



Richard Slingerland
Village Manager
Village of Mamaroneck
123 Mamaroneck Avenue
Mamaroneck, NY 10543

Subject:
Illicit Discharge Detection and Elimination Program – Phase 1

Dear Mr. Slingerland:

Malcolm Pirnie the Water Division of ARCADIS (Pirnie/ARCADIS) was awarded a contract to assist the Village with their illicit discharge detection and elimination program. This contract was awarded, in part, to assist the Village in response to the United States Environmental Protection Agency (USEPA) Administrative Order CWA-02-2001-3022. The tasks completed for this contract are summarized below and the draft deliverables are included in separate attached appendices for your review and comment.

- Task 1 - Kickoff Meeting - The Task 1 meeting was completed early in the program and meeting minutes were provided by Pirnie/ARCADIS at that time.
- Task 2 – Environmental Protection Agency (EPA) Meeting - The Task 2 meeting was completed early in the program and meeting minutes were provided by Pirnie/ARCADIS at that time.
- Task 3 - Determine Sources of Pollutant Load to Mamaroneck Harbor - Task 3 included several activities, one of which was to provide guidance about which outfalls and river locations should be sampled by the Village and to summarize the results of a sampling event completed by the Village. After further discussions, the Village decided to have Pirnie/ARCADIS complete the outfall and river sampling event in November of 2012 under an amendment to the original agreement. The results of these sampling events are included in a separate document entitled Illicit Discharge Detection and Elimination Study – Outfall and River Sampling Results.

Task 3 also included providing guidance for completing outfall inspections; a 24X36 inch Geographic Information System (GIS) map showing the Village outfalls, sewersheds, and drainage areas; a sample blank outfall inspection form

Imagine the result

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and a data dictionary. These deliverables are provided in Appendix A – Outfall Inspection Guidance.

All deliverables are also included electronically in Appendix B on a CD ROM, including the GIS shp files.

- Task 4 – Sampling Guidance - Pirnie/ARCADIS developed a sampling guidance document which includes sampling methodology, a sampling equipment checklist, and recommendations for recording flow measurements. These guidelines are provided as Appendix C, Sampling Guidance.
- Task 5 – DNA Sampling Support – This task was to provide assistance to the Village with selecting a DNA laboratory, choosing the appropriate analytical method, and interpreting the results of the first two rounds of DNA sampling.

Since there is no immediate need for DNA testing, Pirnie/ARCADIS suggests using these 16 hours for a separate IDDE investigation task for the next assignment. These hours won't be used until we receive approval from the Village to do so.

- Task 6 - Field Training and Support Guidance – This task included the development of guidance documents for performing building and sewer dye testing and for smoke testing.

Pirnie/ARCADIS developed standard operating procedures for smoke testing and dye testing, developed sample dye testing and smoke testing inspection forms, and provided notification letters for dye testing, smoke testing, and illicit discharge violations. Appendix D, Field Training and Support provides standard operating procedure memos and guidance documents.

With the exception of the DNA testing, and finalizing this document, the tasks listed in the contract have been completed. Please do not hesitate to contact myself at 518.250.7306 or Bob Matarazzo at 914.641.2790 if you have any questions or would like additional information.

Sincerely,

Malcolm Pirnie/ARCADIS, Inc.

Kevin C. Hogan, P.E.
Senior Engineer

Copy: Carolyn A. Lowe, Pirnie/ARCADIS
Robert Matarazzo, Pirnie/ARCADIS

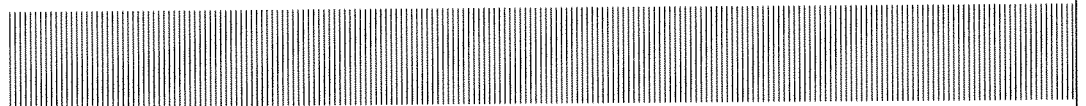
Attachments

APPENDIX

A

Outfall Inspection Guidance

- **Outfall Inspection Procedures**
- **Outfall Map**
- **Outfall Inspection Form**
- **Outfall Data Dictionary**



Outfall Inspection Procedures

The data collected during outfall inspections will support the Village's efforts in complying with the requirements of the Phase II Municipal Separate Storm Sewer (MS4) permit and that of the United States Environmental Protection Agency (USEPA) Administrative Order CWA-02-2001-3022, which both require the development and implementation of an illicit discharge detection and elimination program (IDDE).

To meet the requirements of the MS4 program all stormwater outfalls shall be mapped. In addition, twenty-percent of the outfalls shall be inspected for illicit discharges annually as described in the Center for Watershed Protection publication entitled, Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessment.

The field team shall perform outfall inspection during dry-weather. For the purpose of this project, dry weather will be defined as less than 0.1 inches of rainfall within a duration of 48 hours. A sample outfall inspection form is provided in this Appendix and should be completed with each inspection. The form includes the following components:

- Outfall design description (e.g., material of construction, diameter, shape);
- Inspection details (e.g., date, time, precipitation, inspector's name);
- Structural and operational condition of outfall; and
- Illicit discharge observations in the flow and pool.

Some typical illicit discharge observations may include:

- Dry weather flow;
- Visual evidence (e.g., color, poor clarity, oil sheen, staining, excessive vegetation, dead vegetation, foam, and or sewage debris); and
- Odors (e.g., sewage, chlorine, rotten eggs, petroleum).

The Center for Watershed Protection document referenced above is an excellent reference for outfall inspections and illicit discharge detection and elimination. The field team should be familiar with this document prior to performing the inspections.

If there is dry weather flow at the outfall and visual evidence of a potential illicit discharge, field water quality testing methods could be used to either aid in determining there is an illicit discharge, or that samples should be collected and sent to a laboratory for analysis.

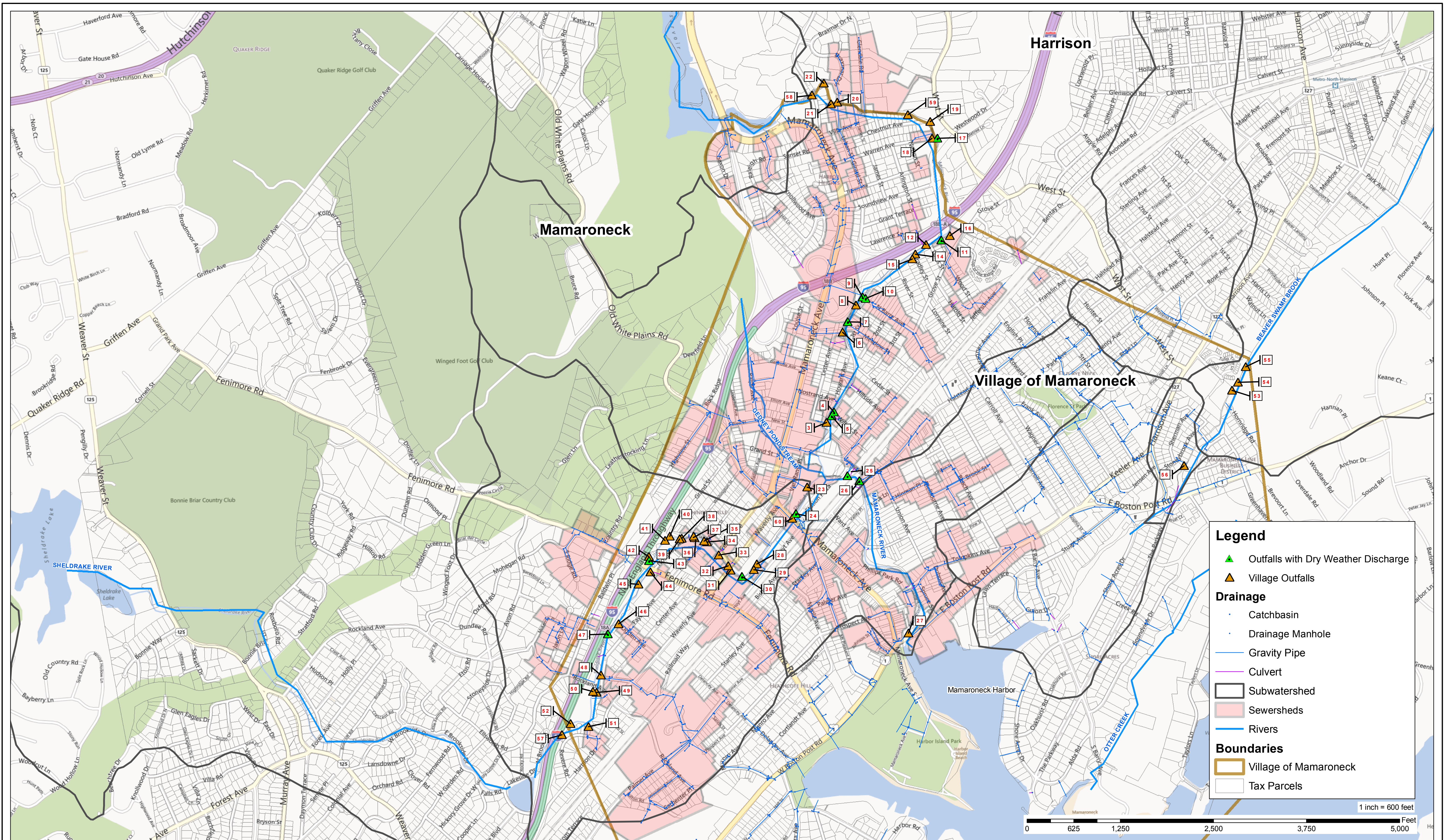
Portable water quality probes can be used to check pH, temperature, conductivity, dissolved oxygen (DO) and turbidity; field test kits can be used to monitor for parameters such as detergents, total chlorine, copper, and phenols; and an organic pollutant fluorimeter can be used determine fluorescence, which correlates with the presence of fecal coliform bacteria. The appropriateness of the use of these methods will need to be evaluated on a case by case basis. Examples of field water quality testing equipment is presented below.

- Field Water Quality Probe (e.g., Horiba U-10 Water Quality Meter to measure pH, temperature, conductivity, DO and turbidity);
- Organic Pollutant Fluorimeter (e.g., SMF 4 Portable Fluorimeter); and
- Water Quality Field Test Kits (e.g., HACH Storm Water Test Kit, Model SW-1 for testing for detergents, total chlorine, copper, and phenols).

The field team shall record their observations on the outfall inspection form and then rate the outfall based on the probability an illicit discharge is present. Outfalls should be rated using the terms, “Unlikely”, “Potential”, and “Obvious”. Some observations, such as light foam, or staining could be naturally occurring so they may receive a rating of “Potential”. The field team should provide a summary of the outfalls that are thought to have illicit discharges along with all observations to the appropriate Village staff so they can make a determination if follow-up actions are necessary.

Photos should be taken of all surveyed outfalls. One or two close-up photos should be taken of the outfall and any specific condition worth noting, such as those in poor physical or operational condition (e.g., silted in), or those thought to have an illicit discharge. A photo should also be taken of the surrounding area so the outfall can be easily located by Village staff in the future. Outfalls that no longer exist due to new construction and outfalls that cannot be accessed should be documented with a photo showing the location and specific notes in the field book to facilitate follow-up discussions.

The discharge rate of each outfall shall be measured or calculated when a sample is collected so that the pollutant load (flow times fecal coliform concentration) can later be determined. In order to calculate the discharge rate at each outfall, the geometry of the pipe and the depth and velocity of the flow must be determined. The velocity may be obtained by using a portable velocity meter. If the velocity is too slow, or if the depth is insufficient to use the velocity meter, a leaf test can be used. A leaf test measures how long it takes a leaf, or similar floating object, to travel a set distance when carried by the flow. A bucket test may be used to measure the discharge rate by measuring the time required to fill a five gallon bucket. A sample outfall inspection form is provided in Appendix A, with this document.



OUTFALL INSPECTIONS

Structure

Structure ID _____ Diameter _____
 Material _____ Submerged in Water _____
 Shape _____ Submerged in Sediment _____
 Num. of Outfalls _____

Inspection Event

Inspector: _____ Air Temperature (°F): _____
 Date: _____ Rainfall Past 24hrs (in): _____
 Time: _____ Rainfall Past 48hrs (in): _____
 Inspection Event Comments: _____ Photo Numbers: _____

Assessment

Structural Condition: _____ Flow Description: _____
 Operational Condition: _____ Flow (gpm): _____
 Illicit Discharge Potential: _____ Determination: _____

Field Parameters

Sample Temperature (°F): _____
 Sample pH: _____
 Sample Ammonia (mg/mL): _____

Discharge Characteristics

Color: _____ Turbidity: _____ Flow Line: _____
 Color Strength: _____ Floatables (suds): _____ Abnormal Vegetation: _____
 Odor Type: _____ Floatables (sewage): _____ Bacterial Growth: _____
 Odor Severity: _____ Floatables (oil): _____
 Discharge Quality Comments: _____

Pool Quality

Color: _____ Suds: _____
 Color Strength: _____ Oil Sheen: _____
 Odor Type: _____ Algae: _____
 Odor Severity: _____
 Pool Quality Comments: _____

Comments:

Outfall Survey and Inspection
Data Dictionary

	FIELD	DESCRIPTION	EXAMPLE	DATA TYPE	VALUES
Structure	Structure ID	Outfall ID assigned during field survey		Text	
	Material	Outfall Material	RCP	Menu	VCP, DIP, RCP, Plastic, Metal, Brick, Stone, Steel
	Shape	Outfall Shape	Circular	Menu	Circular, Elliptical, Box, Other
	Num of Outfalls	Outfall Quantity	Singular	Menu	Single, double, triple, Other
	Diameter	Diameter/Dimensions (in)	36	Text	
	Submerged in Water	Outfall Submerged in Water	Partially	Menu	No, Partially, Fully
	Submerged in Sediment	Outfall Submerged in Sediment	Partially	Menu	No, Partially, Fully
Inspection Event	Inspector	Initials of Individual Completing the Inspection	DRJ	Text	
	Date	Date of inspection of outfall	5/7/2012	Date	
	Time	Time of inspection	12:30 PM	Text	
	Air Temperature	Temperature of the Air in Fahrenheit	65	Number	
	Rainfall Last 24 Hours (in)	Amount of rainfall in last 24 hours (inches)	0.2	Number	
	Rainfall Last 48 Hours (in)	Amount of rainfall in last 48 hours (inches)	0.4	Number	
	Photo Numbers	Photo number reference	1,2,3	Text	
Assessment	Inspection Comments	General Comments		Text	
	Structural Condition	General structural condition	Good	Menu	Good, Poor
	Operational Condition	General operational condition	Poor	Menu	Good, Poor
	Illicit Discharge Potential	In there an illicit discharge? - Potential is presence of two or more indicators, but not an obvious illicit discharge. Suspect is one or more indicators with significant presence or severity	Suspect	Menu	Unlikely, Potential, Suspect, Obvious
	Flow Description	Description of the amount of flow	Trickle	Menu	None, Trickle, Moderate, Substantial
	Flow (gpm)	Flow (gpm)	2	Number	
	Determination	Method of Measuring Flow	Bucket	Menu	Bucket, Area/Velocity, Estimate
Field Parameters	Sample Temperature (Fahrenheit)	Sample Temperature (Fahrenheit)	65	Number	
	Sample pH (pH Units)	Sample pH (pH Units) using test strip or probe	8	Number	
	Sample Ammonia (mg/L)	Sample Ammonia (mg/L) using test strip	2.6	Number	
Discharge Characteristics	Color	Color	Brown	Menu	Clear, Brown, Gray, Yellow, Green, Orange, Red, Other
	Color Strength	Color Strength	Faint Color in Sample Bottle	Menu	(0) Clear, (1) Faint Color in Sample Bottle, (2) Clearly Visible in Sample Bottle, (3) Clearly Visible in Outfall Flow
	Odor Type	Odor Type	Sewage	Menu	None, Sewage, Rancid/Sour, Petroleum/Gas, Sulfide, Other
	Odor Severity	Odor Severity	Faint	Menu	(0) None (1) Faint, (2) Easily Detected, (3) Noticeable from a Distance
	Turbidity	Turbidity	Cloudy	Menu	(0) Clear, (1) Slight Cloudiness, (2) Cloudy, (3) Opaque
	Floatables Type - Suds	Floatables Type - Severity of soap suds	None	Menu	None, Mild, Moderate, Heavy
	Floatables Type - Sewage	Floatables Type - Severity of sewage debris	None	Menu	None, Mild, Moderate, Heavy
	Floatables Type - Oil	Floatables Type - Severity of oil sheen	None	Menu	None, Mild, Moderate, Heavy
	Flow Line	Deposits/Stains - Flow Line	No	Menu	Yes, No
	Abnormal Vegetation	Abnormal Vegetation	None	Menu	None, Excessive, Inhibited
	Bacteria Growth	Bacteria/Algae Growth on Bottom of Pipe	Brown	Menu	None, Brown, Orange, Green, Gray, Other
Pool Quality	Poor Pool Quality - Color	Poor Pool Quality - Color	Gray	Menu	Clear, Brown, Gray, Yellow, Green, Orange, Red, Other
	Poor Pool Quality - Color Strength	Poor Pool Quality - Color Strength	(0) Clear	Menu	(0) Clear, (1) Faint Color in Sample Bottle, (2) Clearly Visible in Sample Bottle, (3) Clearly Visible in Outfall Flow
	Poor Pool Quality - Odors	Poor Pool Quality - Odors	Sewage	Menu	None, Sewage, Rancid/Sour, Petroleum/Gas, Sulfide, Other
	Poor Pool Quality - Odor Severity	Poor Pool Quality - Odor Severity	(1) Faint	Menu	(0) None (1) Faint, (2) Easily Detected, (3) Noticeable from a Distance
	Poor Pool Quality - Suds Severity	Poor Pool Quality - Suds Severity	(2) Moderate	Menu	(0) None (1) Mild (2) Moderate (3) Severe
	Poor Pool Quality - Oil Sheen Severity	Poor Pool Quality - Oil Sheen Severity	(1) Mild	Menu	(0) None (1) Mild (2) Moderate (3) Severe
	Pool Quality Comments	Pool Quality Comments		Text	
Comments	General Comments	General Comments		Text	

Village of Mamaroneck
Illicit Discharge Detection and Elimination Program

APPENDIX

B

CD ROM Containing Electronic Files Illicit Discharge Detection and Elimination Program – Phase 1

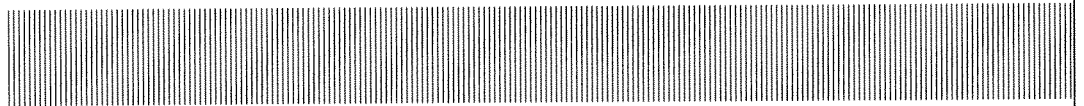


Village of Mamaroneck
Illicit Discharge Detection and Elimination Program

APPENDIX

C

Sampling Guidance



Village of Mamaroneck

Sampling Guidance

**Illicit Discharge Detection and
Elimination (IDDE) Program**

November 2013

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1.0 Introduction

1.1 Background/Objectives

The Village of Mamaroneck (Village) is a New York State Department of Environmental Conservation regulated Municipal Separate Storm Sewer System (MS4) and, as such, is required to implement an illicit discharge detection and elimination (IDDE) program. In addition, the Environmental Protection Agency (EPA) has issued an Administrative Order (CWA-02-2001-3022) against the Village to implement an IDDE program due to high concentrations of fecal and total coliform bacteria in the Sheldrake River, Mamaroneck River, and Mamaroneck Harbor.

Malcolm Pirnie, the Water Division of ARCADIS (Pirnie/ARCADIS) was awarded a contract to assist the Village with their illicit discharge detection and elimination program. Collecting analytical samples is a critical tool for identifying, tracking, and confirming the elimination of illicit discharges. This Sampling Guidance document presents sampling field procedures, quality assurance, and quality control procedures.

1.2 Baseline and Track Down Sampling Description

Baseline Sampling

Samples shall be collected at outfalls having flow during dry weather conditions, as defined as 48 hours with less than 0.1 inches of rainfall or snow melt. A minimum of two samples shall be collected, one sample at each location on two separate days. The samples shall be analyzed by a laboratory for fecal coliform bacteria. The purpose of the replicate sample is to show the results are reproducible. If the result of the second sample is significantly different (higher or lower) than the first sample collected, a third sample shall be collected.

If an outfall is unsuitable for sampling due to submergence or inaccessibility, then the first upgradient manhole that is not surcharged shall be used. The results shall be analyzed to determine if they are meeting the Village's water quality objectives and if further investigation within the drainage basin is necessary. Outfalls shall be inspected a minimum frequency of once every five years in accordance with the MS4 permit.

Track Down Sampling

Once outfalls are determined to be contaminated with fecal coliform bacteria, investigative sampling herein referred to as Track Down sampling, will be used to isolate the potential sources of contamination within a drainage basin. Replicate samples will not need to be collected for Track Down sampling. In addition, the

Village of Mamaroneck

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sample may be collected during light precipitation as the purpose of sampling is to isolate an illicit discharge, not quantify and establish a pollutant load as with Baseline Sampling.

This document provides guidance for collecting samples for laboratory analysis. However, tracking down illicit discharge sources may also be completed using field water quality testing methods. This could include using portable water quality probes to check pH, temperature, conductivity, dissolved oxygen (DO) and turbidity; field test kits to monitor for parameters such as detergents, total chlorine, copper, and phenols; or an organic pollutant fluorimeter. The appropriateness of the use of these other methods will need to be evaluated on a case by case basis.

2.0 Sampling Procedures

2.1 Sampling Procedures and Equipment

The field investigation procedures for sampling in preparation for laboratory analysis are summarized below.

2.1.1 Decontamination of Sampling Equipment

Cross contamination of samples is to be avoided. Field instrumentation should be cleaned per manufacturer's instructions. Probes, such as those used in pH and conductivity meters, must be rinsed prior to and after each use with deionized water. All sampling equipment must be clean and free from the residue of any previous samples.

2.1.2 Sampling

2.1.2.1 Sampling Locations

All sampling locations should be marked on field maps. Outfall sampling locations should be marked with marker paint and/or staked and flagged so they can be easily located in the future.

Sampling Parameters

Fecal coliform bacteria shall be the primary parameter that is measured. A laboratory certified by the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) will be utilized to analyze samples collected. Laboratory analyses and quality control (QC) procedures will be in accordance with the analytical methods identified in Table 2-1 below.

Table 2-1
Sampling Parameters and Requirements

Parameter	Analysis Method	Holding Times	Size	Minimum Volume	Preservation
Fecal Coliform	SM 9222D	8 Hours	125 ml	Full	None, Cool 4° C

2.1.2.2 *Sampling Equipment*

- Permanent waterproof marker;
- Labeling tape;
- Packing tape to cover bottle labels;
- Coolers, chains of custody, and laboratory bottle ware (provided by laboratory);
- Ice;
- Telescopic swing sampler;
- One-liter high density polyethylene (HDPE) bottle for swing sampler (one disposable bottle per sampling location per event);
- Field log book and pen;
- Nitrile gloves (disposable);
- Deionized water;
- Manhole pick;
- White marking paint and flagging (to mark new sampling locations);
- Plastic trash bags (for disposable bottles);
- Duct tape and paper towels;
- First aid kit;
- Rotating amber light for vehicle;
- Traffic cones;
- Steel toe boots, safety vests, and leather work gloves;
- Camera;
- Flashlight;
- Backpack to carry the equipment to isolated areas;
- Bucket with gallon designations, tape measure, survey rod, and stop watch for flow estimation;
- Alconox;
- One gallon ziplock bags;
- Two spray bottles;
- Peristaltic pump and tubing;

- Waders;
- Portable Velocity Meter (for flow calculations);
- Optional Equipment for Field Water Quality Measurements;
- Field Water Quality Probe (e.g., Horiba U-10 Water Quality Meter to measure pH, temperature, conductivity, DO and turbidity);
- Organic Pollutant Fluorimeter (e.g., SMF 4 Portable Fluorimeter); and
- Water Quality Field Test Kits (e.g., HACH Storm Water Test Kit, Model SW-1 for testing for detergents, total chlorine, copper, and phenols).

2.1.2.3 *Sampling Procedures*

Samples will be collected using a disposable one-liter swing sampler bottle or peristaltic pump. A new disposable one-liter sample bottle will be used for each sampling location and samples will be transferred to laboratory prepared sample bottles. A peristaltic pump will be used when the flow is too shallow to collect a sample with the swing sampler. New pump tubing shall be used at each sampling location.

Laboratory provided, pre-preserved sample bottles shall be opened one at a time just prior to filling the sample bottle. The bottles shall not be overfilled. The inside of the sample bottles or caps shall not be touched, and the prepared sample bottles shall not be rinsed with sample water.

If the sampling location is a stormwater outfall, and it is not submerged, the disposable one-liter swing sample bottle shall be held beneath the flow stream to fill the bottle. This bottle will then be used to fill the laboratory sample bottles. Each laboratory bottle shall be filled completely. For submerged or inaccessible outfalls, upgradient manholes should be selected as sampling locations. When sampling from a manhole, a telescoping swing sampler will be used. The sampling personnel shall make every effort not to disturb sediment as this will affect the results of the analysis. If disturbing sediment or sampling in a surcharged manhole cannot be avoided, record that sediment was disturbed in the sampling log.

New disposable nitrile surgical gloves will be worn by the sampling personnel and changed between sampling locations. Samples will be immediately placed in a cooler upon collection. If the exterior of sample bottles become grossly contaminated during sample collection due to highly turbid surface waters, the exterior of the bottles will be rinsed with deionized water after the bottles have been capped and before placing the samples in the cooler for shipment.

2.2 Field Quality Control Samples

When collecting laboratory samples, quality control samples should be collected to ensure that sampling, transportation, and laboratory activities do not bias sample analytical quality. Equipment blanks should be collected if sampling equipment or containers are being reused and cleaned between samples to ensure the cleaning process is being done properly. Duplicate or replicate samples can be collected to measure both field sampling error plus local environmental variances.

2.3 Sample Designation

A sample numbering system will be used to identify each sample. This system will provide a tracking procedure to allow retrieval of information about a particular sample, and will assure that each sample is uniquely numbered. Immediately following sample collection, each sample container will be labeled with a waterproof pen and then covered with clear packing tape to protect the labels.

- Sample ID – Outfalls and manholes will be labeled with their respective name or ID as shown on the field maps;
- Date (e.g., 10/12/2007);
- Military Time (e.g., 0700);
- Requested Analysis (pre-labeled by lab); and
- Sampler's Initials.

2.4 Field Documentation

2.4.1 Introduction

Documentation of an investigative team's field activities often provides the basis for technical site evaluations and other such related written reports. All records and notes generated in the field will be considered controlled evidentiary documents and may be subject to scrutiny in litigation.

Personnel designated as being responsible for documenting field activities must be aware that all notes may provide the basis for preparing responses for legal interrogatories. Field documentation must provide sufficient information and data to enable reconstruction of field activities. Numerically serialized field logbooks provide the basic means for documenting field activities. Control and maintenance of field logbooks is the responsibility of the field team leader. The following information must be provided on the inside front cover of each field logbook:

- Project Name;
- Site Location;
- Site Manager; and
- Date of Issue.

2.4.2 Documentation of Field Activities

Field logbook entries must be legibly written and provide an unbiased, concise, detailed picture of all field activities.

Step-by-step instructions and procedures for documenting field activities are provided below and in following sub-sections. Instruction and procedures relating to the format and technique in which field logbook entries are made are as follows:

- Leave the first two pages blank. They will provide space for a table of contents to be added when the field logbook is complete.
- The first written page for each day identifies the date, time, site name, location, personnel on-site and their responsibilities, other non-personnel and observed weather conditions. Additionally, during the course of site activities, deviations from the sampling plan must also be documented.
- All photos taken must be traceable to field logbook entries. It is recommended to reference photo locations on the site sketch or map.
- All entries must be made in ink. Waterproof ink is recommended.
- All entries must be accompanied by the appropriate military time (such as 1530 instead of 3:30).
- Errors must be lined through and initialed. No erroneous notes are to be made illegible.
- The person documenting must sign and date each page as it is completed.
- Isolated logbook entries made by a team member other than the team member designated responsible for field documentation, must be signed and dated by the person making the entry.
- Additions, clarifications, or corrections made after completion of field activities must be dated and signed.

2.4.3 General Site Information

General site characteristics must be recorded. Information may include:

- Estimate of flow volume – Flow volume shall be estimated for each sample collected. For free flowing outfalls, a bucket marked with gallon designations and a stop watch shall be used to measure flow rate. Flow velocity and flow depth shall be measured for flow calculations in manholes and for outfalls that are too wide or flowing too fast for the bucket test.

Velocity shall be measured using a portable velocity meter or for very slow flow, the time it takes for a leaf or other floating object to travel a measured distance. The flow depth shall be measured using a survey rod. The flow depth shall be calculated by measuring the depth to the bottom of the manhole invert and subtracting that from the depth to the top of the flow. For accuracy, the field personnel shall get close to the ground when reading the survey rod and a string or rigid piece of strap metal shall be laid across the top of the manhole rim to mark the survey rod for accurate reading. If the invert of the manhole is not well defined or does not match the diameter shape of the incoming and outgoing sewer pipes, then the depth of flow shall be measured at the downgradient pipe. Finally, the geometry of the location where the flow depth was measured shall be recorded so that flow can be calculated.

- Evidence of illicit discharges – color, odors, floatables, oils, and sewage debris.
- Type of access into facility (e.g., locked gates, etc.).
- Anything that is unexpected during sampling (e.g., sediment in manholes, unable to open manholes, precipitation, surcharged manholes).

2.4.4 Sample Dispatch Information

When sampling is complete, all sample documentation such as chain-of-custody forms will be copied and copies placed in the project files. A notation of numbers of coolers shipped, carrier, and time delivered to pick-up point should be made in a field notebook.

3.0 Sample and Document Custody Procedures

3.1 Sample Handling

The analytical laboratory will provide the sample containers, including the sample preservatives. Sample containers will be cleaned and prepared by the laboratory prior to being sent to the site.

All samples collected will be identified with a sample label. A label will be attached to each bottle and each sample will be identified with a unique sample number. Immediately following sample collection, each sample container will be marked with the information listed in Section 2.3.

After all sample identification information has been recorded, each sample label will be covered with waterproof clear plastic tape to preserve its integrity. All samples will be recorded and tracked under strict chain-of-custody protocols. In the field, each sample will be checked for proper labeling. The samples will then be double bagged in sealable bags, packed into coolers with ice, and shipped to the laboratory. A chain-of-custody form will be completed for each cooler. The form will be signed and dated by the person who collected the samples, the person the samples were relinquished to for transport to the laboratory, and the laboratory sample controller/custodian who receives the samples.

3.2 Completion of Chain-of-Custody Record

A chain-of-custody record is a printed form that accompanies a sample or group of samples that documents custody transfer from person to person and includes sample information recorded on bottle labels. A chain-of-custody record is a controlled document.

As soon as practicable after sample collection, preferably after decontamination, the following information must be entered on the chain-of-custody form. All information is to be recorded in black ink:

1. **Project number.** Enter the alphanumeric designation assigned by the Village that uniquely identifies the project site.
2. **Project name.** Enter site name.
3. **Samplers.** Sign the name(s) of the sampler(s).
4. **Sample number.** Enter the sample number for each sample in the shipment. This number appears on the consultant's sample identification label.

5. **Date.** Enter a six-digit number, indicating the year, month, and day of sample collection (YYMMDD); for example, 071029.
6. **Time.** Enter a four-digit number indicating the military time of collection; for example, 1354.
7. **Sample Type.** Indicate the type of sample as grab.
8. **Station location.** Describe the location where the sample was collected.
9. **Number of containers.** For each sample number, enter the number of sample bottles that are contained in the shipment.
10. **Remarks.** Enter any appropriate remarks.

3.2.1 Transferring Custody From Consultant Shipper to Common Carrier

Instructions for consultant shipper transferring custody of samples to a common carrier are given below:

1. Sign, date, and enter time under "Relinquished by" entry.
2. Enter name of carrier (e.g., UPS, Federal Express) under "Received by."
3. Enter bill-of-lading of Federal Express airbill number under "Remarks."
4. Place the original of the chain-of-custody form in the appropriate sample shipping package. Retain a copy with field records.
5. Sign and date the custody seal. The custody seal is part of the chain-of-custody process and is used to prevent tampering with samples after they have been collected in the field.
6. Wrap the seal across filament tape that has been wrapped around the package at least twice.
7. Fold the custody seal over on itself so that it sticks together.
8. Complete other carrier-required shipping papers.

Common carriers will usually not accept responsibility for handling chain-of-custody forms; this necessitates packing the record in the sample package.

3.2.2 Transferring Custody From Consultant Sampler Directly to Carrier

To transfer custody of samples from the consultant sampler directly to a carrier, proceed as above, except eliminate the consultant shipper's signature.

4.0 Calibration Procedures and Frequency

4.1 Introduction

Field instruments must be properly calibrated to produce technically valid data. Documented calibration and calibration check results verify that the instruments used for measurement are in proper working order and the data produced is reliable. The calibration requirements described or referenced in this section are necessary to support the data quality objectives for this project. When calibration requirements are met, the data will support the focused investigation decisions dealing with the nature and extent of contamination and safety concerns. In the event that the data are used in court, documented calibrations are necessary to ensure that the data are legally defensible.

4.2 Calibration Procedures for Field Equipment

4.2.1 Field Equipment

Should a water quality meter or probe be used, the following general procedures should be followed. Specific calibration procedures are provided in the owner's manual.

4.2.2 General Procedures

General calibration procedures and requirements are described below:

- All instruments will be calibrated at least once a month.
- All instruments will have the calibrations checked at a minimum at the start of each day before measurements are made.
- The calibration and calibration checks will indicate that the sensitivity of the instrument (practical detection limit) is adequate to meet project needs and that the instrument is accurate over the working range.
- All calibration information will be recorded in the field log book. This includes date and time, personnel signature, calibration procedure, calibration results, calibration problems, recalibration and maintenance, and instrument serial numbers.

All calibration standards will be of National Bureau of Standards (NBS) quality and their sources listed and documented so that standards are traceable. In addition, only personnel trained in the use of the field instruments will operate them. If the instrument readings are incorrect at the time of the initial calibration, the

Village of Mamaroneck

Illicit Discharge Detection and Elimination (IDDE) Program

instrument will either be calibrated by the field personnel or returned to the manufacturer for calibration. If the instrument readings are incorrect after a continuing calibration check, the preceding sample results will be reviewed for validity, and reanalyzed if necessary.

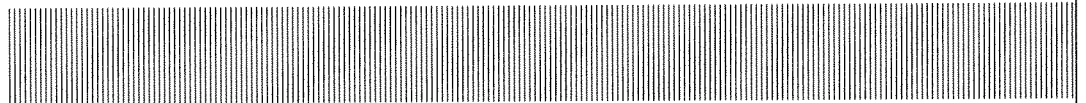
Village of Mamaroneck
Illicit Discharge Detection and Elimination Program

APPENDIX

D

Field Training and Support

- **Smoke Testing Operating Procedures**
- **Smoke Testing Inspection Form**
- **Smoke Testing Notification Letter**
- **Dye Testing Operating Procedures**
- **Dye Testing Inspection Form**
- **Dye Testing Notification Letter**
- **Illicit Discharge Notice of Violation**



Smoke Testing Standard Operating Procedures

BACKGROUND

Smoke testing is the process of blowing non-toxic smoke through the sanitary sewers and observing smoke emissions above ground. Smoke testing is traditionally used for identifying sources of infiltration and inflow to the sanitary sewer, but this process can also be used to find direct and indirect illicit connections to the storm sewer. The smoke should only appear from sanitary sewer manholes or roof vents. The smoke does not enter buildings unless there are defects such as dry or missing traps, or improper connections. If smoke does enter a building, it is an indication that sewer gases also enter the building, which is a dangerous problem that should be corrected.

PUBLIC RELATIONS

Notification letters

A standard smoke-testing notification letter should be distributed two to five days in advance of smoke testing in the affected neighborhoods. Once smoke testing has commenced, the letters should be distributed near the end of each work day to the next neighborhoods to be tested. All notification letters should be printed on Village letterhead. A copy of the notification letter is provided with this document.

Public Interaction

Field staff should be prepared to explain the purpose of smoke testing to interested residents. They can also provide a copy of the smoke testing notification letter and discuss its content. Staff should be sure to mention that the smoke is non-toxic and non-staining. All field team members should familiarize themselves with this document, the notification letter, and the Material Safety Data Sheet (MSDS) for the smoke being used. They may also mention that the smoke testing is part of a larger ongoing project to investigate and rehabilitate the sewers. Staff should not discuss the details of any findings; they should instead direct any further inquiries regarding the projects to the appropriate Village staff. The fire department and police department should be notified that the testing is occurring.

Residents with Special Needs

If advance notice is provided of a special needs resident with respiratory problems, that resident should be contacted immediately preceding the start of smoke testing in that area. The arrangements should entail meeting the resident immediately prior to smoke testing on their street and assisting them in leaving the home to wait outside until that



Smoke Test Notification Letter

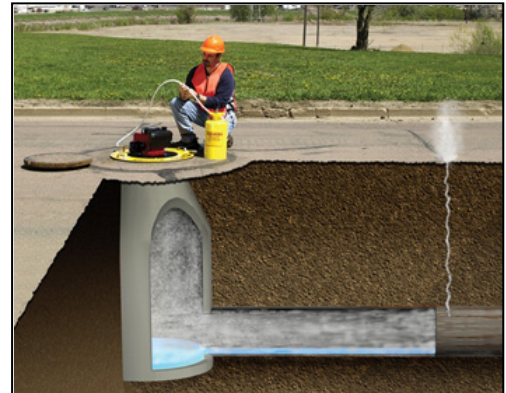
smoke testing run is complete. A field team member should notify the resident upon completion of the work so that the resident can return to their home.

TEST PROTOCOL

Equipment

The following sample equipment list is suggested for the smoke testing and inspection field work:

- Field vehicle;
- Smoke bombs (Non-toxic; Non-staining; Odorless) and an air blower, or a smoker and smoke producing liquid;
- Digital camera, media, batteries;
- Sand bags and/or plugs;
- Bucket;
- Two-way radios and/or cell phones;
- Field maps;
- Field data sheets;
- Traffic cones;
- Traffic signage;
- Safety vests;
- Manhole picks;
- Gloves;
- Towels;
- Rope;
- Ear plugs;
- Gas can;
- Fire extinguisher;
- First aid kit;
- Field notebooks; and
- Copies of the letters and identification.

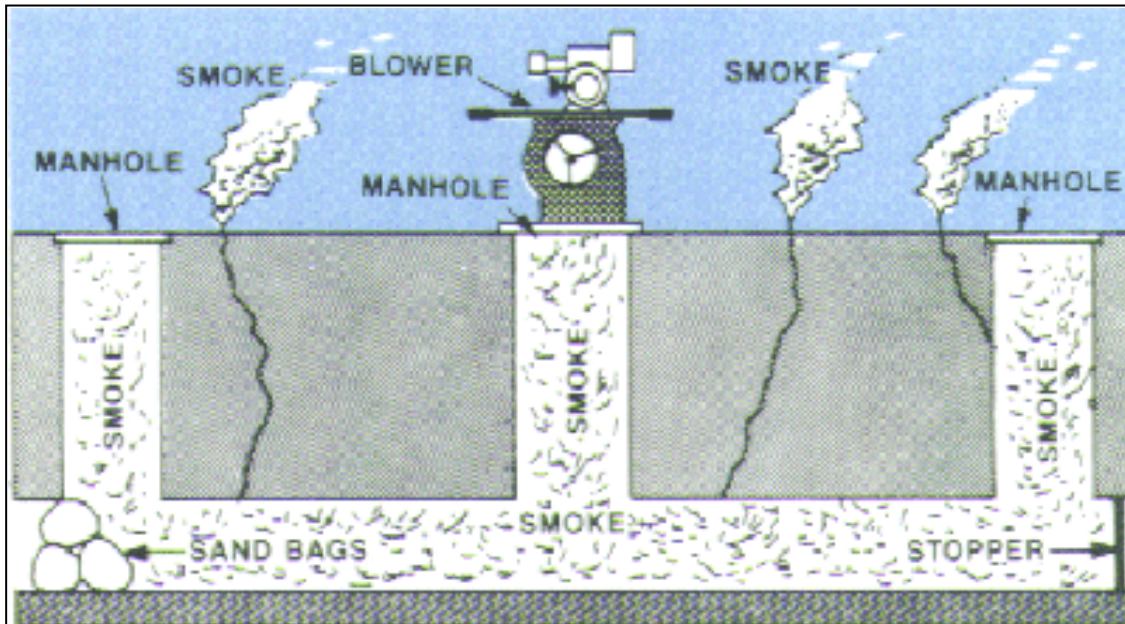


Source: Hurco Technologies, Inc.

Smoke Testing Procedure

The blower should be located at a manhole in the center of a sewer run, allowing testing in both directions. The maximum set-up length for testing is approximately 1,000 linear feet. Early tests should include opening of upstream and downstream manholes to help the team in gauging the maximum run-lengths possible. A sample schematic of the setup is provided as Figure 1 below.

Figure 1 – Smoke Testing Schematic (Source: East County Wholesale)



If smoke candles are used, they last 2-4 minutes. Smoke candles can be fused together in series so that the duration is lengthened. Each test will require at least one smoke candle, possibly up to three. Smoke candles are ignited, placed in a bucket, and lowered into the manhole. The blower is then positioned over the open manhole and set at full throttle.

If a smoker is used, the smoke is generated by burning a liquid that is dispensed into the unit. Figure 2 shows an example of a Hurco Smoker with Liquid Smoke.

Figure 2 – Hurco Smoker with Liquid Smoke



Both upstream and downstream manholes can be restricted with sandbags or blocks during testing to concentrate smoke, at the discretion of the field team leader. Blocks can be placed without entry by using a pole to lower the block into place. Care must be taken not to block the flow significantly, but to just restrict the open space above the flowing channel at the pipe inlet/outlet. The smoke blower should not be started while the blower is positioned over the manhole. The smoke blower should be started and given a brief warm-up to the side of the open manhole to prevent accidental ignition of any accumulated sewer gases.

The field team should then watch for smoke emissions. Smoke should appear at roof vents as these are attached to traps in the house plumbing. These are not considered sources of inflow. The team should watch for smoke coming from roof leaders or downspouts, from catch basins, from the ground, and inside the homes, if possible. One team member should be responsible for operating the blower and assisting in locating smoke emissions while the other photographs and documents smoke emissions. The latter team member should keep a photo log relating the sequence of photos to the location and orientation of the camera and the location of each emission.

All smoke emissions should be recorded on field data sheets, with the location identified on the map and a detailed description included with a photo log identification number. A sample of the field data sheets is provided with this document. The description and photos should be sufficient for someone (not the field team) to find the exact location of the emission again upon revisit for repair or follow-up investigation and for notification of residents of violation of local ordinances pertaining to cross-connections. If the smoke testing reveals defects, CCTV inspections shall be conducted to determine the extent and location of the problems within the sewer so that repairs can be made.

Smoke-testing should not be conducted if the weather is rainy or too windy. Wind can easily dissipate smoke making emissions difficult if not impossible to see. Significant rainfall can similarly affect smoke and sufficient water in the ground can prevent smoke from reaching the surface from damaged pipes.

SMOKE TEST INSPECTION FORM

Time: _____ Date: _____ Inspector: _____	Street: _____ Length: _____ Cover: _____
Upgradient Manhole: _____ Sandbagged: Y / N Blower: Y / N	Downgradient Manhole: _____ Sandbagged: Y / N Blower: Y / N

Obs. No.	Source Address / Location (All Positive and Suspected)	Distance from Upstream MH	Distance from Mainline		Result	Status	Source Type	Smoke Type	Area		Runoff Code
			Left	Right					Ft	Ft	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Sketch


RESULT CODES

1. POSITIVE
2. SUSPECT
3. NEGATIVE
4. CANNOT TEST

STATUS CODES

1. PRIVATE
2. PUBLIC

SOURCE TYPE CODES

1. SERVICE LATERALS
2. TRANSITIONAL JOINT
3. DRIVEWAY DRAIN
4. WINDOW WELL DRAIN
5. STAIRWELL DRAIN
6. AREA DRAIN
7. DOWNSPOUT
8. DOWNSPOUT DRAIN
9. FOUNDATION DRAIN
10. BUILDING INSIDE
11. CATCH BASIN
12. STORM DITCH
13. STORM MANHOLE
14. MAIN SEWER
15. UPSTREAM MANHOLE
16. CLEANOUT
17. OTHER

SMOKE CODE

1. LIGHT
2. MEDIUM
3. HEAVY

RUNOFF CODES

1. 0% PAVED
2. 25% PAVED
3. 50% PAVED
4. 75% PAVED
5. 100% PAVED

Additional Notes:

Village of



Mamaroneck

*Village Hall At The Regatta
P.O. Box 369
123 Mamaroneck Avenue
Mamaroneck, N.Y. 10543*

OFFICE OF
RICHARD SLINGERLAND
VILLAGE MANAGER

TELEPHONE
(914) 777-7703
FAX NUMBER
(914) 777-7760

January 2, 2013

SMOKE TESTING OF SANITARY SEWERS NOTICE TO RESIDENTS

During the next few days the Village of Mamaroneck through its consultant XXX will conduct smoke testing of the sanitary sewer system in your area. This smoke testing involves blowing *simulated* smoke into the sewer lines. The smoke will reveal places where storm and other surface waters are entering the sanitary system in your area. During this testing, gray smoke may exit through vent pipes on roofs of homes and through sewer line breaks.

This smoke is manufactured for this purpose, and is **NON-TOXIC, LEAVES NO RESIDUE AND CREATES NO FIRE HAZARD**. It is gray in color and has no effects on plant and animal life. The smoke has a distinctive but not unpleasant odor. Visibility and odor last only a few minutes where there is adequate ventilation. If you suffer from any lung or respiratory ailments, please contact us at the number below for special service.

Because the plumbing appliances in your house or building are connected to the sanitary sewer system, some of the smoke may enter your house if:

- § The vents connected to your building's sewer pipes are inadequate, defective or improperly installed.
- § The traps under sinks, tubs, basins, showers and other drains are dry, defective, improperly installed or missing.
- § The pipes, connections, and seals of wastewater drain systems in and under your building are damaged, defective, have plugs missing or are improperly installed.

If you have seldom-used drains, please pour a gallon of water in the drain to fill the drain trap. This procedure will help prevent the possibility of smoke entering your living areas through those drains.

All residents are advised that if traces of this smoke or odor enter your house or building, it is an indication that gases and odors from the sewer may also enter. Correction of the source of smoke that enters your house is urgently advised. If you observe smoke in your home, ventilate the room and immediately call it to the attention of the testing crew in the area. If they can't be found, or if you have any additional questions concerning this work, please call XXXXXX at (XXX) XXX-XXX.

The Village of Mamaroneck thanks you in advance for your cooperation on this matter.

Richard Slingerland
Village Manager

THE FRIENDLY VILLAGE

Dye Testing Standard Operating Procedures

BACKGROUND

Dye testing is a tool used to identify the source of an illicit discharge. Dye is placed in building drains or the sanitary sewer to confirm there is not a direct pipe connection to the storm drain, or an indirect transfer of sewage to the storm drain through leaks in the sanitary sewer.

PUBLIC RELATIONS

Notification letters

To schedule a dye test with a building owner, a letter is sent to the building owner to notify them that a dye test must be completed. The letter provides a description of the test, why the test needs to be performed, and contact information for scheduling a mutually convenient date and time. Dye test letters should be sent approximately two-weeks prior to the date of the scheduled test to allow time for residents to reply and to coordinate several dye tests to occur on the same day. If building owners do not reply to the letter, the buildings should be visited by field staff to schedule the dye test in person. A sample dye test letter follows these procedures in this Appendix.

Public Interaction

Field staff should be prepared to explain the purpose of dye testing to interested residents. They can also provide a copy of the dye testing notification letter and discuss its content. Staff should be sure to mention that the dye is non-toxic and non-staining. All field team members should familiarize themselves with this document, the notification letter, and the Material Safety Data Sheet (MSDS) for the dye being used. They may also mention that the dye testing is part of a larger ongoing project to investigate and rehabilitate the sewers. Staff should not discuss the details of any findings; they should instead direct any further inquiries regarding the projects to the appropriate Village staff. The police department should be notified that the testing is occurring.



Dye Test Notification Letter

TEST PROTOCOL

Equipment

The following sample equipment list is suggested for the dye testing and inspection field work:

- Sewer dye (small manageable bottles);
- Rubber gloves;
- Bucket;
- Paper towels;
- Field vehicle;
- Digital camera, media, batteries;
- Two-way radios and/or cell phones;
- Field maps;
- Field data sheets and notebook;
- Traffic cones;
- Traffic signage;
- Safety vests;
- Manhole picks;
- First aid kit;
- Copies of the dye test letters; and
- Identification.



Sewer Dye

Dye Testing Procedures

When performing building dye testing the field teams should use the following protocol. Building dye testing should be performed in coordination with CCTV inspections in order to document the results of the test and observe leaks that would not be seen if observed at the downgradient manhole. When testing a residence and one to two-story commercial properties, all drains should be dye tested, including bathrooms, kitchens, and slop sinks. Washing machines should be run briefly and drained to confirm they are connected properly. Large multi-story apartment buildings and other large commercial properties can be dye tested at the building's main clean-out or sewer trap. Since there is a chance for only a portion of the building to be connected to the storm drain, a sample should be collected from the storm sewer lateral trap (if there is one) and analyzed for fecal coliform bacteria or analyzed with an organic pollutant fluorimeter.



Field crews should also dye test sanitary sewers when analytical sampling has resulted in elevated fecal coliform concentrations. However, this should only be done if the storm sewer was constructed either below or at a similar elevation as an adjacent sanitary sewer. A sanitary sewer dye test is performed by placing dye in an upgradient sanitary sewer manhole and observing the downgradient storm sewer for dye inflow or infiltration using CCTV inspection equipment.

A dye test report should be completed for each dye test and should include, but is not limited to, the drain(s) tested for building dye tests (or the upgradient manhole for sewer dye tests), the color of the dye, the stretch of pipe where the CCTV equipment was located, the dye test results for each test, and any drains that could not be dye tested that day. The field crew should also look for dye in the downgradient sanitary manhole to ensure the sewage is flowing properly to the sanitary sewer. A sample of the dye test form follows these procedures in this Appendix.

DYE TEST INSPECTION FORM

Time: _____ **Date:** _____ **Inspector(s):** _____

Drainage Basin: _____ **Observation Street:** _____

Building Address: _____ **Upgradient Manhole:** _____

Property Address: _____ **Observation Manhole:** _____

Contact Information:

Business Name: _____ **Phone:** _____

Owner's Name: _____ **Phone:** _____

Site Contact's Name: _____ **Phone:** _____

Property Description:

Property Type: _____ **Age of Building:** _____

Number of Stories / _____ **Number of** _____ **Number of** _____

Apartment/ Units: _____ **Bathrooms** _____ **Kitchens:** _____

Dye Test Floor: (Basement/ First/ Second)	Dye Test Floor: (Kitchen/Bath/Laundry)	Dye Color:	Results: (Pos/Neg)
---	--	-------------------	------------------------------

Location 1			
-------------------	--	--	--

Location 2			
-------------------	--	--	--

Location 3			
-------------------	--	--	--

Location 4			
-------------------	--	--	--

Location 5			
-------------------	--	--	--

Location 6			
-------------------	--	--	--

Location 7			
-------------------	--	--	--

Location 8			
-------------------	--	--	--

Location 9			
-------------------	--	--	--

Location 10			
--------------------	--	--	--

Observation Points: _____

Dye observed in Sanitary Manhole? _____ **If Not Where?** _____

General Problem Description: _____

Schedule a Second Dye Test? _____ **If so, Why?** _____

Additional Notes:

Village of



Mamaroneck

*Village Hall At The Regatta
P.O. Box 369
123 Mamaroneck Avenue
Mamaroneck, N.Y. 10543*

OFFICE OF
RICHARD SLINGERLAND
VILLAGE MANAGER

TELEPHONE
(914) 777-7703
FAX NUMBER
(914) 777-7760

February 17, 2014

XXXXXX or Current Resident
XX XXXX XXX
Mamaroneck, NY 10543

Re: Possible Illegal Discharge into the Storm Water Systems Flowing into Mamaroneck Harbor

Dye Test Building Location: XXX XXXX (One Family) – Section-Block-Lot #: XX.XX.XXX

Dear Building Owner:

In accordance with Administrative Order CWA-02-2011-3022, from the United States Environmental Protection Agency, the Village of Mamaroneck has contracted with the engineering firm XXXX to conduct a sewer system investigation in the Mamaroneck Harbor drainage area.

In an effort to identify and remediate any problems associated with the Village of Mamaroneck sewer system, XXXXX will be conducting dye tests of buildings on your street. To determine whether or not your building is discharging sewage into a storm sewer, a dye test of your drain must be conducted.

As such, the Village requests that you contact XXXX representative XXXX XXXXX at XXX-XXX-XXXX within ten (10) days of the receipt of this letter to schedule a mutually convenient time for XXXX and Village staff to visit your home. This representative will fully explain the dye test process and answer any questions you might have. If you own a portion of a multifamily building, and there are multiple owners, please notify the other owners of this letter or tell us about the situation when you call so that we may contact them. If you are a tenant, please have your property owner contact us.

Failure to respond in a timely manner may result in an enforcement action or other administrative action.

The Village of Mamaroneck thanks you in advance for your cooperation on this matter.

Very Truly Yours,

Richard Slingerland
Village Manager

cc: file

THE FRIENDLY VILLAGE

Village of



Mamaroneck

*Village Hall At The Regatta
P.O. Box 369
123 Mamaroneck Avenue
Mamaroneck, N.Y. 10543*

OFFICE OF
RICHARD SLINGERLAND
VILLAGE MANAGER

TELEPHONE
(914) 777-7703
FAX NUMBER
(914) 777-7760

[DATE]

[Owner Name]

[Owner Address]

Mamaroneck, NY 10543

Re: **Building Address – Section-Block-Lot #: XXX.XX-X-XX**
Notice of Violation - #XXXXXX

Dear XX. XXXX:

In response to high levels of fecal coliform bacteria discovered through water sampling conducted on your street, a dye test was completed on your property on [Date]. The results of the dye test and follow-up closed-circuit television (CCTV) investigation in the sanitary sewer showed that sewage is illegally discharging to the storm sewer and not the sanitary sewer.

You are hereby notified of non-compliance with Article VIII, Section 873.731 of the Laws of Westchester County Sanitary Code, New York State Plumbing Code 19 NYCRR Part 1226.1 PMCNY, Section 506.1 and the Code of the Village of Mamaroneck regarding discharges of sewage. [UPDATE AS APPROPRIATE]

You are expected to correct this violation immediately. Within 7 days of receipt of this letter, please notify Bill Gerety of the Village of Mamaroneck Building Department at (914) 777-7731 to discuss your plan of action to connect your home to the sanitary sewer. **You will have no more than 30 days from the date of this letter to correct this problem.**

Very Truly Yours,

Richard Slingerland
Village Manager

cc: file

THE FRIENDLY VILLAGE