Asset Management for Small Water and Wastewater Systems

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Your Presenter Today

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WELCOME!

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Rural Community Assistance Partnership

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Washington, D.C. 20006
www.rcap.org

Western RCAP
Rural Community Assistance Corporation
www.rcac.org

Midwestern RCAP
Midwest Assistance Program
www.map-inc.org

Southern RCAP
Communities Unlimited
www.communitiesu.org

Great Lakes RCAP
Great Lakes Community Action Partnership
www.glcap.org

Southeastern RCAP
Southeast Rural Community Assistance Project
www.sercap.org

Northeastern RCAP
RCAP Solutions
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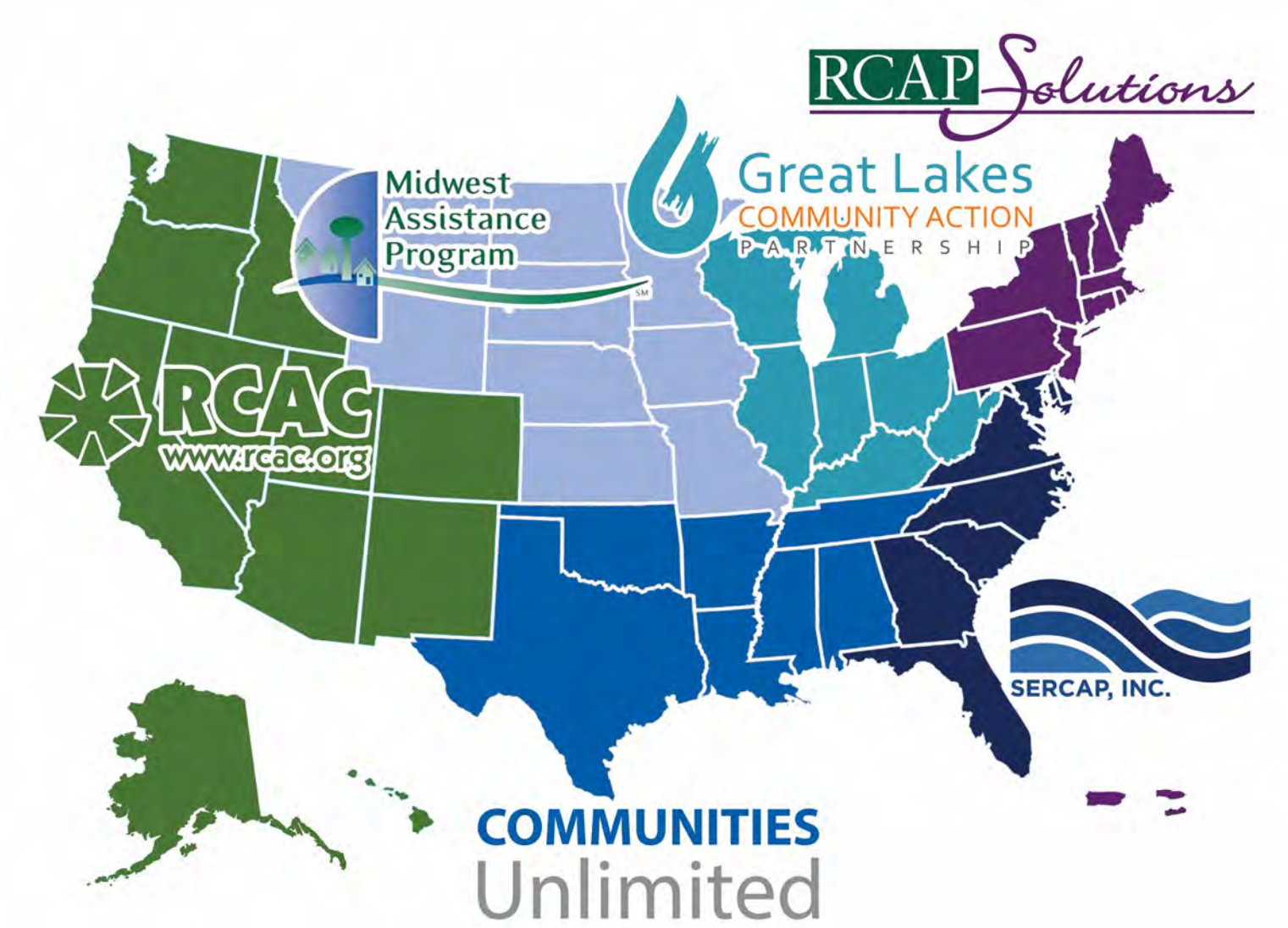

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RCAC Programs

- Affordable housing
- Loan Fund - water and wastewater infrastructure financing
- Classroom and online training
- On-site and remote technical assistance
- Income surveys and rate analysis
- Rural Economic Development

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Today's Agenda

- Introduction to Asset Management
- Six-year Budget and Reserve Accounts
- Resources

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Introduction to Asset Management

What is Asset Management - the basics

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Poll #1

Does your utility have an asset management program?

- Yes, and we use it
- Yes, but it does not get used
- No

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Asset Management

Asset Management Definitions:

- A **long-term** program to attain and sustain the **chosen** level of service for the life of the asset in the **most cost-effective** manner.

- A method to incorporate **system renewal** into the Capital Improvement Plan (CIP) and **include risk management** in system budgeting.

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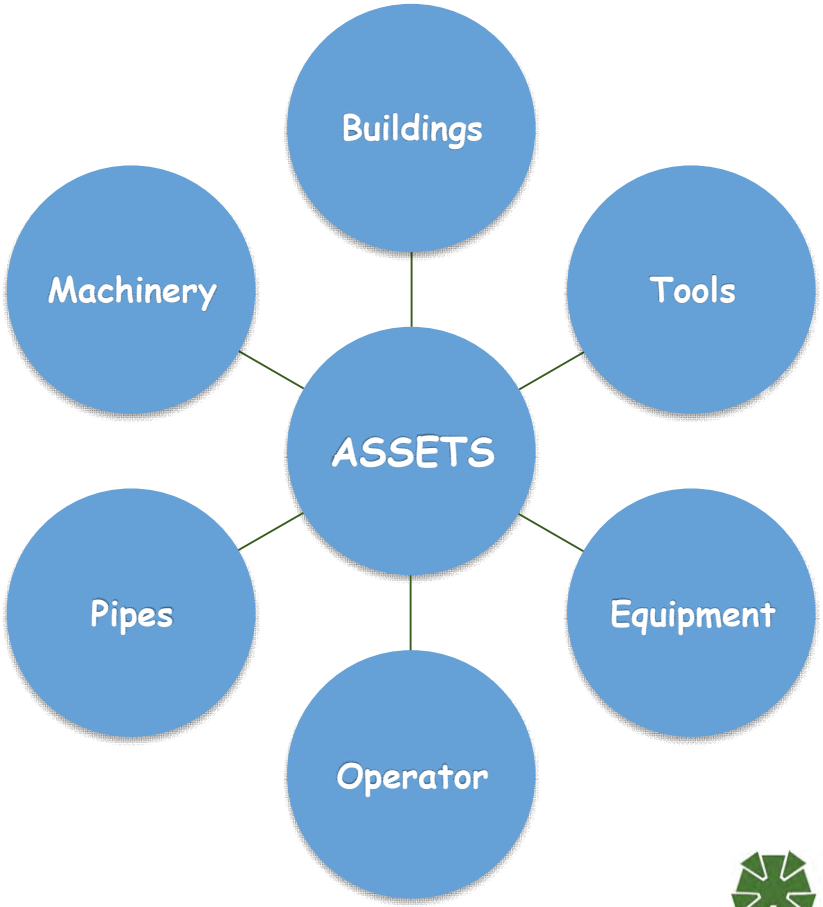
Before You Begin to Plan

Get **Key People** Together - Build Your **Team**	Decision makers
	Community members
	Utility staff
	Business owners
	Financial staff

What is an Asset?

All your “stuff”; pipes, pumps, computer programs, furniture, rolling stock, valves, motors, buildings…



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Asset Truths

- All assets are **not** created equal
- All assets eventually **fail**
- Failures **directly** affect system performance

AM = Risk Based Planning Process

Risk = f (Criticality x Condition)

Risk = f (Consequence of Failure x Likelihood of Failure)

AM = Risk Based Planning Process

		Condition					
	Priority						
Criticality		Very Good	Good	Fair	Poor	Very Poor	
		1	2	3	4	5	
Very Low Impact	1						
Low Impact	2	**2**					
Medium Impact	3						
High Impact	4						
Very High Impact	5					**25**	

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Why Is AM a Good Idea?

- Because assets are large, expensive, long-lived, and often buried
- Well maintained assets are essential to protect public health
- Economic development depends on reliable and safe water delivery

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Good Management Comes With a Price…

What are the two questions you must always be able to answer?

- **Why are we doing this?**
- **What is it going to cost?**

Customers don’t need to “like” the answers.

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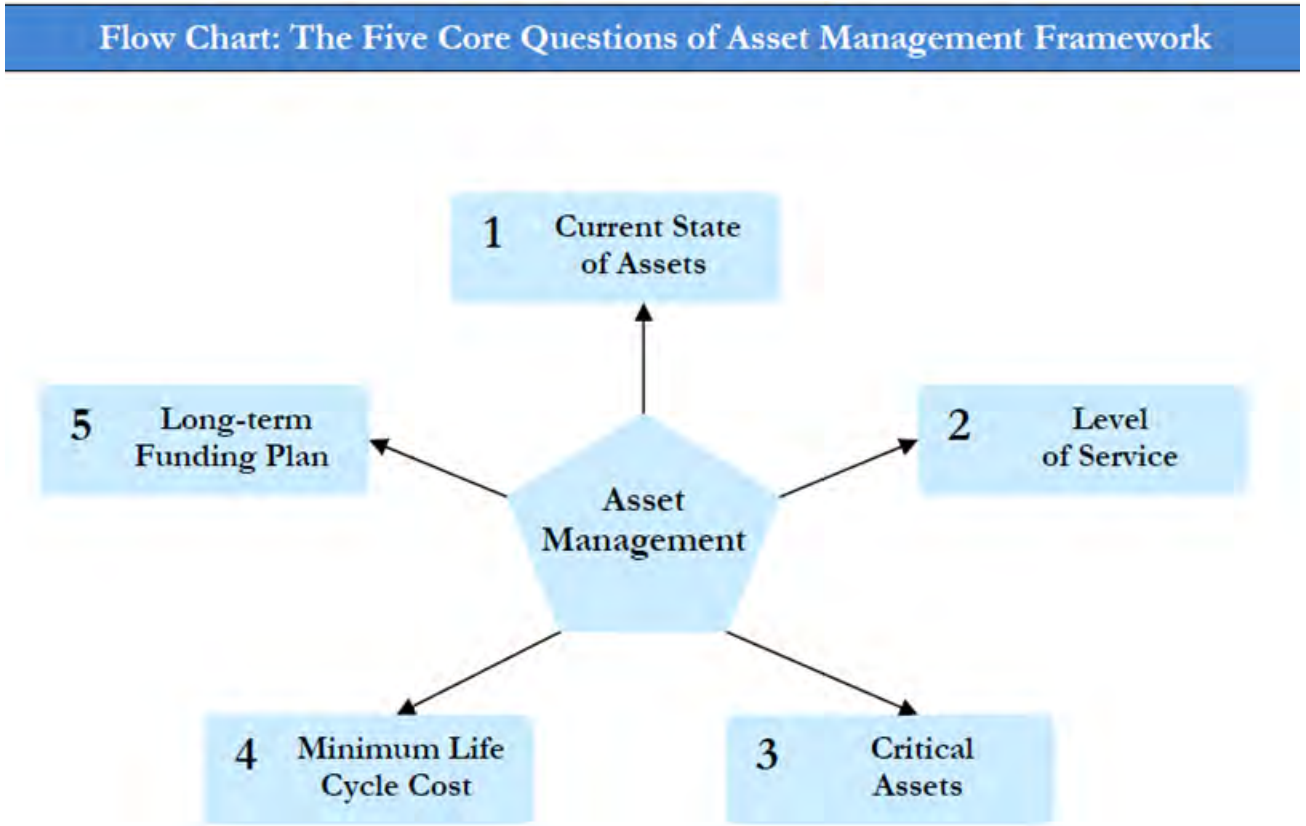
What is Asset Management



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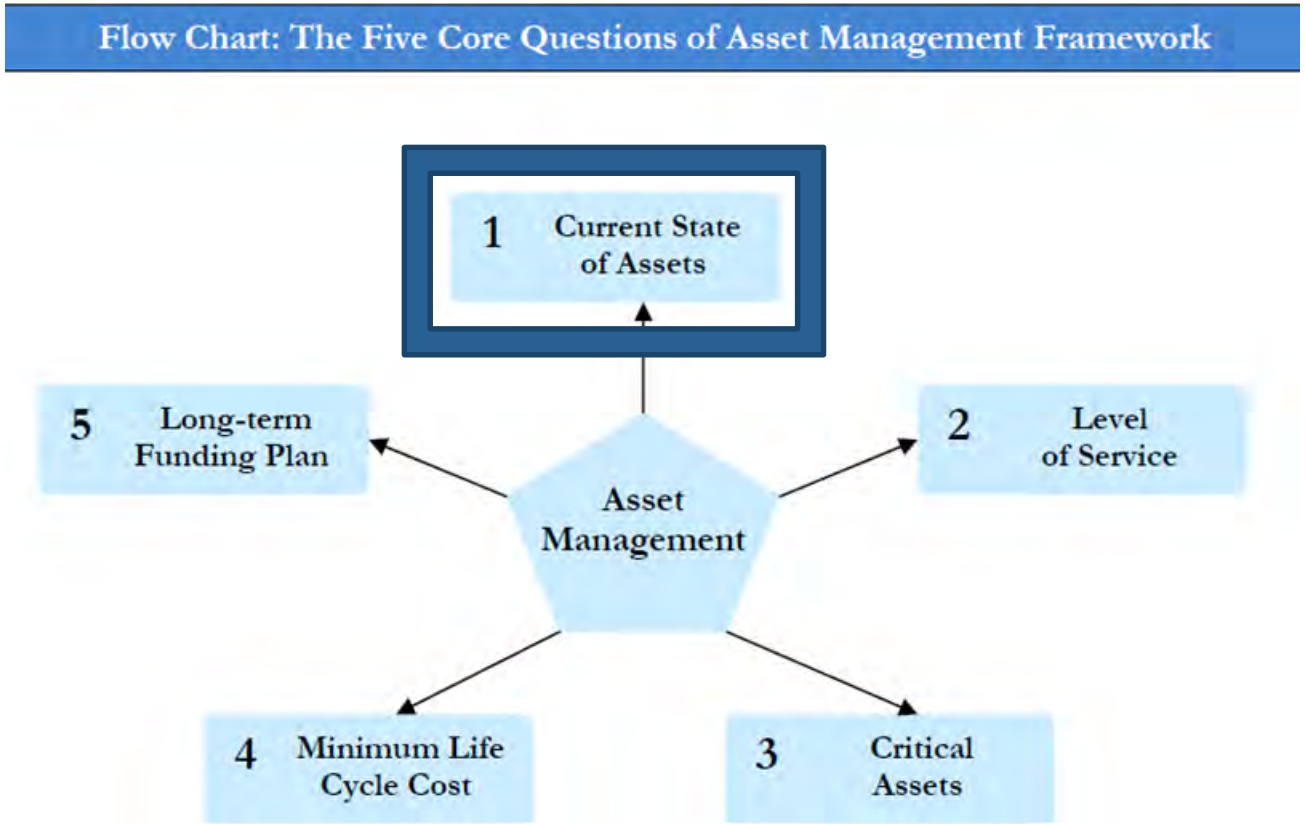
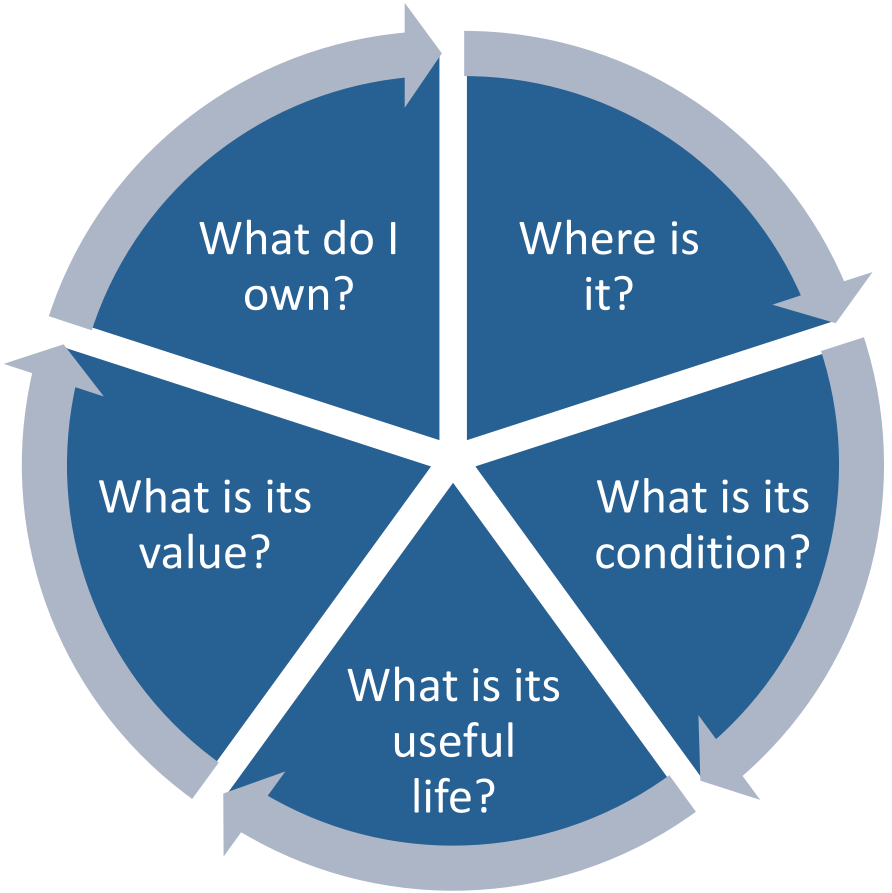
Step 1 Current State of Assets



Step 1 Current State of Assets



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Step 1 Current State of Assets

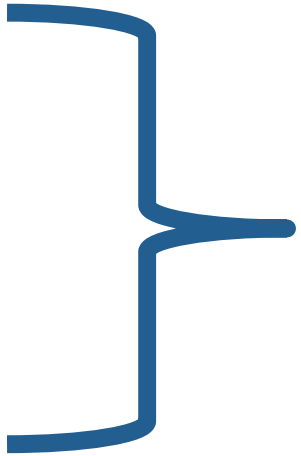
What do we own?

- Prepare an asset inventory
- What type of asset is it?
  - Short lived – generally replaced by cash
  - Long lived (Capital Asset) generally financed but can be cash replaced

Step 1 Current State of Assets

Identify number/feet/type of all important components in your utilities

- ❑ *Year Installed
- ❑ Useful Life
- ❑ **Condition**
- ❑ Replacement Cost



No Fibbing

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Step 1 Current State of Assets

Where is the asset located?

- Prepare a system facility map and show where assets are located
- Are they located in the “best” place?
  - ❑ Computer back ups
  - ❑ Extra vehicle keys

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Step 1 Current State of Assets

Collecting the data…. the biggest challenge!

- Facility Maps and Plans
- Bid/Construction documents
- "As-builts"/Record Drawings
- Walk the line
  - Wheel or pace yardage
  - Count valves, hydrants etc.
- Your experience and observation

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Step 1 Current State of Assets

Identify condition of assets

- Use a value system, 1 – 10, 1 - 5
- Determine which number means immediate replacement

Step 1 Current State of Assets

Assess useful life

- What is the total useful life of the asset
- Calculate the remaining useful life

Step 1 Current State of Assets

Asset Management: A Handbook for Small Water Systems

One of the Simple Tools for Effective Performance (STEP) Guide Series

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Step 1 Current State of Assets

Introduction to the System Inventory Worksheet

The following System Inventory Worksheet will help you:

- Identify all of your system's assets;
- Record the condition of your assets;
- Record the service history of your assets;
- Determine your assets' adjusted useful lives;
- Record your assets' ages; and,
- Estimate the remaining useful life of each of your assets. Usually, there are two steps to estimating useful life:

  1. Determine the expected useful life by using the manufacturer's recommendations or the estimates provided in the box to the right. Adjust these numbers based on the specific conditions and experiences of your system.

  2. Calculate an adjusted useful life by taking into account the service history and current condition of your asset.

Two copies of the worksheet are provided. The first copy is followed by instructions that will help you understand how to complete it. The second worksheet is an example. Appendix A has blank worksheets that you can photocopy and use.

Estimated Useful Lives

Asset	Expected Useful Life (in years)
Intake Structures	35-45
Wells and Springs	25-35
Galleries and Tunnels	30-40
Chlorination Equipment	10-15
Other Treatment Equipment	10-15
Storage Tanks	30-60
Pumps	10-15
Buildings	30-60
Electrical Systems	7-10
Transmission Mains	35-40
Distribution Pipes	35-40
Valves	35-40
Blow-off Valves	35-40
Backflow Prevention	35-40
Meters	10-15
Service Lines	30-50
Hydrants	40-60
Lab/Monitoring Equipment	5-7
Tools and Shop Equipment	10-15
Landscaping/Grading	40-60
Office Furniture/Supplies	10
Computers	5
Transportation Equipment	10

Note: These numbers are ranges of expected useful lives drawn from a variety of sources. The ranges assume that assets have been properly maintained.

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Step 1 Current State of Assets

Determine asset values and replacement costs

- Capital Facility Plan
- Parts suppliers
- Well drillers
- Engineering estimates
- DOH Regional Engineers
- Neighboring systems

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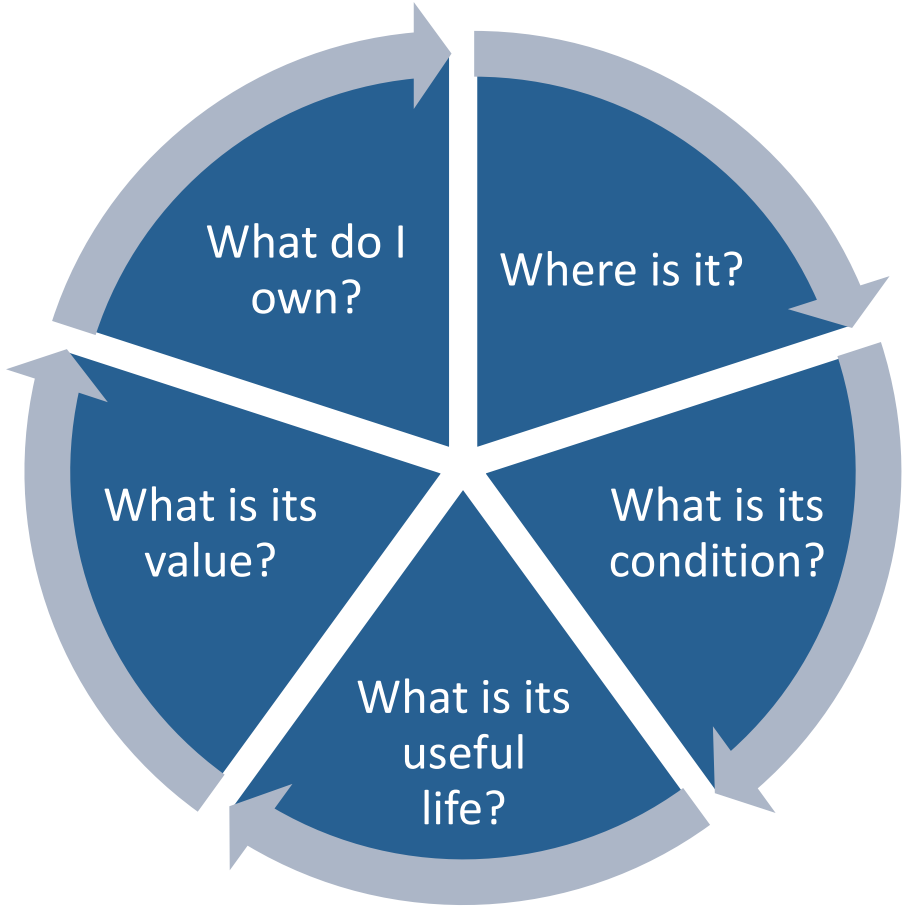
Step 1 Current State of Assets



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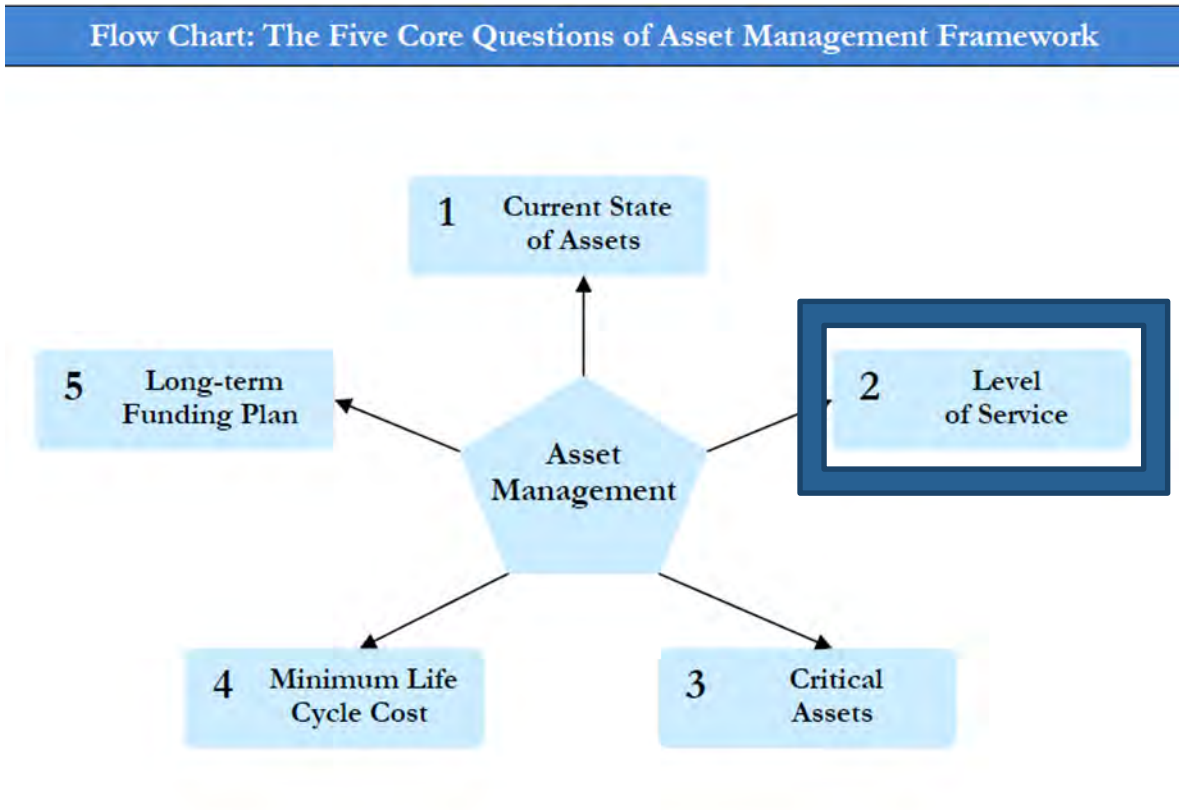
Step 2 Level of Service (LOS)



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Step 2 Level of Service

A policy decision to provide an “amount” of service to meet (local standards):

Which is the best order of importance?

1. Reliability and safety of utilities
2. Future needs
3. Customer needs/wants
4. Financial viability

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Step 2 Level of Service

A policy decision to provide an “amount” of service to meet (local standards):

A. 1. Reliability & Safety, 2. Future needs, 3. Customer needs, 4. Financial viability
B. 2. Future needs, 4. Financial viability , 3. Customer needs, 1. Reliability & Safety
C. 1. Reliability & Safety, 4. Financial viability, 3. Customer needs, 2. Future needs
D. 4. Financial viability, 2. Future needs, 1. Reliability & Safety, 3. Customer needs

Step 2 Level of Service

A policy decision to provide an “amount” of service to meet (local standards):

A. 1. Reliability & Safety, 2. Future needs, 3. Customer needs, 4. Financial viability
B. 2. Future needs, 4. Financial viability , 3. Customer needs, 1. Reliability & Safety
C. 1. Reliability & Safety, 4. Financial viability, 3. Customer needs, 2. Future needs
D. 4. Financial viability, 2. Future needs, 1. Reliability & Safety, 3. Customer needs

Step 2 Level of Service

Financial Viability

"Sufficient funds to operate, maintain and manage a public water system, **on a continuing basis**, in full compliance of federal and state laws"

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Step 2 Level of Service

- No violations
- Planning requirement
- Backup generator
- Emergency plans
- Well trained personnel
- Nice truck w/emblem
- Clean facilities
- Phone answered in 3 rings
- Good water pressure
- System optimization
- Repair parts on-hand
- Proactive maintenance
- Public relations
- Adequate Rates

Step 2 Level of Service

Tracking achievement

- Set criteria
- Based on adopted standards
- Meeting set standards shows customers you take this responsibility seriously

Public Relations

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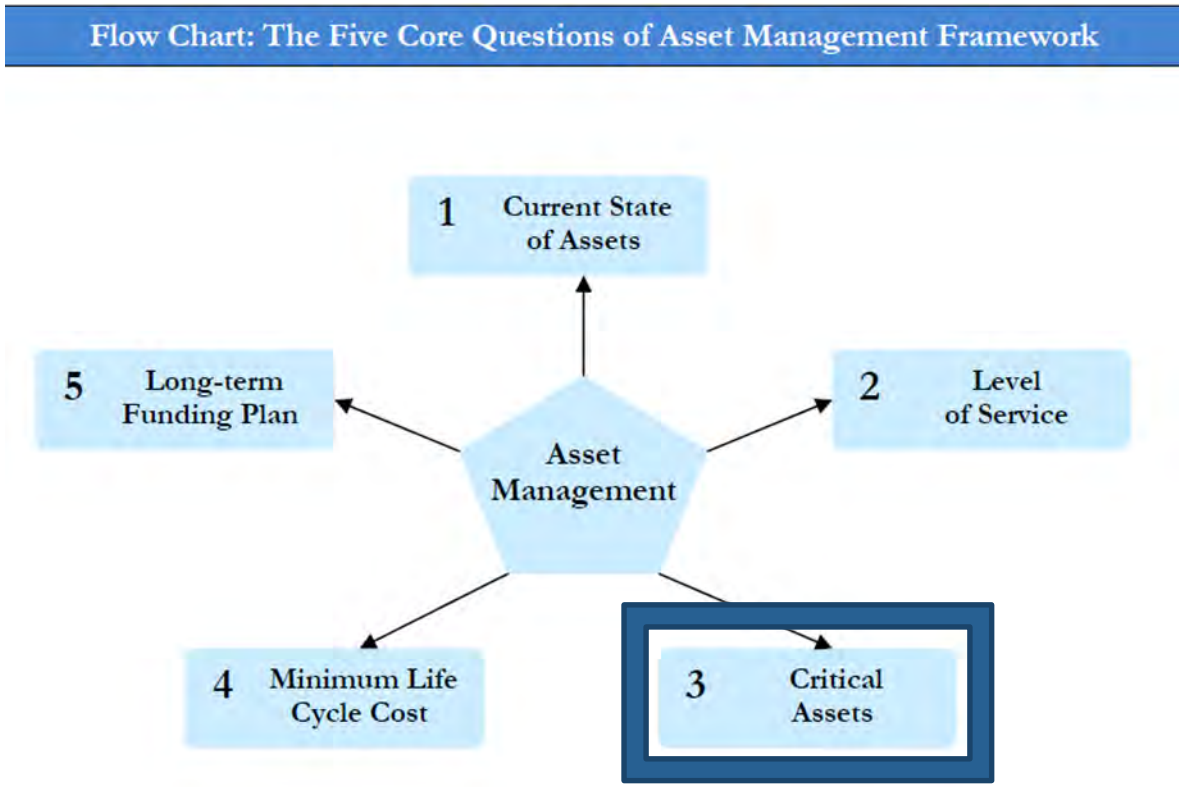
Step 3 Critical Assets



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Step 3 Critical Assets

Identify importance of assets

- How important is this asset? Is it critical or is it for redundancy?

Step 3 Critical Assets

Which assets are critical to sustained performance?

Conduct a **Risk & Resiliency Assessment** to identify vulnerability from intrusion, terrorism, storms, flooding, earthquakes…

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Step 3 Critical Assets

Analyze failure consequences

Develop an **Emergency Response Plan (ERP)** to show what you are going to do about failure, who does what, phone numbers…

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Step 3 Critical Assets

What's the probability of failure?

- Past history
- Age and condition
- Trends

List assets by failure type

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Step 3 Critical Assets: Prioritize Projects

Multiplied		Consequence (Cost) of Failure				
		1	**2**	**3**	**4**	**5**
Probability of Failure	**1**	*1*	*2*	*3*	*4*	*5*
	2	*2*	*4*	*6*	*8*	*10*
	3	*3*	*6*	*9*	*12*	*15*
	4	*4*	*8*	*12*	*16*	*20*
	5	*5*	*10*	*15*	*20*	*25*

1	Very Low	4	High
2	Low	5	Very High
3	Moderate		

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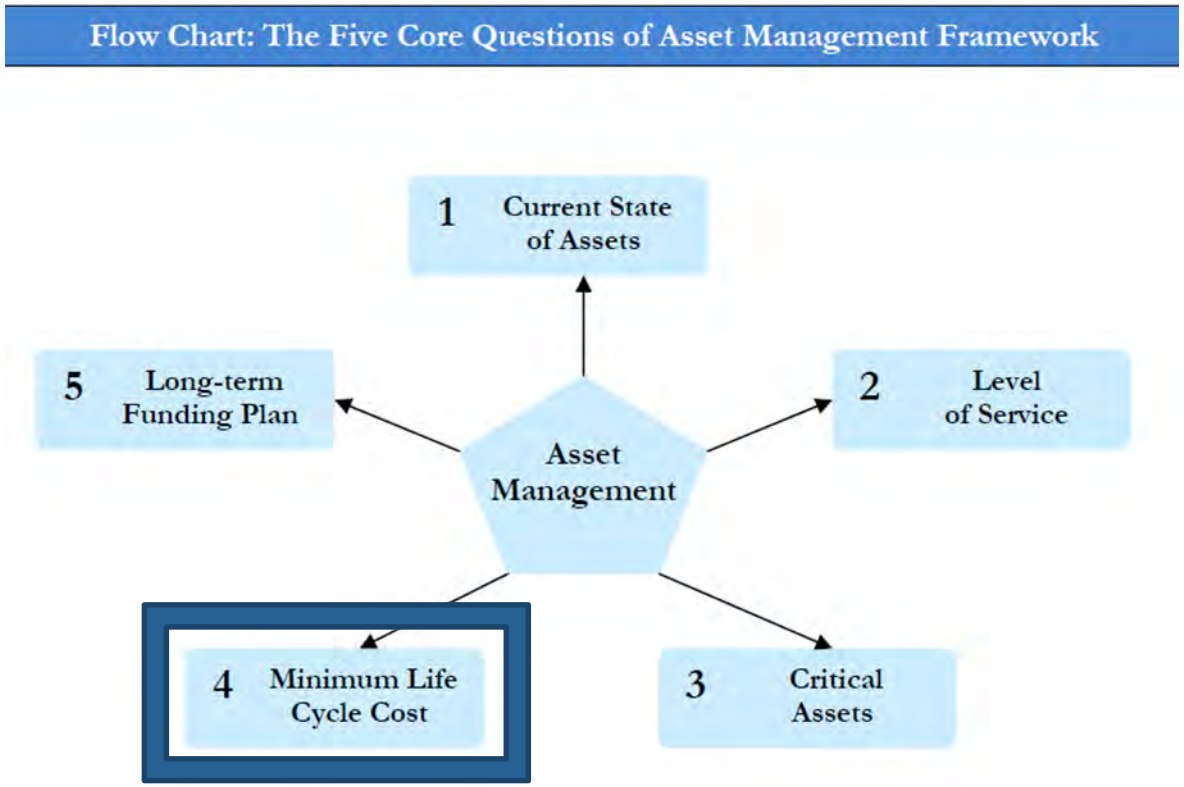
Step 4 Minimum Life Cycle Cost



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Step 4 Life Cycle Phase Asset Management

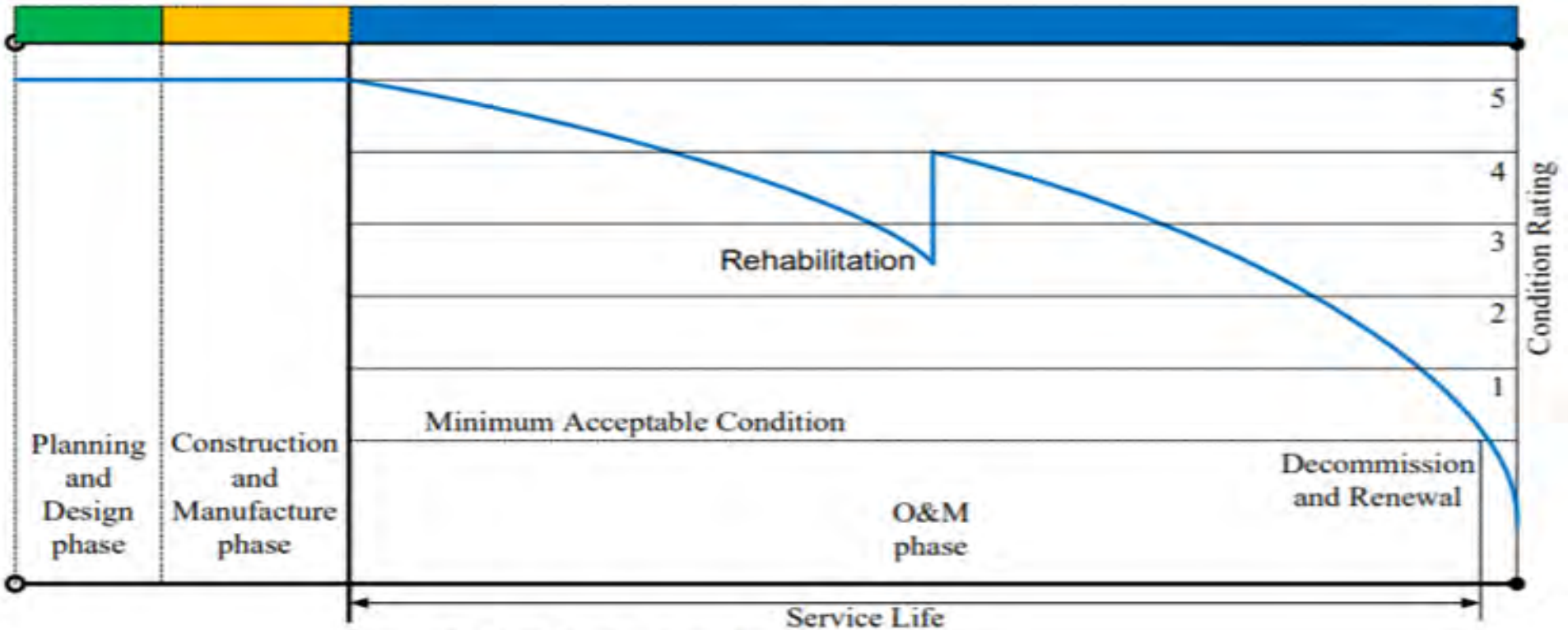

Figure 2-7. Life Cycle Phase Asset Management.

Water Infrastructure Asset Management Primer, Water Environment Research Foundation, 2014

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Step 4 Minimum Life Cycle Cost

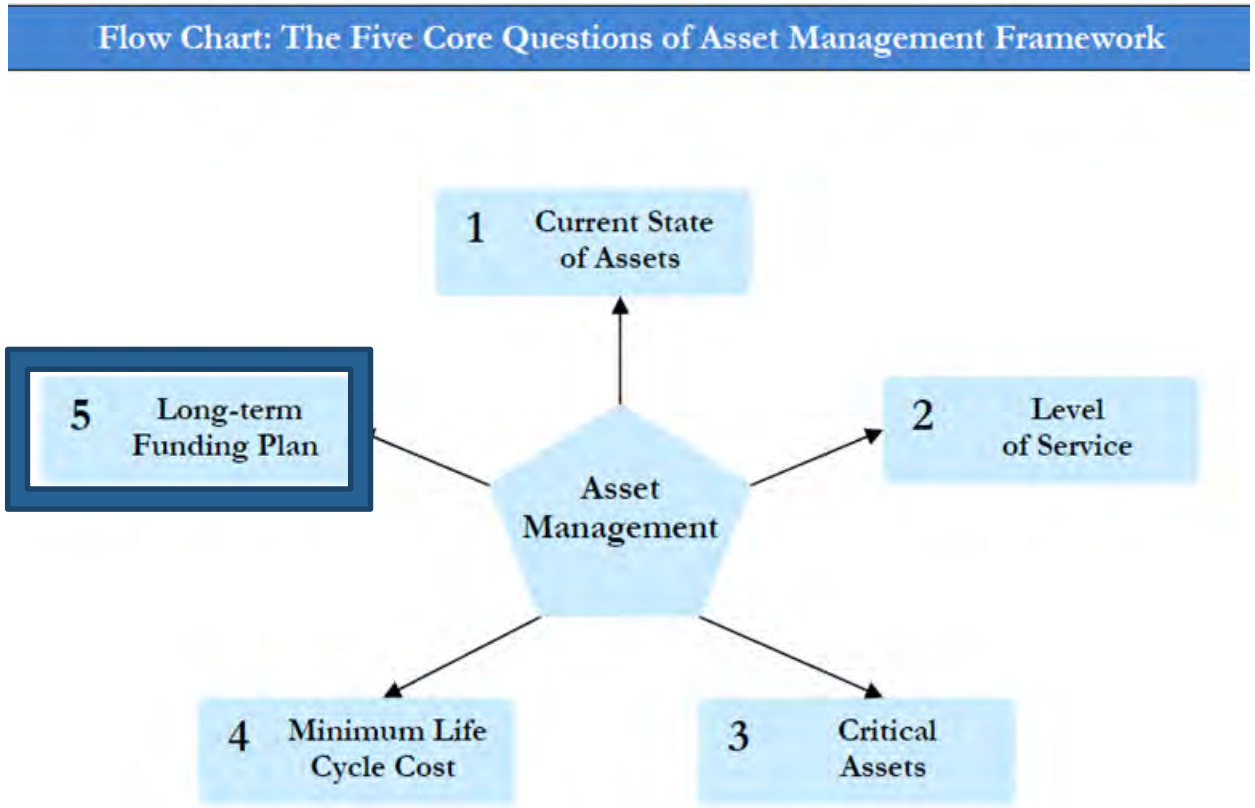
Key Concepts:

- Scheduled Maintenance
  - Reactive vs. Proactive vs. Predictive
- Recordkeeping
  - Track trends
- Planning
  - Financial
  - Contingency

Step 4 Minimum Life Cycle Cost

1. Move from reactive maintenance to predictive
2. Know costs & benefits of rehabilitation vs. replacement
3. Deploy resources based on asset conditions
4. Analyze possible asset failures & develop specific response plans

Step 5 Long-term Funding Plan



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Step 5 Long-term Funding Plan

- ✓ Inventory your assets
- ✓ Service policies
- ✓ Replacement schedule
- ❑ Determine needed reserve accounts
- ❑ Determine funding sources
- ❑ Translate the above into rates!

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Step 5 Long-term Funding Plan

Determine needed reserve accounts

- Short term asset replacement
- Cash components of capital projects such as preliminary engineering or matching funds

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Step 5 Long-term Funding Plan

Determine funding sources:

- Cash reserves
- Loan sources
  - **Learn prioritization of funding**
- Likelihood of grants
  - USDA Rural Development
  - SRF “forgiveness”
  - CDBG

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Step 5 Long-term Funding Plan

Keep in touch

Prioritization for loans and grants changes

- You will need to show financial planning and “sustainability” skills
- You will need to demonstrate “stewardship” of your utilities

Step 5 Long-term Funding Plan

CREATE AND FOLLOW A BUDGET

CREATE & FUND A DEDICATED ASSET RESERVE

REVISE YOUR RATE STRUCTURE

ATTEND EDUCATIONAL WORKSHOPS!

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6 Year Budget

Support the Asset Management Plan

- Begin with 4-year review of past actuals (min 3 yrs)
- Factual budget; 1 year (2022), 5 year projection (2023 – 2027)
- Budget projections include annual expenses, new loans & inflation
- Base budget on true expenses & reserve needs including asset management

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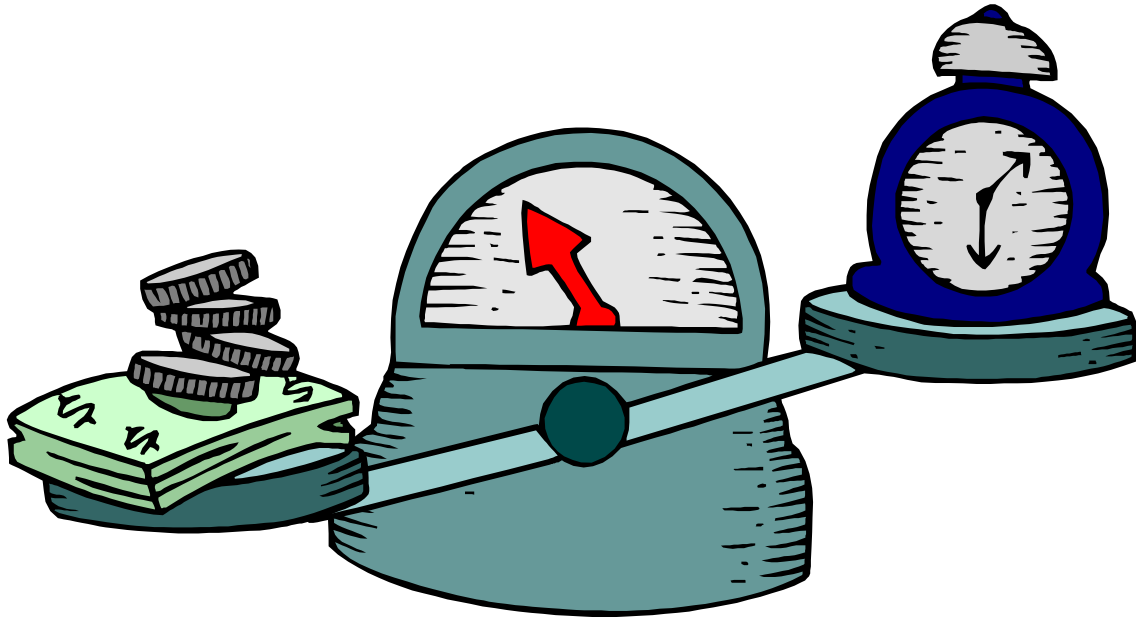
6 Year Budget - Reserves

	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5	Yr. 6
Operating Reserve - Target Balance $7,326 – Year 7						
Operating reserve beginning balance		$0	$0	$1,221	$2,442	$3,663
Contribution to operating reserve			$1,221	$1,221	$1,221	$1,221
Operating reserve ending balance	$0	$0	$1,221	$2,442	$3,663	$4,884
Emergency Reserve - Target Balance $50,000 – Year 13						
Emergency reserve beginning balance		$0	$0	$0	$5,000	$10,000
Contribution to emergency reserve				$5,000	$5,000	$5,000
Withdrawal from emergency reserve						
Emergency reserve ending balance	$0	$0	$0	$5,000	$10,000	$15,000
Short-lived Asset Reserve - Target Balance $13,500 – Year 7						
Short-lived asset reserve beginning balance		$0	$0	$2,700	$5,400	$8,100
Contribution to short-lived asset reserve			$2,700	$2,700	$2,700	$2,700
Withdrawal from short-lived asset reserve	$0	$0				
Short-lived asset reserve ending balance	$0	$0	$2,700	$5,400	$8,100	$10,800
Long-lived Asset Reserve – Target Balance $90,000 – Year 13						
Long-lived asset reserve beginning balance		$0	$0	$0	$9,000	$18,000
Contribution to long-lived asset reserve				$9,000	$9,000	$9,000
Withdrawal from long-lived asset reserve	$0	$0	$0	$0	$0	$0
Long-lived asset reserve ending balance	$0	$0	$0	$9,000	$18,000	$27,000
Long-lived Asset Replacement Funding - Target Balance $350,000 – Year 4						
Lost Creek Loan				$175,000		
Lost Creek Grant				$175,000		
Long-lived asset reserve						
Special capital improvement assessment						
Total funding for long-lived asset replacement	$0	$0	$0	$350,000	$0	$0
Ending Cash Balance for Current Year Does not include reserve account balances.	$118,487	$221,924	$355,810	$473,514	$588,970	$702,112

6 Year Budget - Inflation

Inflation is the erosion of spending power caused by an increase the price of commodities and consumer goods.



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6 Year Budget

- Written assumptions
- Data driven decisions
- Needed rate increases will be clearly shown
- Creates public information

Board Members & Water Rates

"Board Members have a **fiduciary duty** to assure that system revenues cover the **"true"** cost of water delivered."

Ellen Miller

"The Water Board Bible"

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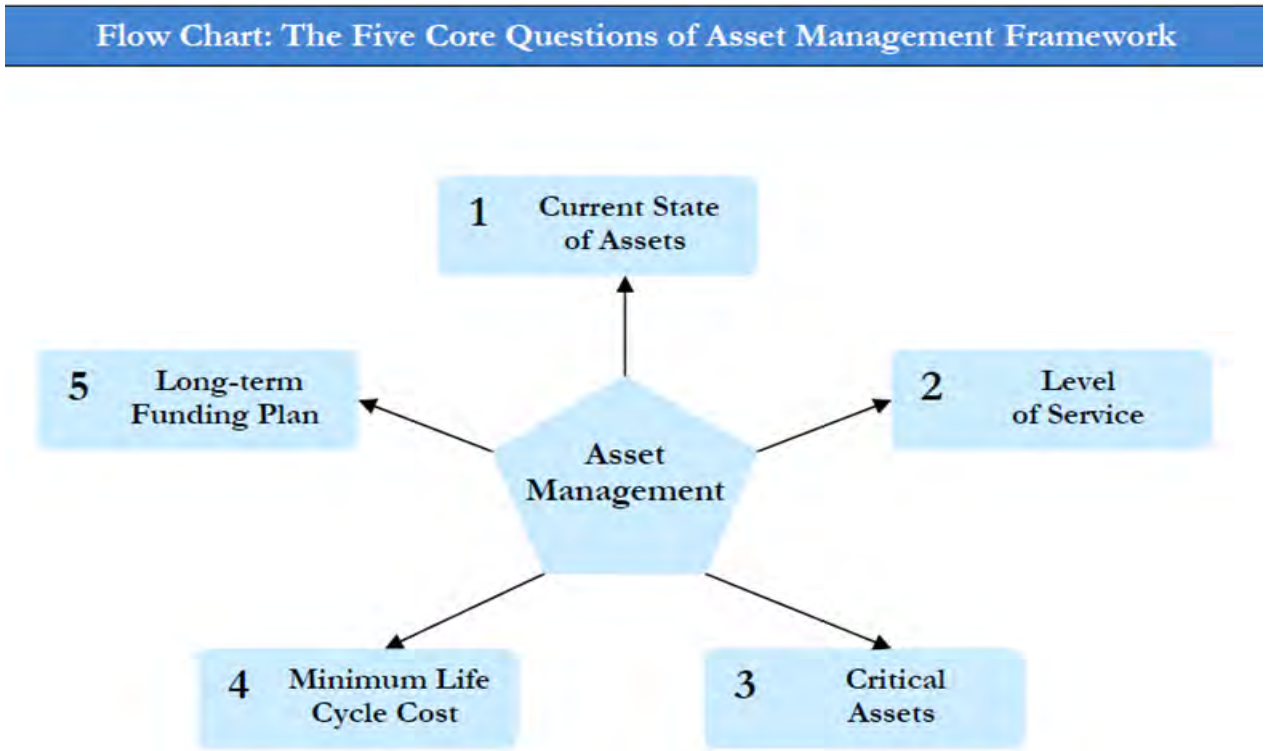
What is Asset Management



AM = Risk Based Planning Process

Risk = f (Criticality x Condition)

Risk = f (Consequence of Failure x Likelihood of Failure)

Take Away

- The AM Plan produces a "**visual picture**" of condition, location and replacement
- The AM Plan **supports** budget and rates
- There are tools and assistance to **help** you get started
- **First** step – get everyone on board

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Questions

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For More Information

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Resources

Where to find help and tools

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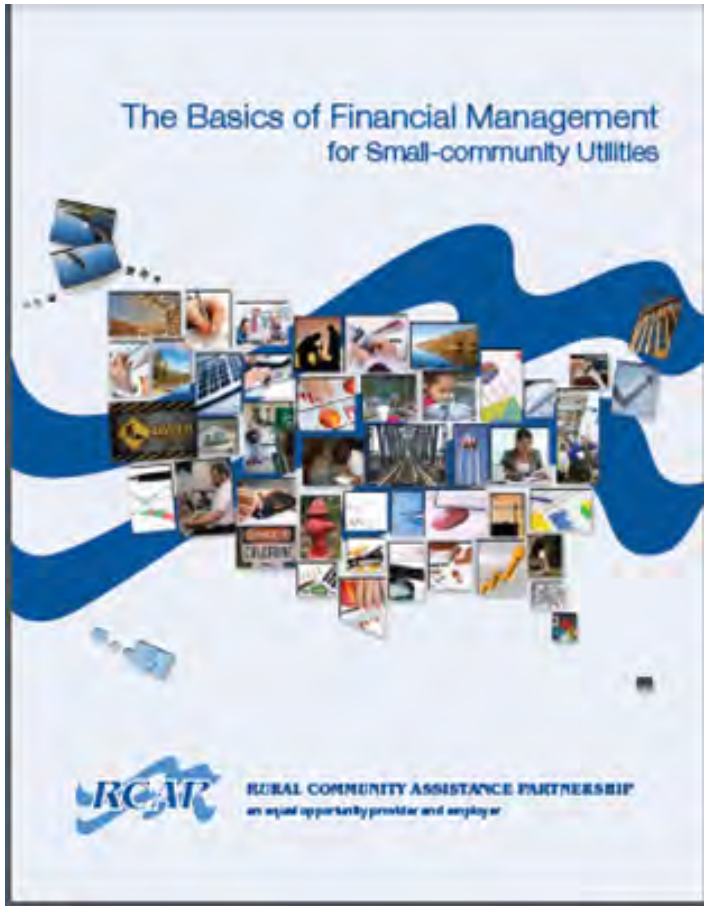
Resources

Free guides from RCAP

https://www.rcap.org/wp-content/uploads/2020/08/Basics-of-Financial-Management_updated.pdf



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Resources

“A living document to govern the managerial, technical, and financial aspects of your water system”

https://www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/WaterSystemDesignandPlanning/SmallWaterSystemMgmt

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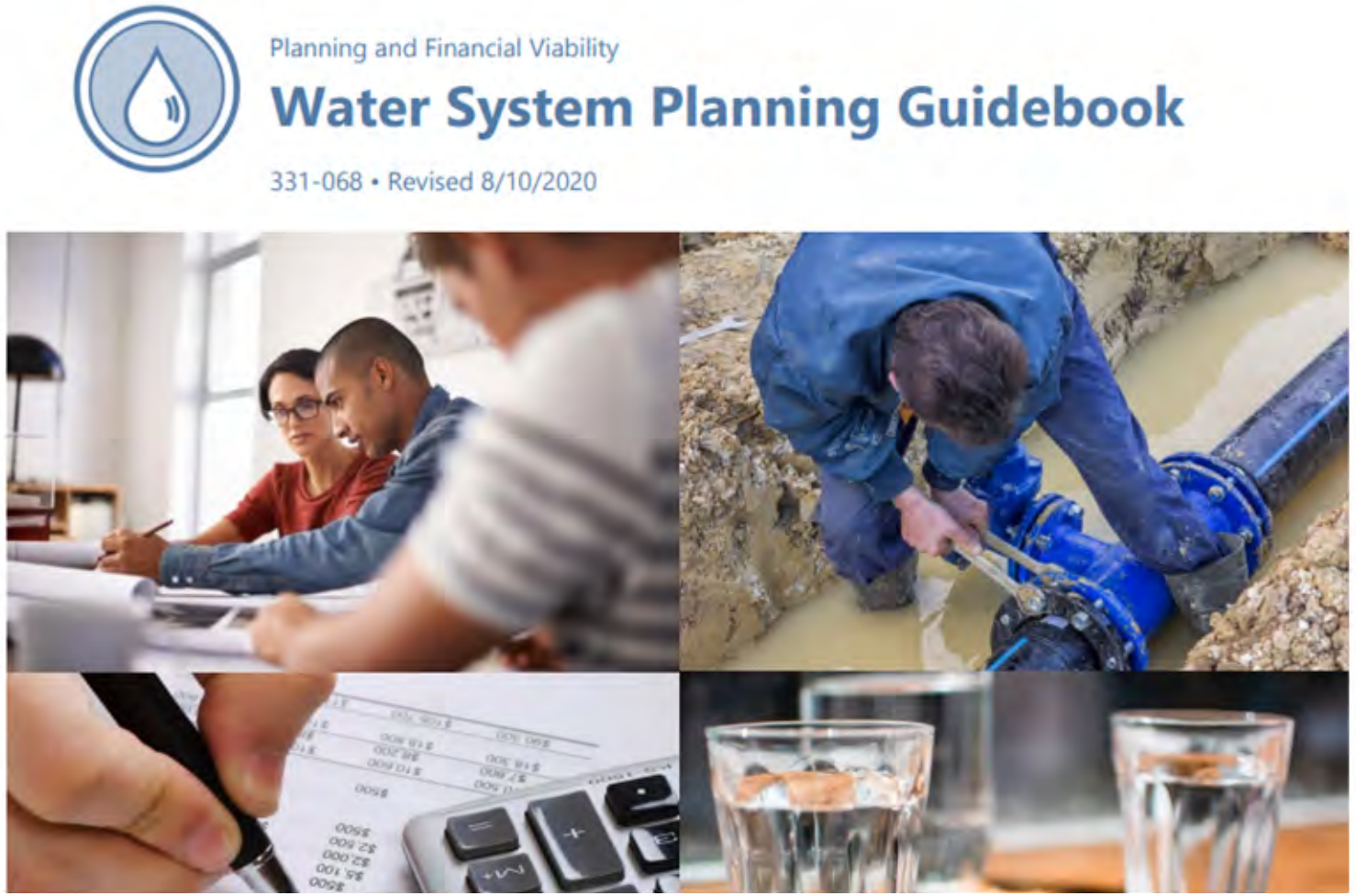
Resources



- https://www.doh.wa.gov/Portals/1/Documents/Pubs/331-068.pdf

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Resources

EPA Asset Management Resources:

https://www.epa.gov/sustainable-water-infrastructure/asset-management-water-and-wastewater-utilities#resources

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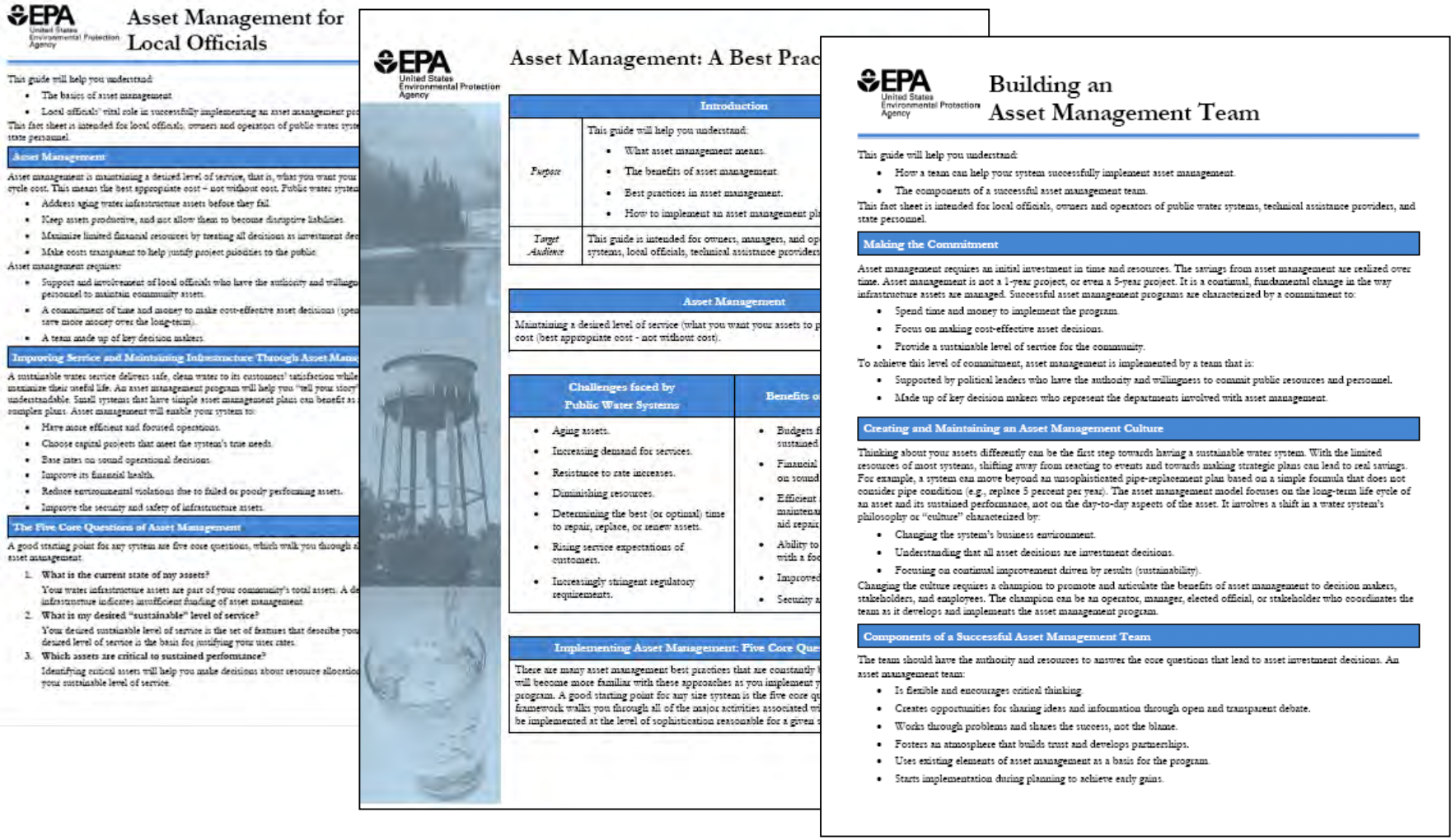
Resources



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Asset Management for Local Officials

This guide will help you understand:

- The basics of asset management.
- Local officials' vital role in successfully implementing an asset management pro

This fact sheet is intended for local officials, owners and operators of public water syste state personnel.

Asset Management

Asset management is maintaining a desired level of service, that is, what you want your cycle cost. This means the best appropriate cost – not without cost. Public water system

- Address aging water infrastructure assets before they fail.
- Keep assets *productive*, and not allow them to become disruptive liabilities.
- Maximize limited financial resources by treating all decisions as investment dec
- Make costs transparent to help justify project priorities to the public.

Asset management requires:

- Support and involvement of local officials who have the authority and willingn personnel to maintain community assets.
- A commitment of time and money to make cost-effective asset decisions (spen save more money over the long-term).
- A team made up of key decision makers.

Improving Service and Maintaining Infrastructure Through Asset Mana

A sustainable water service delivers safe, clean water to its customers' satisfaction while maximize their useful life. An asset management program will help you "tell your story" understandable. Small systems that have simple asset management plans can benefit as complex plans. Asset management will enable your system to:

- Have more efficient and focused operations.
- Choose capital projects that meet the system's true needs.
- Base rates on sound operational decisions.
- Improve its financial health.
- Reduce environmental violations due to failed or poorly performing assets.
- Improve the security and safety of infrastructure assets.

The Five Core Questions of Asset Management

A good starting point for any system are five core questions, which walk you through a asset management.

1. **What is the current state of my assets?**
   You water infrastructure assets are part of your community's total assets. A de infrastructure indicates insufficient funding of asset management.
2. **What is my desired "sustainable" level of service?**
   Your desired sustainable level of service is the set of features that describe you desired level of service is the basis for justifying your user rates.
3. **Which assets are critical to sustained performance?**
   Identifying critical assets will help you make decisions about resource allocatio your sustainable level of service.

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Asset Management: A Best Prac

Introduction

Purpose	This guide will help you understand: • What asset management means. • The benefits of asset management. • Best practices in asset management. • How to implement an asset management pl
Target Audience	This guide is intended for owners, managers, and op systems, local officials, technical assistance provider

Asset Management

Maintaining a desired level of service (what you want your assets to p cost (best appropriate cost - not without cost).

Challenges faced by Public Water Systems	Benefits o
• Aging assets. • Increasing demand for services. • Resistance to rate increases. • Diminishing resources. • Determining the best (or optimal) time to repair, replace, or renew assets. • Rising service expectations of customers. • Increasingly stringent regulatory requirements.	• Budgets f sustained • Financial on sound • Efficient maintena aid repair • Ability to with a foc • Improved • Security a

Implementing Asset Management: Five Core Que

These are many asset management best practices that are constantly will become more familiar with these approaches as you implement program. A good starting point for any size system is the five core qu framework walks you through all of the major activities associated w be implemented at the level of sophistication reasonable for a given

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Building an Asset Management Team

This guide will help you understand:

- How a team can help your system successfully implement asset management.
- The components of a successful asset management team.

This fact sheet is intended for local officials, owners and operators of public water systems, technical assistance providers, and state personnel.

Making the Commitment

Asset management requires an initial investment in time and resources. The savings from asset management are realized over time. Asset management is not a 1-year project, or even a 5-year project. It is a continual, fundamental change in the way infrastructure assets are managed. Successful asset management programs are characterized by a commitment to:

- Spend time and money to implement the program.
- Focus on making cost-effective asset decisions.
- Provide a sustainable level of service for the community.

To achieve this level of commitment, asset management is implemented by a team that is:

- Supported by political leaders who have the authority and willingness to commit public resources and personnel.
- Made up of key decision makers who represent the departments involved with asset management.

Creating and Maintaining an Asset Management Culture

Thinking about your assets differently can be the first step towards having a sustainable water system. With the limited resources of most systems, shifting away from reacting to events and towards making strategic plans can lead to real savings. For example, a system can move beyond an unsophisticated pipe-replacement plan based on a simple formula that does not consider pipe condition (e.g., replace 5 percent per year). The asset management model focuses on the long-term life cycle of an asset and its sustained performance, not on the day-to-day aspects of the asset. It involves a shift in a water system's philosophy or "culture" characterized by:

- Changing the system's business environment.
- Understanding that all asset decisions are investment decisions.
- Focusing on continual improvement driven by results (sustainability).

Changing the culture requires a champion to promote and articulate the benefits of asset management to decision makers, stakeholders, and employees. The champion can be an operator, manager, elected official, or stakeholder who coordinates the team as it develops and implements the asset management program.

Components of a Successful Asset Management Team

The team should have the authority and resources to answer the core questions that lead to asset investment decisions. An asset management team:

- Is flexible and encourages critical thinking.
- Creates opportunities for sharing ideas and information through open and transparent debate.
- Works through problems and shares the success, not the blame.
- Fosters an atmosphere that builds trust and develops partnerships.
- Uses existing elements of asset management as a basis for the program.
- Starts implementation during planning to achieve early gains.

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Resources

https://www.epa.gov/dwcapacity/asset-management-resources-small-drinking-water-systems-0

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Resources

Mapping:

- ❑ RCAC / RCAP GIS Mapping Project
- ❑ Google Earth Pro
- ❑ QGIS (Geographic Information System)
- ❑ Diamond Maps https://diamondmaps.com/

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Resources

GE Pro free download

Using a desktop computer, download the free software:

https://www.google.com/earth/versions/#earth-pro

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Resources

QGIS

Free, open-source Geographic Information System.

Download the software for free here: https://qgis.org/en/site/

Free EPA tutorial on how to use QGIS for water utility management: https://www.youtube.com/watch?v=pnwdvFug9Kc

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Resources

Use your GIS or GEP model/map for:

- Asset Management
- Cross Connection Control
- Line Flushing Program
- Source Water Protection
- Legacy

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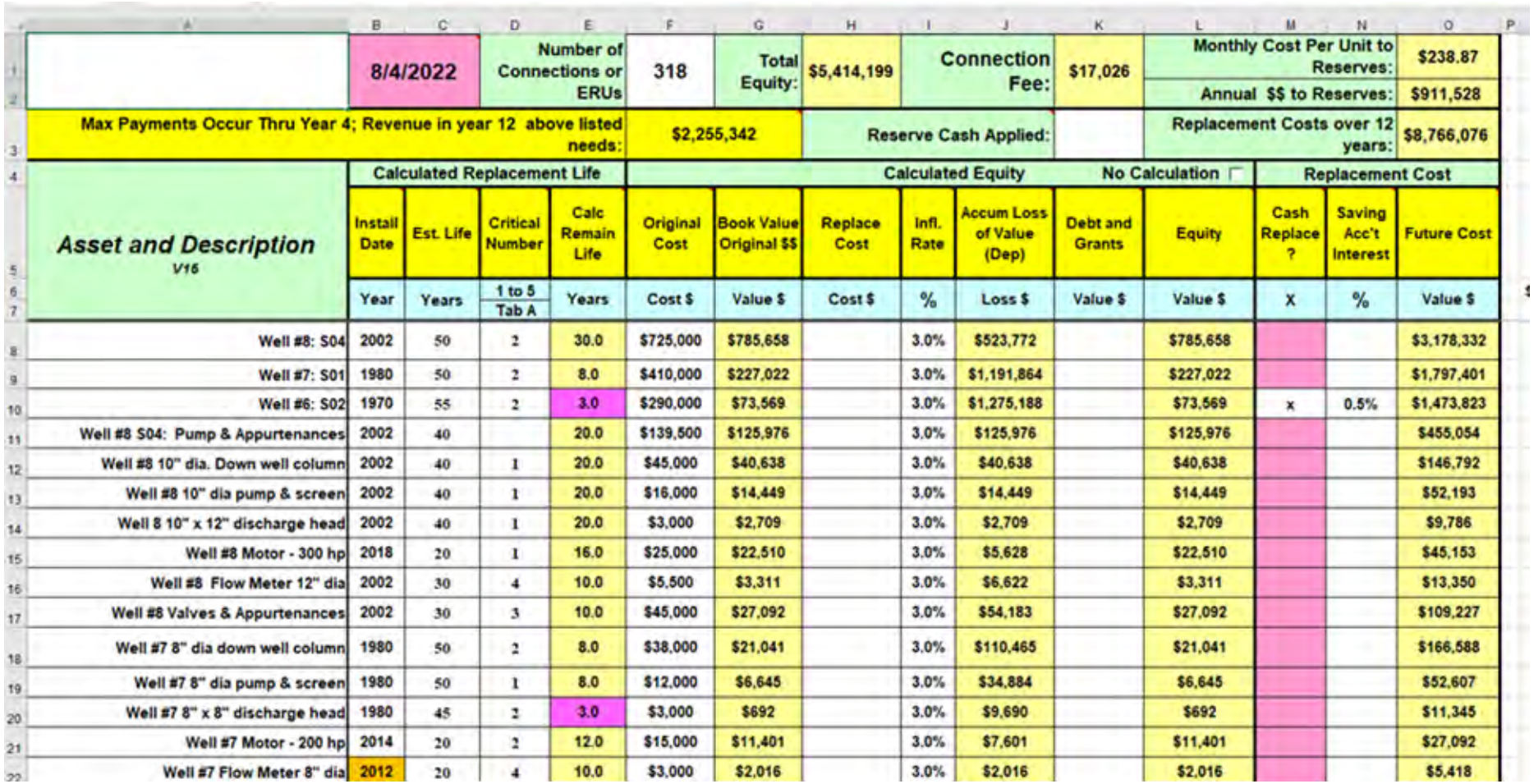
Resources - Spreadsheet



	8/4/2022	Number of Connections or ERUs	318	Total Equity:	$5,414,199	Connection Fee:	$17,026	Monthly Cost Per Unit to Reserves:	$238.87					
								Annual $$ to Reserves:	$911,528					
Max Payments Occur Thru Year 4; Revenue in year 12 above listed needs:			$2,255,342		Reserve Cash Applied:			Replacement Costs over 12 years:	$8,766,076					
	Calculated Replacement Life				Calculated Equity					No Calculation ☐		Replacement Cost		
Asset and Description V16	Install Date	Est. Life	Critical Number	Calc Remain Life	Original Cost	Book Value Original $$	Replace Cost	Infl. Rate	Accum Loss of Value (Dep)	Debt and Grants	Equity	Cash Replace ?	Saving Acc't Interest	Future Cost
	Year	Years	1 to 5 Tab A	Years	Cost $	Value $	Cost $	%	Loss $	Value $	Value $	X	%	Value $
Well #8: S04	2002	50	2	30.0	$725,000	$785,658		3.0%	$523,772		$785,658			$3,178,332
Well #7: S01	1980	50	2	8.0	$410,000	$227,022		3.0%	$1,191,864		$227,022			$1,797,401
Well #6: S02	1970	55	2	3.0	$290,000	$73,569		3.0%	$1,275,188		$73,569	x	0.5%	$1,473,823
Well #8 S04: Pump & Appurtenances	2002	40		20.0	$139,500	$125,976		3.0%	$125,976		$125,976			$455,054
Well #8 10" dia. Down well column	2002	40	1	20.0	$45,000	$40,638		3.0%	$40,638		$40,638			$146,792
Well #8 10" dia pump & screen	2002	40	1	20.0	$16,000	$14,449		3.0%	$14,449		$14,449			$52,193
Well 8 10" x 12" discharge head	2002	40	1	20.0	$3,000	$2,709		3.0%	$2,709		$2,709			$9,786
Well #8 Motor - 300 hp	2018	20	1	16.0	$25,000	$22,510		3.0%	$5,628		$22,510			$45,153
Well #8 Flow Meter 12" dia	2002	30	4	10.0	$5,500	$3,311		3.0%	$6,622		$3,311			$13,350
Well #8 Valves & Appurtenances	2002	30	3	10.0	$45,000	$27,092		3.0%	$54,183		$27,092			$109,227
Well #7 8" dia down well column	1980	50	2	8.0	$38,000	$21,041		3.0%	$110,465		$21,041			$166,588
Well #7 8" dia pump & screen	1980	50	1	8.0	$12,000	$6,645		3.0%	$34,884		$6,645			$52,607
Well #7 8" x 8" discharge head	1980	45	2	3.0	$3,000	$692		3.0%	$9,690		$692			$11,345
Well #7 Motor - 200 hp	2014	20	2	12.0	$15,000	$11,401		3.0%	$7,601		$11,401			$27,092
Well #7 Flow Meter 8" dia	2012	20	4	10.0	$3,000	$2,016		3.0%	$2,016		$2,016			$5,418

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Resources - Funding

Asset Management Plans can be supported by:

CDBG

DOH State Revolving Fund (SRF), US Department of Agriculture Rural Development (USDA RD) and WA State Department of Ecology when tied to a project

http://infrafunding.wa.gov/downloads/Funding-Program-Summary.pdf

https://www.epa.gov/sites/production/files/2019-03/documents/asset_management_initiatives_document_508.pdf

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