The Clean Water Council *of New Jersey*

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Recommendations for Water Infrastructure Management and Financing

The New Jersey Clean Water Council has the statutory function of advising the Commissioner of the Department of Environmental Protection regarding issues related to clean water. The Council is comprised of members appointed by the Governor and representatives of State and interstate agencies. As part of its work, the Council holds annual hearings. Recent hearings (2007, 2008) focused on infrastructure management for wastewater, water supply and stormwater ("water utilities"). One critical issue identified through these hearings is the need for more attention to asset management, including adequate financing. The following draft recommendations were approved for release by the Council for public comment at its annual hearing on October 12, 2010. The recommendations were crafted with the assistance of an ad hoc committee of experts in this field. The final recommendations were approved by the Council at its regular meeting on November 9, 2010.

New Jersey's water infrastructure – water supply, wastewater, stormwater – is aging, with failures being common news. The New Jersey Section of the American Society of Civil Engineers (ASCE) in 2007 gave grades of D to wastewater utilities and C to drinking water utilities in New Jersey, stating that "the existing infrastructure is in need of critical repairs."[1] No score was provided for stormwater infrastructure. The New Jersey Clean Water Council (NJCWC) concludes that:

> New Jersey can maintain a viable economy with a sound environment only if it ensures that its water supply, wastewater and stormwater infrastructure is effectively maintained in a manner that produces the lowest life-cycle cost.

Doing so requires proactive asset management that is not and cannot be driven by typical "end of pipe" regulation,[2] which, though critical for environmental and public health protection, does not directly address infrastructure integrity. Deferred maintenance ("run to failure") might hold rates down in the short term but inevitably increases long-term costs and causes service disruptions that harm the customers and the environment, and is therefore self-defeating. Asset management, utility rates and utility accounting should be used to achieve sustainable utility functions and resilient finances that minimize long-term costs.[3] Some water supply and wastewater utilities are doing so but most are not, as the ASCE-NJ report indicates. New Jersey has no rate- or fee-based stormwater utilities.

The NJCWC recommends legislative and regulatory action to ensure proper water infrastructure management regarding water supply, wastewater and stormwater utility functions including:

1. Implementation of **asset management principles** that ensure a sound understanding of asset inventory and value, as well as maintenance and replacement needs, and allow for cost-effective management;
2. Implementation of standardized approaches to **utility accounting** so that all utilities, regardless of ownership, fully account for asset management costs, with sufficient capital expenditures and reserves; and

[1] ASCE-NJ Section. 2007 Report Card for New Jersey's Infrastructure.

[2] "End of pipe" regulation focuses on the quality of delivered drinking water and of wastewater discharges.

[3] The issues of private systems (i.e., owned by and serving single users such as an apartment complex, commercial building, mobile home park or public building) were not addressed by the NJCWC, as these systems are entirely operated by and for the associated landowner.

3. Ensuring sufficient institutional capacity in municipalities, utilities and State agencies to support effective implementation of these asset management and utility accounting principles.

These systems of asset management and utility accounting should build on existing foundations and should recognize the significant differences between water supply, wastewater and stormwater utility functions, between small and large utilities, and between public sector and private sector utilities. The approaches should be both efficient and cost-effective for each utility category, while also ensuring that no artificial incentives exist for preference of one type of ownership over another. A level playing field is essential.

> New Jersey puts its economy and environment at risk when it ignores infrastructure asset management.

We waste and damage scarce natural resources (including clean water), infrastructure capacity and financial resources that could be put to more productive economic use. Poor infrastructure management imposes environmental costs that New Jersey cannot afford. Effective asset management can protect water resources and save money, with lower lifetime costs, as shown in the attached case studies. It can also restore utility capacity that will be critical to the growth of our urban areas.

The NJCWC recognizes that infrastructure asset management is only one component of water resources management. New Jersey also must embrace cost-effective and environmentally protective technological innovations and new approaches that will help improve our water resources beyond levels achievable with current systems. However, the NJCWC's draft recommendations are focused on management of existing infrastructure.

Existing Utility Forms and Oversight

Different organizational and regulatory frameworks exist for water supply, wastewater and stormwater infrastructure and within each sector. In water supply, the Board of Public Utilities (BPU) regulates rates of a small number of mostly investor-owned utilities (31) that serve over 40% of state residents and businesses. The rate setting process is generally agreed to provide good incentives for proactive asset management for these large systems, though improvements are possible. Of New Jersey's 620 public community water supply systems, three-quarters serve less than 3,000 customer accounts. Most of the smallest systems are private systems serving mobile home parks, homeowners associations, apartment complexes and nursing care facilities that are not subject to rate regulation. More than 300 public community water systems (nearly two-thirds of which serve less than 3,000 customer accounts) are municipal utilities and utility authorities, whose budgets are overseen by the Department of Community Affairs (DCA) to ensure that revenues are sufficient to ensure repayment of bonded indebtedness and cover operating costs. The Department of Environmental Protection (NJDEP) regulates the quality of potable water received by customers, the quantity of water that may be withdrawn from natural resources, system water losses, and physical modifications.

Sanitary wastewater utilities are largely public sector entities rather than private sector, with municipal utilities, regional authorities and MUAs serving areas ranging from intra-municipal to county or even multi-county scale. Of more than 260 community wastewater systems, roughly 60 percent are publicly-owned. Nearly 60 percent of the community wastewater systems are also very small, processing average daily flows of less than 1 million gallons per day. Many of the smallest are private systems serving individual residential subdivisions. DCA regulates budgets of the publicly-owned utilities. NJDEP authorizes and regulates the quality and quantity of effluents discharged from wastewater treatment plants through the NJPDES permit program, and requires "proper operation and maintenance" including "adequate funding," "effective management," and "regularly scheduled inspection and maintenance programs" for both the treatment facility and any collection systems under the same ownership. Collection systems not associated with treatment facilities, however, are not subject to NJPDES permits and are regulated primarily regarding their construction, not ongoing maintenance. In either case, evidence from the field indicates that collection systems often are not maintained properly.

Public stormwater infrastructure is managed by municipal and county public works departments or their equivalent using taxpayer-funded operating budgets, not as utility operations with user fees.[4] DCA oversight (through the Division of Local Government Services and the Local Finance Board) occurs only through the general review of general government budgets. NJDEP regulates municipal and public institutional stormwater systems regarding limited issues, through NJPDES stormwater permits. NJPDES Stormwater General Permits for Tier A municipalities, highway systems and public complexes all incorporate provisions requiring certification that the systems are properly functioning in accordance with a stormwater facility maintenance program for cleaning and maintenance of all municipally owned and operated stormwater facilities. However, evidence from the field indicates that such maintenance is not the norm.

In each case, effective management of existing assets is not ensured but should be. Rigorous asset management is a relatively new focus of wastewater and water supply utilities, and is nearly absent regarding stormwater systems. Importantly, a "one size fits all" approach to infrastructure management and accounting is inappropriate due to the wide variety of ownership types and sizes of systems. Asset management techniques must be suited to each infrastructure type, management structure, whether the system is a bulk or retail service, system size, infrastructure age, etc. While there are emerging general approaches[5] that have broad applicability, the specifics of asset management will vary among and even within systems. Infrastructure financing and accounting requirements likewise should avoid a) damaging what already works (e.g., BPU regulation of large water utilities), b) conflicting with effective regulatory and accounting standards, or c) imposing solutions that are not appropriate for a specific situation.

Ensuring Effective Asset Management

All utilities should be required to establish and practice asset management. Asset management should include three general elements:

- a means of routine asset condition assessment;
- a programmed and preventive maintenance ("PPM") system; and
- a procedure for evaluating the life-cycle cost impacts of repair or replacement decisions.

Any State regulations adopted to require the implementation of these general elements should not mandate specific methods or thresholds across all utility types and sizes unless they are recognized industry standards. Fair, reasonable and consistent regulations are needed. NJDEP should regulate water supply utilities regarding leakage control and water accounting to ensure effective water resource management, to limit system leakage and to allow for proper baseline water auditing. Similar threshold-based indicators are needed for wastewater (e.g., infiltration and inflow, sanitary and combined sewer overflows) and stormwater infrastructure. Based on the regulatory benchmarks, NJDEP should assess utility success regarding maintenance of physical utility assets that are critical to the protection of environmental quality and public health and safety, and make the results available to the public.

All utilities would be required to effectively perform long-term planning of asset and capacity needs, to determine full life-cycle costs, to identify and address the reliability of critical assets, and to proactively account for and perform replacement of critical assets before failure. Phased implementation should be allowed, and shared services agreements encouraged. Where major maintenance, upgrades or replacement actions are needed, consideration should also be given to alternative approaches and technologies that conserve resources and minimize environmental impacts, such as "green infrastructure" techniques. In summary, the system would use the following general approach:

[4] New Jersey is one of only 12 states that does not specifically authorize the creation of stormwater utility authorities.

[5] For example, USEPA has tools for water utilities (especially small systems) at http://www.epa.gov/owm/assetmanage/index.htm. USEPA specifically endorses a Four Pillars Approach to water supply and wastewater infrastructure that addresses asset management, including affected watersheds as one component of a utility's assets. See http://www.epa.gov/waterinfrastructure/basicinformation.html

General Task Description	Equivalent USEPA Asset Management Steps[6]
• Asset inventory and valuation	1. Current state of system assets
• Asset assessment and analysis	2. Required "sustainable" level of service
• Asset investment priorities	3. Critical Assets analysis
• Life cycle costs and funding plan	4. Minimum Life Cycle Cost 5. Long-term Funding Plan
• Asset maintenance, enhancement and replacement	• Follow-up and Continuing Steps
• Ongoing asset monitoring	
• Asset re-evaluation	
• Public education and outreach at key points	

Ensuring Appropriate Infrastructure Financing

All water utilities should include the asset value and the costs of operation, maintenance, repair and replacement in their budgets, such that asset value is maintained over time (defined in terms of serviceability rather than dollar value, as water infrastructure can last well beyond a standard depreciation period). BPU rules and applicable accounting practices help ensure this occurs for BPU-regulated utilities. Extending this approach to public sector utilities would provide direct signals that would drive improved asset management, and therefore appropriate rate setting. In addition, this approach would help ensure much better knowledge of asset quality and improved risk/reward assessments.

NJCWC recommends legislation requiring that BPU (in consultation with DCA) establish consistent asset accounting principles and general practices as standard "best practices" for all water private and public sector utilities – an approach used successfully in New York State. BPU approval of rates would only apply to those it currently regulates, primarily investor-owned utilities. DCA would apply the accounting "best practices" through its review of MUA and municipal utility budgets.[7] Implementation of these "best practices" should be feasible through the accounting system (e.g., GAP, GASB) appropriate to each form of utility ownership.

Utility rates absolutely must be set at a level sufficient to recover the cost of current operations and maintenance expenses AND the full cost of capital.[8] Full cost pricing ensures that utility rates are not artificially low, with too little invested in infrastructure renewal. Recent suggestions that utility rates should be capped at a specific percentage are misdirected, ensuring that inadequate rates and asset management will remain inadequate, to New Jersey's detriment. The Local Finance Board (LFB) should be required to adopt regulations ensuring that municipal utilities and MUAs (a) properly account for asset management costs and (b) retain reserves and capital funds that are sufficient but not excessive for the purpose. Further, LFB regulations should ensure the preservation of these sufficient reserve and capital funds against diversion for municipal general purposes. In this manner, rates will be dictated by a full and public understanding of necessary costs, not by artificial dictates. Public engagement is also critical – history has proven that people better accept paying for something if they know the purpose and desire the benefits to be received.

> New Jersey must avoid the philosophy that keeping rates steady for years is a sure sign of sound management. It may be, but it may also mask systemic problems or imminent breakdowns.

Finally, the NJCWC recommends that utilities that do not engage in proper asset management should not be rewarded with subsidies such as the federal stimulus funds – it sends the wrong message. Where such funds are made available to correct problems, implementation of asset management should be required as a condition of funding. Rate caps may also be appropriate for utilities that are not properly managing their assets. Likewise, it is unfair for the customers of well managed utilities to pay for improvements to poorly managed utilities. All utilities

[6] Adapted from USEPA (see http://www.epa.gov/safewater/smallsystems/pdfs/guide_smallsystems_assetmanagement_bestpractices.pdf, provided to relate terminology used by various sources.

[7] This recommendation does not apply to stormwater infrastructure, which in New Jersey is not managed through a utility approach, but could apply if such utilities become established in New Jersey.

[8] Note: water utility costs uniformly should be charged directly to users as rates, and not hidden as part of the municipal or county property tax.

need to meet the same reliability standards. Conversely, incorporation and full implementation of asset management and accounting "best practices" should be encouraged through regulatory, planning and financial incentives wherever feasible and in keeping with environmental protection.

Household assistance programs should be the primary mechanism of addressing customer impacts of utility rates (i.e., similar to the Universal Service Fund established by BPU for energy utilities). Artificially lowering rates for an entire utility will result in poor asset management, will jeopardize the local economy and will primarily benefit the many customers who can afford realistic rates.

Implementation Steps

Implementation of these recommendations will take time and a phased approach will be needed. Legislation should be developed but should not delay other actions. In the interim and for recommendations not requiring legislation, critical implementation steps include the following, which should engage experts in water utility and environmental management:

1. NJDEP, BPU and DCA, as appropriate to their statutory roles, should identify categories of water utilities for which different asset management or accounting "best practices" will be appropriate.
2. NJDEP should identify and apply the most critical and useful threshold-based infrastructure and environmental indicators, using cost-effective methods for monitoring utility status. NJDEP should then use existing regulatory provisions of its NJPDES and Safe Drinking Water Programs to ensure use of these indicators and implementation of proper asset management by wastewater utilities, municipal stormwater systems and water supply utilities.
3. BPU and DCA should identify accounting "best practices" and methods for implementing any or all of these practices within each agency's existing statutory authority, and then cooperatively engage in the education and training of State agency staff and utility staff (including both licensed operators and other operations staff), managers and policy makers regarding the approaches and their benefits.
4. NJDEP should identify existing or new approaches for physical asset management techniques appropriate to each utility category, and then work with utility-related professional associations to educate and train State agency staff and utility staff (including both licensed operators and other operations staff), managers and policy makers regarding the approaches and their benefits.
5. NJDEP, BPU and DCA, as appropriate to their statutory roles, should identify potential regulatory and financial incentives for utilities adopting and effectively implementing asset management practices, as verified by the threshold-based indicators, and implement any incentives feasible within their existing statutory authority.
6. NJDEP, BPU and DCA and utility-related professional associations should work with New Jersey academic researchers to identify the costs and benefits of asset management versus "run to failure" approaches, and to track the rate of and basis for success for utility efforts to implement asset management approaches.
7. The Legislature should adopt amendments to existing laws to ensure that municipalities cannot require financial contributions from municipal utility authorities or dissolve such authorities to the detriment of proper asset management, and to authorize and guide the establishment of fee-based systems for stormwater utility management in a fashion equivalent to systems for wastewater and water supply utilities.

Taking these steps will result in significant improvement of asset management practices and public confidence in our water utilities. New Jersey cannot afford to be lax in its protection and maintenance of utility capacity.

Asset Management Case Studies

Camden County Municipal Utilities Authority (CCMUA)

CCMUA is a wastewater service provider for the City of Camden and 36 suburban municipalities, some of which includes combined sewers. The treatment facility is designed to handle up to 80 MGD and has average flows of 58 MGD (approximately 500,000 customers). In the late 1990's, CCMUA was faced with several significant issues: an underperforming facility barely compliant with effluent standards, air quality (odor) complaints, an increased gap between revenue and costs (causing a 22% rate increase), aging infrastructure, and the impending loss of institutional memory through retirements. CCMUA adopted an aggressive Environmental Management System (EMS) approach dedicated to optimization of both water quality and odor control performance, with cost minimization. The EMS included establishment of core objectives, management leadership, intensive staff input, detailed asset management efforts, public outreach, and implementation (for more details see www.ccmua.org/ccmuaems.html).

The result over more than 10 years is that CCMUA greatly improved effluent water quality, sludge management and odor control for the facility, with almost complete elimination of wet weather bypasses. The financial implications are striking – CCMUA achieved these objectives while actually reducing rates three times, so that the current rates are lower than in 1996. Management dictated an emphasis on initiatives that would both improve performance and reduce costs, through appropriate selection of projects plus use of the NJ Environmental Infrastructure Finance Program. Within three years of initiation, Operations & Maintenance (O&M) costs were reduced by 25%, for an average annual savings of $5 million over a 10 year period,[9] as reactive maintenance was largely replaced by operational changes, equipment upgrades, and planned and preventive maintenance. CCMUA will have replaced and upgraded the five major process units at the treatment plant by 2010. Their experience is that replacing under-performing process units resulted in improved operational performance and reduced O&M costs. Regarding asset management, Andrew Kricun, Deputy Executive Director/Chief Engineer, notes that "Effective asset management was the single biggest factor in achieving both improvement in environmental performance and cost reductions."[10]

The Southeast Morris County Municipal Utilities Authority (SMCMUA)[11]

SMCMUA is the water utility for four member municipalities (Morristown, Morris Township, Morris Plains and Hanover Township) and portions of other non-member municipalities. It operates 9 wells, a small surface water reservoir and two interconnections to outside supplies. There are approximately 18,000 connections, 15 storage facilities and 315 miles of transmission and distribution mains.

Prior to acquisition of the water system by SMCMUA from the Town of Morristown in 1977, the infrastructure or assets had suffered from many years of neglect. By necessity, SMCMUA has practiced Asset Management by other names since its inception. Several generations of Master Plans have been prepared which served as a guide to managing and improving the water system assets. The most recent plan was completed in 2006. Each Master Plan requires a detailed description of every element of the water supply, pumping, transmission and distribution systems as well as operational practices and management of the utility. Every element or asset is evaluated for current serviceability and projected life. Both deficiencies and better, more efficient ways to provide service are identified and quantified. For each element, a summary and conclusions are presented which lead to specific recommendations and preliminary cost analyses.

The end result is a listing of recommended capital improvements in three phases over the next ten years. Before the recommendations are finalized, additional considerations are analyzed. These include Water System Security,

[9] Kricun, Andrew. 2010. Environmental Justice: An Essential Business Practice for Responsible Utilities. Utility Executive, V.13, No. 2, March-April 2010. Water Environment Federation, Alexandria, VA.

[10] Kricun, Andrew. 2009. Using An Environmental Management System to Optimize Performance And Achieve Sustainability. Annual Conference of the NJ Water Environment Association, Atlantic City.

[11] Information provided by William Hutchinson, Executive Director, SMCMUA

Emergency response, Water Conservation, and Energy use and optimization. The 2006 Plan recommended Capital Improvements totaling $25 million through 2016.

These recommendations were then integrated into a six year Capital Improvement Program which is a part of the annual budget documents. More importantly, financial projections are prepared extending for that six year period. Reasonable assumptions are made for Expenses and Revenue requirements for the six years, and cash flow requirements are projected for the Capital Program. The evaluation was made under the assumption that the Capital Program will be financed entirely from water revenues. As a result, rate increases were adopted in 2006, 2008 and 2010. After that, barring a large, unforeseen event, rates should remain stable through 2013, possibly longer. The ultimate plan was to raise sufficient revenue early in the program so that the Authority would not have to continue to go back to the rate payers any time soon for a significant increase, while simultaneously paying off all existing bonds by 2016. According to William Hutchinson, Executive Director, one result of the past and existing Master Plans has been “emergency repairs are far fewer than in the past.”