Outfall and System Mapping
For Illicit Discharge Detection and Elimination (IDDE) in NY

Introduction:
The Municipal Separate Storm Sewer System (MS4) permit (GP-02-02) requires permittees to develop a map of the MS4 that shows, at a minimum, the location of all outfalls and the names and locations of all waters of the United States and other MS4s that receive discharges from those outfalls. It also requires that the regulated MS4, to the extent allowable, effectively prohibit illicit discharges into their systems. This assistance document defines some of the technical details regarding the mapping and data management for this control measure.

The New York State Department of Environmental Conservation (NYS DEC) recommends the EPA's *Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessment* as the primary resource for implementation of a municipal Phase II Illicit Discharge Detection and Elimination (IDDE) program. Another useful document is the New England Interstate Water Pollution Control Commissions (NEIWPCC) *Illicit Discharge Detection and Elimination Manual.* These assistance documents provide excellent resources for the implementation of an IDDE program.

The purpose of this document is to provide assistance on some of the details of IDDE implementation to complement the NEIWPCC and EPA manuals. It provides a set of specifications for mapping, collecting and reporting data. This document defines an acceptable level of detail, establishes consistency among the neighboring MS4s, and facilitates the final delivery of the program.

NYSDEC encourages all regulated MS4 communities to use Global Positioning System (GPS) and Geographic Information System (GIS) technology for data collection, analysis and storage. Use of GIS makes the process more efficient and accurate, and facilitates data sharing between cooperating municipalities. GIS provides a tool to not only track and manage the IDDE program, but also to effectively utilize the system for integrating with other components of the MS4 program.

Regulated MS4 communities are encouraged to work together on mapping their stormwater outfalls and conveyance system and detecting and eliminating illicit discharges. This is especially important for smaller MS4's, where only a small part is in an urbanized area. Using GPS and GIS is the recommended approach to outfall and system mapping. MS4's who may not have the capacity or expertise in these areas of technology are encouraged to work with their county planning department and/or regional planning board. The county and regional entities will most likely have the resources to assist with GPS and GIS capabilities.

It is strongly recommended that MS4s join coalitions of local governments that have been formed to address the Phase II regulations. The need for collaboration is particularly beneficial for the detection and elimination of illicit discharges that originate and discharge from different municipalities. Examples of such circumstances are discharges to or from school districts, state roads, or federally owned properties.

The NYS DEC's mapping requirements generally follow the standards set by the New York State Geographic Information Systems (GIS) Clearinghouse. The Clearinghouse[1] is operated by the New York State Office of Cyber Security & Critical Infrastructure Coordination. The Clearinghouse is established to disseminate information about New York's Statewide GIS Coordination Program and to provide access to the New York State GIS Metadata and Data Repository.

This document provides assistance on outfall mapping, system mapping and documentation of the collected information. A series of elements that are prerequisite (*minimum*) to achieve compliance and a series of optional elements (*preferred*) that municipalities are encouraged to consider are identified.

GIS topics related to outfall mapping include collection method, data storage, scale, accuracy, projection, basic attributes, data sources, and metadata. System mapping addresses all the elements of outfall mapping in addition to those involving illicit discharge detection and inter-municipal implementation. Data management aspects include data collection, record keeping and reporting. The data management components of the above activities include the minimum elements of acceptable data such as type, attributes, format, frequency, and data structure and data dictionary for validation.

A collection of GIS datasets and examples has been developed to help the MS4 with implementation of the IDDE minimum measure. This collection is on a CD, which can be distributed to MS4s upon their request, and is on the NYS DEC's file transfer protocol (FTP) site[2].

[1] http://www.nysgis.state.ny.us/

[2] ftp://ftp.dec.state.ny.us/dow/stormdocuments/ms4/illicit_discharge_detection_and_elimination/

MAPPING ELEMENT 1: MAP OF OUTFALLS (TABLE 1)

Regulated MS4s are required to provide the DEC with a map detailing all outfalls to Waters of the United States, to another MS4, or to other conveyances that lead to these waters. Data needed to map each outfall includes, at a minimum, the geographic coordinates of each outfall, along with identification of the first (downstream) receiving Water of the US to which the outfall discharges. The community keeps, as part of its Stormwater Management Plan (SWMP), written documentation of the process by which the outfalls were identified. For example, the methodology may include using available record drawings to locate outfalls. At some point field staff needs to verify these outfall locations by inspecting them.

While DEC recognizes the challenges associated with providing data in a digital (i.e., GIS) format, the agency strongly recommends using GPS and GIS technology to locate and store data, and partnering with adjacent regulated MS4s to achieve this goal. In addition, DEC recommends collecting data regarding "physical indicators," such as colors and presence of flow, at each outfall to help prioritize later monitoring efforts.

Table 1. Minimum and Preferred ELEMENTS OF OUTFALL MAPPING

Element	Minimum	Preferred	Technical Guidance Documents
Map of Outfalls	Map (digital or paper) of outfalls that discharge to waters of the United States. Map all inter-municipal surface and subsurface connections. Field verify outfall locations. Document the methodology used to ID outfalls.	Digital map, using GPS to locate outfalls. Collect basic information including field observations at each outfall (see Monitoring section).	NEIWPCC guidance EPA guidance by CWP State mapping guidance below

Identification of "Water of the US":

Minimum: The regulated MS4 identifies, wherever possible, the downstream water that the outfall discharges to. The permit requires identification of outfalls to the Waters of the US. The best representations of Waters of US in NY State are surface Waters of NY. The Water Index Number (WIN) indicates that the segment is mapped and documented in the New York

Codes, Rules, and Regulations (NYCRR). For mapping purposes, the National Hydrography Dataset (NHD)[3] may be used as an alternative source for segment identification. This dataset provides the most up-to-date delineation of surface waters and can be use for identification of the surface waters of NY, as referenced in this guidance document. Because field identification of the waters may be indirect or complex, the community should also clarify the mode of entry, and the certainty of this assignment. The certainty is defined by one of four confidence levels: verified, calculated, historical data, or none (see Table 2 for descriptions). The examples below demonstrate several cases where these data would be applied.

Preferred: The regulated MS4 may identify the Water of the US, to which their system discharges, by indicating the segment's WIN.

Inter-municipal Connections:

Minimum: Identify the downstream owner to which all inter-municipal outfalls discharge, and attempt to identify the water of the US. Municipalities document any interconnections by which the discharge flows to another MS4. Conveyances discharging to another municipality's system are identified by the operator of the originating system. If identification of receiving water is not feasible, MS4s may attempt to identify the downstream water based on general topography, educated guess, or historical data.

Preferred: Report inter-municipal connections to the receiving municipalities. Form an inter-municipal coalition to coordinate outfall/system delineation among the involved municipalities.

[3] The National Hydrography Dataset (NHD) is a vector geospatial theme for surface water hydrography obtained from topographic maps and additional sources.

Outfall Mapping Examples

The following examples address outfall mapping scenarios. The regulated MS4 in the examples is represented by 'MS4(R)'.

Example 1) Direct discharge to a Water of NY

Example 2) Discharge to a Water of NY via a ditch or swale, map the end of channel or trace to the stream

Example 3) Discharge to an intermittent stream, from a municipal outfall, via overland or concentrated flow

Example 4) Discharge from another regulated MS4 system not owned by the municipality (non-traditional MS4)

Example 5) Discharge to unregulated wetland (no obvious hydraulic connection to downstream water); documenting the outfall is encouraged as a sound practice

Example 6) Discharge to a wetland that is hydraulically connected to downstream water

Example 7) Other non-regulated discharges, detected during field survey, are encouraged to be documented and presence of illicit discharges be reported to the Department

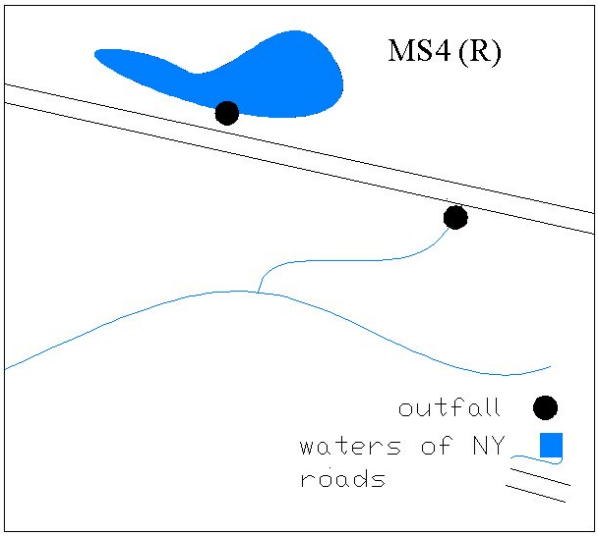
Example 8) Discharges originating in non-regulated areas (do not need to be reported)

Example 9) Inter-municipal outfall discharging to a non-regulated MS4; report the location of interconnection and the receiving water, final outfall not required

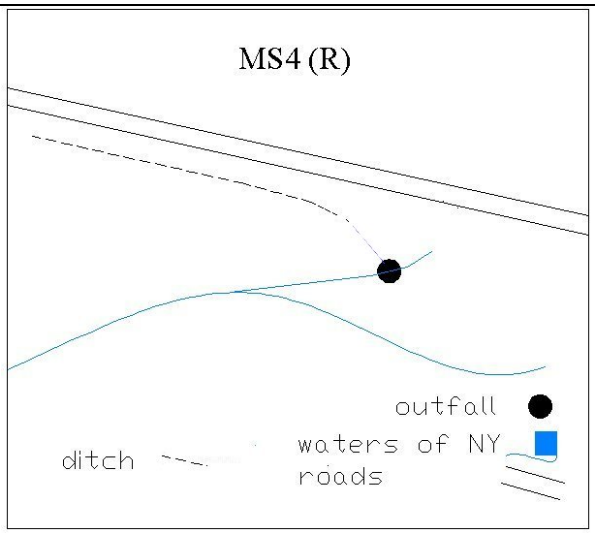
Example 10) Inter-municipal outfall discharging to a non-regulated MS4; report the location of interconnection, identify receiving water to the extent practicable, final outfall not required

Example 11) Inter-municipal outfall discharging to another regulated MS4:
MS4b: report the location of interconnection, identify receiving water, final outfall not required
MS4a: identify outfall and receiving water

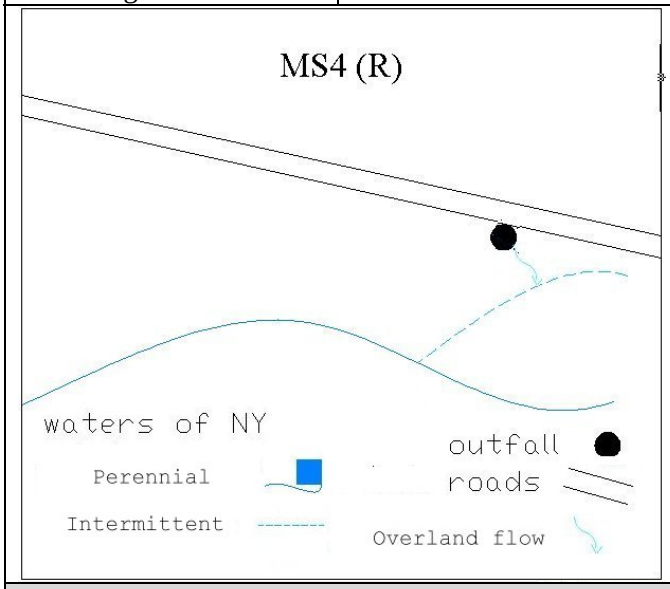
Example 12) Inter-municipal outfall discharging to another regulated MS4:
MS4b: report the location of interconnection; identify receiving water to the extent practicable, final outfall not required
MS4a: identify outfall and receiving water



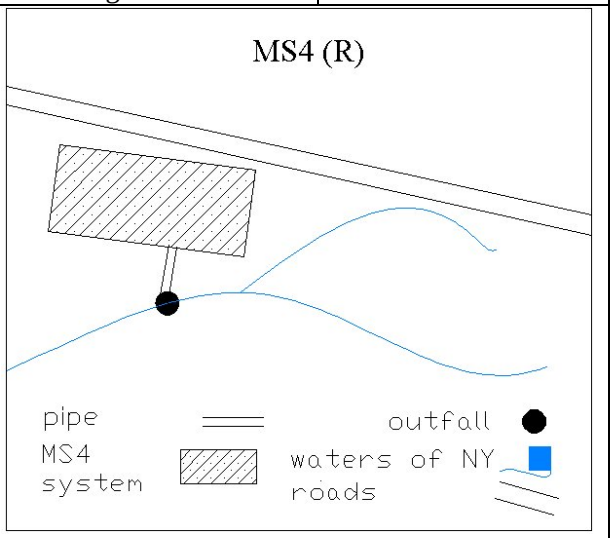
1. Direct discharge to Water of NY	
Receiving Water	Stream/lake name
Mode of Entry	Direct
Outfall Type	Culvert
Confidence Level	Verified
Receiving MS4	None



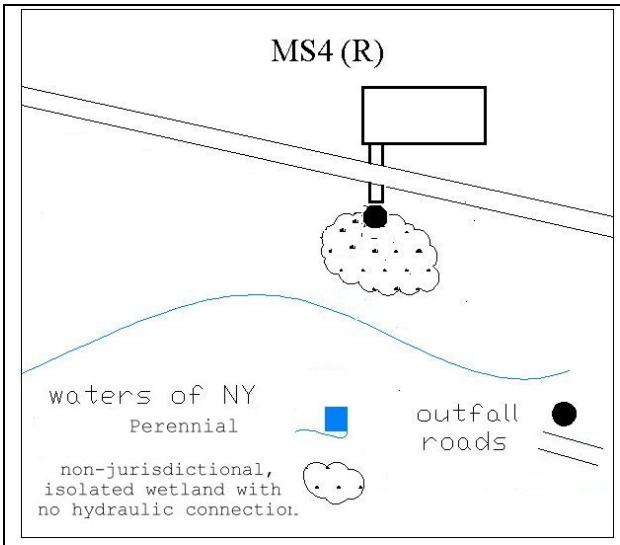
2. Direct discharge to Water of NY via ditch or swale	
Receiving Water	Stream name
Mode of Entry	Direct
Outfall Type	Ditch
Confidence Level	Verified
Receiving MS4	None

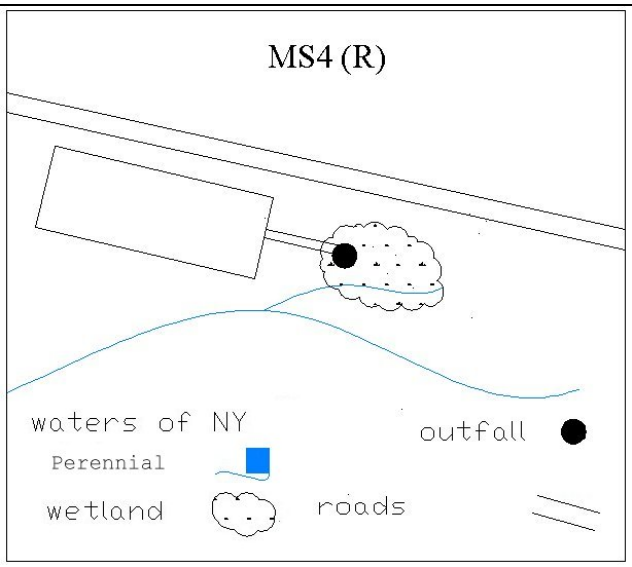


3. Discharge to intermittent stream via overland flow or concentrated flow	
Receiving Water	First named stream
Mode of Entry	Intermittent
Outfall Type	Overland flow
Confidence Level	Calculated
Receiving MS4	None

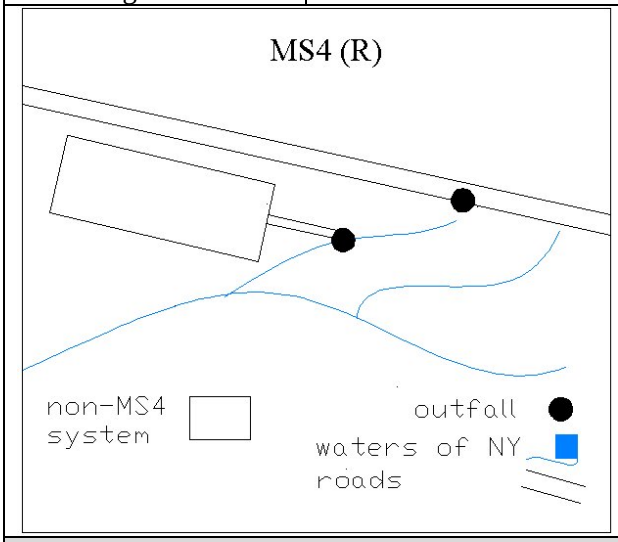


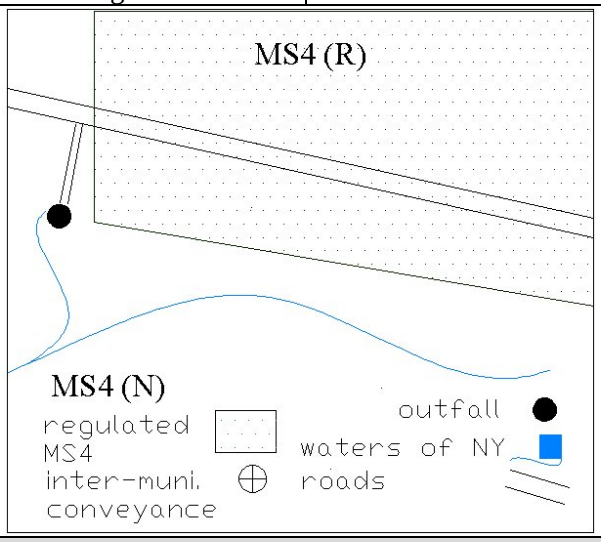
4. Discharge from another regulated MS4 system not owned by municipality (non-traditional MS4)	
Receiving Water	Stream name
Mode of Entry	Direct
Outfall Type	Pipe
Confidence Level	Verified
Receiving MS4	None



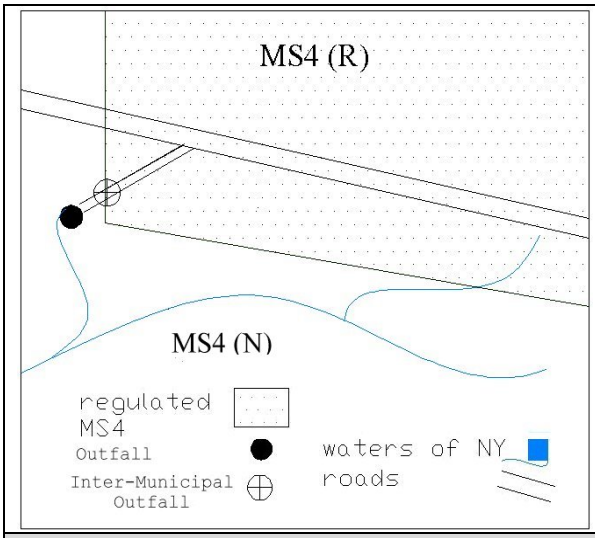


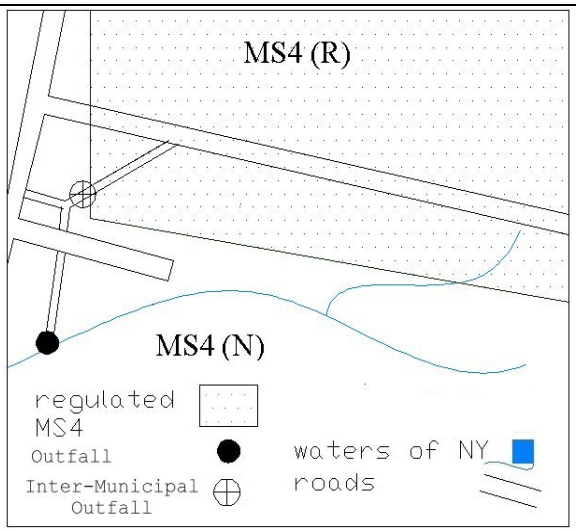
Example 5. Discharge to unregulated wetland (no obvious hydraulic connection to downstream water); documenting outfall is encouraged		Example 6. Discharge to a wetland that is hydraulically connected to downstream water	
Receiving Water	Stream name	Receiving Water	Stream name
Mode of Entry	Indirect	Mode of Entry	Indirect (Overland flow)
Outfall Type	culvert	Outfall Type	Pipe
Confidence Level	None	Confidence Level	Verified
Receiving MS4	None	Receiving MS4	None





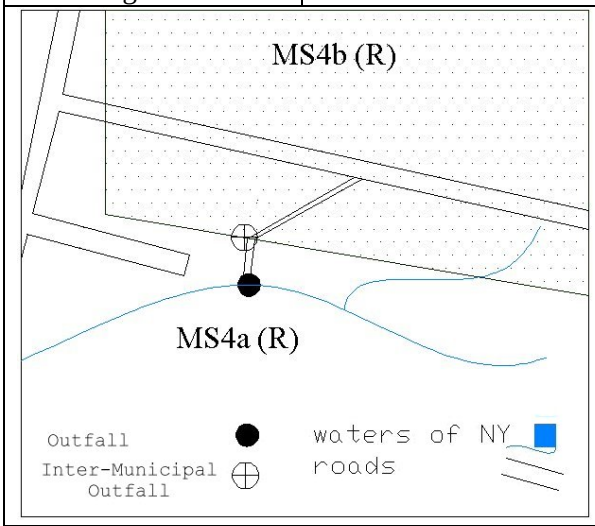
Example 7. Non-regulated discharges detected during field survey		Example 8. Discharges originating in non-regulated areas (do not need to be reported)	
Other non-permitted discharges in regulated MS4	Mapping encouraged	Discharges originating in non-regulated areas	Not required

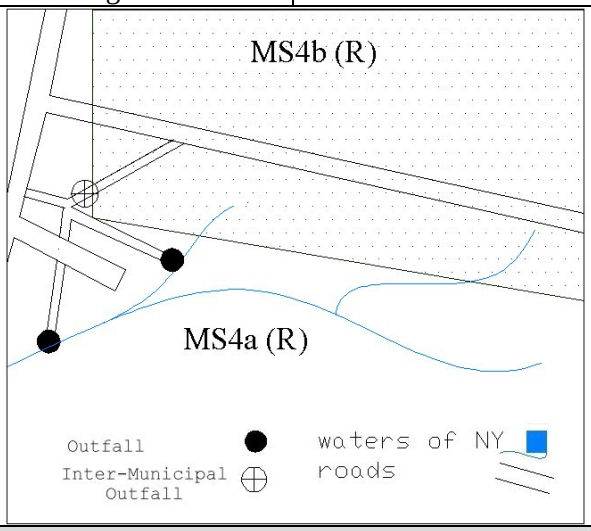




Example 9. Intermunicipal outfall discharging to a non-regulated MS4; interconnection & receiving water easily identified	
Receiving Water	Stream name
Mode of Entry	MS4
Outfall Type	Pipe
Confidence Level	Calculated
Receiving MS4	SWIS Code

Example 10. Intermunicipal outfall discharging to a non-regulated MS4; interconnection & receiving water to the extent practicable	
Receiving Water	Stream name
Mode of Entry	MS4
Outfall Type	Catch basin/manhole
Confidence Level	Historical data
Receiving MS4	SWIS Code





Example 11. Intermunicipal discharge: MS4b:	
Receiving Water	Stream name
Mode of Entry	MS4
Outfall Type	Catch basin/manhole
Confidence Level	Calculated
MS4	NYRxxxxxx
Example 11. Intermunicipal discharge: MS4a:	
Receiving Water	Stream name
Mode of Entry	Direct
Outfall Type	Pipe
Confidence Level	Verified
Receiving MS4	None

Example 12. Intermunicipal discharge: MS4b:	
Receiving Water	Stream name
Mode of Entry	MS4
Outfall Type	Catch basin/manhole
Confidence Level	None
MS4	NYRxxxxxx
Example 12. Intermunicipal discharge: MS4a:	
Receiving Water	Stream name
Mode of Entry	Direct
Outfall Type	Pipe
Confidence Level	Verified
Receiving MS4	None

Data Structure/Dictionary:

Minimum: The attributes in Table 2 documented for each identified outfall.

Table 2. Data Structure / Dictionary

Field	Type	Length	Attributes	Description
MS4 Permit #	character	9	NYRxxxxxx	DEC MS4 permit number
XY coordinate of the outfall or interconnection	numeric	X=6 digits Y=7 digits no decimal		Coordinate values in UTM or other selected projection
Outfall ID	character	6		See notes below
Source of X, Y data	character	10	GPS, map, etc	Method of data collection
HUC #	numeric	11-12	11 or 12 digit	Hydologic Unit Code, the most recent HUC available
Waters of NY name	character	30	Stream name or number	From NHD dataset, if not available reference local names or unnamed
Waters of NY ID	character	14	NHD rch-code	Sample NHD provided on CD
Receiving MS4	character	9	None Permit # (NYRxxxxxx) SWIS code (xxxxxx)	same MS4 Discharge to another regulated MS4, Discharge to non-regulated MS4
Outfall type	character	15	pipe, culvert, ditch, swale, catch basin, manhole	
Mode of Entry	character		Direct MS4 Indirect	Discharge to an identified NY water Discharge to another regulated MS4 Discharge via overland flow, intermittent/unidentified stream (no WIN), no obvious hydraulic connection such as wetlands
Confidence Level	character		Verified Calculated Historical data None	Verified with field observation, Educated guess or desk calculated Existing records or previous knowledge No records
Notes	character	250		

Data Structure/Dictionary (continued):

Outfall ID Description:

Minimum: Assign an outfall ID number with a maximum of 6 digits, preferably starting from lowest to highest on the drainage system, with some gap between identified outfalls to allow future outfall additions. Identification of an outfall is made by a sequence of attributes that include Permit#, HUC#, RCH-Code, and outfall ID. The final product provides a unique identification system, specifying each receiving water and also the MS4.

Preferred: Modify based on field observations as appropriate

Data storage:

Minimum: Paper map, accompanied by tabular data of outfall's geographic coordinates in digital format. Digital format can be in any of the generally acceptable spreadsheet or database formats.

Preferred: Geographic Information System. All data transfer and reporting to DEC or other MS4s would be in digital format.

Scale:

Minimum: 1:24,000

Preferred: 1:12,000. The larger scale (1:12,000) is required when the minimum distance between data features is less than a few meters.

Accuracy

Minimum: To the nearest 2 second (equivalent to approximately 45 meters) in geographic coordinates as set by 6 NYCRR Part 750 of the State Pollutant Discharge Elimination Systems Permits.

Preferred: ± 5 meters

Collection Method:

Minimum: Paper maps, field verified and transferred to digital format by using other available digital data sources such as the NYSDEC Stormwater Interactive Map or desktop GIS software.

Preferred: GPS technology (providing ± 3-5 meter accuracy with a maximum of ± 10 meter accuracy during adverse reading condition).

Data Structure/Dictionary (continued):

Projection:

Minimum: Universal Transverse Mercator (UTM), NYTM or zones 17, 18, or 19, NAD 83 datum. Other projection systems such as, the State Plane Coordinate System, or geographic coordinate system (longitude and latitude) may also be used. However, all data collected in other projection units need to be converted to UTM system if the data is going to be transferred to DEC in digital format.

Data sources:

Minimum: - 1:24,000 National Hydrography Dataset (on IDDE CD, FTP Site[2])
- USGS DRG Images (on IDDE CD, FTP Site[2])
- NRCS 11 digits Hydrologic Unit Code (HUCs), draft USGS sub-watersheds (on IDDE CD, FTP Site[2])

Preferred: Digital Orthophoto quads, other datasets addressed on IDDE CD and FTP Site[2]

Metadata:

Minimum: Information supporting collected digital data, generic format provided. An example is provided on the IDDE CD.

Preferred: Any additional documentation on methodology and data organization. Consistency with the GIS clearinghouse or the Federal Geographic Data Committee (FGDC)[4]-compliant metadata is needed for any geographic data set delivered in a GIS format.

[4] http://www.fgdc.gov/
http://www.fgdc.gov/metadata

MAPPING ELEMENT 2: SYSTEM MAPPING (TABLE 3)

System Mapping is a map of surface and subsurface conveyances within an MS4. Producing an easily usable map of the system can be extremely valuable, but is not required by GP-02-02. However, mapping inter-municipal subsurface connections, delineating storm sewersheds and creating a system for the mapping are prerequisites for a complete IDDE program and are all very useful for creating a system map. Regulated MS4s should develop and retain system mapping in some format as it will be needed to find the source of suspected illicit discharges identified either at outfalls or within stream systems. In addition, the MS4 should identify and map all subsurface conveyances that discharge to the storm drain system of another municipality (inter-municipal discharges).

TABLE 3. ELEMENTS OF NY IDDE SYSTEM MAPPING

Element	Minimum	Preferred	Technical Guidance Documents
Map of Storm Sewer System	Develop and retain system mapping as needed to find the source of identified illicit discharges Preliminary storm sewershed delineation	System mapping should be available (paper or digital). Digital, consistent maps of the system in targeted sub-watersheds. Map system for detecting source of illicit discharge	EPA guidance by CWP State mapping guidance below

System Mapping:

All the methods used for outfall mapping should also be applied to system mapping.

Extent:

Minimum: a) System mapping: as needed to eliminate suspected illicit discharges. Tracking an illicit discharge to its source will involve identification of pipes, manholes, catch basins, and other system components.

b) MS4 storm sewershed delineation: Identification of the actual boundaries of the storm sewersheds is a prerequisite to IDDE. This will involve identification of their system components that are within the Phase II urbanized or designated areas or areas that they are otherwise required to control (includes areas tributary to urbanized or designated areas within the control of the permittee).

Preferred: a) Include in the system map all inter-municipal surface and subsurface conveyances (permit requirement to be mapped as outfalls). This information is useful for system delineation because it helps an MS4 determine where their responsibility begins and ends. This is particularly helpful when the system is discharging an illicit discharge to or receiving an illicit discharge from a neighboring municipality. The reported illicit discharge needs to be reported to the receiving MS4.

b) A map of the entire separate storm sewer system that includes all of the system configuration in GIS or CAD format.

Data sources:

Minimum: Watershed and sub-watershed boundaries are needed to help with the MS4 delineation. System boundaries, however, are not just a function of topographic features of the landscape and are often controlled by the underground piping and man made structures. This infrastructure information needed for storm sewershed or system boundaries may be available at the local level. Existing information can be located in city records, drainage maps, storm drain maps, state or federal storm water permit files, state transportation maintenance maps, or water and sewer agency files.

Preferred: Mapping stormwater drainage infrastructure. Some municipalities may require this information as a part of their engineering/drainage plan review process or during the municipal infrastructure development/maintenance. Normally these plans are in Computer Aided Drafting (CAD) format such as AutoCAD®.

Compatibility with other departments within the municipality, other MS4s and NYS DEC's GIS is an important consideration. If maps are developed in CAD environment, data layers need to be geo-registered. A projection file should accompany CAD drawings to secure data transfer to the GIS environment.

Inter-municipal Discharges:

Minimum: a) Regulated municipalities cooperate in elimination of reported illicit discharges that flow across jurisdictional boundaries. These conveyances are identified and documented by the operator of the originating system.

b) Report illicit discharges to the waters of NY during outfall identification /mapping to NYSDEC.

Preferred: Conveyances that discharge to another municipality's system are reported to the receiving municipalities. Coordinate tracking and elimination among the involved municipalities through an inter-municipal coalition.

SUPPLEMENTAL DATA

As outfalls are mapped, some additional data can be invaluable for future illicit discharge detection. It is recommended that these data be stored in a digital format if possible within a GIS framework. Two types of data include field observations, and chemical monitoring data. For more detail on protocols for collecting these data, consult EPA's *Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessment* (Brown et al., 2004). Example data structures and sheets are included in the State IDDE guidance CD and on the FTP site[2].

Field observations:

As outfalls are mapped, several field observations can help identify potential illicit discharges, and also characterize and verify basic outfall characteristics. Table 4 shows the example data structure and descriptions for IDDE field observations based on the Outfall Reconnaissance Inventory (ORI) field sheet in Brown et al., 2004.

Table 4. Example data structure for IDDE field observation.

Field name	Type	Data Validation
Outfall Description		
Outfall dimensions or diameter	numeric	4 digits with 2 decimals
Outfall type – closed pipe or open drainage	character	pipe, ditch/swale, culvert, manhole/catch basin, overland flow, seep
Outfall material	character	granite, cast iron, red clay, corrugated metal, plastic, concrete, white PVC, green PVC, asbestos, earthen, other
Outfall shape	character	Circular, elliptical, box, trapezoid, parabolic, other
Submerged in water or with sediment	character	no, partially, yes
Functioning	character	no, possibly, yes
Physical Outfall Indicators		
Flow amount	character	dry, moist, drip, trickle, moderate, standing water
Odor	character	none, sewage, oil/gas, laundry, sulfide, other
Color	character	gray, brown, yellow, green, other
Turbidity	character	none, cloudy, opaque
Floatables	character	none, sewage, oil sheen, soap suds, foam, other
Deposit	stain, character	none, black, brown, yellow, white
Vegetative growth	character	normal, excessive, inhibited
Note	memo or text field	(note description of functioning condition, turbidity, deposits, vegetative growth

This chart provides suggested data validation descriptions. All of these descriptions are not required. If you are using the ORI field sheet, you are not required to collect additional data that is not addresses on that sheet. Additional examples of indicators and descriptions of data that could be collected are provided on the IDDE CD and on the FTP site[2].

Monitoring:

Chemical monitoring data for some key constituents at outfalls can identify the presence of an illicit discharge, and sometimes help investigators find the source of the discharge. Example guidance on how to select parameters is provided in Brown et al. (2004).

The ORI field sheet in Brown et al. (2004) is one example of a data sheet for investigating illicit discharges. The NYS IDDE guidance CD also provides example data sheets from the following sources:

Monroe County
NYS Department of Transportation
New Hampshire database

Basic:

Chapter 11 of Brown et al. (2004) provides more detailed explanations of the information below. Section 11.6 – *ORI Section 3 – Quantitative Characterization for Flowing Outfalls* is most applicable.

Quantitative: Follow flow measurement methods identified in Section 11.6.

Descriptive: Identify physical indicators, such as odor, color and turbidity of the discharge.

Laboratory Analysis: Identify potential chemicals in illicit discharges by simple testing methods, such as chemical test strips or inexpensive probes.

Advanced:

Chapter 12 of Brown et al. (2004) provides more detailed explanations of the information below. While identifying and eliminating illicit discharges, use water quality standards as a goal or the number of illicit discharges removed to identify actual measures of resource protection or improvement.

Advanced analyses must be performed if the identification of an illicit discharge needs to be legally defensible in court.

Quantitative: Chapter 12 describes parameters that could be analyzed to determine the possible source of the discharge. Follow DEC approved monitoring protocols and procedures.

Descriptive: description of the mapped outfalls, suspected illicit discharges, identified actions, elimination activities and management decisions.

Laboratory Analysis: Chapter 12 describes parameters that could be analyzed to determine the possible source of the discharge. Use State approved labs if sample analysis is needed. NYSDEC provides a list of acceptable labs for sample analysis in cases when lab analysis is needed.

Glossary/References:

Accuracy: The closeness of observations, computations or estimates to the true value as accepted as being true. Accuracy relates to the exactness of the result, and is distinguished from precision, which relates to the exactness of the operation by which the result was obtained. http://www.geo.ed.ac.uk/agidexe/term?137

Attributes: A trait, quality or property describing a geographical feature. A fact describing an entity in a relational data model, equivalent to the column in a relational table. http://www.geo.ed.ac.uk/agidexe/term?460

Brown, T., Deb Caraco, and Robert Pitt, 2004. *Illicit Discharge Detection and Elimination, A Guidance Manual for Program Development and Technical Assessment*, USEPA. http://cwp.org
To download this document go to:
http://cwp.org.master.com/texis/master/search/+/form/IDDE.html

Data dictionary: repository of information in a database in which information is stored on all the objects within the database and their relationships.
http://www.geo.ed.ac.uk/agidexe/term?194

Data structure: The logical arrangement of data as used by a system for data management; a representation of a data model in computer form.
http://www.geo.ed.ac.uk/agidexe/term?1155

Geo-coordinates: Values represented by x, y, and possibly z, that define a position in terms of a spatial reference framework. Coordinates are used to represent locations on the earth's surface relative to other locations.
http://support.esri.com/index.cfm?fa=knowledgebase.gisDictionary.search&search=true&searchTerm=coordinates

Geographic Information System (GIS): A computer system for capturing, storing, checking, integrating, manipulating, analyzing and displaying data related to positions on the Earth's surface.

Global Positioning System (GPS): A satellite based navigational system allowing the determination of any point on the earth's surface with a high degree of accuracy, given a suitable GPS receiver is used. http://www.geo.ed.ac.uk/agidexe/term?275

Metadata: Data about data and usage aspects of it. This information will often include some of the following: (http://www.geo.ed.ac.uk/agidexe/term?205)

- What it is about
- Where it is to be found
- Who one needs to ask to get it
- How much it costs

- Who can access it
- In what format it is available
- What is the quality of the data for a specified purpose
- What spatial location does it cover and over what time period
- When and where the data were collected and by whom and what purposes the data have been used for, by whom and what related data sets are available, etc.

New England Interstate Water Pollution Control Commissions, *Illicit Discharge Detection and Elimination Manual.* January 2003. http://www.franklinswcd.org/adobeDoc/Illicit%20Discharge%20Manual%20from%20New%20England%20IWPCC.pdf

Projection: A method of representing the earth's three-dimensional surface as a flat two-dimensional surface. This normally involves a mathematical model that transforms the locations of features on the earth's surface to locations on a two-dimensional surface. http://www.geo.ed.ac.uk/agidexe/term?79

Scale: The ratio of the distance measured on a map to that measured on the ground between the same two points. http://www.geo.ed.ac.uk/agidexe/term?831

Sewershed: An urban drainage area where the boundaries are defined based on not only the surface topography, but also the topography of the sewer system. Point(s) of discharge and service areas are subject to the configuration of man-made structures and direction of conveyance systems, which do not necessarily follow surface topography. Storms sewersheds are generally identified as non-sewered, combined, and separate depending on the contributing storm sewer system.

Tabular: of, relating to, or arranged in a table; *specifically*: set up in rows and columns or computed by means of a table.
http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=tabular&x=18&y=14

New York State Codes Rules and Regulations (NYCRR), Volumes B-F, Parts 800-941
West Publishing, Eagan, MN

United States Geological Survey National Hydrography Dataset, http://nhd.usgs.gov last visited April, 2006

Sources:

Association of Geographic Information
http://www.geo.ed.ac.uk/root/agidict/html/welcome.html

ESRI Support Center: http://support.esri.com/index.cfm?fa=homepage.homepage

Merriam-Webster Online Dictionary
http://www.m-w.com/dictionary.htm