

# ADDRESSING INFRASTRUCTURE DECLINE THROUGH PROACTIVE ASSET MANAGEMENT

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*REFERENCE:* *Proceedings of the 2003 Georgia Water Resources Conference*, held April 23-24, 2003, at the University of Georgia. Kathryn J. Hatcher, editor, Institute of Ecology, The University of Georgia, Athens, Georgia.

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**Abstract.** Several recent studies document the declining state of the nation's infrastructure and the increasing financial burden required to sustain these assets. Unable to sustain their aging infrastructure investment due to budgetary pressures, many government entities have evolved into a state of managing "dire-need fixes." Compounding this problem, the "out-of-sight, out-of-mind" traits of many infrastructure assets, such as water and sewer systems, facilitate the politics of deferring the needed maintenance and renewal investment.

Also in recent years, a common direction has emerged in the regulatory realm, as well as among the more progressive public utilities. The use of proactive infrastructure asset management is being advocated to address the infrastructure decline and the associated financial burden.

This paper presents an overview of the current situation in infrastructure assets and the cost/benefit considerations of implementing asset management as a solution.

## INTRODUCTION

### Infrastructure Defined

Governmental Accounting Standards Board Statement No. 34 (GASB 34) defines "infrastructure" as "long-lived capital assets that normally are stationary in nature and normally can be preserved for a significantly greater number of years than most capital assets." Examples include roads, bridges, dams, drainage systems, and water and sewer systems.

Prior to implementation of GASB 34, which began in three phases in fiscal year 2002, infrastructure was not required to be reflected in government financial statements (except where enterprise operations were involved). Therefore, in the past, infrastructure might or might not be inventoried, accounted for, and depicted in statements of net assets – depending on the practices of the public utility and finance departments.

### Asset Management Defined

The term "asset management" has this functional meaning:

- knowing what you have,
- knowing what physical condition it is in,
- knowing what is required financially to sustain it at a targeted level, and
- maintaining an information system that supports this knowledge base and facilitates action.

## THE INFRASTRUCTURE SITUATION

### Infrastructure Decline

The recent increased attention to asset management is driven primarily by recent widespread recognition of the declining state of the nation's infrastructure. This recognition is demonstrated in numerous studies of the future financial burden to recover from this decline, as discussed later. Multiple factors have contributed to the decline of the nation's infrastructure over the past several decades:

**First, significant original investment.** For most of the 20<sup>th</sup> century, the pattern of investment in original infrastructure was substantially upward, particularly in the post-World War II baby boom period. The pattern reflects the concurrent growth in population and increase in standard of living, manifested in such forms as indoor plumbing that drove growth of water and wastewater infrastructure. Figure 1, resulting from analysis of 20 utilities by the American Water Works Association (AWWA), illustrates the long-term profile of original investment in drinking water pipes in the USA from 1870 to 2000.

**Second, depletion of original service life.** With average service lives measured in decades, much of the original infrastructure installed decades ago is now due for significant rehabilitation or replacement. Regardless of the level of diligence in managing the

assets through maintenance, repair, and rehabilitation programs, all infrastructure assets eventually reach the end of original service life and must be replaced through more capital investment.

**Third, growth in population and standard of living.** The financial baseline for water and wastewater utilities continues to rise due to on-going growth of population, the associated economic development, and the concurrent rise in standard of living in areas that affect capital spending on infrastructure.

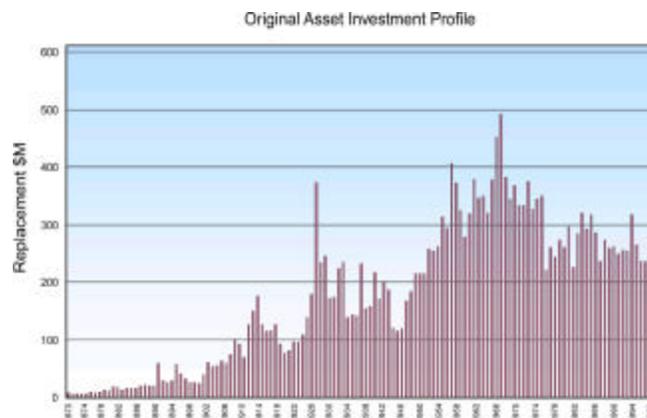
**Fourth, “out-of-sight, out-of-mind” traits of some infrastructure.** The long service lives of infrastructure assets make them very susceptible to being ignored or deferred when it comes to financial planning and, especially, budgeting on an annual cycle. Exacerbating this treatment in the water and wastewater utilities is the fact that collection and distribution systems literally are out of sight of the consuming public – these systems are taken for granted, not as something requiring constant financial feeding to sustain health.

### Looming Financial Burden

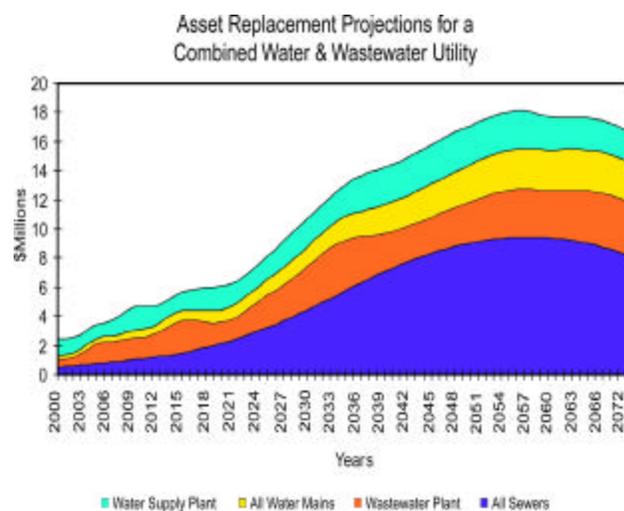
The concurrent effects of investment in original infrastructure decades ago, now reaching the end of the service lives of many of those assets, on-going growth in population and standard of living, and the “invisible” traits of some assets has led decision makers to defer action on infrastructure spending. This deferral has caused a pent-up demand for spending on infrastructure to address the needs both for replacement of old assets and for new assets to meet growth. Figure 2, resulting from analysis of 20 utilities by AWWA, illustrates the tsunami of capital demand that looms ahead for most utilities. Some face this problem immediately; others have some time left for proactive management.

Table 1 provides a sampling of results of recent studies on infrastructure decline and the financial burden required to address the problem.

The general conclusion from this evidence is that a proactive management approach is imperative if the infrastructure decline is to be reversed. Obviously, depleting the infrastructure to dire-need status, then replacement with new assets, makes little sense from any perspective: customer service, capital investment, or operations management.



**Figure 1. Investment in pipes installed by 20 utilities from 1870 to 2000 in current dollars (AWWA).**



**Figure 2. Future financial burden to sustain the infrastructure of a sample combined water and wastewater utility (AWWA).**

### EMERGENCE OF ASSET MANAGEMENT

The use of proactive asset management has emerged in recent years in the water and wastewater utility industry as the apparent future direction for sustaining the investment in infrastructure, subject to sufficient funding to implement it. Most industry professional associations offer many educational and research resources on the subject. Many technical services providers and software vendors offer asset management solutions of varying complexity.

In the regulatory realm, asset management is currently an implementation option (called the “modified approach”) in the new reporting standards

**Table 1. Results of Recent Studies on Infrastructure Decline and Projected Costs to Recover**

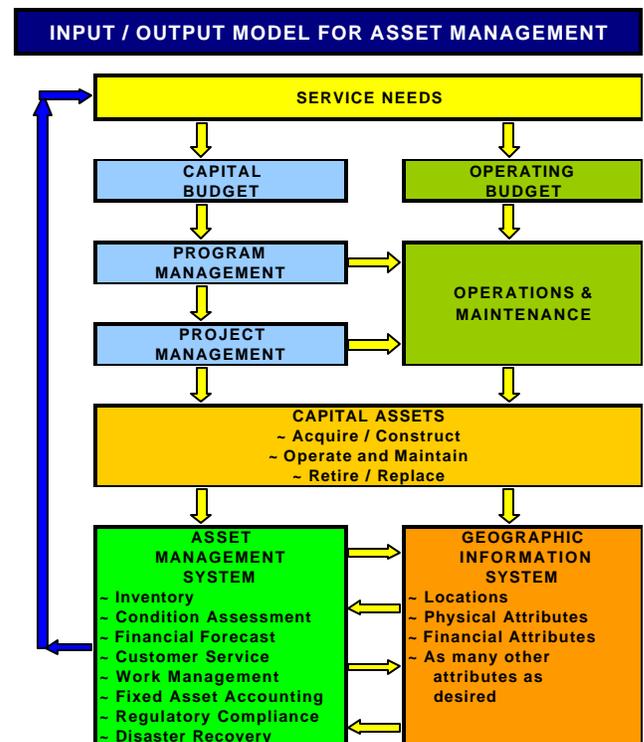
- **American Society of Civil Engineers (1998, 2001):** \$1.3 trillion required over a five-year period to restore infrastructure (roads, dams, bridges, water, wastewater, and seven others) to an acceptable state of repair.
- **Water Infrastructure Network (April 2000):** \$23 billion annual funding gap projected over a 20-year period to replace aging and failing pipes and meet mandates of the Clean Water Act and the Safe Drinking Water Act.
- **American Water Works Association (May 2001):** \$250 billion required over the next 30 years to replace drinking water pipes and associated structures (excludes wastewater needs and cost of implementing new quality standards).
- **Environmental Protection Agency (September 2002):** \$485 to \$896 billion funding gap projected over 20-year period for required capital investment in drinking water and clean water, with a wide range of funding gaps projected under different revenue growth scenarios for required O&M expenditures topping out at \$724 billion over a 20-year period.
- **Congressional Budget Office report to Congress (November 2002):** \$25 to \$41 billion annual investment required over a 20-year period for pipes, treatment plants, storage facilities, and other water infrastructure.

of GASB 34. Asset management is basically what is required in the implementation of the EPA’s Capacity, Management, Operations, and Maintenance (CMOM) program; CMOM regulations are expected to be promulgated in 2003. Numerous judicial consent decrees addressing water pollution essentially specify asset management as the remedy. Finally, recently proposed federal funding legislation covering the state revolving loan funds for wastewater and drinking water programs are specifying asset management capability as a qualifying condition to receive loans.

In reality, asset management is nothing new; most of its elements have existed in the water and wastewater utility world for a long time. What is relatively new (in the USA) is the synthesis of those long-existing elements into a systematic approach that is focused on the long-term financial optimization of capital investment and maintenance expenditure. (This approach has been common practice in the utility districts of New Zealand and Australia since the 1980’s.)

Figure 3 illustrates an input/output model of asset management. Beginning with the community’s service needs, the model shows the parallel paths of capital investment and operations and maintenance, which lead to the management of capital assets. These assets may or may not be tracked in a geographical information system, which could interact with an asset management system. Among these elements that

could exist in an asset management system, none are “new” concepts.



**Figure 3. Asset Management Model.**

## COST/BENEFIT CONSIDERATIONS

### Conflicting Views

As with any shift in paradigm, the emergence of asset management is accompanied by conflicting views on the wisdom, timing, and cost of implementation. These conflicts are strongly associated with short/narrow perspectives versus long/broad perspectives.

The accounting community, driven primarily by imperatives to comply with GASB 34 at lowest cost, tends to opt for traditional depreciation accounting for infrastructure (rather than the alternative “modified approach” which entails asset management). Viewed only in the context of GASB 34 compliance, the lowest short-term cost certainly makes sense. However, viewed in the broader context of CMOM regulations, qualification for revolving loan funds, consent decree compliance (in some cases), and optimization of operations and maintenance, ruling out asset management makes less sense.

Based on numerous personal interviews conducted by the author with accounting firms, it appears that most local governments are being advised by outside accountants and accounting-oriented professional associations simply to not implement asset management at this time; future implementation opportunities still exist under GASB 34 to elect asset management. The focus is almost exclusively on the short-term implementation cost in the current anemic economy.

On the other hand, the solutions provider community, driven by new business development motives, tends to urge new processes and systems – frequently on an enterprise-wide approach. In some cases, their prospective clients are ready to cope with a new world of systems and processes – financially, operationally, and politically. But, much more frequently, prospective clients are lacking on one of these success factors – especially financial in today’s anemic economy as mentioned above. The picture painted by the possibility of an enterprise-wide, fully integrated system is, for many government managers, too much to contemplate in terms of initial cost and overall disruption, regardless of the pressing needs to manage assets better.

Yet, solutions providers tend not to give due attention to these constraints while focusing almost wholly on the long-term benefits. This tends to frame up the decision as an all-or-nothing choice for utility managers and finance directors.

### The Viable Solution in the Middle

Of course, the viable solution is usually found in between extremes. Most utility managers understand the need for asset management and desire it in their operations, subject to affordability. The key to successful implementation of asset management lies in determining the incremental steps within an overall strategy and the cost and timing of those steps. As illustrated in Figure 3, some or several of the elements of asset management might already exist in some form and the challenge is to determine how to synthesize these elements and add those that are still needed.

## CONCLUSION

With regulatory compliance and funding qualification both calling for asset management capability, it is no longer an optional enhancement for utility operations. Utility managers, finance directors, and their governance boards should focus on the viable solution - for their circumstances - that can be found between the conflicting extremes they will encounter.

Asset management is for everybody. The open questions are when, by what implementation route, and at what cost.

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