Building and Maintaining Solid Infrastructure in the Town of Gilbert

By Shayne Kavanagh

Preserving the investment the community has made in its capital assets is a concern for all local governments.

This article is adapted from the upcoming GFOA publication, Informed Decision Making through Forecasting: A Practitioner's Guide to Government Revenue Analysis, *by Shayne Kavanagh.*

The media often uses words like "crisis" and "crumbling" to describe the state of local infrastructure in the United States, and not without reason — one out of every nine bridges in the United States is considered deficient, and nearly a third of major roads are in poor condition.[1] The worst examples, like collapsed bridges and sink holes, make national news and even claim lives. In other instances, infrastructure failures create large, unplanned expenditures, disrupt the local economy, and reduce citizens' trust in government.

Preserving the investment the community has made in its capital assets is a concern for all local governments. The infrastructure challenge faced by the Town of Gilbert, Arizona, stemmed from a history of explosive growth. From 1980 to 2010, its population grew by a little more than 3,500 percent; and the town has continued to grow rapidly since 2010. It has, for instance, routinely issued more building permits each year than the City of Phoenix, Arizona, which has a population of more than 1.5 million people.

Approximately 25 percent of Gilbert's infrastructure was built between 1990 and 1999, and a approximately 50 percent was built between 2000 and 2009. A municipality that has grown at a slower pace would have a smaller portion of its infrastructure reaching the stage where significant maintenance and replacement outlays are required, but Gilbert faced the prospect of a glut of repair and replacement bills coming due at once — without the new revenues that accompanied the initial growth, such as impact fees, to pay for it. And because Gilbert was still growing, the town also had to determine how new growth would pay for itself and how existing infrastructure could support itself, without one subsidizing the other.

CREATING A STRATEGY

A cross-departmental team comprising representatives from the town manager's office, the Office of Management and Budget, and the information technology, parks and recreation, and public works departments led the analysis and development of a long-term infrastructure strategy. Revenue forecasting became an important part of the team's work for two reasons.

First, much of Gilbert's infrastructure was funded by revenues from impact fees — one-time charges paid by new developments to cover the town's costs

for creating the capacity for new police and fire protection, parks and recreation, traffic signals, and utility systems needed to serve the new residents and businesses. As Gilbert reaches full development (projected for 2030 to 2040), far less of this revenue will be available. At the same time, however, Gilbert's sales tax revenues have increased and are expected to increase into the future because of the economic activity created by new residents and business. Hence, the forecasts and financial strategy needed to incorporate the changing composition of the Gilbert's revenue portfolio and its implications for infrastructure financing.

Second, the citizens of Gilbert have consistently demonstrated a desire to keep taxes low, while balancing the provision of high-quality services. As a result of the state tax structure, Gilbert and many other Arizona communities rely heavily on local sales tax revenues. The volume of transactions subject to sales tax in Gilbert has been sufficient to maintain a low rate — 1.5 percent — and the town has not yet demonstrated a need for a primary property tax. In fact, Gilbert is one of the few larger U.S. cities that doesn't have a general purpose property tax.[2] The organization's staff allocation is also conservative. In this and other metrics (e.g., the average annual tax and fee burden per household), Gilbert consistently offers the lowest cost of any of the more sizeable municipalities in the Phoenix metropolitan region.[3] Therefore, accurate and effective forecasting is needed to make the most of current and future revenues before proposing rate increases or new funding mechanisms.

GILBERT'S PLANNING PROCESS

As the first step in Gilbert's planning process, the public works and parks and recreation departments developed an asset inventory, including an assessment of asset condition, in order to determine which assets were most in need of repair, and when. The asset inventory helped the budget staff produce a useful revenue forecast in three important ways.

First and foremost, the inventory helped Gilbert fully understand the long-term maintenance costs it would need to cover. Gilbert's revenue forecasts were far more meaningful when they could be compared to the expenditures needed to maintain the assets, thereby revealing the precise resource gaps that the town would need to address.

Second, the detailed asset inventory provided an opportunity to start a conversation about the *cost* of infrastructure compared to the *value* of infrastructure. "Cost" only refers to the expenditures, while "value" refers to both the cost of the infrastructure and the benefit provided. For example, when considering just cost, one would favor an infrastructure investment with a lower total cost over one with a higher total cost, even if the low-cost asset also had a disproportionately shorter useful life. When considering value, however, one would favor the asset that provided the most service to the public for the expenditure required to acquire and maintain the asset. Talking about value, rather than just cost, allowed the town council and management to have an informed conversation about how expenses and revenues together could maximize the useful life of Gilbert's infrastructure. If value were not taken into account, the conversation would be focused on how to minimize the cost of infrastructure.

Finally, the details provided by the asset inventory helped the budget staff learn about how operating departments approach infrastructure and gave budget staff a better understanding of how infrastructure ages, as well as the conditions that contribute to longer or shorter useful lives for assets. This new knowledge gave the budgeting team additional credibility when talking about infrastructure planning. For example, the team learned why assets in the water treatment facility needed to be replaced on a given schedule, and why failing to replace one asset could have deleterious effects on other assets involved in producing potable water. This understanding helped the budget staff and public works department develop regular schedules for funding maintenance and replacement that would keep the assets in good working order while also preventing big spikes in repair costs.

With the asset inventory in hand, the second step in the planning process was to discuss the level of service Gilbert would find acceptable for its assets. For example, a variable frequency drive starts, stops, and regulates the speed of a water pump, which results in more efficient use of energy and a longer asset life for the pump. Variable frequency drives at Gilbert's North Water Treatment Plant have a 15-year industry standard useful life. After examining the condition of the drives and evaluating how the assets were performing, it was discovered that

the variable frequency drives typically last for 17 to 20 years. However, the rate of failure was found to be much higher after 15 years. Officials therefore decided to put the drives on a 15-year replacement cycle because of the risk of failure and the criticality of the drives to plant operations. The level of service for other asset classes was determined in a similar fashion, taking into account factors like historical levels of service, anticipated levels of service based on growth projections, population, master plans, etc.

The decisions about the desired level of service for its assets prepared Gilbert for the third step in the planning process: determining the revenues available to fund asset upkeep at the desired level of service. To make this determination, Gilbert's departments compared the maintenance requirements to their current labor capacity and funding. If existing resources were not sufficient, then the departments would request additional resources, and the budget office would verify that revenues could support the request in the next year, and for five years to ten years into the future, depending on the fund. For example, the revenues for funding asset maintenance in the streets fund and general funds were largely composed of state-shared revenues. Since state-shared revenues can be volatile, a five-year outlook made sense. Enterprise funds have revenues that are under the direct control of the town, so a ten-year time horizon worked.

Enterprise funds account for many of Gilbert's assets and illustrate how the town used revenue forecasting to support its decisions about asset maintenance planning. The paramount concern with the enterprise funds was the ability of user-fee revenues to fund operations, meet debt obligations, and support Gilbert's minimum desired reserve levels. Gilbert's forecast model used algorithms that included variables to represent the total number of utility accounts the town would service, potential changes in water rates, expected changes in usage patterns, and other factors that affect water sales to make long-term estimates of revenues (see Exhibit 2). The model also disaggregated revenues to a level of detail necessary to distinguish between revenues from existing rate payers and revenues from anticipated new accounts. The town needed to know not just what system development charges were forecasted to be as a result of new customers coming on to the Gilbert's utility system, but also how water usage fees would be affected by new growth.

Gilbert also used what-if analysis to help analyze resource requests. For example, the wastewater division requested approximately $400,000 to migrate to magnetic meters that would no longer require costly annual recalibration and would have a longer useful life. Using the enterprise fund rate model, the town compared the one-time expense of purchasing and installing the new meters to existing revenues. Exhibit 2 shows a representation of the type of analysis the staff performed.

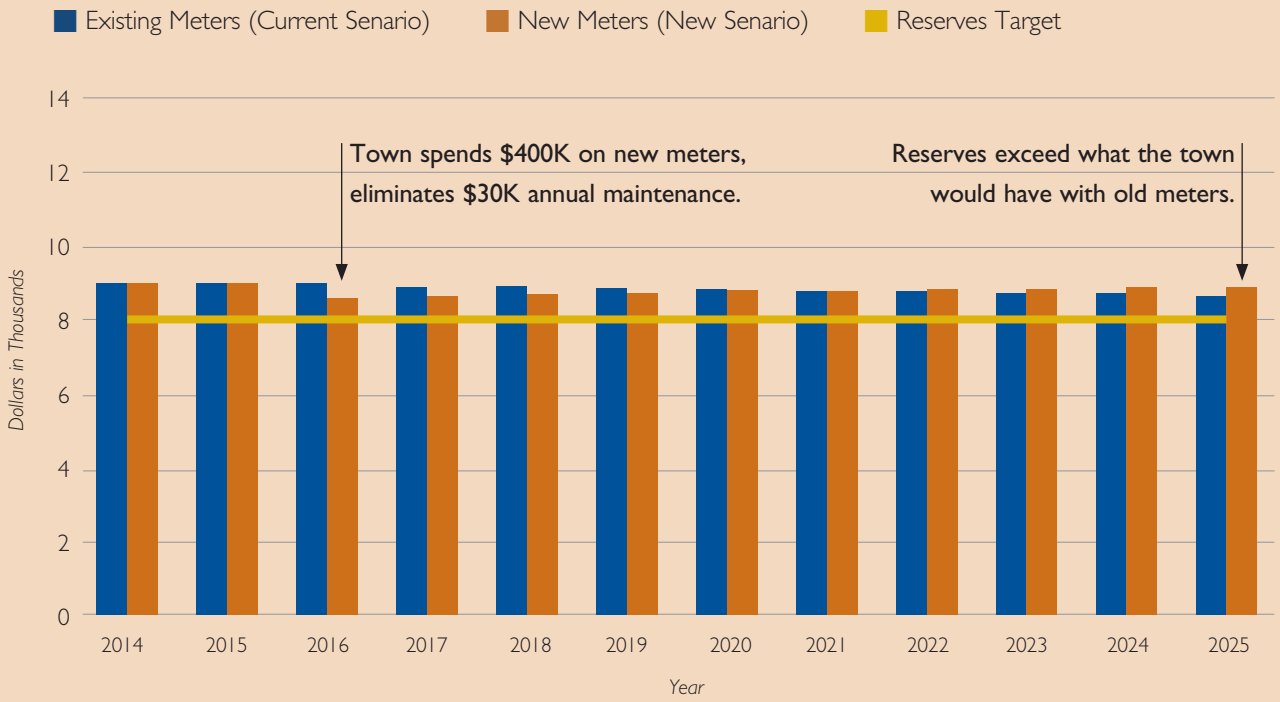
The revenue forecasts allowed Gilbert to move to the next step in the planning process, which was to weigh proposals for spending on infrastructure against other potential uses via annual budget deliberations. Gilbert used a zero-base budgeting process; every three years, departments were required to re-justify all of the expenditures that made up the baseline level of services they provided to the public. In other words, the budget had to be rebuilt from a base of zero as a way to critically re-examine what Gilbert was spending money on and to avoid reauthorizing obsolete expenditures. The departments also had to provide detailed spending plans for any programs or services they proposed that went above and beyond baseline spending. Gilbert's budget analysts and executive management team then conducted a detailed review of all requests.

Exhibit 1: Gilbert's Algorithm for Long-Term Water Rate Revenue Forecasts

	Base rate revenue from existing customers
+	Additional rate revenue from growth
=	Subtotal of rate revenue
X	Proposed water rate percentage increase
=	Annual rate revenue, including increase
-	Adjustment for elasticity of demand*
=	Total revenue from water usage

** Reduction in demand caused by increasing rates*

Exhibit 2: Analyzing the Impact on Reserves of Asset Management Strategies



Gilbert's staff used this type of analysis to illustrate the value of replacing dated meter infrastructure with a newer, more cost-effective model.

This example does not use actual figures from Gilbert's budget. Approximations are used to more clearly illustrate Gilbert's conclusions.

THE IMPACT OF PLANNING

The most fundamental impact of Gilbert's planning process was to establish a better link between asset maintenance and replacement needs and forecasted revenues, allowing the town to better compare its infrastructure needs to the available funding. For example, each year, Gilbert had spent between $2 million and $4 million on preventative street maintenance in neighborhoods around the community. After the inventory and condition-based assessment, it was determined that in order to maintain the assets at the acceptable level of service, the annual funding required would rise to approximately $7 million. Gilbert's financial projection models were updated to see if the supporting revenue stream would be able to accommodate the significant increase in maintenance. This was essential to determining the long-term sustainability of the fund source as well as the infrastructure assets.

The information provided by forecasts and planning led to better decisions about how to use resources. Many local governments operate infrastructure until it fails and then replace it. This is a more costly and less predictable strategy than effective planning of maintenance, rehabilitation, repair, and scheduled replacement. The challenge is that effective planning requires making investments in maintenance and repair before replacement becomes necessary — and making those investments consistently over time. Gilbert's forecasting and planning helped the office of management and budget align the resources necessary for a timely and consistent infrastructure maintenance strategy.

LESSONS LEARNED

Identify a Specific Issue. A forecast, especially a long-term one, will be

much more successful if there is a clear challenge or issue the government is facing. In Gilbert, the objective was to figure out how to support a sustainable infrastructure maintenance and replacement strategy. This means that the forecast was not just an intellectual exercise, but had immediate practical value to decision makers.

Put the Forecast in Context. Gilbert's budget staff did not present revenue numbers in isolation. The revenues numbers were put in the context of the expenditures the town would need to make to provide service to the public.

Understand the Details. The budget team in Gilbert dove into the details of the asset inventory and condition assessment. This helped them communicate more effectively with the public works department, allowed them to build more accurate financial models, and increased their ability to cite and be conversant about the details of the inventory, increasing their credibility.

Help Non-Financial Leaders Understand. The forecaster needs to find a way to give the audience an almost intuitive understanding of what the forecaster knows. One very powerful method, and one that Gilbert used, is simulation through interactive forecast models. Gilbert also gave its elected officials the opportunity to work with an interactive model in one-on-one meetings with budget staff, which provided a more immersive experience than if the model were shown to all officials at once at a council meeting, for example.

Work Closely with Operational Departments. Especially when the issue the forecast is meant to address is one that involves an operating department, the forecaster should work closely with the operating department to develop the forecast. In Gilbert, the public works department helped the budget team learn the details of asset maintenance, and the public works department learned from the budget team more about the funding streams available to support asset maintenance. Both groups benefited from working together and produced a more rigorous and credible forecast and plan as a result.

Integrate the Forecast into a Decision-Making Process. A large part of Gilbert's success is attributable to the decision-making system it had in place. The town started with establishing a broader vision for Gilbert to be "best in-class, all lines of service." This vision created an identity that allowed Gilbert's decision makers to see well-maintained infrastructure as a necessity. Gilbert also had a limited number of more specific long-term strategic initiatives, including "long- and short-term balanced financial plans" and "proactively address infrastructure needs." Finally, Gilbert's zero-base budgeting process provided a way to compare investments in infrastructure maintenance with other possible uses of Gilbert's available revenues.

Build the Forecast Model to Suit the Planning Purpose. Gilbert's forecast model disaggregated growth revenues from regular, ongoing revenues. This included separating water sales from new accounts and sales from existing accounts, not just separating water sales from impact fees. This design was essential in finding out if Gilbert would later be able to maintain the infrastructure it was building. A less detailed model would not have made these distinctions.

Be Open to New Conclusions. One of the conclusions the Gilbert team arrived at early on was that many of the items staff had long viewed as "one-time" investments could be considered ongoing maintenance costs. Though the specific purchases and parts for maintenance may vary from year to year, an approximate ongoing baseline can be established, from which any spikes or true one-time expenditures may be forecast. In essence, embarking on a multi-layer, multi-year effort to inventory all town-owned infrastructure while forecasting future needs may evolve into other discussions. Deviating from the original plan should not be viewed as an obstacle but as one of the beneficial outcomes of the research and resources dedicated to forecasting and planning.

Notes

1. Steve Kroft, "Falling Apart: America's Neglected infrastructure," CBS News, November 23, 2014.
2. Gilbert does have a property tax that is used exclusively to pay down debt that the town has issued.
3. The sources for this information are the budget offices of the Town of Gilbert and the City of Tempe. Both offices develop comparisons of the eight larger cities in the region: Gilbert, Chandler, Scottsdale, Tempe, Phoenix, Glendale, Peoria, and Mesa.

SHAYNE KAVANAGH is senior manager of research for GFOA's Research and Consulting Center in Chicago, Illinois. He can be reached at skavanagh@gfoa.org.