

# Fundamentals of Asset Management

*Step 8. Optimize Capital Investment*

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*A Hands-On Approach*

# Tom's bad day...

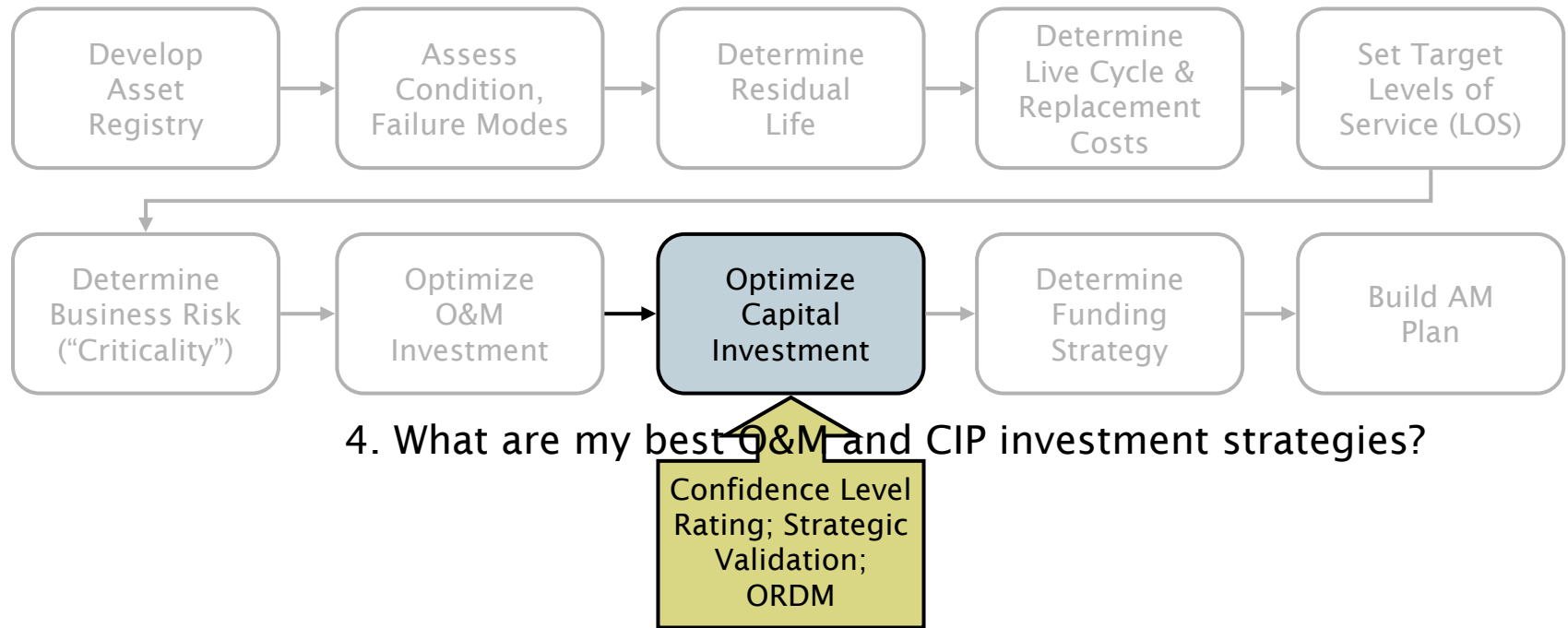


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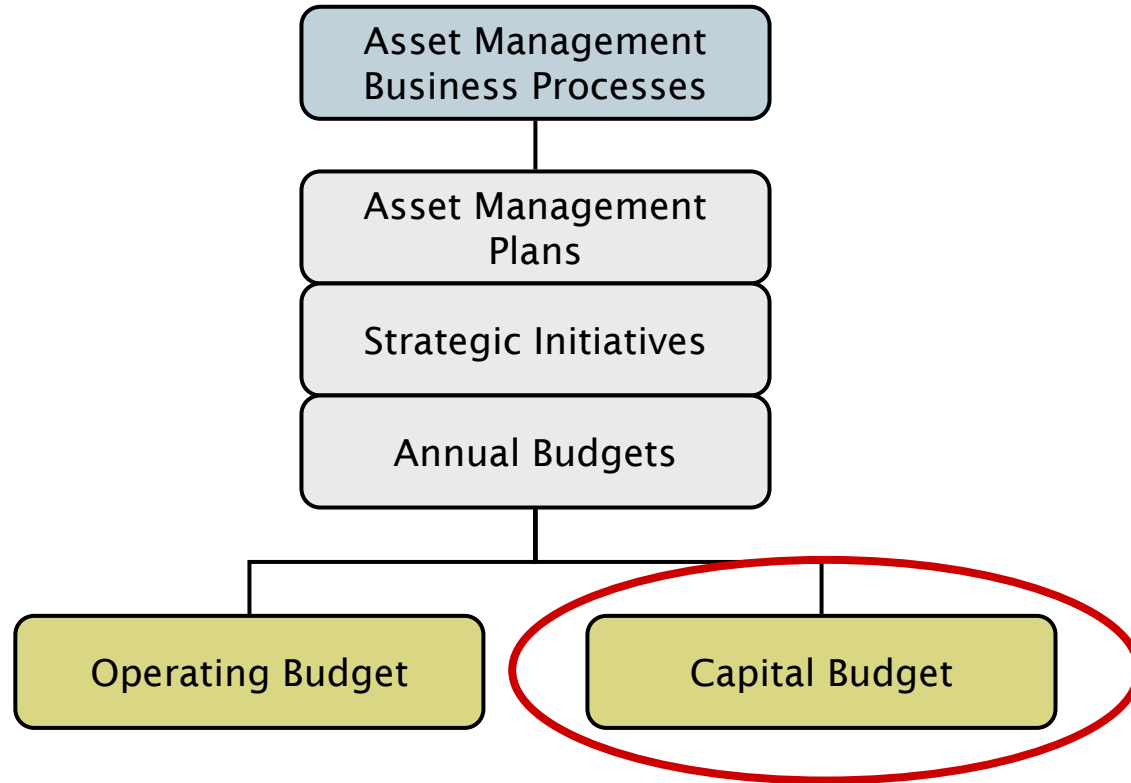
## Fourth of 5 core questions

4. What are my best O&M and CIP investment strategies?
  - What alternative management *options* exist?
  - Which are the *most feasible* for my organization?

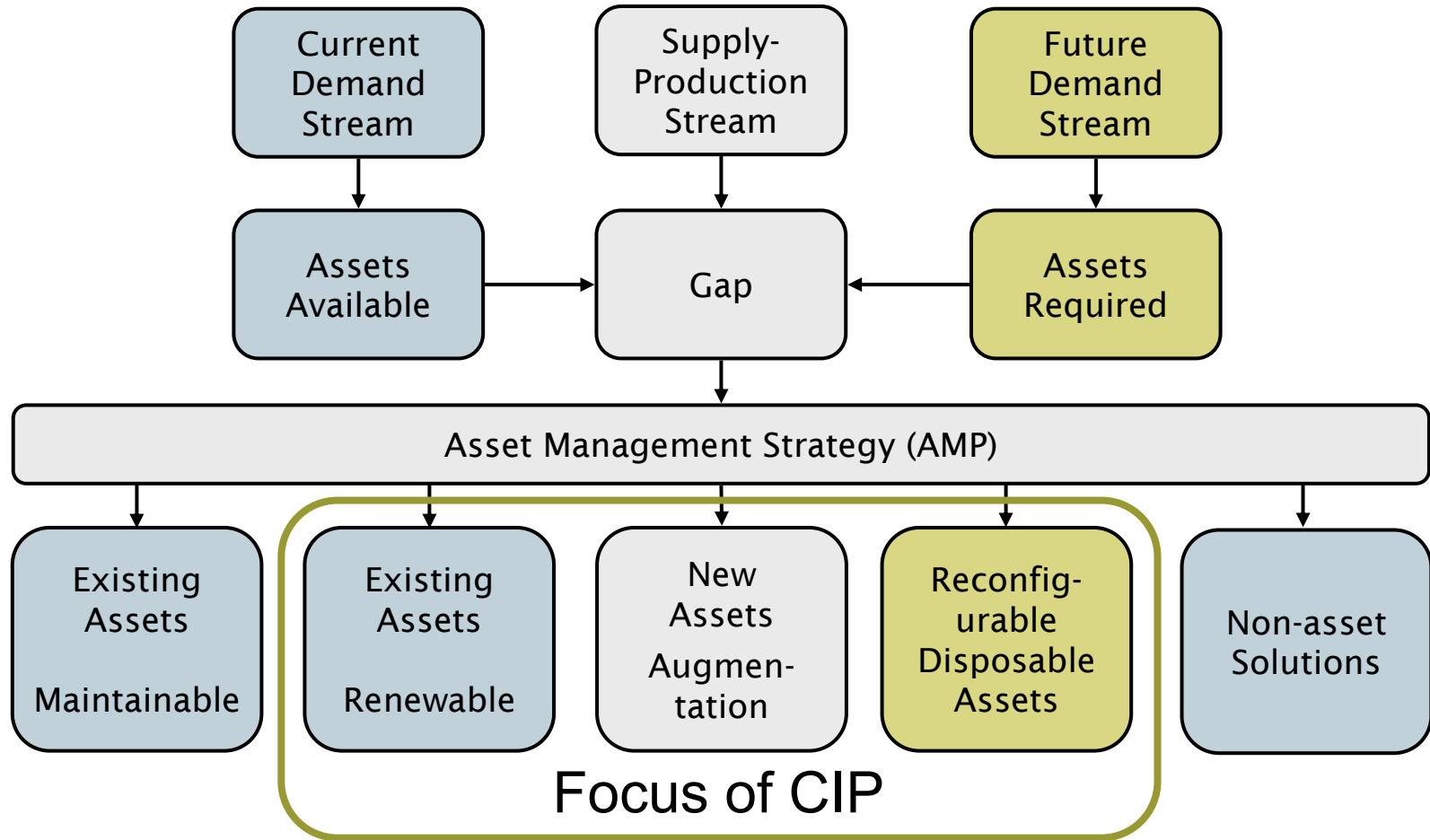
# AM plan 10-step process



# Recall view 4: Management framework



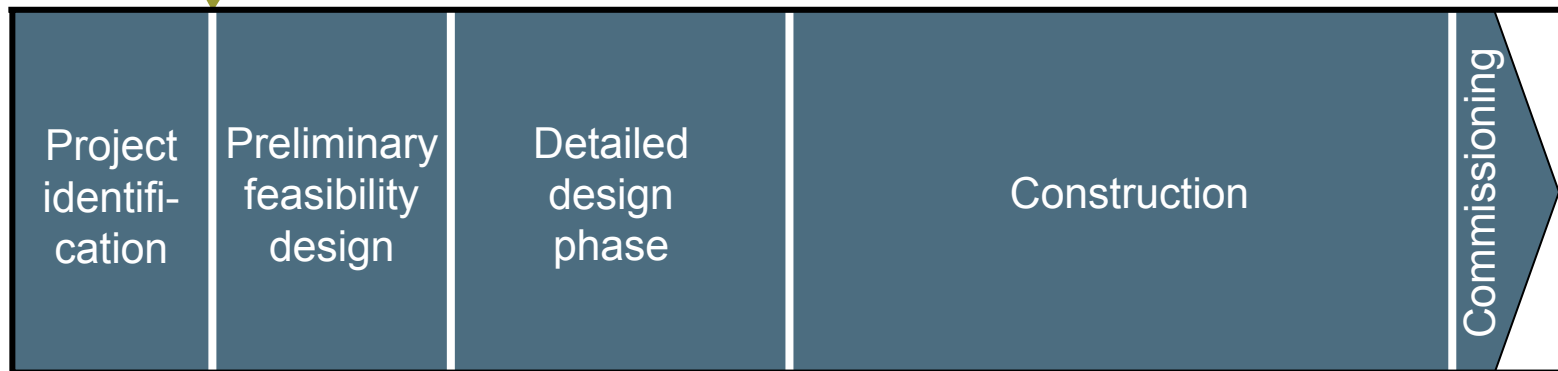
# Balancing future demand with current capabilities



# The CIP process *locks in* life cycle costs!

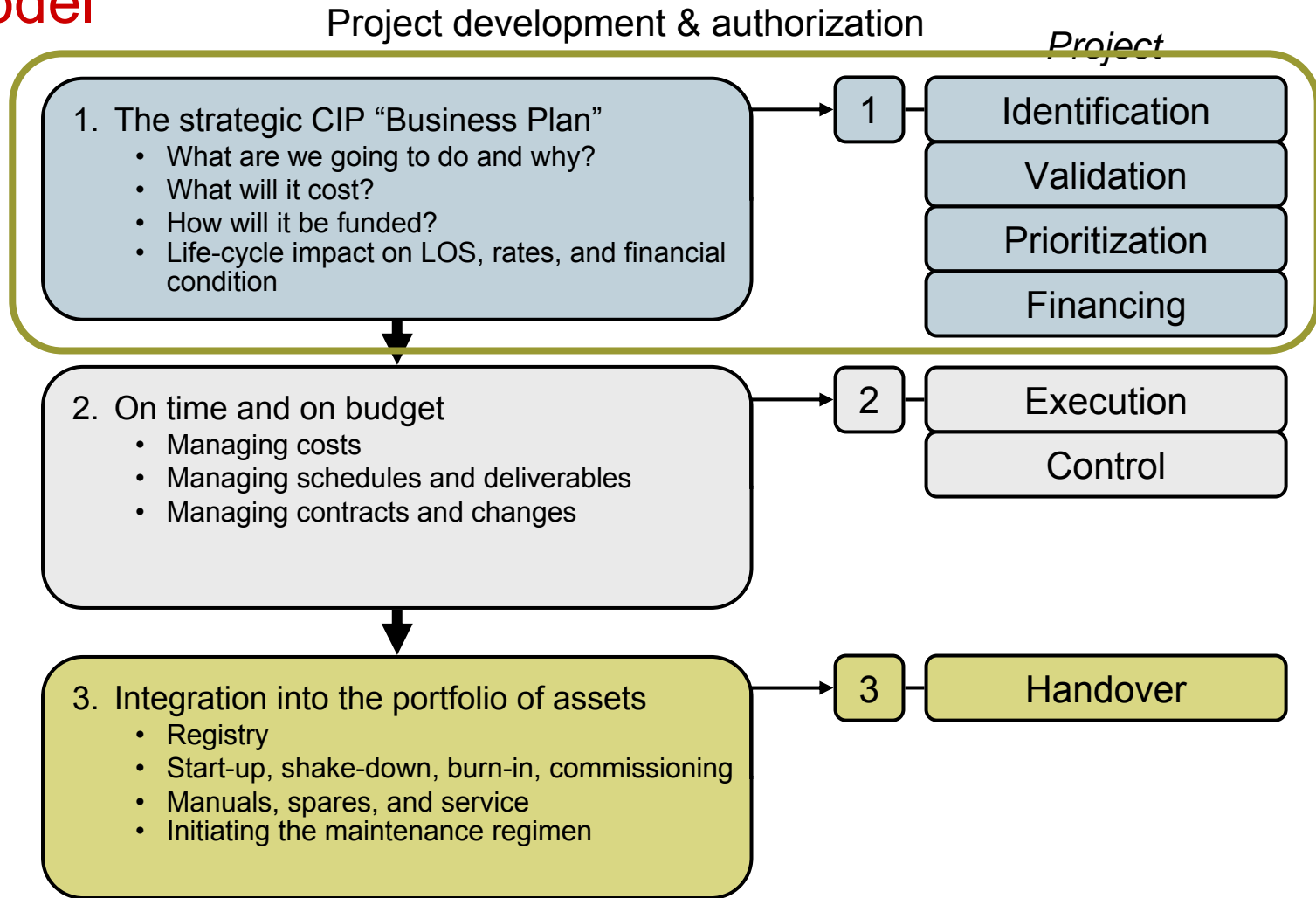
65-85% of all life-cycle costs are “locked-in” here!

Life-cycle O&M costs often are 5-10 (even 20) times initial construction costs



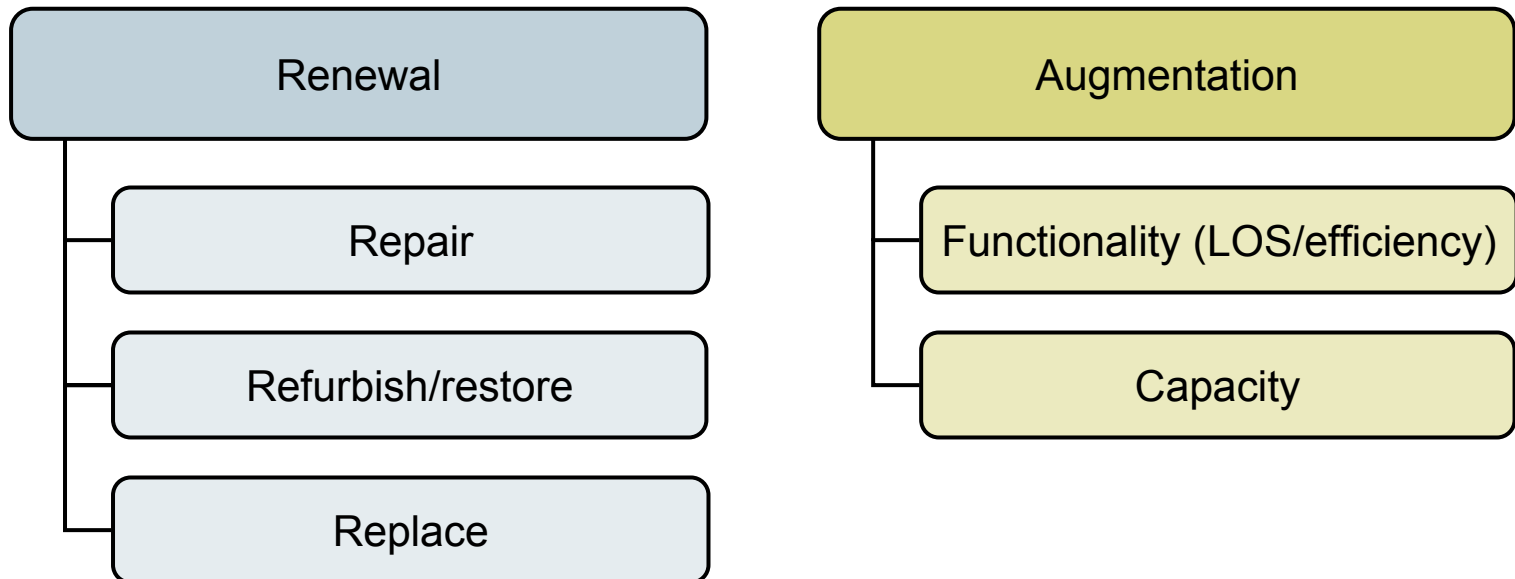
Life-cycle cost reduction opportunities diminish →

# Deriving the CIP investment program – a best practice model

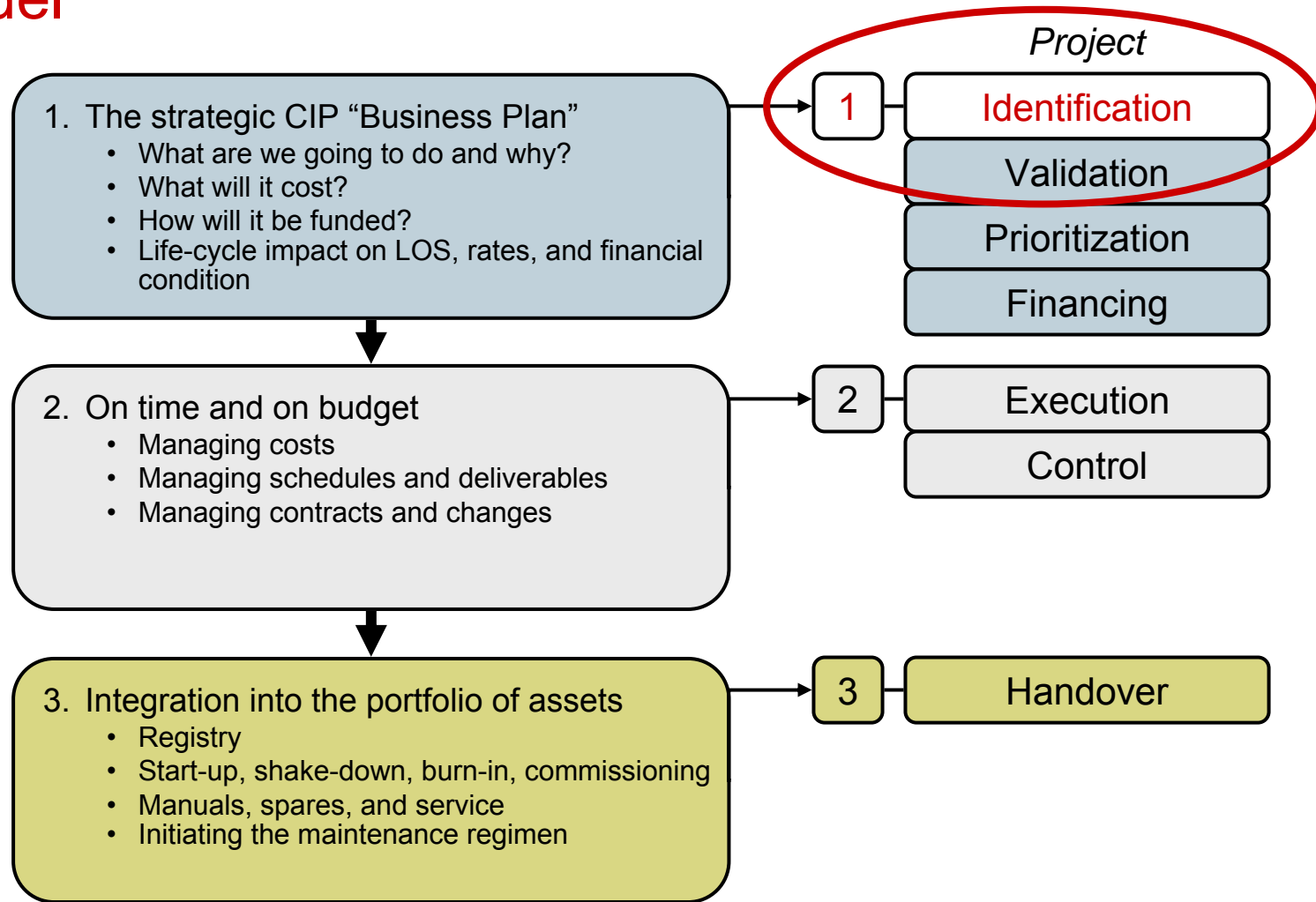




# Capital investment is made up of two major types of projects

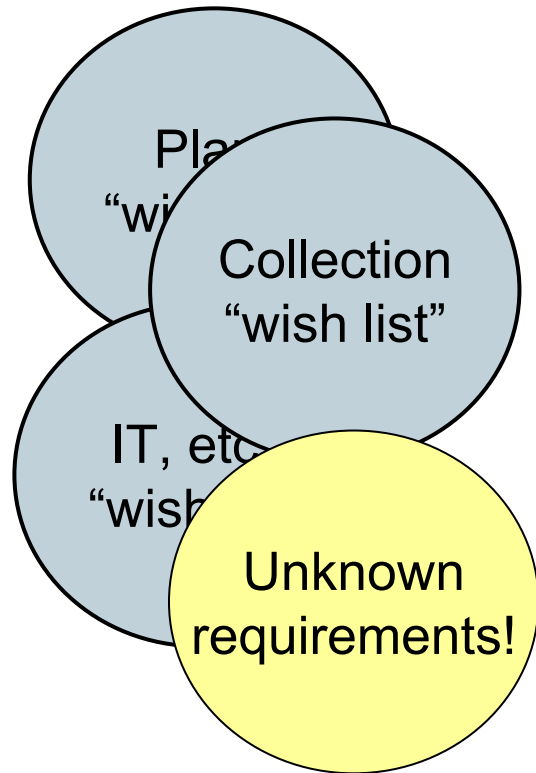


# Deriving the CIP investment program – a best practice model

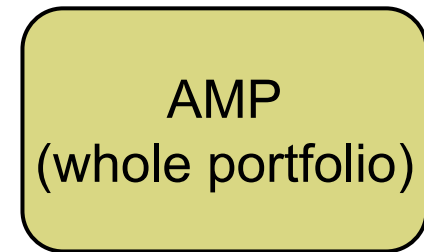


# Project identification: Moving to “best practice”

## “Champion” model

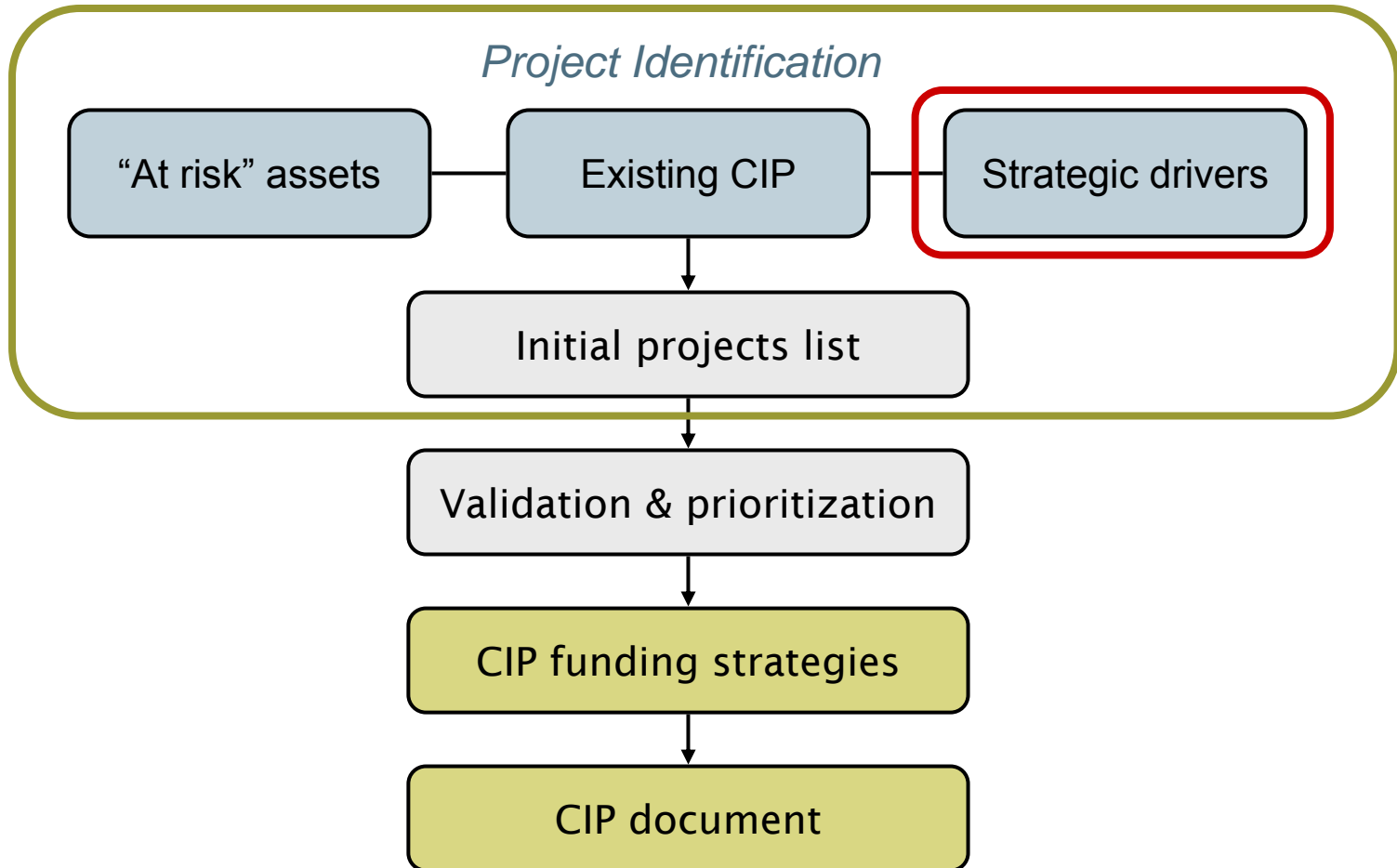


## “Structured” model



- Inventory
- Condition
- Failure modes
- Residual life
- Replacement \$
- LOS
- ODM

# The project development process

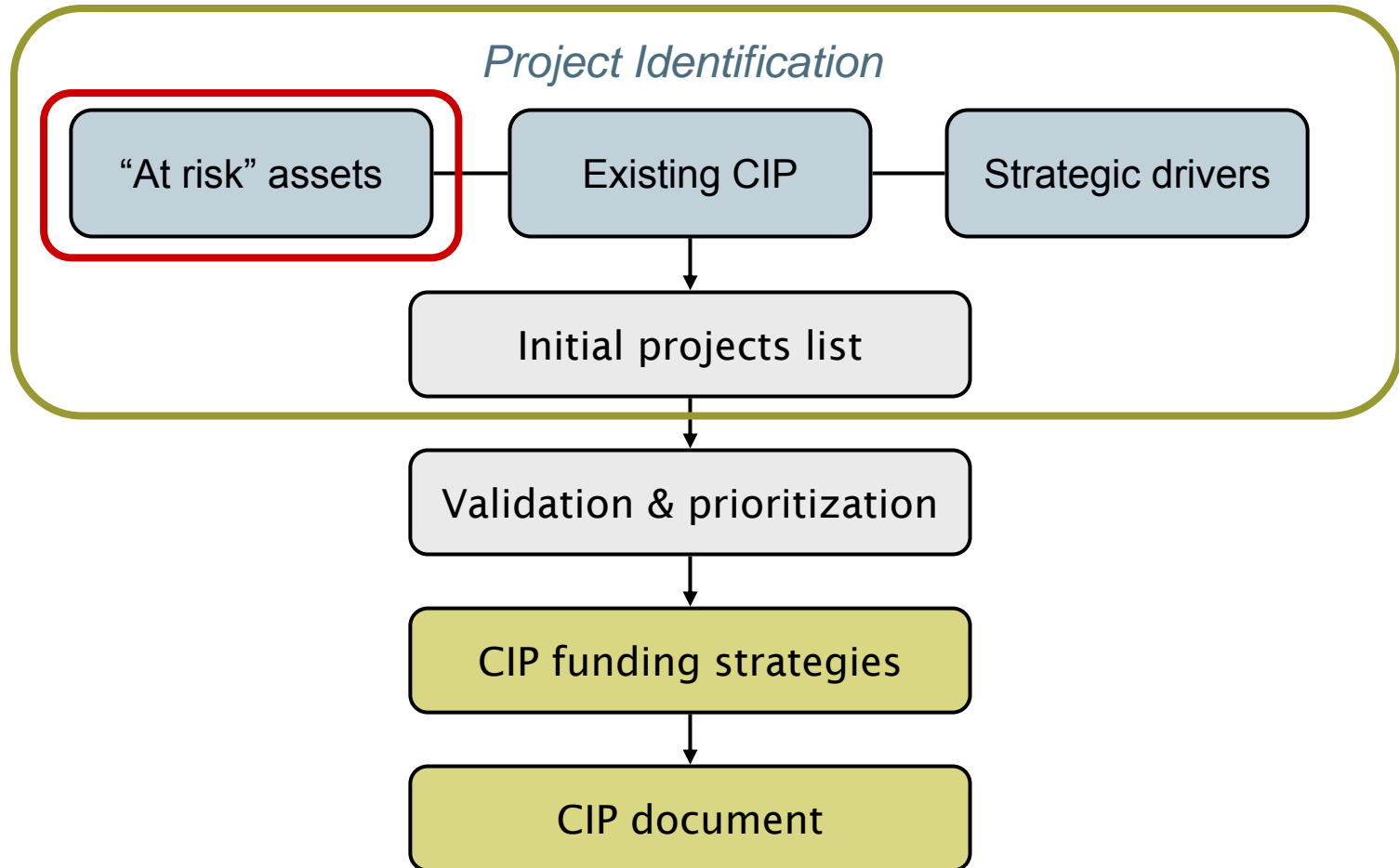


# The “primary failure mode” gives insight into “strategic drivers” at work

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

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

# The project development process



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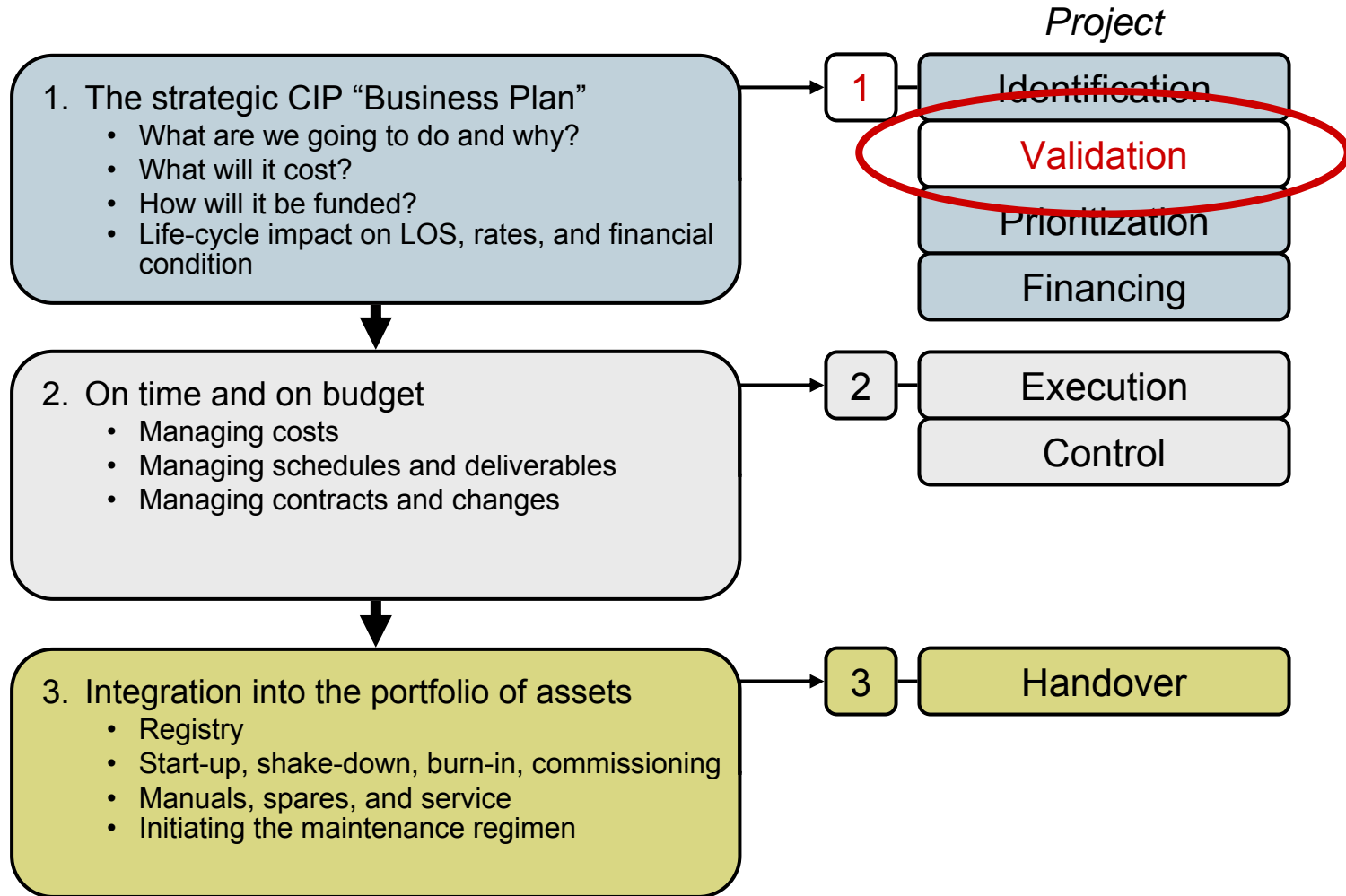
## “At risk” assets

- High business risk exposure scores
- Very low remaining useful lives
- Poor condition scores or scores approaching designated minimum acceptable levels
- Poor performance scores
- Poor reliability scores
- No redundancy
- Imminent major failure mode of “capacity” or “level of service”





# Deriving the CIP investment program – a best practice model



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# Driving down the cost of CIP

Can we...

- Eliminate projects?
- Defer projects?
  - Change maintenance?
  - Change operations?
- Shift to more appropriate Optimized Renewal Decision Making (ORDM) solution (repair, refurbish, replace)?
- Find a non-asset solution?

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## CIP validation

How do we know that we have...

- The right projects?
- At the right time?
- At the right cost?
- For the right reasons?

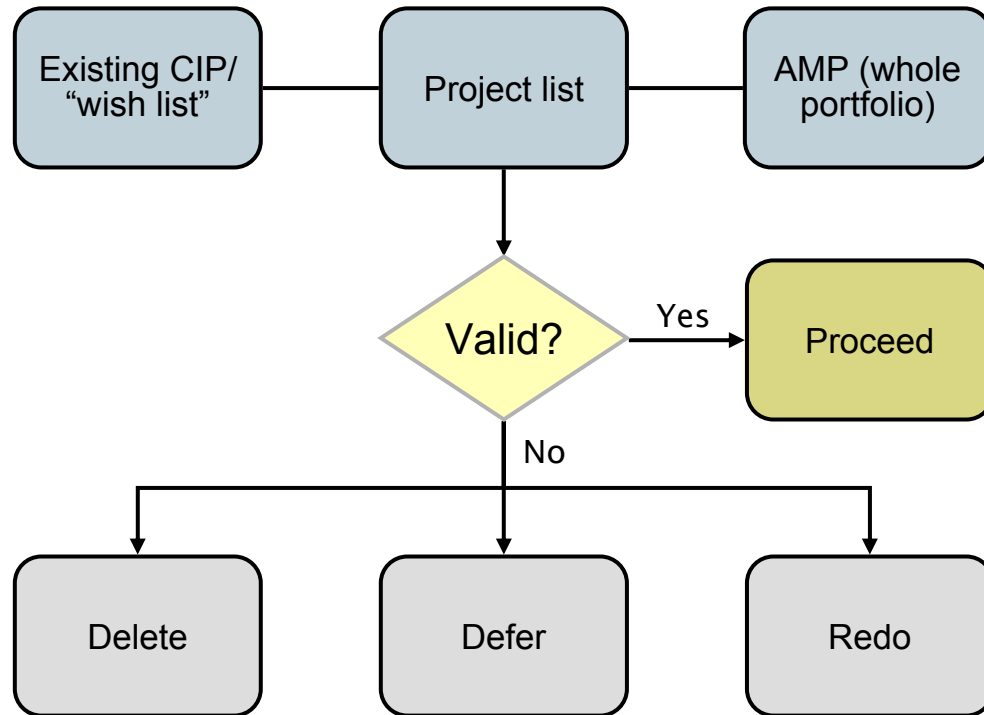
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# CIP Validation

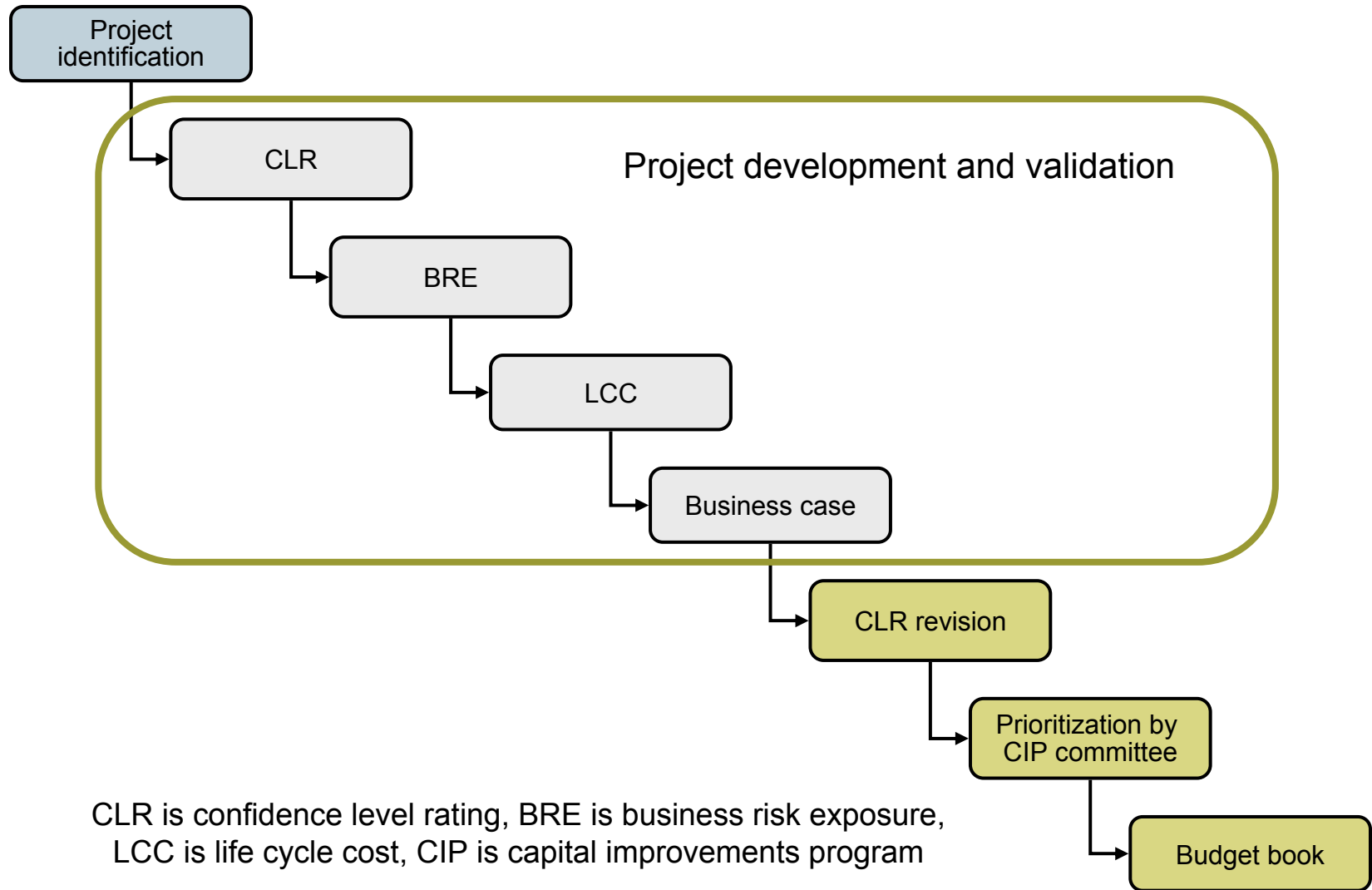
## How do we “validate”?

- We produce a rigorous *business case* for all projects that justifies the timing and project solution including
  - Life cycle cost (capital and O&M)
  - “Triple bottom line” risks (financial, social, and environmental)
- We *sufficiently analyze* in a step-by-step approach to ensure that we have reached an *acceptable level of confidence* (confidence level rating—CLR)
- We set the sophistication of analytical process to match the *risks, value of the capital, and life cycle costs* to be invested

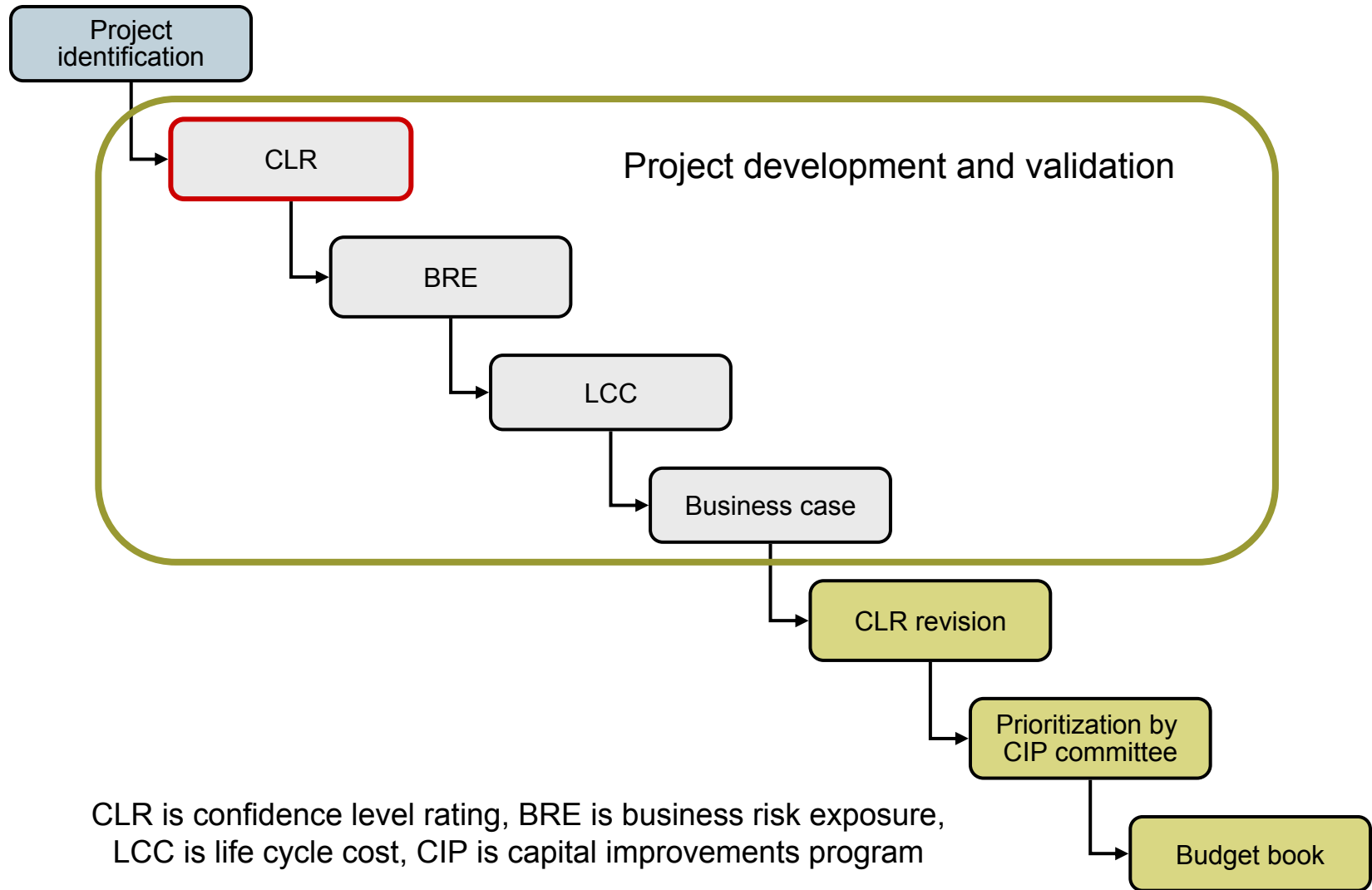
# Validation as a “decision” filter



# Process steps



# Process steps



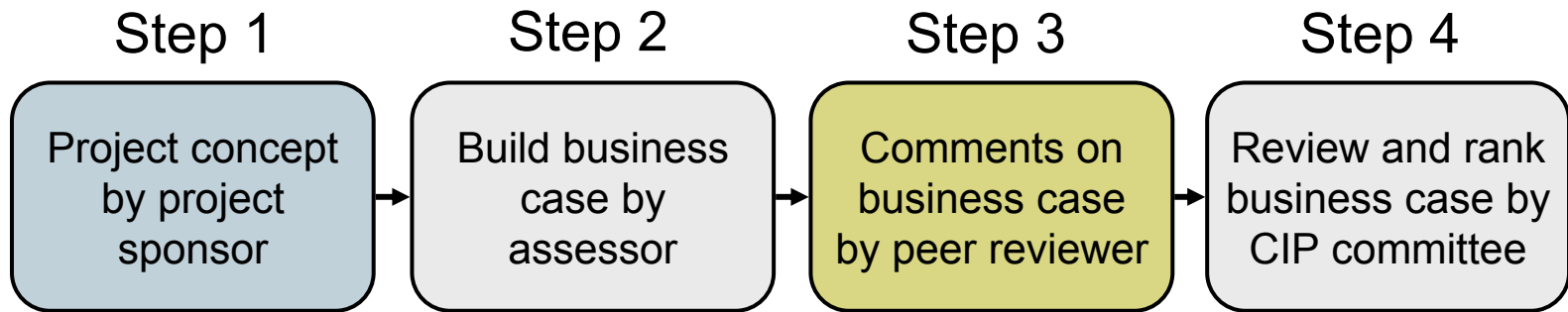
# Measuring our confidence in our proposed projects and solutions

How confident are we that we are recommending the right *solution* at the right *time* at the right *cost*?

$$\begin{array}{rcccl} \text{Best} & & & & \\ \text{Appropriate} & + & \text{Quality of} & = & \text{Confidence} \\ \text{Process} & & \text{Data Used} & & \text{Level Rating} \\ & & & & \text{(CLR)} \\ \hline & 2 & & & \\ \\ 70\% & + & 40\% & = & 55\% \\ \hline & 2 & & & \end{array}$$



# Confidence level rating process steps



# CLR: 13 elements to be considered

1. Existing standard of service?  
What is the purpose of the asset? Why is it there?
2. Knowledge of existing asset or facility (renewal)
  - What condition is the asset in?
  - What is its performance? It's reliability?
3. Current asset utilization (renewal)  
What is the asset actually delivering vs. what do I require the asset to do?

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## CLR: 13 elements to be considered, cont.

### 4. Future demands and reliability

What increase in level of service is expected in the future?

### 5. Prediction of reliability and failure mode (renewal)

Of the four failure modes (Capacity, Level of Service, Mortality and Efficiency), which one is most eminent?

### 6. Timing of reliability / renewal failure

How likely is this failure to occur?

### 7. Consequence of reliability and renewal failure

What is the impact of this failure?

## CLR: 13 elements to be considered, cont.

### 8. Quality of proposed maintenance program

How good are my estimates for maintenance costs for this project? Do I understand the most appropriate regimen across its life cycle?

### 9. Appropriateness of operating budgets

How good are my estimates for operating costs for this project?

### 10. Appropriateness of renewal solution

Have we systematically considered all nine treatment options (do nothing, status quo, operate differently, maintain differently, repair, refurbish/rehabilitate, replace, decommission, and non-asset based)?

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## CLR: 13 elements to be considered, cont.

### 11. Assessment of capital costs

How good are my estimates for capital costs?

### 12. Assessment of benefits (risk reduction)

- What am I really getting for doing this project and have I adequately quantified it?
- Will this provide real benefit to stakeholders?
- Have I done the homework to understand the benefits?

### 13. Appropriateness of evaluation process

Have I balanced business risk and all (life cycle) costs and benefits and documented them in a business case?

# Confidence Level Assessment & Rating

LEVEL 2: Overall Confidence Levels LOS Capital Improvement Projects

**“Gap” is difference between a “perfect” score of 100 and actual score**

No.	Quality Element	Project Value Chain		Process Effectiveness	Data & Knowledge Quality	Effectiveness Score	Quality Score	Quality Rating	Confidence Level	R Rating Gap
		External Regulation (Civil)								
<b>Understanding of existing service</b>										
1	Existing Standard of Service	2%		Formal written standard adopted by legislative body	Large technical group - sound, accurate knowledge	100%	60%	80%	2%	0%
2	Knowledge of Existing Asset / Facility	4%		Informal specific knowledge based on informal records applied	Large technical group - sound, accurate knowledge	50%	60%	55%	2%	2%
<b>Demands placed on service</b>										
3	Current Demands for Service	0%		Current demand specifically analyzed and estimated	Full data and costs down to maintenance managed item level	100%	100%	100%	0%	0%
4	Future Demands for Service	5%		Future demand specifically analyzed and projected	Full data and costs down to maintenance managed item level	100%	100%	100%	5%	0%
<b>Service failures</b>										
5	Predicted Modes of Service Failure	0%		Major (strategic) failure modes analyzed	Large technical group - sound, accurate knowledge	75%	60%	68%	0%	0%
6	Probability / Timing of Failure	0%		Formal analysis at facility/major process or higher level	Moderate data from asset management information system	75%	85%	80%	0%	0%
7	Consequence of Failure	15%		Specific but informal consideration given	Medium technical group - moderate knowledge	50%	50%	50%	8%	8%
<b>Analysis approach</b>										
8	Quality of Proposed Maintenance Programs	7%		Formal analysis at facility/major process or higher level	Large technical group - sound, accurate knowledge	75%	60%	68%	5%	2%
9	Appropriateness of Recurrent Budgets	10%		Formal analysis at facility/major process or higher level	Large technical group - sound, accurate knowledge	75%	60%	68%	7%	3%
10	Appropriateness of Renewal Solutions Considered	10%		Formal analysis at facility/major process or higher level	Key basic data from asset management information system	75%	75%	75%	8%	3%
11	Assessment of Capital Cost Estimates	12%		Formal analysis at asset or lower level	Large technical group - sound, accurate knowledge	100%	60%	80%	10%	2%
12	Assessment of Benefits (Risk Reduction)	15%		Formal analysis at facility/major process or higher level	Key basic data from asset management information system	75%	75%	75%	11%	4%
13	Appropriateness of Economic Evaluation Process	20%		Specific but informal consideration given	Medium technical group - moderate knowledge	50%	50%	50%	10%	10%
<b>TOTALS</b>		<b>100%</b>							<b>66%</b>	<b>34%</b>

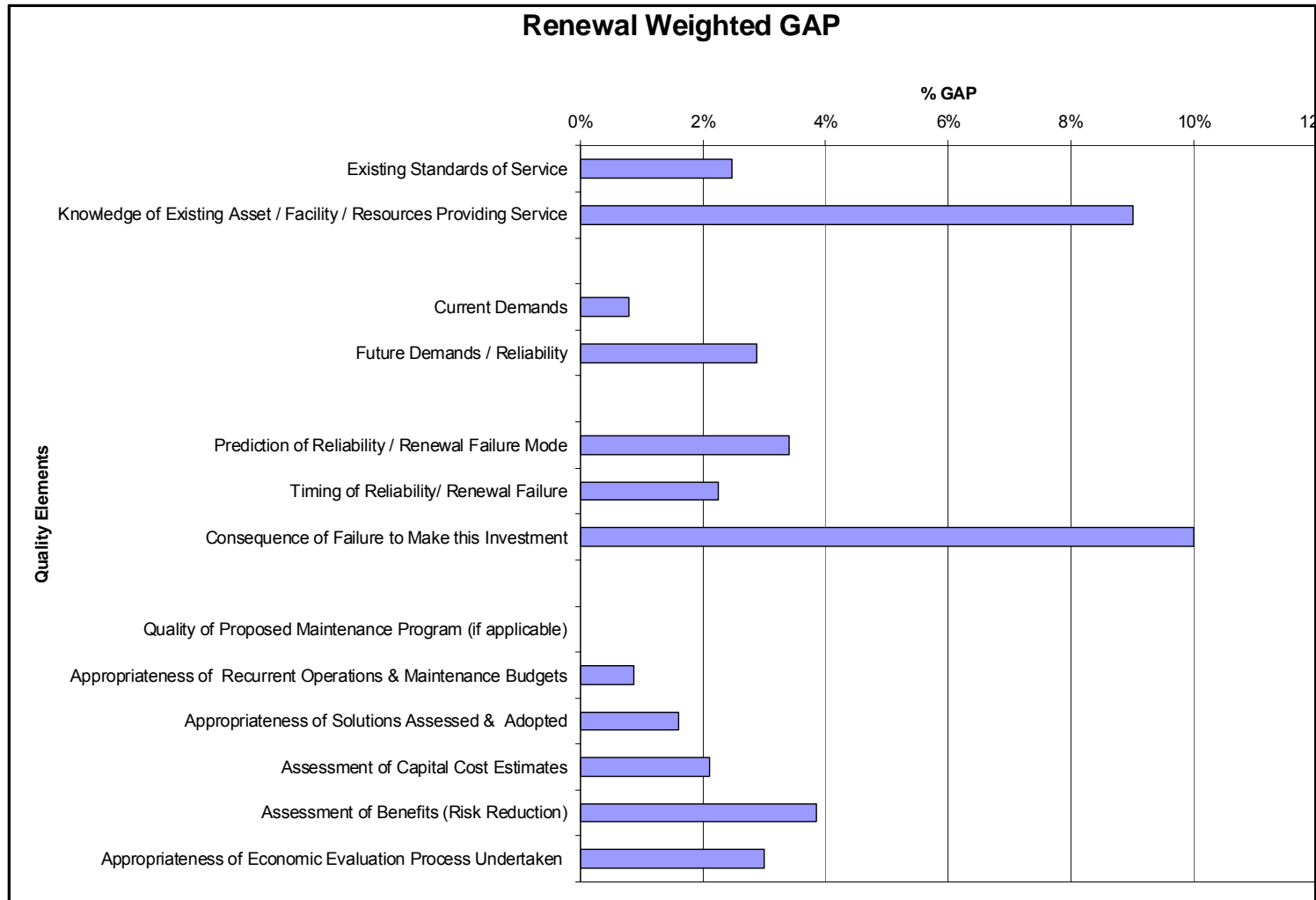
# Scoring “protocol”

<b>Assessment Score</b>	<b>Processes &amp; Practice Followed</b>
0%	No process applied to quality element
25%	Some consideration given to process
50%	Partial consideration of process
70%	Good consideration of process
80%	Very good consideration of process
90%	Excellent consideration of process
100%	Outstanding consideration of process

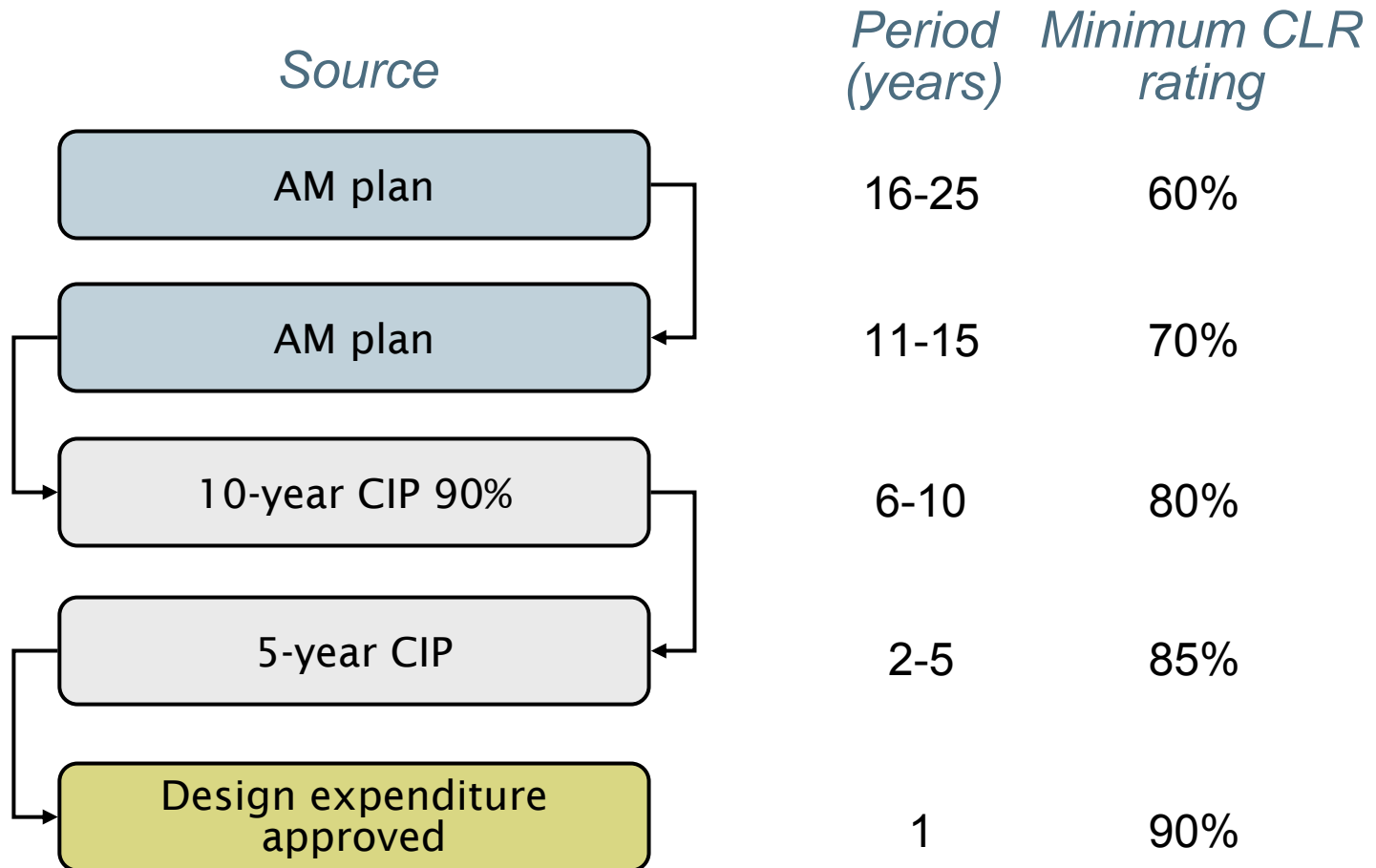
<b>Assessment Score</b>	<b>Description of Data Used</b>
0%	No data available
25%	Some minor data available
40%	Small Delphi Group - poor knowledge
50%	Medium Delphi Group - reasonable knowledge
60%	Large Delphi Group - sound accurate knowledge
75%*	Key base principle data from AMIS
85%*	Secondary data from AMIS
100%*	Full tertiary data & costs down to MMI

# Weighted gap improvements

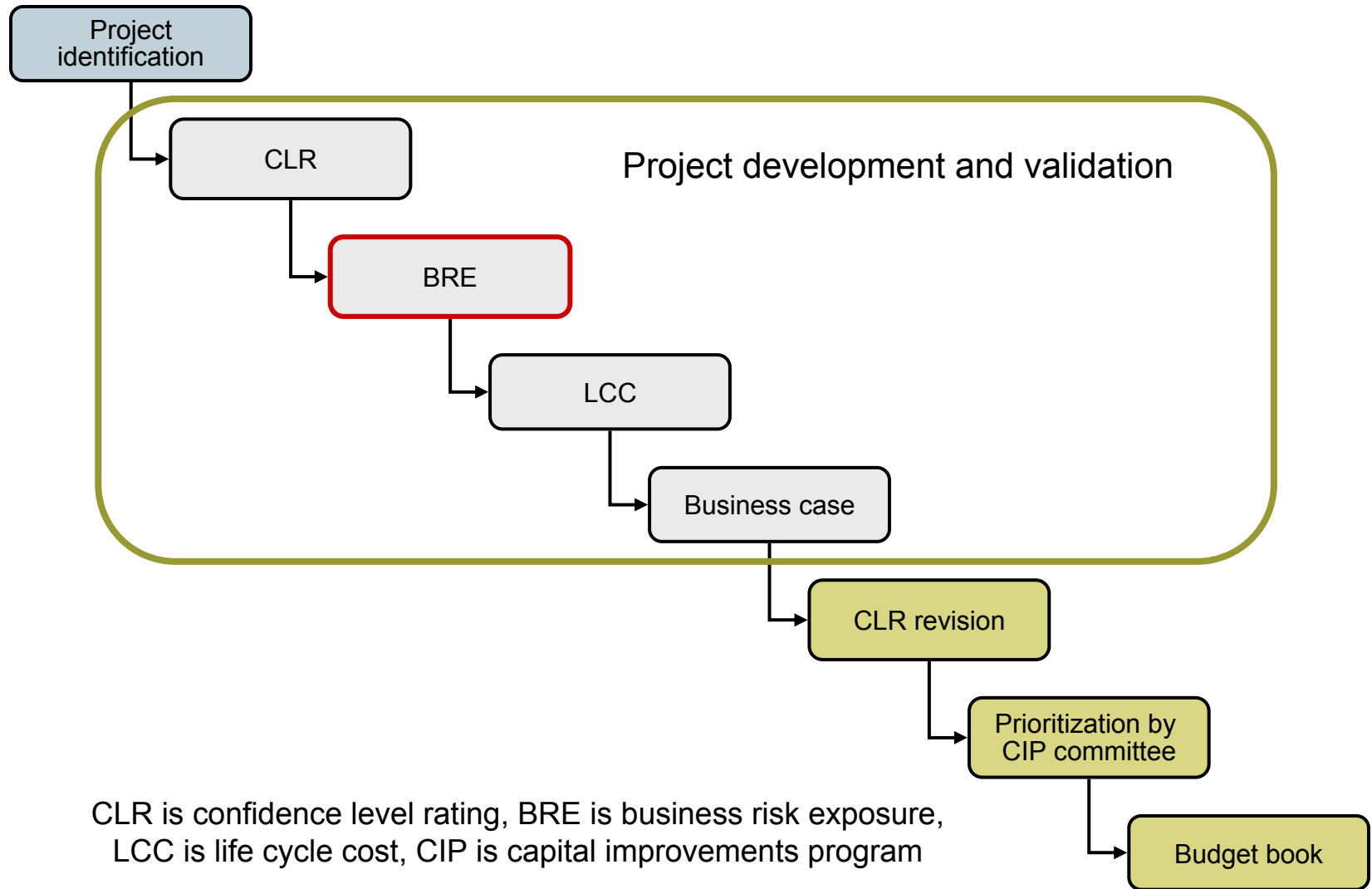




# CIP “hurdle” stages

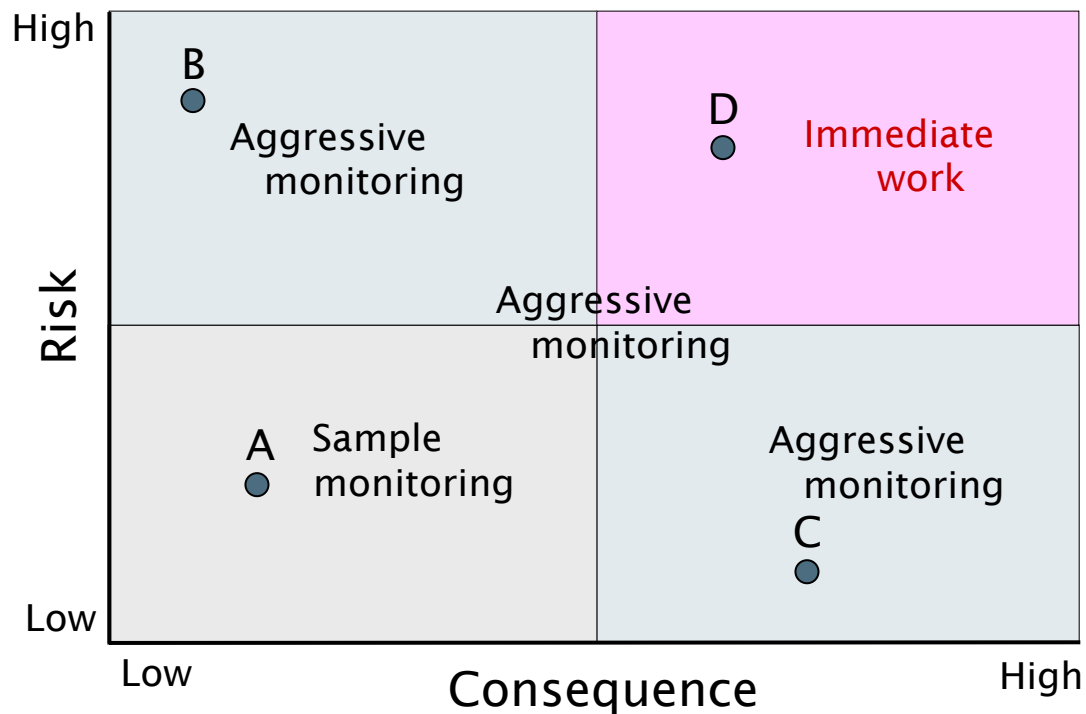


# Process steps



# Recall: Business risk exposure drives work program

## Work program response

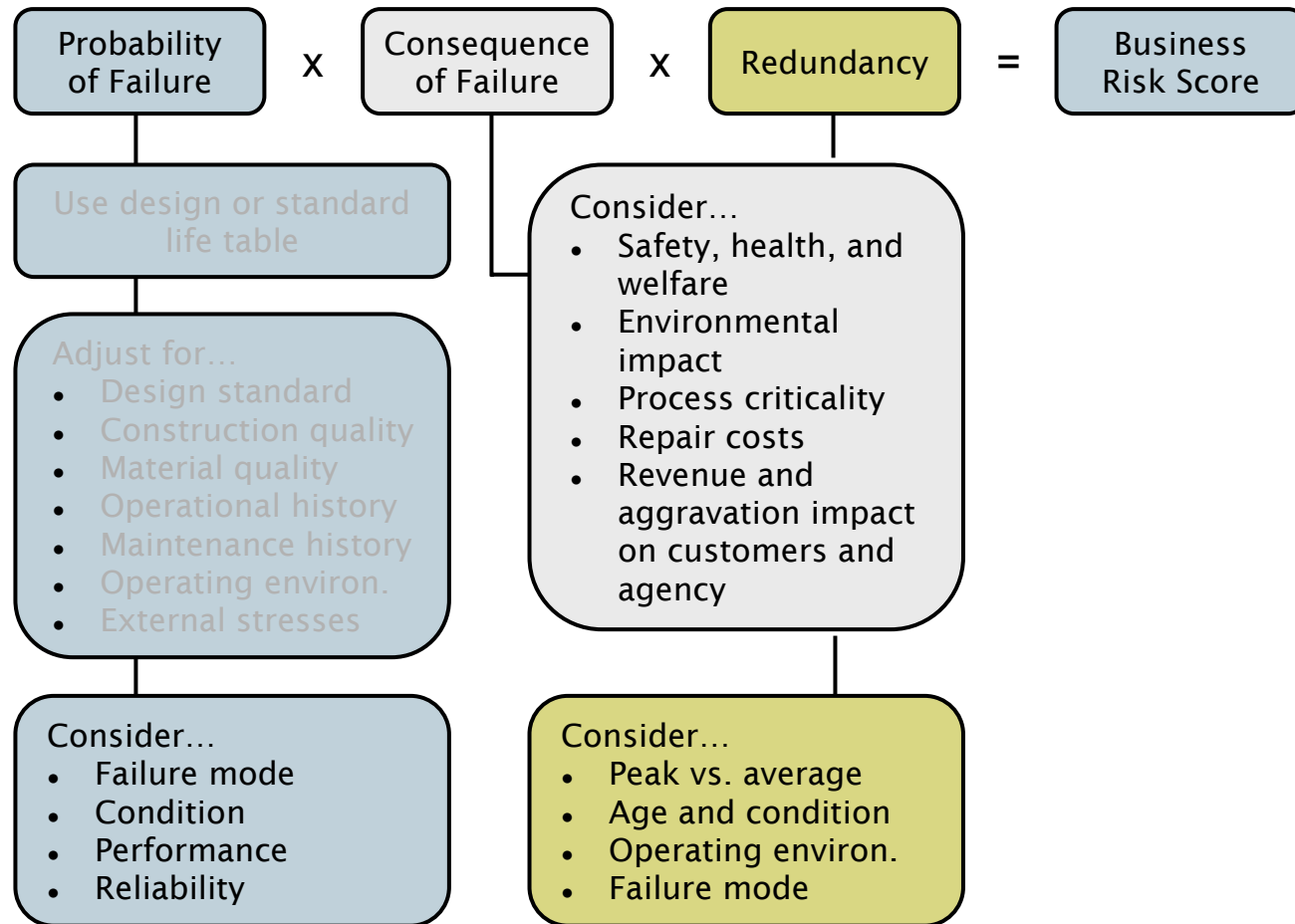


# BRE 1—simple approach

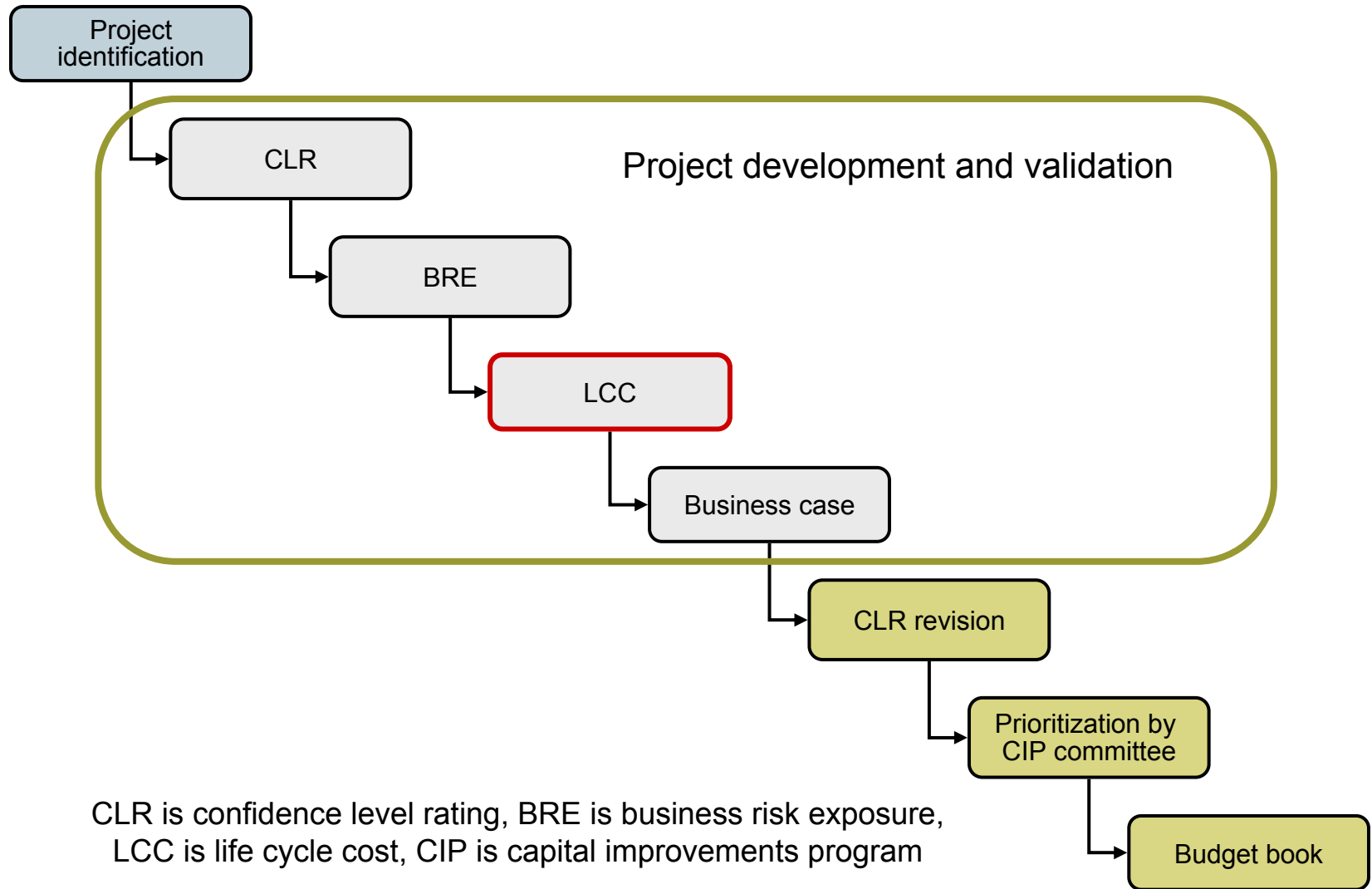
Business risk exposure (BRE) increases (higher numbers) as probability of failure (PoF) and consequence of failure (CoF) increase

High			
3	3	6	9
2	2	4	6
1	1	2	3
Low			
	1	2	3
	Low	Consequence of Failure	High

# Calculating business risk exposure (BRE) – project level



# Process steps



## Recall: Defining life cycle cost

$$\begin{aligned} \text{Life cycle cost} &= \text{original cost} \\ &\quad - \text{salvage value} \\ &\quad + \text{operating costs} \\ &\quad + \text{maintenance costs} \\ &\quad + \text{renewal costs} \\ &\quad + \text{decommissioning costs} \end{aligned}$$

# Life cycle cost – for each feasible option

Microsoft Excel - ODM Example.xls

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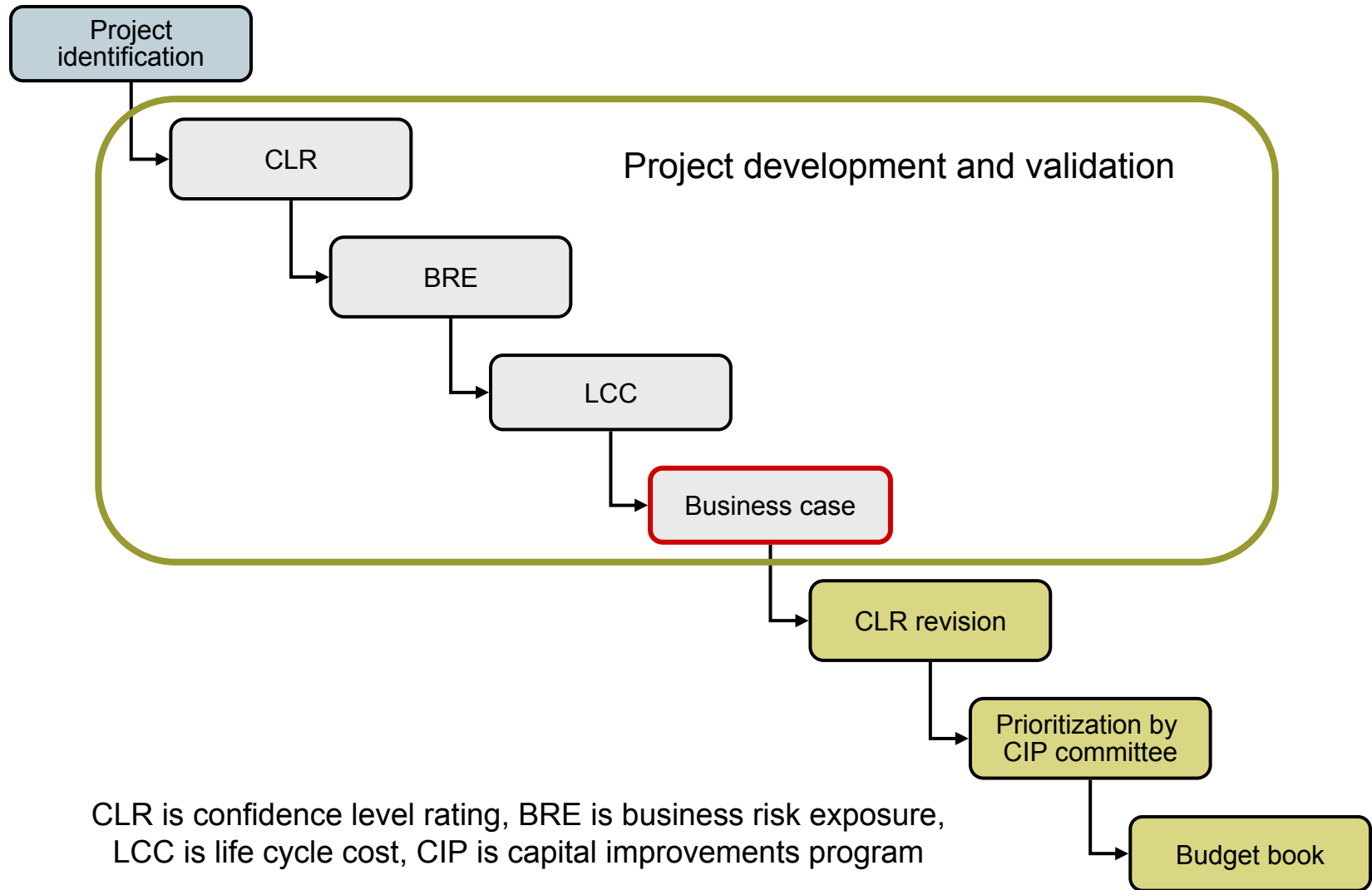
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	A	B	C	D	E	F	G	H	I	J	K	L
1	Discount Rate	1.0%	<b>Avg Annual \$</b>									
2	<b>Repair/Maintenance</b>	<b>Total</b>		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>				
3	Capital	\$ 4,500		\$ 4,500	\$ -	\$ -	\$ -					
4	Operations	\$ 2,033.91		\$ 350.00	\$ 402.50	\$ 414.58	\$ 427.01	\$ 439.82				
5	Maintenance	\$ 1,803.29		\$ 350.00	\$ 355.25	\$ 360.58	\$ 365.99	\$ 371.48				
6	Total Costs	\$ 8,337.20	\$ 1,667	\$ 5,200.00	\$ 757.75	\$ 775.15	\$ 793.00	\$ 811.30				
7	PV Total Costs	\$ 8,259.45	\$ 1,652	\$5,200.00	\$750.25	\$759.88	\$769.68	\$779.64				
8												
9	<b>Refurbish</b>			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	
10	Capital	\$35,500.00		\$ 1,775.00	\$ 1,775.00	\$ 1,775.00	\$ 1,775.00	\$ 1,775.00	\$1,775.00	\$1,775.00	\$1,775.00	\$1,775
11	Operations	\$ 7,515.19		\$ 325.00	\$ 329.88	\$ 334.82	\$ 339.85	\$ 344.94	\$ 350.12	\$ 355.37	\$ 360.70	\$ 366
12	Maintenance	\$ 6,887.73		\$ 275.00	\$ 279.13	\$ 283.31	\$ 287.56	\$ 291.87	\$ 296.25	\$ 300.70	\$ 305.21	\$ 309
13	Total Costs	\$49,902.92	\$ 2,495	\$ 2,375.00	\$ 2,384.00	\$ 2,393.14	\$ 2,402.41	\$ 2,411.82	\$2,421.37	\$2,431.07	\$2,440.91	\$2,450
14	PV Total Costs	\$45,382.14	\$ 2,269	\$2,375.00	\$2,360.40	\$2,345.98	\$2,331.75	\$2,317.71	\$2,303.85	\$2,290.17	\$2,276.68	\$2,263
15												
16	<b>Replace</b>			<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	
17	Capital	\$61,000.00		\$ 1,525.00	\$ 1,525.00	\$ 1,525.00	\$ 1,525.00	\$ 1,525.00	\$1,525.00	\$1,525.00	\$1,525.00	\$1,525
18	Operations	\$10,853.58		\$ 200.00	\$ 203.00	\$ 206.05	\$ 209.14	\$ 212.27	\$ 215.46	\$ 218.69	\$ 221.97	\$ 225
19	Maintenance	\$12,243.67		\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 225.00	\$ 228.38	\$ 231.80	\$ 235
20	Total Costs	\$84,097.25	\$ 2,102	\$ 1,925.00	\$ 1,928.00	\$ 1,931.05	\$ 1,934.14	\$ 1,937.27	\$1,965.46	\$1,972.06	\$1,978.77	\$1,985
21	PV Total Costs	\$69,240.55	\$ 1,731	\$1,925.00	\$1,908.91	\$1,893.00	\$1,877.25	\$1,861.68	\$1,870.06	\$1,857.77	\$1,845.63	\$1,833
22												





# Process steps



# Elements of a “business case”

- Executive Summary
- Part 1, Demand and Supply
  - Objectives
  - Project background
  - Drivers & failure modes
- Part 2, Options Analysis
  - Feasible options defined
  - For each option:
    - Business risk exposure
    - Life cycle costing
    - Confidence level rating (CLR)
  - Summary tables
- Part 3, Recommendation
  - Recommended option and description

**Executive Summary**

Budget Year(s): July 2007 to June 2008

Project Name: 35<sup>th</sup> Av. W. / W. Elmore Sewer Rehabilitation

Project Description: The project goal is to rehabilitate the above sewer, due to a sag in the line, intruding side sewers, missing grout and cracks in the crown, and repair of trestle supports.

Fixed Asset Number: 12EBT-SSL121 (Non OCSD Asset)

Department: Regional Sewer Assets

Division: RAS

Project Gateway: Project Planning

Recommended Option and Description: Authorize commencement of preliminary engineering for relining of the 30" combined sewer pipe and rehabilitation of the trestle, with either wood or plastic. The decision whether to use wood (options 4) or plastic (option 5) will be made after preliminary engineering.

**Table 1 Example Key Project Facts for Preferred Option**

CLR	BRE	Years to 100 % Failure	Decision year	Capital Investment	Annualized O&M costs	Economic Annual Value
72%	\$525,000	2 years	2006	\$400,000	\$30,000	\$164,816

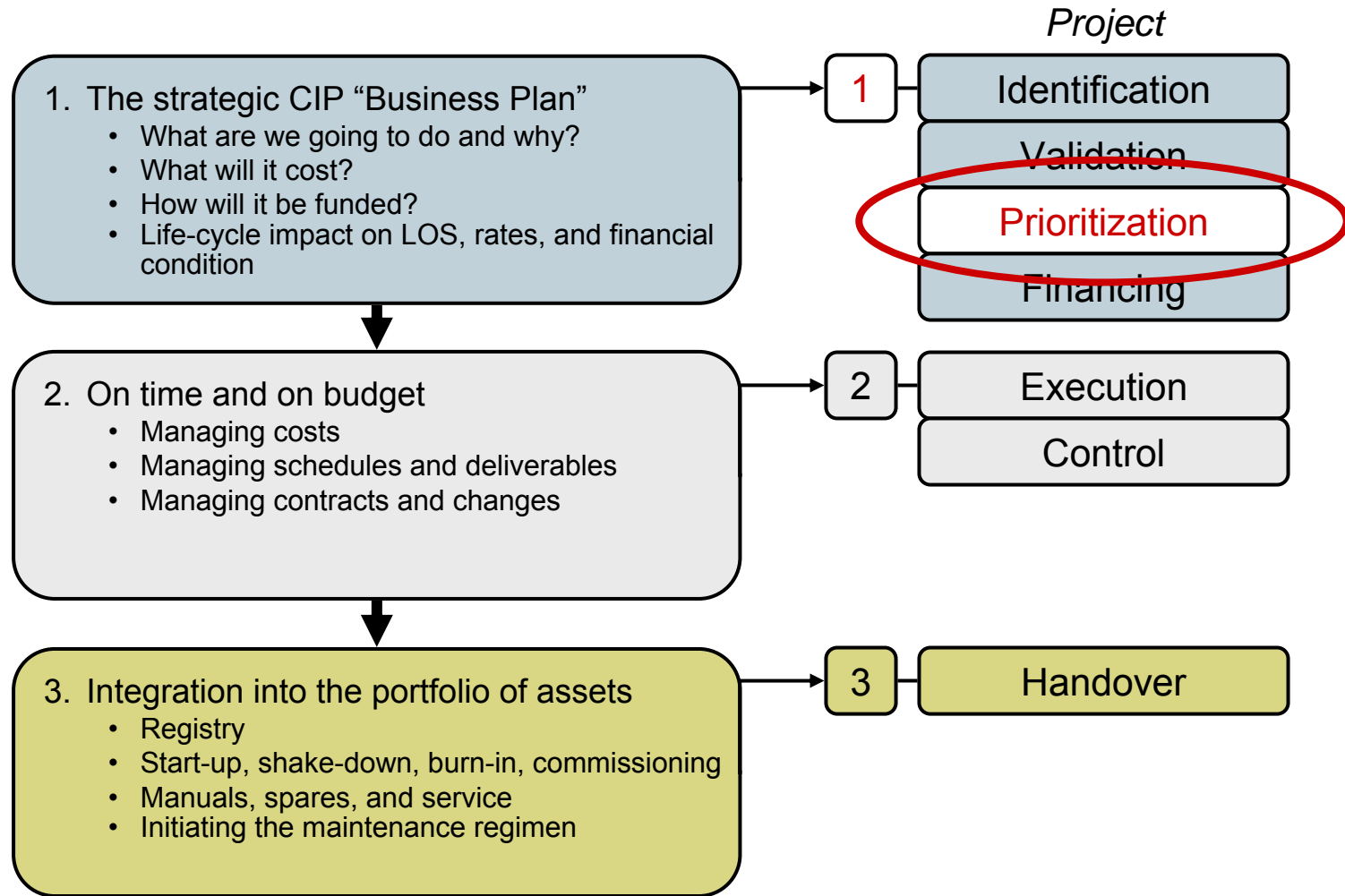
# Options analysis - summarized

Option	Business Risk	Capital (\$)	Annual Operations	Annual Maintenance	PV of Benefits	NPV	Adjusted Annualized PV	Benefit Cost	Pay Back Period	Total PV/CLR
Status Quo										
Do Nothing / Run to Fail										
Operate Differently										
Maintain differently										
Repair										
Refurbish / Rehabilitation										
Replace										
Decommission										
Non Asset Solutions										
(Other options)										

# Moving forward: Project validation decision matrix

	<i>High BRE (&gt;1M)</i>	<i>Medium BRE</i>	<i>Low BRE (&lt;50K)</i>
<b>High CLR (&gt;84)</b>	Proceed with project, no changes	Consider proceeding with project if financial criteria are met and funding is available	Consider <ul style="list-style-type: none"> <li>• Deferral or delay</li> <li>• Project breakup</li> <li>• Cancellation</li> <li>• Increase CLR</li> </ul>
<b>Medium CLR (56-84)</b>	Consider <ul style="list-style-type: none"> <li>• Proceed with project</li> <li>• Deferral or delay</li> <li>• Increase CLR</li> </ul>	Consider <ul style="list-style-type: none"> <li>• Deferral or delay</li> <li>• Breakup project and proceed with parts</li> <li>• Increase CLR</li> </ul>	Consider <ul style="list-style-type: none"> <li>• Deferral or delay</li> <li>• Project breakup</li> <li>• Cancellation</li> <li>• Increase CLR</li> </ul>
<b>Low CLR (&lt;56)</b>	Consider <ul style="list-style-type: none"> <li>• Deferral or delay</li> <li>• Project breakup</li> <li>• Proceed with project using design consultant</li> <li>• Increase CLR</li> </ul>	Consider <ul style="list-style-type: none"> <li>• Deferral or delay</li> <li>• Project breakup</li> <li>• Increase CLR</li> </ul>	Consider <ul style="list-style-type: none"> <li>• Mothball</li> <li>• Deferral or delay</li> <li>• Cancellation</li> <li>• Increase CLR</li> </ul>

# Deriving the CIP investment program – a best practice model



# “Prioritization” rank-orders validated projects

A. Public Health/Safety, Mandated Program, BOC Irrevocable Commitment, Phase Completion	
Points	Criteria
20	<ul style="list-style-type: none"> <li>Urgent to meet <i>emergency situations</i> to remedy or prevent a major health / safety hazard.</li> </ul>
19	<ul style="list-style-type: none"> <li>Essential to remedy or prevent a major health / safety hazard;</li> <li>Essential to comply with legally mandated programs and avoid penalty;</li> <li>Essential to comply with irrevocable commitment by the BOC.</li> </ul>
15	<ul style="list-style-type: none"> <li>Essential to complete a project phase, otherwise the system will not be operational.</li> </ul>
6	<ul style="list-style-type: none"> <li>Very positive economic impact;</li> <li>Ongoing support by BOC for <i>county grants match and outside agency grants</i>;</li> <li>Project identified as highest priority by BOC or County Manager;</li> <li>Potential hazard – deferral of project would increase significant level of hazard.</li> </ul>
3	<ul style="list-style-type: none"> <li>Potential hazard – deferral of project would <i>not</i> increase significant level of hazard.</li> </ul>
0	<ul style="list-style-type: none"> <li>Project does not apply to the aforementioned criteria.</li> </ul>

B. Service Delivery, Fiscal Impact, Leverage	
Points	Criteria
7	<ul style="list-style-type: none"> <li>The project creates revenues or identifies savings <i>in excess of the project cost</i> and is justified by a cost benefit analysis;</li> <li>Implementation plans of the project are required prior to capital allocation and cost savings reduce the base operating budget.</li> </ul>
6	<ul style="list-style-type: none"> <li>Project significantly improves service delivery which will substantially reduce <i>subsequent operating or capital costs</i>;</li> <li>County funds are reimbursed by the federal or state government at a rate of 50% or greater.</li> </ul>
5	<ul style="list-style-type: none"> <li>Project significantly improves service delivery and will be utilized by multiple departments with <i>little or no impact</i> on future operating or capital costs (less than \$20,000 per year);</li> <li>Essential operating capital to meet service growth and/or mandated programs.</li> </ul>
4	<ul style="list-style-type: none"> <li>Project significantly improves service delivery with <i>little or no impact</i> on future operating or capital costs (less than \$10,000 per year);</li> <li>County funds are reimbursed by the federal or state government at a rate less than 50%.</li> </ul>
3	<ul style="list-style-type: none"> <li>Project improves service delivery with <i>no impact</i> on future operating or capital costs (less than \$10,000 per year)</li> <li>Essential operating capital to meet service growth and / or mandated programs</li> </ul>
2	<ul style="list-style-type: none"> <li>Project significantly improves service delivery with <i>moderate impact</i> on future operating or capital costs (\$10,000 – \$50,000 per year)</li> </ul>
1	<ul style="list-style-type: none"> <li>Project significantly improves service delivery with <i>high impact</i> on future operating or capital costs (more than \$50,000 per year)</li> </ul>
0	<ul style="list-style-type: none"> <li>Project does not significantly improve service delivery;</li> <li>Project balance available for annual program;</li> <li>Project requires further study before consideration.</li> </ul>


## Example: Possible prioritization factors & weights

Factor	Weight
Public Health/Safety	15
Federal or State Mandated Program	15
Local Irrevocable Commitment	15
Business Risk Exposure	10
Service Delivery Impact	10
Fiscal Impact	10
Conformance with Plan / Policies; Phase Completion/	8
Efficiency Improvement	7
Leverage	6
Project Interdependence	4
<b>Total Maximum Score</b>	<b>100</b>



## Alternative to prioritization factor weighting

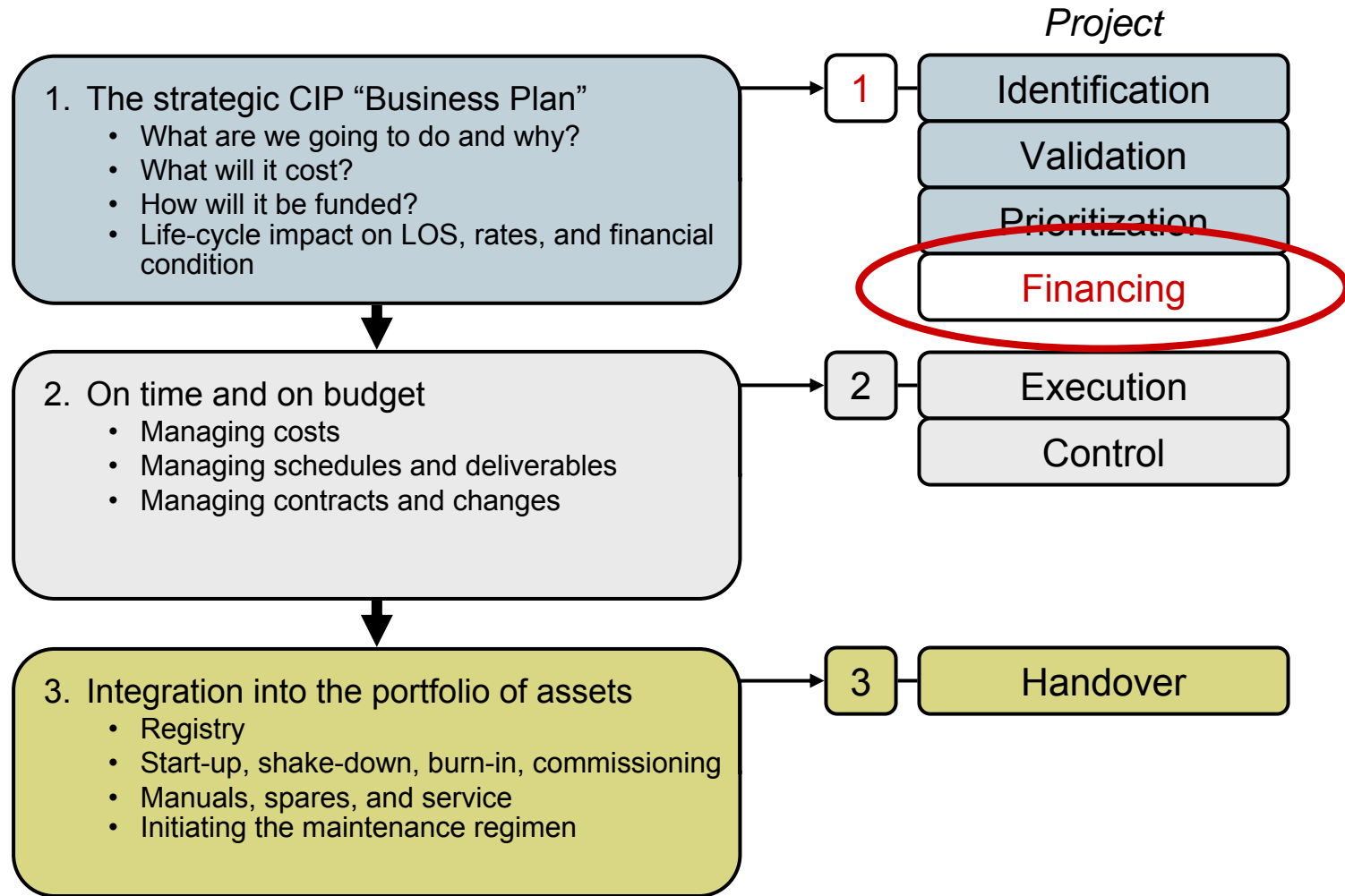
“Risk”



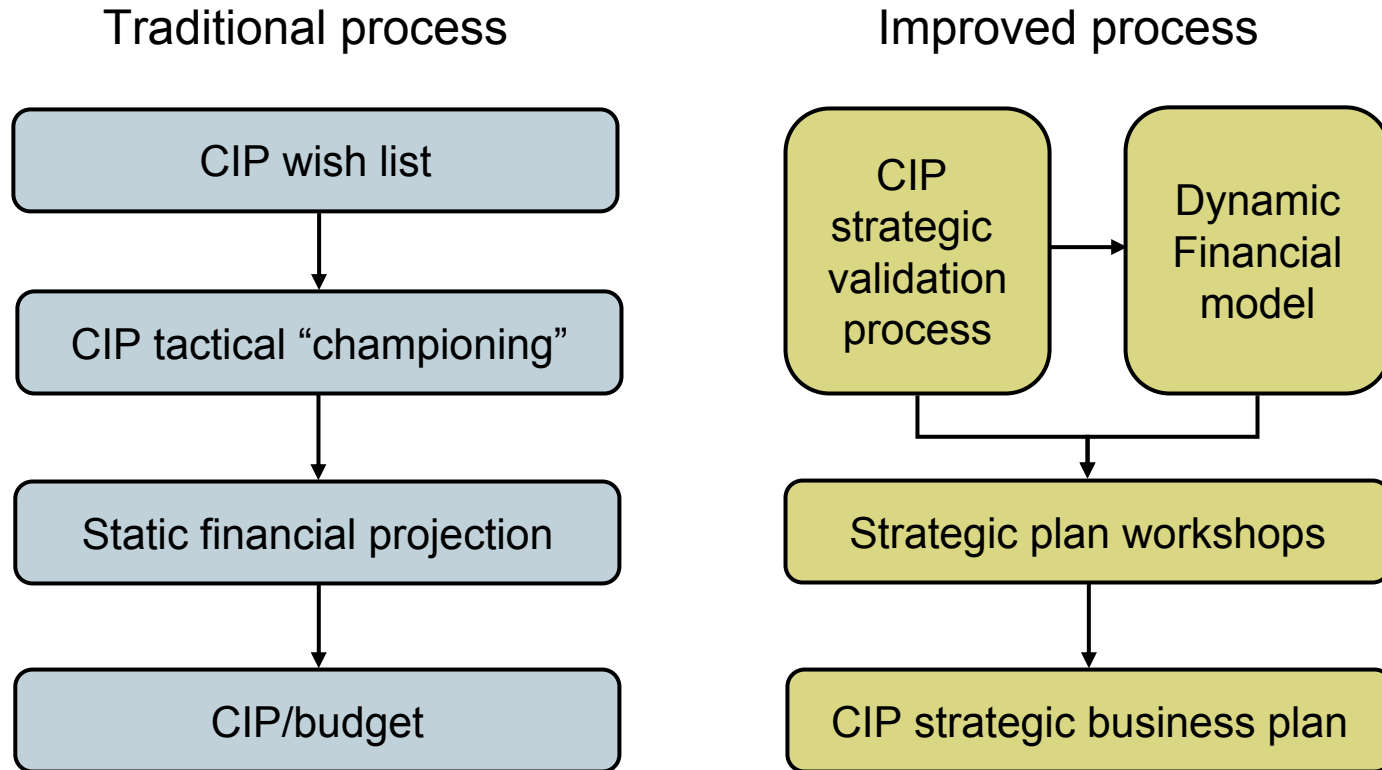
No	Project description	Cost \$M	B/C ratio	PBP yrs	CLR	BRE
256	South trunk renewal	4.2	2.42	2.5	83	610
102	Expand plant automation	6.5	2.35	3.5	63	411
16	Renew digester heaters	2.8	2.10	4.0	74	219
205	New CMMS	8.5	1.95	5.0	69	712
167	Office accommodation	4.7	1.35	6.2	72	813
150	Siphon renewals	2.6	1.30	7.2	73	471

Assume agency CIP limit of \$25M

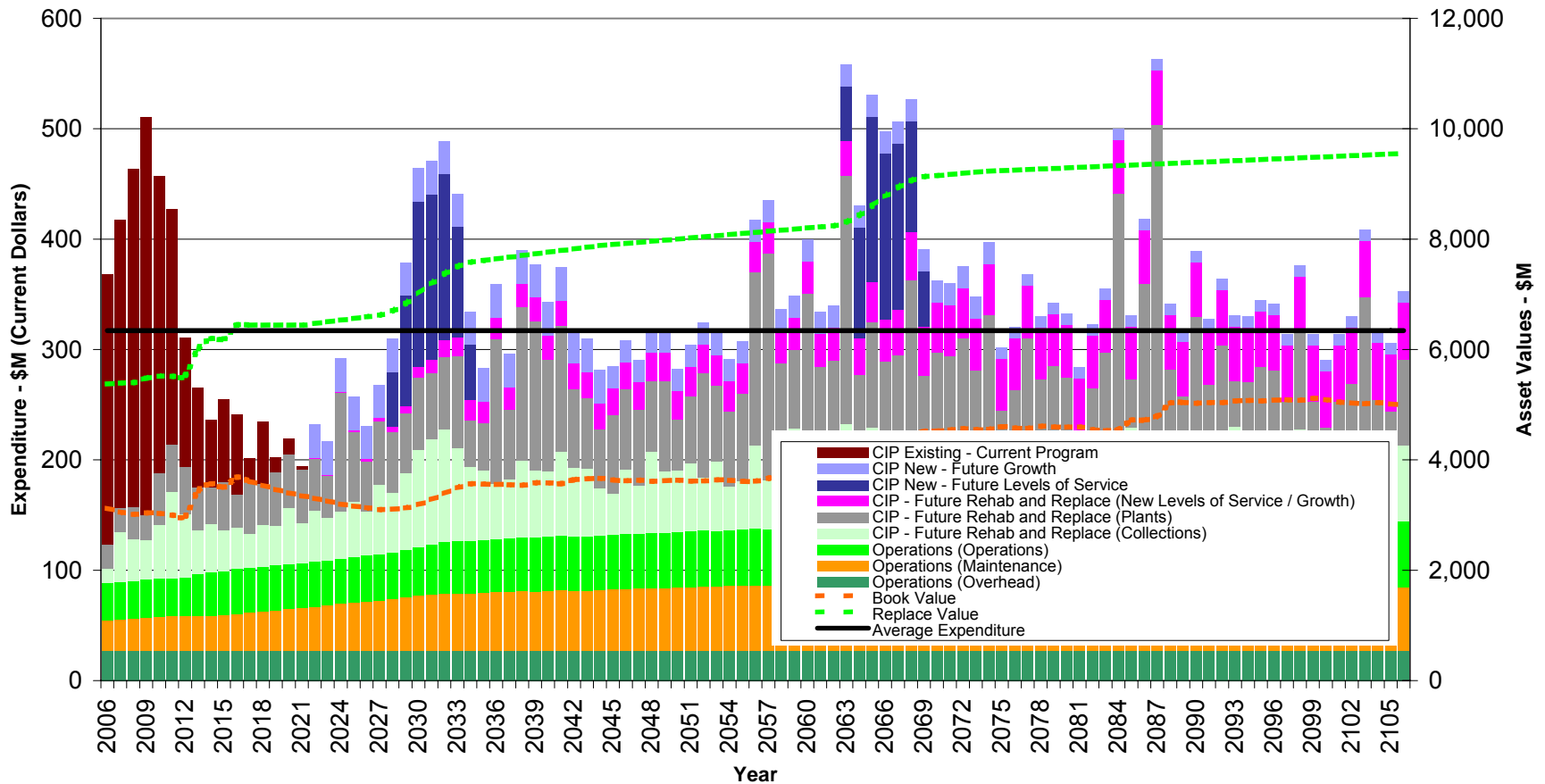
# Deriving the CIP investment program – a best practice model



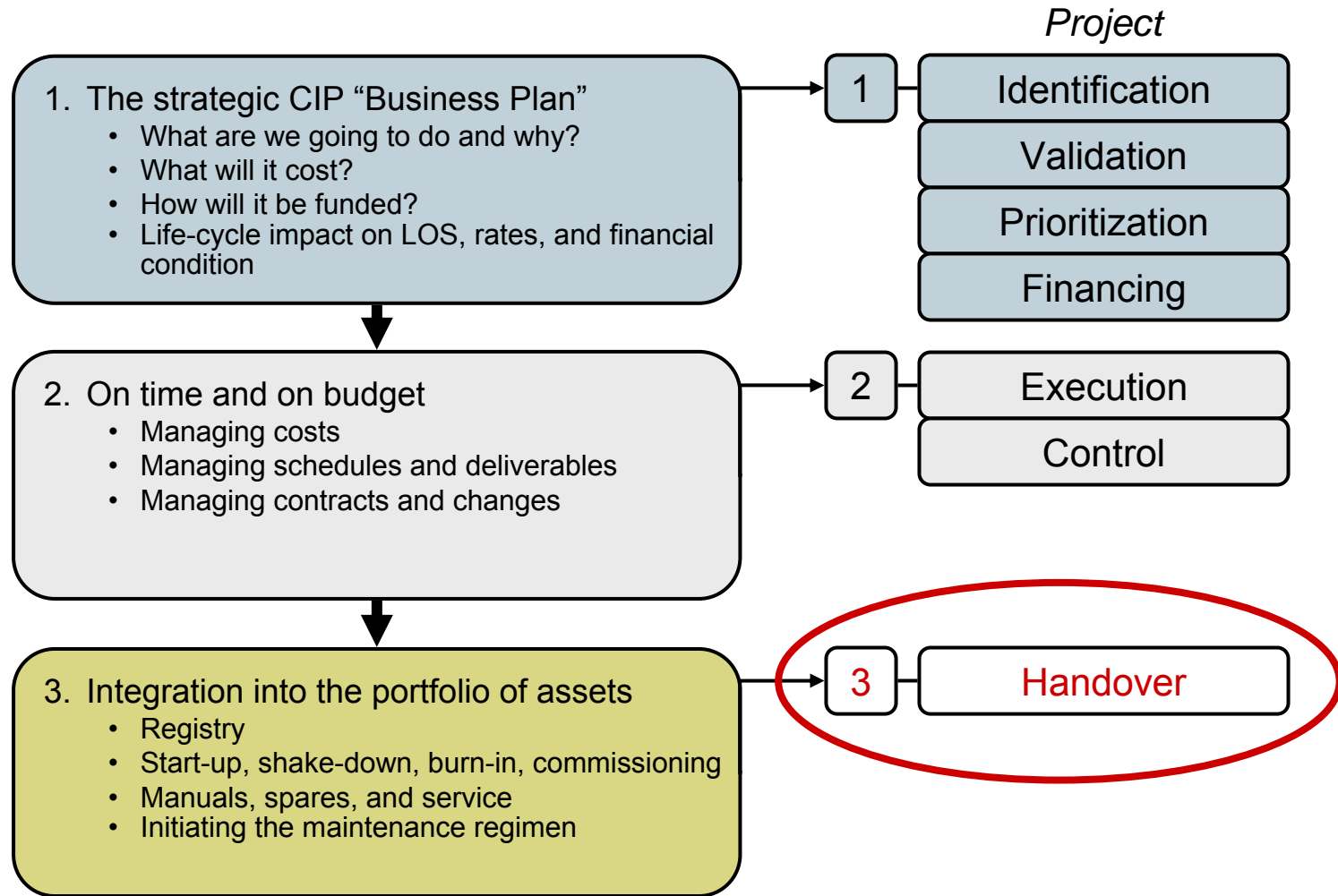
# The strategic CIP financial planning model



# Baseline: Projection of future life-cycle costs



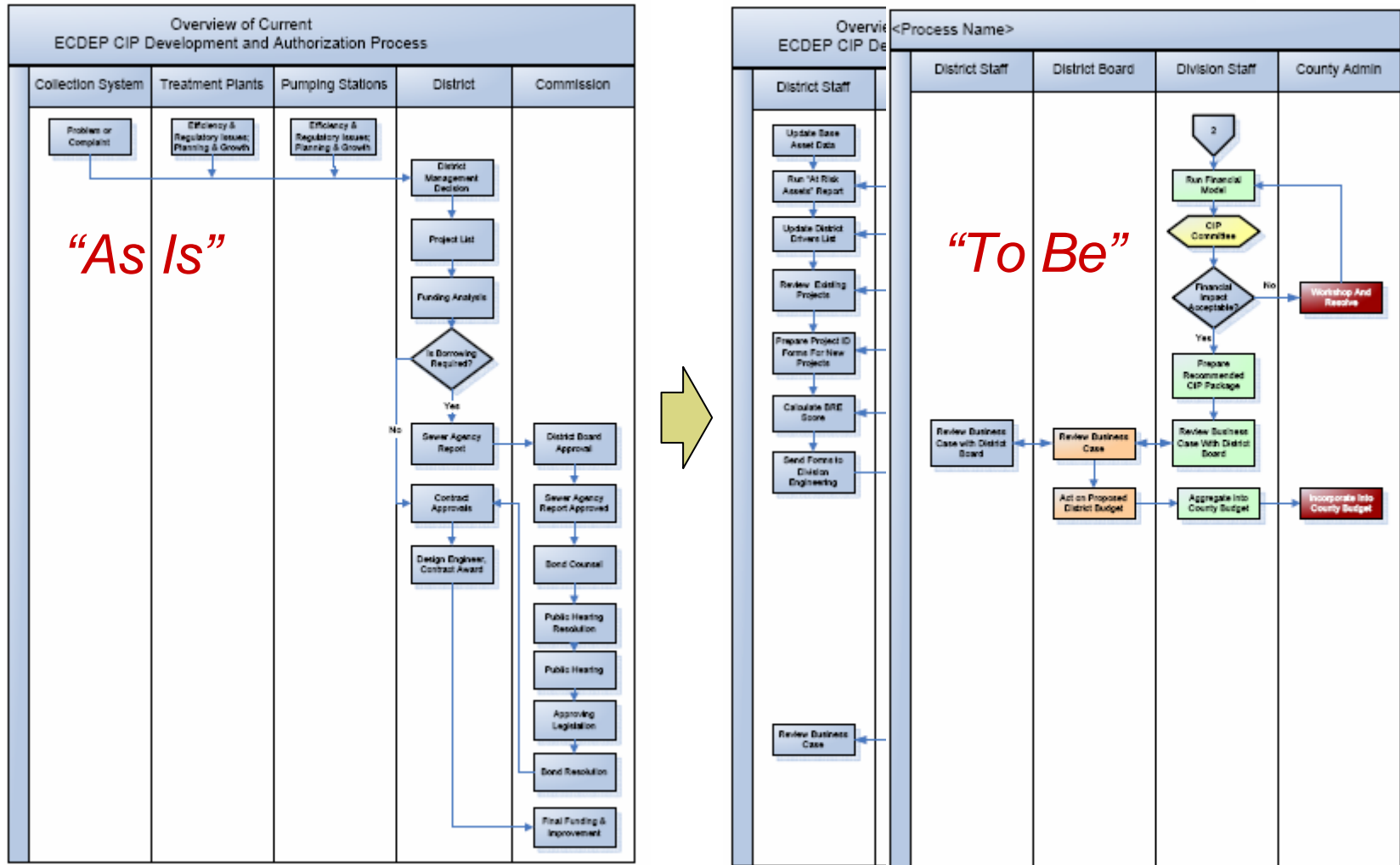
# Deriving the CIP investment program – a best practice model



# Project handover “best practices”

- Have contractor/vendor build asset registry at handover
  - Use retainage to assure
  - Give contractor/vendor asset registry protocol
- Collect baseline performance data after “burn-in” and store with asset ID
- Set up maintenance regimen (reactive, preventive, and predictive) at outset
- Incorporate manuals into EDMS
- Set up spares re-supply protocol

# Adapt the CIP business process!



# Key points from this session

*Given my system, what are my best capital investment strategies?*

## Key Points:

- A cost-effective CIP is about the right solutions at just the right time – a balancing of demand and risk/consequence
- Review your CIP to determine the ‘confidence level’ you have in it – good practices plus good data lead to high confidence decisions
- Decide to proceed with or defer a given project based on the risk it represents to your agency
- For those projects you defer, undertake the necessary analysis to lift the confidence level to where you feel good about proceeding
- The quality of the CIP development process and the quality of the data available determine the level of confidence that can be assigned to the CIP
- A good CIP requires a Strategic CIP Business Plan to fit funding to projects

## Associated Techniques:

- Project development and authorization
- Project identification
- CIP validation
- Project business case
- Strategic CIP Business Plan
- Business risk exposure
- Confidence level metrics



# Tom's spreadsheet

Microsoft Excel - EPA Seminar Master.xls

File Edit View Insert Format Tools Data Window Help Adobe PDF

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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		\$	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	
10	Sanitation System											
11	Disposal System											
12	Treatment Plants											
13	Collection Systems											
14	Sewer Mains											
15	Pump Station											
16	Incoming Sewer											
17	Pipes	1963	3	\$ 1,725	100	6	\$ 17	\$ 742				
18	Manhole	1963	3	\$ 340	100	5	\$ 3	\$ 146				
19	Influent Gate Valve	1986	5	\$ 442	30	8	\$ 15	\$ 235				
20	Incoming Power											
21	Pole & Transformer	2006	4	\$ -	40	1	\$ -	\$ -				
22	Connection	2006	7	\$ -	35	1	\$ -	\$ -				
23	Control system											
24	Incoming Telephone	1985	8	\$ 85	25	7	\$ 3	\$ 71				
25	PLC	1983	8	\$ 8,600	25	8	\$ 344	\$ 7,912				
26	Manual controls	1978	8	\$ 425	25	7	\$ 17	\$ 476				
27	Land & Improvements											
28	Land	1950	10	\$ 630	300	1	\$ 2	\$ 118				
29	Access Road	1963	1	\$ 12,500	75	5	\$ 167	\$ 7,167				
30	Landscaping	2000	1	\$ 595	75	6	\$ 8	\$ 48				
31	Security fence	1963	1	\$ 1,360	75	7	\$ 18	\$ 780				
32	Sub Structure											
33	Cassion Outer	1963	1	\$ 30,600	75	6	\$ 408	\$ 17,544				
34	Upper Floor	1963	1	\$ 4,250	75	6	\$ 57	\$ 2,437				
35	Dry well	1963	1	\$ 6,800	75	6	\$ 91	\$ 3,899				
36	Landings and Stairs	1963	9	\$ 4,250	60	7	\$ 71	\$ 3,046				
37	Wet Well	1963	1	\$ 5,100	75	6	\$ 68	\$ 2,924				
38	Shaped floor	1963	1	\$ 850	75	6	\$ 11	\$ 487				
39	Sump pump	1963	4	\$ 895	40	6	\$ 15	\$ 640				
40	Pumps											
41	Drive shafts	2006	6	\$ 12,560	35	1	\$ 359	\$ -				
42	Pumps	2006	4	\$ 29,750	40	1	\$ 744	\$ -				

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