May 2003

AMSA Wet Weather Survey

Final Report

Association of Metropolitan Sewerage Agencies
1816 Jefferson Place, N.W.
Washington, D.C., 20036
202-833-AMSA
www.amsa-cleanwater.org

Copyright Notice

Acknowledgements

The *AMSA Wet Weather Survey Report* was produced and published by the Association of Metropolitan Sewerage Agencies (AMSA) under the direction of its Board of Directors, Executive Director Ken Kirk, Wet Weather Issues Committee and Sanitary Sewer Overflow (SSO) Workgroup.

The survey questionnaire and data collection effort was conducted for AMSA by CH2M Hill, Oakland, California. Special thanks are due to the very capable individuals who worked on the project, including Reggie L. Rowe, P.E., Global Technology Leader for Combined / Sanitary Sewer Systems in Montgomery, Alabama, and Michele M. Plà, Vice President, Oakland, California.

AMSA also extends its appreciation to the Association's SSO Workgroup for their invaluable advice, detailed comments and dedication to this project. In particular, AMSA thanks Wet Weather Issues Committee Chair David R. Williams, Director of Wastewater, East Bay Municipal Utility District, California; SSO Workgroup Chair Lisa E. Hollander, Assistant General Counsel, Northeast Ohio Regional Sewer District, Ohio; and SSO Workgroup Vice Chair, Karen Pallansch, Director of Environmental Services, Alexandria Sanitation Authority, Virginia.

About AMSA

AMSA is a national trade association representing nearly 300 of the nation's publicly owned wastewater utilities. AMSA members serve the majority of Americans and collectively treat and reclaim over 18 billion gallons of wastewater every day. AMSA members are environmental practitioners dedicated to protecting and improving the nation's waters and public health.

Today's increasingly complex water quality issues present many legislative and regulatory challenges to the wastewater treatment industry. AMSA has long been recognized as a key water quality resource for the U.S. Environmental Protection Agency, Congress, states and industry on a wide range of clean water issues.

For additional information on AMSA, please call AMSA's National Office at 202 / 833-AMSA, or visit our *Clean Water on the Web* site at *http://www.amsa-cleanwater.org*.

Table of Contents

1.0 Executive Summary

The Association of Metropolitan Sewerage Agencies' (AMSA's) *Wet Weather Survey (Survey)* provides critical information that will help to further understanding among state and federal regulators of the factors that publicly owned treatment works (POTWs) consider when sizing their sewer collection systems and treatment plants for peak wet weather flows. The *Survey* constitutes one step in an ongoing effort to highlight and examine the complex issues, including capacity-related issues, which comprise the broader picture of the current state of core wastewater infrastructure in the United States.

The United States Environmental Protection Agency (EPA), wastewater utilities, and other stakeholders continue to explore the development of appropriate regulatory programs and practices to reduce sanitary sewer overflows (SSOs), reduce "blending" occurrences, and to improve water quality. As this dialogue continues, AMSA believes it is essential to account for and understand how existing state and federal statutory and regulatory programs have shaped, and continue to affect, municipal planning, engineering decisions, and peak wet weather flow designs.

These existing design practices and planning considerations shed light not only on what is currently driving these sizing decisions, but also provide insight into how future policies and regulations governing wet weather flows should be crafted in order to preserve the tremendous achievements in water quality realized over the last thirty years. AMSA has already identified several efforts currently underway or planned that will benefit tremendously from the information revealed in the *Survey*, including an AMSA effort to develop a system capacity evaluation process matrix that will provide EPA and other stakeholders with a better understanding of the issues examined in the capacity decision making process.

The *AMSA Wet Weather Survey Report (Report)* has five main sections. Section 1 is an Executive Summary of the *Report* and the *Survey's* findings. Section 2 provides an overview of the existing statutory and regulatory provisions and policies governing peak flows. Section 3 includes information on how AMSA designed and distributed the *Survey* and compiled the responses. Section 4 provides critical details on geographic distribution, government structure, and other *Survey* respondent profile information. Section 5 presents a summary of selected *Survey* question responses, grouped as follows:

- Municipal Peak Flow Decision-Making Processes
- Sizing Criteria Used for Collection Systems
- Peak Flow Controls and Performance Measures Used
- Factors Considered in Plant Sizing Decisions
- Wet Weather Treatment Components and Processes
- Typical Conveyance and Treatment Capacity Related Performance Challenges
- Peak Flows and National Pollutant Discharge Elimination System (NPDES) Permits
- Regulatory / Permitting Authority Role in the Capacity Setting Process
- Regulatory Oversight or Enforcement Influence on the Capacity Setting Process.

Basic Findings

Survey responses highlighted several key characteristics of POTW design and planning processes:

- ***Level of service to their communities and public health concerns are the major factors taken into consideration by POTWs when setting peak flow capacity (Questions 49 and 50).***
- ***POTWs use a variety of collection system sizing criteria protocols, the majority of which (approximately 71%) are dictated by permitting authority (PA) requirements or guidance (Question 22).***
- ***POTW operators are proactive in ensuring adequate treatment capacity. Nearly all of the respondents (99%) initiate action on their own to increase capacity if flows are approaching design capacity (Question 61).***
- ***Technology exists to improve peak flow treatment performance and capacity, but the lack of regulatory compliance clarity and outright objections of regulatory authorities have prevented POTWs from installing the new technology (Question 71).***

Recommendations

Municipalities are using a wide array of tools and approaches to design systems and plants and to manage peak wet weather flows. These approaches are working and municipalities must continue to have sufficient flexibility and a suite of options available to them for dealing with wet weather flows.

A one-size-fits-all approach will not work for highly variable wet weather flows. Any type of national program or standard must be general in nature and performance-based. Prescriptive requirements that dictate what design practices and planning considerations to use will only hamper current efforts by the wastewater community to improve peak wet weather flow management capabilities.

Based on the *Survey* responses, AMSA recommends that:

- ***EPA not seek to develop a single, prescriptive national collection system or POTW sizing requirement, which would be inappropriate given the diverse methods and approaches utilities follow to develop and make peak flow sizing decisions.***
- ***EPA develop, with input from AMSA, general collection system and POTW sizing guidance that incorporates performance-based and site-specific objectives for capacity determinations, which would be part of a SSO regulatory program.***
- ***EPA and the states clarify the role of the PA in POTW and collection system design, permitting, and subsequent enforcement, especially in those instances where enforcement actions cite planning decisions in which the PA was involved.***
- ***The water quality impacts of peak flows should be a critical consideration in the POTW and collection system design, permitting, and PA enforcement processes.***

2.0 Peak Flow Regulatory Overview

During and immediately following storm events, sanitary sewer collection systems and wastewater treatment plants receive additional peak flows. These flows largely are a result of the inflow and infiltration of rainwater from city streets, homes, and buildings. Aging infrastructure, and maintenance challenges associated with this aging, can also lead to excess water in the sanitary sewer pipes. POTW operators use a combination of many different strategies to manage these peak flows, including implementing operation and maintenance programs, enlarging pipes, adding or increasing storage capacity, building additional treatment facilities, or using alternative treatment techniques (e.g., blending) to move peak flows through the wastewater treatment plant.

Peak flow management issues historically have been a matter handled by the states and the POTWs. With over 20,000 POTWs and 500,000 miles of municipal sewer line nationwide, it can be challenging to document in one place the many and complex site-specific factors considered in sizing collection systems and treatment plants.

As explained in the following paragraphs, EPA, the municipal community, and other stakeholders have grappled for many years with how to best address and regulate peak flow issues – specifically SSOs. Recently, blending also has become a subject of extensive discussion and possible future guidance from EPA.

SSOs

Sanitary sewers are designed to carry wastewater – not stormwater – from homes, businesses, and industries to a POTW. A SSO is a wastewater discharge from a sanitary sewer prior to the POTW. In some sewer systems, SSOs occur in engineering-designed locations. In others, SSOs occur in unanticipated locations and can result in basement backups and manhole spills, and may reach surface waters. EPA estimates that there are at least 40,000 SSOs per year.

In 1995, EPA convened an Urban Wet Weather Flows Advisory Committee pursuant to the Federal Advisory Committee Act (FACA). The Committee was to assist EPA in the development of cost-effective solutions for controlling the environmental and human health impacts of urban wet weather flows with minimal regulatory burden. 60 *Fed. Reg.* 21,189 (May 1, 1995). A SSO Subcommittee also was convened ("the SSO Subcommittee"). Both the Committee and SSO Subcommittee included municipal representatives, activist groups, states, and EPA. A March 7, 1995 memorandum from Steven A. Herman, Assistant Administrator for Enforcement, regarding *Enforcement Efforts Addressing Storm Sewer Overflows*, noted that even though EPA was beginning a "dialogue" through the FACA, this dialogue would "not affect in any way ongoing enforcement actions against SSOs," and would "not preclude the EPA or States from bringing additional enforcement actions." The memo reiterated EPA's position that, unless authorized by a National Pollutant Discharge Elimination System (NPDES) permit, SSOs are "illegal," and that SSO discharges "often cause violations of water quality standards and violate NPDES permit requirements for proper operation and maintenance."

The only SSO guidance issued to date in final form by EPA is a 1996 revision to EPA's Enforcement Management System Guide. The revision is more of an identification of enforcement priorities than an identification of appropriate control measures. *Chapter X: "Setting Priorities for Addressing Discharges from Separate Sanitary Sewers." EPA Office of Regulatory Enforcement (1996) ("Chapter X")*. *Chapter X* outlines six principles that should be considered by EPA and the states as they set priorities for addressing SSO discharge violations. Not surprisingly, *Chapter X* suggests focusing time and energy on SSOs that contribute significantly to public health problems or water quality issues. *Chapter X* also outlines a priority scheme for addressing SSOs which focuses on elimination of dry weather discharges first by focusing on operation, maintenance and capacity problems. This would be followed by addressing wet weather operation, maintenance and capacity related problems.

The SSO Subcommittee held ten meetings resulting in the development of an SSO Management Flow Chart that described an approach on which participants were beginning to reach consensus. Discussions had stalled, however, when President Clinton issued a May 1999 memorandum directing EPA to "improve protection of public health at our Nation's beaches by developing, within one year, a strong national regulation to prevent the 40,000 annual sanitary sewer overflows." EPA proceeded to develop a draft SSO regulation and held two meetings with the Subcommittee in July and October of 1999, during which draft regulatory language was reviewed. No further meetings were held and a proposed SSO rule was signed by Administrator Browner in January 2001. The signed rule was withdrawn from the Office of the Federal Register by the incoming Bush Administration for further review before it could be published for public comment.

The draft of the never-proposed SSO regulations was made available on EPA's website and stakeholders provided EPA with extensive comment despite the absence of a formal comment period. Anticipated elements of the proposed SSO rule include:

- A prohibition on all SSOs;
- Expansion of NPDES permitting to thousands of sanitary sewer collection systems for the first time;
- A narrowing of the ability to argue for an affirmative defense for "unavoidable" bypasses, which may be available under the existing NPDES permit regulations;
- Requirements that sanitary sewer collection systems implement capacity, management, operation, and maintenance requirements (CMOM);
- System evaluation and capacity assurance plans (SECAPs) required when peak flows are leading to repeated overflows;
- SSO reporting and recordkeeping requirements; and
- Public notification of SSOs.

Although EPA has indicated its intent to propose the January 3, 2001 regulatory text with a revised preamble, as of the release of this *Report*, proposal has not occurred and no timetable has been set for the rule's release by EPA. AMSA continues to actively urge EPA to move the SSO package to proposal for public comment to keep the dialogue and momentum moving forward on this issue.

Blending

Blending, also referred to as slipstreaming, splitstreaming or recombination, is a peak wet weather flow management practice used by POTWs as part of the treatment process. During peak wet weather conditions, a POTW receives significantly greater flow volumes than in dry weather. Most treatment plants were not built to store this excess flow for later treatment, and processing the peak flow through the biological unit would result in "wash out" of the unit and loss of functionality for days and even weeks. Thus, in a peak flow situation, a POTW operator will divert the flow following primary treatment that exceeds the biological unit's capacity, and then blend the diverted flow with flow that has been through the biological unit. The POTW's effluent limitations are met even when blending is utilized. Blending historically has been authorized and funded by the federal government in construction grants to POTWs. Some POTWs may have their blending practice discussed in their NPDES permit, while others may not.

Certain EPA Regions have recently declared blending to be an illegal "bypass" in enforcement and permitting actions, or have prohibited blending unless the POTW constructs equalization basins. On December 21, 2001, EPA Headquarters released a draft memorandum entitled *"NPDES Requirements for Municipal Wastewater Treatment During Wet Weather Conditions"* to EPA Regions and states for comment. The draft guidance set forth five criteria for approving blending as a permitted alternative treatment process. To date, EPA has not finalized the guidance. AMSA has actively urged EPA to proceed with the blending guidance as soon as possible. While EPA continues to consider options for moving forward with guidance on blending, some Agency officials continue to insist that wastewater treatment agencies can add additional treatment capacity or build storage units to hold peak flows and therefore eliminate blending. By EPA's own estimates, however, the minimum cost to eliminate blending for SSO communities is approximately $79 – 83 billion, and would likely be higher. And because the blending process provides treatment to peak flows that would otherwise be discharged without treatment, the benefits of eliminating the practice are certainly questionable.

3.0 Survey Overview, Development, and Distribution

AMSA conducted the *Survey* as the first step of a much broader look into the complexities of capacity issues and the enormity of the expenses associated with infrastructure upgrades and improvement. This *Survey* documents current collection system sizing and treatment plant flow management evaluations, practices, and considerations among responding AMSA member agencies in the following three areas:

- Factors evaluated, or criteria or procedures used, to establish peak design flow capacity in the collection system.
- Factors evaluated, or criteria or procedures used, to determine if blending is an appropriate option for treatment of wet weather flows.
- How the maximum wet weather flow through the treatment plant is established in design and managed in-situ (including equalization / storage) to avoid wash-out of active biological organisms.

The *Survey* questions are included in Appendix A. The *Survey* included four sections:

Part A, Utility Background, established a profile of the respondent's administrative and organizational structure, information about the geographical and regulatory jurisdiction;

Part B, Conveyance Systems, and **Part C, Treatment**, both included questions grouped under facility data, regulatory factors, design / process / technology factors, and other influencing factors; and

Part D, Definitions, provides definitions for key terms used throughout the *Survey*.

A web-based spreadsheet, available on AMSA's web site at www.amsa-cleanwater.org / advocacy / wwsurvey /, provides more detail on the responses to each question.

The *Survey* was developed by a project team consisting of members of AMSA's SSO Workgroup and CH2M Hill project consultants. An initial set of survey questions was developed by the project consultants and then reviewed and expanded by the project team. An expanded set of questions were pilot-tested by volunteer member agencies for further revision and refinement. Definitions of key terms were provided to assure more consistent responses. To increase consistency in answers, *Survey* questions were predominantly multiple choice or yes / no. The *Survey* did not seek narrative comments. Many *Survey* questions were structured to allow respondents to indicate the parts of their system and the number of plants to which their answers applied.

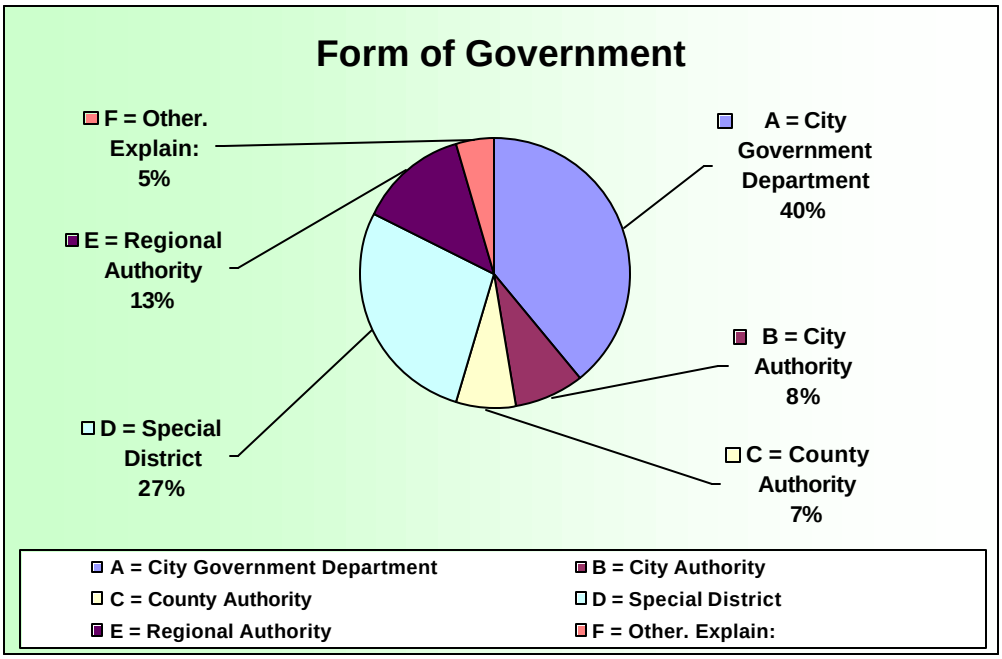
AMSA distributed the *Survey* to its membership in March 2002 and received responses through April 2002. Eighty-four member agencies responded to all or part of the *Survey*. Seventy-five members completed all sections of the *Survey*.

4.0 Respondent Profiles

Questions 1-5, 7-20, and 52-53 obtained profile data about the responding agencies and their facilities.

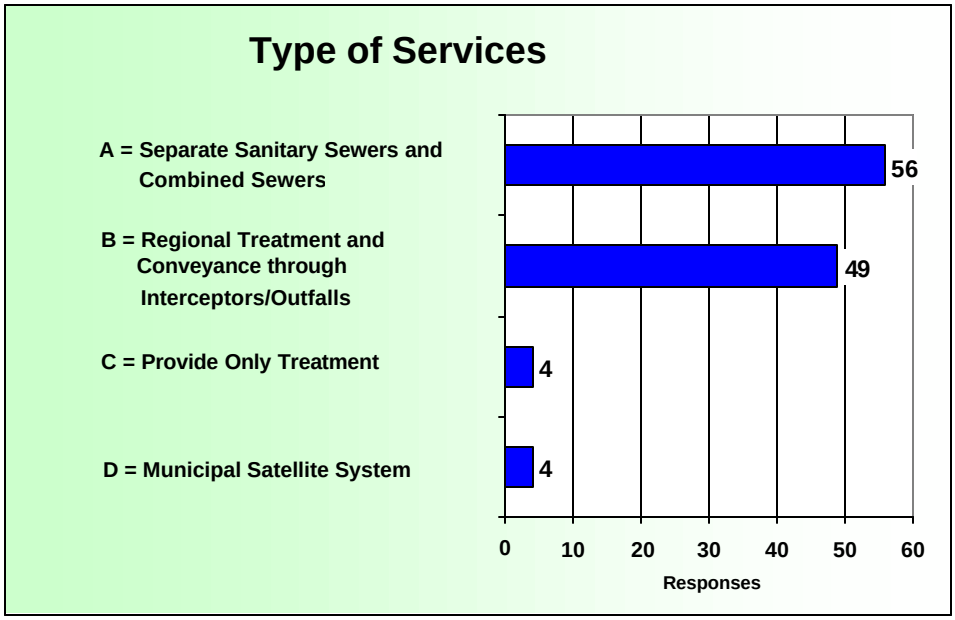
4.1 Form of Government

The forms of government most highly represented in the *Survey* were City Government (40 percent) and Special Districts (27 percent). *(Question 1)*



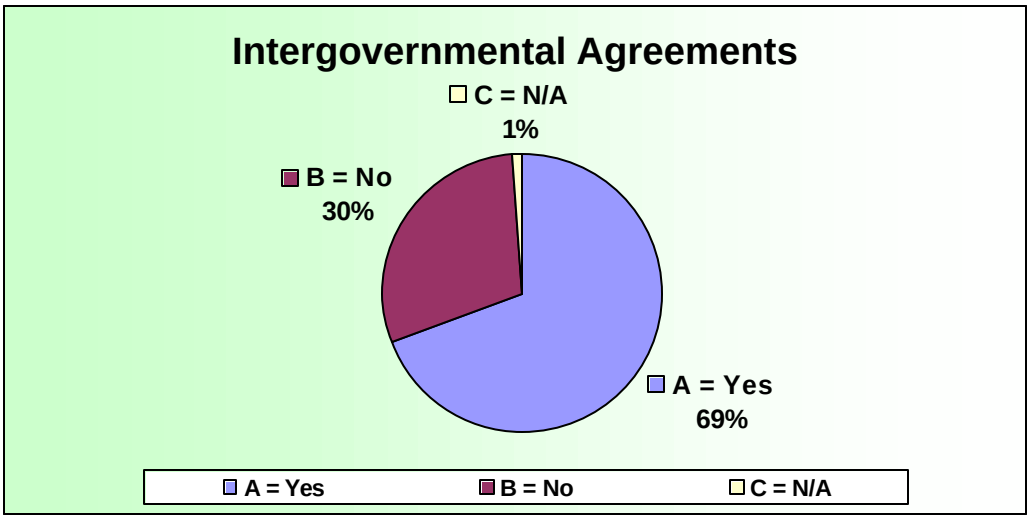
4.2 Type of Services

In addition to providing separate sewer and combined sewer system service, a majority of the respondents also provide regional conveyance and treatment through interceptors / outfalls. (*Question 2*)



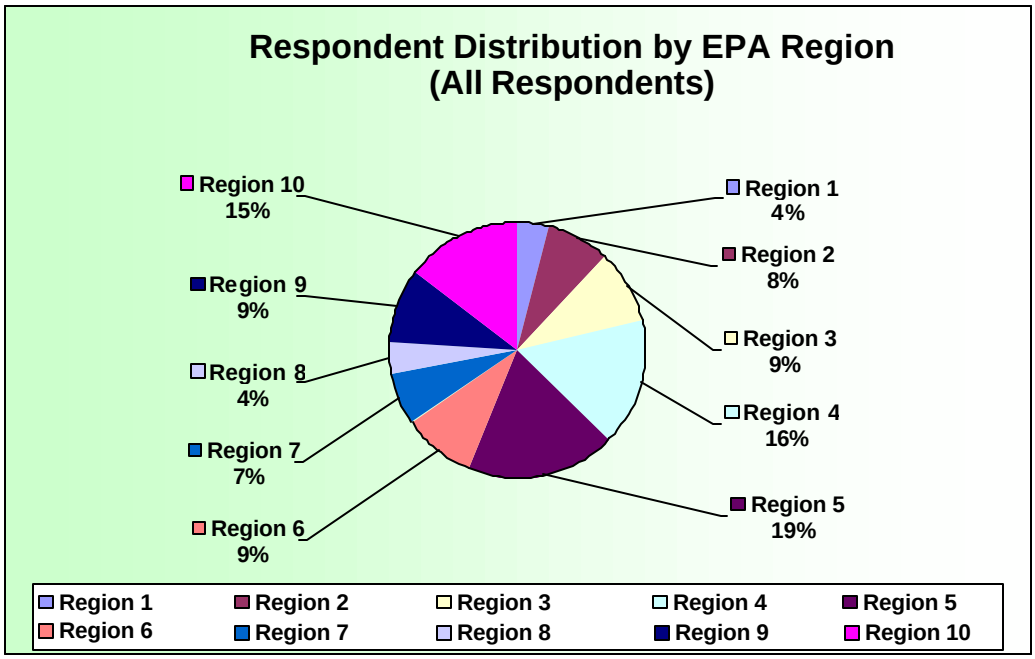
4.3 Intergovernmental Agreements

Most respondents (69 percent) have entered into Intergovernmental Agreements (IGAs) with their satellite collection systems. *(Question 3)*



4.4 EPA Region Distribution

All EPA Regions were represented by the respondents. Regions 5 and 4 had the most representation at 19 percent and 16 percent, respectively. *(Question 4)*



4.5 Sewer System Types[1]

Sixty (60) respondents together had over 13,000 square miles of separate sanitary sewer systems (sixty-six (66) respondents represented over 66,000 miles of sewer and sixty-four (64) respondents represented approximately 27,000,000 people). (*Questions 7, 8, and 9*)

Twenty-one (21) respondents together represented about 640 square miles of combined sewer system, 6,700 miles of sewer, and approximately 11,000,000 people. (*Questions 11, 12, and 14*)

[1] Number of respondents will not equal total *Survey* respondents as some agencies are served by both separate and combined systems. In addition, some respondents did not answer all of the relevant questions related to separate systems (Questions 7, 8, and 9).

4.6 POTW Capacity Distribution

This table shows the distribution among the 78 respondents[2] according to the rated capacity of the POTWs in their systems. Collectively, the 78 respondents have 333 POTWs. The majority of respondents have one POTW, with one respondent having 39 POTWs. (*Question 51 and 52*)

POTW Rated Capacity	No. of Survey Respondents	Total Number of POTWs
<1 mgd	20	71
<2.5 mgd	15	25
2.5 to 5 mgd	16	35
5 to 10 mgd	17	50
10 to 25 mgd	29	57
25 to 100 mgd	39	58
>100 mgd	25	37

[2] Throughout the *Survey Report*, the number of respondents indicated refers to the total number of respondents who answered that particular question. Not all respondents answered every *Survey* question.

5.0 Survey Response Summary

This section summarizes the data from the eighty-five (85) AMSA member agencies responding to the *Survey*. The Response Summary repeats the original question, provides a narrative explanation of the results and in some cases summarizes the responses in tabular form. Complete *Survey* responses, including statistical and graphical analysis of each question, are available on the AMSA website at: www.amsa-cleanwater.org/advocacy/wwsurvey/.

5.1 Municipal Peak Flow Decision-Making Processes

Question 35: What is your utility's typical evaluation cycle for assessing growth trends, evaluating the current conveyance versus planned capacity, and establishing specific capital improvement projects?

A summary of the 75 respondents who have periodic evaluation cycles is provided in the table below. In addition to the response distribution shown in the table, a number of respondents have random evaluation cycles for evaluating growth (7 respondents), capacity (6 respondents), and capital improvement project needs (8 respondents).

	Assessment Areas		
Planning Period	**Growth**	**Capacity**	**CIP Projects**
= 5-year Planning Period	36% (27 of 75)	41% (31 of 75)	65% (49 of 75)
= 10-year Planning Period	24% (18 of 75)	23% (17 of 75)	7% (5 of 75)
= 20-year Planning Period	15%(11 of 75)	15%(11 of 75)	5%(4 of 75)
>20-year Planning Period	9%(7 of 75)	9%(7 of 75)	5%(4 of 75)

Question 36: Does your utility have its own design guidance/policy manual that presents the utility's standards (basis, process, or criteria) for sizing new sewers or expanding capacity for existing conveyance systems?

Most respondents have their own design guidance manuals for sizing sewers (87%; 65 of 75). Of the utilities that have design standards, 65 percent (42 of 65) develop their own. Of those that develop their own, 36 percent (15 of 42) rely on industry developed standards, 38 percent (16 of 42) base standards on criteria required by the permitting authority, and 24 percent (10 of 42) rely on both industry and permitting authority standards or criteria.

Question 38: Do you have a planning document that coordinates conveyance peak flows with treatment capacity peak flows?

Fifty-four percent (38 of 71) of respondents have coordinated planning documents.

Questions 49 and 50: Rank the relative importance of the factors that are currently considered (Question 49) or should be considered (Question 50) most important when setting the peak flow capacity conveyed to the POTW.

These questions compared current and desired management and operations attitudes about eight factors that influence conveyance capacity decisions. A weighted scale produced an overall numeric score for each factor's importance.

QUESTION 49 (CURRENT)		
Factor	**Rank**	**Score**
Level of Service	1	328
Public Health Concerns	2	311
Regulatory Standards	3	298
Designated Use Impacts	4	286
Ambient WQ Impacts	5	281
Affordability	6	271
Enforcement	7	261
Political Factors	8	233

QUESTION 50 (DESIRED)		
Factor	**Rank**	**Score**
Level of Service	1	351
Public Health Concerns	2	334
Designated Use Impacts	3	312
Ambient WQ Impacts	4	310
Affordability	5	268
Regulatory Standards	6	259
Enforcement	7	235
Political Factors	8	176

Question 64: During a wet weather event, when you want to maximize the rate of flow through the plant, how important is avoiding disruption of the biological treatment process when making a decision to bypass secondary treatment (blend secondary and preliminary/primary) flows at the POTW(s)?

Out of 78 respondents, 38 indicated this question was not applicable to their system. Of the remaining 47 respondents who can blend, 74 percent (35 of 47) indicated it is very important to avoid disrupting the biological system of the POTW, and an additional 19 percent (9 of 47) indicated it is important. Six percent (3 of 47) stated disruption of the biological treatment process was not important.[3]

Question 71: Do you think there is a treatment technology currently available for the POTW that could improve your peak flow treatment performance and increase peak flow treatment capacity?

A majority (72%; 56 of 78) stated a technology exists that could improve their POTW treatment performance and capacity. Several sublevel questions were asked about what concerned the respondents the most about investigating the technology further:

- 46 percent (36 of 78) indicated affordability concerns.
- 35 percent (27 of 78) indicated they were reluctant to proceed with improved technology because of lack of regulatory acceptance.
- 65 percent (33 of 51) indicated either the regulatory agency would not allow the technology or they were uncertain whether the technology would be allowed.

Fifty percent (24 of 48) would install the new technology if the permitting agency would allow it.

Question 74: If peak flow coming into the plant headworks regularly exceeds the hydraulic and biological capabilities of the POTW, what is the process you would most likely follow?

Three process concepts to address flows exceeding the POTW headworks capacity were provided to the respondent:

- 67 percent (52 of 78) would focus on a cost-effective, specific fix
- 24 percent (19 of 78) would evaluate the impact of the discharge(s) and get consensus from the regulatory agency prior to proceeding with a specific fix
- 9 percent (7 of 78) would not vary existing practices or would take no immediate action

Question 75: When considering peak flow treatment at your POTW(s), how would you rank each of the following factors in terms of relative importance?

Respondents ranked ten factors as to their relative importance when considering peak flow treatment. A weighted scale produced an overall numeric score for each factor importance.

[3] Since some respondents who do not blend misinterpreted this question and provided a response, the number of respondents (i.e., those facilities that blend) is higher than in other *Survey* responses.

Factor	Rank	Score
Level of Service	1	355
Public Health Concerns	2	346
Designated Use Impacts	3	334
Regulatory Standards	4	331
Treatment Technology	5	329
Affordability	6	306
Enforcement	7	295
Site Constraints	8	265
Political Factors	9	230
Other	9	104

Question 77: If seasonal peak flow is related to snowmelt or rainfall derived infiltration/inflow, (A) is it cost-effective to provide biological treatment for those high flows and/or low temperatures and (B) does your permit allow a different standard of compliance during those high flow and/or low temperature periods?

This question gauged the importance of protecting the biology of the treatment system during high flows. In Subpart A, the term cost-effective was used to get an overall assessment of the benefit of routing flow through the treatment components at the risk of losing biomass in the plant. A majority of the respondents (71%; 44 of 62) stated it was not cost-effective to provide biological treatment for high flows and/or low temperatures.

For Subpart B, the majority of the respondents (73%; 47 of 64) indicated that their permit did not allow a different standard of compliance during these high flow and/or low temperature periods.

Question 78: Does public perception impact your decision on bypassing or blending flows at the POTW?

The public's perception played a role for 40 percent (47 of 78) of the respondents.

5.2 Sizing Criteria Used for Collection Systems

The following *Survey* questions focused on the types of sizing criteria protocols relied on by both permitting authorities and permittees, and attempted to identify criteria used specifically for new versus existing sewers.

Question 22: Does the permitting authority have written requirements or guidance provisions at the planning stage that dictate or affect the peak flow selected by the utility?

The majority of respondents (71%; 53 of 75) indicated that their permitting authority has requirements or guidance that dictate or affect the peak flow capacity selected for the collection system. Only 29 percent (22 of 75) of respondents are not required by their permitting authorities to comply with such pre-set requirements or guidance. Fifty two respondents indicated the following as the most prevalent types of requirements / guidance imposed by the permitting authority:

- Peak to average flow ratios / peaking factors (67%; 35 of 52)
- I / I allowance for new sewers (44%; 23 of 52)
- I / I allowance for existing sewers (33%; 17 of 52)
- Per capita potable water consumption return flow to sewers (33%; 17 of 52)
- Rain event return interval / design storm (24%; 12 of 52)
- Other criteria (12%; 6 of 52), which included reference to specific industry standards or consent decree requirements affecting I / I allowances or contributions per acre.

Question 25: Are plans or specifications for sewer line extensions reviewed and/or approved by the permitting authority prior to adding new growth flows?

The *Survey* indicated that for the vast majority of respondents (65%; 49 of 75) plans or specifications for sewer line extensions are reviewed and / or approved by the permitting authority prior to taking on additional flows from new development, while such review and approval procedures are either not required for 31 percent (23 of 75) or inapplicable for 4 percent (3 of 75). Among those respondents whose permitting authorities review and / or approve plans for expansion, the following references or guidance criteria are used for those reviews *(note: 48 of 49 respondents answered this part of the question)*:

- Available treatment capacity (71%; 34 of 48)
- Sewer capacity (71%; 34 of 48)
- Sewer slope / velocity (69%; 33 of 48)
- Industry reference standards (e.g., Ten State Standards) (62%; 30 of 48)
- Enforcement status (40%; 19 of 48)
- Other references or criteria, such as specific state development design guidance; presence or evidence of SSOs; City-specific criteria; and regionally developed criteria (12%; 6 of 48)
- Don't know what permitting authority uses (12%; 6 of 48)

Question 36: Does your utility have its own design guidance/policy manual that presents the utility's standards (basis, process, or criteria) for sizing new sewers or expanding capacity for existing collection systems?

The vast majority of respondents (87%; 65 of 75) indicated that their utility has its own design guidance/policy manual for sizing or expanding the capacity of collection systems, while 12 percent (9 of 75) indicated that they do not have such protocols in place. Of the 75 respondents, 65 respondents indicated the basis for their design guidance/policy manual (respondents could select more than one basis):

- Developed their own standards (65%; 42 of 65)
- Use adopted industry standards (57%; 37 of 65)
- Use standards based on criteria required by the permitting authority (42%; 27 of 65).

Question 37: What peak flow criteria are typically used to size your new sewers and pump stations or confirm the sizing of existing sewers and pump stations for the entire collection system?

Respondents use a combination of sizing criteria for their separate, combined, and pump station systems.

Criteria	Response
New Sewers	
Per Capita Allowance	85% (57 of 67) [51 separate, 6 combined]
Peaking Factor	61% (41 of 67) [38 separate, 3 combined]
Flow per land use category	54% (36 of 67) [33 separate, 3 combined]
Targeted rainfall intensity/duration	21% (14 of 67) [12 separate, 2 combined]
Flow used in depth/diameter ratio	22% (15 of 67) [13 separate, 2 combined]
Existing Sewers	
Per Capita Allowance	72% (47 of 65) [43 separate, 4 combined]
Targeted rainfall intensity/duration	34% (22 of 65) [17 separate, 5 combined]
Documented historical rain event	31% (20 of 65) [16 separate, 4 combined]
Historical monthly rainfall average	12% (8 of 65) [7 separate, 1 combined]
Pump Stations (new and existing)	
Station flow matches incoming sewer peak flow	73% (46 of 63) [40 separate, 6 combined]
Add capacity allowance to planned incoming sewer peak flow	16% (10 of 63) [10 separate]

Question 39: Is an allowance for I/I included in the peak flow criteria for new, publicly owned sanitary sewers?

Eighty-three percent (54 of 65) of the applicable respondents (excludes the 10 NA responses from the 75 total responses) provide an I/I allowance in their peak flow criteria for new publicly owned separate sewers. Among the 54 respondents who include an I/I allowance 49 responded to the question of whether the I/I allowance accounted for private property sources. The response was 71 percent (35 of 49) indicated that their peak flow criteria included an allowance for I/I from private property. Forty-two percent (25 of 60) of the applicable respondents do not provide a private property I/I allowance.[4]

Question 40: Is an allowance for I/I included in the peak flow criteria for existing publicly owned sanitary sewers?

Eighty-six percent (57 of 66) of the applicable respondents (excludes the 9 NA responses from the 75 total responses) provide an I/I allowance in their peak flow criteria for existing sewers. Among the 57 respondents who include an I/I allowance 49 responded to the question of whether the I/I allowance accounted for private property sources. Seventy-eight percent (38 of 49) of the applicable respondents indicated that their peak flow criteria included an allowance for I/I from private property. Thirty-three percent (20 of 61) of the applicable respondents do not provide a private property I/I allowance.[5]

5.3 Peak Flow Controls and Performance Measures Used

This section summarizes the types of technologies used to handle peak flows, how effective they are, and the methods used for measuring effectiveness.

Question 41: Which wet weather controls do you currently use or are considering to manage system peak flows?

Among the 75 *Survey* respondents with separate sanitary sewers, the following wet weather controls are most often used to manage peak flows:

- I/I rehabilitation (87%; 65 of 75)
- Increased conveyance capacity (45%; 34 of 75)
- Public property service lateral I/I rehabilitation (36%; 27 of 75)
- Real time control or in-line storage (24%; 18 of 75)
- Off-line storage, such as tunnels or reservoirs (24%; 18 of 75)
- Peak excess flow treatment facilities (16%; 12 of 75)
- Private property rehabilitation (15%; 11 of 75)

Many separate sewer system respondents were also contemplating new or enhanced controls to improve peak flow control. The most common practices referenced were:

- Private property service lateral I/I (23%; 17 of 75)
- Off-line storage (20%; 15 of 75)

[4] Twenty-five (25) equals 11 "No" responses plus the 14 "No" responses to tiered question A-1, and 60 = 75 minus 10 NA in question A, minus 5 that did not answer the tiered question A-1.

[5] Twenty (20) equals 9 "No" responses plus the 11 "No" responses to tiered question A-1, and 61 = 75 minus 9 NA in question A, minus 5 that did not answer the tiered question A-1.

- Public property service lateral I/I (19%; 14 of 75)
- Real time controls or in-line storage (16%; 12 of 75)
- Peak excess flow treatment facilities (16%; 12 of 75)

Among the 21 respondents with combined sewer systems, the following wet weather controls are most often used to manage peak flows:

- I/I rehabilitation (76%; 16 of 21)
- Real time control or in-line storage (76%; 16 of 21)
- Peak excess flow treatment facilities (67%; 14 of 21)
- Off-line storage, such as tunnels or reservoirs (57%; 12 of 21)
- Increased conveyance capacity (52%; 11 of 21)
- Sewer separation (52%; 11 of 21)
- Public property service lateral I/I rehabilitation (29%; 6 of 21)
- Private property service lateral rehabilitation (10%; 2 of 21)

Many combined sewer systems respondents were also contemplating new or enhanced controls to improve peak flow control. The most common practices referenced were:

- Off-line storage (52%; 11 of 21)
- Sewer separation (43%; 9 of 21)
- Peak excess flow facilities (38%; 8 of 21)

Question 42: Has I/I reduction been an effective control alternative?

Fifty-two percent of respondents (39 of 75) indicated that I/I control has been an effective peak flow control strategy; 17 percent (13 of 75) believed I/I removal to be effective, yet insufficient data exists to support that conclusion. Among those who believe I/I reduction to be effective, the most common methods for measuring its relative success were reduced customer complaints/service calls in historic problem areas (64%; 25 of 39), post-rehabilitation flow monitoring (49%; 19 of 39), and lower observed peak flows at the POTW (41%; 16 of 39).

Twenty-one percent of respondents (16 of 75) do not believe I/I reduction to be an effective strategy, as determined by the absence of reduced customer complaints/service calls (69 percent; 11 of 16), post-rehabilitation monitoring (25%; 4 of 16), and no observed change in flow recovery to normal after rainfall events (25%; 4 of 16). Several respondents (10 percent; 8 of 75) do not know either way if I/I reduction has been an effective strategy.

Question 43: Do you have a regular program to physically inspect or evaluate (visual inspection, CCTV, SSET, etc.) your sewer system?

The overwhelming majority of *Survey* respondents (93%; 70 of 75) conduct regular programs to physically inspect or evaluate their sewer systems, using techniques such as visual inspections, closed circuit TV (CCTV), and Sewer Scanner and Evaluation Technology (SSET). The portion of the system evaluated annually ranged as follows:

Portion Evaluated	% (Number) of Respondents
<1% per year	3% (2 of 75)
<3% per year	8% (6 of 75)
<5% per year	15% (11 of 75)
<10% per year	25% (19 of 75)
<20% per year	27% (20 of 75)
<50% per year	4% (3 of 75)
>=50% per year	1% (1 of 75)
No Answer	17% (13 of 75)

Question 44: Do you have flow measurement instrumentation at most of your significant pump stations?

The *Survey* found that 61 percent of respondents (46 of 75) have flow measurement instrumentation at most "significant pump stations," (defined in the *Survey* as "size or location of pump could create serious public health, environmental, or nuisance problems if the station failed to function for whatever reason"), or plan to add such instrumentation within the next three years. The remaining respondents (39 percent; 29 of 75) answered that they do not have flow measurement instrumentation at most significant pump stations.

Question 45: Do you have either permanent or temporary emergency power at most of your significant pump stations?

Eighty-four percent (64 of 75) indicated that emergency power is currently on hand or will be available in the next three years at most "significant pump stations. " The remaining 16 percent (12 of 75) do not have permanent or temporary emergency power at most significant pump stations.

Question 46: Are pumping rates and control settings for your significant pump stations checked on a regular basis?

The majority of respondents (71 percent; 53 of 75) indicated that pumping rates and control settings for significant pump stations are checked on a regular basis, with 33 percent (25 of 75) conducting evaluations once a year, 11 percent (8 of 75) at twice per year intervals, and 9 percent (7 of 75) at 3- to 5-year intervals.

Question 66: How do you determine how to limit the peak flow to your secondary treatment biological process?

Fifty-five percent (43 of 78) of respondents rely on full scale operating experience, 35 percent (27 of 78) utilize established design criteria, 26 percent (20 of 78) rely on unit process stress testing, and 13 percent (10 of 78) base such decisions on their POTW operations manual.

Question 68: Have you confirmed the design criteria of unit processes within the POTW(s) through stress testing or other methods?

The responses indicated that 69 percent (54 of 78) of respondents have confirmed the design criteria of unit processes within their POTW(s) through stress testing or other methods. More specifically, 32 respondents indicated that they used stress testing at 50 POTWs. Ten respondents used another method such as modeling, calculations, or university research at 37 POTWs.

The tests for eight (8) respondents indicated that they did not meet their design criteria at 11 POTWs. The test for twenty-three (23) respondents indicated that they had greater capacity than design criteria at 33 POTWs. The tests for ten (10) respondents indicated that they had no change from design criteria at 28 POTWs. One respondent stated that the test for its POTW was inconclusive.

Question 71: Do you think there is a treatment technology currently available for the POTW that could improve your peak flow treatment performance and increase peak flow treatment capacity?

The *Survey* showed that 72 percent (56 of 78) of respondents believe there is treatment technology currently available for the POTW to improve peak flow treatment performance and increase peak flow treatment capacity, while 28 percent (22 of 78) do not believe such a technology is available.

5.4 Factors Considered in Plant Sizing Decisions

These questions explored the fundamental bases of the POTW's unit process design, how these POTW unit processes actually performed, and by what means the comparison was measured. The questions also assess if operators are able to treat more flow in peak weather than designed.

Question 55: Is the design capacity of your primary treatment units greater than your biological treatment units?

The design capacity of the primary treatment units exceeded the capacity of the biological treatment units for 44 percent (35 of 78) respondents. Of those, 73 percent (22 of 30) respondents stated that the ratio of primary treatment capacity to biological treatment capacity was less than 2:1. The others (27%; 8 of 30) stated that the ratio was between 2:1 and 4:1.

Question 56: What is the ratio of peak hour flow to annual average flow that reaches immediately upstream of the POTW headworks (include any flow receiving peak flow treatment at the POTW site)?

Four flow ranges of peak hour to annual average flow were provided in the *Survey*. The responses for both types of systems are provided in the table below.

QUESTION 56

Peak Hour to Annual Average Ratio	Responses	
	Separate Sanitary Sewers	Combined Sewers
3:1 or less	43% (32 of 75)	33% (9 of 27)
Between 3:1 and 5:1	39% (29 or 75)	44% (12 of 27)
Between 5:1 and 7:1	9% (7 of 75)	4% (1 of 27)
7:1 or greater	9% (7 of 75)	18% (5 of 27)

Question 65: What is the maximum ratio of peak hour flow to annual average flow that you allow to flow to the secondary (biological) treatment system for your POTW?

Four ranges of peak hour ratios were provided in the *Survey*. The responses are provided in the table below. (Several respondents entered multiple responses to account for the ranges associated with their multiple POTWs.)

QUESTION 65

Maximum Peak Hour to Annual Average Ratio	Responses
2:1 or less	44% (34 of 78)
2:1-3:1	47% (37 of 78)
3:1-4:1	22% (17 of 78)
4:1 or greater	17% (13 of 78)

Question 66: How did you determine how to limit the peak flow to your secondary treatment biological process?

Operators use several ways to determine how to limit the peak flow to their secondary treatment biological process. The respondents provided the following distribution of responses for these methods listed in the *Survey*:

- Full scale operating experience (55%; 43 of 78)
- Established design criteria (35%; 27 of 78)
- Unit process stress testing (26%; 20 of 78)
- Other (20%; 16 of 78)
- Based on POTW operations manual (13% 10 of 78)

Other responses included historical trends and not limiting the flow.

Question 68: Have you confirmed the design criteria of unit processes with the POTW(s) through stress testing or other methods?

A majority (69%; 54 of 78) of the respondents confirm the design criteria of unit processes within their POTW(s) through stress testing or other methods. Of those, 32 respondents indicated that they have used stress testing at a total of 50 POTWs. Ten (10) respondents

indicated they use other methods besides stress testing such as modeling, calculations, or university research at a total of 37 POTWs.

The tests for eight respondents (11 POTWs) indicated that the POTWs did not meet their design criteria. The tests for twenty-three respondents (33 POTWs) stated that the tests indicated that they had greater capacity than design criteria. The tests for ten respondents (28 POTWs) indicated that they had no change from design criteria. One respondent stated that the test for its POTW was inconclusive.

5.5 Wet Weather Treatment Components and Processes

The following questions examined whether current technology is providing technical solutions for POTW issues and whether regulatory authorities are encouraging or hindering technology integration into the treatment process.

Question 53: What treatment components are provided at your POTW(s)?

Eight percent (6 of 78) indicated having a high-rate physical chemical process for wet weather use. Of those, one respondent utilizes two processes, while the other respondents utilize one process.

Question 54: Do you have treatment units on your POTW site that are brought into operation only when treating peak flows occurring during wet weather?

Twenty-six percent (20 of 78) respondents identified treatment units at the POTW used only to treat peak flows. Of the 58 who did not have such units for only peak flow use, 22 percent (17 of 78) identified units used during both normal and wet weather conditions.

Question 67: Are you able to get increased flows through the biological units during wet weather periods if the blowers/aerators are temporarily turned off compared to leaving them on?

Increased flows through biological units during wet weather periods was possible for 30 percent (13 of 44) of the applicable respondents (excludes from the 78 total respondents the 34 respondents who answered NA) if blowers / aerators were temporarily turned off during high flows. The 13 respondents confirmed that they were generally able to meet their permit effluent requirements. Seventy percent of respondents (31 of 44) indicated that they were not able to get increased flows through their biological units during wet weather periods if their blowers / aerators were temporarily turned off.

Question 70: Is there currently space available at the POTW(s) to improve your peak flow treatment performance and increase peak flow treatment capacity (excluding modifying flow regimes or chemical addition to primary clarifiers)?

Those respondents without available space (33%; or 26 of 78) were asked if there were any developing enhanced primary treatment technologies (high rate processes requiring less space) that they would consider if proven. Four respondents stated that there were such technologies, while 12 stated that there were not. Five respondents stated that they would consider installing a high-rate physical / chemical process that requires less space than

conventional primary units if its effectiveness and operability were better demonstrated, while 8 stated that they would not.

Question 71: Do you think there is a treatment technology currently available for the POTW that could improve your peak flow treatment performance and increase peak flow treatment capacity?

Most respondents (72%; 56 of 78) stated that there is a treatment technology currently available for the POTW that could improve its peak flow treatment performance and increase peak flow treatment capacity. Of those, 64 percent (36 of 56) cited affordability as among the reasons for not implementing the technology. Other reasons cited included:

- Lack of regulatory compliance clarity (36%; 20 of 56)
- High risk of not performing as intended (34%; 19 of 56)
- Staffing concerns (25%; 14 of 56)
- Operations concerns (25%; 14 of 56)
- Insufficient space available (20%; 11 of 56)
- Objections of regulatory agency (12%; 7 of 56)

When asked if their permitting authority would allow the new technology to be incorporated, 35 percent of respondents (18 of 51) stated yes; 8 percent (4 of 51) stated no; and 57 percent (29 of 51) stated that they did not know. When asked if they would be willing to install the new technology if the permitting authority would allow it, 50 percent (24 of 48) stated yes; 8 percent (4 of 48) stated no; and 42 percent (20 of 48) stated that they did not know.

Question 72: Does your POTW(s) add chemicals to the primary clarifiers to improve solids removal during peak flow events?

Chemical addition to the primarily clarifiers is practiced by 9 percent of respondents (7 of 78). The remaining 91 percent (71 of 78) stated that they did not do so.

Question 73: Does your POTW(s) add chemicals to the secondary clarifiers to improve solids removal during peak flow events?

Chemical addition to the secondary clarifiers is practiced by 18 percent of respondents (14 of 78). The remaining 82 percent (64 of 78) stated that they did not do so.

Question 79: Is there sufficient space available at the POTW to mitigate public opposition to equalization facilities?

Sufficient buffer space is available at the POTW for 33 percent of respondents (26 of 78). Forty percent (32 of 78) stated that there was not sufficient buffer space available. Six percent (5 of 78) stated that this was not applicable to them, while 19 percent (15 of 78) did not know.

5.6 Typical Conveyance and Treatment Capacity-Related Performance Challenges

This group of *Survey* questions was designed to develop a ranking of the day-to-day issues that affect the capacity performance of a system.

Question 47: Categorize the extent the following conditions present conveyance performance problems or take up the design capacity in your sewer system.

Seven common conveyance problem categories were provided for the respondents. The three most frequent issues were:

- Fats, oils, and grease (FOG), (32%; 24 of 75)
- Private property rainfall derived infiltration / inflow(RDII) (28%; 21 of 75)
- Public property RDII (24%; 18 of 75)

For localized areas, hydraulic restrictions or surging ranked first at 58% (42 or 75), and FOG ranked the second highest (52%; 39 of 75). The most consistent widespread problem was private (33%; 25 of 75) and public (29%; 22 of 75) RDII.

The three most infrequent problems were:

- Basement flooding (43%; 32 of 75)
- Hydraulic restrictions (43%; 32 of 75)
- Sediment (40%; 30 of 75)

Question 48: Do you have capacity-related SSOs in your separate sanitary sewer system(s)?

Thirty-six percent (27 of 75) believed the SSOs in their systems were capacity related.

Question 63: Which of the listed factors limits the peak flow treatment capacity of your POTW?

The top five ranked peak flow treatment capacity limitations were:

- Internal facility hydraulics (46%; 36 of 78)
- Secondary treatment capacity (45%; 35 of 78)
- Preliminary / primary treatment capacity (35%; 27 of 78)
- POTW influent pumping (29%; 23 of 78)
- Conveyance system (28%; 22 of 78)

Question 76: Do periods of peak flow occur on a predictable seasonal basis?

Sixty-nine percent (54 of 78) indicated that their peak flow periods occurred on a predictable basis.

5.7 Peak Flows and NPDES Permits

Several *Survey* questions were directed at how different states and Regions handle wet weather discharge issues in the NPDES permit, and the various ways in which permit authorities have implemented applicable regulations.

Question 6: Do your NPDES permit(s) have bypass and upset provisions?

Most NPDES permits (80%; 67 of 84) include standard upset and bypass provisions.

Question 20: For separate sanitary sewer systems, indicate the number of emergency overflow structures covered in the permit?

Five respondents included information about emergency overflow structures in the permit application for 30 different pump station locations, but the permit did not separately identify these structures. Thirteen respondents received permits that specifically listed 169 different pump station locations as potential emergency overflow structures. Three respondents are operating under an enforcement mechanism that identifies 85 different pump stations as emergency discharge locations.

Two respondents identified 10 overflow locations within the sewer system in the permit application, but the final permit did not explicitly list these locations as discharge points. Thirteen respondents received permits that identified 112 different sewer system emergency overflow locations as discharge points. Seven respondents have enforcement mechanisms that identify 157 different sewer system locations as potential discharge points.

Question 26: Are you currently authorized by permit, consent decree, or other authority to discharge from your separate sanitary sewer system prior to the POTW headworks using alternative treatment facilities such as peak excess flow treatment facilities (PEFTFs)?

Several respondents (8%; 6 of 75) are already authorized by permit or consent decree to use such facilities. Of the 81.3 percent (61 of 75) that responded "No" to this question, nine responded that they had explored the option.

Question 27: Are you currently authorized by permit, consent decree, or other authority to discharge from your separate sanitary sewer system prior to the POTW headworks through emergency overflow structures where only partial or no treatment is provided?

Several respondents (12%; 9 of 75) are authorized to discharge untreated or partially treated wastewater from emergency overflow structures in the collection system. However, the vast majority of respondents (76%; 57 of 75) indicated that no such authorization has been given.

Question 34: How does your NPDES permit address SSOs in your separate sanitary sewer system?

A significant number of permits contain no provisions identifying the regulatory status of SSOs (32%; 24 of 75). Some permits prohibit all SSOs without exception or affirmative defenses (21%; 16 of 75) or prohibit SSOs with exception for conditions considered to be "unavoidable" (29%; 22 of 75). Two respondents operate under a permit that allows overflows under specified conditions at sites identified in the permit. One respondent's permit contains an exception to the SSO prohibition for flows that exceed the design capacity.

Question 58: Does your permit have a required percent removal of pollutants in addition to a numeric concentration limit?

Many respondents' permits (68%; 53 of 78) have a required percent removal of pollutants in addition to a numeric concentration limit. Among those permits with specific percentage

removal requirements, 16 percent (7 of 44) include removal percentages which change during peak flow conditions.

Question 60: What type of discharge criteria are contained in your permit?

The most common POTW discharge criteria is the mass of pollutants discharged during a specific period of time (63%; 49 of 78). Six of these respondents (8%) also have exceptions for peak flow conditions. Nineteen respondents have permits with limits on the volume of effluent discharged during a specific period of time. Twenty-two respondents (28%) have permit limits on both the volume and mass discharged during a specific period of time.

Question 62: Does your POTW discharge permit include a limit on the number of plant bypasses, or partial plant bypasses, allowed per year?

Most respondents (82%; 64 of 78) do not have permits that include a limit on the number of plant bypasses or partial plant bypasses allowed in a given year.

Question 69: If the primary treated effluent were blended during wet weather with effluent that received biological treatment, would you be capable of meeting your POTW permit effluent limits?

Among the 41 respondents who do not blend during wet weather conditions, 58 percent (24 of 41) indicated that blending would enable the POTW to meet permit effluent limits: three (7%) all the time; 13 (54%) the majority of the time (except in extreme wet weather conditions). Eight (20%) of these responded that permit limits would be met, but blending would not be pursued because this practice is not allowed by the state or regional permitting authority.

Question 77B: If seasonal peak flow is related to snowmelt or rainfall derived infiltration/inflow, does your permit allow a different standard of compliance during those high flow and/or low temperature periods?

The majority of respondents' permits (71%; 47 of 66) do not allow a different standard of compliance during snowmelt/rainfall high flow periods, while 26 percent (17 of 66) do provide a different standard during seasonal high flow periods.

5.8 Regulatory/Permitting Authority Role in the Capacity-Setting Process

Several *Survey* questions focused on the extent to which EPA or state regulators become involved in the municipality's capacity-setting process. The answers to these questions provide a glimpse into the amount of interaction between regulator and permittee, and the impact of pre-existing state or regional standards on the process.

Question 21: At what phase(s) of your utility's operations is the permitting authority directly involved with your sewer capacity issues?

The *Survey* revealed that the permit authority becomes involved in all phases of the municipality's capacity-setting process:

- Planning (51%; 38 of 75)

- Design (new structures or modifications) (57%; 43 of 75)
- Permitting (76%; 57 of 75)
- Following a spill or bypass (61%; 46 of 75)
- Enforcement (60%; 45 of 75)

Questions 22, 36: Does the permitting authority have written requirements or guidance provisions at the planning stage that dictate or affect the peak flow selected by the utility for separate sanitary sewer systems?

Peak flow capacity at the vast majority of sewer systems (71%; 53 of 75 respondents) is dictated by pre-set requirements developed by the permitting authority. The most common sizing standards used are:

- Peak to average flow ratios / peaking factors (67%; 35 of 52)
- I/I allowance for new sewers (44%; 23 of 52)
- I/I allowance for existing sewers (33%; 17 of 52)
- Per capita potable water consumption return flow to sewers (33%; 17 of 52)
- Rain event return interval / design storm (24%; 12 of 52)
- Other criteria (12%; 6 of 52), which included reference to specific industry standards or consent decree requirements affecting I/I allowances or contributions per acre.

Question 23: Does the permitting authority require you to measure or project available capacity for service expansion to confirm that added capacity is available?

Slightly more than one half of the respondents (55%; 41 of 75) indicated that they are required to evaluate their capacity status in connection with service expansions. Eighty-five percent (35 of 41) of those that have such a requirement indicated that they are required to project existing plus expansion flows and compare these to the design capacity.

Question 25: Are plans or specifications for sewer line extensions reviewed and/or approved by the permitting authority prior to adding new growth flows?

For many respondents, the permit authority is involved in review and approval of local plans or specifications prior to adding new capacity to the sewer system. Sixty-five percent (49 of 75) indicated that the permit authority is involved in the approval of sewer line extensions, which considers the following criteria:

- Sewer system capacity (69%; 34 of 49) and available treatment capacity (69%; 34 of 49)
- Sewer slope or velocity (67%; 33 of 49)
- Referenced standard (61%; 30 of 49)
- Enforcement status (39%; 19 of 49)

Questions 28, 29: Are you operating under a current or pending consent decree or other enforcement action that dictates or affects peak flow capacity in your separate sanitary or combined sewer system?

In a significant number of municipal separate (28%; 21 of 75) and combined (57%; 12 of 21) systems, regulatory agencies are mandating the types of capacity improvements made in the system through consent decrees and other enforcement actions.

Question 71: Will your permitting authority allow you to incorporate new treatment technologies currently available for the POTW that could improve your peak flow treatment performance and increase peak flow treatment capacity?

The permit authority significantly influences whether a municipality is willing to install new treatment technologies to improve peak flow treatment performance and increase capacity. For instance, 36 percent of respondents (20 of 56) who believe that there are such technologies available were concerned about investigating a new technology because of the lack of clarity regarding its compliance status, while 13 percent (7 of 56) feared that the permit authority would object. In addition, while 32 percent of respondents (18 of 56) indicated that their permit authority would authorize them to incorporate new wet weather treatment technologies, the majority (59%; 33 of 56) was unsure of their permit authority's acceptance of the new technology, or believed that the authority would prohibit use of the new technology.

5.9 Regulatory Oversight or Enforcement Influence on the Capacity-Setting Process

This following questions solicited responses regarding the impact of regulatory or enforcement oversight on the capacity-setting process. Through consent decrees, sewer moratoriums, overflow tracking, and enforcement discretion, the specific ways in which the permit authority influences capacity decisions across the country varies substantially.

Questions 28, 29: Are you operating under a current or pending consent decree or other enforcement action that dictates or affects peak flow capacity in your separate sanitary or combined sewer system?

A number of respondents (28%; 21 of 75) with separate sewers are operating under a current or pending consent decree or enforcement agreement that dictates peak flow capacity through one or more of the following requirements:

- New or additional I/I removal requirements
- SSO elimination
- Specific sizing criteria

A larger portion of those respondents with combined systems (57%; 12 of 21) are operating under a current or pending consent decree/enforcement agreement that dictates peak flow capacity.

Question 30: Have there been any moratoriums prohibiting new connections to the separate sanitary sewer system issued by the permitting authority in the last three years?

Eleven percent of the respondents (8 of 75) indicated that the regulatory authority had imposed a moratorium on new connections to the sewer system within the last three years.

Question 31: Does your permitting authority count wet weather overflows in the combined sewer area of your system as SSOs when they occur from manholes or other locations not listed in your permit?

States and EPA Regions track individual overflows differently. For instance, some regulatory authorities consider discharges from manholes or other sewer locations in a combined system to be SSOs (28%; 7 of 25), while others define them as CSOs or some other type of release (72%; 18 of 25).

Question 32: Under what circumstances in the last three years has the permitting authority exercised enforcement discretion and not issued an enforcement action for reported SSOs in the separate sanitary sewer systems that reached waters of the U.S.?

A considerable number of permit and enforcement authorities recognize that there is a class of overflows that are caused by conditions that are beyond the control of the operator. Through the use of enforcement discretion, such circumstances appear to justify flexibility despite the occurrence of a SSO. The most frequently cited reasons for not issuing an enforcement action for reported SSOs were:

- Extreme wet weather event (49%)
- Root intrusion, grease, or corrosion during dry weather (39%)
- Vandalism or accident during dry weather (33%)
- Power outage during wet weather (32%) or dry weather (25%)
- Sewer system peak flow capacity exceeded (23%)

Question 61: Do you typically wait for the permitting authority to notify you that your treatment capacity is at or approaching its design capacity before initiating actions to increase treatment capacity?

The *Survey* demonstrated that municipal operators are proactive in ensuring adequate treatment capacity. Nearly all of the responding POTWs (99%; 77 of 78) initiate action on their own to increase capacity if flows are approaching design capacity.

Association of Metropolitan Sewerage Agencies

2002 AMSA Wet Weather Survey

Instructions

Introduction

Thank you for filling out this very important survey! This Wet Weather Survey of AMSA's publicly owned treatment works (POTW) members is being conducted to gain a better understanding of the procedures used and influencing factors behind collection system capacity designs and treatment methods for wet weather flows. This survey is the first, and perhaps most important, component of AMSA's technical action fund (TAF) project on wet weather capacity and treatment. The information you are providing us is critical to AMSA as we negotiate with the U.S. Environmental Protection Agency (EPA) on your behalf to craft reasonable regulations pertaining to sanitary sewer overflows (SSOs) and blending.

Each member's participation in this survey is critically important. Capacity and blending issues have not been previously surveyed on a national basis. Therefore, we need to receive completed surveys from as many members as possible in order to properly characterize our industry's practices. We realize this is an in-depth and time-consuming survey and will require careful analysis, and we greatly appreciate your participation.

Sensitive Information

We recognize that some of the requested information is sensitive. To encourage your participation, the survey will be blind. Information you provide us will be displayed only in an aggregate manner. No specific facility identification will be included in the final report or in any information published.

Your Wet Weather Survey Contact

Please assist us in coordinating survey participation by providing a Wet Weather Survey Contact. We will contact this person for any follow-up questions.

Name:

Phone

email:

Survey Assistance

For assistance in completing this survey or for clarifications of any questions, please contact Reggie Rowe, CH2M HILL at (205)-657-8459 or (334) 271-1445 (ext. 730) or *rrowe@ch2m.com*.

For questions concerning the AMSA project in general, please contact Greg Schaner at (202) 296-9836 or *gschaner@amsa-cleanwater.org*.

Submittal of Completed On-Line or Hard Copy Surveys

You will have the option of completing this form either (1) on-line by accessing the Wet Weather Survey page of AMSA's web site, or (2) in hard copy format. We encourage those of you with internet access to fill out the survey on-line to help us better process your survey information. For on-line surveys, go to http://amsa-cleanwater.org and access the dedicated survey page. For questions concerning the on-line format, please contact Gunnar Gehrmann at 202/833-9384or *ggehrmann@amsa-cleanwater.org.*

The deadline for completing the survey is **April 22, 2002**. The survey is estimated to take a total of 4 to 20 hours to complete, depending on the size of your wastewater system and the number of people or process(es) you involve assembling your information.

Upon completion, please submit your survey by emailing or faxing it to AMSA, c/o Gunnar Gehrmann at:

Fax: 202/833-4657, or

Email: *ggehrmann@amsa-cleanwater.org*

Survey Organization

The survey has four sections:

A. **Utility** Background

B. **Conveyance Systems**

C. Treatment Systems

D. Definitions

All respondents should fill out Section A. Each respondent should then complete the survey section applicable to his/her wastewater **utility** as suggested in Question A.2.

Responses to questions will be either yes or no, multiple choice, or fill in the blank. In some cases, more than one answer or a ranking of responses is requested. If a question is not applicable to your agency, leave it blank or indicate such with "N/A" if space is provided. Most yes/no responses will require that you simply check the "yes" or "no" response. For some questions, expanded information or a definition is provided within the question to help clarify the requested information. Section D is an alphabetical listing of words and phrases used in the survey that may need clarification or expansion.

Definitions of Terms

To encourage consistency, we have included a definition section in **Part D** of the survey form. Words or phrases that are included in the **Part D** appear in **bold** wherever they occur in the survey form.

For many of the questions a column has been provided to the far right marked "#" for entering the number of treatment facilities. This answer applies to when there are multiple facilities in your service area, or other numbers as requested in the question.

PART A. BACKGROUND

Administrative/Organizational Information

1. Please check the letter that best describes the form of government characterizing your **utility** (check only one).

	✓	
A.		City Government Department
B.		City Authority
C.		County Authority
D.		Special District
E.		Regional Authority
F.		Other. Explain:

2. Which of these **utility** services apply to your system? (Check all that apply.)

	✓	
A.		Provide treatment of collected wastewater from **separate sanitary sewers** and/or **combined sewers** that you own (complete Sections B and C).
B.		Provide **Regional treatment** and **Regional conveyance** through **interceptors**/**outfalls** of other's imported collected wastewater (complete Sections B and C).
C.		Provide only treatment (complete Section C).
D.		Municipal satellite system (export all or a portion of your system's collected flow for treatment by another **utility**. Your system may also receive flow from another "upstream" municipal satellite system). (complete Section B).

3. Do you have any Intergovernmental Agreements (IGA) or interconnection applications/petitions with municipal satellite sewer systems? Indicate the number in the column the right.

	✓			#
A.		Yes		
		1.	How many of them have provisions that limit **peak flows** at the intersystem connections?	
		2.	How many of them have no provisions that limit the **peak flow** into your system?	
B.		No		
C.		N/A		

4. In what EPA Region are you located? (Please check.)

1	2	3	4	5	6	7	8	9	10
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

5. Who has primacy for administering the National Pollutant Discharge Elimination System (NPDES) Permit Program?

	✓	
A.		State
B.		EPA Region
C.		Both
D.		N/A (i.e., underground injection, reuse, municipal satellite system)

6. Do your NPDES permit(s) have **bypass** and **upset** provisions?

	✓		#
A.		Yes	
B.		No	

Additional Comments:_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

PART B. CONVEYANCE

Facility Data

Separate Sanitary System (entire service area that contributes to the flows conveyed by your municipality)

		Number	
		Your **Municipal System**	Combination of Your **Municipal System** and any Municipal Satellite Systems
7.	Separate sanitary service coverage area (sq. miles)		
8.	Length of municipally-owned (public property) **separate sanitary sewers** (miles)		
9.	Population served in separate sanitary area		
10.	Number of municipally-owned pump stations		
	a) How many do you consider as significant or major stations: i.e., if station failed, serious public health, environmental, or nuisance problems could result?		

Combined System Overview (entire service area that contributes to the flows conveyed by your municipality)

		Number	
		Your **Municipal System**	Combination of Your **Municipal System** and Municipal Satellite Systems
11.	Combined sewer service coverage area (sq. miles)		
12.	Length of municipally-owned (public property) **combined sewers** (miles)		
13.	Number of designed **CSO outfall discharge structures**		
14.	Population served in combined area		
15.	Number of municipally-owned pump stations		
	a) How many do you consider as significant or major stations: i.e., if station failed, serious public health, environmental, or nuisance problems could result?		

16. What controls or treatment are provided at the combined sewer system overflow discharge structure? Check responses that apply and indicate number of locations where provided.

	✓			#
A.		None provided		
B.		Solids removal		
		1.	End of pipe screening	
		2.	Conventional(< 50%)	
		3.	High-efficiency (> 50%)	
C.		Storage		
D.		Disinfection		
E.		Filtration		
F.		Other: Specify		
G.		N / A		

Municipal Satellite Systems Served by the Utility

17. Please list the number of municipal satellite systems for which you provide service that have:

	✓		#
A.		Only **separate sanitary sewers**	
B.		Only **combined sewers**	
C.		Combination of separate sanitary and **combined sewers**	
D.		Unknown	
E.		N / A	

18. Indicate the total number of municipal satellite system connection points within your municipal (regional) system. _____

Emergency Overflow Structures (within the service area; exclude municipal satellite systems)

19. For separate sanitary sewer systems, how many **emergency overflow structures** are located prior to the **POTW headworks**?

A.		Total number in your system.	
	1.	Of the total, the number located at pump stations	
	2.	Of the total, the number located in the sewer system	
	3.	Of the total, the number not sure where they are located	

20. For separate sanitary sewer systems, indicate the number of **emergency overflow structures** that can be categorized as follows:

		#	
		Pump Stations	Sewer System
A.	Specifically listed in permit application, but not in permit		
B.	Specifically listed in permit		
C.	Specifically listed in **enforcement mechanism** (i.e., administrative order, consent order)		
D.	N/A		

Regulatory Factors

21. At what phase(s) of your **utility**'s operations is the permitting authority directly involved with your **sewer capacity** issues? (Please check all that apply.)

	✓	
A.		Planning
B.		Design (new structures or modifications)
C.		Permitting
D.		Following an incident (spill or bypass)
E.		Enforcement
F.		Other (please explain):
G.		None

22. Does the permitting authority have written requirements or guidance provisions at the planning stage that dictate or affect the **peak flow** selected by the **utility** for separate sanitary sewer systems?

	✓		
A.		Yes. If yes, check which apply:	
		1.	Rain event return interval (design storm)
		2.	Per capita potable water consumption return flow to sewers
		3.	Infiltration/inflow (I/I) allowance for new sewers
		4.	Infiltration/inflow (I/I) allowance for existing sewers
		5.	Peak to average flow ratio (peaking factor)
		6.	Other
		7.	Don't know
B.		No.	

23. Does the permitting authority require you to measure or project **available capacity** for service expansion to confirm that added capacity is available?

	✓		
A.		Yes. If yes, which of the following apply?	
		Measure (actual measurement of existing and available flow capacity)	
		1.	Measure under dry weather conditions
		2.	Measure under **wet weather** conditions
		Project (model or calculation of existing and available flow capacity)	
		1.	Project existing flow plus expansion flows (with or without use of hydraulic model) and compare to **design capacity**.
B.		No.	
C.		N/A	
D.		Don't know.	

25. 24. Under what circumstances has your permitting authority issued you a Notice of Violation (NOV)? Check all that apply.

	✓	
A.		Experienced from 1 to 4 **wet weather** SSOs in the **conveyance system** within 12 months.
B.		Experienced from 4 to 10 **wet weather** SSOs in the **conveyance system** within 12 months.
C.		Experienced greater than 10 **wet weather** SSOs in the **conveyance system** within 12 months.
D.		Other: Specify
E.		Not sure of the specific criteria that prompted the NOV.

25. Are plans or specifications for sewer line extensions reviewed and/or approved by the permitting authority prior to adding new growth flows? (Please check all that apply.)

	✓		
A.		Yes. If yes, what references or guidance criteria do they consider?	
		1.	Sewer slope; i.e velocity
		2.	**Sewer capacity**
		3.	Available treatment capacity
		4.	Enforcement status
		5.	Referenced standard, i.e., Ten States Standard, etc.
		6.	Other:
		7.	Don't know
B.		No	
C.		N/A	

26. Are you currently authorized by permit, consent decree, or other authority to discharge from your separate sanitary sewer system prior to the **POTW headworks** using alternative treatment facilities such as **peak excess flow treatment facilities** (**PEFTFs**) (i.e., physical/chemical treatment facilities, ballasted flocculation, etc.)?

	✓				
A.		Yes			
B.		No		✓	
		1.	If No, have you explored the option?	Yes	No
C.		N/A			

27. Are you currently authorized by permit, consent decree, or other authority to discharge from your separate sanitary sewer system prior to the **POTW headworks** through **emergency overflow structures** where only partial or no treatment is provided?

	✓	
A.		Yes
B.		No
C.		Not sure
D.		N/A

28. Are you operating under a current or pending consent decree or other enforcement action that dictates or affects peak flow capacity in your separate sanitary sewer system: i.e., stipulates new or additional requirements for I/I reduction, eliminating SSOs, specifies sizing criteria for sewers, allows PEFTF, requires CMOM, etc.?

	✓	
A.		Yes
B.		No
C.		N/A

29. Are you operating under a current or pending consent decree or other enforcement action that dictates or affects **peak flow capacity** in your combined sewer system: i.e., stipulates new or additional requirements for I/I reduction; eliminates SSOs; specifies sizing criteria for sewers; allows PEFTF; requires **CMOM**; % CSO capture; separates the combined from the **separate sanitary sewers**; etc.?

	✓	
A.		Yes
B.		No
C.		N/A

30. Have there been any moratoriums prohibiting new connections to the separate sanitary sewer system issued by the permitting authority in the last three years?

	✓	
A.		Yes
B.		No
C.		N / A

31. Does your permitting authority count **wet weather** overflows in the combined sewer area of your system as SSOs when they occur from manholes or other locations not listed in your permit?

	✓	
A.		Yes
B.		No
C.		N / A
D.		Don't know

32. Under what circumstances in the last three years has the permitting authority exercised enforcement discretion and not issued an enforcement action for reported SSOs in the separate sanitary sewer system that reached waters of the United States? (Check all that apply.)

	✓	
A.		Vandalism or accident during dry weather
B.		**Extreme wet weather event**
C.		Conveyance design flow criteria exceeded during **wet weather**
D.		Power outage during dry weather
E.		Power outage during **wet weather**
F.		Root intrusion, grease, or corrosion during dry weather
G.		Reporting or notification infraction
H.		Operation of plant during overflow consistent with **CMOM** plan
I.		Other:
J.		None
K.		N / A

33. Under what circumstances in the last three years has the permitting authority issued an enforcement action for reported SSOs in the separate sanitary sewer system that did not reach waters of the United States? (Check all that apply.)

	✓	
A.		Vandalism or accident during dry weather
B.		**Extreme wet weather event**
C.		Conveyance design flow criteria exceeded during **wet weather**
D.		Power outage during dry weather
E.		Power outage during **wet weather**
F.		Root intrusion, grease, or corrosion during dry weather
G.		Basement backup
H.		Reporting or notification infraction
I.		Related to **CMOM** implementation
J.		Other:
K.		None
L.		N / A

34. How does your NPDES permit address SSOs in your separate sanitary sewer system (exclude the treatment plant, just the sewer system)?

	✓		#
A.		Prohibition of all SSOs, with no exceptions or defenses	
B.		At selected sites listed in permit, allows overflows under certain conditions	
C.		Prohibition of all SSOs, except if flows exceed the **design capacity**	
D.		Prohibition of all SSOs, except under **unavoidable** conditions	
E.		Other:	
F.		No provisions	

Design/Process/Technology Factors

35. What is your **utility**'s typical evaluation cycle for assessing growth trends, evaluating the current conveyance versus planned capacity, and establishing specific capital improvement projects? (Check the best answer for each of the three categories.)

	✓			
	Growth	Capacity	Projects	
A.				≤ 3 years
B.				≤ 5 years
C.				≤ 10 years
D.				≤ 20 years
E.				> 20 years
F.				Random
G.				Other: Specify
H.				Don't know

36. Does your **utility** have its own design guidance / policy manual that presents the **utility**'s standards (basis, process, or criteria) for sizing new sewers or expanding capacity for existing **conveyance systems**?

	✓		
A.		Yes. If yes, which apply?	
		1.	Develop own standards
		2.	Use adopted industry standards, i.e., Ten State Stds; Guides for the Design of Wastewater Treatment Works; Existing Sewer Evaluations & Rehabilitation; Sewer System Evaluations, Rehabilitation and New Construction; etc.
		3.	Use standards based on criteria required by permitting authority
		4.	Don't know
B.		No	
C.		Don't know	

37. What **peak flow criteria** are typically used to size your new sewers and pump stations or confirm the sizing of existing sewers and pump stations for the entire **conveyance system**? (Check all that apply for New Sewers, Existing Sewers, and Pump Stations)

	✓						
	Separate	Combined					
A.			New Sewers				
			1.	Per capita allowance:	Plus an I/I allowance	Without an I/I allowance	
				a.	Fixed value over system		
				b.	Variable value, customer based		
			2.	Peaking Factor (applied to average estimated flow)			
				a.	Fixed value over system		
				b.	Variable value, customer category based		
			3.	Flow per land use classification			
			4.	Targeted rainfall intensity / duration event			
			5.	Flow (from one of above) used in depth / diameter ratio			
			6.	Other:			
B.			Existing Sewers				
			1.	Per capita allowance	Plus an I/I allowance	Without an I/I allowance	
			2.	Targeted rainfall intensity / duration event			
			3.	Documented historical rainfall event			
			4.	Historic characteristic year rainfall (distributed monthly)			
			5.	Other:			
C.			Pump Stations (new and existing[for new stations, might phase pumped flows, but build station for ultimate flows])				
			1.	Station flow matches incoming sewer **peak flow**			
			2.	Add a capacity allowance to the planned incoming sewer **peak flow**. Check which best applies.			
			≤10%		≤20%	≤30%	≤50%
			3.	Other			
D.			Don't know				
E.			N / A				

38. Do you have a planning document that coordinates conveyance **peak flows** with treatment capacity **peak flows**?

	✓	
A.		Yes
B.		No
C.		N/A

39. Is an allowance for I/I included in the **peak flow criteria** for <u>new</u>, publicly owned **separate sanitary sewers**?

	✓			
A.		Yes		
		1. If yes, does the allowance account for I/I from private property sources?	Yes	No
B.		No.		
C.		N/A		

40. Is an allowance for I/I included in the **peak flow criteria** for <u>existing</u>, publicly owned **separate sanitary sewers**?

	✓			
A.		Yes		
		1. If yes, does the allowance account for I/I from private property sources?	Yes	No
B.		No		
C.		N/A		

41. Which **wet weather** controls do you currently use or are considering to manage system **peak flows**? (Check all that apply.)

	✓				
	Currently Use		Considering		
	Separate Sanitary Sewers	Combined Sewers	Separate Sanitary Sewers	Combined Sewers	
A.					I/I Rehabilitation or separation
B.					Public property service lateral I/I rehab or separation
C.					Private property service lateral I/I rehab or separation
D.					Real time control, i.e., in-line storage
E.					Off-line storage (above/below ground, i.e., tunnels, reservoirs)
F.					Increased conveyance capacity
					Sewer separation
G.					**Peak excess flow treatment facilities**
H.					Other:

42. Has I/I reduction been an effective control alternative?

	✓										
A.		Yes	If yes, how have you determined its effectiveness? (Check all that apply.)								
		1.	Post rehab flow monitoring. Check the average reduction realized and circle whether it is a volume or peak hour reduction basis.								
			≤ 10%	≤20%	≤ 30%	≤ 40%	≤ 50%	≤ 60%	>60%	Reduction Basis	
										Volume	Peak hour
		2.	Reduced customer complaints / service calls in historical problem areas.								
		3.	Lower **peak flows** at the **POTW**						Measured	Subjective	
		4.	**POTW** flows recover to normal more quickly after rain events						Measured	Subjective	
B.		No	If No, how have you determined it has not been effective? (Check all that apply.)								
		1.	Post rehab flow monitoring. Check the average reduction realized and circle whether it is a volume or peak hour reduction basis.								
			≤ 10%	≤20%	≤ 30%	≤ 40%	≤ 50%	≤ 60%	>60%	Reduction Basis	
										Volume	Peak hour
		2.	No reduced customer complaints / service calls in historically problem areas.								
		3.	No **peak flow** reductions at the **POTW.**						Measured	Subjective	
		4.	No change in **POTW** flow recovery to normal after rain events.						Measured	Subjective	
C.		Believe so but no data to support. Specify type of control(s) used:									
D.		Don't know									

43. Do you have a regular program to physically inspect or evaluate (visual inspection, CCTV, SSET, etc.) your sewer system?

	✓							
A.		Yes	If yes, please complete the following:					
		1.	What average annual percentage of the system is inspected or evaluated?					
			≤ 1%	≤ 3%	≤ 5%	≤ 10%	≤ 20%	≤ 50%	>50%
		2.	What is the primary basis for conducting regular inspections (do not include emergency or customer response inspections)? (Check one.)					
			Condition assessment					
			Extraneous I/I reduction					
			Geographical, i.e., working from east to west, etc.					
			Random					
			Other: Specify					
B.		No						

44. Do you have flow measurement instrumentation at most of your **significant pump stations**? Check one.

	✓	
A.		Yes
B.		Plan to add at remainder of stations within the next three years
C.		No

45. Do you have either permanent or temporary emergency power at most of your **significant pump stations**? Check one.

	✓	
A.		Yes
B.		Plan to add at remainder of stations within the next three years
C.		No

46. Are pumping rates and control settings for your **significant pump stations** checked on a regular basis?

	✓		
A.		Yes	If yes, how frequently are pump station capacities measured and compared to their **design capacity** rates? At least:
		1.	Once a year
		2.	Twice a year
		3.	Once every two years
		4.	Once every three – five years
		5.	Once every ten years
		6.	Don't know
B.		No	If no, which actions, other than flow calibration, are performed at the **significant pump stations**?
		1.	Only evaluate indirect flow performance parameters such as amp draw, discharge pressure, etc.
		2.	Only visual evaluations are performed
		3.	Do not measure flows
C.		N/A	

47. Categorize the extent the following conditions present conveyance performance problems or take up the **design capacity** in your sewer system. Check all that apply.

		Location Extent		Frequency of Problem				
	Conveyance Problem	Wide Spread Problem	Problem in Localized Areas	Frequent Problem	Infrequent Problem	Not a Problem	Don't Know If a Problem	N/A
A.	Groundwater infiltration							
B.	Fats, Oils, Grease							
C.	Sediment							
D.	Basement Flooding							
E.	Public Property **RDII**							
F.	Private Property **RDII**							
G.	Hydraulic restrictions or surging (i.e., sewer slopes, pump stations)							

48. Do you have capacity-related SSOs in your separate sanitary sewer system(s)?

	✓		#
A.		Yes	
		1. If yes, what is the annual average number of capacity related overflows in your service area?	
B.		No.	

Other Influencing Factors

49. **Current Factors:** Rank the relative importance of the factors that are currently considered when setting the **peak flow capacity** conveyed to the **POTW** (1-5; 5 being of greatest importance). Circle importance of each factor.

Factor		Relative Rank				
A.	Affordability	5	4	3	2	1
B.	Level of service (avoiding service disruptions or backups on personal property or discharges in public areas)	5	4	3	2	1
C.	Impacts on receiving water's designated use or water quality criteria (disruption of public use of waterways for recreation, water supply, etc.)	5	4	3	2	1
D.	Impacts on ambient water quality	5	4	3	2	1
E.	Pre-set regulatory standards (i.e., design storm event)	5	4	3	2	1
F.	Enforcement-related or court order	5	4	3	2	1
G.	Public health concerns	5	4	3	2	1
H.	Political factors	5	4	3	2	1

50. **What should be the most important factors:** Rank the relative importance of the factors that should be considered when selecting the **peak flow** conveyed to the **POTW** (1-5; 5 being of greatest importance). Circle importance of each factor.

Factor		Relative Rank				
A.	Affordability	5	4	3	2	1
B.	Level of service (avoiding service disruptions or backups on personal property or discharges in public areas)	5	4	3	2	1
C.	Impacts on water's designated use (disruption of public use of waterways for recreation, water supply, etc.)	5	4	3	2	1
D.	Impacts on ambient water quality	5	4	3	2	1
E.	Pre-set regulatory standards (i.e., design storm event)	5	4	3	2	1
F.	Enforcement-related or court-order	5	4	3	2	1
G.	Public health concerns	5	4	3	2	1
H.	Political factors	5	4	3	2	1

Additional
Comments:_____
_____
_____
_____
_____
_____

PART C. TREATMENT

Facility Data

51. How many **POTW**s do you have in your entire service area? _____

52. What is the average annual daily design flow for your **POTW**s? (Check all that apply.) List the number of **POTW**s in your system for each range. (Include in the average flow to a **wet weather**-only treatment facility serving the **POTW**.)

	✓		#
A.		< 1 mgd	
B.		<2.5 mgd	
C.		2.5 ≤ 5 mgd	
D.		5 ≤ 10 mgd	
E.		10 ≤ 25 mgd	
F.		25 ≤ 100 mgd	
G.		>100 mgd	

53. What treatment components are provided at your **POTW**(s)? (Check all that apply.) List the number of **POTW**(s) for which each checked treatment component applies.

	✓		#
A.		Preliminary	
B.		Primary	
C.		Flow equalization	
D.		High-Rate physical/chemical processes for **wet weather** use	
E.		Biological processes	
F.		**Advanced Secondary** (includes nutrient removal)	
G.		**Tertiary** (additional unit process)	

54. Do you have treatment units on your **POTW** site that are brought into operation when only treating **peak flows** occurring during **wet weather**? (Do not include regular treatment units designed into the basic flow and treatment configuration that are kept empty.)

	✓			#
A.		Yes.		
B.		No.	If no, which of the below apply?	
		1.	Don't have separate **wet weather** treatment units	
		2.	Used during both normal and **wet weather** conditions	

55. Is the design capacity of your primary treatment units greater than your biological treatment units?

	✓				
A.		Yes			
		1.	If yes, enter the number of treatment plants in the column that best represents the ratio of primary to biological capacity for those plants.		
		≤ 2:1	2:1 to 4:1	4:1 to 6:1	6:1 or greater
B.		No			

56. What is the ratio of peak hour flow to annual average flow that reaches immediately upstream of the **POTW headworks** (include any flow receiving **peak flow** treatment at the **POTW** site)? Enter the number of **POTW**s with the applicable ratio and the predominant sewer system type, i.e., separate sanitary or combined sewer.

	✓		
	Number of **POTW**s		
	Separate Sanitary Sewers	Combined Sewers	
A.			3: 1 or less
B.			Between 3: 1 and 5:1
C.			Between 5:1 and 7:1
D.			7:1 or greater

Regulatory Factors

57. What is the applicable interval for the concentration limits that must be reported under your **POTW** discharge permit(s)? (Check all that apply.) Please list the number of **POTW**(s) for which the checked intervals apply.

	✓		#
A.		Monthly average	
B.		7-day average	
C.		Daily (single composite sample)	
D.		Other. Specify:	

58. Does your **POTW** discharge permit have a required percent removal of pollutants in addition to a numerical concentration limit?

	✓			
A.		Yes. If yes, answer 1, 2, and 3 below.		
		1.	Please note the number of **POTW**(s) that have both percent removal and numerical limits.	
		2.	For each **POTW** with dual limits, please note the percent removal (we assume doesn't vary from permit to permit).	
		3.	Does the percent removal change during **peak flow** events?	
			Yes ☐ No ☐	
B.		No		

59. During **peak flow** events, how does your permit measure compliance? Please list the number of **POTW**(s) for which the checked measure applies.

	✓		#
A.		On the **blended effluent** quality	
B.		Only on the flow receiving biological treatment	
C.		Separate measurements of both the biologically-treated and partially-treated flows using separate quality criteria	

60. Does your **POTW** have discharge criteria that limit any of the following? Please list the number of **POTW**(s) for which the checked criteria apply.

	✓		#
A.		The volume of effluent discharge during a specific period of time	
B.		The mass of pollutants discharged during a specific period of time	
C.		The mass of pollutants discharged during a specific period of time, except during **peak flows** (i.e., tied to stream flow)	
D.		Both volume and mass discharged during a specific period of time	
E.		N / A	

61. Do you typically wait for the permitting authority to notify you that your treatment capacity is at or approaching its **design capacity** before initiating actions to increase treatment capacity?

	✓	
A.		Yes
B.		No

62. Does your **POTW** discharge permit include a limit on the number of plant **bypasses**, or partial plant **bypasses**, allowed per year?

	✓		#
A.		Yes	
		1. If yes, how many are allowable per year?	
B.		No	

Design/Process/Technology Factors

63. Which of the following limits the **peak flow** treatment capacity of your **POTW**(s)? (Check all that apply.) Please list the number of **POTW**(s) for which the checked limiting factors apply.

	✓		#
A.		**Conveyance system**	
B.		**POTW** Influent pumping	
C.		Internal facility hydraulics	
D.		Preliminary / primary treatment capacity	
E.		**Secondary treatment** capacity	
F.		Discharge permit conditions	
G.		Operational staff	
H.		Other (explain):	

64. During a **wet weather** event, when you want to maximize the rate of flow through the plant, how important is avoiding disruption of the biological treatment process when making the decision to bypass **secondary treatment** (blend secondary and preliminary / primary) flows at the **POTW**(s)? This question assumes your **POTW** is not designed to hydraulically limit the flow to the secondary units relative to the primary units. If answer is different for each or several of your **POTW**(s), please list the number of **POTW**(s) for each response:

	✓		#
A.		Very important	
B.		Important	
C.		Not important	
D.		N / A	

65. What is the maximum ratio of peak hour flow to annual average flow that you allow to flow to the secondary (biological) treatment system for your **POTW**? List the number of **POTW**s at this ratio.

	✓		#
A.		2:1 or less	
B.		2:1-3:1	
C.		3:1-4:1	
D.		4:1 or greater	

66. How did you determine how to limit the **peak flow** to your **secondary treatment** biological process? List the number of **POTW**s for all that apply.

	✓		#
A.		Full scale operating experience	
B.		Unit process stress testing	
C.		Established design criteria	
D.		Based on **POTW** Operations manual	
E.		Other (explain):	

67. Are you able to get increased flows through the biological units during **wet weather** periods if the blowers / aerators are temporarily turned off compared to leaving them on?

	✓			
A.		Yes. If yes, are you generally able to meet your permit effluent requirements?	Yes	No
B.		No		
C.		N / A		

68. Have you confirmed the design criteria of unit processes within the **POTW**(s) through stress testing or other methods?

	✓			#
A.		Yes. If yes, please list the number of **POTW**(s) in your system for which the following apply:		
		1.	Stress testing	
		2.	Other method(Please explain):	
		Please note what the results of testing concluded:		
		1.	Couldn't meet design criteria	
		2.	Greater capacity than design criteria	
		3.	No change from design criteria	
		4.	Inconclusive	
B.		No.		

69. If you are not currently blending flow during **wet weather** consider the following. If the primary treated effluent were blended during **wet weather** with effluent that received biological treatment, in the **utility**'s opinion, would you be capable of meeting your **POTW** permit effluent numerical limits?

	✓		
A.		Yes, all the time.	
B.		Yes, majority of time (may not in extreme **wet weather** periods).	
C.		Yes, but will not pursue because (check all that apply):	
		1.	Specifically precluded in permit
		2.	Not allowed by State or Region permit authority
		3.	Facilities are not available at the **POTW**
		4.	Public perception / opposition
		5.	Other (explain):
D.		No. If no, why not? (check all that apply):	
		1.	Permit limits are too difficult to achieve
		2.	Operational issues
		3.	Other (explain):
E.		N / A	

70. Is there currently space available at the **POTW**(s) to improve your **peak flow** treatment performance and increase **peak flow** treatment capacity (excluding modifying flow regimes or chemical addition to primary clarifiers)? Please list the number of **POTW**(s) for which the following apply.

	✓			#	
A.		Yes			
B.		No. If no, then:		Yes	No
		1.	Are there any developing enhanced primary treatment technologies (high rate processes requiring less space) that you would consider if they were proven? Please list:		
		2.	Would you consider installing a high-rate physical / chemical process that requires less space than conventional primary units if its effectiveness and operability was better demonstrated?		

71. Do you think there is a treatment technology currently available for the **POTW** that could improve your **peak flow** treatment performance and increase **peak flow** treatment capacity?

	✓		
A.		Yes	
		1.	If yes, what concerns you most about investigating the technology further? (check all that apply):
		a.	Affordability
		b.	High risk of not performing as intended
		c.	Space not available at **POTW**
		d.	Would need to add staff
		e.	Operations
		f.	Lack of regulatory compliance clarity
		g.	Regulatory agency would object
		h.	Other (explain):
		2.	If yes, will your permitting authority allow you to incorporate it? (check which best applies)
		a.	Yes
		b.	No
		c.	Don't know
		3.	If yes, would you be willing to install it if the permitting authority would allow you? (check which best applies)
		a.	Yes
		b.	No, because:
		c.	Don't know
B.		No	

72. Does your **POTW**(s) add chemicals to the primary clarifiers to improve solids removal during **peak flow** events? Please list the number of **POTW**(s) for which the following apply:

	✓		
A.		Yes. If yes, answer the following questions:	#
		1. How are they added?	
		a. Continuously	
		b. At a specific time	
		2. What percent of the nominal rated flow treatment capacity are you able to increase when chemicals are added? _____	
		3. What is the basis for initiating chemical addition?	
B.		No	

73. Does your **POTW**(s) add chemicals to the secondary clarifiers to improve solids removal during **peak flow** events? Please list the number of **POTW**(s) for which the following apply:

	✓		
A.		Yes. If yes, answer the following questions:	#
		1. How are they added?	
		a. Continuously	
		b. At a specific time	
		2. What percent of the nominal rated flow treatment capacity are you able to increase when chemicals are added? _____	
		3. What is the basis for initiating chemical addition?	
B.		No	

74. If **peak flow** coming into the plant **headworks** regularly exceeds the hydraulic and biological capabilities of the **POTW**, what is the process you would most likely follow?

	✓	
A.		Determine the cost of new treatment capacity versus cost of reducing **peak flow** into **headworks**
B.		Evaluate impacts of the resulting temporary discharge(s) on the public and environment; then develop solutions in cooperation with regulatory agency.
C.		No immediate action
D.		Other (Explain):

Other Influencing Factors

75. When considering **peak flow** treatment at your **POTW**(s), how would you rank each of the following factors in terms of relative importance (1-5, 5 being of greater importance)? Circle correct number for each item.

	Factor	Relative Rank				
A.	Affordability	5	4	3	2	1
B.	Level of service (avoiding service disruptions or backups on personal property or discharges in public areas)	5	4	3	2	1
C.	Impacts on water's designated use (disruption of public use of waterways for recreation, water supply, etc.)	5	4	3	2	1
D.	Site constraints	5	4	3	2	1
E.	Treatment technology	5	4	3	2	1
F.	Pre-set regulatory standards	5	4	3	2	1
G.	Enforcement-related or court order	5	4	3	2	1
H.	Public health concerns	5	4	3	2	1
I.	Political factors	5	4	3	2	1
J.	Other	5	4	3	2	1

76. Do periods of **peak flow** occur on a predictable seasonal basis?

	✓	
A.		Yes
B.		No

77. If seasonal **peak flow** is related to snowmelt or rainfall derived infiltration/inflow:

	✓		
A.		Is it cost-effective to provide biological treatment for those high flows and/or low temperatures?	
		1.	Yes
		2.	No
		3.	N/A
B.		Does your permit allow a different standard of compliance during those high flow and/or low temperature periods?	
		1.	Yes
		2.	No
		3.	N/A
C.		N/A	

78. Does public perception impact your decision on bypassing or blending flows at the **POTW**?

	✓	
A.		Yes
B.		No

79. Is there sufficient buffer space available at the **POTW** to mitigate public opposition to equalization facilities?

	✓	
A.		Yes
B.		No
C.		N/A
D.		Don't know

Additional Comments:_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

PART D. DEFINITIONS	
Advanced secondary	In addition to secondary treatment, additional unit processes to remove nutrients or provide color or odor enhancement of the effluent.
Available capacity	The difference between the design capacity of the sewer and the capacity amount presently occupied in the sewers, i.e. the remaining capacity in the sewers.
Blended effluent	Occurs when wet weather events approach or exceed the design capacity of the **POTW** and the flow is routed around biological treatment units and blended together with the effluent from the biological units prior to discharge.
Bypasses	The intentional diversion of wastestreams from any portion of a treatment (or pretreatment) facility. The treatment facility begins at the headworks where equalization of the waste streams takes place or the collection system otherwise ends. Some Regions and States interpret bypass more broadly to include discharges from sanitary sewer systems before the headworks.
CMOM	Capacity, Management, Operations & Maintenance: the provisions within EPA's proposed SSO Rule that are aimed at establishing performance based requirements and processes that will provide for well managed and efficient operations of separate sanitary sewer systems.
Combined sewers	Conveys sanitary sewer wastes in addition to storm sewer runoff.
Conveyance system	Consists of the sanitary sewers, combined sewers, pumping stations, and any sewer system appurtenances located between the source of the waste or runoff flow and the headworks of the treatment facility.
CSO outfall discharge structures	The structure or outfall pipe that is used to discharge a portion of the flow from the combined sewer system into a water body upstream of the headworks of a **POTW**.
Design average flow	The annual average flow at which the **POTW** was designed to operate.
Design capacity	The maximum amount, usually expressed as a rate, that the conveyance or treatment system or component was designed to properly convey or treat under specified conditions such as during wet weather periods.

Emergency overflow structures	Outfalls from the separate sanitary sewer system that allow a discharge to waters of the United States. Outfalls can be located at a manhole or special structure built to divert flow into the outfall under special conditions or from a pump station wet well. CSOs are not considered to occur at emergency overflow structures.
Enforcement mechanism	An administrative order or consent decree issued by the regulatory authority or the Department of Justice.
Extreme wet weather event	Infrequent, severe natural conditions occurring during hurricanes, tornadoes, and widespread flooding. Extreme wet weather events may cause the design capacity of the conveyance or treatment system to be significantly exceeded to the extent the systems can not function as designed or require protective operational measures to protect the infrastructure. Extreme wet weather events may be locally defined.
Headworks	The point where the conveyance system ends and the treatment facility begins. It is located at the head or beginning of the primary treatment (physical treatment) stage. Headworks include pumping and/or screening facilities.
Interceptors	Interceptors are the larger sewers in the system that function as the primary conveyance pipes that collect and carry flow from main and trunk sewers to the headworks of the treatment facility.
Municipal satellite sewer system	A municipal sewer system that is owned or operated by a municipality other than your own that does not provide its own treatment but conveys it to your municipal system for treatment.
Municipality (municipal system)	A city, town, borough, county, parish, district, association, or other public body created by or pursuant to State law and having jurisdiction over disposal of wastewater, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act.
Outfalls	The pipe or conduit that conveys treated or untreated discharges from either the conveyance system or the treatment facility to waters of the United States or a ditch or storm drain.

Peak excess flow treatment facility (PEFTF)	Sanitary sewer system treatment facilities usually located upstream of the **POTW** headworks that are only used during extreme wet weather periods and that may or may not be designed to meet effluent limits based on secondary treatment.
Peak flow	The maximum flow expressed over a specific length of time. Peak flow equals the design capacity of the conveyance or treatment system.
Peak flow criteria	The guidelines or conditions that are used to establish or test the peak flow standard (i.e. for sewers it could be peak flows that result from a specific rainfall intensity / duration / frequency and stay within certain hydraulic grade line limits above the invert of a gravity sewer).
Peak flow capacity	Same as peak flow.
Peak flow standard	The peak flow value that has been established by the **utility** or regulating authority as the measure for sizing or measuring conveyance or treatment component performance.
POTW or Publicly Owned Treatment Works	A treatment facility that is owned by the state or municipality. This definition includes any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. For the purposes of the survey it does not include sewers, pipes, and other conveyances that convey wastewater to a POTW.
RDII or Rainfall Derived Infiltration and Inflow	That portion of a sewer flow hydrograph above the normal dry-weather flow pattern. It is the sewer flow response to rainfall or snowmelt in a sewershed.
Regional conveyance	A conveyance system that serves your own customers and / or customers from other municipalities that do not provide their own treatment.
Regional treatment	A treatment facility that serves your own customers and / or customers from other municipalities that do not provide their own treatment.
Sanitary sewer overflows (SSOs)	Discharges of raw sewage from municipal sanitary sewer systems. For the purposes of this survey, SSOs includes the release of untreated sewage into basements, out of manholes and onto city streets, and into streams.

Secondary treatment	Technology-based requirements for direct discharging municipal sewage treatment facilities. Standard is based on a combination of physical and biological processes typical for the treatment of pollutants in municipal sewage. Standards are expressed as a minimum level of effluent quality in terms of: BOD5 , suspended solids (SS), and pH (except as provided for special considerations and treatment equivalent to secondary treatment).
Separate sanitary sewer	A pipe or conduit (sewer) intended to carry wastewater or water-borne wastes from homes, businesses, and industries to the POTW.
Sewer drainage basin	The sewer service area composed typically of multiple subbasins where the topography of the sewer service area causes the collected wastewater to flow to a single POTW for treatment.
Sewer capacity	Same as design capacity.
Significant pump stations	Pump stations that because of their size or location would create serious public health, environmental, or nuisance problems if the station failed to function for whatever reason.
Tertiary	In addition to secondary treatment processes, includes additional unit processes such as filtration.
Unavoidable	The discharge was exceptional, unintentional, temporary and caused by factors beyond the reasonable control if the municipality (permittee). In addition, the discharge could not have been prevented by the exercise of reasonable control, such as proper management, operation and maintenance; adequate treatment facilities to accommodate growth or adequately controlling and preventing I/I; preventive maintenance; or installation of adequate backup equipment.
Upset	An exceptional incident in which there is unintentional and temporary noncompliance with the permit limit because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
Utility	Utility is used interchangeably with municipality.

Wet weather	Periods during or after rainfall events. For the purposes of this survey, wet weather refers to wet periods that cause the flows in the conveyance system or at the plant to increase to rates anywhere in the range up to or exceeding the design capacity of the conveyance or treatment system.