

Engineering Standard X-FRA-STD-003

Asset Information Management

Document number: FRA-00011

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1. Purpose

The purpose of this Framework is to establish a consistent, organisation-wide approach to managing asset information within Seqwater. It defines how asset information is created, governed, maintained, and how it is used for decision-making and compliance facilitating effective management of assets.

2. Scope

This Framework applies to all Seqwater Workers unless otherwise stated. This Framework shall apply to data for all new and existing assets undergoing refurbishment or expansion within the scope of Seqwater's [PLN-00264](#) Strategic Asset Management Plan (SAMP) and [POL-00182](#) Asset Information Governance Policy (AIGP). The management of parts and assemblies, Bills of Material, stock-items and inventory is not within scope.

3. Overview

Seqwater is an asset intensive organisation, the asset portfolio has a current replacement cost of \$11b. These assets provide water and recreation facilities to Southeast Queensland. Approximately \$37m per year is spent on repairs and maintenance of the assets.

The Figure 1 below provides an overview of the physical asset portfolio impacted by this Framework, by strategic asset group. Over 40,000 individual assets comprise these asset groups.

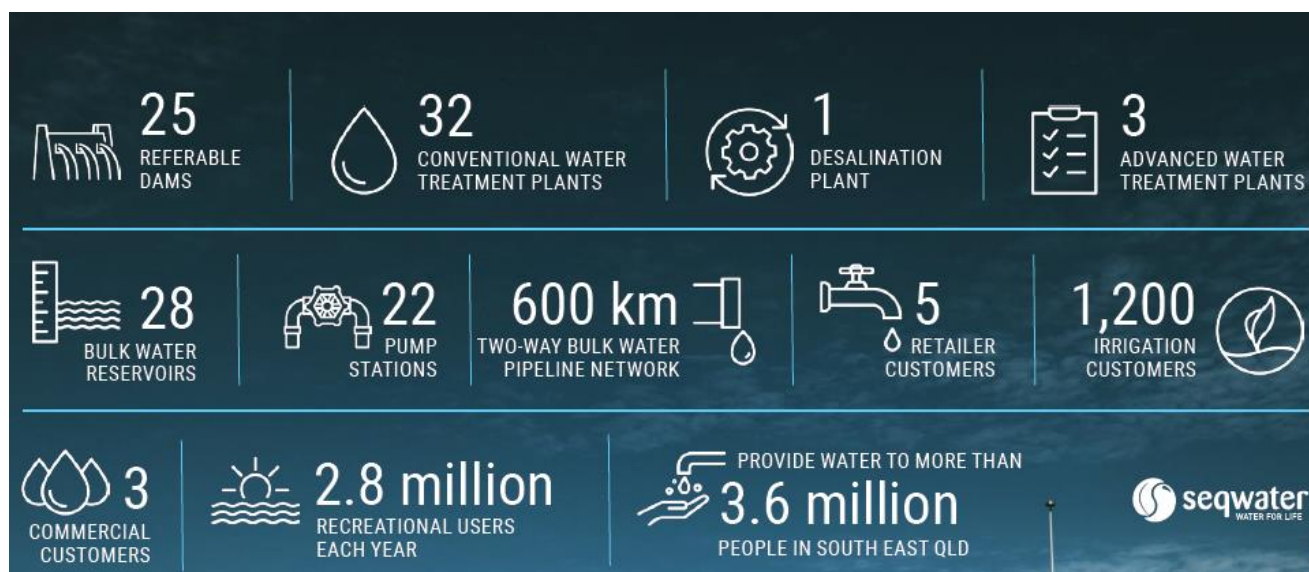


Figure 1 Asset portfolio overview

The asset portfolio is set to increase, with capital projects identified from 2023/24 through to 2027/28 totalling \$3.8 billion. Improving the quantity and quality of asset information Seqwater will enable more accurate decision processes for the allocation of funds based on asset performance for the existing and expanded future portfolio.

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3.1. Relevance to Corporate Strategy

The Seqwater Strategic Plan 2025-29 is focused on building a sustainable future and builds on the previous strategies. The overall vision for Seqwater over the life of this plan is to be ‘an innovative leader, delivering our most precious resource for generations to come’. Four strategic objectives are identified to assist in the delivery of this *Water for Life* vision as follows:

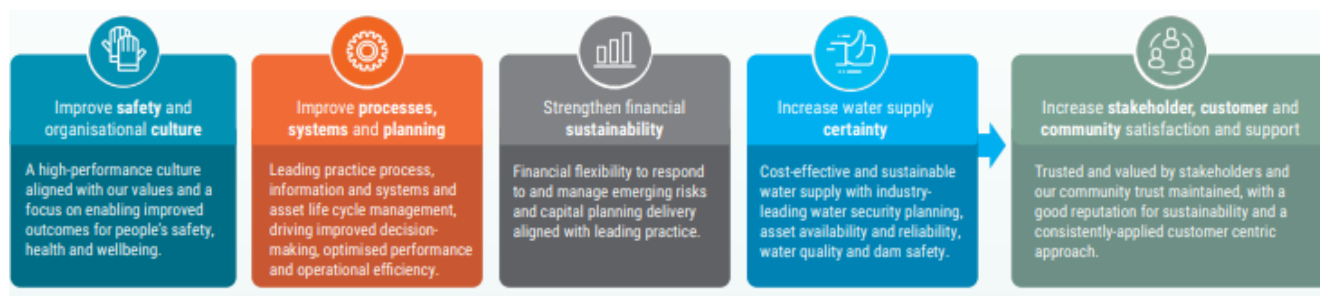


Figure 2 Seqwater strategic objectives

This AIMF contributes to the objective “Improve processes, systems and planning”, leading processes, information and systems for whole of asset lifecycle management.

3.2. Relevance to the Asset Management Policy Statement

The Asset Management Policy Statement ([POL-00052](#)) provides a commitment to proactive and effective management of Seqwater’s assets to provide services for the long-term benefit of communities in South east Queensland. In managing our assets, we are guided by the fundamental pillars of quality of service, compliance with regulatory requirements, sustainability, service continuity and efficiency and affordability (financial). We recognise that our people are instrumental to implementing sound asset management practices.

Seqwater demonstrates this commitment through a series of statements defining its actions. Those that the AIMF will assist in delivering are included in Table 1.

Table 1 AIMF contributions to the Asset Management Policy commitments

Policy commitment	Asset Information Management Framework contribution
We implement an integrated approach to asset management aligned with the requirements of ISO55001.	The Framework is aligned with the requirements of ISO55001:2024, and specifically sections 7.6, and 7.7. We will incorporate the appropriate aspects of the guidance document ISO55013:2024.
We value data and information for informed and timely decision making.	To ensure timely decision making can be undertaken, this Framework sets a consistent approach towards asset information management, ensuring right information is available to the right people at the right time.
We seek to continuously improve our asset management approach.	The Framework and the supporting strategy will continue to be improved over time through a defined process overseen by the Asset Information Governance Policy (POL-00182).
We manage assets for the lowest life cycle cost to achieve desired service standards and acceptable risk	The Framework will enable the base data to be used to determine Level Of Service (LOS) achievement and provide data where applicable to enable lifecycle analysis and maintenance strategy analysis to be undertaken to optimise the asset over its life cycle.

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Policy commitment	Asset Information Management Framework contribution
We undertake long-term planning based on asset management principles to provide reliable and resilient supply of water to our customers	The Framework will enable the base data to be used in long-term planning, through capturing appropriate attributes such as useful life, maintenance strategies, capacities and remaining useful life.
Roles and responsibilities for staff to manage our assets and deliver service are clearly defined and communicated.	The Framework along with the documentation suite including the Asset Information Management Strategy and Asset Information Governance Policy will define different data users, along with their system access requirements, in terms of read/write permissions. In addition, different user roles are defined within a RACI matrix.

3.3. Relevance to the Asset Management System (AMS)

The AIMF governs asset information, which is an integral part of the Asset Management System (AMS) as defined in the Seqwater Strategic Asset Management Plan. It provides the foundational information for many of the decision-making processes within the asset portfolio. AIMF directly relates to the 'Asset Knowledge' component of the AMS as presented in Seqwater's Strategic Asset Management Plan (SAMP).

The connection between the AIMF and AMS ensures the audiences, listed in Table 2, receive the inputs needed for informed decision making, compliance and continuous improvement:

Table 2 AIMF audience

Audience	Significance
Seqwater Executive Management	Executive management support is critical for the successful implementation and continuous improvement of the AIMF. The AIMF requires their involvement, buy-in and endorsement for effective asset management practices. AIMF provides the executive management with the required information to support informed decision-making, implementation, planning, appropriate resource allocation, risk management, and policy development.
Seqwater asset management professionals including those responsible for asset management decision making	Asset management professionals provide the information needs for assets. These insights underpin and guide consistent data capture and analysis, planning and optimising lifecycle activities, enabling data-driven decision making.
Project delivery professionals partnered with Seqwater	Capital delivery partners of Seqwater and other project delivery professionals must have a clear understanding of the asset information that needs to be collected and handed over from the planning, design, construction, and asset commissioning. This ensures Seqwater has the necessary information to efficiently operate and maintain the asset during the operations and maintenance phase.
Seqwater other functional SMEs	This includes all Subject Matter Experts (SME) including IT, Finance, Heritage, Network Planners etc. These stakeholders must understand the specific data requirements to manage the flow of asset information management within their own systems. They benefit from AIMF by gaining clarity on information needs for assessing asset lifecycle costs, financial, and performance.

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Audience	Significance
Other Queensland government departments, asset owners, agencies, or those representing their interests	The inclusion of other state agencies and asset owners promotes interagency collaboration by establishing a common understanding of asset information requirements, data-sharing and reporting standards.

3.4. AIMF Objectives

The key objectives of the AIMF are:

- To establish a consistent, organisation-wide approach to managing asset data, information and knowledge
- To standardise the definition of what a Seqwater asset is, the asset hierarchy, lowest maintainable level and associated numbering conventions
- To integrate all relevant Seqwater asset information related documentation to a single document
- To align the Seqwater asset information management framework with the requirements of international standards such as ISO55001:2024, ISO19650 series to ensure compliance and best practices
- To recognise and manage asset data as a valued organisational asset, ensuring quality, security, stewardship, and continuous improvement throughout its lifecycle, in alignment with international standards and leading practice.

3.5. AIMF Documentation Suite

The composition of the AIMF documentation suite is as presented in Figure 3 below.

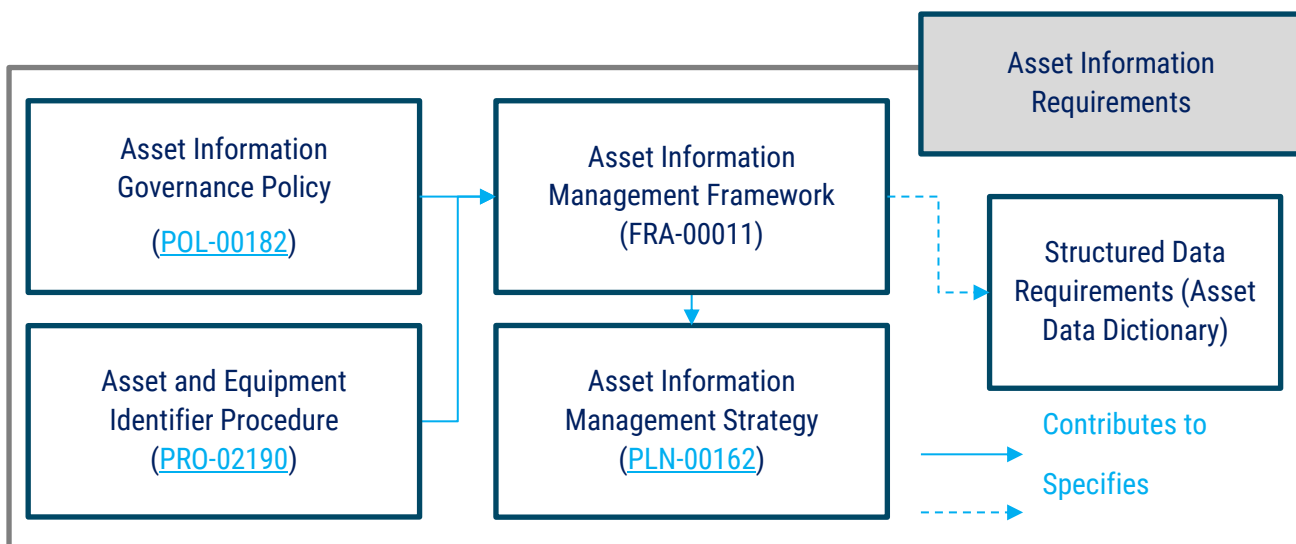


Figure 3 AIMF Document Suite

Asset Information Management Framework (FRA-00011): The Asset Information Management Framework (AIMF) is a comprehensive document outlining the long-term vision and for managing asset information. It sets foundational principles and key concepts such as asset definition, hierarchy, lowest maintainable level, and

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classification systems to provide a consistent framework for organising, maintaining, and using asset data throughout its life cycle.

Asset Information Management Strategy (PLN-00162): The Asset Information Management Strategy (AIMS) is a strategic document detailing the practical plan to implement the AIMF. It compares the current and desired future states of asset information management, identifies gaps, and outlines key initiatives, resources, and timelines. The strategy is reviewed and updated every three years to maintain its relevance and effectiveness.

Asset Information Governance Policy (POL-00182): The Asset Information Governance Policy (AIGP) establishes the principles, objectives, and governing parameters that define how asset information is managed and controlled at Seqwater. This Policy forms a critical artefact in the Asset Information Management Framework documentation suite which translates these governance principles into practical processes, procedures, and standards.

Asset and Equipment Identifier Procedure (PRO-02190): The Asset and Equipment Identifier Procedure outlines the process for numbering Seqwater's assets including equipment and maintainable item labelling. This standard shall apply to all new equipment and to all existing equipment undergoing refurbishment or modification. In the context of Seqwater, Equipment refers to the items that appear in the P&ID and process diagrams.

Asset Data Dictionary: Asset Data Dictionary is a critical artefact of the AIMF documentation suite that outlines Seqwater's asset classifications and defines all the attribute requirements against different levels in the Asset Hierarchy. This also defines the metadata requirements and domain values where applicable.

This documentation suite as a collective is called Seqwater's Asset Information Requirements as per the ISO19650 Series.

The suite of documents are needed to be read in conjunction with each other and the review and update procedure presented in the AIGP applies to the whole suite of documents.

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4. Key concepts

4.1. Asset

The definition of Seqwater's asset is:

An item or a thing that has potential or actual value to Seqwater. An asset can be physical or non-physical. As per Seqwater's Strategic Asset Management Plan (SAMP) Section 1.5, this excludes the non-estate land assets and non-production assets such as fleet and mobile plant, non-operational buildings and non-operational technology-ICT assets and all Portable and Attractive Items (PAA).

4.2. Asset Hierarchy

Seqwater's asset hierarchy has three main dimensions (shown in Figure 4) :

- Location-based: Identifies assets by their physical site, such as a facility or a pipeline.
- Function/system-based: Classifies assets according to the process units or systems they belong to.
- Item-based: Breaks down assets into individual items, right down to the Lowest Maintainable Level (LML).

This structure helps Seqwater manage and maintain assets effectively, ensuring each asset is clearly identified, classified, and tracked throughout its lifecycle.

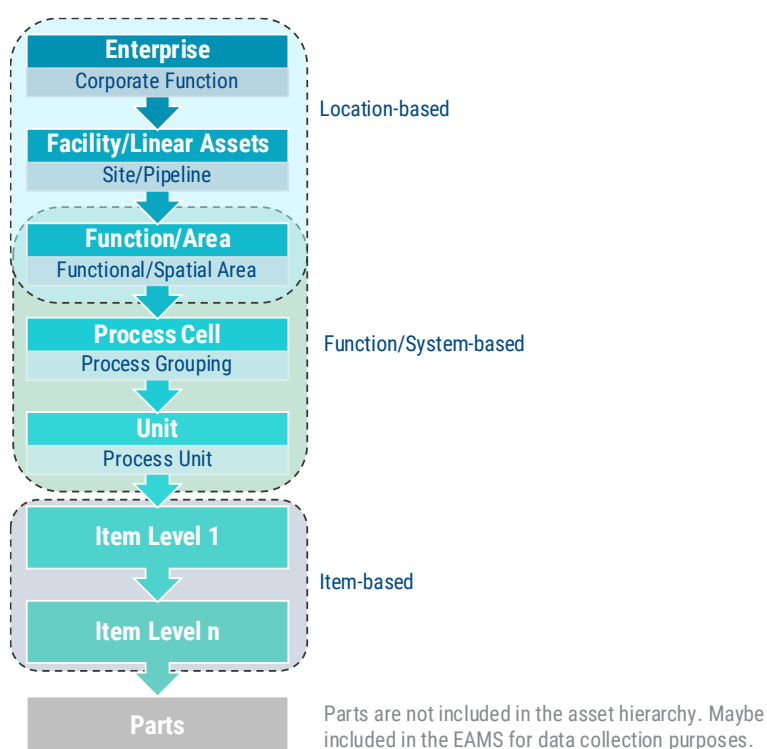


Figure 4 Asset Hierarchy

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- **Enterprise** is the highest level in the hierarchy, representing Seqwater's enterprise-wide Corporate Function groupings used for regulatory, financial, operational, and reporting purposes (i.e. Bulk Water, Irrigation or Recreation.)
- **Facility/Linear Assets** refers to the physical facility (for non-linear assets) or pipeline (for linear assets) within the purview of the enterprise (e.g., Water treatment plant or Treated water scheme).
- **Function/Area** refers to the operational subdivision (i.e., functional area) or boundary area (i.e., spatial area) based on the type of location configuration under consideration. (e.g., Chemical for facilities or sub-catchment boundary for catchments).
- **Process cell** refers to a grouping of processes (i.e., sub-function) within the functional area based on Seqwater business rules around defining the grouping methodology (e.g., Lime).
- **Unit** refers to a specific process unit within a process cell based on Seqwater business rules (e.g., Slurry Tank). This level may be optional based on the configuration of the location under consideration.
- **Item Level 1** refers to the top-level grouping of items that usually belongs to the Unit when deemed necessary (e.g., Element Level 1 – Mixer).
- **Item Level n** The n^{th} level of element belongs to the Lowest Maintainable Level (LML), which is called the "maintainable item" as defined in Section 4.34.3 (e.g., Element Level n: LML – Mixer motor).

It is also possible for Item Levels 1 – 'n-1' to be redundant in instances where the maintainable item (Item Level n) is directly connected to the Unit. These levels 1 – 'n-1' are therefore optional.

The alignment of this hierarchy and ISO14224:2023 can be found in

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Appendix A - Alignment with ISO14224:2023.

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4.3. Lowest Maintainable Level (LML)

Seqwater's definition of the Lowest Maintainable Level (LML) is:

The LML is the lowest level of an asset in the breakdown structure that defines the granularity of asset records. LML may be dependent on the maintenance methodology employed, the complexity of the asset, and the phase of the asset in the life cycle.

This is illustrated in Figure 5 below.

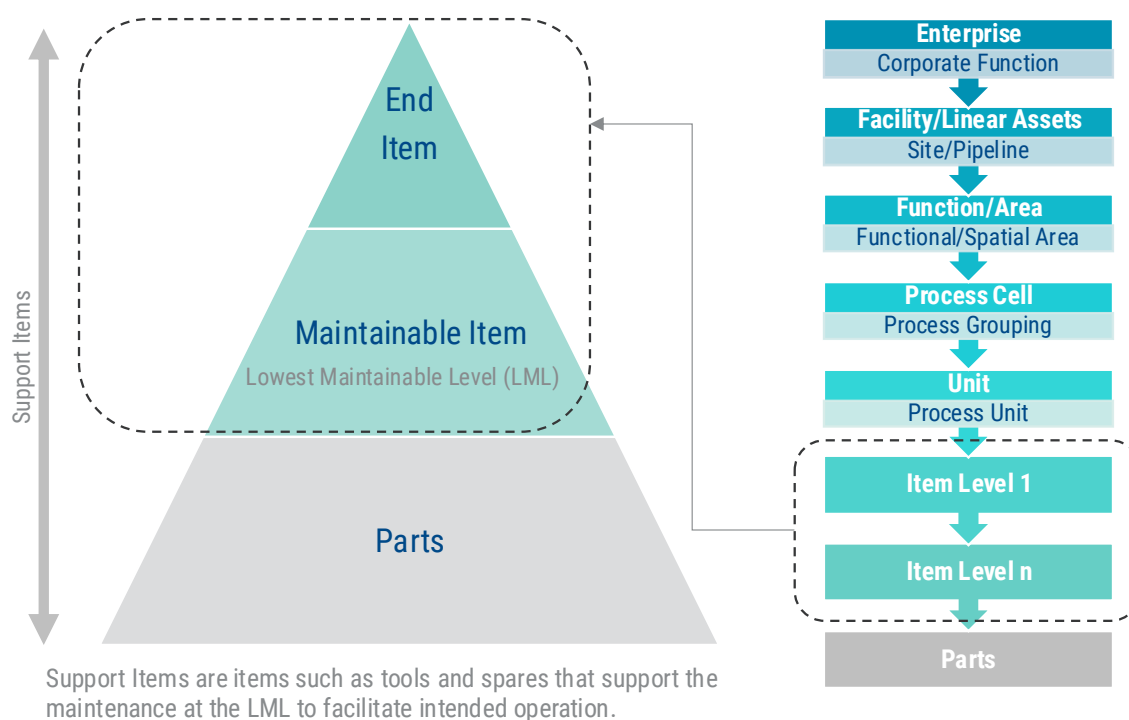


Figure 5 Illustration of the Lowest Maintainable Level (LML)

- **End Item** is the complete, assembled asset or system of assets that is ready for operation, deployment, or use meeting all functional requirements (e.g., Mixer).
- **Maintainable Item** refers to an element of the End Item that:
 - is commonly maintained (repaired/restored) in its entirety;
 - cannot normally be disassembled or repaired or is of such a design that disassembly or repair is impractical or economically not viable, therefore replaced (e.g., Motor, Gearbox, Agitator, etc.); or
 - has individual statutory registration, reporting or compliance requirements.

Maintainable Item (MI) belongs to the LML. Note: The term “maintainable item” now supersedes the legacy term “operating asset”.

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- **Parts** are elements that belong to the maintainable item that are not maintained as standalone items. Parts therefore do not require an individual asset record in the Enterprise Asset Management System. Relies on the business rules defined for exclusion (e.g., Bearing, Shafts, Cabling, etc.).
- **Support Items** are items such as tools and spares that support the maintenance at the LML to facilitate the intended operation.

To better understand the hierarchy, thinking around at which level the workorders are raised can be employed. Typically, all the corrective maintenance/breakdown works related workorders are raised at the LML. Preventative maintenance workorders can be raised at any level in the hierarchy based on organisational decisions around continuous improvement.

The items that belong to the Item Levels 1 - 'n' are not to be confused by 'Equipment' that is in Asset and Equipment Identifier Procedure. Within Seqwater, 'Equipment' refers to the items that are reflected in P&ID drawings and process diagrams. An 'Equipment' may or may not be the maintainable item. All Equipment will have an assigned Equipment number. For more information on this, please refer to [PRO-02190](#) Asset and Equipment Identifier Procedure.

4.4. Linear Asset

Seqwater's definition of Linear Asset is:

A linear asset is a physical infrastructure element that extends continuously across a geographic area, rather than existing as a discrete point or unit. Linear assets include pipelines and roads, where management requires consideration of length, spatial orientation, and changing attributes along the span.

Linear assets are characterised by having a defined start and end point, directionality, with attributes (such as material, diameter, condition, or installation date) that may vary along their length. Their management involves the use of linear referencing systems, enabling precise identification, maintenance, and analysis of locations, features, and events at any point or segment along the asset.

Unlike non-linear (point) assets, linear assets interact dynamically with their environment and operational context, requiring specialised approaches for data capture, segmentation, and integration with spatial and asset management systems.

All linear asset attributes must be standardised across the enterprise, with global domains for key properties. This ensures data quality, supports consistent querying, and enables integration with analytics and reporting tools.

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5. Application of key concepts

5.1. Comparison with the “Location Level” terminology

5.1.1. Definition of a “Location Level”

This “location level” terminology is used to map the hierarchical relationship of assets within an asset register. These are a set of fields in the Enterprise Asset Management System (EAMS) that when concatenated define the hierarchical relationship of an asset. How these can be mapped to the Asset Hierarchy is presented in Section 5.1.2.

5.1.2. Asset Hierarchy vs Location Levels

A comparison of the current hierarchy with the location levels terminology is presented below in Figure 6. Whether the levels in the asset hierarchy are defined spatially or functionally is based on the location configuration of the asset (i.e., whether Level 2 is a Facility or a Catchment or a Linear Asset). More information on this is provided in Section 5.2.

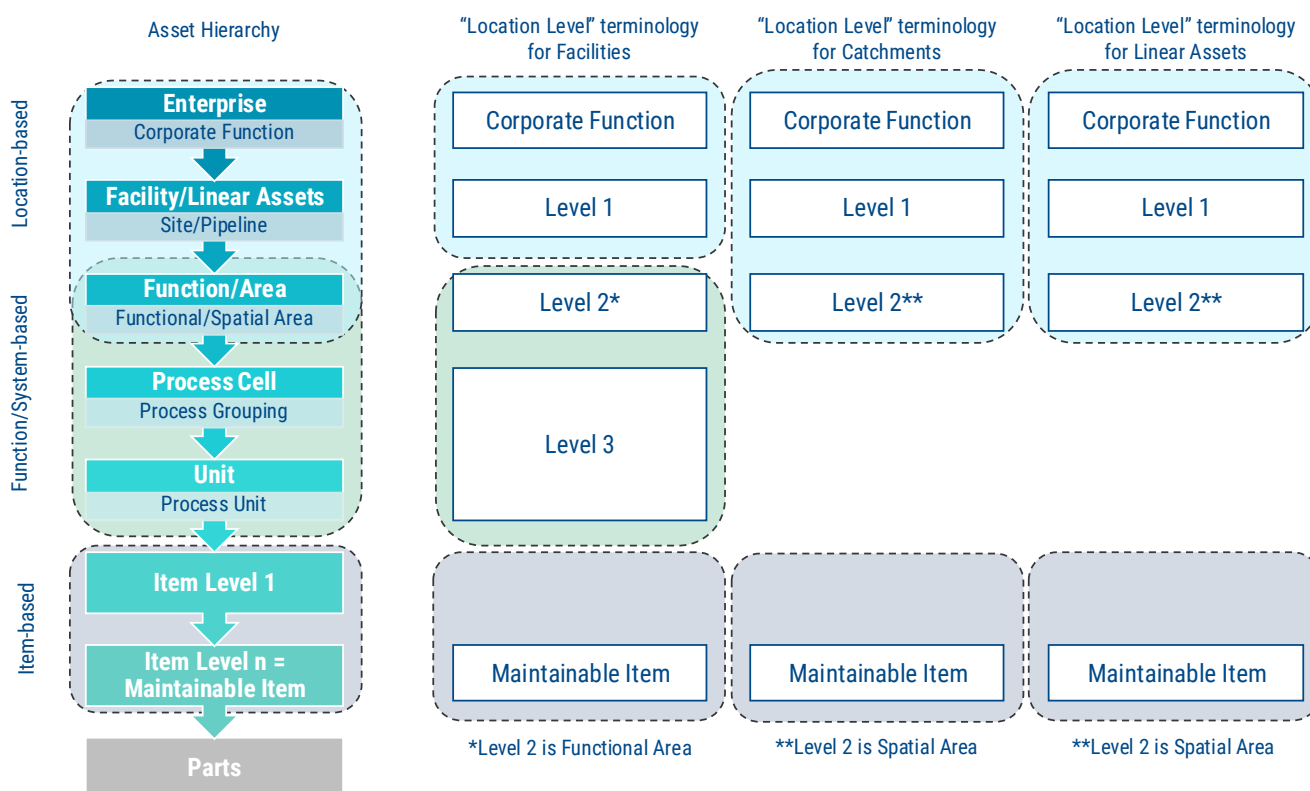


Figure 6 Comparison with the "Location Level" terminology

Important Notes:

- Level 1 can be directly mapped to the Facility/Linear Assets level in the current hierarchy, which is defined spatially.
- Level 2 and Level 3 are described differently depending on the location configuration under consideration (See Figure 6)
- For Linear Assets and Catchments, there is no Location Level 3.
- For Catchments, sub-catchments are considered to be at Location Level 2.
- Level 3 typically sits at the Process Unit level, after which there is a direct link to the Maintainable Item (which was previously called an “Operating Asset”).
- Corporate Function exists above Location Level 1 and reflects predominant purpose rather than spatial boundaries. Corporate Functions may overlap at a site but remain separately classified.

Below sections provide detailed explanations on the rules for determining the levels of the hierarchy.

5.2. Guidelines for determining hierarchical levels

This section illustrates guidelines for determining hierarchical levels and

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Appendix B - Application Examples for Level 1 Levels, provides example/s of applying these guidelines.

Note: Application examples in Appendix B are only to illustrate the process of establishing these levels. The guidelines presented here are not meant to be prescriptive and engagement with key stakeholders about what is to be considered at each level will still be needed. There may be exceptions to these guidelines to satisfy operational demands.

5.2.1. Corporate Function

Corporate Function assignment is mandatory for all Level 1 assets and must reflect the asset's predominant purpose.

Table 3 Corporate Functions

Function	Definition
Bulk Water	The function responsible for securing, sourcing, storing, treating, and supplying safe, reliable and sustainable drinking water to South East Queensland. This includes catchment management, dams, water treatment plants, manufactured water assets, and trunk network operations. Bulk Water reflects Seqwater's core statutory role as the region's bulk water provider, emphasising water security, dam safety, operational excellence, capital delivery, and financial sustainability.
Irrigation	The function responsible for delivering irrigation water services to Seqwater's rural customers across regulated water supply schemes and distribution systems. This includes managing entitlements, delivering scheme-level operational performance, maintaining rural water assets, and meeting obligations under the QCA's irrigation pricing framework.
Recreation	The function responsible for providing safe, sustainable and publicly accessible recreation opportunities at Seqwater-managed lakes, dams, and catchment lands. This includes managing visitor access, facilities, safety, amenity, environmental stewardship, and community expectations, while ensuring recreation does not compromise Bulk Water or asset performance. Recreation activities coexist with other functional uses.

Each Maintainable Item must be assigned to a single Corporate Function based on its predominant purpose. Where assets support multiple purposes, the Corporate Function is determined by the predominant purpose for which the asset exists, operates, or is funded. Corporate Functions may be co-located on the same site, and co-location does not imply a shared Corporate Function.

5.2.2. Location Level 1

Location Level 1 refers to the physical facility (non-linear assets incl. catchments) or pipeline (linear assets) within the purview of the enterprise. It can be defined as a site on which business activity is conducted, which is defined in spatial terms with the spatial boundaries kept in the Seqwater Geographic Information Systems (GIS) system and linked to the EAMS.

This is represented by a unique three-character code, in which the first character refers to the purpose of the site (Table 4). The second two characters are to be chosen to best reflect the name of the site (i.e. "NP" for North Pine or "AS" for Aspley).

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Refer to the Asset and Equipment Identifier Procedure ([PRO-02190](#)) for the code lists related to this level.

Table 4 Facility/Linear Asset Types

First Letter	Location Purpose	Location Configuration
A	Administration/Office Building	Facility
C	Catchment	Catchment
D	Dam	Facility
E	Treatment Plant Wastewater	Facility
H	Hydroelectric Facility	Facility
L	Off Stream Storage	Facility
M	Mobile Assets	Facility
N	Water Quality Dosing/Monitoring Facility	Facility
P	Scheme Treated/Raw Water	Linear Assets
Q	Water Storage Scheme	Facility
R	Reservoir Treated/Raw Water	Facility
S	Pump Station	Facility
T	Water Treatment Plant	Facility
V	Virtual Facility	Facility
Y	Other sites (not defined above)	Facility
Z	Offline Data Storage	Facility

The boundaries and nature of each Facility/Linear Asset (Level 1) should generally be determined according to the following guidelines:

1. The inlet and outlet valves of a facility should be considered the boundaries for inclusion in that site.
 - a. Where the outlet valve for one facility serves as the inlet valve for another facility a decision should be made on which facility the valve belongs to according to the operational & geographic conditions. The inlet valve may take precedence over the outlet valve.
 - b. Where the outlet valve of a facility serves as the inlet valve to a linear asset, the valve shall belong to the facility

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- c. Where there is a transition from one linear asset to another linear asset, the boundary will be drawn by the Inlet/outlet valve, where each scheme retains ownership of its respective inlet valve
2. Sites are determined by geographic boundaries and not the operating purpose of the assets (Facility – Level 1 is defined spatially). For example, a site does not need to only exclusively include assets used for the purpose Water Treatment – it can include the water storage assets such as reservoirs or the water transmission assets such as pump stations.
3. In any context where assets for multiple purposes exist in proximity a “lead” purpose will be established for the purposes of naming the site. Water Treatment Plants (WTPs) and Dams will most frequently serve as the lead sites in instances such as these.
4. Where it is practical, Seqwater property boundaries can serve as the Level 1 site boundaries. Where it is not practical the spatial shape will need to be drawn from scratch in the GIS.

The Asset Information & Systems team, may consult across Asset Services, Technical Support and Improvement, and Engineering when determining Level 1 boundaries.

5.2.3. Location Levels 2&3

As defined in Section 5.1.2, Area can either be defined functionally (for Facilities) or spatially (for Linear Assets and Catchments).

This section details the determination of area for each of these location configurations.

5.2.3.1. Area for Facilities – Functional Area

The Location Level 2 for Facilities is defined functionally.

These functional areas are given a unique digit to identify the areas within a facility. This is in alignment with the coding methodology adopted in the Asset and Equipment Identifier Procedure ([PRO-02190](#)).

Table 5 Unique identifiers for Level 2 Location for Facility

Unique Digit	Level 2 Location (i.e., Functional Area)
1	Raw Water
2	Sedimentation
3	Filtration
4	Disinfection
5	Chemical
6	Water treatment residuals
7	Treated Water
8	Site Services

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The setup of the Location Level 2 Level 3 Codes has several purposes:

- It will allow stakeholders familiar with the codification of one site to be able to confidently navigate another site of the same Site Purpose.
- The ascending order of the codes approximates as close as practical the flow of water through the facility (i.e. Sedimentation coming before Filtration etc.).
- It allows easier benchmarking of costs, labour and other metrics against the process/subprocess across the whole portfolio. It should be noted that direct comparison of two sites will still need account for production volumes and redundancy in the network.

When these levels are defined in the EAMS, the format of the Level 2 and 3 codes shall be three numeric characters which follow on from each other.

The methodology used for establishing Level 2/3 Locations for Facilities is illustrated in Table 6 Facility Location Level 2/3 Summary.

Note: Table 6 provides a snapshot of how these levels are presented in the EAMS, and are not relevant to equipment numbering.

Table 6 Facility Location Level 2/3 Summary

Level 2	Level 3
0X0 – Standard Process 1	0X0-010 – Subprocess 1
	0X0-020 – Subprocess 2
	0X0-031 – Subprocess 3 – System 1
	0X0-032 – Subprocess 3 – System 2
	0X0-040 – Subprocess 4
	0X0-050 – Subprocess 5
0X1 – Non-standard Process 1	0X1-010 – Subprocess 1
	0X1-020 – Subprocess 2
0X0 – Standard Process 2	0X0-010 – Subprocess 1
	0X0-020 – Subprocess 2
	0X0-030 – Subprocess 3
	0X0-040 – Subprocess 4
120 – Embedded Facility	120-XXX – Embedded Facility Code

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Level 2	Level 3
	120-XXX – Embedded Facility Code

These codes differ when it is applied to equipment numbering. For equipment numbering code lists, refer to the Asset and Equipment Identifier Procedure ([PRO-02190](#)).

Guidelines of this method are as follows:

1. Each Level 2 Location is defined as a function/process (i.e., functional area) and is described by a 3-digit numeric code. All codes that end in a “0” are a standard process that exists at all Facility sites. Wherever that code is used the description is required to be consistent across all the Seqwater portfolio.
2. In contrast, any code not ending in a “0” is defined as non-standard and can be described on a site-specific basis (e.g., 011 will not necessarily describe the same process on any two sites but 010 will).
3. Each Level 3 Location is defined as a subprocess and is described by 7-digit code. This code consists of:
 - a. The first three characters belonging to the parent process (i.e., Level 2)
 - b. The separator character (“-”)
 - c. A three-digit numeric code to describe the subprocess. In a similar fashion to the Level 2 codes, the Level 3 codes ending in ‘0’ must be consistently named across all the Seqwater WTP portfolio.
 - d. The Level 3 codes in the “gaps” (i.e. not ending in ‘0’) are reserved for the purpose of splitting a process into multiple systems.
 - i. The splitting of the Level 3 into multiple systems is useful for certain sites that have two distinct systems of the same sub-process in different physical locations. A prime example is sites where two polymer dosing systems exist – one at the inlet works and one for the sludge part of the process. Instead of listing all the polymer-related items at one location it can be split into two and each location may be named specifically for that site. A multiple systems split example is presented with a standard case below:

Case 1) Standard case with subprocesses:

050 – Chemical

050-200 - Polyelectrolyte (Polymer)

Maintainable Item 1

Maintainable Item 2

Case 2) Multiple Systems:

050 - Chemical

050-201 – Polyelectrolyte (Polymer) – Inlet Works System

Maintainable Item 1

Maintainable Item 2

050-202 - Polyelectrolyte (Polymer) – Sludge System

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Maintainable Item 1

Maintainable Item 2

4. Embedded facilities are to be reserved for "120" slot. This location is intended for wholly self-contained facilities found within the main facility that need to be considered separately due to ownership or functional considerations (e.g., pumps stations, water quality monitoring facilities, or recreation sites within the main facility).
 - a. The Level 2 and Level 3 descriptions are not required to be consistent across the portfolio for embedded facilities.

5.2.3.2. Area for Linear Assets – Spatial Area

Location Level 2 for Linear Asset Schemes are to be created in line with the divisions of schemes according to mechanical drawings.

Linear segmentation is applied to represent linear assets as individual units to support both operational and analytical needs. Two approaches are recognised:

- Dynamic Segmentation (preferred approach) is when the linear asset is represented as a single, continuous entity. Attribute changes (e.g., material, diameter, installation date, condition) are recorded as spans along the asset, each defined by start and end measures. A Linear Referencing System (LRS) is used, supporting both absolute referencing (distance from a defined origin) and relative referencing (offset from known features), along with multi-axis offsets (X, Y, Z) for precise location and directionality.
- Static Segmentation (legacy/least recommended) is when the asset is divided into fixed segments wherever a physical or attribute change occurs, with each segment treated as a separate asset record. Static segmentation should only be used where legacy system constraints require it and should be phased out over time.

Effective segmentation relies on robust referencing standards, including absolute and relative measures, multi-axis offsets, and directionality, to ensure accurate documentation of locations, features, and events along the asset's length.

As mentioned in Section 5.1.2, linear assets do not have a Location Level 3.

5.2.3.3. Area for Catchments – Spatial Area

Location Level 2 for Catchments is defined spatially in the GIS and linked to the EAMS.

Specifically, Catchments are divided into Sub Catchments as defined in the GIS. As an example, the Logan River Catchment is divided into 10 Sub Catchments as presented in Figure 7. *Please Note: numbering in Figure 7 is indicative only.*

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Figure 7 Logan River Catchment

The codification for Sub-Catchments is to be three alpha characters with the first character being “C” and the other two characters determined based on the name of the location.

Typically for Catchments, there is no Level 3 Location as the specification of the catchment and sub catchment is deemed to be sufficient for identifying maintainable items (see Figure 8).

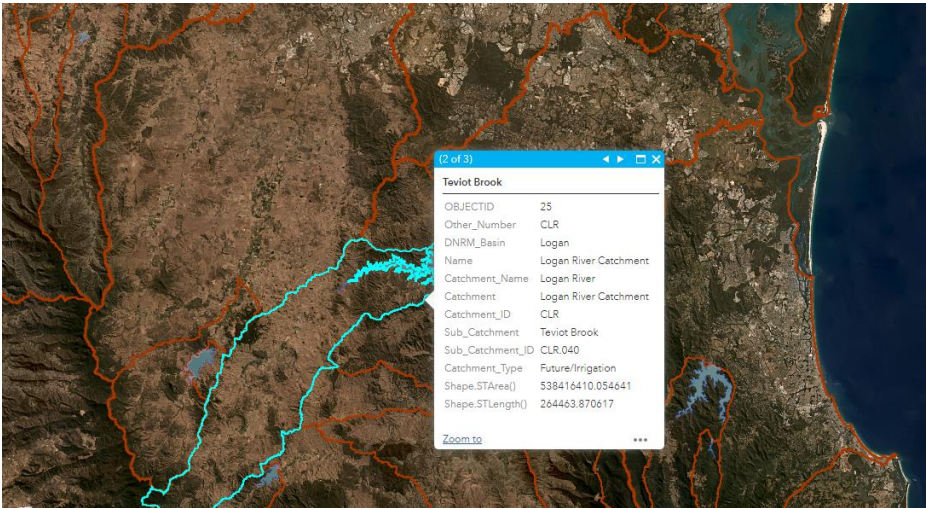


Figure 8 Logan River Catchment Sub-catchment

Code lists for Catchments can be found in Asset and Equipment Identifier Procedure ([PRO-02190](#)).

5.2.4. Maintainable Item (Item Levels 1 to ‘n’)

Item Levels 1 to ‘n’ are used as a flexible placeholder to define the Maintainable Item within the asset hierarchy below Location Level 3. The value of ‘n’ represents the number of hierarchical levels required to logically and consistently identify the Lowest Maintainable Level (LML).

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This range is intentionally defined to allow a single, coherent hierarchy to be applied across the entire asset portfolio, recognising that different asset classes may require different depths to accurately represent maintainable items, where:

- $n = 1$, the Lowest Maintainable Level (LML) is identified directly beneath Location Level 3, and no intermediate levels are required, and
- $n > 1$, one or more intermediate levels are used to group components or assemblies until the LML is reached.

The Lowest Maintainable Level (LML) represents the lowest level in the hierarchy at which physical maintenance can be performed, recorded, and costed. As such, corrective maintenance and breakdown-related work orders are typically raised at the LML, ensuring accurate fault attribution, work history, and performance reporting.

Consistent with the Work Management Manual ([MAN-00394](#)), Preventive Maintenance (PM) that is non-corrective in nature may be assigned at a higher hierarchical level where the activity:

- applies uniformly to multiple child assets;
- provides assurance over the condition, compliance, or availability of those assets; and
- does not represent physical intervention on a specific maintainable component.

In these cases, the higher-level PM functions as a strategy-driven assurance activity, while any deterioration, defects, or corrective actions identified through the PM must be raised as separate follow-up work orders at the appropriate Lowest Maintainable Level (LML).

This distinction reinforces a clear separation between assurance activities (PM) and intervention activities (CM/BM), while enabling consistent, practical use of the asset hierarchy across planning, execution, and reporting.

If an end item has individual regulatory compliance requirements (e.g. registration, inspection, reporting) under any relevant primary Queensland or Commonwealth Act and its subordinate legislation (including regulations, codes or administrative directions), it shall be established as a distinct Maintainable Item at the lowest maintainable level (LML). This ensures each item can be managed, tracked and reported in accordance with regulatory obligations. The following is required:

- End items that require registration under the Work Health and Safety Regulation 2011 (Qld), Division 2 (e.g. pressure vessels, lifts, boilers) must be recorded as separate Maintainable Items at the LML; and
- End items that require periodic testing and reporting under the Plumbing and Drainage Regulation 2019 (Qld), (such as: Home Sewage Treatment Plant (HSTP) and testable backflow prevention devices, e.g. RPZ valves) must also be separately identified at the LML.

Any other end item subject to regulatory oversight or reporting shall be individually recorded at the LML, regardless of its integration within a larger system or assembly. For example, all individually registered cranes located on a site shall have separate maintainable item records to ensure compliance with statutory registration and inspection requirements.

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6. Asset Information Requirements (AIR)

The Asset Information Management Framework (AIMF) documentation suite collectively defines Seqwater's Asset Information Requirements (AIR). The AIR specify the minimum breadth, depth, structure, and quality of asset information required to support the Asset Information Model (AIM) and Seqwater's Asset Management System across the asset lifecycle.

Asset information may be created or updated as a result of asset creation, modification, operation, or disposal.

The AIR form a subset of the overall information requirements applicable to asset creation, modification, operation, and stewardship. Where asset information is produced as a direct outcome of asset creation or modification, the AIR define the information obligations necessary to:

- support contractual requirements;
- enable effective asset commissioning, operation, and maintenance; and
- ensure asset information is delivered, complete, and fit for purpose at handover.

Where asset information is produced through asset data remediation, as-found surveys, or legacy data uplift activities, the AIR remain applicable; however, the standard, extent, and method of data capture may be varied where this is financially prudent and risk-based. In such cases, acceptable data standards, tolerances, and limitations shall be explicitly defined and approved by the Asset Information & Systems team, recognising constraints such as accessibility, uncertainty, and the condition of legacy assets (for example, buried or undocumented infrastructure).

Asset information may be delivered through Digital Engineering (BIM-enabled) or Non-Digital Engineering pathways. While the processes, systems, and artefacts differ, the intended asset information outcomes are consistent, unless otherwise formally agreed in accordance with this Framework.

Other information requirements not forming part of the AIR, such as safety studies, risk assessments, and certain geometric or design-specific deliverables—are managed separately through the Information Requirements for BIM Framework ([FRA-00052](#)) or other applicable corporate frameworks.

6.1. Asset Information Requirements delivery pathways

The Asset Information Requirements may be satisfied through different delivery pathways depending on the nature of the work, the delivery model, and the maturity of available information. These pathways define how asset information is produced and exchanged; they do not redefine what asset information is required, except where formally varied in accordance with this Framework.

The delivery pathways recognised by Seqwater are:

- Digital Engineering (BIM-enabled) delivery; and
- Non-Digital Engineering delivery, including remediation and legacy uplift activities.

All delivery pathways shall result in asset information that is suitable for integration into the Asset Information Model (AIM), subject to any approved, risk-based limitations.

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6.2. Digital Engineering (BIM-enabled) Asset Information Requirements

The Figure 9 below explains the relationship between AIR and other information categories at Seqwater.

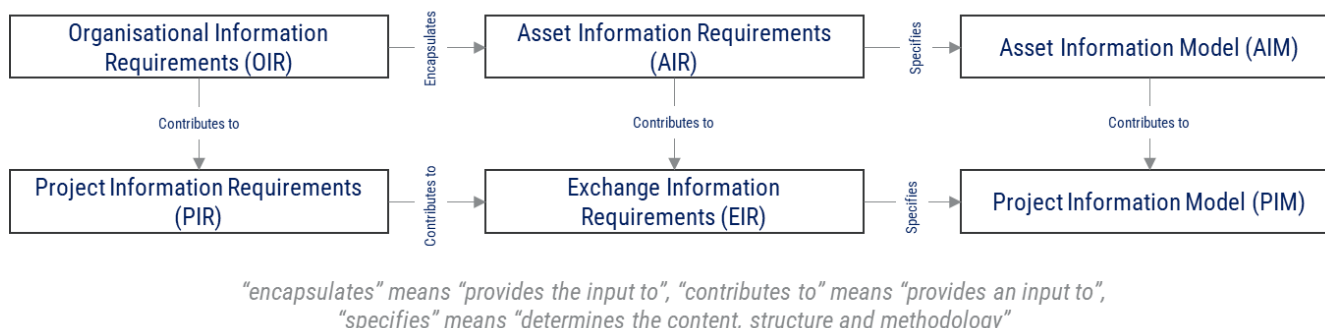


Figure 9 Relationship between information categories (Reference: ISO19650 Part 1)

A high-level explanation of the information categories shown in Figure 9 are presented in Table 7. For more information and detailed explanations on these, refer to [FRA-00052](#) Information Requirements for BIM Framework.

Table 7 Asset Information Categories

Category	Description
Organisational Information Requirements (OIR)	Organisational Information Requirements (OIR) are established in a statement about the information needed by an organisation to inform decision-making about high-level strategic objectives. The OIR inform the AIR and the project information requirements (PIR) but, unlike the AIR and PIR, the OIR are generally not issued as part of tender documentation.
Asset Information Requirements (AIR)	Asset Information Requirements (AIR) primarily set out the technical aspects of the required asset information, that is, the information needed to support operational activities. In Seqwater's context, this refers to the AIMF documentation suite that sets out the foundational principals behind asset information and requirements for asset data handover.
Project Information Requirements (PIR)	Project Information Requirements (PIR) set out the information required by Seqwater for decision-making about the project throughout its duration. These requirements can include documents such as project specifications, design briefs, construction and project management documents and/or purpose-written reports including cost and progress reports. Organisational policies, such as financial reporting procedures and formats can also influence project information requirements (PIR). In Seqwater's context, this refers to the Project Information management Standard (PIMS) that sets out the requirements for projects to successfully create high quality asset data and information to support decision-making throughout asset lifecycle including project duration

Category	Description
Exchange Information Requirements (EIR)	While the AIR and PIR primarily describe what information is required, the EIR is primarily concerned with the who, how and when of their delivery. The EIR represent the overall information requirements incorporating managerial, commercial and technical aspects with both AIR and PIR encompassed. The requirements detail the roles and responsibilities of project team members, information production processes and procedures, and data standards, file formats and timelines for information exchanges. The EIR inform the later development of the BIM Management Plan (BMP) or a BIM Execution Plan (BEP) developed for project delivery.
Project Information Model (PIM)	The Project Information Model (PIM) supports the delivery of the project and contributes to the asset information model (AIM). Not everything added to the PIM during project delivery is relevant to the AIM, part of the project planning process should include how the AIM will be derived from the PIM, and which parties will be responsible. A PIM should be stored for auditing purposes and to provide a long-term archive of the project.
Asset Information Model (AIM)	The Asset Information Model (AIM) is deliverable (suite of deliverables including geometric and non-geometric information) provided by the delivery team in response to the Seqwater's AIR. It supports Seqwater's strategic and day-to-day AM (Asset Management) / FM (Facilities Management) processes. It can also provide information at the start of a refurbishment or extension of an existing asset. For more information on AIM, refer to Section 6.2.2.

The processes of delivering the assets and the associated data and information are parallel and connected and will be explained in detail in Section 6.2.1.

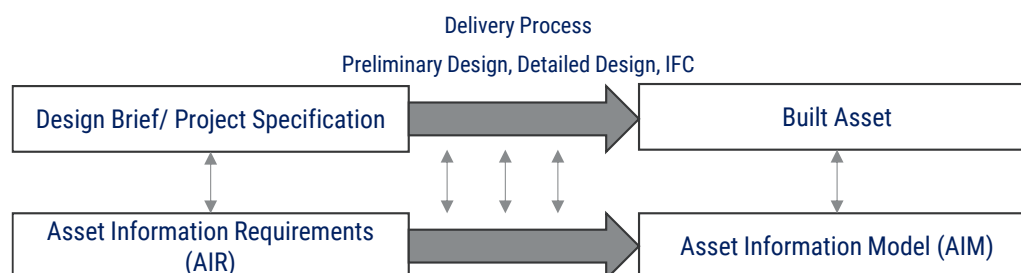


Figure 10 Parallel Delivery of Built Asset and Asset Data (Reference: ABAB AIR Guide)

The provision of asset data in response to the specified requirements forms part of design and construction obligations within the associated contracts.

6.2.1. Asset Data Handover

This section describes Seqwater's requirements for asset data to be handed over in relation to new or decommissioned assets created as part of capital and minor works projects. The document describes the data required and the structure and format it shall be supplied in.

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- **Equipment number request** - List the assets being created as part of the project.

Seqwater developed the X-TMP-STD-023 Equipment Number Request Form ([FRM-01068](#)) to assist with consistent and easy data entry, as well as for providing a template for equipment number requests. The contractor (or PM) submits this form at conclusion of Preliminary Design and Detailed Design, as defined in Engineering Standard X-PRO-STD-009 Engineering Design, Construction, Operation and Maintenance Procedure ([PRO-01617](#)).

- **As Constructed Equipment Information Report** - Contains specification data for each of the assets listed in the Enterprise Asset Management System (EAMS) and associated data, such as model, manufacturer, serial numbers etc.

The As Constructed Equipment Information Report is used to collect data specific to the types of assets which are being added or replaced in the EAMS. As the specifications are specific to the assets, this worksheet can only be generated once the Equipment Number Request Form has been updated appropriately.

For each asset, complete the required specifications in the relevant column. If the specification is not relevant to the particular asset indicate this by entering "N/A" or just leave a blank field in the specification 'Comments' column. Drop-down boxes have been provided where a specification is restricted to a range of set values. If the appropriate value is not available in the drop-down enter the specification in the Comments column.

The format for supplying asset data is in the form of spreadsheets and is presented in a timeline in Table 8.

Table 8 Timelines for Asset Data Handover

Information Requirement	Due	Responsibility
FRM-01068 X-TMP-STD-023 Equipment Number Request Form	Preliminary Design	Contractor/PM
FRM-01068 X-TMP-STD-023 Equipment Number Request Template – As Constructed	Detailed Design	Contractor/PM
As Constructed Equipment Information Report	Within 30 days of receiving the completed Equipment Number Request form - Final	Asset Information Team
Completed As Constructed Equipment Information Report	IFC	Contractor/PM
Asset Information updated in EAMS	Target is 30 days of receiving the completed As Constructed Equipment Information Report	Asset Information Team

6.2.2. Asset Information Model (AIM)

The AIM provides validated and approved information that supports strategic and day-to-day Asset Management. In other words, it is a digital representation of all the structured and unstructured information that are needed to manage Seqwater's assets throughout their entire lifecycle (Figure 11).

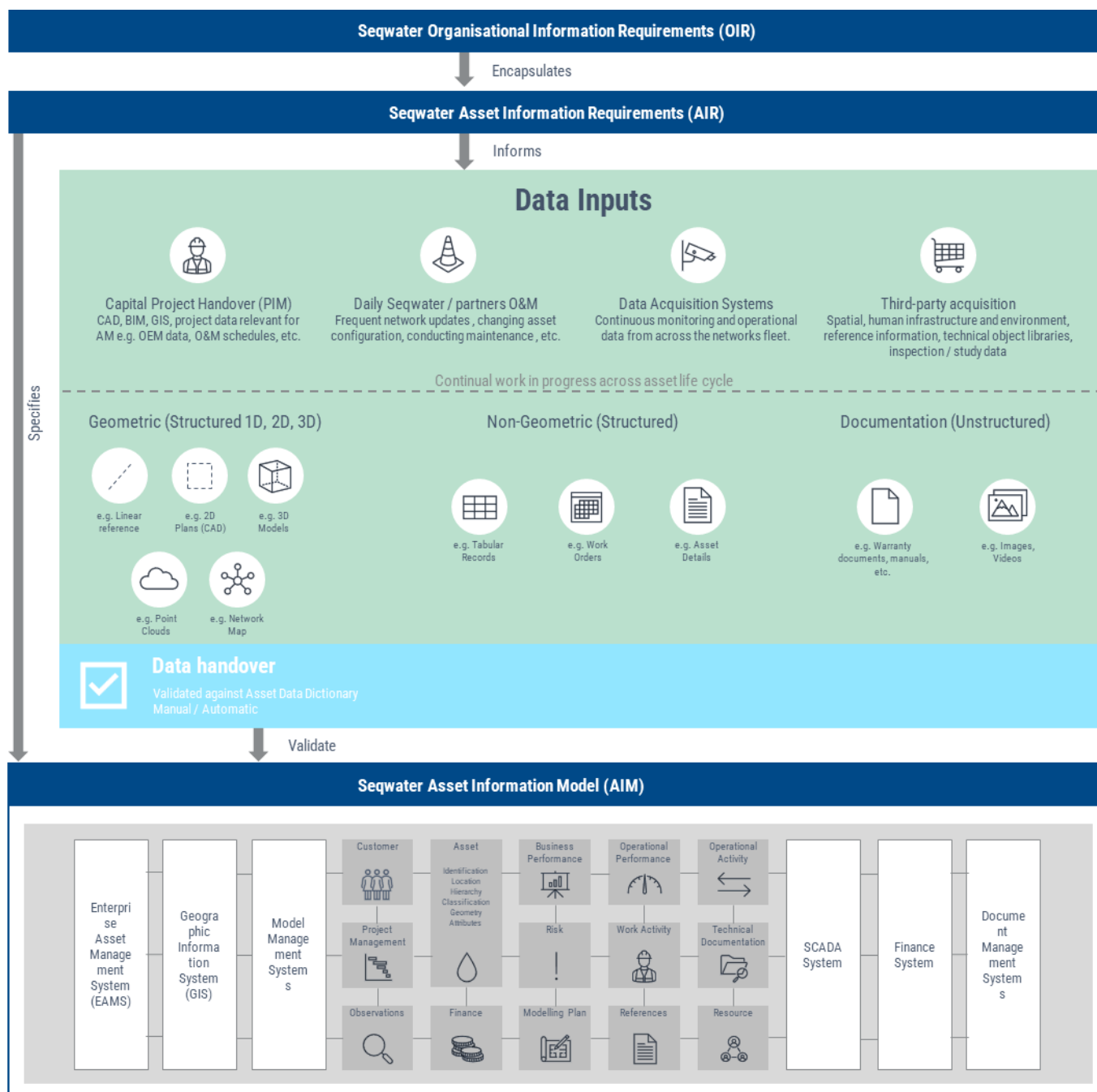


Figure 11 Illustration of the Asset Information Model

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6.3. Non-Digital Engineering Asset Information Requirements

Non-Digital Engineering delivery pathways apply where asset information is produced outside BIM-enabled Digital Engineering processes, including operational works, minor capital works, management of change activities, and other interventions delivered through established operational and maintenance frameworks.

Under Non-Digital Engineering delivery, the Asset Information Requirements (AIR) remain applicable. The absence of BIM-enabled tools does not, of itself, reduce Seqwater's requirements for the breadth, depth, quality, or governance of asset information, except where formally varied in accordance with this Framework.

Where asset information is generated because of change, as defined in the Management of Change Framework ([FRA-00009](#)), the capture, validation, and handover of asset information shall be managed through the Management of Change process which requires:

- For changes of a technical nature, asset information requirements shall be satisfied in accordance with the applicable technical procedures, including Management of Change (Technical) Procedure ([PRO-02234](#)), and
- Asset information produced through MoC forms part of the approved change record and shall be completed prior to closure of the change.

Where asset information is identified, corrected, or supplemented while delivering works, the capture and follow-up of that information shall be managed through the work identification, feedback, and close-out mechanisms defined in the Work Management Manual ([MAN-00394](#)). In these cases, asset information updates shall be progressed through the prescribed follow-up processes to ensure appropriate review, validation, and incorporation into enterprise asset systems.

Where Non-Digital Engineering activities result in the creation, replacement, or material modification of assets, the AIR define the minimum information obligations necessary to:

- support contractual and governance requirements;
- enable safe and effective commissioning, operation, and maintenance; and
- ensure asset information is complete, structured, and suitable for ingestion into the Asset Information Model (AIM).

Non-Digital Engineering delivery pathways may utilise alternative artefacts, systems, or methods for producing and exchanging asset information. Such approaches are acceptable provided that the resulting information:

- satisfies the AIR and Asset Data Dictionary;
- aligns with the AIM; and
- is validated and accepted in accordance with Seqwater governance arrangements.

6.4. Asset data remediation, survey and uplift

Asset data remediation and legacy information uplift activities address gaps, deficiencies, uncertainty, or misalignment in existing asset information. These activities may include as-found surveys, validation exercises, condition assessments, inspections, and targeted data improvement initiatives intended to improve the accuracy, confidence, and usability of asset information for existing assets.

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In asset data remediation contexts, the Asset Information Requirements (AIR) remain the reference standard for asset information. However, the standard, extent, precision, and method of data capture may be varied where this is financially prudent and risk-based. This recognises practical constraints commonly associated with legacy assets, particularly where assets are buried, inaccessible, undocumented, or operationally constrained, and where intrusive investigation would introduce disproportionate cost, safety risk, or service disruption relative to the value of the information obtained.

In determining what is financially prudent and risk-based, consideration shall be given to factors including, but not limited to:

- the criticality and risk profile of the asset;
- the purpose for which the information will be used;
- the cost, safety, and operational impacts of direct verification;
- the confidence achievable through non-intrusive, inferred, or indirect methods; and
- the opportunity for progressive improvement over time.

For all asset data remediation, survey, and legacy uplift activities, early engagement with the Asset Information & Systems (AI&S) team shall occur during scoping. This engagement is required to ensure that:

- the intended data outputs can be matched to existing asset records and hierarchies;
- data structures, identifiers, and classifications align with the Asset Information Model (AIM) and Asset Data Dictionary;
- data quality expectations, confidence levels, and limitations are clearly defined and achievable; and
- remediation outputs are suitable for ingestion, governance, and ongoing maintenance within enterprise systems.

Failure to engage AI&S during scoping may result in data outputs that are not accepted into the asset register or require rework at the cost of the initiating activity.

For asset data remediation, survey, and legacy uplift activities:

- acceptable data standards, tolerances, assumptions, confidence levels, and limitations shall be explicitly defined and approved by the Asset Information & Systems team prior to execution;
- any deviation from full AIR compliance shall be deliberate, documented, and justified on the basis of risk, value, and intended use of the information; and
- the resulting asset information shall clearly distinguish between verified, inferred, estimated, and unknown attributes, where applicable.

Asset data remediation and survey activities may result in updates to existing asset records, including attributes such as condition, performance, and remaining useful life. Where condition information is collected or updated, the scope, methodology, and frequency of condition surveys shall be defined in the relevant Asset Class Plans (ACPs). The AIR govern how the resulting information is structured, recorded, and maintained, but do not override asset-class-specific requirements for condition assessment.

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Asset data remediation does not constitute asset creation and does not, of itself, establish contractual delivery obligations equivalent to those associated with capital or minor works projects. Accordingly, remediation outputs may be delivered to a lesser or partial standard than would be required for newly created or materially modified assets, provided that:

- the limitations of the data are transparent and understood;
- the information is sufficient to support operational, regulatory, safety, and risk management needs; and
- the data can be governed, maintained, and progressively improved over time within Seqwater's enterprise systems.

Where asset data remediation or survey activities identify information that constitutes a change, as defined in the Management of Change Framework ([FRA-00009](#)), the requirements of the Management of Change process apply. Any resulting asset information updates shall be managed through the appropriate change and close-out mechanisms prior to incorporation into the Asset Information Model (AIM).

Asset data remediation, surveys, and legacy information uplift activities are recognised mechanisms for the continuous improvement of asset information maturity. They complement, but do not replace, the requirement for full and compliant asset information delivery where assets are newly created, replaced, materially modified, or disposed.

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7. Definitions

Table 9 Definitions

Term	Definition
Artefact	A discrete item of information or documentation produced, used, or delivered as part of an information management process.
Asset	An item or a thing that has potential or actual value to Seqwater. An asset can be physical or non-physical. As per Seqwater's Strategic Asset Management Plan (SAMP) Section 1.5, this excludes the non-estate land assets and non-production assets such as fleet and mobile plant, non-operational buildings and non-operational technology-ICT assets and all Portable and Attractive Items (PAA).
Audit	Systematic, independent and documented process for obtaining audit evidence and evaluating it objectively to determine the extent to which the audit criteria are fulfilled. (ISO19011:2019)
contributes to	Provides an input to.
Corporate Function	Corporate Function is the highest level in the asset hierarchy. It describes Seqwater's enterprise-wide functional groupings used for regulatory, financial and operational reporting. Corporate Function defines the predominant purpose within which assets are planned, funded, managed, and accounted for.
Data	Facts about an object. An object can be physical (e.g. a pump, a bridge, a building), or non-physical (e.g. a project plan, copyright, software). (ISO55000:2024, Clause 3.1.10).
Employees	Persons employed directly by Seqwater in a permanent, temporary or casual capacity.
encapsulates	Provides the input to.
Equipment	Equipment is the set of elements (including control, piping and monitoring devices) that are required to be represented in P&IDs, PFDs and Electrical Drawings.
Information	Meaningful result of organising and processing data. Example: Make/model/type of a pump in a specific location, span of a bridge, asset performance indicator, an asset's current total cost of ownership (ISO55000:2024).
Knowledge	Understanding facts, information, and principles acquired through experience, research, or education. Asset management knowledge can come from (ISO55000:2024): a) Internal sources (e.g., intellectual property, experience, lessons learned, bodies of knowledge, informal sources, process improvements, products/services, simulation models). b) External sources (e.g., standards, books, academia, conferences, customer or provider input).

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Term	Definition
Linear Asset	A linear asset is a physical infrastructure element that extends continuously across a geographic area, rather than existing as a discrete point or unit. Linear assets include pipelines and roads, where management requires consideration of length, spatial orientation, and changing attributes along the span.
Lowest Maintainable Level	The Lowest Maintainable Level (LML) is the lowest level of an asset in the breakdown structure that defines the granularity of asset records. LML may be dependent on the maintenance methodology employed, the complexity of the asset, and the phase of the asset in the life cycle.
Maintainable Item	Maintainable Item (MI) refers to an element that is commonly maintained (repaired/restored) in its entirety or cannot normally be disassembled or repaired or is of such a design that disassembly or repair is impractical or economically not viable, therefore replaced (e.g., motor, gearbox, agitator, etc.). Maintainable Item (MI) belongs to the LML. <i>This term supersedes the legacy term "operating asset".</i>
may	Indicates that the function may be exercised or not exercised, at discretion.
Portable and Attractive Items	Portable and Attractive Items (PAA) are the items that have values below the asset recognition threshold and are by their nature, susceptible to theft or loss. Such items include power tools, workshop equipment etc.
shall / must	Indicates a mandatory requirement.
should	Indicates a recommendation.
specifies	Determines the content, structure and methodology.
Supplier	Entities or individuals that provide goods, services (non-consulting), materials or systems to the organisation under procurement arrangements.

Table 10 Acronyms

Acronym	Definition
AIGP	Asset Information Governance Policy
AIM	Asset Information Model
AIMF	Asset Information Management Framework
AIMS	Asset Information Management Strategy
AIR	Asset Information Requirements
AM	Asset Management
AMS	Asset Management System
APMP	Asset Portfolio Master Planning Guideline
BAC	Biologically Activated Carbon

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Acronym	Definition
BEP	BIM Execution Plan
BIM	Building Information Model
BMP	BIM Management Plan
DAF	Dissolved Air Flotation
EAMS	Enterprise Asset Management System
EIR	Exchange Information Requirements
FM	Facilities Management
GAC	Granulated Activated Carbon
GIS	Geographic Information Systems
HACCP	Hazard Analysis Critical Control Point
HSTP	Home Sewage Treatment Plant
ICT	Information and Communication Technology
LML	Lowest Maintainable Level
LOS	Level of Service
LRS	Linear Referencing System
MI	Maintainable Item
OIR	Organisational information requirements
PAA	Portable and Attractive Items
PAC	Powder Activated Carbon
PIM	Project Information Model
PIR	Project Information Requirements
RPZ	Reduced Pressure Zone
SAMP	Strategic Asset Management Plan
SCADA	Supervisory Control and Data Acquisition
SME	Subject Matter Expert
WTP	Water Treatment Plant

8. References and Related Materials

Table 11 References and related materials

Description	Location
AS ISO 19011:2019 – Guidelines for auditing management systems	Intertek Inform
AS ISO14224:2023 Petroleum, petrochemical and natural gas industries - Collection and exchange of reliability and maintenance data for equipment	Intertek Inform
Asset Data Dictionary	Waternet
Australasian BIM Advisory Board Asset Information Requirements Guide	Internet
FRA-00009 Management of Change Framework	REX
FRA-00052 Engineering Standard X-FRA-STD-002 Information Requirements for BIM Framework	REX
FRM-01068 X-TMP-STD-023 Equipment Number Request Form	REX
GFMAM:2024 The Asset Management Landscape	Internet
ISO19650 series AS ISO19650-1:2019 – Concepts and principles AS ISO19650-2:2019 – Delivery phase of assets AS ISO19650-3:2021 – Operational phase of assets AS ISO19650-5:2021 – Security-minded approach to information management	Intertek Inform
ISO55000:2024 Asset management - Vocabulary, overview and principles	Intertek Inform
ISO55001:2024 International Standard for Asset Management – Asset Management System – Requirements	Intertek Inform
ISO55013:2024 International Standard for Asset Management – Guidance on the Management of Data Assets	Intertek Inform
MAN-00394 Work Management Manual	REX
MAN-00411 Financial Management Practice Manual	REX
PLN-00025 Seqwater Strategic Plan	REX
PLN-00162 Asset Information Management Strategy	REX
PLN-00264 Strategic Asset Management Plan	REX
PLN-00388 Monitoring and Control Systems (MCS) Asset Class Plan	REX
PLN-00395 Air Conditioning and Ventilation Systems Asset Class Plan	REX
PLN-00405 Walkways, Platforms and Ladders Asset Class Plan	REX
PLN-00406 Bridges and Major Culberts Asset Class Plan	REX

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Description	Location
PLN-00407 Erosion Protection Systems Asset Class Plan	REX
PLN-00408 Fences and Gates Asset Class Plan	REX
PLN-00409 Playgrounds Asset Class Plan	REX
PLN-00410 Roads, Trails and Hardstands Asset Class Plan	REX
PLN-00412 Drainage Systems Asset Class Plan	REX
PLN-00414 Tunnels Asset Class Plan	REX
PLN-00415 Auxiliary Power Asset Class Plan	REX
PLN-00417 Fire and Security Systems Asset Class Plan	REX
PLN-00421 Power Distribution and Switchboards Asset Class Plan	REX
PLN-00422 Transformers Asset Class Plan.	REX
PLN-00424 Blowers and Compressed Air Systems Asset Class Plan	REX
PLN-00427 Filters Asset Class Plan	REX
PLN-00431 Process Water Reticulation Asset Class Plan	REX
PLN-00434 Buildings Asset Class Plan	REX
PLN-00437 Dams, Concrete and Earth Embankments Asset Class Plan	REX
POL-00052 Asset Management Policy Statement	REX
POL-00182 Asset Information Governance Policy	REX
PRO-01617 Engineering Standard X-PRO-STD-009 Engineering Design, Construction, Operation and Maintenance Procedure	REX
PRO-02190 Asset and Equipment Identifier Procedure	REX
PRO-02205 Engineering Standard X-PRO-STD-008 Asset Standards Management and Application Procedure	REX
PRO-02234 Management of Change (Technical) Procedure	REX
Seqwater Corporate Strategy	Waternet
SPE-00442 Seqwater Baseline Security Measures Standard	REX

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Appendix A - Alignment with ISO14224:2023

Figure 12 below is an illustration of how the Seqwater’s asset hierarchy aligns with ISO14224:2023.

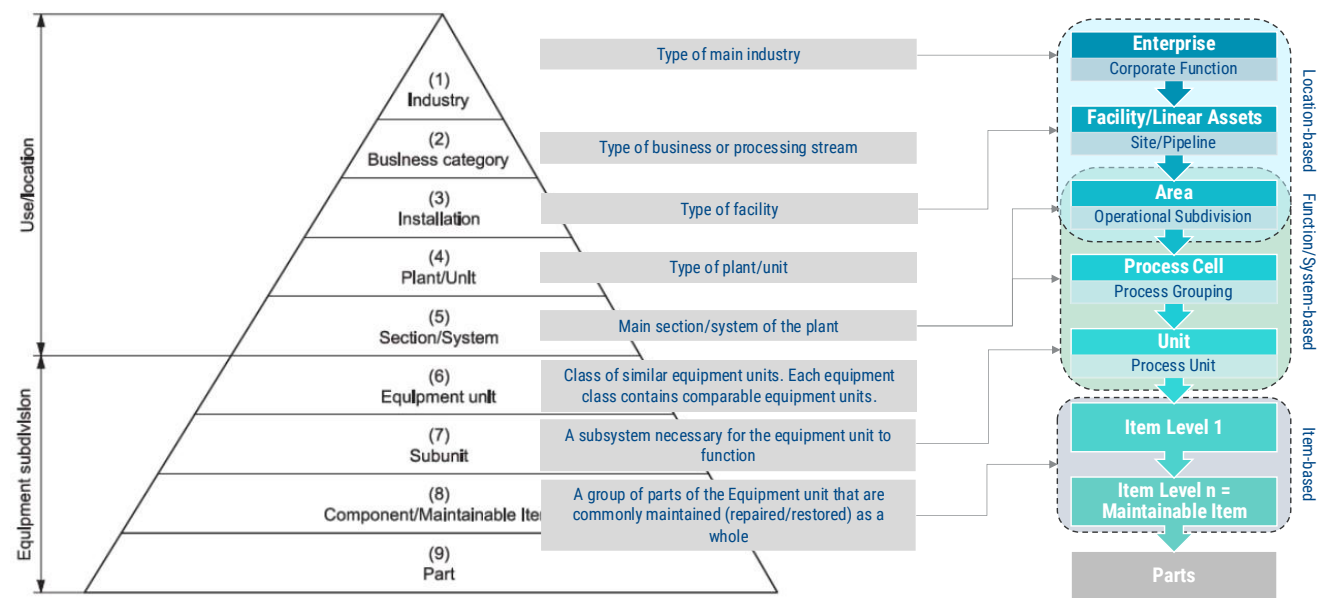


Figure 12 Alignment of Asset Hierarchy to ISO14224

Appendix B - Application Examples for Level 1 Levels

Application Example – Level 1 – Facility – Capalaba WTP

An example of spatially determining Location Level 1 at Capalaba is shown in Figure 13. More examples can be found in Appendix C - Application Examples for Level 2/3 to Maintainable Item. Guidelines from Section 5.2.2 were employed to determine this site as follows:

- Seqwater Property Boundary **2RP108087** has been identified as the starting point for Site Boundaries.
- The boundary must be expanded to the north-east to include the full extent of the raw water pipeline **PIPAW-0000205** (shown with the blue line towards the north of the site).
- The outlet valves **VLVTRE-0004365** and **VLVTRE-0004360** are to serve as the end point of the site (shown with red markers in the south-east of the site).
- “Capalaba WTP” has been identified as the lead purpose and therefore gets populated into the “Location Level 1” field.
- “TCP” is determined to be the Location Level 1 Code (“T” for WTP and “CP” chosen for Capalaba).



Figure 13 Location Level 1 Example – Capalaba WTP

More application examples can be found in Appendix C - Application Examples for Level 2/3 to Maintainable Item.

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Application Example – Level 1 – Facility – Alexandra Hills

An example of spatially determining Location Level 1 at Alexandra Hills is shown in Figure 14. Guidelines from Section 5.2.2 were employed to determine this site as follows:

- Seqwater Property Boundary **150SP228350** has been identified as a starting point for the Site Boundaries.
- The inlet valve to the site from the west is **VLVTRE-0004735** and this serves as one boundary.
- The outlet valves **VLVTRE-0004788** and **VLVTRE-0004790** going south towards Heinemann Road serve as the other boundaries.
- The boundary will also need to be extended to the north-east to capture the offtake.
- “Alexandra Hills Reservoirs” has been identified as the lead purpose and therefore gets populated into the “Location Level 1” field.
- “RAH” is determined to be the Location Level 1 Code (“R” for Reservoir and “AH” chosen arbitrarily for Alexandra Hills).

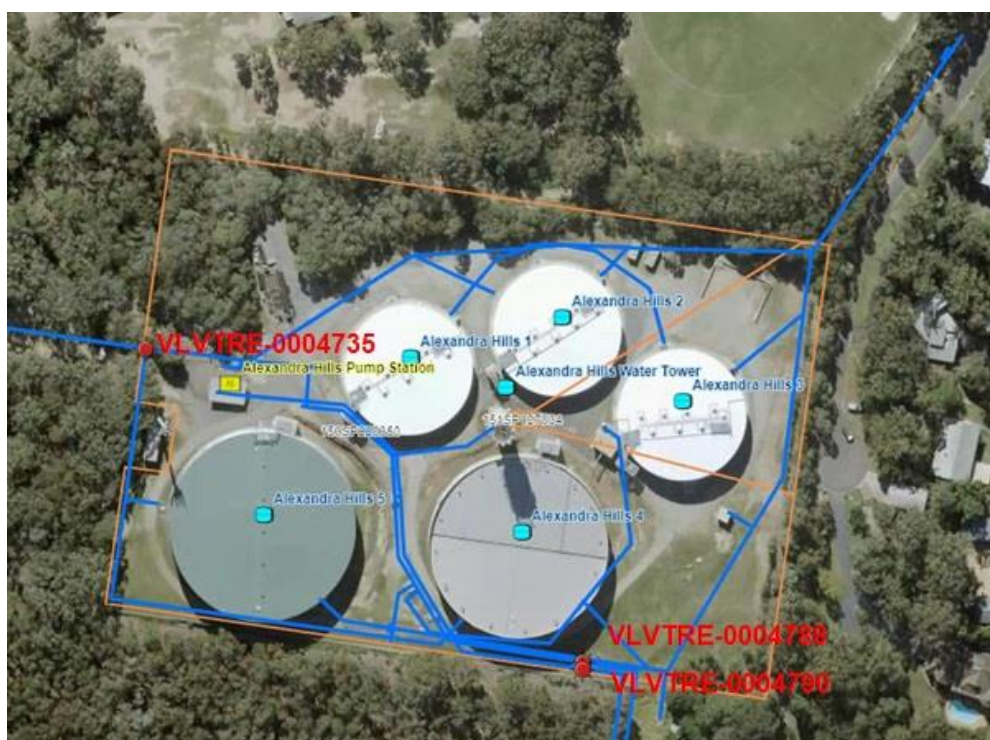


Figure 14 Location Level 1 Example – Alexandra Hills Reservoirs

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Application Example – Level 1 – Linear Assets – Brighton Supply

Spatially determining a Location Level 1 for Linear Assets is shown in Figure 15, taking the Treated Water Scheme – Brighton Supply as an example. Figure 16 shows the close-up of the boundary at the T-Intersection with the scheme isolation valve marked as a red cross. Guidelines from Section 5.2.2 were employed to determine this site as follows:

- The Site Boundaries are taken to be everything on the blue line from the right arm of the T intersection.
- The boundary for the scheme at the T-intersection is taken to begin at **VLVTRE-0002538** which isolates the whole scheme (Figure 16).
- “Brighton Supply” has been identified as the lead purpose and therefore gets populated into the “Location Level 1” field.
- P05 is chosen as the Location Level 1 code (P for treated water scheme and 05 as the scheme number).

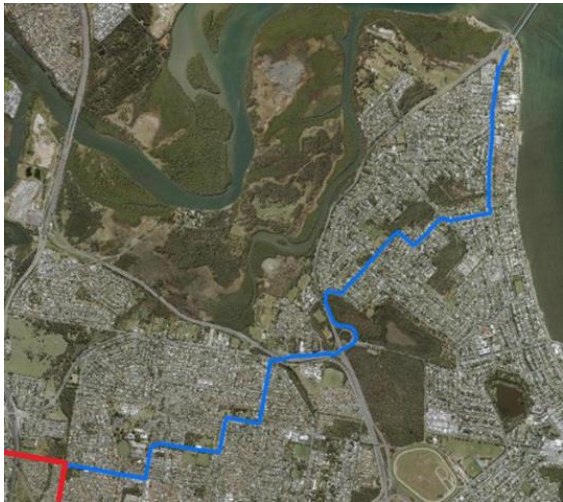


Figure 15 Brighton Supply



Figure 16 Brighton Supply – Closeup of boundary

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Application Example – Level 1 – Linear Assets – Logan Central Supply

An example of spatially determining Location Level 1 at Logan Central Supply is shown in Figure 17. Guidelines from Section 5.2.2 were employed to determine this site as follows:

- The site boundaries are taken to be everything on the blue line on Figure 17.
- The scheme terminates south of Kuraby on valve **VLVTRE-0004286** (Figure 18).
- The scheme terminates at Kimberley Park on Valves **VLVTRE-0004531** and **VLVTRE-0004385** (Figure 19).
- “Logan Central Supply” has been identified as the lead purpose and therefore gets populated into the “Location Level 1” field.
- P14 is chosen as the Location Level 1 code (P for Water Treatment Scheme and 14 for the Scheme Number).

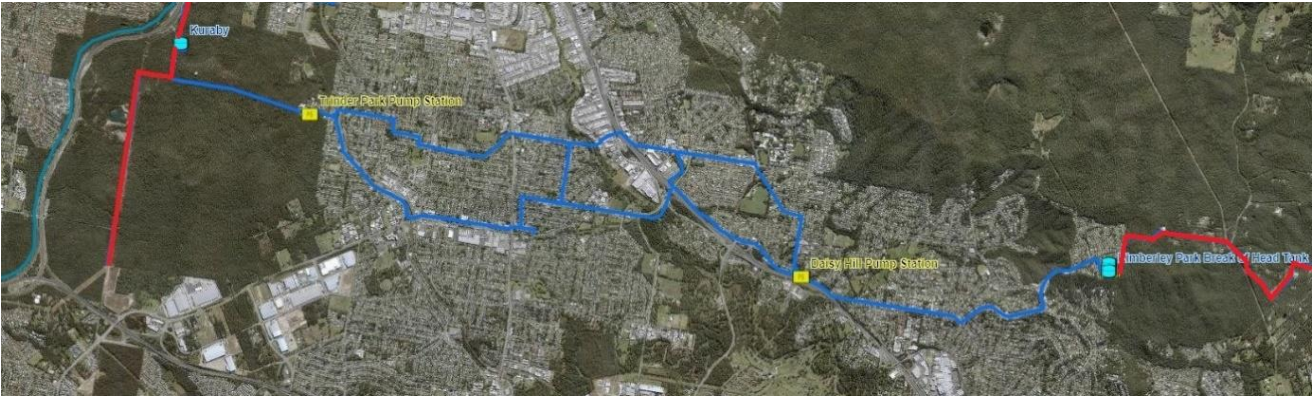


Figure 17 Logan Central Supply (TWS 14)



Figure 18 Logan Central Supply Termination



Figure 19 Logan Central Supply Termination

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Application Example – Level 1 – Catchments – Logan River Catchment

An example of spatially determining Location Level 1 at Logan River Catchment is shown in Figure 20 below. Guidelines from Section 5.2.2 were employed to determine this site as follows:

- The Site Boundaries are taken to be everything on the blue line on Figure 20.
- “Logan River Catchment” has been identified as the lead purpose and therefore gets populated into the “Location Level 1” field.
- CLR is chosen as the Location Level 1 code (“C” for Catchment and “LR” for Logan River).

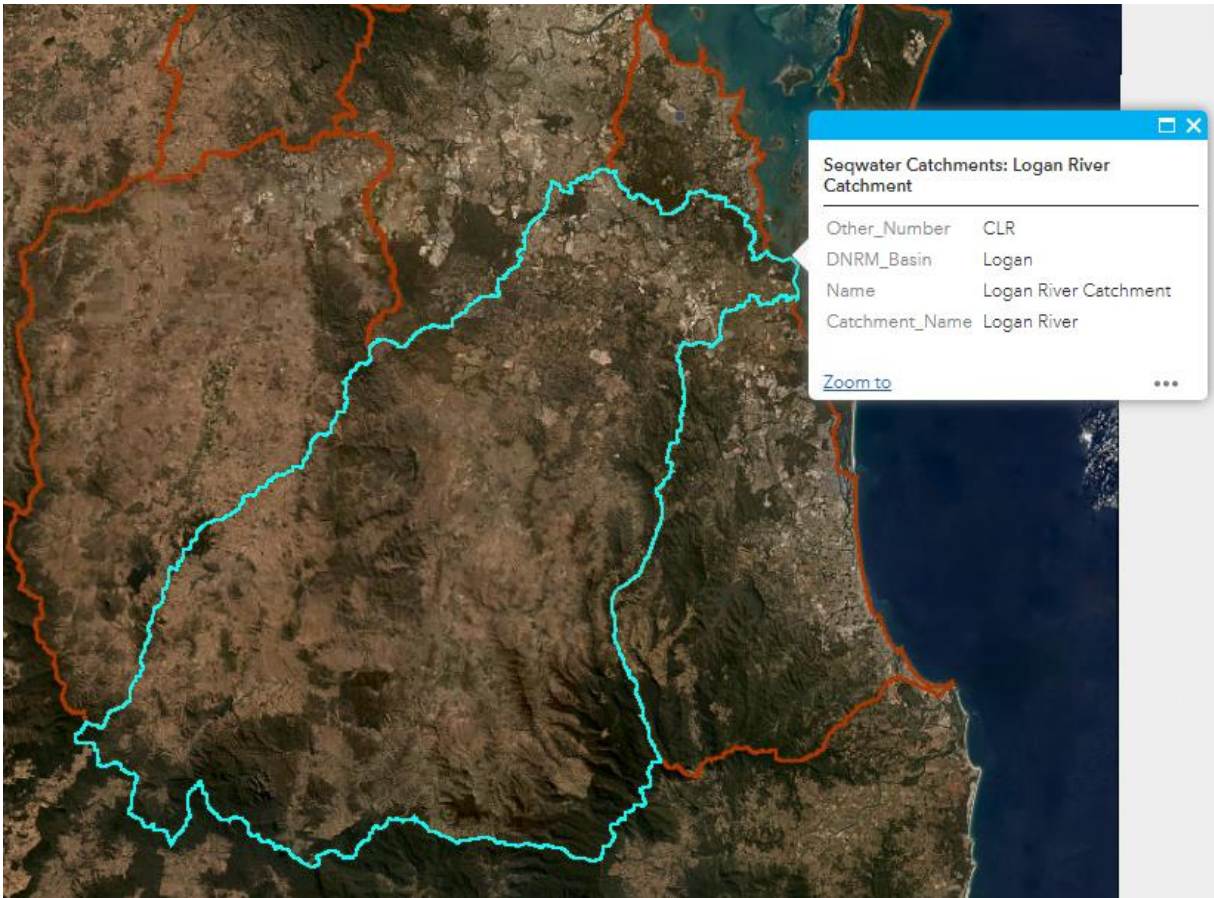


Figure 20 Logan River Catchment

Appendix C - Application Examples for Level 2/3 to Maintainable Item

Application Example – Level 2/3 – 010 Raw Water

Raw Water is the Level 2 Functional Location which encompasses all operations relating to the intake of water into a facility. For WTPs, the battery limits of what defines a 'Raw Water Asset' is evident in each WTP's Schematic Diagram found in the HACCP Plan. All assets from the start of the Schematic Diagram (i.e., Raw Water Intake) until the first form of physical water treatment will be considered a 'Raw Water Asset'. The only exception to above rule is the Aerator systems where they are located before any other physical treatment process. An example of what is included in the raw water functional location is shown below in Figure 21.

Capalaba WTP – Schematic Diagram

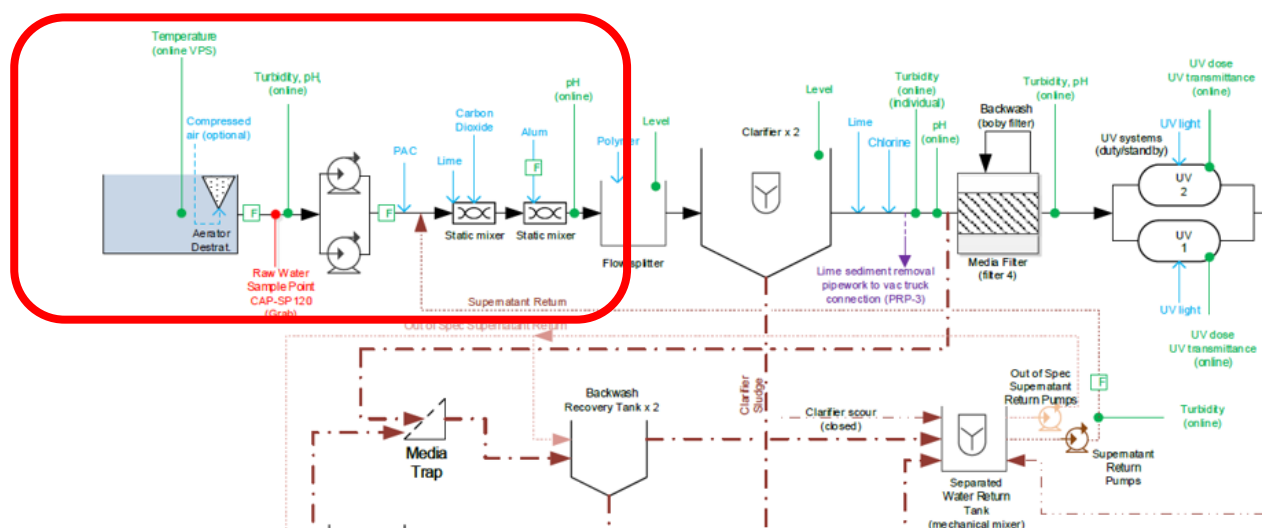


Figure 21 Raw Water Functional Location Battery Limits

010-010 Raw Water Intake

The Intake Functional Location relates to the static physical infrastructure involved in the extraction of Raw Water. Common maintainable items and their parts may include:

- Bores
- Penstocks
 - Actuators
- Reservoirs
- Screens
- Significant Valving
- Strainers

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- Tanks
- Significant Valving
- Towers
- Wells
- Sump Pumps in Intake Area
- Tunnel.

010-020 Raw Water Monitoring

Common maintainable items include:

- Analysers
- Controllers
- Meters (Turbidity, Conductivity, Oxygen, Flow, pH)
- Temperature Transmitters
- Adjustment Tanks (pH).

010-030 Raw Water Transfer

Common maintainable items and their parts may include:

- Raw Pumps/Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Common components of Raw Water Pump Systems
- Pump Wells
- Significant Valving
- Distribution Pit.

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010-040 Aerator System

This Level 3 Functional Location incorporates the 'Pre-Works' treatment system used in the Raw Water Level 2 Functional Location. Common maintainable items and their parts may include:

- Aerators (Static Mixing)
 - Blowers
 - Gearboxes
 - Impellers
 - Motors.

010-050 Flash & Static Mixers

This Level 3 Functional Location is intended to define the base case for both Flash and Static Mixers. Most of these units are located before the first physical treatment process and therefore sit under Level 3. However, if they are directly servicing another portion of the WTP (if evident in the plants schematic diagram), they should be located appropriately under an existing Level 3, as a maintainable item.

Common maintainable and their parts may include:

- Diffusers
- Penstocks
 - Actuators
- pH Meters
- Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meters
- Sample Points
- Tanks acting as Flash Mixers
 - Flow Meters
 - Significant Valving
 - Mixers
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving.

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010-060 Dam Structure (Dams)

This Level 3 Functional Location is designed to capture civil assets relating to the entirety of a Dam structure. Common maintainable items and their parts may include:

- Basins
- Baulks
- Bridges
- Channels
 - Sluice Gates
- Concrete Sections
- Crests
- Dam Walls
- Dissipaters
- Diversions
- Fishway Systems
 - Barriers
 - Hoppers
- Gates
- Inlet Structures
 - Screens
 - Sluice Gates
 - Significant Valving
- Offtakes
 - Bulkhead Gates
 - Sluice Gates
- Outlet Structures
- Plunge Pools
- Pools
- Regulators
 - Conduits
 - Significant Valving
- Scour Boxes

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- Spillways
 - Abutments
 - Bridges
 - Discharge Channels
 - Sluice Gates
 - Spillway Sections
 - Training Walls
- Support Plinths
- Tower Structures
- Weirs.

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Application Example – Level 2/3 – 020 Sedimentation

Sedimentation is the function of solids separation by either gravity (settling) or by increasing the buoyancy of particles by trapping them on rising air bubbles (flotation). In all cases, following coagulation, the dosed water is further mixed (with less energy) to form floc. These larger floc particles settle or float. The sedimentation function enables the bulk of the solid separation.

Apart from Level 3 functional locations 020-050 which covers common items, Level 3 functional locations should be populated with maintainable items that correspond to the sedimentation process.

In some cases, the process unit will be a more complex arrangement of multiple chambers (often the case with sedimentation basins). In this case it is permissible to define a basin or unit as a Level 3 functional location and have the individual chambers serve as the maintainable items.

Consider the contrast of the two cases below:

Process Units are simple enough to be maintainable items:

- 020 - Sedimentation
 - 020-020 - Sedimentation System
 - FAC##### Sedimentation Basin 1
 - FAC##### Sedimentation Basin 2

Complex Process Units are Level 3 Functional Locations and Chambers are maintainable items:

- 020 - Sedimentation
 - 020-021 – Sedimentation Basin 1
 - FAC##### Sedimentation Basin 1 Flocculation Chamber
 - FAC##### Sedimentation Basin 1 Sedimentation Chamber
 - Other FACs such as significant valving applicable to the whole basin
 - 020-022 - Sedimentation Basin 2
 - FAC##### Sedimentation Basin 1 Flocculation Chamber
 - FAC##### Sedimentation Basin 1 Sedimentation Chamber
 - Other FACs such as significant valving applicable to the whole basin

020-010 Flocculation

This Level 3 is to accommodate flocculator process units specifically that are stand-alone and not part of some other clarification system (i.e. a chamber within a sedimentation basin).

Common maintainable items and their parts may include:

- Flocculation Chambers (standalone)
 - All individual Measuring & Metering Devices (pH Meters, Flow Meters, Turbidity Meters)
 - Mixers/Mixer

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- Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Pumps/Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Significant Valving
- Stop Boards.

020-020 Sedimentation Basin System

Common maintainable items and their parts may include:

- A single generic record "Bridges, Walkways & Framework" (if applicable)
- Inlet/Outlet Channels
- Sample Pumps
- Process Unit Chambers (entire basin or multiple distinct chambers)
 - All individual Measuring & Metering Devices (pH Meters, Flow Meters, Turbidity Meters)
 - Penstock
 - Actuators
 - Pumps/Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Rakes
 - Gearboxes
 - Motors
 - Significant Valving
 - Shaft

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- Scrapers
 - Gearbox
 - Motors
 - Significant Valving
- Mixers/Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving.

020-030 Dissolved Air Flotation Unit (DAF) System

Common maintainable items and their parts may include:

- A single generic record “Bridges, Walkways & Framework” (if applicable)
- Inlet/Outlet Channels
- Sample Pumps
- Process Unit Chambers (entire DAF Unit or multiple distinct chambers)
 - All individual Measuring & Metering Devices (pH Meters, Flow Meters, Turbidity Meters)
 - Penstock
 - Actuators
 - Pumps/Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Rakes
 - Gearboxes
 - Motors
 - Significant Valving
 - Shaft
 - Scrapers
 - Mixers/Mixer.

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020-040 Settled Water System

Common maintainable items and their parts may include:

- Clarifiers
 - All individual Measuring & Metering Devices (pH Meters, Flow Meters, Turbidity Meters, Temperature Indicators, Blanket Meters)
 - Filters
 - Mixers/Mixer1.5
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Rake
 - Gearboxes
 - Significant Valving
 - Motors
 - Shaft
 - Neoprene Scrapers
 - Penstocks
 - Actuators
 - Points
 - Scrapers
 - Gearbox
 - Motors
 - Significant Valving
 - Significant Valving/Valving
 - Sludge Cones
 - Sludge Removal
 - Shaft (Centre/Outer)
 - Launder Isolations

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- Drive
- Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter.

020-050 Common Sedimentation Equipment

The common sedimentation equipment Level 3 Functional Location serves multiple maintainable items that cannot be identified to a specific Level 3 Functional Location. It can be based on maintainable items serving multiple individual sedimentation units.

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Application Example – Level 2/3 – 030 Filtration

Filtration covers all solids removal processes. Apart from Level 3 functional locations 030-010, 030-060 and 030-070 which cover ancillary filtration processes such as backwash the Level 3 functional locations should be populated with maintainable items that correspond to filter process units. In some cases, the filter process unit will be a more complex arrangement of multiple chambers. In this case it is permissible to define a filter unit as a Level 3 functional location and have the chambers serve as the maintainable items. Consider the contrast of the two cases below:

Common maintainable items and their parts may include:

- 030 – Filtration
 - 030-020 – Mono Media Filter System
 - FAC##### Filter 1
 - FAC##### Filter 2
- Complex Filters are L3 Functional Locations and Chambers are maintainable items:
- 030 – Filtration
 - 030-021 – Mono Media Filter #1
 - FAC##### Filter #1 Flocculation Chamber
 - FAC##### Filter #1 Filtration Chamber
 - FAC##### Filter #1 Saturator
 - 030-022 – Mono Media Filter #2
 - FAC##### Filter #2 Flocculation Chamber
 - FAC##### Filter #2 Filtration Chamber
 - FAC##### Filter #2 Saturator

030-010 Filter Feed System

The common maintainable items and their parts may include:

- Filter Feed Pumps
 - Significant Valving
 - Flow Meters.

030-020 Biologically Activated Carbon (BAC) Filter System

As per [PLN-00427](#) Filters Asset Class Plan, the common maintainable items and their parts may include:

- Filter
 - Significant Valving
 - Flow Meters

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- Filter Media
- Sample Skid
 - Sample/Return Pumps
 - Flow Meters
- Blowers
 - Motors.

030-030 Membrane Filter System

The common maintainable items and their parts may include:

- Membrane Filter Train
 - Analyser (Turbidity, Conductivity)
 - Membrane Filters
 - Significant Valving
- Sample Tank
- Sample Skid
 - Sample/Return Pumps
 - Flow Meters
 - Significant Instrumentation.

030-040 Granulated Activated Carbon (GAC) Filter System

As per [PLN-00427](#) Filters Asset Class Plan, the common maintainable items and their parts may include:

- Filter
 - Significant Valving
 - Flow Meters
 - Filter Media
- Sample Panel
 - Supply/Return Pumps
- Common Components such as bypass lines.

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030-050 Backwash System

The common maintainable items and their parts may include:

- Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Flow Meter
- Tank
- Blowers.

030-060 Water Transfer

The Water Transfer system within filtration consists of maintainable items that contribute to the transportation of water in and out of the system.

- Pump
 - Significant Valving
- Tank (Transfer)
- Flow Meter
- Vessel
- Distribution Chamber.

030-070 Cartridge Filtration

The common maintainable items are:

- Significant Valving.

030-080 Mono Media Filtration

Mono Media Filtration refers to a filtration system that is composed of both sand and gravel layers of which the water passes through. The common maintainable items are:

- Significant Valving.

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030-090 Dual Media Filtration

Dual Media Filtration refers to a filtrations system that is composed of sand, gravel and coal of which water passes through. The common maintainable items are:

- Significant Valving
- Under Drains.

030-100 Multi-Media Filtration

Multi-Media Filters refers to a filtration system that is composed of sand, gravel, coal, and garnet of which water passes through. The common maintainable items are:

- Significant Valving
 - Actuators
- Under Drains
- Flow Meter.

030-110 Common Filtration Equipment

The common filtration equipment L3 Functional Location serves multiple maintainable items that cannot be identified to a specific L3 Functional Location.. Definable by assets serving multiple individual filtration units.

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Application Example – Level 2/3 – 040 Disinfection

040-010 UV Disinfection

UV Disinfection Systems can be formatted in numerous different ways. Some may utilise a single chamber or dual chambers, with others relying on a reactor. Common maintainable items and their parts can be listed below:

- All Individual Measurement Devices (Flow Meters, Analysers, Transmitters, etc.)
- Banks
 - Flow Switches
 - Significant Valving
- Chambers
 - Amalgam Lamps
 - Flow Switches
 - Significant Valving
 - Sleeve Wiping Systems Valving
- Control/Analyser Panels
- Reactors
 - Flow Switches
 - Significant Valving.

040-020 Chlorine Contact

This L3 captures the vessels and infrastructure that all water flows through to be disinfected with the application of chlorine. This is only to be used if a chlorine contact tank exists that is distinct from the treated water tanks. Note that the batching, storage and dosing of either the gaseous chlorine or powder sodium hypo will be captured under the relevant chemical system (060-100 or 060-280). Common maintainable items and their parts can be listed below:

- Chlorine Contact Tanks
 - Significant Valving
 - Significant Instrumentation
- Flow Channels

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- Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Common equipment not resolvable to a relevant parent.

040-030 Ozone System

This L3 captures the vessels and infrastructure that all water flows through to be disinfected with the application of activated oxygen (ozone). Note that the batching, storage and dosing of either the gaseous or powder chemicals will be captured under the relevant chemical system. Common maintainable items and their parts can be listed below:

- Tank (Contact)
 - Significant Valving
- Static Mixer.

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Application Example – Level 2/3 – 050 Chemical

Chemical systems are for dosing the raw water for the treatment to flocculate, kill microorganisms, and remove unwanted elements alongside enriching water with fluoride compounds. The process is split into powder, gas, and dosing systems. The gas systems are typically void of chemical dosing systems and do not require dosing skids while powder chemical systems such as Polymer, Alum and Fluoride systems will require dosing skids to be defined as maintainable items. Each distinct chemical is required to be put in as an L3 functional location. If there are multiple systems of the same chemical (perhaps dosing into different parts of the process) site-specific L3s will accommodate this and avoid ambiguity of having two physically separate systems under one L3. In this case each system is to reference what part of the process it serves. Consider the difference between the single system scenario versus the multi-system scenario below:

Single Distinct Polymer Systems on a site:

- 050 – Chemical
 - 050-010 Polymer System

Multiple Polymer Systems on a site:

- 050 – Chemical
 - 050-011 Flash Mixer Polymer System
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - 050-012 Sludge Polymer System.

050-010 Aluminium Chlorohydrate

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)

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- Vacuum Unloaders
- Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Vibrator
- Feeder/blower
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving

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- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers

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- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record “Pipework, Significant Valving & Gauges”
 - Dosing quills, ejectors & spears.

050-020 Aluminium Sulphate (Alum)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks

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- Significant Valving
- Significant Instrumentation
- Agitators
- (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)

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- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-030 Ammonia Gas

Typical maintainable items and their parts may include:

- Pumps (Carry Water Pumps etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Dosing Apparatus (Chlorinators, Ammoniators)
- Compressors
- Contact Tanks
- Oil Separator
- Air Filter

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- Cooling Water Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Analyzers
- Cylinders & Cylinder Banks (Cylinders to be part of Bank if possible)
- Gas Leak Detectors
- Emergency /Safety Shutoff System (Due to the hazardous nature of reactive gases)
- Automatic Changeover System
- Scaling/Measuring Systems (Similar to including a level in a tank)
- A single generic record "Pipework, Significant Valving & Gauges"
- Any additional metering device.

050-040 Ammonium Hydroxide (Aqueous)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter

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- Service Water/ Mixing Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Level Switch

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- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-050 Ammonium Sulphate

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors

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- Significant Valving
- Significant Instrumentation
- Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes

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- Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener

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- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-060 Anhydrous Ammonia

Typical maintainable items and their parts may include:

- Pumps (Carry Water Pumps etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Dosing Apparatus (Chlorinators, Ammoniators)
- Compressors
- Contact Tanks
- Chlorine Controller
- Chlorination Line
 - Ejector
- Oil Separator
- Air Filter
- Ozone Generator
- Cooling Water Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Ozone Content Meter
- Ozone Destructor

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- Analyzers
- Cylinders & Cylinder Banks (Cylinders to be part of Bank if possible)
- Gas Leak Detectors
- Emergency /Safety Shutoff System (Due to the hazardous nature of reactive gases)
- Automatic Changeover System
- Scaling/Measuring Systems (Similar to including a level in a tank)
- A single generic record "Pipework, Significant Valving & Gauges"
- Any additional metering device.

050-070 Ascorbic Acid

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Tank (Collection/Buffer)
- Transfer Pumps
- Dosing System
 - Batching Tank
 - Mixer
 - Dosing Pump
- Oil Water Separator
 - Vertical Tube Packs
 - Filter Bags
 - Oil Collection Tank
- Electrical
 - Control Panel
- Bund
 - Sump Pump.

050-080 Calcium Chloride

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving

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- Significant Instrumentation
- Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors

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- Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan

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- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record “Pipework, Significant Valving & Gauges”
 - Dosing quills, ejectors & spear.

050-090 Calcium Hydroxide (Lime)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator

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- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel

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- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spear.

050-100 Carbon Dioxide (CO2)

Typical maintainable items and their parts may include:

- Pumps (Carry Water Pumps etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Dosing Apparatus (Chlorinators, Ammoniators)
- Compressors
- Contact Tanks
- Chlorine Controller

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- Chlorination Line
 - Ejector
- Oil Separator
- Air Filter
- Ozone Generator
- Cooling Water Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Ozone Content Meter
- Ozone Destructor
- Analyzers
- Cylinders & Cylinder Banks (Cylinders to be part of Bank if possible)
- Gas Leak Detectors
- Emergency /Safety Shutoff System (Due to the hazardous nature of reactive gases)
- Automatic Changeover System
- Scaling/Measuring Systems (Similar to including a level in a tank)
- A single generic record "Pipework, Significant Valving & Gauges"
- Any additional metering device.

050-110 Chlorine Dioxide

Typical maintainable items and their parts may include:

- Pumps (Carry Water Pumps etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Dosing Apparatus (Chlorinators, Ammoniators)
- Compressors
- Contact Tanks
- Chlorine Controller

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- Chlorination Line
 - Ejector
- Oil Separator
- Air Filter
- Ozone Generator
- Cooling Water Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Ozone Content Meter
- Ozone Destructor
- Analyzers
- Cylinders & Cylinder Banks (Cylinders to be part of Bank if possible)
- Gas Leak Detectors
- Emergency /Safety Shutoff System (Due to the hazardous nature of reactive gases)
- Automatic Changeover System
- Scaling/Measuring Systems (Similar to including a level in a tank)
- A single generic record "Pipework, Significant Valving & Gauges"
- Any additional metering device.

050-120 Citric Acid

To be developed as required by Asset Information & Systems Team

050-130 Ferric Chloride

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter

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- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving

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- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers

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- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record “Pipework, Significant Valving & Gauges”
 - Dosing quills, ejectors & spears.

050-140 Heptafluoropropane (FM200)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower

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- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)

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- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-150 Hydrochloric Acid

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)

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- Vacuum Unloaders
- Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving

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- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"

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- Dosing quills, ejectors & spears.

050-160 Hydrogen Peroxide

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps

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- Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving

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- Significant Instrumentation
- Motor
- Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-170 Hypochlorous Acid

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation

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- Flow Meter
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter

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- Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

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050-180 Liquid Oxygen

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Service Water/ Mixing Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
- Motors

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- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Mixer
- Gearboxes
- Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation

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- Motor
- Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-190 Magnasol

To be developed as required by Asset Information & Systems Team

050-200 Methyl Alcohol

To be developed as required by Asset Information & Systems Team

050-210 Monochloramine

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders

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- Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps

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- Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

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050-220 PolyDADMAC (Polydiallyldimethylammonium Chloride)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving

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- Significant Instrumentation
 - Flow Meter
- Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor

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- Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-240 Polyelectrolyte (Polymer)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps

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- Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Level Switch
 - Transmitter Switch

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- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-250 Potassium Permanganate

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving

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- Significant Instrumentation
- Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors

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- Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
- Significant Valving
 - Service Water/ Mixing Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan

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- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record “Pipework, Significant Valving & Gauges”
 - Dosing quills, ejectors & spears.

050-260 Powder Activated Carbon (PAC)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Service Water/ Mixing Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Vibrator

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- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel

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- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-270 Sodium Bisulphite

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation

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- Load Cells (single record for all cells on a silo)
- Vacuum Unloaders
- Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors

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- Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation

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- A single generic record “Pipework, Significant Valving & Gauges”
- Dosing quills, ejectors & spears.

050-280 Sodium Carbonate (Soda Ash)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators

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- (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment

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- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-290 Sodium Chloride (Salt)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
- Motors

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- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Service Water/ Mixing Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Mixer
- Gearboxes
- Motors
- Propellers/Impellers/Paddles
- Significant Valving
 - Scraper
- Gearbox
- Motors
- Significant Valving
 - Service Water/ Mixing Pumps
- Motors
- Significant Valving

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- Significant Instrumentation
- Flow Meter
 - Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

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050-300 Sodium Fluorosilicate

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving

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- Significant Instrumentation
 - Flow Meter
- Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
- Gearbox
- Motors
- Significant Valving
 - Service Water/ Mixing Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor

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- Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system.
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-310 Sodium Hydroxide (Caustic Soda)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Service Water/ Mixing Pumps

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- Motors
- Significant Valving
- Significant Instrumentation
- Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Level Switch
 - Transmitter Switch

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- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-320 Sodium Hypochlorite (Hypo)

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving

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- Significant Instrumentation
- Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator
- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors

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- Propellers/Impellers/Paddles
 - Significant Valving
- Scraper
 - Gearbox
 - Motors
 - Significant Valving
- Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Switch
- Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel
- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan

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- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record “Pipework, Significant Valving & Gauges”
 - Dosing quills, ejectors & spears.

050-330 Sulphuric Acid

Assets are mainly comprised of the storage/batching and transfer assets and the dosing assets. This standard list is common to all liquid/powder based chemical systems.

- Pumps (booster, mixing etc.)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Silo
 - Significant Valving
 - Significant Instrumentation
 - Load Cells (single record for all cells on a silo)
 - Vacuum Unloaders
 - Transfer Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Vibrator

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- Feeder/blower
- (Batching, Saturator, Dosing, Mixing, Storage, etc.) Tanks
 - Significant Valving
 - Significant Instrumentation
 - Agitators
 - (Transfer/hydro) Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Mixer
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving
 - Scraper
 - Gearbox
 - Motors
 - Significant Valving
 - Service Water/ Mixing Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Level Switch
 - Transmitter Switch
- Hopper (Ejector)
 - Agitator
 - Heater
 - Vibrator
- Control Panel

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- Strainer (If found under Dosing Skid, remove and place as maintainable item)
- Bunds
 - Significant Instrumentation
- Leak Detection Equipment
- Feeders
 - Significant Valving
 - Significant Instrumentation
 - Motor
 - Gearbox
- Delivery Panel
- Air Dryer
- Water Softener
- Exhaust Fan
- Bag Squeezer system
- Analysers
- Dosing Skid
 - Dosing Pumps
 - Significant Instrumentation
 - A single generic record "Pipework, Significant Valving & Gauges"
 - Dosing quills, ejectors & spears.

050-340 Common Equipment

This is intended to be used for chemical equipment that cannot be reasonably assigned to a specific chemical such as chemical delivery bunds for multiple chemicals.

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Application Example – Level 2/3 – 060 Water treatment residuals

Sludge system is a multiple step process to dewater sludge obtained from water purification processes, primarily sludge derived in flocculation and sedimentation. Level of sludge refinement can vary greatly across sites and some Locations will be absent of specific sub-processes.

060-010 Backwash Recovery (Waste Water)

Backwash Recovery is the process to trap and store sludge from backwashing of filters and other components in the water purification process. This process captures and removes sludge hindering the flow of water across the water purification systems. Common maintainable items and their parts are as shown below:

- Balance Ponds
- Return Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Flow Meters
- Media Trap
- Backwash Recovery Tank
 - Significant Valving
 - Significant Instrumentation.

060-020 Sludge Storage & Mixing

Sludge obtained from backwash recovery is stored and mixed in large Balance/Equalization Tanks. Mixing is important to reduce flocculant consumption and increase dry solids content in helping to dewater faster.

- (Macerator) Pumps
- Sludge Balance/Equalization Tank
 - Rake
 - Gearboxes
 - Motors
 - Significant Valving
 - Shaft
 - Significant Valving
 - Significant Instrumentation
- Retaining Well

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- Pits (Always a maintainable item. Will not be a part of a maintainable item)
- Mixer (Take as maintainable item if it's a:)
 - Gearboxes
 - Motors
 - Propellers/Impellers/Paddles
 - Significant Valving.

060-030 Sludge Thickening

Sludge thickening usually contains polymer dosing to further thicken sludge stored in the sludge thickener tank and increase dry solids content to accelerate dewatering process.

- Sludge Thickener
 - Level Sensors/Meters
- Bypass Pit
- Sludge Thickener/Thickened/Discharge/Feed Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Level Sensors/Meters
- Flocculation/flow Chamber
 - Rake
 - Gearbox
 - Motors
 - Significant Valving
 - Shaft.

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060-040 Supernatant Return

This is the water extracted from sludge system returned to water purification plant through return Pumps. Certain tanks ensure capacity and control towards feeding water back to water purification.

- Supernatant Return Pumps
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Supernatant Return Tank
 - Significant Valving
 - Significant Instrumentation
- Collection Chamber
 - Significant Valving
 - Significant Instrumentation
- Balance Tank
 - Significant Valving
 - Significant Instrumentation
- Bypass Pit
- Common Equipment (Turbidity Controllers, Meters and common valving).

060-050 Sludge Dewatering (Drying)

This process uses active and/or passive solutions to dewater sludge from Sludge thickening. Centrifuge spin and remove water from sludge and output sludge cakes, later exported out as waste or fertilizers. Sludge beds & bores are shallow pools that dry the sludge and evaporate water through sunlight.

- Centrifuge
- Flow meters
- Geotubes
- Significant Valving (Diversion etc.)
- Bores (e.g., Bore 1, Bore 2 etc.)
- Sludge Beds (Lagoons) (e.g., Sludge Bed 1, Sludge Bed 2 etc.).

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060-060 Centrate System

- Pumps
 - Significant Valving
- Significant Valving
- Flow Meters
- Motor
- Well
- Tank.

060-070 Common Equipment

The common Sludge equipment L3 Functional Location serves multiple maintainable items that cannot be identified to a specific L3 Functional Location or maintainable item. Definable by assets serving multiple individual Sludge units.

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Application Example – Level 2/3 – 070 Treated Water

The Treated Water L2 Functional Location is the final stage in the WTP across the various sites and consists of assets related to storage, monitoring as well as transportation of the treated water.

070-010 Treated Water Storage

The common maintainable items and their parts may include:

- Reservoir
 - Trunk Main
 - Chamber
 - Hydrant
 - Sections
 - Significant Valving
- Tank
 - Flow Meter
- Bund.

070-020 Treated Water Monitoring

The common maintainable items and their parts may include:

- Analysers (Chlorine, Fluoride)
 - Probe
- Pumps (Sample, Sump)
- Meters (Flow, Turbidity, pH)
- Pits (Flow Meter)
 - Significant Valving
- Tank (Sump Return)
 - Significant Valving
 - Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter.

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070-030 Treated Water Transfer

The common maintainable items and their parts may include:

- Pumps
 - Actuator
 - Motor
 - Significant Valving
 - Soft Starter
 - Control Panel
 - Flywheel
 - Vibration Meter
 - Variable Speed Drive
- Rising/Treated Water Main
 - Significant Valving
 - Pressure Relied Discharge Apron
 - Analyser (Chlorine, Fluoride)
 - Air Significant Valving Pit
 - Meter (Flow, Turbidity, pH).

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Application Example – Level 2/3 – 080 Site Services

080-010 Electrical

Electrical is required to sit as a level three Functional Location under Site Services (080) to capture electrical assets. The battery limits of what constitutes an electrical asset will be defined as per the documents:

- [PLN-00415](#) Auxiliary Power Asset Class Plan
- [PLN-00421](#) Power Distribution and Switchboards Asset Class Plan
- [PLN-00422](#) Transformers Asset Class Plan.

Nearly all electrical assets are to be located here, even if it is directly servicing part of the water treatment process. Common maintainable items and their parts to sit under this Location may include:

- Batteries (That cannot be located as a part)
- Control Panels
- Distribution Boards
- Digital Panel Meter (DPM) Power Meter
- Earthings
- External Lighting (A single generic record, "External Lighting")
- Generators.
- Internal Lighting (A single generic record, "Internal Lighting")
- Junction Boxes
- Lightning Protection System
- Load Banks
- LV, HV Equipment, Chargers & Batteries
- Motor Control Centre (MCC)
 - Surge Counters
 - Surge Diverters
- PFC Capacitors
- Power Poles
- Ring Main Units
- Solar Panels
- Surge Protection Devices

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- Switchboards
 - Air Circuit Breakers (ACB)
 - Main Isolators
 - Soft Starters (Promotion to a maintainable item if no parent)
 - Variable Speed Drives (VSD) (Promotion to maintainable item if no parent)
- Terminal Boxes
- Transformers
- UPS Units
- Cathodic Protection Systems.

080-020 Site Infrastructure

Site Infrastructure is required to sit as a level three Functional Location under Site Services (080) to capture infrastructure assets that are not related to the production of treated water. The battery limits of what constitutes site infrastructure will be defined as per the documents:

- [PLN-00405](#) Walkways, Platforms and Ladders Asset Class Plan
- [PLN-00406](#) Bridges and Major Culverts Asset Class Plan
- [PLN-00407](#) Erosion Protection Systems Asset Class Plan
- [PLN-00408](#) Fences and Gates Asset Class Plan
- [PLN-00409](#) Playgrounds Asset Class Plan
- [PLN-00410](#) Roads, Trails and Hardstands Asset Class Plan
- [PLN-00412](#) Drainage Systems Asset Class Plan
- [PLN-00414](#) Tunnels Asset Class Plan
- [PLN-00437](#) Dams, Concrete and Earth Embankments Asset Class Plan

Single generic record should be captured for:

- Bridges
- Fencing & Gates
- Gabions
- Grounds
- Guardrails
- Landscaping
- Playgrounds
- Retaining Walls

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- Roads
- Signage
- Steelworks
- Stormwater Drainage
- Turnaround Area/Barriers
- Tunnels
- Handrails
- Walkways, Stairways & Platforms.

With additional maintainable items including:

- Additional equipment providing a service that cannot be reasonably located elsewhere (Ice Machines, etc.)
- All individual motorised gates
- Fixed Ladders (Statutory Requirement)
- Cathodic Protection Systems “Site Infrastructure” is the only Location that should have these types of assets under it. Any entries of this nature that are against process-related maintainable items such as process units should therefore be removed.

080-030 Fire Protection & Security Systems

Fire Protection and Security Systems are required to sit as a level three Functional Location under Site Services (090). The battery limits of what constitutes Fire Protection & Security Systems will be defined as per the document [PLN-00417](#) Fire and Security Systems Asset Class Plan and Seqwater Baseline Security Measures Standard ([SPE-00442](#)). Common maintainable items and their parts to sit under this Location may include:

A single generic record should be captured for:

- CCTV systems
- Emergency & Exit Lighting System
- EWIS System
- Fire Blankets
- Fire Detection System
- Fire Doors
- Fire Extinguishers
- Fire Hose Reels
- Fire Hydrant System
- Fire Sprinkler System
- Perimeter Fencing

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- Security System
- Security Gates
- Smoke Doors.

Where individual instances of this equipment can be identified, each site can determine to list parts to help their contractor identify all equipment (Individual Fire Extinguishers, Fire Blankets, etc.). Alternatively attach the details of Locations against the placeholder asset and leave it at that.

Fire system assets that should be listed individually as maintainable items and their parts may include:

- Fire Indicator Panels
- Fire Pumps (diesel or electric)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Suppression Systems.

080-040 Lifting Equipment

Lifting Equipment is required to sit as a level three Functional Location under Site Services (080) to capture all individual equipment related to lifting (manual & automated). The battery limits of what constitutes a lifting equipment asset will be defined as per the document [PLN-00398](#) Cranes, Hoists and Winches Asset Class Plan. Common maintainable items to sit under this Location are:

- A-Frames
- Chain Blocks
- Cranes
- Davits
- Hoists
- Jibs
- Lifting Beams
- Lifting Points
- Monorails
- Portal Frames
- Slings
- Spreader Bars
- Winches.

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These maintainable items may have parts if deemed necessary, based on the scale of their use and type. However, for this level three Functional Location, parts should be generally avoided.

080-050 Compressed Air

Compressed Air is required to sit as a level three Functional Location under Site Services (080) to capture either a single or multiple air systems. The battery limits of what constitutes a compressed air asset will be defined as per the document [PLN-00424](#) Blowers and Compressed Air Systems Asset Class Plan. Common maintainable items to sit under this Location that are part of the compressed air reticulation system are:

- Air Dryers
- Air Filters
- Air Receivers
- Compressors
- Oil Separator.

Common parts to the maintainable items may include:

- Significant Valving.

080-060 Mobile Equipment (No Applicable ACP)

Mobile Equipment is required to sit as a level three Functional Location under Site Services (090). This may encompass any portable or mobile machinery, tools or equipment that cannot be reasonably located elsewhere in the register excluding PAA. Common maintainable items to be individually listed under this Location are:

- Mobile Plants/Conveyors
- Pressure Washing Equipment
- Sand Blasting Equipment
- Trailers/Trailer Equipment (Fuel Trailer, Light Tower Trailer, Generators Trailer, etc.).

080-070 Water Reticulation

Water Reticulation is required to sit as a level three Functional Location under Site Services (080) to capture assets related to the transfer and storage of water, that are not related to the production of treated water. The battery limits of what constitutes water reticulation will be defined as per the document [PLN-00431](#) Process Water Reticulation Asset Class Plan. Common maintainable items and their parts to sit under this Location may include:

- All Individual Flow Meters
- All individual Pumps/Pump (Not located to a system)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter

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- Facilities/Plant Services
- Hot Water Services
- Irrigation Systems
- Mains Distribution (Between site sub-sectors)
- Potable Water Systems
 - Pumps/Pump (Promotion to maintainable item if no parent)
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
 - Flow Switches
- Process Water Systems
 - Pumps/Pump (Promotion to maintainable item if no parent)
 - Significant Valving
 - Flow Switches
 - Motors
 - Significant Instrumentation
 - Flow Meter
- Refrigerated Water Coolers
- Service Water Systems
 - Pumps/Pump (Promotion to maintainable item if no parent)
 - Significant Valving
 - Flow Switches
 - Motors
 - Significant Instrumentation
 - Flow Meter
- Tanks
 - Level Transmitters
 - Level Switches
- Water Hydraulic Systems
 - Accumulators

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- Pumps/Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Tanks
- Wells
- CIP Systems.

080-080 Sewerage (No Applicable ACP)

Sewerage is required to sit as a level three Functional Location under Site Services (080) to capture assets related to the transfer and storage of sewerage. Dependent on the size of the site, some operations may utilise a single generic record of "Sewerage Reticulation System" to group assets. Common maintainable items and their parts to be individually listed under this Location may include:

- A single generic record "Pipework"
- Holding Tanks
- HSTP's
- Manholes
- Septic Tanks
- Sewerage Pumps/Pump
 - Motors
 - Significant Valving
 - Significant Instrumentation
 - Flow Meter
- Transpiration Areas
- Transpiration Trenches/Areas
- Wells
- Level Switches.

080-090 Control & Monitoring

Control & Monitoring systems are required to sit as a level three Functional Location under Site Services (090). The battery limits of what constitutes a control and monitoring asset will be defined as per the document [PLN-00388](#) Monitoring and Control Systems (MCS) Asset Class Plan. The maintainable item that gets assigned the

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control system PMs should be the central “brain” of the system - at most sites there exists a “SCADA M&C” asset which is a good candidate. Parts of this can be PLCs and RTUs.

Other maintainable items in the system can be:

- Cabinets
- Communications Racks
- Workstations.

080-100 HVAC

Air Conditioning (HVAC) units are required to sit as a level three Functional Location under Site Services (090). The battery limits of what constitutes an air conditioning asset will be defined as per the document [PLN-00395](#) Air Conditioning and Ventilation Systems Asset Class Plan. This allows an extensive list of all HVAC systems to be defined for contractors to functionally locate. Any HVAC unit shall be listed here individually whether it is a split system, cassette system, ducted system, or a standalone air conditioning unit. Additionally, wall mounted fans, louvers, dampers, and ducting are to be captured as parts underneath the equivalent building “Ventilation System”. Common maintainable items and their parts to sit under this Location may include:

- Individual Air Conditioners
- Ventilation System
 - Louvres
 - Dampers
 - Wall Mounted Fans
 - Ducting
 - Exhaust Fans.

080-110 Buildings

Buildings are required to sit as a level three Functional Location under Site Services (090). The battery limits of what constitutes buildings, and their assets will be defined as per the document [PLN-00434](#) Buildings Asset Class Plan. This allows every building (inclusive of relevant shelters, huts, etc.) that houses assets to be defined. Common parts to sit under each maintainable item (buildings) may include:

- Fixed Equipment (Of reasonable scale)
- Gas Systems
- Major Structural Sub-Components
- Passenger/Goods Lifts
- Racking (Of reasonable scale)
- Sump Pumps (That cannot be reasonably located elsewhere in the register)
- Ventilation Systems

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- Water Quality Systems.

080-120 Safety Equipment & PPE (No Applicable ACP)

Safety Equipment & PPE is required to sit as a level three Functional Location under Site Services (080). This Location may include any assets not reasonably listed under 090-030, that relate to personal safety and harm prevention excluding PAA. Where it is not practical to include each individual asset as a maintainable item, it is permissible to use a placeholder on the condition that a list be attached to the placeholder for statutory maintenance purposes. Common maintainable items to sit under this Location, but not limited to are:

- Fall Arrest Blocks
- First Aid Kits
- Low Voltage Rescue Kits
- Safety Showers/Eye Wash Stations
- Spill Kit.

It is encouraged under this level three Functional Location to include any reasonable safety related apparatuses and equipment if not listed above.

080-130 Workshop Equipment

Any equipment that resides within a workshop space, excluding PAA, will remain as a maintainable item under this L3 functional level.

080-140 Recreation Areas (Dam)

Recreation Areas are required to sit as a level three Functional Location under Site Services (080), specifically as part of the Dams register. These recreation areas can range across multiple different uses, however, most seen as communal picnic areas, walking/biking tracks and boat ramps.

Common items found under each recreation area are:

- A single generic record "BBQ's – Electric"
- A single generic record "BBQ's – Gas"
- Boat Ramps & Launch Pads
- Bridges & Walkways
- Buildings
- Lookouts
- Playgrounds
- Shade Structures
- Shelters
- Tanks.

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