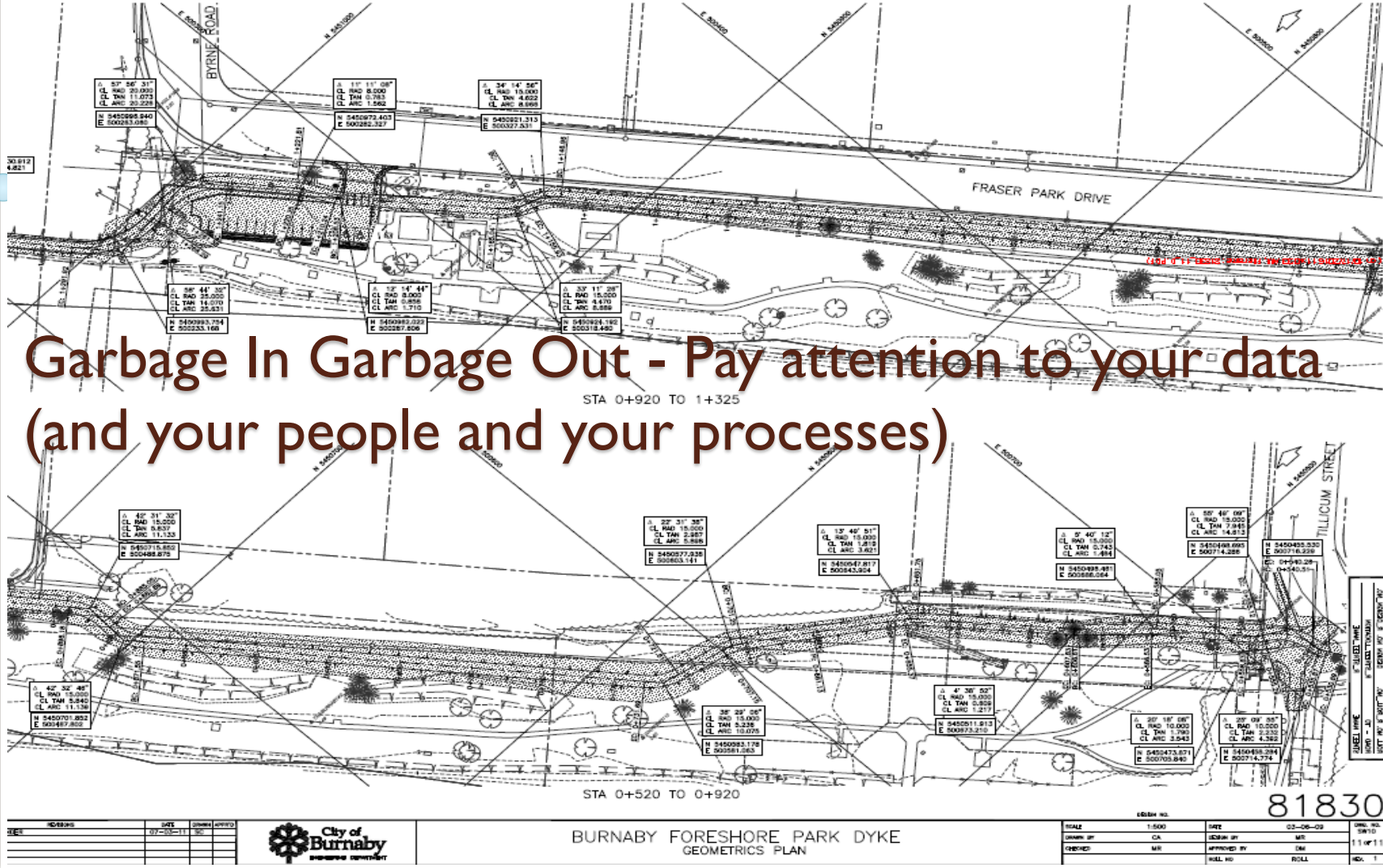
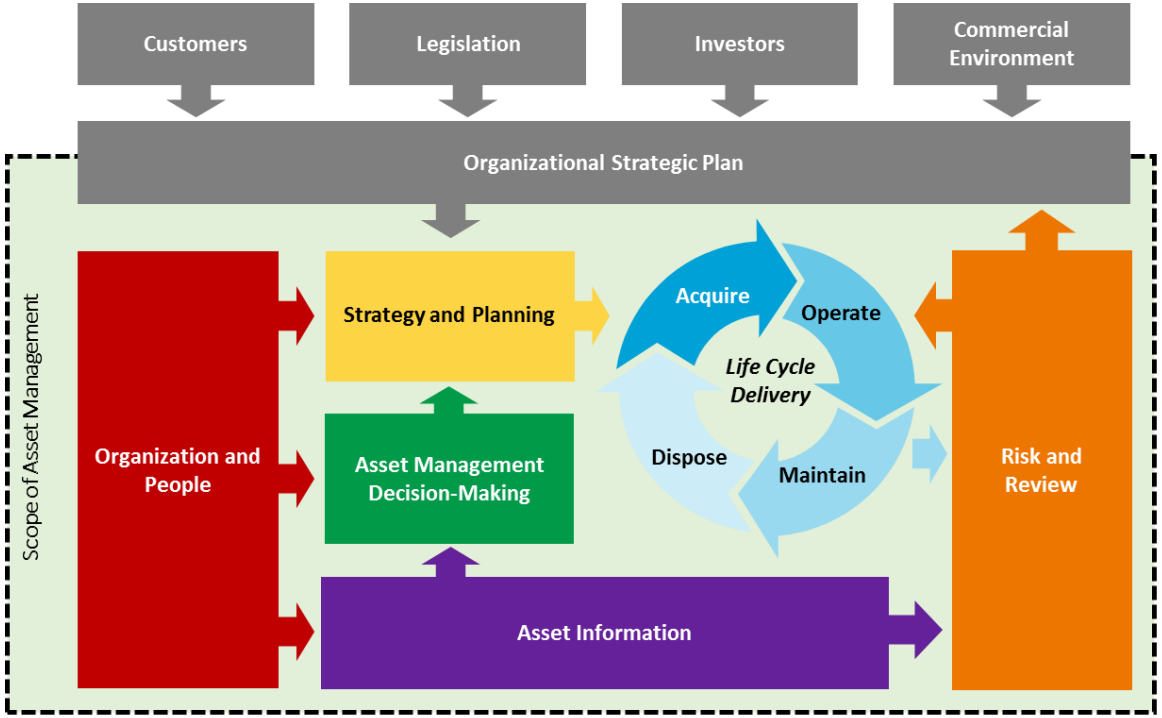
Garbage In Garbage Out - Pay attention to your data (and your people and your processes)



Observations by AMBC – What's the problem?

- Too many communities have paid very little attention to an inventory of what they own. PSAB brought this to their attention however most did an inventory for accounting and valuation purposes and didn't look forward to incorporating into Asset Management
- Many communities still have several inventories by department, which have varying degrees of completeness, may overlap, many duplicate assets and may define the same asset differently
- Linear assets and some structures based on function are managed through the public works Department. Other buildings serve Parks and Rec functions and are managed elsewhere. Then there are the other culture, administrative and miscellaneous building and structures managed across the organization. There is no cohesive approach to defining these assets
- No one is in charge of the inventory and there are few or no rules as to what, how and when things go in or out
- There are no policies in place respecting inventory content, management and control
- Adding infrastructure is often ignored or is not added in a timely fashion (anecdotally one community we are aware of requires "as builts" for new development to be added within two years……a long time!
- No policy or actions respecting deletion from the inventory……no one person in charge
- Different inventories in different departments used for different purposes can generate different answers for the same asset ….needs co-ordination.

Why have good information?



Source: IAM Anatomy: 2012

Asset Information Enables Informed Decision-Making

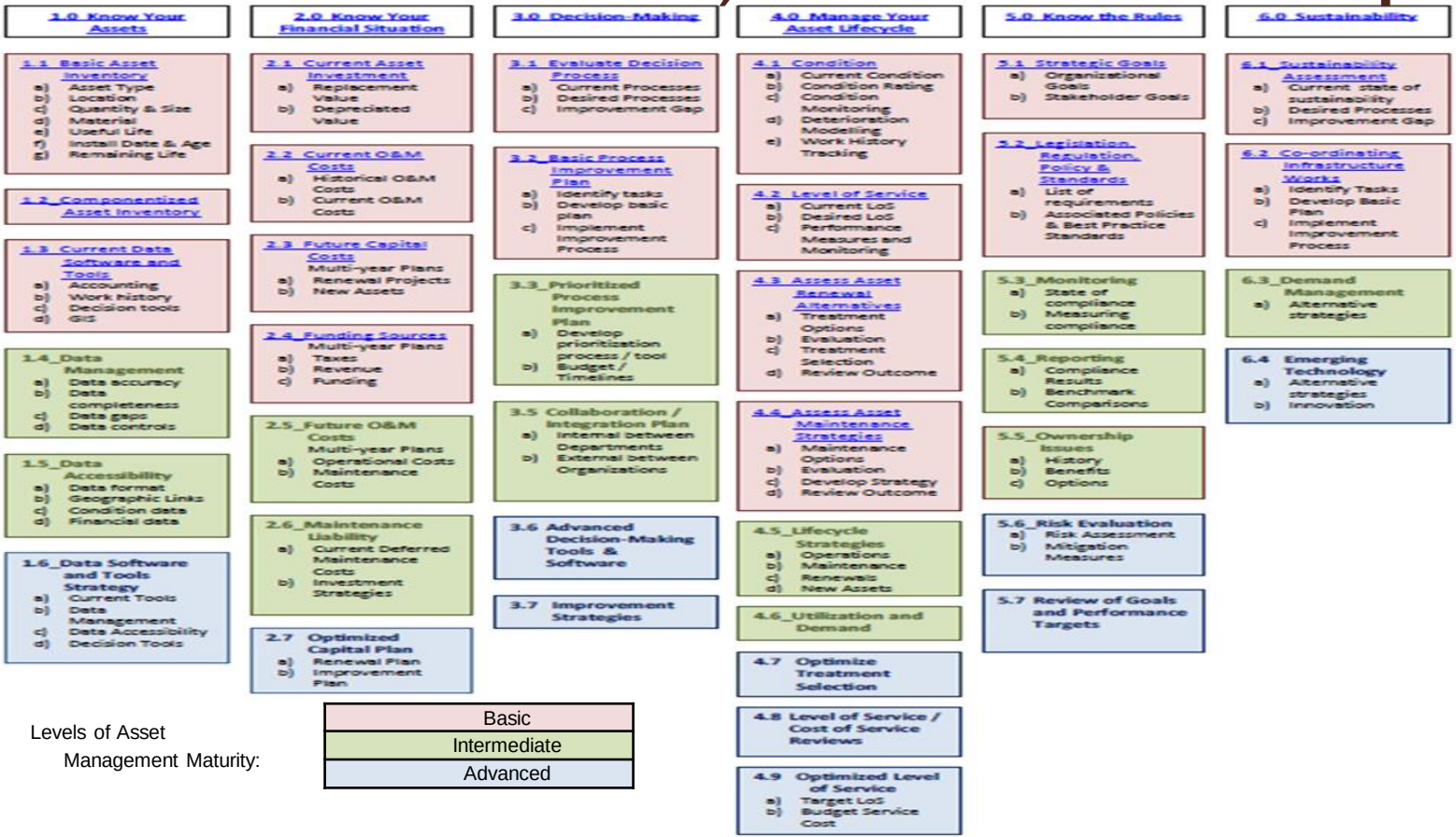
*"**Asset information** is a combination of data about physical assets used to inform decisions about how they are managed.*

***Good asset information** enables better decisions to be made, such as determining the optimal asset maintenance or renewal frequency for an asset."*

Source: The IAM Subject Specific Guideline (SSG) 'Asset Information, Strategy, Standards and Data Management'

- Good information helps people make informed decisions
- Think of the phrase: "Garbage-in-garbage-out"
- Poor decisions – arising from bad information -- have consequences
- Asset information therefore helps to manage risk

What's the Fix? 1)AMBC Roadmap



AMBC Roadmap

1.1 Basic Asset Inventory

a) Asset Type
b) Location
c) Quantity & Size
d) Material
e) Useful Life
f) Install Date & Age
g) Remaining Life

1.2 Identify Asset Components

1.3 Current Data, Software and Tools

a) Asset data
b) Accounting
c) Work history
d) Decision tools
e) GIS

1.4_Data Management

a) Data accuracy
b) Data completeness
c) Data gaps
d) Data controls

1.5_Data Accessibility

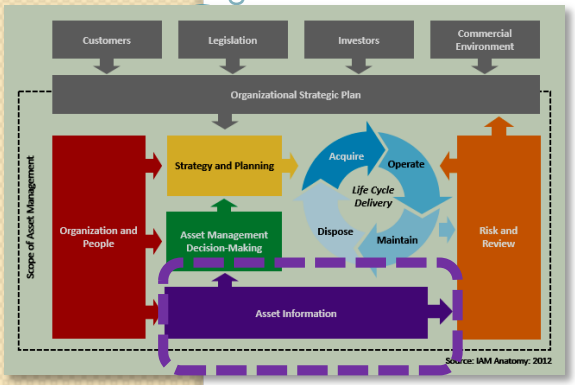
a) Data format
b) Geographic Links
c) Condition data
d) Financial data

1.6_Data, Software and Tools Strategy

a) Current Tools
b) Data Management
c) Data Accessibility
d) Decision Tools

2) IAM – INSTITUTE FOR ASSET MANAGEMENT

1 The IAM's Conceptual Model



2 The IAM's Anatomy of Asset Management

Asset Information

The IAM's 39 Subjects of Asset Management

Group 1 - Strategy & Planning

1. Asset Management Policy
2. Asset Management Strategy & Objectives
3. Demand Analysis
4. Strategic Planning
5. Asset Management Planning

Group 2 - Asset Management Decision-Making

6. Capital Investment Decision-Making
7. Operations & Maintenance Decision-Making
8. Lifecycle Value Realisation
9. Resourcing Strategy
10. Shutdowns & Outage Strategy

Group 3 - Life Cycle Delivery

11. Technical Standards & Legislation
12. Asset Creation & Acquisition
13. Systems Engineering
14. Configuration Management
15. Maintenance Delivery
16. Reliability Engineering
17. Asset Operations
18. Resource Management
19. Shutdown & Outage Management
20. Fault & Incident Response
21. Asset Decommissioning & Disposal

Group 4 - Asset Information

22. Asset Information Strategy
23. Asset Information Standards
24. Asset Information Systems
25. Data & Information Management

Group 5 - Organisation & People

26. Procurement & Supply Chain Management
27. Asset Management Leadership
28. Organisational Structure
29. Organisational Culture
30. Competence Management

Group 6 - Risk & Review

31. Risk Assessment & Management
32. Contingency Planning & Resilience Analysis
33. Sustainable Development
34. Management of Change
35. Asset Performance & Health Monitoring
36. Asset Management System Monitoring
37. Management Review, Audit & Assurance
38. Asset Costing & Valuation
39. Stakeholder Engagement

Source: IAM Anatomy: 2015

What does good data management look like?

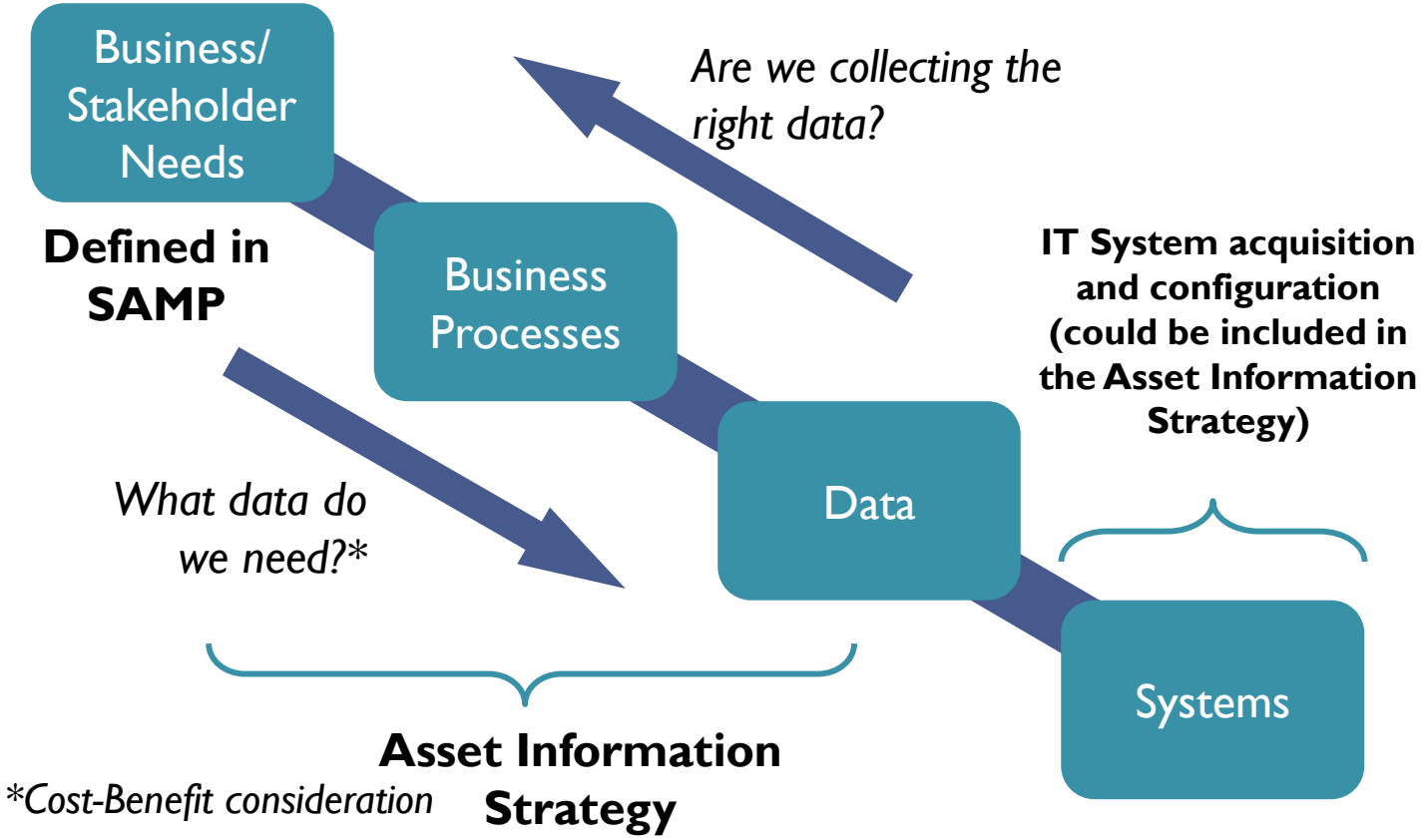
- Asset Information Strategy
- Asset Information Standards
- Asset Information Systems
- Data & Information Management

Asset Information Strategy

- Asset information **policy**
- Identification of asset information needs that support AM **decision-making** and operational business processes
- Processes for continued **alignment** as organizational needs evolve
- **Gap analysis** of current information availability against needs
- **Cost benefit analysis** of closing the gaps
- **Processes** for improvement of asset information and data quality
- Description of the asset information **improvement program**

There are several key requirements for an information strategy

Defining Asset Data Needs



Types of Asset Information

Physical asset data	What?	The assets that are owned/operated Their technical characteristics
Location & spatial data	Where?	That asset location Its relationship to other assets
Work management data	Who? When? How?	The work that has been or will be performed on this asset
Performance data	Why? Will?	The asset's function and contribution to AM objectives
Condition data	Which? What if?	The condition and residual life of the asset
Cost data	How much?	The cost to buy and operate the asset

Asset Information Standards

- Why?
- Types
- Quality
- Confidence Limits
- Frequency of Collection

Why?

To ensure a consistent approach to the recording of asset information to meet the asset information needs and data quality requirements as defined by the Asset Information Strategy

Type of Information Standards

- Asset hierarchy
- Required attributes of assets and acceptable values for these
- The geographical position of assets
- Condition grades
- Categorizing and recording asset defects and failures
- Categorizing and recording of the root cause of asset failures
- Categorizing and recording the consequences of asset failures
- Utilization and performance of assets

Standards are common methods for recording information of different types

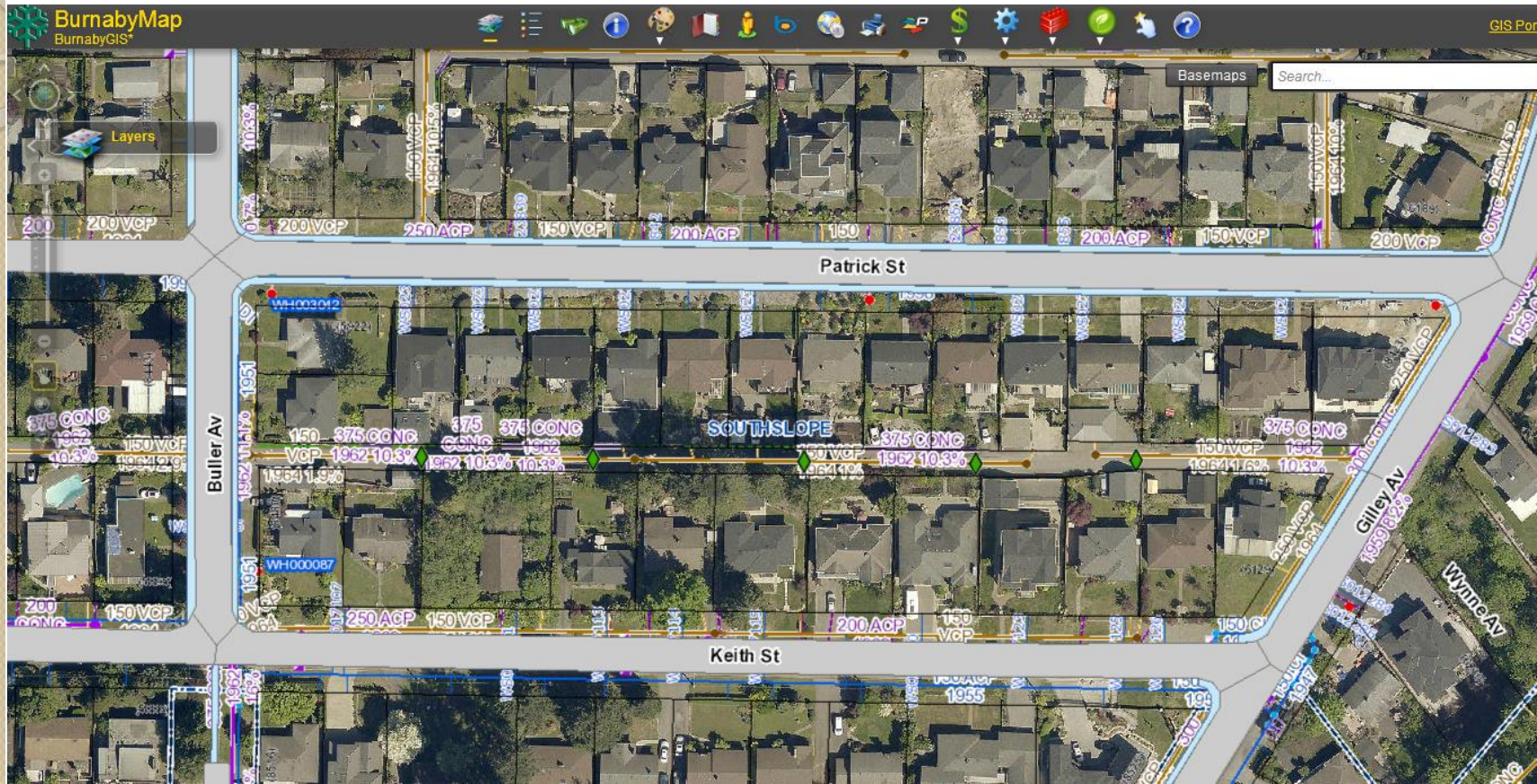
It also includes defining the required quality and accuracy of this information

Data Quality

- **Accuracy** – the data is a true reflection of the physical entity it represents.
- **Completeness** – a complete set of data is available for each data record.
- **Consistency** – data is consistent in its definition, rules, format & value.
- **Validity** – all data held complies with data storage rules.
- **Timeliness** – data reflects the current state of an asset and complies with organizational standards for data update timescales.
- **Uniqueness** – all keys should be unique with no duplication of data.
- **Traceability** – rolled-up data can be traced back to its parts and sources.

Data quality is a generic term to cover a number of specific measures

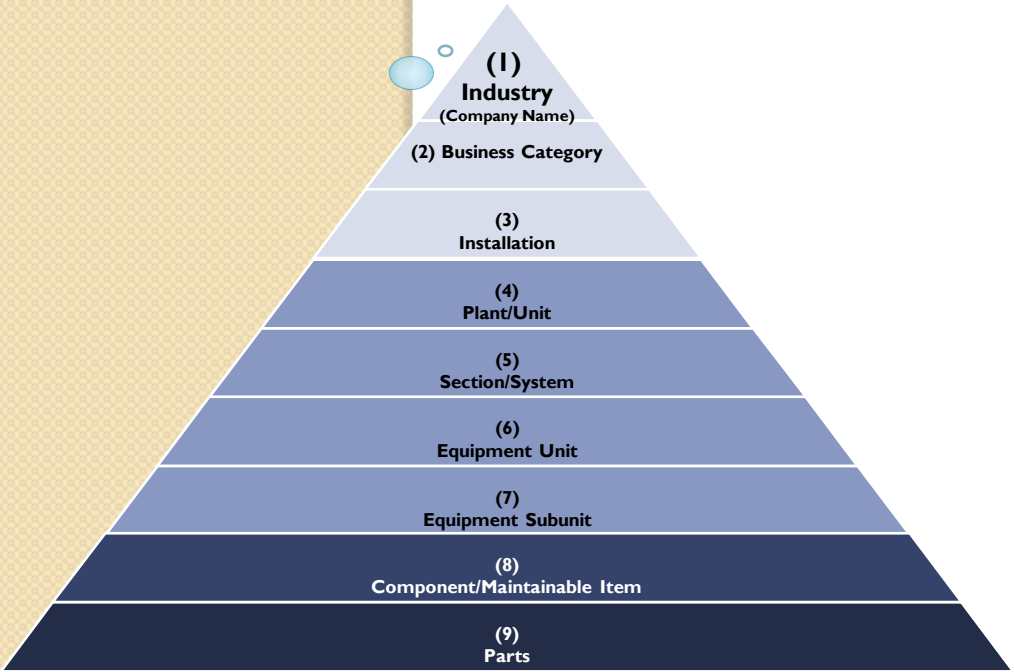
Asset Information Systems



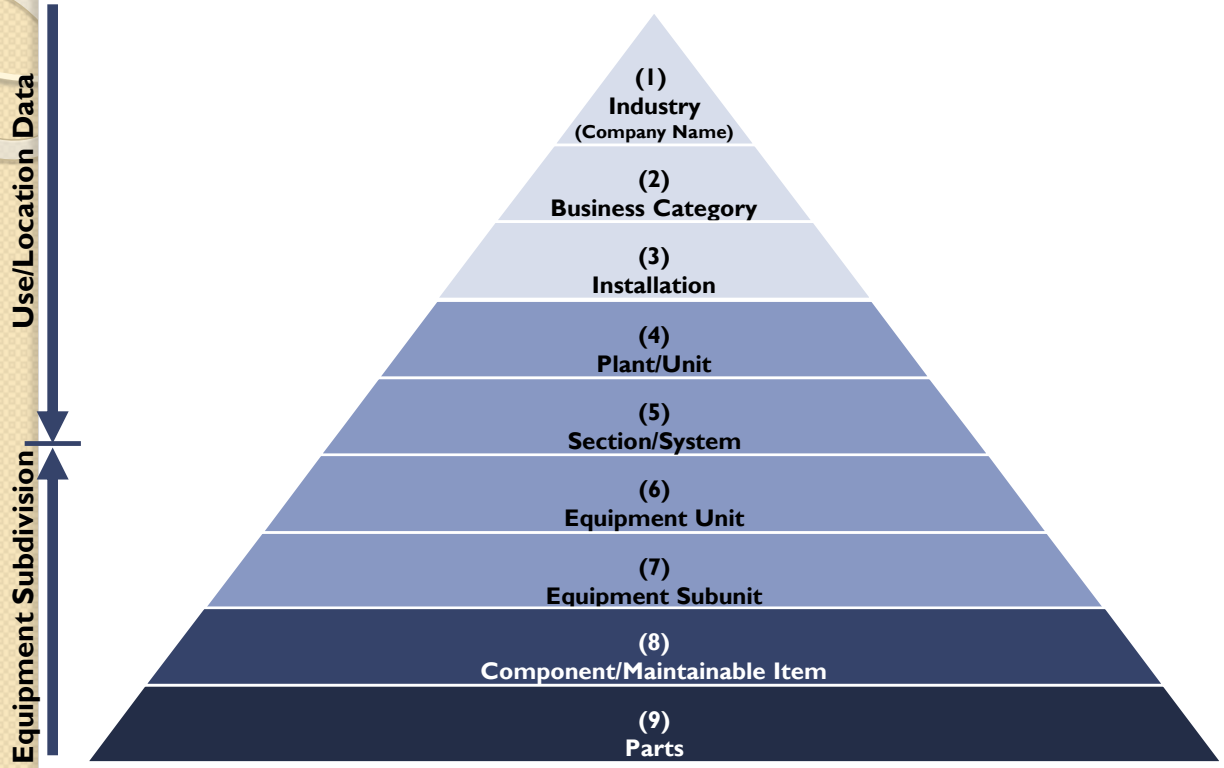
Types of Asset Information Systems

- An Asset Register to detail the assets of interest to an organization
- Work management systems to plan and record work activities
- Logistics systems to manage the storage, issuing and use of materials and spares
- An Investment Management System to record and manage the capital projects and programs
- Finance Systems to record expenditure that are configured with the higher levels of the asset hierarchy.
- Unit Costing Systems that can provide estimates of capex, opex and carbon.
- Document Management System containing standards and specifications.
- A Geographical Information System (GIS) to record the location and spatial details of assets.
- Demand management systems will forecast how demand on assets will change.
- Decision Support Tools such used in strategic planning activities.
- Process, telemetry and SCADA systems provide a record of how well assets have performed and are meeting their service requirements.
- An Asset Risk Register to record and manage asset risk.

ASSET INVENTORY & HIERARCHY



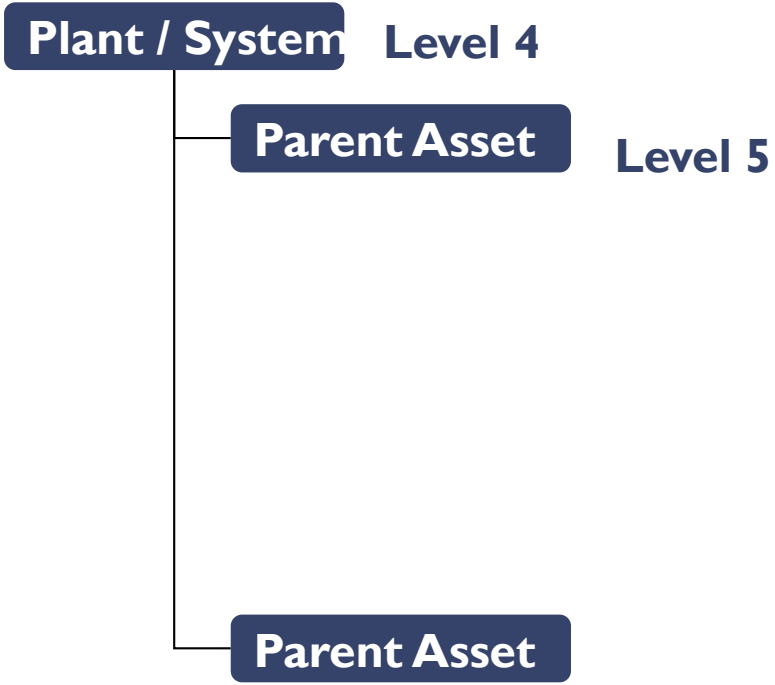
The Asset Hierarchy - Example



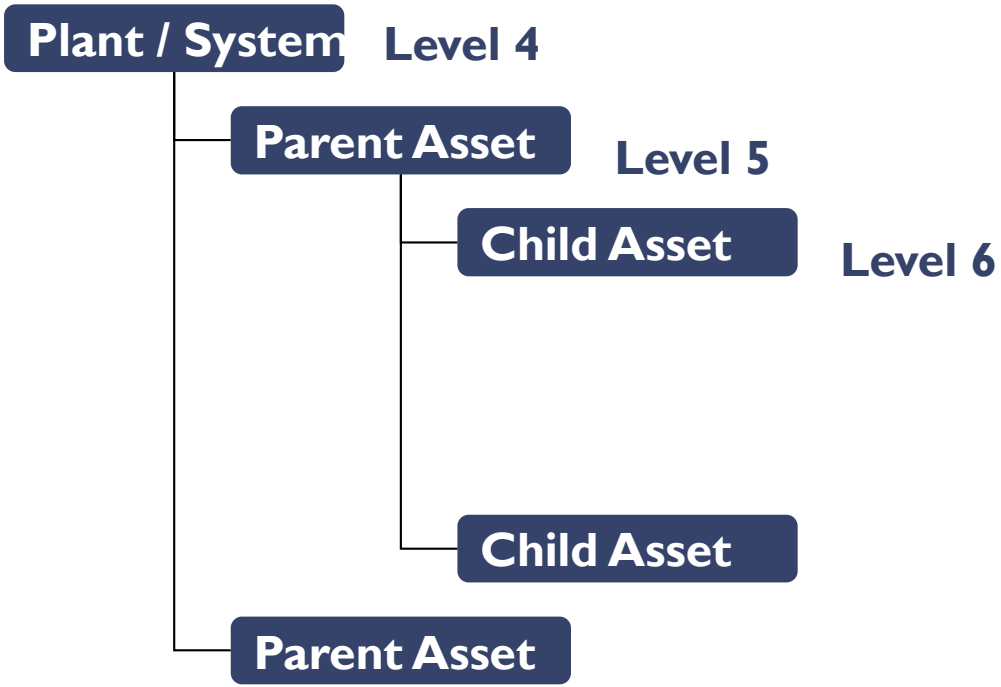
The key is to develop the hierarchy to relate to the functions of the overall asset so cost and performance information can roll up

Source: ISO 14224 (Reliability and Maintenance Standard for Oil & Gas Industry)

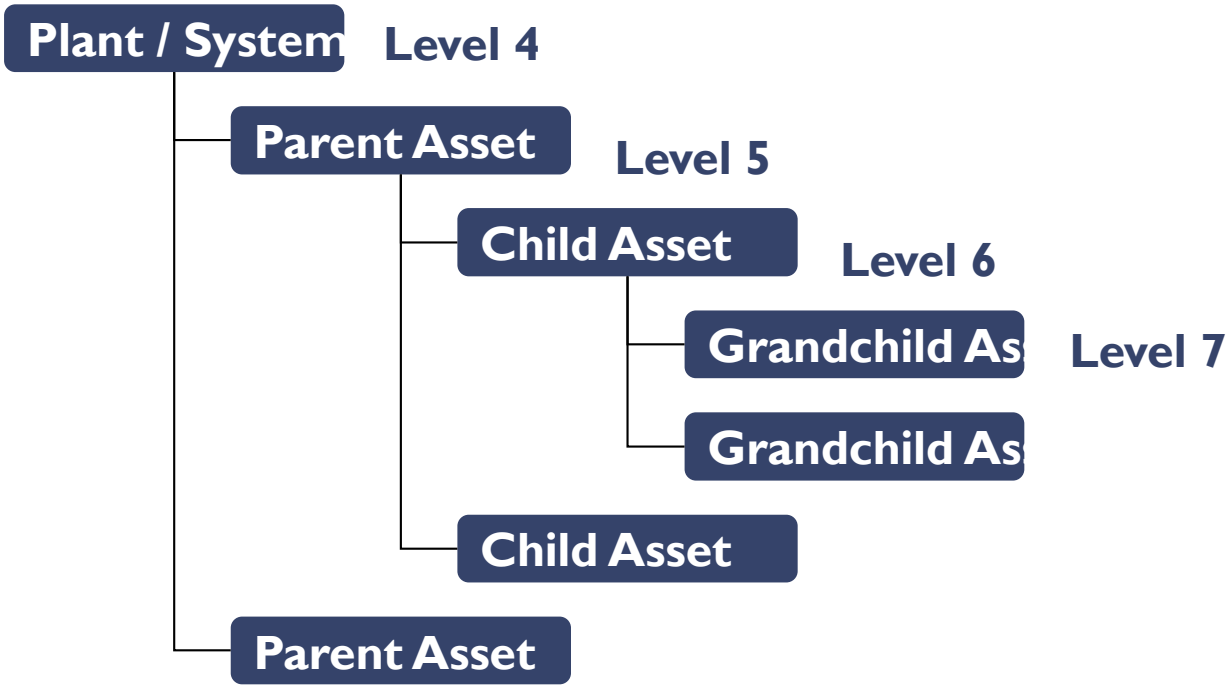
Asset Hierarchy



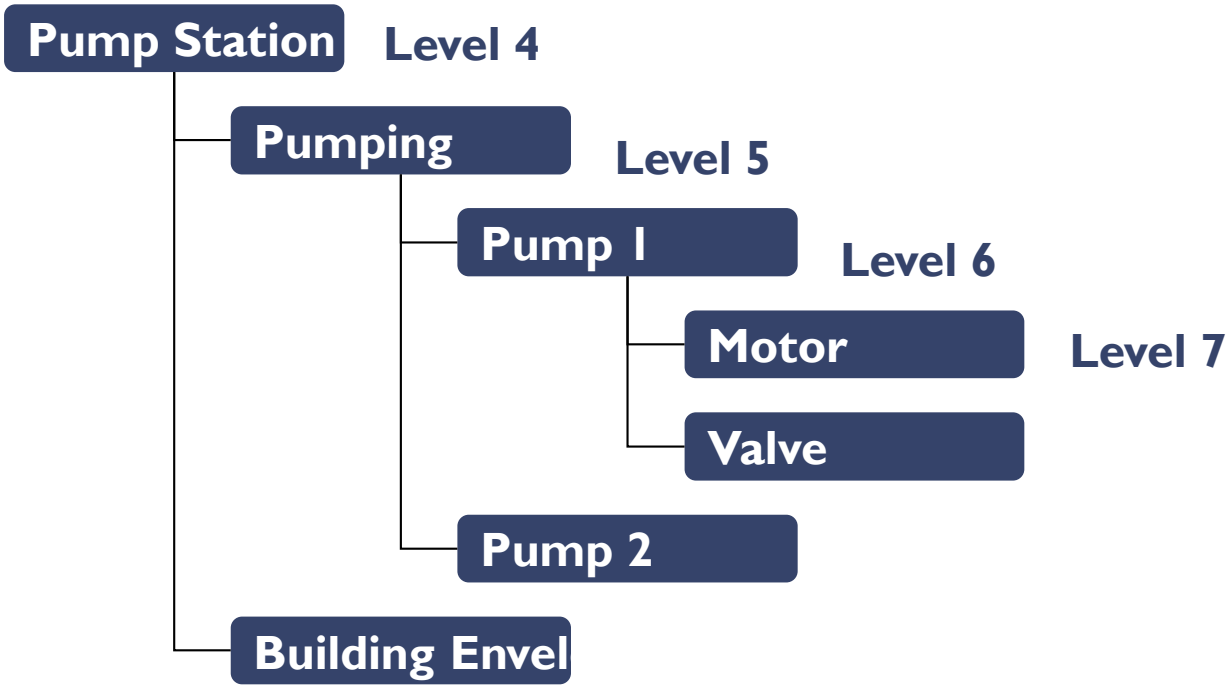
Asset Hierarchy



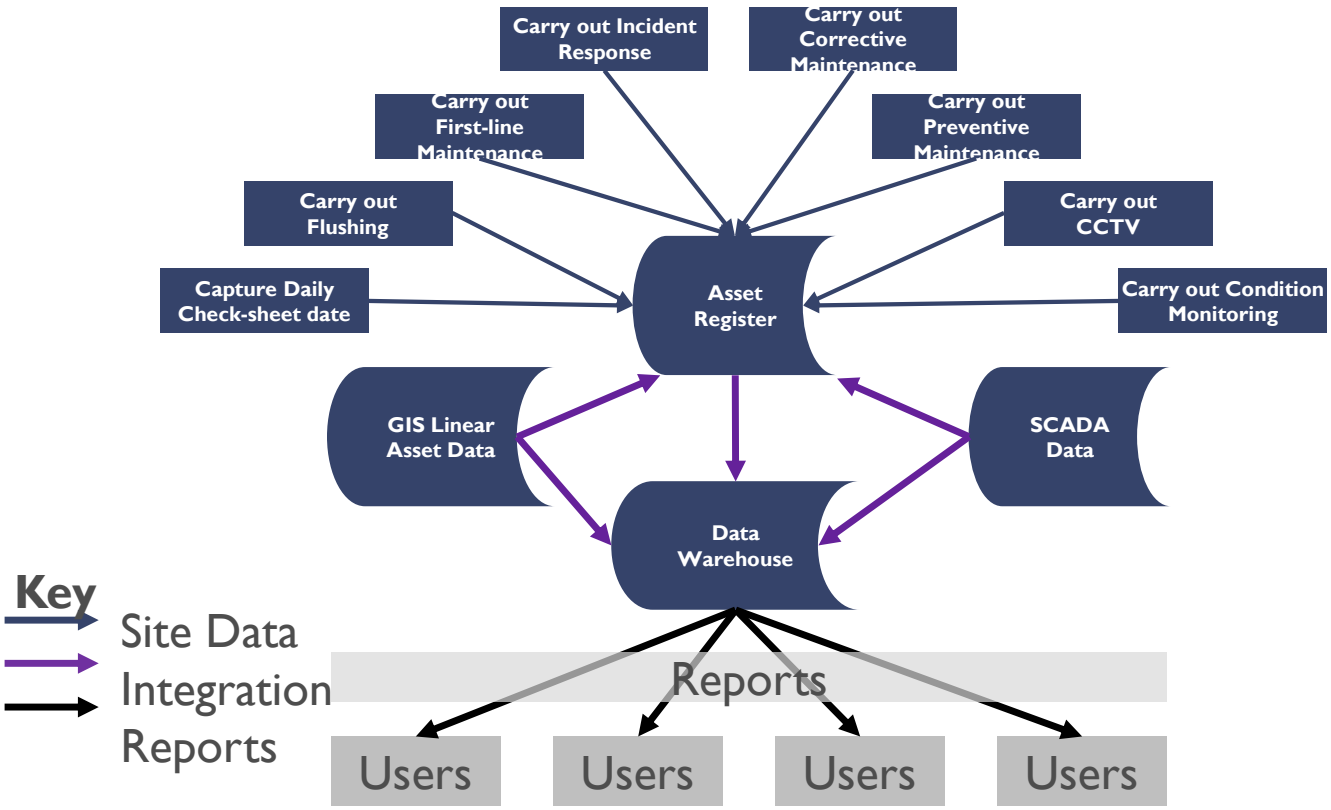
Asset Hierarchy



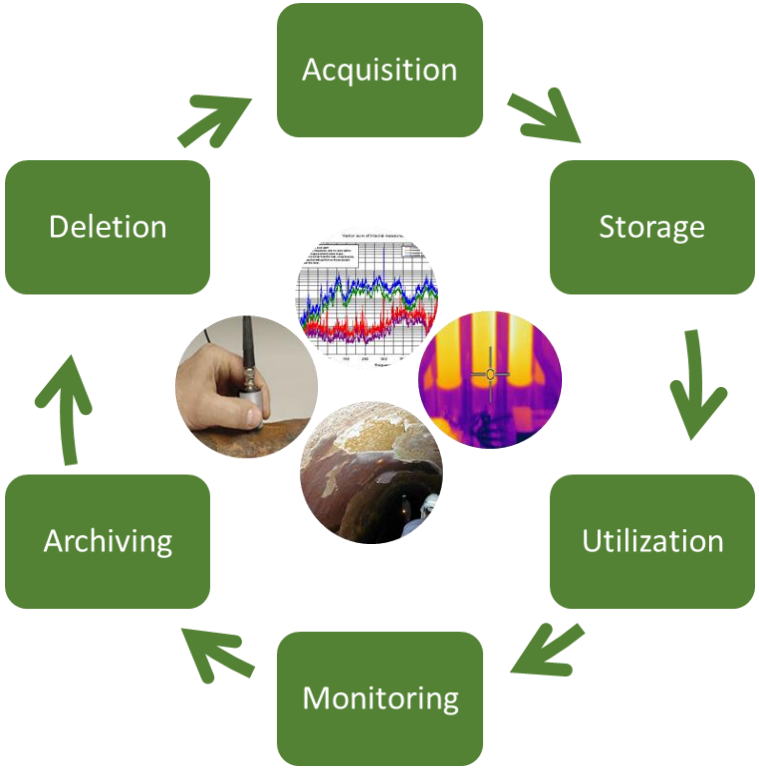
Asset Hierarchy



Common Asset Referencing



Asset Data Life Cycle



Asset data needs to be **actively managed throughout its life cycle** and to conform with requirements defined by the Asset Information Standards.

Asset data has a life cycle consisting of six stages

Data and Information Management

- Processes are required for data management throughout this life cycle which typically includes:
  - Definition of data owners and consumers and access rights
  - Creation and Update processes
  - Expected life of data
  - Protocols for storage, archiving and deletion

- Also includes governance and validation processes to provide organization with assurance that:
  - Data and information is fit for purpose
  - Data and Information is consistent with the asset information standards quality and accuracy requirements

Summary

- Effective Asset Management Decision Making relies upon People, Processes and Data
- Asset information management can therefore provide organizations with the platform for improved decision making.
- Asset Information Systems are decision support tools and should be selected to support the defined needs of decision making processes
- and the right solution for one organization is not necessarily best for another
- A well developed Asset Hierarchy and common asset referencing system will greatly aid in system integration and cost roll up and reporting

- Acknowledgements to the City of Burnaby and CH2M for the presentation materials

- Questions?