


---

---

---

---

---

---

---

---

### What is Asset Management

- Refers to any system that monitors and maintains things of value to an entity or group
- It may apply to both tangible assets such as buildings and to intangible assets such as human capital, intellectual property, and financial assets

**An Asset is the physical transportation infrastructure**

- For example, roads, bridges, cattle guards, drainage culverts, signs, trucks, pipes, tanks basins and other elements of the transportation system

---

---

---

---

---

---

---

---

### What is Asset Management

- The practice of managing assets to achieve the greatest return and the process of monitoring and maintaining facilities systems, with the objective of providing the best possible service to users

ASSET MANAGEMENT		
Management	Engineering	Information
Business Strategy	Planning	System Architecture
Regulatory Strategy	Design	System Integration
Operational Design	Operations	Business Intelligence
Performance Mgmt	Maintenance	Knowledge Mgmt
Process Design	Reliability	Asset Registry
Resource Planning	Protection	EMR, GIS, GIS
Decision Analysis	Equipment Health	CMMS, SCM
Financial Risk	Technical Risk	SCADA, OMS

---

---

---

---

---

---

---

---

### What is Asset Management

- **Asset management** is a systematic process of deploying, operating, maintaining, upgrading, and disposing of **assets cost-effectively**
- The term is most commonly used in the financial world to describe people and companies that manage investments on behalf of others

---

---

---

---

---

---

---

### Why Asset Management

- Utilities can be more stable if they run on a business model of long term stability
- Issues
  1. Growing populations
  2. Increased service demands
  3. Limited water supplies
  4. Aging infrastructure
  5. Limited funding

---

---

---

---

---

---

---

### Why Asset Management

- Asset management reduces the gap between what is needed and what funds are available
- Good asset management plans present convincing evidence that they possess adequate financial, technical, and managerial capacity to provide the service that their customers expect

---

---

---

---

---

---

---

### Why Asset Management

- Good asset management plans maintain the infrastructure necessary to provide that service, and to manage the organization technically and financially throughout the life expectancy of the improvements being financed



---

---

---

---

---

---

---

---

### Why Asset Management

- The assets that make up a water system generally lose value over time as the system ages and deteriorates
- It may be more difficult to deliver the type of service that the utility's customers want

---

---

---

---

---

---

---

---

### Why Asset Management

- Costs of operation and maintenance will increase as the assets age
- Meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets



---

---

---

---

---

---

---

---

## Why Asset Management

- Help utilities make better decisions on when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy



---

---

---

---

---

---

---

---

## Why Asset Management

- As more and more options become available, utilities can reach limitless potential through planning, managing and controlling assets
- Focus and priority on asset management can be the difference in a utility surviving financially and not



---

---

---

---

---

---

---

---

## Quiz Time



---

---

---

---

---

---

---

---

Asset Management is \_\_\_\_\_



1. A tangible assets such as buildings and to intangible assets such as human capital, intellectual property, and financial assets
2. A systematic process of deploying, operating, maintaining, upgrading, and disposing of assets cost-effectively
3. A system that monitors and maintains things of value to an entity or group
4. All of the above

---

---

---

---

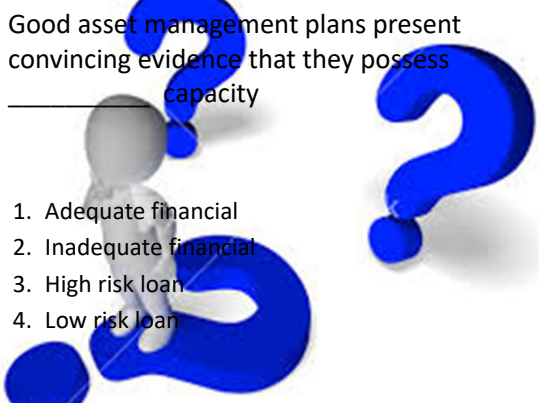
---

---

---

---

Good asset management plans present convincing evidence that they possess \_\_\_\_\_ capacity



1. Adequate financial
2. Inadequate financial
3. High risk loan
4. Low risk loan

---

---

---

---

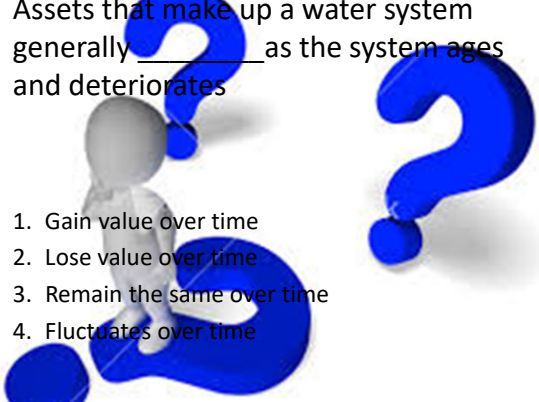
---

---

---

---

Assets that make up a water system generally \_\_\_\_\_ as the system ages and deteriorates



1. Gain value over time
2. Lose value over time
3. Remain the same over time
4. Fluctuates over time

---

---

---

---

---

---

---

---

Great Asset Management plans consider the required level of service in the most cost-effective way through \_\_\_\_\_

1. The creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets
2. Run to fail tactics
3. The promotion of supervisor favorites
4. Buying top of the line equipment as it becomes available

---

---

---

---

---

---

---

Utilities can be more stable if they run on a business model of \_\_\_\_\_

1. Short term savings
2. Long term high spending
3. Long term stability
4. Strict and short sighted

---

---

---

---

---

---

---

Asset Management includes \_\_\_\_\_

1. Management
2. Engineering
3. Information
4. All of the above

---

---

---

---

---

---

---

### Five Core Components of Asset Management

1. Asset Inventory
2. Level of Service
3. Criticality
4. Life Cycle Costs
5. Long Term Funding

---

---

---

---

---

---

---

### Asset Inventory

- Monitor parts and assets of the entire system
- It is important to keep track of items knowing their functions and characteristics
- Asset Tracking Systems control the tracking of internal tools and materials
- Asset tracking systems improving resource optimization and reduce costs

---

---

---

---

---

---

---

### Asset Inventory

- Fixed assets are considered long-term assets on the balance sheet
- The company expects to profit from use of the assets for a period of time referred to as its useful life
- Assets have a finite useful life, the decline in usefulness represented by recording periodic depreciation

---

---

---

---

---

---

---

### Asset Inventory

- To combat depreciation, fixed asset management systems should have the ability to track required and preventive maintenance on equipment
- Fixed asset management helps plan and schedule necessary repairs, calibrations, and tune-ups to equipment; thereby prolonging the useful life of its assets

---

---

---

---

---

---

---

---

### Asset Inventory

- Fixed asset management monitors tools, machines, equipment, vehicles, important documents, furniture, and other items that companies use *internally* for their own operations or that are a part of their manufacturing output
- When the assets being tracked are tools or machines the value becomes one of increased quality and improved end product, happier customers, and improvements to the bottom line

---

---

---

---

---

---

---

---

### Level of Service

---

---

---

---

---

---

---

---



### Seven Question That Drive Asset Management



---

---

---

---

---

---

---

### Seven Questions That Drive Asset Management

1. What do we have? Data, GIS, inventory verification, maps etc.
2. What is it worth? Asset valuations, depreciations, salvage value, resale
3. What is its condition? Visual Analysis, CCTV, Hydraulic Modeling
4. What do we need to do to it? Rehabilitate, replace, nothing, enhance, expand

---

---

---

---

---

---

---

### Seven Questions That Drive Asset Management

5. When do we need to do it? Prioritize, master plans, budgeting, planning
6. How much will it cost? Construction, materials, operations, maintenance, human resources, bonds
7. How will we finance it? rate studies, bond issues, grants, loans

---

---

---

---

---

---

---



What do we have? Data, GIS, Inventory Verification, Maps Etc.

- Originally the primary function for GIS for water and wastewater utilities was to map capital assets
- GIS is now being used for spatial analysis and data management
- It is also being integrated with hydraulic modeling which helps provide tremendous operational advantages

---

---

---

---

---

---

---

---



What do we have? Data, GIS, inventory verification, maps Etc.

The Information that is gathered for asset management is critical.



Managing the information and the data is important as well

---

---

---

---

---

---

---

---



80- 90% of a utility's data is somehow tied to a geographic location



GIS allows users to query and analyze information based on its location and its spatial relationship to other features-often where no other relationship is available

---

---

---

---

---

---

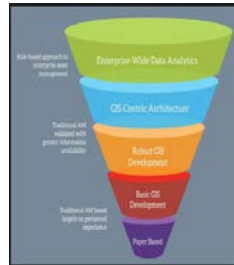
---

---



GIS applications can identify trends in water main breaks to prioritize pipe replacement and rehabilitation projects

Projects are typically analyzed using criteria such as pipe material, diameter, age, surrounding soil conditions, proximity to critical locations (such as hospitals and schools), main-break history, and water quality



---

---

---

---

---

---

---

---



Once established, a Global Information System (GIS) can be enhanced to serve as a critical link for meeting ongoing data maintenance requirements, supporting numerous data analysis/reporting activities, and interfacing with other applications

1. Hydraulic Modeling
2. Customer Information
3. Asset Management
4. Field Data Collection

---

---

---

---

---

---

---

---

Present Worth, Asset Valuations  
Depreciation, Salvage Value and Resale

---

---

---

---

---

---

---

---

### What is it worth? Asset valuations, Depreciations, Salvage Value, Resale

#### Present Worth Analysis

- **Present value** is the value on a given date of a future payment or series of future payments, discounted to reflect the time value of money and other factors such as investment risk

<http://www.free-online-calculator-use.com/npv-calculator.html>

---

---

---

---

---

---

---

---

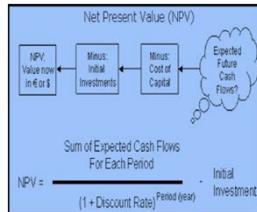
---

---

### What is it worth? Asset valuations, Depreciations, Salvage Value, Resale

#### Present Worth Analysis

- Value on a given date of future payments (Usually 20 year projections)
- Considers operation and maintenance costs
- Involves long and short term decision making
- Provides an “apples to apples” economic comparison




---

---

---

---

---

---

---

---

---

---

## Asset Valuations

- The process of estimating the market value of a financial asset or liability
- Valuations are needed for many reasons such as
  1. Investment analysis
  2. Capital budgeting
  3. Merger and acquisition transactions
  4. Financial reporting
  5. Taxable events to determine the proper tax liability
  6. Litigation

---

---

---

---

---

---

---

---

---

---

## Asset Valuations

- Common terms for the value of an asset or liability are fair market value, fair value, and intrinsic value
- When a plant asset is purchased for cash, its acquisition cost is simply the agreed on cash price
- However, when a business acquires plant assets in exchange for other non-cash assets (shares of stock, a customer's note, or a tract of land) or as gifts, it is more difficult to establish a cash price

---

---

---

---

---

---

---

---

## Asset Valuations

- An appraised value is an expert's opinion of an item's fair market price if the item were sold
- The book value of a fixed asset is its recorded cost minus accumulated depreciation
- Capital assets should be valued at cost including all ancillary charges necessary to place the asset in its intended location and condition for use

Source: Boundless. "Basic Components of Asset Valuation." *Boundless Accounting*. Boundless, 26 May, 2016. Retrieved 12 Jul, 2016  
<https://www.boundless.com/accounting/textbooks/boundless-accounting-textbook/controlling-and-reporting-of-real-assets-property-plant-equipment-and-natural-resources-6/valuing-of-assets-43/basic-components-of-asset-valuation-238-11164/>

---

---

---

---

---

---

---

---

## Depreciation

- Depreciation is the process by which a company allocates an asset's cost over the duration of its useful life
- Each time a company prepares its financial statements, it records a depreciation expense to allocate a portion of the cost of the buildings, machines or equipment it has purchased
- The purpose of recording depreciation as an expense is to spread the initial price of the asset over its useful life

---

---

---

---

---

---

---

---



### Salvage Value

- Salvage value is used in calculating depreciation and making equipment purchase decisions
- Management will often consider the estimated salvage value of an asset when deciding to make a new equipment purchase because a salvage value will often lower the total cost of the asset over time since the salvage value can be recouped when the asset is later sold

---

---

---

---

---

---

---

---

### Salvage Value

- If it is too difficult to determine a salvage value, or if the salvage value is expected to be minimal, then it is not necessary to include a salvage value in depreciation calculations
- Instead, simply depreciate the entire cost of the fixed asset over its useful life
- Any proceeds from the eventual disposition of the asset would then be recorded as a gain

---

---

---

---

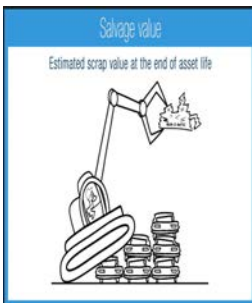
---

---

---

---

### Salvage Value



**Salvage Value**

$$S = P(1 - i)^y$$

*P* = original price  
*i* = depreciation rate  
*y* = age in years  
*S* = salvage value

---

---

---

---

---

---

---

---

### Resale



- Establish a standard procedure for the proper disposal of assets
- Take into consideration applicable laws and concerns regarding information security, hazardous waste, radiation safety, etc.
- Find buyers for the sale of surplus or long term not in use items

---

---

---

---

---

---

---

### Quiz Time



---

---

---

---

---

---

---

\_\_\_\_\_ allows users to query and analyze information based on its location and its spatial relationship to other features

1. GPS
2. Salvage Value
3. Assets
4. GIS



---

---

---

---


---

---

---



Present worth value is based on a given date of future payments usually based on \_\_\_\_\_ projections



1. 2 year
2. 5 year
3. 12 year
4. 20 year

---

---

---

---

---

---

---

The process of estimating the market value of a financial asset or liability is known as \_\_\_\_\_



1. Asset resale
2. Asset liquidation
3. Asset valuation
4. Asset reconditioning

---

---

---


---

---

---

---

\_\_\_\_\_ of a utility's data is somehow tied to a geographic location.



1. 5-7%
2. 20-30%
3. 50-60%
4. 80-90%

---

---

---

---

---

---

---

Capital assets should be valued at cost including all ancillary charges necessary to place the asset \_\_\_\_\_.

1. At city hall
2. In its intended location and condition for use
3. In storage
4. On site



---

---

---

---

---

---

---

---

\_\_\_\_\_ is the process by which a company allocates an asset's cost over the duration of its useful life

1. Allocation
2. Depreciation
3. Disposal
4. Resale value



---

---

---

---

---

---

---

---

Management will often consider the \_\_\_\_\_ of an asset when deciding to make a new equipment purchase because it will often lower the total cost of the asset over time

1. Total Cost
2. Estimated salvage value
3. Global position
4. Suggested manufacturers price



---

---

---

---

---

---

---

---

Condition Rating	Condition	Description
0	Excellent	Less than 10% of useful life used up
1	Very Good	Between 11% and 25% of useful life used up
2	Good	Between 26% and 60% of useful life used up
3	Average	Between 61% and 75% of useful life used up
4	Fair	Between 76% and 95% of useful life used up
5	Poor	Between 96% and 100% of useful life used up

**Asset Conditions**

---

---

---

---

---

---

---

---

### What is Its Condition?

- Assets should be frequently inspected to determine their condition
- Preventive maintenance requirements should be followed closely
- Records should be kept and coupled with the asset inventory information

---

---

---

---

---

---

---








---

### What is Its Condition?

Prioritize your areas of focus based on

1. Customer service levels
2. Financial Constraints
3. System Needs

Average Physical Condition of Different Asset Classes

	<b>POTABLE WATER: GOOD</b> EVR for assets in poor or very poor condition \$25 billion
	<b>WASTEWATER: GOOD</b> EVR for assets in poor or very poor condition \$26 billion
	<b>STORMWATER: VERY GOOD</b> EVR for assets in poor or very poor condition \$10 billion
	<b>ROADS AND BRIDGES: GOOD</b> EVR for assets in poor or very poor condition \$50 billion
	<b>BUILDINGS: GOOD</b> EVR for assets in poor or very poor condition \$12 billion
	<b>SPORT AND RECREATION FACILITIES: FAIR</b> EVR for assets in poor or very poor condition \$9 billion
	<b>PUBLIC TRANSIT: GOOD</b> EVR for assets in poor or very poor condition \$9 billion

EVR = Estimated Replacement Value  
Source: 2018 Canadian Infrastructure Report Card

---

---

---

---

---

---

---

---

### What is It's Condition Visual Analysis

Seeing is Believing

- Perform visual inspections on assets and equipment on a daily, weekly, monthly, quarterly, semi annual, and annual basis depending on the maintenance or checklist schedule



---

---

---

---

---

---

---

---

### What is Its Condition?

Closed Circuit TV

1. Records the condition of the assets
2. Creates a digital file of conditions
3. Creates still pics for filing



---

---

---

---

---

---

---

---

### What is Its Condition?

Closed Circuit TV

1. Shows conditions in areas that operators can't visually see
2. Helps determine rehabilitation and replacement projects

---

---

---

---

---

---

---

---

### Hydraulic Modeling

- Illustrates the effects of changing demand and climactic conditions on water distribution and wastewater collection systems
- Helps predict pressures and identify bottlenecks
- Demonstrates the effectiveness of proposed solutions

---

---

---

---

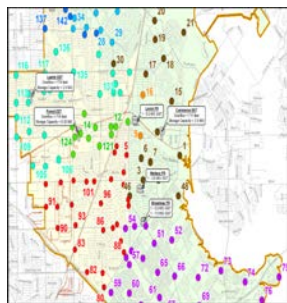
---

---

---

### Hydraulic Modeling

- Help utilities minimize the cost of improvements
- Can be combined with integrated GIS software packages



---

---

---

---

---

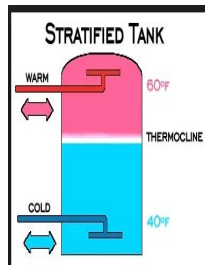
---

---

### Hydraulic Modeling

Can help you eliminate:

1. Low water pressure
2. Overloaded pipes
3. Poor turnover in tanks (stratification)
4. Excessive water age
5. Closed valves
6. Short circuiting in tanks
7. Pressure surges
8. Sewer overflows



---

---

---

---

---

---

---

### Hydraulic Modeling

- Integration of a GIS with a hydraulic model allows utilities to get the most from their GIS investment
- Integration provides up-to-date information, reduced response times and accessibility of modeling elements and data to all GIS tools and functionality

---

---

---

---

---

---

---

### Hydraulic Modeling

- Hydraulic Model updates can be performed more often with an integrated approach
- Data transfer, clean up and model building is much easier through integration
- Utilizing hydraulic modeling in conjunction with GIS will give more reliable information as well as provide sophisticated tools and applications for system evaluation

---

---

---

---

---

---

---

### Integrating Hydraulic Modeling and GIS



- The level of detail and type of information included should be decided upon by the utility
- Models can be categorized by the type of information that is stored within the model

---

---

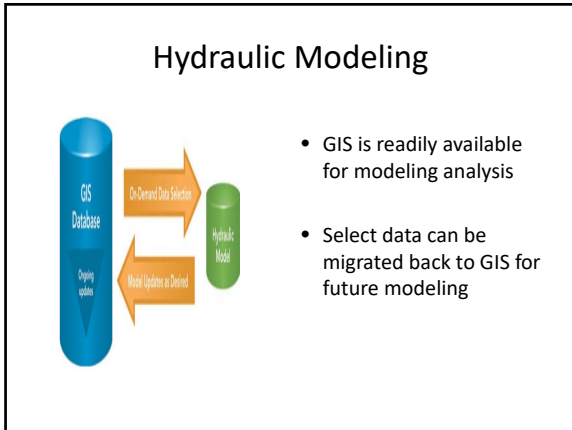
---

---

---

---

---



---

---

---

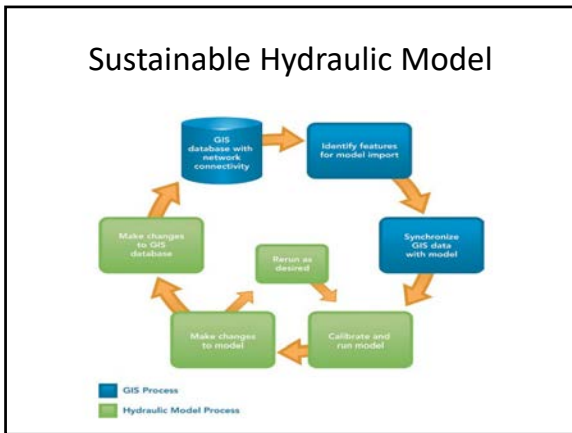
---

---

---

---

---



---

---

---

---

---

---

---

---

### What Do We Need to Do to It?

**Four actions that can be taken after an Asset Management Assessment**

1. No-Action Alternative
2. Rehabilitation
3. Replacement
4. Preferred Alternative



---

---

---

---

---

---

---

---

### No-Action Alternative

- Discuss what would happen if the project were not built
- Describe the social, economic, and environmental impacts
- Describe why this alternative was not chosen, including whether it was feasible or not

---

---

---

---

---

---

---

---

### Rehabilitation

- Discuss whether or not rehabilitation is a feasible alternative
- Describe the various methods that could be used to rehabilitate
- Each practicable alternative for rehabilitation should be a separate alternative
- Provide the rationale as to whether the alternative by itself would be accepted or rejected

---

---

---

---

---

---

---

---

### Replacement

- Describe whether replacement is a feasible alternative
- Discuss the various methods that could be use to replace portions of the system
- Each practicable alternative for replacement should be a separate alternative
- Provide the rationale as to whether the alternative by itself would be accepted or rejected

---

---

---

---

---

---

---

---



### Preferred Alternative

- Preferred alternative may be a combination of the above alternatives
- Describe the preferred alternative by summarizing and referring back to any other alternative descriptions as necessary
- Provide the rationale as to why this alternative is the preferred alternative
- These rehabilitation methods and replacement would be combined into the Preferred Alternative.

---

---

---

---

---

---

---

### Quiz Time



---

---

---

---

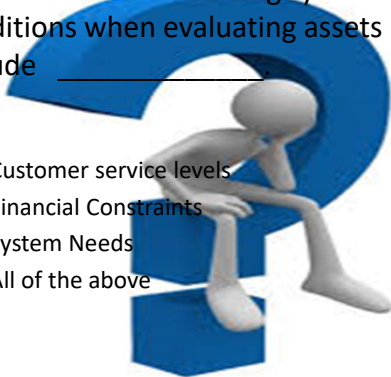
---

---

---

Areas of focus concerning system conditions when evaluating assets include \_\_\_\_\_

1. Customer service levels
2. Financial Constraints
3. System Needs
4. All of the above



---

---

---

---

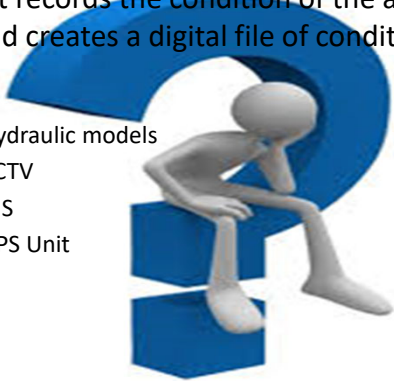
---

---

---

What records the condition of the assets and creates a digital file of conditions

1. Hydraulic models
2. CCTV
3. GIS
4. GPS Unit



---

---

---

---

---

---

---

---

\_\_\_\_\_ illustrates the effects of changing demand and climactic conditions on water distribution and wastewater collection systems

1. GPS
2. Rehabilitation
3. Replacement
4. Hydraulic Modeling



---

---

---

---

---

---

---

---

Integration of \_\_\_\_\_ with a hydraulic model allows utilities to get the most from their \_\_\_\_\_ investment

1. GIS
2. GPS
3. CCTV
4. Disposal



---

---

---

---

---

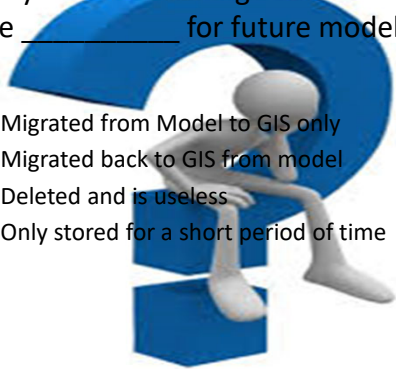
---

---

---

In hydraulic modeling select data can be \_\_\_\_\_ for future modeling

1. Migrated from Model to GIS only
2. Migrated back to GIS from model
3. Deleted and is useless
4. Only stored for a short period of time



---

---

---

---

---

---

---

\_\_\_\_\_ discusses what would happen if the project were not built

1. Rehabilitation
2. Replacement
3. No Action Alternative
4. Preferred Alternative



---

---

---

---

---

---

---

A combination of the asset management alternatives of rehabilitation, replacement and no action alternatives for system management falls under the \_\_\_\_\_

1. Preferred Alternative
2. Recommended Alternative
3. No Alternative
4. GIS Alternative



---

---

---

---

---

---

---

**When Do We Need to Do it?  
Prioritize, Planning, Budgeting**



---

---

---

---

---

---

---

---

**Prioritize**

- Perform or create an asset inventory update
- Set goals for managing the assets
- Identify the current performance of the assets
- Rank the importance of the system assets to help make decisions of allocating resources

---

---

---

---

---

---

---

---

**Prioritize**

1. What is its remaining useful life
2. What is its impact on public health
3. Is there an alternate asset that can perform that function



---

---

---

---

---

---

---

---

### Prioritize

- Identify assets that are most critical to sustained performance
- The most impactful situations should be priority whether it is financial impact or customer service related
- Older decrepit assets should also be near the top of the priority list

---

---

---

---

---

---

---

---

### Prioritize

- Learn to balance rehabilitation and replacement needs with growth-related projects
- Know the risks associated with delaying capital projects

---

---

---

---

---

---

---

---

### Prioritize

- Sync projects so that the least amount of disruption is created
- Projects can also be done simultaneously such as road and sewer repair done simultaneously



---

---

---

---

---

---

---

---

### Planning

- Good asset management practice is based on having reliable knowledge of what assets are owned, how they are performing, what investments are being made and how it is likely to affect performance
- Good asset management planning provides a decision making structure for getting the best performance

---

---

---

---

---

---

---

---

### Planning



- Planning helps set the goals for your asset management program
- Support team has to be ready to own the improvements and execute the plan

---

---

---

---

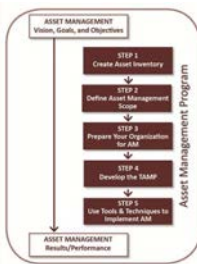
---

---

---

---

### Planning



#### Transportation Asset Management Plan (TAMP)

- Checklist of monitoring the accomplishments of the projects and coordinating and scheduling

---

---

---

---

---

---

---

---

### Planning



- Results and performance should be monitored, tracked, and evaluated
- Performance and results can drive future decisions and projects
- Results also drive the future directions of the asset management plan

---

---

---

---

---

---

---

---

### Budgeting

What funding do we need to properly operate the assets?




---

---

---

---

---

---

---

---

### Budgeting

- Ideally, each year's budget would be sufficient to keep every asset shiny and new
- Real world budgets rarely come close
- The most difficult decisions to make relate to which projects to address right away and what to put on hold




---

---

---

---

---

---

---

---

### Budgeting

- Determine which assets are most in need of repair
- Consider both current and future cost projections of critical maintenance
- Tackle the most pressing projects smarter




---

---

---

---

---

---

---

---

### Budgeting

- Set up an annual budget planning cycle
- Present information, compare it to policies, principles and finances
- Forecast financial availability for 1, 2, 5 and 10 year plans




---

---

---

---

---

---

---

---

### Budgeting

- Develop a budget, make it available to all persons relevant to the operation and the stakeholders
- Involving everyone eliminates some surprises and overlooked issues
- Update the budget status bi annually and be consistent in the release of the information




---

---

---

---

---

---

---

---



**Budgeting**

- Factor-in items such as maintenance and spare parts for a period after supply of the equipment
- Include staff costs associated with the purchase and the installation/implementation phases
- Consider the need for adjustments in other parts of the infrastructure
- Hold as steadfast as possible to budgeted numbers

---

---

---

---

---

---

---

---

**Budgeting**

- Remember to integrate condition assessment, capital budgeting, and project management functions to better allocate budget and resources for complete end-to-end planning

---

---

---

---

---

---

---

---

**How Much Will it Cost?  
Construction, Materials, Operations,  
Maintenance, Human Resources, Bonds**



---

---

---

---

---

---

---

---

### How Much Will It Cost

- Costs of assets include both the initial capital cost and the subsequent operation and maintenance costs
- Remember to include engineering, technology, and permit fees

"You can't get the best use of your assets if you only have a vague idea of what they are, where they are, and what they cost. This is as good a time as any to count your longer term assets."

CLEARLY INVENTORY

---

---

---

---

---

---

---

---

### How Much Will It Cost

**Capital cost for a project includes the expenses related to the initial establishment**

1. Land acquisition, including assembly, holding and improvement
2. Planning and feasibility studies
3. Architectural and engineering design
4. Construction, including materials, equipment and labor
5. Field supervision of construction
6. Construction financing
7. Insurance and taxes during construction
8. General overhead
9. Equipment and furnishings not included in construction
10. Inspection and testing

---

---

---

---

---

---

---

---

### How Much Will It Cost

**Operation and maintenance cost in subsequent years over the project life cycle includes**

1. Land rent, if applicable
2. Operating staff
3. Labor and material for maintenance and repairs
4. Periodic renovations
5. Insurance and taxes
6. Financing costs
7. Utilities
8. Owner's other expenses

---

---

---

---

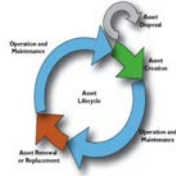
---

---

---

---

### How Much Will It Cost



- Construction cost may be the single largest component of the capital cost
- It is equally important to estimate the corresponding operation and maintenance cost of each alternative in order to analyze the life cycle costs

---

---

---

---

---

---

---

---

### How Much Will It Cost

- Allowance for contingency amount may be included within each cost item or be included in a single category of construction contingency
- The amount of contingency is based on historical experience and the expected difficulty of a particular construction project

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---



---

---

---

---

---

---

---

---

### Table Top Exercise

- List of 10 (descriptions and pictures) – pick the 5 assets you wish to include
- Develop a rating system & rate your assets
- Estimate/determine age
- Remaining useful life
- Estimated value
- Energy user (efficiency)

---

---

---

---

---

---

---

---

### Run to Failure

- Low risk assets
- Low cost
- May be most economical option
- Full life span

---

---

---

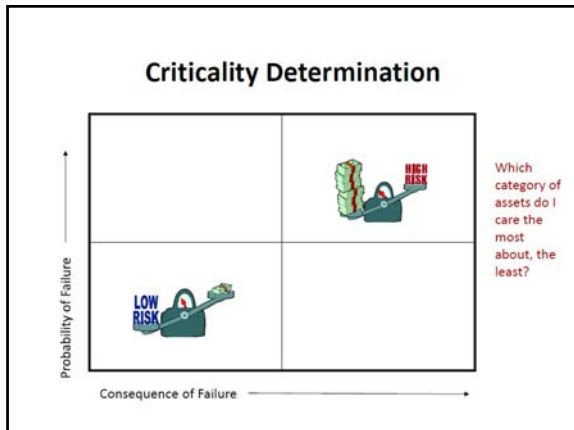
---

---

---

---

---



---

---

---

---

---

---

---

---

### Asset Management represents a way of thinking about assets

---

Customer focused

Assets are viewed individually not as a lump (a piece of pipe vs. water distribution system; individual blower vs. aeration system)

Performance is tracked and measured over time by the management/elected officials

Money is spent in the right place for O&M and for capital expenses

---

---

---

---

---


---

---

---

It's our responsibility,  
as operators to convince our  
City Councils and Boards that this plan  
has merit and will be  
a benefit to the City.

A benefit for those who follow in their footsteps.



.....change can be for the better.

---

---

---

---

---

---

---

---

### **Asset Management Strategy**

- A common understanding of strategic asset management concepts and benefits
- Defined service level targets on which to base a life cycle asset management strategy
- An assessment of your current asset management activities and recommendations for improvement
- A structured plan, schedule and business case for improving your asset management capabilities

---

---

---

---

---

---

---

### **Good Asset Management Plans**

- Addresses not only infrastructure assets, but also the supporting resources, business processes, data and enabling technologies that are critical to success
- Should be incorporated in day to day business

---

---

---

---

---

---

---

### **Good Asset Management Plans**

- People, processes, data, and information technology, coming together at the right time to form the foundation of a successful asset management program
- Being able to forecast where and when infrastructure investments should occur is critical to a company's product quality and performance reliability

---

---

---

---

---

---

---

**Good Asset Management Plans**

- Knowing the best times to invest limited capital and Operations and Maintenance (O&M) dollars requires an understanding of the current condition and capacity of the company's infrastructure, as well as future capacity and reliability requirements

---

---

---

---

---

---

---

---

**Good Asset Management Plans**

- Prioritize capital projects over a five to ten year period based on strategic objectives
- Forecast capital renewal, replacement and expansion costs over a ten to fifteen year period
- Forecast infrastructure-funding requirements based on long-term revenue and cost.

---

---

---

---

---

---

---

---

**Asset Management**

- The top four challenges facing water and wastewater utilities today are aging infrastructure, managing capital costs, managing operational costs and funding for capital projects

---

---

---

---

---

---

---

---

### **Asset Management**

- In a time where lots of rehabilitation and rebuilding of systems is taking place, now is a great time to talk about the short and long term benefits of managing assets
- Asset management drives optimization
- It is expected that 90 percent of utility leaders expect to have formal asset management programs in place or in progress by 2016

---

---

---

---

---

---

---

---

### **Asset Management Plans**

1. Makes decisions clear to others
2. Provides criteria for making the decisions
3. Help minimize long term O & M costs

---

---

---

---

---

---

---

---

### **Asset Management Plans**

4. Defines acceptable levels of customer service
5. Creates data and information processes to improve future decision making
6. Establishes roles, goals, and metrics to focus and motivate organization

---

---

---

---

---

---

---

---



### Operation and Maintenance Logs

- Help make sure the system is working optimally
- Help keep track of repair and replacement work for equipment
- Help develop accurate maintenance budgets

---

---

---

---

---

---

---

### Operation and Maintenance Logs

- Inflow and infiltration studies quantify and locate its sources
- Maintenance activities should listed with dates
- List a thorough system description of the current conditions

---

---

---

---

---

---

---

### System Analysis

- Provide a description of the lift stations in the sewer shed where the project will occur. For lift stations, utilize the following example definitions for Good, Fair, and Poor

---

---

---

---

---

---

---

**Risk Management**

- **Concept and Design**
  - Eliminate factors that could result in risks during the conceptual and actual design phases
- **Construction**
  - Identify and address risks that have the potential to seriously impact the viability of the project
- **Commissioning**
  - Reviews are essential to ensure that the capital equipment and systems have been manufactured, installed and connected in a safe and reliable fashion

---

---

---

---

---

---

---

---

**Risk Management**

- **Concept and Design**
  - Eliminate factors that could result in risks during the conceptual and actual design phases
  - Limit the overall risk exposure that a facility will carry for the remainder of its operating life
  - More effective than attempting to manage in-built risks later during a facility's operating phase
- **Construction**
  - It is essential to identify and address risks that have the potential to seriously impact the viability of the project
- **Commissioning**
  - Reviews are essential to ensure that the capital equipment and systems have been manufactured, installed and connected in a safe and reliable fashion

---

---

---

---

---

---

---

---

**Risk Management**

- **Commissioning**
  - Reviews are essential to ensure that the capital equipment and systems have been manufactured, installed and connected in a safe and reliable fashion
- **Certification**
- **Production**
  - Procedures and improved maintenance practices to manage operational risks

---

---

---

---

---

---

---

---

### Risk Management

- **Decommissioning**
  - It is important to identify potential risks early on and act accordingly
- **Disposal**
- Good decisions made early in the project will enable safety, operational and business risks to be eliminated or, at worst, minimized if elimination is not possible

---

---

---

---

---

---

---

---

### Deterioration and Failure

1. Poor design and installation
2. Inadequate or improper bedding material
3. Chemical attack
4. Traffic loading
5. Soil movements

---

---

---

---

---

---

---

---

### Deterioration and Failure

6. Root Intrusion
7. Compressed joint integrity
8. Subsequent construction damage
9. Ground water fluctuation
10. Inadequate maintenance

---

---

---

---

---

---

---

---

**Issues that cause deterioration and Failure**

1. Deposition of material and sewer blockages
2. Pipe defects cause blockages
3. Water flowing through defects weaken soil pipe structure
4. Fine soil particles carried into sewer reduces soil support causing deformation and subsidence
5. Exfiltration weakening the soil
6. Soil movement from traffic exceeds soil design assumptions

---

---

---

---

---

---

---

**THINGS TO LOOK AT**

- **Budget**
- **Rate increase required**
- **Revenue sources**
- **Priorities**
- **I/I from private property**

---

---

---

---

---

---

---

**Cost Cutting Measures**

- **Conduct in-house study**
- **Do rehab work in-house**
- **Find O&M savings**

---

---

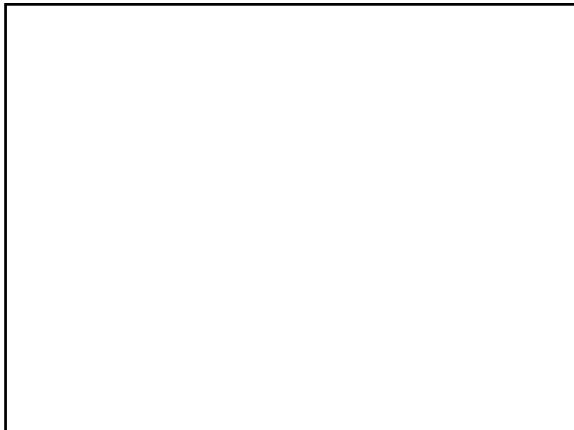
---

---

---

---

---



---

---

---

---

---

---

---

---

### Life Cycle Asset Management

Integrated approach to **optimizing** the life cycle of your assets beginning at conceptual design, continuing through shut down and decommissioning

---

---

---

---

---

---

---

---

### Life Cycle Asset Management

- Operating and maintenance strategies
- Organizational structure
- Staffing requirements
- Optimized PM/PdM procedures

---

---

---

---

---

---

---

---

**Life Cycle Asset Management**

- Reliability engineering processes
- Work control/planning and scheduling processes
- Equipment criticality and hierarchy in the appropriate enterprise resource system format
- Purchasing and stores processes

---

---

---

---

---

---

---

**Life Cycle Asset Management**

- Maintenance inventory requirements with min./max. stocking levels
- Training plan
- Start up and commissioning plan
- Decommissioning plan
- Executive dashboards with performance baselines and targets

---

---

---

---

---

---

---