

# Detailed Scope and Methods

The United States Environmental Protection Agency (EPA) prepared the *Clean Watersheds Needs Survey (CWNS) 2012 Report to Congress*, hereinafter referred to as “the Report,” in compliance with Clean Water Act (CWA) section 516(b)(1)(B). The Report— which contains results from the 16<sup>th</sup> survey since the CWA was enacted in 1972—estimates the capital investment necessary for the nation’s publicly owned treatment works (POTWs) to meet the water quality objectives of the CWA.

The Report is a collaborative effort among the States, the District of Columbia, U.S. Territories (collectively referred to as “States”), and EPA. From November 2009 through December 2011, the CWNS 2012 National Workgroup provided input on CWNS methods.

## Types of Needs in the Report

Needs in the Report include the unfunded capital costs of treatment works projects (as defined in CWA section 212), that:

- Address a water quality or a water quality-related public health problem existing as of January 1, 2012, or expected to occur within the next 20 years for POTWs; and
- Meet the CWNS documentation criteria that includes: (1) a description and location of a water quality or water quality-related public health problem, (2) a site-specific solution to the problem, and (3) detailed cost information to implement the solution.

Needs in the Report are summarized using the needs categories in Table 1 and defined in Appendix C of the Report. The Report does not include all needs related to water quality and water quality-related public health problems. The following costs are not included:

- Known water quality projects that do not yet have documented solutions or cost estimates. In some communities, the source of the problem, the proposed solution, or the cost estimates of the solution are not yet sufficiently documented to meet the guidelines for inclusion in CWNS 2012.
- Projects for which unofficial cost estimates approximate needs without acceptable documents.
- Privately owned wastewater facilities or those that serve privately owned industrial facilities, military installations, national parks, or other federal facilities.
- Operation and maintenance projects.
- Nonpoint source pollution control projects (previously reported as Category VII).
- Projects on tribal lands and Alaskan Native Villages. The Indian Health Service (IHS) conducts a separate survey and provides a Report to Congress annually under Public Law 86-121. Wastewater needs on tribal reservations and Alaskan Native Villages are based on the Sanitation Deficiency System within the IHS Sanitation Tracking and Reporting System (<http://wstars.ihs.gov/>).

- Projects in South Carolina, American Samoa, and the Northern Mariana Islands, because they did not participate in the 2012 CWNS.

Appendix D in the Report summarizes Decentralized Wastewater Treatment Systems (Category XII) needs that met CWNS documentation requirements but are not defined in CWA section 212.

**Table 1. CWNS 2012 Needs Categories**

<p>Section 212<sup>a</sup> Wastewater Treatment &amp; Collection</p>	<p><b>Wastewater Treatment</b> Secondary wastewater treatment (I) Advanced wastewater treatment (II) <b>Conveyance System Repair</b> Infiltration/inflow correction (III-A) Sewer replacement/rehabilitation (III-B) <b>New Conveyance Systems</b> Collector sewers (IV-A) Interceptor sewers (IV-B) <b>Recycled Water Distribution (X)</b></p>
<p>Section 212<sup>a</sup> Wet-Weather Water Management</p>	<p><b>Combined Sewer Overflow Correction (V)</b> <b>Stormwater Management</b> Conveyance Infrastructure (VI-A) Treatment Systems (VI-B) Green Infrastructure (VI-C) General Stormwater Management (VI-D)</p>

<sup>a</sup> Consistent with CWA section 212 funding assistance eligibilities, official needs in Categories I through VI (except VI-C) and Category X are limited to publicly owned treatment works.

## Time Frame for Needs in the Report

For inclusion in the Report, a need had to address a water quality or water quality-related public health problem that existed as of January 1, 2012, or was expected to occur within the next 20 years.

The Report compiles short-term and long-term needs that could be documented in accordance with documentation criteria. During the 1970s and 1980s, wastewater infrastructure planning primarily used a 20-year planning horizon (as influenced by a Title II Construction Grants Program requirement). Beginning with the 1990 survey, the focus of CWNS shifted to updating documented needs based on eligibilities for the Clean Water State Revolving Fund (CWSRF) program. In the CWSRF program, States and local communities have greater flexibility for managing construction activities. Now, wastewater infrastructure planning horizons vary considerably across the United States. Planning horizons now range from 5 years or less to 20 years or more. Because the CWNS rely on state and local documents of varying time horizons, the needs documented in reports after 1990 have not estimated the complete 20-year needs for the nation. While the Report might capture needs over a period of up to 20 years, nearly all needs it includes are for projects that will be completed within 5 years (i.e., 2012-2017). States do not generally have documentation that demonstrates needs over a 20-year time frame. Costs beyond 20 years have been excluded from the Report.

# Types of Technical Data in the Report

In addition to needs data, technical data included in the Report and online data tools include the following:

- Facility information, including facility name, CWNS number, and ownership information. It also describes the present components of the project (e.g. treatment plant, separate sewers), the planned change to the project (e.g. rehabilitation, replacement), and the resulting projected components.
- Permit information, including NPDES permits and state permits.
- Point of Contact information, including the authority name and contact information for the responsible entity.
- Location information, including physical address for treatment plants, coordinates, county(ies), congressional district(s), and watershed(s).
- Flow for treatment plants, including existing flow, present design flow, and future design flow.
- Present and projected population receiving centralized and decentralized treatment
- Present and projected effluent level of treatment, including advanced treatment indicators (e.g., nitrogen removal, ammonia removal) for facilities with advanced treatment.
- Present and projected discharge method (e.g., discharge to surface water, discharge to another facility)

In addition to the technical data from facilities with official needs, the technical data associated with facilities that reported zero needs and unofficial cost estimates are included in the report analysis and online tables. Since South Carolina and the Northern Mariana Islands did not participate in CWNS 2012, their technical data from the CWNS 2008 are used in the Report.

## Data Entry Procedures

EPA and the CWNS 2012 National Workgroup set the following CWNS 2012 data entry objectives:

- Updating and entering new documented costs using the most current planning documents available;
- Documenting Combined Sewer Overflow (CSO) Correction (Category V) needs using long-term control plans or other planning documents;
- Improving the reporting of historically underreported needs for small communities, decentralized wastewater treatment systems, and stormwater management projects; and

- Identifying projects that are designed to improve energy efficiency or mitigate the impacts of climate change.

To help achieve these objectives, EPA and the CWNS 2012 National Workgroup continued to enhance the Data Entry Portal (DEP), developed a detailed CWNS 2012 User Manual, and created outreach materials focused on improving the reporting of historically underreported needs. EPA provided training to States via a webcast series (November 2010 - March 2011) and at 5 regional kickoff meetings (April - December 2011). EPA also provided data from the CWNS 2008 as a baseline for the CWNS 2012 data entry effort. States entered data into the CWNS 2012 DEP from January through December 2012.

To clarify issues raised by States throughout the data entry period, EPA held monthly conference calls, provided additional training opportunities, and developed frequently asked questions documents. EPA also supported individual states through phone calls and e-mail.

## CWNS 2012 Data Entry Portal (DEP)

The CWNS 2012 DEP allowed States to enter detailed information about each facility, such as facility descriptions, funding needs, locations, and wastewater systems' levels of treatment and populations served. The DEP provided several data entry and review advantages, including the ability to do the following:

- Have multiple users, across multiple organizations, within each State
- Designate which State users have which access rights to which data records
- Copy data, such as National Pollutant Discharge Elimination System (NPDES) data, from other systems to minimize required data entry
- Click on an interactive Internet map to capture location data in the DEP
- Upload and annotate documents

A data dictionary with detailed descriptions of data fields in the CWNS 2012 DEP is available at [www.epa.gov/cwns](http://www.epa.gov/cwns).

The CWNS 2012 DEP contains information on 34,444 active entries. Seventy percent (24,221) of these entries have wastewater treatment and collection system information, 27 percent (9,286) have decentralized wastewater treatment system information, and 8 percent (2,647) have stormwater management information. An additional 10 percent (3,370) have NPS control, point source pollution, or plan development information and are not included in the Report.

### Examples of DEP Entries

- Wastewater Treatment Plant
- Wastewater Collection System
- CSO Control Facility
- Stormwater Management Facility
- Septic Systems for a community

# Documentation of Needs

Consistent with previous surveys, rigorous documentation was required to validate needs and to ensure the quality of cost and technical information for CWNS 2012. CWNS only captures documented needs for which the sources of the problem are known, solutions are identified, and cost estimates are developed. There are existing, known wastewater infrastructure needs that are not included in this survey due to insufficient documentation. A number of external factors influence available documentation, including municipal budgets, availability of market capital, State and local priorities, and project timing. For example, communities might know they need to address permit compliance issues, but they could be undecided about the specific project they will build. Because there is no documented cost estimate, the needs are not included in CWNS 2012.

## Documentation Criteria

EPA, in consultation with the CWNS 2012 National Workgroup, established seven criteria for States to document each need:

- 1. A description of the current or potential water quality impairment and information on its potential source.** The problem description needed to include specific pollutant source information and/or specific threats to the waterbody. A general statement about water quality impairment or threat did not meet this criterion.
- 2. The location of the problem** needed to be identified as a single latitude/longitude point, a polygon, or a county, watershed or town.
- 3. The solution to the problem.** One or more specific pollution control measures or best management practices (BMPs) needed to be identified.
- 4. The cost for each solution.** The cost to implement each pollution control measure or specified BMP needed to be provided. General estimates for the problem area were not permitted; only site-specific data were acceptable to generate costs.
- 5. The source of the cost.** Documentation (e.g., engineer's estimates, costs from comparable practices, estimates from equipment suppliers) for each solution needed to be identified.
- 6. The total cost.** The total cost of all pollution control measures and BMPs documented for the facility or project needed to be provided.
- 7. Current documentation.** For records with total needs greater than \$30 million (January 2012 dollar base), the documentation date of all documents needed to be January 1, 2006, or more current. For all other needs, the documentation date needed to be January 1, 2003, or more current.

## Acceptable Document Types

To maintain quality and consistency in documentation of needs from State to State, EPA and the CWNS 2012 National Workgroup developed a list of 47 approved types of documentation. In addition, EPA implemented an innovative methods process in which States were able to develop documentation outside the 47 approved types and submit it for EPA evaluation. If EPA determined that the documentation met the criteria listed previously, the documentation could be used to estimate needs and costs. A list of pre-approved documents and their reported needs is presented in Table 2. Definitions of each of the document types are available at [epa.gov/cwns](http://epa.gov/cwns).

**Table 2. Approved Types of Documentation and Associated Needs in CWNS 2012**

Document type code	Document type	January 2012 dollars (billions)	Percentage of total need (%)
01	Intended Use Plan	26.47	9.77
02	State and Federal Loan and Grant Applications	4.55	1.68
03	CWSRF Loan Applications	7.95	2.93
04	Non-governmental Grant Applications	<0.01	<0.01
05	Cost of Previous Comparable Construction	0.15	0.05
06	State-Approved Area-wide or Regional Basin Plan	0.70	0.26
07	State-Approved Local Comprehensive Water and Sewer Plan	3.04	1.12
08	Total Maximum Daily Load (TMDL)	1.53	0.57
10	Nutrient Criteria Studies	0.08	0.03
12	State Needs Surveys & Other State Forms	1.82	0.67
20	Capital Improvement Plan (CIP)	108.03	39.87
21	Facility Plan	30.92	11.41
22	Preliminary Engineer's Estimate	21.69	8.00
23	Final Engineer's Estimate	3.00	1.11
24	Sewer System Evaluation Documents	5.09	1.88
25	Diagnostic Evaluation	<0.01	<0.01
26	Sanitary Survey	0.52	0.19
27	State-Approved Municipal Wasteload Allocation Plan	<0.01	<0.01
28	New State or Federal Regulation	0.08	0.03
30	Administrative Orders, Court Orders, or Consent Decrees	0.39	0.15
31	NPDES or State Permit Requirement (with Schedule)	0.46	0.17
32	CSO Long-Term Control Plan (LTCP)	25.51	9.41
33	Approved CSO Long-Term Control Plan (LTCP)	10.38	3.83
35	State Approved LTCP from CSO LTCP EZ Template	0.02	0.01
40	Watershed Management Plans	5.95	2.20
41	Section 319 Funded or EPA Reviewed Watershed Management Plans	0.15	0.05
43	Approved State 319 Project Implementation Plans	0.18	0.07
44	NPS Mgmt. Program/Assessment Report	<0.01	<0.01

**Table 2. Approved types of documentation and associated needs in CWNS 2012 (continued)**

Document type code	Document type	January 2012 dollars (billions)	Percentage of total need (%)
60	Municipal Storm Water Management Plan	0.82	0.30
71	Small Community Needs Form	3.21	1.19
73	CUPSS (Check Up Program for Small Systems) Wastewater Asset Management Plan	0.06	0.02
93	ARRA Loan Applications	0.73	0.27
99	EPA-HQ Approved	7.51	2.77
<b>Total</b>		<b>270.96</b>	<b>100.00</b>

A variety of cost curves were available in the DEP to estimate costs in cases where the documents contained only a description of the needs. Cost curves were not allowed for facilities where documented cost estimates were available. The wastewater treatment plant and conveyance system cost curves are the same as those available for CWNS 2008. Wastewater treatment plant cost curves are only available for facilities with a projected design flow of less than 5 million gallons per day (MGD). Conveyance system cost curves are limited to facilities with population receiving collection of less than 15,000 people. Many of the decentralized wastewater treatment system cost curves were updated for CWNS 2012. The list of cost curves available for CWNS 2012 is presented in Table 3.

**Table 3. Cost Curves in the CWNS 2012 DEP**

<b>Wastewater Treatment Plants (Categories I &amp; II)</b>
Disinfection Only
Increase Level of Treatment
Increase Flow Capacity
Replacement of Treatment Plant
New Treatment Plant
<b>Conveyance System Repairs and New Conveyance Systems (Categories III &amp; IV)</b>
New/Expand Separate Sewers-Collector
New/Expand Separate Sewers-Interceptor
Separate Sewer System Rehabilitation/Replacement
<b>Decentralized Wastewater Treatment Systems (Category XII)</b>
Rehabilitate Onsite Wastewater Treatment System-Conventional
Rehabilitate Onsite Wastewater Treatment System-Innovative
Rehabilitate Onsite Wastewater Treatment System-All
Rehabilitate Clustered Systems
New Onsite Wastewater Treatment System-Conventional
New Onsite Wastewater Treatment System-Innovative
New Onsite Wastewater Treatment System-All
New Clustered Systems

## Additional Documentation Options for Small Communities

Nationally, needs for small communities—population fewer than 10,000 people—were underestimated, because these communities often had fewer resources available for facility evaluations and other formal documents that explain needs and costs. To more fully capture the needs of small communities, EPA and the CWNS National Workgroup first established guidelines to allow communities to use more streamlined forms of documentation for CWNS 2008. This streamlined process was enhanced for CWNS 2012. Eligible communities were able to provide a description of the proposed project, an explanation of why the project was necessary (i.e., the water quality-related public health or water quality problem), and an estimate of the needs (if available) on a standardized survey form that was signed by suitable community and/or State officials. If cost estimates were not provided, the State used cost curves to estimate costs when possible (Table 3).

## Key Changes from CWNS 2008

For CWNS 2012, several key changes were made to the methodology and review procedures. There were two changes to the categories in which needs were reported. CSO needs were reported in two sub-categories, CSO Correction- Traditional Infrastructure (V-A) and CSO Correction- Green Infrastructure (V-B), instead of a single category. NPS Control (Category VII) needs and technical information were not collected for CWNS 2012.

There were also changes to allowable methods for documenting needs and costs. Five additional documents were added to the pre-approved document list:

- Signed draft Long Term Control Plan (LTCP) from CSO LTCP-EZ Template
- State approved LTCP from CSO LTCP-EZ Template
- CUPSS (Check Up Program for Small Systems) Wastewater Asset Management Plan
- ARRA (American Recovery and Reinvestment Act) Loan Application
- GPR (Green Project Reserve) Business Cases

In addition, CSO needs were based exclusively on documented cost estimates, such as LTCP and other planning documents. CSO cost curves (projections) were not an approved type of documentation for CWNS 2012. For all previous surveys, Category V needs were estimated using a combination of documented costs and cost curve estimates. CWNS moves away from modeling costs to documenting costs when sufficient documentation is available. Cost curve estimates for the CSO Correction (Category V) have been decreasing as a percentage of the CSO Correction needs from 66 percent in 1996 to 42 percent in 2008. In preparation for the CWNS 2012 data collection, states indicated that there is sufficient documentation to allow for the elimination of the cost curve. States did not report documented needs for some facilities that previously reported needs calculated by cost curves.

EPA put an increased emphasis on ensuring that the reported stormwater needs have a stated water quality benefit (as required by documentation criteria 1) during the review process. This was not a change in the methodology. Documentation criteria 1 was in place for CWNS 2008. Rather, it was a change in the review procedures. As a result, projects characterized as “flood control” without a stated water quality benefit were not accepted for CWNS 2012. States indicated that this change made it more difficult to meet EPA’s documentation criteria for stormwater in 2012 than in 2008.

## Data Quality Assurance

EPA conducted a quality control and quality assurance review to ensure the precision and accuracy of the data for the Report. To meet this objective, EPA followed the Agency’s Information Quality Guidelines and developed a Quality Assurance Project Plan (QAPP) in accordance with *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5, EPA/240/B-01/003). As part of the QAPP, EPA developed specific and well-defined standard operating procedures for reviewing technical and cost data. The QAPP defined processes for monitoring adherence to quality control procedures and quality assurance requirements.

A team of reviewers used the QAPP standard operating procedures to review the data that individual States entered into the CWNS 2012 data entry system. The procedures included comparing hardcopy and electronic documentation with data entered in the system, as well as ensuring consistency of technical and cost data.