Municipality/Organization: **Pittsfield, Massachusetts**

EPA NPDES Permit Number: **MA041018**

MaDEP Transmittal Number: **W035321**

Annual Report Number & Reporting Period: **No. 5: April 2007-March 2008**

NPDES PHASE II Small MS4 General Permit Annual Report

Part I. General Information

Contact Person: Matt Billetter | Title: City Engineer

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Certification:

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

Signature: Bruce Collingwood

Printed Name: Bruce Collingwood

Title: Commissioner of DPW

Date: 4/29/08

Part II. Self-Assessment

The City of Pittsfield has completed the required self-assessment and has determined that our municipality is in compliance with all permit conditions with the exception of the following:

Part II.A.2 - The City has not yet adopted the necessary ordinances required under Part II.B.4 (a) and B.5 (a) whereby construction-phase and post-construction phase stormwater run-off must be managed in accordance with water quality protection standards. As a policy, and in terms of guidance provided to the development and construction communities, the City is operating in conformance with the goals of the General Permit, however, specific regulatory language is still under review. Additional information regarding the efforts to date to implement these permit conditions is provided in this Annual Report.

Part I. D. 4 - To our knowledge the state has not yet drafted TMDLs for waters within the boundaries of the City of Pittsfield. The City will consider measures to address pollutants of concern for impaired waters in subsequent permit periods.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities
PEO1	Delineate critical habitats and ecosystems in the community.	Engineering / Matt Billetter	Implement GIS technology to create data layer mapping.	None.	Critical / sensitive areas will be incorporated as a GIS layer. This information will be used when planning maintenance or improvement activities.
PEO2	Disseminate storm water educational brochures at household hazardous waste collection days.	CET and DPW&U / Bruce Collingwood	Collaborate with CET and HVA to make storm water related educational materials available to hand out beginning with the household hazardous waste collection days scheduled for April and May 2003. Thereafter at each proposed household hazardous waste and computer & monitor collection event through 2008.	Educational materials were made available at the May 5, 2007 collection event.	Educational materials will be made available at future household hazardous waste collection events.

PEO3	Utility bill inserts	CET and DPW&U / Bruce Collingwood	Collaborate with CET and HVA to create and disseminate educational brochures with utility bills twice per year beginning April 2003 and continuing until April 2008. The brochures will address different subjects such as the basics of hydrology; what a storm drain is; danger of and alternatives to pesticides, fertilizers, insecticides and herbicides; hotline phone number to report suspected illegal dumping or illicit discharge; date, time, location and materials that will be accepted at household hazardous waste collection events. Budget $3500 per year for educational materials beginning fiscal year 2004, through fiscal year 2008.	None.	Continue brainstorming with CET and HVA.
PEO4	Media	Engineering / Matt Billetter	Schedule roundtable with CET and HVA on the Mayor's radio and television programs within the next six months; investigate the possibility of securing a periodic time slot dedicated to environmental awareness and storm water topics.	None.	Meet with CET and HVA to brainstorm other possible media outreach.
PEO5	Walk-in / website outreach	Engineering / Matt Billetter	Continue to make educational materials available to the public in this office and other offices in City Hall. Add information and links to the City's website in the next six months.	Various environmental education materials are posted and available in brochure format at City Hall.	Continue same. Refine website page and links.

PEO6	Classroom and hands on storm water education for school children. HVA has an excellent program in place that combines a classroom presentation including an environmental model and a subsequent field day when students label catch basins with an important message.	HVA	Partner with HVA in supporting their educational programs to afford every public and private student the opportunity to participate and learn. We see this as an ongoing BMP that can be modified and adapted to reach other groups and focus on additional field parameters. From the HVA website: "**Community Education**. HVA can provide speakers for community events, annual meetings, educational forums and other adult activities. HVA can also provide displays on the Housatonic River for your event. We sponsor and conduct educational seminars for land use officials and others on topics of interest. Check with us for details."	HVA continued their school storm water awareness program.	Continue same. Write letters of support for HVA's grant applications.
PEO7	Toxics use reduction	CET	Partner with CET to reduce the use of toxic products on lawns and gardens through education and outreach.	CET continues their toxics use reduction outreach and education.	Continue to support CET's efforts throughout the community. Write letters of support for CET's grant applications.
PEO8	Responsible recreational vehicle use	Engineering / Matt Billetter	Collaborate with HVA, CET, Massachusetts Environmental Police and/or others to educate and survey recreational vehicle retailers and consumers, urging care and proper procedure when fueling and servicing their boats, jet skis, wave runners, snowmobiles, motorcycles, four wheelers, etc.	None.	Meet with local environmental groups to discuss and implement effective means of educating the target audience; i.e. point of sale and point of use outreach, manufacturer's literature, etc.

2. Public Involvement and Participation

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities–
PIP1	Revised: Public review of Notice of Intent and annual reports.	Engineering / Matt Billetter	Solicit review and commentary from the citizens of Pittsfield, CET, HVA and BRPC within the next six months. Incorporate such feedback into the City's storm water management plan, as warranted.	Activity completed in prior reporting periods...	Continue to make program information available.
PIP2	Illicit discharge / illegal dumping hotline	Unknown at this time.	Revise City code to establish severe penalties and punishment for illegal dumping. Assess the willingness and ability of City, County and State law enforcement officials to impose penalties and punishment for illegal dumping. Establish and advertise a hotline number within the next two years.	No activity this reporting period.	Review current ordinance, draft proposed modifications.
PIP3	Volunteer monitoring	HVA	Conduct annual survey to determine the number of new volunteers that join HVA's existing program as a result of public education and outreach.	No activity this reporting period.	Inquire.

3. Illicit Discharge Detection and Elimination

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities
IDDE1	Identifying illicit connections	DPW&U / Bruce Collingwood	Revised: Continue working with the Housatonic Valley Association (HVA) to resolve illicit discharge problems. HVA conducts water quality testing near our storm drain outfalls and contacts us when an illicit discharge is detected. The Water Division then investigates the storm drain at points of access, working up gradient from the outfall until the problem is isolated. This partnership has already yielded corrective results thanks to the devotion of the HVA volunteer monitors and the hard work of the Water Division. Generate plan for dry weather inspection, camera survey, smoke testing, and/or dye testing of storm drains.	SEA Consultants completed inspection and sampling of the city's storm drain outfalls and compiled the "City of Pittsfield Illicit Detection and Elimination Program Report" which is attached as appendix A. The city replaced a section of sewer at a bridge crossing that was leaking to the southwest branch of the Housatonic. As this time, the city is completing a project at the Pecks Road Fire Department training facility that will collect runoff from practice exercises and route it to the sanitary sewer. This is vast improvement as runoff will no longer discharge to the storm drain and nearby stream.	Implement report recommendations. Continue working with HVA.

IDDE2	Illicit discharge / illegal dumping hotline	DPW&U / Bruce Collingwood	Revise City code to establish severe penalties and punishment for illegal dumping. Assess the willingness and ability of City, County and State law enforcement officials to impose penalties and punishment for illegal dumping. Establish and advertise a hotline number within the next two years.	A comprehensive overhaul of the City's drainage ordinance is underway. Language will include an explicit prohibition of non-stormwater discharges and appropriate enforcement authority as required.	Review proposed ordinance drafted by SEA, modify as needed, then adopt.
IDDE3	Illegal Dumping	DPW&U / Bruce Collingwood	Revise City code to establish severe penalties and punishment for illegal dumping. Assess the willingness and ability of City, County and State law enforcement officials to impose penalties and punishment for illegal dumping.	No activity this period.	This can be combined with illicit discharges. There are already littering and illegal dumping regulations. Review current ordinance, draft proposed modifications.
IDDE4	Storm drain Mapping	Engineering / Matt Billetter	Verify accuracy of storm drain drawings and modify as necessary, upgrade to GIS over five year timeline.	Field verification of storm drain mapping continued during this reporting period. Field inspection results are contained in the IDDE report attached.	Incorporate into GIS.

4. Construction Site Stormwater Runoff Control

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities
C1	Revised: Require erosion & sediment control plan for all construction sites disturbing less than one acre, which are not in wetland resource areas.	Engineering / Matt Billetter	Collaborate with the Conservation Commission over the next year to establish requirements and review process.	Draft stormwater management ordinance is under review. The ordinance will coordinate site drainage design and performance standards with relevant Planning and Community Development review procedures, including erosion and sedimentation controls during construction.	Continue to work with SEA to implement program.
C2	Revised: Require site plan and signed covenant for waste management and vehicle maintenance for all construction sites disturbing less than one acre which are not in wetland resource areas.	Engineering / Matt Billetter	Collaborate with the Conservation Commission over the next year to establish requirements and review process. Generate covenant within the next year, revise City code to support enforcement of covenant.	None.	Work with SEA to strengthen program.
C3	Revised: Require escrow account from developer for all construction projects.	DPW&U / Bruce Collingwood	Revise City code and/or subdivision regulations to require an escrow account from the developer to be used by the City to employ the services of an independent, qualified construction inspector selected solely by the City. This account will be required in addition to a performance bond.	Implemented. Using funds for third party review.	Include as part of zoning ordinance, subdivision regulation and city code. Use funds also for construction inspection.

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

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 5 (Reliance on non-municipal partners indicated, if any)	Planned Activities
PC1	Structural	Engineering / Matt Billetter	Inventory and document all existing structural storm water management facilities within the city, evaluate their current condition, identify the parties responsible for maintenance and any existing maintenance schedules (typically part of the articles of incorporation), request schedule if none exists, request written documentation of maintenance performed to date and annually thereafter. Review and revise as necessary the City's construction specifications and standards, city code, zoning ordinances and subdivision regulations.	Encouraged low impact development through reduction of subdivision roadway width. All new catch basins are required to have a deep sump and oil / water /debris separator.	Continue to develop. Revise / amend construction standards and specifications. Create inventory list of publicly and privately owned structural storm water management facilities within the City. Identify on GIS mapping.
PC2	Nonstructural	Engineering / Matt Billetter	Establish criteria for site planning that requires incorporation of non-structural storm water management measures (trees, shrubs, flowers, etc.) where applicable.	The city continues to study and encourage low impact development. We worked with designers on recent projects to include items such as rain gardens and water quality swales.	Continue to develop. Revise / amend construction standards and specifications.

PC3	Ordinance	DPW&U / Bruce Collingwood and City Council	Review and revise as necessary the City's construction specifications and standards, city code, zoning ordinances and subdivision regulations to clearly define storm water management requirements, policies and practices.	SEA consultants completed draft ordinance for "Stormwater Management and Land Disturbance" and "Post-Construction Stormwater Management".	These draft ordinances will be reviewed by the city's Department of Public Works, Department of Community Development, Conservation Commission, legal counsel and any other interested or affected parties; revised as necessary and finally adopted as ordinance.

6. Pollution Prevention and Good Housekeeping in Municipal Operations

BMP ID #	**BMP Description**	**Responsible Dept./Person Name**	**Measurable Goal(s)**	**Progress on Goal(s) – Permit Year 5** (Reliance on non-municipal partners indicated, if any)	**Planned Activities**
PPGH1	Continue used motor oil, oil filter and antifreeze recycling.	Highway / Tom Foody		Continue same.	Continue same.
PPGH2	Responsible pest control	Highway / Tom Foody, Water & Sewer/ Matt Inhelder Wastewater / Tom Landry Parks / Jim McGrath Buildings / Ernie Fortini	Although the City of Pittsfield uses little to no chemical pesticides at this time, we will be working with CET to create an Integrated Pest Management (IPM) plan for the City that minimizes use of Tier 1 chemicals to the MEP.	Idle for now as it was determined that the City currently uses little to no pesticides, herbicides and fertilizers.	None.

PPGH3	Vehicle washing	Highway / Tom Foody, Water & Sewer/ Matt Inhelder Wastewater / Tom Landry Parks / Jim McGrath Buildings / Ernie Fortini	Revised: Establish and implement a policy for washing City vehicles only on grassed areas, areas that drain to the sanitary sewer via an oil / water separator or in an area where wash water is contained and pumped to the sanitary sewer. City conducted audits of all municipal facilities including facilities that include vehicle washing operations. Recommendations were made regarding long term washing operations which are currently under review by the City.	No activity this reporting period.	Write official policy. Share policy with all City departments that own/operate or maintain City vehicles. Check to see if we are implementing. If not, re- educate Department Heads and staff.
PPGH4	Research alternatives to road salts and effective application rates	Engineering / Matt Billetter Highway / Tom Foody	Research effective alternatives to conventional road salts that are more environmentally friendly and techniques of effective lower salt application rates. Research road salt application rates of other communities in Berkshire County and the northeast region. Perform active experimentation on designated sections of roadway and document results, starting winter 2003/2004. Create a map identifying sensitive areas where little or no salt shall be applied (bridges, culverts, wetlands, etc.); to be completed and distributed within the next year.	No activity this reporting period.	Review "Manual of Practice for an Effective Anti-Icing Program" and additional research. Involve the Highway Superintendent and Commissioner.

PPGH5	Household hazardous waste collection events(HHWCE)	CET and DPW&U / Bruce Collingwood	Collaborate with CET to organize one HHWCE for each spring, summer and fall in the City of Pittsfield.	A HHWCE was held on May 5, 2007.	Next HHWCE is scheduled for May 10, 2008.
PPGH6	Street & parking lot sweeping	Highway / Tom Foody	Revised: Sweep streets before flushing water mains, consider vacuum sweepers	Streets & parking lots were swept. Pre water main flushing priority is being given to streets closest to lakes and streams.	Streets & parking lots will be swept. Revise contract schedule so that sweeping occurs prior to water main flushing. Consider using vacuum sweepers. Review EPA & DEP guidance and regulation. Modify disposal methods if necessary.
PPGH7	Storm drain system cleaning	Water & Sewer/ Matt Inhelder	Revised: Clean each catch basin once annually. Inspect each outfall once annually and clean accordingly.	City's Water, Sewer & Drain Department actively cleans catch basins; city also contracts this work.	Continue same. Review EPA & DEP guidance and regulation. Modify disposal methods if necessary.
PPGH8	Proper snow disposal	Highway / Tom Foody	Develop policy and train Highway Department personnel.	None.	Write official policy. Train staff.

APPENDIX A

City of Pittsfield
Illicit Discharge Detection and Elimination Program
Report

February 2008

Prepared for:
City of Pittsfield

Prepared by:
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1. Introduction

US EPA NPDES Stormwater Phase II Final Rule

On December 8, 1999, the US Environmental Protection Agency published the National Pollution Discharge Elimination System (NPDES) Final Rule as applies to stormwater discharges from small and medium Municipal Separate Storm Sewer System operators (MS4s). The City of Pittsfield is one of the MS4s required to comply with the NPDES Stormwater Final Rule.

Components of Compliance – The Six Minimum Control Measures

MS4s are required to create stormwater management programs designed to reduce discharge of pollutants to the "maximum extent practicable," protect water quality, and comply with the applicable water quality provisions of the Clean Water Act. The Stormwater Phase II Final Rule program is defined by EPA as a program comprised of six Minimum Control Measures to be implemented together, thereby significantly reducing inputs of pollutants into receiving waters. The six Minimum Control Measures are:

1. Public Education and Outreach
2. Public Participation and Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Runoff Control
6. Pollution Prevention/Good Housekeeping

2. Illicit Discharge Detection and Elimination

This report focuses on one specific Minimum Control Measure – Illicit Discharge Detection and Elimination (IDDE).

Discharges from stormwater management systems throughout urbanized areas have often included wastes and wastewater from non-stormwater sources. NPDES Phase II focuses on these discharges because they have been shown in some areas to make up as much as half the total flows within the stormwater management system. These flows are designated as "Illicit Discharges" because they consist of or contain materials the stormwater drainage system is not designed to treat, transport or discharge. Illicit Discharges are therefore considered by Federal regulations to be "...any discharge to an MS4 that is not composed entirely of stormwater..." There are particular exceptions to this definition, such as discharges from NPDES-permitted industrial sources and discharges from fire-fighting activities.

Illicit discharges enter stormwater systems through either direct connections (e.g., wastewater piping either mistakenly or deliberately connected to the storm drains) or indirect connections (e.g., infiltration from cracked sanitary systems, spills collected by drain outlets, or paint or used

oil dumped directly into a drain). The untreated discharges then contribute high levels of pollutants to receiving water bodies (for example, heavy metals, toxics, oil and grease, solvents, nutrients, viruses, and bacteria). Specific examples of illicit discharges include sanitary wastewater, effluent from septic tanks, car wash wastewaters, improper oil disposal, radiator flushing, laundry wastewaters, spills from roadway accidents, improper disposal of auto and household toxics. Pollutant levels from these illicit discharges have been shown to be high enough to significantly degrade receiving water quality and threaten aquatic, wildlife, and human health.

The tasks summarized in this report were undertaken to address the NPDES requirements cited in the General Permit. The permit obligates the City to develop and implement a plan to detect and address non-stormwater discharges. That plan must include procedures for locating illicit discharges, such as visual screening or other tactics such as dye or smoke testing.

This report is intended to be used as a guide for the City of Pittsfield to locate specific sources of illicit discharges after a dry weather flow has been identified in the storm sewer system, as an ongoing maintenance program. In addition, the results of dry weather observations and follow-up activity undertaken as an element of the current program are summarized in Section 4.

Included within the report are

- City-wide map of identified stormwater outfalls
- Sample notifications and forms;
- Additional manhole and up-the-pipe storm drain inspection methods;
- Procedures to conduct and analyze Dye, Smoke and TV inspection; and
- Flow charts and diagrams to assist understanding of the illicit discharge location process
- Laboratory analytical results of sampled dry weather flows

2.1 Inspection and Sampling

An Illicit Discharge Detection and Elimination (IDDE) program is generally understood as requiring the inspection of all storm sewer outfalls within a regulated MS4, during dry weather flow conditions. Those outfalls where dry weather flows are observed, or where evidence of previous illicit discharge is observed, require follow-up. This section briefly describes the process for inspecting an outfall, for determining if dry weather flows contain pollutants, so that the MS4 authorities can determine if follow up procedures should be implemented.

Exemptions for non-stormwater discharges are generally understood to include the following:

- *Water line flushing*
- *Landscape irrigation*
- *Diverted stream flows*
- *Rising ground waters*
- *Uncontaminated ground water infiltration*
- *Uncontaminated pumped ground water*
- *Discharge from potable water source*
- *Foundation drain*

- *Air conditioning condensation*
- *Irrigation water, springs*
- *Water from crawl space pumps*
- *Footing drains*
- *Lawn watering*
- *Individual resident car washing*
- *Flows from riparian habitats and wetlands*
- *De-chlorinated swimming pool discharge*
- *Street wash water*
- *Residential building wash waters, without detergent*

These 18 sources are considered allowable non-storm water discharges as long as it has been determined by the permittee that they are not significant contributors of pollutants to the MS4.

2.2 Outfall Inspections

Each outfall in a regulated MS4 should be inspected during dry weather flow conditions – generally no less than 48 hours (preferably no less than 72 hours) after a significant rain event. Waiting at least 48 hours after the completion of a rain event allows residual stormwater flows to make their way through a storm sewer system to the outfall. After this time, there should be no storm-related flows coming through a 'clean' storm sewer system.

Outfall inspections are generally conducted in a hazardous environment - it is therefore very important that inspectors are fully aware of the potential dangers and exercise extreme caution while conducting inspections.

A baseline outfall inspection requires a physical visit to that outfall, and approximately 15 minutes to fully inspect, record and photograph the conditions observed. A sample outfall inspection report is shown in Appendix B. It is important that all of the data fields are filled out, and that a photograph is taken to clearly show the condition of the outfall.

2.3 Dry Weather Flow Sampling

If dry weather flow is observed during an outfall inspection, there are two general courses of action that can be taken:

(1) The inspector can, based on his knowledge of the area and storm sewer system maps, make a determination if the dry weather flow comes from one of the 'allowable' non-stormwater discharges (see introduction to this section for list of allowable non stormwater discharges). For example, it may be clear that a stream has been diverted into the storm sewer system, at some point above the outfall, and will thus flow through the outfall. If an example like this can be clearly identified, and the flow is shown to be clear, and there are no signs of other previous illicit discharges or pollutants, the inspector should make detailed notes of his observations, and ensure that the City authorities are made aware of the situation.

(2) The inspector may decide that no such determination as described above can be made, and that based on his observations, there is an illicit discharge coming from the outfall. In this case it will be necessary to take a sample of the dry weather flow and have it analyzed. For the purposes of this program, MADEP requires testing be undertaken for fecal coliform only. As part of an ongoing inspection program, the City may choose to make arrangements with a local laboratory to have the sample tested for a variety of parameters.

While awaiting results of these analyses, the City should take pollutant-mitigation efforts at the outfall to minimize potential pollutant loading to the water body. If the lab results return a positive for fecal coliform, the City must proceed immediately to the section in this report on follow-up of dry weather flows, and activate the procedures to locate the specific source(s) of the illicit discharge. If the lab results return a negative for fecal coliform, the City should decide if testing for other pollutants should be undertaken. The results of this additional testing may also require activation of the follow-up procedures described later in this report.

In addition to laboratory testing, other field tests can be undertaken to assist in determining if dry weather flows are, in fact, illicit discharges. Tests in the field can include simple tests such as clarity, odor, temperature, etc. Some field tests are quite easily performed: A pH probe can help to reduce laboratory testing of pH over the course of the inspections. Turbidity can be estimated in the field with a turbidity chart. A conductivity probe can be purchased and easily used by field personnel to help reduce lab costs. A thermometer can be used to measure the temperature of the dry weather flow, and to measure the temperature of the receiving water body, so that a temperature comparison can be made.

Table 2-1 can be used as a guide in determining appropriate analysis depending on observed conditions.

TABLE 2-1
RECOMMENDED ANALYTICAL PARAMETERS

Dry Weather Flow Analytical Program Recommendations		
Observed Condition	**Possible Source(s)**	**Recommended Analysis**
Sewage Odors / Floatable Waste	Non-permitted sewage connection	Fecal Coliform (SM 9222 D)
Oily Sheen	Discharge of petroleum into storm drain, release of petroleum from unknown source	Total Petroleum Hydrocarbons (TPH) Fingerprint (EPA Method 8100M or equivalent) Ammonia
"Chemical" Odor	Release of solvent/industrial chemicals from unknown sources	Volatile Organic Compounds (VOCs) (EPA Method 8260B)
Soap Foaming	Laundry Discharges	Optical Brightener Test (Fluorescence)
Vegetative Growth at Outfall	Fertilizers, Sewage	Total Phosphorus (SM 4500-P F) Nitrate (EPA Method 353.2) Biological Oxygen Demand (SM 5210 B)

General notes on outfall inspections.

- Check the immediate area for sources of flow that are not coming from an illicit connection such as water in the gutters, car washing, draining pools, etc.

- Observe carefully any evidence of previous illicit discharge, even if there is no dry weather flow at the time of inspection. Dry weather flows are often intermittent. Examples of evidence would include toilet paper, bleached ground etc.

2.4 Dry Weather Flow Follow-up Procedures

If the existence of an illicit discharge is confirmed at an outfall, the specific source of the discharge must be located, and mitigated. The procedure recommended to locate the source of the discharge is a two-phase process:

1. Using system maps, GIS tracing tools and inspection of manholes and catch basins to determine the approximate location of the source of the illicit discharge.

2. Using more advanced techniques, such as dye testing, smoke testing or TV inspection to locate the specific source of the discharge:

This section is intended to guide Pittsfield's MS4 authority through the process of locating the source of an illicit discharge.

The process flow chart below describes the process to follow from the time of outfall inspection, determining if a dry weather flow is an illicit discharge or not, through to the approximate locating (phase I) of the source to the specific locating (phase II) of the source.

The specific procedures identified in this process flow chart are described in detail later in this section.

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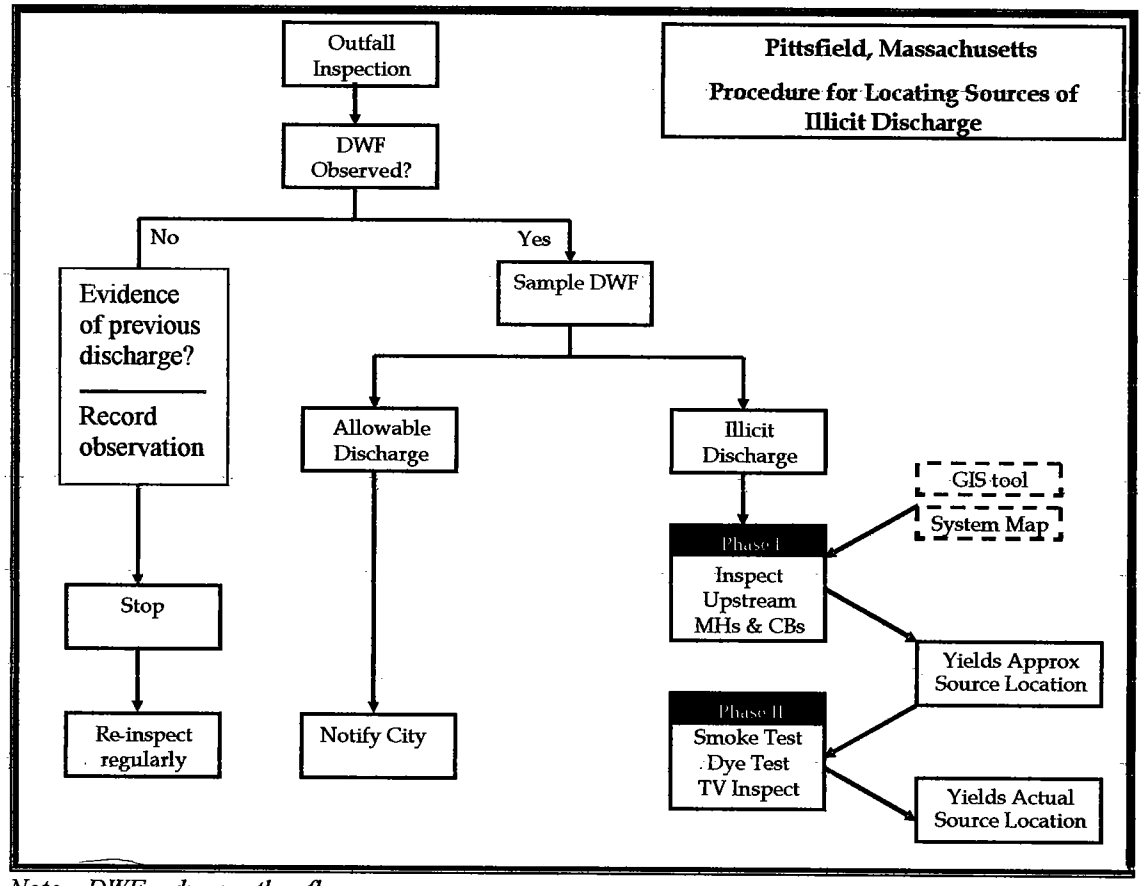
FIGURE 2.1
FLOW CHART SHOWING PROCESS OF IDENTIFYING ILLICIT DISCHARGE SOURCES



Note – DWF – dry weather flow

As described above, phase I of the illicit discharge source location procedure is to locate the approximate location of the source. Following the steps described in this section will result in locating the source of an illicit discharge, with an accuracy of 'between two manholes'. This is done using the following three tools/methods:

- GIS tracing tool – Using the City's GIS tracing tool, the user will be able to select the outfall in question and select the 'Trace Upstream System' tool. The GIS system will then highlight all parts of the storm sewer system that are upstream of that outfall. The user can then print out that map, showing the outfall, and all tributary stormwater structures.

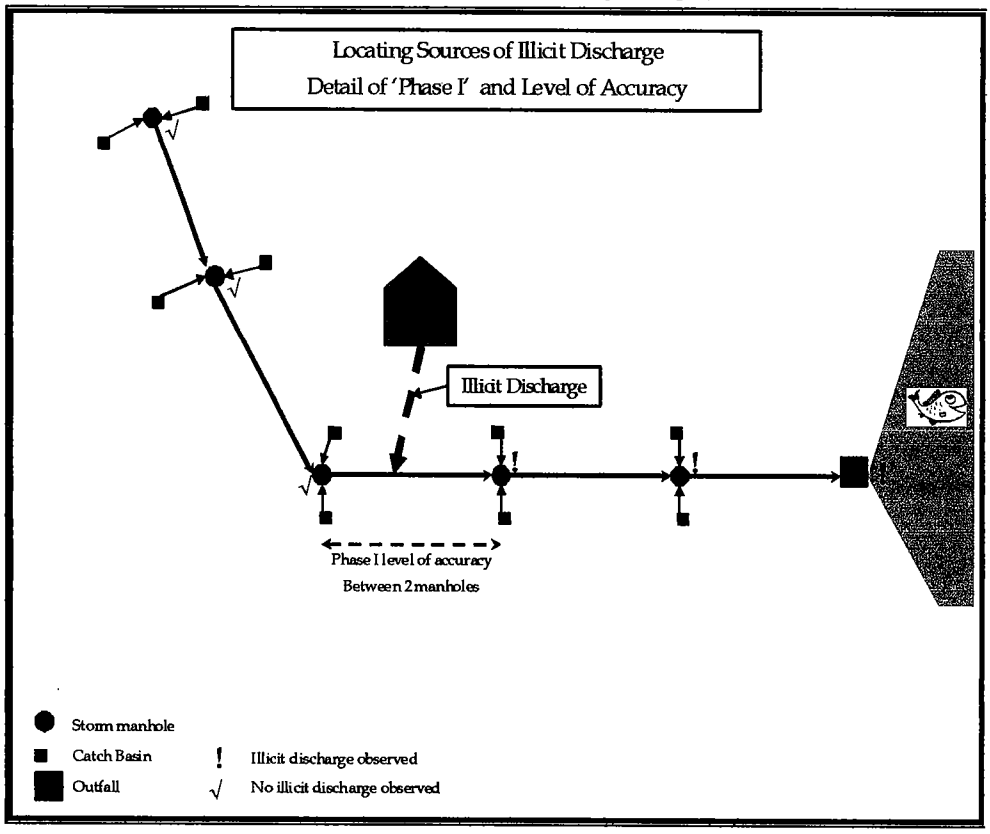
- Storm sewer maps - Using the map developed in the step above, the user can begin to study the catchment area upstream of the selected outfall. Having an understanding of the

area is an important tool in locating the source of the illicit discharge. For example, the lab analysis of the dry weather flow sampled at the outfall might show that there is oil in the flow. This could point to the potential of the source being a local garage. If after studying the area, the user determines that it is a mainly residential area, with just one garage, this will assist greatly in the location of the source.

- Inspection of manholes and catch basins upstream of the outfall – Having a map of the upstream storm sewer network, and an understanding of the catchment area, the user should then begin to inspect storm sewer manholes and catch basins – moving step by step, upstream from the outfall. Inspection should show that manholes downstream of a source show the same type of discharge as observed at the outfall, and manholes upstream of the source do not. Using this logic, by inspecting upstream into the system, an inspector will be able to flag the manhole where the evidence of the illicit discharge begins to be observed. A manhole upstream of this manhole should show no such evidence.

The figure below shows a graphical representation of a typical 'phase I' illicit discharge source location.

FIGURE 2.2
PHASE I SOURCE LOCATION



The following are the recommended steps to follow to determine approximate location of a dry weather flow.

Phase I Inspection Procedures

Step 1

Use the MS4 storm sewer system mapping to get a clear map of the outfall and the pipes, manholes and catch basins that are upstream from it. This can be obtained from the GIS tracing tool, or often more simply, by highlighting on a paper map those structures that are upstream from the outfall. Whatever method is used, it is important that the inspector has a good understanding of the storm sewer system that collects and transports flow to the outfall.

Step 2

Revisit outfall and confirm that dry weather flow is still running. Illicit discharges may be intermittent and a flow observed one day may not necessarily be observed the following day or at a different time. An illicit discharge will be most easily traceable if it is active during the follow up procedures.

(Revisiting the outfall is not necessary if follow up procedures are being undertaken due to signs of previous illicit discharge at the outfall, but it can often be useful to allow the inspector get a better 'lay of the land'.)

Step 3

Begin inspecting manholes and catch basins moving upstream and away from the outfall. Inspect each structure, specifically looking out for similar characteristics as were observed at the outfall.

If there is no evidence of those characteristics at the first set of manholes and catch basins upstream of a flowing outfall, it is likely that the source of the illicit discharge is located somewhere between the outfall and these structures. Skip Step 4 and move on to Phase II.

Step 4

Repeat Step 3, continuing to move upstream and away from the outfall, to inspect manholes and catch basins for the same flow characteristics that were observed at the outfall.

As soon as the inspection process yields a set of manholes/catch basins where the outfall characteristics are not observed, stop the inspection process. At this stage, it can be reasonably determined that the source of the illicit discharge is somewhere between this set of manholes/catch basins, and the set of structures immediately downstream of there.

On completion of Phase I source location activities, the inspection team should know, with an accuracy of 'between two manholes' where the illicit discharge is entering the storm sewer system. The inspection team should then move on to Phase II procedures (see Section 2.5).

Additional notes on source location

- **Notification** - It is important for the inspection team to notify local MS4 authorities, and the local police department regarding the location and times of inspections. This is important for the safety of the inspection team and for the information of the general public. Based on the potential locations (busy roads) the police department may determine that it is appropriate to have a police detail accompany the inspection team to safeguard the safety of the team and to direct traffic on busy roads. Public notification is also a key factor in a successful tracing program.

- **Multiple Discharges** - In some instances, multiple illicit discharges may be flowing to one outfall. In cases such as these a manhole inspection might show a reduction in, but not absence of flow compared with a downstream manhole. This likely means that there is one illicit source downstream of the manhole, and an additional source or sources upstream of the manhole. In a case such as this the inspection team should take detailed notes and inspection records and continue inspecting upstream storm structures until no flow is observed. The inspection team will then know that there are multiple sources between that point and the outfall, and phase II activities should be implemented on that portion of the system.

2.5 *Locating Illicit Discharge Sources – Phase II*

The phase I source location procedures will give the inspection team a length of storm sewer system, (between two consecutive manholes for a single source, a longer stretch of storm system for multiple sources). At this point, simple inspections of storm system structures are not sufficient for locating specific sources. The following set of phase II procedures will assist the inspection team in locating specific sources.

The following illicit discharge detection methods are described and discussed below:

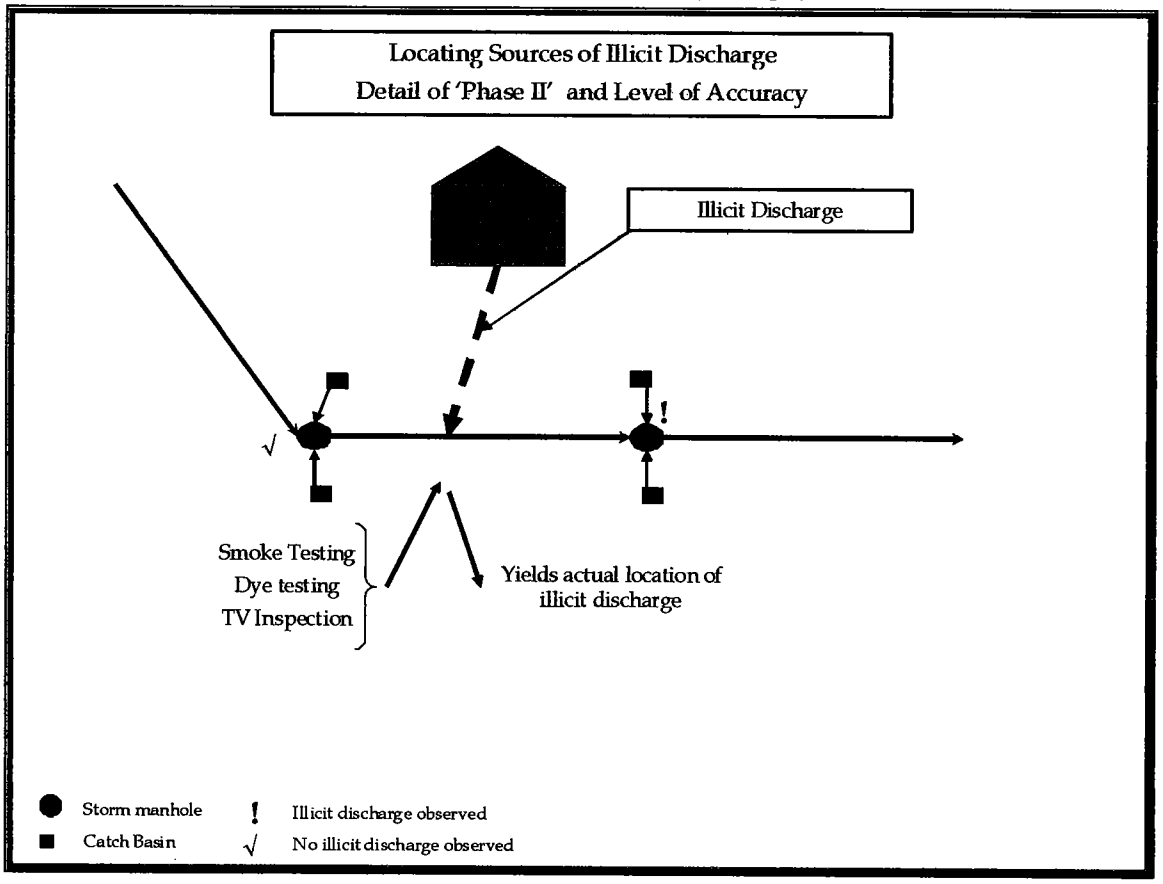
- Smoke testing
- Dye testing
- Television inspection

Public notification is an important part of all of these phase II procedures. Phase II procedures will target more specific sections of the storm system, and will typically end up highlighting specific properties. In many cases, the owners of those properties will not be aware that there is an illicit discharge source on or close to their property. Property owners should be notified in advance that activities such as smoke testing, dye testing or TV inspection are planned for their

street/area, and a specific MS4 authority contact name should be made available to them so that they can discuss any concerns they might have. Sample notifications are included in Appendix B.

The figure below shows a graphical representation of a typical 'phase II' illicit discharge source location.

FIGURE 2.3
PHASE II SOURCE LOCATION



2.5.1 Smoke Testing

Description – Blowing smoke, under pressure, into an isolated section of storm sewer system that has been plugged (by sand bags, beach balls, or other types of plug) at all ends. The pressurized smoke will not be able to exit via the plugged manholes/catch basins, and will therefore seek the path of least resistance to exit the system. If there are other connections to the system, such as roof leaders or floor drains, the smoke will flow up these connections and exit the system this way. Inspector should look out for smoke coming out of roof leaders or basements for a positive test. A dye test (see below) is typically used to confirm the results of a positive smoke test.

Smoke testing is useful for determining inflow sources such as roof leaders, cellar, yard, and area drains, foundation drains, abandoned building sewers, faulty connections, illegal connections, and cross connections with the sanitary sewers.

Smoke testing does require specific equipment (mechanical blowers etc) and training. If it is determined that smoke testing is the most appropriate tracing method to be used, a local contractor should be contacted to undertake the work, unless the MS4 has the appropriate equipment and personnel.

Smoke testing is a multiple source method – one setup of smoke testing may flag up multiple potential sources.

Appropriate uses – smoke testing is most appropriately used when there are multiple potential sources between consecutive manholes or along a stretch of several manholes.

Notes – Because of the use of smoke, coordination with the public is particularly important when undertaking smoke testing. The local fire department should be alerted about where and when the testing will take place, as they will likely get calls from residents who see smoke and believe there is a fire emergency. In some communities, the local fire department will send a detail to attend the smoke testing. The smokes used are generally harmless, but may in some cases cause aggravation to those with previously existing breathing difficulties.

If undertaken by a private contractor, 2006 costs for smoke testing typically range from $1,500 - $2,000 per day for day rate services, and small linear footages. For larger smoke testing projects, generally in excess of 5,000 linear feet, a per-linear foot rate may be more appropriate. Smoke testing rates of $0.35 - $0.45/ linear foot are typical on this basis.

2.5.2 Dye Testing

Description – Pouring dyed water into a suspected source (roof leader, floor drain) and monitoring the downstream manhole for appearance of the dye. If the dye poured into a suspected source is observed in a downstream manhole or catch basin shortly after, this will confirm that the source is connected into the storm system.

Dye testing is a single source method – each dye test setup will confirm only one source.

Appropriate uses – Dye testing is best used on a source that is strongly suspected of being connected to the system, because it is part of the only property contributing flow to a suspected portion of storm system, or because it is a high-risk property.

If there are multiple properties along a suspected section of storm system, it may be more efficient to conduct smoke testing, as multiple dye tests along a single section of storm system can be time consuming and can yield confusing results.

Notes –Dye testing does not require specific training or equipment, and can typically be undertaken by MS4 employees. The dye that is used in this process is generally made of vegetable dyes, and is harmless. Ultimately, dye that is introduced into the storm sewer system will flow out of the outfall, and will likely cause discoloration of the water in the vicinity of the outfall. This can cause concern to local residents, and the MS4 authorities should notify the appropriate departments so that these concerns can be put to rest.

2.5.3 Television Inspection

Description – Television inspection consists of a robotic TV camera that is mounted on wheels and is placed within the suspect pipe. The camera has an odometer on it to measure distance. The camera travels down the pipe and records the pipe condition while being watched by a technician from above. The technician can adjust the focus and camera direction from up top. If an illicit discharge source is found, the technician can then stop the travel of the camera and focus in on the source. TV inspection is used to follow a trunk line to determine the location of an illicit discharge from within the pipe itself. TV inspection will also yield a measurement from the camera entry point to the illicit source, making it easier to locate the source on street level when it is time to eliminate the illicit connection. The TV inspection method will also yield the direction of the illicit connection entering the pipe (left or right of the robot), which can be very useful to determine the source of the flow.

Appropriate uses - TV inspection is most appropriately used when there are multiple potential sources between consecutive manholes or along a stretch of several manholes. The camera can pinpoint a connection and still see if there is any flow upstream of that connection telling the camera operator to continue upstream until there are no dry weather flows in the pipe.

TV inspection is also useful within areas sensitive to public concern. The TV inspection method does not produce any visual effects on the water bodies, such as dye testing. TV inspection also does not produce any visual effects within the air space of a sensitive property like a nursing home or hospital, such as smoke testing. It is also useful when a property owner does not allow access to their property to confirm a suspected source of inflow.

Notes - Because of the need to have access to the storm sewers and the need to park a TV inspection vehicle in the street to conduct the inspection it is necessary to coordinate all activities with the MS4 coordinator and the local police department. Having a parked vehicle in the road while conducting an inspection may require a police detail to direct traffic. Alerting local residents of these activities will also reduce the phone calls to City departments from concerned residents.

2006 costs for TV inspection averaged $1,500 - $3,500 per day for day rate services, and small linear footages. Linear footage based rates, for larger quantities are in the range of $1.50 to $2.00 per linear foot.

3. Recommendations for an Ongoing Illicit Discharge Identification Program

3.1 Introduction

The outfall inspections reported herein were part of the City's efforts to remain in compliance with the Phase II EPA Stormwater Regulations. The outfall inspections, however, are one-time inspections and it is important to bear in mind that at any time new illicit discharge sources may come on line, or intermittent illicit discharges that were not observed during the initial outfall inspection program will continue to pollute water bodies. Because of this, it is vital for the health of the City's and the watershed's water quality, that the City implement an ongoing program of identifying illicit discharges.

3.2 Ongoing Outfall Inspection

At the conclusion of the 2007 IDDE and stormwater GIS implementation, the City will have a detailed GIS map of all of its stormwater outfalls and general collection infrastructure. Use of the new GIS technology should make it straightforward for the City to coordinate re-inspection of outfalls on a regular basis. As outfalls are re-inspected, the data can be input to the GIS system to ensure that the most current data is in the system.

As the ongoing outfall inspection proceeds, dry weather flows may be observed. These dry weather flows should be dealt with as detailed in Section 2 of this report, and if determined to be non-allowable dry weather flows, the sources should be traced as detailed in Section 3 of this report.

In addition to this program, the City of Pittsfield has a longstanding, effective relationship with the Housatonic Valley Association which regularly monitors water quality within the watershed. The City plans to continue working with HVA to identify and eliminate illicit discharges suspected as a result of their water quality analyses.

4. Field Inspection and Sampling Results

4.1 Summary of Dry Weather Flows Observed

At the initiation of outfall inspection activity, records indicated that the City of Pittsfield contained 397 outfalls identified from record drawings and construction plans compiled by the City's GIS consultant. Using this database, stormwater outfalls were located and inspected during dry weather periods. A map showing all identified outfalls has been attached as Appendix A, and all of this information is further available through the existing GIS database created as part of this project. Of the 397 inspected outfalls, 210 inspections indicated no illicit discharge was present and no additional action was required under the IDDE program. During the first inventory to identify outfall condition, 79 of the documented outfalls could not be located. In a subsequent investigation, 29 outfalls or structures which had not been found earlier were either identified or found to be no longer extant based on further observation or anecdotal information.

Ultimately, 103 outfalls were characterized as having a low suspicion of an illicit discharge. This is a highly conservative number, as the majority of those (73) were so characterized because they were either completely or partially submerged at the time of inspection, or could not be accessed and evaluated due to location (e.g. private property/secured site). The 30 remaining outfalls in this low priority category consist of outfalls at which a clear, odorless discharge or low to moderate flows with some organic debris were observed. A significant portion of the outfalls were observed to have silt or other organic debris build-up, or other conditions which warranted maintenance. The submersion or periodic inundation of the outfalls appears to be the primary cause of this condition.

Eight (8) outfalls were initially determined to have a high priority dry weather flow with observed impacts. These outfalls are identified on the map provided in Appendix A. Four (4) of the outfalls were determined to be without flow upon a second visit for sampling purposes. The four (4) remaining outfalls were sampled and results are provided below.

Table 4-1
Dry Weather Flows

Outfall ID #	Outfall Location	Laboratory Results	Comments
13	Easement	EPH – ND Fec. Col. – 8,500 CFU/100 ml	Partially submerged culvert.
236	Easement	EPH – ND Fec. Col. – 37,000 CFU/100 ml	Discharge to heavily overgrown area.
316	North Street	EPH – ND Fec. Col. – 20 CFU/100 ml	Originally identified with strong, clear discharge. Results appear to indicate that flow is either groundwater or diverted stream flow.
318	Hancock Rd.	EPH – ND Fec. Col. - ND	Originally observed with moderate flow, with brown algae in vicinity of discharge. Results appear to indicate that flow is either groundwater or diverted stream flow.
169	Columbus Ave.	N/A	Originally observed with low flow, clear discharge. No flow during sampling event.
291	Plastics Ave.	N/A	Outlet into stilling basin. No flow during sampling event.
277	Hancock Rd.	N/A	Low flow and lots of moss and algae growth in pipe. No flow during sampling event.
407	Taconic Park Drive	N/A	No flow during sampling event.

4.2 Details on Tracing of Illicit Discharges

A large percentage of outfalls in the City are either partially or completed submerged. As a consequence, significant organic debris or growth was observed in the general vicinity of the outfalls, and this in turn impacts maintenance requirements. As indicated above, several of the "high priority" outfalls were non-flowing during the sampling event. It is recommended that the City re-visit these outfalls at a future time, under dry weather conditions, to determine if there is

continuous or periodic flow from these outfalls. If flow is observed, sampling and analysis for parameters appropriate to observed conditions, as described in Section 2.3, should be conducted. In the event that there is no flow, but physical evidence of periodic discharges in the vicinity of the outfall (e.g. distressed vegetation, odor, detritus), an investigation should also be conducted.

Results of the sampling indicated that outfalls 236 and 13 had elevated fecal coliform counts. There were no other observed conditions of distressed vegetation, oil sheens, or potential detergents/surfactants observed. The results indicate potential illicit discharges and/or sanitary connections are possible along drain systems which discharge at these locations. Additional investigation is warranted upstream of these locations. Outfall no. 316 also indicated fecal coliform present, although at significantly lower concentrations. Although a positive result, the findings do not necessarily suggest a direct sanitary connection as the figure is less than what might be expected from raw sewage. To put the figure in perspective, a standard for Class 1 waters (used primarily for recreation) requires fecal coliform counts below 200 colonies per 100 ml. The findings could be the result of surface water flow picking up animal feces on ground surfaces and washing it into the drainage system. Enforcement of pet waste pick-up policies, for instance, may be the appropriate response. Future testing of the outfall is recommended to determine if there is continued dry weather flow, and if there is any increase in the concentration of bacteria in the discharge.

Laboratory results reported no indication of petroleum hydrocarbons present at detectable levels at any outfall location.

5. Conclusions

The City of Pittsfield has made huge strides in identifying, mapping, and inspecting storm water structures throughout the City. Inspection results suggest that follow-up investigations at two (2) outfalls where elevated fecal coliform results were reported should be conducted as priority tasks.

Outfalls which could not be found, or accessed, should be part of the City's ongoing inspection program, through procedures outlined in this report. Thereafter, outfalls which have been identified as low priority for potential illicit discharges, due either to submersion or inadequate access to allow an inspection, should be investigated.

APPENDIX A
CITY-WIDE OUTFALL STRUCTURES MAP

APPENDIX B
SAMPLE FORMS

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitutde:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

☐ Industrial
☐ Ultra-Urban Residential
☐ Suburban Residential
☐ Commercial
☐ Open Space
☐ Institutional
Other: _____
Known Industries: _____

Notes (e.g.., origin of outfall, if known):

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ **Closed Pipe**	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Eliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**	**(applicable when collecting samples)**				
Flow Present?	☐ Yes ☐ No	*If No, Skip to Section 5*			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS

PARAMETER		RESULT	UNIT	EQUIPMENT
☐Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°F	Thermometer
pH			pH Units	Test strip/Probe
Ammonia			mg/L	Test strip

Outfall Reconnaissance Inventory Field Sheet

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No *(If No, Skip to Section 5)*

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 - Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No *(If No, Skip to Section 6)*

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes	☐ No		
2. If yes, collected from:	☐ Flow	☐ Pool		
3. Intermittent flow trap set?	☐ Yes	☐ No	If Yes, type: ☐ OBM	☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

APPENDIX C
LABORATORY ANALYTICAL RESULTS

Report Date:
12-Oct-07 14:21

☑ Final Report
☐ Re-Issued Report
☐ Revised Report

SPECTRUM ANALYTICAL, INC.
Featuring
HANIBAL TECHNOLOGY

Laboratory Report

SEA Consultants
200 Corporate Place
Rocky Hill, CT -
Attn: John Nolan

Project: Pittsfield Drainage Outfall - MA
Project [none]

Laboratory ID	Client Sample ID	Matrix	Date Sampled	Date Received
SA68846-01	318 Outfall	Water	28-Sep-07 09:50	28-Sep-07 14:05
SA68846-02	316 Outfall	Water	28-Sep-07 10:00	28-Sep-07 14:05
SA68846-03	13 Outfall	Water	28-Sep-07 11:00	28-Sep-07 14:05
SA68846-04	236 Outfall	Water	28-Sep-07 12:45	28-Sep-07 14:05

I attest that the information contained within the report has been reviewed for accuracy and checked against the quality control requirements for each method. These results relate only to the sample(s) as received.
All applicable NELAC requirements have been met.
Please note that this report contains 4 pages of analytical data plus Chain of Custody document(s).
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New Jersey # MA011/MA012
New York # 11393/11840
Rhode Island # 98
USDA # S-51435
Vermont # VT-11393

Authorized by:

Hanibal C. Tayeh, Ph.D.
President/Laboratory Director

Technical Reviewer's Initial:

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Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
318 Outfall SA68846-01	[none]	Water	28-Sep-07 09:50	28-Sep-07

CAS No. Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Extractable Petroleum Hydrocarbons										
Non-polar material (SGT-HEM)	BRL		mg/l	1.0	1	EPA 1664 Rev. A	02-Oct-07	03-Oct-07	7100092	JK
Microbiological Analyses										
Fecal Coliforms	BRL		CFU/100 ml	2	2	SM 9222D	28-Sep-07 15:40	28-Sep-07	7091667	CB

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
316 Outfall SA68846-02	[none]	Water	28-Sep-07 10:00	28-Sep-07

CAS No. Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Extractable Petroleum Hydrocarbons										
Non-polar material (SGT-HEM)	BRL		mg/l	1.0	1	EPA 1664 Rev. A	02-Oct-07	03-Oct-07	7100092	JK
Microbiological Analyses										
Fecal Coliforms	20		CFU/100 ml	2	2	SM 9222D	28-Sep-07 15:40	28-Sep-07	7091667	CB

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
13 Outfall SA68846-03	[none]	Water	28-Sep-07 11:00	28-Sep-07

CAS No. Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Extractable Petroleum Hydrocarbons										
Non-polar material (SGT-HEM)	BRL		mg/l	1.0	1	EPA 1664 Rev. A	02-Oct-07	03-Oct-07	7100092	JK
Microbiological Analyses										
Fecal Coliforms	8,500		CFU/100 ml	100	100	SM 9222D	28-Sep-07 15:40	28-Sep-07	7091667	CB

Sample Identification	Client Project #	Matrix	Collection Date/Time	Received
236 Outfall SA68846-04	[none]	Water	28-Sep-07 12:45	28-Sep-07

CAS No. Analyte(s)	Result	Flag	Units	*RDL	Dilution	Method Ref.	Prepared	Analyzed	Batch	Analyst
Extractable Petroleum Hydrocarbons										
Non-polar material (SGT-HEM)	BRL		mg/l	1.0	1	EPA 1664 Rev. A	02-Oct-07	03-Oct-07	7100092	JK
Microbiological Analyses										
Fecal Coliforms	37,000		CFU/100 ml	100	100	SM 9222D	28-Sep-07 15:40	28-Sep-07	7091667	CB

Extractable Petroleum Hydrocarbons - Quality Control

Analyte(s)	Result	Flag	Units	*RDL	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch 7100092 - SW846 3510C										
Blank (7100092-BLK1)										
Prepared: 02-Oct-07 Analyzed: 03-Oct-07										
Non-polar material (SGT-HEM)	BRL		mg/l	1.0						
LCS (7100092-BS1)										
Prepared: 02-Oct-07 Analyzed: 03-Oct-07										
Non-polar material (SGT-HEM)	15.3		mg/l		18.1		85	64-132		

Notes and Definitions

BRL	Below Reporting Limit - Analyte NOT DETECTED at or above the reporting limit
dry	Sample results reported on a dry weight basis
NR	Not Reported
RPD	Relative Percent Difference

A plus sign (+) in the Method Reference column indicates the method is not accredited by NELAC.

Interpretation of Total Petroleum Hydrocarbon Report

Petroleum identification is determined by comparing the GC fingerprint obtained from the sample with a library of GC fingerprints obtained from analyses of various petroleum products. Possible match categories are as follows:

Gasoline - includes regular, unleaded, premium, etc.
Fuel Oil #2 - includes home heating oil, #2 fuel oil, and diesel
Fuel Oil #4 - includes #4 fuel oil
Fuel Oil #6 - includes #6 fuel oil and bunker "C" oil
Motor Oil - includes virgin, waste automobile oil and hydraulic oil
Ligroin - includes mineral spirits, petroleum naphtha, vm&p naphtha
Aviation Fuel - includes kerosene, Jet A and JP-4
Other Oil - includes lubricating and cutting oil, and silicon oil

At times, the unidentified petroleum product is quantified using a calibration that most closely approximates the distribution of compounds in the sample. When this occurs, the result is qualified as *TPH (Calculated as).

Laboratory Control Sample (LCS): A known matrix spiked with compound(s) representative of the target analytes, which is used to document laboratory performance.

Matrix Duplicate: An intra-laboratory split sample which is used to document the precision of a method in a given sample matrix.

Matrix Spike: An aliquot of a sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. A matrix spike is used to document the bias of a method in a given sample matrix.

Method Blank: An analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing. The method blank should be carried through the complete sample preparation and analytical procedure. The method blank is used to document contamination resulting from the analytical process.

Method Detection Limit (MDL): The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.

Reportable Detection Limit (RDL): The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes the RDL analyte concentration is selected as the lowest non-zero standard in the calibration curve. While the RDL is approximately 5 to 10 times the MDL, the RDL for each sample takes into account the sample volume/weight, extract/digestate volume, cleanup procedures and, if applicable, dry weight correction. Sample RDLs are highly matrix-dependent.

Surrogate: An organic compound which is similar to the target analyte(s) in chemical composition and behavior in the analytical process, but which is not normally found in environmental samples. These compounds are spiked into all blanks, standards, and samples prior to analysis. Percent recoveries are calculated for each surrogate.

Validated by:
Hanibal C. Tayeh, Ph.D.
June O'Connor
Kim Wisk

SEA L-8846

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CHAIN OF CUSTODY RECORD

Page ____ of ____

Special Handling:
- ☐ Standard TAT - 7 to 10 business days
- ☐ Rush TAT - Date Needed: ____
- All TATs subject to laboratory approval. Min. 24-hour notification needed for rushes.
- Samples disposed of after 60 days unless otherwise instructed.

Report To: SEA Consultants
John Nolan
200 Corporate Place
Rocky Hill CT
Project Mgr.: ____

Invoice To: ____

P.O. No.: ____ RQN: ____

Project No.: ____
Site Name: Pittsfield Drainage Outfall
Location: ____ State: MA
Sampler(s): JW, RN

1=$Na_2S_2O_3$ 2=HCl 3=H_2SO_4 4=HNO_3 5=NaOH 6=Ascorbic Acid
7=CH_3OH 8=$NaHSO_4$ 9=____ 10=____

DW=Drinking Water GW=Groundwater WW=Wastewater
O=Oil SW=Surface Water SO=Soil SL=Sludge A=Air
X1=____ X2=____ X3=____

G=Grab C=Composite

Lab Id:	Sample Id:	Date:	Time:	Type	Matrix	Preservative	Containers: # of VOA Vials	# of Amber Glass	# of Clear Glass	# of Plastic	Analyses: TPH 1664	Fecal	QA Reporting Notes: (check if needed)
L8846-01	318 Outfall	9/28/07	09:50		W			1		1	✓	✓	☐ Provide MA DEP MCP CAM Report ☐ Provide CT DPH RCP Report QA/QC Reporting Level ☐ Standard ☐ No QC ☐ Other ____ State specific reporting standards:
-02	346 Outfall	"	10:00		W			1		1	✓	✓	
-03	13 Outfall	"	11:00		W			1		1	✓	✓	
-04	236 Outfall	"	12:45		W			1		1	✓	✓	

☐ Fax results when available to (____) ____
☐ E-mail to John.Nolan@seacon.com
EDD Format ____

Condition upon receipt: ☐ Iced ☐ Ambient ☐ °C 20.4

Relinquished by:	Received by:	Date:	Time:
Robin Nolan		9/28/07	1405