



# Don't Shoot the Messenger

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# Asset Management Policy Issues

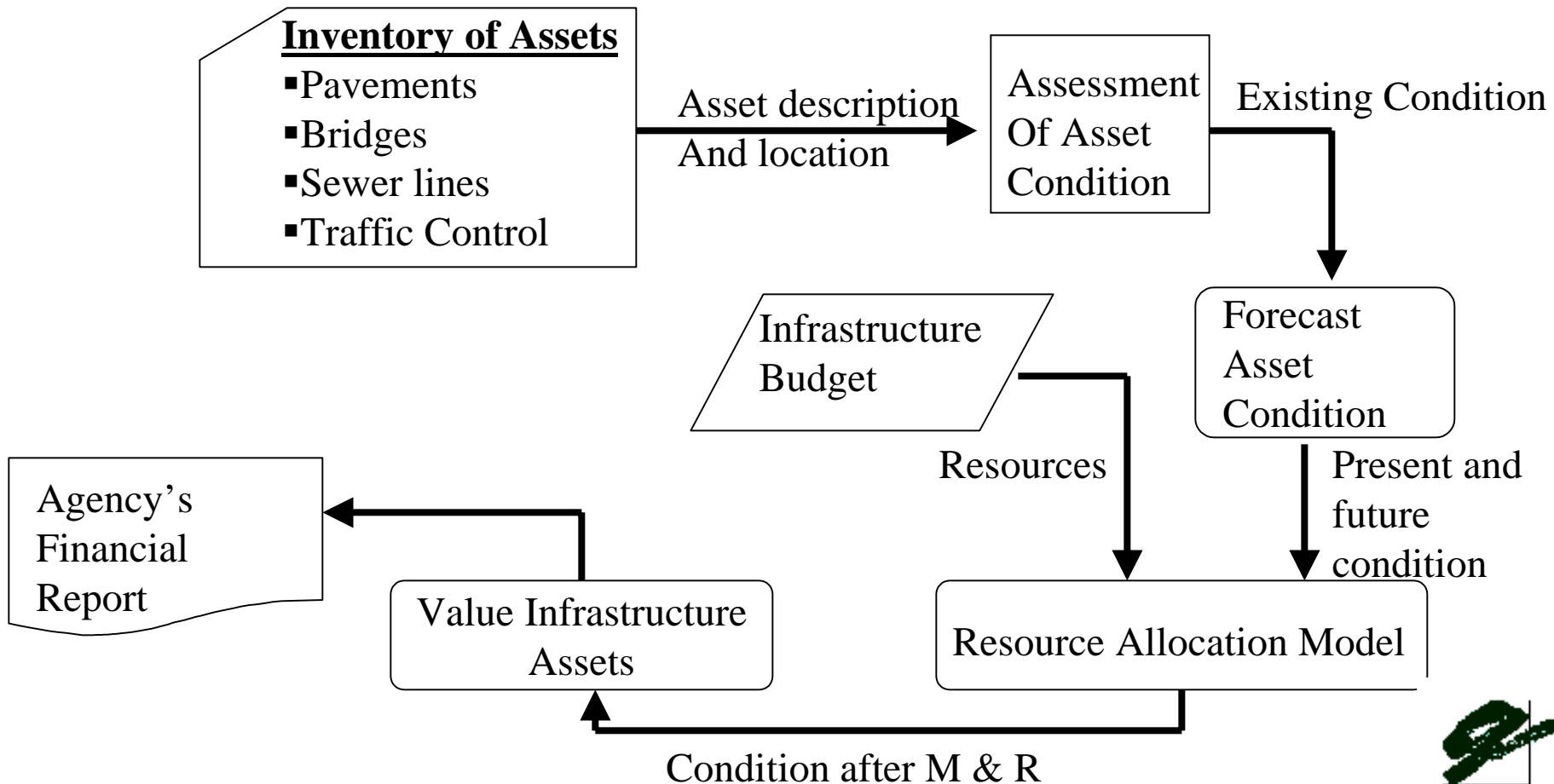


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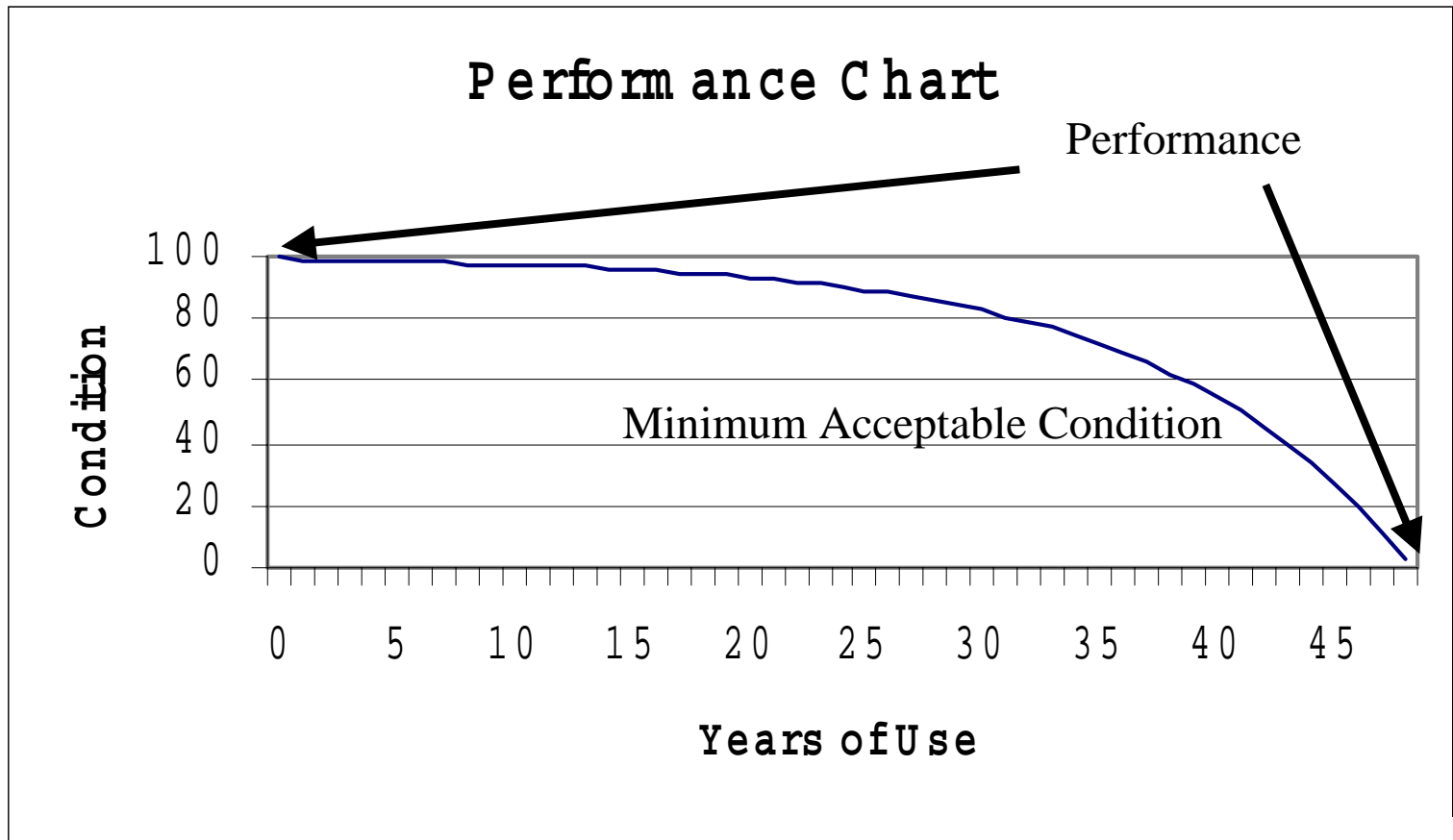
Tom Maze, Ph.D., P.E.  
Vice President  
Howard Green Company



# Asset Management Steps

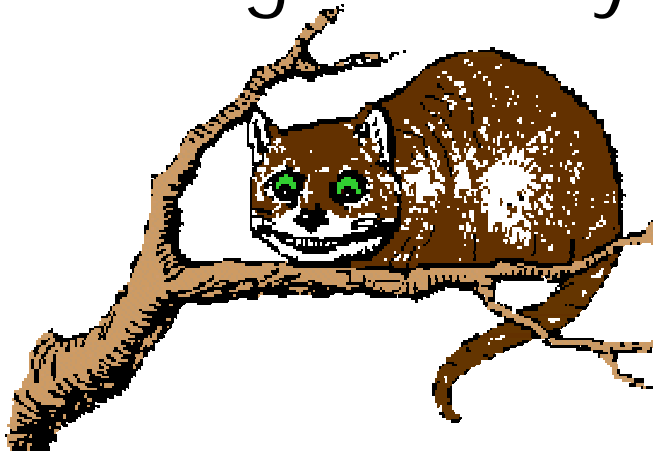


# Asset condition forecast



# Inventory Development

- What's the objective of the asset management system?





# Example Objectives

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- Satisfy GASB 34





# Example Objectives

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- Satisfy GASB 34
- Forecast the relation between expenditures and infrastructure condition (Network level)
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# Example Objectives

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- Satisfy GASB 34
- Forecast the relation between expenditures and infrastructure condition (Network level)
- Objective support for CIP development process
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# Example Objectives

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- Satisfy GASB 34
- Forecast the relation between expenditures and infrastructure condition (Network level)
- Objective support for CIP development process
- Objective support for maintenance management



# The objective impacts

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- The inventory granularity
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# The objective impacts

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- The inventory granularity
- Condition assessment frame work
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# The objective impacts

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- The inventory granularity
- Condition assessment frame work
- Resource allocation model employed
- Valuation method used
- 





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# The objective impacts

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- The inventory granularity
- Condition assessment frame work
- Resource allocation model employed
- Valuation method used
- Need for functions such as images and video





# Inventory decisions

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- Referencing systems
  - Literal
  - Linear
  - Geographic coordinates





# Inventory Decisions

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- Fundamental management unit (smallest division of the asset or asset network)
  - Linear system – segments
    - Example – pavement segments
  - Two or Three dimensional system – elements
    - Example – bridge core elements



# Boundaries for management unit - Example

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- Homogeneous performance along unit
  - Such as, pavement of same material
  - Similar or same construction history
- Homogeneous use
  - traffic patterns
- Political boundaries
- Maintenance treatments
- Maximum length or area





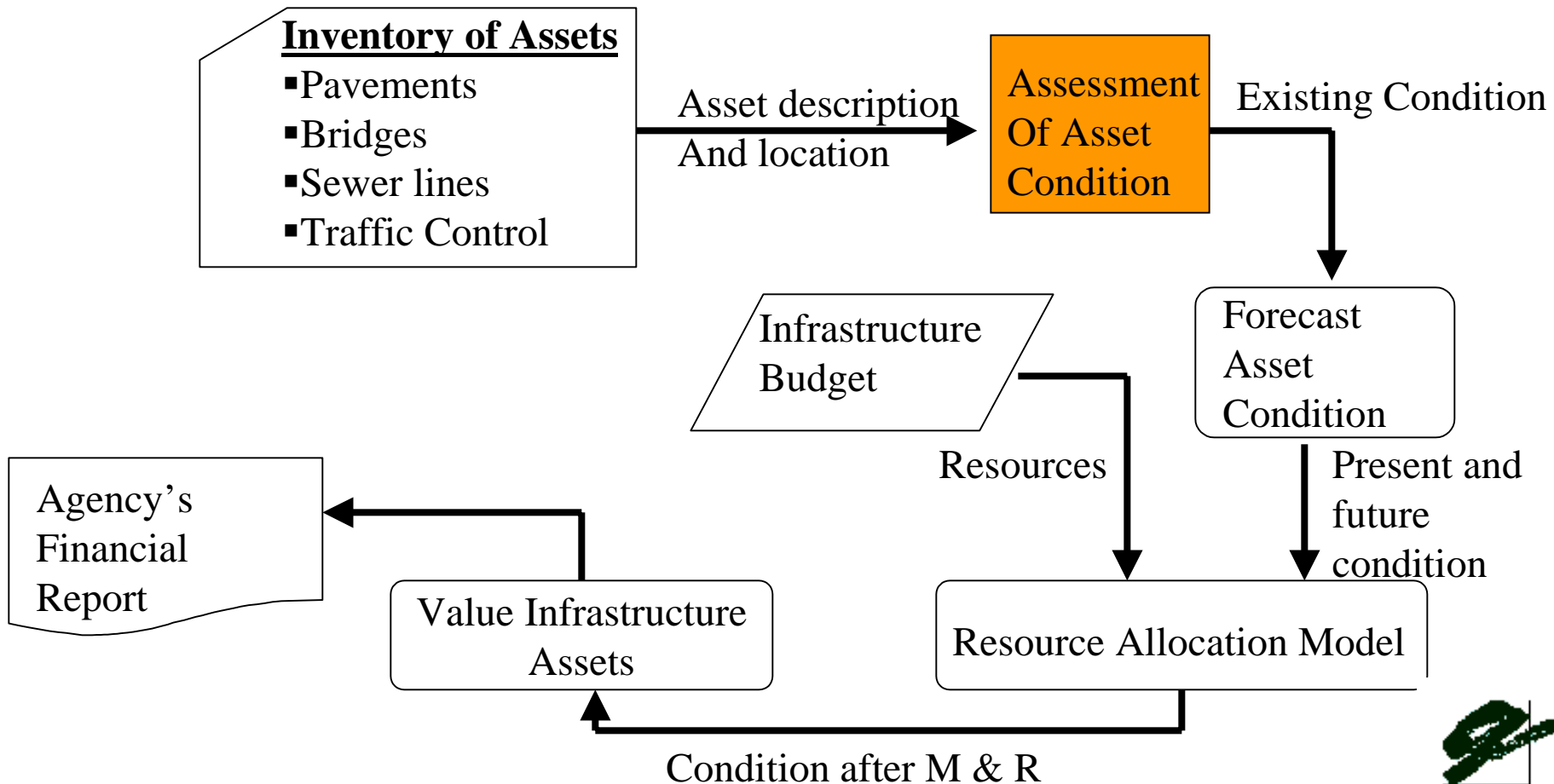
# Example boundary criteria

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- Pavement segments
  - Maximum 0.1 km
  - Same design and construction history
    - Material and thickness
  - Same traffic loadings
- Bridge Units
  - Decks
  - Girders
  - Diaphragms
  - Abutments

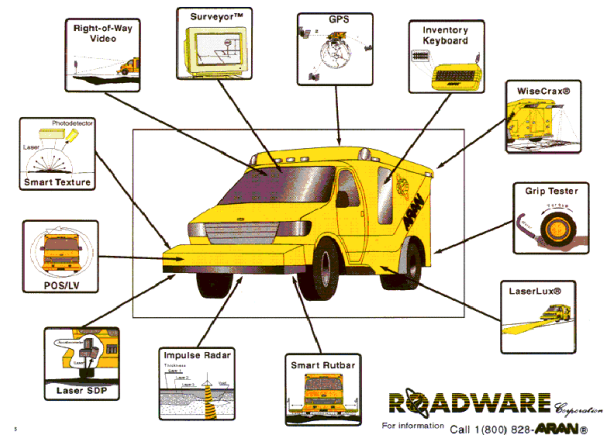


# Asset Management Steps



# Condition assessment

- Measured by
  - Type of condition
  - Extent
  - Severity
- Measured
  - Visually - subjectivity
  - Automated - reliability





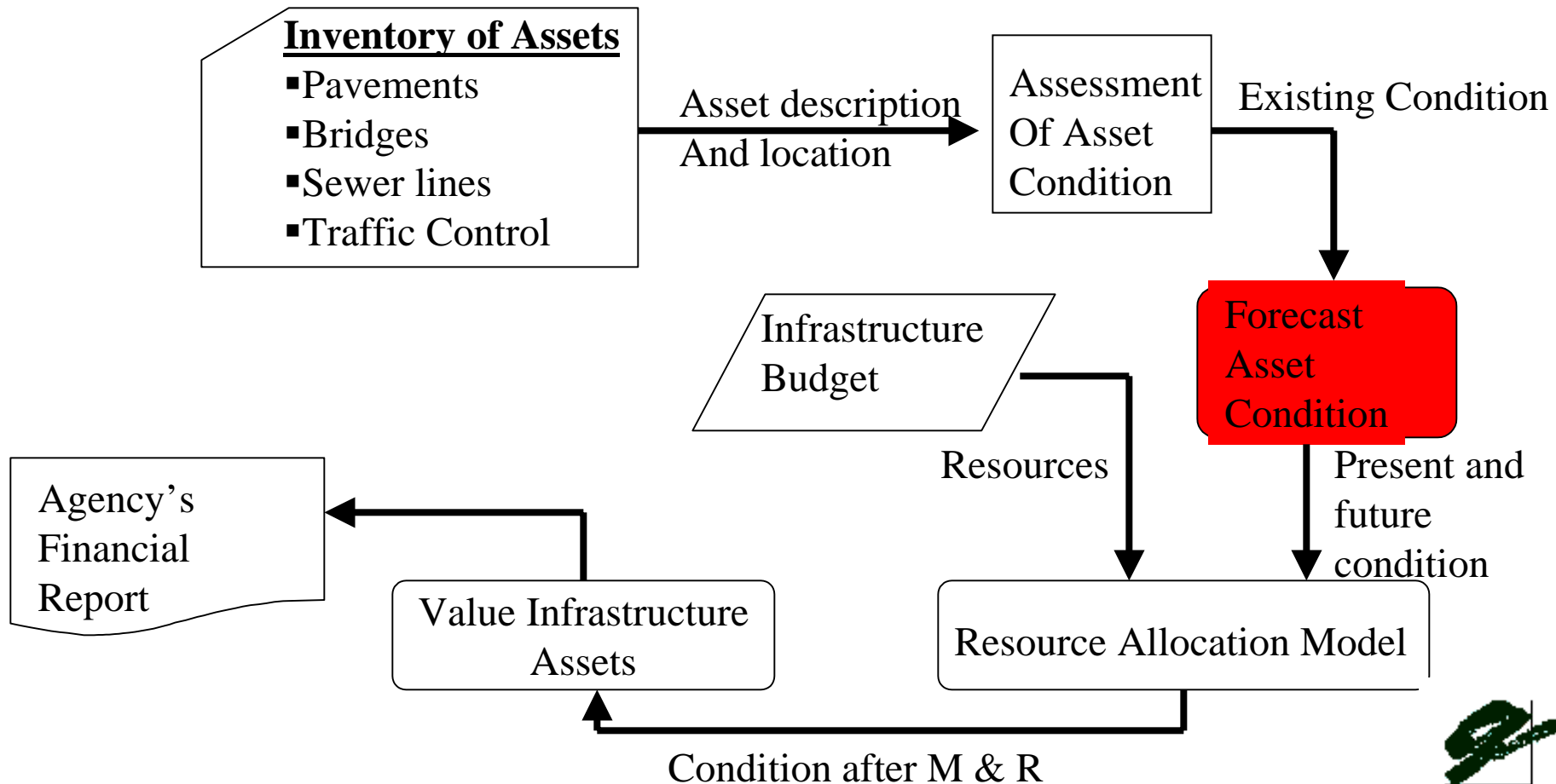
# Example pavement conditions

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- Pavement distress
  - Cracking
  - Block cracking
  - Rutting
  - Friction loss
- Pavement structure
- Pavement roughness



# Asset Management Steps





# Condition forecasts

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- Two schools of thought
  - Forecast a composite condition
    - One measure of overall condition
    - Identify minimum acceptable levels of condition
  - Remaining service life
    - Assets condition (and failure) is generally related to one failure mechanism
    - Remaining life can be predicted based on current condition of failure mechanism





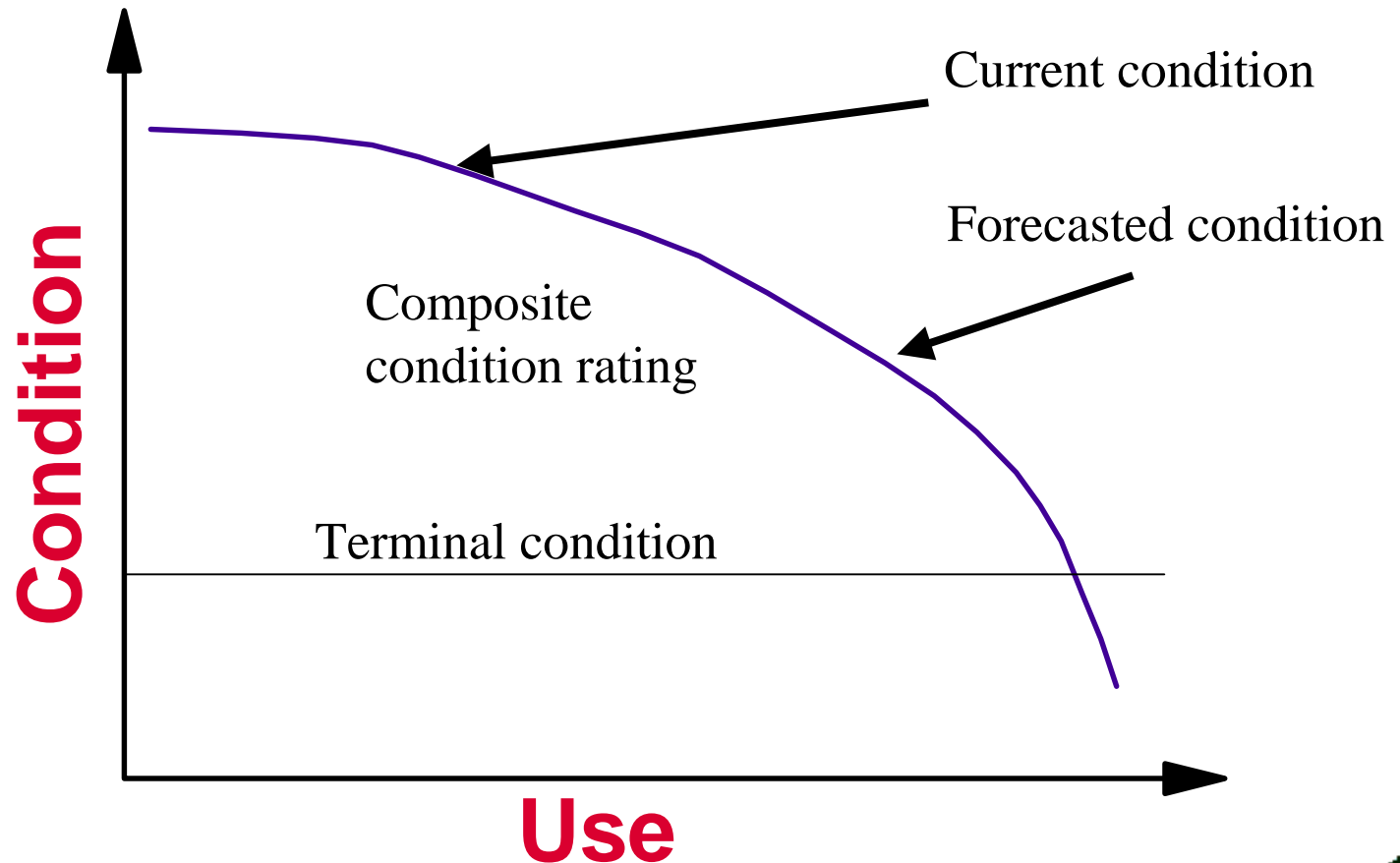
# Composite measure forecasts

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- Determinist models
  - Estimates one value for future condition
  - Forecasts are usually based on average observed performance
- Probabilistic models
  - Estimates a distribution of values for future conditions
  - Judgment may be built into estimates



# Condition forecasts – determinist model



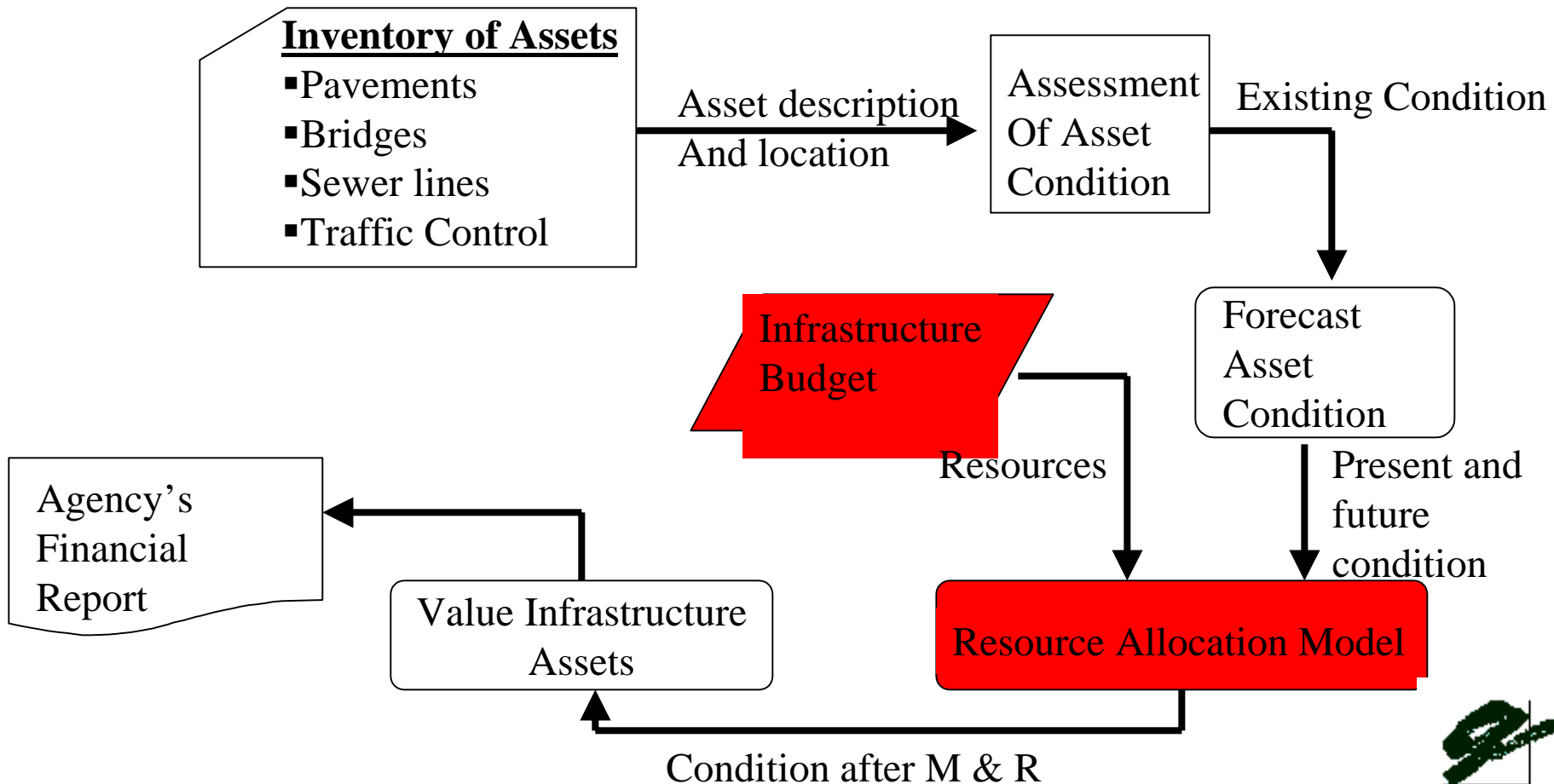


# Probabilistic model

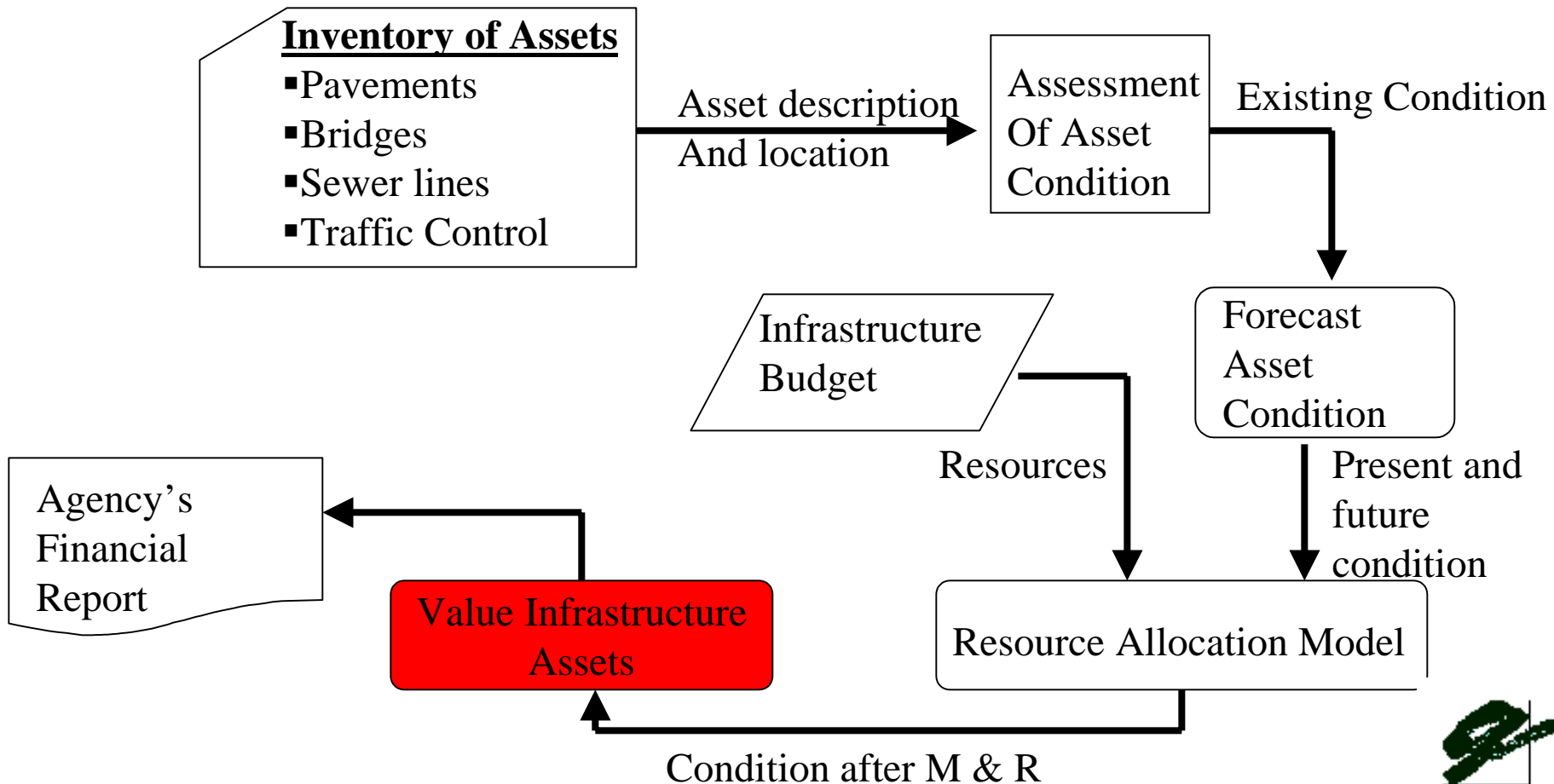
Starting condition	Ending Condition After One Year			
	100 – 90	90 – 80	80 – 70	70 or less
100 – 90	45%	50%	5%	0%
90 – 80	0%	60%	20%	20%
80 – 70	0%	0%	50%	50%
70 or less	0%	0%	0%	100%



# Asset Management Steps



# Asset Management Steps





# Methods for valuation

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- Depreciated historical costs
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# Methods for valuation

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- Depreciated historical costs
- Replacement cost
- 
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# Methods for valuation

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- Depreciated historical costs
- Replacement cost
- Market value
- 





# Methods for valuation

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- Depreciated historical costs
- Replacement cost
- Market value
- Earning potential (sum of future benefits)





# Problems with valuation

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- Many facilities are justified based on land access
  - Built to standards
  - Maintained to standards
- Engineering value estimates do not take into account
  - Benefits or potential benefits
  - Safety and functionality are not part of valuation





# Methodological issues for valuation

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- No U.S. standards for valuation of infrastructure exist
- How do you treat change due to changes in design or regulatory standards
  - Design deficient facility
  - Facilities that could not be replaced due to regulatory standards

