project.

- Close and seal floor drains in the Fire Department's garages that discharge to either drywells or leaching systems. Investigate floor drains in Fire Stations with unknown connections.

- Consider allowing the fire departments to wash their equipment and vehicles on the municipal washing pad when completed. Until that time, suggest to the districts that they wash their vehicles outdoors at a location that does not discharge into the storm drain system.

d) Winter road and lot maintenance

- Continue with the Town's project to construct enclosed storage for road salt, sand/salt mix, and sand piles. Dissolved salts and sediments from exposed piles have potential water quality impacts.

- Consider identifying areas and ways the Town can reduce the amount of sand and salt used on roads and parking lots without compromising safety. For example, ensuring proper spreader calibration and using road temperature sensors to estimate an appropriate level of salt application. Also, records of salt use, meteorological

conditions, and effectiveness could be maintained for areas where large of amounts of deicing salts have historically been used.

e) Municipal landscaped areas maintenance

- Consider targeting an education campaign towards discouraging feeding geese in public parks.

- Continue with the Town's project to provide pet owners with bag dispensers at frequented location. The Town should also ensure that waste receptacles are placed in conjunction with the dispensers to insure that patrons are given the opportunity to dispose of their pet waste properly.

f) Solid waste removal and handling

- Install signage along open drainage systems and roadways where yard waste disposal has been observed, banning illegal dumping, warning potential polluters of mandatory fines, and providing an incident report telephone number.

- Conduct a survey of residents to determine their current practices to dispose of household hazardous wastes, waste oils, and automotive fluids. This survey would determine whether public education or solid waste services should be enhanced as well as increase public awareness.

- Consider having the DPW consistently publish a semiannual newsletter that provides residents with information about where and how they can properly dispose of waste as well as the impacts of improper disposal. For example, the newsletter could promote services like Eco-Depot and list out quantities of dumped materials the DPW retrieved. Refer to Appendix K for an example of a newsletter distributed in the City of Pawtucket. Additionally, this information, including electronic copies of the DPW newsletters, should be included on the municipal website.

g) Hazardous materials handling and storage

- Post prominently displayed emergency action plans in areas where hazardous materials are used or stored in the event of spills or accidents.

- Provide easily accessible equipment or materials to properly minimize the impacts of spills. Also provide response training and instructions on proper disposal of cleanup waste.

- Perform annual training and practice drills to reinforce proper emergency action and to determine weaknesses in current operations or to develop new BMPs.

- Conduct a detailed inspection annually of the Public Works and School Department garages (Physical Plant), and Fire Stations to identify potential pollution sources and take appropriate action to address known deficiencies.

2. *Include employee training on incorporating pollution prevention/good housekeeping techniques into municipal operations such as landscaping, car and truck fleet maintenance, building and public works yard maintenance, new construction, land disturbances, and storm water system maintenance. Training materials available from the USEPA and RIDEM may be used to assist with this task.*

10.0 PLAN SUMMARY/IMPLEMENTATION MEASURES

The Town of Coventry currently implements many of the elements of a successful Storm Water Management Program. In order to fully comply with the RIPDES General Permit issued by RIDEM, the Town must implement additional measures. The following table (also found in Appendix L) outlines those measures, identifies the responsible parties, measurable goals, and provides a schedule for implementation over the five year permit term. The listed measures were identified through several workshops conducted with the Town's Storm Water Committee. Technical Memorandums (TMs) were prepared for each of the six minimum control measures. At these workshops the TMs were reviewed and implementation alternatives were discussed. Where possible, the measurable goals are identified as quantifiable measures. In other instances the measurable goals are presented as discrete activities. For these, the conduct of the activity is intended to serve as the goal.

11.0 PROGRAM EVALUATION

11.1 Revisions to Storm Water Management Program

The Town must annually evaluate the compliance of its storm water management program with the conditions of the general permit. The evaluation must consider the appropriateness of the selected BMPs in efforts towards achieving the defined measurable goals. The storm water management program and associated plan may be changed in accordance with the following provisions:

- Changes adding (but not subtracting or replacing) components, controls or requirements to the Plan may be made at any time upon written notification to RIDEM,

- Changes replacing an ineffective or infeasible six minimum control measure BMP, specifically identified in the SWMPP, with an alternative BMP may be requested at any time. Unless denied, changes proposed in accordance with the criteria below shall be deemed approved and may be implemented sixty (60) days from submittal of the request. If the request is denied, RIDEM will send a written explanation of the denial. Changes replacing an ineffective or infeasible storm water control specifically identified in the SWMPP or in an approved Scope of Work document to meet the requirements of an approved TMDL, may be requested at any time, however, written approval from the Department must be received prior to implementing changes.

- Modification requests, must include the following information:
  - Analysis of why the BMP is ineffective or not feasible (e.g., cost prohibitive).
  - Expectations on the effectiveness of the replacement BMP.
  - Analysis of how the replacement BMP is expected to achieve the goals of the BMP to be replaced.

Revision requests or notifications must be in writing and signed in accordance with the signatory requirements of the permit.

RIDEM may require changes to the Plan as needed to:

- Address impacts on receiving water quality caused or contributed to by discharges from the MS4,
- To include more stringent requirements necessary to comply with new Federal statutory or regulatory requirements, or
- To include such other conditions deemed necessary to comply with the goals and requirements of the Clean Water Act.
- Include a revised scope of work and implementation schedule necessary to comply with the TMDL requirements.

11.2 Annual Report

The Town must submit an annual report that summarizes information regarding storm water management activities during the previous calendar year and planned activities for the upcoming year. The initial report is due one year from the effective date of the general permit and annually thereafter. Provided in Appendix M is a draft template for annual reporting.

The following information must be contained in the annual report:

- A self assessment review of compliance with the permit conditions.
- Assessment of the appropriateness of the selected BMPs.
- Assessment of the progress towards achieving the measurable goals.
- Assessment of the progress towards meeting the requirements for the control of storm water identified in an approved TMDL.
- Summary of results of any information that has been collected and analyzed. This includes any type of data.
- Discussion of activities to be carried out during the next reporting cycle.
- A discussion of any proposed changes in identified BMPs or measurable goals.
- Date of annual notice and copy of public notice.
- Summary of public comments received in the public comment period of the draft annual report and planned responses or changes to the program.
- Planned municipal construction projects and opportunities to incorporate water quality BMPs, low impact development as well as activities to promote infiltration and recharge.
- Newly identified physical interconnections with other small MS4s.
- Coordination of activities planned with physically interconnected MS4s.
- Summary of the extent of the MS4 system mapped, actions taken to detect and address illicit discharges including: the number of illicit discharges detected, illicit discharge violations issued, and violations that have been resolved. Number and summary of all enforcement actions referred to RIDEM.
- Summary of the number of site inspections conducted for erosion and sediment controls, inspections that have resulted in an enforcement action, and violations that have been resolved. Number and summary of all enforcement actions referred to RIDEM.
- Summary of the number of site inspections conducted for proper installation of post construction structural BMPs, inspections that have resulted in an enforcement action, and violations that have been resolved. Number and summary of all enforcement actions referred to RIDEM.
- Summary of the number of site inspections conducted for proper operation and maintenance of post construction structural BMPs, inspections that have resulted in an enforcement action, and violations that have been resolved.
- Reference any reliance on another entity for achieving any measurable goal.

11.3 Record Keeping

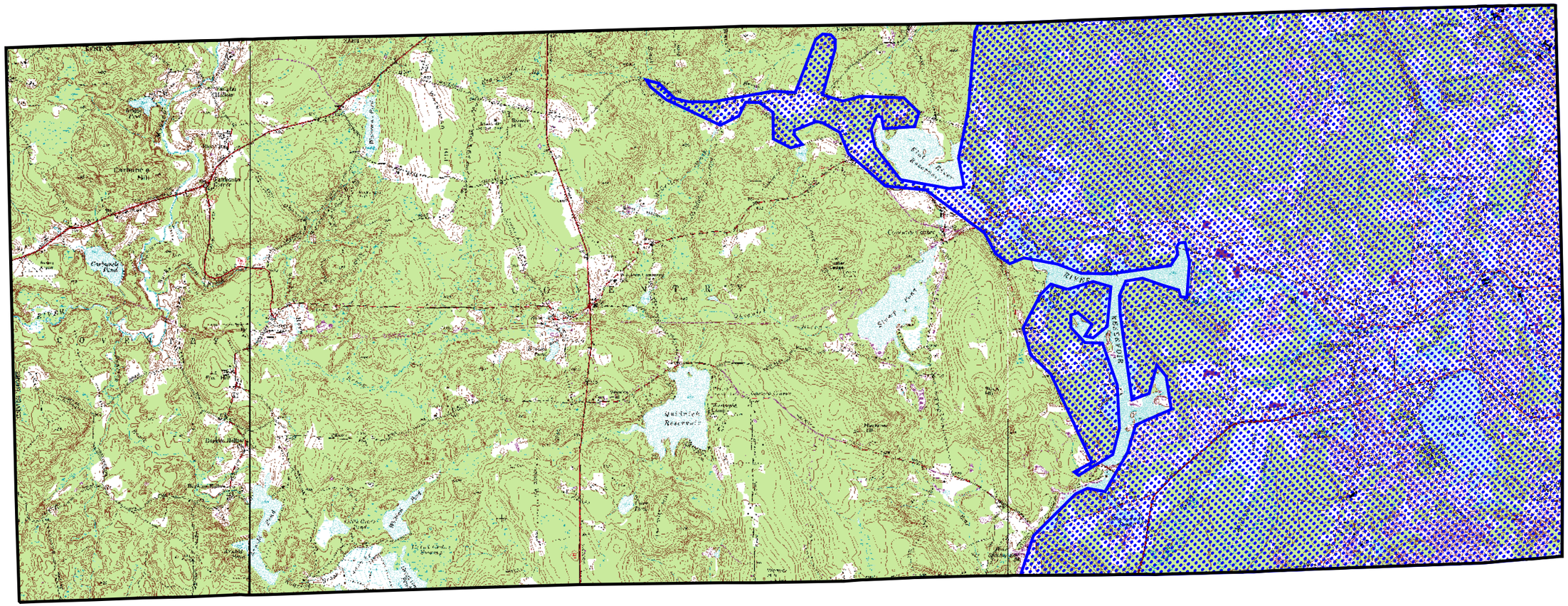
All records required by the general permit must be kept for a period of three years. Records include information used in the development of the storm water management program, any monitoring, copies of reports, and all data used in the development of the notice of intent.

Records need to be submitted to RIDEM only when specifically requested by the permitting authority. The Town must make this plan and records relating to the general permit available to the public.

FIGURES

Figure 1

Town of Coventry
Urbanized Areas



Scale: 1" = 5000'

Urbanized Areas, as delineated in the 2000 Census

Source: All data layers compiled from RIGIS and the US Census Bureau

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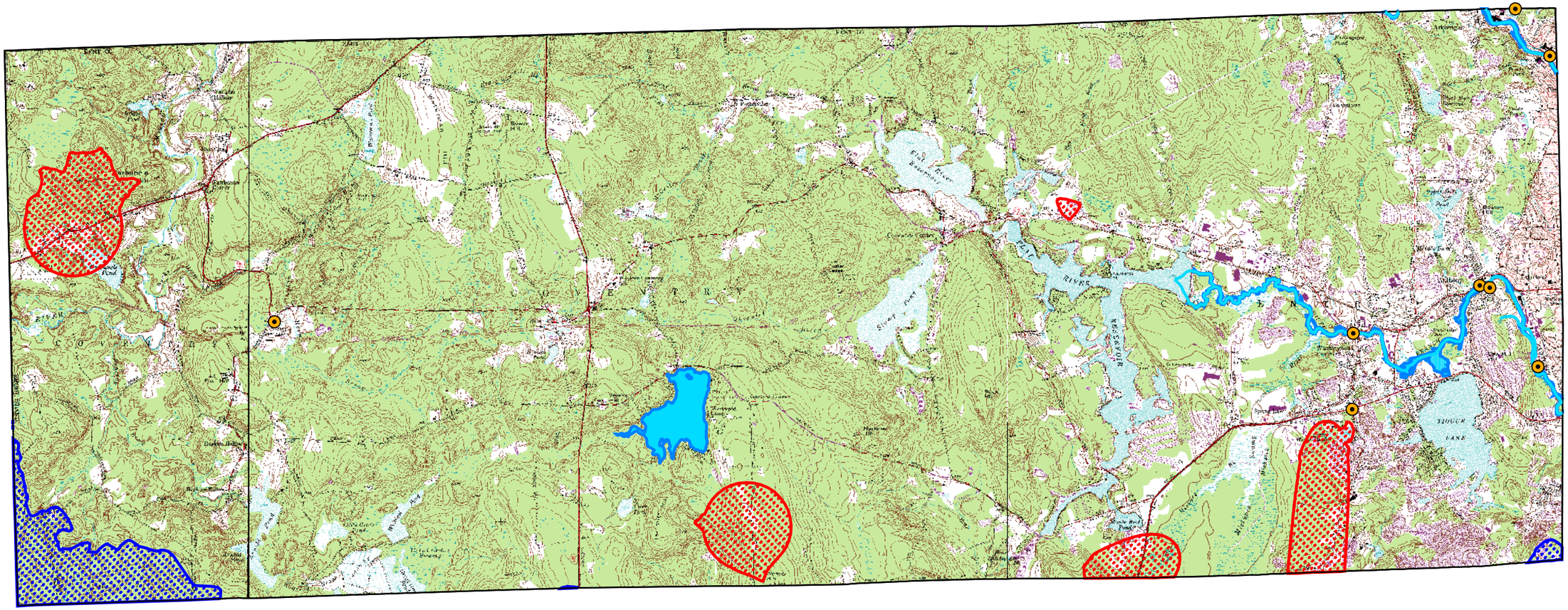
December 2002

Figure 2

Town of Coventry
Impaired Waters



Scale: 1" = 5000'

RIPDES

Impaired Fresh Water

Sole Source Aquifer

Wellhead Protection Areas

Source: All data layers compiled from RIGIS

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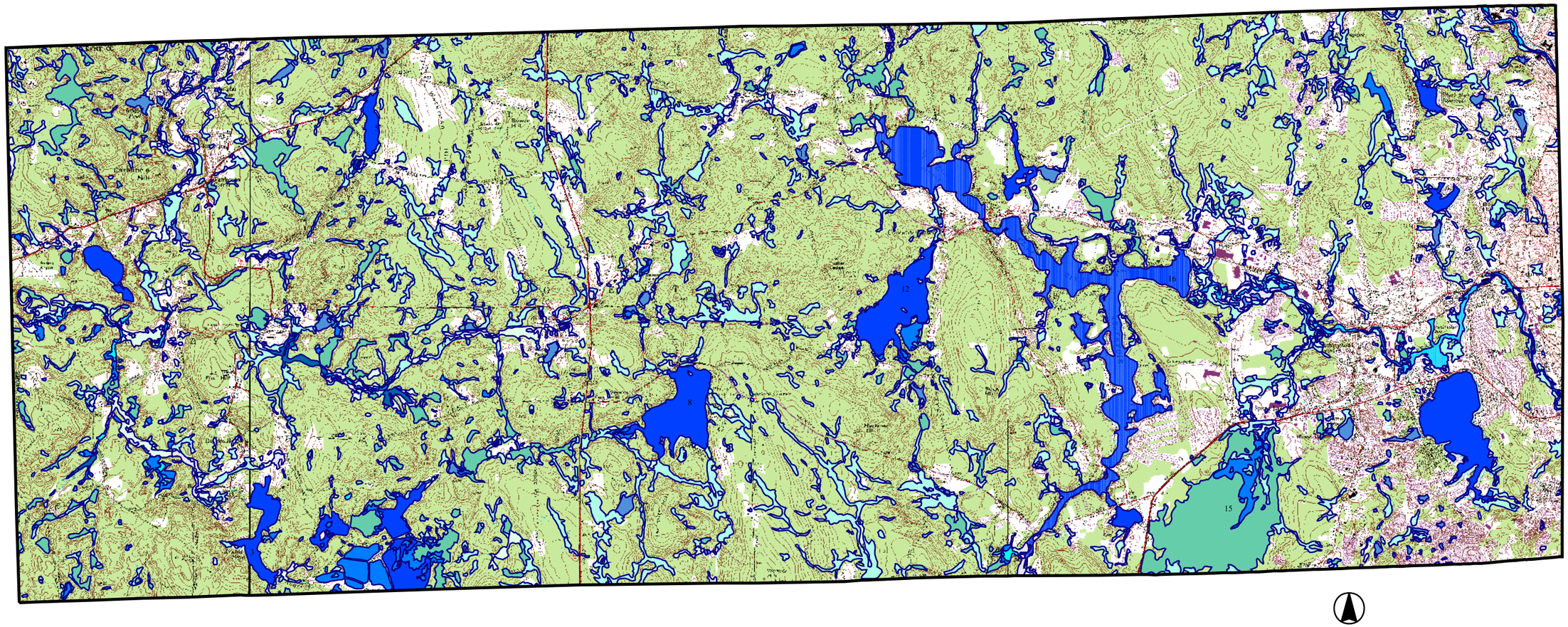
Figure 3

Town of Coventry
Wetlands



Scale: 1" = 5000'

Wetlands cover 7,541 Acres.
Approximately 19% of the Town.

- Emergent Wetland: Emergent Fen or Bog
- Emergent Wetland: Marsh/Wet Meadow
- Estuarine Emergent Wetland
- Estuarine Open Water
- Estuarine Scrub-Shrub Wetland
- Forested Wetland: Coniferous
- Forested Wetland: Dead
- Forested Wetland: Deciduous
- Lacustrine Open Water
- Marine/Estuarine Rocky Shore
- Marine/Estuarine Unconsolidated Shore
- Palustrine Open Water
- Riverine Nontidal Open Water
- Scrub-Shrub Swamp
- Scrub-Shrub Wetland: Shrub Fen or Bog

Source: All data layers compiled from RIGIS

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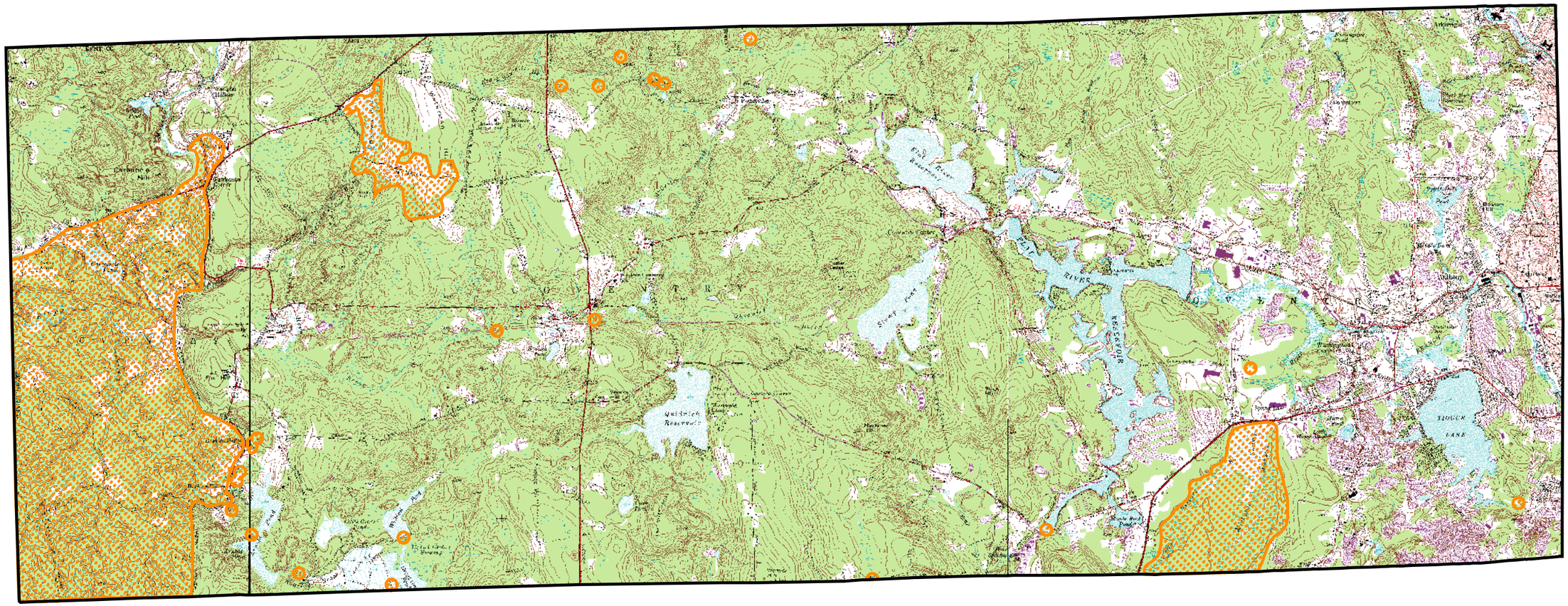
Figure 4

Town of Coventry
Natural Resources



Scale: 1" = 5000'

Rare Species

Source: All data layers compiled from RIGIS

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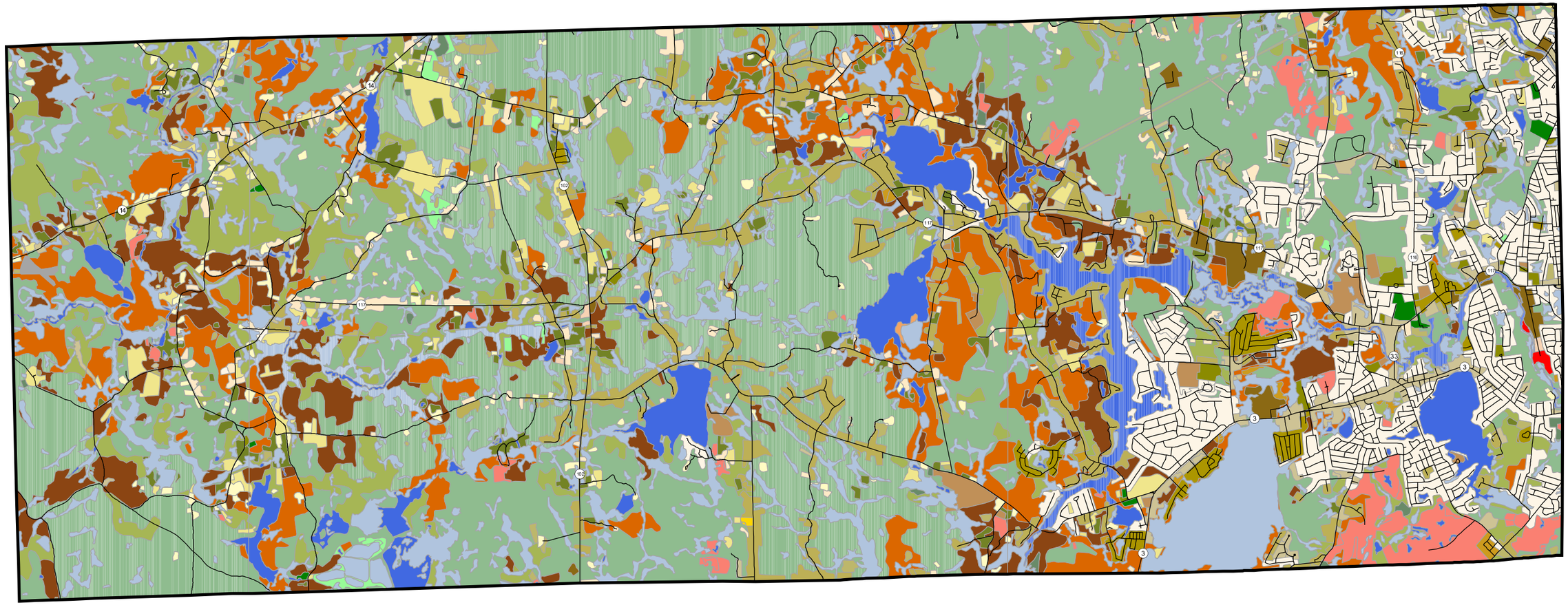
Figure 5

Town of Coventry
Land Uses



Approximately 39,946 Acres in the Town consisting of:

- Airports - 19 Acres
- Beaches - 1 Acre
- Brushland - 271 Acres, 0.7%
- Cemeteries - 63 Acres, 0.2%
- Commercial - 401 Acres, 1%
- Commercial / Industrial Mixed - 15 Acres
- Confined Feeding Operations - 5 Acres
- Cropland - 677 Acres, 1.7%
- Deciduous Forest (>80% hardwood) - 13,785 Acres, 34.5%
- Developed Recreation - 220 Acres, 0.6%
- Evergreen Forest (>80% softwood) - 2,281 Acres, 5.7%
- High Density Residential (<1/8 acre lots) - 314 Acres, 0.8%
- Idle Agriculture (abandoned fields and orchards) - 75 Acres, 0.2%
- Industrial - 227 Acres, 0.6%
- Institutional - 100 Acres, 0.3%
- Low Density Residential (>2 acre lots) - 403 Acres, 1%
- Med. Density Residential (1 to 1/4 acre lots) - 2,422 Acres, 6.1%
- Med. High Density Residential (1/4 to 1/8 acre lots) - 3,119 Acres, 7.8%
- Med. Low Density Residential (1 to 2 acre lots) - 572 Acres, 1.4%
- Mines, Quarries and Gravel Pits - 737 Acres, 1.8%
- Mixed Deciduous Forest (50 to 80% hardwood) - 2,532 Acres, 6.3%
- Mixed Evergreen Forest (50 to 80% softwood) - 3,197 Acres, 8%
- Orchards, Groves, Nurseries - 116 Acres, 0.3%
- Other Transportation (terminals, docks, etc.) - 15 Acres
- Pasture - 664 Acres, 1.7%
- Power Lines - 22 Acres, 0.1%
- Sandy Areas (not beaches) - 6 Acres
- Transitional Areas (urban open) - 138 Acres, 0.3%
- Vacant Land - 57 Acres, 0.1%
- Waste Disposal - 44 Acres, 0.1%
- Water - 2,040 Acres, 5.1%
- Water and Sewage Treatment - 15 Acres
- Wetland - 5,393 Acres, 13.5%

Scale: 1" = 5000'

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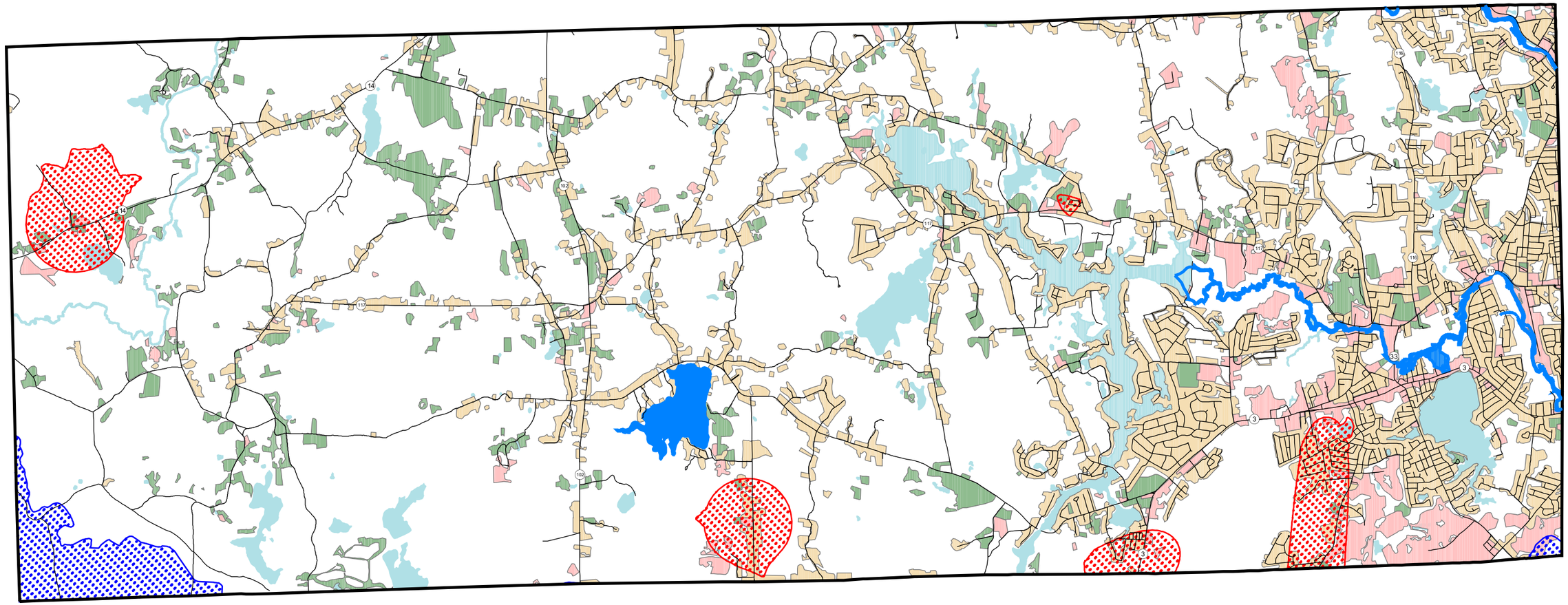
Source: All data layers compiled from RIGIS

Figure 6

Town of Coventry
Potential Target Areas



High Risk Land Use, Approximately 1,577 Acres

Medium Risk Land Use, Approximately 6,564 Acres

Agriculture, Approximately 1,816 Acres

Impaired Fresh Water

Sole Source Aquifer

Wellhead Protection Areas

Scale: 1" = 5000'

Source: All data layers compiled from RIGIS

FUSS & O'NEILL INC. *Consulting Engineers*

December 2002

APPENDIX A
PRELIMINARY INVENTORY OF WATER RESOURCES IN COVENTRY-APPLIED BIO-SYSTEMS, INC.

Preliminary Inventory of Water Resources in Coventry

This report was prepared by Applied Bio-Systems, Inc. in association with Fuss & O'Neill, Inc. as part of the initial wetlands inventory for the Town of Coventry Phase II Stormwater Management Plan. Wetlands of important ecological significance or those wetland resources that warrant more protection from stormwater impacts have been identified. These wetland resources have been numbered on the USGS topographic map for the Town of Coventry as provided by Fuss & O'Neill, Inc. Several resources have been utilized to account for the identification of these wetland resources. These resources include:

- State of Rhode Island 303(d) List of Impaired Waters
- Wetland Coverage mapped by RIGIS
- Estimated Habitat and Range of Rare Species and Noteworthy Natural Communities
- Soil Survey of Rhode Island, USDA
- Communication with Rhode Island Natural Heritage Program and Rhode Island Natural History Survey
- Personal knowledge of Coventry wetland areas

A total of 17 wetland areas or wetland complexes have been mapped based on these data resources. Each wetland area in this report has been given a rapid assessment to identify the predominant functions and values of these resources. This report was developed solely for the Coventry Stormwater Management Plan and should not be used for regulatory requirements.

Please note, these areas were not classified by wetland habitat types and / or classes at this preliminary stage of the project. However, any known critical wetland habitat types have been identified. Recreational value refers to either state management areas, public beaches or privately owned wetlands that may allow or could allow in the future any hunting, fishing, passive recreation, etc. opportunities to the public. Scenic / Aesthetic Quality refers to the open space and natural aesthetics of a wetland as viewed by the public. Vernal pools are small transient water bodies that have high habitat value for amphibians but are extremely sensitivity to changes in water quality.

Wetland Resources

Areas west of Route 102

Wetland 1 – Roaring Brook Watershed

- Critical Habitat

- Wildlife Habitat
- Vernal Pools
- Fisheries Habitat / Recreational Fisheries
- Rare Species Habitat
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- State Management Area
- Sole source Aquifer
  Wellhead Protection Area

Wetland 2 – Moosup River Watershed

- Critical Habitat
- Wildlife Habitat
- Fisheries Habitat / Recreational Fisheries
- Rare Species Habitat
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- State Management Area

Wetland 3 – Arnold Pond

- Critical Habitat
- Wildlife Habitat
- Fisheries Habitat / Recreational Fisheries
- Rare Species Habitat
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Wetland 4 – Little Grass Pond, Great Grass Pond and Whitford Ponds

- Critical Habitat
- Wildlife Habitat
- Fisheries Habitat
- Rare Species Habitat
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- Diverse complex of wetland types

Wetland 5 – Waterman Pond Complex

- Critical Habitat
- Wildlife Habitat
- Fisheries Habitat

- Rare Species Habitat
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Wetland 6 – Bucks Horn Brook Watershed
- Critical Habitat
- Wildlife Habitat
- Vernal Pools
- Fisheries Habitat
- Rare Species Habitat
- Recreation
- Wetlands adjacent to Trestle Trail
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Wetland 7 – Koszela Pond and associated wetlands
- Wildlife Habitat
- Fisheries Habitat
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Areas east of Route 102/ West of Coventry Center

Wetland 8 – Quidnick Reservoir
- List of Rhode Island 303(d) List of Impaired Waters
- Wildlife Habitat
- Fisheries Habitat / Recreational Fisheries
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- Wellhead Protection Area

Wetland 9 – Wetland complex east of Route 102
- Diverse wetland types
- Wildlife Habitat
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- Wellhead Protection Area

Wetland 10 – Parker Woodland Border
- Wildlife Habitat
- Fisheries Habitat

- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Wetland 11 – Flat River wetland complex
- Diverse wetland types
- Wildlife Habitat
- Fisheries Habitat and Recreational Fisheries
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Wetland 12 – Stump Pond
- Wildlife Habitat
- Fisheries Habitat and Recreational Fisheries
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- Wellhead Protection Area
- Groundwater Recharge

Wetland 13 – Wetland complex west of Whaley Hollow Road
- Diverse wetland types
- Wildlife Habitat
- Fisheries Habitat / Recreational Fisheries
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Wetland 14 – Fish Hill Road wetland complex
- Diverse wetland types
- Critical Habitat
- Wildlife Habitat – Heron rookery
- Rare Species Habitat
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality

Areas east of Coventry Center

Wetland 15 – Mishnock Swamp
- Critical Habitat
- Wildlife Habitat
- Fisheries Habitat
- Rare Species Habitat
- Recreation

- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- Groundwater Aquifer

Wetland 16 – Flat River Reservoir

- Densely populated
- Heavy fishing and boating pressure
- Wildlife Habitat
- Winter waterfowl habitat
- Fisheries Habitat and Recreational Fisheries
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- Wellhead Protection Area
- Groundwater Aquifer
- Groundwater Recharge

Wetland 17 – South branch of the Pawtuxet River

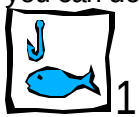
- Listed in Rhode Island 303 (d) List of Impaired Waters
- Wildlife Habitat
- Winter waterfowl habitat
- Fisheries Habitat and Recreational Fisheries
- Recreation
- Flood Zone / 100 year Flood Plain
- Scenic / Aesthetic Quality
- Groundwater Aquifer
- Groundwater Recharge

It is very difficult to rank wetlands in some order of value since current research supports the premise that each wetland has a number of functions and values. The value of the wetland will change depending upon which function is prioritized. Each of the above wetlands has a list of functions and values (in no particular order) below them. For stormwater impacts, the wetlands (Wetlands 1 through 14, not Wetland 8) are most sensitive to new stormwater inputs because of their present near pristine conditions. Vernal pools and small open water bodies may be most impacted by stormwater inflow into freshwater wetlands and should be protected from direct stormwater flow (ie. Wetland 6). Wetlands that support State or Federal Endangered and Threatened species are also extremely critical for preservation. The developed section of eastern Coventry contains wetlands where existing outfalls could be improved and new inputs should be minimized. The culmulative impact of multiple stormwater outfalls will gradually degrade the receiving waters. Some of the wetlands already have invasive species that are, in all probability, caused by existing stormwater discharge into those wetlands.

APPENDIX B
EDUCATION AND OUTREACH

10 THINGS YOU CAN DO TO IMPROVE WATER QUALITY IN RHODE ISLAND

There are many streams and rivers that flow through our backyards and drain into ponds, lakes, bays and ultimately the ocean. Pollutants such as animal feces, fertilizer, oil, hazardous waste, road sand, and grease on the land can be washed into our waters, but we can reduce this type of pollution. Here is a list of 10 things you can do to help clean our local waterways.



1. Learn about your local waters. Everyone lives in a **watershed**, which is the drainage area to a local waterbody (think of washing everything in a sink down the drain and the drain is your local river or stream). Figure out what waters are closest to you and where they flow. Learn about local animal life and plants that live in and around these waters. Check out DEM's website to find out more about your watershed at **www.state.ri.us/dem/topics/water.htm**

2. Don't feed ducks! Although you may enjoy feeding geese, ducks, gulls and other waterfowl, remember that they too contribute to the same type of pollution that limits swimming and shellfishing. One bird dropping can contaminate 10,000 gallons of water. Bread and other human food are bad for bird's digestive tracts too. Feeding waterfowl can also attract larger bird populations and may cause some birds to stop migrating.

3. Pick up after your pets. Dog waste and feces from other warm-blooded animals pollute local waterways and are larger polluters than you may think. This type of pollution contributes to the closing of beaches and shellfish beds all over the state. Pick up your pet's waste and deposit it in a trash can.

4. Inspect septic systems. Approximately 1/3 of the state uses some form of septic system for sewage disposal. Failing septic systems or cesspools are a major source of pollution to ground water and local reservoirs. What you flush directly affects the water we drink and the waters where we fish, swim and boat. If you have a septic system inspect it regularly, pump and repair it as needed. If you have a cesspool, replace it. For more information on maintaining a healthy septic system the **Septic System Checkup Handbook is available online at www.state.ri.us/dem/pubs/regs/regs/water/isdsbook.pdf or** call for a copy at **222-6822.**

5. Avoid over-fertilizing your lawn. During rain storms, **nutrients** from lawn fertilizer can be washed off lawns and paved areas into local waters. This type of pollution contributes to **eutrophication**, a process that causes nuisance algal blooms and reduction of habitat and oxygen levels for many aquatic organisms. This leads to a decline in fish and shellfish populations, and reduces the diversity of fish in our waters. Get your soil tested to see if it really needs more fertilizer and if so, use as little as necessary. Read the label on fertilizer packages, apply according to directions, and clean-up any fertilizer left on paved areas. Also, reduce your lawn area by planting native, more drought-tolerant plants that are better adapted for the environment, and can act as buffers to prevent runoff from your lawn. For more information and fact sheets, log onto the **University of Rhode Island Cooperative Extension Home*A*Syst** website at **www.uri.edu/ce/wq.**

6. Minimize the use of hazardous products and **recycle** as much as possible. Cleaning and other household products contain many hazardous chemicals. Try to use the least harmful products available. Learn how to dispose of household hazardous chemicals properly by calling the **RI Resource Recovery program** at **942-1430 x 241** or visit them online at **www.rirrc.org.** The RIRRC website also has recycling information. Recycling helps to conserve natural resources and reduces the amount of refuse sent to landfills. Start a compost bin and buy products made with or packaged in recycled material to reduce waste further. Consult your town for **recycling** guidelines and check the RIRRC website listed above.

7. Get involved. **Volunteer.** Help with clean-up efforts or be a volunteer water monitor. Participate in local activities that benefit the environment. Find out if there is a watershed council near you. A list is available on DEM's website at **www.state.ri.us/dem/topics/water.htm.** If your watershed does not have an association, start one! Other statewide non-profit organizations also need volunteers. For more information check out the websites for Save the Bay at **www.savebay.org** and URI's Watershed Watch at **www.uri.edu/ce/wq/.** Every little bit you do counts! **Speak out.** Attend public meetings that pertain to water quality. Your participation makes the statement that your community is concerned about local waterways. Public involvement is imperative if your local and state public servants are to help you make large-scale improvements in your watershed. If you see a problem in your area or want something done, say something! If you don't have time to attend meetings, call or contact a city or town official, a state representative, or DEM.

8. Conserve water. If you are connected to a public sewer, conserving water will help reduce the discharge from your wastewater treatment facility into local waters. Water conservation helps prevent septic system failures. To learn more about conserving water, visit the RI Water Resources Board at **www.wrb.state.ri.us.**

9. Pump it, don't dump it! If you own a sailboat or a motorboat have your holding tank emptied at one of the local pumpout stations around Rhode Island. For a list of **pumpout locations call 222-3961** or visit **www.state.ri.us/dem/maps/static/pumpmap.jpg**. Also, if you have an old engine on your motor boat, look into updating it to a new 2-cycle or 4-cycle engine. They are cleaner for the environment and more efficient, which means they are lighter on your wallet!

10. Get out! Get out on the water. Swim, sail, surf, kayak, fish, windsurf, boat, shellfish, go birding or walk along the shore. Explore the waters near your home or visit other parts of the state. For information about beach closures, contact the Department of Health **Beach Hotline at 222-2751** or online at **www.health.state.ri.us/topics/bathing.htm.** For information on **shellfish bed closures, call DEM at 222-3961**. Make it a point to enjoy the benefits of living near the water, and while you're out there keep an eye out for problems or pollution sources. **To file an environmental complaint with DEM** (which can be anonymous), **call: 222-1360.**

Rhode Island Department of Environmental Management
Office of Water Resources
235 Promenade Street, Providence, RI 02908-5767
Phone (401) 222-6800
www.state.ri.us/dem/

V. Masson April 2003

10 SIMPLE THINGS YOU CAN DO TO HELP CLEAN RHODE ISLAND WATERS

Septic System Information for Rhode Islanders

WHAT'S IN YOUR BACKYARD?

Forty percent of Rhode Islanders get their drinking water from groundwater or small local reservoirs. Outdated cesspools and failing septic systems are a major source of pollution to these water supplies. What you flush down your toilet directly affects the water you drink and the waters you fish, swim, and boat in.

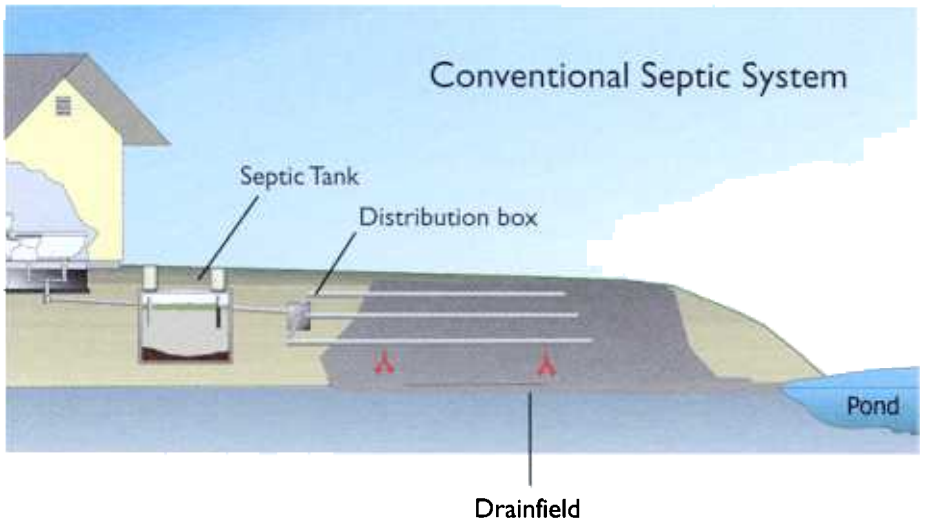
What YOU can do.

- **Inspect your septic system regularly**
- **Pump and repair it as needed**
- **If you have a cesspool, plan to replace it**

CONVENTIONAL SEPTIC SYSTEMS

When properly designed, installed, and maintained, septic systems help keep your water supply safe. They replenish groundwater, and they are considered a permanent disposal option. All septic systems need regular maintenance. It is much less expensive to keep them operating properly through regular inspections and pumping than to replace them if they fail. With proper care a conventional septic system can be long lasting and cost effective.

There are two major parts to a conventional septic system



THE SEPTIC TANK

The septic tank separates solids from liquid before sending wastewater to the drainfield. A layer of sludge settles at the bottom and a layer of scum forms at the top, so only the clearest wastewater goes into the ground. Keeping solids in the tank and out of the drainfield is the best way to prolong system life.

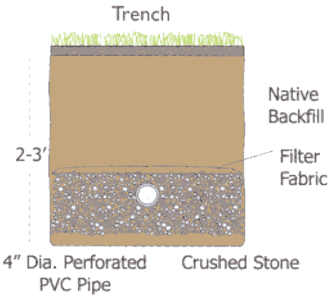
Modern Tank features include:

- Water tightness, solids gradually build up and must be pumped out regularly.
- Access risers allow easy entry for inspection and pumping.
- A low cost effluent filter to help keep solids in the tank and protect your drainfield.

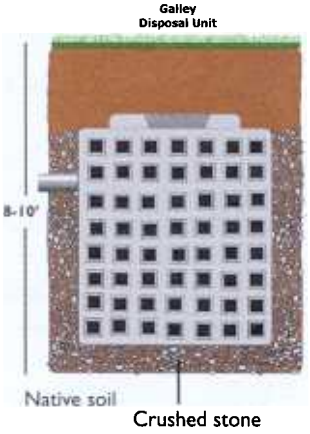
THE DRAINFIELD

Drainfields distribute the wastewater to the soil. Two types commonly used are disposal trenches and leaching chambers.

A **Trench**-type drainfield consists of two or more parallel stone-lined ditches, each with a perforated pipe that allows incoming liquid wastewater to seep into the soil. A distribution box located between the tank and the drainfield splits wastewater flow to the different lines.



Leaching chambers are bottomless concrete box-like structures with open, grated sides. Two types are commonly used. "Galleys" are 4ft. x 4ft. X 4ft. units installed as deep as 10 feet below ground. "Flow diffusers" are shallow 8ft. X 4ft. x 18in. units. Both types of seepage pits are generally installed in a series of three or more. Liquid effluent flows directly from the tank into the seepage pit where it seeps out the side walls and bottom.

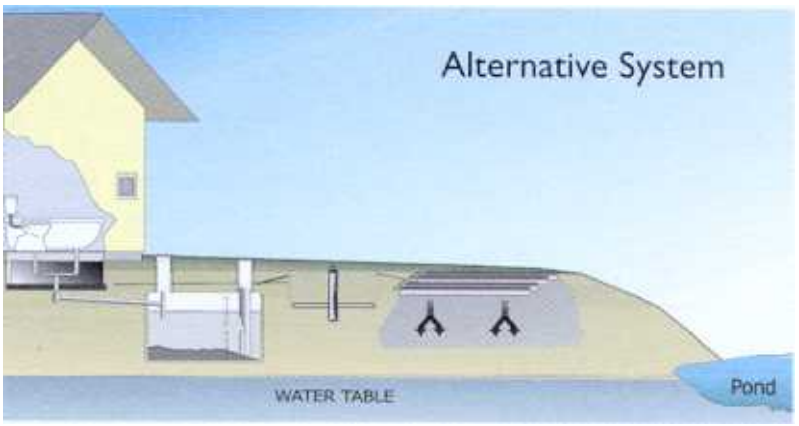


UNIVERSITY OF RHODE ISLAND

Rhode Island Regional Water Quality Program
University of Rhode Island College of Environment & Life Sciences
Department of Natural Resources Science
Cooperative Extension On-Site Wastewater Training Center

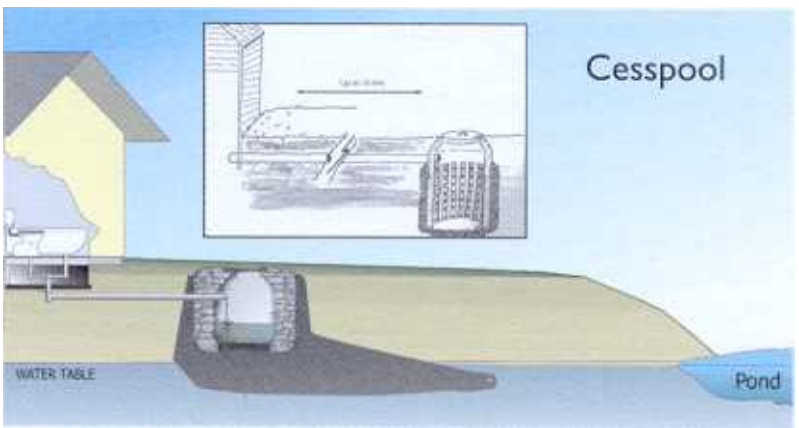
ALTERNATIVE SEPTIC SYSTEM

New technologies treat wastewater before it reaches groundwater. These alternative systems provide one or more extra treatment steps than conventional systems. Enhanced treatment systems offer solutions for difficult sites and environmentally sensitive areas.



CESSPOOLS

A cesspool is nothing more than a covered pit that receives wastewater and allows it to drain into the surrounding soil. This might be a stone-walled pit, perforated concrete chamber, or leaking steel tank. Although still in common usage, cesspools don't treat wastewater. Solids and liquids seep directly through the soil into the groundwater. This poses a threat to surrounding bodies of water and nearby wells. Not sure what's in your backyard? Chances are you have a cesspool or other substandard system if your house was built before 1970.



FAILING SEPTIC SYSTEMS

Septic systems fail when wastewater is unable to seep into the ground. Common causes of failure are:

- Overloading with too much water.
- Improper disposal of solids or grease.
- Tank full of solids, drainfield clogged with solids.
- High water table flooding the drainfield.
- Broken pipes, tree roots disrupting system, or other damage.

Your system may be failing if you have:

- Sluggish drains or odor
- Wastewater backups into house
- Squishy patches above drainfield
- Lush grass above drainfield

Even if you don't notice any problem, your system can still be polluting groundwater. In very sandy or wet soils wastewater may reach the groundwater too quickly. Leaking tanks or broken pipes allow wastes to seep into groundwater without treatment.

Even new systems can fail due to faulty design or poor installation. Common causes are use of unwashed stone or poor-quality gravel fill, improperly sealed tank seams and plugs, and soil compaction or structural damage by heavy equipment driven over the system.

FIND OUT WHAT'S IN YOUR BACKYARD

To keep drinking water safe, and maintain property values, many RI towns require regular system maintenance. Financial assistance may be available for repairs. Contact your town hall to learn more. For technical information contact URI Cooperative Extension at 401-874-4558/5950 or http://www.uri.edu/ce/wq.

Cooperative Extension in Rhode Island provides equal opportunities in programs and employment without regard to race, color, national origin, sex, or preference, creed or disability. This publication is supported by URI Cooperative Extension, College of the Environment and Life Sciences, University of Rhode Island. Partial funding for this project provided by CSREES, Project 92- EWQI-1-1040, and the EPA Block Island/ Green Hill Pond Watershed National Community Decentralized Wastewater Treatment Demonstration Project, Clean Water Act section 319, and the RI Department of Environmental Management.

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11/01

Stormwater Pollution Found in Your Area!

This is not a citation.

This is to inform you that our staff found the following pollutants in the storm sewer system in your area. This storm sewer system leads directly to

_____ .

- ❑ Motor oil
- ❑ Oil filters
- ❑ Antifreeze/ transmission fluid
- ❑ Paint
- ❑ Solvent/degreaser
- ❑ Cooking grease
- ❑ Detergent
- ❑ Home improvement waste (concrete, mortar)
- ❑ Pet waste
- ❑ Yard waste (leaves, grass, mulch)
- ❑ Excessive dirt and gravel
- ❑ Trash
- ❑ Construction debris
- ❑ Pesticides and fertilizers
- ❑ Other _____

For more information or to report an illegal discharge of pollutants, please call:

WHEN IT RAINS IT DRAINS

www.epa.gov/npdes/stormwater

EPA
United States Environmental Protection Agency

EPA 833-F-03-002
April 2003

Stormwater runoff is precipitation from rain or snowmelt that flows over the ground. As it flows, it can pick up debris, chemicals, dirt, and other pollutants and deposit them into a storm sewer system or waterbody.

Anything that enters a storm sewer system is discharged *untreated* into the waterbodies we use for swimming, fishing, and providing drinking water.

Remember: Only Rain Down the Drain

To keep the stormwater leaving your home or workplace clean, follow these simple guidelines:

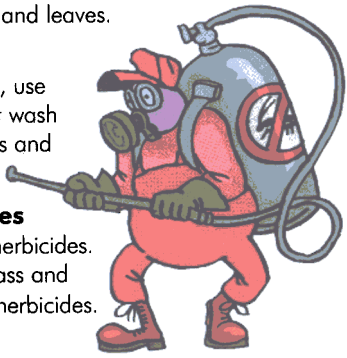
- Use pesticides and fertilizers sparingly.
- Repair auto leaks.
- Dispose of household hazardous waste, used auto fluids (antifreeze, oil, etc.), and batteries at designated collection or recycling locations.
- Clean up after your pet.
- Use a commercial car wash or wash your car on a lawn or other unpaved surface.
- Sweep up yard debris rather than hosing down areas. Compost or recycle yard waste when possible.
- Clean paint brushes in a sink, not outdoors. Properly dispose of excess paints through a household hazardous waste collection program.
- Sweep up and properly dispose of construction debris like concrete and mortar.

Keep Our Streams Clean!

Storm Drains lead to fresh water!

■ Street Litter, Plastics, and Leaves

Be mindful of litter, NEVER throw litter down into storm drains. Keep catch basins free of debris and leaves.



■ Fertilizers

Avoid use of fertilizers. If needed, use organic fertilizers. Sweep, do not wash any fertilizers or soil off driveways and walkways.

■ Pesticides and Herbicides

Minimize use of pesticides and herbicides. Use natural alternatives. Trim grass and remove weeds by hand without herbicides.

■ Pet Waste

Dispose of pet waste by flushing it down the toilet, burying it, or discarding it into a plastic bag and place in your trash.

■ Yard Waste

Do not allow soil, leaves or grass clippings to accumulate on your driveway, sidewalk or in the street. Compost yard waste and use on your soil.

■ Motor Oil

Never pour used motor oil down the drain. Take it to a local service station to be recycled.

■ Anti-Freeze

Take used Anti-Freeze to a service station for recycling. Never mix Anti-Freeze with any other substance.

■ Paint

Donate old paint to local groups. Dispose of oil and lead based paints at the designated household hazardous waste collection center, Bondi's Island Landfill. Appointments are available by calling 787-7840.

■ Household Hazardous Waste

Do not pour hazardous waste down any drain or discard with regular trash. Contact your Springfield Solid Waste Office (787-7840) to learn how to properly dispose of hazardous waste. Use natural or less toxic alternatives.

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Sponsored by City of Springfield
Parks Dept.
Planning Dept.
Public Works Dept.
Water/Sewer Commission

EPA
United States Environmental Protection Agency

EPA 841-F-03-003

Protecting Water Quality *from* URBAN RUNOFF

Clean Water Is Everybody's Business

In urban and suburban areas, much of the land surface is covered by buildings and pavement, which do not allow rain and snowmelt to soak into the ground. Instead, most developed areas rely on storm drains to carry large amounts of runoff from roofs and paved areas to nearby waterways. The stormwater runoff carries pollutants such as oil, dirt, chemicals, and lawn fertilizers directly to streams and rivers, where they seriously harm water quality. To protect surface water quality and groundwater resources, development should be designed and built to minimize increases in runoff.

The most recent National Water Quality Inventory reports that runoff from urbanized areas is the leading source of water quality impairments to surveyed estuaries and the third-largest source of impairments to surveyed lakes.

Did you know that because of impervious surfaces like pavement and rooftops, a typical city block generates more than 5 times more runoff than a woodland area of the same size?

How Urbanized Areas Affect Water Quality

Increased Runoff

The porous and varied terrain of natural landscapes like forests, wetlands, and grasslands traps rainwater and snowmelt and allows them to filter slowly into the ground. In contrast, impervious (nonporous) surfaces like roads, parking lots, and rooftops prevent rain and snowmelt from infiltrating, or soaking, into the ground. Most of the rainfall and snowmelt remains above the surface, where it runs off rapidly in unnaturally large amounts.

Storm sewer systems concentrate runoff into smooth, straight conduits. This runoff gathers speed and erosional power as it travels underground. When this runoff leaves the storm drains and empties into a stream, its excessive volume and power blast out streambanks, damaging streamside vegetation and wiping out aquatic habitat. These increased storm flows carry sediment loads from construction sites and other denuded surfaces and eroded streambanks. They often carry higher water temperatures from streets, roof tops, and parking lots, which are harmful to the health and reproduction of aquatic life.

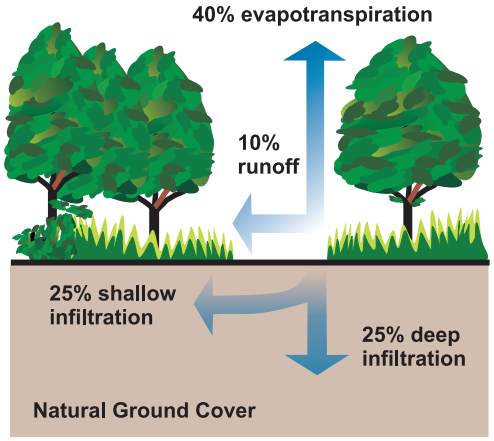
The loss of infiltration from urbanization may also cause profound groundwater changes. Although urbanization leads to great increases in flooding during and immediately after wet weather, in many instances it results in lower stream flows during dry weather. Many native fish and other aquatic life cannot survive when these conditions prevail.

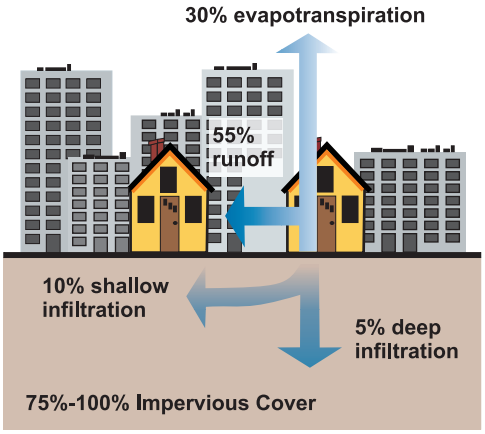
Increased Pollutant Loads

Urbanization increases the variety and amount of pollutants carried into streams, rivers, and lakes. The pollutants include:

- Sediment
- Oil, grease, and toxic chemicals from motor vehicles
- Pesticides and nutrients from lawns and gardens
- Viruses, bacteria, and nutrients from pet waste and failing septic systems
- Road salts
- Heavy metals from roof shingles, motor vehicles, and other sources
- Thermal pollution from dark impervious surfaces such as streets and rooftops

These pollutants can harm fish and wildlife populations, kill native vegetation, foul drinking water supplies, and make recreational areas unsafe and unpleasant.





Relationship between impervious cover and surface runoff. Impervious cover in a watershed results in increased surface ruunoff. As little as 10 percent impervious cover in a watershed can result in stream degradation.

Managing Urban Runoff

What Homeowners Can Do

To decrease polluted runoff from paved surfaces, households can develop alternatives to areas traditionally covered by impervious surfaces. Porous pavement materials are available for driveways and sidewalks, and native vegetation and mulch can replace high maintenance grass lawns. Homeowners can use fertilizers sparingly and sweep driveways, sidewalks, and roads instead of using a hose. Instead of disposing of yard waste, they can use the materials to start a compost pile. And homeowners can learn to use Integrated Pest Management (IPM) to reduce dependence on harmful pesticides.

In addition, households can prevent polluted runoff by picking up after pets and using, storing, and disposing of chemicals properly. Drivers should check their cars for leaks and recycle their motor oil and antifreeze when these fluids are changed. Drivers can also avoid impacts from car wash runoff (e.g., detergents, grime, etc.) by using car wash facilities that do not generate runoff. Households served by septic systems should have them professionally inspected and pumped every 3 to 5 years. They should also practice water conservation measures to extend the life of their septic systems.

Controlling Impacts from New Development

Developers and city planners should attempt to control the volume of runoff from new development by using low impact development, structural controls, and pollution prevention strategies. Low impact development includes measures that conserve natural areas (particularly sensitive hydrologic areas like riparian buffers and infiltrable soils); reduce development impacts; and reduce site runoff rates by maximizing surface roughness, infiltration opportunities, and flow paths.

Controlling Impacts from Existing Development

Controlling runoff from existing urban areas is often more costly than controlling runoff from new developments. Economic efficiencies are often realized through approaches that target "hot spots" of runoff pollution or have multiple benefits, such as high-efficiency street sweeping (which addresses aesthetics, road safety, and water quality). Urban planners and others responsible for managing urban and suburban areas can first identify and implement pollution prevention strategies and examine source control opportunities. They should seek out priority pollutant reduction opportunities, then protect natural areas that help control runoff, and finally begin ecological restoration and retrofit activities to clean up degraded water bodies. Local governments are encouraged to take lead roles in public education efforts through public signage, storm drain marking, pollution prevention outreach campaigns, and partnerships with citizen groups and businesses. Citizens can help prioritize the clean-up strategies, volunteer to become involved in restoration efforts, and mark storm drains with approved "don't dump" messages.

Related Publications

Turn Your Home into a Stormwater Pollution Solution!
www.epa.gov/nps

This web site links to an EPA homeowner's guide to healthy habits for clean water that provides tips for better vehicle and garage care, lawn and garden techniques, home improvement, pet care, and more.

National Management Measures to Control Nonpoint Source Pollution from Urban Areas
www.epa.gov/owow/nps/urbanmm

This technical guidance and reference document is useful to local, state, and tribal managers in implementing management programs for polluted runoff. Contains information on the best available, economically achievable means of reducing pollution of surface waters and groundwater from urban areas.

Onsite Wastewater Treatment System Resources
www.epa.gov/owm/onsite

This web site contains the latest brochures and other resources from EPA for managing onsite wastewater treatment systems (OWTS) such as conventional septic systems and alternative decentralized systems. These resources provide basic information to help individual homeowners, as well as detailed, up-to-date technical guidance of interest to local and state health departments.

Low Impact Development Center
www.lowimpactdevelopment.org

This center provides information on protecting the environment and water resources through integrated site design techniques that are intended to replicate preexisting hydrologic site conditions.

Stormwater Manager's Resource Center (SMRC)
www.stormwatercenter.net

Created and maintained by the Center for Watershed Protection, this resource center is designed specifically for stormwater practitioners, local government officials, and others that need technical assistance on stormwater management issues.

Strategies: Community Responses to Runoff Pollution
www.nrdc.org/water/pollution/storm/stoinx.asp

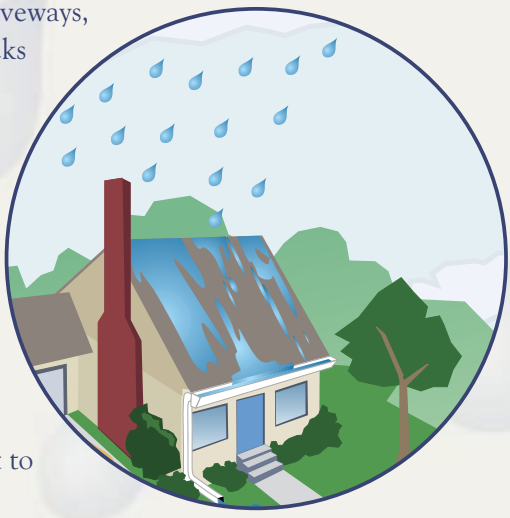
The Natural Resources Defense Council developed this interactive web document to explore some of the most effective strategies that communities are using around the nation to control urban runoff pollution. The document is also available in print form and as an interactive CD-ROM.

For More Information

U.S. Environmental Protection Agency
Nonpoint Source Control Branch (4503T)
1200 Pennsylvania Avenue, NW
Washington, DC 20460
www.epa.gov/nps

February 2003

As stormwater flows over driveways, lawns, and sidewalks, it picks up debris, chemicals, dirt, and other pollutants. Stormwater can flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water. Polluted runoff is the nation's greatest threat to clean water.



By practicing healthy household habits, homeowners can keep common pollutants like pesticides, pet waste, grass clippings, and automotive fluids off the ground and out of stormwater. Adopt these healthy household habits and help protect lakes, streams, rivers, wetlands, and coastal waters. Remember to share the habits with your neighbors!

Healthy Household Habits for Clean Water

Vehicle and Garage

- Use a commercial car wash or wash your car on a lawn or other unpaved surface to **minimize** the amount of dirty, soapy water flowing into the storm drain and eventually into your local waterbody.

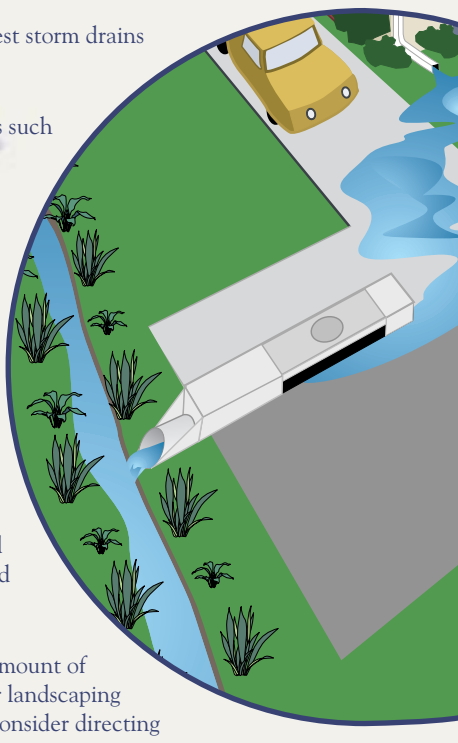
- Check your car, boat, motorcycle, and other machinery and equipment for leaks and spills. Make repairs as soon as possible. Clean up **spilled fluids** with an absorbent material like kitty litter or sand, and don't rinse the spills into a nearby storm drain. Remember to properly dispose of the absorbent material.
- **Recycle** used oil and other automotive fluids at participating service stations. Don't dump these chemicals down the storm drain or dispose of them in your trash.

Lawn and Garden

- Use pesticides and fertilizers **sparingly**. When use is necessary, use these chemicals in the recommended amounts. Avoid application if the forecast calls for rain; otherwise, chemicals will be washed into your local stream.
- Select **native** plants and grasses that are drought- and pest-resistant. Native plants require less water, fertilizer, and pesticides.
- **Sweep up** yard debris, rather than hosing down areas. Compost or recycle yard waste when possible.
- Don't overwater your lawn. Water during the **cool** times of the day, and don't let water run off into the storm drain.
- Cover piles of dirt and mulch being used in landscaping projects to prevent these pollutants from blowing or washing off your yard and into local waterbodies. **Vegetate** bare spots in your yard to prevent soil erosion.

Home Repair and Improvement

- Before beginning an outdoor project, locate the nearest storm drains and **protect** them from debris and other materials.
- **Sweep up** and properly dispose of construction debris such as concrete and mortar.
- Use hazardous substances like paints, solvents, and cleaners in the **smallest amounts possible**, and follow the directions on the label. Clean up spills **immediately**, and dispose of the waste safely. Store substances properly to avoid leaks and spills.
- Purchase and use **nontoxic**, **biodegradable**, **recycled**, and **recyclable** products whenever possible.
- **Clean** paint brushes in a sink, not outdoors. Filter and reuse paint thinner when using oil-based paints. Properly dispose of excess paints through a household hazardous waste collection program, or donate unused paint to local organizations.



- **Reduce** the amount of paved area and increase the amount of vegetated area in your yard. Use native plants in your landscaping to reduce the need for watering during dry periods. Consider directing downspouts away from paved surfaces onto lawns and other measures to increase infiltration and reduce polluted runoff.

Pet Care

- When walking your pet, remember to **pick up** the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Swimming Pool and Spa

- **Drain** your swimming pool only when a test kit does not detect chlorine levels.
- Whenever possible, drain your pool or spa into the **sanitary** sewer system.
- Properly store pool and spa chemicals to **prevent** leaks and spills, preferably in a covered area to avoid exposure to stormwater.

Septic System Use and Maintenance

- Have your septic system **inspected** by a professional at least every 3 years, and have the septic tank **pumped** as necessary (usually every 3 to 5 years).
- Care for the septic system drainfield by **not** driving or parking vehicles on it. Plant only grass over and near the drainfield to avoid damage from roots.
- Flush responsibly. Flushing household chemicals like paint, pesticides, oil, and antifreeze can **destroy** the biological treatment taking place in the system. Other items, such as diapers, paper towels, and cat litter, can **clog** the septic system and potentially damage components.

Storm drains connect to waterbodies!

EPA United States Environmental Protection Agency

EPA 833-B-03-003

January 2003

THE YEAR OF CLEAN WATER

Internet Address (URL) • HTTP://www.epa.gov

Recycled/Recyclable • Printed With Vegetable Oil Based Inks on 100% Postconsumer, Process Chlorine Free Recycled Paper

Remember: Only rain down the drain!

For more information, visit
www.epa.gov/npdes/stormwater
or
www.epa.gov/nps

Make your home

The SOLUTION TO STORMWATER POLLUTION!

A homeowner's guide to healthy habits for clean water

EPA United States Environmental Protection Agency

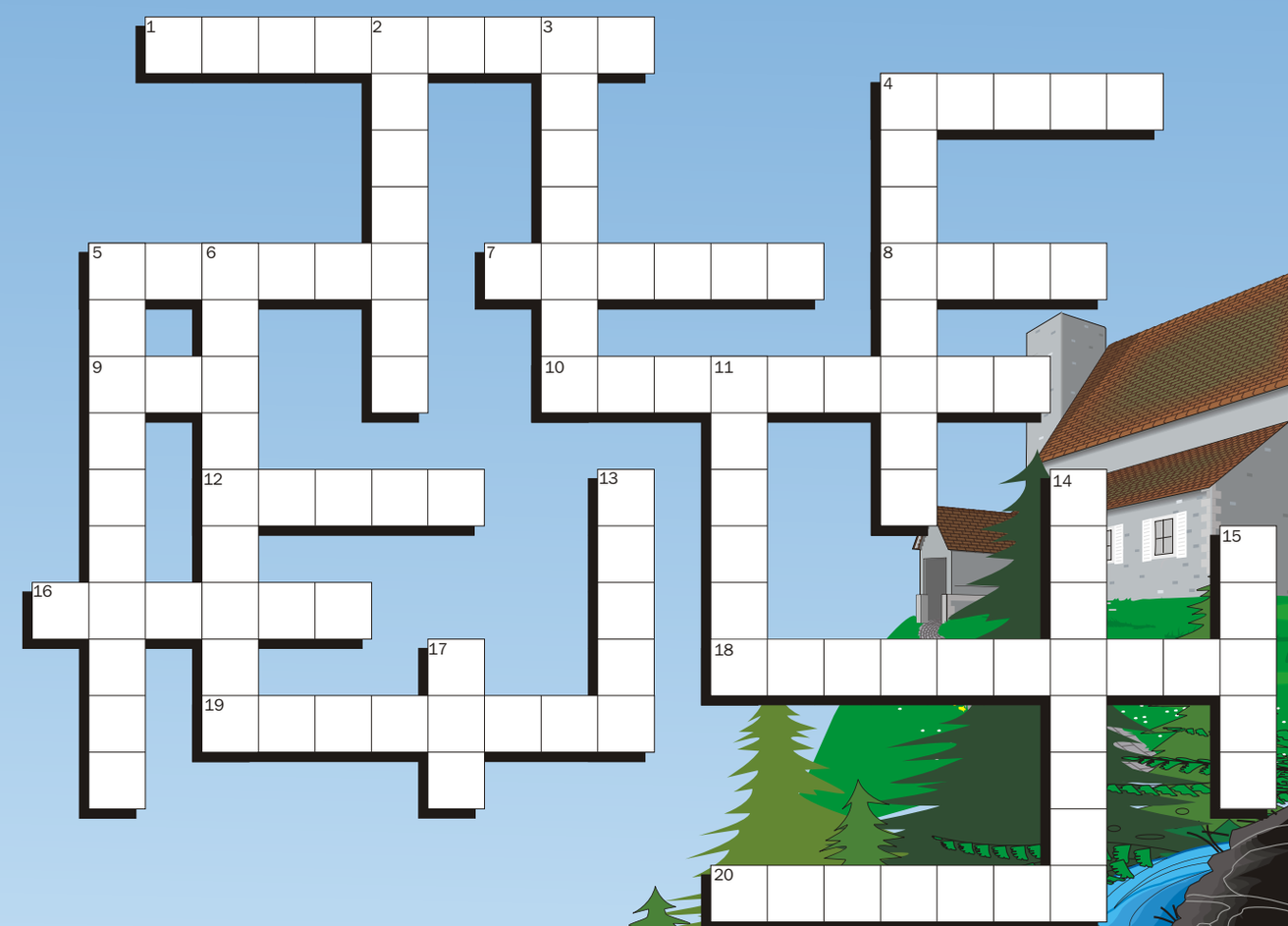
Take the Stormwater Runoff Challenge

Across:

1) The area of land that drains into an estuary, lake, stream, or groundwater is known as a _____.
4) The _____ of speeding boats can erode shorelines.
5) Maintaining your _____ tank will help to prevent bacteria and nutrients from leaking into groundwater and surface waters.
7) Wetland plants act like a natural water _____, removing harmful pollutants from stormwater runoff.
8) Leave your grass clippings on your _____ to reduce the need for commercial fertilizers.
9) A single quart of motor _____, if disposed of improperly, can pollute 2 million gallons of water.
10) Fertilizers and animal wastes contain _____ that "feed" algae and other aquatic plants harmful to water quality.
12) Polluted runoff from both rural and _____ sources has a significant impact on water quality.
16) Storm _____ don't always connect to sewage treatment plants, so runoff can flow directly to rivers, lakes, and coastal waters.
18) Follow directions carefully when applying _____ on your lawn—more isn't always better.
19) Polluted runoff (also called_____ source pollution) comes from so many places that it's hard to "pinpoint" a source.
20) Yard and vegetable food waste are suitable additions to a _____ pile.

Down:

2) Don't dump used motor oil into storm drains. _____ it!
3) _____ of soil from barren land can cloud nearby streams.
4) _____ prevent flooding, improve water quality, and provide habitat for waterfowl, fish, and wildlife.
5) Marking "Do Not Dump, Drains to Bay" on a _____ is one way to educate people about polluted runoff.
6) Excess sediment, nutrients, toxics, and pathogens are all types of runoff _____.
11) Polluted _____ is the nation's #1 water quality problem.
13) The cattail is one wetland _____ that helps purify polluted runoff.
14) Too much _____ in water can harm aquatic life.
15) Proper crop and animal management on _____ helps to control water pollution.
17) _____ impact development helps control stormwater pollution through conservation approaches and techniques.



Choices:

compost	nonpoint	sediment
drains	nutrients	septic
erosion	oil	storm drain
farms	plant	urban
fertilizer	pollution	wakes
filter	recycle	watershed
lawn	runoff	wetlands
Low		

EPA United States Environmental Protection Agency

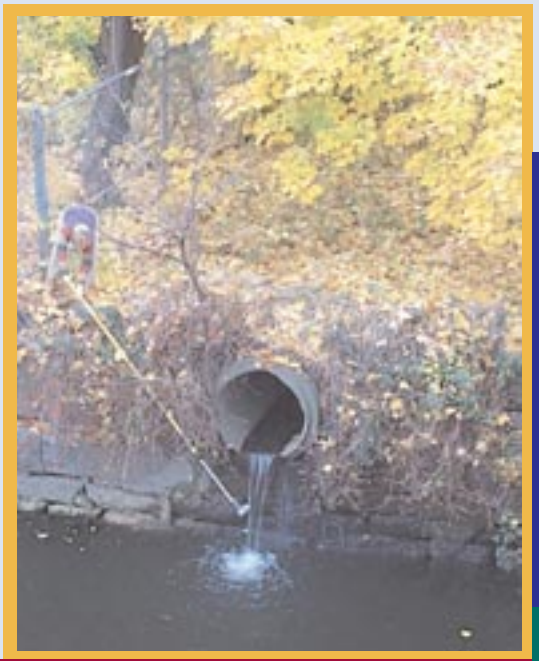
For more information, please visit EPA's Polluted Runoff web site at www.epa.gov/nps

Printed with soy based inks on recycled paper.

APPENDIX C
MODEL ILLICIT DISCHARGE AND CONNECTION STORMWATER ORDINANCE (NEIWPCC)

ILLICIT DISCHARGE DETECTION AND ELIMINATION MANUAL

A Handbook for Municipalities



NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION

January 2003

APPENDIX A

Model Illicit Discharge and Connection Stormwater Ordinance[1]

ORDINANCE NO. _____

SECTION 1. PURPOSE/INTENT.

The purpose of this ordinance is to provide for the health, safety, and general welfare of the citizens of (_____) through the regulation of non-storm water discharges to the storm drainage system to the maximum extent practicable as required by federal and state law. This ordinance establishes methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process. The objectives of this ordinance are:

1)To regulate the contribution of pollutants to the municipal separate storm sewer system (MS4) by stormwater discharges by any user

(2) To prohibit Illicit Connections and Discharges to the municipal separate storm sewer system

(3) To establish legal authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this ordinance

SECTION 2. DEFINITIONS.

For the purposes of this ordinance, the following shall mean:

Authorized Enforcement Agency: employees or designees of the director of the municipal agency designated to enforce this ordinance.

Best Management Practices (BMPs): schedules of activities, prohibitions of practices, general good house keeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act. The federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity. Activities subject to NPDES Construction Permits. Currently these include construction projects resulting in land disturbance of 5 acres or more. Beginning in March 2003, NPDES Storm Water Phase II permits will be required for construction projects resulting in land disturbance of 1 acre or more. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials. Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Discharge. Any direct or indirect non-storm water discharge to the storm drain system, except as exempted in Section X of this ordinance.

Illicit Connections. An illicit connection is defined as either of the following:

[1] USEPA. 2002. *Model Ordinances to Protect Local Resources: Illicit Discharges.* http://www.epa.gov/owow/nps/ordinance/discharges.htm

Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm drain system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm drain system and any connections to the storm drain system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency or,

Any drain or conveyance connected from a commercial or industrial land use to the storm drain system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Industrial Activity. Activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit. means a permit issued by EPA (or by a State under authority delegated pursuant to 33 USC § 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Non-Storm Water Discharge. Any discharge to the storm drain system that is not composed entirely of storm water.

Person. means any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting as either the owner or as the owner's agent.

Pollutant. Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Premises. Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Storm Drainage System. Publicly-owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Storm Water. Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

Stormwater Pollution Prevention Plan. A document which describes the Best Management Practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to Stormwater, Stormwater Conveyance Systems, and/or Receiving Waters to the Maximum Extent Practicable.

Wastewater means any water or other liquid, other than uncontaminated storm water, discharged from a facility.

SECTION 3. APPLICABILITY.

This ordinance shall apply to all water entering the storm drain system generated on any developed and undeveloped lands unless explicitly exempted by an authorized enforcement agency.

SECTION 4. RESPONSIBILITY FOR ADMINISTRATION.

The_____ [authorized enforcement agency] shall administer, implement, and enforce the provisions of this ordinance. Any powers granted or duties imposed upon the authorized enforcement agency may be delegated in writing by the Director of the authorized enforcement agency to persons or entities acting in the beneficial interest of or in the employ of the agency.

SECTION 5. SEVERABILITY.

The provisions of this ordinance are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this Ordinance or the application thereof to any person, establishment, or circumstances shall be held invalid, such invalidity shall not affect the other provisions or application of this Ordinance.

SECTION 6. ULTIMATE RESPONSIBILITY.

The standards set forth herein and promulgated pursuant to this ordinance are minimum standards; therefore this ordinance does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants.

SECTION 7. DISCHARGE PROHIBITIONS.

Prohibition of Illegal Discharges.

No person shall discharge or cause to be discharged into the municipal storm drain system or watercourses any materials, including but not limited to pollutants or waters containing any pollutants that cause or contribute to a violation of applicable water quality standards, other than storm water.

The commencement, conduct or continuance of any illegal discharge to the storm drain system is prohibited except as described as follows:

(1) The following discharges are exempt from discharge prohibitions established by this ordinance: water line flushing or other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, non-commercial washing of vehicles, natural riparian habitat or wetland flows, swimming pools (if dechlorinated - typically less than one PPM chlorine), fire fighting activities, and any other water source not containing Pollutants.

(2) Discharges specified in writing by the authorized enforcement agency as being necessary to protect public health and safety.

(3) Dye testing is an allowable discharge, but requires a verbal notification to the authorized enforcement agency prior to the time of the test.

(4) The prohibition shall not apply to any non-storm water discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for any discharge to the storm drain system.

Prohibition of Illicit Connections.

(1) The construction, use, maintenance or continued existence of illicit connections to the storm drain system is prohibited.

(2) This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection.

(3) A person is considered to be in violation of this ordinance if the person connects a line conveying sewage to the MS4, or allows such a connection to continue.

SECTION 8. SUSPENSION OF MS4 ACCESS.

Suspension due to Illicit Discharges in Emergency Situations

The _____ [authorized enforcement agency] may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4 or Waters of the United States. If the violator fails to comply with a suspension order issued in an emergency, the authorized enforcement agency may take such steps as deemed necessary to prevent or minimize damage to the MS4 or Waters of the United States, or to minimize danger to persons.

Suspension due to the Detection of Illicit Discharge

Any person discharging to the MS4 in violation of this ordinance may have their MS4 access terminated if such

termination would abate or reduce an illicit discharge. The authorized enforcement agency will notify a violator of the proposed termination of its MS4 access. The violator may petition the authorized enforcement agency for a reconsideration and hearing.

A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this Section, without the prior approval of the authorized enforcement agency.

SECTION 9. INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES.

Any person subject to an industrial or construction activity NPDES storm water discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the _____ [authorized enforcement agency] prior to the allowing of discharges to the MS4.

SECTION 10. MONITORING OF DISCHARGES.

1. Applicability.
   This section applies to all facilities that have storm water discharges associated with industrial activity, including construction activity.

2. Access to Facilities.

(1) The_____ [authorized enforcement agency] shall be permitted to enter and inspect facilities subject to regulation under this ordinance as often as may be necessary to determine compliance with this ordinance. If a discharger has security measures in force which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the authorized enforcement agency.

(3) Facility operators shall allow the _____[authorized enforcement agency] ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge storm water, and the performance of any additional duties as defined by state and federal law.

(3) The _____ [authorized enforcement agency] shall have the right to set up on any permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's storm water discharge.

(4) The _____ [authorized enforcement agency] has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy.

(5) Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of the [authorized enforcement agency] and shall not be replaced. The costs of clearing such access shall be borne by the operator.

(6) Unreasonable delays in allowing the _____ [authorized enforcement agency] access to a permitted facility is a violation of a storm water discharge permit and of this ordinance. A person who is the operator of a facility with a NPDES permit to discharge storm water associated with industrial activity commits an offense if the person denies the authorized enforcement agency reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this ordinance.

(7) If the _____ [authorized enforcement agency] has been refused access to any part of the premises from which stormwater is discharged, and he/she is able to demonstrate probable cause to believe that there may be a violation of this ordinance, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this ordinance or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the authorized enforcement agency may seek issuance of a search warrant from any court of competent jurisdiction.

SECTION 11. REQUIREMENT TO PREVENT, CONTROL, AND REDUCE STORM WATER POLLUTANTS BY THE USE OF BEST MANAGEMENT PRACTICES.

[Authorized enforcement agency] will adopt requirements identifying Best Management Practices for any activity, operation, or facility which may cause or contribute to pollution or contamination of storm water, the storm drain system, or waters of the U.S. The owner or operator of a commercial or industrial establishment shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses through the use of these structural and non-structural BMPs. Further, any person responsible for a property or premise, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of storm water associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this section. These BMPs shall be part of a stormwater pollution prevention plan (SWPP) as necessary for compliance with requirements of the NPDES permit.

SECTION 12. WATERCOURSE PROTECTION.

Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse, so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

SECTION 13. NOTIFICATION OF SPILLS.

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illegal discharges or pollutants discharging into storm water, the storm drain system, or water of the U.S. said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the authorized enforcement agency in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the _____ [authorized enforcement agency] within three business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

SECTION 14. ENFORCEMENT.

1. Notice of Violation.
   Whenever the _____ [authorized enforcement agency] finds that a

person has violated a prohibition or failed to meet a requirement of this Ordinance, the authorized enforcement agency may order compliance by written notice of violation to the responsible person. Such notice may require without limitation:
(a) The performance of monitoring, analyses, and reporting;
(b) The elimination of illicit connections or discharges;
(c) That violating discharges, practices, or operations shall cease and desist;
(d) The abatement or remediation of storm water pollution or contamination hazards and the restoration of any affected property; and
(e) Payment of a fine to cover administrative and remediation costs; and
(f) The implementation of source control or treatment BMPs.
If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the work will be done by a designated governmental agency or a contractor and the expense thereof shall be charged to the violator.

SECTION 15. APPEAL OF NOTICE OF VIOLATION.
Any person receiving a Notice of Violation may appeal the determination of the authorized enforcement agency. The notice of appeal must be received within _ days from the date of the Notice of Violation. Hearing on the appeal before the appropriate authority or his/her designee shall take place within 15 days from the date of receipt of the notice of appeal. The decision of the municipal authority or their designee shall be final.

SECTION 16. ENFORCEMENT MEASURES AFTER APPEAL.
If the violation has not been corrected pursuant to the requirements set forth in the Notice of Violation, or , in the event of an appeal, within __ days of the decision of the municipal authority upholding the decision of the authorized enforcement agency, then representatives of the authorized enforcement agency shall enter upon the subject private property and are authorized to take any and all measures necessary to abate the violation and/or restore the property. It shall be unlawful for any person, owner, agent or person in possession of any premises to refuse to allow the government agency or designated contractor to enter upon the premises for the purposes set forth above.

SECTION 17. COST OF ABATEMENT OF THE VIOLATION.
Within __ days after abatement of the violation, the owner of the property will be notified of the cost of abatement, including administrative costs. The property owner may file a written protest objecting to the amount of the assessment within __ days. If the amount due is not paid within a timely manner as determined by the decision of the municipal authority or by the expiration of the time in which to file an appeal, the charges shall become a special assessment against the property and shall constitute a lien on the property for the amount of the assessment.
Any person violating any of the provisions of this article shall become liable to the city by reason of such violation. The liability shall be paid in not more than 12 equal payments. Interest at the rate of __ percent per annum shall be assessed on the balance beginning on the _st day following discovery of the violation.

SECTION 18. INJUNCTIVE RELIEF.
It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Ordinance. If a person has violated or continues to violate the provisions of this ordinance, the authorized enforcement agency may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

SECTION 19. COMPENSATORY ACTION.
In lieu of enforcement proceedings, penalties, and remedies authorized by this Ordinance, the authorized enforcement agency may impose upon a violator alternative compensatory actions, such as storm drain stenciling, attendance at compliance workshops, creek cleanup, etc.

SECTION 20. VIOLATIONS DEEMED A PUBLIC NUISANCE.
In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this Ordinance is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

SECTION 21. CRIMINAL PROSECUTION.
Any person that has violated or continues to violate this ordinance shall be liable to criminal prosecution to the fullest extent of the law, and shall be subject to a criminal penalty of _____ dollars per violation per day and/or imprisonment for a period of time not to exceed ____ days.
The authorized enforcement agency may recover all attorney's fees court costs and other expenses associated with enforcement of this ordinance, including sampling and monitoring expenses.

SECTION 22. REMEDIES NOT EXCLUSIVE.
The remedies listed in this ordinance are not exclusive of any other remedies available under any applicable federal, state or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies.

SECTION 23. ADOPTION OF ORDINANCE.
This ordinance shall be in full force and effect __ days after its final passage and adoption. All prior ordinances and parts of ordinances in conflict with this ordinance are hereby repealed.

PASSED AND ADOPTED this ____ day of _____, 19__, by the following vote:

APPENDIX D
ALTERNATE MODEL ILLICIT DISCHARGE CONNECTION ORDINANCES

"Illicit discharges to the municipal storm sewer system are comprised of non-storm water discharges that are expressly prohibited from the municipal storm sewer system unless the discharges have received all required federal, state and local permits including the National Pollutant Discharge Elimination System (NPDES) or is included in one of the following categories of discharges: water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated ground water infiltration, uncontaminated pumped groundwater, discharges from potable water sources, foundation drains, air conditioning condensation, irrigation water springs, water from crawl space sumps, footing drains, lawn watering, individual residential car washing, flows from riparian habitats and wetlands, de-chlorinated swimming pool discharges, and street wash water discharges, flows from fire fighting activities. If an illicit discharge to the municipal storm sewer system is detected, the owner of the discharge shall cease said discharge within seven calendar days. If the owner does not cease said discharge within seven calendar days, the Town of Coventry shall have the right to take whatever actions it deems necessary to correct the violations and to assert a lien on the subject property in an amount equal to the costs of the remedial actions. The lien shall be enforced in the manner provided or authorized by law for the enforcement of common law liens on personal property. The lien shall be recorded in the land evidence records of the Town of Coventry, and shall incur legal interest from the date of the recording. The imposition of any penalty shall not exempt the offender from compliance with the provisions of this ordinance, including revocation of the performance bond or assessment of a lien on the property."

APPENDIX E
CONTRACTOR SELF-INSPECTION FORM

Contractor Self-Inspection Form

C4.1 Construction Site Inspection Checklist

Inspected By: _____

Project: _____

Contractor: _____

Date: _____

Check "Yes" or "No" or "N/A" if not applicable.

YES	NO	N/A		
	_____		1	Has there been an absence of rain since the last inspection?
	_____		2.	Are all sediment barriers (e.g., sandbags, straw bales, and silt fences) in place in accordance with the Plan and are they functioning properly?
_____	_____		3.	If present, are all exposed slopes protected from erosion through the implementation of acceptable soil stabilization practices?
	_____	_____	4.	If present, are all sediment traps/basins installed and functioning properly (if applicable)?
_____	_____	_____	5.	Are all material handling and storage areas reasonably clean and free of spills, leaks, or other deleterious materials?
	_____	_____	6	Are all equipment storage and maintenance areas reasonably clean and free of spills, leaks, or any other deleterious materials?
	_____	_____	7.	Are all materials and equipment properly covered?
			8.	Are all external discharge points (i.e., outfalls) reasonably free of any noticeable pollutant discharges?
	_____	_____	9.	Are all internal discharge points (i.e., storm drain inlets) provided with inlet protection?

SOURCE ALAMEDA CLEAN WATER PROGRAM

Check "Yes" or "No" or "N/A" if not applicable.

YES	NO	N/A	
			10 Are all external discharge points reasonably free of any significant erosion or sediment transport?
			11. Are all BMPs identified on the Plan installed in the proper location and according to the specifications for the plan?
			12. Are all structural control practices in good repair and maintained in functional order?
			Are all on-site traffic routes, parking, and storage of equipment and supplies restricted to areas designated in the Plan for those uses?
			14. Are all locations of temporary soil stockpiles or construction materials in approved areas?
			15. Are all seeded or landscaped areas properly maintained?
			16. Are sediment treatment controls in place at discharge points from the site?
			17. Are slopes free of significant erosion?
			18. Are all points of ingress and egress from the site provided with stabilized construction entrances?
			19. Is sediment, debris, or mud being cleaned from public roads at intersections with site access roads?
			20. Does the Plan reflect current site conditions?

If you answered "no" to any of the above questions (except Number 1), describe any corrective action(s) that must be taken to remedy the problem and when the corrective action is to be completed:

_____

_____

_____

_____

_____

C4.2 Inspection Log

The site shall be inspected before and after storm events with 0.25 inches or greater predicted or actual precipitation, and documented on the Construction Site Inspection Checklist. Incidents of noncompliance must be reported to the Engineer.

Date	Inspector	Type of Inspection			Observations (If post-storm inspection, note size of storm in inches)
		Routine	Pre-Storm	Post-Storm	

APPENDIX F
TOWN OF WATERFORD, CONNECTICUT
JORDAN BROOK WATERSHED MANAGEMENT PLAN

The Jordan Brook Watershed Management Plan: Protecting Wetlands and Water Quality from Future Development

Abstract

This paper presents a comprehensive watershed management plan for the Jordan Brook watershed, a 21.2 square-kilometer (8.2 square-mile) coastal watershed located in a developing area of southeastern Connecticut on Long Island Sound. The plan provides a consistent framework for evaluating and controlling impacts to wetlands and watercourses from development in the watershed. The watershed management plan includes a baseline assessment of wetland resources throughout the watershed to identify particularly high value wetlands and wetlands which require special levels of protection. The recommended plan consists of five major components including stormwater quality controls, upland protection zones for wetlands and watercourses, groundwater recharge and peak flow requirements, open space protection, and water quality monitoring. A multi-tiered framework is recommended for determining the level of stormwater quality controls required for development projects in order to protect downstream receiving waters and wetlands. The recommended watershed management plan provides a framework which could be applied in other municipalities, especially those affected by EPA's recently promulgated Stormwater Phase II regulations.

Introduction

Research has demonstrated that urbanization is a major cause of degradation to wetlands and surface water quality and typically results in:

Increased volume of stormwater runoff,
Increased pollutant loadings from stormwater runoff,
Reduced infiltration and groundwater recharge,
Lower dry weather stream flows,
Degraded stream habitat, and
Reduced wetland moisture levels.

In most states, protection of wetlands and watercourses is regulated at the local level by municipalities. However, many communities do not have a consistent framework for evaluating wetland and watercourse impacts from development projects.

This paper presents a watershed management plan that provides a consistent framework for evaluating and controlling impacts to wetlands and watercourses from development. The plan was developed to protect wetland resources in the Jordan Brook watershed, a coastal watershed located in southeastern Connecticut on Long Island Sound. While the southern

portion of the watershed has been developed, large areas of the northern watershed remain undeveloped and are experiencing significant development pressure.

The Jordan Brook watershed management plan includes an evaluation of existing watershed resources, including wetlands, stream water quality, land use, and hydrologic conditions. A baseline assessment of wetland resources throughout the watershed was conducted to identify particularly high value wetlands and determine which wetlands require special levels of protection. A geographic information system (GIS)-based pollutant loading model was developed to evaluate subwatershed pollutant loadings, and a hydrological model was developed for the watershed to address stormwater quantity management issues.

The recommended watershed management plan consists of five major components:

Stormwater quality controls,
Upland protection zones for wetlands and watercourses,
Groundwater recharge and stormwater peak flow requirements,
Open space protection within the watershed, and
Water quality monitoring.

The following sections describe existing conditions in the Jordan Brook watershed, an evaluation of the watershed wetlands, and the major components of the recommended watershed management plan.

Watershed Conditions

The Jordan Brook watershed is a 21.2 square-kilometer (8.2 square-mile) watershed located in southeastern Connecticut. A majority of the watershed (94 percent) is located in the Town of Waterford, with a small portion of the watershed (6 percent) located in the City of New London. This watershed is oriented in a north-south direction, extending approximately 8.8 kilometers (5.5 miles) from its headwaters south to Jordan Cove which discharges to Long Island Sound.

The upper reaches of the Jordan Brook watershed are largely undeveloped. Jordan Brook crosses several highways, including Interstate-95, Interstate-395, and State Route 85 through the central portion of the watershed. Development and corresponding imperviousness increase as the brook flows south. Jordan Brook reaches its confluence with Nevins Brook approximately 400 feet upstream of Jordan Cove. Nevins Brook drains the southeastern portion of the watershed. Several smaller tributaries oriented in an east-west direction feed the central and southern portions of Jordan Brook. Figure 1 shows the location of the Jordan Brook watershed.

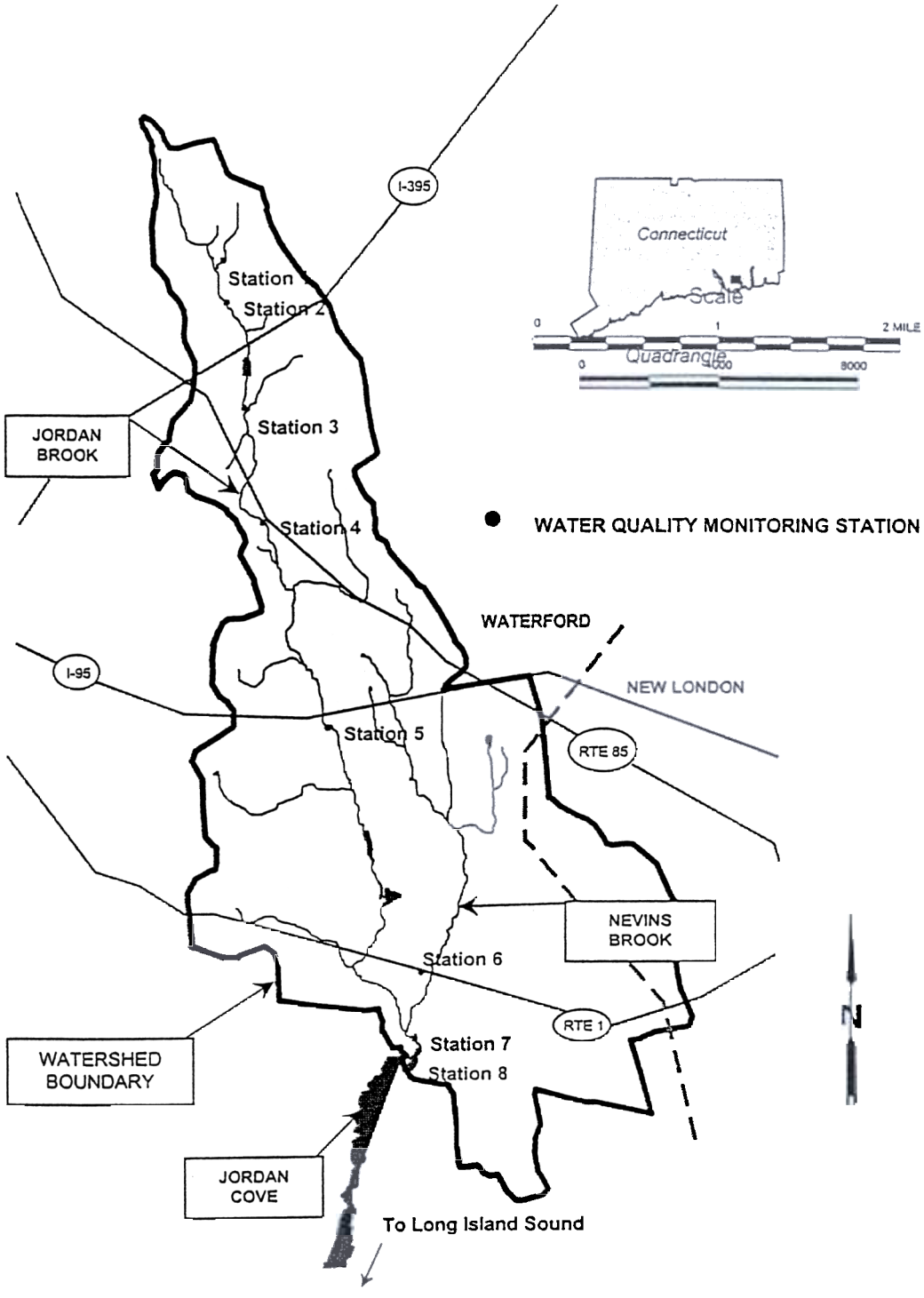


Figure 1. Location map of the Jordan Brook watershed.

Land Use

Watershed land use affects the quantity and quality of stormwater generated in the watershed. Factors such as impervious area, drainage system, development characteristics, traffic volume, air emissions, and exposure of other pollutant sources are dependent on land

use. Approximately 76 percent of the watershed consists of a combination of undeveloped, single family residential, and public facility land uses. Approximately 17 percent of the watershed consists of commercial, industrial and multi-family land uses. Highways and roads comprise approximately 7 percent of the watershed area.

Water Quality

Surface water quality in the watershed generally meets "fishable and drinkable" (Class A) standards established for the State of Connecticut. While surface water quality still meets standards, in-stream concentrations of pollutants increase downstream as development and impervious surfaces increase. Overall watershed imperviousness is approximately 12 percent, while highly developed areas in the southern portion of the watershed are up to 30 percent impervious. These levels of imperviousness are generally within the widely-cited range of impervious coverage values (10 to 30 percent) at which impacts to downgradient water resources are observed (Booth and Reinfelt 1993; Shaver and Maxted 1996; Schueler 1993; Arnold and Gibbons 1996). Additionally, modeling of future pollutant loads indicates that stormwater pollutant loadings could increase by more than 100 percent for zinc and between 30 and 50 percent for phosphorous, copper, and lead under a future full build-out scenario.

Groundwater

The Jordan Brook watershed is underlain by areas of stratified drift that could serve as groundwater aquifers. Potential groundwater aquifers are generally concentrated along Jordan Brook, Nevins Brook, and their associated tributaries. A widespread area of thick stratified drift deposits is located in the southern portion of the watershed. The Town of Waterford has identified this area as a potential public water supply source. However, this area is also susceptible to groundwater contamination from point and non-point sources of pollution due to the high degree of development in the area.

Wetlands Evaluation

A field survey and evaluation of wetlands and watercourses in the watershed was performed in April 1998. The purpose of this survey was to develop a description and biological evaluation of significant surface water and wetland ecosystems within the Jordan Brook watershed in order to identify particularly high value wetlands and wetlands which require special levels of protection.

Wetlands within the Jordan Brook watershed were evaluated using an adaptation of the method developed by the Connecticut Department of Environmental Protection (CTDEP) (Ammann, et al., 1991). This method was designed for use by municipalities as a planning tool and consists of a scientifically defensible numerical scoring system that can

be used to compare the relative value of all wetlands within the same watershed. Wetland value rankings (Low, Average, High or Very High), which reflect the comparative value of wetlands within the watershed, were assigned to each wetland based upon the numerical scores.

The evaluation also identified wetlands within the watershed that would benefit greatly by improvements in the quality of stormwater flowing into them. These wetlands are either

Located in undeveloped areas and would be significantly impacted by degraded stormwater from road runoff or construction related sedimentation,
Degraded surface waters which flow through developed areas and would be significantly enhanced by water quality improvements, or
Wetlands deemed especially sensitive and meriting all possible measures of protection or preservation.

Recommended Plan

A recommended watershed management plan was developed to control wetland and watercourse impacts that may be caused by new development or altered land use activities in the Jordan Brook watershed. The goal of this plan is to maintain or improve existing ecological conditions in watershed wetlands and watercourses while not unreasonably restricting future development. In general, this plan controls several types of potential impacts associated with development. These potential impacts include:

Degradation of surface water quality and wetland habitat
Reduction of groundwater base flows
Increase in stream flood flows

The following are the major elements of the recommended watershed plan.

Stormwater Quality Controls

A stormwater quality control selection methodology was recommended for future development projects to protect watershed wetlands and water quality. This recommended methodology utilizes a tiered approach to define the appropriate level of stormwater controls that would be necessary to protect downstream resources based on the type and size of development and its potential impacts. Three tiers of stormwater controls were recommended, which are triggered based on development characteristics such as level of imperviousness, size of the development, land use, and also based on receiving water/wetland resources.

Base Level Controls

Base level controls are intended to provide baseline protection against degradation of downstream resources across the entire watershed. Base level controls provide gross contaminant and sediment reduction and serve to dissipate the potential erosive energy of stormwater runoff. A base level of stormwater quality controls would be required for all new developments. Redevelopments that result in land use changes or modifications to the storm drainage system would also be required to implement these controls as an opportunity to improve watershed water quality. Base level controls would not be required for single-family houses or residential subdivisions with four or fewer lots that have no new roads, provided that any discharge from the subdivision would not affect a wetland or watercourse that is sensitive to water quality. Development that is part of a phased development project would not be exempt from base level controls.

Base level controls would be required for diffuse runoff and point discharges and would consist of, at a minimum, one or a combination of stormwater Best Management Practices (BMPs) such as vegetated buffer strips, oil/particle separators, level spreaders, sediment basins (with floatables trap), infiltration basins, and vegetated drainage swales. These measures provide a minimum level of stormwater treatment by promoting infiltration and filtration of stormwater pollutants by vegetation or by removal of gross solids and floatables.

Secondary and Tertiary Controls

In addition to the base level controls required for all future development, more stringent stormwater quality controls would be required for developments that have the potential to generate higher pollutant loadings. Similarly, stormwater discharges to wetlands or watercourses identified as being sensitive to water quality would also require an additional level of protection to limit pollutant impacts to these resources. Under this stormwater quality control selection methodology, two levels of additional controls may be required for stormwater discharges that meet these criteria.

Secondary controls would require implementation of stormwater BMPs that remove at least 80 percent of the total suspended solids (TSS) load. The 80 percent TSS removal requirement applies to post-development conditions after a site is stabilized. Examples of BMPs which have been shown to achieve 80 percent TSS removal on average include:

Extended detention pond (equipped with sediment forebay)
Wet pond (equipped with sediment forebay)
Constructed wetland
Sand or organic filter

Devices using swirl/vortex technology
Other proprietary technologies demonstrated to provide 80 percent TSS removal

Floatables such as oil and grease could be removed using a base level control such as an oil/water separator in combination or in addition to the above measures.

Tertiary controls has the goal of no net increase in future pollutant loadings as compared to existing conditions, considering maximum attainable reductions in stormwater pollutant loadings. This level of controls would require at least 80 percent removal of TSS, removal of floatables, and demonstration of no net increase in loadings of other pollutants suspected of being present in the stormwater (e.g., nutrients, metals, coliform bacteria) through the use of a stormwater pollutant loading model. Required stormwater controls would likely consist of one or a series of state-of-the-art stormwater BMPs. This level of control would be required only for those developments with the greatest potential for significant pollutant loadings or potential impacts to wetlands or watercourses which are sensitive to water quality.

Selection Criteria

Selection of the appropriate level of stormwater quality controls for a particular development would be based on consideration of the following criteria:

Receiving water resource - Wetlands or watercourses which are sensitive to water quality would be protected by providing the maximum attainable level of stormwater controls. Tertiary stormwater quality controls would be required for all developments which discharge to such wetlands or watercourses as a point source, either directly or via a storm drainage system, or as uniform, diffuse flow. Stormwater discharges to all other wetlands or watercourses would require base level or secondary controls, depending on the other selection criteria.

Land use of proposed development - Tertiary controls would be required for developments with industrial, high-intensity commercial, or other land uses with the potential for significant pollutant loadings (e.g., gas stations, vehicle service facilities, salt storage areas, marinas).

Level of imperviousness - Developments with less than 10 percent impervious area would require base level controls. Developments with more than 10 percent impervious area would require secondary stormwater quality controls.

Size of development - Developments with greater than five acres of disturbed area would require secondary stormwater quality controls, which is consistent with the CTDEP's existing stormwater general permit that requires projects that result in more

than five acres of disturbance to install controls with a goal of at least 80 percent TSS reduction.

Stormwater quality control selection thresholds for each of these criteria are summarized in Table 1. The most stringent of the applicable control levels would dictate the required level of controls for a particular development project.

Table 1. Stormwater quality control level selection methodology.

Selection Criteria	Stormwater Quality Control Level		
	Base Level Controls	Secondary Controls	Tertiary Controls
Receiving Water Resource	All other wetlands/watercourses	All other wetlands/watercourses	Discharge to wetland/ watercourse sensitive to water quality
Land Use	All other land uses	All other land uses	Facilities with potential for extremely high pollutant loadings
Percent Impervious	0 to 10 percent	Greater than 10 percent	—
Size of Development	0 to 5 acres	Greater than 5 acres	—

Upland Protection Zones

One of the most effective ways to protect wetlands of special significance is to designate an Upland Protection Zone of undisturbed vegetation along the wetland boundary. Natural vegetation stabilizes transitional soils between uplands and wetlands, thereby preventing erosion and sedimentation. The ability to anchor soils on steep slopes is especially important. The vegetation slows the passage of stormwater, allowing infiltration into the soil, thereby removing nutrients and other pollution. Edge habitats in uplands bordering wetlands are also heavily utilized by wildlife, especially birds. An Upland Protection Zone 50 feet in width is recommended for all wetlands, and a 100-foot width is recommended adjacent to perennial streams. These widths are believed adequate to prevent soil erosion on sloping land, provide upland nesting sites for birds, and provide an unbroken travel corridor for mammals, reptiles and amphibians.

No structures, other than bridge supports, culvert abutments, stormwater control devices, or utility lines would be allowed in the Upland Protection Zone. Site-specific

factors which should be considered in adjusting the width of an upland protection zone include the significance of the wetland resource, land slope, soil type, and flood plain limits.

Groundwater Recharge and Peak Stormwater Flows

The watershed management plan recommends that new developments maintain pre-development groundwater base flows. One means of potentially accomplishing this recommendation would be for new developments to infiltrate "clean" roof runoff from non-metallic roofs. Alternatively, new developments could be allowed to infiltrate less water by demonstrating through an engineering evaluation of actual site conditions that less water can be infiltrated and still maintain groundwater base flows.

Increased development could result in increased impervious surfaces and, without adequately sized stormwater controls, will increase peak stormwater flows and increase the volume and rate at which runoff will drain from the site. In order to control this potential impact from new development, the plan recommends that developers include detention/retention devices such that pre-development peak discharge rates from the site are maintained. Some developments that have little potential to significantly impact off-site peak discharge rates could be exempted from this requirement. The developments that could be exempted are small projects that would generate a net increase of peak stormwater flows of less than 1 cubic foot per second and where this level of control may be overly burdensome and include:

Single family residences,
Subdivisions with four lots or less with no new public/private roads,
A project with a net increase of less than 5,000 square feet of impervious surfaces.

The plan requires that new development projects demonstrate no net increase in pre-development peak flows from the site for proposed conditions and compare total proposed peak discharge from the site to existing peak flows at downstream points-of-concern (culverts, wetlands, floodprone areas, etc.). If the total proposed peak discharge from the site exceeds 10 percent of the existing peak flow at a downstream point-of-concern, the project must demonstrate no net increase in pre-development peak flows at each point-of-concern between the site and the downstream most point-of-concern.

Open Space Protection

While encroachment of new development into wetland areas can be prevented through existing regulations, upland areas can be developed, within limitations, unless that land is controlled/or owned by an entity (public or private) that prevents its development. The intent and benefit of maintaining adjacent upland areas is for maintenance of wetland

hydrology and ecological setting. The watershed management plan recommends that the Town of Waterford continue to acquire upland open space that would improve the value of wetlands in the watershed.

Water Quality Monitoring

The plan recommends continued surface water quality monitoring in the watershed to evaluate trends in water quality and the overall success of the watershed management program. Biannual wet and dry weather sampling of Jordan Brook is recommended to monitor conventional water quality parameters. Water quality monitoring of stormwater BMPs is also recommended to confirm that new developments have appropriate controls. Initial and long-term post-construction monitoring of BMPs is recommended.

Conclusions

The watershed management plan described in this paper provides a framework which could be applied to watershed management in other municipalities, especially those affected by EPA's recently promulgated Stormwater Phase II regulations which will require expanded stormwater controls for small- to mid-size municipalities. Field evaluation of wetlands and water resources in the watershed is a critical component of this framework, which prioritizes the required level of stormwater quality controls based on a number of site-specific factors, including the relative value of the receiving water resource. The success of this watershed management plan will be measured through ongoing water quality and stormwater BMP monitoring, as well as future wetlands evaluations.

References

Ammann, A.P., R.W. Franzen and J.L. Johnson, 1991. Method for the Evaluation of Inland Wetlands in Connecticut: A Watershed Approach, Bulletin No. 9, Department of Environmental Protection, 79 Elm Street, Hartford, Connecticut.

Arnold, C.L., Jr., and C.J. Gibbons, 1996. Impervious Surface Coverage: The Emergence of a Key Environmental Indicator, Journal of the American Planning Association, 62(2).

Booth, D.B. and L.E. Reinfelt, March 1993. Consequences of Urbanization on Aquatic Systems - Measured Effects, Degradation Thresholds, and Corrective Strategies, In Proceedings of the Watershed '93 Conference, Alexandria, Virginia.

Schueler, T.R., 1994. The Importance of Imperviousness, Watershed Protection Techniques, Vol. 1, No. 3

Shaver, E.J. and J.R. Maxted, 1996. Technical Note 72 Habitat and Biological Monitoring

Reveals Headwater Stream Impairment in Delaware's Piedmont, Watershed Protection Techniques, Vol. 2, No. 2.

APPENDIX G
DRAFT MODEL STORMWATER CONTROL ORDINANCE

Draft
Model Stormwater Control Ordinance

Section 1

1.1 Purpose

Unmitigated stormwater from areas altered by development may pose public health and safety threats. Potential contaminants in stormwater runoff may include suspended solids, nitrogen, phosphorus, hydrocarbons, heavy metals, pathogenic organisms (bacteria and viruses), and road salts. Stormwater runoff may impact any water resource—surface water, groundwater and wetlands—and is often cited as the most significant contributor of nonpoint source water pollution.

Best management practices for stormwater management help to prevent adverse impact. However, practices must be designed, installed and maintained properly to ensure their effective function. Practices that do not function properly may degrade water quality as well as present nuisance and safety hazards.

This ordinance establishes the administrative mechanisms necessary for *[name of municipality]* to ensure proper stormwater management. The ordinance is written to work in conjunction with current state regulations.

1.2 Applicability

This ordinance shall apply to all development occurring within *[name of municipality]*. No person shall engage in land development activities without receiving approval from *[name of governing body]*, unless specifically exempted by Section 1.3 of this ordinance.

1.3 Exemptions

The following activities do not require written approval pursuant to this ordinance:

(A) Agricultural land management activities carried out in accordance with a conservation management plan that has been approved by the Natural Resources Conservation Service.

(B) Additions or modifications to existing single-family residential structures.

(C) Grading, as a maintenance measure or for landscaping, on contiguous areas of developed land, parcels and lots, which in aggregate do not exceed five thousand (5,000) square feet.

1.4 Variance

The _____ (municipal board or official) reviewing an application under this ordinance may:

(A) Vary requirements of this ordinance when strict implementation of the requirements of this ordinance create an unnecessary hardship or are not feasible.

(B) Allow use of an innovative management practice where strict adherence to existing criteria would be costly or of negligible environmental benefit.

1.5 Compatibility with Other Enforceable Policies

This ordinance shall not obviate or supercede any other federal, state or local regulations or statutes. The provisions of this ordinance shall be held to be minimum requirements for the promotion of public health, safety and general welfare. If a provision of this ordinance imposes a standard different from any related regulation or statute, the provision that imposes the more protective standard shall be observed.

1.6 Severability

If the provisions of any article, section, subsection, paragraph, subdivision or clause of this ordinance shall be judged invalid by court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision or clause of this ordinance.

Section 2--Definitions

The following definitions apply to this ordinance.

AGRICULTURAL DEVELOPMENT: means land uses normally associated with the production of food, fiber and livestock for sale. For purposes of this ordinance, such uses shall not include the development of land for the processing or sale of food and the manufacturing of agriculturally related products.

BEST MANAGEMENT PRACTICE (BMP): means a method for pollution

management, which is deemed to provide the best available treatment or control of a pollution source such as stormwater.

DETENTION BASIN: means an embankment and associated space for impoundment of water or, alternatively, the space for impoundment partially or entirely created by excavation rather than by embankment, in either case designed to temporarily retain stormwater runoff.

FLOOD HAZARD AREAS: means the floodway and flood fringe areas determined or delineated by the Department of Environmental Management.

FLOOD PLAIN: means the flood hazard areas of streams delineated the Department of Environmental Management and areas inundated by the 100-year flood in areas not delineated by the Department of Environmental Management.

FLOODWAY: means the channel of a natural stream and portions of the flood hazard areas adjoining the channel, which are reasonably required to carry and discharge the flood water or flood flow of any natural stream.

INFILTRATION BASIN: means a detention facility, which is not an injection well, that is designed to gradually filter and pass retained water to the subsurface.

NONPOINT SOURCE POLLUTION: means pollution from any source that is not discernible, confined and discrete. Potential sources of nonpoint pollution include, but are not limited to, stormwater runoff, agriculture, silviculture, mining, construction, septic systems and urban development.

RECHARGE: means the replenishment of underground water reserves.

STORMWATER RUNOFF: means flow on the surface of the ground, resulting from precipitation.

WET BASIN: means a detention basin designed to retain some water on a permanent basis.

WETLANDS: means an area, as defined by the Rhode Island General Laws and as determined by the Department of Environmental Management or the Coastal Resources Management Council, which is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support--and under normal circumstances does support--a prevalence of vegetation typically adapted for life in

saturated soil conditions, commonly known as hydrophytic vegetation.

Section 3—Submissions and Approvals

In accordance with Section 1.2 of this ordinance, all persons must obtain approval from *(name of municipal review board)* prior to engaging in any land development activities, unless exempted by Section 1.3 of this ordinance. To obtain approval applicants must demonstrate compliance with all policy, standards and requirements of this ordinance to the satisfaction of the *(name of municipal review board).* Applicants may demonstrate compliance via submission of materials and documentation in accordance with this section.

3.1 Stormwater Management Plan

All applicants shall provide a stormwater management plan as part of the submission for approval. Stormwater management plans shall incorporate the following.

(A) A discussion of protection of environmental resource functions and values in accordance with Section of this ordinance.

(B) A discussion of best management practices employed, in accordance with this ordinance, both during construction and post construction.

(C) A discussion of best management practice maintenance to be used, in accordance with this ordinance, both during construction and post construction.

3.2 Site Plan

All applicants shall provide a site plan as part of the submission for approval. Site plans shall incorporate the following.

(A) A map of existing site conditions in accordance with Section of this ordinance.

(B) Maps of the site showing all phases of construction of the proposed project in accordance with Section of this ordinance.

(C) Site planning calculations in accordance with Section of this ordinance.

(D) A narrative description of the proposed project in accordance with

Section of this ordinance.

3.3 Maintenance Agreement

All applicants shall provide a maintenance agreement as part of the submission for approval in accordance with Section of this ordinance.

3.4 Performance Surety

All applicants shall provide performance surety as part of the submission for approval. The performance surety shall incorporate the following.

(A) A letter of credit in accordance with Section of this ordinance.

(B) Evidence of posting in accordance with Section of this ordinance.

3.5 Processing of Submittals

Procedures for processing of submittals shall be as follows.

(A) Submittals for approval shall be provided to *[name of municipal governing board]* for review, processing and approval. *[Number of copies to be provided by applicant]* copies of the submittal shall be provided.

(B) All applicants shall provide an application fee as part of the submittal. Application fees shall be charged in accordance with Section10 of this ordinance.

(C) A review of the submittal shall be conducted by *[name of municipal governing board]* within *[number of days required for review]* days from the date of receipt. Written comments shall be provided to the applicant regarding the completeness of the submittal and requesting further information as necessary.

(D) If *[name of municipal governing board]* determines the submittal to be in compliance with the requirements of this ordinance, a permit may be issued. If the *[name of municipal governing board]* determines the submittal does not fully conform to the requirements of this ordinance a written denial shall be issued with an explanation for the denial.

(E) Any applicant who believes that a submission for approval has been denied without sufficient cause and that the submittal fully conforms with this ordinance may petition *[name of municipal*

governing board] in writing. If the applicant is again denied, the denial may be appealed to *[name of municipal appeals board]*, whose decision shall be final.

Section 4--Protection of functions and values

4.1 Wildlife And Wildlife Habitat Values

Stormwater management plans shall address protection of areas that provide wildlife habitat benefits.

4.2 Recreation and Cultural Values

Stormwater management plans shall address protection of areas that provide recreational, cultural or aesthetic values.

4.3 Flood Protection

Stormwater management plans shall demonstrate that a proposed project provides for protection of life and property from flooding and flood flows. Water quantities must be controlled in accordance with the *Rhode Island Stormwater Design and Installation Standards Manual*, as amended, or a municipally approved regional stormwater management plan for the watershed in which the development site is located. Stormwater management plans shall demonstrate incorporation of the following standards into the proposed project:

(A) Control and maintenance of postdevelopment peak discharge rates from the 2-year and 25-year storm events and predevelopment levels.

(B) Downstream analysis of the 100-year storm event and control of the peak discharge rate for the 100-year storm to mitigate significant downstream impacts.

(C) Discharge from any stormwater facility must be conveyed through properly constructed watercourses to provide for nonerosive flows during all storm events. The proposed stormwater conveyance system consisting of open channels, pipes, and other conveyance devices shall at a minimum accommodate the runoff from a 10-year storm event. The stormwater conveyance system must provide for nonerosive flows to receiving waters.

4.4 Surface Water And Groundwater

Stormwater management plans shall demonstrate that during develop

and postdevelopment, all receiving waters will be recharged in a manner closely resembling predevelopment conditions and that the developed site will retain hydrological conditions that closely resemble of those prior to disturbance.

Section 5—Technical Standards

All applicants are required to develop and submit a stormwater management plan. All stormwater management plans must address stormwater management on a site-by-site basis and all requirements of this ordinance. All stormwater management practices shall be consistent with the *Rhode Island Stormwater Design and Installation Standards Manual* and the *Rhode Island Soil Erosion and Sediment Control Handbook*, as amended. The following general standards and policies are also requirements of the state. However, a state permit, assent, or other approval does not necessarily assure similar municipal approval. In situations where the state determines that a project is below regulatory threshold or outside state jurisdiction, *[name of municipality]* will continue to require that the following policies and standards be upheld.

All development shall incorporate appropriate and practical stormwater management. Stormwater management shall be described by applicants in a stormwater management plan and submitted in accordance with Section # of this ordinance. Stormwater management plans shall be prepared in accordance with Appendix A of this ordinance and demonstrate the following to maximum extent practicable.

5.1 Soil Erosion And Sediment Control

Stormwater management plans shall demonstrate soil erosion and sediment control in accordance with the *Rhode Island Soil Erosion and Sediment Control Handbook*, as amended. Soil erosion and sediment control must incorporate the following:

(A) Fit development to the terrain.

(B) Divide the site into drainage areas to determine how runoff will travel over the site.

(C) Cluster buildings together to the extent allowable by municipal ordinances and regulations.

(D) Minimize impervious areas.

(E) Minimize disturbance of the natural drainage system.

(F) Keep land disturbance to a minimum.

(G) Stabilize disturbed areas.

(H) Keep runoff velocities low.

(I) Minimize the grades of slopes.

(J) Protect disturbed areas from stormwater runoff.

(K) Install perimeter sediment control practices.

(L) Prepare a thorough maintenance and inspection plan.

(M) Assign responsibility for a maintenance program.

(N) Coordinate with other development in the watershed.

5.2 Performance Standards

(A) Stormwater management plans shall incorporate best management practices for water quality control, which in combination are demonstrated to reduce the average annual total suspended solids in postdevelopment runoff by eighty percent (80%). Development in drinking water supply watersheds may be held to higher standards. To meet standards the following must be incorporated:

(B) The water quality design volume shall be defined as one inch (1”) of runoff over all impervious surfaces or 0.4 inches of runoff over pervious areas. For purposes of computing runoff, all lands in the site shall be assumed, prior to development, to be in good hydrologic condition (if the lands are pastures, lawns or parks), with good cover (if the lands are woods), or with conservation treatment (if the land is cultivated), regardless of conditions existing at the times of computation. For lands to be considered cultivated, it shall have been used for such purposes uninterruptedly for a period of at least 10 years prior to the time of computation. If such uninterrupted use has not occurred or cannot be satisfactorily demonstrated, woods or brush shall be assumed to be the predeveloped land condition. All significant surface storage including open waters, ponding factors and hedgerows shall be accounted for in computing predevelopment runoff.

(C) Wet ponds must have a permanent pool volume equal to the water quality volume as described in item A.

(D) Extended detention dry ponds must detain the water quality volume over a 36-hour period (brim drawdown time).

(E) Infiltration methods must be designed to retain and exfiltrate the water quality volume over a maximum 72-hour period.

(F) All runoff up to the water quality design storm shall be controlled by one or more of the stormwater management best management practices as described in the *Rhode Island Stormwater Design and Installation Standards Manual*, as amended.

(G) Alternative land use, site design, source controls and structural controls may be used when they can be shown to provide equal or greater water quality protection, have acceptable maintenance requirements, and will be monitored to demonstrate their effectiveness on site.

5.3 Disallowed Stormwater Best Management Practices

(A) The following stormwater best management practices shall not be allowed in *[name of municipality]*, regardless of any other federal, state, regional or local policy or regulation. (list of disallowed best management practices)

(B) The placement of detention basins and other stormwater structures within a floodplain shall be avoided. If there is no alternative, the applicant must show what effects, if any, the tailwaters created by the floodplain will have on the outflow and effective storage capacity of the detention facility.

5.4 Safety

Safety measures are to be incorporated in the design of all stormwater and infiltration control projects. These may include but are not limited to fencing, warning signs/stadia rod indicating depth at the deepest point, outlet structures designed to limit public access, and aquatic benches in basins containing permanent or standing water levels.

5.5 Facilitation of Maintenance

Stormwater management facilities must be designed to operate with minimal maintenance. Facilities that require maintenance shall be designed to minimize the need for regular maintenance, facilitate required maintenance, and ensure accessibility of components that require maintenance. At a minimum, all stormwater management plans must incorporate best

management practices with appropriate maintenance design in accordance with the *Rhode Island Stormwater Design and Installation Standards Manual*, as amended; or the *Rhode Island Soil Erosion and Sediment Control Handbook*, as amended. In addition, the following maintenance design standards and policies must be incorporated into management practice design and stormwater management plans.

(A) Strong, durable and noncorroding materials, components, and fasteners shall be incorporated in facility design and demonstrated in stormwater management plans. These include, but are not limited to, the following:

1. Lightweight noncorroding metals such as aluminum for trash racks, orifice plates, anti-seep collars, and access hatches.

2. Hardy, disease resistant grasses for bottoms and side slopes (as prescribed by Soil Erosion and Sediment Control Standards administered by the local Soil Conservation District).

3. Reinforced concrete for outlet structures and inlet headwalls; PVC piping for culverts, and riprap and gabions for channel and outlet linings.

(B) Stormwater management facility outlets shall be designed to function normally without manual, electric or mechanical controls.

5.6 Nuisance Control

All stormwater management plans and best management practices shall incorporate nuisance control as appropriate. The following are the required policies and minimum standards:

(A) To control weeds, disease and pests, a regularly scheduled program of mowing and trimming of bottoms, side-slopes and embankments shall be specified and conducted.

(B) Stormwater management facilities shall be designed to minimize propagation of insects, particularly mosquitoes.

5.7 Landscaping

Stormwater management facilities shall be designed in a harmonious and attractive manner that visually compliments the natural environment of the development site as well as the postdeveloped condition.

(A) Use of landscaping as a method of reducing runoff and preventing pollutant inputs.

(B) Application of a minimal disturbance and minimal maintenance policy for landscaping. Where practical, clearing or site grading should only occur on land required for the structure and its associated utilities, drives, walks, and active recreational facilities. Following construction, unbuilt disturbed areas shall be revegetated with low- and no-maintenance, indigenous species.

(C) Where land disturbance is necessary and existing vegetation is removed, alternative landscaping, which encourages ground coverings, shade trees and shrubbery should be used. Landscaping should incorporate native vegetation to the maximum extent practicable. Use of lawns should be avoided where conditions indicate potential problems with turf establishment and maintenance.

(D) Appropriate fertilizer selection and application for vegetation reestablishment and landscaping.

Section 6—Maintenance Requirements for Best Management Practices

6.1 Routine Maintenance and Repair Procedures

(A) Preventative maintenance procedures are required to maintain the intended operation and safe condition of the stormwater management facility by greatly reducing the occurrence of problems and malfunctions. To be effective, preventative maintenance shall be performed on a regular basis and include such routine procedures as training of staff, periodic inspections, grass cutting (at least twice a year) and fertilizing, upkeep of moving parts, elimination of mosquito breeding habitats, and pond maintenance. Disposal of sediment and debris must occur on a regular basis (unless otherwise specified within an approved plan), at suitable disposal sites or recycling sites and comply with applicable local, state and federal regulations.

(B) Corrective maintenance procedures are required to correct a problem or malfunction at a stormwater management facility and to restore the facility's intended operation and safe condition. Based upon the severity of the problem, corrective maintenance must be performed on an as-needed or emergency basis and

include such procedures as structural repairs, removal of debris, sediment and trash removal which threaten discharge capacity, erosion repair, snow and ice removal, fence repair, mosquito extermination, and restoration of vegetated and nonvegetated linings.

(C) In the event that the stormwater management facility becomes a danger to public safety or public health, or in need of maintenance, the City/Town of _____ shall so notify the responsible person in writing by certified mail. Upon receipt of that notice, the responsible person shall have fourteen (14) days to effect maintenance and repair of the facility in a manner that is approved by the municipality. If the responsible person fails or refuses to perform such maintenance and repair, the municipality may immediately proceed to do so and shall bill the cost thereof to the responsible person.

6.2 General Maintenance Standards for Stormwater Best Management Practices.

Maintenance design and maintenance procedures for all stormwater best management practices shall be in accordance *Rhode Island Stormwater Design and Installation Standards Manual*, as amended; or the *Rhode Island Soil Erosion and Sediment Control Handbook*, as amended. Stormwater management plans shall demonstrate appropriate maintenance design and procedures for each proposed best management practice. The following policies and standards for maintenance must be incorporated into stormwater management plans, as applicable.

(A) A maintenance schedule for each type of BMP must be included in the application package and on the final site plans. These schedules shall list the frequency and type of maintenance operations necessary along with the legally responsible party's name, address, and telephone number. If the stormwater drainage system is to be deeded to the local municipality the applicant must obtain a letter from the municipality acknowledging maintenance responsibility and intent of ownership.

(B) An area must be set aside within the development site for the purpose of sediment disposal (where applicable). The disposal area shall be large enough to handle the volume of two clean-out cycles. The site may also serve as open space and recreation areas.

(C) Proper erosion and sediment control practices must be implemented during all phases of construction and until the site is satisfactorily stabilized. These plans must be printed on the final

site plans submitted for approval. All control practices shall be in accordance with the most recent edition of the *Rhode Island Soil Erosion and Sediment Control Handbook*.

(D) Grasses selected for specific site conditions must be planted around and within basins immediately following construction to stabilize the slopes and prevent erosion. Trees and shrubs shall not be planted on any impounding embankments, to prevent potential subsurface disturbance and possible failure of the structure.

(E) Side-slopes, embankments, and the upper stage of basins shall be mowed at least once per growing season, to prevent unwanted woody growth. Mowing may be more frequent in residential areas if a more groomed appearance is desired, however if a stormwater facility is managed for wildlife habitat mowing shall be conducted after mid-August to prevent mortality to ground nesting birds and animals.

(F) All trash and litter and other debris shall be removed from any stormwater facility including inlet and outlet structures. Maintenance of this type improves the physical appearance of the facility and prevents blockage of inlet/outlet structures, thereby averting failure of the structure. This must be accomplished at least twice per year, preferably spring and fall.

(G) Sediments shall be removed from any basin immediately following site stabilization and thereafter in accordance with the specific maintenance plan. Accumulated sediments may have to be removed more frequently if the sediment storage capacity of the forebay or sediment storage area is within the last 10 percent of its available capacity. Sediment removal within a basin shall restore the original capacity and design depth.

(H) If blockage of a basin outlet structure occurs, it may be necessary to dewater the pond for access to the blockage. The dewatering flow must be adequately filtered prior to discharge into a receiving waterbody to remove suspended solids.

(I) Pools of stagnant water in detention basins indicate failure due to erosion and scouring of the basin bottom, particularly near an inlet device. Such a deficiency must be corrected immediately to prevent a nuisance habitat for insects, especially mosquitoes.

(J) All outlet structures and outflow channels must be inspected annually. Furthermore, extended detention devices should be

inspected at least twice per year. Inspections should be accomplished several times during the first six months of operation, especially after rainfall events to check for clogging or, conversely, too rapid of a release.

(K) The grassed areas of any basin must be inspected at least twice per year to check for erosion problems. Problem areas must be reseeded immediately to stabilize exposed soils, thereby preventing erosion and potential clogging of outflow devices.

(L) Inspections of all catch basins on-site shall occur on an annual basis to check for debris removal (sediment and hydrocarbons) and structural integrity or damage. Such deficiency must be corrected immediately.

(M) Repairs or replacement of inlet/outlet structures, riprap channels, fences, or other elements of the facility shall be done within 30 days of deficiency reports. If an emergency situation is imminent then repair/replacement must be done immediately to avert failure or danger to nearby residents.

Section 7—Site Plan

7.1 Map of Existing Site Conditions

The existing conditions site map is useful for reviewing the physical features present at the proposed development site prior to any alteration from land disturbance or construction. This map of predevelopment conditions should at minimum include the information listed below. Additionally, this map should have a scale no smaller than 1 inch = 100 feet with contour intervals no greater than 5 feet. Larger map scales providing greater detail will be acceptable. Individual sheets must not exceed 24 inches by 36 inches.

(A) North arrow with scale.

(B) Existing topography of the site.

(C) Subwatersheds must be clearly delineated and numbered for reference. Within each subwatershed the following information must be clearly noted: Area in acres, runoff curve number, soil types, hydrologic class, and hydrologic condition.

(D) The stormwater discharge location for each subwatershed must be identified and labeled with peak discharge rates and volumes for the required design storms.

(E) Location of steep slopes, bedrock outcrops, or other significant site constraints.

(F) The applicant's property lines and boundaries of proposed development with bearings and distances.

(G) Abutting property owners and their respective boundaries must be clearly shown along with nearby utility pole numbers and adjacent streets and intersections to facilitate identification of the proposed development.

(H) All perennial and intermittent streams, wetland boundaries, surface water bodies, and areas subject to storm flows or flooding must be indicated. In addition, all coastal features (as identified in the Coastal Resource Management Plan, CRMP), should be delineated where applicable.

(I) The 100-year flood plain boundary with 100-year flood elevations and floodway must be clearly identified consistent with the most recent Federal Emergency Management Agency maps. This may include identifying any applicable flood velocity zones.

(J) The location of existing on-site stormwater structures.

(K) The location and types of easements.

(L) The seasonal high groundwater table in the location of proposed stormwater structures (e.g., detention basins, infiltration trenches, vegetated swales, etc.) as established in accordance with the procedures described in Section 6 of the RI Stormwater Design and Installation Standards Manual.

(M) Location of any required investigative soil pits or test wells.

(N) The delineation of major soil types in the vicinity of the proposed development as identified by the RI Soil Survey or qualified professional.

(O) Location of private and public water supply wells within 100 feet.

(P) Location of existing ISDSs abutting to and within the development site.

(Q) Vegetative cover type including outline of woodland cover.

(R) Existing open space.

(S) Any landmarks, stonewalls, fences, etc.

7.2 Maps of Site Showing Phases of the Proposed Project

The final site map must have all information necessary to evaluate the proposed project after the final construction phase is completed. This map must be at the same scale as the existing conditions site plan map(s) and include the following information.

(A) North arrow with scale.

(B) Subwatersheds must be clearly delineated and numbered for reference. Within each subwatershed the following information must be clearly noted: Area in acres, runoff curve number, soil types, hydrologic class, and hydrologic condition.

(C) Location of proposed structures and individual lots. These lots must be numbered for reference.

(D) Delineation of Individual Sewage Disposal Systems, public and private water supply wells, utility lines, and sub-drains.

(E) Location of all existing and proposed roads, driveways, parking lots, and other impervious surfaces. The total area of all impervious surfaces within each subwatershed must be clearly marked and labeled within the subwatershed boundary.

(F) All new stormwater structures (BMPs), collection and conveyance systems, and remaining portions of existing systems including points of discharge shall be clearly identified.

(G) The peak discharge rate and volume of stormwater flow shall be labeled where stormwater enters and exits all BMPs. Additionally, the final discharge points labeled with peak discharge rates and volumes of stormwater flow must be shown for all subwatersheds.

(H) All water channels or areas subject to storm flows into wetlands, shoreline and coastal features, and tidal waters must be clearly identified whether on-site or in abutting off-site locations.

(I) Design details of all specified stormwater structures (e.g., basins,

trenches, etc.) including inlet and outlet structures.

(J) Limits of vegetation clearing and overall site disturbance including delineation of lawns, open space, etc.

(K) The final elevation grade of the proposed development.

(L) Easements are required for installation and access of all stormwater management devices. These must be clearly identified on final plans.

(M) Complete soil erosion and sediment control plans to be implemented in all construction phases along with final site stabilization plans.

(N) Maintenance schedules for all stormwater structures as specified in Section 12 of the RI Stormwater Design and Installation Standards Manual.

7.3 Site Plan Calculations

In addition to the information required for site plans the following information must also be included with the application, where applicable.

(A) The area of each subbasin as identified on final site plans.

(B) The area of impervious surfaces (including all roads, driveways, rooftops, sidewalks, etc.) for each subbasin as identified in 13.5(1) section of the RI Stormwater Design and Installation Standards Manual.

(C) Weighted curve numbers, (CN) as determined by the SCS TR-55 method, for the pervious surfaces within each subbasin as identified in 13.5(1) section of the RI Stormwater Design and Installation Standards Manual.

(D) Invert elevations for all applicable BMPs. In addition, the elevations for permanent and/or flood pool stages, including peak discharge rates for each stage, within all basins are required.

(E) The total volume capacity for all flood control and water quality BMPs (e.g. infiltration basin, detention basins, wet ponds, etc.). Volumes must be segregated into permanent and flood pool stage

volumes where applicable. Furthermore, the volumes of all sediment storage (basins, forebays, etc.) areas must also be shown.

(F) Predevelopment and postdevelopment peak discharge rates and runoff volumes for the 2-year, 25-year, and 100-year frequency storm events for each subwatershed. The water quality volume must also be calculated for each subwatershed. All relevant variables such as curve numbers and time of concentration, along with the supporting computations and worksheets must be included.

7.4 Narrative Description

As part of the Site Plan, a narrative description should be prepared by the applicant to provide the following information: a brief description of the proposed project; potential water quality and/or hydrologic impacts of the proposed project on surface and/or groundwater resources, existing infrastructure, and/or adjacent properties; and proposed measures or practices to mitigate potential impacts. All affected wetlands, surface water and groundwater resources, and any significant site constraints affecting the selection of stormwater management practices must be identified.

The following outline is provided as guidance for preparing a narrative description for the Site Plan. Depending on the size and scope of the proposed project, the amount of information required by the permitting agency may vary, therefore it is advised to consult the appropriate permitting agency for specific requirements.

(A) Site description – general topography, soil types, current vegetative composition and relative abundance, identification of major resources (e.g., wetlands, groundwater, surface waters, etc.) name of receiving water(s).

(B) Site input data – watershed characteristics, area of all impervious surfaces, total area of site, annual mean rainfall, runoff coefficients, curve numbers for various land uses, peak discharge rates.

(C) Pollutant loading forecast – predevelopment and postdevelopment pollutant mass loadings to demonstrate the removal rates of individual or combined BMPs.

(D) Land use planning and source control plan.

(E) Best Management Practices – identify the type of BMP and justification for selection, including any deviation from the RI Stormwater Design and Installation Standards Manual and the potential effect on pollutant removal efficiency.

(F) Technical feasibility – of BMPs including sizing, location, hydraulic and environmental impacts. Alternatives, which were considered but determined not to be feasible, should also be discussed.

Section 8—Maintenance Agreements

Maintenance agreements shall provide written, contractual documentation, which demonstrates compliance with this section and legal arrangements for the upkeep of stormwater facilities to assure their functionality and safety in accordance with this ordinance.

Maintenance agreements, which describe all maintenance schedules and requirements, must be developed for each stormwater management facility unless the facility is dedicated to and accepted by *[name of municipality]*.

8.1 Recognition of Municipal Inspection Requirements

Maintenance agreements shall include a reasonable and regular schedule for the *[name of municipality]*, or designee, to conduct on-site inspection of the functionality and safety of stormwater management facilities. Inspection schedules shall be based on the complexity and frequency of maintenance needs and shall be subject to the approval of *[name of municipality]*.

Maintenance agreements shall recognize the authority of *[name of municipality]*, or designee, to conduct on-site inspections of stormwater management facilities should evidence exist that the facility is not being operated in accordance with the maintenance agreement or this ordinance; or should evidence exist that the facility poses an eminent threat to public health, welfare or safety.

8.2 Record Keeping for Maintenance Activities

Maintenance agreements shall include provisions for maintenance record keeping. All activities conducted in accordance with a maintenance agreement

must be recorded in a work order and inspection log. Timely updates of the log shall be the responsibility of the stormwater management facility owner or other responsible party pursuant to Section 8.3 of this ordinance. Review of the maintenance and inspection log shall be completed by *[name of municipality]*, or designee, to determine the effectiveness of operation, maintenance and safety activities. Reviews shall occur as part of each on-site inspection. Additional reviews may be made as deemed appropriate by *[name of municipality]* or designee.

8.3 Responsibility for Maintenance to Assure Functionality and Safety

Appropriate maintenance to assure functionality and safety of stormwater management facilities shall be the responsibility the owner or may be assumed by another party via a written contractual arrangement in accordance with Section 8.4 of this ordinance.

8.4 Alterations to Maintenance Agreements

Any alterations in maintenance responsibility or alterations to maintenance agreements must be reviewed and approved by (name of municipal review board). If portions of the land serviced by a stormwater management facility are to be sold, written contractual arrangements shall be made to pass all responsibility of the maintenance agreement to the purchaser and shall be subject to review and approval of (name of municipal review board). All alterations to maintenance agreements shall be recorded in accordance with Section 8.5 of this ordinance.

8.5 Recordation of Maintenance Agreements

All maintenance agreements and alterations to maintenance agreements shall be recorded in the land evidence records of *[name of municipality]*. Copies of all maintenance agreements and alterations to maintenance agreements shall be included in stormwater management plans. Recordation of maintenance agreements in accordance with this ordinance shall be the responsibility of the owner.

Section 9— Policy and Requirements for Performance Surety

A performance bond shall be posted to insure that all stormwater management facilities can be repaired in the event of malfunction. To demonstrate the posting and integrity of the performance bond, a letter of

credit shall be provided as part of the stormwater management plan. The letter of credit and posting of the performance bond shall be the responsibility of the property owner.

9.1 Value of the Performance Surety

The value of the performance bond shall be at least equal to the cost of implementing the stormwater management plan, fully.

9.2 Review and Approval of the Performance Surety

The acceptance of the performance bond and letter of credit for the purposes of this ordinance shall be subject to approval of the form, content, amount and manner of execution by the (name of the municipal review board).

9.3 Posting of the Surety with the Subdivision Bond

The amount of a performance bond for the stormwater management plan may be included with the performance bond of a subdivision provided that the performance bond receives full review and approval by (name of municipal review board) in accordance with Section 9.2 of this ordinance. Such a posting shall still require a letter of credit.

9.4 Release of the Performance Surety

The performance bond shall only be released after an on-site inspection of all the stormwater management practices in operating condition as describe in the stormwater management plan, and submission of as-built drawings certified by a registered professional engineer as being in compliance with the stormwater management plan.

9.5 Revocation of the Performance Surety

[Name of municipality] may revoke the performance bond in accordance with Section 10 of this ordinance.

Section 10–-Application Fees

[Name of governing body] shall be empowered to collect fees from permit applicants, which are commensurate with the cost of administering this ordinance.

Section 11—Enforcement

[Name of municipality] shall have the authority and discretion to invoke penalties, whenever a stormwater management facility is not implemented and operated in accordance with its approval and this ordinance. Any penalty invoked shall be in accordance with this section.

11.1 Revocation or Suspension of Approval

The approval of stormwater management plans, stormwater management facility construction and stormwater management facility operation, as subject to this ordinance, may be revoked or suspended, and all work on the project halted for an indefinite time period by (name of municipal review board) or a designee, after written notification is transmitted by the building official to the developer for one or more of the following reasons:

(A) Failure to comply with any condition of an approved plan, or specifications pertaining thereof.

(B) Violation of any requirement of this ordinance.

11.2 Notification of Violation

Whenever there is a failure to comply with the provisions of this ordinance, the [*name of municipality*] shall have the right to notify the applicant/owner that he or she has (5) days from the receipt of the notice to temporarily correct the violations and (30) days from receipt of notice to permanently correct the violations.

Should the applicant/owner fail to take the corrective actions, the city/town of _____ shall then have the right to take whatever actions it deems necessary to correct the violations and to assert a lien on the subject property in an amount equal to the costs of remedial actions. The lien shall be enforced in the manner provided or authorized by law for the enforcement of common law liens on personal property. The lien shall be recorded in the land evidence records of the city/town of _____, and shall incur legal interest from the date of recording. The imposition of any penalty shall not exempt the offender from compliance with the provisions of this ordinance, including revocation of the performance bond or assessment of a lien on the property.

11.3 Hearing

Any owner or responsible party, receiving a written notice of violation, shall be given an opportunity, within a reasonable time frame, for a hearing before the (name of municipal review board) to state their case. If evidence indicates that a violation has not occurred, the (name of municipal review board) shall revoke the notice of violation.

Section 12—Implementation

This ordinance shall take effect upon final passage and approval by the town/city council as appropriate.

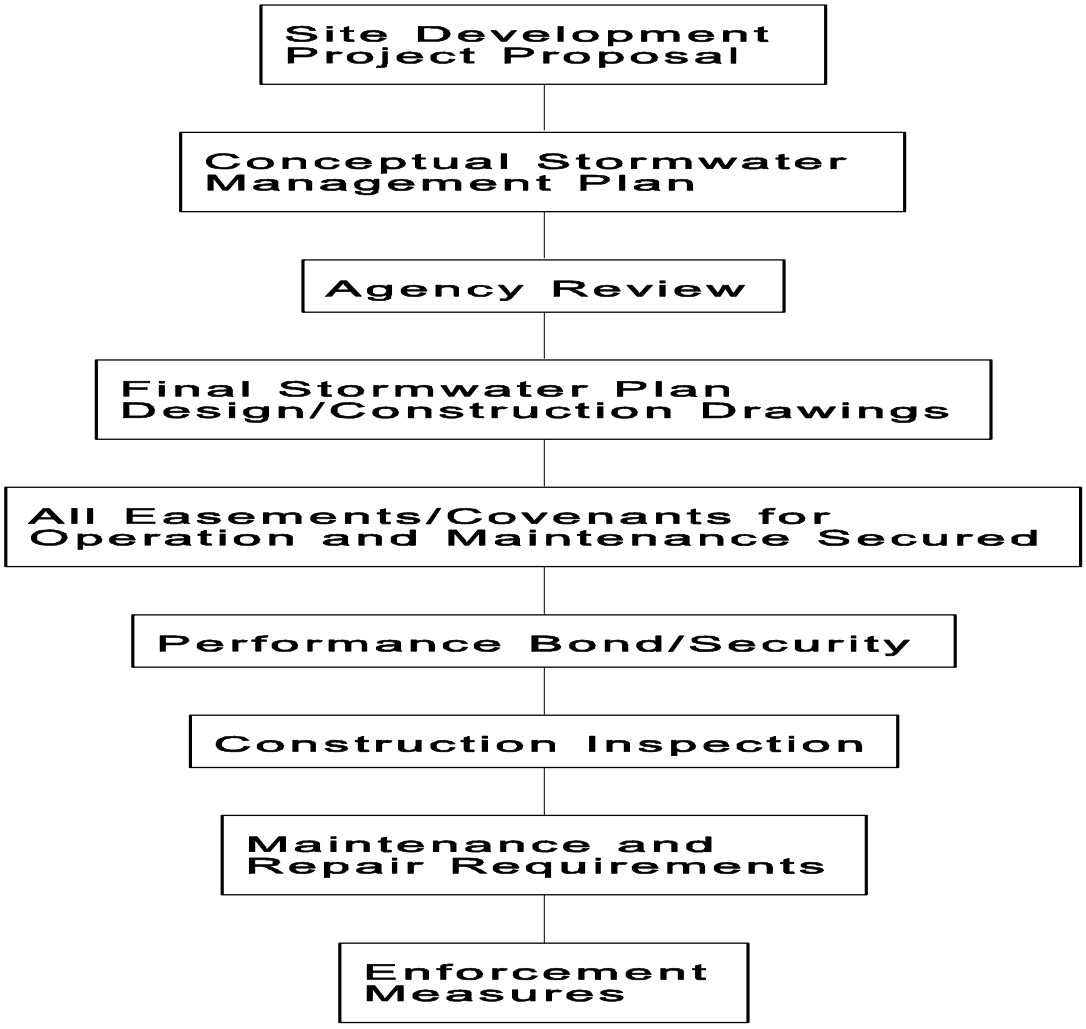
APPENDIX H
MODEL POST-CONSTRUCTION STORM WATER RUNOFF CONTROL ORDINANCE

Model Post-Construction Stormwater Runoff Control Ordinance

This model ordinance is intended to be a tool for communities who are currently or may soon be responsible for meeting the stormwater management requirements of the National Pollutant Discharge Elimination System (NPDES) regulations. The goal of providing this model ordinance is to assist communities in creating their own stormwater management ordinance. In designing a model stormwater ordinance for a national audience, we purposely avoided creating too complex an ordinance, and instead tried to include suggestions for standard language and concepts that we believe a good stormwater management ordinance should contain. This ordinance should not be construed as an exhaustive listing of all the language needed for a local ordinance, but represents a good base that communities can build upon and customize to be consistent with the staff resources available in their locality. We recommend that you use this document in conjunction with other sources, such as existing ordinances created by other stormwater management programs in your geographic region that have objectives similar to your program's.

Feel free to download and alter any and all portions of this document to meet your needs. Throughout the ordinance, there are sections in which you must insert the name of the agency that you have given regulatory power over stormwater management issues in order to customize it. These sections are denoted by **bold** text placed in brackets. By using this ordinance and customizing these sections, you can create a viable local ordinance with minimal editing.

Italicized text with this symbol ➲ should be interpreted as comments, instructions, or information to assist the ordinance writer. This text *should not appear* in your final ordinance.


Site Development Project Proposal
Conceptual Stormwater Management Plan
Agency Review
Final Stormwater Plan Design/Construction Drawings
All Easements/Covenants for Operation and Maintenance Secured
Performance Bond/Security
Construction Inspection
Maintenance and Repair Requirements
Enforcement Measures

Model Ordinance for the Control of Post Construction Stormwater Runoff

Table of Contents

Section 1. General Provisions
Section 2. Definitions
Section 3. Permit Procedures and Requirements
Section 4. Waivers
Section 5. General Performance Criteria for Stormwater Management
Section 6. Specific Performance Criteria for Stormwater Treatment Practices
Section 7. Requirements for Stormwater Management Plan Approval
Section 8. Construction Inspection Provisions
Section 9. Maintenance and Repair Requirements
Section 10. Enforcement and Violations

Section 1. General Provisions

1.1. Findings of Fact

It is hereby determined that:

Land development projects and associated increases in impervious cover alter the hydrologic response of local watersheds and increase stormwater runoff rates and volumes, flooding, stream channel erosion, and sediment transport and deposition;

This stormwater runoff contributes to increased quantities of water-borne pollutants, and;

Stormwater runoff, soil erosion and nonpoint source pollution can be controlled and minimized through the regulation of stormwater runoff from development sites.

Therefore, the **(jurisdictional stormwater authority)** establishes this set of water quality and quantity policies applicable to all surface waters to provide reasonable guidance for the regulation of stormwater runoff for the purpose of protecting local water resources from degradation. It is determined that the regulation of stormwater runoff discharges from land development projects and other construction activities in order to control and minimize increases in stormwater runoff rates and volumes, soil erosion, stream channel erosion, and nonpoint source pollution associated with stormwater runoff is in the public interest and will prevent threats to public health and safety.

1.2. Purpose

The purpose of this ordinance is to establish minimum stormwater management requirements and controls to protect and safeguard the general health, safety, and welfare of the public residing in watersheds within this jurisdiction. This ordinance seeks to meet that purpose through the following objectives:

(1). minimize increases in stormwater runoff from any development in order to reduce

flooding, siltation, increases in stream temperature, and streambank erosion and maintain the integrity of stream channels;

(2). minimize increases in nonpoint source pollution caused by stormwater runoff from development which would otherwise degrade local water quality

(3). minimize the total annual volume of surface water runoff which flows from any specific site during and following development to not exceed the pre-development hydrologic regime to the maximum extent practicable.

(4). reduce stormwater runoff rates and volumes, soil erosion and nonpoint source pollution, wherever possible, through stormwater management controls and to ensure that these management controls are properly maintained and pose no threat to public safety.

➲ *The above list is a general set of objectives to reduce the impact of stormwater on receiving waters. The local stormwater authority may wish to set some more specific objectives, based on priority water quality and habitat problems (e.g., to reduce phosphorus loads being delivered to recreational lakes, to sustain a class X trout fishery)*

1.3. Applicability

This ordinance shall be applicable to all subdivision or site plan applications, unless eligible for an exemption or granted a waiver by the **(jurisdictional stormwater authority)** under the specifications of Section 4 of this ordinance. The ordinance also applies to land development activities that are smaller than the minimum applicability criteria if such activities are part of a larger common plan of development that meets the following applicability criteria, even though multiple separate and distinct land development activities may take place at different times on different schedules. In addition, all plans must also be reviewed by local environmental protection officials to ensure that established water quality standards will be maintained during and after development of the site and that post construction runoff levels are consistent with any local and regional watershed plans.

➲ *The size of the site development to which post-construction stormwater management runoff control applies varies but many communities opt for a size limit of 5000 square feet or more. For sites less than 5000 square feet, local officials may wish to grant an exemption as long as the amount of impervious cover created does not exceed 1000 square feet.*

To prevent the adverse impacts of stormwater runoff, the **(jurisdictional stormwater authority)** has developed a set of performance standards that must be met at new development sites. These standards apply to any construction activity disturbing ____ or more square feet of land. The following activities may be exempt from these stormwater performance criteria:

1. Any logging and agricultural activity which is consistent with an approved soil conservation plan or a timber management plan prepared or approved by the **(appropriate agency)**, as applicable.
2. Additions or modifications to existing single family structures
3. Developments that do not disturb more than ____ square feet of land, provided they are not part of a larger common development plan;
4. Repairs to any stormwater treatment practice deemed necessary by

(jurisdictional stormwater authority).

When a site development plan is submitted that qualifies as a redevelopment project as defined in Section 2 of this ordinance, decisions on permitting and on-site stormwater requirements shall be governed by special stormwater sizing criteria found in the current stormwater design manual. This criteria is dependent on the amount of impervious area created by the redevelopment and its impact on water quality. Final authorization of all redevelopment projects will be determined after a review by **(jurisdictional stormwater authority)**.

➲ *There are a number of decisions to be made by local communities when addressing the issue of redevelopment and stormwater treatment. The first is defining exactly what qualifies as redevelopment. The definition in Section 2 is from the current Maryland Stormwater Management regulations, and uses the square foot size of the project and its land use classification to establish the definition of a redevelopment project. The second decision involves to what level of stormwater management standards redevelopment projects will be held. Providing cost effective stormwater treatment at redevelopment sites is often a difficult task, and these projects may be given reduced criteria to meet to allow for site constraints. The State of Maryland currently requires that proposed redevelopment project designs include either at least a 20 percent reduction in existing site impervious area, management of at least 20 % of the water quality volume, or some combination of both.*

1.4. Compatibility with Other Permit and Ordinance Requirements

This ordinance is not intended to interfere with, abrogate, or annul any other ordinance, rule or regulation, stature, or other provision of law. The requirements of this ordinance should be considered minimum requirements, and where any provision of this ordinance imposes restrictions different from those imposed by any other ordinance, rule or regulation, or other provision of law, whichever provisions are more restrictive or impose higher protective standards for human health or the environment shall be considered to take precedence.

1.5. Severability

If the provisions of any article, section, subsection, paragraph, subdivision or clause of this ordinance shall be judged invalid by a court of competent jurisdiction, such order of judgment shall not affect or invalidate the remainder of any article, section, subsection, paragraph, subdivision or clause of this ordinance.

1.6. Development of a Stormwater Design Manual

The **(jurisdictional stormwater authority)** may furnish additional policy, criteria and information including specifications and standards, for the proper implementation of the requirements of this ordinance and may provide such information in the form of a Stormwater Design Manual.

This manual will include a list of acceptable stormwater treatment practices, including the specific design criteria and operation and maintenance requirements for each stormwater practice. The manual may be updated and expanded from time to time, at the discretion of the local review authority, based on improvements in engineering, science, monitoring and local maintenance experience. Stormwater treatment practices that are designed and constructed in

accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards.

➲ *Local communities will need to select the minimum water quality performance standards (e.g., 80% TSS, 40% P) they will require for stormwater treatment practices and place these in their design manual. The 80% removal goal for total suspended solids (TSS) is a management measure developed by EPA as part of the Coastal Zone Act Reauthorization Amendments of 1990. It was selected by EPA for the following factors: (1) removal of 80% is assumed to control heavy metals, phosphorus, and other pollutants; (2) a number of states including DE, FL, TX, MD, and MA require/recommend TSS removal of 80% or greater for new development; and (3) data show that certain structural controls, when properly designed and maintained, can meet this performance level. Further discussion of water quality standards for stormwater management measures can be found in the CZARA Coastal Zone 6217(g) management measures document entitled "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters" (US EPA, 1993).*

➲ *There are a number of good stormwater design manuals available around the country that communities may wish to refer to in creating their own local manual. Two examples are the new Maryland Department of the Environment 2000 Maryland Stormwater Design Manual Volumes I & II available online at http://www.mde.state.md.us/environment/wma/stormwatermanual/ and the* Stormwater Management Manual for Western Washington, Volumes 1-5 available online at *http://www.ecy.wa.gov/programs/wq/stormwater/manual.html.*

➲ *Local communities may also wish to consult a new resource available on the Internet called the* ***Stormwater Managers Resource Center (SMRC)****. This site is dedicated to providing information to stormwater management program managers in Phase II communities to assist in meeting the requirements of the new National Pollutant Discharge Elimination System Phase II regulations. Among the resources available at the website will be a section devoted to supplying guidance on how to build a stormwater manual, including sizing and design criteria. The SMRC website and the manual-builder resources are located at www.stormwatercenter.net.*

Section 2. Definitions

"Accelerated Erosion" means erosion caused by development activities that exceeds the natural processes by which the surface of the land is worn away by the action of water, wind, or chemical action.

"Applicant" means a property owner or agent of a property owner who has filed an application for a stormwater management permit.

"Building" means any structure, either temporary or permanent, having walls and a roof, designed for the shelter of any person, animal, or property, and occupying more than 100 square feet of area.

"Channel" means a natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

"Dedication" means the deliberate appropriation of property by its owner for general public use.

"**Detention**" means the temporary storage of storm runoff in a stormwater management practice with the goals of controlling peak discharge rates and providing gravity settling of pollutants.

"Detention Facility" means a detention basin or alternative structure designed for the purpose of temporary storage of stream flow or surface runoff and gradual release of stored water at controlled rates.

"Developer" means a person who undertakes land disturbance activities.

"Drainage Easement" means a legal right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

"Erosion and Sediment Control Plan" means a plan that is designed to minimize the accelerated erosion and sediment runoff at a site during construction activities.

"Fee in Lieu" means a payment of money in place of meeting all or part of the storm water performance standards required by this ordinance.

"**Hotspot**" means an area where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.

"**Hydrologic Soil Group (HSG)**" means a Natural Resource Conservation Service classification system in which soils are categorized into four runoff potential groups. The groups range from A soils, with high permeability and little runoff production, to D soils, which have low permeability rates and produce much more runoff.

"**Impervious Cover**" means those surfaces that cannot effectively infiltrate rainfall (e.g., building rooftops, pavement, sidewalks, driveways, etc).

"**Industrial Stormwater Permit**" means an National Pollutant Discharge Elimination System permit issued to a commercial industry or group of industries which regulates the pollutant levels associated with industrial stormwater discharges or specifies on-site pollution control strategies.

"**Infiltration**" means the process of percolating stormwater into the subsoil.

"**Infiltration Facility**" means any structure or device designed to infiltrate retained water to the subsurface. These facilities may be above grade or below grade.

"**Jurisdictional Wetland**" means an area that is inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation.

"Land Disturbance Activity" means any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial removal of vegetation,, or any activity which bares soil or rock or involves the diversion or piping of any natural or man-made watercourse.

"Landowner" means the legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

"**Maintenance Agreement**" means a legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of storm water management practices.

"**Nonpoint Source Pollution"** means pollution from any source other than from any discernible, confined, and discrete conveyances, and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal and urban runoff sources.

"Offset Fee" means a monetary compensation paid to a local government for failure to meet pollutant load reduction targets.

"Off-Site Facility" means a stormwater management measure located outside the subject property boundary described in the permit application for land development activity.

"On-Site Facility" means a stormwater management measure located within the subject property boundary described in the permit application for land development activity.

"Recharge" means the replenishment of underground water reserves.

"**Redevelopment**" means any construction, alteration or improvement exceeding ___ square feet in areas where existing land use is high density commercial, industrial, institutional or multi-family residential.

"Stop Work Order" means an order issued which requires that all construction activity on a site be stopped.

"Storm Water Management" means the use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, peak flow discharge rates and detrimental changes in stream temperature that affect water quality and habitat.

"Storm Water Retrofit" means a stormwater management practice designed for an existing development site that previously had either no stormwater management practice in place or a practice inadequate to meet the stormwater management requirements of the site.

"**Stormwater Runoff**" means flow on the surface of the ground, resulting from precipitation.

"**Stormwater Treatment Practices (STPs)**" means measures, either structural or nonstructural, that are determined to be the most effective, practical means of preventing or reducing point source or nonpoint source pollution inputs to stormwater runoff and water bodies.

"**Water Quality Volume (WQ_v)**" means the storage needed to capture and treat 90% of the average annual stormwater runoff volume. Numerically **(WQ_v)** will vary as a function of long term rainfall statistical data.

"Watercourse" means a permanent or intermittent stream or other body of water, either natural or man-made, which gathers or carries surface water.

Section 3. Permit Procedures and Requirements

3.1. Permit Required.

No land owner or land operator shall receive any of the building, grading or other land development permits required for land disturbance activities without first meeting the requirements of this ordinance prior to commencing the proposed activity.

➲ *The intent is to ensure that no activities that disturb the land are issued permits prior to review and approval of the stormwater management plan. Communities may elect to issue a stormwater management permit separate of any other land development permits required, or, as in this ordinance, tie the issuing of construction permits to the approval of a final stormwater management plan.*

3.2. Application Requirements

Unless specifically excluded by this ordinance, any land owner or operator desiring a permit for a land disturbance activity shall submit to the **(jurisdictional stormwater authority)** a permit application on a form provided for that purpose.

Unless otherwise excepted by this ordinance, a permit application must be accompanied by the following in order that the permit application be considered: a stormwater management concept plan; a maintenance agreement; and a non-refundable permit review fee.

The stormwater management plan shall be prepared to meet the requirements of Sec. 5 of this ordinance, the maintenance agreement shall be prepared to meet the requirements of Sec. 9 of this ordinance, and fees shall be those established by the **(jurisdictional stormwater authority)**.

3.3. Application Review Fees

The fee for review of any land development application shall be based on the amount of land to be disturbed at the site, and the fee structure shall be established by the **(jurisdictional stormwater authority)**. All of the monetary contributions shall be credited to a local budgetary category to support local plan review, inspection and program administration, and shall be made prior to the issuance of any building permit for the development.

➲ *Local communities can use these review fees to raise funds for staff and resources to further their stormwater management programs.*

3.4. Application Procedure

1. Applications for land disturbance activity permits must be filed with the **(appropriate review agency)** on any regular business day.
2. A copy of this permit application shall be forwarded to **(jurisdictional stormwater authority)** for review
3. Permit applications shall include the following: two copies of the stormwater management concept plan, two copies of the maintenance agreement, and any required review fees.
4. Within __ business days of the receipt of a complete permit application, including all documents as required by this ordinance, the **(jurisdictional stormwater authority)** shall inform the applicant whether the application, plan and maintenance agreement are approved or disapproved.

➲ *Local officials will need to decide the appropriate time frame for review of an application. This will often be determined by the staff available for permit review and for an inspection of sites undergoing construction.*

5. If the permit application, stormwater management plan or maintenance agreement are disapproved, the applicant may revise the stormwater management plan or agreement. If additional information is submitted, the **(jurisdictional stormwater authority)** shall have __ business days from the date the additional information is received to inform the applicant that the plan and maintenance agreement are either approved or disapproved.

6. If the permit application, final stormwater management plan and maintenance agreement are approved by the **(jurisdictional stormwater authority)**, all appropriate land disturbance activity permits shall be issued.

3.5. Permit Duration

Permits issued under this section shall be valid from the date of issuance through the date the **(jurisdictional stormwater authority)** notifies the permitholder that all stormwater management practices have passed the final inspection required under permit condition.

Section 4. Waivers to Stormwater Management Requirements

4.1. Waivers for Providing Stormwater Management

Every applicant shall provide for stormwater management as required by this ordinance, unless a written request is filed to waive this requirement. Requests to waive the stormwater management plan requirements shall be submitted to the **(jurisdictional stormwater authority)** for approval.

The minimum requirements for stormwater management may be waived in whole or in part upon written request of the applicant, provided that at least one of the following conditions applies:

1. It can be demonstrated that the proposed development is not likely to impair attainment of the objectives of this ordinance.
2. Alternative minimum requirements for on-site management of stormwater discharges have been established in a stormwater management plan that has been approved by the **(jurisdictional stormwater authority)** and the implementation of the plan is required by local ordinance.
3. Provisions are made to manage stormwater by an off-site facility. The off-site facility is required to be in place, to be designed and adequately sized to provide a level of stormwater control that is equal to or greater than that which would be afforded by on-site practices and there is a legally obligated entity responsible for long-term operation and maintenance of the stormwater practice.
4. The **(jurisdictional stormwater authority)** finds that meeting the minimum on-site management requirements is not feasible due to the natural or existing physical characteristics of a site.
5. Non-structural practices will be used on the site that reduce: a) the generation of stormwater from the site, b) the size and cost of stormwater storage and c) the pollutants generated at the site. These non-structural practices are explained in detail in the current design manual and the amount of credit available for using such practices shall be determined by the **(jurisdictional stormwater authority)**.

In instances where one of the conditions above applies, the **(jurisdictional stormwater authority)** may grant a waiver from strict compliance with these stormwater management provisions, as long as acceptable mitigation measures are provided. However, to be eligible for a

variance, the applicant must demonstrate to the satisfaction of the **(jurisdictional stormwater authority)** that the variance will not result in the following impacts to downstream waterways:

Deterioration of existing culverts, bridges, dams, and other structures;
Degradation of biological functions or habitat;
Accelerated streambank or streambed erosion or siltation;
Increased threat of flood damage to public health, life, property .

Furthermore, where compliance with minimum requirements for stormwater management is waived, the applicant will satisfy the minimum requirements by meeting one of the mitigation measures selected by the jurisdictional stormwater authority. Mitigation measures may include, but are not limited to, the following:

- The purchase and donation of privately owned lands, or the grant of an easement to be dedicated for preservation and/or reforestation. These lands should be located adjacent to the stream corridor in order to provide permanent buffer areas to protect water quality and aquatic habitat,
- The creation of a stormwater management facility or other drainage improvements on previously developed properties, public or private, that currently lack stormwater management facilities designed and constructed in accordance with the purposes and standards of this ordinance,
- Monetary contributions (Fee-in-Lieu) to fund stormwater management activities such as research and studies (e.g., regional wetland delineation studies, stream monitoring studies for water quality and macroinvertebrates, stream flow monitoring, threatened and endangered species studies, hydrologic studies, and monitoring of stormwater management practices.

4.2. Fee in Lieu of Stormwater Management Practices.

Where the **(jurisdictional stormwater authority)** waives all or part of the minimum stormwater management requirements, or where the waiver is based on the provision of adequate stormwater facilities provided downstream of the proposed development, the applicant shall be required to pay a fee in an amount as determined by the **(jurisdictional stormwater authority)**.

When an applicant obtains a waiver of the required stormwater management, the monetary contribution required shall be in accordance with a fee schedule (unless the developer and the stormwater authority agree on a greater alternate contribution) established by the **(jurisdictional stormwater authority)**, and based on the cubic feet of storage required for stormwater management of the development in question. All of the monetary contributions shall be credited to an appropriate capital improvements program project, and shall be made by the developer prior to the issuance of any building permit for the development.

4.3. Dedication of land

In lieu of a monetary contribution, an applicant may obtain a waiver of the required stormwater management by entering into an agreement with the **(jurisdictional stormwater authority)** for the granting of an easement or the dedication of land by the applicant, to be used for the

construction of an off-site stormwater management facility. The agreement shall be entered into by the applicant and the **(jurisdictional stormwater authority)** prior to the recording of plats or, if no record plat is required, prior to the issuance of the building permit.

Section 5. General Performance Criteria for Stormwater Management

Unless judged by the **(jurisdictional stormwater authority)** to be exempt or granted a waiver, the following performance criteria shall be addressed for stormwater management at all sites:

(A). All site designs shall establish stormwater management practices to control the peak flow rates of stormwater discharge associated with specified design storms and reduce the generation of stormwater. These practices should seek to utilize pervious areas for stormwater treatment and to infiltrate stormwater runoff from driveways, sidewalks, rooftops, parking lots, and landscaped areas to the maximum extent practical to provide treatment for both water quality and quantity.

➲ *There are several sources of climatological references that can be consulted to find the rainfall depths for the appropriate design storm intervals (1, 10, 25, and 100 year). The NOAA National Climatological Data Center has a "Summary of the Day" database that can provide rainfall numbers for most major cities and airports in the country. Another possible source is the Urban Hydrology for Small Watersheds, TR-55 (Technical Release 55) published by the Engineering Division, United States Natural Resource Conservation Service (formerly known as the Soil Conservation Service) United States Department of Agriculture, June 1986.*

(B). All stormwater runoff generated from new development shall not discharge untreated stormwater directly into a jurisdictional wetland or local water body without adequate treatment. Where such discharges are proposed, the impact of the proposal on wetland functional values shall be assessed using a method acceptable to the **(jurisdictional stormwater authority)**. In no case shall the impact on functional values be any less than allowed by the Army Corp of Engineers (ACE) or the **(Appropriate State Agency)** responsible for natural resources.

(C). Annual groundwater recharge rates shall be maintained, by promoting infiltration through the use of structural and non-structural methods. At a minimum, annual recharge from the post development site shall mimic the annual recharge from pre-development site conditions.

➲ *Recharge is a relatively new stormwater criteria, and has been implemented so far in the Massachusetts coastal zone and in Maryland. The recharge criteria requires considerable effort to use existing pervious areas for stormwater treatment and infiltration, which means that it must be considered very early in the site design process when basic decisions about layout and vegetative cover are made. For additional discussion of recharge criteria, consult the manual builder on the Stormwater Managers Resource Center (SMRC) at www.stormwatercenter.net.*

(D). For new development, structural stormwater treatment practices shall be designed to remove __% of the average annual post development total suspended solids load (TSS). It is presumed that a STP complies with this performance standard if it is:

- sized to capture the prescribed water quality volume (WQ_v).
- designed according to the specific performance criteria outlined in the local stormwater design manual,
- constructed properly, and
- maintained regularly.

➲ *For post construction stormwater runoff, the ability of stormwater management programs to meet federal guidelines under the NPDES regulations will become increasingly important. A local government seeking to manage runoff to achieve water quality standards has a number of options for reaching their goal. The options are listed below, from the most typical standard stormwater quality practice to more advanced program options. Each option has an associated level of effort for the management of stormwater, and the likelihood of realizing water quality treatment goals depends on the option a local government selects. Local governments should assess the option they wish to select in light of new Phase II regulations and the current ability of their stormwater management staff to meet more extensive local/state staff review and inspection requirements.*

Option 1. Require Stormwater Treatment Practices for Stormwater Quality

Many current stormwater programs simply require that the developer install stormwater treatment practices, but do not specify a target for specific pollutant reduction performance. These programs simply require that a standard volume of stormwater be treated (e.g., a half-inch of runoff). Many of these programs also have generous waiver and exemption provisions, so that as much as 25% of all new development can avoid criteria for water quality. Unless the target removal goals are very low, these communities cannot expect their current programs to eliminate net additional pollutants associated with future development.

(See City of Knoxville, TN Stormwater and Street Ordinance, at http://www.ci.knoxville.tn.us/)

Option 2. Institute More Rigorous Design Standards for Stormwater Practices.

A number of communities have improved their stormwater programs by strengthening their design standards for stormwater practices. This has involved narrowing the list of acceptable practices to those with a proven ability to remove particular pollutants, increasing the volume of runoff that is treated by each practice (e.g, treat first 1" of stormwater runoff), clamping down on waivers and exemptions (or requiring a fee-in-lieu), and requiring design features that reduce maintenance problems.

The advantage of this program option is that compliance can be presumed as long as designers follow the design rules. It does require a good stormwater manual and more extensive local/state staff review and training. It can achieve significant reduction for some pollutants, such as sediment and nutrients. The disadvantage of the program option is that current stormwater technology may not be effective enough for some pollutants (e.g., bacteria), or capable of reducing the net additional load for high levels from future development.

(For an example see Maryland Department of the Environment 2000 Maryland Stormwater Design Manual available at http://www.mde.state.md.us/environment/wma/stormwatermanual/ . The states of New York and Vermont are in the process of adopting similar design standards for their manuals).

Option 3. Require On-Site Load Calculation

A handful of communities have adopted an approach whereby the design engineer must calculate pre- and post- development loads for a particular pollutant, and then design a system of practices to meet a load reduction target, based on STP removal rates. Phosphorus has been used in most cases, and the load

reduction target varies. This option results in more directed design geared more specifically to the pollutant of concern.

The on-site load calculation option has several disadvantages. First, designers can select to use math modeling to their advantage to reduce costs and come into compliance. Second, technical data to support the program option are limited to just a few parameters, such as phosphorus, nitrogen and sediment. Third, the removal rates for the stormwater practices seldom account for factors where pollutant load removal is compromised, and tend to be optimistic. Lastly, this program option is very intensive in terms of local review and compliance, and requires more staffing to implement.

(For an example of on-site load calculation see the publication Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development by the Maine Department of Environmental Protection. Another example where this option has been applied is for New York City water supply areas).

Option 4. Load Calculation w/ Stormwater Offset Fee to Provide Retrofits on Existing Development

In this program option, a community requires the on-site load calculation described in Option 3, but is very conservative in the assumptions it allows on loading and removal efficiency. Consequently, designers at most sites cannot fully comply with the load reduction for the requirement at their site. To fully comply, they must pay an offset fee to the local government which is used to support design and construction of stormwater retrofits at existing development in the watershed. The fee is set at the cost of providing an equivalent amount of pollutant removal elsewhere (dollars/pound).

The advantage of this approach is that it provides a means of financing the stormwater retrofits needed to reduce pollutant loads from existing development. It does require greater local staffing to find, design and build the retrofits which offset the loads from new development. If administered properly, this program option can potentially eliminate the net additional load from new development. Several communities currently provide this option for developers, but it is not clear how much revenue has been collected so far.

(This option has been applied in Maryland Critical Areas and Virginia Chesapeake Bay resource management areas. For more information, see the website regarding the Maryland Critical Area Act at http://www.dnr.state.md.us/criticalarea/ and the Virginia Chesapeake Bay Preservation Area Regulation at http://www.cblad.state.va.us/regs.htm)

(E). To protect stream channels from degradation, a specific channel protection criteria shall be provided as prescribed in the current stormwater manual.

➲ *Channel protection is a relatively new criteria, but is increasingly viewed as a critical one due to the mounting evidence that stream channels enlarge in response to watershed development. Studies have found higher bank erosion rates and increased instream sediment loads for urban streams when compared to the 5-20% estimate for the annual sediment budget attributable to bank erosion in rural streams (Walling and Woodward, 1995; Collins et al., 1997). Research also indicates that channel enlargement can begin at a relatively low level of watershed development, as indicated by the amount of impervious cover. One study estimated that channel erosion rates were three to six times higher in a moderately urbanized watershed (14% impervious cover) than in a comparable rural one, with less than 2% impervious cover (Neller, 1988).*

The basic methodology to calculate channel enlargement relies on obtaining historical cross-sectional data from past surveys (often obtained from transportation agencies or public works departments that conducted surveys at the time of road construction or improvement projects) and comparing these with current cross-sectional data obtained from field surveys conducted at the time of the study. The approach also utilizes predictive (i.e., empirical) equations to estimate an ultimate channel enlargement ratio once the channel has enlarged sufficiently to be in balance with its hydrological forces.

Basic Options for Stream Channel Protection

Many different design criteria have been suggested to protect downstream channels from erosion. It should be clearly noted that none of these criteria have yet been monitored in the field to demonstrate their effectiveness, and most are based on hydrologic or hydraulic modeling of streams. The three options that appear to hold some promise are:

***24 hour detention of the one year storm event**. This criteria would result in up to 24 hours of detention for runoff generated by a rainfall depth based on annual rainfall for a region. Smaller storms events would also experience some detention, but probably much less than 24 hours. The premise of this criteria is that runoff would be stored and released in such a gradual manner that critical erosive velocities would seldom be exceeded in downstream channels. The required volume needed for 1 year extended detention is significant; it is roughly equivalent to about 90 to 95% of the required volume needed for ten year peak discharge control. Consequently, the need for two year peak discharge management would be eliminated when the 1 year ED is provided, as long as the ten year peak discharge control is achieved.*
(For an example, see Maryland Department of the Environment 2000 Maryland Stormwater Design Manual available at http://www.mde.state.md.us/environment/wma/stormwatermanual/ . The states of New York and Virginia also use this design criteria for stream channel protection in their stormwater design manuals).

***Distributed runoff control (DRC):** This criteria has been developed by MaCrae (1993) and involves complex field assessments and modeling to determine the hydraulic stress and erosion potential of bank materials. The criteria states that channel erosion is minimized if the alteration in the transverse distribution of erosion potential about a channel parameter is maintained constant with predevelopment values, over the range of available flows, such that the channel is just able to move the dominant particle size of the bed load. This Canadian method holds promise, but has not been tested extensively in the United States and requires significantly greater data collection and modeling then any of the other methods.*
(For a discussion of this criteria, see the Vermont Stormwater Management Handbook Technical Support Document- Appendix B, November 2000).

***Bankfull capacity/duration criteria:** This criteria has been advanced by Tapley et al 1996, and states that the post-development, bankfull flow frequency, duration and depth must be controlled to predevelopment values at a designated control point(s) in the channel. The Rule of thumb for selecting control point(s) is to use a 10: 1 ratio of peak discharge from the one year storm for the developed site to the discharge from the stream for the same frequency storm (Tapley et al, 1996). In theory, this criteria should result in a high level of downstream protection. The practical problem is in defining how the criteria is to be interpreted; whether sub-bankfull events (that typically erode the toe of the streambank) should also be considered; and precisely where the "bankfull" should be measured. For example, the channel of many streams have been modified in the past by prior land uses and channelization, and may not represent the "true" channel. In other cases, the stormwater outfall discharge laterally to a stream, and it is therefore difficult to assign which flows the developer is actually responsible for controlling.*

Pros and Cons of Channel Protection Sizing Criteria.

Each of the three options has some limitations. For example, both the DRC and bankfull capacity sizing criteria options lack widely accepted or universal design methodologies. In each case, local stream cross-section and/or soil measurements are needed, and considerable contention between the designer and the reviewer can be expected on how and where the analysis should be performed. Given the many operational problems currently associated with either option, and the lack of a tested design methodology at present, the two options probably deserve further study, but are not ready for wide application.

This leaves only one remaining option-- the one-year 24 hour detention criteria. It, too, has some limitations:

- *results in unacceptably small diameter orifices for sites less than ten acres in size.*
- *requires a storage volume roughly equivalent to that needed for two year control.*
- *has not been "tested" by continuous simulation modeling to determine if acceptable detention times can be achieved for smaller storms can be achieved (1.0 to 1.5 inches).*
- *is only needed in streams that are susceptible to bank erosion.*

Based on the foregoing, it appears that the best option to provide channel protection (Cp_v) is 12 to 24 hour extended detention of the one-year 24 hour storm event. This Cp_v requirement only applies to sites greater than ten acres in size. Local governments may wish to retain the option of employing the DRC or bankfull capacity/duration criteria as an alternative, should their analytical and design requirements become more simplified and refined in the future

There are some basic exemptions to where the channel protection criteria should be applied (small drainage areas, direct discharge to tidal waters or a lake, flat terrain etc), and communities must decide how and when this criteria will be required.

(F). Stormwater discharges to critical areas with sensitive resources (i.e., cold water fisheries, shellfish beds, swimming beaches, recharge areas, water supply reservoirs) may be subject to additional performance criteria, or may need to utilize or restrict certain stormwater management practices.

(G). Certain industrial sites are required to prepare and implement a stormwater pollution prevention plan, and shall file a notice of intent (NOI) under the provisions of the National Pollutant Discharge Elimination System (NPDES) general permit. The stormwater pollution prevention plan requirement applies to both existing and new industrial sites.

➲ *Applicants and local communities may wish to consult the Environmental Protection Agency website at http://www.epa.gov/owm/swm/phase2 for more information on Phase II requirements.*

(H). Stormwater discharges from land uses or activities with higher potential pollutant loadings, known as “hotspots”, may require the use of specific structural STPs and pollution prevention practices.

(I). Prior to design, applicants are required to consult with the **(jurisdictional stormwater authority)** to determine if they are subject to additional stormwater design requirements.

(J). The calculations for determining peak flows as found in the Stormwater Design Manual shall be used for sizing all stormwater management practices.

Section 6. Basic Stormwater Management Design Criteria

➲ *Rather than place specific stormwater design criteria into an ordinance, it is often preferable to fully detail these requirements in a stormwater design manual. This allows specific design information to change over time as new information or techniques become available without requiring the formal process needed to change ordinance language. The ordinance can then require those submitting any development application to consult the current stormwater design manual for the exact design criteria for the stormwater management practices appropriate for their site.*

In the Maryland Stormwater Design Manual, for example, there are a set of specified performance criteria for each stormwater management practice, based on six factors:

- *Site Design Feasibility -*
- *Conveyance Issues -*
- *Pretreatment Requirements -*
- *Treatment/Geometry Conditions*
- *Environmental/Landscaping Standards*
- *Maintenance Needs*

Each community will need to decide the specific design and sizing criteria for the stormwater management practices they allow, and select a storm event frequency(1, 2, 10, 100 year) that they believe will meet their stormwater quality and quantity control requirements.

6.1. Minimum Control Requirements

All stormwater management practices will be designed so that the specific storm frequency storage volumes (e.g., recharge, water quality, channel protection, 10 year, 100 year) as identified in the current stormwater design manual are met, unless the **(jurisdictional stormwater authority)** grants the applicant a waiver or the applicant is exempt from such requirements.

In addition, if hydrologic or topographic conditions warrant greater control than that provided by the minimum control requirements, the **(jurisdictional stormwater authority)** reserves the right to impose any and all additional requirements deemed necessary to control the volume, timing, and rate of runoff.

6.2 Site Design Feasibility

Stormwater management practices for a site shall be chosen based on the physical conditions of the site. Among the factors that should be considered:

1. Topography
2. Maximum Drainage Area
3. Depth to Water Table
4. Soils
5. Slopes
6. Terrain
7. Head

8. Location in relation to environmentally sensitive features or ultra-urban areas

Applicants shall consult the Stormwater Design Manual for guidance on the factors that determine site design feasibility when selecting a stormwater management practice.

6.3. Conveyance Issues

All stormwater management practices shall be designed to convey stormwater to allow for the maximum removal of pollutants and reduction in flow velocities. This shall include, but not be limited to:

1. Maximizing of flowpaths from inflow points to outflow points
2. Protection of inlet and outfall structures
3. Elimination of erosive flow velocities
4. Providing of underdrain systems, where applicable

The Stormwater Design Manual shall provide detailed guidance on the requirements for conveyance for each of the approved stormwater management practices.

6.4. Pretreatment Requirements

Every stormwater treatment practice shall have an acceptable form of water quality pretreatment, in accordance with the pretreatment requirements found in the current stormwater design manual. Certain stormwater treatment practices, as specified in the Stormwater Design Manual, are prohibited even with pretreatment in the following circumstances:

A. Stormwater is generated from highly contaminated source areas known as "hotspots"

B. Stormwater is carried in a conveyance system that also carries contaminated, non-stormwater discharges

C. Stormwater is being managed in a designated groundwater recharge area.

D. Certain geologic conditions exist (e.g., karst) that prohibit the proper pretreatment of stormwater.

6.5. Treatment/Geometry Conditions

All stormwater management practices shall be designed to capture and treat stormwater runoff according to the specifications outlined in the Stormwater Design Manual. These specifications will designate the water quantity and quality treatment criteria that apply to an approved stormwater management practice.

6.6. Landscaping Plans Required

All stormwater management practices must have a landscaping plan detailing both the vegetation to be in the practice and how and who will manage and maintain this vegetation. This plan must be prepared by a registered landscape architect or soil conservation district.

6.7. Maintenance Agreements

All stormwater treatment practices shall have an enforceable operation and maintenance agreement to ensure the system functions as designed. This agreement will include any and all maintenance easements required to access and inspect the stormwater treatment practices, and to

perform routine maintenance as necessary to ensure proper functioning of the stormwater treatment practice. In addition, a legally binding covenant specifying the parties responsible for the proper maintenance of all stormwater treatment practices shall be secured prior to issuance of any permits for land disturbance activities.

6.8. Non-Structural Stormwater Practices

The use of non-structural stormwater treatment practices is encouraged in order to minimize the reliance on structural practices. Credit in the form of reductions in the amount of stormwater that must be managed can be earned through the use of non-structural practices that reduce the generation of stormwater from the site. These non-structural practices are explained in detail in the current design manual and applicants wishing to obtain credit for use of non-structural practices must ensure that these practices are documented and remain unaltered by subsequent property owners.

Section 7. Requirements for Stormwater Management Plan Approval

7.1. Stormwater Management Plan Required for All Developments.

No application for development will be approved unless it includes a stormwater management plan detailing in concept how runoff and associated water quality impacts resulting from the development will be controlled or managed. This plan must be prepared by an individual approved by the **(jurisdictional stormwater authority)** and must indicate whether stormwater will be managed on-site or off-site and, if on-site, the general location and type of practices.

The stormwater management plan(s) shall be referred for comment to all other interested agencies, and any comments must be addressed in a final stormwater management plan. This final plan must be signed by a licensed professional engineer (PE), who will verify that the design of all stormwater management practices meet the submittal requirements outlined in the Submittal Checklist found in the stormwater design manual. No building, grading, or sediment control permit shall be issued until a satisfactory final stormwater management plan, or a waiver thereof, shall have undergone a review and been approved by the **(jurisdictional stormwater authority)** after determining that the plan or waiver is consistent with the requirements of this ordinance.

➲ *One way to handle the submittal requirements for both the concept plan and the final design plan is to place Submittal Checklists in the stormwater design manual and require that they are used for submission of any plan. The benefit of this is that changes in submittal requirements can be made as needed without needing to revisit and alter the original ordinance. Three model checklists can be found on the Stormwater Managers Resource Center (SMRC) website at www.stormwatercenter.net.*

7.2. Stormwater Management Concept Plan Requirements

A stormwater management concept plan shall be required with all permit applications and will include sufficient information (e.g., maps, hydrologic calculations, etc) to evaluate the

environmental characteristics of the project site, the potential impacts of all proposed development of the site, both present and future, on the water resources, and the effectiveness and acceptability of the measures proposed for managing stormwater generated at the project site. The intent of this conceptual planning process is to determine the type of stormwater management measures necessary for the proposed project, and ensure adequate planning for management of stormwater runoff from future development. To accomplish this goal the following information shall be included in the concept plan:

1. A map (or maps) indicating the location of existing and proposed buildings, roads, parking areas, utilities, structural stormwater management and sediment control facilities. The map(s) will also clearly show proposed land use with tabulation of the percentage of surface area to be adapted to various uses; drainage patterns; locations of utilities, roads and easements; the limits of clearing and grading; A written description of the site plan and justification of proposed changes in natural conditions may also be required.

➲ *This project description and site plan requirement includes information normally found in an Erosion and Sediment Control plan. For local governments that do not currently have ESC plan requirements or are looking to upgrade their ESC ordinance language, there is a model Erosion and Sediment Control ordinance located at the SMRC website.*

2. Sufficient engineering analysis to show that the proposed stormwater management measures are capable of controlling runoff from the site in compliance with this ordinance and the specifications of the Stormwater Design Manual.
3. A written or graphic inventory of the natural resources at the site and surrounding area as it exists prior to the commencement of the project and a description of the watershed and its relation to the project site. This description should include a discussion of soil conditions, forest cover, topography, wetlands, and other native vegetative areas on the site. Particular attention should be paid to environmentally sensitive features that provide particular opportunities or constraints for development.
4. A written description of the required maintenance burden for any proposed stormwater management facility.
5. The **(jurisdictional stormwater authority)** may also require a concept plan to consider the maximum development potential of a site under existing zoning, regardless of whether the applicant presently intends to develop the site to its maximum potential.

For development or redevelopment occurring on a previously developed site, an applicant shall be required to include within the stormwater concept plan measures for controlling existing stormwater runoff discharges from the site in accordance with the standards of this Ordinance to the maximum extent practicable.

7.3. Final Stormwater Management Plan Requirements

After review of the stormwater management concept plan, and modifications to that plan as deemed necessary by the **(jurisdictional stormwater authority)**, a final stormwater management plan must be submitted for approval. The final stormwater management plan, in addition to the information from the concept plan, shall include all of the information required in

the Final Stormwater Management Plan checklist found in the Stormwater Design Manual. This includes:

1. Contact Information

   The name, address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected.

2. Topographic Base Map

   A 1" = 200' topographic base map of the site which extends a minimum of___ feet beyond the limits of the proposed development and indicates existing surface water drainage including streams, ponds, culverts, ditches, and wetlands; current land use including all existing structures; locations of utilities, roads, and easements; and significant natural and manmade features not otherwise shown.

3. Calculations

   Hydrologic and hydraulic design calculations for the pre-development and post-development conditions for the design storms specified in this ordinance. Such calculations shall include (i) description of the design storm frequency, intensity and duration, (ii) time of concentration, (iii) Soil Curve Numbers or runoff coefficients, (iv) peak runoff rates and total runoff volumes for each watershed area, (v) infiltration rates, where applicable, (vi) culvert capacities, (vii) flow velocities, (viii) data on the increase in rate and volume of runoff for the design storms referenced in the Stormwater Design Manual, and (ix) documentation of sources for all computation methods and field test results.

4. Soils Information

   If a stormwater management control measure depends on the hydrologic properties of soils (e.g., infiltration basins), then a soils report shall be submitted. The soils report shall be based on on-site boring logs or soil pit profiles. The number and location of required soil borings or soil sits shall be determined based on what is needed to determine the suitability and distribution of soil types present at the location of the control measure.

5. Maintenance and Repair Plan

   The design and planning of all stormwater management facilities shall include detailed maintenance and repair procedures to ensure their continued function. These plans will identify the parts or components of a stormwater management facility that need to be maintained and the equipment and skills or training necessary. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program and the need for revisions or additional maintenance procedures shall be included in the plan.

6. Landscaping plan

   The applicant must present a detailed plan for management of vegetation at the site after construction is finished, including who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved. This plan must be prepared by a registered landscape architect or by the soil conservation district.

7. Maintenance Easements

The applicant must ensure access to all stormwater treatment practices at the site for the purpose of inspection and repair by securing all the maintenance easements needed on a permanent basis. These easements will be recorded with the plan and will remain in effect even with transfer of title to the property.

8. Maintenance Agreement

   The applicant must execute an easement and an inspection and maintenance agreement binding on all subsequent owners of land served by na on-site stormwater management measure in accordance with the specifications of this ordinance.

9. Erosion and Sediment Control Plans for Construction of Stormwater Management Measures

   The applicant must prepare an erosion and sediment control plan for all construction activities related to implementing any on-site stormwater management practices.

10. Other Environmental Permits

    The applicant shall assure that all other applicable environmental permits have been acquired for the site prior to approval of the final stormwater design plan.

7.4. Performance Bond/Security

The **(jurisdictional stormwater authority)** may, at its discretion, require the submittal of a performance security or bond prior to issuance of a permit in order to insure that the stormwater practices are installed by the permit holder as required by the approved stormwater management plan. The amount of the installation performance security shall be the total estimated construction cost of the stormwater management practices approved under the permit, plus 25%. The performance security shall contain forfeiture provisions for failure to complete work specified in the stormwater management plan.

The installation performance security shall be released in full only upon submission of "as built plans" and written certification by a registered professional engineer that the stormwater practice has been installed in accordance with the approved plan and other applicable provisions of this ordinance. The **(jurisdictional stormwater authority)** will make a final inspection of the stormwater practice to ensure that it is in compliance with the approved plan and the provisions of this ordinance. Provisions for a partial pro-rata release of the performance security based on the completion of various development stages can be done at the discretion of the **(jurisdictional stormwater authority)**.

➲ *Some communities elect to also require a maintenance performance security. This bond typically is set at the maintenance costs estimated in the stormwater plan for the period during which the permit holder has maintenance responsibility and is released when the responsibility for practice maintenance is passed on to another party, via an approved maintenance agreement.*

Section 8. Construction Inspection

8.1. Notice of Construction Commencement

The applicant must notify the **(jurisdictional stormwater authority)** in advance before the commencement of construction. Regular inspections of the stormwater management system

construction shall be conducted by the staff of the **(jurisdictional stormwater authority)** or certified by a professional engineer or their designee who has been approved by the jurisdictional stormwater authority. All inspections shall be documented and written reports prepared that contain the following information:

1. The date and location of the inspection;
2. Whether construction is in compliance with the approved stormwater management plan
3. Variations from the approved construction specifications
4. Any violations that exist

If any violations are found, the property owner shall be notified in writing of the nature of the violation and the required corrective actions. No added work shall proceed until any violations are corrected and all work previously completed has received approval by the **(jurisdictional stormwater authority)**.

8.2. As Built Plans

All applicants are required to submit actual "as built"plans for any stormwater management practices located on-site after final construction is completed. The plan must show the final design specifications for all stormwater management facilities and must be certified by a professional engineer. A final inspection by the **(jurisdictional stormwater authority)** is required before the release of any performance securities can occur.

8.3. Landscaping and Stabilization Requirements

Any area of land from which the natural vegetative cover has been either partially or wholly cleared or removed by development activities shall be revegetated within ten (10) days from the substantial completion of such clearing and construction. The following criteria shall apply to revegetation efforts:

Reseeding must be done with an annual or perennial cover crop accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until such time as the cover crop is established over ninety percent (90%) of the seeded area.

Replanting with native woody and herbaceous vegetation must be accompanied by placement of straw mulch or its equivalent of sufficient coverage to control erosion until the plantings are established and are capable of controlling erosion.

Any area of revegetation must exhibit survival of a minimum of seventy-five percent (75%) of the cover crop throughout the year immediately following revegetation. Revegetation must be repeated in successive years until the minimum seventy-five percent (75%) survival for one (1) year is achieved.

In addition to the above requirements, a landscaping plan must be submitted with the final design describing the vegetative stabilization and management techniques to be used at a site after construction is completed. This plan will explain not only how the site will be stabilized after construction, but who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved. This plan must be prepared by a registered landscape architect or by the soil conservation district, and must be approved prior to receiving a permit.

Section 9. Maintenance and Repair of Stormwater Facilities

➲ *A model operation and maintenance ordinance for stormwater facilities is also available at the SMRC website. This ordinance goes into greater detail on the elements needed to create an effective stormwater maintenance ordinance. Requirements for inspection are also included in the model.*

9.1. Maintenance Easement

Prior to the issuance of any permit that has an stormwater management facility as one of the requirements of the permit, the applicant or owner of the site must execute a maintenance easement agreement that shall be binding on all subsequent owners of land served by the stormwater management facility. The agreement shall provide for access to the facility at reasonable times for periodic inspection by the **(jurisdictional stormwater authority)**, or their contractor or agent, and for regular or special assessments of property owners to ensure that the facility is maintained in proper working condition to meet design standards and any other provisions established by this ordinance. The easement agreement shall be recorded by the **(jurisdictional stormwater authority)** in the land records.

9.2. Maintenance Covenants

Maintenance of all stormwater management facilities shall be ensured through the creation of a formal maintenance covenant that must be approved by the **(jurisdictional stormwater authority)** and recorded into the land record prior to final plan approval. As part of the covenant, a schedule shall be developed for when and how often maintenance will occur to ensure proper function of the stormwater management facility. The covenant shall also include plans for periodic inspections to ensure proper performance of the facility between scheduled cleanouts.

The **(jurisdictional stormwater authority)**, in lieu of an maintenance covenant, may accept dedication of any existing or future stormwater management facility for maintenance, provided such facility meets all the requirements of this chapter and includes adequate and perpetual access and sufficient area, by easement or otherwise, for inspection and regular maintenance.

9.3. Requirements for Maintenance Covenants

All stormwater management facilities must undergo, at the minimum, an annual inspection to document maintenance and repair needs and ensure compliance with the requirements of this ordinance and accomplishment of its purposes. These needs may include; removal of silt, litter and other debris from all catch basins, inlets and drainage pipes, grass cutting and vegetation removal, and necessary replacement of landscape vegetation. Any maintenance needs found must be addressed in a timely manner, as determined by the **(jurisdictional stormwater authority)**, and the inspection and maintenance requirement may be increased as deemed necessary to ensure proper functioning of the stormwater management facility.

9.4. Inspection of Stormwater Facilities

Inspection programs may be established on any reasonable basis, including but not limited to: routine inspections; random inspections; inspections based upon complaints or other notice of possible violations; inspection of drainage basins or areas identified as higher than typical sources of sediment or other contaminants or pollutants; inspections of businesses or industries of a type associated with higher than usual discharges of contaminants or pollutants or with discharges of a type which are more likely than the typical discharge to cause violations of state or federal water or sediment quality standards or the NPDES stormwater permit; and joint inspections with other agencies inspecting under environmental or safety laws. Inspections may include, but are not limited to: reviewing maintenance and repair records; sampling discharges, surface water, groundwater, and material or water in drainage control facilities; and evaluating the condition of drainage control facilities and other stormwater treatment practices.

9.5. Right-of-Entry for Inspection

When any new drainage control facility is installed on private property, or when any new connection is made between private property and a public drainage control system, sanitary sewer or combined sewer, the property owner shall grant to the **(jurisdictional stormwater authority)** the right to enter the property at reasonable times and in a reasonable manner for the purpose of inspection. This includes the right to enter a property when it has a reasonable basis to believe that a violation of this ordinance is occurring or has occurred, and to enter when necessary for abatement of a public nuisance or correction of a violation of this ordinance.

9.6. Records of Installation and Maintenance Activities.

Parties responsible for the operation and maintenance of a stormwater management facility shall make records of the installation and of all maintenance and repairs, and shall retain the records for at least___ years. These records shall be made available to the (jurisdictional stormwater authority) during inspection of the facility and at other reasonable times upon request.

9.7 Failure to Maintain Practices

If a responsible party fails or refuses to meet the requirements of the maintenance covenant, the **(jurisdictional stormwater authority)**, after reasonable notice, may correct a violation of the design standards or maintenance needs by performing all necessary work to place the facility in proper working condition. In the event that the stormwater management facility becomes a danger to public safety or public health, the **(jurisdictional stormwater authority)** shall notify the party responsible for maintenance of the stormwater management facility in writing. Upon receipt of that notice, the responsible person shall have___ days to effect maintenance and repair of the facility in an approved manner. After proper notice, the **(jurisdictional stormwater authority)** may assess the owner(s) of the facility for the cost of repair work and any penalties; and the cost of the work shall be a lien on the property, or prorated against the beneficial users of the property, and may be placed on the tax bill and collected as ordinary taxes by the county.

Section 10. Enforcement and Penalties.

10.1. Violations

Any development activity that is commenced or is conducted contrary to this Ordinance, may be restrained by injunction or otherwise abated in a manner provided by law.

10.2. Notice of Violation.

When the **(jurisdictional stormwater authority)** determines that an activity is not being carried out in accordance with the requirements of this Ordinance, it shall issue a written notice of violation to the owner of the property. The notice of violation shall contain :

(1) the name and address of the owner or applicant;

(2) the address when available or a description of the building, structure or land upon which the violation is occurring;

(3) a statement specifying the nature of the violation;

(4) a description of the remedial measures necessary to bring the development activity into compliance with this Ordinance and a time schedule for the completion of such remedial action;

(5) a statement of the penalty or penalties that shall or may be assessed against the person to whom the notice of violation is directed;

(6) a statement that the determination of violation may be appealed to the municipality by filing a written notice of appeal within fifteen (15) days of service of notice of violation.

10.3. Stop Work Orders

Persons receiving a notice of violation will be required to halt all construction activities. This "stop work order" will be in effect until the **(jurisdictional stormwater authority)** confirms that the development activity is in compliance and the violation has been satisfactorily addressed. Failure to address a notice of violation in a timely manner can result in civil, criminal, or monetary penalties in accordance with the enforcement measures authorized in this ordinance.

10.4. Civil and Criminal Penalties

In addition to or as an alternative to any penalty provided herein or by law, any person who violates the provisions of this Ordinance shall be punished by a fine of not less than Dollars ($xx) or by imprisonment for a period not to exceed____ (xx) days, or both such fine and imprisonment. Such person shall be guilty of a separate offense for each day during which the violation occurs or continues.

10.4. Restoration of lands

Any violator may be required to restore land to its undisturbed condition. In the event that restoration is not undertaken within a reasonable time after notice, the **(jurisdictional stormwater authority)** may take necessary corrective action, the cost of which shall become a lien upon the property until paid.

10.5. Holds on Occupation Permits

Occupation permits will not be granted until a corrections to all stormwater practices have been made and accepted by the **(jurisdictional stormwater authority)**.

Approved by: _____ Date _____

References

Collins, A. , D. Walling, and G. Leeks. 1997. Source Type Ascription for Fluvial Suspended Sediment Based on a Quantitative Composite Fingerprinting Technique. Catena, 29: 1-27

MacRae, C. 1993. An alternate design approach for the control of instream erosion potential in urbanizing watersheds. pp. 1086-1091. In proceedings of the Sixth International Conference on Urban Storm Drainage. Niagra Falls, Ontario. Marsalek and Torno (eds.)

Maine Dept. of Environmental Protection (MDEP). 1992. Phosphorus Control in Lake Watersheds: A Technical Guide to Evaluating New Development. Augusta, Maine.

Maryland Department of the Environment (MDE). 2000. Maryland Stormwater Design Manual. Baltimore, MD.

Neller, 1988. A comparison of Channel Erosion in Small Urban and Rural Catchments, Armidale, New South Wales. Earth Surface Processes and Landforms, 13(1): 1-7

Tapley, T, W. Jenkins and R. Gardner. 1996. Managing Stormwater Runoff: A New Direction. pp. 864-866. Proceedings of Watershed '96. Water Environment Federation.

United States Environmental Protection Agency. 1993. Guidance Specifying Management Measures for Sources if Nonpoint Pollution in Coastal Waters. EPA 840-B-92-002. USEPA, Office of Water, Washington, D.C.

United States Department of Agriculture (USDA). Natural Resources Conservation Service (NRCS). 1986. Technical Release 55: Urban Hydrology for Small Watersheds, 2nd Edition. Washington, D.C.

Walling, D. E. and J.C. Woodward. 1995. Tracing Sourcs of Suspended Sediment in River Basins: A Case Study of the River Culm, Devon, UK. Marine and Freshwater Research, 46: 324-336.

APPENDIX I
STORMWATER BEST MANAGEMENT PRACTICES (BMPs) OPERATION AND MAINTENANCE GUIDELINES

STORMWATER BEST MANAGEMENT PRACTICES (BMPs) OPERATION AND MAINTENANCE GUIDELINES

Stormwater treatment controls should be routinely inspected and maintained to ensure that the controls are in proper working condition and operating as designed. Operation and maintenance (O&M) guidelines for common stormwater Best Management Practices (BMPs) are summarized below. Detailed maintenance requirements for specific stormwater treatment BMPs can be found in the publication "Urban Runoff Quality Management" (Water Environment Federation and American Society of Civil Engineers, 1998) and the references listed therein.

General O&M requirements for stormwater treatment controls include

Inspections: Inspections should be performed at regular intervals to ensure proper operation of stormwater BMPs. Inspections should be conducted at least annually, with additional inspections following large storm events, especially storm events that exceed the design storm for the system. Inspections should include a comprehensive visual check for evidence of the following:

- Accumulation of sediment or debris at inlet and outlet structures
- Erosion, settlement, or slope failure
- Clogging or buildup of fines on infiltration surfaces
- Vegetative stress and appropriate water levels for emergent vegetation

Routine Maintenance: Routine maintenance should be performed following inspections to ensure proper BMP operation and aesthetics. Routine maintenance should include:

- Debris and litter removal
- Silt and sediment removal
- Clearing of vegetation around flow control devices
- Maintenance and mowing of healthy vegetative cover for infiltration/filtration BMPs

Nonroutine Maintenance: Nonroutine maintenance refers to corrective measures taken to repair or rehabilitate stormwater controls to proper working condition. Nonroutine maintenance is performed as needed, typically in response to problems detected during routine maintenance and inspections, and can include:

- Erosion and structural repair
- Sediment removal and disposal
- Nuisance control (odors, mosquitoes, weeds, excessive litter)

Recommended O&M practices for specific classes of stormwater BMPs are summarized below:

1) Vegetated Swales and Filter Strips

Inspect biofilters annually and after heavy rainfall.
- Damage to vegetation by foot or vehicular traffic
- Gully erosion and evidence of concentrated bypass flows around swale/strip
- Reduction in vegetation density

Keep biofilters free of lawn debris and pet waste.
Keep inlet flow spreaders even and free of debris.
Maintain dense grass cover through periodic mowing, spot reseeding, and weed control.
Do not mow grass too close to the ground or over-apply fertilizers and pesticides.
Mow vegetation to a height above the maximum flow depth.
At end of growing season, vegetation should be at least 2 inches above the design water depth.
Remove and properly dispose of grass cuttings.
Remove sediment with a flat-bottomed shovel.
Re-seed damaged areas and cover with erosion control fabric.

2) Infiltration Trenches

Inspect trenches several times in the first few months of operation, and then annually thereafter.
If possible, conduct inspections after large storms.
Check for surface water ponding or clogging.
Periodically check pretreatment inlets of underground trenches and clean out when sediment depletes more than 10% of available capacity.
Prune or trim adjacent trees to prevent leaves from clogging the trench.
Rehabilitate trench after it becomes clogged, typically after 10 to 15 years.

3) Infiltration Basins

Inspect after major storm events in the first few months after construction. Check for:
- Standing water after 48 to 72 hours following a storm
- Upland sediment erosion
- Low spots

Inspect basin annually thereafter. Check for:
- Differential settlement, cracking, erosion, or leakage through the embankment
- Condition of the riprap in the inlet and outlet channels
- Sediment accumulation in the basin

Mow the buffer, side-slopes, and basin floor at least twice a year to discourage woody growth and control weeds.
Mow dry ponds more frequently in residential areas adjacent to residences.
Remove all litter and debris during each mowing operation.
Immediately replace/revegetate eroding or barren areas.

Annual or semi-annual tilling may be required for basins located on marginally permeable soils.
Deep tilling, regrading, and leveling typically required every 5 to 10 years.
Carefully remove the top layer of accumulated sediment after the basin has thoroughly dried out, as necessary.

4) Media Filters

Inspect semiannually and after major storm events.
Remove sediment and floatables from the:
- settling basin when 4 inches of sediment accumulates
- filter when 0.1 inches accumulates or when there is standing water over the filter 40 hours after a storm

Clean the filter surfaces twice per year by raking off dried sediment

5) Extended Detention (Dry) Basins/Retention (Wet) Ponds

Mow the upper stage, side-slopes, embankment and emergency spillway at least twice a year to discourage woody growth and control weeds.
Mow ponds more frequently in residential areas adjacent to residences.
Inspect ponds annually. If possible inspections should be conducted during wet weather.
Regular inspections of the following components should be conducted:
- Check extended detention control device for clogging
- Check upper stage pilot channel for signs of erosion
- Check the pond's bed and banks for signs of erosion
- Check the condition of the emergency spillway
- Check for accumulation of sediment around the riser

Remove accumulated debris and litter from around the extended detention control device.
Regrade and replant vegetation to correct problems with pond side-slopes, emergency spillway, and embankment.
Reduce potential nuisance conditions (i.e., odors, mosquitoes, weeds, and litter).
Remove accumulated sediment from the lower stage of the pond every 5 to 10 years, on average.

6) Constructed Wetlands

Inspect quarterly in year 1, semiannually in years 2 and 3, and annually thereafter.
Conduct inspections with the as-built pondscaping plans in hand for:
- Wetland plant species distribution/survival
- Sediment accumulation
- Water elevations
- Condition of the outlet

Clean out accumulated sediments in the forebay every 3 to 5 years. Conduct cleanouts after draining the forebay.
Mow the maintenance access, bench, and embankment twice a year to prevent woody growth.

Replant or adjust plant types depending on water levels and operating conditions.
Remove potential nuisance plant species.

7) Oil/Water Separators

Inspect monthly during the wet season.
Clean several times per year.
Always clean before the start of the wet season.
Properly dispose of removed oil.

APPENDIX J
NEW DEVELOPMENT INSPECTION FORM

NEW DEVELOPMENT INSPECTION FORM

Project:_____
BMP:_____
Location:_____

INSTALLATION	MAINTENANCE			
Date Installed:_____	Inspected By:	Date Inspected	Maintenance Satisfactory?	If No, Correction Action Needed
Date Inspected:_____	1) _____	_____	☐ Yes ☐ No	_____
Inspected By:_____	2)_____	_____	☐ Yes ☐ No	_____
Installation Satisfactory?	3)_____	_____	☐ Yes ☐ No	_____
☐ Yes ☐ No	4)_____	_____	☐ Yes ☐ No	_____
If No, Corrective Actions Needed	5)_____	_____	☐ Yes ☐ No	_____
_____				

BMP:_____
Location:_____

INSTALLATION	MAINTENANCE			
Date Installed:_____	Inspected By:	Date Inspected	Maintenance Satisfactory?	If No, Correction Action Needed
Date Inspected:_____	1) _____	_____	☐ Yes ☐ No	_____
Inspected By:_____	2)_____	_____	☐ Yes ☐ No	_____
Installation Satisfactory?	3)_____	_____	☐ Yes ☐ No	_____
☐ Yes ☐ No	4)_____	_____	☐ Yes ☐ No	_____
If No, Corrective Actions Needed	5)_____	_____	☐ Yes ☐ No	_____
_____				

BMP:_____
Location:_____

INSTALLATION	MAINTENANCE			
Date Installed:_____	Inspected By:	Date Inspected	Maintenance Satisfactory?	If No, Correction Action Needed
Date Inspected:_____	1) _____	_____	☐ Yes ☐ No	_____
Inspected By:_____	2)_____	_____	☐ Yes ☐ No	_____
Installation Satisfactory?	3)_____	_____	☐ Yes ☐ No	_____
☐ Yes ☐ No	4)_____	_____	☐ Yes ☐ No	_____
If No, Corrective Actions Needed	5)_____	_____	☐ Yes ☐ No	_____
_____				

APPENDIX K
POLLUTION PREVENTION / GOOD HOUSEKEEPING

THE PAWTUCKET NEWS
RECYCLING

FALL 2002 - Issue #4

THE OFFICIAL NEWSLETTER FOR THE CITY OF PAWTUCKET SANITATION & RECYCLING PROGRAM

COMPUTER RECYCLING A SUCCESS!

On Saturday August 17th, The City of Pawtucket collected over 9,000 lbs. of used computer equipment. Computers contain hazardous materials and should not be put out in your trash. To dispose of computer equipment, you can call Eco-Depot to make an appointment at (401) 942-1430, ext. 241.

Mike Mesolella (left) from RI Resource Recovery checks on available space while John Gomes and Luis Quadros unload computers.

LEAF COMPOSTING PROGRAM

Leaf composting bags will go on sale Tuesday, October 15th. Bags are 25 cents each. Leaf bags can be purchased at The Public Works Center, 250 Armistice Blvd., sanitation division, Monday thru Friday 8:30 a.m. to 4:30 p.m. and on Saturdays 8:00 a.m. until 12 noon. Bags may also be purchased at the Pawtucket Library during normal business hours. The Library phone number is 725-3714. You may also purchase the bags at the Transfer Station on Grotto Avenue.

DO NOT PLACE LEAVES IN THE GUTTER OR STREET.

PLASTIC BAGS CANNOT BE USED DURING THE PROGRAM.

DO NOT MIX THE LEAVES WITH GRASS OR TRASH.

If you use barrels, please keep them separate from your regular trash. Collection of leaf composting will start on Monday October 28th and continue through the month of November. City residents can transport leaves themselves to the Transfer Station on Grotto Avenue. For additional information, call 728-0500, ext. 282.

CITY OF PAWTUCKET
REFUSE COLLECTION RULES

1. **LOOSE GARBAGE WILL NOT BE PICKED UP.**
2. All refuse receptacles must be watertight and MUST have covers and two handles. Receptacles must be free from jagged or sharp edges.
3. No container may be over 32 gallons in capacity. The container may not exceed 75 lbs. in weight. OIL DRUMS ARE PROHIBITED.
4. Tree limbs and wood must be less than 3 inches in diameter and less than 3 feet in length. It must be tied and bundled in small bundles. WOOD MUST BE FREE OF ALL NAILS AND SCREWS.
5. Rugs must be cut in half and no longer than 4 ft. in length and tied.
6. No sand, dirt, sod, rocks, demolition lumber, broken concrete, asphalt, plaster, tile, brick or other construction material will be collected.
7. No automobile or motorcycle parts. No tires, motor oil or hazardous liquids.
8. If refuse is of such size and nature that it cannot be placed in containers, then it shall be so arranged next to the container so that it may be picked up by the collector. Otherwise the collector may properly refuse to take same.
9. Frozen barrels or barrels with warm ashes, sod or rocks will not be picked up. No animal waste will be picked up.
10. Mattress may be put out with your regular trash.
11. Trash is to be put out no sooner than 24 hrs. prior to pickup.
12. No full paint cans. Latex paint can be recycled in your blue recycle bin if empty. Oil paint can be disposed of by calling the Eco-Depot at (401) 942-1430, ext. 241.
13. Computers and all computer equipment should not be put out with your trash. Call the Eco-Depot at (401) 942-1430, ext. 241 to find out about dates and locations for disposing of these items.
14. Metal items must be prescheduled for pickups before putting them on the curbside. (stoves, refrigerators, washers, etc.) **Please call 728-0500 Ext. 282.**

If you have any questions,
please call 728-0500, ext. 282.

CHRISTMAS TREE PICKUP

Christmas trees will be collected during the month of January. Your tree should be placed at curbside the same day as your regular trash pickup. The tree should be placed outside without plastic bags and ornaments or glitter. It will take 3 to 4 weeks to complete the pickup of all trees. If your tree has not been picked up by the end of January 2003, call 728-0500 Ext. 282 for more information.

PAINT DISPOSAL

Cans of Latex Paint can be dried up. When completely dried the empty can should be put in your blue bin and the dried up paint can be put in your regular trash. For more information call 728-0500 Ext. 282.

All Oil Base Paint must be disposed of at Eco Depot! Oil Base Paint contains hazardous materials. For an appointment to dispose of oil based paint call the Eco Depot at 941-1430 Ext. 241.

PROPANE TANKS

Propane tanks **cannot** be put out with regular trash. **20 gallon tanks only** can be brought to 250 Armistice Blvd. and dropped off at the Sanitation Dept. Please check with someone in the office before dropping off the tanks or call sanitation at 728-0500 Ext. 282. Propane tanks can also be disposed of at Eco-Depot, call (401) 942-1430, ext. 241.

TOP EIGHT RECYCLING MISTAKES

LOOSE PAPER: All paper **should be tied or put in bags** and then placed in the green bins.

RINSE ALL CONTAINERS: Please **empty and rinse** all containers before placing them in your blue bin.

OVERFILLING OF BINS: Please **don't overstuff your bins**, put the recyclables out weekly. Extra blue and green bins are available at the Public Works Center.

BEER AND SODA PACKAGING: Please do not leave the bottles in the original packaging. The **beer and soda packaging is not recyclable**. Put the packaging in your trash.

MIXING YOUR RECYCLABLES: Please **do not mix your recyclables**. The blue bin is for bottles, cans and small metals. The green bins are for cardboard and paper products.

OVERSTACKING CARDBOARD: Recycling Trucks have small areas for cardboard. Cardboard should be 12 inches in height and 3 feet x 3 feet tied and bundled. **Boxes should be flattened**.

PIZZA BOXES: Pizza boxes **are not recyclable** because of the grease from the pizza. Put these boxes in your trash.

BROKEN GLASS: Broken glass **is not recyclable** and should be placed in a box and sealed and marked as broken glass. This should be placed atop your trash cans.

Newsletter funded by a grant from RI Resource Recovery

City of Pawtucket
Mayor James E. Doyle
Public Works Department
250 Armistice Boulevard
Pawtucket, RI 02860

PRSRT STD
U.S. POSTAGE
PAID
Permit No. 267
PROVIDENCE, RI

Printed on Recycled Paper

IMPORTANT NUMBERS

RHODE ISLAND RESOURCE RECOVERY
942-1430

ECO-DEPOT
942-1430, EXT. 241

SEWER, SANITATION, RECYCLING
728-0500, EXT. 282

NOTICE
TOWN OF COVENTRY
SPRING SWEEPING ORDER BY NEIGHBORHOOD

TOWN SWEEPER	CONTRACT SWEEPER
1. WALKER FARM/WALKER RIDGE	1. WINDSOR PARK
2. CHANDLER PLAT	2. BOSTON STREET
3. HIGHLAND ACRES	3. READ AVENUE
4. WOOD ESTATES	4. RED OAK ESTATES
5. SOUTH MAIN STREET	5. BLACK ROCK ROAD
6. STATION STREET	6. OAK HAVEN
7 HIGHWOOD	7. EAST SHORE DRIVE
8. REMINGTON FARM	8. NEW LONDON TURNPIKE
9. HARRIS	9. ARNOLD ROAD
10. STREETS WEST OF READ SCHOOL HOUSE ROAD AND WEST OF HILL FARM ROAD IN NO PARTICULAR ORDER.	10. HOPKINS HILL ROAD

THE OBJECTIVE OF THE COVENTRY PUBLIC WORKS DEPARTMENT IS TO HAVE ALL NUMBERED AREAS SWEPT BY JUNE 30TH, 2002. DO NOT PUT SAND IN BAGS. PLEASE SWEEP SAND FROM SIDEWALKS INTO THE STREET. QUESTIONS CAN BE ANSWERED BY CALLING 822-9110.

Coventry Public Works
Spill Response Procedures

The following procedures are to be followed for every spill of more than 1 gallon of the following materials, particularly any time that there is a potential of environmental impact, materials flowing off of the pavement and onto the ground, in the vicinity of wells, streams, or wetlands, etc.:

- Hydraulic Oil is not considered hazardous waste. Clean up with speedy dry, spill containment, or sand. Pick up material once it is soaked up. Dispose of as solid waste.

- Anti-freeze is not considered hazardous waste. Clean up with speedy dry, spill containment, or sand. Pick up material once it is soaked up. Dispose of as solid waste.

- Diesel is a virgin oil. Spill has to be cleaned up with sand and disposed of at a proper site, like D'Ambra.

- Crankcase oil is a hazardous waste. We must take emergency measures to stop the spread, using standard spill containment materials. A licensed contractor must be called in to do the clean-up.

- Gasoline is a hazardous waste. We must take emergency measures to stop the spread, using standard spill containment materials. A licensed contractor must be called in to do the clean-up.

In all cases, contact DEM at ~~277~~ 222-1360 (days). Nights and weekends call 277-3070 and leave a message.

Note: This procedure does not apply to minor spills in the DPW yard or garage.

APPENDIX L
STORM WATER MANAGEMENT PLAN AND SCHEDULE

EXECUTIVE SUMMARY
STORM WATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
TOWN OF COVENTRY
Coventry, Rhode Island

This table identifies how the Plan complies with the General Permit (RIR040000) requirements for the six minimum best management practices. While this report identifies many alternatives, the items that the Town has committed to are specified in this table.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.G.1	Submit Annual Report to RIDEM	Town Council,	Annual Report completed	March 10 of every permit year (commencing 2005)	As discussed in Section 11.2 of the SWMPP. Annual Report Template included in Appendix M
1.	**Public Education and Outreach**				
IV.B.1.b.1 and 5	Distribute Storm Water Awareness Package (Neighbor to Neighbor)	Storm Water Committee, DPW	Materials complied. Information distributed. Number of packages distributed (distributed with Recycle Bins, copies at Town Hall and Library).	Start distributing media by: 3/10/2005	As discussed in Section 4.4 of the SWMPP. Example educational materials for potential use included in Appendix B.
IV.B.1.b.1 and 5	Distribute storm water flyer to residents in urbanized areas.	Storm Water Committee	Flyer distributed annually.	Media distributed by: 3/10/2005	As discussed in Section 4.0 of the SWMPP. Example educational materials for potential use included in Appendix B.
IV.B.1.b.1 and 5	Continue school programs and meet with local school officials annually to identify past activities and upcoming curriculum.	Storm Water Committee	Annual meeting.	Meeting held by January each permit year	Continue educational programs as discussed in Section 4.2 of the SWMPP.
IV.B.1.b.1 and 5	Make the Storm Water Management Plan available to the General Public	Storm Water Committee	Make plan available at Town Hall and in schools. Consider putting the plan on the Town's web site.	Make copy of SWMPP and NOI available in 2004	
IV.B.1.b.2	Develop strategies to inform public (visitors, employees, residents) on how to become involved in storm water program. Develop strategy for topics and media to be used.	Storm Water Committee	Strategy decided, information packaged for chosen media(s). Information distributed to the public.	Strategy developed by: 3/10/2005 and implemented in following years.	Opportunities are discussed in Section 5.2 of the SWMPP.
IV.B.1.b.2	Develop strategies to utilize partnerships with other governmental and non-governmental entities.	Storm Water Committee	Meeting(s) held with other community groups (governmental and non-governmental). Strategy developed.	Strategy developed by: 3/10/2005 and implemented in following years	Potential partners discussed in Section 5.2 of the SWMPP.
IV.B.1.b.3	Potential target audiences are described in Section 4.3.2 of the SWMPP.	Storm Water Committee	List developed.	Developed by: 3/10/2004 and reviewed annually	
IV.B.1.b.4	Potential target pollutant sources are discussed in Section 4.3.3 of the SWMPP.	Storm Water Committee	List developed.	Developed by 3/10/2004 and reviewed annually	
IV.B.1.b.7	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March 10 of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
2.	**Public Participation**				
IV.B.2.b.1	SWMPP was developed by storm water committee that included Town Council, Planning Board, and DPW representatives. Plan was also made available to public comment and public noticed. A public meeting was held with the Town Council (11/13/2002) during the preparation of the SWMPP.	Storm Water Committee	SWMPP available for review	SWMPP available for review prior to submission to RIDEM	Copy of Public Notice available from Town Planner or the DPW Director.
IV.B.2.b.2.i	Potential target audiences are described in Section 4.3.2 of the SWMPP.	Storm Water Committee	List developed.	Developed by: 3/10/2004 and reviewed annually.	
IV.B.2.b.2.ii	Include public involvement in the Town's storm water program.	Storm Water Committee	Community groups contacted. Number of public activities.	Review annually	Section 5.2 includes current public involvement activities that exist within the Town
IV.B.2.b.2.ii	Develop local storm water committee to continue to develop and implement the Plan.	Town Council	Committee developed and maintained.	Developed by 9/10/2004	
IV.B.2.b.2.ii	Conduct annual Storm Water Plan meeting for the public.	Storm Water Committee	Conduct annual meeting.	Meeting conducted prior to March of every permit year (commencing 2005).	
IV.B.2.b.2.ii	Develop storm drain stenciling program in urbanized areas.	Storm Water Committee	Program developed, volunteers organized, basins stenciled.	Organize program by 2004 Begin stenciling by 2005	
IV.B.2.b.2.ii	Sponsor and support cleanup projects.	Storm Water Committee	Program developed, volunteers organized,	Organize program by 2004 Begin cleanups by 2005	
IV.B.2.b.2.iii	Provide adequate public notice prior to submitting the annual report. Allow the public to comment and review report.	Town Council, Storm Water Committee	Annual Report made available at a specified community location. Public meeting held annually.	Meeting conducted prior to March of every permit year (commencing 2005).	
IV.B.2.b.2.iii	Provide a written summary of responses for all significant comments.	Town Council, Storm Water Committee	Comments reviewed, written response made available to public (if necessary)	As needed	
IV.B.2.b.4	Evaluate the success of this minimum measure.	Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005).	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
3	**Illicit Discharge Detection and Elimination**				
IV.B.3.b.1	Complete an outfall map including locations of all outfalls (GPS) and names of receiving waters in the urbanized areas.	DPW	Mapping completed, consider integration of asset management system. Identify names and locations of all receiving waters.	Developed by: 12/2006	As discussed in Section 6.2 and Section 6.4 of the SWMPP.
IV.B.3.b.2	Implement outfall tagging program to identify and number outfall pipes in urbanized areas (optional if GIS mapping is available for all outfalls in MS4).	DPW	Number of outfalls tagged. Survey of outfalls completed. Number of outfall tags maintained (if installed).	Implemented by: 12/2006	As discussed in Section 4.4.1 and Section 6.4 of the SWMPP.
IV.B.3.b.3	Additional elements shall be recorded on an on-going basis. At a minimum, field notes will be made on municipal plat maps to plot the location of additional elements that will also be used to prepare outfall mapping. These additional elements will be recorded during maintenance of drainage structures, dry weather surveys and installation of new storm drains in the urbanized areas.	DPW	Procedures developed and implemented.	Procedures developed by 12/2006	Mapping discussed in Section 6.2 and Section 6.4 of the SWMPP.
IV.B.3.b.4	Develop and introduce an ordinance or other regulatory mechanism to effectively prohibit and enforce unauthorized non storm water discharges into the system. Section 6.3 and Section 6.4 of the SWMPP identifies alternatives for the Town to accomplish this.	Town Council	Draft language and legal review. Conduct informational meetings as necessary.	Developed and introduced by: 12/2004	As discussed in Section 6.3 of the SWMPP. Potential model ordinances are included in Appendix C and Appendix D.
IV.B.3.b.4	Adopt an ordinance or other regulatory mechanism to effectively prohibit and enforce unauthorized non storm water discharges into the system.	Town Council	Submit and schedule for vote at Town Meeting. Regulatory mechanism in place.	Adopted by: 12/2005	As discussed in Section 6.3 of the SWMPP. Potential model ordinance included in Appendix C and Appendix D.
IV.B.3.b.5.i.	Urbanized area will be the priority for illicit discharge investigation and elimination. Given the limited extent of urbanized areas, no additional prioritization is proposed with the exception of responding to complaints or other findings indicating a problem with illicit discharges.	DPW	Investigations identified, prioritized, conducted. Suspected illicit connections investigated. Source identified and scheduled for removal. Enforcement actions taken or referred to other entity such as police or RIDEM.	Program implemented by: 12/2007	As discussed in Section 6.4 of the SWMPP.
IV.B.3.b.5.ii	Complaints associated with illicit discharges will be directed to the DPW where these complaints will be logged. DPW will review these complaints upon receipt and determine the appropriate action to take.	DPW	Number of complaints logged and responded to.	Complaint procedures implemented by: 12/2006.	
IV.B.3.b.iii	Procedures for tracing sources of illicit discharges are detailed in Section 6.4 of the SWMPP.	DPW	Number of illicit connections detected.	Procedures completed	

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.3.b.iv	The process for removing illicit discharges will be defined by the mechanism that will be used to prohibit and enforce illicit discharges.	DPW	Sources identified and removed.	Adopted by: 12/2005	The regulatory mechanism will define this process which must be approved as part of its adoption.
IV.B.3.b.v	The illicit discharge and detection program will be evaluated and assessed annually prior to the preparation of the Annual Report. This will consist of reviewing the areas evaluated, findings, whether changes in procedures and priorities need to be made. A summary of this evaluation will be included in the Annual Report.	DPW	Completion of annual review.	March of every permit year (commencing 2005).	
IV.B.3.b.5.vi	Inspect all catch basins in the Town's urbanized area at least once. Maintain records of all inspections and corrective actions required and completed. This activity will be coordinated with the recording requirements as stipulated in IV.B.3.b.3 and cleaning activities required in IV.B.6. During these inspections, odors or flow and any other observations will be noted and reported for the purposes of determining whether illicit discharges should be investigated discharging to those structures.	DPW	Number of catch basins inspected. Records maintained. Number of corrective measures required and completed.	Inspections completed by: 12/2007	
IV.B.3.b.5.vii	Perform dry weather surveys in accordance with procedures established in Section 6.4 of the report. Perform a minimum of two surveys in accordance with standards stipulated in the General Permit.	DPW	Two sampling events completed.	Surveys completed by: 12/2007	
IV.B.3.b.7	If illicit discharges are detected from other physically interconnected MS4s, the Town will report the finding to the owner of the illicit discharge.	DPW	Number of illicit discharges reported to other MS4 owners.	Process in place by: 12/2006	
IV.B.3.b.8	Unauthorized non-storm water discharges that are deemed appropriate to continue discharging to the storm drain system will be referred to the RIPDES program for appropriate action. Process will follow procedures developed by the RIPDES program for such a review.	DPW	Number of illicit discharges referred to RIDEM.	Process in place by: 12/2006.	
IV.B.3.b.9	Public education and municipal employee training programs will inform about hazards associated with illegal discharges and improper disposal of waste. Coordinate with Minimum Measure #1 and 6.	Storm Water Committee	Ensure that educational materials developed include illicit discharge awareness. Materials developed and distributed.	Materials selected, distribution commenced 12/2007	As discussed in Section 4.0 and Section 6.4 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.3.b.10	All actions taken to detect and address illicit discharges will be recorded in both field notes as well as on outfall mapping prepared for IV.B.3.b.1.	DPW	Submittal of findings in Annual Report.	March of every permit year (commencing 2005).	
IV.B.3.b.12	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
4	**Construction Site Runoff Control**				
IV.B.4.b.1 and 3	Develop and introduce an ordinance or other regulatory mechanism to require sediment and erosion control and control of other wastes at construction sites. Section 7.3 and Section 7.4 of the SWMPP identifies alternatives for the Town to accomplish this. The Rhode Island Soil Erosion and Sediment Control Handbook (as amended) will serve as the minimum standard.	Town Council	Draft language and legal review. Conduct informational meetings as necessary.	Developed and introduced by: 12/2004	
IV.B.4.b.1	Adopt an ordinance or other regulatory mechanism to require sediment and erosion control and control of other wastes at construction sites.	Town Council	Submit and schedule for vote at Town Meeting. Regulatory mechanism in place.	Adopted by: 12/2005	As discussed in Section 7.3 of the SWMPP.
IV.B.4.b.2	Issue and track permits for all construction projects resulting in land disturbance of greater than 1 acre in urbanized areas to ensure compliance with erosion and sediment control ordinance. Permit issuance procedures will be defined in the ordinance. Current tracking procedures will be reviewed and amended as necessary to comply with this program.	Building Official	Review current procedures. Improved procedure developed and implemented. Number of permits issued and tracked.	Developed by: 12/2005	As discussed in Section 7.2 and Section 7.3 of the SWMPP.
IV.B.4.b.4	Procedures for reviewing plans and SWPPPs for construction projects resulting in land disturbance of 1-5 acres, not reviewed by other State programs will be defined in the ordinance developed to comply with IV.B.4.b.1 and 2.	DPW, Town Council, Storm Water Committee	Ordinance developed. Number of plans and SWPPPs reviewed.	Develop by: 12/2004 100% reviewed by: 12/2006	As discussed in Section 7.3 and Section 7.4 of the SWMPP
IV.B.4.b.5	Develop procedures for coordination of site plan and SWPPP review when relying on State program review of construction activity.	DPW, Town Council, Storm Water Committee	Procedure developed.	Procedures implemented by: 12/2005	
IV.B.4.b.6	Public comment and information regarding new development projects and construction runoff related impacts will be directed to the Building Department where these complaints will be logged. The Building Department will review these complaints upon receipt and determine the appropriate action to take. Develop procedures for receipt and consideration of information submitted by the public.	Building Department	Procedure developed. Number of complaints logged and responded to.	Complaint procedures implemented by: 12/2006.	

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.4.b.7	Procedures for site inspection and enforcement of erosion and sediment control measures and other measures for control of wastes at construction sites will be defined in the ordinance developed to comply with IV.B.4.b.1 and 2.	Town Council,	Review current procedures. Improved procedure developed and implemented.	Procedures implemented by: 12/2005	As discussed in Section 7.3 and Section 7.4.4 of the SWMPP. A sample of a contractor self-inspection report is included in Appendix E.
IV.B.4.b.7	Inspect 100% construction sites located within the urbanized area twice (1st during construction, 2nd after final stabilization)	Building Department	Staff trained, Number of construction sites inspect and number of occurrences per site.	Start: 12/2005	
IV.B.4.b.8	Develop procedures for referral to the State of non-compliant construction site operators.	DPW, Town Council, Storm Water Committee	Procedure developed. Number of non-compliant construction sites referred to RIDEM.	Process in place by: 12/2005	
IV.B.4.b.10	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March 10th of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
5	**Post-Construction Runoff Control**				
IV.B.5.b.1, 2 and 8	The Town will rely on the State of Rhode Island Stormwater Design and Installation Manual (as amended) as a standard to address storm water runoff from new development and redevelopment projects. At this time, no additional modifications are proposed especially since the new manual is soon to be released by RIDEM.	Town Planner	Program developed, priority areas specified.	Program in place by: 12/2005	As discussed in Section 8.0. A model watershed management plan is included in Appendix F.
IV.B.5.b.3	Procedures for pre-application meetings and site plan review (coordinate IV.B.4.b.4) will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Town Planner	Procedures developed, number of pre-application meetings held.	Process in place by: 12/2005	
IV.B.5.b.4	Review 100% of plans and SWPPPs for development projects located in the urbanized area resulting in land disturbance greater than 1 acre, not reviewed by other State programs (coordinate with IV.B.4.b.4). Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Town Planner	Number of plans and SWPPPs reviewed.	Start: 12/2005	
IV.B.5.b.5	Procedures for coordination of local and State post-construction storm water management reviews. Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	DPW, Town Council, Storm Water Committee	Procedures developed.	Process in place by: 12/2005	
IV.B.5.b.6	New industrial discharges proposed to discharge to discharge to the storm drain system will be referred to the RIPDES program for review and approval. Process will follow procedures developed by the RIPDES program for such a review.	DPW, Town Council, Storm Water Committee	Number of activities referred to RIDEM.	Process in place by: 12/2005	
IV.B.5.b.7	When the Town's Comprehensive Plan of Development is updated, opportunities for smart growth such as in-fill development, direct growth to identified areas, and protect sensitive areas will be identified. Additionally, non-structural BMPs as described in the State of Rhode Island Stormwater Design and Installation Manual (as amended) will be considered. Public education will include discussion of ways to limit runoff.	DPW, Town Council, Storm Water Committee	Items developed and distributed.	Materials selected, distribution commenced by 12/2007	As discussed in Section 4.0 and Section 8.3.

EXECUTIVE SUMMARY
STORM WATER MANAGEMENT PROGRAM PLAN SUMMARY AND SCHEDULE
TOWN OF COVENTRY
Coventry, Rhode Island

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.5.b.7 and 9	Develop and introduce an ordinance or other regulatory mechanism to address post construction runoff from new development and redevelopment projects. State standards will be included by reference. Section 8.3 and Section 8.4 of the SWMPP identifies alternatives for the Town to accomplish this.	Town Council,	Draft language and legal review. Conduct informational meetings as necessary.	Developed and introduced by: 12/2004	As discussed in Section 8.2, Section 8.3, and Section 8.4.2. Model ordinance is included in Appendix G.
IV.B.5.b.9	Adopt an ordinance or other regulatory mechanism to address post construction runoff from new development and redevelopment projects.	Town Council	Submit and schedule for vote at Town Meeting. Regulatory mechanism in place.	Adopted by: 12/2005	As discussed in Section 8.2, Section 8.3, and Section 8.4.2. Model ordinance is included in Appendix G.
IV.B.5.b.10	Inspect 100% construction sites after final stabilization (coordinate with IV.B.4.b.7). Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Building Department	Number of construction sites inspected.	Start: 12/2005	As discussed in Section 8.3.
IV.B.5.b.11-12	Adopt by-law or regulations with language and enforceable mechanism for long term operation and maintenance of post-construction runoff controls. Include language will provide DPW authority to ensure proper operation and maintenance of all BMPs tributary to the storm sewer system in urbanized area. Procedures will be developed as part of the development of new ordinances as described in IV.B.5.b.9.	Town Council,	By-law or regulation developed. Submit and schedule for vote at Town Meeting. Voted and adopted.	Adopted by: 12/2005	As discussed in Section 8.3 and Section 8.4.3. Suggested BMP operation and maintenance guidelines are included in Appendix I.
IV.B.5.b.14	Evaluate the success of this minimum measure.	Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
6	**Pollution Prevention and Good Housekeeping in Municipal Operations**				
IV.B.6.b.1.i	Identify and list locations and description of all structural BMPs owned or operated by the MS4 within the urbanized area.	DPW	Number of structures identified.	Initial list: 3/2004 Update: March 10th of every year.	As discussed in Section 9.2.2 of the SWMPP.
IV.B.6.b.1.ii	Formalize procedures for inspections, cleaning and repair of detention/retention basins, storm sewers, and catch basins. The Town is already conducting these tasks.	DPW	Identify the structures tributary to the system. Conduct a catch basin sediment accumulation pilot program. Establish a routine inspection and maintenance program. Maintain records of inspections conducted, number of structures cleaned, approximate volume of material collected.	Developed: 12/2005	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.1.iii	Formalize current catch basin inspection and cleaning program. All catch basins will be inspected annually and cleaned as necessary unless documentation supporting a different frequency of cleaning is submitted to RIDEM as part of the Annual Report.	DPW	Formalized existing program. Number of catch basins inspected and number cleaned.	Developed by: 12/2005 Annually commencing 12/2006	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.1.iv	DPW staff will observe road shoulders during road work projects. If erosion is observed, the crew will report it to its manager. DPW will then schedule repairs and appropriate methods for stabilization including riprap or vegetative stabilization.	DPW	Procedures implemented developed	Developed by: 12/2005	
IV.B.6.b.1.vi	Formalize current street and road sweeping program. Town will continue to sweep all roads and streets once per year.	DPW	Maintain records of curb-miles swept, approximate volume of material collected.	Formalized by: 12/2006 Annually commencing 12/2006	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.1.vii	Develop program for controls to reduce floatables and other pollutants from the MS4. This program will be based on a review of current catch basin grates and their ability to bypass flows to a curb inlet, as well as observation of outfalls to determine locations with the greatest potential for floatables. A pilot program is proposed to evaluate the effectiveness of any floatable reduction strategy.	DPW	Program developed, volume of wastes collected and disposed.	Program developed by: 12/2005.	
IV.B.6.b.1.viii	Town will continue to dispose of wastes removed from the MS4 in accordance with applicable State requirements.	DPW, Storm Water Committee	Waste disposed of properly.	Reviewed annually	As discussed in Section 9.6 of the SWMPP.

Permit Reference	Minimum Control Measure Best Management Practice (BMP) Description	Potential Responsible Party/Department	Measurable Goal	Proposed Schedule	Comments
IV.B.6.b.2	Operations under MS4s legal control that have the potential to introduce pollutants into the storm water system are addressed in Section 8.0.	DPW, Storm Water Committee		Completed by: 3/2004	
IV.B.6.b.3	Industrial facilities owned and operated by MS4s that have storm water discharges associated with industrial activities have been listed on the NOI.	DPW, Storm Water Committee	Facilities identified on NOI.	Completed by: 3/2004	
IV.B.6.b.4	Operation and maintenance and good housekeeping practices and BMPs for municipal operations have been identified in Section 8.0.	DPW, Storm Water Committee	Continue to implement	Implementation by: 3/2006	As discussed in Section 9.6 of the SWMPP.
IV.B.6.b.6	Incorporate storm water awareness training into existing training for equipment operators and mechanics (Heath & Safety, Right to Know)	DPW, Town Council	Training completed. Educational materials distributed.	Procedures developed: 12/2006	As discussed in Section 9.6.
IV.B.6.b.7	Develop procedures to incorporate water quality improvements into flow management projects.	DPW, Town Council	Procedures developed	Procedures developed: 12/2007	
IV.B.6.b.8	Develop procedures for implementing proper erosion and sediment and water quality controls for all construction projects undertaken by the Town.	DPW, Town Council	Procedures developed	Procedures developed: 12/2006	
IV.B.6.b.8	Include a list of planned capital improvements in the Annual Report.	DPW, Town Council, Storm Water Committee	Meeting held to discuss municipality's needs. Improvements assessed and listed.	March of every permit year (commencing 2005)	
IV.B.6.b.10	Evaluate the success of this minimum measure.	Town Council, Storm Water Committee	Annual Report completed	March of every permit year (commencing 2005)	As discussed in Section 11.0 of the SWMPP.

APPENDIX M
ANNUAL REPORT TEMPLATE

STORM WATER MANAGEMENT
ANNUAL REPORT

NAME OF CLIENT
City, State

DATE

STORM WATER MANAGEMENT
ANNUAL REPORT
Client Name

TABLE OF CONTENTS

SECTION		PAGE
1.0	INTRODUCTION	4
2.0	PUBLIC EDUCATION AND OUTREACH	4
2.1	Education Materials Prepared	4
2.2	Education Materials Distributed	4
2.3	Workshops/Meetings Attended	4
2.4	Modifications to Plan	4
2.5	Activities Scheduled for Next Year	4
3.0	PUBLIC PARTICIPATION	4
3.1	Public Meetings Conducted	4
3.2	Presentations Given	4
3.3	Notices Published	5
3.4	Feed Back - Letters/Comments Received	5
3.5	Website	5
3.6	Modifications to Plan	5
3.7	Activities Planned for Next Year	5
4.0	ILLICIT DISCHARGE DETECTION/ELIMINATION	5
4.1	Illicit Discharge Investigation Activities	5
4.2	Illicit Discharge Removal Activities	5
4.3	Modifications to Plan	6
4.4	Planned for Next Year	6
5.0	CONSTRUCTION SITE RUNOFF CONTROLS	6
5.1	Construction Plans Reviewed	6
5.2	Construction Activities Commenced	6
5.3	Construction Sites Inspected	6
5.4	Modifications to Plans	6
5.5	Activities Planned for Next Year	6
6.0	POST CONSTRUCTION STORM WATER MANAGEMENT	6
6.1	Structures Installed	6
6.2	Structures Inspected	6
6.3	Modifications to Plan	6
6.4	Activities Planned Next Year	7
7.0	POLLUTION PREVENTION/GOOD HOUSEKEEPING	7
7.1	Employee Training Conducted	7

7.2 Street Sweeping 7
7.3 Snow Removal 7
7.4 Catch Basin Cleaning 7
7.5 Preventative Maintenance Activities 7
7.6 Complaint Responses 7
7.7 Spill Response Activities 7
7.8 Transfer Station 8
7.9 Municipal Waste Disposal 8
7.10 Municipal Recycle 8
7.11 Household Hazardous Waste Collection 8
7.12 Municipal Facility Inspection 8
7.13 Modification to Plan 8
7.14 Activities Planned Next Year 8

NAME OF REPORT
Client Name

TABLE OF CONTENTS
(continued)

TABLES **FOLLOWING PAGE**

FIGURES **FOLLOWING PAGE**

APPENDICES **END OF REPORT**

1.0 INTRODUCTION

2.0 PUBLIC EDUCATION AND OUTREACH

2.1 Education Materials Prepared

Appendix A examples

2.2 Education Materials Distributed

2.3 Workshops/Meetings Attended

2.4 Modifications to Plan

2.5 Activities Scheduled for Next Year

3.0 PUBLIC PARTICIPATION

3.1 Public Meetings Conducted

3.2 Presentations Given

3.3 Notices Published

Appendix B examples

3.4 Feed Back - Letters/Comments Received

3.5 Website

3.6 Modifications to Plan

3.7 Activities Planned for Next Year

4.0 ILLICIT DISCHARGE DETECTION/ELIMINATION

4.1 Illicit Discharge Investigation Activities

Location	Type	Date Identified	Identified By	Estimated Flow	Scheduled for Repair

4.2 Illicit Discharge Removal Activities

Location	Type	Date Removed	Removed By	Cost

4.3 Modifications to Plan

4.4 Planned for Next Year

5.0 CONSTRUCTION SITE RUNOFF CONTROLS

5.1 Construction Plans Reviewed

5.2 Construction Activities Commenced

5.3 Construction Sites Inspected

5.4 Modifications to Plans

5.5 Activities Planned for Next Year

Name	Site	Type	Date Reviewed	Date Commenced	Date Inspected

6.0 POST CONSTRUCTION STORM WATER MANAGEMENT

6.1 Structures Installed

6.2 Structures Inspected

6.3 Modifications to Plan

6.4 Activities Planned Next Year

Project	Site	Type Structure	Date Installed	Date Inspected

7.0 POLLUTION PREVENTION/GOOD HOUSEKEEPING

7.1 Employee Training Conducted

7.2 Street Sweeping

Curb miles swept, # material removed

7.3 Snow Removal

7.4 Catch Basin Cleaning

cleaned, # material removed

7.5 Preventative Maintenance Activities

Work order tracking

7.6 Complaint Responses

7.7 Spill Response Activities

7.8 Transfer Station

7.9 Municipal Waste Disposal

7.10 Municipal Recycle

7.11 Household Hazardous Waste Collection

7.12 Municipal Facility Inspection

Appendix C

7.13 Modification to Plan

7.14 Activities Planned Next Year