

## *Storyline: Tom's Bad Day*

### A Step-By-Step Approach To Discovering And Applying Asset Management In A Utility Environment

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[The storyline begins in *Introduction of Storyline: Tom's Bad Day*.]

#### *Prologue*

It is twilight. Night is coming on fast. A light rain is falling. Tom is standing beside the road and looking at his Jones Street lift station. Raw sewage is flowing out of this failed pump station and spreading across the street surface. A pick-up truck has slid in the sewage, swerved off the road, and hit an electrical power pole, knocking out power in the neighborhood. The police were called. They have arrived and begun to direct traffic. Tom is expecting a reporter to show up at any moment with a camera crew. For temporary lighting, small electric generators have been positioned and started, and are contributing their motor whine to this uncertain beginning of a nighttime emergency response.

Faces are glum in Tom's emergency response crew. The crew is waiting for an electrician who knows how to connect a large generator to the lift station's motor control center. That generator has not yet arrived. While crew members wait, they would like to be able to connect their small gas-powered pumps to the force main to divert the sewage from the storm drain, but the piping connections cannot be found in the field truck and the right fittings are not in inventory back at the warehouse. June, the Field Superintendent, has called Red, the local plumbing supply storeowner, and asked the owner to open his store so she can obtain the fittings.

Meanwhile, the scale of the problem is worsening as escaped sewage from the pump station is reaching storm drains on its way to the river. Tom grimaces as he acknowledges to himself that the river is the sole supply of drinking water for Anders, a small, downstream community. Indicating that matters are worsening further, Tom has taken a radio call advising him that AgriCorp, an industry located upstream—and the major employer in the area—is reporting wastewater backups.

This, unfortunately, is the fourth major failure of a pump station in Tom's collection system in the past 18 months. Each of the other three occurred from equipment failures—an electrical problem in a control panel in one case and a variable speed drive failure in another. The third failure resulted from the rupture of a section of the force main at a 50-year-old pump station. Each of these failures caused significant wastewater spills into storm drains that flow to the river. Two also resulted in wastewater backups in businesses and homes—both of which made the six o'clock news!

Tom has been a City employee for 16 years. He joined the City as a Supervisor, was promoted to Plant Manager after 5 years, and has been the Utility Director for just under 3 years. The City Manager that promoted Tom retired shortly thereafter, and the new City Manager's performance will be evaluated and the renewal of his employment contract will be addressed by the City Council in about 6 months. Both the City Manager and Tom took heat from the City Council about the two most recent pump station failures. Some Council members have asked why the utility maintenance program is not what it should be, and one even proposed that an outside management audit be conducted so the City could "fix its utility management problems."

The City's utility rates are reasonably competitive and the City Council is proud of the fact that they have "held the line on rates" for four straight years. At a recent City Manager staff meeting, the Finance Director expressed concern that utility system failures may adversely impact the bond rating for a key bond issue planned for next year. The treatment plants for which Tom is responsible have been meeting permit requirements—just barely in some months—but his Plant Managers have submitted CIP requests for significant additions, modifications, and replacements and have justified these on the basis of unit age and anticipated permit requirement changes.

Tom has noticed an appreciable increase in the number and severity of sanitary sewer overflows in the collection system, and is concerned about SSO & CMOM compliance. He also is concerned that enforcement actions are looming as a result of the previous pump station failures. Since he became Director, Tom has been limited to annual O&M budget increases that merely added minor inflation allowances to previous year's budgets. Thus far, his requests to the Budget Director for capital improvement projects have fared pretty well—due largely to the fact that they were small, he suspects—but additional projects likely will trigger the need for rate increases.

Tom knows that he is "under the gun" and that this lift station failure will serve to "turn up the heat." In fact, the heat will be turned up soon enough, he realizes, as the new Whispering Oaks subdivision comes on line in several months and starts sending its sewage to the lift station.

Tom's discussion with the City Manager early the next morning confirms his concerns about "the heat." Following that discussion, Tom calls an *ad hoc* staff meeting in which he demands answers. Unfortunately, what he gets is more bad news.

The maintenance budget for this year is already 12% over-expended—with two months to go before the fiscal year ends. This emergency likely will put the whole department in the red. On top of that, his two most senior field people are leaving—one just won the lottery, the other is taking early retirement due to illness.

Tom has a nearly sleepless night. It's been a bad month. In fact, if the truth were known, it's not been such a hot couple of years. Tom realizes that things are getting out of hand. It's clear that he and his team are simply not in control

of the system—events are overrunning him and his management team. He knows he must take action or he is certain that someone else will. But what action? He finally falls asleep thinking, “We cannot keep doing things the same old way and expect different results... And I cannot possibly be the first person ever to face and solve these kinds of problems. I’ve got great people... But our infrastructure keeps failing!...”

*There must be a better way of running a utility!*

The morning after the lift station overflow, Tom calls an old college colleague, Ashley Johnson, who manages a large beer brewery in the private sector. They meet for lunch and Tom spills his guts about his problems. Ashley suggests he look into incorporating some concepts of advanced asset management, which is what she is doing. Tom is puzzled. He’s heard the term, asset management, but not had time to really look into it. She sketches some of the fundamental concepts, and stresses the benefits of “long-term sustainability,” the management of “business risk,” and managing on the basis of “lowest total life-cycle costs.” He’s intrigued. She describes where she is going in her own asset management initiative at the brewery, and then promises to e-mail him a set of five core questions that she uses to guide her asset management decision making. He spends some time that afternoon studying the five core questions she has sent.

### **The Five Core Questions**

- Q1. What Is The State Of My Assets?
  - a. What Do I Own And Where Is It?
  - b. What Condition Is It In And What Is Its Remaining Physical Life?
  - c. What Is The Value Of My Assets?
- Q2. What Is My Required “Sustainable” Level Of Service?
- Q3. Which Assets Are Critical To Sustained Performance?
- Q4. What Are My “Minimum Life-Cycle-Cost” CIP And O&M Strategies?
  - a. Using AM To Drive O&M Decisions
  - b. Using AM To Drive The CIP
- Q5. What Is My Best Long-Term Funding Strategy?

[The storyline picks up here in ***Step 1. Develop Asset Registry.***]

### ***Q1. What Is The State Of My Assets?***

Tom is struck by the realization that his assets are actually being “consumed” in the day-to-day generation of services—that is, in achieving the mission of the

Utility, he is “using up” his assets. He has never thought of it that way before. He realizes that, unlike Ashley, he has no idea of what his real “consumption rate or costs” are—how fast his plant and pipe are being used up. And, more importantly, that without such information he is running blind. “No wonder events are overrunning me!”

He suspects that his level of reinvestment is wholly inadequate. He putters around and locates the annual financial statements sent over last year by Finance and runs some numbers. His calculations show that the Utility currently reinvests less than one-half of one percent of the “book value” of the Utility’s assets each year. This means, he suddenly realizes, that at a half percent per year rate, he implicitly anticipates his assets lasting 200 years!

“It’s no wonder the performance of my system is diminishing even though I’m spending more and more on maintenance—mostly emergency maintenance at that! But I need better facts to confirm this if I am to have any chance to make a case for increased reinvestment.

*“To really understand what it costs to provide services, I have to know what assets I have and where they are. Then I have to know what their remaining useful lives are—that is, what condition they are in.”*

Tom starts to see, albeit sketchily, that the real issues here are *management* ones—an integration of engineering science with more advanced management concepts than what he has been accustomed to. As the Utility Manager, his role in the organization is really more about *managing* his assets rather than just “*engineering*” them.

Tom realizes his immediate data collection effort actually divides into two core efforts:

- Systematically documenting what we have, where it is, and what condition it is in, and
- Understanding the actual consumption rate of our assets, or, more fundamentally, their true remaining useful value.

Once he has real data about each, he can then better determine where to send his maintenance people, when to repair and when to replace, and which assets to refurbish, build, or acquire. He senses that he has just taken a major step into new territory—a different way of thinking.

### *Q1a. What Do I Own And Where Is It?*

Tom starts with the challenge of defining what assets he has. He already knows that collecting data is expensive.

“What data do I really need? What data do I have? How do I organize my data so that it feeds my information and knowledge needs?”

Tom goes searching for data about his assets. To his dismay, he discovers data stacked haphazardly in piles and boxes. No systematic data record or database exists. He has no single, current listing or register of what he owns. Worse,

what data he does have does not “fit together”—his GIS data do not “fit” with his CMMS data which do not tie to Finance.

And much of the information he depends on is “mortal” data—in the heads of his most experienced people. He sees the real issue is one of silos—everyone has a “different piece of the elephant!” “We’ve got to find a way of getting the right information to the right person, in the right format, at the right time if we want to make good decisions.

While reflecting on the data structure he has developed, Tom realizes he must integrate “his” data standard with those of his senior management team. In fact, he starts to see that information integration and roll-up are vitally important! All of the “silos” in the organization need to have access to the same data and have the same knowledge about the Utility’s assets.

[The storyline continues here in ***Step 2. Assess Performance, Failure Modes.***]

### ***Q1b. What Condition Is It In And What Is Its Remaining Physical Life?***

Now that he has a data hierarchy and record layout—a data standard—how best to collect the data—especially condition data? Tom runs the numbers and discovers that getting all the condition data for all of his plants and pipes is hugely expensive. But he has to move forward or be stuck forever in a reactive mode. How to do that?

He realizes that the first step is to set up some type of condition scale. He considers a simple “excellent, good, fair, and poor” condition scale as a starting point. That should be rather simple to accomplish using his existing field folks. Maybe he could get an engineering student at the university up the road on board as an intern to coordinate the work and fill in around his staff.

He starts to picture a complete and systematic inventory of his system with a condition code assigned to each asset. Suddenly, he frowns. “What would I do with the information once I have it. That is, what does a “fair” rating tell me to do? What exactly does “fair” or “poor” mean from a maintenance or renewal standpoint? Should he and his crews keep all assets at “fair” or better level of maintenance? A few of his crew have mumbled that some of the assets, while only in fair condition, seem to be fine for the foreseeable future. And collecting condition data would seem to be an expensive proposition. Does he really need to collect condition data for all his assets? Is there a “smart” way to get condition data that stretches his lean budget? Tom sets about to develop a cost-effective condition assessment protocol.

[The storyline continues in ***Step 3. Determine Residual Life.***]

While building his condition assessment protocol, Tom realizes that condition, while important, is only a “means to an end,” in which the end is an

understanding of the useful life left in each of his assets. Somehow he has to relate his condition codes of “excellent” or “fair” to an estimate of remaining useful life. How to do this? What ways are out there to develop estimates of residual life?

[The storyline continues in *Step 4. Determine Life Cycle & Replacement Costs.*]

### *Q1c. What Is The Value Of My Assets?*

Now that he has his data-structuring and data-gathering efforts underway, Tom turns to the second question the City Manager asked him at lunch—what will it cost to keep his system running given its condition?

“How much have we consumed over the years—more importantly, what is left to work with? *Most* importantly, what will it cost to sustain the performance of those assets given the useful life left—at a level that his NPDES permit requires?”

How can he assess the impact on his business of repeated failures if he has no feel for the value of his existing system or the cost of those failures to his business?

The word “valuation” pops into his head. Tom recalls his City Manager at last week’s staff meeting talking about a new accounting requirement that requires the City to disclose the value of all of its assets for the first time. Tom knows that his counterpart at Public Works is quite concerned because he, for the first time, has to determine the value of all of the City’s roads, streets, sidewalks, bridges, stormwater culverts, traffic signs—anything that has a useful life of more than one or two years. Tom calls the City Manager and the Finance Director to see if they are available for lunch. He wants to understand how this focus by the new accounting rules can help him manage his own assets.

At lunch, the Finance Director says that the City will actually show an item called “depreciation” as an annual expense on its annual financial statements. Tom vaguely recalls from his college days that depreciation is a concept used in the private sector to place a value on the consumption of a corporation’s assets. He asks how this works. The Finance Director says that it’s really rather simple: the City will take the historic cost of all of its assets and divide that cost by the asset’s useful life in years. The amount that results from the division is called the “depreciation expense.” This amount is to be treated as an annual expense, just like payroll or the purchase of cylinders of chlorine. The difference is, that because the depreciation expense is not actually paid to someone, it “frees up” cash for the City to reinvest in its assets. At least, that’s how it is supposed to work in the private sector, he says.

The City Manager does not sound particularly convinced. He knows that the Utility, as an “enterprise fund,” has been using depreciation for years. Yet the condition of its assets is not exactly top notch. He asks Tom to compare the Utility’s annual depreciation expense, as reflected in the City’s Annual Report,

to what the Utility's replacement and refurbishment needs really are. An interesting idea, thinks Tom; he commits to get right back to the City Manager.

Tom returns to his office. He notes that to do what the City Manager has requested, Tom needs two things: 1) the dollar amount of annual depreciation charged to his Utility and 2) an estimate of what it will take to refurbish and replace his assets over their life.

He starts with finding the depreciation expense first. He recalls that his latest Financial Statements reflect a dollar value for his assets. Once again he digs through his shelves until he locates a copy of last year's Annual Financial Report. He turns to the Balance Sheet and sees a dollar number listed as the "book value" of his assets. What exactly does the term "book value" mean? More fundamentally, how is it calculated and what does it mean from a management standpoint? Can it help him figure out how much he should be reinvesting in his system to sustain performance at the level his Council set, given that he is using up his assets a little bit every day?

The disclosure notes section of the Annual Financial Report says that the value listed is based on "depreciated historic cost." What does "depreciated historic cost" really mean? He digs out his old engineering economics textbook from his college days. It says that "depreciated historic cost" means what is left of the original cost after accumulated depreciation has been removed. And "depreciation" is the original cost divided by the expected life of the asset, and "original cost" is what the Utility actually paid at the time it bought or built the asset. Well, that's simple enough, he reflects.

"But wait a moment—many of my assets are decades old!" The more he thinks about it, the more he realizes that with long lived assets, historic depreciation is virtually meaningless from a management view. He figures that what the Agency paid for an asset fifty years ago, given the rise in the cost of things since then, can tell him little that is important about managing that asset today.

Clearly, assets that were built or acquired years ago have historic costs that are far below what it would cost to refurbish or, most certainly, to replace the asset.

"If I have lots of old assets—which I do," he notes, "then my annual depreciation 'allowance' is most assuredly far below what I need for actual replacement purposes. Wouldn't information about *replacement* cost be far more relevant to the decisions he needs to make? Shouldn't I be focusing on replacement cost instead of depreciated historic cost? And what about *refurbishment* costs versus *replacement* costs? Those would seem to be significantly different numbers themselves."

"If I am spending more on emergency maintenance to continually repair my problem assets than it would cost to refurbish or replace them," he reasons, "then I am wasting my very limited budget dollars. I had best get a handle on the refurbishment and replacement costs of my assets," Tom concludes. Tom tracks down his old Engineering Economics textbook again and takes it home for some late night reading.

[The storyline continues in **Step 5. Set Target Level of Service.**]

It dawns on Tom that knowing the residual life of his assets and their associated refurbishment and replacement values is only half of the question—the other half is, “at what level am I to sustain the performance of the system?” This leads to a contemplation of the relationship between the **cost** of delivering service to customers (given his system’s actual remaining useful lives) and his system’s expected **performance**—“level of service” Ashley called it. He sees a clear connection—*the higher the level of service, the higher the cost to sustain it*. It dawns on him that the relationship between sustained level of service and the cost of that service has never been clearly presented to the City’s Executive Management Team—much less to the City Council.

Tom now understands the importance of knowing the remaining physical life of his assets. But he also realizes that he can’t understand whether their performance will be adequate unless he understands the performance that they need to achieve—and to sustain—over time. It occurs to him that he needs to set some performance criteria—some “levels of service.”

### **Q2. What Is My Required “Sustainable” Level Of Service?**

Now that he understands the importance of defining a level of service, how to do it? What are the different aspects or “dimensions” of LOS? Tom starts with thinking that defining his current LOS will be simple—he needs only to look at the most recent NPDES permit. As he reflects, though, he becomes aware of the distinction between *system performance* (the technical or physical performance of the system—what he typically thinks of as service) and *serviceability*—that is, what his customers and stakeholder think of the service.

It is also clear that what his City Manager and City Council set as levels of service standards must be both measurable and routinely measured. Finally, he recognizes that the standards set for the organization as a whole must somehow be directly *linked* to the performance of each individual asset. That is, that the strategic level targets must be directly connected to the operations level, if the targets set by the Council are to be met and sustained.

[The storyline continues in **Step 6a. Determining Business Risk (“Criticality”)** and **Step 6b. Optimized Investment Decision Making (OIDM).**]

### **Q3. Given My System, Which Assets Are Critical To Sustained Performance?**

Now that he has his arms around his data needs and has defined his target levels of service, Tom starts reflecting on what “proactively” managing his assets is all about—how it differs in a big way from simply reacting to failures once they show up.

Tom’s reflection leads him to conclude that good asset management is about successfully managing the *potential* for assets to fail. How do assets fail? Is

there a way to understand the management of asset failure? His quest takes him back to Ashley, his beer-plant counterpart, who points him to an area called “root cause analysis.” She gives him several books on a subject called “failure mode, effects and criticality analysis”—“FMECA,” she calls it.

His reading carefully distinguishes between the likelihood of failure and the consequences of failure. That is, not all assets fail the same way and not all failures have the same consequences for the Utility in terms of revenue loss, compliance with regulatory requirements, and customer satisfaction. He begins to see that the failure of the Jones Street lift station has impacts on his business that are much greater than the narrow—albeit painful—repair costs incurred and the grumbling of his crews.

To his surprise, Tom realizes he has never really determined exactly what caused the lift station to fail. The truck knocking over the power pole was merely insult on top of injury. He rummages through his in-box and locates the incident report June had dropped on his desk on the way home from a long night.

As he scans June’s notes, several entries jump out at him:

“19:35—Entered superstructure to shut off power breakers before power-up. The main breaker had been tripped. No immediate clue as to what triggered it. No sign of arcing or flash explosion around the box. That means neither Motor/Pump 1 nor Motor/Pump 2 could run. No wonder the overflow. Why are both down?”

20:25—Power temporarily restored by Costly Electric & Illumination; they will return in am to install permanent pole. (Shouldn’t we ask them to move it back from the road?)

20:30—Mac and I turned on main breaker to Motor 1. Immediately heard loud screeching. Seems to be from Motor 1. Immediately shut main down. Turned off breaker to Motor 1. Turned on main. Good news—Motor 2 ran fine. No unusual noise. Nice to have lights. Wonder if coffee pot works!

20:40—Noted that motor mounts on Motor 1 appear loose—black skid marks up to half inch from front feet; back shows movement but not as bad.

20:45—I entered wet well and dry well with Motor 2 running. Mac stayed top. Noted that the two shaft guides on the wall for Motor/Pump 1 were completely loose, one side pulled off wall. Bolts pulled clear from wall too. Noticed substantial play in pump shaft at the coupler to the shaft. Way too much play here. See photos.

05:15—My guess at this point—looks like vibration worked the shaft guides loose, increasing strain on the motor, working the motor loose, which strained bearings to point of break down.

05:30—Sent crews home with Motor/Pump 2 running alone. What to do

with Motor/Pump 1? Repair? Refurbish? Replace? Will discuss with you after I get some shut eye.”

Tom realizes that he needs to understand the *root cause* of the failure before he can have confidence in any decision as to what to do. He consults her photos.

Tom is intrigued with this concept of managing asset failure. He recalls that his Jones Street lift station still can pump effluent at the rate it originally was designed to do, but it simply cannot keep up with the additional demand placed on it by the recently constructed Whispering Oaks subdivision. If one point stood out clearly from his review of the failure literature, it was that *physical failure* is quite different from *effective failure*! Effective failure—the failure to sustain performance at the targeted performance level of the asset—can precede physical failure by many months—or even years.

Tom begins to see an “onion” approach to his data collection efforts. The key lies in deciding which assets are most critical to keeping the system running—perhaps he should focus his limited resources on those most critical assets first, then work his way through increasingly less critical “layers” or groups of assets until he has the data he really needs. By using this very simple, “high level” risk analysis, Tom can assign a “first cut” asset criticality value to each of his assets or groups of assets—which will subsequently guide where to focus his data efforts.

He does this in a collaborative manner with his Operations, Finance, Maintenance, and Engineering managers gathered around a table over a process schematic of his plant and pipe system. They use colored drafting dots to create a “measles map” of system failures and critical assets.

Tom suspects that these risk and “failure analysis” concepts will guide much more than just data collection efforts. As he and his management team grow in their understanding of advanced asset management, he can drill into lower levels of detail as relevant (like peeling the onion, he thinks).

#### *Q4. What Are My “Minimum Life-Cycle Cost” CIP And O&M Strategies”?*

It takes only several evenings of reading for Tom to see that “failure mode” and “risk-consequence” concepts have real ramifications for his Maintenance, Operations, and Engineering teams.

Tom brings his O&M and Engineering teams together for a skull session about failure modes, effects, and criticality analysis—FMECA—concepts. The Staff get interested, even excited, about how this changes what work they should be doing. Operations begins to understand why Maintenance does what it does. And Maintenance sees better how it impacts the availability of service when it takes down a pump. Both agree there is much room for improving availability of service and reliability. Operations even indicates it looks forward to redefining some of its roles with Maintenance. Engineering sees a better way to plan for

rehab and replacement projects in their CIP and sees that small strategic redesigns can make both operations and maintenance costs significantly lower.

In the course of the review of the Jones Street lift station using risk-consequence concepts, June, the Maintenance Superintendent, states that it may be about time to renew the lift station rather than to keep repairing it. Tom is startled to realize that he has no clear method for determining when to repair and when to replace, having used just “judgment” in the past. It occurs to him that replacing too early or repairing too late in the asset life cycle is just wasting bucks—and he has precious few of those to waste. So just how does one really know when to repair and when to replace—how to determine when the correct time is at hand?

That evening he comes across an article in a trade journal that describes an Australian approach called “optimized renewal decision making.” He reads the article, sits back in contemplation, and then calls Ashley to see if she will assist his team in applying the concept to the lift station.

[The storyline continues in ***Step 7. Optimize Operations & Maintenance (O&M) Investment.***]

#### *Q4a. Using AM To Drive O&M Decisions*

June, his maintenance superintendent, sticks her head in the door, sees Tom is alone and sinks quietly into the old chair next to his desk. He can see something is on her mind.

“I’ve been thinking,” she starts, “about the reliability discussion we had yesterday. At the State operators conference in Springfield last March, there was a presentation by Southeast Sanitary about their new program called RCM—reliability centered maintenance, I believe is what he said it stood for. Seems it uses a bunch of the concepts we’ve been talking about—failure modes, risk, and the like—to guide where they send their crews and what they do. Appears its focus is on finding maintenance strategies that really manage failures rather than just jumping on an asset once it’s broke. Also seems that sometimes running your equipment until it fails *is* the lowest cost approach—just not running all equipment ‘til it fails like we do.”

“I called Southeast’s Maintenance Super, Joe Buck, whom I’ve known for years. Joe’s a tight old bird. He admitted he was reluctant at first to get into a new approach with his guys so they took it slow on a couple of small test sites. He’s kinda pleased with the results. Says they are now expanding it all across the 21st Street plant and then gonna take it into the collection system starting next Spring.”

Tom leans back, grins, and says “I like it. Let’s go for it, June. Let’s get with Joe over some barbeque and look more at how this works.”

[The storyline continues in **Step 8. Optimize Capital Investment.**]

Over a cup of coffee, Tom reflects on how much more comfortable he feels with how and where his crews are being deployed. Good crews doing the wrong work (or doing the right work at the wrong time) has arguably been the single biggest surprise during his pursuit of asset management. It seems so clear, now. He shudders at what has been spent over the decades with the best of intentions but in the absence of good decision processes and solid data.

He stops in his tracks. It dawns on him that the whole process, indeed all of asset management, boils down to “confidence in decision making”—in short, to having confidence that the decisions being made are in fact the very best long-term decisions that can be made. More importantly, he sees that confidence is really the result of interaction between just two variables—good practices (which starts with asking the right questions) and good data.

#### **Q4b. Using AM To Drive The CIP**

Now that the team is more comfortable with renewal decision making, Tom shifts his focus from maintenance to the big-ticket item on his plate—his CIP needs.

Tom knows he has a far bigger CIP list than he can afford to fund. He suspects it is more a loose compilation of separate wish lists than a carefully balanced projects list. He is sure that the failure/risk-consequence techniques he has developed are key here too, but suspects there is even more at work.

It dawns on him that to make tough decisions about which projects to invest in—and which not to—he must clearly understand the *demand* for his assets; that is, he must understand why his customers need his Utility services and how that need is likely to change over the next decades. What *are* the core forces driving his customers?

“So,” he reflects, “a CIP really boils down to confidence—confidence that he is recommending the right solutions to the City Manager and City Council at just the right time.” In his head, a checklist—more specifically, a set of “decision filters”—begin to emerge. He jots down a set of notes, then takes a project through the “filters” to test his idea. As he puts all his projects through the filters, he begins to sort the projects into those that are defensible, those that are not, and those that are premature at this time. This last group of projects he’ll need to know more about before they can be allowed to proceed.

[The storyline continues in **Step 9. Determine Funding Strategy.**]

Tom is thankful that his earlier work of setting up data standards and getting better data about what he owns gives him a better basis on which to make the tough CIP decisions that lie ahead. Tom starts systematically assembling a realistic CIP from the bits and pieces of requests scattered here and there. As he works he realizes that many of the projects simply are not ready to go

forward to his Council for consideration. Indeed, even worse, if they did go forward, he would be liable to get his head handed to him, because the projects simply have not been reviewed from a “big picture” perspective. Some of them are even contradictory in nature—like upsizing the lift station downtown when flow (demand!) there already is falling, and is likely to fall for years! He starts reflecting on what *he* would want to know if he were a City Council member before he felt comfortable in agreeing to fund a specific project.

### *Q5. What Is My Best Long-Term Funding Strategy?*

In his office, Tom kicks back and reflects over the past three months. Things are starting to come together—there is at least a glimmer of hope on the horizon that he and his staff may finally get on top of the “failures beast.” Which, he chuckles to himself, sure as heck beats being constantly chewed up by the critter.

As he reviews his management team’s progress with the principles of asset management, it occurs to him that his approach so far has dealt a lot with *individual* assets. What of the big picture—how does it all fit together, especially financially? More to the point, what funding level would it take to sustain performance of the Utility over the long haul? The word “sustain” resonates in his head. “Good grief!” he chuckles, startled at the simplicity of it all, “It’s all about sustainability!” Suddenly he realizes how important it is to him to hand over “his” Utility to the next generation in better shape than when he took it over. How to identify a long term funding level for asset renewal that sustains his target LOS? And how would he ever be able to explain it to his City Manager, much less his Council? And more importantly...he pauses...is Ashley available for dinner?

[The storyline ends in ***Step 10. Build Asset Management Plan.***]

Tom roughs out an annuity renewal level and notes how better quality data will give him more and more confidence in setting and adjusting the funding level. At the request of the City Manager, he starts developing renewal and replacement costs for all City assets, so that the City can begin the process of confronting its future—likely to be a contentious and painful process given the years of “deferred maintenance” across the City. And the City Manager has asked Tom to be thinking of how the City would put together its first Asset Management Plan.

### *Assembling The “Big Picture” View*

The insight about confidence in decision making deriving from good practice and good data has been a major break-through in his own mind. He realizes that what he has been doing over the past several months is building a management framework for thinking about his assets, while at the same time building a library of “best practices.” He now wants to put it all together into a package.

How do the pieces fit together as a whole? Can it all be summarized into a strategic plan that provides a decision framework for all his resource allocation decisions? Most importantly, can't these concepts be viewed as a dynamic framework for making ongoing decisions about all of his assets?

Tom reflects on his "big picture" plan, beginning to feel pleased about it all, recognizing that maybe, just maybe, his team has turned the corner, and that he will be able to leave behind a legacy to future generations of sustained and sustainable performance.

We leave Tom at this point to continue to discover and apply the principles of asset management with his management team as they bootstrap themselves toward best practice.

But what about Tom and Ashley—will they break down their own silos and manage assets together into the sunset?