Removing the Guesswork

Mapping and Managing Assets Across Local Government Operations

An Executive Briefing to Local Government Officials

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Overview

Given the down-turned economy and the added responsibilities of managing services once provided by federal and state governments, today's local government managers must be judicious when allocating community assets and resources. But with no "road map" to guide them, local government managers face difficult decisions regarding how to direct and where to distribute scarce fiscal and human resources. Asset management—a methodology to efficiently and equitably allocate resources among valid and competing goals and objectives—can remove some of the guesswork. Asset management is a new framework for local government administrations that

- Tracks location, condition, and ages of both capital assets (e.g., car fleets and computers) and infrastructure assets (e.g., bridges, buildings, and sewers)
- Monitors the use and distribution of assets across departments and business functions
- Measures asset life cycles, maintenance costs, and depreciation

Asset management not only keeps track of valuable resources but also unifies departments by integrating the management of resources, financial costs, and investments with the day-to-day maintenance of jurisdictional properties. It is neither inexpensive nor easy to implement. However, proactive and strategic implementation powered with technology and combined with strong financial management can generate direct and indirect cost savings and other benefits across the organization. Information about assets can be used to address a range of internal and external functions such as homeland security and emergency response; setting, meeting, and paying for technology goals; and mandating compliance.

Technology investments—specifically, a geographic information system (GIS)—can be applied to unite the information and service functions of various departments to display and analyze data. Local governments can invest in GIS to help respond to challenges, enhance business functions, increase efficiencies, improve service delivery, and plan for the future. GIS applied to asset management can not only facilitate data collection, processing, and display but can also integrate asset mapping with project management and budgeting tools so that maintenance, inspections, and expenses can be accounted for in the same place. GIS is an important decision making tool for local governments.

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Asset Management

Competing and Conflicting Needs

To ensure that infrastructure lasts a number of years, assets are generally maintained and rehabilitated to certain condition levels. Regular maintenance efforts, if applied as needed, can extend the useful life of the assets, saving staff time and public money.

To apply asset management, public works departments must be able to forecast asset life cycles and maintenance costs. To do this, the following must be accomplished:

- Each asset or asset system must be identified, its condition rated, and its anticipated life cycle determined. What do we own? In what condition are our assets? How long do we expect the assets to last?
- Potential activities must be defined (maintenance efforts and replacement). Should we repair or replace the asset? What types of maintenance do we perform on our assets?
- Activities must be incorporated into decision models. What actions should we take based on the particular asset and its condition?

Managers can analyze costs for each action, prioritize projects, and develop strategies for improving operations, service delivery, efficiency, and utility. This information can be used to make proactive, rather than reactive, decisions to better align funding with maintenance needs.

Additional Resources

- American Public Works Association. http://www.apwa.net
- National Association of County Engineers. http://www.naco.org/nace/index.htm
- Asset Management Primer. December 1999. Washington, D.C.: Federal Highway Administration, U.S. Department of Transportation. http://www.fhwa.dot.gov/infrastructure/asstmgmt/amprimer.pdf

Mapping and Managing Assets

Location-Based Information

Jurisdictions are integrating infrastructure and asset planning, financing, and maintenance in order to increase efficiencies, reduce redundancies, and improve work processes throughout departments. GIS, an important tool in asset management, has other applications across departments and business tasks with the same timesaving and money saving benefits that have come to define good government.

In its simplest form, a GIS fixes an asset to a place (physical or institutional) and maintains the information, such as the costs, support materials, or uses needed, to appraise the asset's usefulness, functionality, and value across the government.

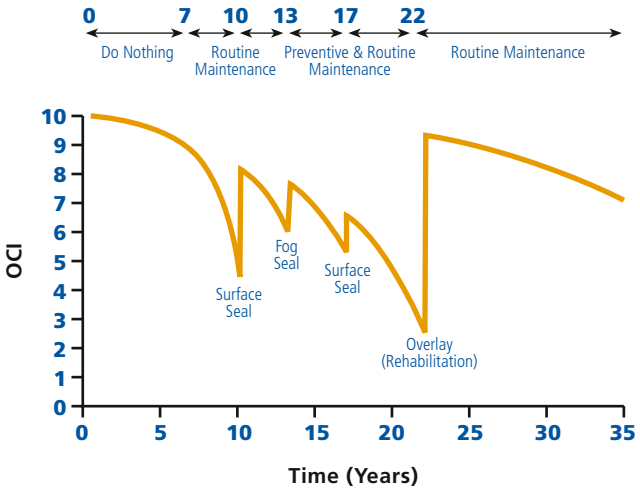
GIS is used to input, maintain, manipulate, and query location-based information. Although rooted in the premise of mapping components (buildings, pipes, trees) and their attributes (color, size, shape), geospatial technologies combine mapping features with relational databases to provide powerful new tools for managing and reporting complex information. Like the assets tracked in the GIS, the spatial data becomes, as a whole, a stock of value.

The use of GIS in asset management has direct and measurable benefits for public works, finance, and homeland security. GIS-based systems can

- Facilitate information input, storage, display, and retrieval.
- Build public accountability for infrastructure management.
- Improve service delivery.
- Provide a budgeting tool and a means of justifying maintenance needs.
- Maximize return on public infrastructure investment.
- Promote efficient allocation of human and fiscal resources.
- Provide a more complete portfolio of public capital and infrastructure assets.
- Assist in long-term planning.
- Track maintenance costs according to where they are expended.

Hillsborough County, Florida, Pavement Management Curve

This curve shows how the condition of the pavement system deteriorates over time and how regular maintenance efforts may improve and extend the life of the asset.



THE GUESSWORK

Public Works, GIS, and Asset Management

Many communities are developing or modifying GIS-based asset management systems to create auditable asset inventories and track maintenance and cost information. These new systems allow public works staff to identify and locate assets as well as determine asset attributes such as location, size, age, system, condition, and most recently performed maintenance.

Much of public works' day-to-day operations occur outside of the office, and the department may rely on staff who are not well trained in or comfortable with computers. Handheld computers and wireless technologies may be used with GIS to enable mobile government. Public works staff can be trained in applications to do inventorying and assessments in the field on a small computer that can be synchronized with the rest of the system. This practice reduces paperwork, saves time in data collection and processing, and increases accuracy (by, for example, decreasing the rate of data input errors made from reading poor handwriting).

A GIS-based asset management system can boost internal efficiencies through its capabilities to issue work orders, budget and forecast maintenance efforts, and track predicted versus actual costs. It can also be used to track deteriorations such as vandalism, tree diseases, or fish kills.

A Financial Perspective

Not only do GIS-based asset management systems support public works goals and operations, but they also promote enterprisewide goals of financial efficiency and public accountability.

Infrastructure assets, such as pavement and storm water systems, are necessary and invaluable local government investments funded in large part through public debt.

Many communities finance these investments by issuing municipal or general obligation bonds, using the revenue to pay for construction projects. The bonds pay for short-term maintenance efforts, but they increase long-term debt.

How well local governments make decisions, maintain public investments, and manage the debt are of great interest to the financial community that invests in bonds and to the general public that wants a well-managed local government. Full disclosure of infrastructure assets paints a more complete, transparent financial picture.

GIS can be used to facilitate accurate and timely resource inventory and accounting procedures and planning for and meeting personnel, infrastructure, and operational expenses by measuring deterioration and predicting replacement costs. The data can be displayed in a number of ways, enabling financial staff and department heads to analyze it and make asset adjustments to save money or improve efficiencies. The GIS allows a range of asset information to be visually displayed, which greatly facilitates analysis and decision making.

Additional Resources

- Hillsborough County. http://www.hillsboroughcounty.org
- GIS for State & Local Government. ESRI. http://www.esri.com/industries/localgov/index.html
- Gene Kindrachuk. "Integration of Asset Management and GIS." Paper presented at the GITA 2001 Conference, Sydney, Australia, August 2001. http://www. gisdevelopment.net/proceedings/gita/2001/tat/techgi088pf.htm
- Urban and Regional Information Systems Association. http://www.urisa.org

Deterioration

Many of the great roads and bridges that are part of the American cultural landscape were built decades ago and have not been thoroughly maintained. Much of America's infrastructure is in a state of steady deterioration. The Rebuild America Coalition quantified the decline in infrastructure quality in its 1996 report Quality of Life…The Unspoken Promise: A Case for Infrastructure Investment.

Findings cited in this report include

- 57 percent of principal highway miles are rated in fair, mediocre, or poor condition.
- 10,000 dams are classified as high hazard; 13,549 are dams classified as significant hazards.

Inordinate expenses are required to rehabilitate these assets. In the state of California alone, estimated infrastructure investment needs are in excess of $80 billion over the next 10 years—with state and local revenues able to meet only half of these needs.

What can local governments do to better manage their infrastructure systems? How can local governments maximize their return on infrastructure investments?

Preventive and on-demand maintenance throughout the life of the assets may reduce this massive backlog of infrastructure projects. Effective asset management provides local government managers opportunities to better steward public infrastructure investments, plan funding and human efforts toward maintenance, and reap the greatest rewards from their efforts.

Asset Management for Compliance

As local governments work toward compliance with federal and financial industry mandates and standards, they may face difficulty in acquiring the accurate tools and information to do so.

Several recent mandates require local governments to collect detailed information about one or more of their infrastructure systems.

Local governments can leverage existing asset management systems to comply with new mandates or can use the mandates as opportunities to invest in systems that will create benefits beyond compliance.

GASB Statement 34

GASB Statement 34: Basic Financial Statements and Management's Discussion and Analysis for State and Local Governments, issued by the Governmental Accounting Standards Board (GASB) in June 1999, has changed state and local government accounting practices. While GASB Statement 34 contains new provisions, perhaps the most controversial change and the biggest challenge is that governments must now count, assess, and document their infrastructure assets—and liabilities—in their yearly financial statements. GASB 34 is not a legally enforceable regulation, but it is part of a body of generally accepted accounting principles with implications that could affect bond ratings and public opinion.

Consider the amount of money that state and local governments invest in building, maintaining, and repairing their infrastructures—which GASB estimates at an annual cost of $140 to $150 billion. Prior to GASB 34, no financial reporting standards were in place to track the value of these long-lived assets, how the investment was financed, or how well the governments were maintaining the investment. Now, local governments must integrate their infrastructure with other assets on their financial statements. GASB 34 compliance emphasizes government accountability and stewardship for preserving public investment. Transparent accounting and full disclosure ensure that elected officials, auditors, citizens, financial markets, and other stakeholders can measure how well the government is managing its resources in comparison to other governments.

Implementation has been staggered into three revenue classes with all high- and medium-revenue governments required to retroactively report on their infrastructure assets and smaller governments strongly encouraged to do so. After initial GASB 34

Continued on next page

Case Study

Hillsborough County Asset Management

Hillsborough County, Florida (population more than 1 million), located midway on the west coast of Florida, encompasses almost 1,100 square miles of land and inland water. Hillsborough County includes several municipalities, such as Tampa, but the majority (more than 86 percent) of the total area is unincorporated.

Within the unincorporated areas, the county public works department administers all major construction projects and implements the county's capital improvement program. The department's vast infrastructure includes roadway, right-of-way, traffic, and storm water assets. Public works maintains 20,000 linear miles of roadway assets, 6,000 signs, and a storm water system of 4 million linear feet. The more than $3 million infrastructure/asset management program involves data collection, recording, and analysis in support of long-term maintenance and rehabilitation.

Transformation From Reactive to Proactive Decision Making

As recently as 1999, little was known about the quantity or condition of Hillsborough County's infrastructure assets. The public works department had based its operating budget on historic line-item expenditures, asset failures, citizen or political demands, and worst case scenarios. New management models and recent technologies provided a new context for decision making—the department adopted the asset management approach to doing business. Asset management provided a proactive framework for making cost-effective resource allocation decisions that emphasized preventive maintenance and long-term planning. In 1997, the public works department assembled a management team to launch an asset management program. The best management practice concept grew into the Hillsborough Asset Management System (HAMS), a GIS-based management information system. Within the department, HAMS supports asset inventory and valuation, tracks maintenance efforts, and facilitates strategic decision making for the long term.

Hillsborough Asset Management System Delivers Results

HAMS has greatly improved the public works department's relationship with service users, connecting infrastructure maintenance needs with efforts. The system enables department staff to

- Forecast infrastructure maintenance and replacement needs.
- Calculate related costs.
- Organize, prioritize, and manage its multiple projects.
- Provide hard numbers to back up funding requests..

Numbers provide powerful leverage when competing for scarce budget resources—the predictive ability of asset management enables the county to attach cost ranges for its planned maintenance efforts. Based on HAMS forecasting, the board of county commissioners has recognized the need for preventive maintenance, assuring $10 million in infrastructure funding for the next 20 years. Hillsborough County is also applying its asset management system toward GASB 34 implementation and for emergency management and response funding.

Asset Management for Compliance

Continued from previous page

compliance, local governments must reevaluate assets on a regular basis. Governments may choose to implement the statement through a depreciation or a modified approach.The goals of the modified approach—asset preservation through preventive maintenance and better alignment of infrastructure expenditures with maintenance needs—mirror those of the asset management framework.

Additional Resources

- GASB 34. Saco, Maine. http://www.sacomaine.org/departments/finance/gasb34.shtml
- "GASB 34: What It Means for You." IQ Service Report. 2001. Washington, D.C.: ICMA. http://bookstore.icma.org
- Statement 34 Resource Center: Information and Resources for GASB Statement 34 and Related Statements. Governmental Accounting Standards Board. http://www.gasb.org/repmodel/index.html
- GASB 34 Watch. ESRI. http://www.esri.com/industries/localgov/gasb34.html
- GASB 34 Forum. Government Finance Officers Association. http://www.gfoa.org/services/gasb34forum.shtml

NPDES and CMOM: Regulating Wastewater Through Asset Management

GIS-based asset management can be an effective tool in organizing wastewater infrastructure location and quality data for compliance with National Pollutant Discharge Elimination System (NPDES) permit requirements for local government capacity, management, operation, and maintenance (CMOM) programs as well as for other environmental compliance regulations. Appropriate tracking of natural resource measurements, as well as industrial by-products, can help monitor or predict potential problem areas and enable local professionals to plan accordingly.

Additional Resources

- Wastewater Treatment: Sources of Potential Environmental Liability for Local Governments. 2003. Washington, D.C.: Local Government Environmental Assistance Network. http://www.lgean.org/documents/Wastewater.pdf
- National Pollution and Discharge Elimination System (NPDES). U.S. Environmental Protection Agency. http://cfpub.epa.gov/npdes/
- Fact Sheet: Asset Management for Sewer Collection Systems. 2002. Washington, D.C.: U.S. Environmental Protection Agency. http://www.epa.gov/npdes/pubs/assetmanagement.pdf

Asset Management, Homeland Security, and Emergency Response

The day-to-day responsibilities of local governments are critical to maintaining public safety, quality of life, and community growth. A number of activities—local planning, environmental and safety monitoring, citizen and intergovernmental communications, and infrastructure support—determine how expeditiously communities respond to emergencies.

The 2002 USA Patriot Act defines critical infrastructure as those systems and assets, whether physical or virtual, so vital to the United States that their incapacity or destruction would have a debilitating impact on security, national economy, national public health or safety, or a combination of those matters.

Public safety depends on the safety of critical infrastructure and the reliability of public assets such as transportation, telecommunications, and technology networks. Critical infrastructure protection requires a complete, up-to-date, quickly accessible picture of the location and condition of a jurisdiction's assets. GIS-based asset management systems provide an integrated picture to determine what exists, where, and in what condition.

Integrated, GIS-Based Systems Can

- Locate and manage resources and information.
- Provide the enterprise context in which local governments can store, analyze, and use location-based data for long-term planning and massive interoffice coordination.
- Establish an effective communication vehicle and method to share information among responders and across levels of government.
- Support day-to-day operations such as traffic control.
- Help monitor hazardous materials.
- Supply an auditable asset inventory for recovering lost assets through federal emergency grants. GIS is used for more effective response when multiple themes (e.g., roads, waterways, and telecommunication systems) are simultaneously threatened. Geospatial information provides the backdrop upon which effective, efficient detection and threat analyses are accomplished.

Additional Resources

- *GIS for Homeland Security*. November 2001. Washington, D.C. ESRI. http://www.esri.com/library/whitepapers/pdfs/homeland_security_wp.pdf
- "A Common Vision for Homeland Security." *ArcUser Online*. January–March 2002. ESRI. http://www.esri.com/news/arcuser/0102/homeland1of2.html
- Public Safety, Security, and Emergency Management. International City/County Management Association. http://www.icma.org/content/topic.asp?tpid=23
- Johnson, Russ. *GIS Technology for Disasters and Emergency Management*. May 2000. Washington, D.C. ESRI. http://www.esri.com/library/whitepapers/pdfs/disastermgmt.pdf

[1] *Danylo, Norman H., and Andrew Lemer. 1998. Asset Management for the Public Works Manager: Challenges and Strategies: Findings of the APWA Task Force on Asset Management. Alexandria, Virginia. Association of Public Works Administrators. http://www.apwa.net/Documents/ResourceCenter/ampaper.rtf*

[2] *Protecting the Nation's Critical Infrastructure. Washington, D.C. U.S. Department of Homeland Security. http://www.dhs.gov/dhspublic/display?theme=31&content=58*

Case Study

City of Saco, Maine

The city of Saco (population 16,822) is located in eastern Maine, about 15 miles south of Portland. Saco is leveraging its GASB 34 implementation as an investment opportunity for GIS, with benefits across the organization. Saco's finance department has been the driver in that city's adoption of GIS for asset management. The finance department understood how high-quality asset management using GIS could

- Enhance the city's asset inventory.
- Improve fiscal planning.
- Track and convey costs and benefits yielded from particular investments.
- Facilitate conveyance of information to citizens and elected officials through maps and tables.
- Support interdepartmental collaboration and resource sharing.

Ahead of the Pack

Saco first engaged GIS in preparation for GASB 34 but since then has seen expanded uses across government operations.

Saco fully complied with GASB 34 requirements for the fiscal year ending June 30, 2001, in its Comprehensive Annual Financial Report (CAFR), finishing a year ahead of the first required deadline. At that time, Saco was one of only 200 state and local governments to have fully implemented the requirements of GASB 34 early.

Saco began planning for compliance early not only to improve the city's financial position through GASB 34 but also to forge better relationships among departments and build the foundation for a citywide GIS, thereby increasing operational efficiency and improving service delivery. Saco decided on the modified approach to its GASB 34 compliance and used a GIS-based asset management system to emphasize long-term operations and maintenance goals.

Educating Elected Officials

Saco has done many things well. One of the best results has been improved working relationships with elected officials. Before the city could proceed with its GIS and GASB 34 plans, it had to secure permission for the project. Finance and public works staff met several times with city council members to educate them about the mandate and explain the potential benefits (e.g., maps, increased efficiencies, and improved bond ratings) of the modified approach. Saco achieved buy-in and got the "okay" for its information technology investments.

Saco's Solution

The city's asset management solution was conducted in four basic steps.

1. Collect data.

Saco was fortunate in that it had already conducted both a combined sewer overflow inventory for the city's downtown, comprising 70 percent of the total sewer system infrastructure, and a pavement condition survey. The existing infrastructure asset information was compiled, and the remaining data was collected from the field using handheld computers and wireless technology.

2. Build an asset management system.

The city realized this was not feasible to do in-house and, therefore, subcontracted with an outside vendor to create a GIS-based asset management system.

3. Train staff.

4. Compile and document results.

This step was essential in proving the city's return on investment.

Saco's Strategic Planning Pays Off

Shortly after its GASB 34 implementation, two national agencies upgraded Saco's bond rating. This change was made in part due to the city's proactive fiscal management demonstrated by its early implementation. The bond upgrades saved Saco 20 basis points when the city issued a school improvement bond, amounting to $2 million in savings to citizens over 20 years. Saco's efforts laid the foundation for a citywide GIS, supported a new partnership between the finance and public works departments, and provided leverage for a federal grant application. In addition to the direct benefits and cost savings, Saco has gained national and state recognition for its management excellence, garnering such accolades as the

- National Government Finance Officers Association (GFOA) Certificate of Achievement for Excellence in Financial Reporting for the city's GASB 34 compliant, comprehensive annual financial report for the fiscal year ending June 30, 2001
- GFOA Distinguished Budget Presentation Award for the fiscal year ending June 30, 2002
- Margaret Chase Smith Maine State Quality Award in recognition of leadership, strategic planning, and quality improvement

For more than 30 years ESRI has been helping people manage and analyze geographic information. ESRI offers a framework for implementing GIS technology in any organization with a seamless link from personal GIS on the desktop to enterprisewide GIS client/server and data management systems. ESRI GIS solutions are flexible and can be customized to meet the needs of our users. ESRI is a full-service GIS company, ready to help you begin, grow, and build success with GIS.

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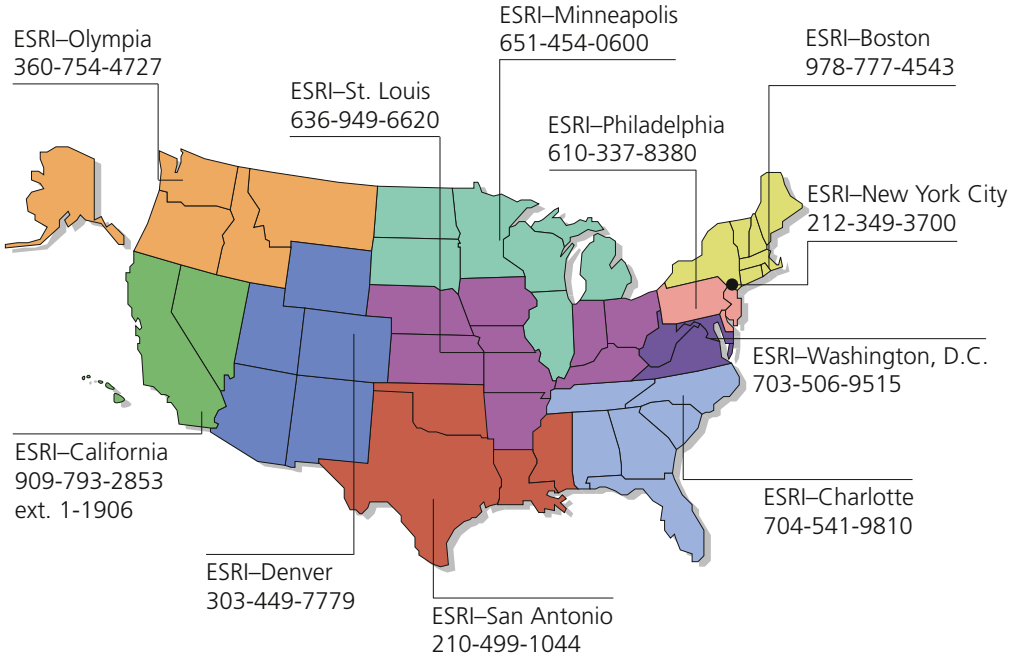

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