

RAISING WATER

INFRASTRUCTURE AWARENESS

New Project Tries to
Explain the Value of Water

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A nation that fails to plan intelligently for the development and protection of its precious waters will be condemned to wither because of its shortsightedness. The hard lessons of history are clear, written on the deserted sands and ruins of once proud civilizations. [Lyndon B. Johnson](#)

For decades, public works managers and engineers have been trying to warn us about an American water infrastructure crisis. But most of us have hardly noticed, and the reasons why are interesting. Not only is this infrastructure discreetly tucked away from the communities it serves or buried out-of-sight beneath our feet, it was built and paid for a long time ago.

According to the American Water Works Association (AWWA), previous generations originally built, installed, and paid for most of this infrastructure during the economic booms that characterized the last century's periods of growth and expansion. Today, most Americans have never known a time when water did not flow at the turn of a tap.

In less than a century, our water and sewer systems have become something the average American can count on. The general consensus now seems to be that these things have always been there and always will be. And we did not have to pay for them, making them a free public service. Without public education efforts, these attitudes may not change.





“An environmental historian once told me there are two big things that make cities as we know them possible: (1) the fire code and (2) sanitary sewer and clean water systems,” says Tom Keiter, creative director for Penn State Public Broadcasting. “The fact that human beings require water, coupled with the public health role of wastewater systems, makes this an important issue in my mind. As we look globally at water and nationally at water issues, the topic is certainly as critical (or more so) than energy. Infrastructure is essential for economic development. We might have a ‘beyond oil’ world, but ‘beyond water’ seems unlikely.”

Public Education Raises Awareness

Keiter says that public education programs that spread awareness and understanding about America’s buried and hidden assets will help create political will to invest in their rehabilitation. He also believes that the public will be receptive to an awareness program.



To learn about building public awareness, see the article “Accentuate the Positive: How Social Marketing Makes a Difference” on the NESC Web site at www.nesc.wvu.edu/ndwc.

A 2000 survey conducted by the National Environmental Education and Training Foundation says that although widespread environmental illiteracy persists, this lack of knowledge is not reflected in most peoples’ attitudes. In fact, there is increasing public concern about pollution of the environment, and Americans endorse government programs to protect water and air from pollution. This attitude could be duplicated for water infrastructure.

“Our discussions with many cities and municipal authorities revealed that they need significant public education around water infrastructure issues, particularly on the costs of maintaining systems,” says Keiter. “Taxpayers and ratepayers may be affected, and many make decisions affecting infrastructure.”

To help raise public awareness, Penn State Public Broadcasting is developing a public education program called *Liquid Assets*. “The goal with this project is to provide the public with a baseline awareness about the significance of water infrastructure,” Keiter explains, “ideally, providing media-based tools useful to any entity—government, education, non-profit—that needs to educate people about this subject.”

“The project came to us through a Penn State civil engineering faculty member who runs the Pipeline Infrastructure Research Center (PIRC), Professor Sunil Sinha,” he says. “We were introduced to the Buried Asset Management Institute (BAMI) and Atlanta Mayor Shirley Jackson.

Engineers Grade Infrastructure

“As we learned about the circumstances facing many cities and learned of the American Society of Civil Engineering (ASCE) report card, we saw this to be an issue that required an educated public,” Keiter says. “We thought an in-depth look at clean water infrastructure was an important topic to focus on.

“In its 2005 assessment of the nation’s infrastructure, ASCE assigned the grade D– for water and wastewater infrastructure,” he says. “Most of this infrastructure is aging and deteriorating. In addition, demand on these systems has increased. And the cost of rebuilding them is staggering.”

The U.S. Environmental Protection Agency (EPA) produced “The Clean Water and Drinking Water Infrastructure Gap Analysis” in 2002, which notes that drinking water faces an annual shortfall of at least \$11 billion to replace aging facilities that are near the end of their useful life and to comply with existing and future federal water regulations. The shortfall does not account for any growth in the demand for drinking water over the next 20 years.

“Aging wastewater management systems discharge billions of gallons of untreated sewage into U.S. surface waters each year,” says Keiter. “EPA estimates that the nation must invest \$390 billion over the next 20 years to replace existing systems and build new ones to meet increasing demands. Many systems have reached the end of their useful design lives. Older systems are plagued by chronic overflows during major rainstorms and heavy snowmelt and, intentionally or not, are bringing about the discharge of raw sewage into U.S. surface waters.”

“Because federal assistance has not kept pace with needs,” notes a House Transportation and Infrastructure Committee 2004 report, “in less than a generation, the U.S. could lose much of the gains it made thus far in improving water quality and wind up with dirtier water than existed prior to the enactment of the 1972 Clean Water Act.”

Situation Seems Serious

“While there is likely some bias in the ASCE report card, this seems like a serious situation,” says Keiter. “With the consent decrees that many cities face, the issue of how to finance clean water systems becomes a significant issue.”

Added to that, some of the most important parts of this public infrastructure are pipes that we cannot see, says AWWA. Not only do we take these pipes for granted because we can’t see them, we didn’t pay for them initially. Added to that, most pipes last a long time, making them a huge capital expense that today’s customers never had to bear. They’ve always been there and have always been invisible to us.

“This topic requires a media education program. Because we can’t see it (unlike a highway for example), we take it for granted,” Keiter says.

“We can’t see its condition. But it makes sense that systems installed 100 years ago may be deteriorating. It could be a health issue. It also makes sense that capacity might be an issue.”

Liquid Assets Increases Impact

According to Keiter, the *Liquid Assets* project will be designed to facilitate public education in multiple ways to increase impact, including:

- national broadcast for broad education efforts,
- an outreach grant program to provide funding to local public broadcast organizations for developing “town meetings” around the national broadcast, or producing local programs on the topic (like a talk show with local officials), and
- toolkits with DVDs (with short and segmented versions of the broadcast production) to facilitate public meetings, educational sessions with local government officials, etc. Local water authorities or local non-profits may use the toolkits.

“We want to maximize the use of the video story elements in multiple ways and ultimately to generate community discussion at the local level where action takes place,” Keiter says.

“Seed funding for initial research and project development was supplied by the National Association of Sewer Service Companies (NASSCO),” says Keiter. “We are in the early stages of fundraising and project development. We have completed a research phase and have developed a project budget and plan. We are making presentations to organizations, agencies, and industry groups to develop the project, find funding (approximately \$780,000), and identify an advisory board and an implementation board. We have commitments for approximately 30 percent of the budget to date. Once we secure 75 percent of the budget, we will begin production.

“The project will be shot in high definition video and will take about 16 months to produce with another two months for toolkit production and implementation,” he explains. “We hope to raise the balance of funding in the next three months.

“I personally am interested in this topic because it gets at how we live on earth,” Keiter says. “Ultimately our man-made systems need to integrate with nature. We are part of a natural system, not apart from nature.”

Public Broadcasting Produces Project

Penn State Public Broadcasting will act as the *Liquid Assets* project’s producers. However, they have recognized the need for partnerships. They have partnered with PIRC, BAMI, and NASSCO.

“Because a key element of the effort is helping the audience ‘see the unseen,’ extensive animations that explore the man-made, below-ground infrastructure, and its relationship to the natural watershed infrastructure will be developed,” says Keiter. “Penn State Public Broadcasting is considering a number of potential partners to assist in animation/modeling, including organizations that specialize in spatial information

management solutions for companies operating in the telecommunications, real estate, government, media, entertainment, architecture, engineering, and navigation sectors.

“The project will be developed as a documentary featuring stories of selected cities and regions engaged in rebuilding infrastructure,” he continues. “We’ll hear from people in planning, engineering, politics, economics, historians, public health, government, and others as we explore all sides of the issues surrounding our clean water infrastructure.”

Keiter says that the project also includes the following elements:

The Fundamental Public Health System We Take For Granted

Essential to all life on earth, water is the provenance of civilization. Throughout history, thriving cities have had in common the presence of a water infrastructure. Much of the original American infrastructure, however, is still unchanged and in use today. This section will illuminate the integral role of water and wastewater infrastructures in our lives, offering a brief history of wastewater practices in addition to accounts of the burdens placed on and the neglect of our current system.

A Watershed Protection Approach

Understanding the risks of neglecting our buried assets means understanding our role in watersheds and hydrologic/geologic cycles. This section will follow the natural cycle of our water supply and will address the health and environmental hazards that our cities face when industrial and residential districts unsustainably interface with the water cycle.

An Engineering Marvel—Seeing the Unseen

Simply considering the complexity of constructing a system serving a city the size of Philadelphia or Atlanta is daunting, but the task of restoring a broken system is even more so. With the help of 3-D imaging and dynamic animation, this section will visually expose America’s underground and will explore with engineers the technical complexity of our national infrastructure.

21st Century Solutions

The preceding section will dovetail into this section, which will explore the innovative solutions being developed by engineers to address infrastructure rehabilitation needs. Buried asset management, robotic pipe inspections, engineering research, pipe restoration and replacement technologies - these concepts along with the best practices from each of the cities will be explored, revealing a portrait of 21st century technology, economics, and solutions.

For more information about this project, contact Keiter at tek2@psu.edu.



On Tap Editor **Kathy Jespersion** is very interested in public health and is pursuing a master of public health degree at West Virginia University.