



Strategic Asset Management in a Tertiary Education Environment

University of Auckland Fast Facts



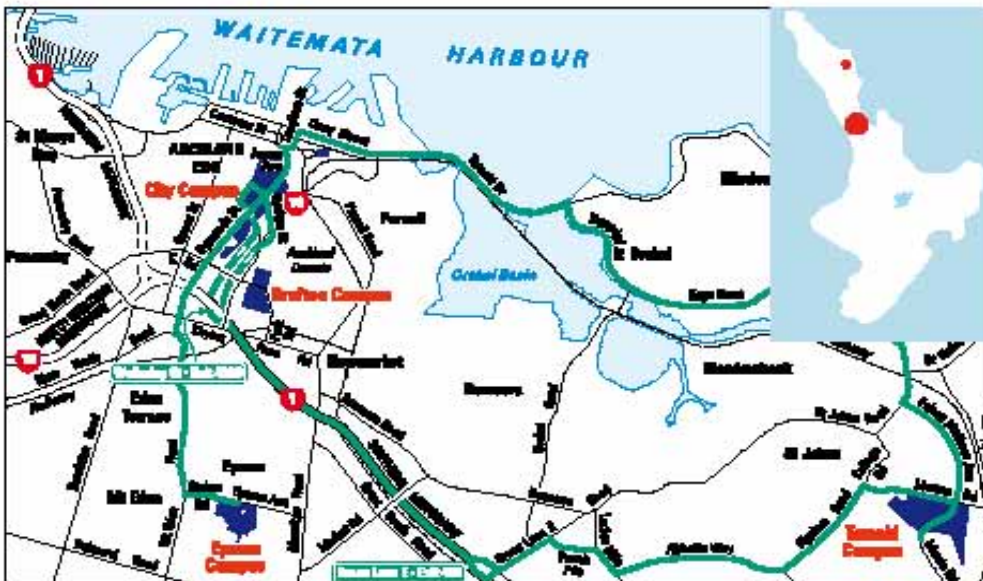
University fast facts 2008

Students	
Undergraduate	28,026
Postgraduate	10,525
Total	38,551
Domestic	
International	4,283

Degrees Awarded	
Undergraduate	5,849
Postgraduate	4,062
Total	9,931

Staff	
Academic	3,474
General	3,311
Total	6,785

Total research revenue \$ 190 million



University Rankings



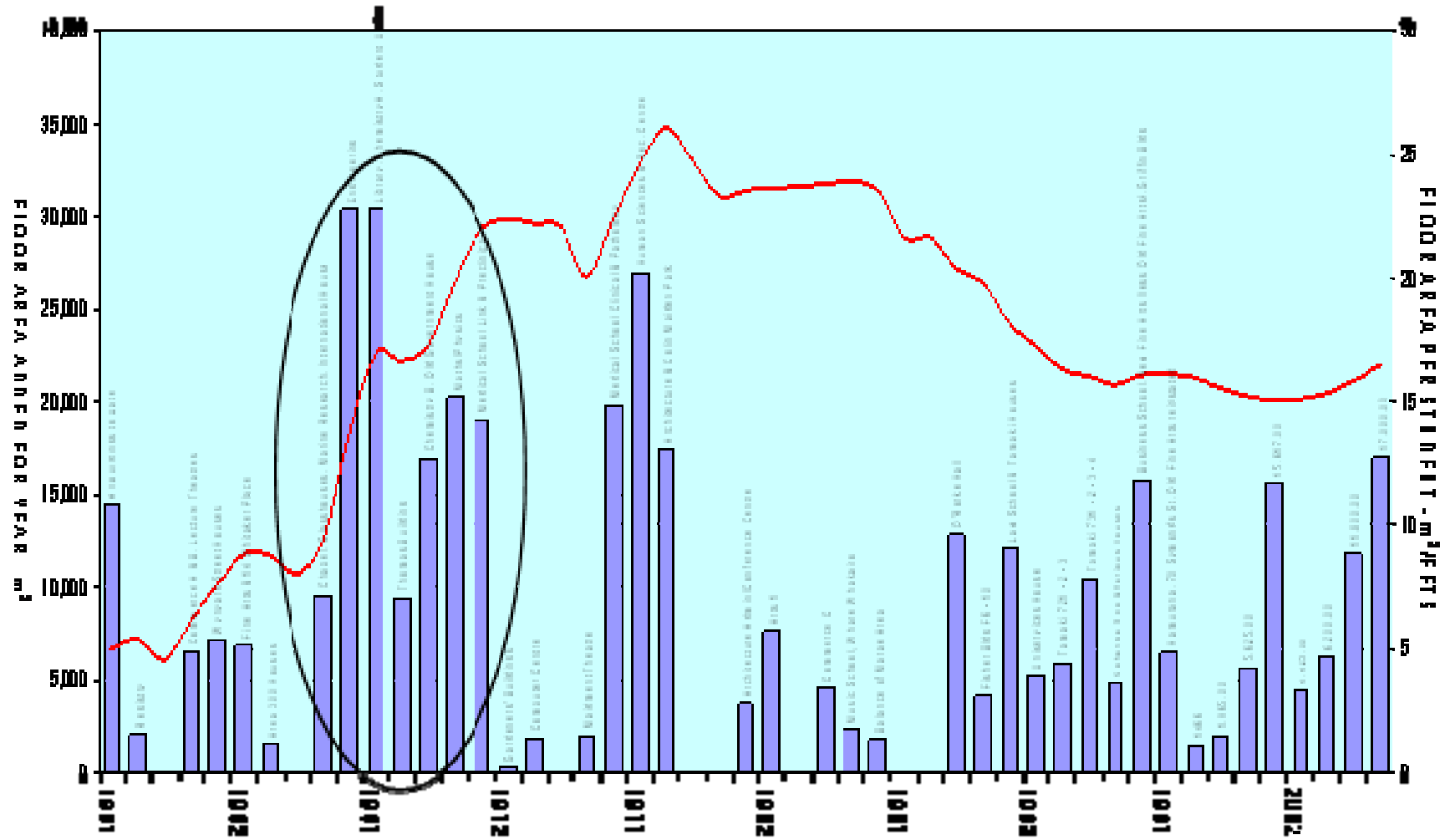
The World ranking of New Zealand Universities according to the Times Higher Education - QS rankings 2009

University	THE-QS ranking 2009
• The University of Auckland	61
• University of Otago	125
• University of Canterbury	188
• Victoria University of Wellington	229
• Massey University	299
• University of Waikato	314

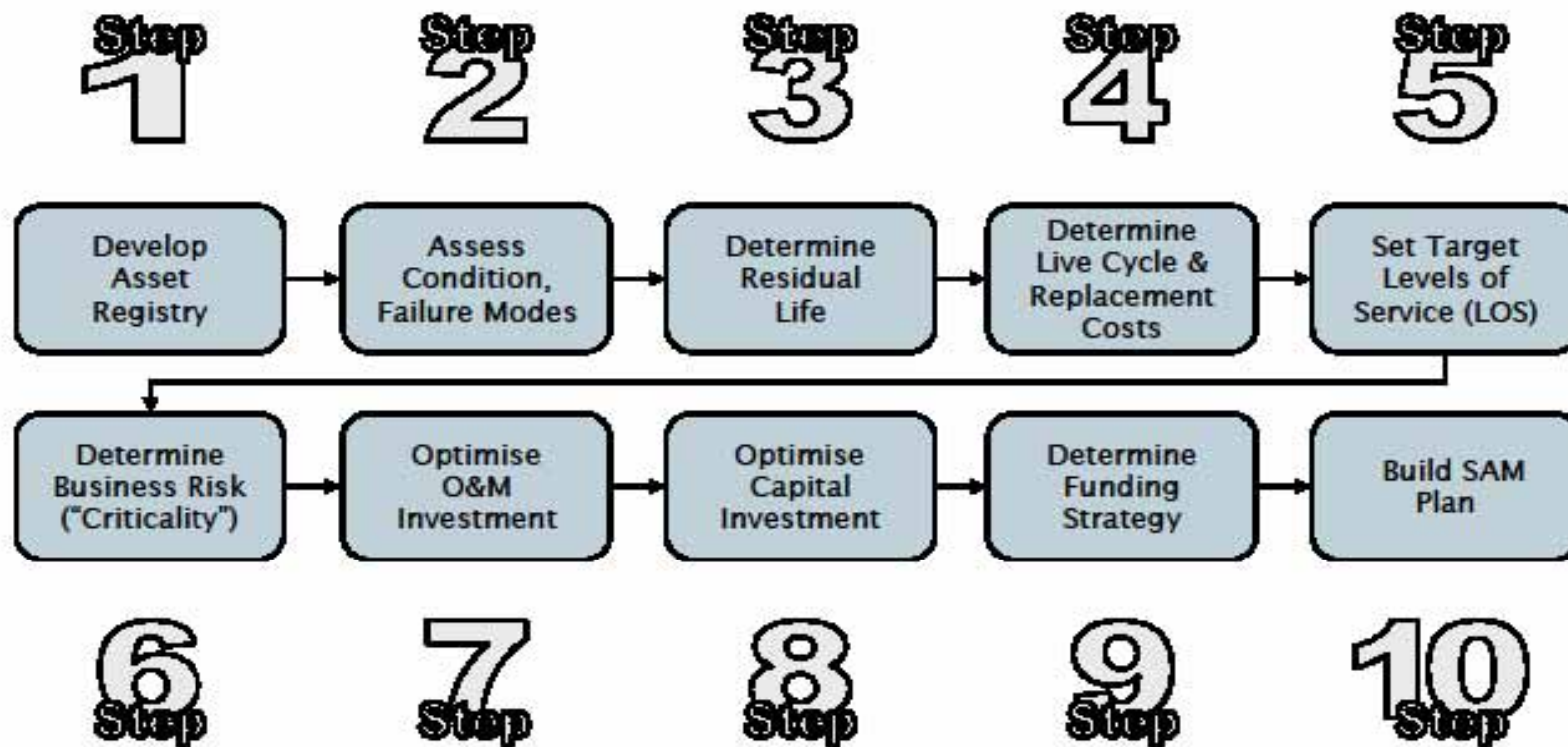
City Campus Sectors



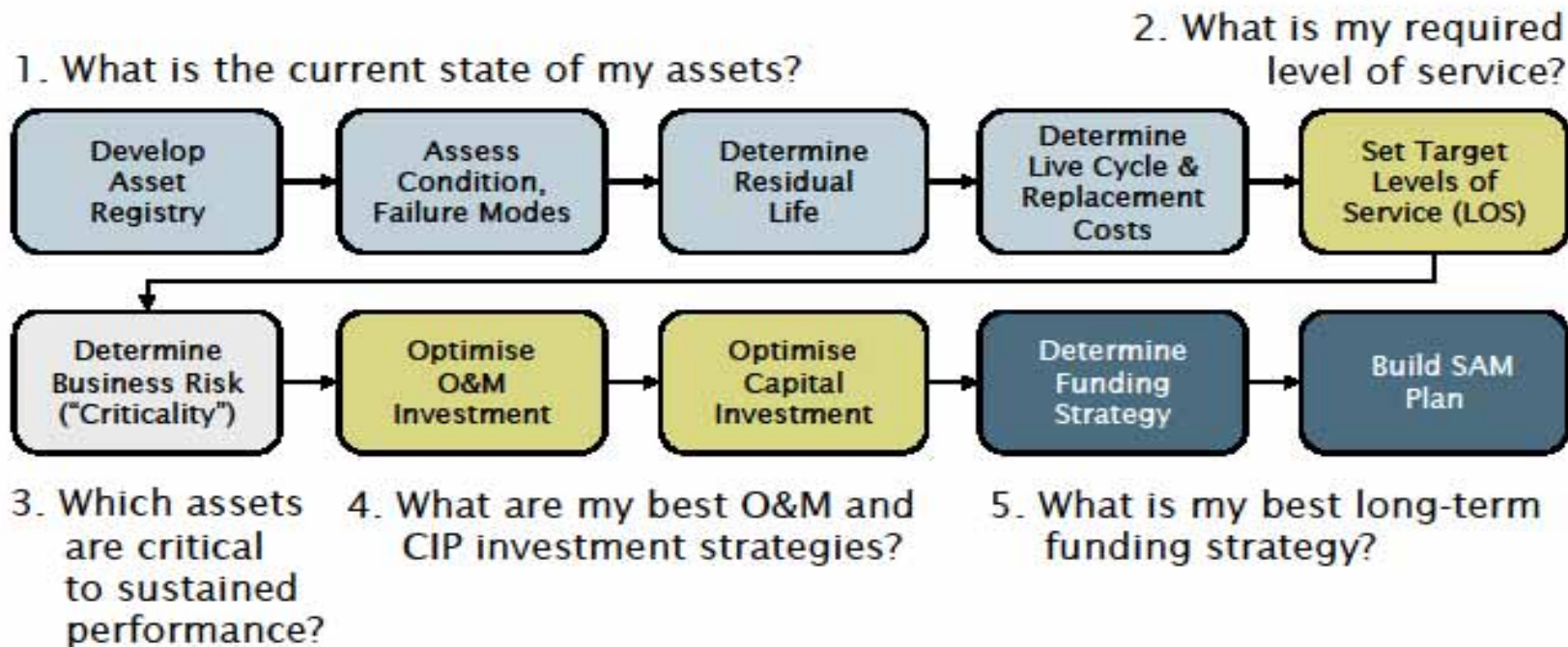
ORIGIN FLOOR AREA & AREA PER STUDENT



SAM plan 10-step process



Integration of 5 core questions with 10-step process



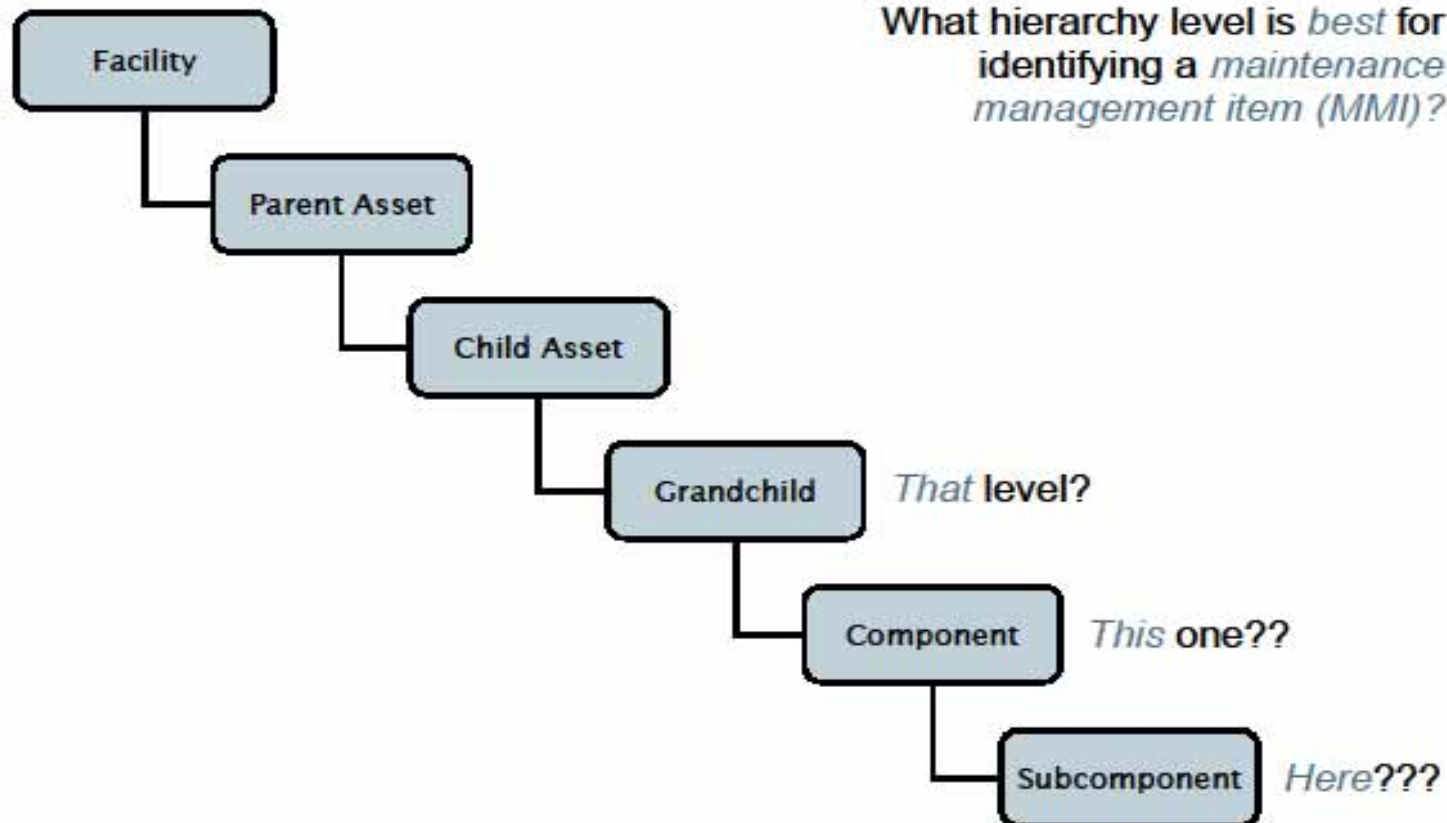
Five Core Questions Expanded

- 1. What is the current state of my assets?
 - What do I own?
 - Where is it?
 - What condition is it in?
 - What is its remaining useful life?
 - What is its remaining economic value?
- 2. What is my required level of service (LOS)?
 - What is the demand for my services by my stakeholders?
 - What do regulators require?
 - What is my actual performance?
- 3. Which assets are critical to sustained performance?
 - How does it fail? How can it fail?
 - What is the likelihood of failure?
 - What does it cost to repair?
 - What are the consequences of failure?
- 4. What are my best O&M and Capital investment strategies?
 - What alternative management options exist?
 - Which are the most feasible for my organization?
- 5. What is my best long-term funding strategy?

- What is the Current State of my Assets

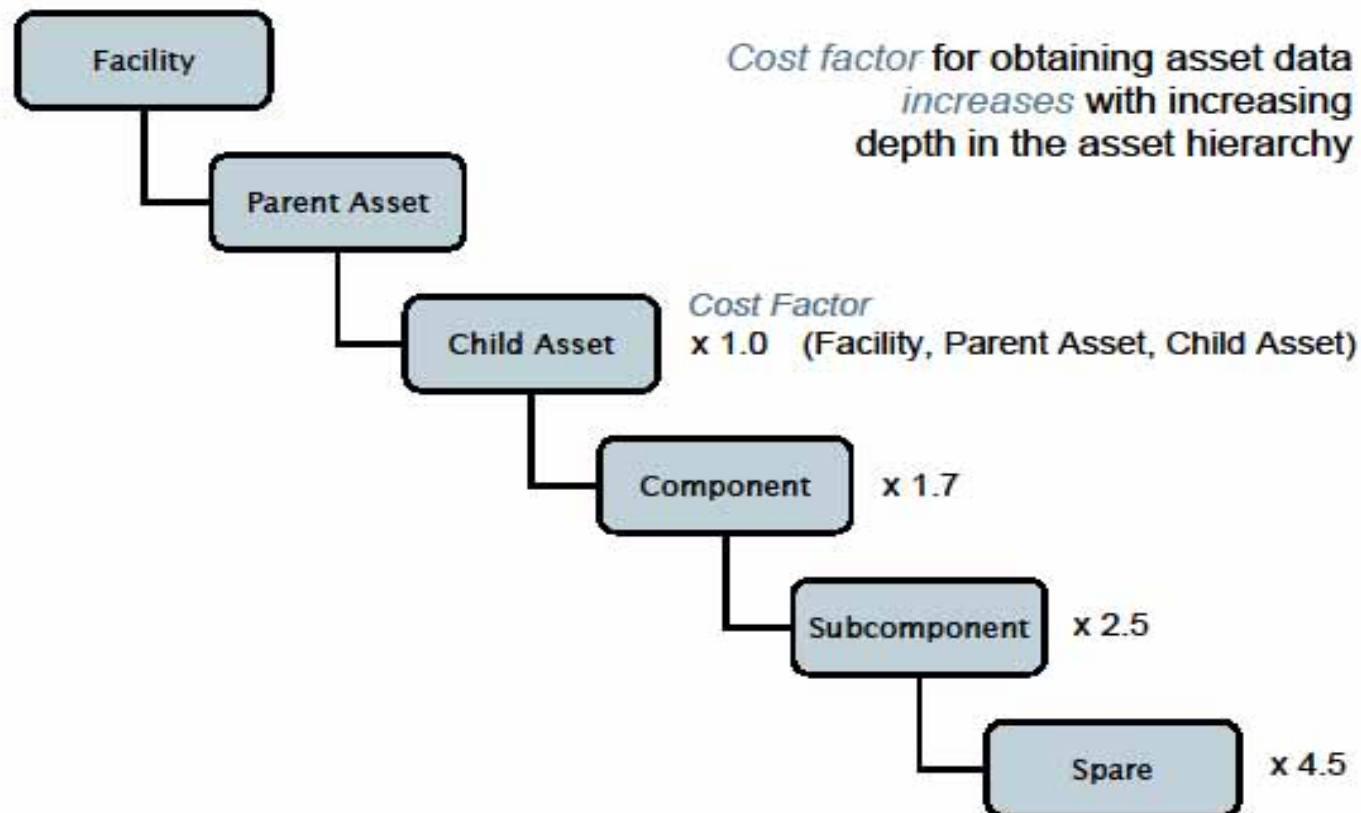
- What do I own?
- Where is it?
- What condition is it in?
- What is its remaining useful life?
- What is its remaining economic value?

Asset Hierarchy



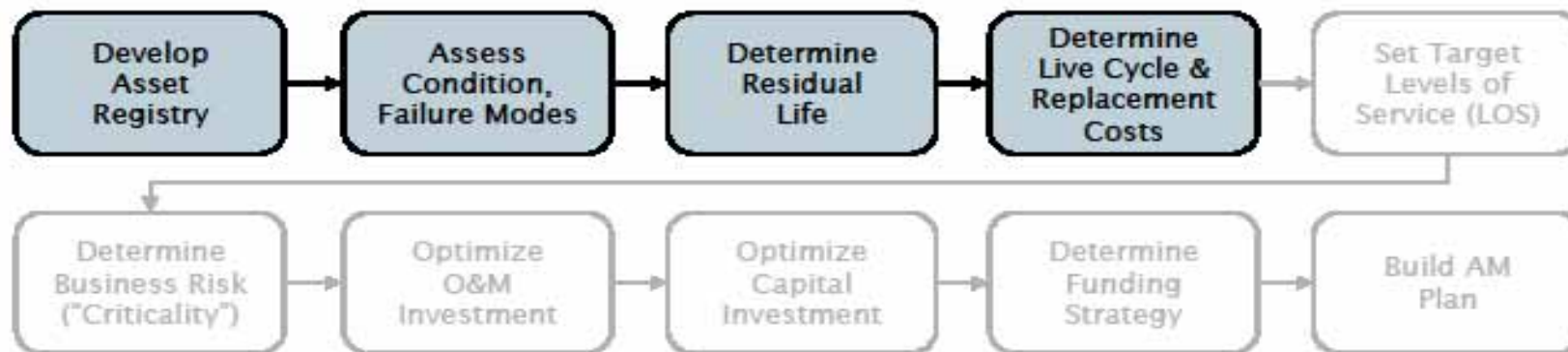
How Far to Go with Assets?

Data Costs Within Asset Hierarchy



SAM plan 10-step process

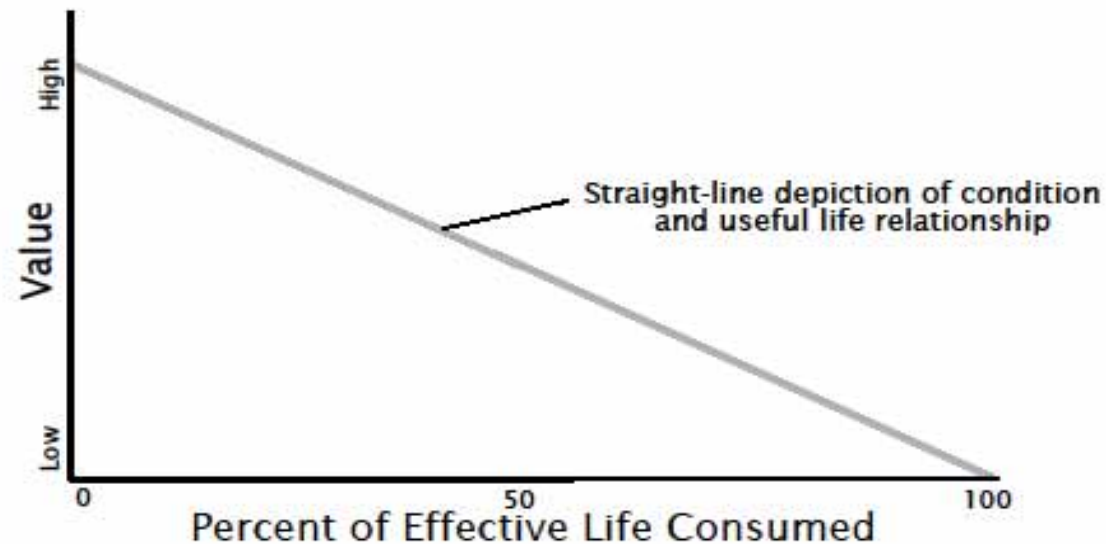
1. What is the current state of my assets?



Basic Depreciation Method

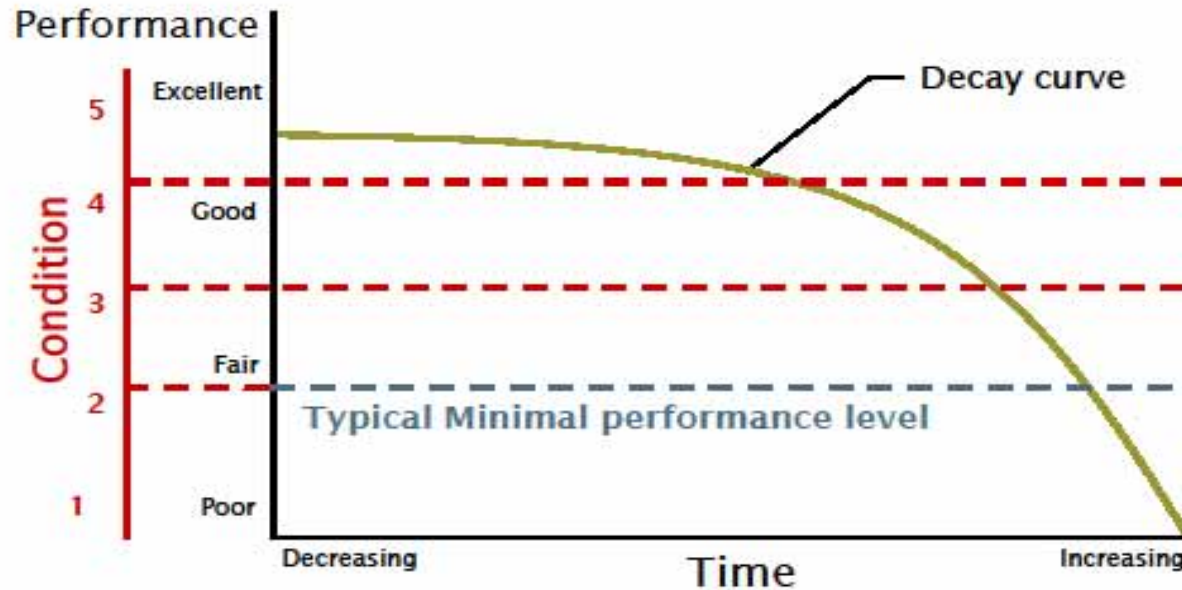
Straight-line depreciation

- Easy to apply, but rarely a true reflection of asset decay and useful life
- $\text{Book value} = \text{Original cost} / \text{Useful life}$



How Long Will it Last

Tying Condition Score to Asset Failure



Maximo Asset Data example

MAXIMO - Assets - Windows Internet Explorer
https://maximo.auckland.ac.nz/maximo/ui/maximo.jsp?sc=12790306909076event=loadapp&value=asset

Assets

Find: Select Action

Asset: 17413 301 - LIFTING HEATING BOILER T. Label: 301-BOL7
Location: 301-0020 Internal Space Inside wall area M2
Direction: YONGE EM1200 BURNER ELCO KLOCKNER S- Site: UOA
Classification: SERVICES \ MECHANICAL \ HEATING WATER \
GL Account: 035-8102

Attachments
Moved?
Status: OPERATING
Type: PRODUCTION

Details

Parent:
Maintain Hierarchy?
Location: 301-0020 Internal Space
Bin:
Rotating Item:
Meter Group:
Usage:
Calendar:
Shift:
Priority: 2 Routine
Serial #:
Failure Class: BOLERS
Item Type:
Tool Rate:

Purchase Information Asset Survey Costs

Vendor: Useful life: 30.0000000000 Total Cost: 0.00
Manufacturer: Remaining Life: YTD Cost: 0.00
Installation Date: 1/01/03 TEFMA Index: Budgeted: 0.00
Refurbishment Cost: Inventory: 0.00
Replacement cost: 29,000.000000

Downtime TEFMA Ratings

Asset Up?
Last Changed Date: 18/10/08 00:04
Total Downtime: 0.00

Modified

Changed By: MXNTADM
Changed Date: 21/07/10 13:10

Risk: 3 Below General Std. Requires regular checking
Condition: 3 Fair
Importance: 3
Functionality: 3 Fair Functionality: Efficiency between 50% & 8

Asset Useful Life

MAXIMO - Classifications - Windows Internet Explorer

https://maximo.auckland.ac.nz/maximo/ul/maximo.jsp?sc=1279830690987&event=gotoapp&value=assetcat&uniqueid=20040384

MAXIMO - Classifications

Classification: BOILER HEATING MEDIUM
Classification Path: SERVICES \ MECHANICAL \ HEATING WATER
Parent Classification: SERVICES \ MECHANICAL \ HEATING WATER
Class Structure ID: 1048

Organization: UTAK
Site: UQA

HEATING BOILER 275 - 950 KW

Description Generation Details

Generate Description? Assets? Locations? Changes? Releases? Incidents? Service Requests?
Use Classification? Items? Work Orders? Activities? Problems? Solutions?

Classification	Description	Organization	Site
..No rows to display..			

Attributes

Attribute	Attribute Description	Section	Domain	Data Type	Unit of Measure
LIFE	Useful life of mechanical plant			NUMERIC	YEARS
REPCOST	Replacement cost			NUMERIC	EACH

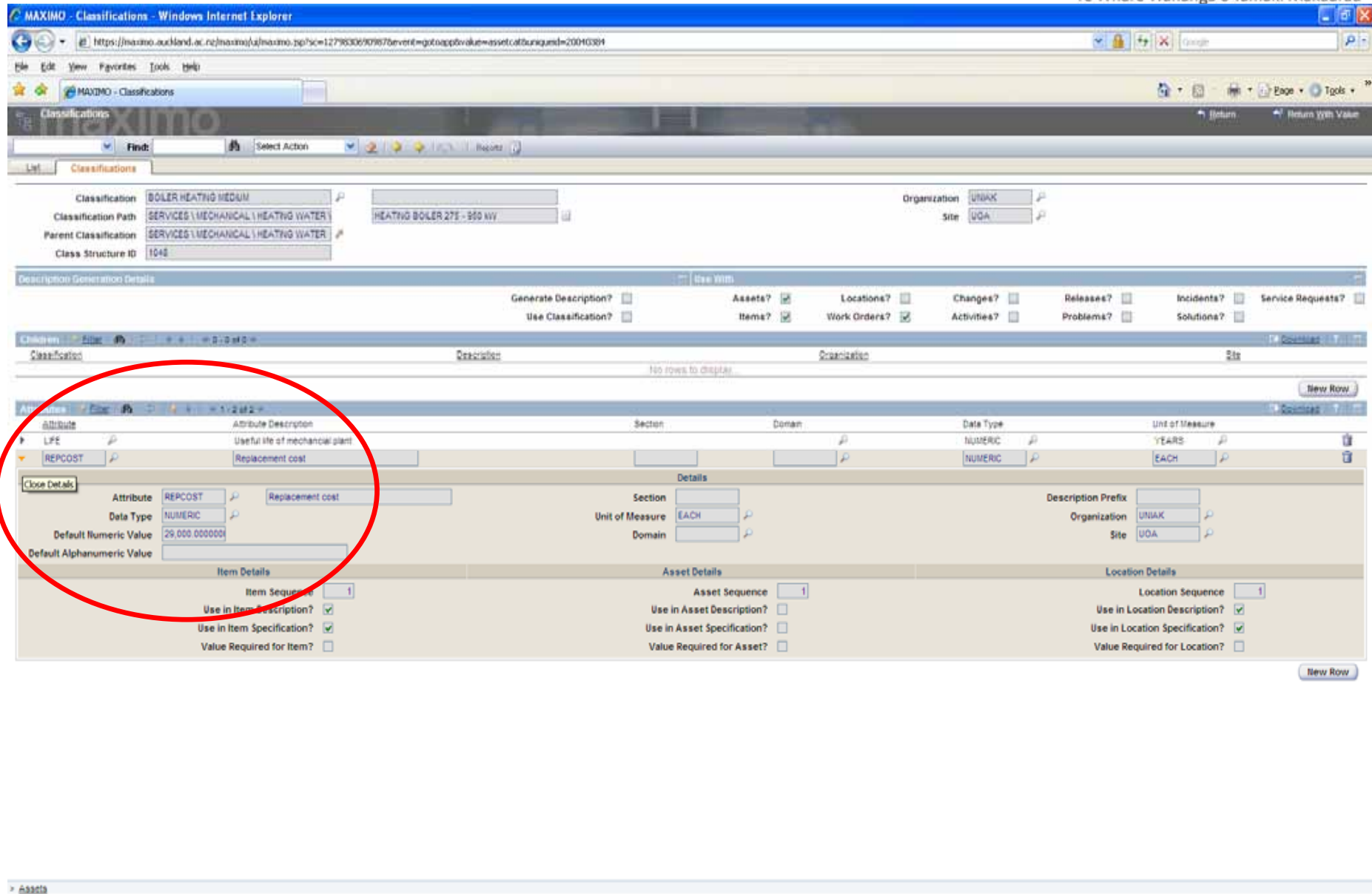
Details

Attribute: LIFE
Attribute Description: Useful life of mechanical plant
Data Type: NUMERIC
Default Numeric Value: 30.0000000000
Default Alphanumeric Value:

Section:
Unit of Measure: YEARS
Domain:
Description Prefix:
Organization: UTAK
Site: UQA

Item Details	Asset Details	Location Details
Item Sequence: 2 Use in Item Description? <input checked="" type="checkbox"/> Use in Item Specification? <input checked="" type="checkbox"/> Value Required for Item? <input type="checkbox"/>	Asset Sequence: 2 Use in Asset Description? <input type="checkbox"/> Use in Asset Specification? <input type="checkbox"/> Value Required for Asset? <input type="checkbox"/>	Location Sequence: 2 Use in Location Description? <input checked="" type="checkbox"/> Use in Location Specification? <input checked="" type="checkbox"/> Value Required for Location? <input type="checkbox"/>

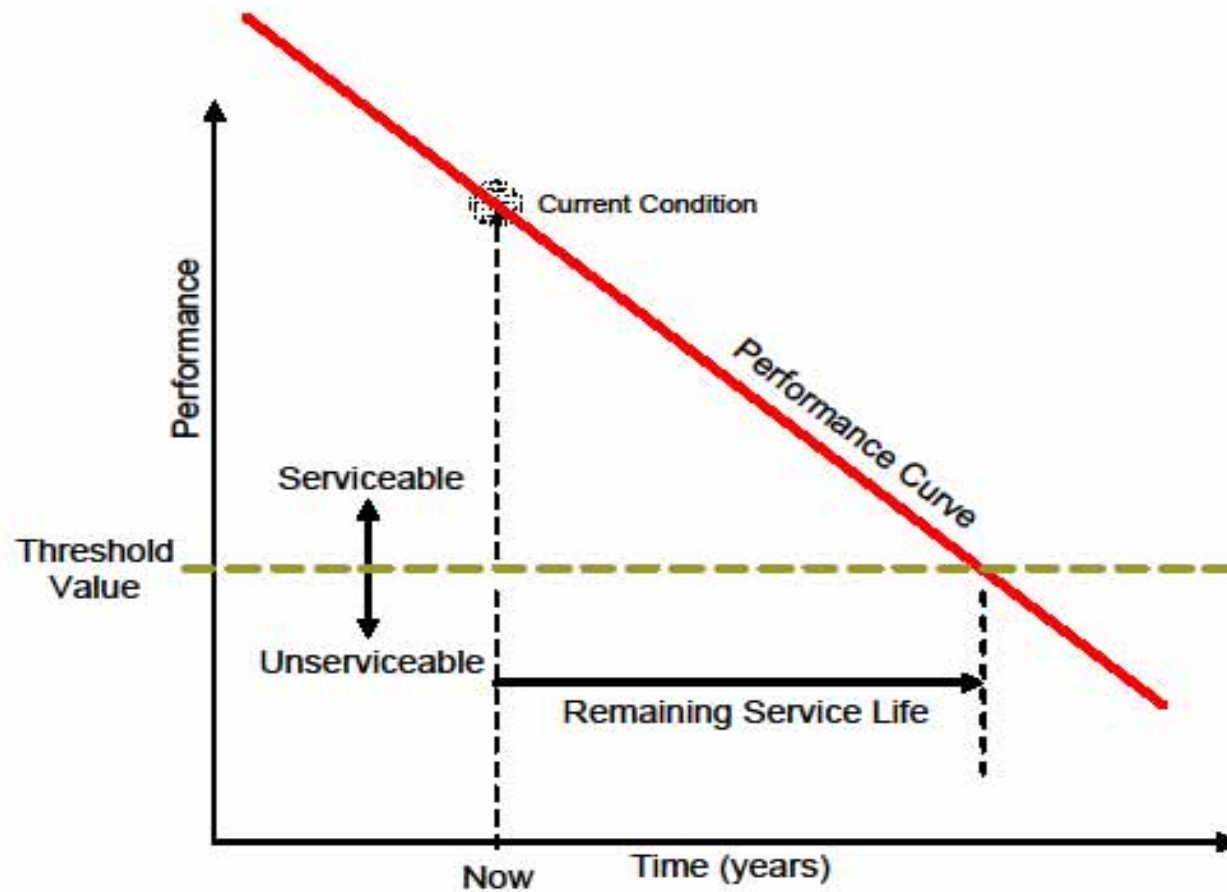
Asset Replacement Value



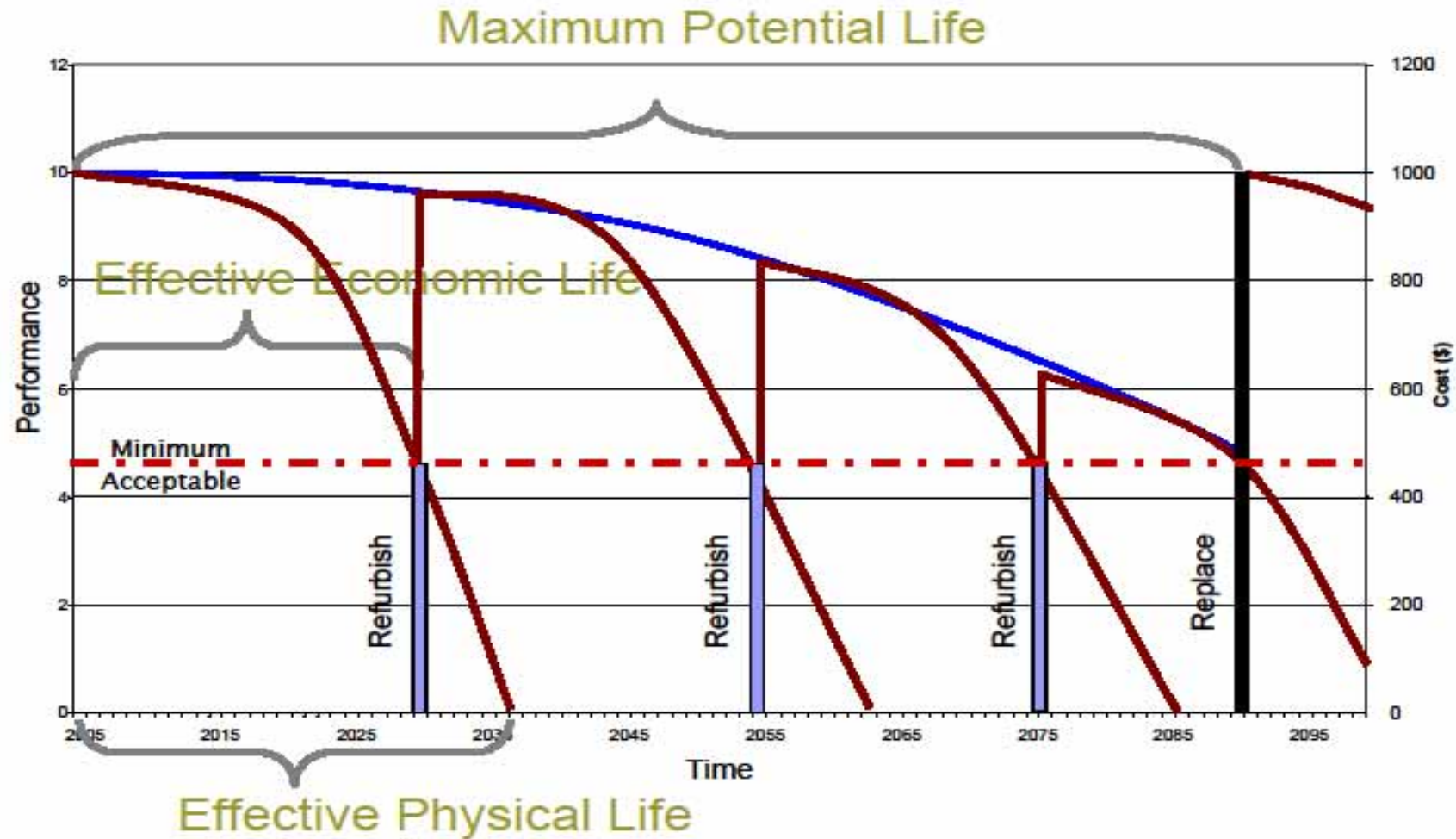
The screenshot displays the MAXIMO web interface in Internet Explorer. The browser title is "MAXIMO - Classifications - Windows Internet Explorer". The address bar shows the URL: <https://maximo.auckland.ac.nz/maximo/aj/maximo.jsp?sc=12798306/909878event=getapprovalvalue=assetclassid=20040384>. The page content includes a search bar, a "Find:" field, and a "Select Action" dropdown. Below this, there are fields for "Classification" (BOILER HEATING MEDIUM), "Classification Path" (SERVICES \ MECHANICAL \ HEATING WATER), "Parent Classification" (SERVICES \ MECHANICAL \ HEATING WATER), and "Class Structure ID" (1048). The "Organization" is set to UNIAK and the "Site" is UQA. A "Description Generation Details" section contains various checkboxes for generating descriptions for different asset types. Below this is a table with columns for "Classification", "Description", "Organization", and "Site", which is currently empty. The "Attributes" section shows a table with columns for "Attribute", "Attribute Description", "Section", "Domain", "Data Type", and "Unit of Measure". The "REPCOST" attribute is highlighted with a red circle. Its details are shown in a pop-up window, including "Attribute" (REPCOST), "Attribute Description" (Replacement cost), "Data Type" (NUMERIC), "Default Numeric Value" (29,000,000,000), "Unit of Measure" (EACH), "Organization" (UNIAK), and "Site" (UQA). The "Item Details" section includes "Item Sequence" (1) and checkboxes for "Use in Item Description?", "Use in Item Specification?", and "Value Required for Item?". The "Asset Details" section includes "Asset Sequence" (1) and checkboxes for "Use in Asset Description?", "Use in Asset Specification?", and "Value Required for Asset?". The "Location Details" section includes "Location Sequence" (1) and checkboxes for "Use in Location Description?", "Use in Location Specification?", and "Value Required for Location?".

How Low do you Go?

Determining Remaining Life



How Do We Make It Last!



Who Collects the Data?

Asset Data Responsibilities

<i>Data Task</i>	<i>Organization Group</i>
Asset details	Operations and Maintenance
Condition assessment	Operations and Maintenance
Asset values	Technical Engineering Services
Residual physical lives	Technical Engineering Services
Probability of failure	Operations and Maintenance
Consequence of failure	Technical Engineering Services
Business risk exposure	Technical Engineering Services
Optimal renewal strategy	Maintenance and/or Engineering

• Level of Service

- What is the demand for my services by my stakeholders?
- What do regulators require?
- What is my actual performance?

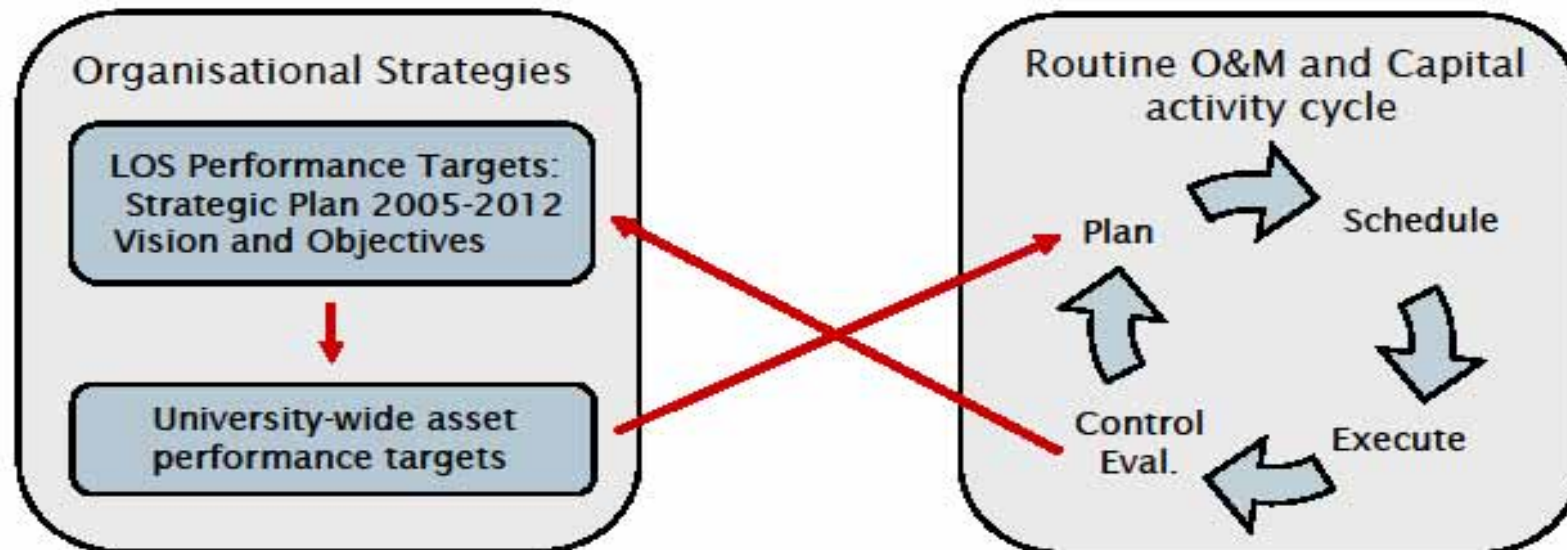
SAM plan 10-step process

Step
5

2. What is the required level of service?



Alignment of routine O&M and capital activities with organisational strategies

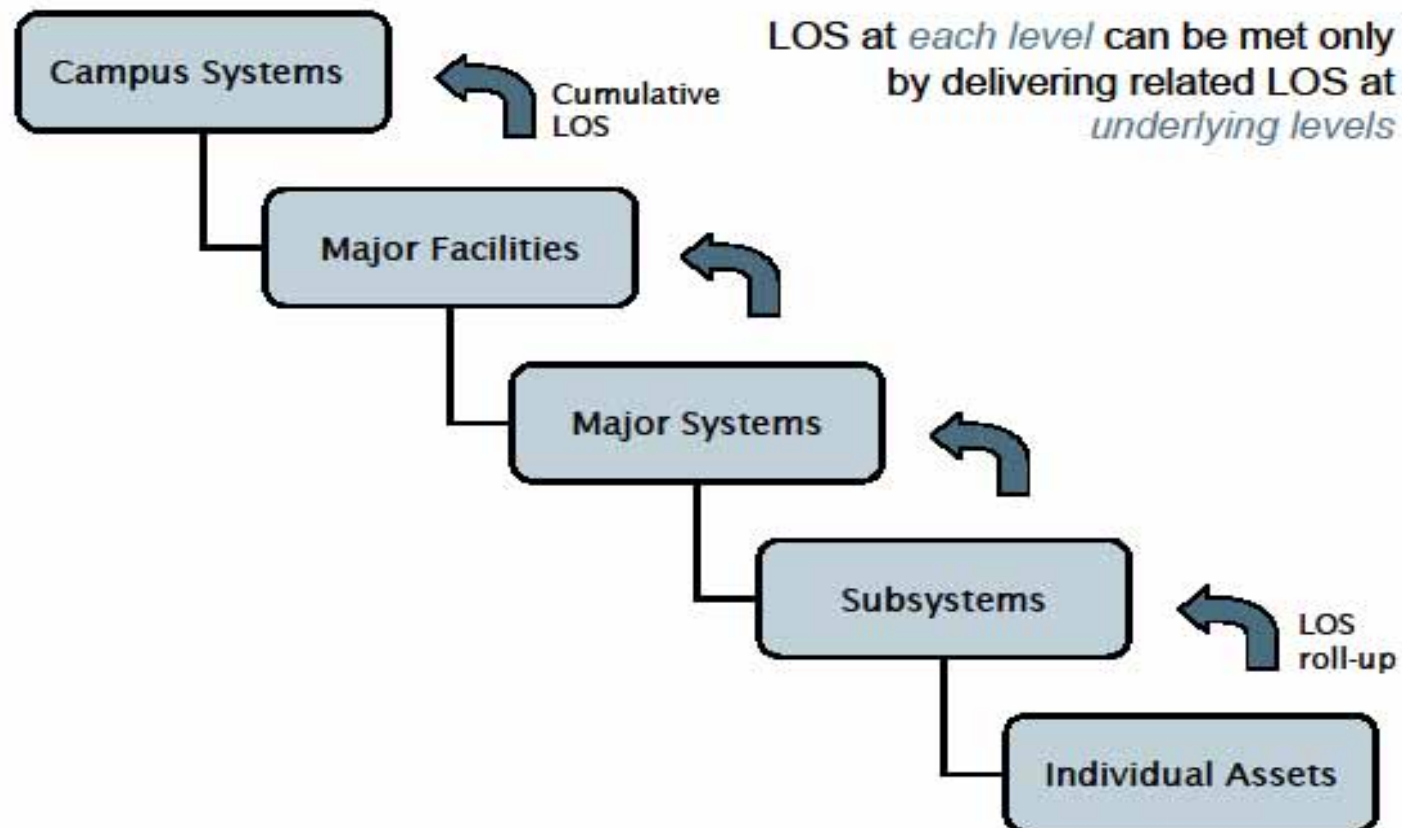


Why Level Of Service?

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
 - Fee impacts
 - Reinvestments for renewal
 - Level of risk

Roll up of Level Of Service



Forces Driving Level Of Service (LOS)

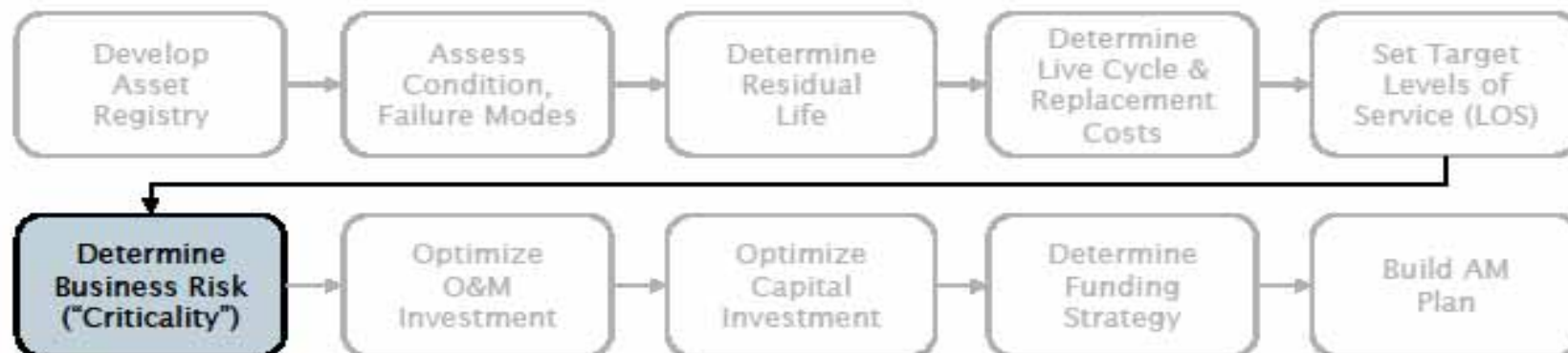
LOS is constantly subjected to forces of change:

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

- Which Assets Are Critical to Performance

- How does it fail? How can it fail?
- What is the likelihood of failure?
- What does it cost to repair?
- What are the consequences of failure?

SAM plan 10-step process

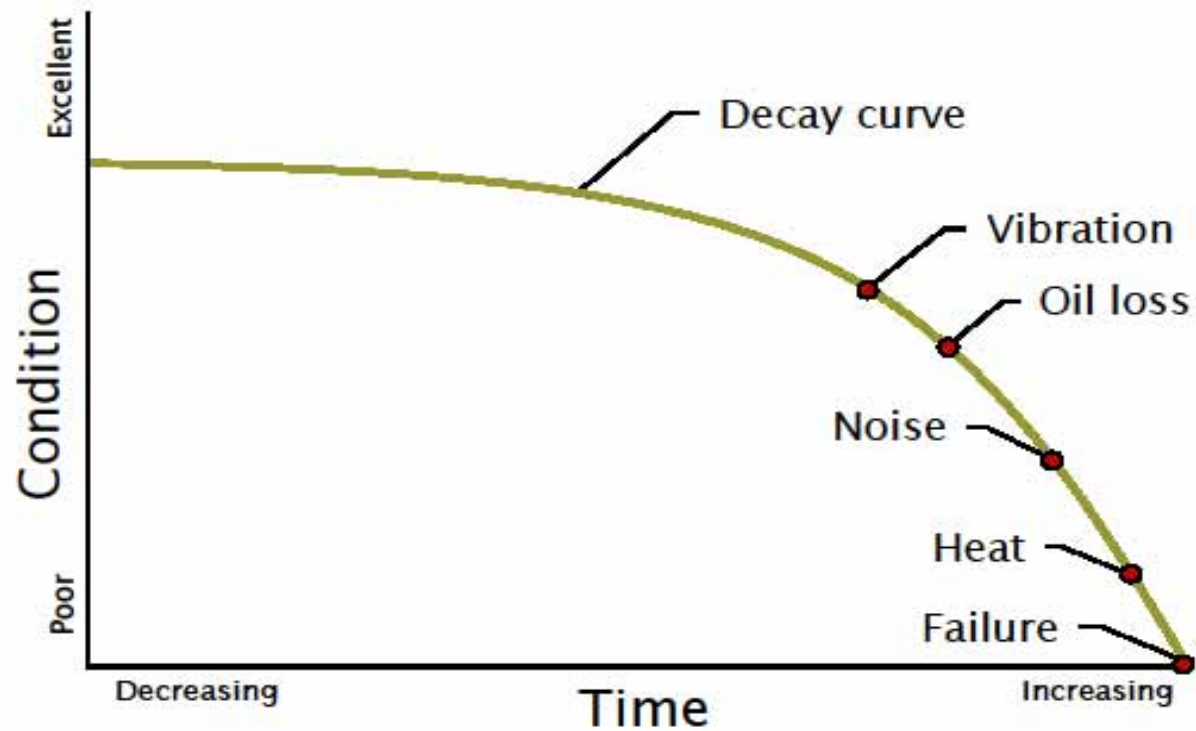


3. Which assets are critical to sustain performance?

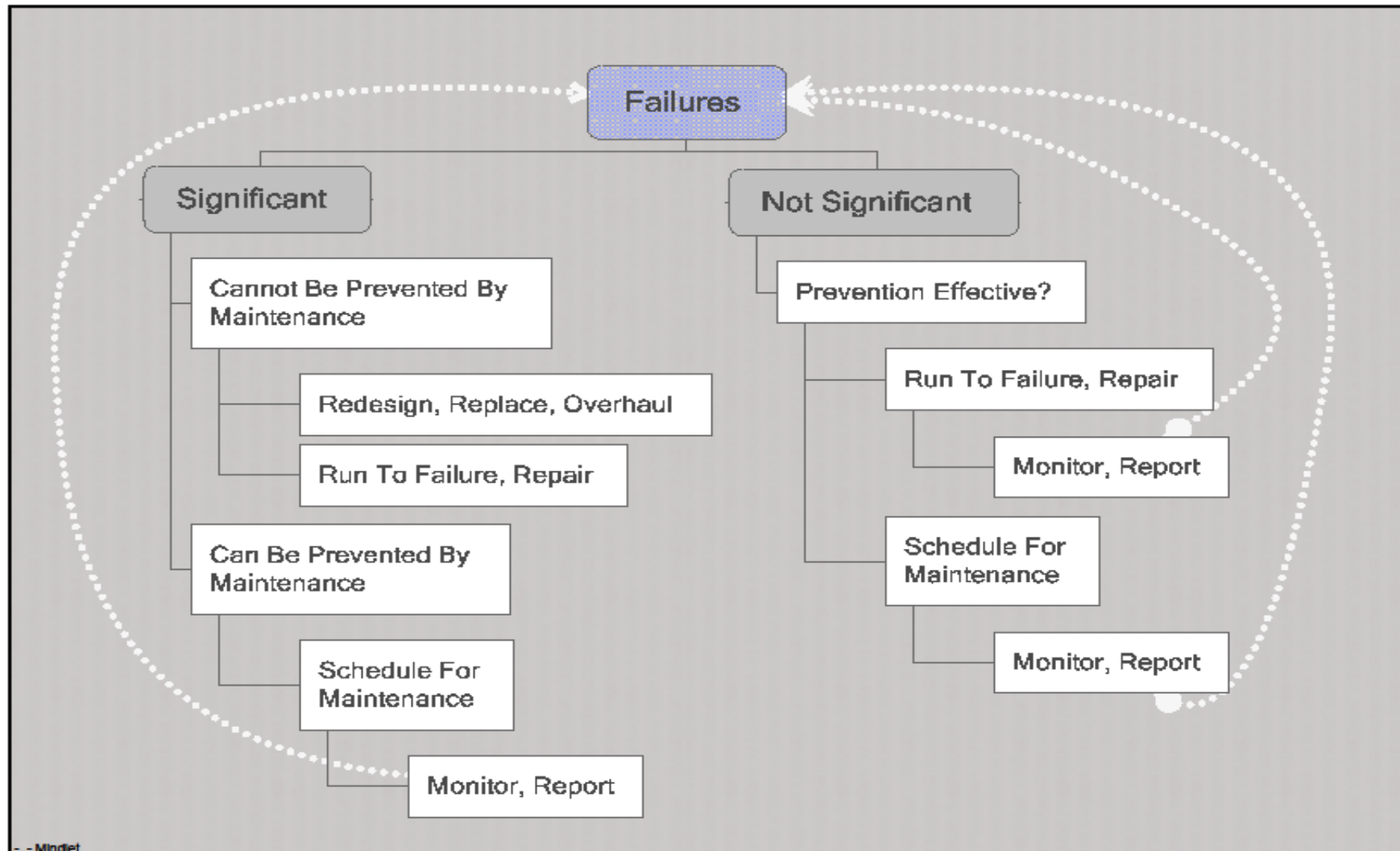
6
Step

How do Assets Fail?

Monitoring condition is a key to knowing risk



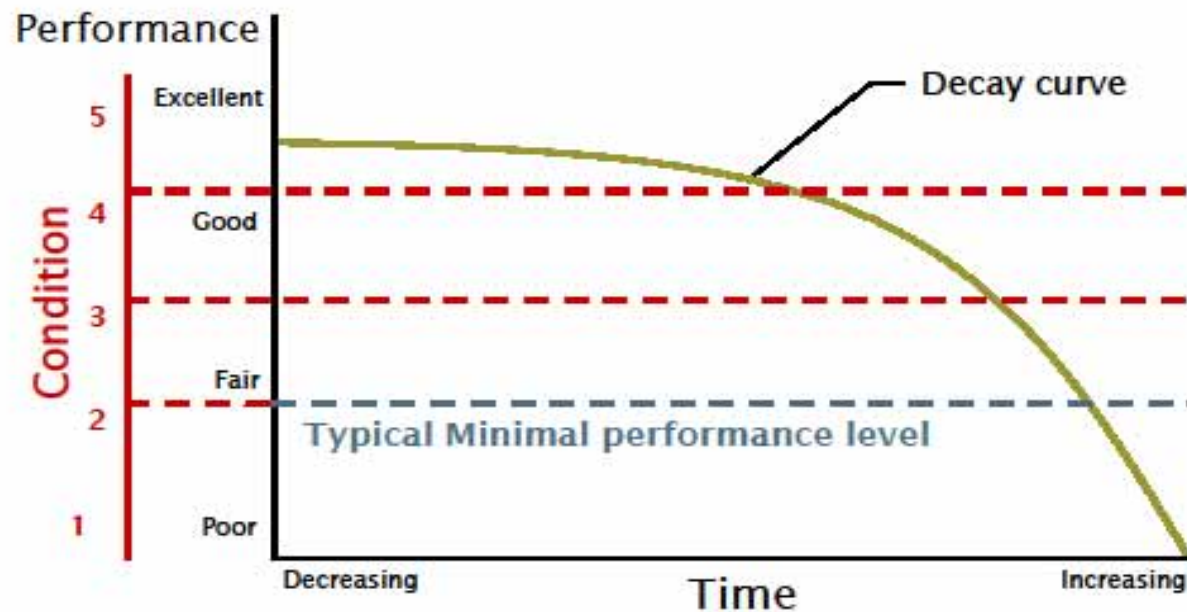
Is Failure Significant?



Asset Condition can Predict Failure

How Low do you Go?

Tying Condition Score to Asset Failure



Risk Probability and Consequence

Risk Probability

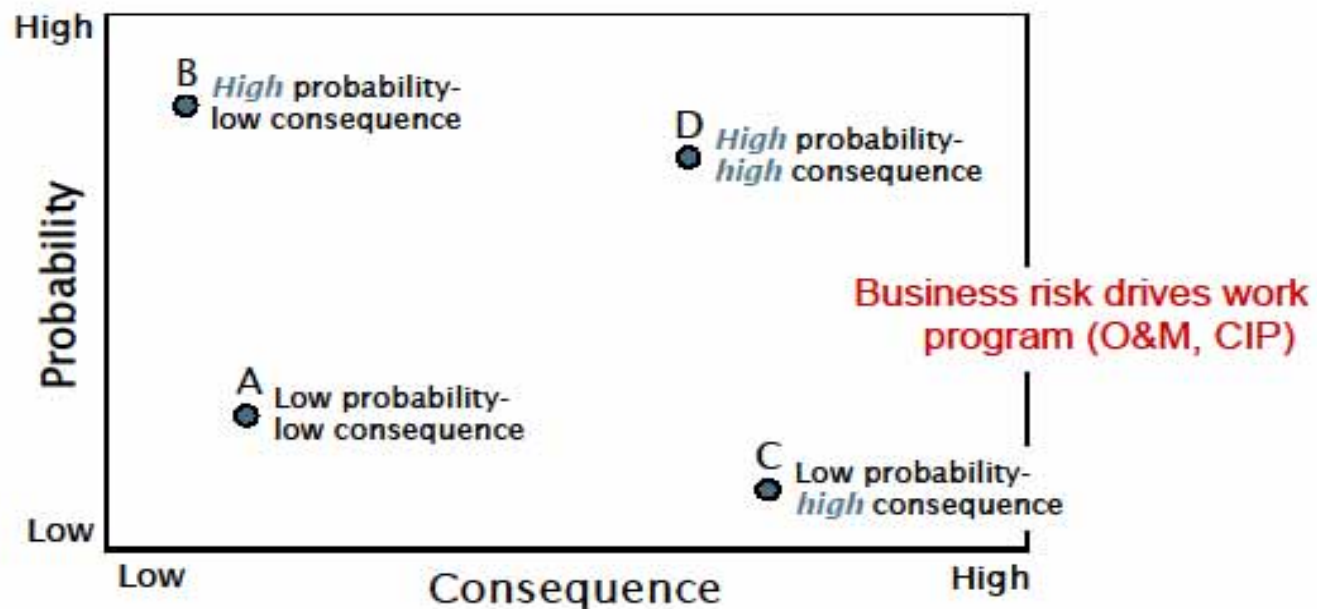
Probability	General Description	Rating
Rare	May occur only in exceptional circumstances	1
Unlikely	Could occur at some time	2
Moderate	Might occur at some time	3
Likely	Will probably occur in most circumstances	4
Almost Certain	Is expected to occur in most circumstances	5

Risk Consequence

Consequence	General Description	Rating
Catastrophic	Asset is unusable. Immediate high risk to security, health and safety, property damage; very significant cost of delay/financial loss implication.	5
Major	Major disruption to service capability. High probability of risk to health and safety or property; high cost of delay/financial loss implication.	4
Moderate	Constant inconvenience to operations. Some risk to health and safety or property; medium cost of delay/financial loss implication	3
Minor	Intermittent, minor inconvenience to operations. Probability of risk to health and safety or property is slight; low cost/financial loss implication.	2
Insignificant	No effect on service capability. Negligible consequence	1

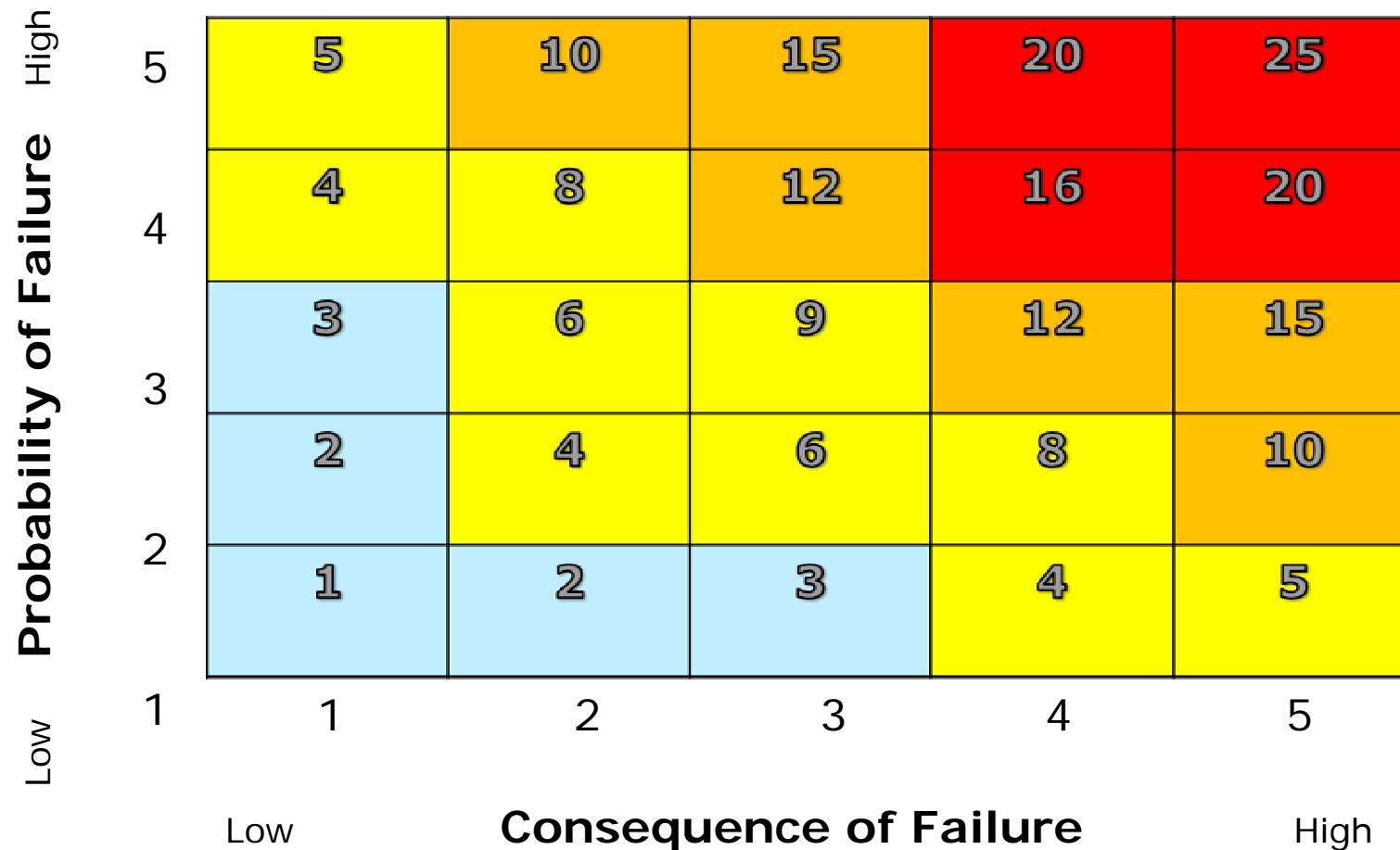
Determine Asset Failure Risk

What is probability of failure? What is consequence of failure?



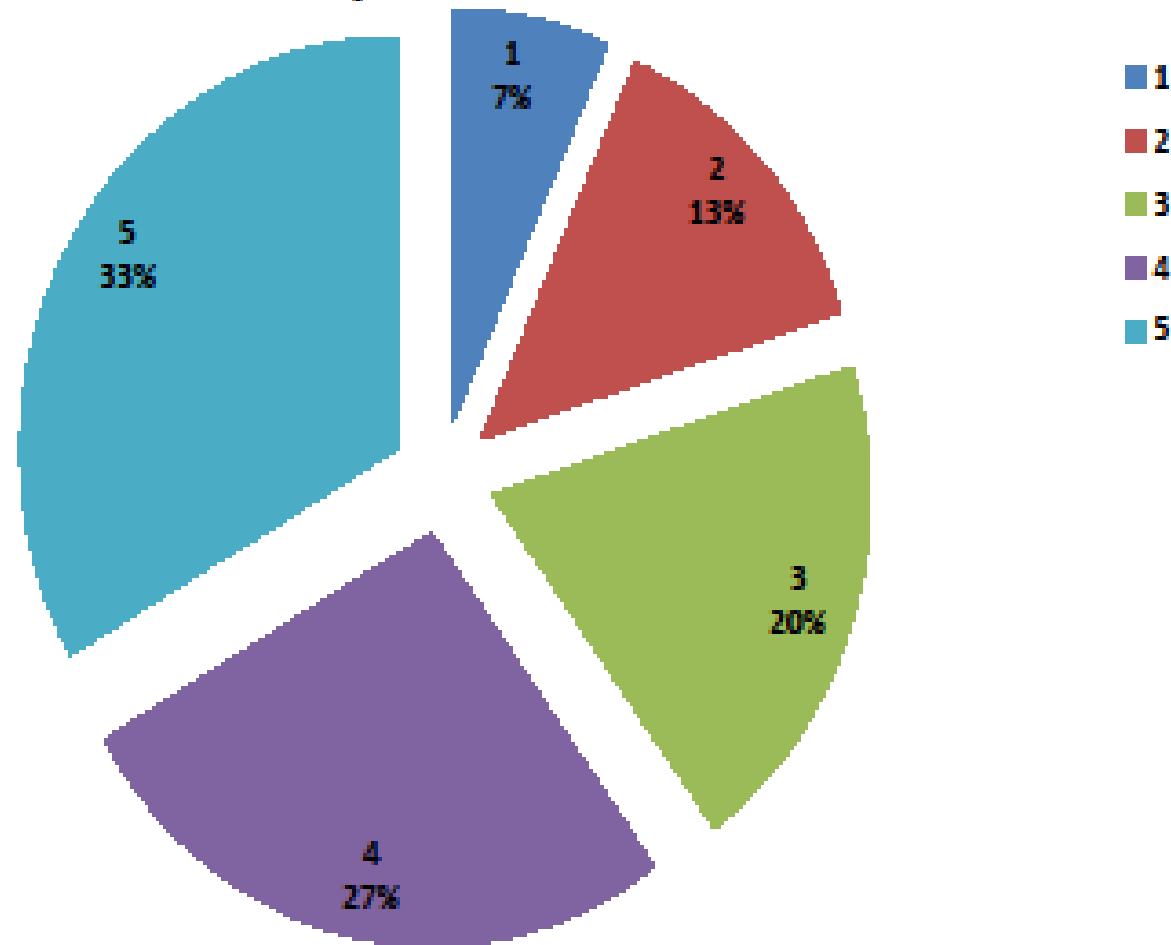
Which Projects First?

Business Risk Exposure (BRE) increases as Consequence of Failure (CoF) and Probability of Failure (PoF) increase



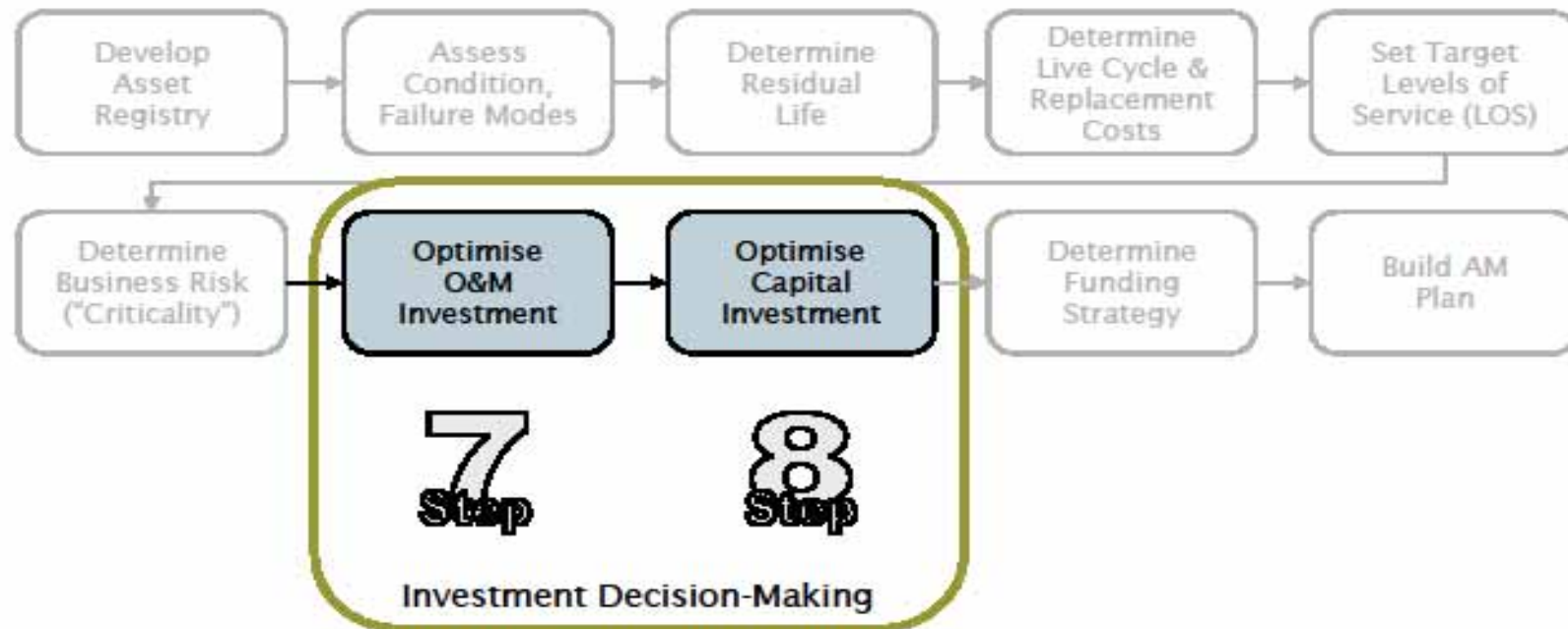
Probability of Failure	High	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	Low	1	2	3	4	5
		1	2	3	4	5
		Low	Consequence of Failure			High

University Asset Condition



- What are my best
Investment Strategies
 - What alternative management options exist?
 - Which are the most feasible for my organisation?

SAM Plan 10-Step Process



What Management Strategies?

So, what is meant by...

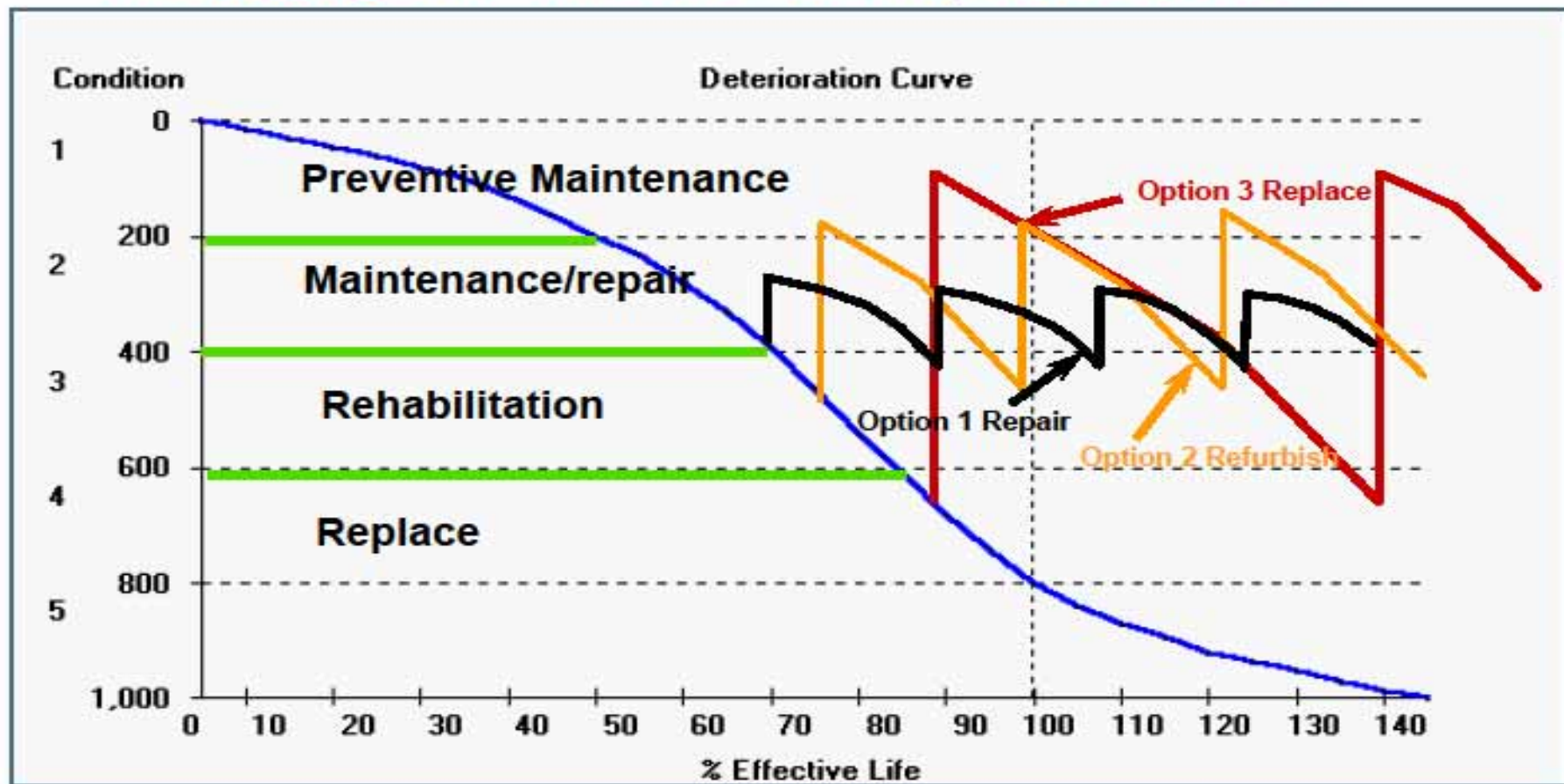
Life Cycle Cost Strategies

- Fundamental asset management options available to the management team are
 - Do nothing (zero-based strategy)
 - Status quo
 - Operate differently
 - Maintain differently—run to failure, preventive-based, predictive-based (condition, usage)
 - Repair
 - Refurbish/rehabilitate
 - Replace
 - Decommission
- Which strategy for each asset?
- Combinations over life cycle

It's *all* investment!

What Management Strategies?

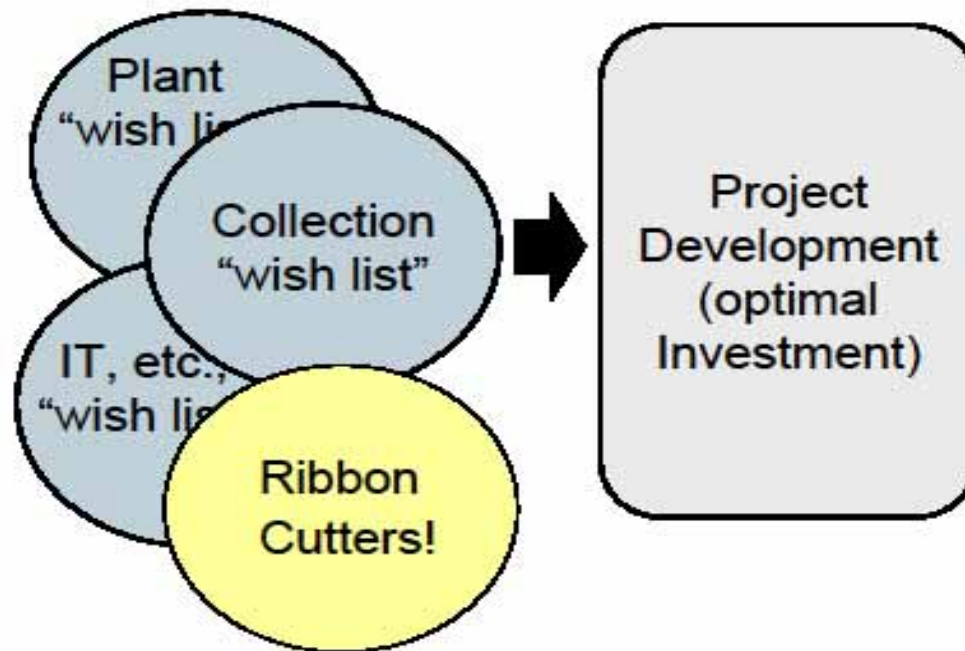
Managing the “Asset Consumption” Process



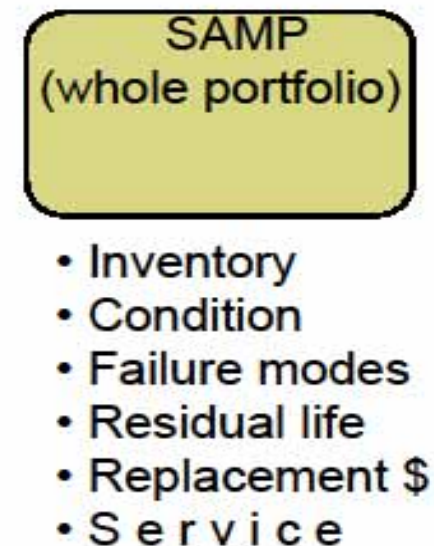
Who Decides?

Project identification: Moving to “best practice”

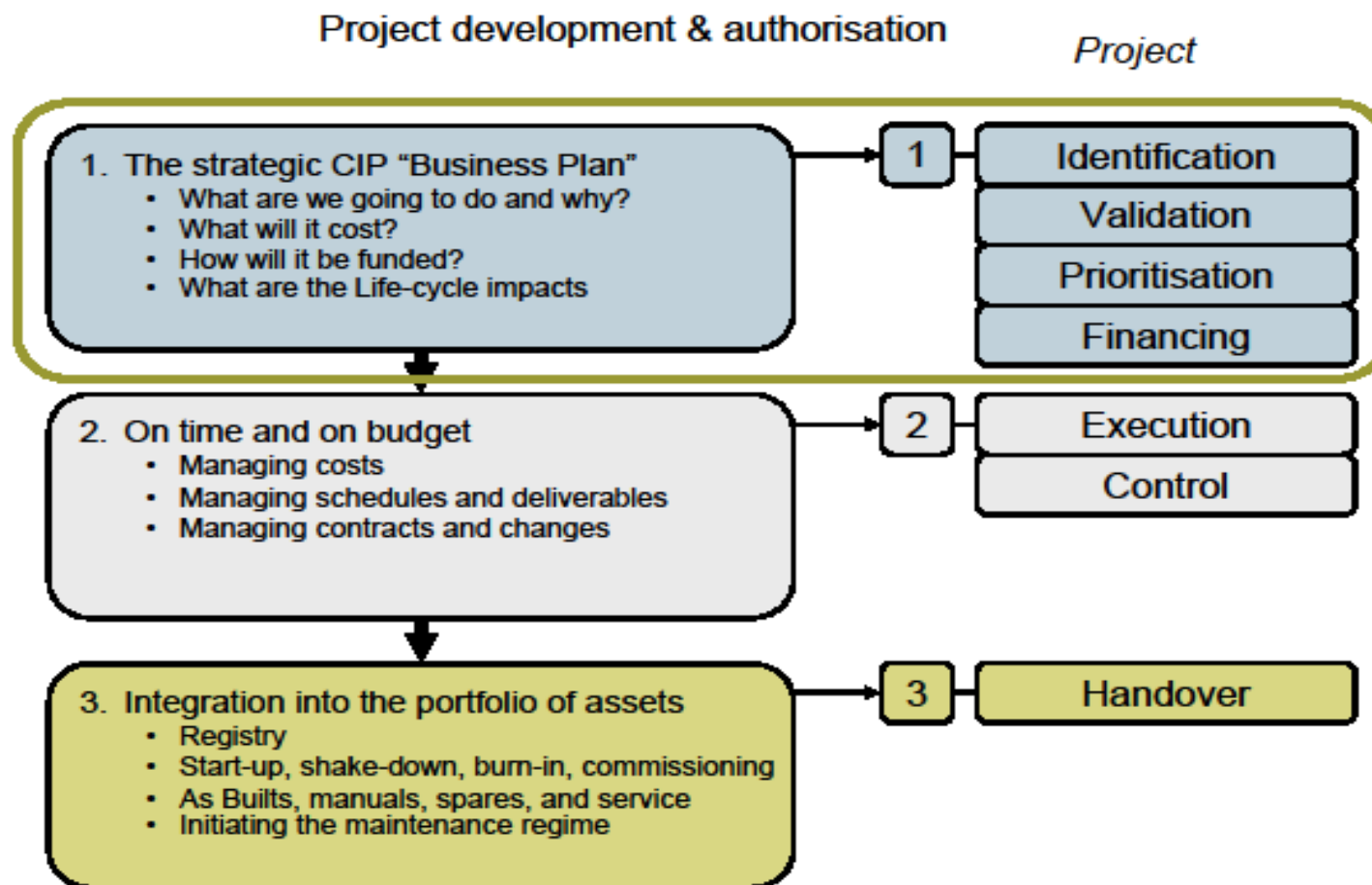
“Champion” model



“Structured” model

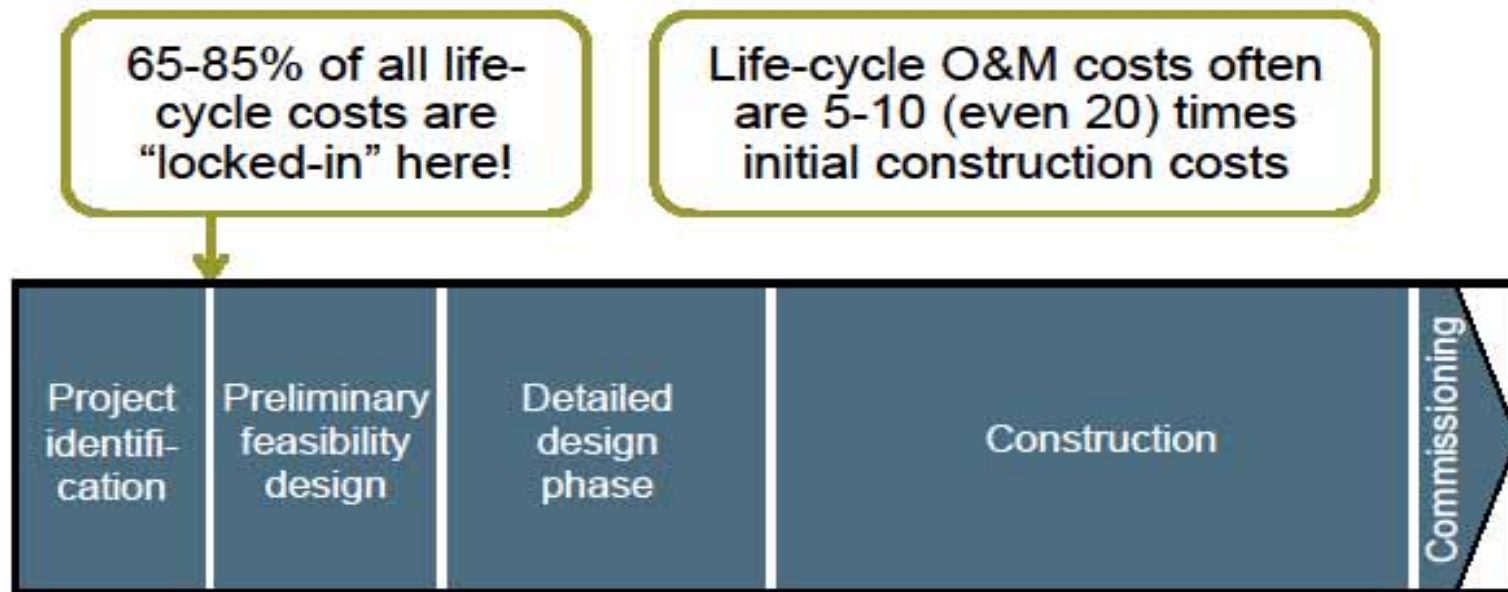


Capital Investment Program - best practice model



Who Inputs to Design and When?

The CIP process *locks in* life cycle costs!

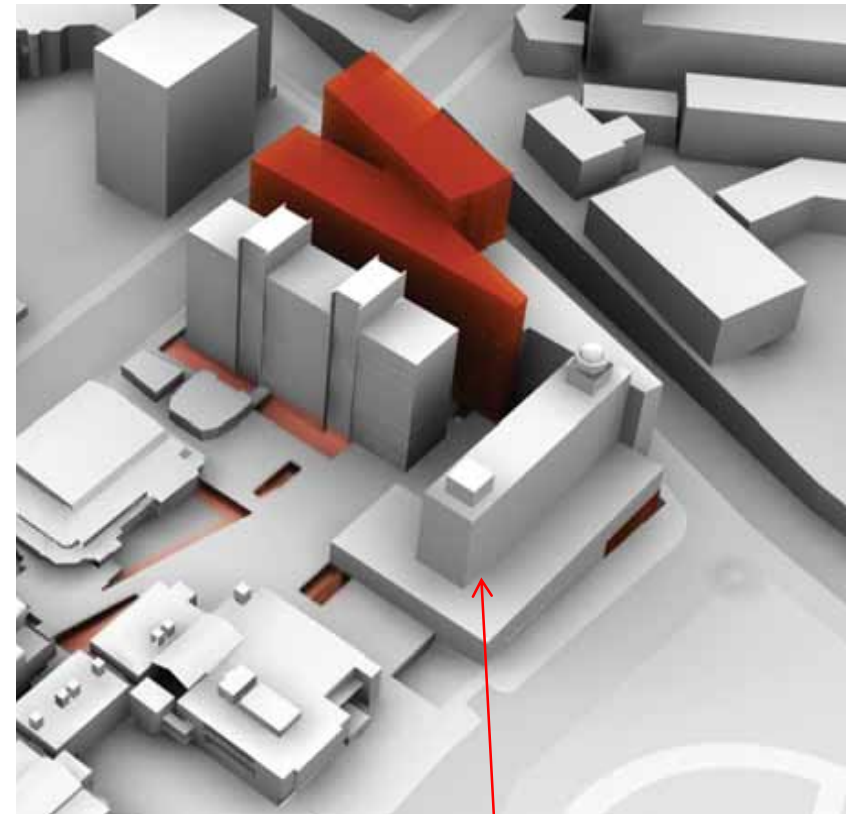


Life-cycle cost reduction opportunities diminish →

Planning

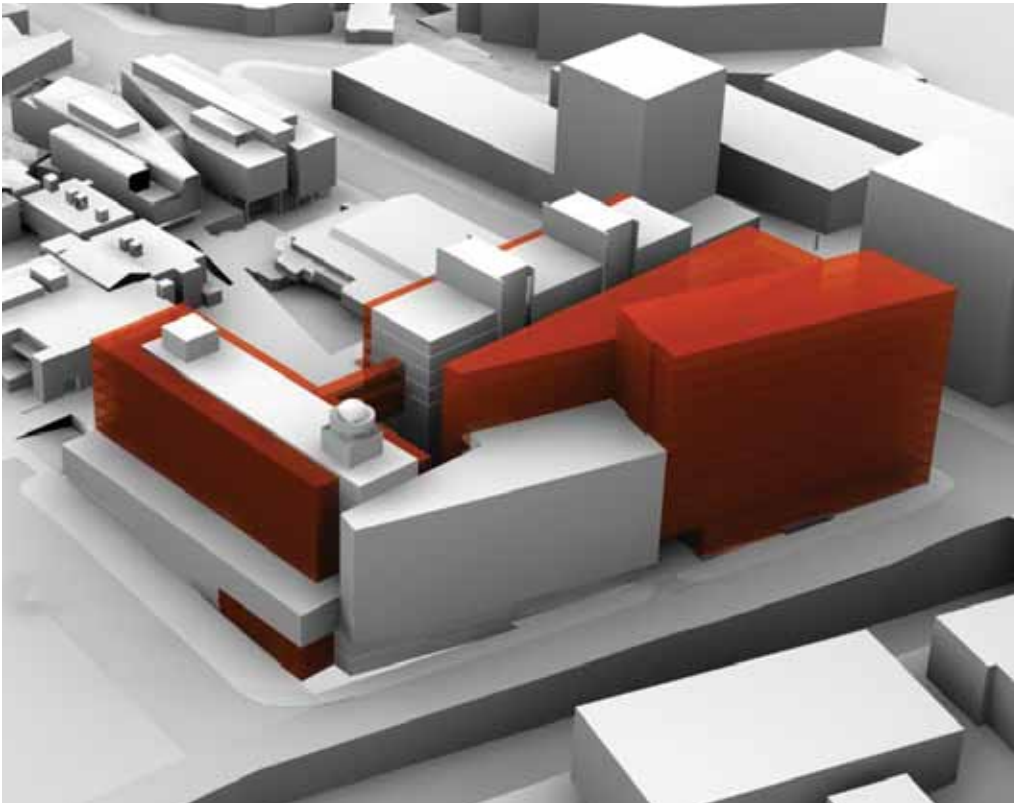


ARTS 1 Refurbishment

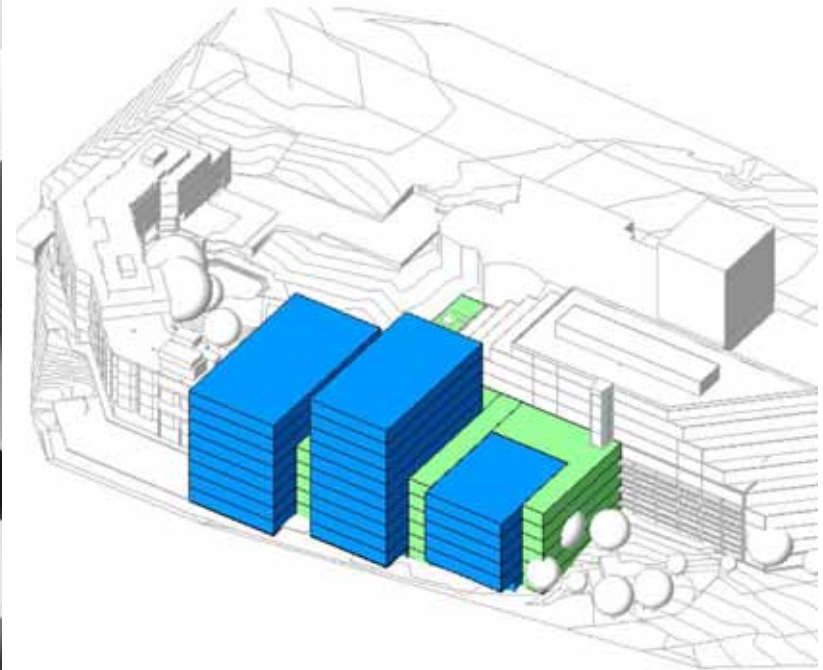


Maths/Physics
Refurbishment

Planning



Science Towers



New Eastern Edge
Buildings

Grafton

Boyle Building – Medical Campus (Completion 2011)



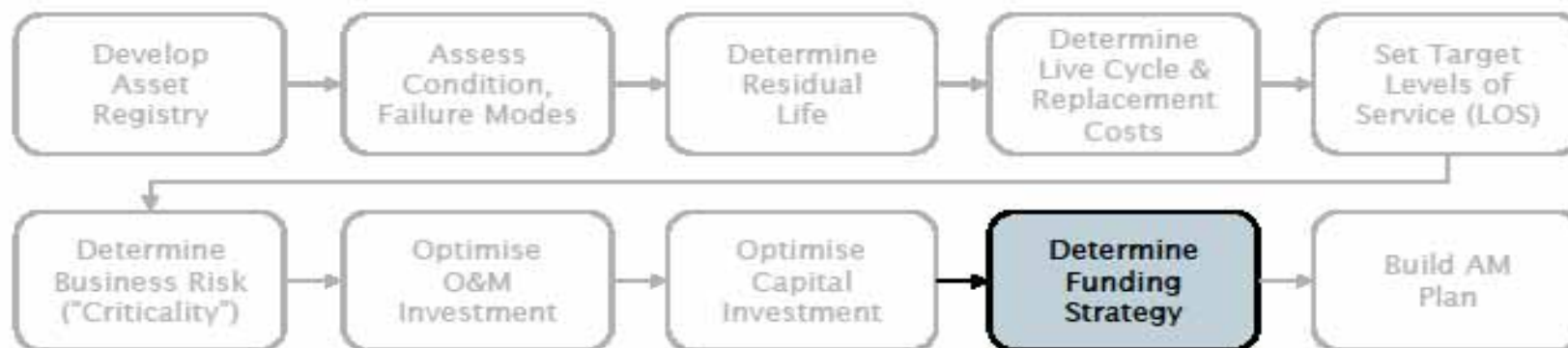
Thomas Extension IIB

Leading Research



- What is the best Funding Strategy

SAM plan 10-step process



5. What is my best long-term funding strategy?

9
Step

What Gives the Best Return?

Asset Management Investment Planning

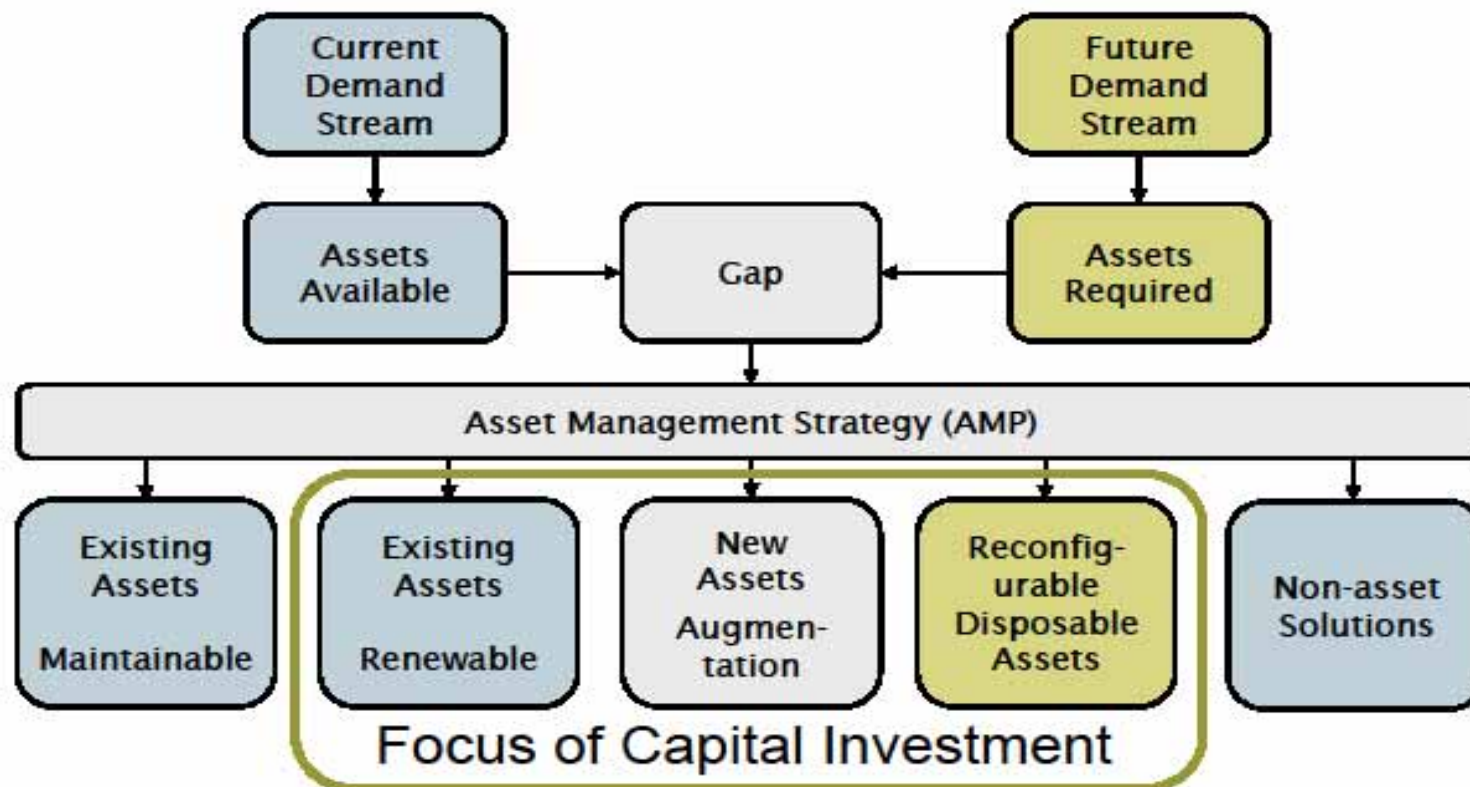
- Capital investment
 - Renewal (repair, refurbish, replace)
 - Augmentation (capacity, functionality)
- Maintenance investment
 - Planned
 - Preventive
 - Predictive
 - Corrective
 - Unplanned

What will be Future
Life-cycle projected costs?

Where is the Gap?

Capital Investment Plan

Balancing future demand with current capabilities

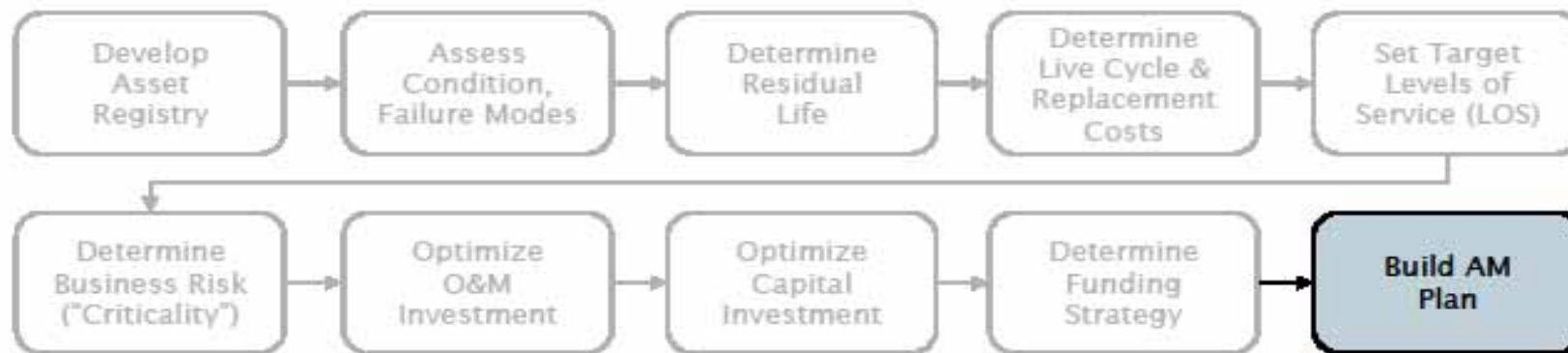


How Do We Pay?

Financing Strategies

- “Pay as you go” – current revenues
 - Dedicated reserve account (“hands off”)
 - Replacement/renewal recovery embedded in fee structure
- “Pay as you use” – debt service
 - “slice of debt service”
 - “intergenerational equity”
 - Interest as an expense that reduces available capital

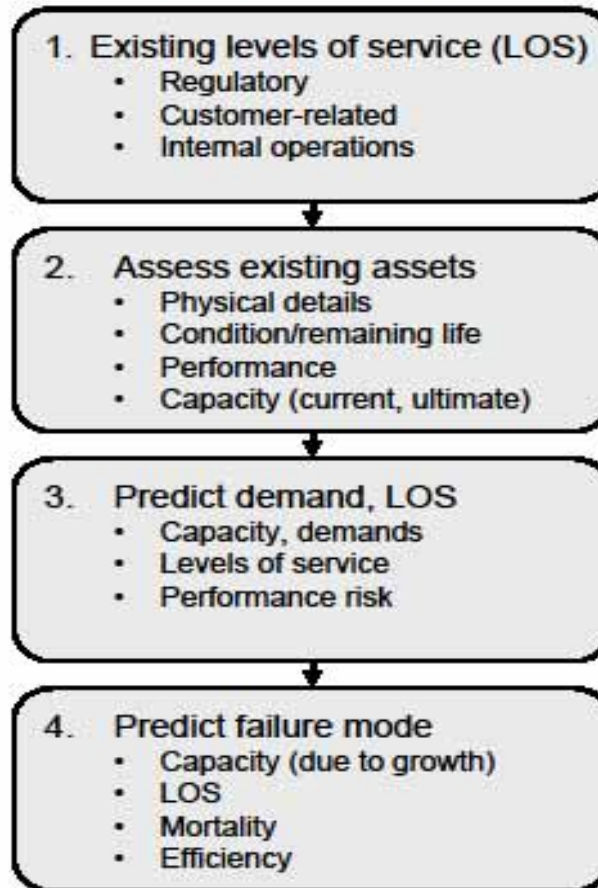
SAM plan 10-step process



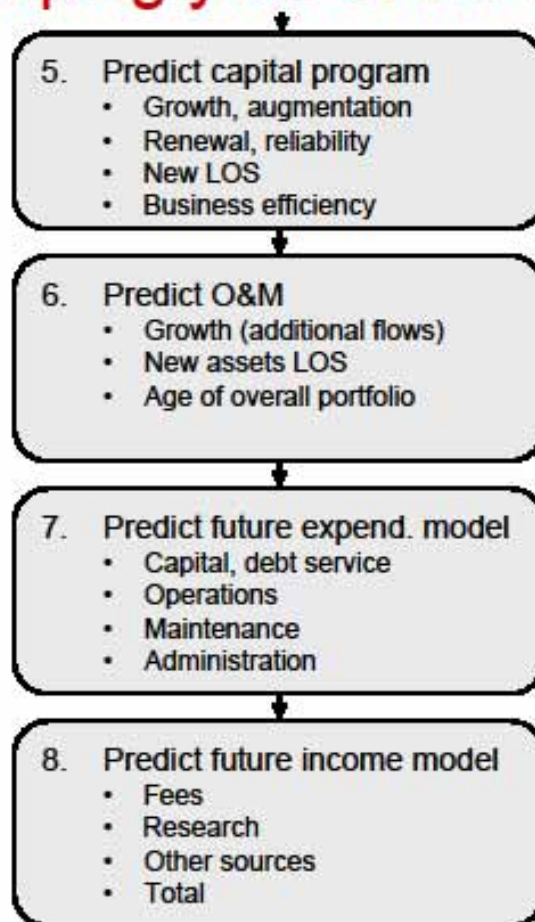
10
Step

Putting It Together

Steps in developing your SAMP

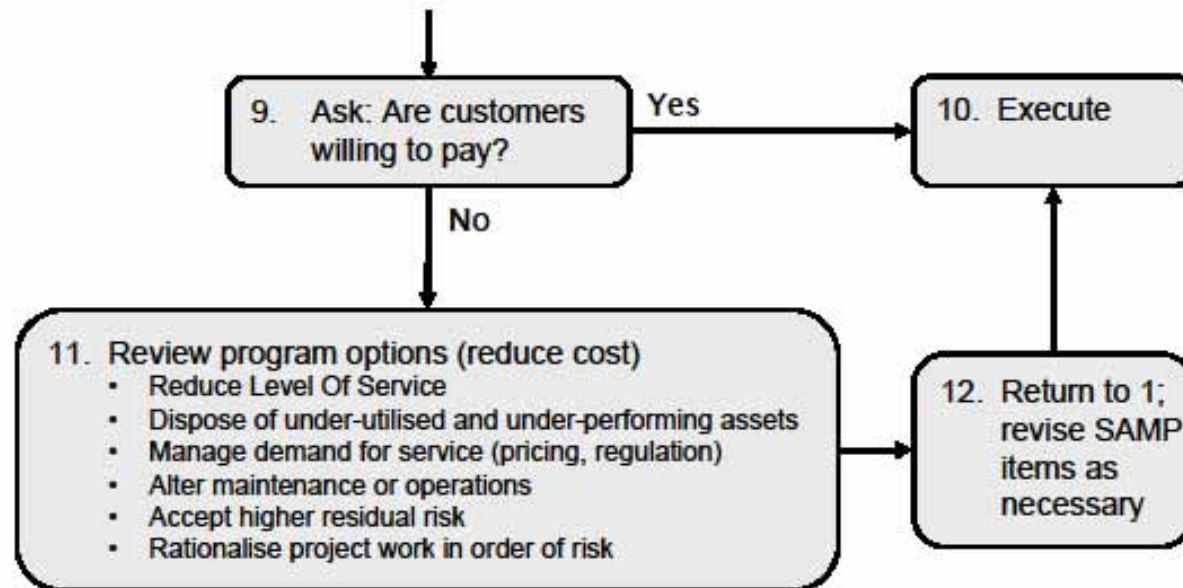


Steps in Developing your SAMP, cont.



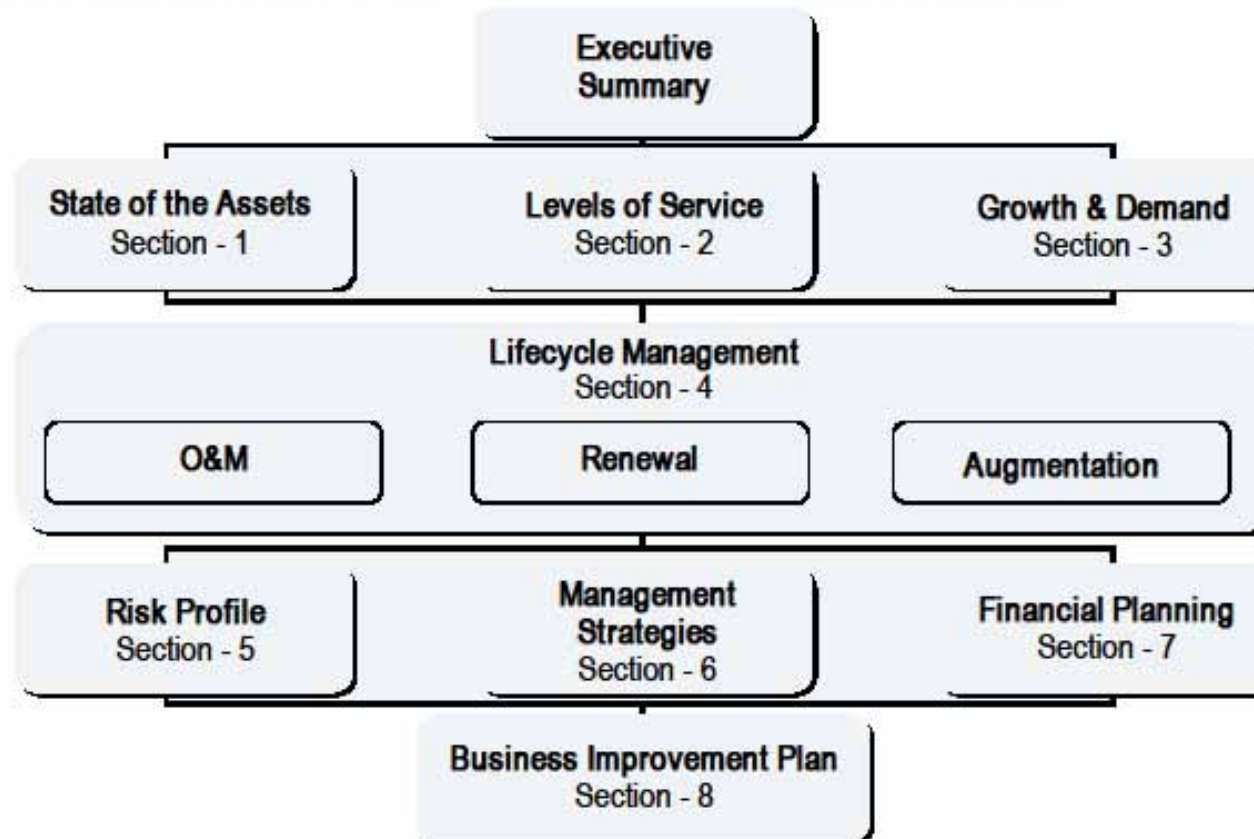
What Can You Afford?

Steps in developing your SAMP, cont.



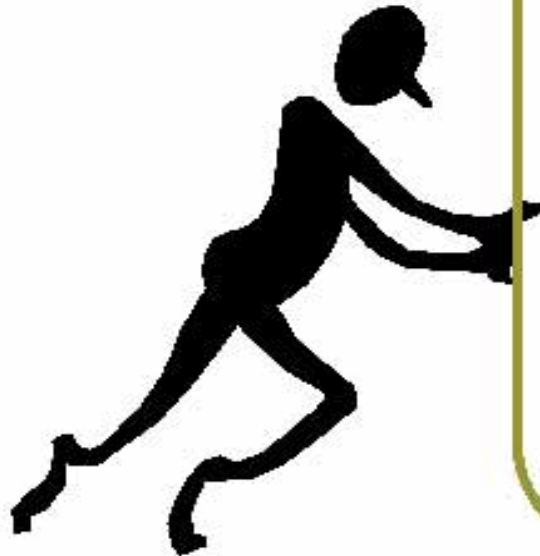
Publish The Plan

The Strategic Asset Management Plan



How Long Does it Take?

Realistic Expectations for SAM



- Takes several years of detailed, *nitty-gritty work* to fully deploy
- Requires eventual *buy-in* commitment of the whole organisation
- Needs *upfront* investment to get started, with *hidden* returns for initial years



Questions?