

Drinking Water and Wastewater Infrastructure Needs in Minnesota Valuation Technical Work Team Report

**University of Minnesota Water Resources Center
January 2011**

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A. Key Findings

- More than \$6 billion will be needed to improve drinking water systems in Minnesota over the next 20 years.
- Of the estimated 535,000 individual sewage treatment systems in Minnesota, about 39% are failing or pose an imminent threat to public health and safety.
- More than \$4.5 billion will be needed to improve public wastewater systems in Minnesota over the next 20 years.
- More than \$1.2 billion will be needed to upgrade and maintain individual wastewater systems over the next 20 years.

B. Introduction

This report summarizes information about drinking water and wastewater infrastructure needs in Minnesota.

- *Drinking water infrastructure* - The U.S. Environmental Protection Agency (EPA) estimates in the next 20 years more than \$6 billion will be needed to improve drinking water systems throughout Minnesota.
- *Wastewater infrastructure* - The Minnesota Pollution Control Agency (MPCA) estimates in the next 20 years more than \$4.5 billion will be needed to improve public wastewater systems, and more than \$1.2 billion to upgrade and maintain individual wastewater systems.

C. Drinking Water System

This section is based on the EPA's fourth national assessment of public water system infrastructure needs, *Drinking Water Infrastructure Needs Survey and Assessment (DWINSA)*, 2007. To continue to provide safe drinking water to the public, EPA estimates nationwide total 20-year capital improvement needs at \$334.8 billion (January 1, 2007, through December 31, 2026). This estimate only includes capital improvement projects eligible for Drinking Water State Revolving Fund (DWSRF) monies, which are in furtherance of the public health protection goals of the Safe Drinking Water Act (SDWA). Eligible projects generally fall into one of two categories:

- 1) replacement or rehabilitation of existing infrastructure due to age or deterioration
- 2) new or expanded infrastructure to meet an unmet need for the current population or to comply with an existing regulatory requirement

Projects ineligible for DWSRF are not included, such as raw water dams and reservoirs, projects related primarily to population growth, and water system operation and maintenance costs. The 20-year drinking water infrastructure need for Minnesota is \$5,988.4 million. This figure is less than the full investment needed since infrastructure costs ineligible to the DWSRF are not included. However, all reported projects eligible for DWSRF are included. The Minnesota Department of Health (MDH) reports all eligible projects, which include:

1. Community Water Systems (CWS)

Public water systems that serve at least 15 connections used by year-round residents or that regularly serve at least 25 residents year-round, including:

- Publicly owned municipal type systems
- Regional water systems
- Privately owned condominium and manufactured home park systems

2. Nonprofit Noncommunity Systems (NPNCWS)

Public water systems that are not a community water system and that serve a nonresidential population of at least 25 individuals daily for 60 days of the year, such as:

- Schools, day care centers, churches, retreat centers

The projects can be grouped into four major categories based on the project type: source, transmission and distribution, treatment, and storage. An additional category “other” is composed of types that do not fit into any of the four categories, such as systemwide telemetry, supervisory control and data acquisition (SCADA) systems, and water system security measures. The distribution of the total need by project type is shown in Table 1.

Table 1. Minnesota 20-year drinking water infrastructure need by project type

Project Type	Needs (million dollars)	Proportion (%)
Source	372.0	6.2
Transmission/Distribution	2,819.3	47.1
Treatment	1,982.9	33.1
Storage	770.3	12.9
Other	43.9	0.7
Total	5,988.4	100.0

Source: *Drinking Water Infrastructure Needs Survey and Assessment*, EPA, 2007

The infrastructure need for transmission and distribution projects is 47.1% of the total and the largest portion. The need for treatment projects counts for 33.1% of the total. The remaining 20% is for storage, source, and other costs.

The total infrastructure need can be also divided by system size, as shown in Table 2.

Table 2. Minnesota 20-year drinking water infrastructure need by system size

System Size	Population Served	Needs (million dollars)	Proportion (%)
Large CWS	over 100,000	672.0	11.2
Medium CWS	3,301 to 100,000	3,631.7	60.6
Small CWS	3,300 and fewer	1,416.5	23.7
NPNCWS		268.3	4.5
Total		5,988.4	100.0

Source: *Drinking Water Infrastructure Needs Survey and Assessment*, EPA, 2007

Over 60% of the total need is for medium CWSs, which typically serve populations from 3,301 to 100,000 persons. Of the remaining 40% of the total need, more than half is for small CWSs. The infrastructure need for large CWSs is 11.2%, and the NPNCWSs' need is only 4.5%.

D. Wastewater Systems

This section is based on two MPCA reports: *Future Wastewater Infrastructure Needs and Capital Costs*, January 2010; and *10-Year Plan to Upgrade and Maintain Minnesota's On-site (ISTS) Treatment Systems*, February 2004.

The majority of Minnesota's wastewater treatment facilities operate according to EPA National Pollutant Discharge Elimination System (NPDES) permits. NPDES permits are issued by MPCA under a delegation agreement with the EPA. Treatment facilities that discharge to land receive (State Disposal System) SDS permits instead of NPDES permits. Municipal wastewater systems with flows less than 10,000 gallons per day and land based disposal are not issued NPDES or SDS permits and are not counted. About 75% of the total domestic wastewater discharged by Minnesota residents is collected and treated by NPDES and SDS permitted systems. The remaining domestic wastewater is treated by privately owned subsurface sewage treatment systems (SSTS), which generally don't receive NPDES or SDS permits.

Infrastructure costs of wastewater system are mainly capital costs and operation and maintenance costs. Capital costs include construction, rehabilitation, improvement, and expansion of wastewater infrastructure. Operation and maintenance costs include the cost of chemicals, supplies, laboratory analysis, power, and equipment repair and replacement. Reasons to incur infrastructure costs include:

- infrastructure rehabilitation and replacement
- infrastructure expansion due to the community growth
- infrastructure development in unsewered and under-sewered communities
- infrastructure upgrade to meet new or more restrictive wastewater discharge standards.

1. Public Systems

According to MPCA's 2010 report *Future Wastewater Infrastructure Needs and Capital Costs*, during the two-year period from January 1, 2008, through December 31, 2009, a total of 310 wastewater infrastructure projects were completed throughout Minnesota for a total cost of \$860.56 million. The distribution of costs by geographic area and type of project is summarized in Table 3.

Future infrastructure needs for 1,200 wastewater infrastructure projects are identified in Minnesota according to the 2009 Wastewater Infrastructure Needs Survey (WINS) and/or listed on the current state FY 2010 Project Priority List (PPL). The total cost is \$4,340.37 million, and the distribution by project type is summarized in Table 4.

Table 3. Cost distribution of wastewater infrastructure projects (01/01/2008 – 12/31/2009)

Projects	Quantity (Million Dollars)		% Type	% Total
Greater Minnesota	504.14	(197 projects)		59
Sewer System Rehabilitation			89.94	18
New Interceptors			44.55	9
Infiltration/Inflow			52.56	10
New Collection			33.08	7
Combined Sewer Overflow (CSO) Correction			0.22	<1
Secondary Treatment			242.24	48
Advanced Treatment			40.60	8
Metro Council Environmental Services (MCES)	287.50	(63 projects)		33
Interceptor System			204.13	71
Treatment Facilities			63.25	22
Systemwide & Rural Area Improvement			20.13	7
MCES Service Area Communities	68.92	(50 projects)		8
Sewer System Rehabilitation			40.88	59
New Interceptors			5.09	7
Infiltration/Inflow			13.62	20
New Collection			6.55	10
Combined Sewer Overflow (CSO) Correction			2.78	4
Total	860.56	(310 projects)		100

Source: *Future Wastewater Infrastructure Needs and Capital Costs*, MPCA, 2010

Table 4. Future wastewater infrastructure need by project type

Project Types	Quantity (Million Dollars)		% Type	% Total
Sewer System	2,773.05			64
Rehabilitation		1,897.15	68	
New Interceptors		450.55	16	
Infiltration/Inflow		215.36	8	
New Collection		193.36	7	
Combined Sewer Overflow (CSO) Correction		16.63	1	
Wastewater Treatment Facilities	1,379.69			32
Secondary Treatment		1,188.21	86	
Advanced Treatment		191.46	14	
Unsewered Area*	187.63			4
Total	4,340.37			100

Source: *Future Wastewater Infrastructure Needs and Capital Costs*, MPCA, 2010

*Unsewered area projects doesn't include the potential need to address the unsewered areas with failed or inadequate SSTs, which is discussed in the part of private wastewater discharge system

Future wastewater infrastructure projects in the metropolitan area are approximately 55% of the total cost. Table 5 shows the distribution of the total cost by area and project type.

Table 5. Future wastewater infrastructure need by area and project type (million dollars)

Type \ Area	Metropolitan	Greater MN	Total*
Rehabilitation	1,468.76	430.52	1,899.28
New Interceptors	280.47	193.63	474.10
Infiltration/Inflow	49.81	166.14	215.95
New Collection	82.45	198.49	280.94
Combined Sewer Overflow (CSO) Correction	15.20	1.43	16.63
Secondary Treatment	446.53	814.17	1,260.70
Advanced Treatment	71.58	120.23	191.81
Total	2,414.79**	1,925.58	4,340.37

Source: *Future Wastewater Infrastructure Needs and Capital Costs*, MPCA, 2010

*The numbers are greater than the corresponding ones in Table 4 because the specific types of unsewered area projects are included.

**The Metropolitan Council Environmental Services (MCES) projects need is \$1940.25 million, and the MCES service area projects need is \$474.54 million.

The 1,200 future wastewater infrastructure projects are planned on a 20-year time frame. Table 6 shows the time frame and corresponding costs.

Table 6. Future wastewater infrastructure needs by timeframe

Time Frame	Quantity (Million Dollars)	% Total
0-5 Year	2,008.87	46
5-10 Year	1,283.02	30
10-20 Year	1,048.48	24
Total	4,340.37	100

Source: *Future Wastewater Infrastructure Needs and Capital Costs*, MPCA, 2010

2. Individual Systems

According to the MPCA’s 2004 report *10-Year Plan to Upgrade and Maintain Minnesota’s On-site (ISTS) Treatment Systems*, approximately 450,000 Minnesota homes, 75,000 cabins, and 10,000 businesses (resorts, commercial buildings, and industrial buildings) are outside areas served by public wastewater treatment systems. In total, approximately 535,000 locations should have a functioning individual sewage treatment system (ISTS)¹. However, a substantial proportion of ISTSs are categorized as either “failing” systems or imminent threat to public health and safety (ITPHS) systems which pose serious potential threat to health and environment. Table 7 shows the number of ISTS systems with various types of problems.

Table 7. Minnesota on-site sewage treatment at a glance

System	Quantity	Proportion	Problem
Normal	327,000	61%	N.A.
Failing ISTS	144,000	27%	System discharging untreated or partially treated sewage too close to the water table and may cause ground water contamination
ITPHS	64,000	12%	<ul style="list-style-type: none"> ▪ Sewage backing up into the home ▪ Sewage discharging to the ground surface ▪ Sewage discharging to surface water bodies such as ditches, streams or lakes
Total	535,000	100%	

Source: *10-Year Plan to Upgrade and Maintain Minnesota’s On-site (ISTS) Treatment Systems*, MPCA, 2004

MPCA estimates the average cost of ISTS upgrade at \$6,300. In a survey of more than 1,400 homeowners in 11 southeastern Minnesota counties, 53% of respondents indicated they would pay for ISTS system repairs and replacement from savings or a home equity loan, 88% indicated they thought low-interest loans should be available through their local government, and 33% said they would need a low-interest loan to be able to afford repairs and replacement. The estimated total cost of upgrading all problem ISTSs is \$1,230,660,349. The MPCA estimated in 2004 that if the state were to provide upgrade support funding of 5%, the resulting *annual* funding target amount would be \$6,153,302 for the 10-year plan. The overall estimated 10-year cost to address failed and inadequate ISTSs is \$1,230,660,349. Up-to-date information about the status

¹ ISTS is same with SSTS. Here ISTS is used in order to be consistent with the term used in MPCA report.

of the plan proposed in the 2004 report is essential to estimate the current infrastructure needs; since such information is not available, current infrastructure need is not estimated.

E. References

Minnesota Department of Health. *Drinking Water Revolving Loan Fund General Information*.
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