EPA Clean Water Act
National Compliance Initiative Series

BMPs for POTW Compliance: Critical Elements of Successful Wastewater Treatment (Part 2 of 2)

Presented Live:

September 15, 2020

US EPA Office of Compliance Technical Assistance Webinar Series

Introduction: Seth Heminway, US EPA Office of Compliance (heminway.seth@epa.gov)

- Webinar series supports the national EPA and state initiative to reduce noncompliance among CWA - NPDES permitted facilities. Focus is on helping wastewater system operators return their facilities to compliance, and those interested in fine-tuning their systems.
- The webinar will be recorded and posted.
- Certificates of attendance will be sent to those who have registered.
- You will be in “listen only mode.”
- Use the chat box to ask questions and to suggest other training
- Speakers do not necessarily reflect EPA positions or policy.
- We strive for continuous improvement. Please complete the post webinar survey.

Developing and Implementing Better SOPs

EPA Technical Assistance Webinar

September 2020

Why do we need SOPs?

SOPs create repeatable protocols for carrying out critical tasks, creating consistency in facility and operator performance.

What will a good SOP help you achieve?

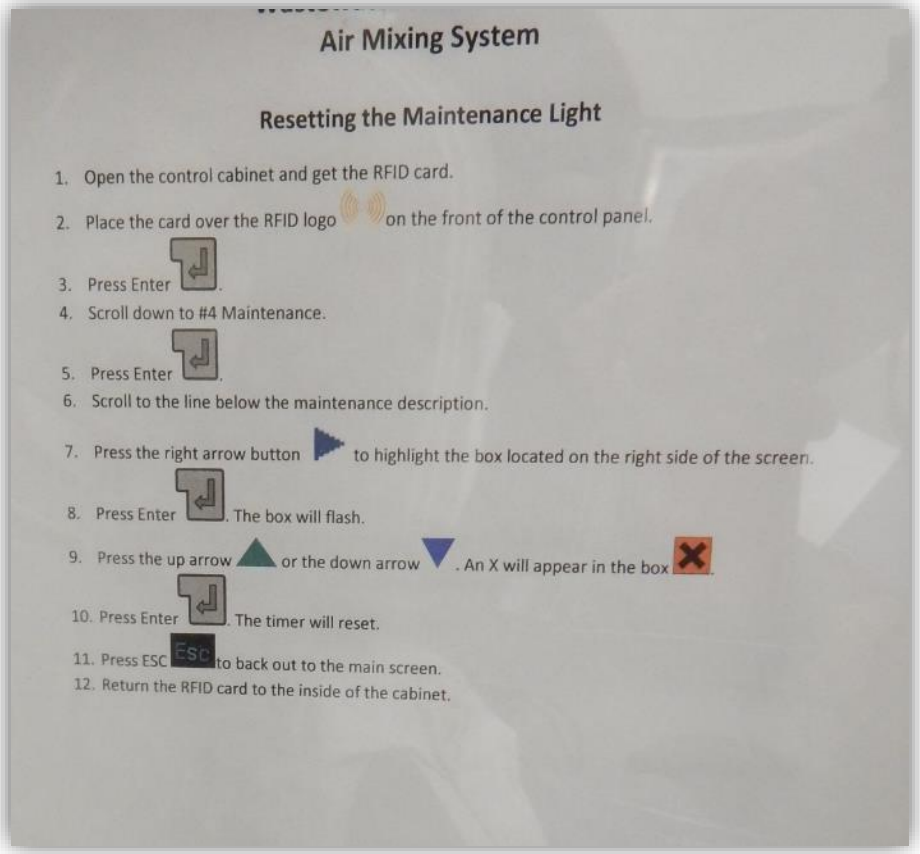
- Proper operation and maintenance
- Manage avoidable failures
- Facility optimization and efficiency
- Meet Permit standards
- Employee health and safety
- Training

What should you consider?

- **Audience is key** – Not all procedures need to be complicated. Think of who will be using them.
- **Operations are constantly evolving and may need modification** – Make sure to have a procedure in place to review your procedures.
- **Make sure SOPs are used** – SOPs should not be designed to sit in a book or on a shelf. Make them known and make sure they are field functional.
- **Link SOPs to documentation** – Ensure mechanisms for data collection and documenting observations is included.
- **TRAINING!**

Tips and Tricks

- Engage operators in the development process.
- Keep it simple when appropriate but include key operational values and ranges.
- Use pictures and imagery – before and after, right and wrong.
- Keep SOPs close to the equipment and operations they were developed for.
- Use SOPs as a chance to set expectations – for example, how long a task should take or cost
- Attach or incorporate SOPs into work orders



Air Mixing System

Resetting the Maintenance Light

1. Open the control cabinet and get the RFID card.
2. Place the card over the RFID logo on the front of the control panel.
3. Press Enter.
4. Scroll down to #4 Maintenance.
5. Press Enter.
6. Scroll to the line below the maintenance description.
7. Press the right arrow button to highlight the box located on the right side of the screen.
8. Press Enter. The box will flash.
9. Press the up arrow or the down arrow. An X will appear in the box.
10. Press Enter. The timer will reset.
11. Press ESC to back out to the main screen.
12. Return the RFID card to the inside of the cabinet.

Date : 8/27/18

EMERGENCY SPILL RESPONSE PROCEDURE

Time	Description of Action Taken
9:55 dm	Spill/Sheen reported to office. Reported by : Michael From A-26 to A44
10:15 dm	Investigate sheen; if possible, determine where originating from B. Idg. Pump. No odor, no rainbow
10:25 dm	Determine Product: Gasoline, Diesel, Engine Oil or other unknown
10:25 dm	Determine size of slick on water (example 100' X 25') 200' x 50'
N/A	Action Taken (deploy sweep, boom, etc.) Let it evaporate
10:25 dm	Instruct 1 crew member to take camera and document all actions with pictures
10:30 dm	Call National Response Center 1-800-424-8802

Person spoken to: Quinn

Time begin call: 10:35 dm Time End call: 10:40 dm

Report Number 1222802

10:43 dm Call MD Department of Environment (MDE) 1-866-633-4686

Person spoken to: Neil

Time begin call: 10:43 dm Time End call:

Report Number 8-27-18 (Date) 10:43 dm (Time)

Call vessel owner, if sinking, get permission to pump-out and haul-out and/or ask if Boat/US or Sea Tow Member. Have owner call Boat/US or Sea Tow if needed and have them respond

10:50 dm

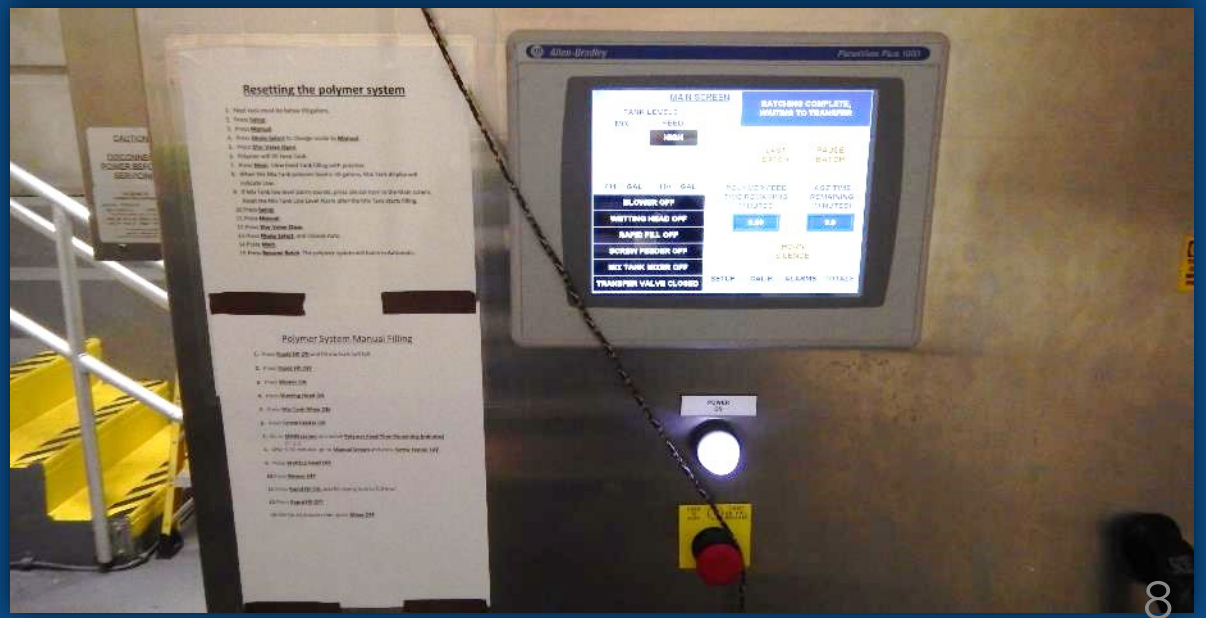
11:00 dm

Call Michael Tate @ [illegible]

Remarks/Comments:

Polymer System Manual Filling

1. Press **Rapid Fill ON** and fill mix tank half full
2. Press **Rapid Fill OFF**
3. Press **Blower ON**
4. Press **Wetting Head ON**
5. Press **Mix Tank Mixer ON**
6. Press **Screw Feeder ON**
7. Go to **MAIN screen** and watch **Polymer Feed Time Remaining (minutes)** 5:33
8. After 5.55 minutes, go to **Manual Screen** and press **Screw Feeder OFF**
9. Press **Wetting Head OFF**
10. Press **Blower OFF**
11. Press **Rapid Fill ON**, and fill mixing tank to full level
12. Press **Rapid Fill OFF**
13. Mix for 45 minutes then press **Mixer OFF**



Example: SOP for Post-Aeration Basin Management

PURPOSE

The primary purpose of the Post-Aeration Basin is to ensure that WWTP's effluent dissolved oxygen level is maintained at a concentration of 6.5 mg/L or greater. The basin also provides an opportunity for the operations team to visually inspect the SBR effluent quality prior to the UV disinfection process.

SUMMARY

This SOP describes the process for determining the performance of the Post Aeration Basin at the current time and since the last sludge judge solids depth measurements. Field data will be collected, documented and maintained in the Basin Sludge Level Form. The raw data and visual observations will be critical in the diagnostic evaluations of the operational variables contributing to the negative impacts on the performance of the Post-Aeration Basin and threats to the Plant's effluent quality.

The following quantitative information and operations observations will be critical to supporting the diagnostic evaluations of operational variables:

- ✓ WWTP current operation mode (normal/dry weather or wet weather mode)
- ✓ Visual appearance of SBR's effluent
- ✓ Volume/rate of SBR decant cycle
- ✓ Depth of the SBR decant arm with respect to the SBR's sludge blanket during the complete decant cycle
- ✓ Visual appearance of basin without aeration
- ✓ Visual appearance of basin during aeration
- ✓ Depth of solids in the basin
- ✓ Visual appearance of basin's effluent to UV System

RELATED SOPs

Wet Weather Operations Mode SOP

Sequenced Batch Reactor SOP

Ultraviolet Disinfection Unit SOP

HEALTH AND SAFETY

Prior to the collection of sludge judge solids depth measurements, the operator shall ensure that they have the proper personal protective equipment (PPE) staged in the collection area and that PPE will be worn during the activity. The collection of sludge judge core samples and any wastewater samples will require the use of eye protection, plastic gloves, disinfectant cleaning solution and paper towels. All other applicable safety procedures and PPE should be employed as needed, including but not limited to vests, cones, lockout/tagout procedures, and other process area control procedures and equipment.

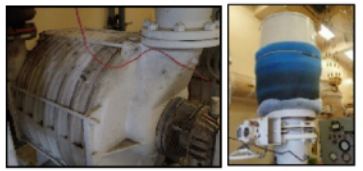
STEP No. / DESCRIPTION	VISUAL AID
1. Observe the visual water quality of the basin	**Photographs**
Observe the basin's visual quality during morning and afternoon rounds. Note the following: 1. Color and solids concentrations during both aeration and standby modes. 2. If there is any color or solids during an aeration cycle return to the basin 10 minutes after the decant cycle has been completed. Make additional observations and conduct a sludge judge profile of the basin as described on the Basin Sludge Level Form (Appendix 2). 3. Operator will follow the procedures reviewed in Step No. 2 when profiling the basin.	 Basin during an aeration cycle without solids. **Condition**: Good
2. Solids profiling of the Post Aeration Basin 1. The basin should be profiled for solids accumulation on a regular basis. The WWTP team will use the Basin Sludge Level Form (Appendix 2). 2. The basin will be profiled at least 3 times a week even if color and/or solids are not observed.	 Basin during an aeration cycle with approximately 8 inches of settled solids accumulation in basin **Condition**: Poor

Condition Rating	Criteria	Comments/Actions
Good	No sludge judge measurable solids in the basin. SBR effluent is free of visible and measure solids. Post-Aeration Basin effluent is free of visible and measure solids.	No action required.
Average	Measurable amount (up to 1”) of solids found during sludge judge profiling, not impacting effluent quality. SBR effluent has a faint shade of color. Effluent from basin to UV disinfection clear.	No action required.
Fair	Measurable amount (1” to 3”) of solids, starting to impact effluent quality, water quality still in compliance. Some floating solids observed after aeration cycle has been completed. SBR effluent has color and is changing the color in the Post-Aeration Basin. Effluent from basin to UV disinfection has a light color. Solids can be seen in the effluent at times.	Implement additional monitoring. Confirm effluent quality with respect to permit limitations. Formally review recent stresses to the SBRs, try to identify peak hourly flow period. Document length of Wet Weather event operations. Evaluate solids removal scheduling. Ensure that
Poor	Measurable amount (> 3”) of solids, impacting effluent quality, water quality compliance is threatened. Floating solids observed after aeration cycle has been completed. SBR effluent has dark color and is changing the color in the Post-Aeration Basin. Effluent from basin to UV disinfection has a dark color. A large volume of solids can be seen in the effluent. The effluent is not clear. Disinfection process may be threatened. Permitted effluent quality is threatened.	Have solids removed from basin immediately. Implement additional monitoring. Confirm effluent quality with respect to permit limitations. Formally review recent stresses to the SBRs, try to identify peak hourly flow period. Document length of Wet Weather or operational event identified as the stress to operations. Modify operating and maintenance schedules so that solids are removed prior to threatening permit compliance.

Example: SOP for Asset Risk Assessment

Formalized Guidance and
Standard Operating Procedures

- Incorporated separate guidance to educate why the SOPs are needed and how they were developed.
  - How does the utility define an asset?
  - Condition assessment criteria
  - Considerations for determining the potential and consequence of failure (i.e., POF and COF)
  - Estimating useful life
- Photos, images, and examples from the utility
- SOPs were designed to be detached from the guidance and carried in the field

STEP No. / DESCRIPTION	VISUAL AID
1. Determine whether the item is an asset	**Picture**
When considering whether to classify an item as an asset, a supply, or something else, one should answer the following questions: 1. Does it have value for the organization? 2. Is it managed (i.e., is routine and/or corrective maintenance performed on it, or would it just be discarded and replaced)? 3. Would it cost more than $1,000 to $2,000 to replace? (Additional consideration can be made for lower cost items that occur in large quantities, such that collectively, the total value is significant.) If the answer to all three questions is yes, it is an asset.	
2. Determine the number of sub-assets (if applicable)	**Example Parent–Child Relationship**
In many cases, it will be appropriate to break an asset into smaller units, or sub-assets (i.e., a parent – child relationship). A sub-asset, or child asset, is one that fits the following conditions: 1. It is managed separately from the parent asset. 2. It is or can be replaced separately from the rest of the parent asset. 3. The component in question cannot be classified as a supply (something that is discarded when it malfunctions or wears out and replaced without much thought. 4. Appropriate level of detail (enough assets to enable work orders to be written effectively without being too much of a burden to manage the information) 5. In general, costs more than $1,000 to $2,000 to replace. (Additional consideration can be made for lower cost items that occur in large quantities, such that collectively, the total value is significant.)	**Parent Asset**: Headworks Blower  **Child Asset 1**: Blower Motor  **Child Asset 2**: Blower Unit with Filter (filter considered a supply not an asset)  **Child Asset 3**: Blower Controls 

3. Assess Asset Condition	Example Condition Ratings

For assets that can be seen in the field without risking harm to those making the assessment, assess the condition while looking at the asset. Use the following rating scale:

Condition Rating	Criteria
Excellent	– Performs like new. – No identifiable problems. – No visible wear.
Good	– Is an efficient asset. – Could have a minor defect, but not one affecting performance. – Wear less than 15%.
Average	Minor defects, some that affect performance. – Shows some wear and tear (16 - 25% wear).
Fair	– Major and minor defects, some or most affecting performance. – Shows wear and tear (26% - 50%). Getting close to end of useful life.
Poor	– Major defects, most or all affecting performance. – Shows major wear and tear (greater than 50%). – At or near the end of its useful life. – Should be replaced. – May require constant maintenance or operational interventions.

Documented data and records, such as work orders and inspection reports, can be used to supplement the field information. For assets that cannot be seen (e.g., collection system pipes), use historical data and personnel experiences to help in rating the condition.

Pua Pump Station Discharge Valve
Condition: Good

Hilo WWTP Headworks Blower No. 1 Motor
Condition: Average

Hilo WWTP Biotower Pump No. 1
Condition: Fair

Kealakehe Pump Station Pump No. 2 Check Valve
Condition: Poor

4. Estimate the useful life remaining

To estimate the useful life remaining for an asset or sub-asset, think about what that asset or type of asset is expected to do. Consider all you know about the asset (e.g., how the asset has performed, whether and what type of maintenance has been completed, history of repairs, past experience with assets of this type) and estimate how much longer the asset can continue to do what it is supposed to do. Provide the useful life estimate in terms of years of life remaining.

Example Useful Life Estimates

Pua Pump Station Discharge Valve No. 1
Useful Life Remaining: 8 yrs.

Hilo WWTP Headworks Blower No. 1 Motor
Useful Life Remaining: 3 yrs.

Hilo WWTP Biotower Pump No. 1
Useful Life Remaining: 1 yr.

Kealakehe Pump Station Pump No. 2 Check Valve
Useful Life Remaining: 1 yr.

5. Determine Probability of Failure (POF)

Recall that there are four major failure modes of an asset:

- Mortality
- Level of Service
- Financial Inefficiency
- Capacity

While evaluating each asset, consider all failure modes and which failure mode is likely to dominate. Rank the probability that the asset will fail from 1 to 5, with 1 being least likely, and 5 being most likely. Use the table below for guidance.

POF Factor	Criteria
1	Asset is brand new or like new.
2	Asset is not brand new but shows no more than cosmetic signs of wear and tear.
3	Asset shows signs of operational or physical decline but has not yet entered a potential failure state. Asset may show light to moderate rust, some light to moderate wear and tear, be nearing but not at physical capacity.
4	Asset is in potential failure—showing signs of failure, such as cracks, root intrusions, I/I, vibration, noise, excessive rust—but is still delivering all or most of the required service (i.e., not in functional failure mode). Functional failure not expected within the next year, but within the next few years.
5	Asset is already in failure mode (Level of Service, Mortality, Financial, Capacity) or expected to fail within 1 year.

Example POF Ratings

Pua Pump Station Discharge Valve No. 1
POF: 1

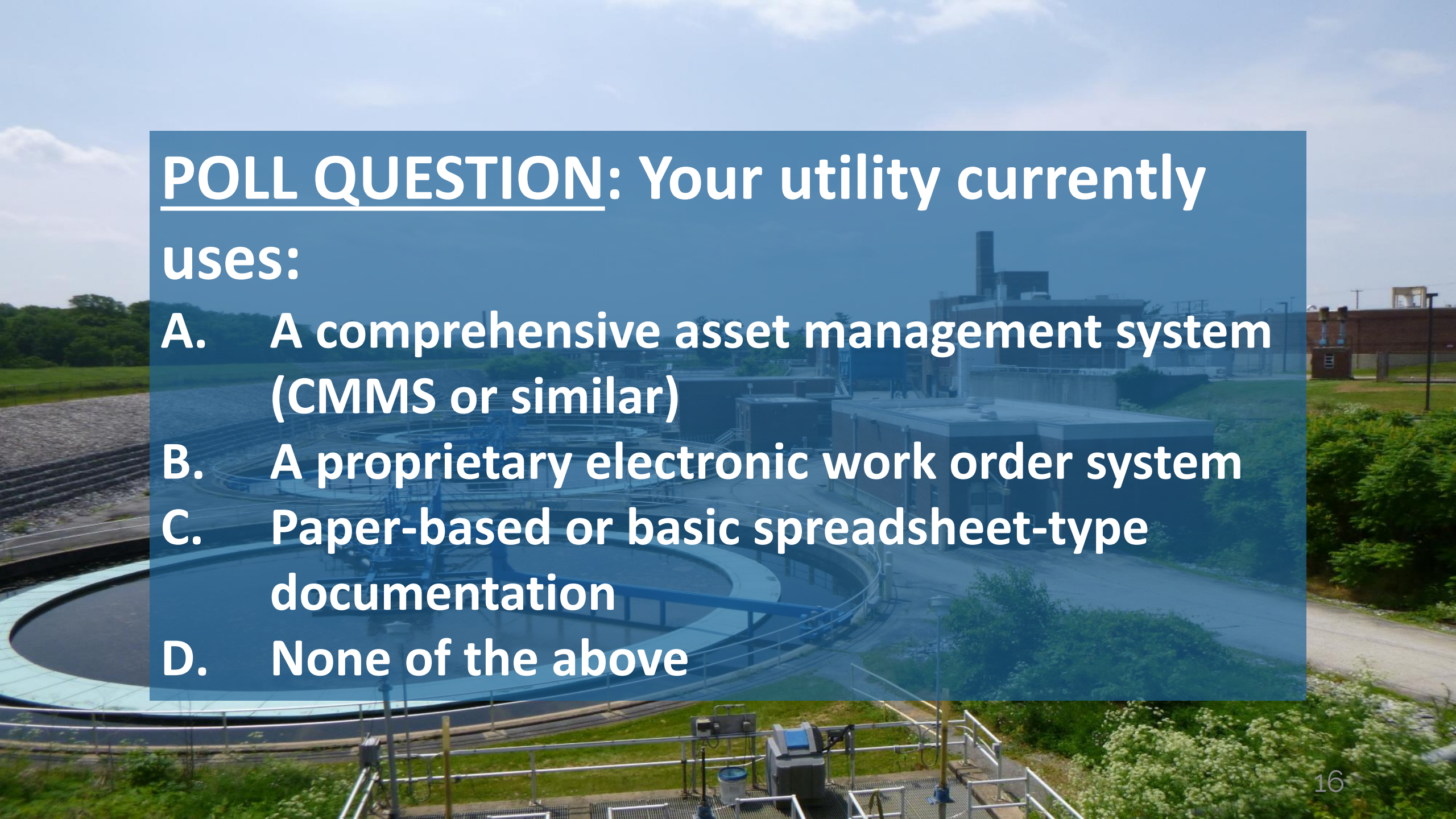
Hilo WWTP Headworks Blower No. 1 Motor
POF: 2

Hilo WWTP Headworks Blower Electrical Controls
POF: 3

Hilo WWTP Biotower Pump No. 1
POF: 4

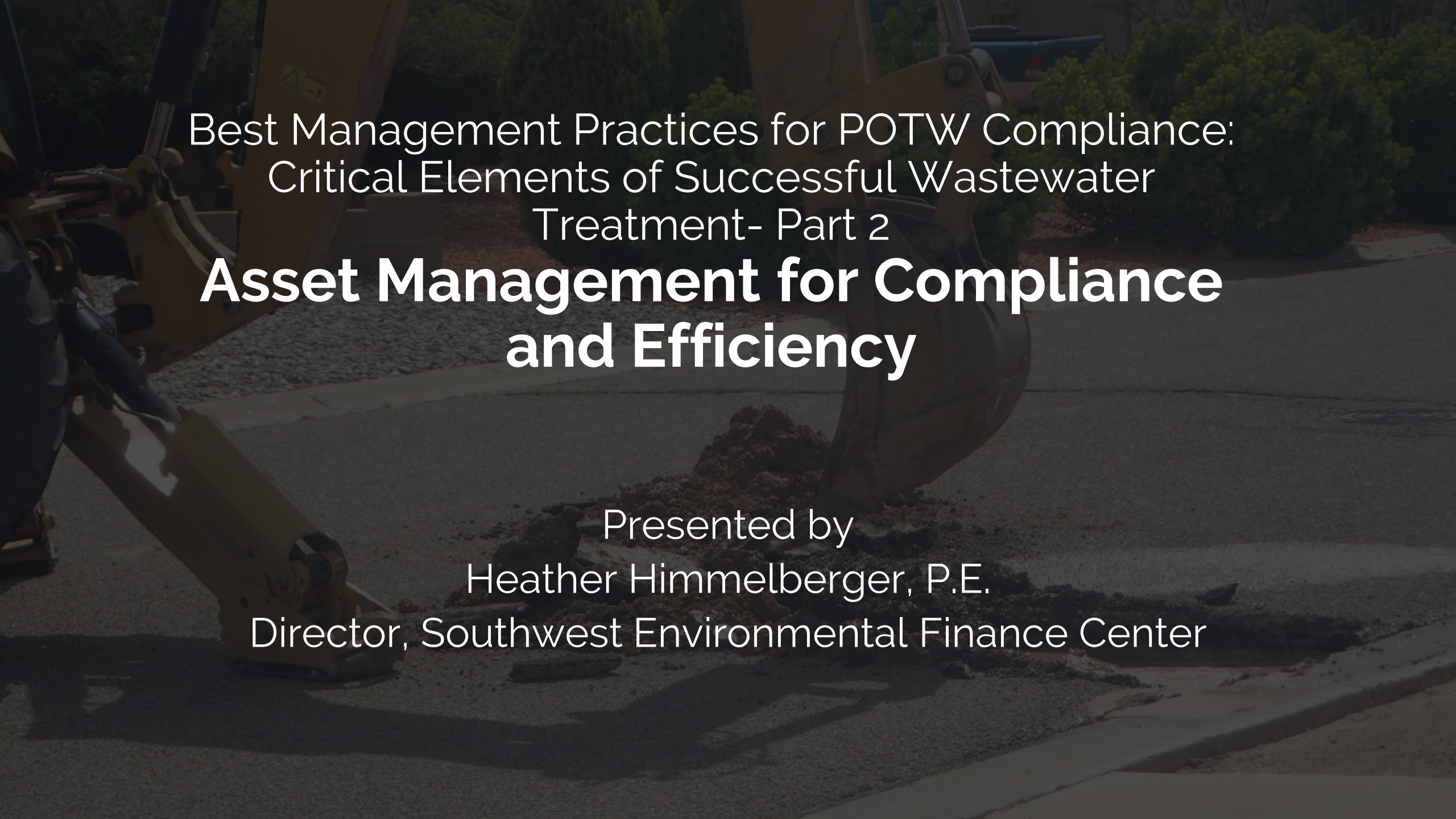
Kealakehe Sewage Pump Station – Pump No. 2
POF: 5


Questions



POLL QUESTION: Your utility currently uses:

A. A comprehensive asset management system (CMMS or similar)
B. A proprietary electronic work order system
C. Paper-based or basic spreadsheet-type documentation
D. None of the above

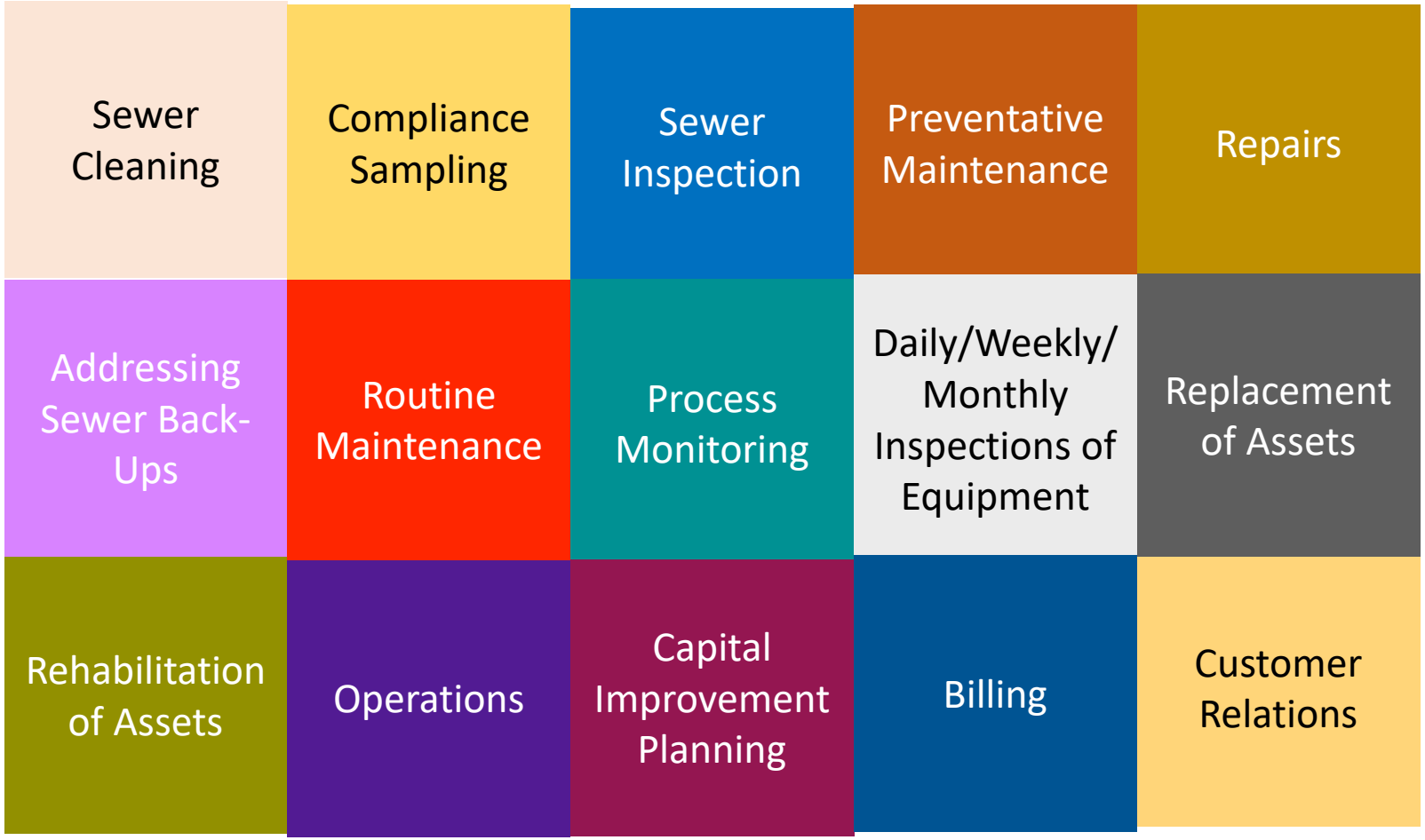


Best Management Practices for POTW Compliance: Critical Elements of Successful Wastewater Treatment- Part 2

Asset Management for Compliance and Efficiency

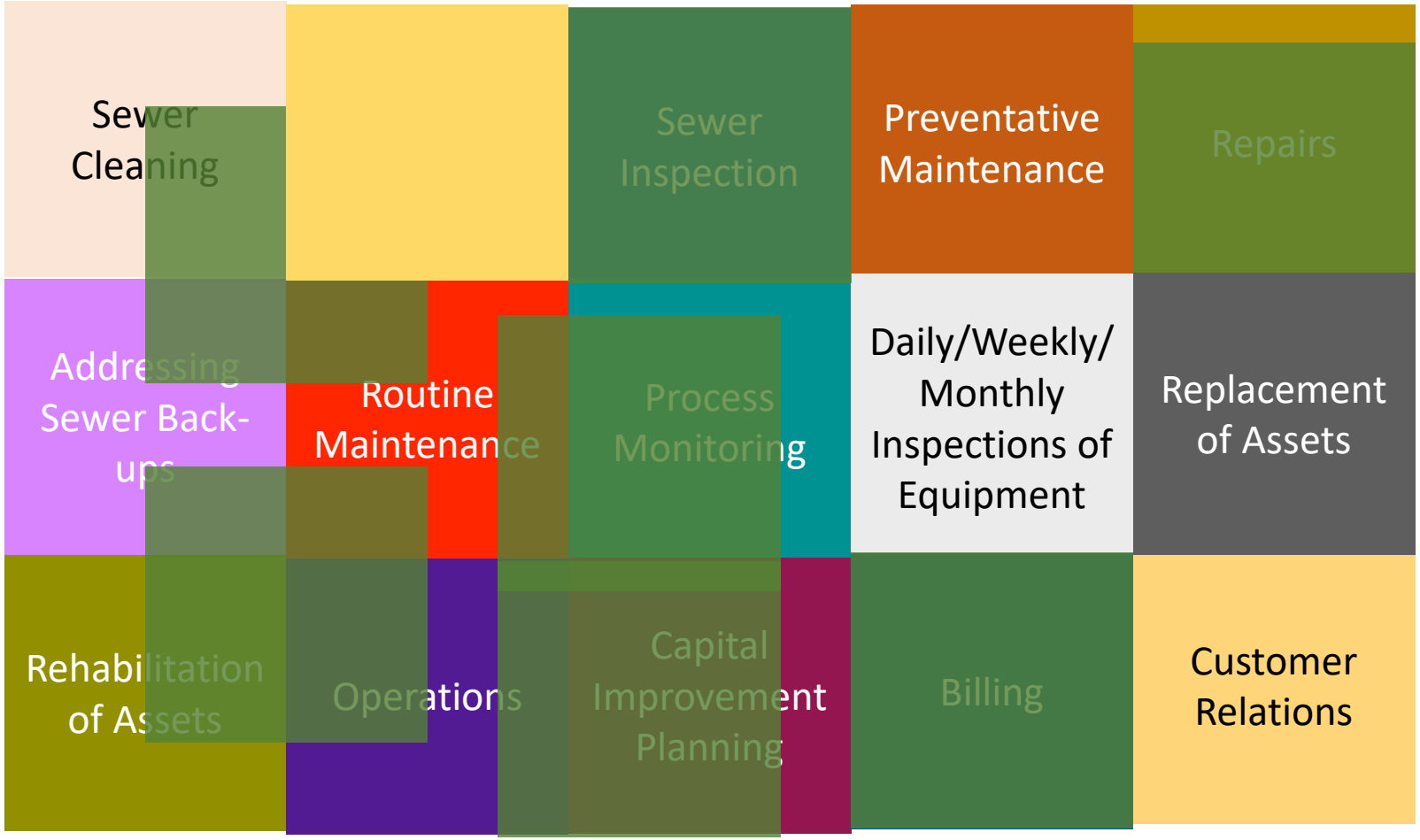
Presented by
Heather Himmelberger, P.E.
Director, Southwest Environmental Finance Center

Resources (money & time) Available



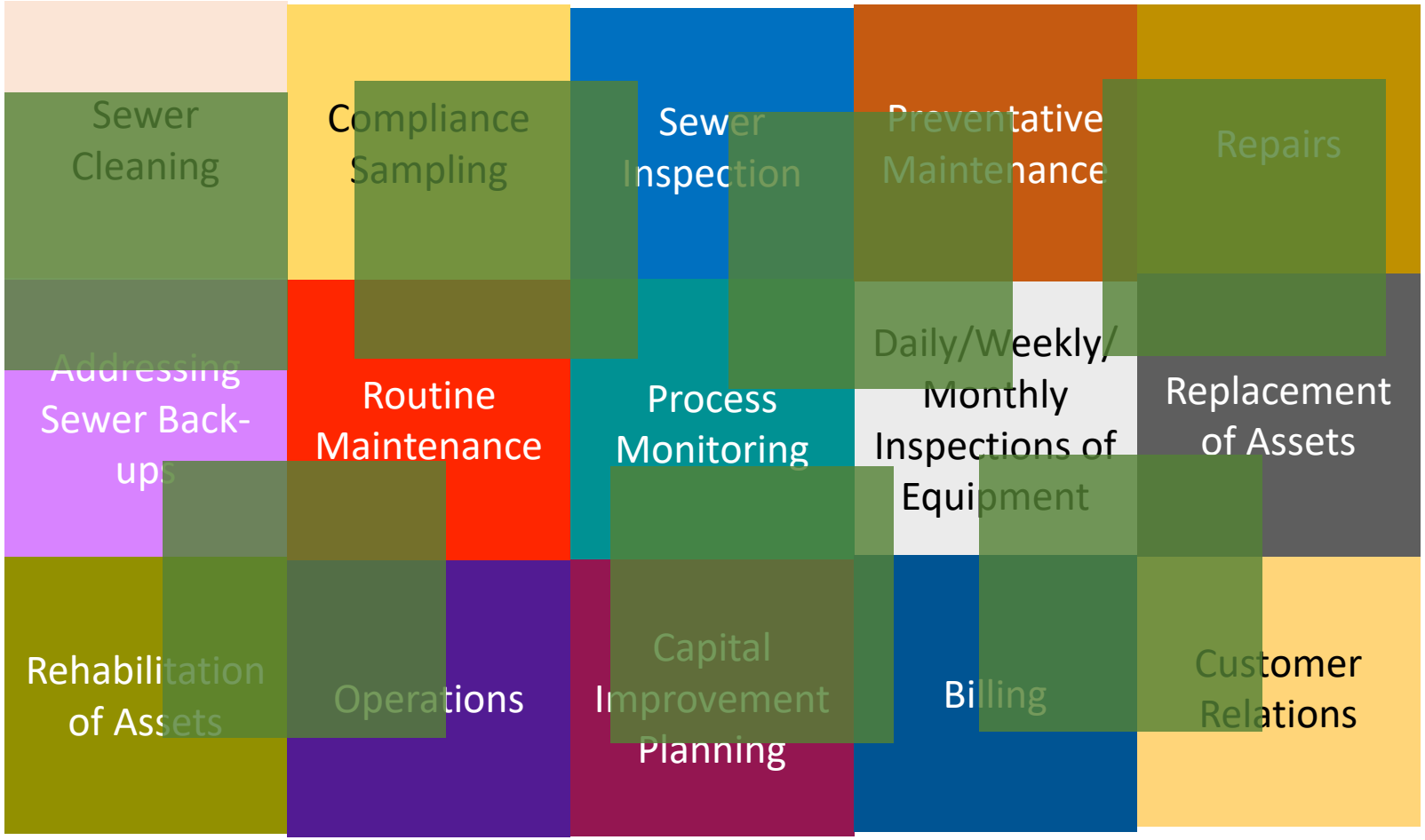
Typical Situation

Resources (money & time) Available



So what happens?

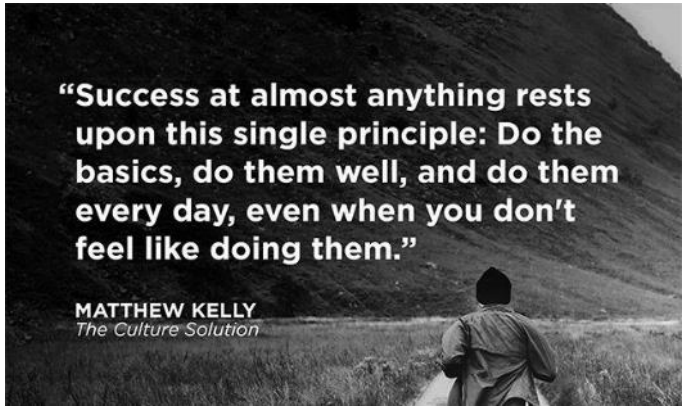
Resources (money & time) Available

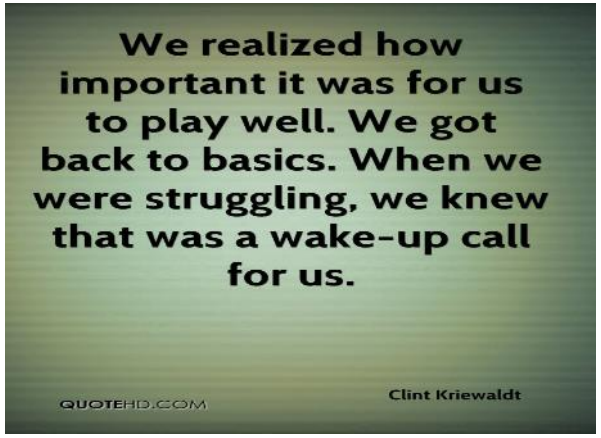


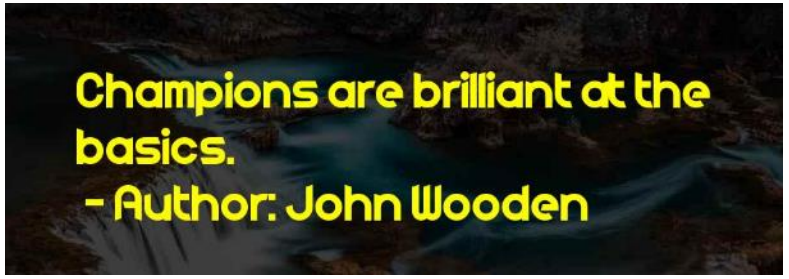
What we really need is a better way to make these hard decisions

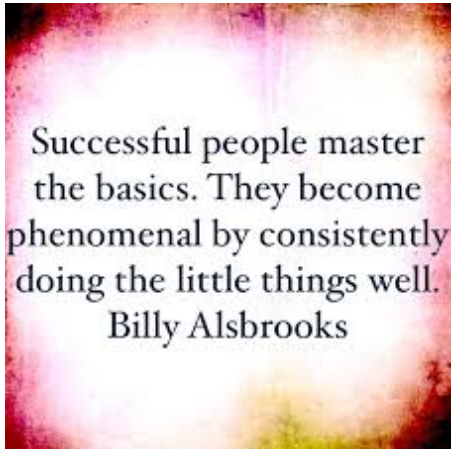
Asset Management provides that better way

Google's Secret Formula for Management? Doing the Basics Well









It helps you do the basic functions well

To improve compliance & efficiency

What are the most important basics?

Protect Public Health

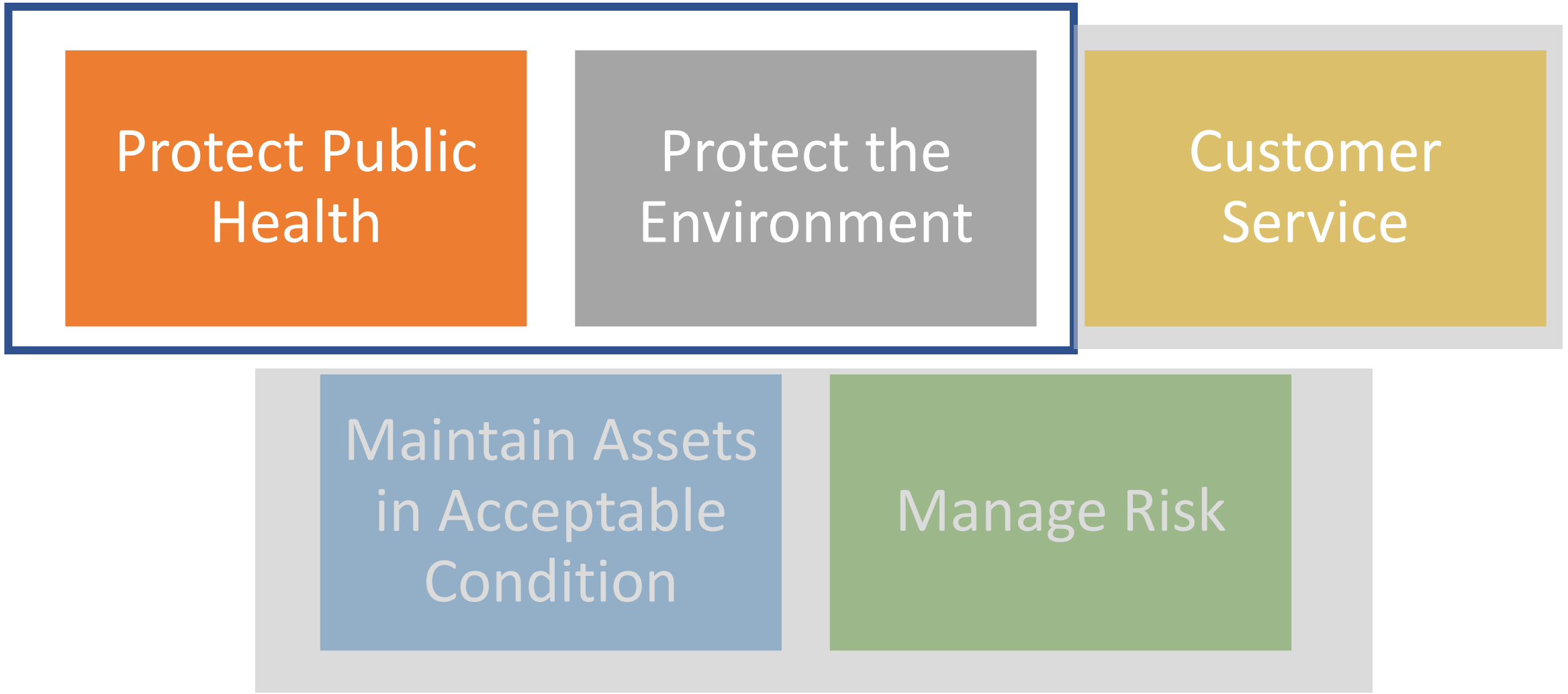
Protect the Environment

Customer Service

Maintain Assets in Acceptable Condition

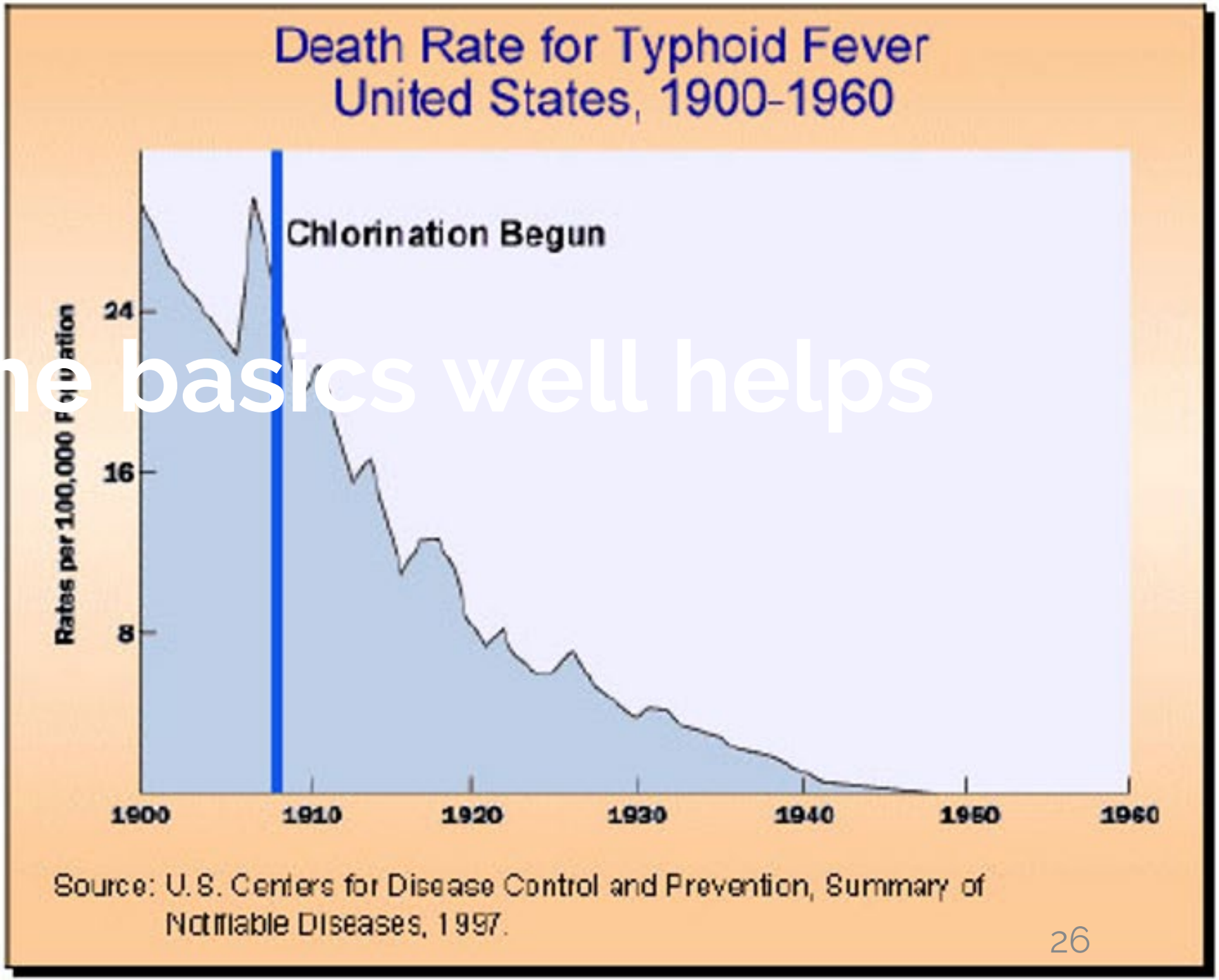
Manage Risk

Where does compliance fit in?

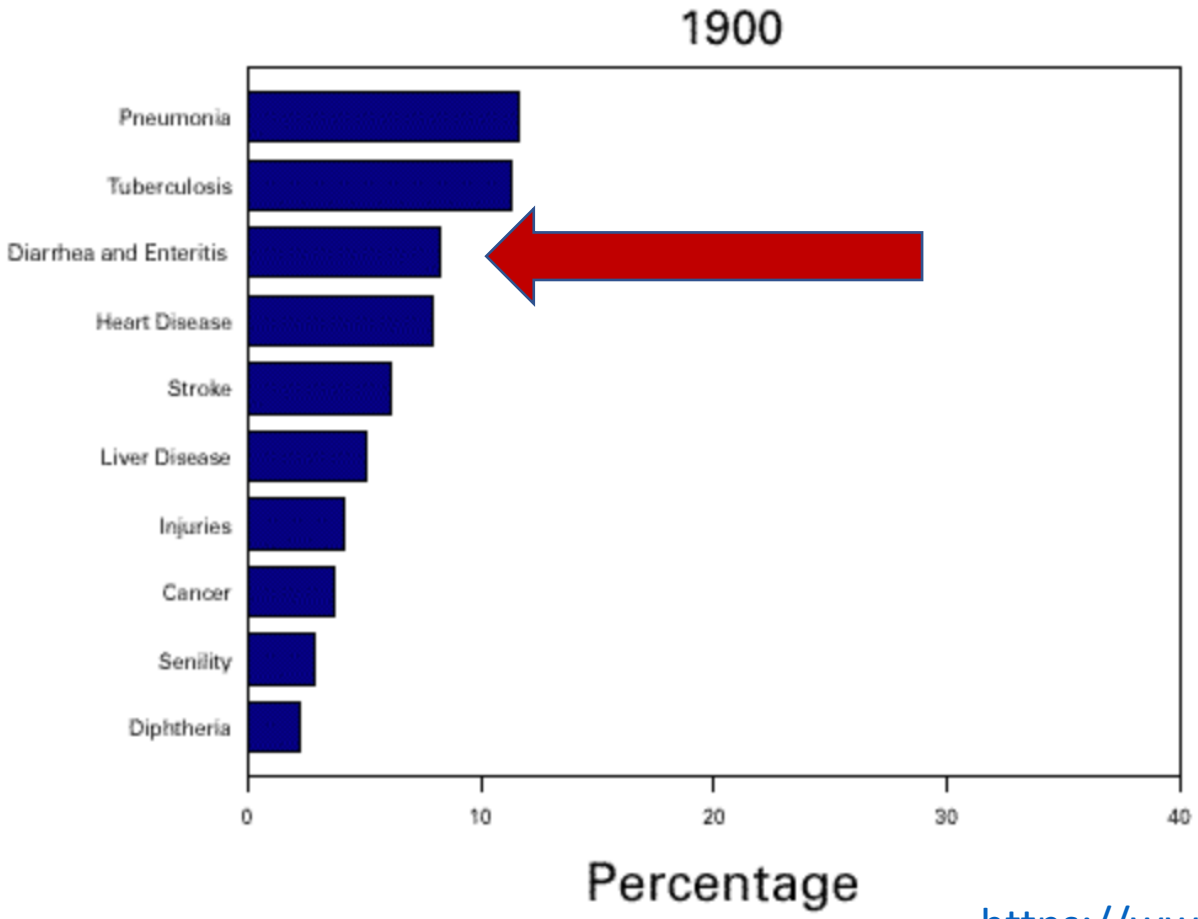


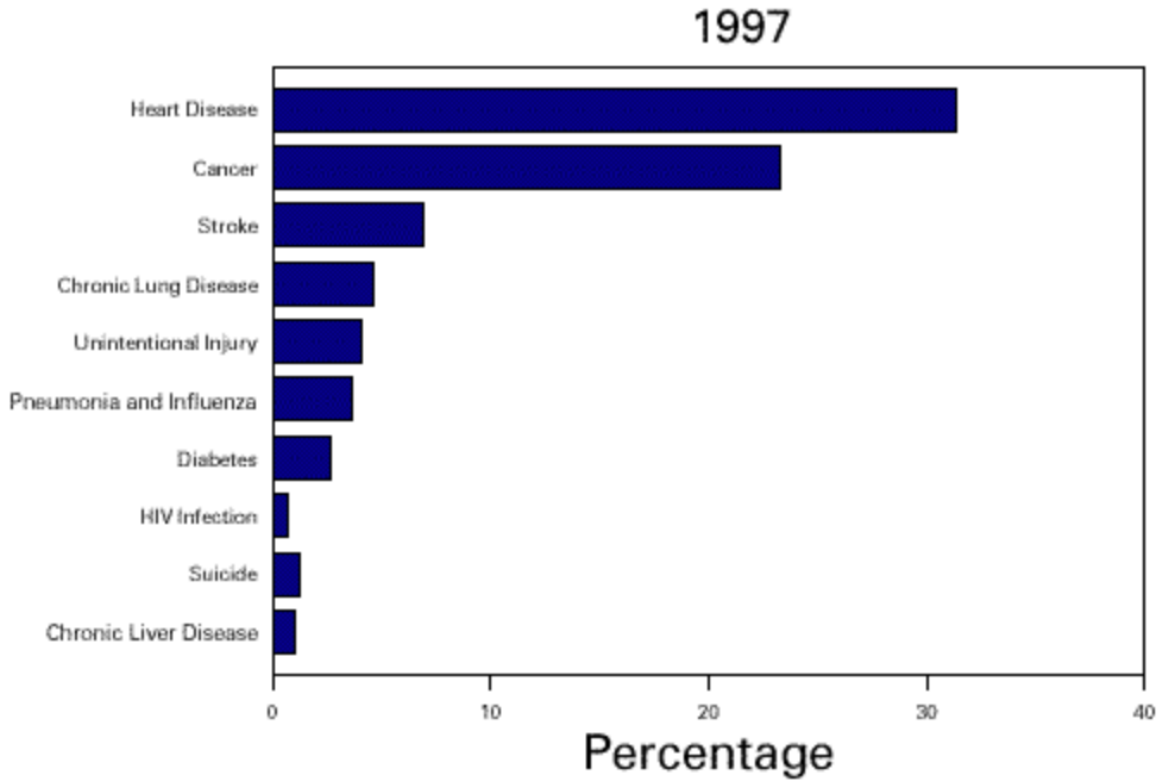
The purpose of regulations and compliance with regulations is to protect public health and the environment

Why?



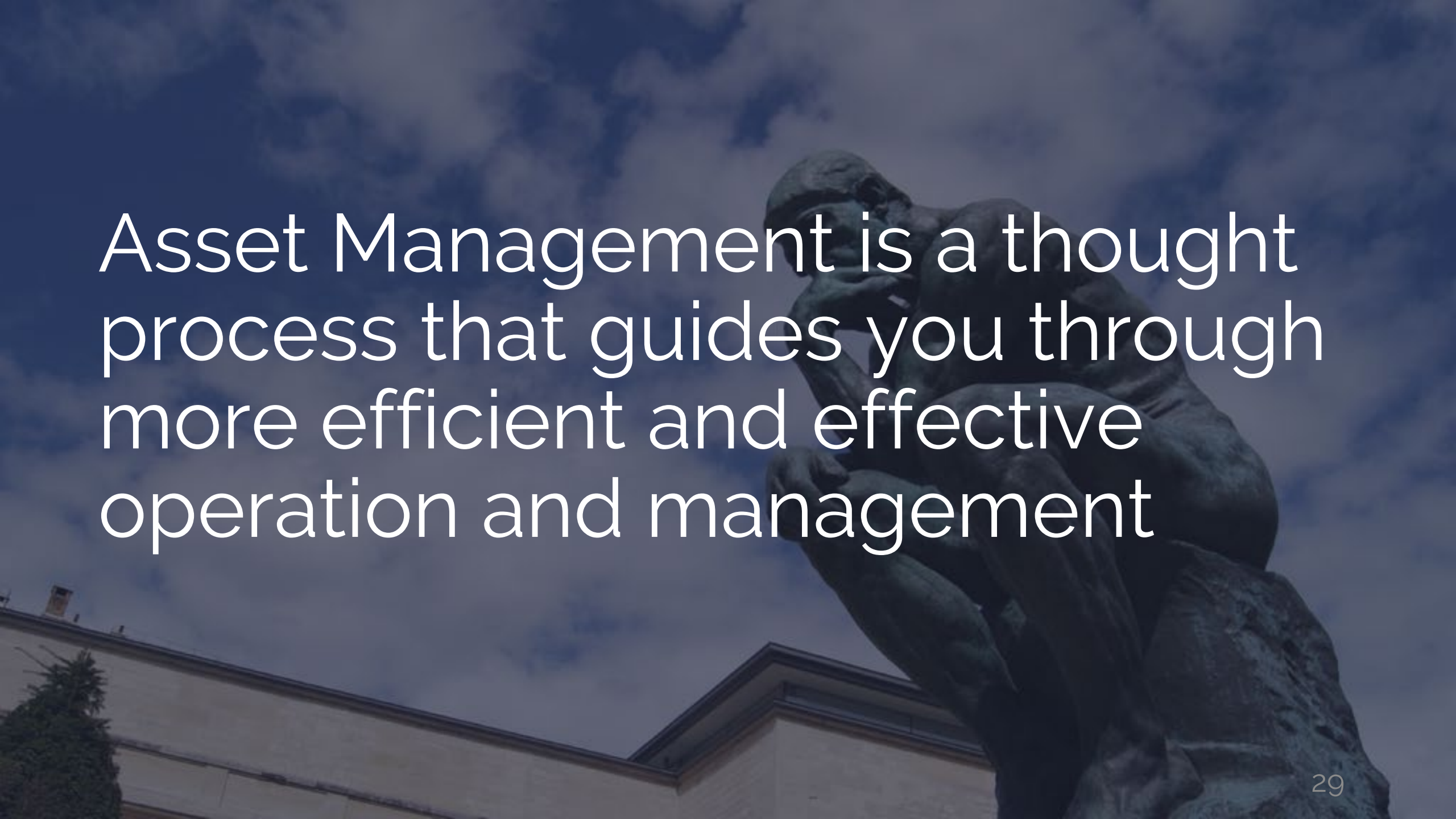
CDC Data: Leading Causes of Death 1900 and 1997





https://www.cdc.gov/mmwr/preview/mmwrhtml/mm4829a1.htm


If we believe compliance is important, how can Asset Management help?



Asset Management is a thought process that guides you through more efficient and effective operation and management

Asset Management

is designed to help you decide the best way to spend your limited resources (time and money) to have the best outcomes (to do the basics well to meet the needs of customers)

It includes 5 Major Components

What assets do you have?

Which ones are most critical to doing that?

Do you have the money to get it all done?

What do you want them to do?

How do you ensure the assets do their job over their life spans?

The Category Names

Current State of the Assets

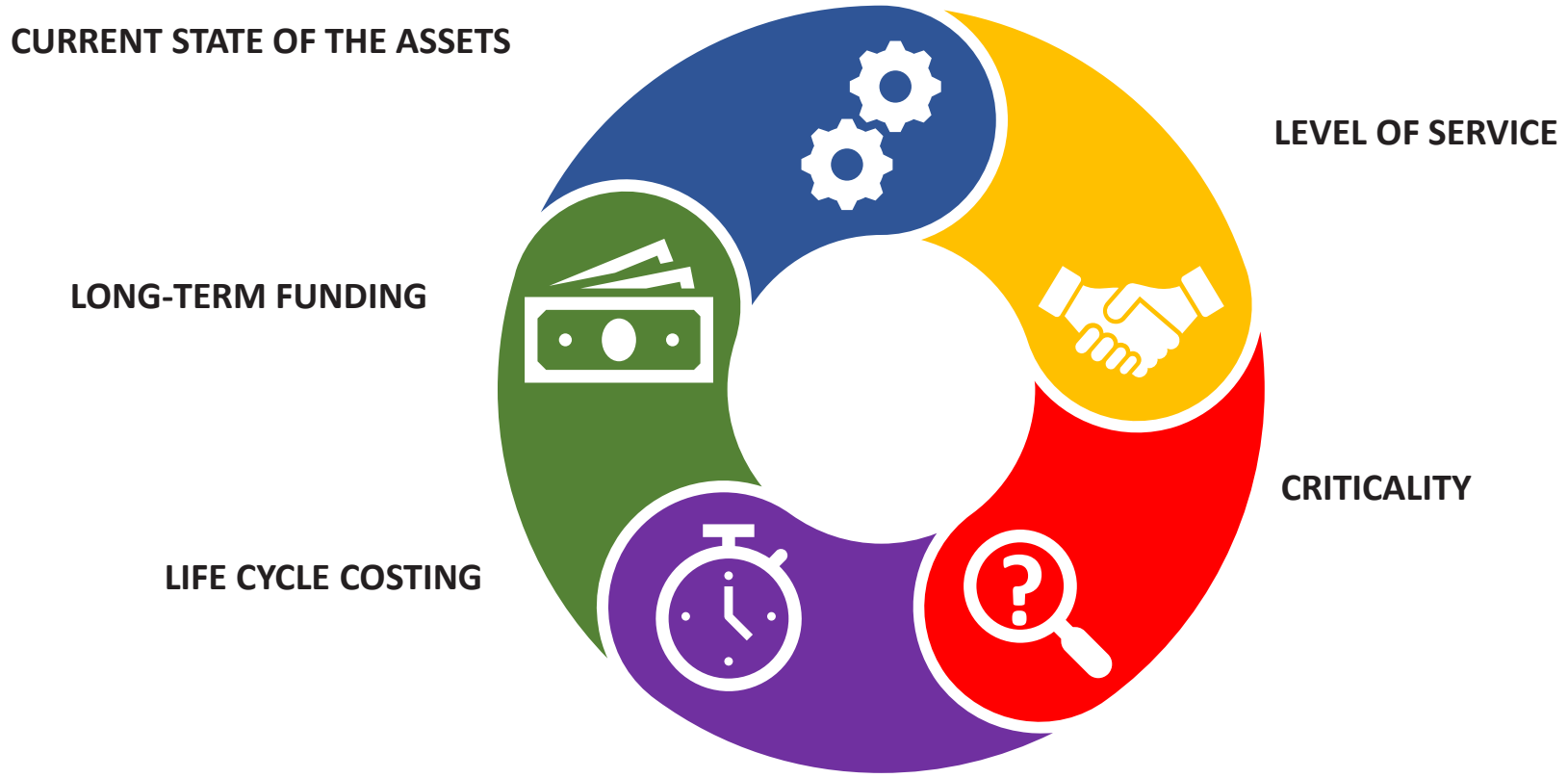
Criticality

Long-Term Funding

Level of Service

Life Cycle Costing

Asset Management Is Not Actually Linear



AM doesn’t have a beginning or end

Your utility starts wherever it is. You aren’t responsible for the past and can’t change it

Use the past as a learning opportunity

AM is a JOURNEY not a destination

Move forward from wherever you are

Continue the practice on into the future


Let's dig a
little deeper

Current State of the Assets

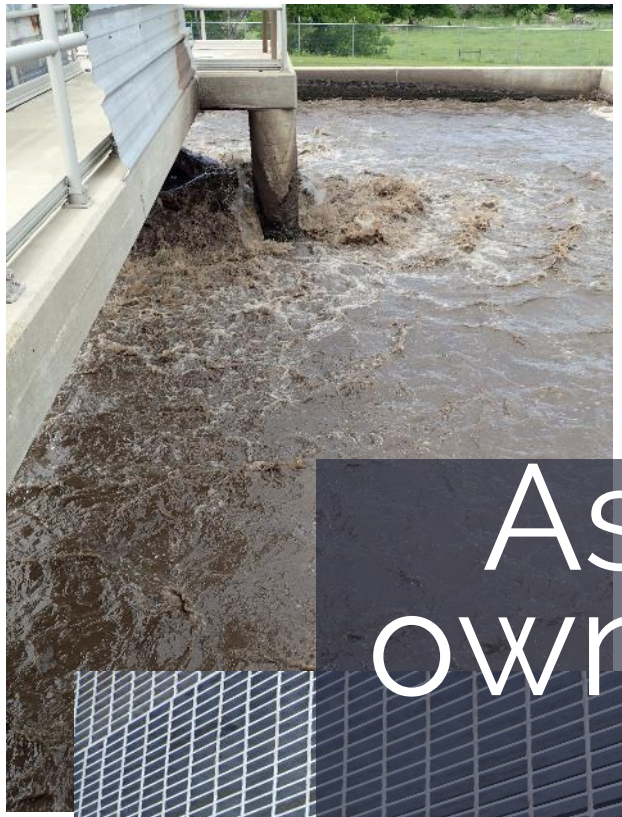
Current State of the Assets is the **foundation** upon which **everything else** is built.

Answers the Basic Questions...

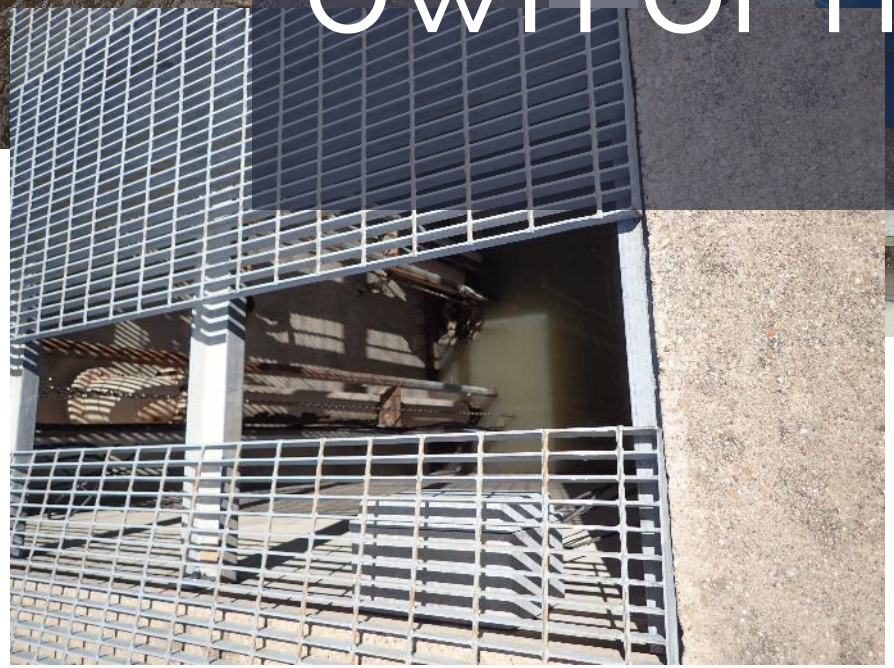
What assets do I have?

Where are they located?

What do I need to know about them?

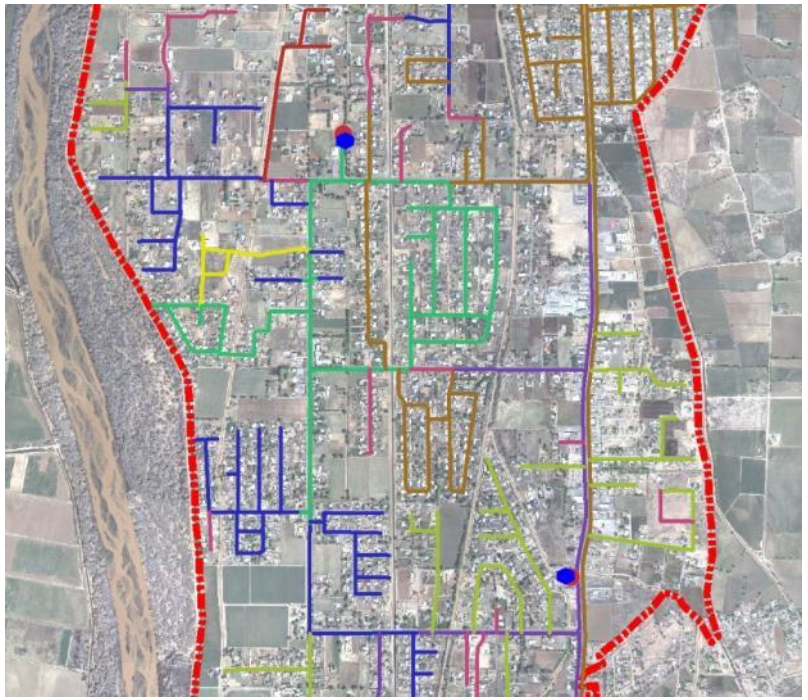


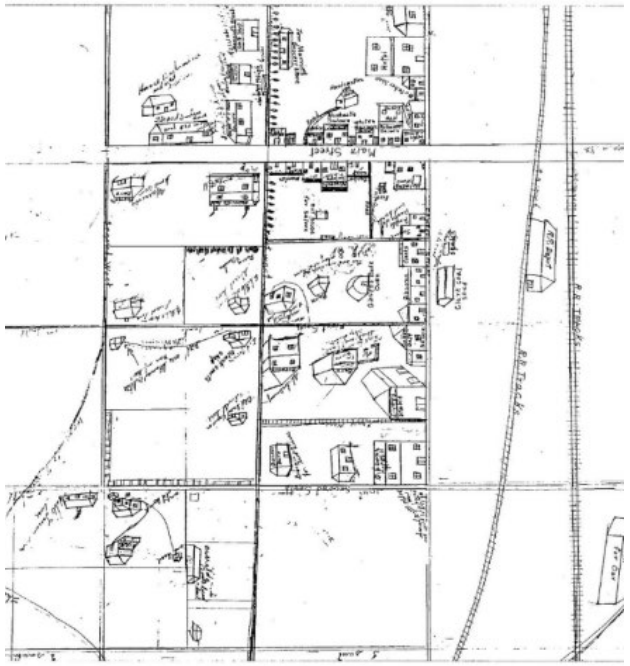
Assets: Anything you own or manage that has value

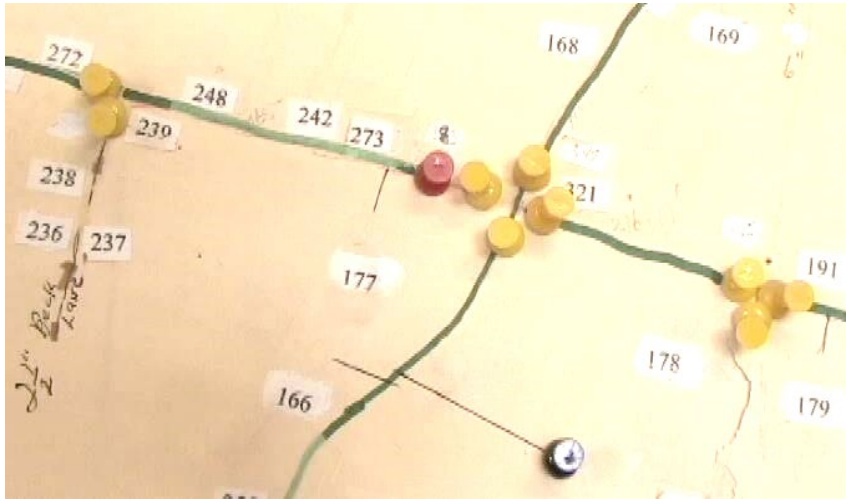



Location: GPS, Street Address, Description

Collect field data





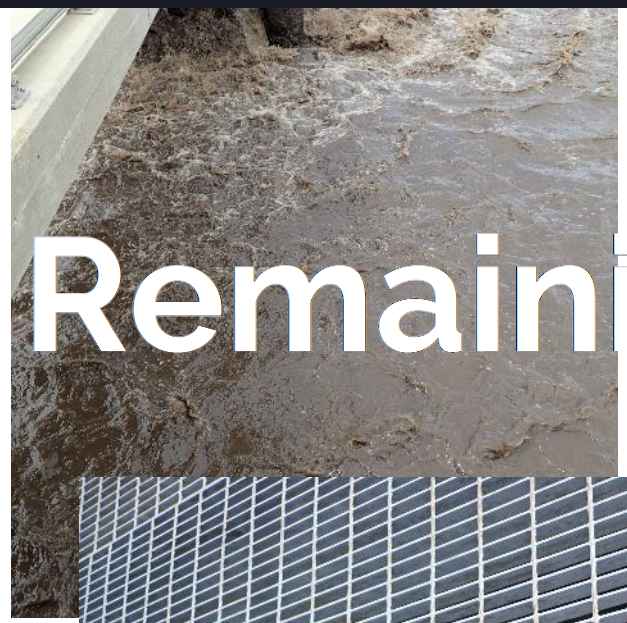


MAKE A MAPS

ALL TYPES OF MAPS CAN BE USEFUL. DOESN'T HAVE TO BE AN ELECTRONIC MAP.

One use of a map: Creating a Legacy

Asset Name and ID



Condition

Remaining useful life

Replacement Cost

Anything Else You Want to Know

Maintenance Records

Operational status

Size or Volume

Manufacturer

Warranty Status

Supplier Contact Info

Records

WATER & SEWER LEAK CALL LOG

WA/SE	DATE	TIME	ADDRESS	USER	CALLED	NOTES	UPDATES	WORK TICKET #
WA	2/9/2016	10:38AM	OLD HILLSIDE NURSING HOME	BH	RM	FIRE HYDRANT RUNNING	CREW WORKING ON LINE PER RM @ 10:50AM	48674
STREET	2/9/2016	11:24AM	1008 PLEASANT	DD	RM	LEAK IN THE STREET	FIXED	48642
SE	2/10/2016	10:00AM	400 FINNIMORE	BH	RM	SEWER BACKED UP AT STREET	UNCLOGGED	48683
WA	2/10/2016	10:00AM	3502 RIVER ROAD	BH	RM	A CAR HIT THE FIRE HYDRANT	FIXED DA/CN 2-22-16	48644
WA	2/10/2016	10:00AM	CORNER OR 22ND AND WACO	BH	RM	LEAK FILLING UP CULVERT		
SE	2/10/2016	10:36AM	2015 WACO STREET	DD	RM	RAW SEWER SHOOTING UP IN AIR FROM CLEAN OUT	UNCLOGGED	48684
WA	2/10/2016	3:15PM	1105 S LOVE LANE	BH	RM		FIXED	48647
WA	2/10/2016	3:30PM	206 FIELDSTONE			[illegible] OVER BROKE	FIXED	48648
WA	2/10/2016	3:32PM	119 N 28 ST	BH	RM	LEAK @ METER	FIXD	48649
WA	2/10/2016	3:57PM	119 N 28 ST	BH	RM	CUSTOMER CALLED AGAIN AND SAID METER LEAK WAS VERY LARGE. CALLED RODNEY TO LET HIM KNOW	FIXED	48649
WA	2/11/2016	9:00AM	28TH AND MEARS	BH	RM	WATER SHOOTING OUT OF MANHOLE	FIXED	48687
WA	2/11/2016	9:00AM	BLESSINGS BUILDING	BH	RM	WATER LEAK BEHIND BUILDING	FIXED	48671
SE	2/11/2016	9:53A	102 1/2 SURRY 300A	DD	RM	CALLED LAST NIGHT AT 8 AND THEY TURNED OFF WATER BUT THEN	SEWER STOP UP FIXED	48685
SE	2/11/2016	11:01AM	409 PARK	DD	RM	SEWER BACKING UP BUT SAID THEY NEED TO PUMP BOTH SIDES. WHEN	FIXED	48686
WA	2/16/2016	11:20AM	601 S. 14TH ST.	KS	RM	WANTS TO KNOW IF THERE IS A METER IN PLACE OR IF HE NEEDS TO GET ONE INSTALLED	01/16/2016 11:20:00 AM THERE IS AN EXISTING WATER LINE THERE, WILL INSTALL METER WHEN THEY ARE READY	48659/48676
NA	2/16/2016	1:30PM	9TH STREET BETWEEN 8TH AND LUTTERLOH	BH	RM	WATER LEAK	IT IS NOT A LEAK 02-17-16	48654

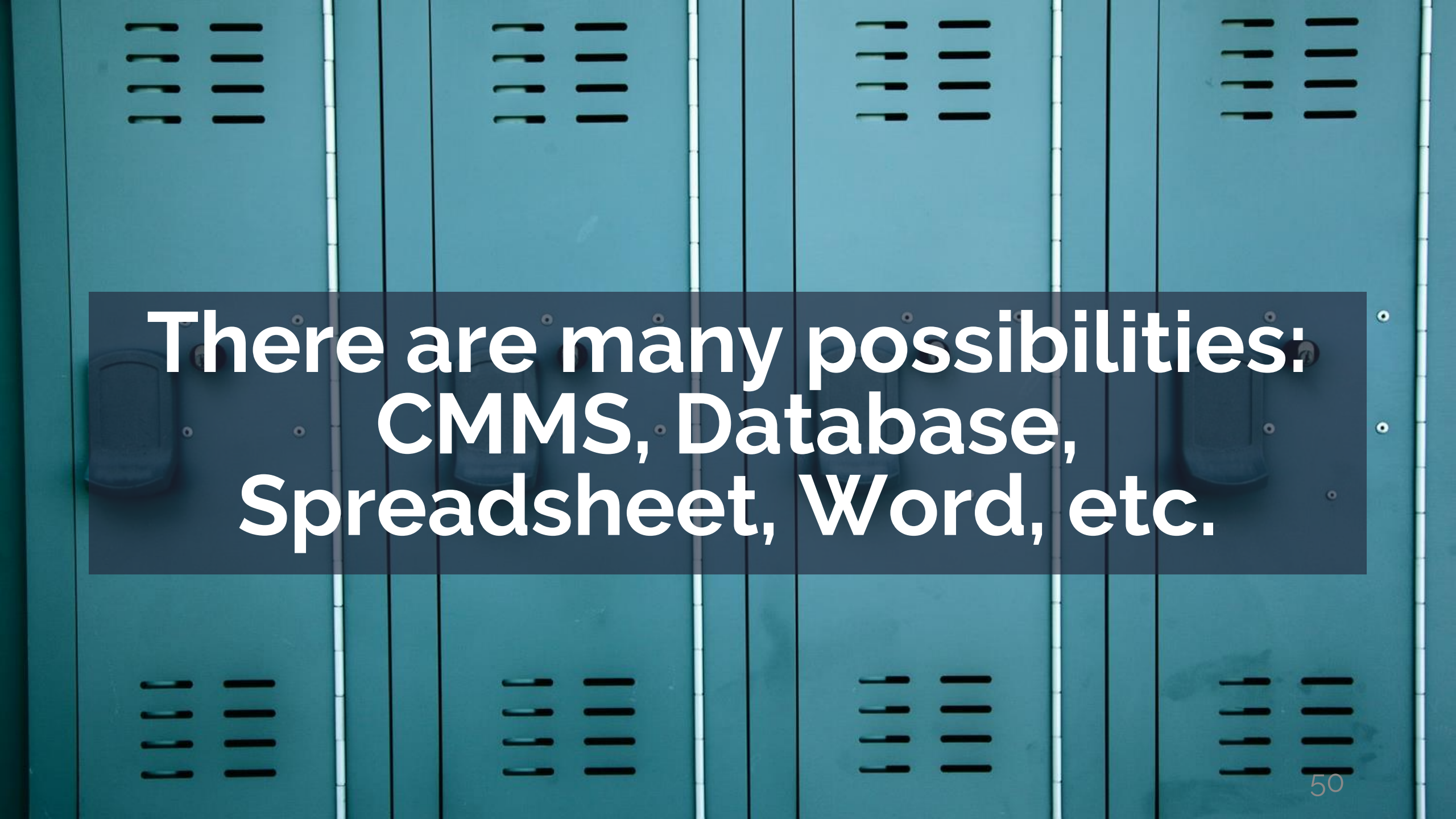
Pictures

Video

Notes

Collect all the data into an Asset Inventory


Where can you store your asset data?


There are many possibilities:
CMMS, Database,
Spreadsheet, Word, etc.

Level of Service

A wastewater system is first and foremost a customer service business


Level of Service is a chance to have a conversation with customers.
Conversations

Level of Service is directly related to cost

higher levels of service = higher costs
lower levels of service = lower costs

Level of Service sets the overall policies, goals and procedures for the organization.

It puts everyone on the same page…

Desired Characteristics of Levels of Service Goals

Meaningful	Relevant to staff and stakeholders Provides a clear picture of performance
Measurable	Can be measured in a cost-effective manner Expressed as a qualitative or quantitative measure
Consistent	Consistent with industry practice Measurement is reproducible by others
Useful	Helps manage the utility Encourages improvement
Unique	Describes a specific attribute of utility services or activities Independent of other levels of service

Goals can be internal….

Meaning they are relevant primarily to internal staff (operators, managers)

Types of goals: System Maintenance, Employee Safety, Energy Management

Goals can be external….

Meaning they are also relevant to elected leaders and customers.

Types of goals: Public Health & Safety, Customer Service, Response Time

Having goals won't help if we can't or don't measure them….

CONSIDER HOW GOALS CHANGE YOUR OPERATION AND MANAGEMENT

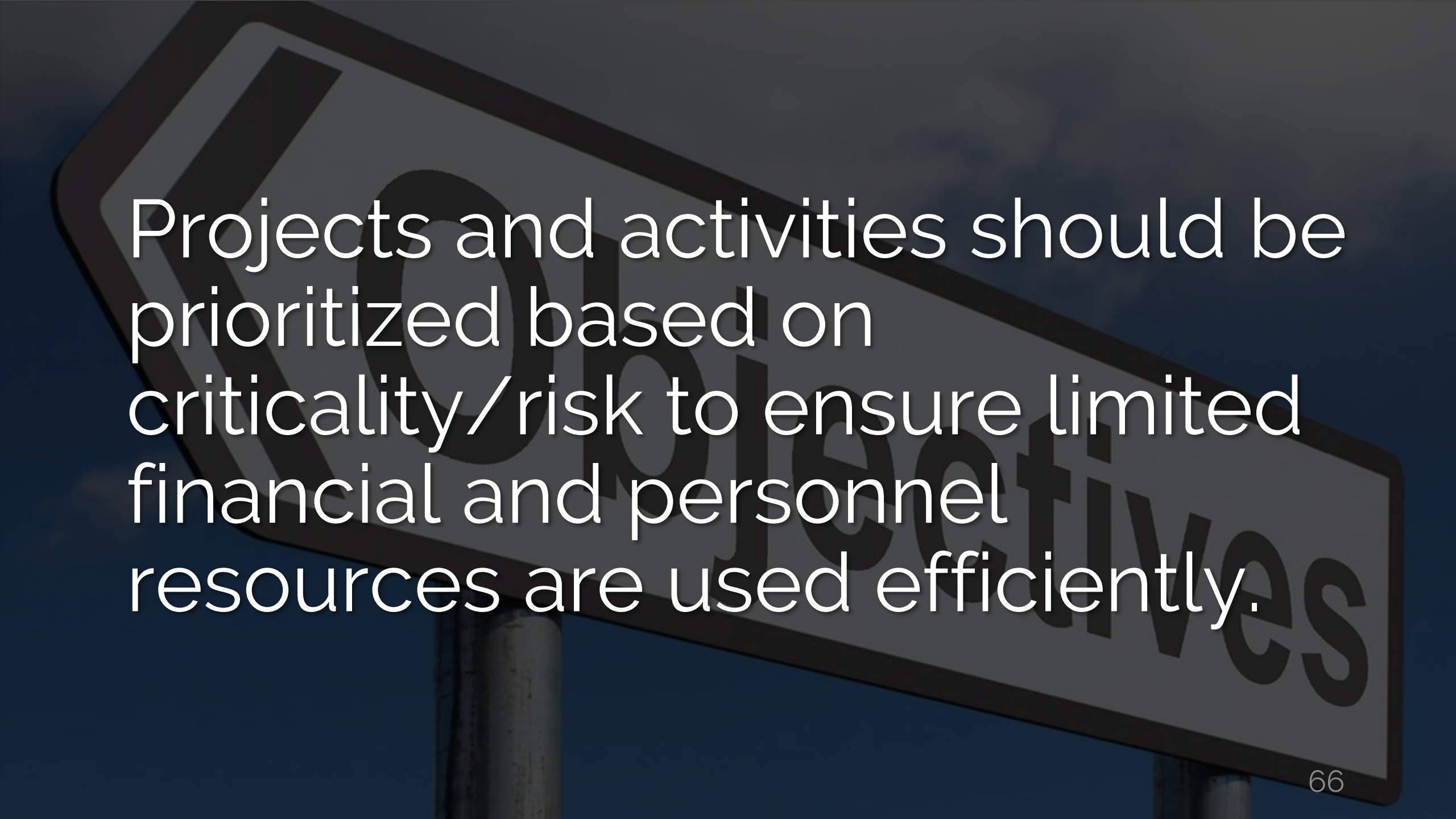
Goals are not set in stone…

They can be changed, adjusted over time and added or removed

Criticality

Risk Analysis


Criticality is the heart and soul of asset management



Projects and activities should be prioritized based on criticality/risk to ensure limited financial and personnel resources are used efficiently.


Probability
of Failure
Consequence
of Failure

What is the likelihood a given asset will fail?

No single cause should be the sole predictor…

Most Common Factors to Consider

- Condition of the Assets
- Remaining Useful Life
- Historical Knowledge
- Repair History
- Operation and Maintenance History

PoF Rankings from 1 to 5

1	Extremely low probability of failure
2	Low probability of failure
3	Average probability of failure
4	High probability of failure
5	Extremely high probability of failure

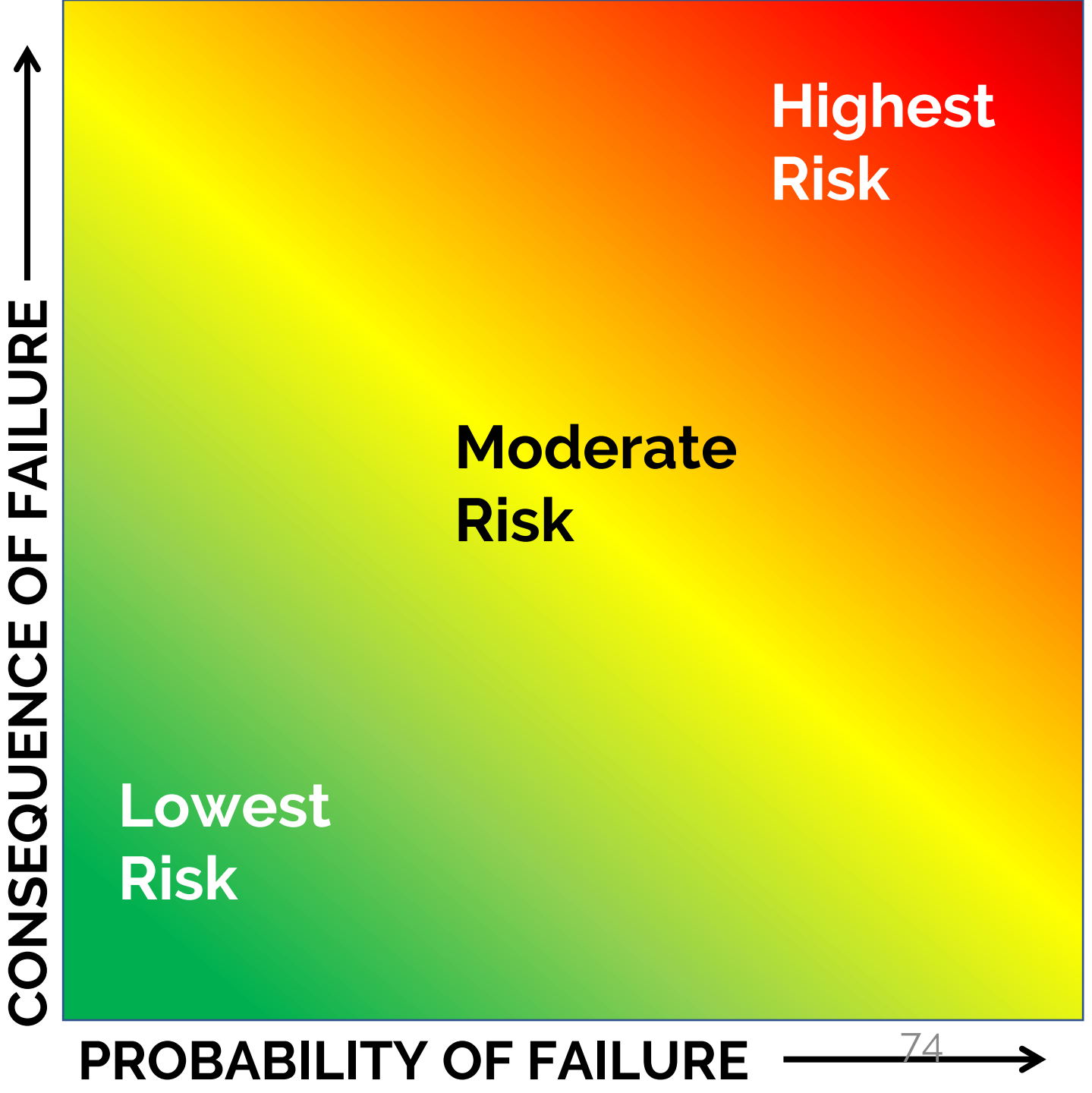
Consider the triple bottom line:

1. Financial
2. Environmental
3. Social

CoF Rankings from 1 to 5

1	Extremely low consequence of failure
2	Low consequence of failure
3	Average consequence of failure
4	High consequence of failure
5	Extremely high consequence of failure

More time and effort should be spent on highest risk assets



Ways to Reduce Risk

Routine & Preventative maintenance

Redundancy

Spare Parts

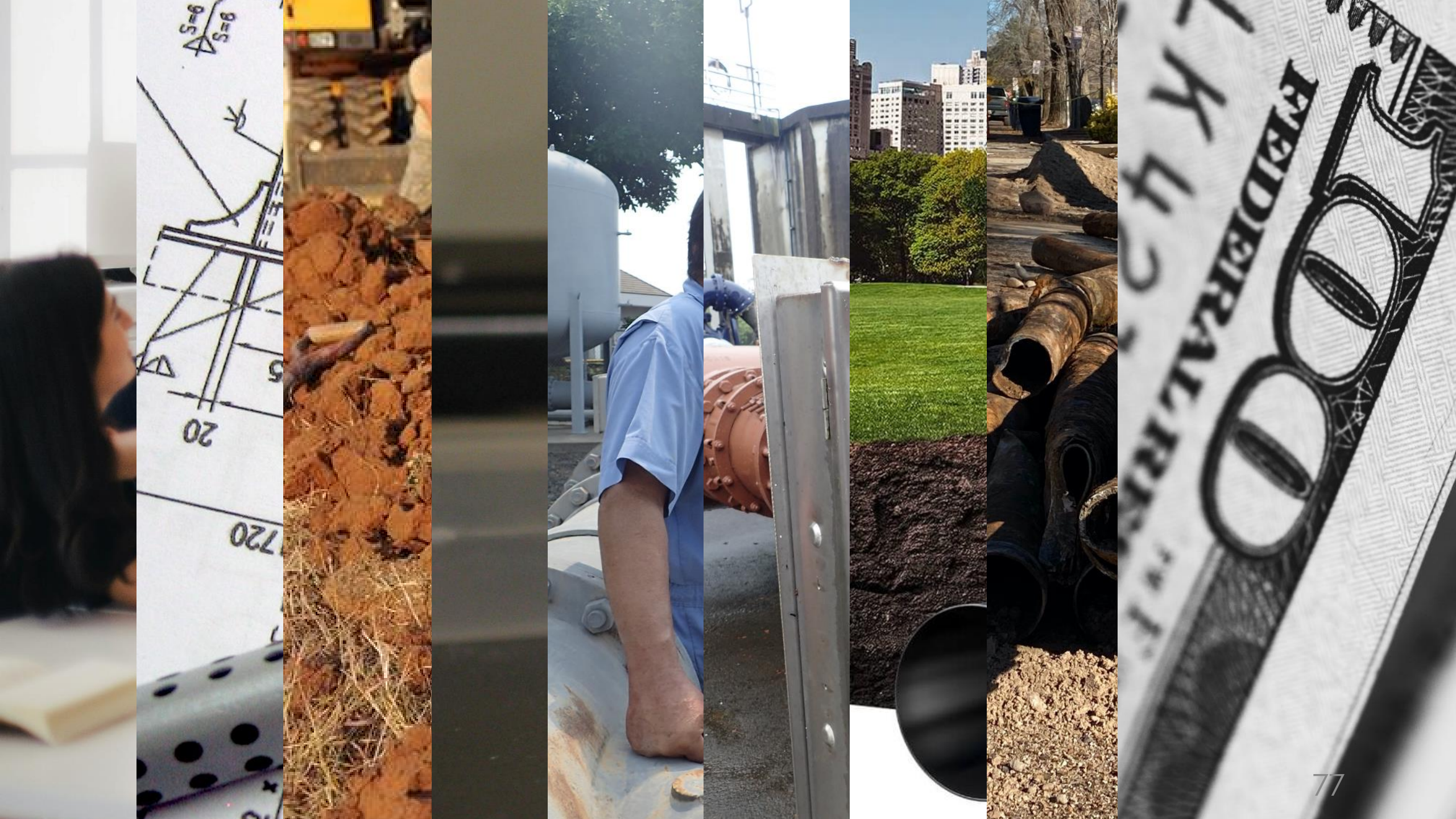
Specialized Training

Replace Assets Early

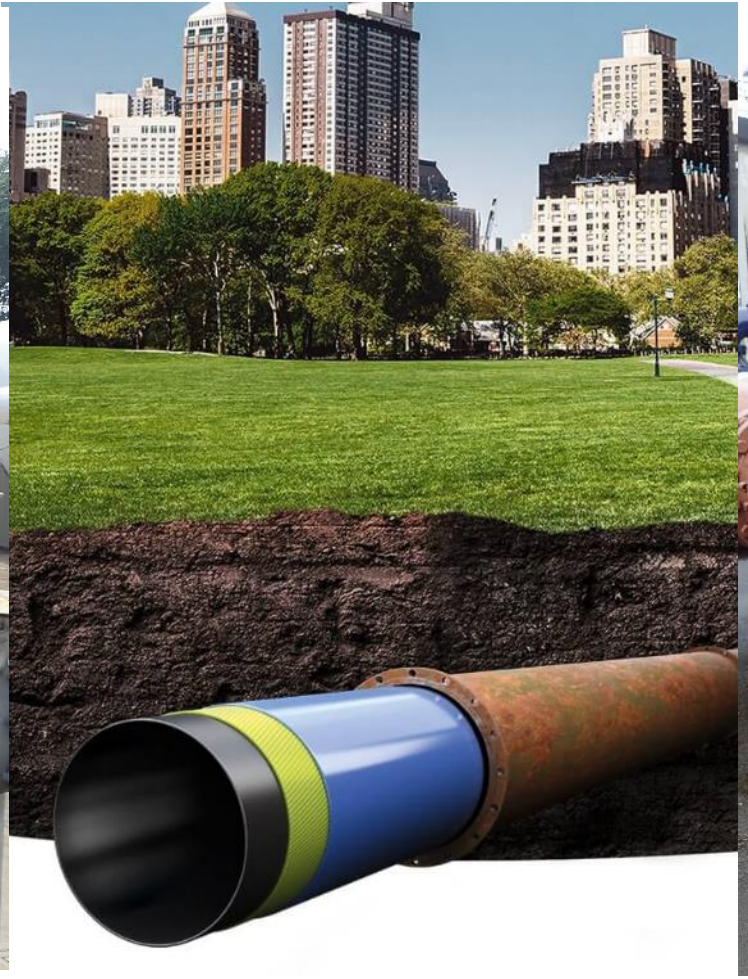
Monitoring

Life Cycle Costing

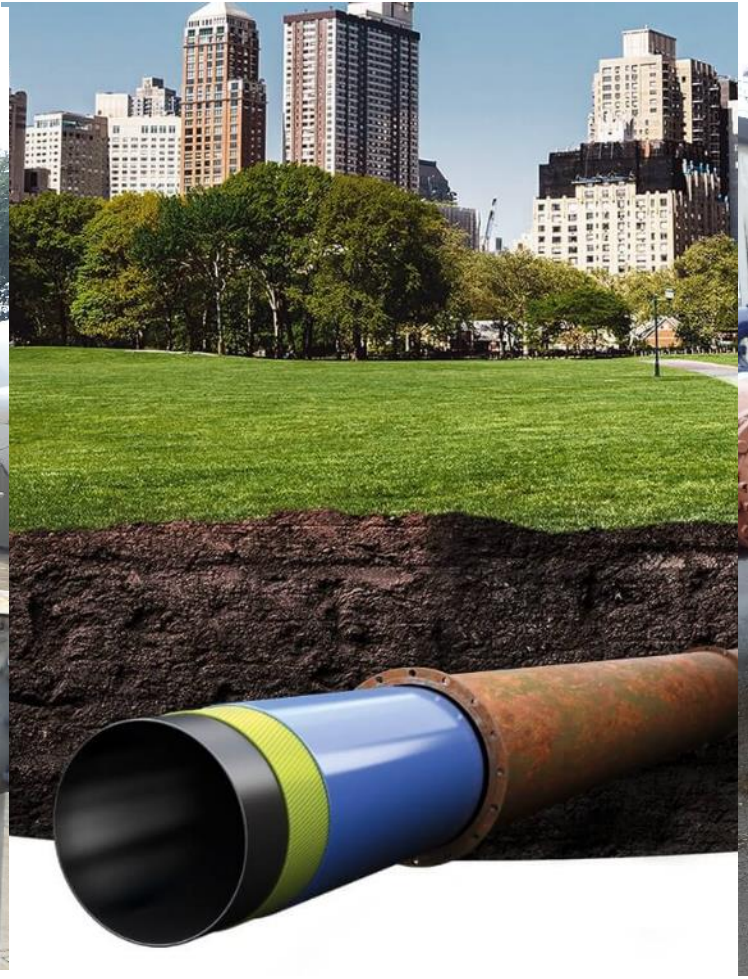
An examination of the entire life of the asset to **optimize** O&M, repair, rehabilitation, and replacement of **system assets**.


S=θ
S=θ
20
720

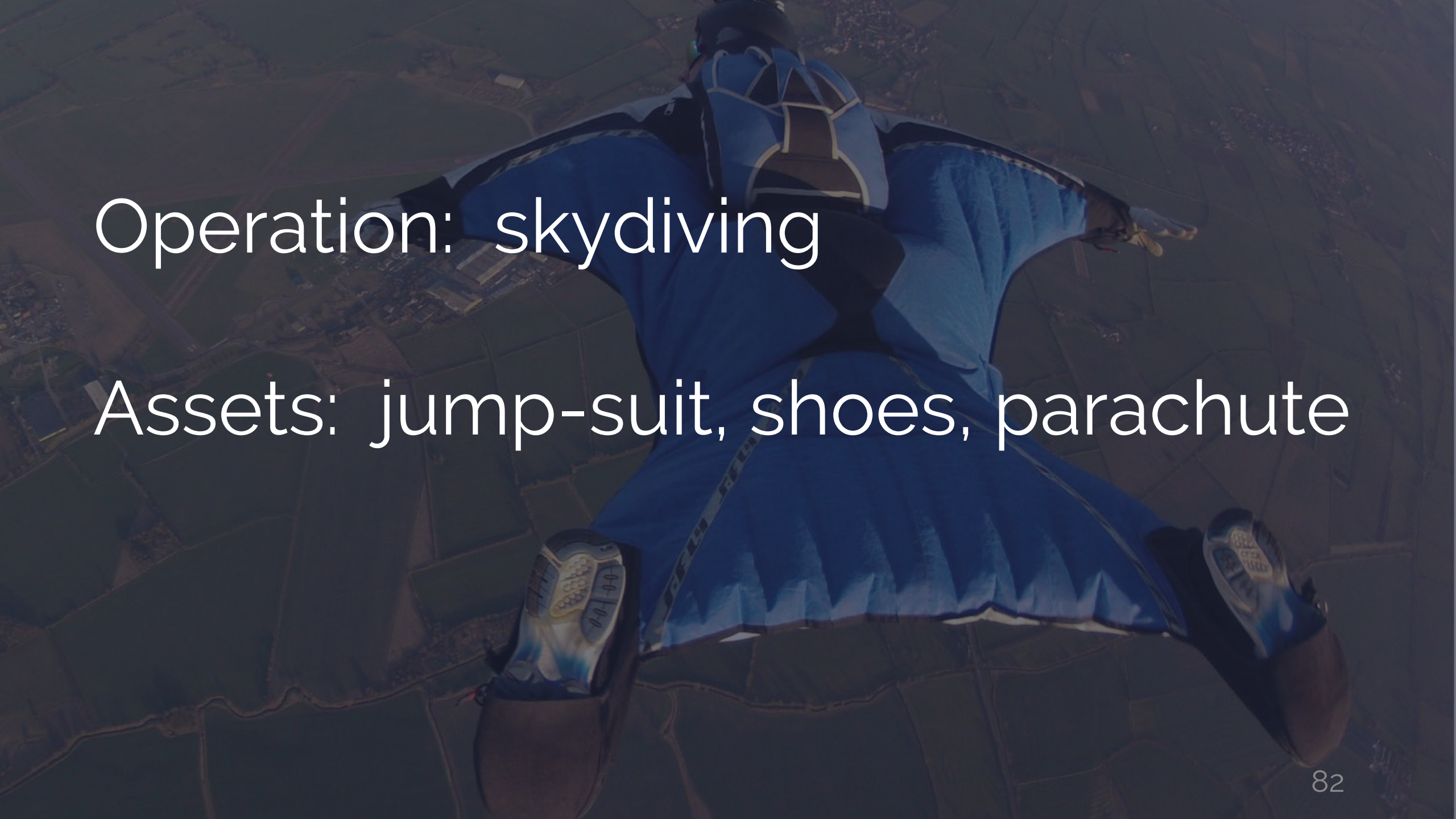
How do planning, design, and construction intersect with operations?



Once you have your assets in place….



It’s time to manage them….



Operation: skydiving

Assets: jump-suit, shoes, parachute

Where should most resources be focused?

A - his jumpsuit

B - his shoes

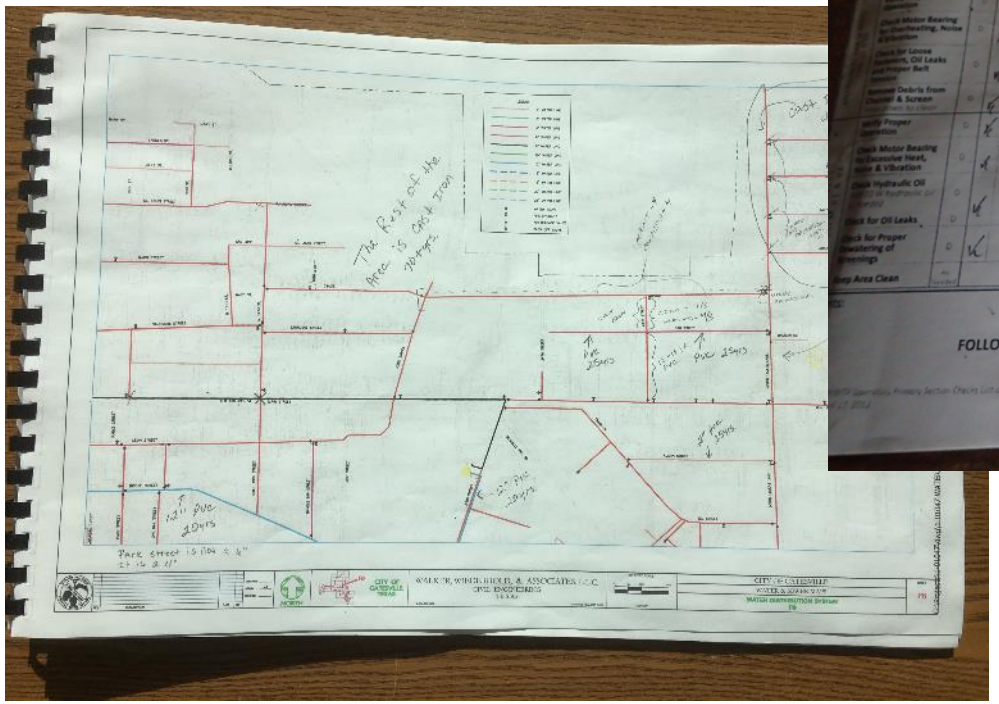
C - his parachute

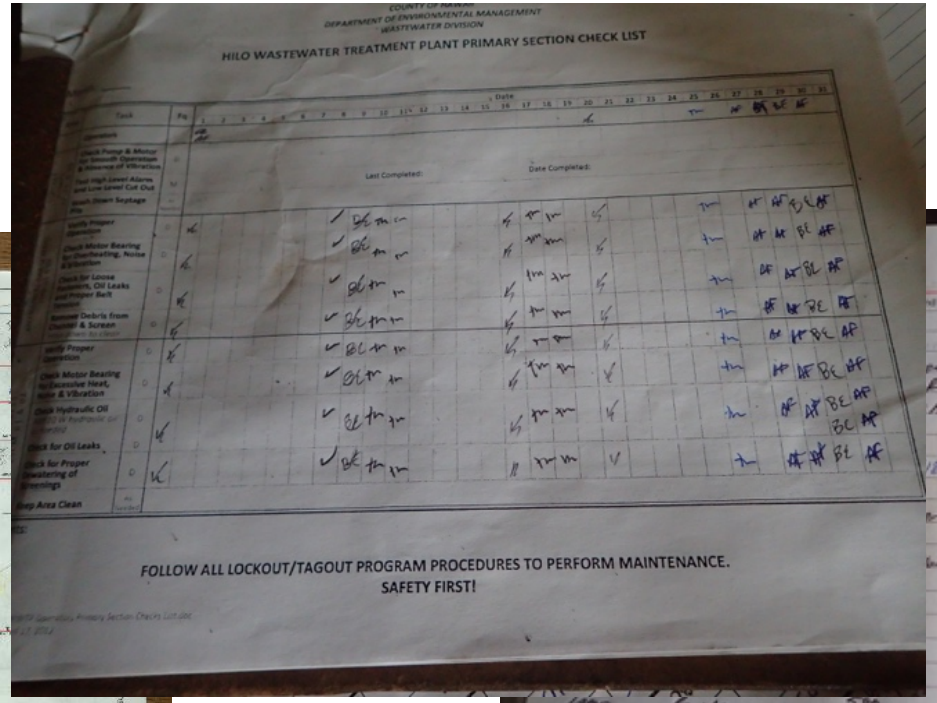
Answer:

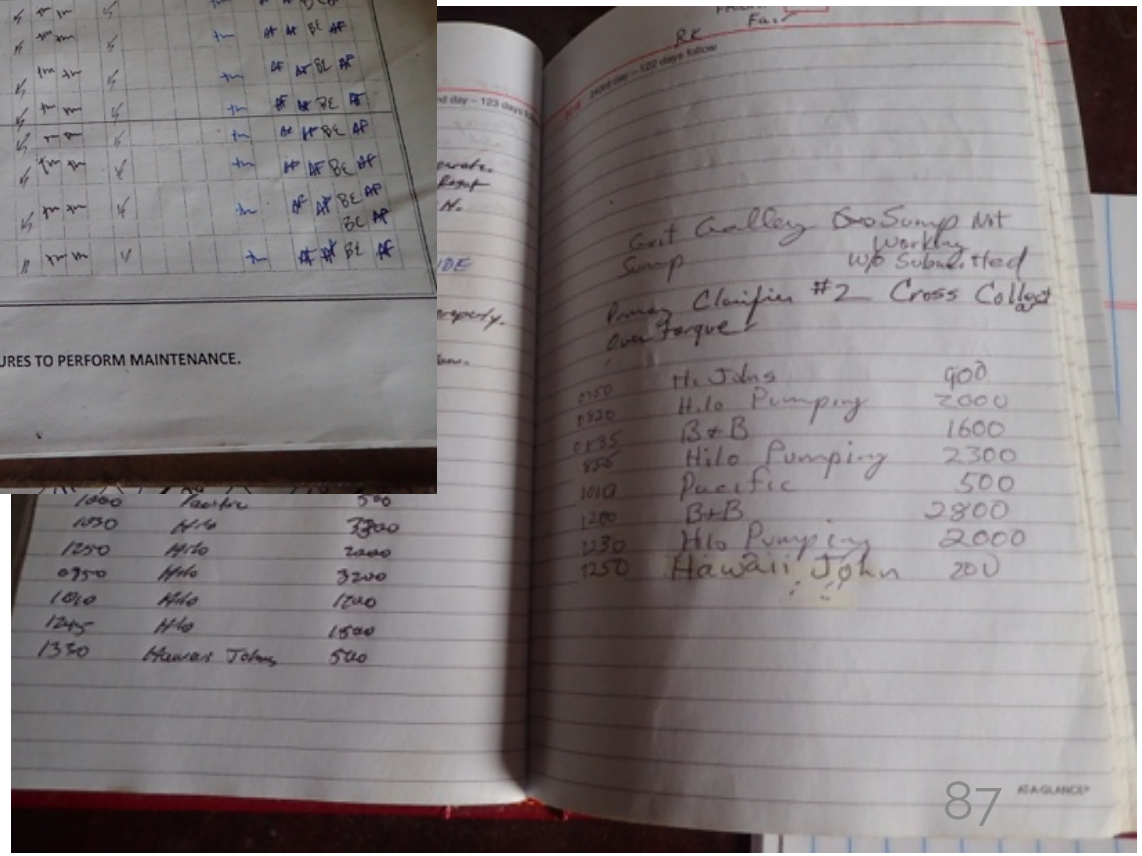
In this case, it was pretty obvious what to spend time and money on. Is it always that easy?


We're making maintenance decisions now, but are they the right ones?

We need more (and accessible) information to make better decisions





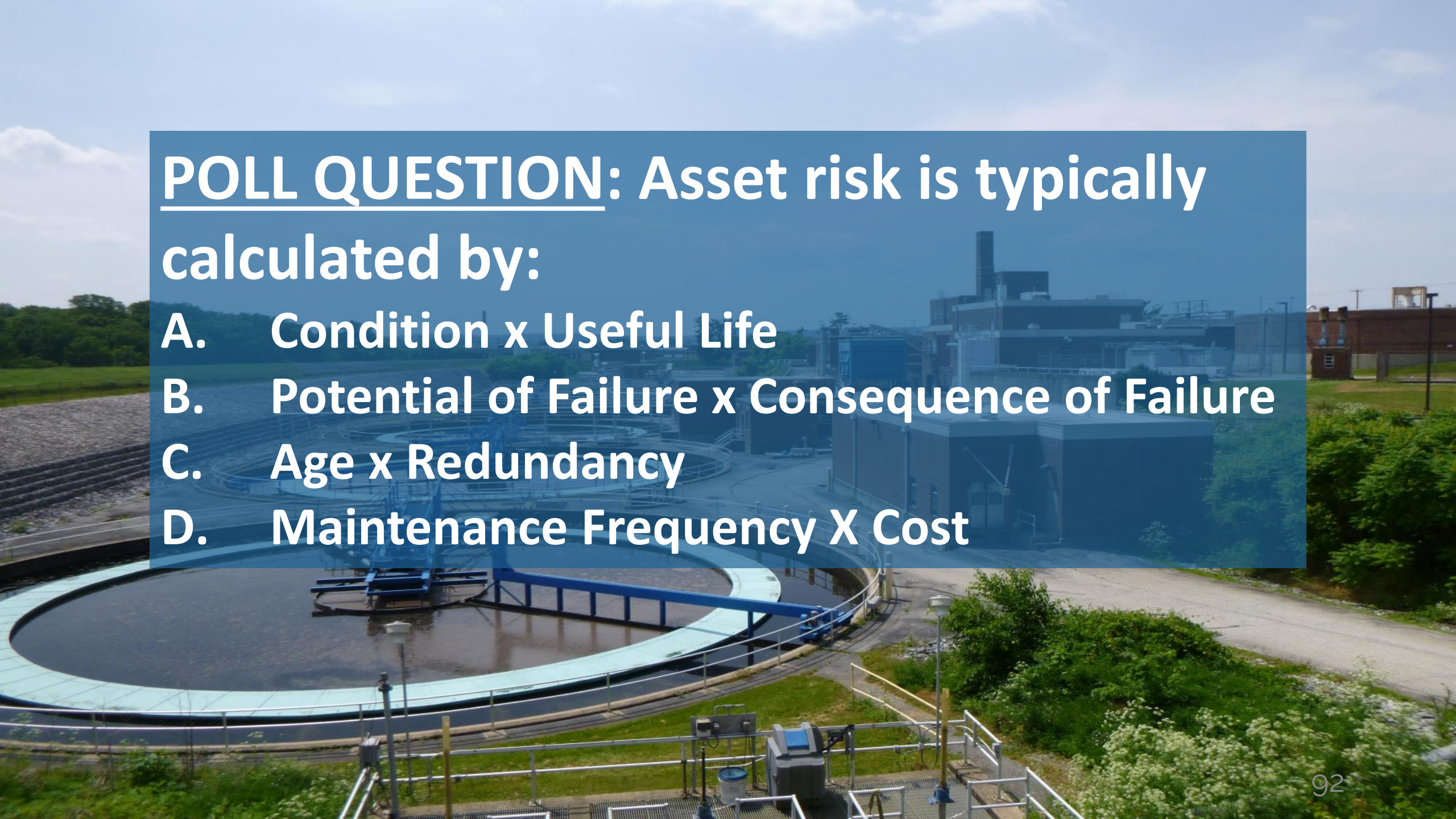


What kind of information would you want?

Asset Information

Maintenance Records

Condition Information



POLL QUESTION: Asset risk is typically calculated by:

A. Condition x Useful Life
B. Potential of Failure x Consequence of Failure
C. Age x Redundancy
D. Maintenance Frequency X Cost

Risk (PoF X CoF)

Cost Information

Types of Data

Electronic Files

WATER & SEWER LEAK CALL LOG

WA/SE	DATE	TIME	ADDRESS	USER	CALLED	NOTES	UPDATES	WORK TICKET #
WA	2/9/2016	10:38AM	OLD HILLSIDE NURSING HOME	BH	RM	FIRE HYDRANT RUNNING	CREW WORKING ON LINE PER RM @ 10:50AM	48674
STREET	2/9/2016	11:24AM	1008 PLEASANT	DD	RM	LEAK IN THE STREET	FIXED	48642
SE	2/10/2016	10:00AM	400 FINNIMORE	BH	RM	SEWER BACKED UP AT STREET	UNCLOGGED	48683
WA	2/10/2016	10:00AM	3502 RIVER ROAD	BH	RM	A CAR HIT THE FIRE HYDRANT	FIXED DA/CN 2-22-16	48644
WA	2/10/2016	10:00AM	CORNER OR 22ND AND WACO	BH	RM	LEAK FILLING UP CULVERT		
SE	2/10/2016	10:36AM	2015 WA[illegible]O STREET	[illegible]	RM	[illegible]	UNCLOGGED	48684
WA	2/10/2016	3:15PM	1105 S LOVERS LANE	BH	RM	[illegible]	FIXED	48647
WA	2/10/2016	3:30PM	206 FIELDSTONE	DD	RM	LEAK-METER WAS RUN OVER BROKE	FIXED	48648
WA	2/10/2016	3:32PM	119 N 28 ST	BH	RM	[illegible] METER	FIXD	48649
WA	2/10/2016	3:57PM	119 N 28 ST	BH	RM	[illegible]ER CALLED AGAIN AND SAID METER LEAK WAS VERY LARGE. CALLED RODNEY TO LET HIM KNOW	FIXED	48649
WA	2/11/2016	9:00AM	28TH AND MEARS	BH	RM	WATER SHOOTING OUT OF MANHOLE	FIXED	48687
WA	2/11/2016	9:00AM	BLESSINGS BUILDING	BH	RM	WATER LEAK BEHIND BUILDING	FIXED	48671
SE	2/11/2016	9:53A	102 1/2 SURRY 300A	DD	RM	CALLED LAST NIGHT AT 8 AND THEY TURNED OFF WATER BUT THEN	SEWER STOP UP FIXED	48685
SE	2/11/2016	11:01AM	409 PARK	DD	RM	SEWER BACKING UP BUT SAID THEY NEED TO PUMP BOTH SIDES. WHEN	FIXED	[illegible]
WA	2/16/2016	11:20AM	601 S. 14TH ST.	KS	RM	WANTS TO KNOW IF THERE IS A METER IN PLACE OR IF HE NEEDS TO GET ONE INSTALLED	01/16/2016 11:20:00 AM THERE IS AN EXISTING WA[illegible] LINE THERE, WILL INSTALL METER WHEN THEY ARE READY	4869[illegible]48676
NA	2/16/2016	1:30PM	9TH STREET BETWEEN 8TH AND LUTTERLOH	BH	RM	WATER LEAK	IT IS NOT A LEAK 02-17-16	48654

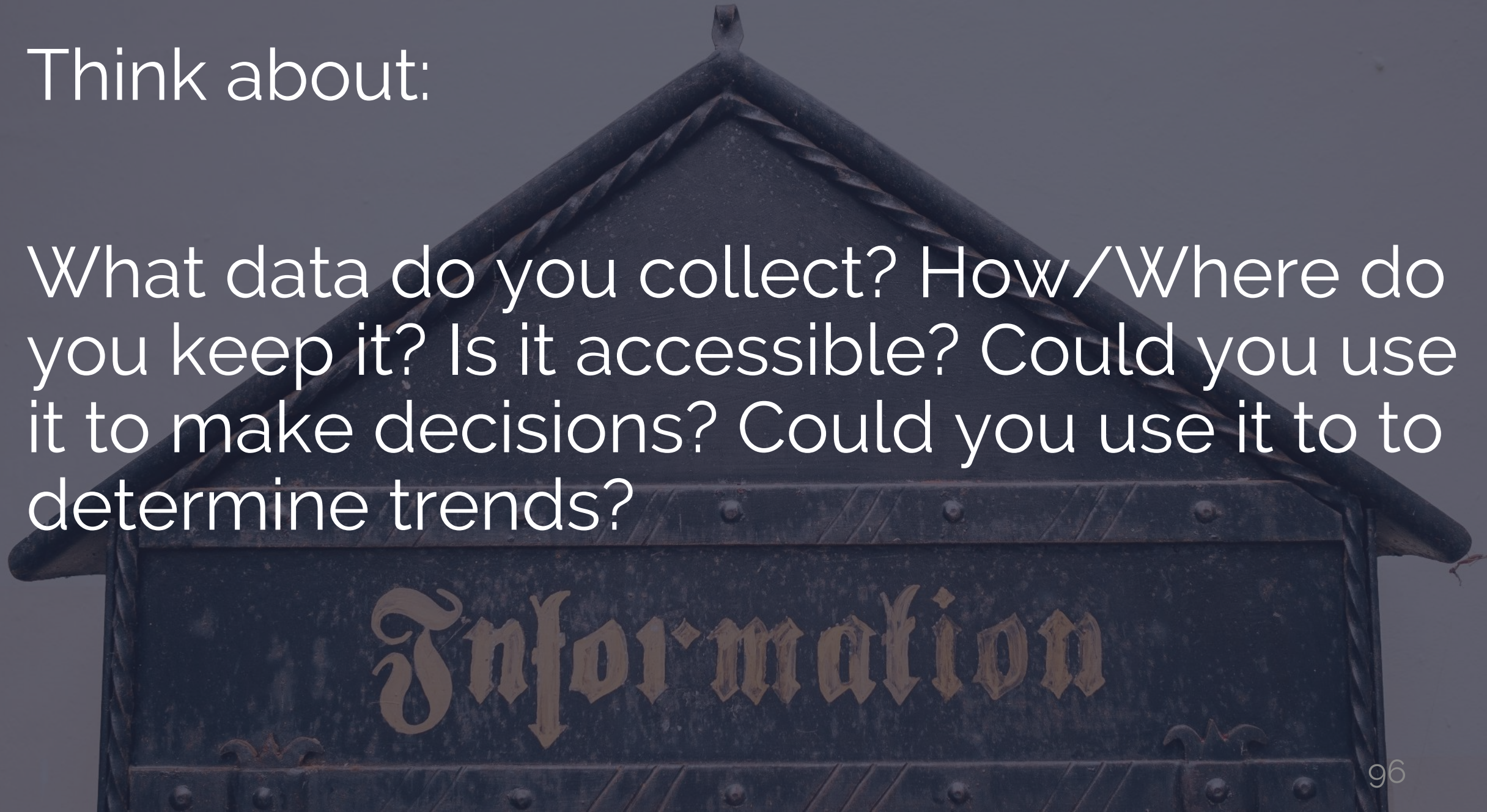
Pictures

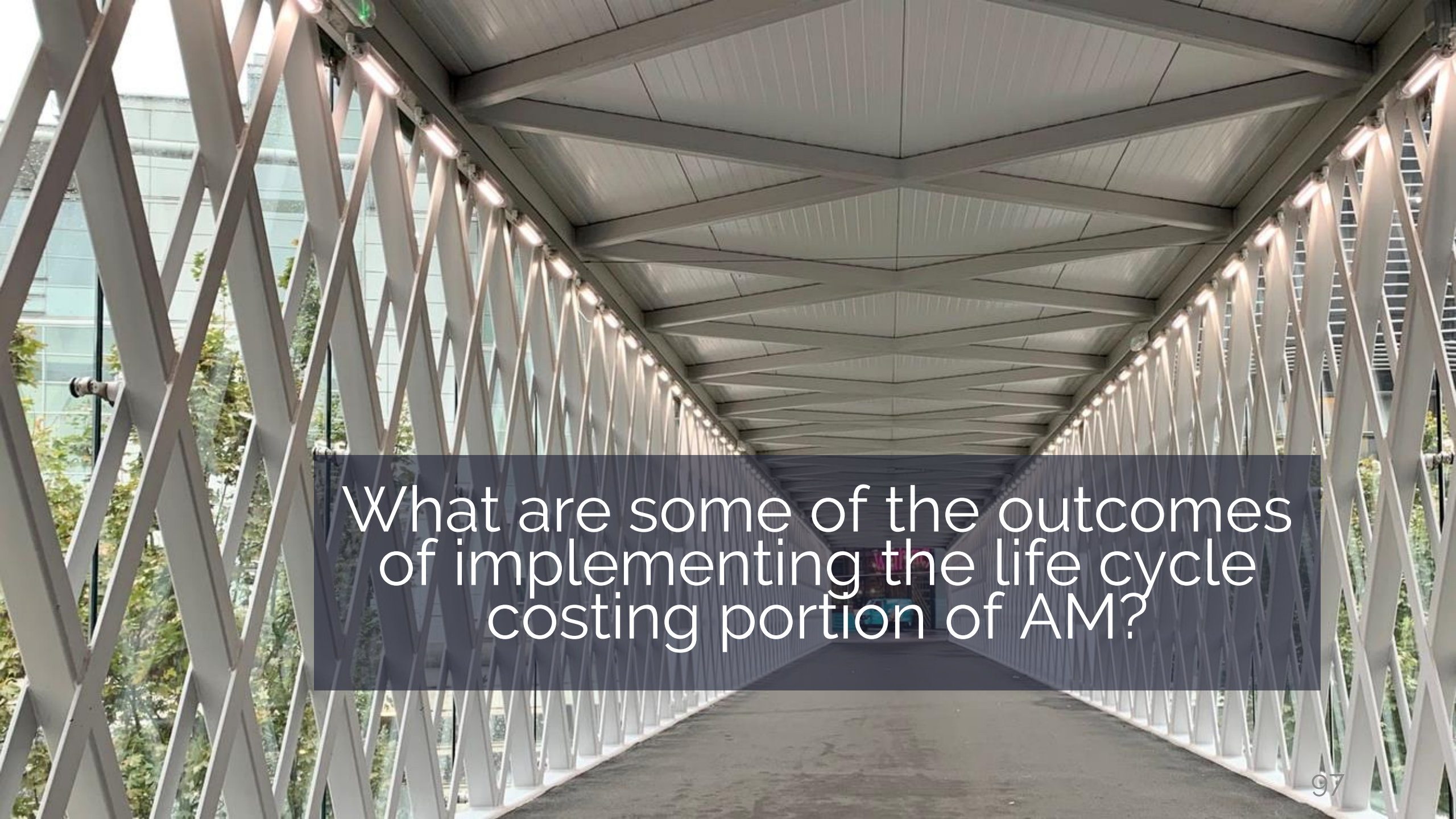
Videos

Notes

Think about:

What data do you collect? How/Where do you keep it? Is it accessible? Could you use it to make decisions? Could you use it to to determine trends?





What are some of the outcomes of implementing the life cycle costing portion of AM?

A **strategic plan** for **operating** and **maintaining** assets

Five questions to help develop an O&M plan…

What Maintenance Activities Do You Need To Do?

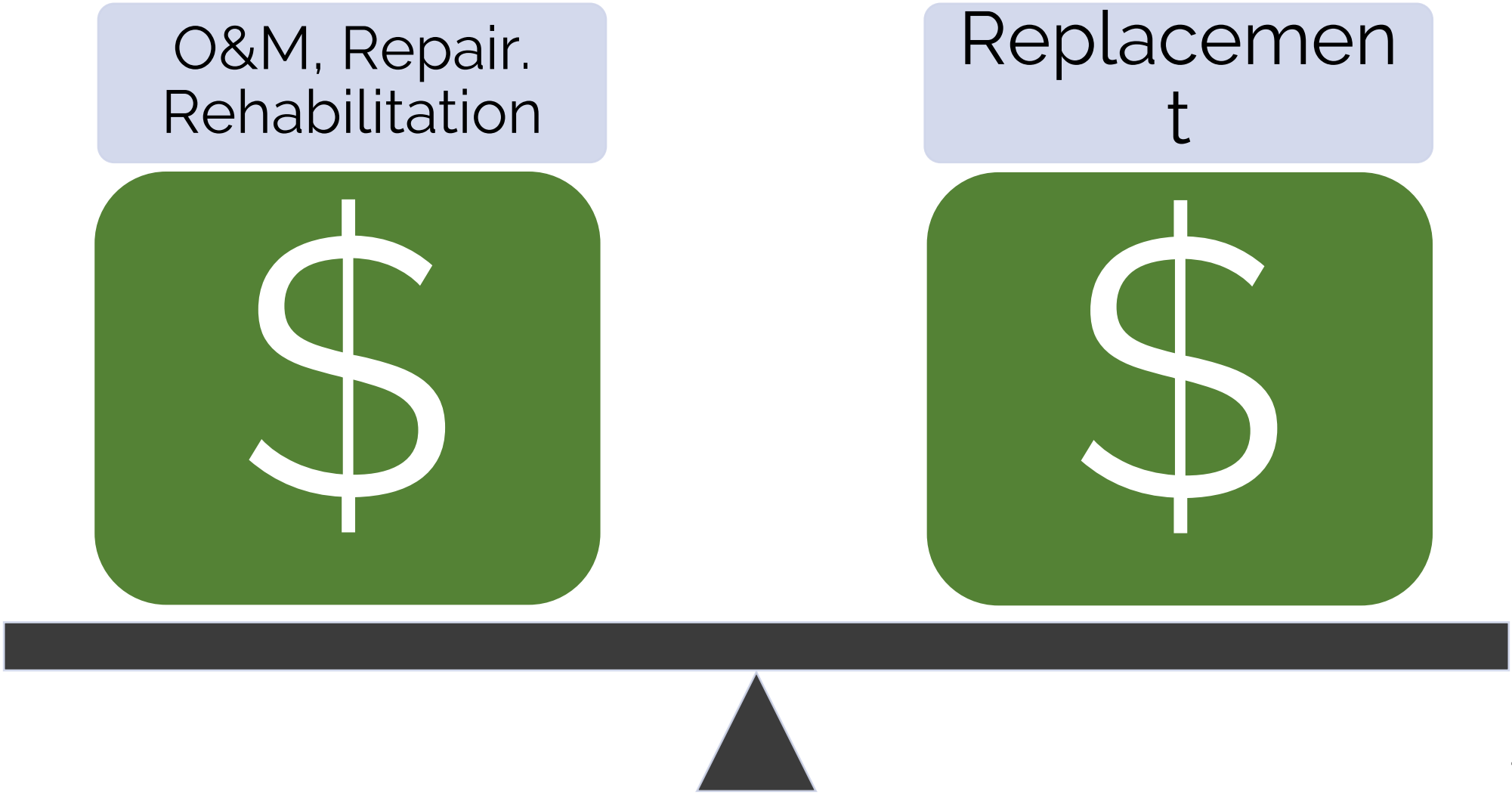
When Should You Do Them?

How Do You Do Them?

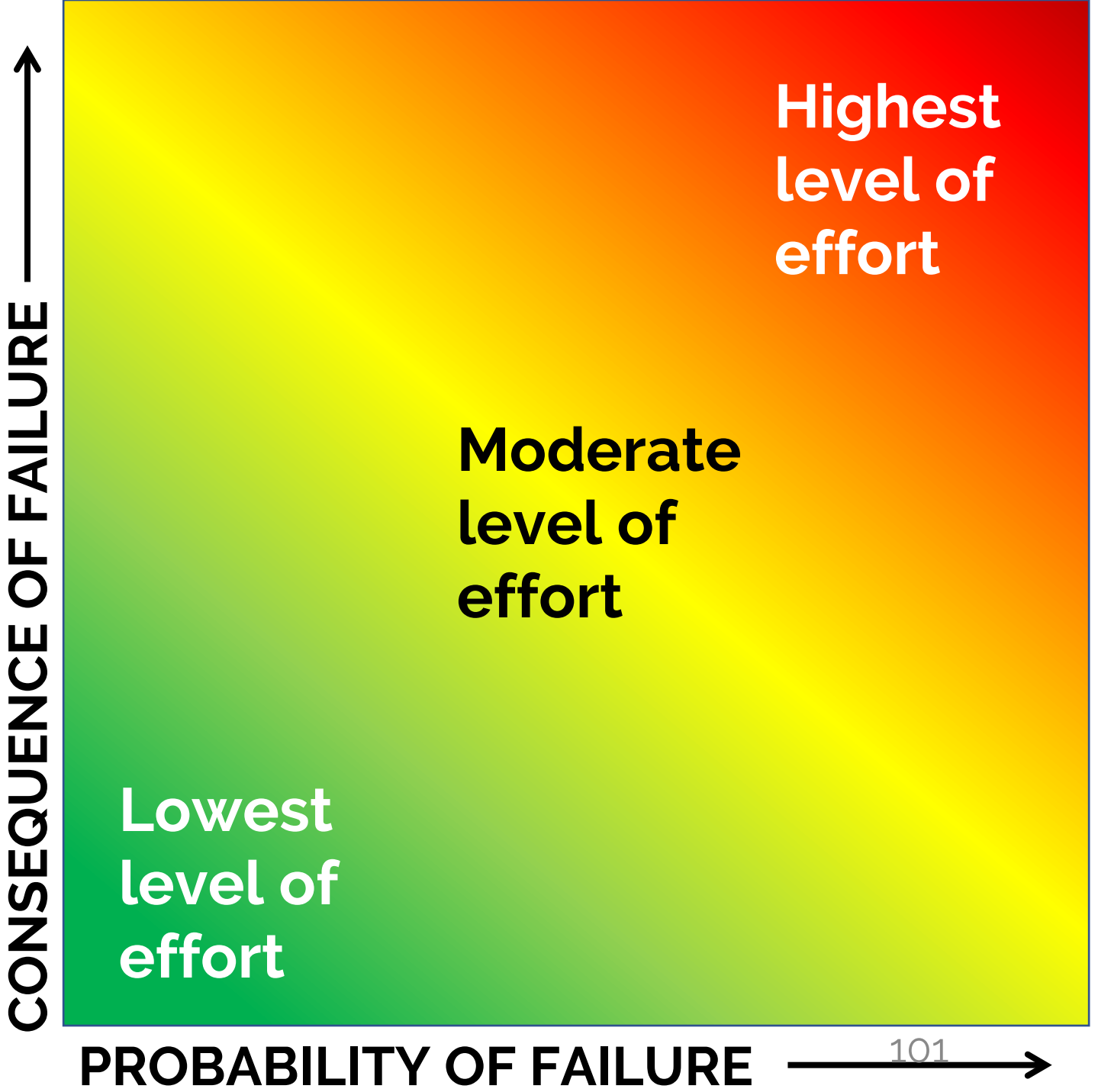
What Equipment Do You Need?

What Do They Cost?

Making the Case for O&M/Repair/ Rehab Over Replacement



Using risk to drive decisions on O&M, Repair, Rehab, and Replacement

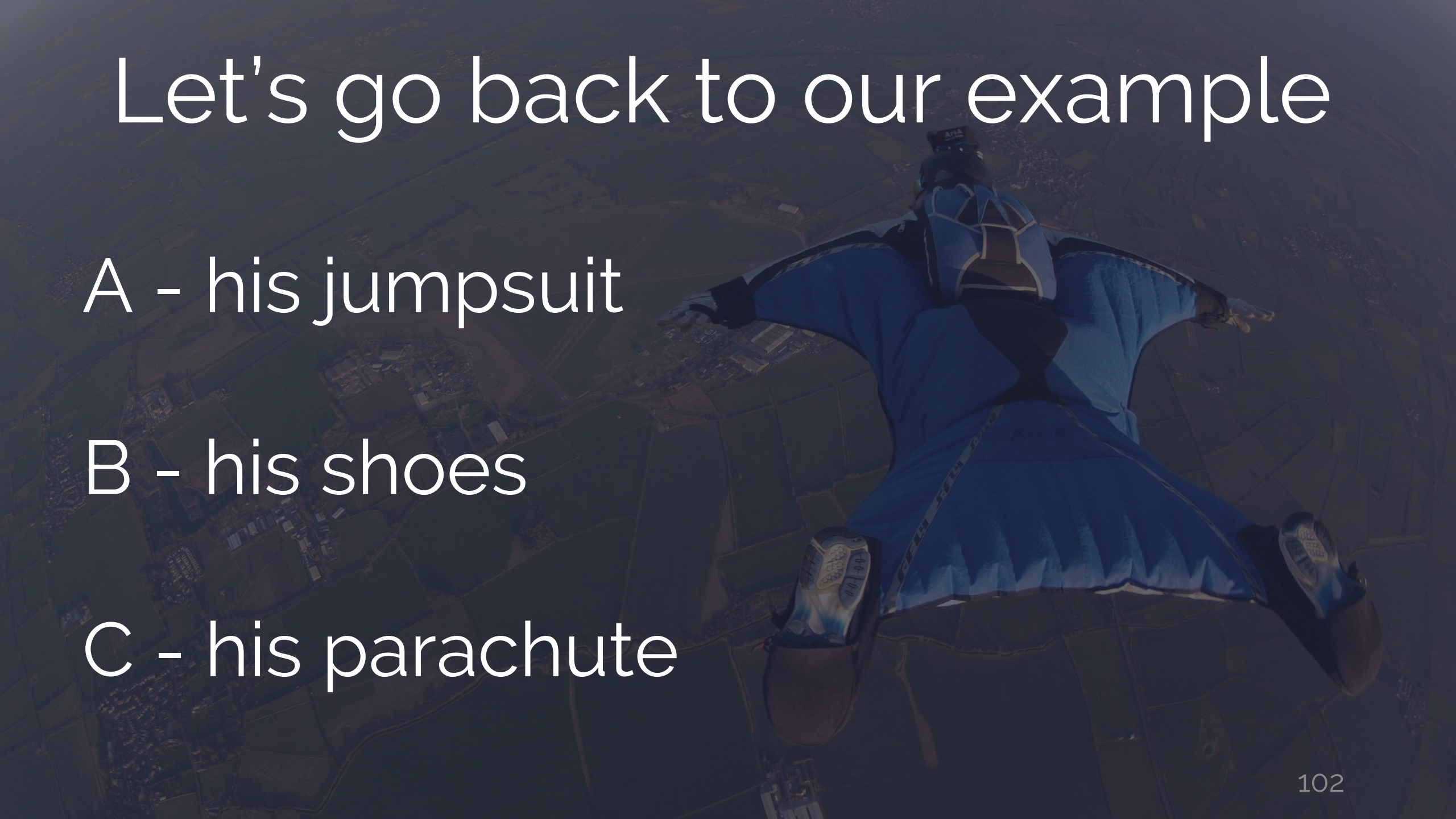


Let’s go back to our example

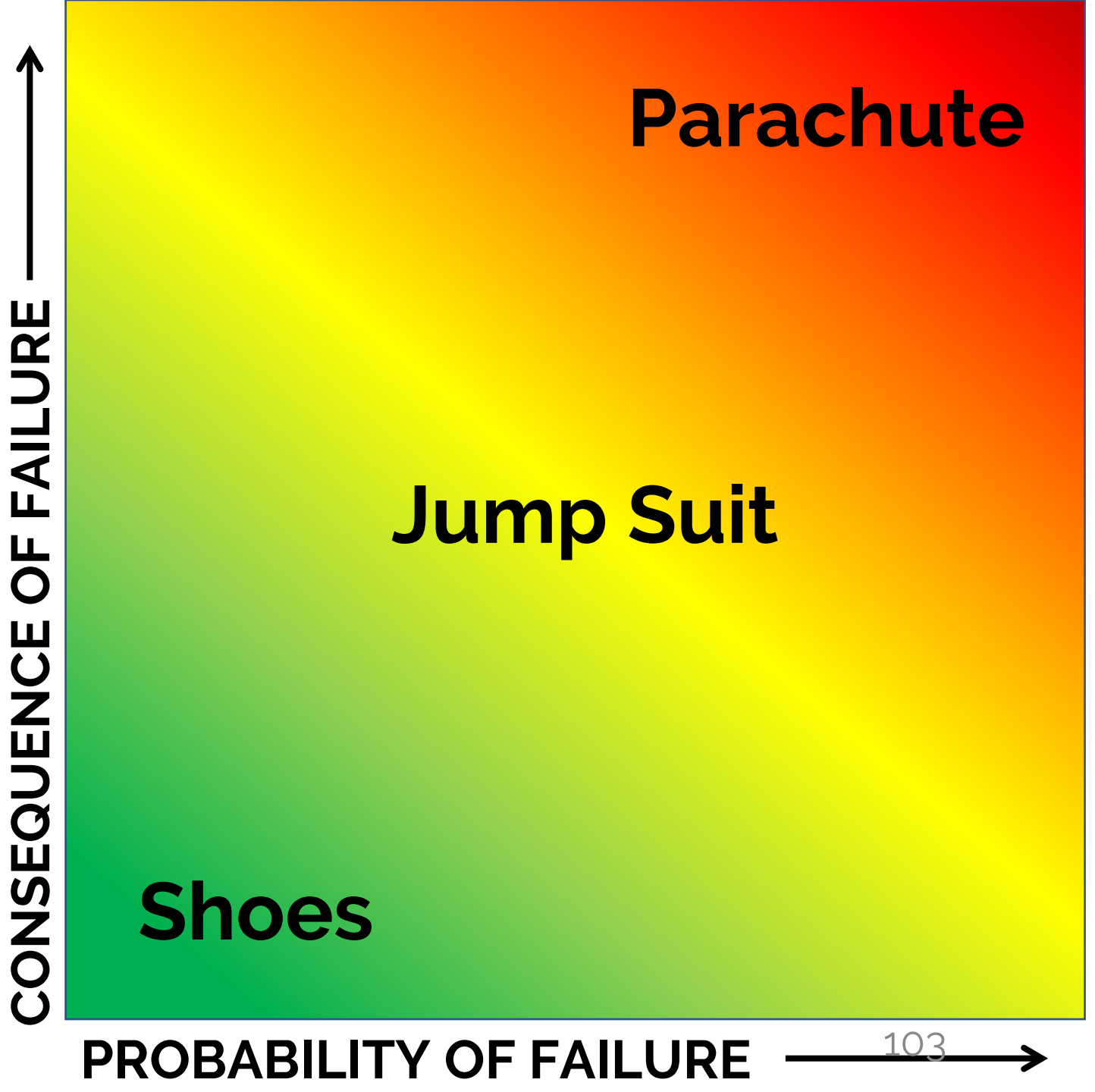
A - his jumpsuit

B - his shoes

C - his parachute



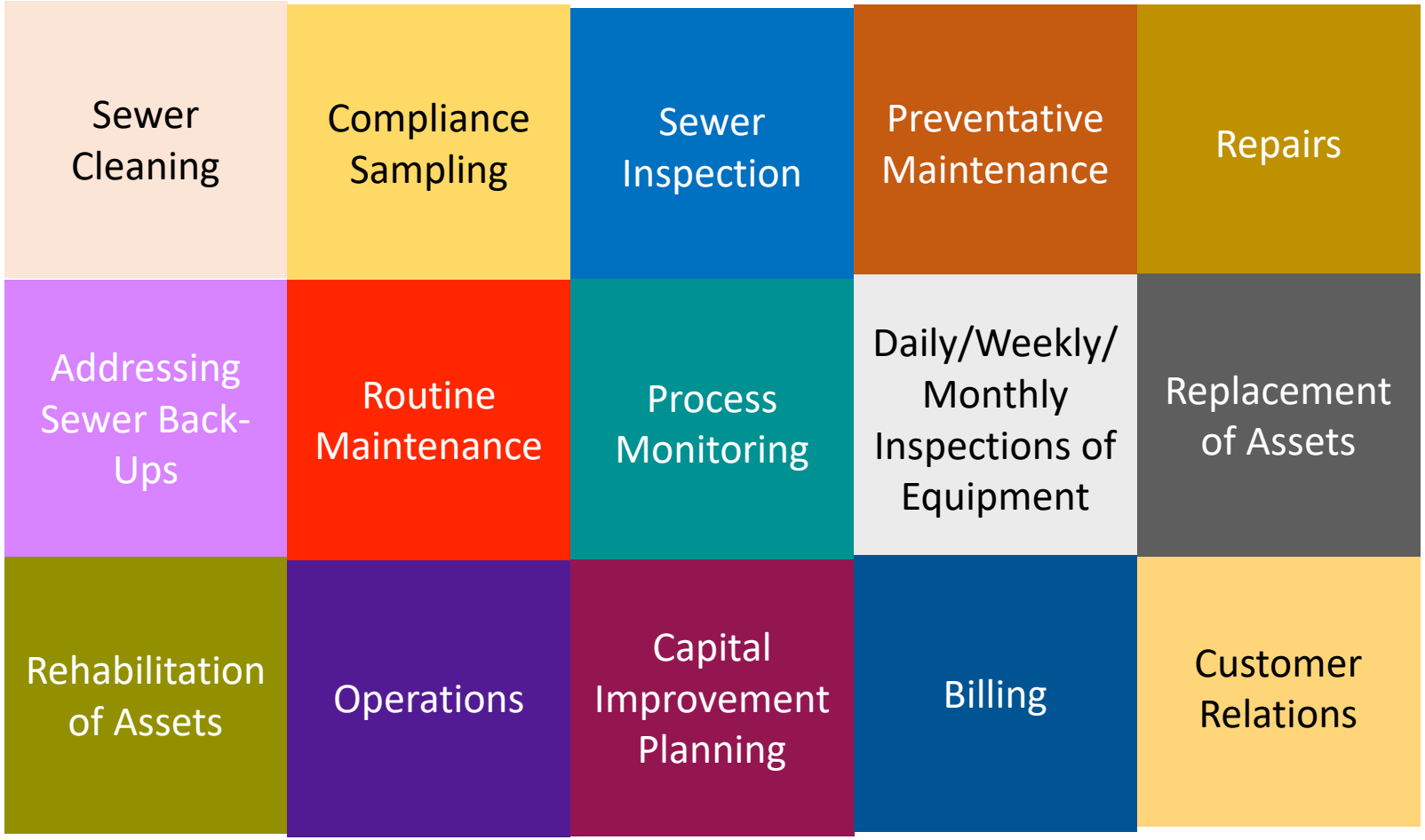
How Would We Handle These Assets Based on The Risk



Long Term Funding

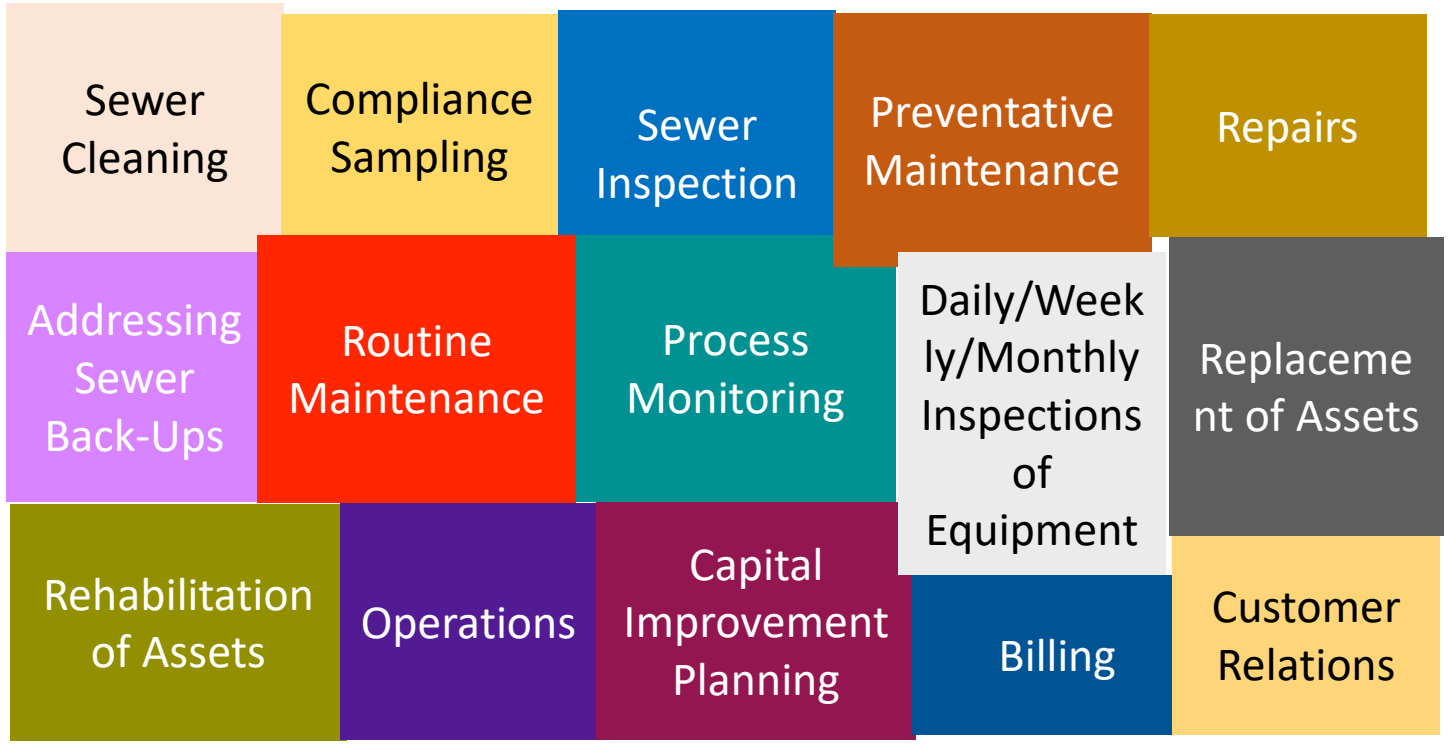
In order to maintain the desired level of service for the lowest life cycle cost, a utility must have a sustainable funding strategy

Resources (money & time) Available



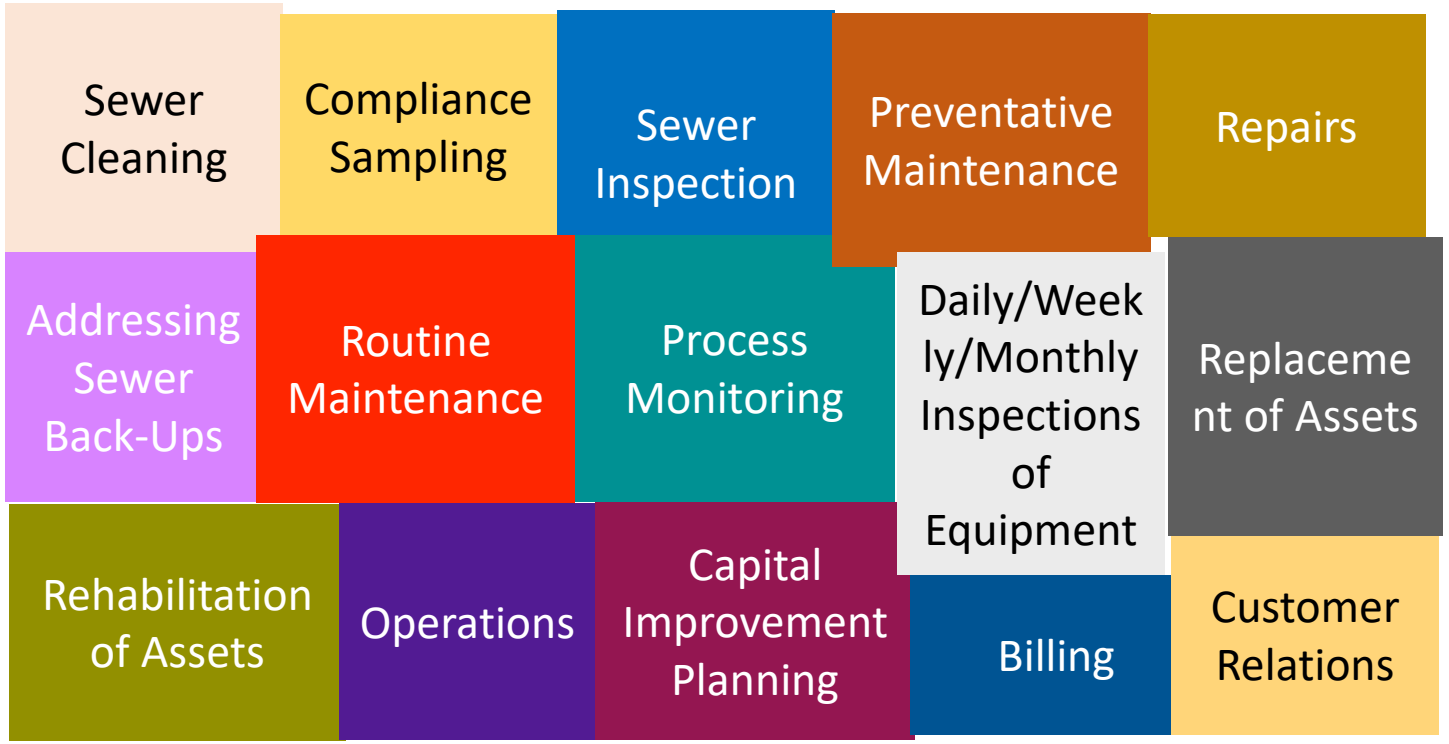
Remember this?

Resources (money & time) Available



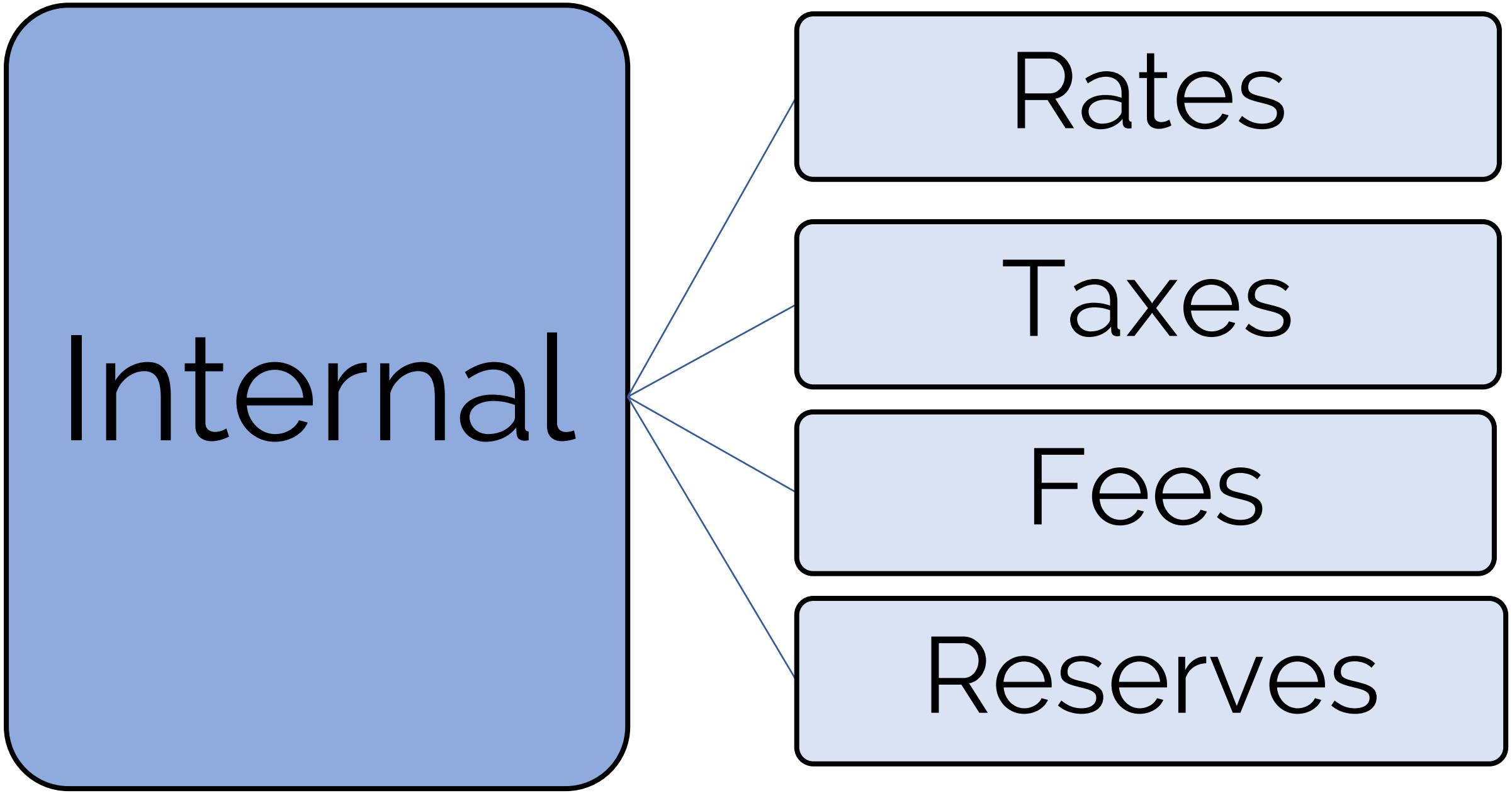
The first 4 parts of Asset Management Can Improve Efficiency to help shrink size of boxes

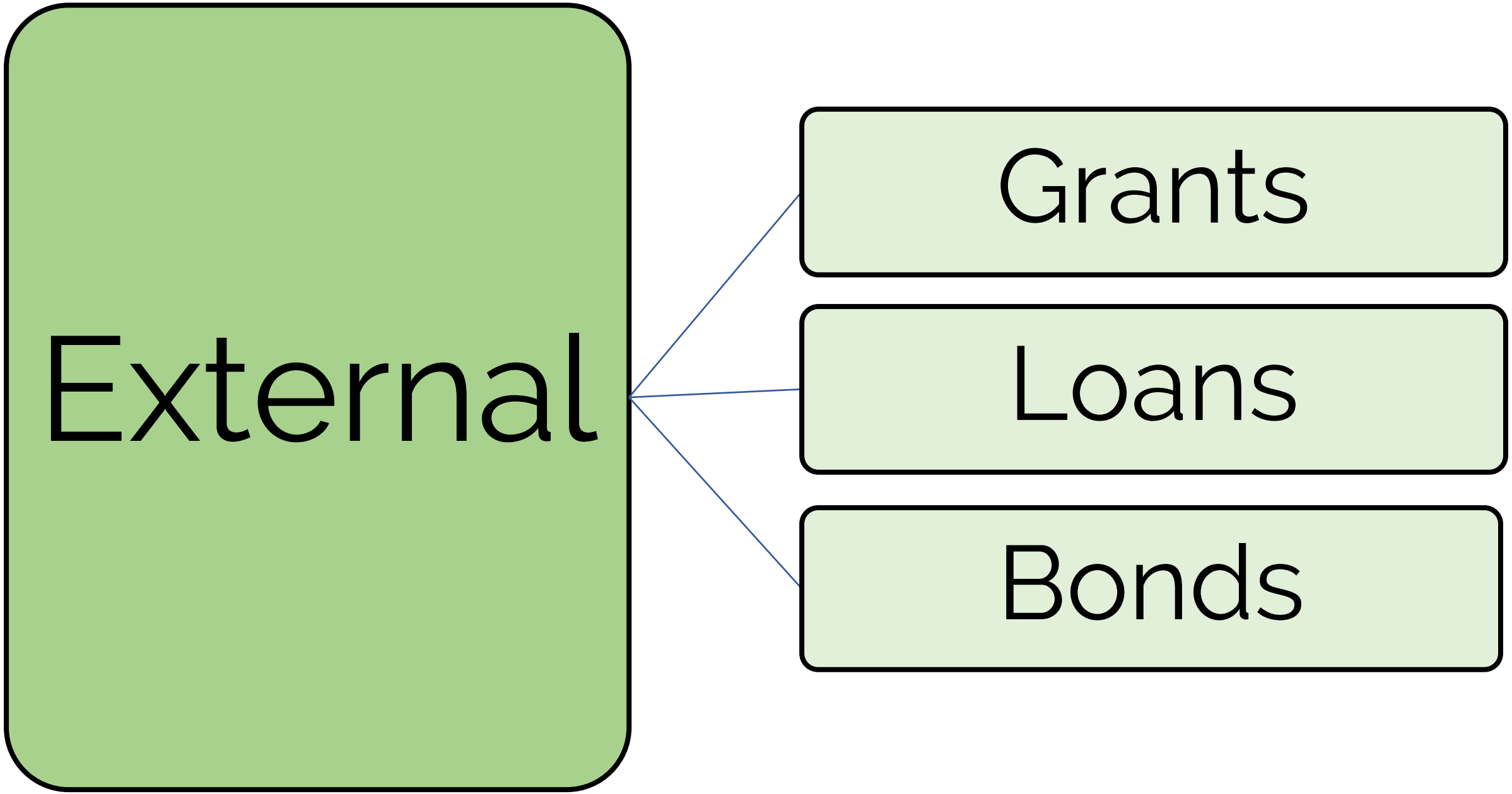
Resources (money & time) Available



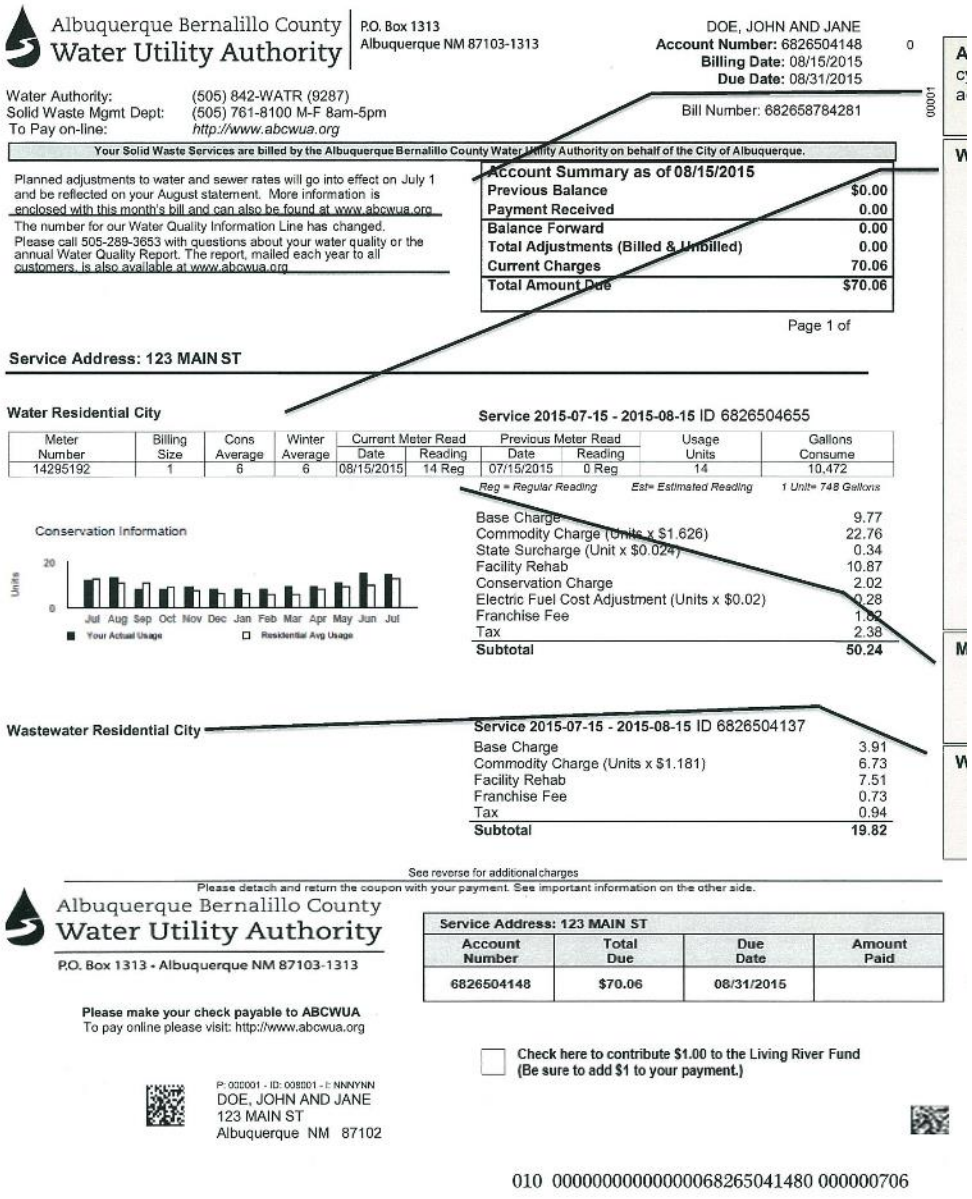
Long-Term funding – 5th part of Asset Management – addresses the size of the green box

What funds are available?


Internal
Rates
Taxes
Fees
Reserves


External
Grants
Loans
Bonds

Internal funds come primarily from your Rates



Albuquerque Bernalillo County Water Utility Authority
P.O. Box 1313
Albuquerque NM 87103-1313

DOE, JOHN AND JANE
Account Number: 6826504148
Billing Date: 08/15/2015
Due Date: 08/31/2015
Bill Number: 682658784281

Water Authority: (505) 842-WATR (9287)
Solid Waste Mgmt Dept: (505) 761-8100 M-F 8am-5pm
To Pay on-line: http://www.abcwua.org

Your Solid Waste Services are billed by the Albuquerque Bernalillo County Water Utility Authority on behalf of the City of Albuquerque.

Planned adjustments to water and sewer rates will go into effect on July 1 and be reflected on your August statement. More information is enclosed with this month's bill and can also be found at www.abcwua.org

The number for our Water Quality Information Line has changed. Please call 505-289-3653 with questions about your water quality or the annual Water Quality Report. The report, mailed each year to all customers, is also available at www.abcwua.org

Account Summary as of 08/15/2015	
Previous Balance	$0.00
Payment Received	0.00
Balance Forward	0.00
Total Adjustments (Billed & Unbilled)	0.00
Current Charges	70.06
Total Amount Due	$70.06

Page 1 of

Service Address: 123 MAIN ST

Water Residential City

Service 2015-07-15 - 2015-08-15 ID 6826504655

Meter Number	Billing Size	Cons Average	Winter Average	Current Meter Read Date	Current Meter Read Reading	Previous Meter Read Date	Previous Meter Read Reading	Usage Units	Gallons Consume
14295192	1	6	6	08/15/2015	14 Reg	07/15/2015	0 Reg	14	10,472

Reg = Regular Reading Est= Estimated Reading 1 Unit= 748 Gallons

Conservation Information

Base Charge	9.77
Commodity Charge (Units x $1.626)	22.76
State Surcharge (Unit x $0.024)	0.34
Facility Rehab	10.87
Conservation Charge	2.02
Electric Fuel Cost Adjustment (Units x $0.02)	0.28
Franchise Fee	1.82
Tax	2.38
Subtotal	50.24

Wastewater Residential City

Service 2015-07-15 - 2015-08-15 ID 6826504137

Base Charge	3.91
Commodity Charge (Units x $1.181)	6.73
Facility Rehab	7.51
Franchise Fee	0.73
Tax	0.94
Subtotal	19.82

See reverse for additional charges

Please detach and return the coupon with your payment. See important information on the other side.

Albuquerque Bernalillo County Water Utility Authority
P.O. Box 1313 - Albuquerque NM 87103-1313

Service Address: 123 MAIN ST			
Account Number	Total Due	Due Date	Amount Paid
6826504148	$70.06	08/31/2015	

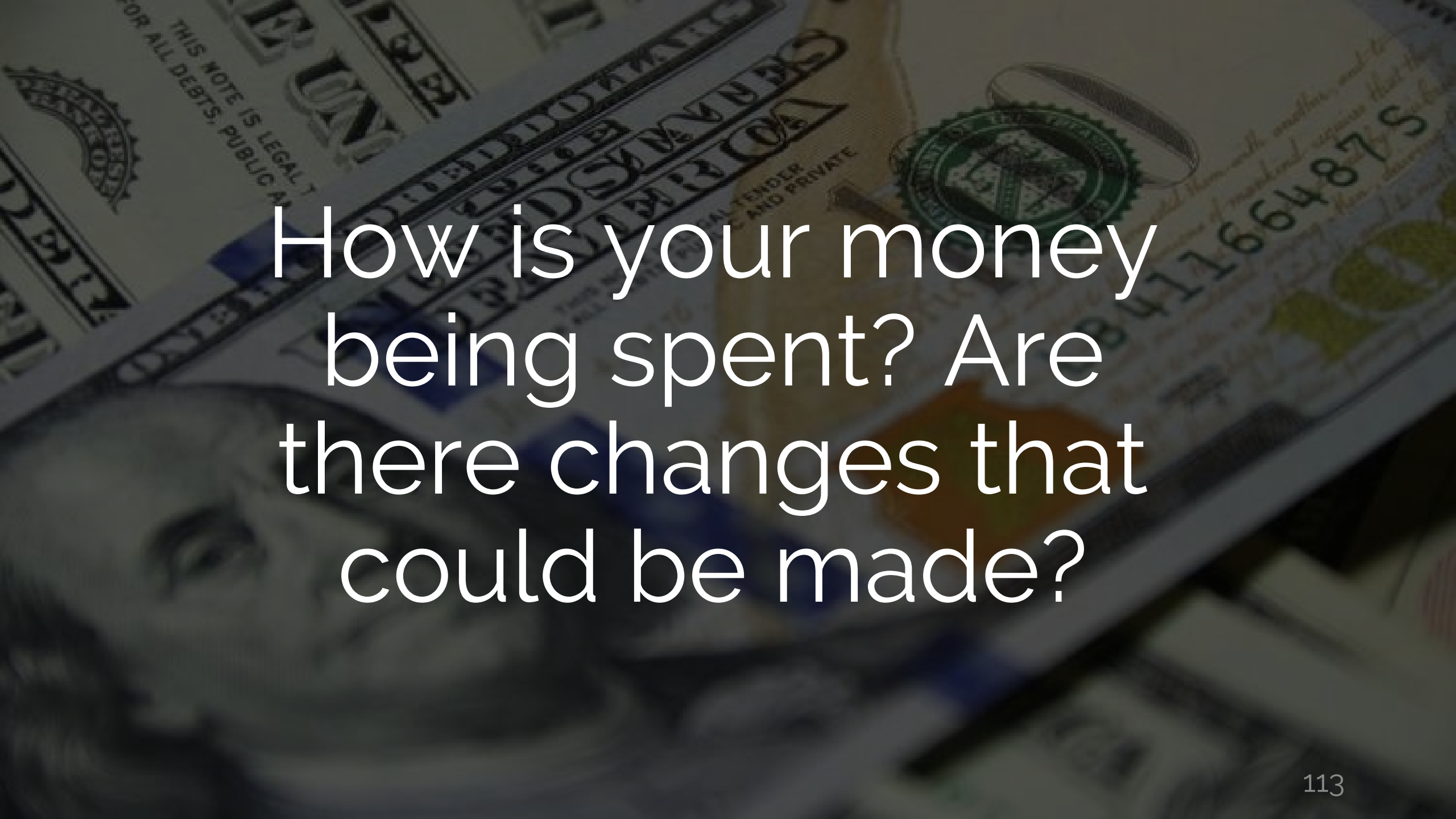
Please make your check payable to ABCWUA
To pay online please visit: http://www.abcwua.org

Check here to contribute $1.00 to the Living River Fund (Be sure to add $1 to your payment.)

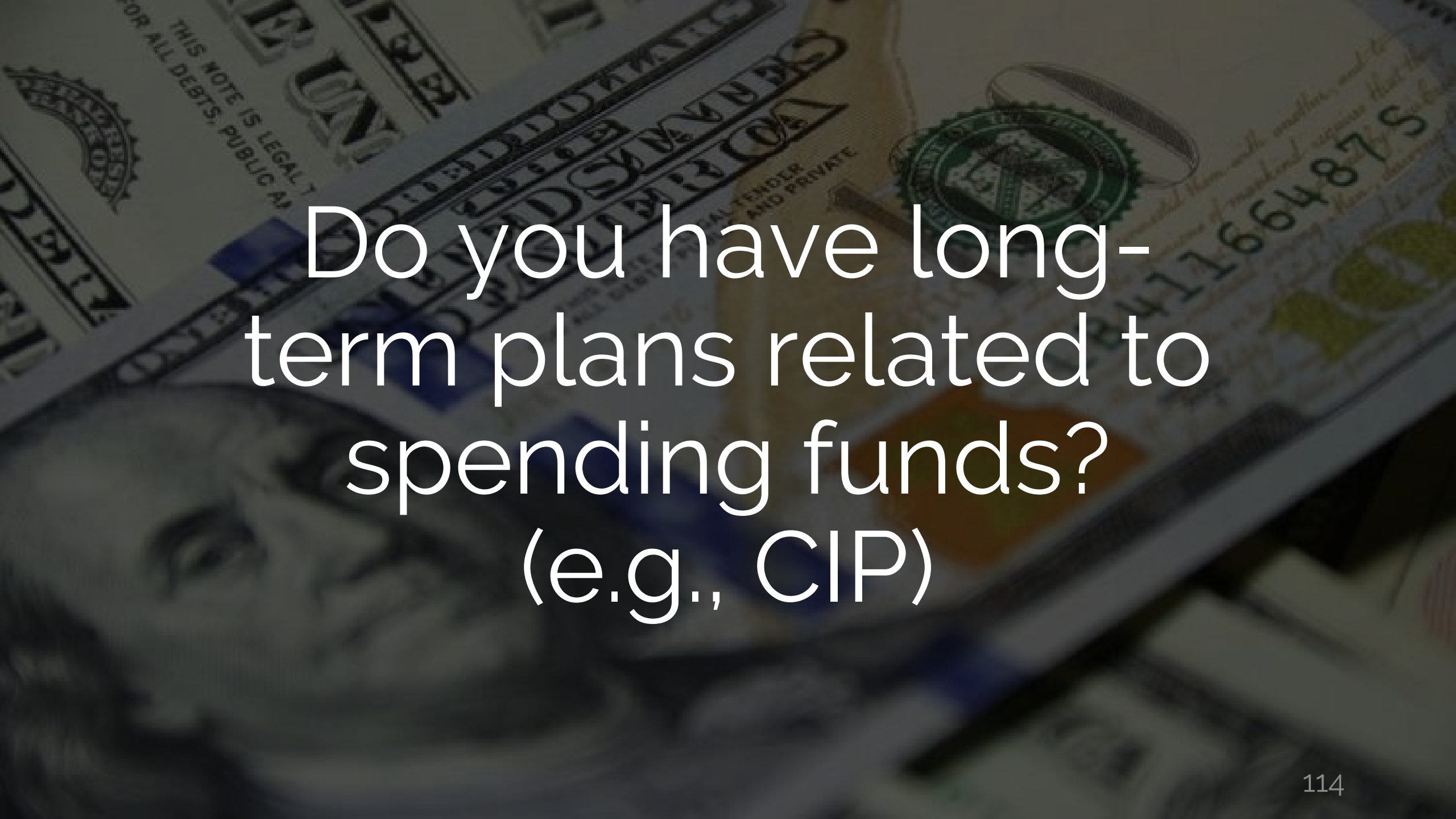
P: 000001 - ID: 008001 - E: NNNYNN
DOE, JOHN AND JANE
123 MAIN ST
Albuquerque NM 87102

010 00000000000000068265041480 000000706

Are your rates sufficient? When was the last rate increase? Do increases keep pace with rising costs?

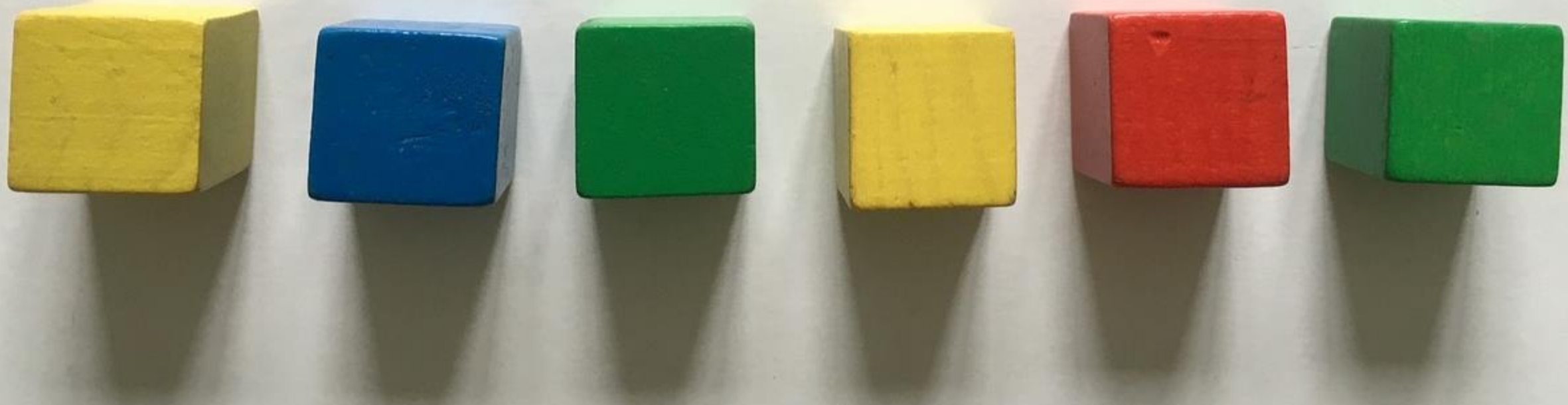


How is your money being spent? Are there changes that could be made?

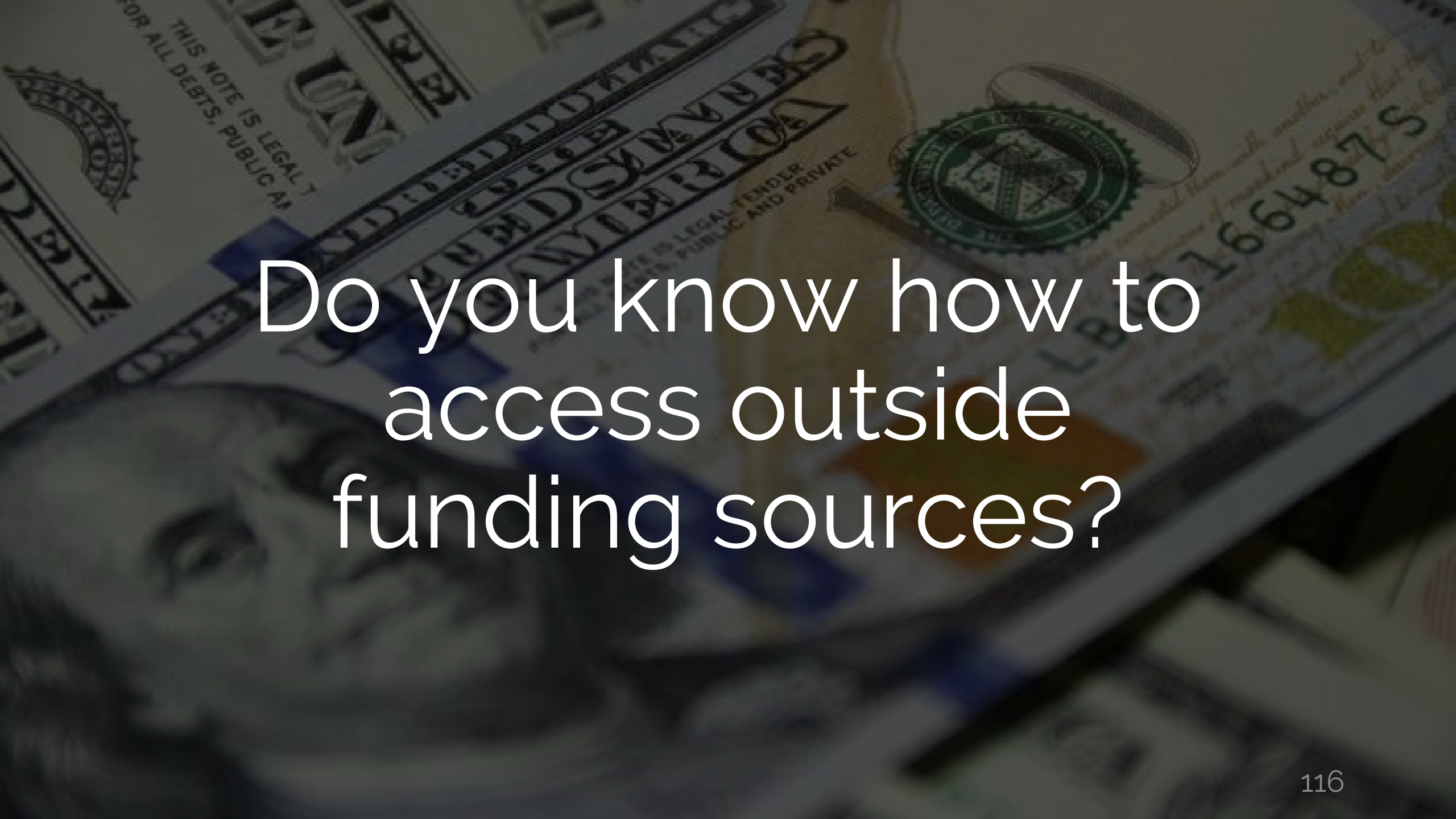


Do you have long-term plans related to spending funds? (e.g., CIP)

Are you incrementally funding infrastructure replacement?



What is your replacement cycle?



Do you know how to access outside funding sources?

EFCN environmental finance center network

Innovative Finance Solutions for Environmental Services

HOME ABOUT WORKSHOPS & WEBINARS ASSISTANCE RESOURCES BLOG ARCHIVES

› FUNDING SOURCES BY STATE OR TERRITORY

https://efcnetwork.org/funding-sources-by-state/

Funding Sources by State or Territory

Note: Some states or territories may have additional resources listed below the map.

Click on the map below to view funding sources for each state:

Back to the basics:

Protect Public Health

Protect the Environment

Customer Service

Maintain Assets in Acceptable Condition

Manage Risk

AM Addresses all of these:

Protect Public Health

Protect the Environment

Customer Service

Maintain Assets in Acceptable Condition

Manage Risk

Which helps compliance by:

Understanding risk and acting on it reduces overall risk

Doing preventative and routine maintenance to keep assets working

Understanding what assets you have to do the job at hand

Recognizing that Customer Service is first and foremost

Collecting operational data to be able to trend and see when things are going awry

Having a CIP allows for a good long term plan for what work to do when money is available and what work to put off when it is not available

Understanding condition and maintaining condition enables them to do the tasks

Helps develop a plan for and make a case for incremental investment

Resources

SOUTHWEST ENVIRONMENTAL FINANCE CENTER

Start Here Resources

Asset Management Switchboard

The Southwest Environmental Finance Center has partnered with EPA to create a repository of documentation and tools related to Asset Management.

Whether you are new to the Asset Management process or just need a refresher on a specific topic, the resource you are looking for is probably here. If you're unable to find what you're looking for, reach out and tell us about it.

If you would like to contribute by having a resource added to the repository, please email the Southwest Environmental Finance Center (by clicking on the link below) and tell us about it. We welcome your feedback and strive to serve your utility and water systems at large.

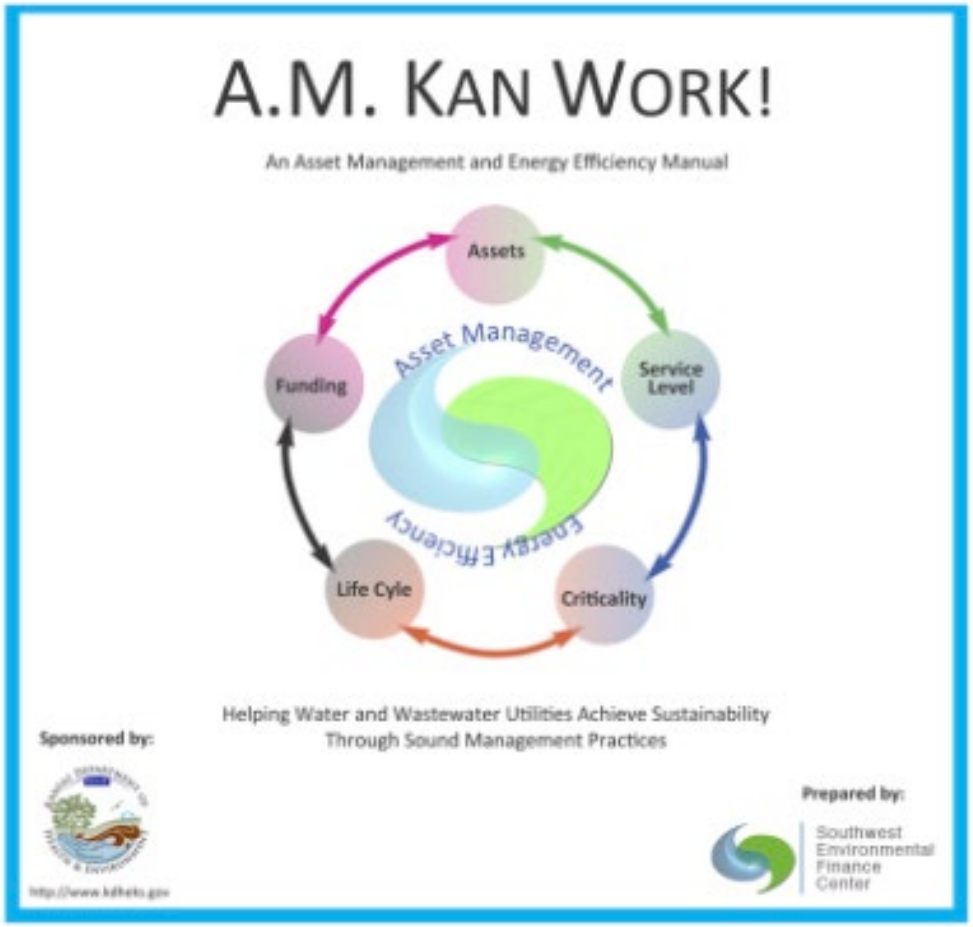
Email SW EFC

Phone (505) 277-0644

https://swefcamswitchboard.unm.edu/am/

Resources

https://swefc.unm.edu/home/



Kansas
Department of Health and Environment

Appendix F

ASSET MANAGEMENT IQ

An Asset Management IQ Test is presented here in order to help you review the concepts of the various core components of Asset Management. Both the test and a scoring table are also available as a printable pdf, which may be copied for use by multiple personnel within your utility.

In the web version of the test, clicking on a choice will automatically enter the number of points for that option and keep track of the score for each section of the Asset Management IQ as well as the total cumulative score. If a new answer is selected, the new choice and the new points will appear and the old points will be removed.

If the user completes the entire Asset Management IQ tool (all 30 questions) before starting Asset Management, it will provide a baseline evaluation at the beginning of Asset Management. Comparing the scores of each of the six sections will show which areas have the biggest gaps in terms of Asset Management activities. These scores may provide information about where efforts should be focused. You may wish to start with areas that are the weakest, offering a large improvement with a little effort, or with areas that are strong, which would offer a chance to get started in a familiar area.

As the utility progresses, the Asset Management IQ can be repeated and the scores compared to previous scores. At a minimum, you may wish to repeat the Asset Management IQ every year.

It should be noted that a total score of 150 would represent best practice in all areas of Asset Management. Not all utilities will be interested in achieving this goal. The utility should set its own target levels. The tool is meant to help utilities gauge their progress over time.


Q&A

Additional Resources for Training and Technical Assistance

- **EPA's Water Infrastructure and Resiliency Finance Center**
  https://www.epa.gov/waterfinancecenter
- **EPA's Tools, Training, and Technical Assistance for Small and Rural Wastewater Systems**
  https://www.epa.gov/small-and-rural-wastewater-systems/tools-training-and-technical-assistance-small-and-rural
- **Clean Water State Revolving Fund**
  General Info: https://www.epa.gov/cwsrf
  State contacts: https://www.epa.gov/cwsrf/state-cwsrf-program-contacts
- **Environmental Finance Centers**
  https://www.epa.gov/waterfinancecenter/efcn
- **Rural Community Assistance Corporation (RCAC)**
  https://rcac.org/
- **National Rural Water Association (NRWA)**
  https://nrwa.org/

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