
Fundamentals of Asset Management

Step 5. Set Target Level of Service

A Hands-On Approach

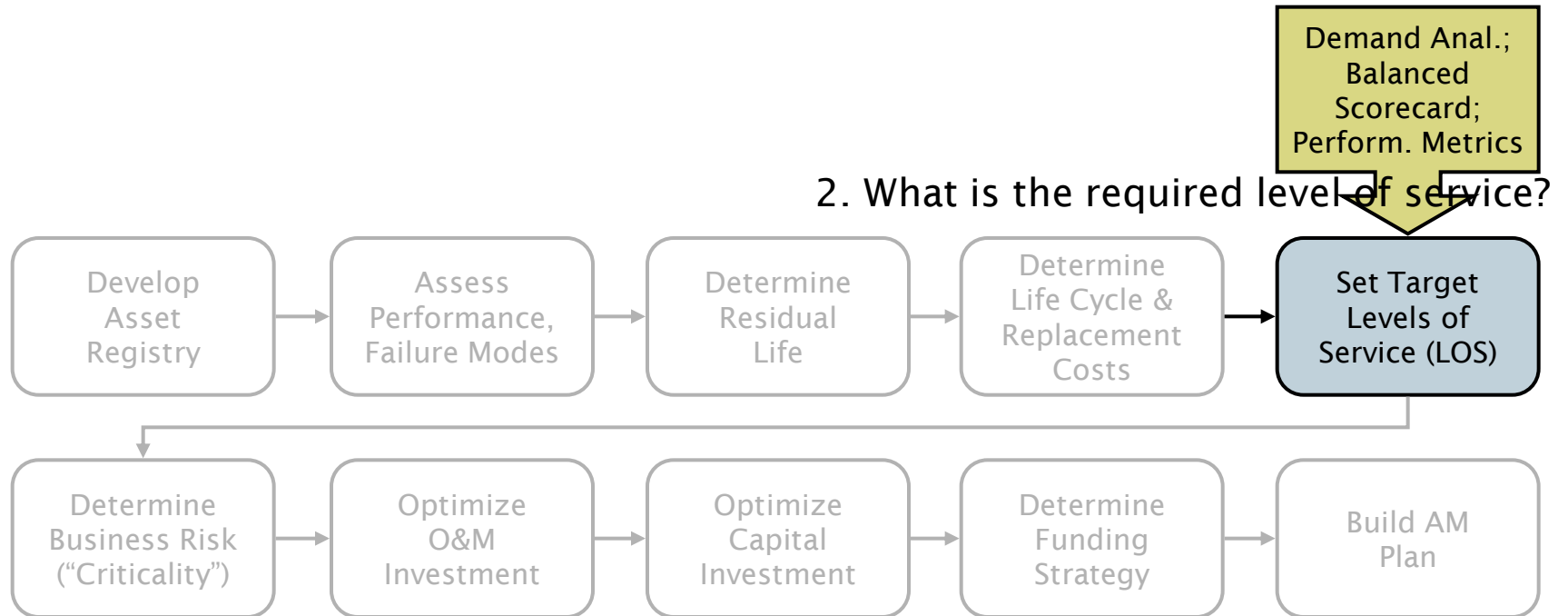
Tom's bad day...



Second of 5 core questions

2. What is the required level of service (LOS)?
 - What is the *demand for my services* by my stakeholders?
 - What do *regulators require*?
 - What is my *actual performance*?

AM plan 10-step process



Level of service

- Good, output-oriented management is driven by a defined standard or level of service
- Where that LOS is
 - Driven by *customer-user* demand
 - As determined by the appropriate legislative body in a political arena
 - Tied at the *strategic* organizational level to the *tactical* asset level
- LOS can be defined as
 - Characteristics or attributes of a service that describe its required level of performance
 - These characteristics typically describe *how much, of what nature, and how frequently* about the service

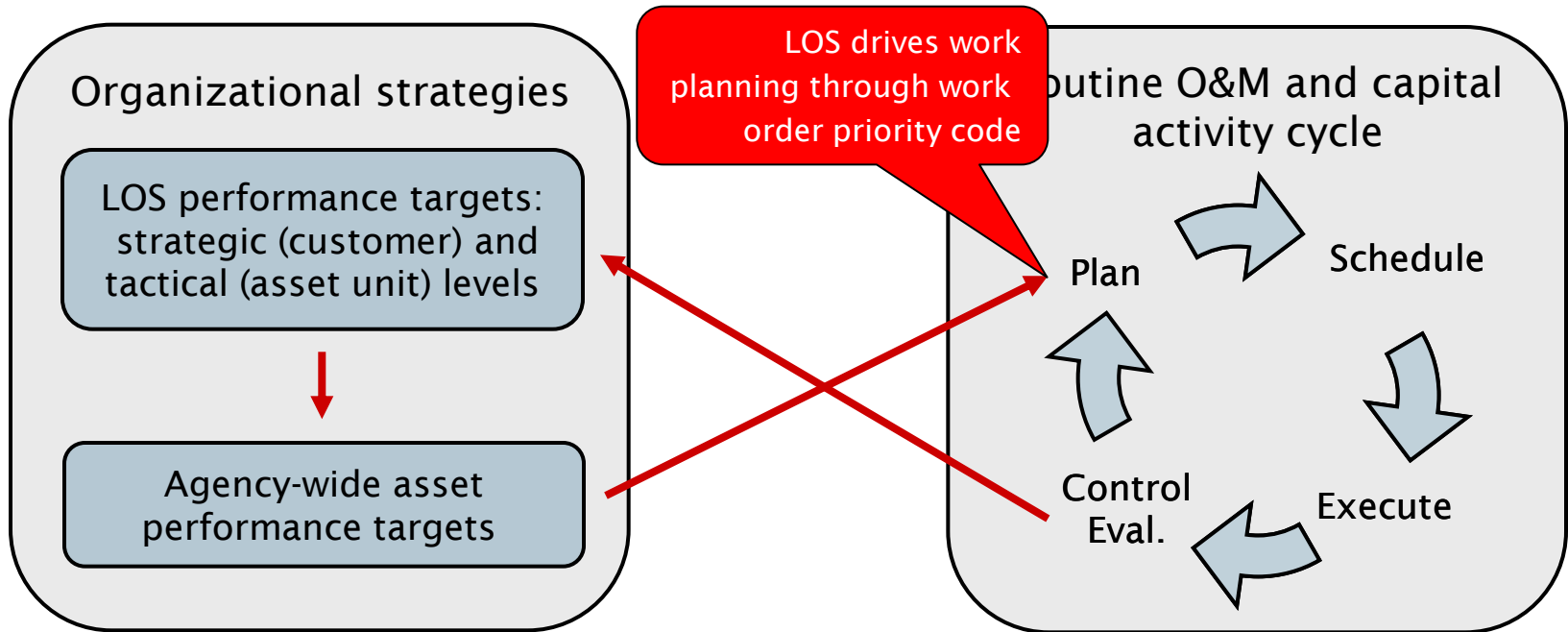
Why LOS?

It helps us...

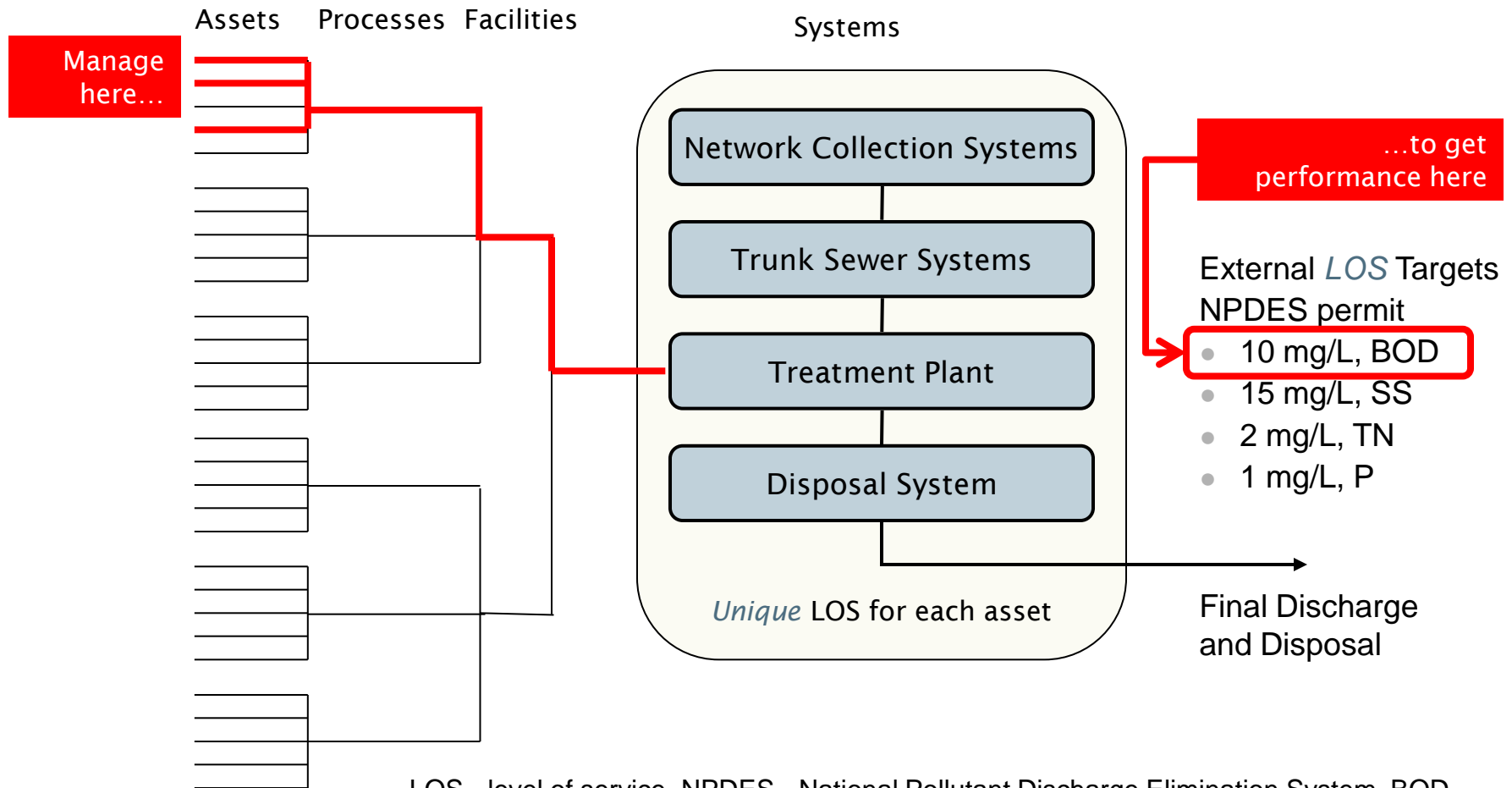
- *Concentrate* (focus) efforts and resources
 - On agreed on service levels
 - Less *service-level-defined-by-notion*
- *Communicate* service expectations and choices
 - Increased services equal increased costs
 - Discussion of trade-offs and risks
- *Negotiate* (regulators and council/commission/board)
 - Service levels
 - Costs and budgets
 - Rate impacts
 - Reinvestments for renewal
 - Level of risk

Alignment of O&M and capital activities with organizational Level of Service strategies

2.
Set minimum
levels of
performance
at asset level

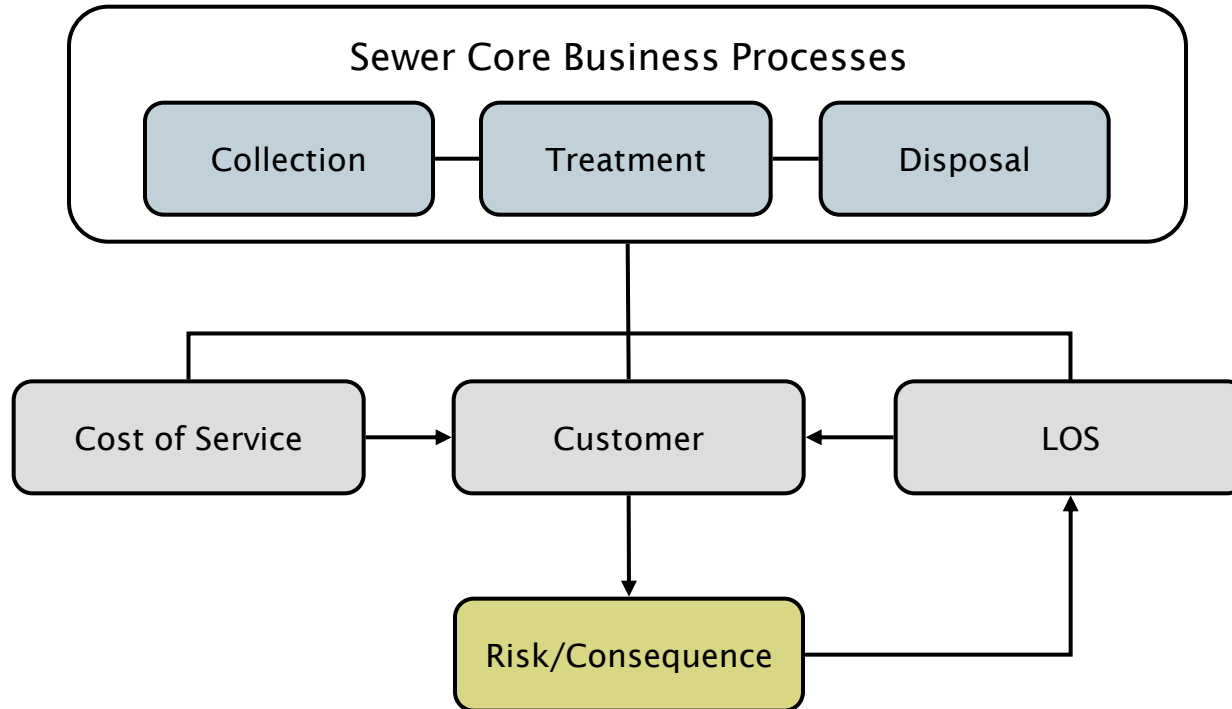


System performance requirements



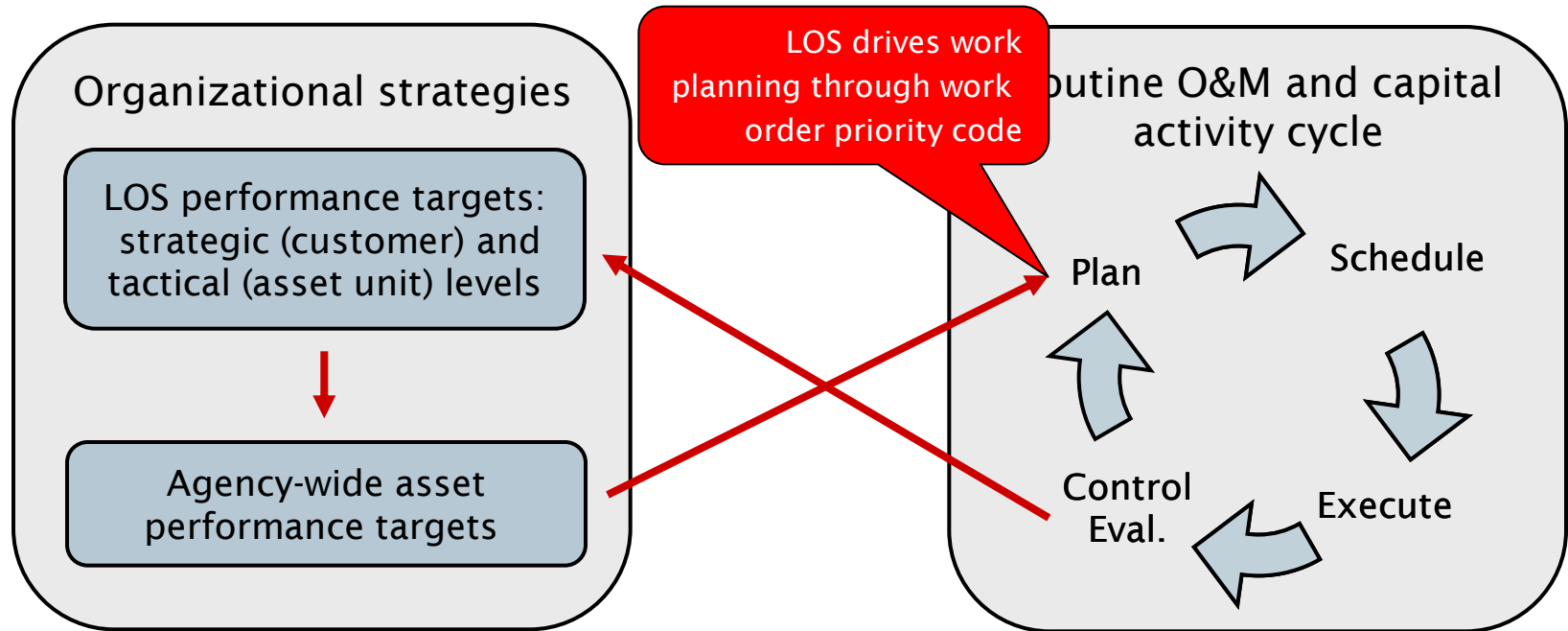
LOS - level of service, NPDES - National Pollutant Discharge Elimination System, BOD - biochemical oxygen demand, SS - suspended solids, TN - total nitrogen, P - phosphorus

LOS's strategic position



Alignment of O&M and capital activities with organizational Level of Service strategies

2.
Set minimum
levels of
performance
at asset level



Nature of LOS

- LOS occurs at multiple levels
 - Agency-wide
 - Groups or systems of assets (collection system, treatment plants)
 - Assets (individual pump stations, digesters, clarifiers)
 - Key asset components (pumps, motors, vfd's)
- LOS targets are established to *roll up* to meet higher level targets

Nature of LOS, continued

There are internal and external LOS targets

- External LOS targets typically are strategic or KPI outcomes
 - Driven by customer-user demand
 - Confirmed or determined by the appropriate legislative body in a political arena
- Internal LOS targets typically are tactical and geared toward focusing management activities

LOS is level of service, KPI is key performance indicator

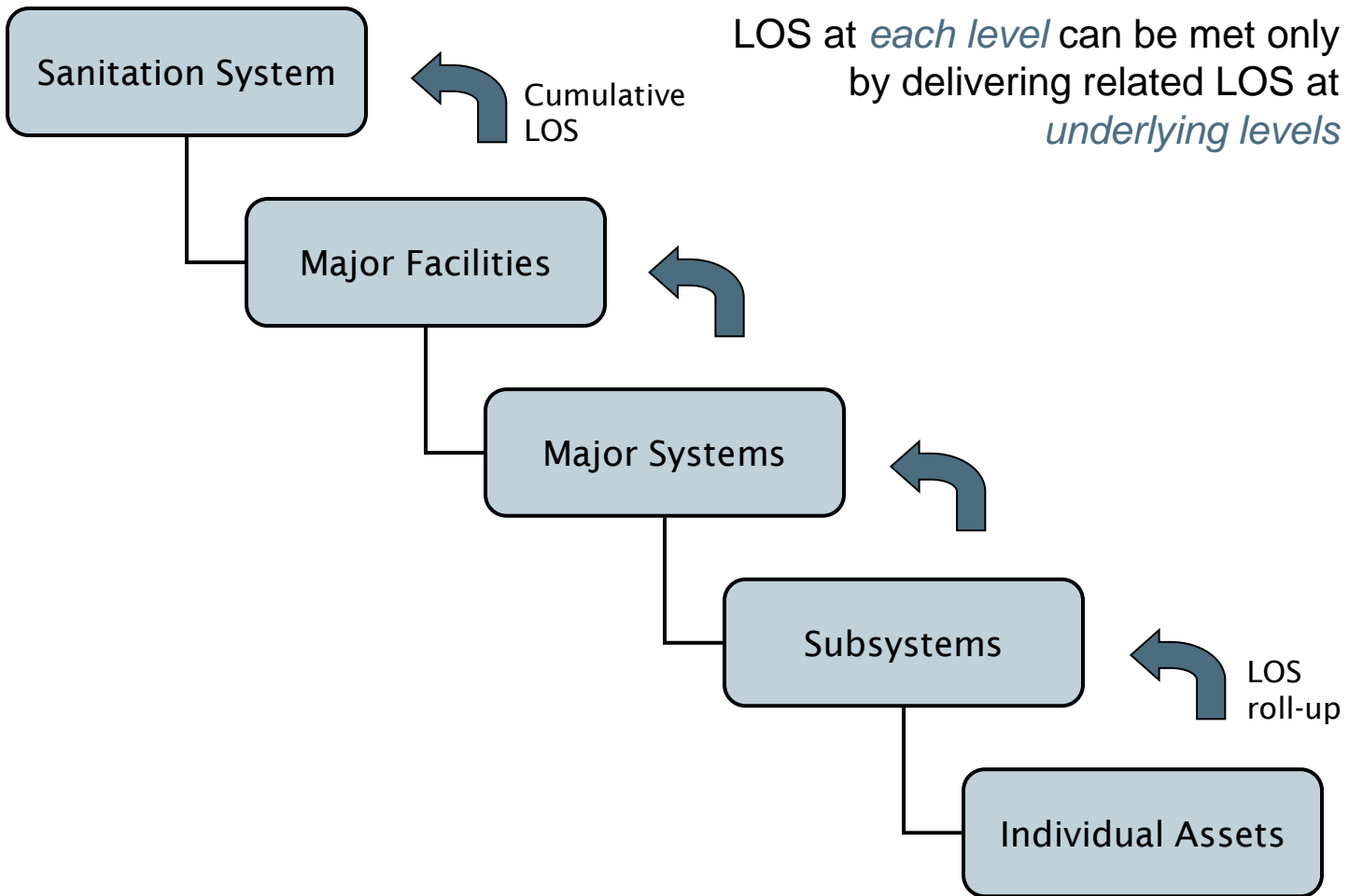
Defining our “product”

- What does your utility “sell”?
 - Collection, conveyance, treatment, and disposal of **sewage**
 - Generation, transmission, treatment, and distribution of **potable water**
- In what manner? (highest level “attributes”)
 - Customer friendly,
 - Environmentally responsible,
 - Affordable

Drivers of “customer outrage”

- Service adequacy
 - Safety/health (standards, spills, purity, pressure)
 - Quality (standards, odor, taste, color, clarity, pressure)
- Reliability (frequency of outages)
- Availability/maintainability (duration of outages)
- Affordability/efficiency (price, equity, fiscal condition)
- Courtesy
- Environmental impact

Roll up of LOS



ENVIRONMENTAL

Key Performance Indicators

1. OCSD will comply with effluent quality standards.

- a. Compliance with all Ocean Discharge Permits
- b. Concentration of Emerging Chemicals in Ocean Discharge Plant No. 1 Secondary Effluent
- c. Effluent total coliform bacteria after initial treatment
- d. Source Control permittee compliance with percent

2. OCSD will manage flows reliably.

- a. Frequency of use of emergency 1-mile outfall
- b. Sanitary sewer spills per 100 miles
- c. Contain sanitary sewer spills within 5 hours

3. OCSD's effluent will be recycled.

- a. Treated effluent reclaimed, % (flow)

4. OCSD will implement a sustainable biosolids program.

- a. National Biosolids Program Certification for Management System
- b. Percent of biosolids beneficial reuse
Class "B"
Class "A/EQ"

5. OCSD will improve the regional watershed.

- a. Dry weather urban runoff collected and treated
- b. Rainfall induced inflow and infiltration, wet weather
- c. Stormwater management, % of treatment plant treated on-site
- d. Per capita wastewater flow rate, gallons per day

6. OCSD will protect the air environment.

- a. Odor complaints: Reclamation Plant No. 2 Treatment Plant No. 2 Collection System
- b. Air emissions health risk to:
Community, cancer risk per 1 million
Employees
- c. Air mass emissions permit compliance, %

SOCIAL

Key Performance Indicators

2005 Target Level of Service

1. OCSD will be a good neighbor and will be responsive to its customers.

- a. Off site Biosolids nuisance complaints 0
- b. Odor complaint response
Treatment Plants within 1 hour 100%
Collection System within 1 working day 100%
- c. Restore collection service to customer within 8 hours 100%
- d. Respond to public complaints or inquiries regarding construction projects within 1 working day >90%
- e. Respond to collection system spills within 1 hour 100%
- f. New connection permits processed within one working day >90%
- g. Dig Alert response within 48 hours 100%

2. OCSD will provide public access to OCSD information.

- a. Public Records Act requests within 10 working days 100%
- b. Post Board/Committee Agenda Packages 72 hours prior to meeting 100%
- c. Post studies and reports on OCSD website within 1 week of receive/file. 100%

3. OCSD will take care of its people.

- a. Training hours per employee 45
- b. Employee Injury Incident Rate <3.75

ECONOMIC

Key Performance Indicators

2005 Target Level of Service

1. OCSD will exercise sound financial management.

- a. New borrowing Not more than annual Capital Improvement Program requirements
- b. COP coverage ratio Between 1.25 and 2.0
- c. COP service Principal and Interest < than O&M expenses
- d. Annual SFR user fee increase not more than 15%
- e. Annual user fees Sufficient to cover all O&M requirements
- f. Annual increase in collection, treatment, and disposal costs per million gallons < 10%
- g. Annual variance from adopted reserve policy <5%

Example of "Triple Bottom Line" LOS statement

ENVIRONMENTAL

Key Performance Indicators	2005 Target Level of Service
1. OCSD will comply with effluent quality standards.	
a. Compliance with all Ocean Discharge Permit Limits, %	100%
b. Concentration of Emerging Chemical Constituents of Concern, Plant No. 1 Secondary Effluent	NDMA < 150 ppt 1,4 Dioxane <2ppb
c. Effluent total coliform bacteria after initial dilution, mpn	<1,000
d. Source Control permittee compliance with permit conditions, percent	>90%
2. OCSD will manage flows reliably.	
a. Frequency of use of emergency 1-mile outfall	0 per year during dry weather < once per 3 years in peak wet weather
b. Sanitary sewer spills per 100 miles	< 2.1
c. Contain sanitary sewer spills within 5 hours	100%
3. OCSD's effluent will be recycled.	
a. Treated effluent reclaimed, % (flow)	4% (10 mgd)
4. OCSD will implement a sustainable biosolids management program.	
a. National Biosolids Program Certification for Environmental Management System	Maintain
b. Percent of biosolids beneficial reuse	100%
Class "B"	40%
Class "A/EQ"	60%
5. OCSD will improve the regional watershed.	
a. Dry weather urban runoff collected and treated	4 mgd
b. Rainfall induced inflow and infiltration, wet weather peak factor	<2.2
c. Stormwater management, % of treatment process area runoff treated on-site	100%
d. Per capital wastewater flow rate, gallons per person per day	<105
6. OCSD will protect the air environment.	
a. Odor complaints: Reclamation Plant No. 1	5
Treatment Plant No. 2	4
Collection System	
b. Air emissions health risk to:	
Community, cancer risk per 1 million	<25
Employees	<25
c. Air mass emissions permit compliance, %	100%

Triple Bottom Line Category

1.
Set strategic levels of service & tolerable risk limits

Value Statements

Example of "Triple Bottom Line" LOS statement

Key Performance Indicators

KPI Targets

SOCIAL

Key Performance Indicators	2005 Target Level of Service
1. OCSD will be a good neighbor and will be responsive to its customers.	
a. Off site Biosolids nuisance complaints	0
b. Odor complaint response	
Treatment Plants within 1 hour	100%
Collection System within 1 working day	100%
c. Restore collection service to customer within 8 hours	100%
d. Respond to public complaints or inquiries regarding construction projects within 1 working day	>90%
e. Respond to collection system spills within 1 hour	100%
f. New connection permits processed within one working day	>90%
g. Dig Alert response within 48 hours	100%
2. OCSD will provide public access to OCSD information.	
a. Public Records Act requests within 10 working days	100%
b. Post Board/Committee Agenda Packages 72 hours prior to meeting	100%
c. Post studies and reports on OCSD website within 1 week of receive/file.	100%
3. OCSD will take care of its people.	
a. Training hours per employee	45
b. Employee Injury Incident Rate	<3.75

ECONOMIC

Key Performance Indicators	2005 Target Level of Service
1. OCSD will exercise sound financial management.	
a. New borrowing	Not more than annual Capital Improvement Program requirements
b. COP coverage ratio	Between 1.25 and 2.0
c. COP service Principal and Interest	< than O&M expenses
d. Annual SFR user fee increase	not more than 15%
e. Annual user fees	Sufficient to cover all O&M requirements
f. Annual increase in collection, treatment, and disposal costs per million gallons	< 10%
g. Annual variance from adopted reserve policy	<5%

Triple Bottom Line Category

Value Statements

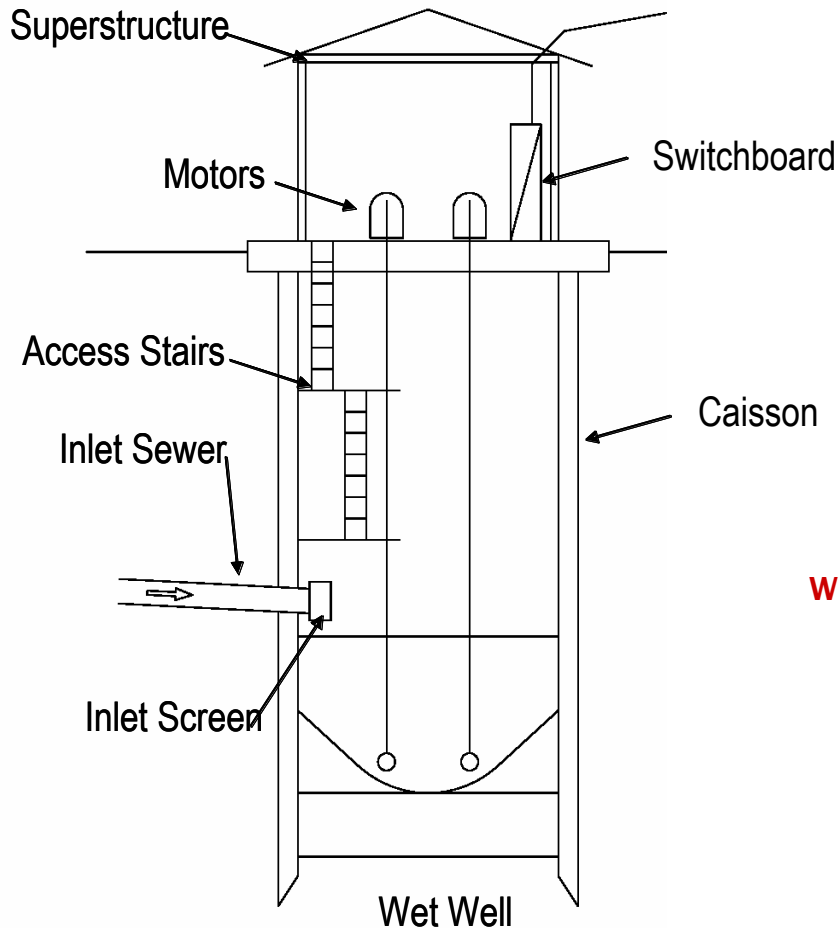
1. Set strategic levels of service & tolerable risk limits

Example of "Triple Bottom Line" LOS statement

Key Performance Indicators

KPI Targets

Pump station LOS requirements



Which assets relate directly to achieving target levels of service?

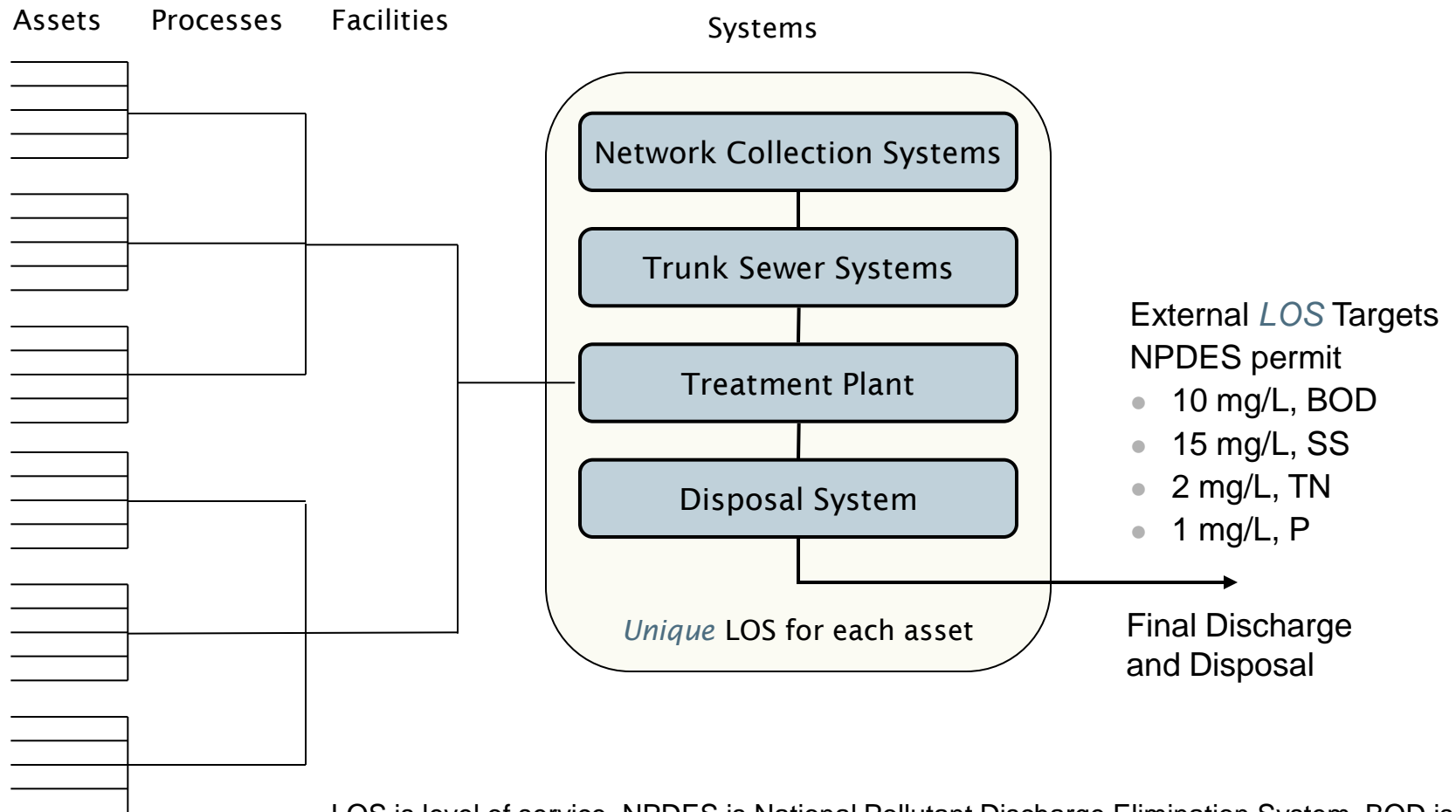
External *LOS for Pump Station*

- No preventable SSOs
- 3 odor complaints/year. max.
- 35 dB at boundary, max.
- OSHA compliance
- NPDES & CMOM compliance

Where in the lift station is noise generated?

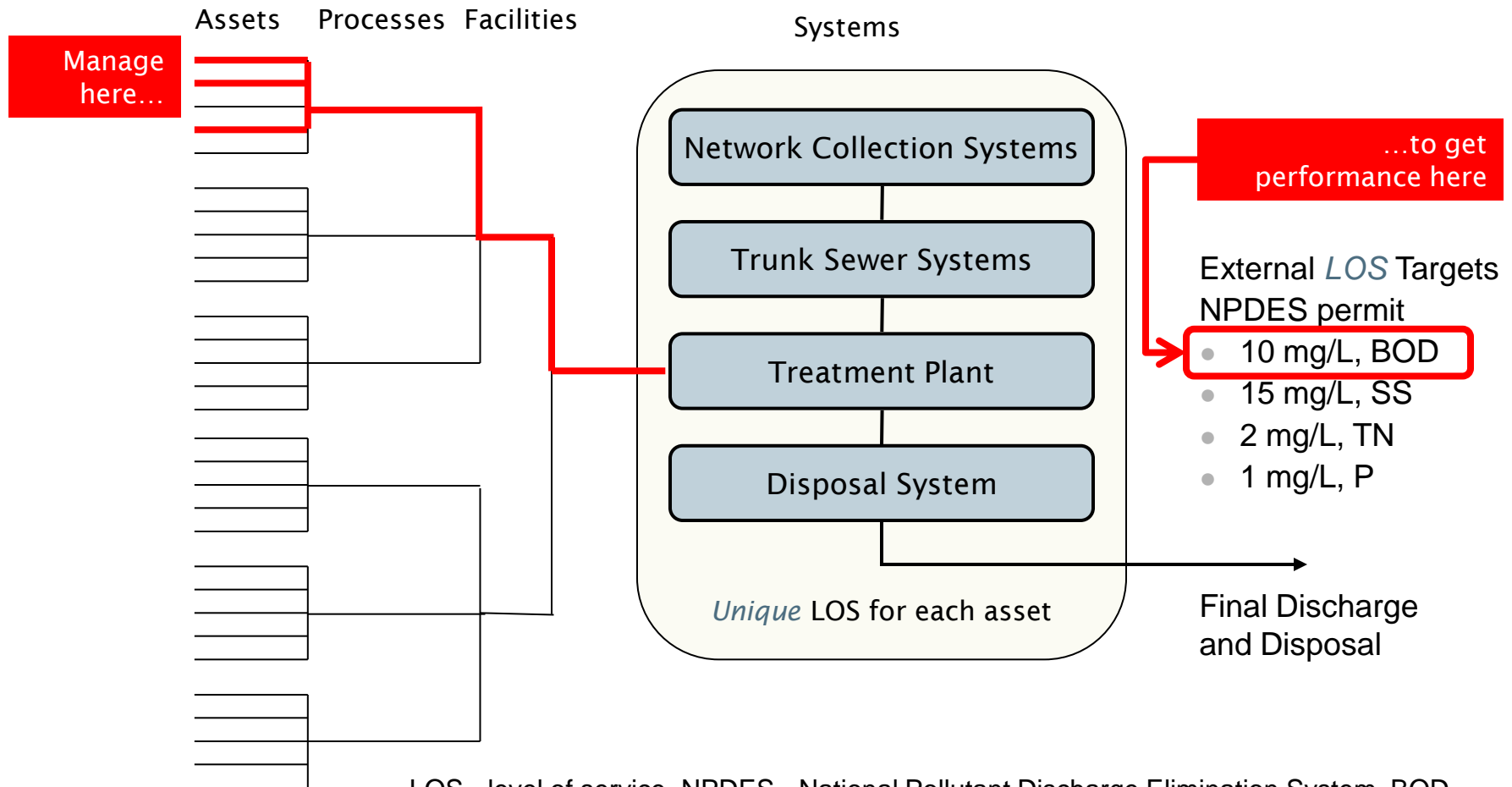
LOS is level of service, SSOs are sewer overflows, dB is decibel, OSHA is Occupational Safety and Health Administration, NPDES is National Pollutant Discharge Elimination System, CMOM is capacity, management, operation, and maintenance

System performance requirements



LOS is level of service, NPDES is National Pollutant Discharge Elimination System, BOD is biochemical oxygen demand, SS is suspended solids, TN is total nitrogen, P is phosphorus

System performance requirements



LOS - level of service, NPDES - National Pollutant Discharge Elimination System, BOD - biochemical oxygen demand, SS - suspended solids, TN - total nitrogen, P - phosphorus

Recall: Four major failure modes

<i>Failure Mode</i>	<i>Definition</i>	<i>Tactical Aspects</i>	<i>Management Strategy</i>
Capacity	Volume of demand exceeds design capacity	Growth, system expansion	Redesign
LOS	Functional requirements exceed design capacity	Codes & permits: NPDES, CSOs, OSHA, noise, odor, life safety; service, etc.	O&M optimization, renewal
Mortality	Consumption of asset reduces performance below acceptable level	Physical deterioration due to age, usage (including operator error), acts of nature	O&M optimization, renewal
Efficiency	Operations costs exceed that of feasible alternatives	Pay-back period	Replace

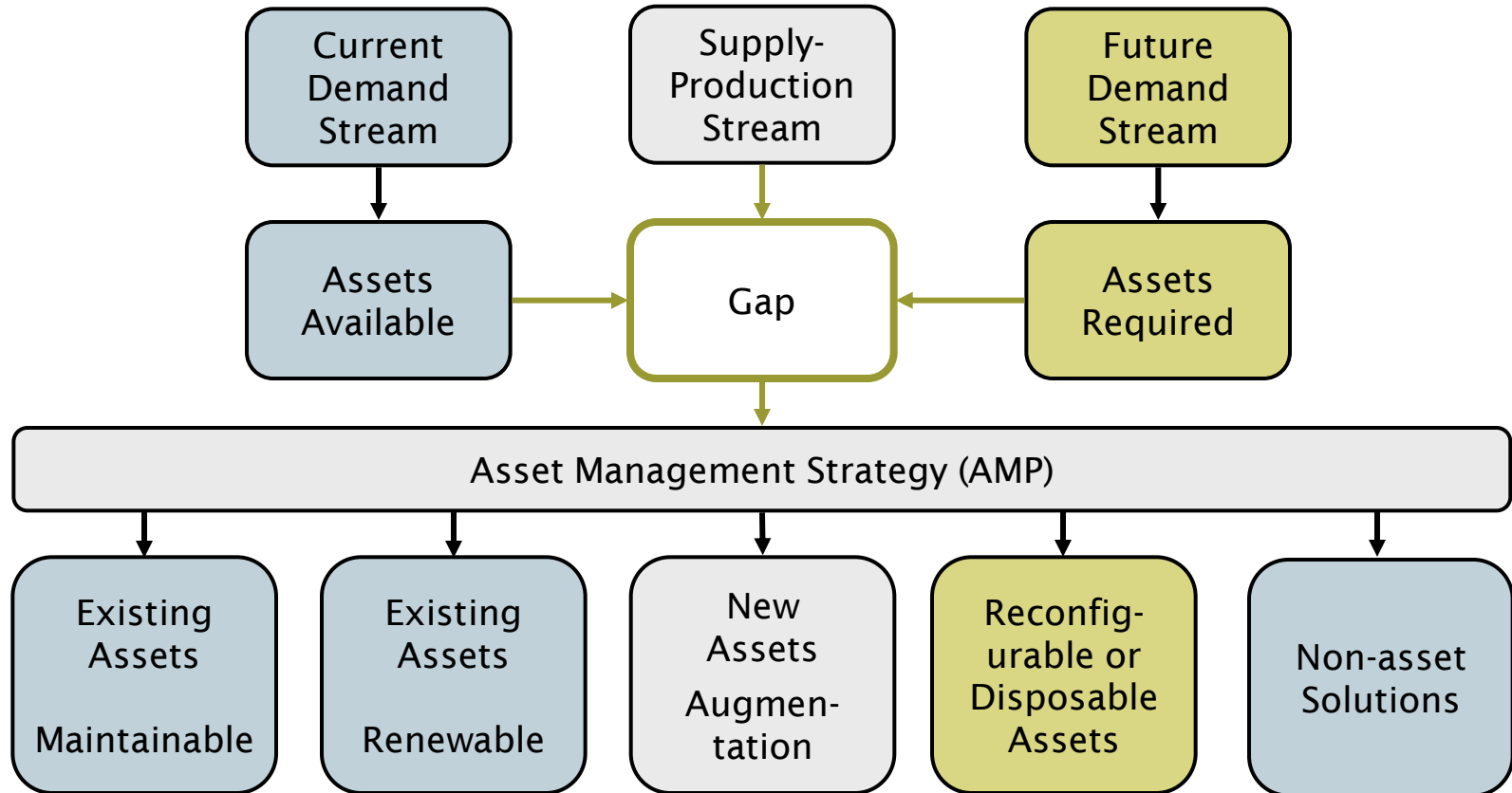
NPDES is National Pollutant Discharge Elimination System, CSOs are combined sewer overflows, and OSHA is Occupational Safety and Health Administration

Forces driving LOS

LOS is constantly subjected to forces of change:

- Growth/retrenchment
- Regulatory requirements
- Demands of customers
- Physical deterioration
- Operational costs/efficiencies

Balancing future demand with current capabilities



Example: Pump station LOS

<i>Standard</i>	<i>Measure</i>	<i>Current</i>	<i>Target</i>
<i>Performance</i>			
Odor	Complaints/year	0.5	1
	Number/year	2	0
Spills	Gallons/spill	56,000	2,000
Pumping	Percent influent	99.68%	100%
<i>Reliability</i>			
SCADA	Outages/year	7	2
	Duration, hours	72+	8
Power	Outages/year	1	1
	Duration, hours	7	2.5

Example: Pump station LOS

<i>Standard</i>	<i>Measure</i>	<i>Current</i>	<i>Target</i>
<i>Reliability, cont.</i>			
Pumps	% reserve capacity, peak Q	30%	30%
	% redundancy at peak Q	0	50%
Power	2nd source, hours	7	2.5
<i>Regulatory</i>			
Spill reporting	Verbal, hours	NA	24
	Report, days	21	10
	Impact notice, hours	NA	8
	Training, hours/yr	0	8

Key points from this session

What is my required sustainable level of service?

Key Points:

- LOS is the “collection of measurable attributes or characteristics of a product or service delivered” to a customer
- LOS is most useful in a long term perspective - “sustainable LOS”
- LOS is ultimately defined by customers and regulators through the agency’s Policy Board.
- System performance and customer satisfaction (“serviceability”) are related but separate concepts.
- LOS is directly related to the cost of service and the level of acceptable business risk.
- LOS is best measured across a range of balanced measures.
- Your Board should be involved in determining LOS.

Associated Techniques:

- Customer demand analysis
- Regulatory requirements analysis
- Level of service statements; LOS “roll-up” hierarchy
- Balanced scorecard”
- Asset functionality statements
- AM Charter

Tom's spreadsheet

Microsoft Excel - EPA Seminar Master.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

Arial 10 B I U

U13

Asset Register and Hierarchy					What is the State of My Assets?			Required LOS?		Which Are Most "Critical"?		
Installed Date	Asset Class	Original Cost	Estimated Effective Life	Condition Rating	Annual Dep	Accum Dep	Current LOS?	Minimum Condition	Backup Reduction (Redundancy)	Probability of Failure	Consequence of Failure	
Year	Tab A	\$	Years	1 to 10	\$	\$			%	Rating	1 to 10	
Act or Est	Tab A	Act or Est	Calculated	Tab A	Calculated	Calculated		Tab A	Tab D	Calculated	Tab C	
Sanitation System												
Disposal System												
Treatment Plants												
Collection Systems												
Sewer Mains												
Pump Station												
Incoming Sewer												
Pipes												
1963	3	\$ 1,725	100	6	\$ 17	\$ 742		2	0%	4	5	
Manhole												
1963	3	\$ 340	100	5	\$ 3	\$ 146		2	0%	4	5	
Influent Gate Valve												
1996	5	\$ 442	30	8	\$ 15	\$ 295		2	0%	7	5	
Incoming Power												
Pole & Transformer												
2006	4	\$ -	40	1	\$ -	\$ -		2	0%	0	5	
Connection												
2006	7	\$ -	35	1	\$ -	\$ -		2	0%	0	5	
Control system												
Incoming Telephone												
1985	8	\$ 85	25	7	\$ 3	\$ 71		2	0%	8	2	
PLC												
1983	8	\$ 8,600	25	8	\$ 344	\$ 7,912		2	0%	9	2	
Manual controls												
1978	8	\$ 428	25	7	\$ 17	\$ 476		2	50%	5	2	
Land & Improvements												
Land												
1950	10	\$ 630	300	1	\$ 2	\$ 118		4	0%	2	1	
Access Road												
1963	1	\$ 12,500	75	5	\$ 167	\$ 7,167		4	0%	6	1	
Landscaping												
2000	1	\$ 595	75	6	\$ 8	\$ 48		3	0%	1	1	
Security fence												
1963	1	\$ 1,360	75	7	\$ 18	\$ 780		2	0%	6	3	
Sub Structure												
Cassion Outer												
1963	1	\$ 30,600	75	6	\$ 408	\$ 17,544		3	0%	6	4	
Upper Floor												
1963	1	\$ 4,250	75	6	\$ 57	\$ 2,437		3	0%	6	4	
Dry well												
1963	1	\$ 6,800	75	6	\$ 91	\$ 3,899		3	0%	6	4	
Landings and Stairs												
1963	9	\$ 4,250	60	7	\$ 71	\$ 3,046		2	0%	7	4	
Wet Well												
1963	1	\$ 5,100	75	6	\$ 68	\$ 2,924		3	0%	6	4	
Shaped floor												
1963	1	\$ 850	75	6	\$ 11	\$ 487		3	0%	6	3	
Sump pump												
1963	4	\$ 595	40	6	\$ 15	\$ 640		2	0%	10	4	
Pumps												
Drive shafts												
2006	6	\$ 12,560	35	1	\$ 359	\$ -		2	TBD	10	TBD	
Pumps												
2006	4	\$ 29,750	40	1	\$ 744	\$ -		2	TBD	10	TBD	

Ready

start

Modules 2

Duncan Rose - Inbox ...

Webpage has expire...

EPA 0 Overview.ppt

Day 1.EPA.Revised.ppt

Microsoft Excel - EPA ...

10:43 AM
Tuesday
4/10/2007