



ADAC XML

Data Capture Guidelines

Version 4.0



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Reference Document	URL
ADAC Information	https://www.ipwea-qnt.com/Web/Web/Resources/Asset-Design-As-Constructed-ADAC.aspx
Asset Information Specification (AIS)	https://www.seqcode.com.au/seq-asset-information-specification
Infrastructure Products and Materials (IPAM)	http://www.seqcode.com.au/products/
ADAC Data Dictionary	https://www.ipwea-qnt.com/Web/Web/Resources/Asset-Design-As-Constructed-ADAC.aspx
ADAC Schema	https://www.ipwea-qnt.com/Web/Web/Resources/Asset-Design-As-Constructed-ADAC.aspx
Unitywater Reference Library	https://www.unitywater.com/building-and-developing/reference-library

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Glossary of Terms

Asset Status & Network Terms

Term	Description
Asset Assembly	A group of physically or operationally related assets that collectively perform a defined network function. Asset Assemblies provide operational context for understanding how individual ADAC assets function within the network.
Asset Relationship	The operational, spatial or functional connection between two or more assets within an infrastructure network.
Asset Status	The lifecycle state of an asset recorded within the ADAC XML (e.g., Planned, Designed, Newly Constructed, Existing, Rehabilitated, Removed or Retired).
Connectivity	The operational and spatial relationship between assets that allows infrastructure to function as part of a connected network.
Connectivity Node	An asset that provides a defined connection point between two or more assets within a network.
Existing Asset	An asset that remains in service and forms part of the operational network at the time of survey and handover.
Network Connectivity	The relationship between assets that demonstrates how infrastructure connects and functions within the operational network.
Operational Asset Environment	The infrastructure environment associated with the completed project scope that will ultimately support operational, maintenance and asset management activities following project handover and any associated network connection activities.
Rehabilitated Asset	An existing asset refurbished, relined, repaired, or otherwise upgraded for continued operational use.
Removed Asset	An asset physically removed as part of the works and recorded with an ADAC Status of "Removed".
Retired Asset	An asset no longer in operation but left in-situ. May also be referred to as an abandoned asset.
Superseded Asset	An asset replaced by new infrastructure and either removed or retired as part of the works.

Term	Description
Utility Network Model (UNM)	Unitywater's enterprise GIS and network model used to manage the spatial representation, asset connectivity, asset relationships, network tracing and operational analysis of infrastructure assets.
Utility Network Traceability	The ability to trace, analyse and understand the connectivity, relationships and operational interactions between assets within Unitywater's Utility Network Model environment.

Survey & Certification Terms

Term	Description
Australian Height Datum (AHD)	The adopted vertical datum used for recording level information within ADAC submissions.
Cadastral Connection	A relationship linking infrastructure assets to the land parcel or property they serve or are associated with.
Data Quality	Classification used to describe the confidence and reliability of asset location and attribute information.
Geocentric Datum of Australia 2020 (GDA2020)	The adopted horizontal datum used for spatial information submitted to Unitywater.
Map Grid of Australia Zone 56 (MGA56)	The adopted projected coordinate system used for spatial information submitted to Unitywater.
Origin Mark	Survey control mark used to establish the spatial reference framework for a project.
Permanent Survey Mark (PSM)	A survey control mark used to establish horizontal and vertical survey control.
Professional Attribution	Information identifying the responsible engineer and surveyor, including registration details.
Registered Surveyor	A Registered Surveyor (Queensland) responsible for certifying survey information associated with the project.
RPEQ	Registered Professional Engineer of Queensland.
Survey Certification	Certification of survey information by a suitably qualified Registered Surveyor.

ADAC & Validation Terms

Term	Description
ADAC	Asset Design As Constructed.

Term	Description
ADAC Data Dictionary	The official reference describing ADAC schema elements, attributes and allowable values.
ADAC Operator	The individual responsible for compiling, validating and exporting an ADAC XML submission.
ADAC Schema	The XML schema defining the structure, relationships, attributes and validation rules applicable to an ADAC XML submission.
ADACId	A unique identifier assigned to an asset or feature within an ADAC XML file. Each ADACId shall be unique within an individual ADAC XML submission.
Asset Information Specification (AIS)	The South East Queensland specification governing the capture and submission of asset information for water and sewerage infrastructure.
Asset Ownership	The identification of the organisation responsible for ownership and ongoing management of an asset.
Enumeration	A predefined allowable value within the ADAC schema.
FME	Feature Manipulation Engine software used by Unitywater to undertake validation, transformation and loading of asset information.
Project Attribution	Information identifying the project, organisations and responsible professionals associated with an ADAC XML submission.
Project Status	The overall purpose or status of an ADAC XML submission and not the status of individual assets.
Schema Compliance	Conformance with the structure and rules defined by the applicable ADAC XML schema.
Submission Provider	The organisation or individual responsible for preparing and submitting asset information to Unitywater.
Unitywater Review Check	A Unitywater-specific assessment of asset information, connectivity, attribution or operational suitability that may be undertaken in addition to schema validation.
Validation Report	The report generated from ADAC validation software identifying errors, warnings and review items.
XML	Extensible Markup Language.

Asset Assembly Terms

Term	Description
Boundary Kit Assembly	A pressure sewer assembly generally comprising a Property Isolation Valve and associated boundary infrastructure providing the transition between public and private pressure sewer assets.
Gravity Sewer Assembly	A group of connected gravity sewer assets typically comprising maintenance structures, sewer mains and property connections.
Hydrant Assembly	A group of connected assets typically comprising a water main connection, fittings, hydrant riser and hydrant.
Domestic Meter Assembly	An assembly comprising a water meter and associated assets typically installed to provide a metered connection to a property. A Domestic Meter Assembly may include a water service connection, connector, isolation valve, water meter and other associated fittings required to support the metered service connection.
Large Meter Assembly	An assembly comprising a larger capacity water meter and associated assets used to service non-residential, commercial, industrial or other higher demand connections. A Large Meter Assembly may include isolation valves, bypass arrangements, strainers, fittings, instrumentation and other operational assets associated with the metered connection.
Pressure Sewer Assembly	A group of connected pressure sewer assets that collectively transfer wastewater under pressure through the sewer network.
Sewage Pumping Station Assembly	A collection of interconnected civil, mechanical, electrical and operational assets that collectively perform sewer pumping functions.
Vacuum Sewer Assembly	A group of connected sewer assets that transfer wastewater through a vacuum sewer network.
Water Service Assembly	A group of connected assets providing a water supply connection between the water main and the customer metering point.

Drawing & Submission Terms

Term	Description
As Constructed Drawing	A certified engineering drawing accurately representing the completed works.

Term	Description
Certified Drawing	A drawing endorsed by the appropriately qualified professional responsible for the information shown.
Development Portal	The Unitywater portal used to manage development applications, infrastructure submissions and supporting documentation.
Handover Submission	The complete package of documentation, drawings, ADAC records and supporting information submitted for asset acceptance.
IFC Drawing	Issued For Construction drawing.
Redline Markup Drawing	Marked-up IFC or approved design drawing showing all changes incorporated during construction.
Submission Register	A schedule identifying all deliverables included within a handover submission package.
Works Approval	Approval issued for the construction of infrastructure works

Abbreviations

Abbreviation	Meaning
ADAC	Asset Design As Constructed
AHD	Australian Height Datum
AIS	Asset Information Specification
ATL	Asset Technical Library
FME	Feature Manipulation Engine
GDA2020	Geocentric Datum of Australia 2020
GIS	Geographic Information System
IPAM	Infrastructure Products and Materials
LPS	Low Pressure Sewer
MGA56	Map Grid of Australia Zone 56
PDF	Portable Document Format
PSM	Permanent Survey Mark
RPEQ	Registered Professional Engineer of Queensland
SEQ Code	South East Queensland Water Supply and Sewerage Design and Construction Code

Abbreviation	Meaning
SPS	Sewage Pumping Station
UNM	Utility Network Model
UW	Unitywater
XML	Extensible Markup Language
XSD	XML Schema Definition

1. Introduction

1.1 Purpose

The purpose of these ADAC XML Data Capture Guidelines is to provide practical guidance and comprehensive instructions for the creation, validation and submission of compliant Asset Design As Constructed (ADAC) XML files.

These Guidelines support the requirements of the South East Queensland Water Supply and Sewerage Design and Construction Code Asset Information Specification (AIS) and provide Unitywater-specific direction regarding the capture, validation and submission of asset information associated with new, modified and existing water and sewerage infrastructure.

For design submissions, the Guidelines support the preparation of ADAC XML files that enable early validation of proposed asset information and assist in identifying potential data quality issues prior to construction.

For As Constructed submissions, the Guidelines support the creation of an accurate digital representation of the completed works, including associated asset attributes, survey information, cadastral information, network connectivity and operational asset relationships necessary for ongoing asset management activities.

ADAC XML files are required to accompany RPEQ-certified As Constructed civil survey drawings (DWG and PDF formats), redline markup drawings (PDF format) and other supporting documentation as required for new, upgraded, rehabilitated or modified water and sewerage infrastructure.

The information contained within an ADAC XML submission forms an important component of Unitywater's asset information records and assists with the validation, integration and long-term management of infrastructure assets within enterprise asset management and Geographic Information Systems (GIS).

1.2 Scope

This guideline has been developed to support the preparation and submission of asset information for water supply and sewerage infrastructure commonly delivered through development, capital delivery, renewal and operational projects.

The guideline focuses on asset classes and infrastructure routinely represented within ADAC submissions and commonly transferred into Unitywater operational systems.

Specialised operational facilities may require additional project-specific asset information requirements, data structures, documentation or review processes that are outside the scope of this guideline.

Examples may include:

- Water treatment facilities;
- Sewage treatment facilities;
- Major storage reservoirs;
- Water booster pumping stations; and
- Other complex operational infrastructure.

Where project-specific requirements apply, Unitywater may provide supplementary guidance in addition to the requirements contained within this document.

2. Document Hierarchy

The order of precedence for asset information requirements is:

- Asset Information Specification (AIS);
- ADAC Schema;
- ADAC Data Dictionary; and
- Unitywater ADAC XML Data Capture Guidelines.

Where inconsistencies occur, the higher-order document shall prevail.

These Guidelines do not replace or supersede the requirements of the AIS, ADAC Schema or ADAC Data Dictionary. Rather, they provide additional clarification, examples, Unitywater business rules and submission guidance to assist Submission Providers in preparing ADAC XML submissions

3. ADAC Overview

ADAC (Asset Design As Constructed) is an industry-standard digital asset information format used throughout Australia to facilitate the transfer of infrastructure asset information between designers, surveyors, constructors, asset owners and asset management systems.

Within South East Queensland, the submission of ADAC XML files forms part of the Asset Information Specification (AIS) requirements associated with water and sewerage infrastructure delivered under the South East Queensland Water Supply and Sewerage Design and Construction Code.

Unitywater currently accepts ADAC XML submissions prepared in accordance with ADAC Schema Version 6.00. Submission Providers should confirm current requirements prior to project completion as accepted schema versions may change over time.

ADAC XML files submitted to Unitywater are used to support:

- Design review activities;
- Asset information validation;
- Asset handover processes;
- GIS integration;
- Asset management system integration; and
- Long-term management of water and sewerage infrastructure.

ADAC XML files should accurately represent the infrastructure constructed under the project and support the future establishment of the operational asset environment.

3.1 Utility Network Model Alignment

Unitywater's Utility Network Model (UNM) provides an enterprise framework for managing network connectivity, traceability, operational analysis and asset relationships.

The quality and completeness of information submitted through ADAC XML directly influences the successful integration of assets into operational systems and the Utility Network environment.

Accurate representation of:

- Asset connectivity;
- Asset relationships;
- Asset ownership;
- Asset status;
- Spatial location; and
- Operational infrastructure arrangements

supports:

- Network tracing;
- Outage management;
- Operational planning;
- Maintenance activities;
- Asset lifecycle management; and
- Future infrastructure planning.

While ADAC XML submissions continue to consist of individual asset classes and associated attribution, Unitywater's operational environment increasingly relies upon the relationships between those assets.

3.2 Asset Assemblies

Unitywater recognises that many infrastructure assets operate as part of a larger operational arrangement rather than as isolated individual assets.

For this reason, these Guidelines introduce the concept of an Asset Assembly.

Asset Assembly Definition

An Asset Assembly is a group of physically or operationally related assets that collectively perform a defined network function.

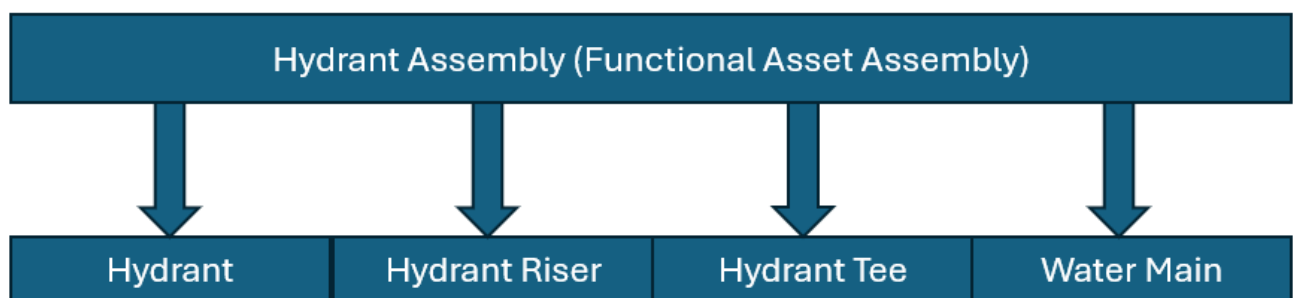
Asset Assemblies are used throughout these Guidelines to:

- Provide operational context;
- Explain asset relationships;
- Support network traceability;
- Improve submission quality;
- Assist validation activities; and
- Support interpretation of ADAC requirements.

Asset Assemblies do not replace individual ADAC assets.

ADAC XML submissions shall continue to contain all required individual assets, attributes and relationships required by the applicable ADAC Schema and Asset Information Specification.

Figure 3.1 – Asset Assembly Concept



An Asset Assembly provides operational context by grouping physically or operationally related assets that collectively perform a defined network function. Individual assets remain separate ADAC assets but are considered together as part of a functional assembly.

Why Asset Assemblies Have Been Introduced

Historically, ADAC guidance has been presented around individual asset classes such as pipes, valves, hydrants, meters and maintenance holes.

While this approach remains appropriate for ADAC schema compliance, Unitywater's Utility Network Model, GIS environment and operational systems rely heavily upon asset relationships, connectivity and network traceability.

To better align asset information requirements with Unitywater's operational environment, these Guidelines present assets within the context of their operational relationships and associated infrastructure systems.

This approach:

- Retains compliance with ADAC requirements;
- Supports Utility Network connectivity;
- Improves operational understanding;
- Assists GIS integration;
- Aligns with validation and loading processes;
- Reflects SEQ standard drawing arrangements; and
- Better represents how infrastructure is operated and maintained throughout its lifecycle.

The Asset Assembly approach does not alter ADAC requirements. Rather, it provides additional context to assist Submission Providers in accurately representing assets and their operational relationships within Unitywater's network environment.

3.3 Operational Asset Environment

The objective of an ADAC XML submission is not simply to represent individual assets but to accurately represent the infrastructure delivered under the completed project scope and its relationship to the surrounding infrastructure environment.

The operational asset environment may comprise:

- Newly constructed assets;
- Existing assets;
- Rehabilitated assets;
- Removed assets;
- Retired assets;
- Modified assets; and
- Associated cadastral information.

The combination of these assets should accurately represent the infrastructure associated with the completed project scope and support the future establishment of the operational asset environment.

Submission Providers should consider the relationship between existing and proposed infrastructure when preparing ADAC XML submissions to ensure that infrastructure relationships, intended connectivity and operational context are appropriately represented.

3.4 Connectivity and Asset Relationships

Infrastructure assets should be represented in a manner that accurately reflects their physical, operational and functional relationships.

Connectivity and asset relationships assist in understanding how infrastructure assets interact within the broader infrastructure environment and support the accurate representation of completed works.

Asset geometry should accurately represent both:

- The physical location of the asset; and
- The asset's operational relationship with the surrounding network.

Where survey capture methodologies result in differences between the physical survey capture point and the preferred network representation, asset geometry shall be represented in a manner that maintains network connectivity.

Survey capture locations do not necessarily determine how assets should be connected within the ADAC XML submission.

The representation of assets within the ADAC XML should support:

- Operational understanding;
- Utility Network integration;
- Validation processes; and
- Network tracing.

3.5 ADAC Validation

Submission Providers are encouraged to undertake validation and quality assurance checks prior to submitting ADAC XML files to Unitywater.

ADAC validation software and online tools can assist in identifying:

- Schema compliance issues;
- Missing mandatory attributes;
- Invalid attribute values;
- Connectivity issues;
- Coordinate system inconsistencies; and
- Other data quality concerns.

Examples of available tools include:

- ADAC validation tools and workflows made available through the Unitywater Development Portal;
- Commercial ADAC authoring and validation software; and
- Online ADAC XML viewing applications.

3.5.1 Unitywater Business Rule Validation

Successful schema validation does not guarantee acceptance of a submission.

Unitywater applies additional business rule validation to ADAC XML submissions.

These reviews may assess:

- Asset attribution;
- Network connectivity;
- Asset ownership;
- Asset status;
- Utility Network relationships;
- Easement requirements;
- Survey quality;
- Spatial relationships;
- Operational requirements; and
- Other Unitywater-specific business rules.

Validation processes may include automated checks, GIS reviews, Utility Network reviews and manual technical assessment.

3.5.2 Validation Outputs

Submission Providers are encouraged to review all validation reports, warning reports and generated output files prior to formal submission.

Warnings may identify issues requiring review even where the ADAC XML file successfully passes schema validation.

Typical validation outputs may include:

- Schema validation reports;
- Error reports;
- Warning reports; and
- Validation spreadsheets.

Submission Providers should investigate and resolve validation issues where appropriate before submission.

3.5.3 Unitywater Review Checks

In addition to schema compliance, Unitywater may review submissions to confirm:

- Infrastructure is represented consistently with certified As Constructed documentation;
- Asset assemblies are represented appropriately;
- Network connectivity has been maintained;
- Asset relationships align with operational requirements;
- Spatial locations are consistent with survey information;
- Asset attribution reflects the installed infrastructure; and
- The submission accurately represents the delivered infrastructure, its connectivity and its relationship to surrounding infrastructure.

Throughout these Guidelines, Unitywater-specific review considerations are identified as **Unitywater Review Checks** to assist Submission Providers in preparing complete and accurate submissions.

4. Datum Information

4.1 Overview

Datum information establishes the spatial reference framework for all asset information contained within an ADAC XML submission.

The coordinate reference system, horizontal datum and vertical datum adopted for a project shall be applied consistently across:

- ADAC XML files;
- As Constructed drawings;
- CAD files (DWG);
- PDF drawings;
- Survey reports;
- Survey certification documentation;
- Survey control records; and
- Supporting spatial datasets submitted as part of the project.

Consistent application of datum information supports:

- Accurate asset positioning;

- Utility Network integration;
- GIS integration; and
- Network connectivity

4.2 Horizontal Coordinate System

All spatial information submitted to Unitywater shall be provided in:

Map Grid of Australia Zone 56 (MGA56)

The horizontal coordinate system used within the ADAC XML shall be consistent with the coordinate system adopted within all associated project documentation.

Unitywater Clarification

The coordinate system utilised within the ADAC XML file shall be consistent with:

- Survey information;
- As Constructed drawings;
- CAD files;
- PDF drawings;
- Survey reports; and
- Supporting spatial datasets.

Submissions containing mixed coordinate systems may result in validation issues, GIS loading issues or requests for resubmission.

4.3 Horizontal Datum

All spatial information submitted to Unitywater shall be referenced to:

Geocentric Datum of Australia 2020 (GDA2020)

The horizontal datum utilised within the ADAC XML submission shall be consistent with the datum adopted throughout the project documentation and survey control framework.

Unitywater Clarification

Submission Providers should verify the adopted horizontal datum prior to exporting the final ADAC XML file. Particular attention should be given to:

- Legacy survey information;
- Existing infrastructure records;
- Survey control information;
- Third-party datasets; and
- CAD file coordinate systems.

Where older project information references a superseded datum, appropriate transformations should be undertaken prior to submission.

4.4 Vertical Datum

All level information submitted to Unitywater shall be referenced to:

Australian Height Datum (AHD)

Level information recorded within the ADAC XML shall be consistent with the adopted project survey control and all associated project documentation.

Unitywater Clarification

Level information contained within:

- ADAC XML files;
- As Constructed drawings;
- Longitudinal sections;
- Survey reports;
- Asset schedules; and
- Associated certification documentation

shall be consistent with the adopted AHD reference framework.

Mixing alternative level datums within a submission is not acceptable.

4.5 Survey Certification

Survey control and survey information utilised in the preparation of ADAC XML files and associated As Constructed documentation should be certified by a Registered Surveyor in accordance with applicable legislative, statutory and project requirements.

The Registered Surveyor responsible for the survey information should be identified within the ADAC XML Project Attribution information, including their name and registration details.

Survey certification information should be consistent with:

- Survey reports;
- Survey certifications;
- As Constructed drawings;
- Project Attribution information; and
- Supporting documentation submitted with the project.

4.6 Coordinate Reference Framework

Unitywater requires all components of an ADAC XML submission to utilise a common coordinate reference framework.

This includes, but is not limited to:

- ADAC XML files;
- As Constructed survey drawings;
- CAD files (DWG);
- PDF drawings;
- Survey reports;
- Survey point files; and
- Supporting spatial datasets.

The coordinate system, horizontal datum and vertical datum adopted for the preparation of the ADAC XML shall be consistent with those used within the associated As Constructed drawings and supporting survey information.

Submissions incorporating alternative datums, mixed coordinate reference systems or inconsistent survey references may require revision prior to acceptance.

4.7 Survey Control

Survey control information used in the preparation of ADAC XML submissions shall be consistent with the adopted project coordinate reference framework.

Survey control should be established and maintained in accordance with accepted surveying practices and any project-specific requirements.

Where an Origin Mark is recorded within the ADAC XML submission, the information should be consistent with:

- Survey certification documentation;
- Survey control records;
- As Constructed drawings; and
- Supporting survey information.

Unitywater Clarification

Survey control information forms the foundation for the spatial accuracy of all asset information represented within the ADAC XML submission.

Survey control inconsistencies may result in:

- Incorrect asset positioning;
- GIS integration issues;

- Connectivity issues;
- Validation issues; and
- Asset registration delays.

4.8 Common Datum Issues

The following issues are commonly identified during submission reviews:

- ADAC XML files referenced to GDA2020 while associated drawings reference an alternative datum;
- Missing or incorrect coordinate reference information within the ADAC XML;
- Survey information prepared using local or assumed coordinate systems;
- Inconsistencies between survey control documentation and submitted files;
- Inconsistencies between horizontal and vertical survey references;
- Level information not referenced to AHD;
- Mixed coordinate systems within the same submission;
- Missing Registered Surveyor attribution; and
- Survey certification information inconsistent with submitted documentation.

Submission Providers should verify coordinate system settings, datum information, survey control records and export parameters prior to generating the final ADAC XML submission and associated validation reports.

4.8.1 Unitywater Review Checks

Unitywater may review submissions to confirm:

- MGA56 has been adopted consistently;
- GDA2020 has been adopted consistently;
- AHD has been adopted consistently;
- Survey certification information aligns with Project Attribution records;
- Survey control information is consistent with supporting documentation;
- ADAC XML geometry aligns with certified As Constructed drawings, registered survey plans and associated survey information;
- Coordinate reference frameworks are consistent across all submitted documents; and
- The submitted asset information accurately represents the surveyed infrastructure.

Submission Providers are encouraged to undertake survey quality assurance reviews prior to generating the final ADAC XML submission and validation report.

5. Creation of ADAC XML Files

ADAC XML files shall be prepared in accordance with the current Asset Information Specification (AIS), applicable ADAC Schema and ADAC Data Dictionary.

In addition to schema compliance, Unitywater requires asset information to accurately represent the infrastructure delivered under the completed project scope., network connectivity and asset relationships necessary to support GIS integration, network traceability and long-term asset management activities.

Submission Providers should consider how individual ADAC assets form part of broader operational asset assemblies and should ensure that asset relationships, connectivity and supporting attribution accurately reflect the constructed infrastructure at the time of submission.

5.1 Project Attribution

Project Attribution information identifies the project, organisations and responsible professionals associated with the preparation of the ADAC XML submission.

Project Attribution information shall be completed in accordance with the applicable ADAC Schema, Asset Information Specification (AIS) and ADAC Data Dictionary requirements.

The information recorded within Project Attribution shall be complete, accurate and consistent with all supporting documentation submitted as part of the project.

Project Attribution information forms an important component of the asset record and assists with submission traceability, professional accountability and future asset information management activities.

Table 5.1 – Project Attribution Attributes

Attribute	Mandatory (Y/N)	Notes
ProjectName	Y	Project name consistent with application records and supporting documentation.

5.1.1 Responsible Professionals

The ADAC XML shall identify the responsible professionals associated with the preparation, survey and certification of the submitted asset information.

Where applicable, the following information shall be provided:

- Full name of the Registered Surveyor;
- Surveyor registration number;
- Full name of the responsible Engineer; and
- RPEQ registration number.

For the purposes of ADAC submissions, company names alone are not considered sufficient professional attribution.

The ADAC XML should identify the responsible individual together with their applicable registration details.

These Project Attribution fields complement, but do not replace, certification requirements contained within certified As Constructed drawings, certification letters, survey certifications or other supporting documentation.

The purpose of these fields is to maintain the association between the digital asset information record and the responsible certifying professionals.

5.1.2 ADAC Operator

An ADAC XML submission may be prepared by an ADAC Operator, consultant, contractor or specialist service provider acting on behalf of the project team.

The ADAC Operator is responsible for:

- Compiling asset information;
- Creating the ADAC XML file;
- Performing validation checks;
- Resolving validation errors where appropriate; and
- Generating the XML submission and associated validation report.

Preparation of the ADAC XML does not replace the requirement to identify and certify the responsible Registered Surveyor and/or responsible engineer.

Where an ADAC Operator prepares the ADAC XML file, the Project Attribution information shall continue to identify the professionals responsible for survey certification and engineering certification.

5.1.3 Consistency Requirements

Professional attribution information recorded within the ADAC XML shall be consistent with:

- Survey certifications;
- Engineering certifications;
- As Constructed drawings;
- Survey reports;
- Validation reports; and
- Other supporting documentation submitted as part of the project.

Any discrepancies between professional attribution information contained within the ADAC XML and supporting documentation shall be resolved prior to submission.

Unitywater Clarification

Unitywater requires Project Attribution information to clearly identify the individuals accountable for the survey and engineering information contained within the submission.

The responsible Registered Surveyor and responsible engineer remain accountable for the accuracy and certification of information contained within the submission regardless of whether the ADAC XML file is prepared by an ADAC Operator or other third party.

Where professional registration information is required by the applicable schema or supporting documentation, the registration number should be included together with the individual's name.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Company names provided in place of individual professional details;
- Missing surveyor registration details;
- Missing RPEQ registration details;
- Professional attribution information inconsistent with certification documents;
- Professional attribution information inconsistent with As Constructed drawings;
- Incomplete Project Attribution fields; and
- ADAC Operator details provided without identifying the responsible Registered Surveyor or engineer.

Submission Providers are encouraged to review all Project Attribution information prior to creating the final ADAC XML submission and associated validation report.

5.2 Global Attribution

Global Attribution information defines project-wide information applicable to the ADAC XML submission.

Global Attribution attributes establish the coordinate reference framework, project metadata and other information that applies across the entire ADAC XML file.

All Global Attribution information shall be completed in accordance with the applicable ADAC Schema, Asset Information Specification (AIS) and ADAC Data Dictionary requirements.

Information recorded within Global Attribution shall be complete, accurate and consistent with all supporting documentation submitted as part of the project.

Table 5.2 – Global Attribution Attributes

Attribute	Mandatory (Y/N)	Notes
ExportDateTime	Y	Date and time the ADAC XML file was generated.
Owner	Y	Asset owner identified within the ADAC XML submission.
Receiver	Y	Receiving authority for the ADAC XML submission.
WorksApprovalID	Y	Applicable development approval or works approval reference.
DrawingNumber	Y	Associated As Constructed drawing number.
DrawingRevision	N	Associated drawing revision information as required.
ConstructionDate	Y	Construction completion date for the project.
HorizontalCoordinateSystem	Y	MGA56.
HorizontalDatum	Y	GDA2020.
VerticalDatum	Y	AHD.
IsApproximate	Y	Indicates whether supplied coordinates are approximate.
OriginMark	N	Survey control mark used where applicable.
DrawingExtents	Y	Project drawing extents.
Description	Y	General project or asset description and stage reference if applicable.
ProjectStatus	Y	Status applicable to the ADAC XML submission.
SoftwareProduct	Y	Software used to generate the ADAC XML file.
SoftwareVersion	Y	Software version used to generate the ADAC XML file.
Notes	N	Additional information relevant to the overall project or submission.

5.2.1 Asset Ownership

The Owner attribute identifies the organisation responsible for ownership and ongoing management of the assets represented within the ADAC XML submission.

Owner values shall be populated in accordance with the applicable ADAC Schema and Asset Information Specification requirements.

Where assets are intended to be transferred to Unitywater, the Owner attribute shall accurately reflect the ownership arrangements applicable at the time of submission.

Incorrect or inconsistent ownership attribution may result in validation failures, asset registration issues or delays during submission review.

5.2.2 Project Status

Project Status identifies the purpose of the ADAC XML submission and provides context regarding the stage of project delivery represented by the submitted data.

Project Status recorded within the ADAC XML should accurately reflect the purpose of the submission and be consistent with associated project documentation

Table 5.3 – Project Status Examples

Status	Description
Design	ADAC XML prepared to support planning, servicing, design review or approval activities.
As Constructed	ADAC XML prepared to support commissioning, asset handover and asset registration activities.
Other	Alternative status as permitted by the applicable ADAC Schema.

5.3 Survey Conventions

Survey information forms a critical component of ADAC XML submissions and provides the spatial framework used to support asset registration, GIS integration, operational planning and asset management activities.

All survey information incorporated within an ADAC XML submission shall be captured, processed and represented in accordance with:

- The applicable Asset Information Specification (AIS);
- The applicable ADAC Schema;
- The ADAC Data Dictionary;
- Relevant survey standards; and
- Applicable legislative and statutory requirements.

Survey information shall accurately represent the location of assets and associated infrastructure at the time of survey capture.

The survey conventions contained within this section are intended to promote consistency between ADAC XML submissions, As Constructed drawings and supporting survey documentation.

5.3.1 General Survey Requirements

Survey information contained within the ADAC XML submission shall:

- Be spatially accurate;
- Be referenced to the nominated project survey control;
- Be consistent with associated As Constructed drawings;
- Be consistent with survey certification documentation; and
- Accurately represent constructed asset locations.

Surveyed asset positions should represent the actual location of infrastructure at the time of survey capture.

Where assets are not directly observable, the adopted survey methodology should provide the highest practical level of confidence available.

5.3.2 Survey Tolerance and Confidence Levels

The Australian Standard AS 5488 “Classification of Subsurface Utility Information (SUI)” describes a classification system for the quality of the location and attribute data of buried infrastructure. It specifies four quality levels with level A being the highest quality and level D the lowest. This Specification also prescribes a higher quality level than level A, which is designated level A+. For convenience, this Specification applies the principles of AS 5488 to both surface features and buried features.

The quality-level required for information submitted in accordance with this Specification varies according to the stage of a project and the status and type of the infrastructure. The accuracy required increases as the project progress through planning, design, and construction. The accuracy required for proposed water and sewerage infrastructure, is also higher than it is for infrastructure of other types.

Table 5.4 – Survey Tolerance Requirements

Project Stage	Existing Buried Infrastructure	Existing and Proposed Surface Features and Boundaries	Proposed Designed / As Constructed Water & Sewerage Infrastructure
Preliminary Approval/ Pre-lodgement	D	C	N/A
Design Approval / Development Approval	C	B	Use the actual design values.

Project Stage	Existing Buried Infrastructure	Existing and Proposed Surface Features and Boundaries	Proposed Designed / As Constructed Water & Sewerage Infrastructure
As Constructed (Except as described in the next row)	C for those parts where no additional information was gathered during construction. B for those parts where additional information was gathered.	A	A X, Y & Z coordinates of water mains and sewer pressure mains and XY coordinates of gravity sewerage pipes and maintenance structures.
As Constructed gravity sewerage	As above	A	A+ Z ordinates of the invert of gravity sewer pipes and the invert and cover level of gravity sewerage maintenance structures

Table 5.5 – Data Quality Tolerances

AS5488 Quality Level	Information Sources / Survey Requirements	XY Tolerance	Z Tolerance
D	Existing Records, cursory site inspection, anecdotal evidence	N/A	N/A
C	As for D plus site survey of visible evidence that may use relative or absolute positioning.	±300mm	N/A
B	As for C but must include a survey of both the surface and buried features. Buried features of existing infrastructure may be captured by no-dig survey techniques.	±300mm	±500mm
A	Positive identification of attributes and the absolute location of subsurface and surface features in three dimensions.	±50mm	±50mm

AS5488 Quality Level	Information Sources / Survey Requirements	XY Tolerance	Z Tolerance
A+	Positive identification of attributes and the absolute location of subsurface features in three dimensions.	±50mm	±10mm

The Asset Information Specification (AIS) provides additional clarification regarding the assignment of Quality Level A and A+ classifications for water and sewerage infrastructure. In particular, the AIS recognises that practical construction and survey methodologies may not always permit continuous line-of-sight verification of buried infrastructure between survey points.

For quality level A, AS 5488 specifically states that where a whole line segment cannot be checked by line of sight before backfilling, quality level A, and by extension level A+, shall not be attributed to the line segment between validating points. For example, it is not a valid assumption to assume a gravity sewer pipe is laid in a perfectly straight line between its recorded invert positions as surveyed in the maintenance structures at either end. Nevertheless, for the purposes of the AIS, the whole line segment shall be deemed to satisfy level A (and A+) where the maximum distance between survey points on a gravity sewer is less than 25 metres or some other means of verification, such as photographs, CCTV or site records, can be used to verify intermediate points.

For pressure pipelines, the whole line segment shall be deemed to satisfy level A where the surveyor has picked up every change of direction and gradient and either the maximum distance between survey points is fifty metres or some other means of verification has been used and recorded.

The tolerances in the AS5488 Quality Level in table 5 above should not be used to round the survey data. The data given in an ADAC XML should be as shown on the drawings where an XML is submitted at some stage prior to the as constructed stage, or the actual values surveyed when the XML is submitted as an as constructed record.

Unitywater Clarification

The majority of ADAC XML submissions provided to Unitywater for new water supply and sewerage infrastructure are expected to contain asset information captured at:

- Quality Level A for newly constructed water supply assets;
- Quality Level A for newly constructed sewer pressure assets; and
- Quality Level A+ for newly constructed gravity sewerage assets, where required by the Asset Information Specification.

Lower quality classifications may be appropriate for existing infrastructure, legacy assets, planned assets or information derived from historical records.

5.3.3 Asset Location Requirements

Asset locations recorded within the ADAC XML shall accurately represent the spatial position of the asset being described.

Asset location points shall be consistent with the asset-specific location conventions defined within the Asset Information Specification (AIS), ADAC Schema and ADAC Data Dictionary.

Surveyed positions should be captured at locations that provide an appropriate representation of asset geometry, connectivity and operational function.

Table 5.6 – Typical Survey Capture Location

Asset Type	Typical Survey Capture Requirement
Gravity Sewer Pipes	Invert of the pipe.
Pressure Sewer Pipes	Top of Pipe (Obvert).
Sewer Connections	Invert of the pipe.
Maintenance Holes	Centre point of the structure.
Maintenance Shafts	Centre point of the structure.
Valves	Centre point of the valve spindle, valve box or valve chamber location.
Hydrants	Centre point of the hydrant assembly.
Water Meters	Location of the installed meter assembly.
Fittings	Location of the installed fitting.
Survey Marks	Surveyed position of the survey mark.
Easements	Surveyed cadastral representation of the easement.

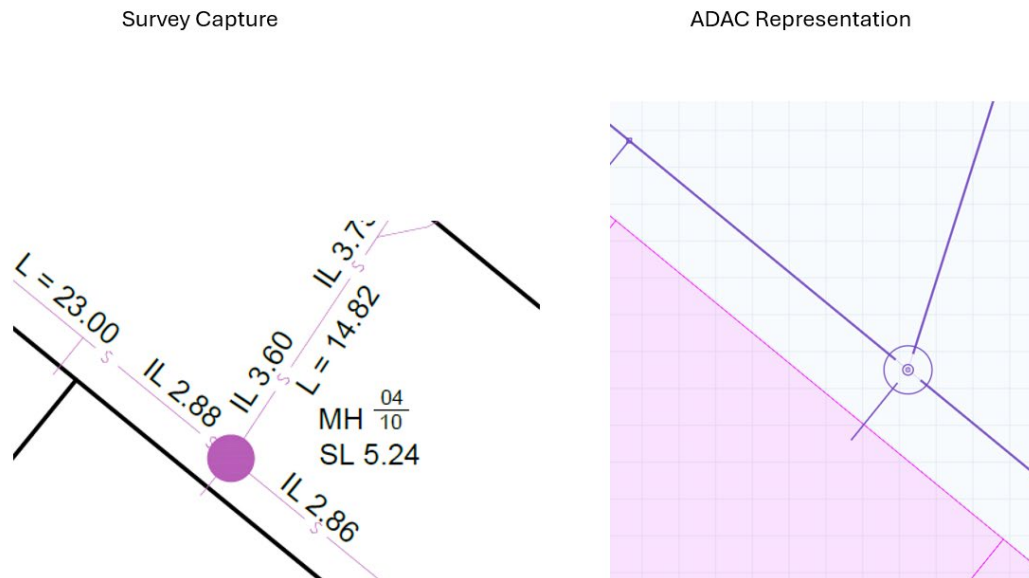
Unitywater Clarification

Unitywater requires survey information, ADAC geometry and associated As Constructed documentation to utilise consistent asset capture locations throughout the submission.

Survey capture locations establish the spatial position of assets. Asset geometry represented within the ADAC XML may differ from surveyed geometry where necessary to maintain network connectivity, support operational network representation and facilitate GIS integration, validation processes and asset management activities.

Survey information should not be altered or manipulated to artificially create connectivity. Rather, ADAC asset representation should utilise the surveyed asset locations while maintaining the connectivity and operational relationships required to represent the infrastructure delivered under the completed project scope..

Figure 5.1 – Survey Capture and ADAC Representation



Survey information provides the spatial location of assets and structures. ADAC representation incorporates surveyed asset locations while also maintaining the connectivity and operational relationships required to represent the infrastructure delivered under the completed project scope..

Survey capture locations and assigned Data Quality classifications should be consistent with the survey methodology used and the confidence level attributed to the asset.

5.3.4 Survey Control

Survey control information used in the preparation of ADAC XML submissions shall be consistent with the adopted project coordinate reference framework.

Survey control should be established and maintained in accordance with accepted surveying practices and any project-specific requirements.

Where an Origin Mark is recorded within the ADAC XML submission, the information should be consistent with:

- Survey certification documentation;
- Survey control records;
- As Constructed drawings; and
- Supporting survey information.

5.3.5 Data Quality

Data Quality values shall accurately reflect the confidence, reliability and origin of the survey information used to determine asset location and asset attributes.

The selected Data Quality classification should be consistent with:

- Survey methodologies used;
- Availability of surveyed information;
- Asset visibility;
- Construction records; and
- Supporting documentation.

Submission Providers should avoid assigning high-confidence Data Quality classifications where asset locations have been derived solely from records, assumptions or indirect observations.

5.3.6 Approximate Locations

Where asset locations cannot be reliably determined through survey, the relevant ADAC attributes should accurately indicate that the information is approximate.

Approximate asset locations should be supported by the best available information, including:

- Existing records;
- Construction information;
- Visible surface evidence;
- Utility investigations; or
- Other supporting information.

Assets represented using approximate locations should not be presented as surveyed positions.

5.3.7 Survey Certification

Survey control and survey information utilised in the preparation of ADAC XML files and associated As Constructed documentation should be certified by a Registered Surveyor in accordance with applicable legislative, statutory and project requirements.

The Registered Surveyor responsible for the survey information should be identified within the ADAC XML Project Attribution information, including their name and registration details, and these details should be consistent with any survey certification provided as part of the submission.

Unitywater Clarification

Unitywater expects all ADAC XML submissions to provide an accurate spatial representation of the infrastructure delivered under the completed project scope..

Survey information contained within the ADAC XML should be consistent with:

- As Constructed drawings;
- Survey certifications;
- Validation reports;

- Survey control documentation;
- Supporting survey files; and
- Other submission documentation.

Survey inconsistencies identified during the review process may result in requests for additional information, resubmission of survey information or revision of the ADAC XML file prior to acceptance.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Inconsistencies between ADAC XML coordinates and As Constructed drawings;
- Missing or incorrect survey control information;
- Incorrect or misleading Data Quality classifications;
- Approximate locations represented as surveyed positions;
- Incorrect structure locations;
- Connectivity issues resulting from inaccurate survey capture;
- Inconsistencies between survey certification documentation and ADAC XML information; and
- Missing surveyor attribution information within Project Attribution records.

Submission Providers are encouraged to undertake survey quality assurance reviews prior to generating the final ADAC XML submission and validation report.

5.4 Capture Conventions

Capture conventions establish Unitywater requirements and expectations for the representation of assets, asset relationships, ownership, status and supporting information contained within an ADAC XML submission.

The objective of these conventions is to promote consistency between ADAC XML submissions, As Constructed documentation, survey information and supporting project records.

Unless otherwise specified, asset information shall accurately represent the infrastructure delivered under the completed project scope and be consistent with supporting survey, design and construction information.

5.4.1 Asset Identification

Each asset contained within an ADAC XML submission shall be assigned a unique ADACId.

The ADACId is used to:

- Identify assets during validation;
- Reference assets within error and warning reports;

- Support submission review activities;
- Assist with issue resolution; and
- Improve traceability during asset handover processes.

Although the ADAC Schema does not prescribe a specific naming convention, Unitywater considers the ADACId to be mandatory for practical validation and review purposes.

Any naming convention may be adopted provided that:

- Each ADACId is unique within the ADAC XML file;
- The identifier is consistently applied; and
- Duplicate identifiers are not used.

Unitywater Clarification

Meaningful ADACId values are recommended as they assist reviewers in locating and resolving identified validation issues.

5.4.2 Network Connectivity

Asset geometry and asset relationships shall be represented in a manner that supports network connectivity and operational understanding of the asset network.

Connectivity should be considered in the context of both the individual asset and the broader operational asset assembly of which it forms part.

Survey capture methodologies should not result in unintended gaps, overlaps or disconnected assets within the ADAC XML submission.

Where structures form part of a connected network, associated linear assets should be represented in a manner that maintains network connectivity.

Examples include:

- Sewer maintenance structures;
- Access chambers;
- Water valves;
- Hydrants;
- Fittings;
- Pump stations;
- Network structures; and
- Recycled water assets.

Unitywater Clarification

A surveyed asset location and the ADAC network representation may differ where necessary to maintain appropriate network connectivity.

Where operational asset assemblies comprise multiple connected assets, the adopted ADAC representation should accurately reflect the operational relationships between those assets while maintaining compliance with the applicable ADAC Schema and Asset Information Specification.

5.4.3 Asset Scope

ADAC XML submissions to Unitywater should primarily represent assets associated with Unitywater ownership, operation, maintenance or asset management responsibilities.

Where assets form part of a larger operational arrangement or interface with Unitywater infrastructure, additional assets may be represented where required to support:

- Infrastructure connectivity;
- Asset relationships;
- Operational understanding;
- Serviceability investigations;
- Spatial context; or
- Other Unitywater business requirements.

Unless otherwise approved, ADAC XML submissions will generally be limited to:

- Water supply infrastructure;
- Sewerage infrastructure;
- Recycled water infrastructure;
- Associated cadastral information;
- Supporting connectivity assets; and
- Other assets specifically required by the Asset Information Specification or Unitywater.

Assets owned or maintained by other authorities, organisations or private entities should only be included where necessary to support:

- Connectivity;
- Project interfaces;
- Spatial context;
- Asset relationships; or
- Regulatory requirements.

Examples of assets not normally required

Unless specifically required to support connectivity, operational context, project interfaces or other Unitywater requirements, ADAC XML submissions would not normally include:

- Stormwater infrastructure;
- Road and transport infrastructure;
- Street lighting infrastructure;
- Parks and recreation infrastructure;
- Landscape infrastructure;
- Third-party communications infrastructure; and
- Other assets outside Unitywater ownership or project scope.

5.4.4 Asset Ownership

The Owner attribute identifies the organisation responsible for ownership and ongoing management of an asset.

Ownership values shall be populated in accordance with the applicable ADAC Schema and Asset Information Specification.

Table 5.7 – Typical Owner Values

Owner	Description
Unitywater	Assets intended for ownership and maintenance by Unitywater.
Council	Assets owned and maintained by the relevant local government authority.
Private	Assets that remain under private ownership and maintenance responsibility.

Unitywater Clarification

Asset ownership shall accurately reflect the intended ownership and maintenance responsibility of the asset at the time of submission.

Incorrect ownership attribution may result in validation errors, asset registration issues or delays during review.

5.4.5 Asset Status

Asset Status identifies the lifecycle state of an individual asset represented within the ADAC XML submission.

Asset Status values shall be applied in accordance with the ADAC Schema and Asset Information Specification.

Table 5.8 – Asset Status

Asset Status	Description
Planned	Future asset proposed during planning activities.
Designed	Future asset represented by an approved design.
Newly Constructed	New asset constructed as part of the project.
Existing	Existing asset retained in service.
Rehabilitated	Existing asset upgraded or renewed.
Removed	Asset physically removed from service.
Retired	Asset remaining in situ but no longer operational.

Unitywater Clarification

Asset Status shall accurately reflect the lifecycle state of the asset represented within the ADAC XML submission and be consistent with the completed project scope.

Incorrect status attribution may result in validation errors, incorrect asset representation or delays during review.

5.4.6 Representation of Decommissioned, Removed and Retired Assets

ADAC XML submissions shall accurately represent the asset status and operational network configuration that exists at the time of survey, certification and submission.

Unitywater Clarification

Where existing infrastructure is proposed to be decommissioned or removed as part of development works but remains operational pending future connection, cutover or transfer works, the asset shall continue to be represented in accordance with its actual operational condition and status at the time of submission.

Submission Providers shall not assign an Asset Status of Removed or Retired where the asset remains operational, connected to the network or has not yet been physically disconnected from service.

Future Decommissioning

Where future decommissioning or asset removal is proposed, the intended arrangement should be clearly identified within:

- Certified As Constructed documentation;
- Redline Markup drawings;
- Supporting submission documentation; and
- Relevant notes, schedules or project records where applicable.

The ADAC XML submission should reflect the existing operational asset environment and not a future intended asset state that has not yet been delivered.

Subsequent Works by Others

In some circumstances, existing infrastructure may remain operational until final connection or transfer works are completed by Unitywater, Private Works contractors or other authorised parties following handover of the development infrastructure.

Examples may include:

- Water main cutovers;
- Sewer diversion connections;
- Service transfers;
- Pump-over arrangements;
- Temporary network configurations;
- Staged infrastructure commissioning; and
- Network transition activities.

Unitywater Review Checks

Unitywater may review submissions to confirm that:

- Proposed decommissioned assets have been clearly identified on the certified documentation;
- Asset Status values accurately reflect the condition of the asset at the time of submission;
- Assets intended for future removal or retirement have not been incorrectly attributed as Removed or Retired;
- Existing operational infrastructure has been represented appropriately within the ADAC XML submission; and
- The represented operational asset environment is consistent with the certified documentation provided.

5.4.7 Asset Splitting Rules

Separate ADAC assets shall be created where a change occurs in any attribute that materially affects the representation or management of the asset.

Examples may include changes to:

- Diameter;
- Material;
- Class;
- Lining;

- Protection;
- Asset Status;
- Ownership;
- Asset Use;
- Asset Type; or
- Other attributes required by the applicable ADAC Schema.

Example

A water main changing from DN150 PVC-O PN16 to DN225 PVC-O PN16 should be represented as two separate ADAC pipe assets.

5.4.8 Asset Notes

The Notes attribute may be used to provide supplementary information that assists with interpretation, validation and future management of individual assets.

Notes may be particularly useful where:

- Proprietary products are installed;
- Asset configurations are non-standard;
- Additional explanation may assist reviewers;
- Temporary arrangements require clarification;
- Asset functionality is not adequately represented by available schema attributes; or
- Additional operational information is considered beneficial.

Examples

- Proprietary maintenance hole systems;
- Combination valve assemblies;
- Pressure reducing valve stations;
- End-of-line discharge arrangements;
- Special access arrangements;
- Non-standard fittings; and
- Unique construction details.

Notes should not be used as a substitute for mandatory schema attributes where a dedicated attribute exists.

5.4.9 Unitywater Validation Considerations

Unitywater applies validation checks beyond basic ADAC schema compliance.

These reviews may include:

- Asset attribution;
- Network connectivity;
- Asset ownership;
- Asset status;
- Utility Network relationships;
- Coordinate systems;
- Material compliance;
- Easement requirements;
- Survey quality;
- Spatial relationships;
- Asset assemblies;
- Asset lifecycle considerations; and
- Other business rules supporting asset registration, GIS integration and Utility Network management.

Successful schema validation does not guarantee acceptance of an ADAC XML submission.

Validation processes may include automated checks, GIS reviews, Utility Network reviews and manual technical assessment activities undertaken by Unitywater.

6. Cadastral Information

Cadastral information provides important spatial context for water, sewerage and recycled water infrastructure represented within an ADAC XML submission.

Cadastral information also provides an important framework for establishing the spatial relationship between infrastructure assets, land ownership, easements, access requirements and operational asset responsibilities.

Accurate cadastral information assists with GIS integration, Utility Network management, asset access planning, maintenance activities and future infrastructure planning.

The capture of cadastral information assists with:

- Asset ownership identification;
- Easement management;
- Asset access requirements;
- Property servicing;
- Infrastructure planning;

- Operational activities; and
- Long-term asset management.

Cadastral information submitted within an ADAC XML file shall be consistent with the associated survey information, As Constructed drawings and supporting cadastral documentation.

Unless otherwise approved, cadastral information should represent the final cadastral arrangement applicable at the time of submission.

6.1 Cadastral Connection

This represents an observed and reduced cadastral connection feature. This feature does not relate to lot boundaries, water boundaries or easements which are detailed in the tables below.

Unitywater Clarification

Cadastral Connections should provide sufficient survey information to support the spatial relationship between Unitywater infrastructure and the surrounding cadastral framework.

Where assets are located within easements, road reserves or other cadastral areas, associated cadastral information should be consistent with the asset locations represented within the ADAC XML.

Cadastral information should support the accurate representation of the relationship between infrastructure assets and the surrounding cadastral environment.

6.2 Lot Parcel

Asset Capture:

Area feature (can be multi-part) representing the boundary of a titled or proposed Cadastral Lot.

Spatial Relationship:

May share boundaries with Road Reserves or Water Courses. Vertices must be coincident with any shared boundaries.

Unitywater Clarification:

Lot Parcel information assists with validating:

- Property service connections;
- Water meter locations;
- Easement requirements;
- Asset ownership responsibilities; and
- Access and maintenance requirements.

Lot Parcel boundaries should represent the final cadastral arrangement applicable to the submission.

Where property service connections, water meters or other customer-related assets are included within the ADAC XML submission, the associated Lot Parcel information should be consistent with the surveyed location of those assets.

Table 6.1 – Lot Parcel Attributes

Element Name	Mandatory (Y/N)
LotNo	Y
PlanNo	Y
CancelledLotPlan	N
TitledArea_m2	Y

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Missing Lot Parcel information;
- Lot boundaries inconsistent with submitted survey information;
- Water meter locations inconsistent with lot allocation;
- Property service connections not aligned with the serviced lot; and
- Cadastral information inconsistent with As Constructed drawings.

Submission Providers are encouraged to verify Lot Parcel information against survey information, cadastral plans and associated submission documentation prior to generating the final ADAC XML file.

6.3 Easement

Asset Capture:

Area feature representing an easement associated with water, sewerage or recycled water infrastructure.

Spatial Relationship:

May share boundaries with Lot Parcels, Road Reserves or Water Course Reserves. Vertices should be coincident with any shared boundaries.

Unitywater Clarification:

Where water, sewerage or recycled water infrastructure is located within land requiring easement protection, the associated easement should be included within the ADAC XML submission where supported by the applicable ADAC Schema.

Easement information should be consistent with:

- Survey plans;

- Cadastral information;
- Registered easement documentation;
- As Constructed drawings; and
- Other supporting documentation submitted as part of the project.

Easement information assists with:

- Utility Network and asset management activities;
- Asset access and maintenance requirements;
- Asset protection;
- Operational activities;
- Future renewal and replacement works;
- Development assessment activities; and
- Long-term asset management.

Table 6.2 – Easement Attributes

Element Name	Mandatory (Y/N)
EasementType	Y
EasementReference	Y
Description	N

Easements should accurately represent the area intended to provide access, protection or operational rights associated with the infrastructure being serviced.

Where multiple easements exist within a project, each easement should be represented separately.

Common Submission Issues:

The following issues are commonly identified during submission reviews:

- Water infrastructure located within private property with no easement identified;
- Sewer infrastructure located within private property with no easement identified;
- Easement boundaries inconsistent with cadastral information;
- Easement information omitted from the submission;
- Infrastructure extending beyond the easement area; and
- Easement information inconsistent with associated survey documentation.

Submission Providers are encouraged to verify easement information against survey plans, cadastral records and As Constructed documentation prior to generating the final ADAC XML submission.

6.4 Road Reserve

Asset Capture:

Multi-patched area feature (can be multi-part) representing a road reserve boundary.

Spatial Relationship:

May share boundaries with Water Course Reserve, Lot Parcels or other Road Reserve areas.

Vertices must be coincident with any shared boundaries.

Unitywater Clarification:

Road Reserve information provides important spatial context for water, sewerage and recycled water infrastructure located within public land.

Road Reserve information assists with:

- Asset ownership determination;
- Maintenance access requirements;
- Asset location verification;
- Development assessment activities;
- Infrastructure planning; and
- Future operational responsibilities.

Road Reserve boundaries should accurately represent the final cadastral arrangement applicable to the project at the time of submission.

Where water, sewerage or recycled water infrastructure is located within a road reserve, the spatial relationship between the asset and the road reserve should be consistent with the associated survey information and As Constructed drawings.

Table 6.3 – Road Reserve Attributes

Element Name	Mandatory (Y/N)
Name	Y

Road Reserve information should align with the associated cadastral framework and maintain coincident boundaries with adjoining Lot Parcels, Water Course Reserves and neighbouring Road Reserve areas where applicable.

Where multiple road reserves exist within a project, each reserve should be represented separately.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Road Reserve information omitted from the submission;
- Road Reserve boundaries inconsistent with cadastral information;
- Road Reserve boundaries not coincident with adjoining cadastral features;
- Asset locations inconsistent with surveyed Road Reserve boundaries;
- Road Reserve attribution inconsistent with supporting cadastral information; and
- Cadastral information inconsistent with As Constructed drawings.

Submission Providers are encouraged to verify Road Reserve information against survey plans, cadastral records and supporting project documentation prior to generating the final ADAC XML submission.

6.5 Survey Mark

Asset Capture:

Simple point feature representing a Permanent Survey Mark.

Spatial Relationship:

May be used in a Cadastral Connection (to lot parcels).

Unitywater Clarification:

Survey Marks are primarily included to support survey verification and cadastral reference activities and are not intended to represent operational infrastructure assets.

Table 6.4 – Survey Mark Attributes

Element Name	Mandatory (Y/N)
MarkName	Y

Survey Marks included in the ADAC XML should be identifiable within the associated survey documentation and capable of supporting the spatial framework adopted for the project.

Where multiple Survey Marks are included, each Survey Mark should be uniquely identified.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Survey Mark information omitted from the submission where referenced by supporting survey documentation;
- Survey Mark identifiers inconsistent with survey records;

- Survey Mark locations inconsistent with associated survey information;
- Survey control information that cannot be reconciled with supporting documentation; and
- Incomplete Survey Mark attribution.

Submission Providers are encouraged to verify Survey Mark information against survey certification documentation, survey control records and supporting project documentation prior to generating the final ADAC XML submission.

6.6 Water Course Reserve

Asset Capture:

Area feature representing a boundary of a Water Course reserve.

Spatial Relationship:

May share boundaries with RoadReserves and LotParcels. Vertices must be coincident with any shared boundaries.

Unitywater Clarification:

Water Course Reserve information provides important spatial context where water, sewerage or recycled water infrastructure interfaces with waterways, drainage corridors and environmentally constrained areas.

Water Course Reserve information should be consistent with:

- Survey information;
- Cadastral records;
- As Constructed drawings; and
- Supporting project documentation.

Where assets traverse, adjoin or are located within a Water Course Reserve, the cadastral representation should accurately reflect the final surveyed arrangement applicable to the project.

Water Course Reserve information assists with:

- Asset location verification;
- Access and maintenance planning;
- Infrastructure protection;
- Environmental management considerations; and
- Future asset management activities.

Table 6.5 – Water Course Reserve Attributes

Element Name	Mandatory (Y/N)
Name	Y

Water Course Reserve boundaries should maintain coincident geometry with adjoining cadastral features where shared boundaries exist.

Where multiple Water Course Reserves are present within a project, each reserve should be represented separately.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Water Course Reserve information omitted from the submission;
- Boundaries inconsistent with cadastral information;
- Water Course Reserve boundaries not coincident with adjoining cadastral features;
- Asset locations inconsistent with surveyed Water Course Reserve boundaries;
- Naming inconsistencies between the ADAC XML and supporting documentation; and
- Cadastral information inconsistent with As Constructed drawings.

Submission Providers are encouraged to verify Water Course Reserve information against cadastral records, survey information and supporting project documentation prior to generating the final ADAC XML submission.

6.7 Common Submission Issues

The following cadastral-related issues are commonly identified during submission reviews:

- Missing or incomplete cadastral information;
- Omitted easement information;
- Asset locations inconsistent with cadastral boundaries;
- Water meter locations inconsistent with lot allocations;
- Property service connections not aligned with the serviced lot;
- Road Reserve boundaries inconsistent with associated survey information;
- Water Course Reserve boundaries inconsistent with cadastral records;
- Easement information inconsistent with survey documentation;
- Survey Mark information inconsistent with survey control records; and
- Incomplete representation of the final cadastral arrangement associated with the project.

Unitywater Clarification

Cadastral information forms an important component of the overall asset information submission and supports:

- Asset ownership determination;
- Access and maintenance planning;
- Property servicing validation;
- Easement management;
- GIS integration; and
- Long-term asset management activities.

Submission Providers are encouraged to verify cadastral information against survey plans, cadastral records, As Constructed drawings and supporting submission documentation prior to generating the final ADAC XML submission and validation report.

7. Sewerage Assets

Sewerage assets represented within an ADAC XML submission shall accurately reflect the infrastructure delivered under the completed project scope. associated with the project.

Asset information shall be prepared in accordance with the applicable Asset Information Specification (AIS), ADAC Schema, ADAC Data Dictionary and Unitywater requirements.

The sewerage network represented within the ADAC XML should:

- Accurately reflect the constructed infrastructure;
- Maintain network connectivity;
- Be consistent with associated survey information;
- Be consistent with As Constructed drawings;
- Include all relevant sewerage assets associated with the project; and
- Support future operational, maintenance and asset management activities.

Where existing sewerage assets are impacted by the works, the ADAC XML submission should accurately represent the relationship between new and existing infrastructure.

Unitywater Clarification

Sewerage assets should be captured and attributed in a manner that supports:

- Asset registration;
- GIS integration; and
- Network tracing;

Successful schema validation does not guarantee acceptance of a sewerage asset submission. Asset relationships, connectivity, ownership and other business rules may also be reviewed as part of the submission assessment process.

Generic Enumeration Values

Generic enumerations and placeholder values shall not be used where a valid ADAC enumeration exists.

Examples include:

- Unknown;
- Other; and
- Other placeholder or reserved values contained within the applicable ADAC Schema.

Where the value Other is used, the actual asset characteristic shall be described within the Notes attribute.

This requirement applies to all sewerage assets unless otherwise stated.

Asset Geometry Reference Points

Unitywater requires sewerage asset geometry to be captured and represented using the following survey reference points.

Table 7.1 – Sewerage Asset Geometry Reference Points

Asset Type	Geometry Reference Point
Sewer Connections	Invert
Gravity Sewer Pipes	Invert
Maintenance Holes	Centre of structure with associated cover and invert level information
Maintenance Shafts	Centre of structure with associated surface and invert level information
Pressure Sewer Pipes	Top of pipe (obvert)

Survey information, ADAC geometry, asset attributes and As Constructed drawings shall utilise a consistent geometric reference point throughout the submission.

Mixing invert-based and top-of-pipe representations for the same asset type within a submission is not acceptable.

Asset Connectivity

Unitywater requires sewerage assets to be represented in a manner that maintains network connectivity throughout the ADAC XML submission.

Survey capture methodologies shall not result in disconnected assets, unintended gaps or incomplete network relationships.

Where a surveyed asset location differs from the preferred network representation, the ADAC geometry shall be represented in a manner that preserves network connectivity.

This requirement applies to all sewerage assets unless otherwise stated.

Unitywater Clarification

The adopted geometry reference point is critical for maintaining data quality and enabling future reuse of asset information within GIS, modelling, operational and asset management systems.

7.1 Sewerage Asset Assemblies

7.1.1 Overview

Unitywater's sewerage network comprises groups of interconnected assets that collectively perform defined operational functions.

While ADAC XML submissions continue to represent individual assets, understanding how those assets interact within operational asset assemblies assists with:

- Asset capture;
- Network connectivity;
- Utility Network traceability;
- Validation activities;
- Operational planning;
- Maintenance activities; and
- Long-term asset management.

Asset Assemblies are provided to assist Submission Providers in understanding the operational relationships that exist between sewerage assets.

Asset Assemblies do not replace individual ADAC assets and are provided for operational context only.

7.1.2 Gravity Sewer Assembly

Gravity sewer systems typically comprise a combination of:

- Maintenance Holes;
- Maintenance Shafts;
- Inspection Openings;
- Non-Pressure Pipes;
- Property Connections; and

- Associated fittings and structures.

Typical Gravity Sewer Assembly

Sequence	Asset
1	Maintenance Hole
2	Non-Pressure Pipe
3	Maintenance Hole
4	Property Connection
5	Maintenance Shaft or Inspection Opening

Unitywater Clarification

Gravity sewer assets should be represented in a manner that maintains network connectivity and accurately reflects the infrastructure delivered under the completed project scope..

Connectivity between sewer mains, maintenance structures and property connections is critical for future operational tracing, maintenance activities and Utility Network management.

7.1.3 Pressure Sewer Assembly

Pressure sewer systems comprise interconnected assets used to transfer wastewater under pressure from one or more collection points to the receiving sewerage network.

Pressure sewer assets may include:

- Pressure Pipes;
- Property Isolation Valves;
- Boundary Kits;
- Flushing Points;
- Air Release Valves;
- Scour Assemblies;
- Pressure Sewer Laterals; and
- Associated fittings.

Typical Pressure Sewer Assembly

Sequence	Asset
1	Pressure Main
2	Pressure Sewer Lateral
3	Property Isolation Valve

Sequence	Asset
4	Boundary Kit
5	Private Pressure Sewer System

Unitywater Clarification

Pressure sewer infrastructure should be represented in a manner that accurately reflects ownership, connectivity and operational relationships between public and private infrastructure.

Property Isolation Valves typically represent an important operational boundary between Unitywater-owned and privately-owned assets.

Pressure sewer assets should be represented consistently with approved As Constructed drawings and the applicable pressure sewer system configuration.

7.1.4 Boundary Kit Assembly

Boundary Kit Assemblies provide the operational interface between Unitywater-owned pressure sewer infrastructure and privately-owned pressure sewer infrastructure.

Boundary Kit Assemblies commonly include:

- Pressure Sewer Lateral;
- Property Isolation Valve;
- Boundary Kit;
- Associated fittings;
- Ownership transition point; and
- Private pressure sewer infrastructure.

Typical Boundary Kit Assembly

Sequence	Asset
1	Pressure Main
2	Pressure Sewer Lateral
3	Property Isolation Valve
4	Boundary Kit
5	Private Pressure Sewer Infrastructure

Unitywater Clarification

Boundary Kit Assemblies form an important operational and ownership interface within pressure sewer systems.

Boundary Kit infrastructure should be represented in a manner that:

- Clearly identifies public and private infrastructure boundaries;
- Supports network connectivity;
- Supports asset ownership attribution;
- Supports future maintenance activities; and
- Accurately reflects the infrastructure delivered under the completed project scope..

Property Isolation Valves typically represent a significant operational boundary between Unitywater-owned and privately-owned infrastructure and should be attributed accordingly.

Where Boundary Kit infrastructure forms part of a pressure sewer installation, associated assets should be represented consistently with certified As Constructed documentation and the installed operational configuration.

7.1.5 Vacuum Sewer Assembly

Vacuum sewer systems transfer wastewater using negative pressure and comprise specialised vacuum collection and transport infrastructure.

Vacuum sewer assets may include:

- Collection Chambers;
- Vacuum Interface Valves;
- Vacuum Mains;
- Isolation Valves;
- Rodding Points;
- Vacuum Stations; and
- Associated fittings and equipment.

Typical Vacuum Sewer Assembly

Sequence	Asset
1	Property Connection
2	Collection Chamber
3	Vacuum Interface Valve
4	Vacuum Main
5	Vacuum Station

Unitywater Clarification

Vacuum sewer assets should be represented in a manner that supports network connectivity and clearly identifies the relationship between collection infrastructure and the vacuum transport network.

Vacuum sewer assets should accurately represent the final operational infrastructure and associated asset relationships.

7.1.6 Sewage Pumping Station Assemblies

Sewage Pumping Stations (SPS) comprise multiple interconnected civil, mechanical, electrical and operational assets that collectively perform wastewater transfer functions.

Typical Pumping Assembly

Sequence	Asset
1	Inlet Sewer
2	Pump Well
3	Pump Assembly
4	Valve Chamber
5	Flowmeter
6	Rising Main

Typical Ventilation Assembly

Sequence	Asset
1	Pump Well
2	Vent Pipe
3	Vent Pole

Typical Odour Control Assembly

Sequence	Asset
1	Pump Well
2	Odour Control Unit
3	Vent Stack

Typical Potable Water Assembly

Sequence	Asset
1	Water Service
2	Water Meter

Sequence	Asset
3	RPZ Device
4	Well Washer System

Typical Overflow Assembly

Sequence	Asset
1	Pump Well
2	Overflow Chamber
3	Non-Return Valve
4	Overflow Main

Typical Flow Meter Assembly

Sequence	Asset
1	Rising Main
2	Isolation Valve
3	Flow Meter
4	Access Chamber
5	Rising Main

Typical Air Valve Assembly

Sequence	Asset
1	Rising Main
2	Isolation Valve
3	Air Release Valve
4	Access Chamber

Unitywater Clarification

Sewage Pumping Station assets should be represented in a manner that accurately reflects the final operational facility.

Particular attention should be given to:

- Asset connectivity;
- Spatial relationships;

- Civil infrastructure;
- Mechanical infrastructure;
- Electrical infrastructure;
- Instrumentation infrastructure;
- Telemetry and monitoring assets;
- Pumps;
- Flow monitoring infrastructure;
- Air management infrastructure;
- Overflow infrastructure;
- Isolation valve infrastructure;
- Non-Return Valve infrastructure;
- Access chambers; and
- Associated operational asset assemblies.

Operationally significant SPS assets should not be omitted from ADAC submissions solely because they form part of a larger facility.

SPS asset assemblies should be represented consistently with the certified As Constructed documentation and the infrastructure delivered under the completed project scope..

7.1.7 Unitywater Review Checks

Unitywater may review sewerage asset submissions to confirm:

- Sewer network connectivity has been maintained;
- Asset geometry reflects the adopted geometry reference point;
- Maintenance structures are represented appropriately;
- Pressure sewer assets are connected correctly;
- Boundary Kit Assemblies are represented consistently with the installed pressure sewer configuration;
- Vacuum sewer assets are represented consistently with approved documentation;
- Sewage Pumping Station assets are represented consistently with certified documentation;
- Asset ownership is represented correctly;
- Asset status reflects the infrastructure delivered under the completed project scope; and
- Asset assemblies are represented in a manner consistent with the intended operational infrastructure.

7.2 Connection

Asset Capture:

Complex linear feature (polyline comprised of straight-line segments) representing the invert of the connection pipe asset.

Line direction shall be captured in the direction of gravity flow from the inspection opening towards the connecting sewer main, maintenance hole or other receiving sewerage asset.

Refer to the applicable connection arrangement figures for examples of jump-up connections, sloped branch connections and stub connections.

Unitywater Requirement

Unitywater requires Sewer Connection assets to be represented using invert-based geometry.

Recorded levels, geometry and associated survey information shall be consistent with the invert of the installed sewer connection.

Spatial Relationship:

The downstream end of the connection shall be coincident with either:

- A sewer main;
- A maintenance hole;
- A maintenance shaft;
- An inspection opening; or
- Another approved receiving sewerage asset.

Connection assets should maintain network connectivity and accurately represent the infrastructure delivered under the completed project scope..

Figure 7.1 – Sewer House Connection Examples

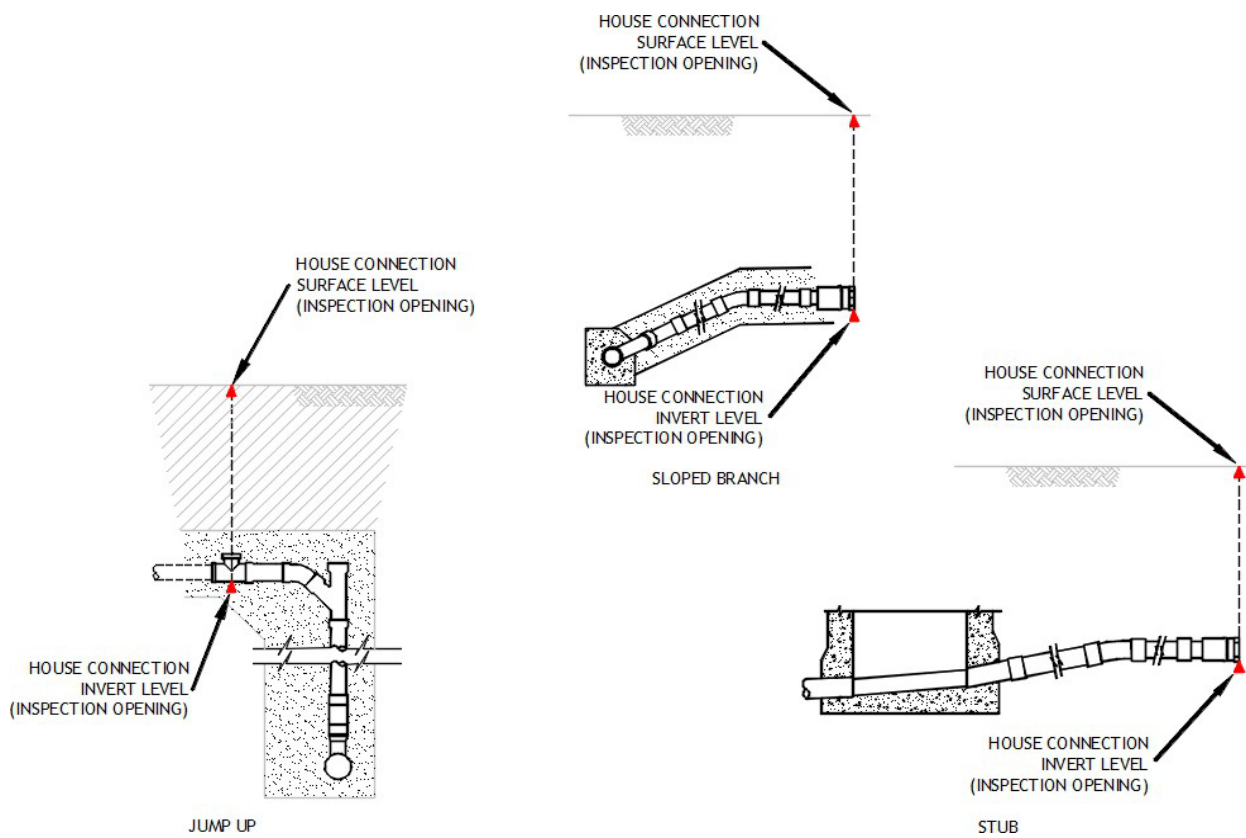
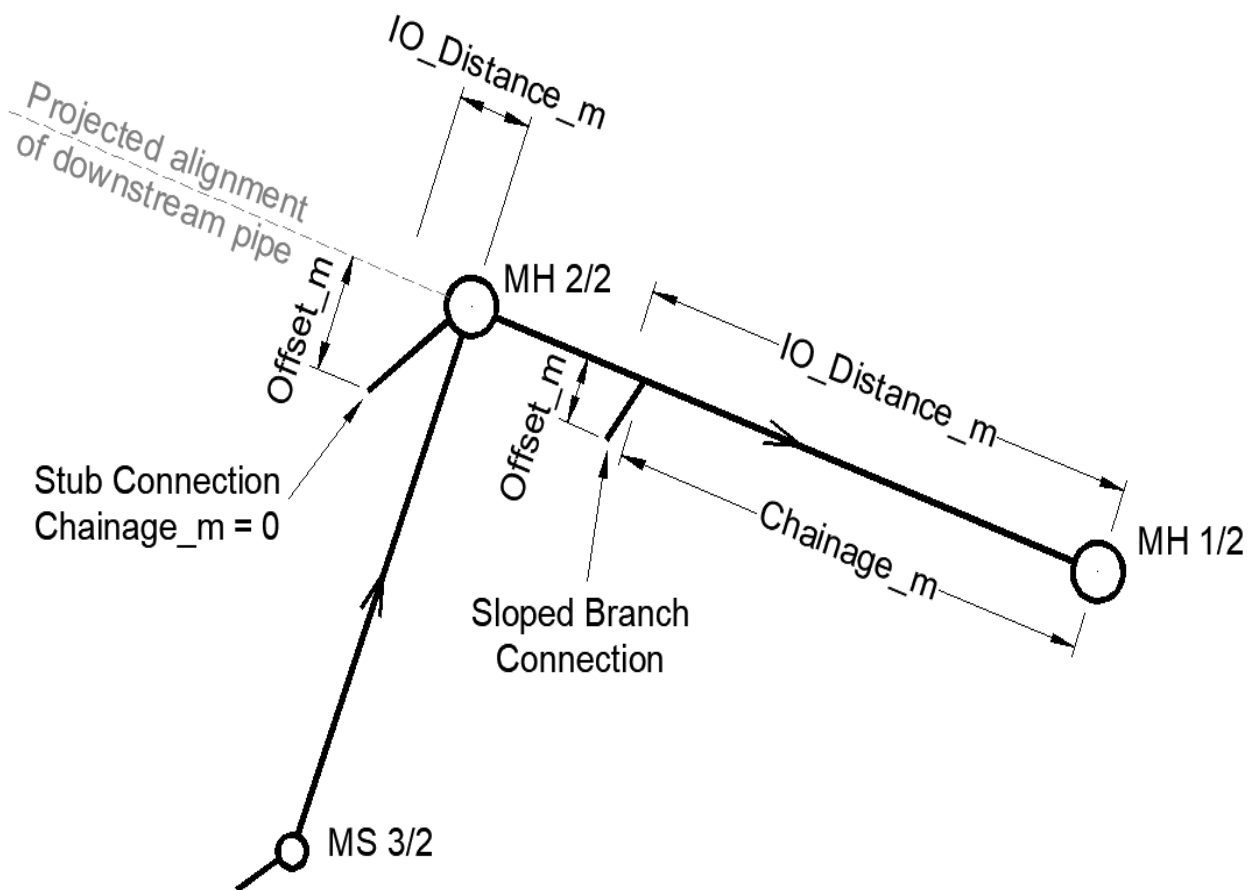


Figure 7.2 – Dimensional Attribution Details for Sewer House Connections



Unitywater Clarification:

Connection assets play an important role in maintaining sewer network connectivity and serviceability.

Connection assets also form an important component of the broader Gravity Sewer Assembly and provide the operational link between the property drainage system and the reticulation sewer network.

Accurate representation of Connection assets assists with property servicing verification, maintenance activities, network tracing and Utility Network connectivity.

Connection geometry should be consistent with:

- As Constructed drawings;
- Survey information;
- Lot servicing arrangements;
- Property connection layouts; and

- Associated sewerage assets.

Connections should accurately represent the final constructed arrangement and should not introduce unintended gaps or disconnected assets within the sewerage network.

Connection assets should remain connected to the receiving sewer infrastructure represented within the ADAC XML submission.

Typical Gravity Sewer Service Assembly

Sequence	Asset
1	Property Sewer System
2	Connection
3	Non-Pressure Pipe
4	Maintenance Hole
5	Gravity Sewer Network

Unitywater Clarification

The Connection asset forms part of a larger gravity sewer service arrangement and should be represented in a manner that accurately reflects the final operational relationship between the serviced property and the receiving sewerage network.

Table 7.2 – Connection Attributes

Element Name	Mandatory (Y/N)
SurfaceLevel_m	Y
InvertLevel_m	Y
Use	Y
Diameter_mm	Y
Material	Y
Class	Y
Length_m	Y
Type	Y
Chainage_m	Y
Offset_m	Y
LineNumber	N
DSMHID	N

Element Name	Mandatory (Y/N)
IO_Distance_m	Y
SO_Nearest_m	Y
SO_Other_m	Y
Sediment_Trap	Y

7.2.1 Unitywater Review Checks

Unitywater may review Connection assets to confirm:

- Connection assets remain connected to the receiving sewer network;
- Geometry direction is consistent with gravity flow;
- Mandatory dimensional information is provided;
- Service connections align with associated lot servicing arrangements;
- Connection geometry is consistent with certified As Constructed documentation;
- Chainage and offset information is recorded correctly;
- Property servicing relationships are consistent with associated cadastral information;
- Asset attribution reflects the installed infrastructure; and
- Notes information has been provided where additional clarification is required.

7.3 Fitting

Asset Capture:

Single point feature representing the centre point of the fitting.

Unitywater requires long radius bends to be represented as individual Fitting assets.

Where a long radius bend is installed, the associated sewer pipe shall be segmented to allow the bend to be independently represented and attributed within the ADAC XML submission.

Fittings represent important connectivity points within the sewerage network and are used to identify changes in direction, alignment, diameter or asset configuration.

Where fittings form part of a larger operational asset assembly, they should be represented as individual assets to preserve network connectivity, asset attribution and long-term asset management information.

Spatial Relationship:

Fittings shall be coincident with:

- The end of pipe assets; or

- A pipe asset along its length,

as appropriate for the installed configuration.

Fittings shall maintain network connectivity and accurately represent the physical arrangement of the constructed sewerage network.

Unitywater Clarification:

Fittings should be captured at locations where they form part of the operational sewer network and should be consistent with:

- Survey information;
- As Constructed drawings;
- Asset connectivity requirements; and
- The final constructed arrangement.

Fittings are commonly used to represent:

- Bends;
- Tees;
- Wyes;
- Tapers;
- Connectors; and
- Other approved sewerage pipe junctions and transitions.

Fittings should be represented as individual assets and should not be incorporated into adjacent pipe assets.

The representation of fittings as discrete assets assists with Utility Network traceability, network analysis and future maintenance activities.

Long radius bends, tees, wyes and other significant fittings should remain identifiable within the ADAC XML submission and associated asset records.

Typical Asset Assembly Relationship

Sequence	Asset
1	Non-Pressure Pipe
2	Fitting
3	Non-Pressure Pipe

Unitywater Clarification

Fittings are typically used to connect, redirect or transition between sewerage assets.

The fitting should be represented as an individual asset located at the point of transition or change and should maintain connectivity with all associated sewer assets.

Table 7.3 – Fitting Attributes

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Lining	Y
Protection	Y
BodySize_mm	Y
BranchSize_mm	Y (if Type = Taper, Tee or Wye)
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Proprietary fittings;
- Non-standard fittings;
- Special sewerage fittings;
- Assets represented using the value **Other**; or
- Other fitting characteristics not adequately represented by the available schema attributes.

7.3.1 Unitywater Review Checks

Unitywater may review Fitting assets to confirm:

- Fitting type is correctly attributed;
- Branch size information is provided where required;
- Long radius bends are represented as individual assets;
- Fittings are not incorporated into adjoining pipe assets;
- Asset locations are consistent with certified As Constructed documentation;
- Connectivity has been maintained between fittings and associated sewer assets;
- Asset attribution reflects the installed infrastructure;
- Valid ADAC enumerations have been used; and
- Notes information has been provided where additional clarification is required.

7.4 Maintenance Hole

Asset Capture:

Single point feature located at the centre of the maintenance hole on the top surface.

Where the access cover is not centrally positioned over the maintenance hole structure, the surveyed location should represent the centre of the maintenance hole structure rather than the centre of the cover.

Spatial Relationship:

Maintenance Holes form a critical component of the sewerage network and shall be represented in a manner that supports network connectivity between incoming and outgoing sewer assets.

Associated sewer pipes shall connect to the Maintenance Hole representation in a manner that supports:

- Network connectivity;
- Validation processes;
- GIS integration; and
- Future network tracing activities.

Unitywater Clarification

Maintenance Holes represent key operational and maintenance access points within the sewerage network.

Maintenance Holes are critical connectivity assets within Gravity Sewer Assemblies and typically define the operational relationship between adjoining sewer mains, property connections and maintenance access infrastructure.

Maintenance Holes provide an important reference point for network tracing, hydraulic analysis, maintenance activities and Utility Network connectivity.

Prefabricated Maintenance Holes

Where prefabricated Maintenance Holes are installed, the manufacturer and model information should be provided to support future asset identification, maintenance activities and renewal planning.

Where proprietary Maintenance Shaft systems have been selected from products included within the current Infrastructure Products and Materials (IPAM) lists, sufficient manufacturer and product information should be supplied to support future asset identification, maintenance activities and renewal planning.

Where dedicated schema attributes are not available, this information should be recorded within the Notes attribute.

Examples include:

- Modular Maintenance Hole systems;

- Proprietary chamber systems;
- Factory manufactured structures; and
- Other approved prefabricated installations.

Typical Gravity Sewer Assembly Relationship

Sequence	Asset
1	Non-Pressure Pipe
2	Maintenance Hole
3	Non-Pressure Pipe
4	Property Connection (where applicable)

Unitywater Clarification

Maintenance Holes typically act as the primary connectivity node within gravity sewer networks.

Associated sewer assets should be represented in a manner that maintains connectivity with the Maintenance Hole and accurately reflects the final operational network arrangement.

Table 7.4 – Maintenance Hole Attributes

Element Name	Mandatory (Y/N)
Type	Y
Use	Y
ChamberSize.Rectangular.Width_mm	Y (if rectangular)
ChamberSize.Rectangular.Length_mm	Y (if rectangular)
ChamberSize.Circular.Diameter_mm	Y (if circular)
ChamberSize.Custom.Area_m2	Y (if custom)
ShaftSizeDiameter_mm	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
FloorConstruction	Y
FloorMaterial	Y
WallConstruction	Y
WallMaterial	Y
RoofMaterial	Y

Element Name	Mandatory (Y/N)
Lining	Y
LidType	Y
LidAccessRestraint	Y
LidMaterial	Y
DropType	Y
Benching	N
CatchmentPS	N
LineNumber	Y
MH_Number	N
Chainage_m	N
TieDistance_m	N
OffsetDistance_m	Y
Rotation	Y

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Prefabricated Maintenance Holes;
- Proprietary chamber systems;
- Non-standard configurations;
- Special construction arrangements;
- Manufacturer details;
- Model information; or
- Asset characteristics not adequately represented by standard schema attributes.

7.4.1 Unitywater Review Checks

Unitywater may review Maintenance Hole assets to confirm:

- Maintenance Hole locations are consistent with certified As Constructed documentation;
- Surface and invert levels are reasonable and internally consistent;
- Chamber dimensions align with the installed structure;
- Maintenance Holes maintain connectivity with associated sewer assets;

- Asset attribution reflects the installed infrastructure;
- Prefabricated structures include appropriate manufacturer and product information where applicable;
- Valid ADAC enumerations have been used;
- Notes information has been provided where additional clarification is required; and
- The Maintenance Hole is represented consistently with the infrastructure delivered under the completed project scope.

7.5 Maintenance Shaft (Including Inspection Openings at End-of-Lines)

Asset Capture:

Single point feature located at the centre of the shaft on the top surface.

The surveyed position should represent the centre of the Maintenance Shaft structure and not necessarily the centre of the access cover where these locations differ.

Spatial Relationship:

Maintenance Shafts form part of the operational sewer network and should be represented in a manner that supports network connectivity and future maintenance activities.

Associated sewer pipes should maintain connectivity with the Maintenance Shaft representation within the ADAC XML submission.

Unitywater Clarification

Maintenance Shafts provide access to the sewer network where the installation of a Maintenance Hole is not required or where network configuration permits the use of a shaft structure.

Maintenance Shafts form part of the broader Gravity Sewer Assembly and provide operational access, inspection and maintenance capability within the sewer network.

Maintenance Shafts support network tracing, maintenance activities and Utility Network connectivity while reducing the need for larger maintenance structures in appropriate locations.

Maintenance Shafts and Inspection Openings

For the purposes of ADAC capture, Inspection Openings located at sewer end-of-lines should be captured as Maintenance Shafts where required by the applicable ADAC Schema and Asset Information Specification.

The captured asset should accurately represent the installed configuration and associated sewer network connectivity.

Where Inspection Openings form the terminal point of a Gravity Sewer Assembly, the asset representation should support both operational understanding and future maintenance activities.

Prefabricated Maintenance Shafts

Manufacturer and Model Number information should be provided for prefabricated Maintenance Shaft systems.

Where dedicated schema attributes are not available, this information should be recorded within the Notes attribute.

Where proprietary Maintenance Shaft systems have been selected from products included within the current Infrastructure Products and Materials (IPAM) lists, sufficient manufacturer and product information should be supplied to support future asset identification, maintenance activities and renewal planning.

Typical Gravity Sewer Assembly Relationship

Sequence	Asset
1	Non-Pressure Pipe
2	Maintenance Shaft
3	Non-Pressure Pipe
4	Inspection Opening (where applicable)

Unitywater Clarification

Maintenance Shafts typically provide operational access to sewer mains while maintaining network connectivity.

Maintenance Shafts should be represented as individual assets and connected to the associated sewer infrastructure in a manner that accurately reflects the final operational network arrangement.

Table 7.5 – Maintenance Shaft Attributes

Element Name	Mandatory (Y/N)
Type	Y
Diameter_mm	Y
RiserDiameter_mm	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
BaseMaterial	Y
RiserMaterial	Y
LidType	Y
LidAccessRestraint	Y
LidMaterial	Y

Element Name	Mandatory (Y/N)
Manufacturer	Y
ModelNumber	Y
CatchmentPS	N
LineNumber	N
MH_Number	Y
Chainage_m	N
TieDistance_m	N
OffsetDistance_m	N
Rotation	Y

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Proprietary Maintenance Shaft systems;
- Inspection Openings;
- Non-standard shaft arrangements;
- Manufacturer details;
- Model information;
- Special construction requirements; or
- Asset characteristics not adequately represented by standard schema attributes.

7.5.1 Unitywater Review Checks

Unitywater may review Maintenance Shaft assets to confirm:

- Maintenance Shaft locations are consistent with certified As Constructed documentation;
- Shaft and riser dimensions align with the installed structure;
- Surface and invert levels are reasonable and internally consistent;
- Manufacturer and model information has been provided where applicable;
- Inspection Openings have been represented appropriately;
- Connectivity has been maintained with associated sewer assets;
- Asset attribution reflects the installed infrastructure;
- Valid ADAC enumerations have been used;

- Notes information has been provided where additional clarification is required; and
- The asset is represented consistently with the infrastructure delivered under the completed project scope.

7.6 Non-Pressure Pipe

Asset Capture:

Complex linear feature (polyline comprised of straight-line segments) representing the invert of the sewer pipe asset.

Unitywater Requirement

Unitywater requires gravity sewer pipes to be represented using invert-based geometry.

The upstream and downstream invert levels associated geometry and survey information shall be consistent with the invert of the installed sewer pipe.

The upstream and downstream ends of the pipe should be represented at the intersection between the pipe wall and the inside face of the receiving structure.

Pipes shall be captured and represented based on their physical characteristics and asset attributes.

A separate sewer pipe asset shall be created where there is a change to:

- Diameter;
- Material;
- Class;
- Lining;
- Protection;
- Ownership;
- Asset Status; or
- Other attributes requiring separate asset representation.

Sewer connections shall not be used to create unnecessary breaks in a sewer main.

Non-Pressure Pipes represent the primary conveyance assets within Gravity Sewer Assemblies and should be represented in a manner that maintains connectivity between all associated sewer network assets.

Pipe geometry, asset attribution and connectivity should collectively represent the final operational sewer network and support future Utility Network integration.

Spatial Relationship:

Non-Pressure Pipes shall maintain connectivity with:

- Maintenance Holes;
- Maintenance Shafts;
- Inspection Openings;
- Sewer Connections; and
- Other connected sewer assets.

Pipe geometry should accurately represent the final constructed arrangement while maintaining network connectivity.

Unitywater Clarification:

The ADAC geometry of a sewer pipe should represent both:

- The surveyed location of the asset; and
- The operational connectivity of the sewer network.

Non-Pressure Pipe assets are fundamental to network traceability and should support future network analysis, maintenance planning, hydraulic assessment and Utility Network activities.

Connectivity should be maintained regardless of the survey methodology used to capture associated maintenance structures.

Typical Gravity Sewer Assembly Relationship

Sequence	Asset
1	Maintenance Hole
2	Non-Pressure Pipe
3	Maintenance Hole
4	Property Connection (where applicable)
5	Maintenance Shaft or Inspection Opening (where applicable)

Unitywater Clarification

Non-Pressure Pipes provide the primary hydraulic connection between structures within a Gravity Sewer Assembly.

Pipe geometry should maintain connectivity with all associated sewer assets and accurately represent the final operational arrangement constructed on site.

Table 7.6 –Non-Pressure Pipe Attributes

Element Name	Mandatory (Y/N)
LineNumber	Y

Element Name	Mandatory (Y/N)
Use	Y
Diameter_mm	Y
Material	Y
Class	Y
Lining	Y
Protection	Y
JointType	Y
US_InvertLevel_m	Y
DS_InvertLevel_m	Y
US_SurfaceLevel_m	Y
DS_SurfaceLevel_m	Y
Alignment_m	N
Depth_m	Y
Embedment	Y
RockExcavated	Y
PipeGrade	N
Length_m	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Proprietary pipe systems;
- Non-standard installations;
- Special construction methods;
- Alternative materials;
- Alternative embedment systems;
- Rehabilitation works; or
- Asset characteristics not adequately represented by the available schema attributes.

Pipe Break Requirements

A separate Non-Pressure Pipe asset shall be created where any of the following occur:

- Change in pipe diameter;

- Change in pipe material;
- Change in pipe class;
- Change in lining;
- Change in protection;
- Change in ownership;
- Change in Asset Status;
- Maintenance Holes;
- Maintenance Shafts;
- Valves; or
- Other assets requiring separate asset representation.

Sewer pipes should not be broken solely because a property connection joins the main.

Pipe segmentation should reflect changes in asset characteristics or operational requirements and not simply the presence of intermediate survey observations or geometry vertices.

7.6.1 Unitywater Review Checks

Unitywater may review Non-Pressure Pipe assets to confirm:

- Pipe geometry direction is consistent with gravity flow;
- Upstream and downstream invert levels are reasonable and internally consistent;
- Pipe endpoints maintain connectivity with associated maintenance structures;
- Pipe geometry is consistent with certified As Constructed documentation;
- Pipe break requirements have been applied appropriately;
- Unnecessary pipe segmentation has been avoided;
- Property Connections have not been used as pipe break locations unless required by a change in asset attributes;
- Material, class, lining and protection information reflects the installed asset;
- Valid ADAC enumerations have been used;
- Notes information has been provided where additional clarification is required; and
- Pipe geometry accurately represents the final operational sewer network.

7.7 Pressure Pipe

Asset Capture:

Complex linear feature (polyline comprised of straight-line segments) representing the pressure wastewater pipe asset.

Unitywater requires Pressure Pipe assets to be represented using top of pipe (obvert) geometry.

Pipe geometry, survey information, asset attributes and As Constructed documentation shall utilise a consistent top of pipe reference point throughout the submission.

Pressure Pipe assets shall be captured and represented based on their physical characteristics and asset attributes.

A separate Pressure Pipe asset shall be created where there is a change to:

- Diameter;
- Material;
- Class;
- Lining;
- Protection;
- Ownership;
- Asset Status; or
- Other attributes requiring separate asset representation.

Pressure Pipe assets should be represented as individual pipe assets and should accurately reflect the final constructed arrangement.

Pressure Pipe assets form the primary conveyance component within pressure wastewater systems and are critical to maintaining network connectivity between pumping stations, pressure sewer assemblies, valve assemblies, fittings, discharge structures and receiving wastewater infrastructure.

Pipe geometry, asset attribution and connectivity should accurately represent the final operational pressure wastewater network.

Spatial Relationship:

Pressure Pipe assets shall maintain connectivity with:

- Sewage Pumping Stations;
- Maintenance Holes;
- Gravity Sewers;
- Valves;
- Fittings;
- Air Valve Assemblies;
- Scour Assemblies;

- Pressure Sewer Assemblies; and
- Other connected wastewater assets.

Pipe geometry should accurately represent the final constructed arrangement while maintaining network connectivity.

Unitywater Clarification:

Pressure Pipe geometry should be consistent with:

- Survey information;
- As Constructed drawings;
- Longitudinal sections;
- Asset connectivity requirements; and
- The infrastructure delivered under the completed project scope..

Pressure wastewater infrastructure forms part of a network that relies on correct connectivity to support future operational, maintenance and modelling activities.

Pressure Pipe assets are fundamental to Utility Network traceability and should support future operational analysis, maintenance activities, asset management processes and network investigation.

Connectivity should be maintained throughout the pressure wastewater network regardless of the survey methodology adopted for associated assets.

Pressure Pipe Network Configurations

Pressure Pipe assets may form part of a variety of wastewater network configurations including:

- Pressure Sewer Schemes;
- Sewage Pumping Station rising mains;
- Wastewater transfer systems;
- Connections between Sewage Pumping Stations;
- Connections to Maintenance Holes;
- Connections to Gravity Sewers;
- Syphon arrangements; and
- Other pressure wastewater infrastructure.

Pressure Pipe connectivity shall be maintained between all associated wastewater assets to accurately represent the final operational network.

The downstream asset may be a Sewage Pumping Station, Maintenance Hole, Gravity Sewer, Treatment Facility or other wastewater asset depending on the operational network configuration.

Typical Rising Main Relationship

Sequence	Asset
1	Sewage Pumping Station
2	Discharge Valve Assembly
3	Pressure Pipe (Rising Main)
4	Air Valve Assembly (where applicable)
5	Receiving Maintenance Hole
6	Gravity Sewer

Unitywater Clarification

A Pressure Pipe asset may represent a rising main conveying wastewater from a Sewage Pumping Station to a receiving Maintenance Hole, Gravity Sewer, Treatment Facility or other wastewater infrastructure.

Connectivity shall be maintained between all associated assets to accurately represent the final operational wastewater network.

A rising main may also convey wastewater between Sewage Pumping Stations or other wastewater infrastructure depending on the final operational network arrangement.

Typical Pressure Sewer Assembly Relationship

Sequence	Asset
1	Pressure Main
2	Pressure Pipe
3	Property Isolation Valve
4	Boundary Kit
5	Private Pressure Sewer Infrastructure

Unitywater Clarification

Pressure Pipe assets provide the primary hydraulic connection between pressure sewer infrastructure components.

Pressure Pipe geometry should maintain connectivity with associated valves, fittings, pumping infrastructure and receiving sewer assets while accurately representing the final operational network.

Table 7.7 – Pressure Pipe Attributes

Element Name	Mandatory (Y/N)
Type	Y
Use	Y
Diameter_mm	Y
InternalDiameter_mm	N
US_InvertLevel_m	N
DS_InvertLevel_m	N
US_SurfaceLevel_m	N
DS_SurfaceLevel_m	N
Material	Y
Class	Y
Lining	Y
Protection	Y
JointType	Y
Alignment_m	N
Depth_m	Y
Embedment	Y
RockExcavated	Y
Length_m	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Proprietary pressure pipe systems;
- Special construction requirements;
- Alternative materials;
- Pressure system interfaces;
- Rehabilitation works;
- Asset characteristics not adequately represented by available schema attributes; or
- Other information considered beneficial for future asset management activities.

Pipe Break Requirements

A separate Pressure Pipe asset shall be created where any of the following occur:

- Change in pipe diameter;
- Change in pipe material;
- Change in pipe class;
- Change in lining;
- Change in protection;
- Change in ownership;
- Change in Asset Status;
- Changes in operational function;
- Valves;
- Major fittings;
- Connections to major pressure infrastructure; or
- Other assets requiring separate asset representation.

Pressure Pipe assets should be segmented to support accurate asset attribution and ongoing asset management activities.

Pipe segmentation should occur only where changes in asset characteristics, asset ownership, operational function or associated infrastructure require separate asset representation.

7.7.1 Unitywater Review Checks

Unitywater may review Pressure Pipe assets to confirm:

- Pipe geometry direction is consistent with the intended flow direction;
- Pressure Pipe assets maintain connectivity with associated valves, fittings and pressure wastewater infrastructure;
- Pipe geometry is consistent with certified As Constructed documentation;
- Material, class, lining and joint information reflects the installed asset;
- Pipe segmentation has been applied appropriately;
- Unnecessary pipe segmentation has been avoided;
- Asset ownership is represented correctly;
- Valid ADAC enumerations have been used;
- Notes information has been provided where additional clarification is required;

- Pressure Pipe geometry accurately represents the final operational pressure wastewater network; and
- Connectivity with associated Sewage Pumping Station infrastructure, where applicable, has been maintained.

7.8 Septic Tank

Asset Capture:

Septic Tanks are not required to be captured within ADAC XML submissions to Unitywater.

Unitywater Clarification

Unitywater ADAC XML submissions are intended to represent water supply, sewerage, recycled water and associated cadastral information relevant to Unitywater ownership and operational responsibilities.

Private on-site sewerage treatment systems do not generally form part of Unitywater's operational asset environment and are therefore not considered part of a Sewerage Asset Assembly for ADAC capture purposes.

Unless specifically directed otherwise, septic systems should not be represented within the ADAC XML submission.

7.8.1 Unitywater Review Checks

Unitywater may review submissions to confirm:

- Assets represented within the ADAC XML are relevant to Unitywater ownership, operation and maintenance responsibilities;
- Private septic systems have not been included unnecessarily;
- Sewerage assets intended for handover have been represented appropriately;
- Asset ownership has been attributed correctly; and
- The submission accurately represents the infrastructure delivered under the completed project scope.

7.9 Valve

Asset Capture

Single point feature representing the centre point of the valve spindle, valve box or valve chamber associated with the valve asset.

The captured location should accurately represent the installed valve position and be consistent with the surveyed location recorded within the associated As Constructed documentation.

Valves form important operational assets within Pressure Sewer Assemblies and are commonly used to support isolation, flushing, maintenance, air management and commissioning activities.

Valve assets should be represented individually to ensure appropriate asset attribution, connectivity and future asset management.

Spatial Relationship

Valves shall be connected to the associated Pressure Pipe asset and represented in a manner that maintains network connectivity.

Valve assets should be spatially coincident with the associated Pressure Pipe geometry and accurately represent the final constructed arrangement.

Unitywater Clarification

Valves form an important part of pressure sewer infrastructure and support:

- Network isolation;
- Air management;
- Flushing and scour operations;
- Maintenance activities;
- Commissioning activities; and
- Emergency response operations.

Valve locations should be consistent with:

- Survey information;
- As Constructed drawings;
- Pipe geometry;
- Associated fitting arrangements; and
- The infrastructure delivered under the completed project scope.

Valves shall be represented as individual assets and not incorporated into adjacent pipe or fitting assets.

Valve assets support network traceability, operational isolation, maintenance planning and emergency response activities.

Accurate valve representation assists with future network operations and asset management activities.

Common Valve Types

Valve arrangements commonly encountered within pressure sewer systems may include:

- Isolation Valves;
- Air Release Valves;
- Air/Vacuum Valves;

- Combination Air Valves;
- Scour Valves;
- Flushing Valves; and
- Special-purpose valve assemblies.

Where multiple valves form part of a single assembly, each valve should be represented in accordance with the applicable ADAC Schema and available asset attribution.

Common Enumeration Issues

Incorrect Valve Use and Type combinations are a common source of ADAC validation errors. Table 21 provides examples of commonly used valve Use and Type combinations.

Table 7.8 – Common Sewer Valve Use and Type Combinations

Valve Use	Valve Type
Non-Return	Generic
	Rubber Gate
	Swing Check
Service Stop Scour Diversion Zone Boundary Flow Control	Gate
	Butterfly
	Knife Gate
	Eccentric Plug
	Globe
	Ball
	Penstock
Pressure Control	Generic
	Overflow
	Pressure Relief
Gas Release	Vacuum Release
	Air Valve
Other	Special

Note: This table provides commonly used valve Use and Type combinations based on the ADAC Schema. Refer to the current ADAC Data Dictionary and Schema for the complete list of allowable values and combinations.

Valve Chambers

Pressure sewer installations may include valve chambers or access chambers associated with:

- Isolation Valves;

- Air Release Valves;
- Scour Assemblies;
- Flow Meter Installations;
- Reflux Valves;
- Pump Station Infrastructure; and
- Other specialist pressure sewer infrastructure.

Unitywater Clarification

The representation of valve chambers, pits and associated structures shall be consistent with the applicable ADAC Schema and Unitywater asset modelling requirements. Where the schema requires a separate chamber asset, the chamber shall be captured and attributed accordingly.

Combination Valve Assemblies

Combination valve assemblies may include:

- Air release functionality;
- Air intake functionality;
- Isolation valves;
- Washout connections; or
- Other associated components.

Because combination valve assemblies are frequently proprietary systems, the standard schema attributes may not always fully describe the installed arrangement.

Where additional information is required to explain the assembly configuration, manufacturer information and model information should be recorded within the Notes attribute.

Where combination valve assemblies comprise multiple operational components, the ADAC representation should accurately reflect the arrangement adopted within the infrastructure delivered under the completed project scope.

Reflux and Non-Return Valves

Pressure sewer infrastructure commonly incorporates reflux valves or other non-return devices to prevent reverse flow and protect associated pumps, rising mains and operational infrastructure.

Unitywater Clarification

Reflux Valves and Non-Return Valves perform a different operational function to isolation valves and should be attributed using the most appropriate valve classification available within the ADAC Schema.

Submission Providers should ensure valve attribution accurately reflects the operational purpose of the installed valve and is consistent with the certified As Constructed documentation.

Where reflux valves form part of a larger Pump Station, Rising Main or Flow Meter Assembly, the operational relationship between the associated assets should be maintained.

Proprietary Valve Assemblies

Where proprietary valve assemblies are installed, Unitywater encourages the inclusion of:

- Manufacturer;
- Model Number;
- Product Name; and
- Any other identifying information relevant to future operations and maintenance.

Where dedicated ADAC attributes are unavailable, this information should be recorded within the Notes attribute.

Examples may include:

- Combination Air Valve assemblies;
- Pressure management assemblies;
- Proprietary flushing assemblies;
- Reflux Valve assemblies;
- Pump Station valve arrangements;
- Flow Meter bypass arrangements; and
- Other specialist valve systems.

Where proprietary valve assemblies have been selected from products included within the current Infrastructure Products and Materials (IPAM) lists, Submission Providers are encouraged to record sufficient manufacturer and product information to support future maintenance and asset management activities.

Typical Pressure Sewer Assembly Relationship

Sequence	Asset
1	Pressure Pipe
2	Valve
3	Fitting
4	Pressure Pipe

Unitywater Clarification

Valves typically operate in conjunction with adjoining Pressure Pipe and Fitting assets and should be represented in a manner that maintains network connectivity and accurately reflects the installed arrangement.

Valve assets should remain identifiable as individual operational assets within the ADAC XML submission.

Table 7.9 – Valve Attributes

Element Name	Mandatory (Y/N)
Type	Y
Chamber	Y
Diameter_mm	Y
Material	Y
Manufacturer	N
ModelNumber	N
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Combination valve assemblies;
- Proprietary valve systems;
- Reflux valve arrangements;
- Pump station valve infrastructure;
- Flow meter valve assemblies;
- Non-standard installations;
- Manufacturer details;
- Model information;
- Asset functionality not adequately represented by the available schema attributes; or
- Other information beneficial to future operational and maintenance activities.

7.9.1 Unitywater Review Checks

Unitywater may review Valve assets to confirm:

- Valve locations are consistent with certified As Constructed documentation;
- Valve assets maintain connectivity with associated Pressure Pipe and Fitting assets;
- Valve type and diameter information accurately reflect the installed infrastructure;
- Combination valve assemblies have been represented appropriately;

- Manufacturer and model information has been provided where applicable;
- Asset ownership and asset status have been assigned correctly;
- Valid ADAC enumerations have been used;
- Notes information has been provided where additional clarification is required;
- Valve assets are represented consistently with the infrastructure delivered under the completed project scope;
- Reflux Valves and Non-Return Valves have been attributed appropriately;
- Valve chambers and access chambers have been represented consistently with the installed arrangement;
- Flow Meter and Air Valve installations have been represented appropriately; and
- Valves associated with Sewage Pumping Station rising mains have been represented consistently with certified documentation and the installed operational arrangement.

7.10 Break Points for Linear Sewerage Assets – Sewerage Pipes

Purpose

Linear sewerage assets shall be segmented where changes occur that materially affect the asset's representation, operation, maintenance or management.

Appropriate asset segmentation supports:

- Asset registration;
- GIS integration;
- Asset lifecycle management;
- Network tracing;
- Maintenance planning;
- Future renewal activities;
- Utility Network traceability; and
- Operational asset management.

Unitywater Requirement

Unitywater requires separate sewer pipe assets to be created where any of the following occur:

- Change in pipe diameter;
- Change in pipe material;
- Change in pipe class;
- Change in lining;

- Change in protection;
- Change in ownership;
- Change in Asset Status;
- Installation of a Maintenance Hole;
- Installation of a Maintenance Shaft;
- Installation of a Fitting;
- Installation of a Long Radius Bend represented as a Fitting;
- Connection to a Valve;
- Connection to another asset type requiring independent attribution; or
- Any other circumstance where separate attribute information is required.

Asset segmentation should support both accurate asset attribution and the operational representation of the sewerage network.

The objective of pipe segmentation is to identify meaningful changes in asset characteristics, ownership, status or operational function while maintaining appropriate network connectivity.

Maintenance Holes

Sewer pipe assets shall be segmented at Maintenance Holes where required to support independent asset representation and network connectivity.

Unitywater Clarification

Maintenance Holes act as primary network connectivity nodes within Gravity Sewer Assemblies.

Pipe segmentation should support asset attribution, network tracing and future maintenance activities.

Maintenance Shafts

Sewer pipe assets shall be segmented at Maintenance Shafts where required to support independent asset representation and maintain network connectivity.

Unitywater Clarification

Maintenance Shafts form part of the operational sewer network and should be represented as distinct connectivity assets within the ADAC XML submission.

Fittings

Sewer pipe assets shall be segmented at fittings where required to allow the fitting to be independently represented as a discrete ADAC asset.

Examples include:

- Long Radius Bends;

- Tees;
- Wyes;
- Tapers;
- Connectors; and
- Other significant fittings.

Unitywater Clarification

Long Radius Bends represented as Fitting assets shall create a pipe break on each side of the fitting.

This allows the fitting to be independently attributed and represented within the ADAC XML submission.

Valves

Pressure sewer pipe assets shall be segmented where necessary to allow Valve assets to be independently represented.

Examples include:

- Isolation Valves;
- Air Release Valves;
- Combination Air Valves;
- Scour Valves;
- Reflux Valves;
- Non-Return Valves; and
- Other specialist valve installations.

Unitywater Clarification

The objective is not to create unnecessary segmentation but to ensure operational assets can be appropriately represented and connected within the pressure sewer network.

Property Connections

Property Connections shall not create mandatory break points within a sewer main unless a change in asset attributes also occurs.

Unitywater Clarification

Property servicing arrangements should maintain connectivity with the parent sewer infrastructure without introducing unnecessary segmentation.

Pressure Sewer Assemblies

Pipe segmentation should support representation of Pressure Sewer Assemblies and Boundary Kit Assemblies.

Examples include:

- Property Isolation Valves;
- Boundary Kits;
- Air Valve Assemblies;
- Scour Assemblies;
- Flushing Installations; and
- Associated fittings.

Unitywater Clarification

Segmentation should support clear identification of ownership boundaries, operational assets and network connectivity.

Sewage Pumping Station Infrastructure

Pipe segmentation should support representation of operational SPS infrastructure.

Examples include:

- Pump Discharge Pipework;
- Flow Meter Assemblies;
- Air Valve Assemblies;
- Overflow Infrastructure;
- Valve Assemblies; and
- Associated access structures.

Unitywater Clarification

Segmentation should enable SPS assets to be represented in a manner consistent with the final operational facility and associated maintenance requirements.

Asset Ownership Changes

A break point shall be created where ownership changes between infrastructure assets.

Examples may include:

- Unitywater-owned infrastructure;
- Private infrastructure;
- Pressure Sewer Property Infrastructure;
- Developer-owned infrastructure; and

- Other ownership transitions.

Unitywater Clarification

Asset ownership boundaries should be capable of being clearly identified from the ADAC XML submission.

Pipe Breaks Not Required

Unitywater does not require a sewer main to be broken solely because:

- A property connection joins the sewer main;
- Survey observations have been taken along the pipe;
- Minor geometry vertices have been included to represent alignment; or
- No associated attribute changes occur.

Unnecessary segmentation should be avoided as it increases asset complexity and may introduce avoidable maintenance and validation issues.

Network Connectivity

Pipe segmentation shall not compromise network connectivity.

All segmented pipe assets shall maintain appropriate connectivity to:

- Maintenance Holes;
- Maintenance Shafts;
- Connections;
- Valves;
- Fittings; and
- Other associated sewerage assets.

Connectivity should be always maintained regardless of the number of pipe assets used to represent the sewer network.

Pipe segmentation shall not introduce gaps, overlaps, duplicate assets or disconnected network elements. Examples include:

- Diameter change;
- Material change;
- Maintenance Hole connection;
- Property connection without pipe break; and
- Asset Status change.

Examples of pipe breaks not required include:

- Property service connection;
- Intermediate survey point;
- Geometry vertex; and
- Alignment change without attribute change.

Unitywater Clarification

The objective of pipe segmentation is to accurately represent changes in asset characteristics rather than simply increase asset count.

Pipe assets that share identical attributes and form a continuous sewer main should generally remain a single ADAC asset.

Submission Providers should avoid both under-segmentation and over-segmentation of sewer assets.

Insufficient segmentation may result in incorrect asset attribution, while excessive segmentation may create unnecessary complexity within GIS, Utility Network and asset management systems.

7.10.1 Unitywater Review Checks

Unitywater may review sewer pipe segmentation to confirm:

- Pipe breaks have been applied where asset attributes change;
- Pipe breaks occur at Maintenance Holes and Maintenance Shafts where required;
- Fittings, valves and associated sewer assets are supported by appropriate segmentation;
- Pressure Sewer Assemblies and Boundary Kit Assemblies are represented appropriately;
- SPS infrastructure is represented consistently with the installed configuration;
- Property Connections have not been used as pipe break locations unless required by a change in asset attributes;
- Excessive pipe segmentation has been avoided;
- Connectivity has been maintained between all adjoining sewer assets;
- Pipe lengths are consistent with the represented infrastructure;
- Asset statuses have been applied correctly;
- Asset ownership changes have been represented appropriately; and
- The segmented assets accurately represent the final operational sewer network.

7.11 Sewerage Submission Validation and Review

Overview

Sewerage asset information submissions shall accurately represent the infrastructure delivered under the completed project scope and support future operational, maintenance, planning and asset management activities.

Sewerage submissions should be prepared in accordance with:

- The ADAC Schema;
- The ADAC Data Dictionary;
- This Asset Information Specification;
- Certified As Constructed documentation;
- Survey information; and
- Applicable Unitywater requirements.

Submission Providers are encouraged to undertake comprehensive internal quality assurance checks prior to submission.

Network Connectivity

Sewerage submissions should maintain network connectivity throughout the sewerage system.

Network connectivity should be maintained between:

- Non-Pressure Pipes;
- Pressure Pipes;
- Connections;
- Maintenance Holes;
- Maintenance Shafts;
- Valves;
- Fittings;
- Sewage Pumping Stations; and
- Other associated sewerage assets.

Disconnected assets, unintended gaps and incomplete network relationships should be resolved prior to submission.

Gravity Sewer Verification

Submission Providers should verify that:

- Gravity sewer connectivity has been maintained;
- Maintenance Holes and Maintenance Shafts are represented appropriately;
- Pipe geometry reflects gravity flow direction;

- Property Connections are represented correctly;
- Pipe segmentation complies with this specification; and
- Gravity sewer assets accurately reflect the certified As Constructed documentation.

Pressure Sewer Verification

Submission Providers should verify that:

- Pressure sewer connectivity has been maintained;
- Pressure Pipe geometry and attribution are accurate;
- Valves and fittings are represented appropriately;
- Air Valve Assemblies are represented appropriately;
- Scour Assemblies are represented appropriately;
- Boundary Kit infrastructure has been represented correctly; and
- Pressure sewer assets accurately reflect certified As Constructed documentation.

Property Servicing Verification

Property servicing information should be verified against:

- Certified As Constructed documentation;
- Lot servicing arrangements;
- Connection information;
- Boundary Kit Assemblies have been represented consistently with ownership and servicing arrangements; and
- Supporting handover documentation.

Submission Providers should confirm that:

- Serviced lots have been represented appropriately;
- Property Connections have not been omitted;
- Ownership boundaries are represented correctly; and
- Service arrangements reflect the installed infrastructure.

Sewage Pumping Station Verification

Where Sewage Pumping Station infrastructure forms part of the submission, Submission Providers should verify that:

- Pumps have been represented appropriately;
- Rising Mains maintain connectivity;
- Flow Meter infrastructure has been represented appropriately;

- Air Valve infrastructure has been represented appropriately;
- Overflow infrastructure has been represented appropriately;
- Non-Return Valves and Reflux Valves have been represented appropriately;
- Access Chambers have been represented appropriately; and
- SPS assets accurately reflect the certified As Constructed documentation and final operational facility.

Ownership Verification

Submission Providers should confirm that:

- Asset ownership has been assigned correctly;
- Ownership transitions have been represented appropriately;
- Public and private infrastructure has been distinguished correctly; and
- Asset status values accurately reflect the operational asset environment.

ADAC Validation Requirements

Prior to submission, Submission Providers should review:

- ADAC validation reports;
- Validation warnings;
- Validation errors;
- Attribute completeness;
- Enumeration compliance; and
- Geometry compliance.

Validation issues should be resolved prior to submission wherever practicable.

Supporting Documentation

Supporting documentation may include:

- Certified As Constructed drawings;
- Survey information;
- SPS commissioning information;
- Manufacturer information;
- Proprietary asset information;
- Asset schedules; and
- Other supporting information relevant to the submitted assets.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Disconnected sewer networks;
- Incorrect asset connectivity;
- Missing Property Connections;
- Missing pressure sewer assets;
- Pipe segmentation inconsistent with break point requirements;
- Incorrect ownership attribution;
- Missing SPS infrastructure;
- Invalid enumeration values;
- Missing Notes information where clarification is required; and
- Inconsistencies between the ADAC XML submission and supporting handover documentation.

Submission Providers are encouraged to undertake a detailed quality assurance review prior to submission.

Unitywater Review Checks

Unitywater may review submissions to confirm:

- Sewer network connectivity has been maintained;
- Asset assemblies are represented consistently with the installed configuration;
- Gravity sewer assets are represented appropriately;
- Pressure sewer assets are represented appropriately;
- Boundary Kit Assemblies and public/private ownership interfaces have been represented appropriately;
- Property servicing arrangements have been represented correctly;
- Sewage Pumping Station infrastructure has been represented consistently with the installed configuration;
- Asset ownership and asset status have been assigned correctly;
- ADAC Schema requirements have been satisfied;
- Supporting information is consistent with the submitted asset data; and
- The submission accurately represents the infrastructure delivered under the completed project scope.

8. Water Supply Assets

Water Supply assets represented within an ADAC XML submission shall accurately reflect the infrastructure delivered under the completed project scope.

Asset information shall be prepared in accordance with the applicable Asset Information Specification (AIS), ADAC Schema, ADAC Data Dictionary and Unitywater requirements.

The water supply network represented within the ADAC XML should:

- Accurately reflect the constructed infrastructure;
- Maintain network connectivity;
- Be consistent with associated survey information;
- Be consistent with As Constructed drawings; and
- Include all relevant water supply assets associated with the project.

Where existing water supply assets are impacted by the works, the ADAC XML submission should accurately represent the relationship between new and existing infrastructure.

These requirements apply to water supply infrastructure regardless of water quality classification, including potable water, recycled water and other water supply systems supported by the ADAC Schema.

Unitywater Clarification

Water supply assets should be captured and attributed in a manner that supports:

- Asset registration;
- GIS integration; and
- Network tracing.

Successful schema validation does not guarantee acceptance of a water supply asset submission. Asset relationships, connectivity, ownership and other business rules may also be reviewed as part of the submission assessment process.

Generic Enumeration Values

Generic enumerations and placeholder values shall not be used where a valid ADAC enumeration exists.

Examples include:

- Unknown;
- Other; and
- Other placeholder or reserved values contained within the applicable ADAC Schema.

Where the value **Other** is used, the actual asset characteristic shall be described within the **Notes** attribute.

This requirement applies to all water supply assets unless otherwise stated.

Asset Geometry Reference Points

Unitywater requires water supply asset geometry to be captured and represented using the following survey reference points.

Table 8.1 – Water Supply Asset Geometry Reference Points

Asset Type	Geometry Reference Point
Water Pipes	Top of pipe (obvert)
Water Services	Top of pipe (obvert)
Hydrants	Centre of hydrant assembly
Valves	Centre of valve spindle, valve box or valve chamber
Meters	Centre of meter assembly
Fittings	Centre point of fitting
Maintenance Holes	Centre of structure with associated cover and invert level information

Survey information, ADAC geometry, asset attributes and As Constructed drawings shall utilise a consistent geometric reference point throughout the submission.

Mixing top-of-pipe and alternative geometry reference points for the same asset type within a submission is not acceptable.

Asset Connectivity

Unitywater requires water supply assets to be represented in a manner that maintains network connectivity throughout the ADAC XML submission.

Survey capture methodologies shall not result in disconnected assets, unintended gaps or incomplete network relationships.

Where a surveyed asset location differs from the preferred network representation, the ADAC geometry shall be represented in a manner that preserves network connectivity.

This requirement applies to all water supply assets unless otherwise stated.

8.1 Water Supply Asset Assemblies

8.1.1 Overview

Unitywater's water supply network comprises groups of interconnected assets that collectively perform defined operational functions.

While ADAC XML submissions continue to represent individual assets, understanding how those assets interact within operational asset assemblies assists with:

- Asset capture;
- Network connectivity;
- Utility Network traceability;
- Validation activities;
- Operational planning;
- Maintenance activities; and
- Long-term asset management.

Asset Assemblies are provided to assist Submission Providers in understanding the operational relationships that exist between water supply assets.

Asset Assemblies do not replace individual ADAC assets and are provided for operational context only.

8.1.2 Water Main Assembly

Sequence	Asset
1	Valve
2	Water Main
3	Fitting
4	Water Main
5	Valve

Unitywater Clarification

Water mains form the primary conveyance infrastructure within the water supply network.

Water Main Assemblies typically comprise water pipes, valves, fittings, hydrants, service connections and other associated network assets.

Water Main Assemblies should be represented in a manner that maintains network connectivity and accurately reflects the infrastructure delivered under the completed project scope..

8.1.3 Hydrant Assembly

Sequence	Asset
1	Water Main
2	Hydrant Tee
3	Reducer (where applicable)
4	Hydrant Riser

Sequence	Asset
5	Hydrant

Future Extension (Duckfoot) Hydrant Assembly

Sequence	Asset
1	Water Main
2	Isolation Valve
3	Hydrant Tee
4	Hydrant Riser
5	Hydrant

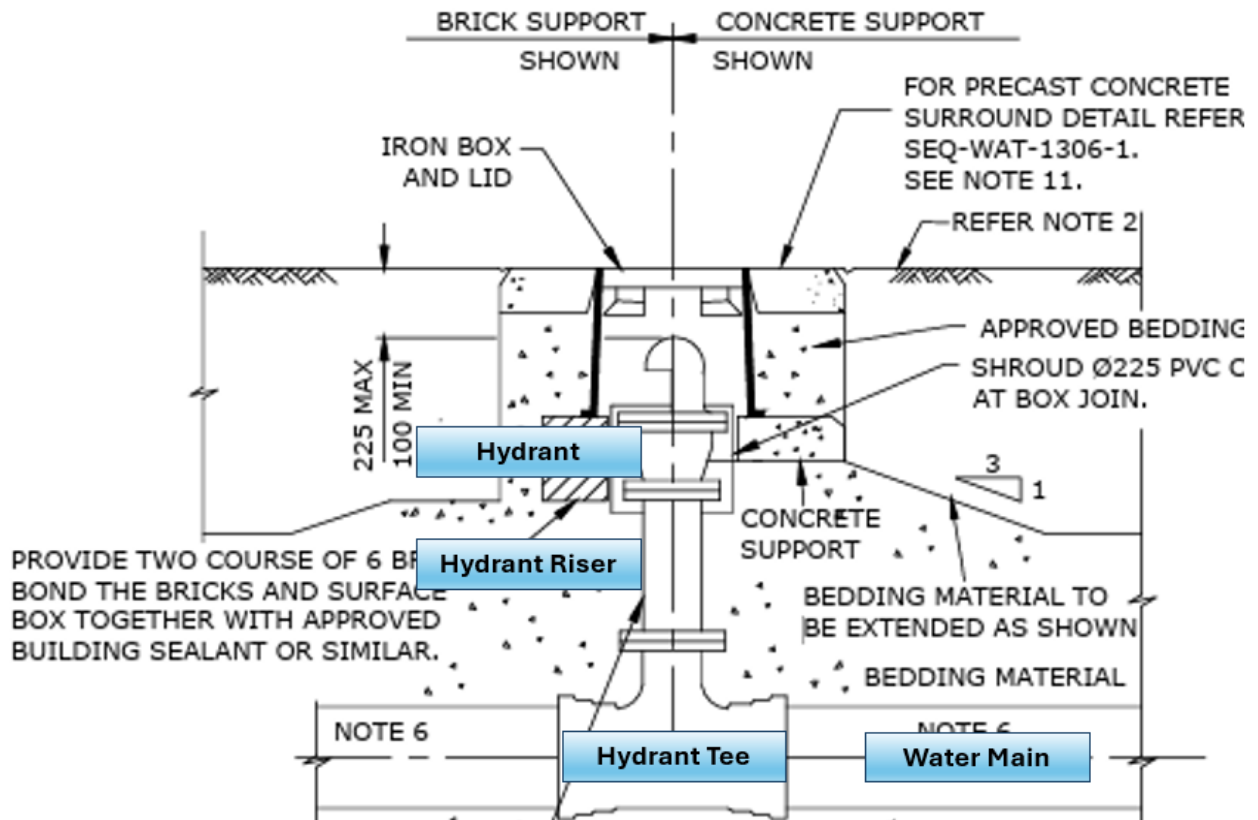
Unitywater Clarification

Hydrants rarely operate as isolated assets and should be considered within the context of the associated Hydrant Assembly.

Accurate representation of hydrant-related fittings assists with operational understanding, maintenance activities and future asset management.

Future Extension (Duckfoot) Hydrants form part of the operational water supply network and should be represented in a manner consistent with the final installed configuration.

Figure 8.1 – Example Hydrant Assembly



Example of a hydrant assembly comprising a hydrant, hydrant riser, hydrant tee and water main. Individual assets remain separate ADAC assets but collectively form a functional asset assembly.

8.1.4 Water Service Assembly

Sequence	Asset
1	Water Main
2	Tapping
3	Water Service
4	Valve
5	Water Meter

Unitywater Clarification

Water Services provide the operational connection between the water supply network and the customer metering arrangement.

Water Service Assemblies should be represented in a manner that accurately reflects ownership boundaries, operational responsibilities and network connectivity.

8.1.5 Meter Assembly

Residential Meter Assembly

Sequence	Asset
1	Water Service
2	Isolation Valve
3	Water Meter

Large Meter Assembly

Sequence	Asset
1	Isolation Valve
2	Strainer
3	Water Meter
4	Testing Port
5	Non-Return Valve
6	Isolation Valve

Unitywater Clarification

Meter installations frequently comprise multiple operational assets forming a Meter Assembly.

While the ADAC XML continues to represent individual assets, Submission Providers should consider the operational relationship between the meter, isolation valves, strainers, testing points and associated fittings when preparing asset information submissions.

8.1.6 Fire Service Assembly

Sequence	Asset
1	Water Main
2	Isolation Valve
3	Fire Service Meter
4	Testing Port
5	Backflow Prevention Device
6	Fire Service

Unitywater Clarification

Fire Service Assemblies comprise a combination of metering, isolation, testing and backflow prevention assets that collectively support fire protection infrastructure.

Fire Service Assemblies should be represented in accordance with the final operational arrangement shown on the certified As Constructed documentation.

8.1.7 Valve Assembly

Sequence	Asset
1	Water Main
2	Fitting
3	Valve
4	Surface Box or Chamber

Unitywater Clarification

Valve Assemblies provide operational isolation, maintenance and network control functions.

Valves often form part of larger operational arrangements that may include chambers, surface fittings, hydrant connections, scour arrangements or air valve installations.

8.1.8 Unitywater Review Checks

Unitywater may review submissions to confirm:

- Water supply network connectivity has been maintained;
- Asset assemblies are represented consistently with certified As Constructed documentation;
- Water services connect appropriately to the parent water supply network;
- Hydrant assemblies are represented consistently with the installed configuration;
- Meter assemblies accurately reflect the operational arrangement;
- Fire service assemblies are represented appropriately;
- Asset ownership and asset status have been assigned correctly; and
- The submission accurately represents the infrastructure delivered under the completed project scope.

8.2 Fitting

Asset Capture:

Single point feature representing the centre point of the fitting.

Long radius bends shall be represented as fittings within the ADAC XML submission.

Unitywater Requirement

Unitywater requires long radius bends to be represented as individual Fitting assets.

Where a long radius bend is installed, the associated water pipe shall be segmented to allow the bend to be independently represented and attributed within the ADAC XML submission.

Spatial Relationship:

Fittings shall be coincident with:

- The end of pipe assets; or
- A pipe asset along its length,

as appropriate for the installed configuration.

Fittings shall maintain network connectivity and accurately represent the physical arrangement of the constructed water supply network.

Unitywater Clarification:

Fittings should be captured at locations where they form part of the operational water supply network and should be consistent with:

- Survey information;
- As Constructed drawings;
- Asset connectivity requirements; and
- The final constructed arrangement.

Fittings are commonly used to represent:

- Bends;
- Tees;
- Crosses;
- Tapers;
- Reducers;
- Connectors;
- Couplings; and
- Other approved water supply fittings.

Fittings should be represented as individual assets and should not be incorporated into adjacent pipe assets.

Table 8.2 – Fitting Attributes

Element Name	Mandatory (Y/N)
Type	Y

Element Name	Mandatory (Y/N)
Material	Y
Lining	Y
Protection	Y
BodySize_mm	Y
BranchSize_mm	Y (where applicable)
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Proprietary fittings;
- Non-standard fittings;
- Special water supply fittings;
- Assets represented using the value **Other**; or
- Other fitting characteristics not adequately represented by the available schema attributes.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Incorrect fitting type selection;
- Missing branch size information where required;
- Generic material values used where a valid enumeration exists;
- Fittings represented as part of adjoining pipe assets rather than individual assets;
- Fitting locations inconsistent with As Constructed drawings;
- Missing Notes information where the value **Other** has been used; and
- Connectivity issues resulting from disconnected fitting geometry.

Submission Providers are encouraged to verify fitting attribution, connectivity and spatial location prior to generating the final ADAC XML submission and validation report.

8.3 Hydrant

Asset Capture

Single point feature representing the centre point of the hydrant assembly.

Hydrants shall be captured at the location of the installed hydrant and should accurately represent the final constructed arrangement.

Hydrant assets shall be represented as individual assets within the ADAC XML submission.

Spatial Relationship

Hydrants shall maintain connectivity with the associated water supply network.

Hydrants are typically connected to a water main via:

- A Hydrant Tee;
- Associated fittings;
- A hydrant riser; and
- Any reducers required as part of the assembly.

Hydrant assets should be spatially coincident with the associated water main connectivity and accurately represent the final installed arrangement.

Unitywater Requirement

Hydrants shall be represented as individual assets and shall not be incorporated into adjoining pipe or fitting assets.

Hydrant locations shall be consistent with:

- Survey information;
- As Constructed drawings;
- Installed asset configuration; and
- The infrastructure delivered under the completed project scope.

Unitywater Clarification

Hydrant attribution should reflect the installed hydrant assembly and not necessarily the diameter of the water main from which the hydrant is supplied.

Where a hydrant assembly incorporates a reducer between the water main and the hydrant riser, the hydrant attributes should reflect the installed hydrant assembly.

For Unitywater installations, hydrant assemblies typically incorporate a DN100 hydrant riser regardless of the diameter of the water main to which the hydrant is connected.

Hydrant information should be consistent with:

- The installed hydrant assembly;
- Associated fittings;
- Survey information;
- As Constructed drawings; and
- Supporting project documentation.

Hydrant Location Requirements

Hydrant locations should be consistent with the applicable SEQ Code requirements, approved design drawings and As Constructed information.

Hydrant assets should be represented at the installed hydrant location and not at the connection tee on the water main.

Proprietary Hydrant Assemblies

Where proprietary hydrant assemblies or non-standard installations are utilised, additional information should be provided to support future asset identification and maintenance activities.

Where dedicated schema attributes are unavailable, this information should be recorded within the Notes attribute.

Information may include:

- Manufacturer;
- Model Number;
- Product designation; and
- Other identifying information relevant to future operations and maintenance.

Table 8.3 – Hydrant Attributes

Element Name	Mandatory (Y/N)
Type	Y
Diameter_mm	Y
Manufacturer	N
ModelNumber	N
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Proprietary hydrant assemblies;
- Non-standard installations;
- Manufacturer details;
- Model information;
- Special operational requirements; or
- Asset characteristics not adequately represented by available schema attributes.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Hydrant diameter attributed using the diameter of the connected water main;
- Hydrant locations inconsistent with As Constructed drawings;
- Hydrant assets omitted from the ADAC XML submission;
- Hydrant assemblies not represented consistently with the installed configuration;
- Duckfoot Hydrants or future extension hydrants omitted from the ADAC XML submission;
- Missing manufacturer or model information where applicable;
- Generic attribute values used where valid enumerations exist;
- Missing Notes information where additional clarification is required; and
- Hydrant assets not connected appropriately to the associated water supply network.

Submission Providers are encouraged to verify hydrant locations, assembly configuration, asset attribution and supporting documentation prior to generating the final ADAC XML submission and validation report.

8.4 Valve

Asset Capture

Single point feature representing the centre point of the valve spindle, valve box or valve chamber associated with the valve asset.

The captured location should accurately represent the installed valve position and be consistent with the surveyed location recorded within the associated As Constructed documentation.

Valve assets form important operational components of the water supply network and support isolation, maintenance, commissioning and operational activities.

Valve assets shall be represented as individual assets within the ADAC XML submission to support asset attribution, connectivity and future asset management activities.

Spatial Relationship

Valves shall maintain connectivity with the associated Water Pipe asset and be represented in a manner that maintains network connectivity.

Valve assets should be spatially coincident with the associated Water Pipe geometry and accurately represent the final installed arrangement.

Where valve chambers are installed, the valve location shall represent the valve asset itself and not merely the surrounding chamber structure.

Unitywater Requirement

Unitywater requires valves to be represented as individual assets and not incorporated into adjacent Water Pipe or Fitting assets.

Valve locations shall be consistent with:

- Survey information;
- As Constructed drawings;
- Installed asset configuration; and
- The infrastructure delivered under the completed project scope.

Unitywater Clarification

Valves form an important part of the water supply network and support:

- Network isolation;
- Maintenance activities;
- Commissioning activities;
- Operational control;
- Emergency response activities; and
- Future network modifications.

Valve locations should be consistent with:

- Survey information;
- As Constructed drawings;
- Associated fittings;
- Associated water mains; and
- The infrastructure delivered under the completed project scope..

Valve assets shall be represented as individual assets and should remain identifiable within the ADAC XML submission.

Accurate valve representation assists with future network operations, maintenance activities, outage management and Utility Network traceability.

Common Valve Types

Valve arrangements commonly encountered within water supply systems may include:

- Resilient Seated Gate Valves;
- Butterfly Valves;
- Air Valves;
- Scour Valves;
- Pressure Reducing Valves;
- Pressure Sustaining Valves;

- Control Valves;
- Isolation Valves; and
- Other approved valve configurations.

Where multiple valves form part of a single operational arrangement, each valve should be represented in accordance with the applicable ADAC Schema and available asset attribution.

Common Enumeration Issues

Incorrect Valve Use and Type combinations are a common source of ADAC validation errors. Table 26 provides examples of commonly used valve Use and Type combinations.

Table 8.4 – Common Water Valve Use and Type Combinations

Valve Use	Valve Type
Non-Return	Generic Non-Return
	Rubber Gate
	Swing Check
	Wafer
	RPZ
Stop Scour Diversion Zone Boundary Flow Control Bypass Service	Gate
	Butterfly
	Knife Gate
	Eccentric Plug
	Globe
	Ball
	Vee Ported Ball
	Control
Pressure Control	Overflow
	Pressure Relief
	Pressure Sustaining
	Altitude
	Vacuum Release
Gas Release	Air Valve
Other	Special

Note: This table provides commonly used valve Use and Type combinations based on the ADAC Schema. Refer to the current ADAC Data Dictionary and Schema for the complete list of allowable values and combinations.

Valve Chambers

Some water supply installations include valve chambers or access chambers associated with large diameter valves, pressure management infrastructure, meter assemblies or other specialist network components.

Where a chamber exists solely to provide access to the valve installation, the chamber generally forms part of the overall valve arrangement and should not be assumed to be a separate ADAC asset unless specifically required by the applicable ADAC Schema.

The valve remains the primary operational asset and should be represented as a Valve asset within the ADAC XML submission.

Pressure Management and Specialist Valve Assemblies

Pressure management installations may comprise:

- Pressure Reducing Valves;
- Pressure Sustaining Valves;
- Isolation Valves;
- Air Valves;
- Scour Connections;
- Bypass Arrangements; and
- Associated fittings.

Because these installations are frequently proprietary systems, standard schema attributes may not always fully describe the installed arrangement.

Where additional information is required to explain the assembly configuration, manufacturer information, model information and other relevant details should be recorded within the Notes attribute.

Proprietary Valve Assemblies

Where proprietary valve systems are installed, Unitywater encourages the inclusion of:

- Manufacturer;
- Model Number;
- Product Name; and
- Other identifying information relevant to future operations and maintenance.

Where dedicated ADAC attributes are unavailable, this information should be recorded within the Notes attribute.

Examples may include:

- Pressure reducing valve assemblies;
- Pressure sustaining valve assemblies;

- Flow control valve assemblies;
- Specialty isolation valve systems; and
- Other approved valve arrangements.

Typical Valve Assembly Relationship

Sequence	Asset
1	Water Pipe
2	Valve
3	Fitting
4	Water Pipe

Unitywater Clarification

Valves typically operate in conjunction with adjoining Water Pipe and Fitting assets and should be represented in a manner that maintains network connectivity and accurately reflects the installed arrangement.

Valve assets should remain identifiable as individual operational assets within the ADAC XML submission.

Table 8.5 – Valve Attributes

Element Name	Mandatory (Y/N)
Type	Y
Chamber	Y
Diameter_mm	Y
Material	Y
Manufacturer	N
ModelNumber	N
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Pressure management assemblies;
- Proprietary valve systems;
- Non-standard installations;
- Manufacturer details;

- Model information;
- Asset functionality not adequately represented by the available schema attributes; or
- Other information beneficial to future operational and maintenance activities.

Unitywater Review Checks

Unitywater may review Valve assets to confirm:

- Valve locations are consistent with certified As Constructed documentation;
- Valve assets maintain connectivity with associated Water Pipe and Fitting assets;
- Valve type and diameter information accurately reflect the installed infrastructure;
- Pressure management and specialist valve assemblies have been represented appropriately;
- Manufacturer and model information has been provided where applicable;
- Asset ownership and asset status have been assigned correctly;
- Valid ADAC enumerations have been used;
- Notes information has been provided where additional clarification is required;
- Valve assets are represented consistently with the infrastructure delivered under the completed project scope; and
- Associated valve chambers, where installed, have been represented consistently with the adopted asset capture methodology.

8.5 Water Service

Asset Capture

Complex linear feature (polyline comprised of straight-line segments) representing the top of pipe (obvert) of the installed Water Service.

Water Service assets shall be captured and represented based on their physical characteristics and asset attributes.

Water Service assets provide the operational connection between the water supply network and the customer metering arrangement and shall be represented as individual assets within the ADAC XML submission.

Unitywater Requirement

Unitywater requires Water Service assets to be represented using top-of-pipe (obvert) geometry.

Pipe geometry, survey information, asset attributes and As Constructed documentation shall utilise a consistent top-of-pipe reference point throughout the submission.

Water Service geometry shall accurately reflect the installed service connection and the infrastructure delivered under the completed project scope.

Spatial Relationship

Water Services shall maintain connectivity with:

- Water Pipes;
- Fittings;
- Valves;
- Water Meters; and
- Other associated water supply assets.

Water Service geometry should accurately represent the final constructed arrangement whilst maintaining network connectivity.

Unitywater Clarification

Water Services provide the operational connection between the reticulation water supply network and customer metering infrastructure.

Water Service assets should be represented in a manner that supports:

- Asset registration;
- GIS integration;
- Utility Network traceability;
- Maintenance activities;
- Customer servicing; and
- Future asset management activities.

Water Service geometry should be consistent with:

- Survey information;
- As Constructed drawings;
- Lot servicing arrangements;
- Water Meter locations; and
- The infrastructure delivered under the completed project scope..

Water Service Assemblies

Water Services commonly form part of a broader Water Service Assembly comprising:

- Water Main;
- Tapping arrangement;
- Water Service;
- Isolation Valve; and

- Water Meter.

The Water Service should be represented as an individual ADAC asset and should not be incorporated into adjoining Water Pipe, Meter or Fitting assets.

End-of-Line Service Arrangements

Water Services shall be represented in accordance with the final operational configuration existing at the time of survey, certification and submission.

Where a Water Meter has not been installed at the time of submission, the Water Service shall terminate at the asset or fitting that forms the operational end point of the installation.

Examples may include:

- Ball Valves;
- End Caps;
- Dead End Fittings;
- Temporary Termination Arrangements; and
- Other approved end-of-line configurations.

Future Water Meters or other assets that have not yet been installed shall not be represented within the ADAC XML submission.

Where a Water Meter is installed as part of a subsequent works package, subdivision stage or Private Works activity, the Water Meter should be represented within the certified asset information associated with the works under which the installation occurred.

Water Meter assets shall not be attributed to a development stage, application or submission where the meter has not been installed as part of those works.

Property Servicing

Water Service assets should accurately represent the final servicing arrangement provided to the lot or development being serviced.

Where multiple services are installed, each service should be represented individually.

The number and location of Water Service assets should align with:

- Approved servicing arrangements;
- As Constructed drawings;
- Associated Lot Parcel information; and
- Metering infrastructure.

Service Conduits and Enveloper Pipes

Water Services installed within protective conduits should be attributed using the applicable Protection attribute in accordance with the ADAC Data Dictionary.

Where multiple Water Services are installed within a common conduit, each Water Service shall be individually represented within the ADAC XML submission.

The number of Water Services represented within the ADAC XML shall be consistent with the certified As Constructed documentation and the servicing arrangement provided.

Water Service assets shall not be omitted solely because multiple services share a common road crossing conduit installation.

Where an Enveloper Pipe is represented as a separate asset, the applicable Water Pipe attributes shall be assigned in accordance with the ADAC Schema and Data Dictionary requirements.

Water Service Location Requirements

Water Service geometry should represent the installed pipework and not merely a conceptual connection between the water main and the meter.

Service alignment should accurately reflect the final installed arrangement shown on the certified As Constructed documentation.

Table 8.6 – Water Service Attributes

Element Name	Mandatory (Y/N)
Diameter_mm	Y
Material	Y
Class	Y
Protection	Y
Lining	Y
JointType	Y
Depth_m	Y
Length_m	N
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Non-standard service arrangements;
- Proprietary service installations;
- Multiple service configurations;
- Special servicing requirements;
- Temporary service arrangements; or

- Asset characteristics not adequately represented by the available schema attributes.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Water Services not connected to the parent Water Main;
- Water Service geometry inconsistent with As Constructed drawings;
- Water Meter installations with no associated Water Service;
- Multiple services represented as a single asset;
- Incorrect or missing material attribution;
- Generic attribute values used where valid enumerations exist;
- Missing Notes information where additional clarification is required; and
- Service locations inconsistent with associated Lot Parcel information.

Submission Providers are encouraged to verify Water Service connectivity, asset attribution and servicing arrangements prior to generating the final ADAC XML submission and validation report.

Unitywater Review Checks

Unitywater may review Water Service assets to confirm:

- Water Services maintain connectivity with the parent water supply network;
- Service locations are consistent with certified As Constructed documentation;
- Property servicing arrangements have been represented correctly;
- Water Service quantities are consistent with certified As Constructed documentation and lot servicing arrangements;
- Water Services installed within shared conduits have been represented individually;
- Water Services have not been omitted where shared conduit installations are present;
- Water Service terminations are represented consistently with the certified As Constructed documentation and the operational asset environment existing at the time of submission;
- Water Service Protection attributes have been assigned appropriately;
- Enveloper Pipe assets, where represented, are attributed consistently with the ADAC Data Dictionary;
- Water Services are aligned with associated Meter assets where meters have been installed;
- Material and diameter information reflects the installed infrastructure;
- Asset ownership and asset status have been assigned correctly;
- Valid ADAC enumerations have been used;

- Notes information has been provided where additional clarification is required; and
- The Water Service is represented consistently with the infrastructure delivered under the completed project scope.

8.6 Water Meter

Asset Capture

Single point feature representing the centre point of the Water Meter assembly.

Water Meter assets shall be captured at the installed meter location and accurately represent the final operational arrangement existing at the time of survey, certification and submission.

Water Meter assets shall be represented as individual assets within the ADAC XML submission.

Spatial Relationship

Water Meter assets shall maintain connectivity with the associated Water Service and associated water supply infrastructure.

Meter locations should accurately represent the installed metering arrangement and be consistent with certified As Constructed documentation.

Where a Water Meter forms part of a larger Meter Assembly, the meter location shall represent the meter asset itself and not the surrounding installation.

Unitywater Requirement

Unitywater requires Water Meter assets to be represented as individual assets.

Where a Water Meter has been installed at the time of submission, the meter shall be represented within the ADAC XML submission together with the associated Water Service and supporting infrastructure.

Water Meters shall not be represented where the meter has not yet been installed.

Unitywater Clarification

Water Meters form part of broader Meter Assemblies and should be considered within the context of the associated Water Service and metering infrastructure.

Water Meter information should be consistent with:

- Survey information;
- Certified As Constructed documentation;
- Installed service arrangements;
- Meter assembly configuration; and
- The infrastructure delivered under the completed project scope..

Water Meter information should also be consistent with associated meter installation records, meter registers, Property and Meter Details schedules and other supporting handover documentation.

Meter serial numbers, meter identifiers, meter diameter attributes and associated lot information should be represented consistently across all submission deliverables.

Where discrepancies exist between the ADAC XML submission and supporting meter documentation, Submission Providers should resolve inconsistencies prior to submission.

Water Meter assets shall only be represented where the meter has been physically installed at the time of survey, certification and submission.

Where a meter is installed as part of a subsequent works package, development stage or Private Works activity, the meter should be represented within the certified asset information associated with the works under which the installation occurred.

Water Meter assets shall not be attributed to a development stage, application or submission where the meter has not been installed as part of those works.

Residential Meter Assemblies

A typical residential meter installation may comprise:

- Water Service;
- Isolation Valve; and
- Water Meter.

Large Meter Assemblies

Large meter installations commonly comprise:

- Isolation Valve;
- Strainer;
- Water Meter;
- Testing Port;
- Non-Return Valve;
- Downstream Isolation Valve; and
- Associated pipework and fittings.

Large Meter Assemblies should be attributed in a manner consistent with the final installed configuration.

Meter Location Requirements

Water Meter assets should be represented at the installed Water Meter location.

Water Meter assets should not be represented at:

- The Water Main;
- The Service Tapping Location;

- The Property Boundary (unless this is the actual meter location); or
- Any inferred or future meter location.

Proprietary Meter Installations

Where proprietary meter systems are installed, additional information should be provided to support future asset identification and maintenance activities.

Where schema attributes are insufficient to fully describe the installation, relevant information should be recorded within the Notes attribute.

Information may include:

- Manufacturer;
- Model Number;
- Meter Type;
- Assembly Configuration; and
- Other information relevant to future operations and maintenance.

Table 8.7 – Water Meter Attributes

Element Name	Mandatory (Y/N)
SerialNumber	Y
Type	Y
Diameter_mm	Y
InstallationDate	Y
LotNo	Y
PlanNo	Y
WaterQuality	Y
Manufacturer	N
ModelNumber	N
InitialReading	N
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Proprietary meter installations;
- Large meter assemblies;

- Non-standard configurations;
- Manufacturer details;
- Model information;
- Special operational requirements; or
- Meter characteristics not adequately represented by available schema attributes.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Water Meter assets represented where no meter has been installed;
- Installed Water Meter assets omitted from the ADAC XML submission;
- Meter locations inconsistent with certified As Constructed documentation;
- Water Meter assets not aligned with the associated Water Service;
- Incorrect meter diameter attribution;
- Missing serial number information;
- Generic attribute values used where valid enumerations exist;
- Missing Notes information where additional clarification is required;
- Meter assemblies not represented consistently with the installed configuration;
- Meter serial numbers inconsistent with supporting handover documentation;
- Meter identifiers inconsistent between submission deliverables;
- Meter diameter attributes inconsistent with installed meter configuration;
- Meter assets attributed to an incorrect development stage or application; and
- Meter assets represented where installation has not occurred.

Unitywater Review Checks

Unitywater may review Water Meter assets to confirm:

- Water Meter locations are consistent with certified As Constructed documentation;
- Water Meter assets are aligned with associated Water Services;
- Meter installations are represented consistently with the final operational arrangement;
- Meter assets have not been represented where installation has not yet occurred;
- Meter diameter and type information reflect the installed infrastructure;
- Meter serial numbers have been populated appropriately;
- Valid ADAC enumerations have been used;

- Notes information has been provided where additional clarification is required;
- Meter serial numbers are consistent with associated meter installation records and supporting handover documentation;
- Meter identifiers are consistent between submission deliverables;
- Meter diameter attributes are consistent with the installed meter configuration;
- Meter assets have not been attributed to an incorrect development stage or application;
- Water Meter assets are only represented where installation has occurred at the time of submission;
- Lot information is consistent between the ADAC XML submission and associated Property and Meter Details documentation; and
- The Water Meter is represented consistently with the infrastructure delivered under the completed project scope.

8.7 Water Pipe

Asset Capture

Complex linear feature (polyline comprised of straight-line segments) representing the top of pipe (obvert) of the installed Water Pipe.

Water Pipe assets shall be captured and represented based on their physical characteristics and asset attributes.

Water Pipe assets form the primary conveyance infrastructure within the water supply network and shall be represented as individual assets within the ADAC XML submission.

Unitywater Requirement

Unitywater requires Water Pipe assets to be represented using top-of-pipe (obvert) geometry.

Pipe geometry, survey information, asset attributes and As Constructed documentation shall utilise a consistent top-of-pipe reference point throughout the submission.

Water Pipe geometry shall accurately represent the installed infrastructure and the infrastructure delivered under the completed project scope.

Spatial Relationship

Water Pipe assets shall maintain connectivity with associated:

- Water Pipes;
- Fittings;
- Valves;
- Hydrants;
- Water Services;

- Water Meters;
- Maintenance Holes; and
- Other associated water supply assets.

Water Pipe geometry should accurately represent the final installed arrangement whilst maintaining network connectivity.

Unitywater Clarification

Water Pipe assets form the backbone of the operational water supply network and should be represented in a manner that supports:

- Asset registration;
- GIS integration;
- Utility Network traceability;
- Network operations;
- Maintenance activities;
- Renewal planning; and
- Long-term asset management.

Water Pipe geometry and attribution should be consistent with:

- Survey information;
- Certified As Constructed documentation;
- Associated network assets;
- Asset connectivity requirements; and
- The infrastructure delivered under the completed project scope..

Operational Water Pipe Types

The ADAC Schema supports a range of Water Pipe uses that assist in describing the operational function of water infrastructure.

Common Water Pipe uses include:

- Reticulation;
- Trunk;
- Service;
- Fire Service;
- Fire Domestic;
- Fire Sprinkler;

- Fire Service Through Meter;
- Scour;
- Enveloper Pipe; and
- Other approved uses supported by the ADAC Schema.

Unitywater Clarification

The selected Water Pipe use should accurately reflect the installed operational function of the pipe and be consistent with the certified As Constructed documentation.

Water Pipe Connectivity

Water Pipe assets shall be connected in a manner that accurately represents the operational water supply network.

Survey capture methodologies shall not result in disconnected assets, unintended gaps or incomplete network relationships.

Where a surveyed asset location differs from the preferred network representation, the ADAC geometry shall be represented in a manner that preserves network connectivity.

Unitywater Clarification

Water Pipe connectivity should be maintained through:

- Fittings;
- Valves;
- Hydrant Assemblies;
- Meter Assemblies;
- Water Service Assemblies;
- Fire Service Assemblies; and
- Other operational network arrangements.

Submission Providers should consider how individual Water Pipe assets function within the broader operational network and ensure connectivity and asset relationships are maintained throughout the submission.

Enveloper Pipes

Some water supply installations utilise an Enveloper Pipe to provide protection to a carrier water main crossing beneath roads, rail corridors, waterways, utility corridors or other constrained locations.

Typical installations may comprise:

- Enveloper Pipe;
- Carrier Water Main;

- Spacers or centralisers;
- Annulus grouting;
- End sealing systems;
- Transition fittings; and
- Associated connection infrastructure.

Unitywater Clarification

The ADAC Schema includes Water Pipe functionality for infrastructure represented as an Enveloper Pipe.

Where an Enveloper Pipe forms part of the installed infrastructure, Submission Providers should assess whether the Enveloper Pipe is required to be represented as a separate Water Pipe asset in accordance with the ADAC Schema and Data Dictionary.

Where represented:

- The carrier pipe and Enveloper Pipe should be attributed as separate assets;
- Asset connectivity should be maintained through the installation;
- Pipe attributes should accurately reflect the installed configuration; and
- Supporting documentation should clearly identify the arrangement.

Fire Service Pipes

Fire Service installations may comprise dedicated pipework supplying fire protection infrastructure.

Unitywater Clarification

Fire Service pipework should be attributed using the appropriate ADAC Water Pipe use value and represented consistently with the final installed configuration.

Fire Service infrastructure should maintain connectivity with the associated Meter Assembly, Valve Assembly and water supply network.

Scour Pipes

Scour Pipes provide a controlled means of flushing, draining or dewatering sections of the water supply network for operational and maintenance purposes.

Scour infrastructure is commonly associated with:

- Water Mains;
- Trunk Mains;
- Reservoir Infrastructure;
- Pressure Management Infrastructure; and
- Other operational water supply assets.

Unitywater Clarification

The ADAC Schema includes a Water Pipe use classification for Scour infrastructure.

Where Scour infrastructure forms part of the operational water supply network, the Water Pipe should be attributed using the applicable Water Pipe use classification and represented consistently with the certified As Constructed documentation.

Scour pipes should maintain connectivity with the associated water supply network and any related valves, fittings, discharge structures, outlets or maintenance infrastructure.

Submission Providers should ensure scour installations are represented consistently with the infrastructure delivered under the completed project scope..

Water Main Terminations

Water Pipes shall be represented in accordance with the operational arrangement existing at the time of survey, certification and submission.

Water Main terminations may include:

- Duckfoot Hydrants;
- End Caps;
- Dead End Fittings;
- Valves;
- Future Extension Arrangements;
- Temporary Network Configurations; and
- Other approved termination arrangements.

Unitywater Clarification

Future infrastructure not constructed at the time of submission shall not be represented within the ADAC XML submission.

Water Pipe assets should terminate at the actual operational end point existing at the time of survey and certification.

Where future extension infrastructure is proposed, the intended arrangement should be identified within certified As Constructed documentation and supporting submission information.

Table 8.8 – Water Pipe Attributes

Element Name	Mandatory (Y/N)
Use	Y
WaterQuality	Y
Diameter_mm	Y

Element Name	Mandatory (Y/N)
Material	Y
Class	Y
Lining	Y
Protection	Y
JointType	Y
Depth_m	N
Embedment	N
Length_m	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Enveloper Pipe installations;
- Horizontal Directional Drilling installations;
- Thrust bored crossings;
- Rail crossings;
- Waterway crossings;
- Proprietary pipe systems;
- Special transition arrangements; or
- Other non-standard Water Pipe configurations.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Disconnected Water Pipe geometry;
- Water Pipe locations inconsistent with certified As Constructed documentation;
- Incorrect Water Pipe use attribution;
- Scour infrastructure omitted from the ADAC XML submission;
- Scour Pipes incorrectly attributed as Reticulation or Trunk Water Pipes;
- Carrier pipes represented without corresponding Enveloper Pipe attribution where required;
- Enveloper Pipe assets omitted from trenchless crossing installations;
- Water Pipe embedment values inconsistent with the installed arrangement;
- Generic attribute values used where valid ADAC enumerations exist;

- Missing Notes information where additional clarification is required; and
- Water Pipe assets not represented consistently with the infrastructure delivered under the completed project scope.

Submission Providers are encouraged to verify Water Pipe connectivity, asset attribution and spatial location prior to generating the final ADAC XML submission and validation report.

Unitywater Review Checks

Unitywater may review Water Pipe assets to confirm:

- Water Pipe connectivity has been maintained throughout the submission;
- Water Pipe locations are consistent with certified As Constructed documentation;
- Water Pipe use values accurately reflect the installed infrastructure;
- Scour infrastructure has been represented and attributed appropriately;
- Associated fittings, valves, hydrants and services connect appropriately to the parent network;
- Enveloper Pipe installations have been represented consistently with certified As Constructed documentation;
- Carrier pipe and Enveloper Pipe relationships have been attributed appropriately;
- Trenchless crossings and protected crossings have been represented consistently with the installed configuration;
- Material, diameter and class attributes reflect the installed infrastructure;
- Valid ADAC enumerations have been used;
- Notes information has been provided where additional clarification is required; and
- The Water Pipe is represented consistently with the infrastructure delivered under the completed project scope.

8.8 Water Maintenance Hole

Asset Capture

Single point feature representing the centre point of the Water Maintenance Hole.

Water Maintenance Holes shall be captured at the centre of the installed structure and represented as individual assets within the ADAC XML submission.

Water Maintenance Holes provide access to operational water supply infrastructure and shall be attributed in a manner consistent with the final installed configuration.

Unitywater Requirement

Unitywater requires Water Maintenance Holes to be represented as individual assets where they form part of the operational water supply network.

Water Maintenance Hole locations shall be consistent with:

- Survey information;
- Certified As Constructed documentation;
- Associated water supply infrastructure; and
- The infrastructure delivered under the completed project scope.

Spatial Relationship

Water Maintenance Holes shall maintain a logical relationship with the infrastructure they provide access to.

Water Maintenance Holes are commonly associated with:

- Valves;
- Flow Meters;
- Air Valves;
- Pressure Management Infrastructure;
- Pump Stations;
- Scour Installations; and
- Other operational water supply assets.

Water Maintenance Holes should be located at the installed structure location and not be represented at the location of the asset contained within the structure unless coincident.

Unitywater Clarification

Water Maintenance Holes are access structures that support inspection, maintenance and operational access to water supply infrastructure.

Water Maintenance Holes should be represented in a manner that supports:

- Asset registration;
- GIS integration;
- Utility Network traceability;
- Operational access;
- Maintenance activities; and
- Long-term asset management.

Water Maintenance Holes should not be confused with the operational assets located within them.

For example:

- A valve chamber may contain a Valve asset and a Water Maintenance Hole asset.

- A flow meter chamber may contain a Meter asset and a Water Maintenance Hole asset.
- A pressure management chamber may contain multiple assets in addition to the Water Maintenance Hole.

Common Water Maintenance Hole Uses

The ADAC Schema provides for several Water Maintenance Hole uses including:

- Valve Pit;
- Complex;
- Pressure Regulation;
- Pump Station;
- Temporary Works;
- Disused;
- Other; and
- Unknown.

Unitywater Clarification

The selected use should reflect the primary operational purpose of the structure and be consistent with the certified As Constructed documentation.

Where a structure contains multiple operational assets, the use value should reflect the dominant operational function of the installation.

Valve Chambers and Access Chambers

Valve chambers and access chambers are commonly represented using the Water Maintenance Hole asset class.

Examples include:

- Valve access chambers;
- Air Valve chambers;
- Flow Meter chambers;
- Pressure Reducing Valve chambers;
- Pressure Sustaining Valve chambers; and
- Other specialist access structures.

Unitywater Clarification

Where an access structure forms part of the operational asset environment, the structure should be represented as a Water Maintenance Hole asset in addition to the operational assets located within the structure.

The operational asset and the access structure perform different functions and should not be combined into a single asset representation.

Table 8.9 – Water Maintenance Hole Attributes

Element Name	Mandatory (Y/N)
Use	Y
ChamberSize	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
FloorConstruction	Y
FloorMaterial	Y
WallConstruction	Y
WallMaterial	Y
RoofMaterial	Y
LidMaterial	Y
Rotation	N

Notes Attribute

The Notes attribute should be used where additional information is required to describe:

- Complex chamber arrangements;
- Pressure management installations;
- Proprietary access structures;
- Non-standard chamber configurations;
- Assets represented using the value Other; or
- Other operational characteristics not adequately represented by available schema attributes.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Water Maintenance Holes omitted from chambered installations;
- Valve chambers represented only as Valve assets;
- Flow Meter chambers represented only as Meter assets;
- Incorrect use attribution;

- Chamber dimensions inconsistent with certified As Constructed documentation;
- Generic attribute values used where valid ADAC enumerations exist;
- Missing Notes information where additional clarification is required; and
- Access structures not represented consistently with the infrastructure delivered under the completed project scope.

Submission Providers are encouraged to verify structure attribution, chamber dimensions and associated asset relationships prior to generating the final ADAC XML submission and validation report.

Unitywater Review Checks

Unitywater may review Water Maintenance Hole assets to confirm:

- Water Maintenance Hole locations are consistent with certified As Constructed documentation;
- Chamber use values accurately reflect the installed infrastructure;
- Associated valves, meters and other operational assets have been represented appropriately;
- Chamber dimensions are consistent with the installed configuration;
- Asset relationships are represented appropriately;
- Valid ADAC enumerations have been used;
- Notes information has been provided where additional clarification is required; and
- The Water Maintenance Hole is represented consistently with the infrastructure delivered under the completed project scope.

8.9 Water Pipe Break Point Rules

Overview

Water Pipe assets shall be segmented in a manner that supports asset attribution, network connectivity, operational requirements and future asset management activities.

Break points create individual Water Pipe assets within the ADAC XML submission and enable changes in asset characteristics and network configuration to be represented appropriately.

Water Pipe segmentation should be consistent with:

- The ADAC Schema;
- The ADAC Data Dictionary;
- Certified As Constructed documentation;
- Survey information; and

- infrastructure delivered under the completed project scope.

Mandatory Break Points

Unitywater requires Water Pipe assets to be segmented where there is a change in:

- Diameter;
- Material;
- Class;
- Lining;
- Protection;
- Joint Type;
- Use;
- Water Quality; or
- Asset Ownership.

A new Water Pipe asset shall be created where any of the above asset characteristics change.

Fittings

Water Pipe assets shall be segmented at fittings where required to allow the fitting to be independently represented as a discrete ADAC asset.

Examples include:

- Bends;
- Tees;
- Crosses;
- Tapers;
- Reducers;
- Connectors;
- Combi Valves;
- Tapping Bands represented as fittings; and
- Other fittings requiring independent asset attribution.

Unitywater Clarification

Long radius bends represented as Fitting assets shall create a Water Pipe break point on each side of the fitting.

This allows the fitting to be independently represented and attributed within the ADAC XML submission.

Valves

Water Pipe assets shall be segmented where necessary to allow Valve assets to be independently represented within the network.

Examples include:

- Gate Valves;
- Butterfly Valves;
- Air Valves;
- Pressure Control Valves;
- Scour Valves;
- Non-Return Valves; and
- Other valve installations.

Unitywater Clarification

The objective is not to create unnecessary pipe segmentation but to ensure operational assets can be appropriately represented and connected within the network.

Hydrant Assemblies

Water Pipe segmentation should support representation of Hydrant Assemblies.

Typical break points may occur at:

- Hydrant Tees;
- Combi Valve installations;
- Reducers; and
- Other fittings associated with hydrant infrastructure.

Water Services

Water Pipe break points shall be created where Water Services connect to Water Mains and where the servicing arrangement requires independent asset representation.

Unitywater Clarification

Water Service connections should be represented in a manner that:

- Maintains network connectivity;
- Supports Utility Network traceability;
- Accurately reflects servicing arrangements; and
- Represents the final installed configuration.

Meter Assemblies

Break points should be created where necessary to support representation of Meter Assemblies and associated infrastructure.

Examples include:

- Large Water Meter installations;
- Fire Service Meter Assemblies;
- Meter pits;
- Testing arrangements; and
- Associated valve installations.

Fire Service Installations

Water Pipe segmentation should support representation of Fire Service infrastructure and associated assets.

Examples include:

- Fire Service Meter Assemblies;
- Backflow Prevention Assemblies;
- Isolation Valve installations; and
- Fire Service Connections.

Enveloper Pipe Installations

Break points shall be created at each transition between:

Carrier Pipe; and

Enveloper Pipe infrastructure.

Unitywater Clarification

Enveloper Pipe installations are commonly associated with:

- Thrust bored crossings;
- Horizontal Directional Drilling installations;
- Rail crossings;
- Major road crossings;
- Waterway crossings; and
- Other protected crossings.

Segmentation should clearly identify the limits of the Enveloper Pipe installation and associated carrier pipe arrangement.

Asset Ownership Changes

A break point shall be created where ownership changes between infrastructure assets.

Examples may include:

- Unitywater-owned infrastructure;
- Customer-owned infrastructure;
- Developer-owned infrastructure;
- Private Fire Service infrastructure; and
- Other ownership transitions.

Unitywater Clarification

Asset ownership boundaries should be capable of being clearly identified from the ADAC XML submission.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Water Pipes not segmented where mandatory attribute changes occur;
- Long radius bends not creating appropriate break points;
- Water Service connections not represented correctly;
- Hydrant Assemblies not supported by appropriate pipe segmentation;
- Meter Assemblies not represented appropriately;
- Enveloper Pipe limits not clearly identified;
- Asset ownership boundaries not represented correctly;
- Excessive pipe segmentation with no operational purpose; and
- Network connectivity issues resulting from incorrect break point placement.

Unitywater Review Checks

Unitywater may review Water Pipe segmentation to confirm:

- Mandatory break points have been applied appropriately;
- Asset attribute changes correspond with Water Pipe segmentation;
- Fittings, valves, hydrants and services are supported by appropriate network segmentation;
- Meter Assemblies and Fire Service Assemblies are represented appropriately;
- Enveloper Pipe installations are segmented and attributed correctly;
- Asset ownership transitions have been represented appropriately;
- Network connectivity has been maintained throughout the submission; and

- The Water Pipe network accurately represents the infrastructure delivered under the completed project scope.

8.10 Water Supply Submission Validation and Review

Overview

Water Supply submissions should be prepared in accordance with:

- The ADAC Schema;
- The ADAC Data Dictionary;
- This Asset Information Specification;
- Certified As Constructed documentation;
- Survey information; and
- Applicable Unitywater requirements.

Submission Providers are encouraged to undertake comprehensive internal quality assurance checks prior to submission.

Network Connectivity

Water Supply submissions should maintain network connectivity throughout the water supply system.

Network connectivity should be maintained between:

- Water Pipes;
- Fittings;
- Valves;
- Hydrants;
- Water Services;
- Water Meters;
- Maintenance Holes; and
- Other associated assets.

Disconnected assets, unintended gaps and incomplete network relationships should be resolved prior to submission.

Asset Assembly Verification

Submission Providers should verify that asset assemblies have been represented consistently with the installed operational arrangement.

Verification should include:

- Water Main Assemblies;
- Hydrant Assemblies;
- Water Service Assemblies;
- Meter Assemblies;
- Fire Service Assemblies; and
- Valve Assemblies.

Asset assemblies should accurately reflect the final installed infrastructure.

Property Servicing Verification

Property servicing information should be verified against:

- Certified As Constructed documentation;
- Lot servicing arrangements;
- Water Service information;
- Water Meter information; and
- Supporting handover documentation.

Submission Providers should confirm that:

- All serviced lots have been represented appropriately;
- Service quantities align with certified documentation;
- Water Services have not been omitted;
- Shared conduit installations have been represented correctly; and
- Water Service terminations reflect the installed arrangement.

Meter Information Verification

Water Meter information should be verified against:

- Meter installation records;
- Property and Meter Details schedules;
- Supporting handover documentation;
- Certified As Constructed documentation; and
- Installed infrastructure.

Submission Providers should confirm that:

- Meter serial numbers are correct;
- Meter identifiers are consistent between submission deliverables;

- Meter diameters reflect the installed infrastructure;
- Lot information is correct;
- Meter locations have been represented accurately;
- Installed meters have been represented; and
- Meters not yet installed have not been included in the submission.

Water Pipe Verification

Submission Providers should verify that:

- Water Pipe connectivity has been maintained;
- Water Pipe segmentation complies with the break point rules;
- Pipe attribute changes correspond with asset segmentation;
- Water Pipe use values reflect operational function;
- Fire Service infrastructure has been represented appropriately;
- Scour infrastructure has been represented appropriately; and
- Water Pipe assets accurately reflect the certified As Constructed documentation.

Enveloper Pipe Verification

Where Enveloper Pipe installations exist, Submission Providers should verify that:

- Enveloper Pipe assets have been represented appropriately;
- Carrier Pipe relationships have been represented correctly;
- Trenchless crossings are attributed appropriately;
- Embedment attributes are consistent with the installation method;
- Asset connectivity has been maintained; and
- Supporting documentation adequately describes the arrangement.

Ownership Verification

Submission Providers should confirm that:

- Asset ownership has been assigned correctly;
- Ownership transitions have been represented appropriately;
- Public and private infrastructure has been distinguished correctly; and
- Asset status values accurately reflect the operational asset environment.

ADAC Validation Requirements

Prior to submission, Submission Providers should review:

- ADAC validation reports;
- Validation warnings;
- Validation errors;
- Attribute completeness;
- Enumeration compliance; and
- Geometry compliance.

Validation issues should be resolved prior to submission wherever practicable.

Supporting Documentation

Supporting documentation may include:

- Certified As Constructed drawings;
- Survey information;
- Property and Meter Details schedules;
- Manufacturer information;
- Proprietary asset information;
- Commissioning documentation; and
- Other supporting information relevant to the submitted assets.

Common Submission Issues

The following issues are commonly identified during submission reviews:

- Disconnected Water Supply networks;
- Incorrect asset connectivity;
- Missing Water Services;
- Missing Water Meters;
- Meter information inconsistent with supporting documentation;
- Incorrect asset ownership attribution;
- Water Pipe segmentation inconsistent with break point requirements;
- Missing Enveloper Pipe attribution;
- Invalid enumeration values;
- Missing Notes information where clarification is required; and
- Inconsistencies between the ADAC XML submission and supporting handover documentation.

Submission Providers are encouraged to undertake a detailed quality assurance review prior to submission.

Unitywater Review Checks

Unitywater may review submissions to confirm:

- Water Supply network connectivity has been maintained;
- Asset assemblies are represented consistently with the installed configuration;
- Property servicing arrangements have been represented appropriately;
- Water Meter information is consistent with supporting handover documentation;
- Water Service and Water Meter relationships are represented appropriately;
- Water Pipe segmentation complies with this specification;
- Enveloper Pipe installations have been represented appropriately;
- Asset ownership and asset status have been assigned correctly;
- ADAC Schema requirements have been satisfied;
- Supporting information is consistent with the submitted asset data; and
- The submission accurately represents the infrastructure delivered under the completed project scope.

Where multiple drawing types are submitted, information should be consistent across all drawings and supporting asset information.

8.11 Redline Markup Drawings

Redline Markup Drawings provide a record of differences between the approved design and the infrastructure delivered under the project.

Redline Markup Drawings should clearly identify:

- Changes in asset location;
- Changes in asset configuration;
- Changes in levels or grades;
- Changes in dimensions;
- Changes in materials or asset types;
- Added assets;
- Removed assets; and
- Other deviations from the approved design.

Redline Markup Drawings should be prepared in a manner that enables reviewers to readily identify modifications without requiring detailed comparison against the approved design drawings.

Redline Markup Drawings should be consolidated into a single PDF document containing all relevant project drawings and markups. Where multiple drawing sheets are required, they should be provided as individual pages within the same document wherever practical.

Redline Markup Drawings form a vital component of the asset information review process and are typically considered the primary engineering record of project changes.

8.12 As Constructed Drawings

Where required, As Constructed Drawings provide a record of the infrastructure constructed and associated survey information.

As Constructed Drawings should accurately represent:

- Asset locations;
- Dimensions;
- Levels;
- Grades;
- Survey information; and
- Other infrastructure information necessary to describe the completed works.

Where As Constructed Drawings are generated from the same source information used to create the ADAC XML, the drawings should remain consistent with the submitted ADAC information.

As Constructed Drawings should be provided as a single DWG file and a corresponding PDF file containing all relevant drawing sheets associated with the project. Multi-sheet submissions should use layouts or drawing tabs where appropriate to minimise the number of individual files requiring management and review.

The existence of an As Constructed Drawing does not remove the requirement for ADAC XML submissions, Asset Templates or other supporting documentation where required by Unitywater.

8.13 Drawing Consistency Requirements

Drawings shall be consistent with other submitted asset information.

Particular attention should be given to consistency between:

- Drawings and ADAC XML files;
- Drawings and Asset Templates;
- Drawings and commissioning documentation;
- Drawings and survey information;
- Drawings and equipment schedules; and

- Drawings and supporting manuals.

Examples of inconsistencies that may result in additional review activities include:

- Different asset locations;
- Missing assets;
- Different asset descriptions;
- Different asset quantities;
- Different dimensions or levels;
- Different commissioning dates; and
- Conflicting infrastructure representation.

8.14 Drawing Review Considerations

During review activities, Unitywater may consider whether drawings:

- Accurately represent the completed project scope;
- Are consistent with submitted asset information;
- Clearly identify design changes;
- Support verification of ADAC XML content;
- Adequately describe operational infrastructure;
- Include all required assets; and
- Are suitable to support asset acceptance activities.

Drawings may also be reviewed in conjunction with supporting documentation, commissioning information and asset records.

8.15 Typical Drawing Types

Depending on project scope and infrastructure complexity, Unitywater may require one or more of the following drawing types:

- Redline Markup Drawings;
- As Constructed Drawings;
- Mechanical Drawings;
- Electrical Drawings;
- Control System Drawings;
- Site Layout Drawings;
- General Arrangement Drawings;

- Single Line Diagrams;
- Piping and Instrumentation Diagrams (P&IDs); and
- Other project-specific drawings.

The specific drawing requirements applicable to a project should be determined by the infrastructure being delivered and associated Unitywater requirements.

9. Asset Templates

9.1 General

Asset Templates provide detailed information relating to operational, mechanical, electrical, instrumentation, communication and control system assets associated with infrastructure delivered to Unitywater.

Asset Templates support the establishment and maintenance of asset records within Unitywater systems and assist operational, maintenance and asset management teams in understanding the assets delivered under a project.

Asset Templates shall accurately represent the infrastructure installed on site and should be completed using information obtained from verified project records and commissioning activities.

9.2 Asset Template Requirements

Asset Templates shall:

- Be completed in the format nominated by Unitywater;
- Be complete and internally consistent;
- Be based upon the infrastructure installed on site;
- Align with associated project documentation;
- Be suitable for loading into Unitywater asset systems; and
- Be subject to appropriate verification activities prior to submission.

Asset Templates should not contain placeholder information, copied information from unrelated projects or information that has not been verified.

9.3 Asset Information Verification

Information recorded within Asset Templates shall be verified against appropriate source information.

Verification sources may include:

- Equipment nameplates;
- Commissioning records;

- Site Acceptance Test (SAT) records;
- Factory Acceptance Test (FAT) records;
- Manufacturer documentation;
- Asset schedules;
- Electrical drawings;
- Mechanical drawings;
- Control system documentation; and
- Site inspections.

Submission providers should ensure that information entered into Asset Templates accurately reflects the infrastructure installed under the project.

9.4 Asset Identification Information

Asset identification information recorded within Asset Templates should be complete, accurate and consistent across all submission deliverables.

Particular attention should be given to:

- Asset names;
- Asset identifiers;
- Equipment references;
- Manufacturer names;
- Model numbers;
- Serial numbers;
- Asset ratings;
- Equipment capacities; and
- Asset status information.

This information should align with associated drawings, commissioning documentation and supporting project records.

9.5 Consistency with Other Deliverables

Asset Templates shall be consistent with:

- ADAC XML files;
- Drawings;
- Commissioning records;

- Equipment schedules;
- Operations and Maintenance Manuals;
- Manufacturer information; and
- Supporting documentation.

Where discrepancies exist between submitted information sources, clarification or correction may be required prior to acceptance.

9.6 Common Asset Template Issues

The following issues are commonly identified during review activities:

- Incomplete Asset Templates;
- Missing asset information;
- Incorrect equipment descriptions;
- Incorrect model numbers;
- Incorrect serial numbers;
- Incorrect manufacturer information;
- Use of information copied from unrelated projects;
- Inconsistent commissioning dates;
- Inconsistent asset identifiers;
- Missing operational assets;
- Missing electrical assets;
- Missing mechanical assets; and
- Asset information inconsistent with installed infrastructure.

Identification of these issues during review may result in clarification requests, correction requests or resubmission requirements.

9.7 Unitywater Review Considerations

When reviewing Asset Templates, Unitywater may consider whether:

- Required templates have been provided;
- Information is complete;
- Information is accurate;
- Information is internally consistent;

- Asset identification information is suitable for operational use;
- Information aligns with supporting documentation;
- Assets delivered under the project have been appropriately represented; and
- The information is suitable for loading into Unitywater systems.

9.8 Asset Template Acceptance

Asset Templates may be considered acceptable when Unitywater is satisfied that:

- The information is complete;
- The information accurately reflects installed infrastructure;
- Supporting records are available where required;
- Information is consistent across submission deliverables; and
- The asset information is suitable to support ongoing operational, maintenance and asset management activities.

Asset Template acceptance forms a vital component of the overall asset information acceptance process.

10. Operations, Maintenance and Supporting Documentation

10.1 General

Operations, Maintenance and Supporting Documentation forms a vital component of the asset information submission package and assists Unitywater in understanding, operating, maintaining and managing infrastructure assets throughout their lifecycle.

Supporting documentation shall accurately reflect the infrastructure installed under the project and be consistent with submitted asset information, drawings, commissioning records and Asset Templates.

Where required, supporting documentation shall be provided prior to asset acceptance.

10.2 Purpose of Supporting Documentation

Supporting documentation provides information that may not be fully represented within:

- ADAC XML files;
- Asset Templates;
- Drawings; or
- Commissioning Records.

Supporting documentation assists Unitywater to:

- Understand asset functionality;
- Operate infrastructure safely;
- Maintain assets throughout their lifecycle;
- Identify asset limitations and design intent;
- Verify submitted asset information; and
- Support future operational and renewal activities.

10.3 Operations and Maintenance Manuals

Operations and Maintenance Manuals shall be provided where required by the project scope or asset type.

Operations and Maintenance Manuals should provide sufficient information to enable the safe and effective operation and maintenance of infrastructure assets.

Information may include:

- Asset descriptions;
- Operating procedures;
- Maintenance requirements;
- Preventative maintenance schedules;
- Manufacturer recommendations;
- Troubleshooting information;
- Safety requirements;
- Spare parts information; and
- Warranty information.

Where multiple assets are covered by a single manual, the relevant assets should be clearly identified.

10.4 Asset Manuals

Asset Manuals provide detailed technical information relating to specific assets or groups of assets.

Asset Manuals should align with the infrastructure installed under the project and may include:

- Technical specifications;
- Product information;
- Equipment schedules;
- Installation information;

- Operating limitations;
- Maintenance requirements;
- Calibration requirements; and
- Manufacturer documentation.

Asset Manuals should be current and relevant to the installed asset configuration.

10.5 Manufacturer Documentation

Where applicable, manufacturer documentation shall be provided to support the asset information submission.

Examples include:

- Product datasheets;
- Technical specifications;
- Product approvals;
- Factory documentation;
- Equipment schedules;
- Certificates of conformity; and
- Warranty information.

Manufacturer information should correspond to the actual assets installed under the project.

10.6 Electrical Documentation

Where electrical infrastructure forms part of the project scope, supporting electrical documentation shall be provided.

Documentation may include:

- General Arrangement Drawings;
- Electrical Schematics;
- Single Line Diagrams;
- Switchboard Schedules;
- Cable Schedules;
- Protection Settings;
- Equipment Data Sheets; and
- Other electrical documentation relevant to the installed infrastructure.

Where required by project scope, electrical documentation should also include:

- Power System Analysis reports;
- Arc Flash Assessment reports;
- Protection coordination studies;
- Protection setting schedules; and
- Other electrical compliance documentation relevant to the installed infrastructure.

These documents should reflect the final installed electrical configuration and be suitable for ongoing operational and maintenance activities.

Electrical documentation should accurately represent the final installed configuration.

10.7 Mechanical Documentation

Where mechanical infrastructure forms part of the project scope, supporting mechanical documentation shall be provided.

Documentation may include:

- Mechanical General Arrangement Drawings;
- Equipment Layout Drawings;
- Equipment Schedules;
- Piping and Instrumentation Diagrams (P&IDs);
- Mechanical Datasheets;
- Valve Schedules; and
- Other project-specific documentation.

Mechanical documentation should accurately represent the final installed configuration.

10.8 Control System and Communications Documentation

Where control systems, telemetry, instrumentation or communications infrastructure forms part of the project scope, supporting documentation shall be provided.

Documentation may include:

- Control System Architecture Drawings;
- Telemetry Configuration Information;
- Instrument Schedules;
- Network Diagrams;
- Input / Output Schedules;
- Communication System Information; and

- Other project-specific documentation.

Where telecommunications or telemetry infrastructure forms part of the project scope, supporting documentation may include:

- Radio coverage surveys;
- Communications performance testing;
- Telemetry commissioning records;
- Signal strength assessments; and
- Other communications verification documentation.

Documentation should be sufficient to support ongoing operational and maintenance activities.

10.9 Commissioning Documentation

Commissioning documentation provides evidence that infrastructure has been installed, tested and commissioned in accordance with project requirements.

Documentation may include:

- Site Acceptance Test (SAT) records;
- Factory Acceptance Test (FAT) records;
- Commissioning Reports;
- Functional Test Results;
- Performance Test Results;
- Electrical Test Certificates;
- Mechanical Test Records; and
- Other project-specific commissioning records.

Asset-specific commissioning documentation may also be required where commissioning check sheets, worksheets or similar verification records are used by Unitywater to demonstrate successful completion of commissioning activities.

Examples may include:

- Pressure Reducing Valve commissioning check sheets;
- Sewage Pump Station commissioning check sheets;
- Overflow and Emergency Storage commissioning check sheets;
- Reservoir commissioning records; and
- Other asset-specific commissioning documentation.

For water supply infrastructure, commissioning documentation may include:

- Pressure testing records;
- Flushing records;
- Disinfection records;
- Bacteriological testing results;
- Water quality compliance records; and
- Other documentation required to demonstrate readiness for connection to the operational network.

Where performance monitoring, operational trials or reliability trials form part of a project's commissioning requirements, associated records and outcomes should be included within the asset information submission where required.

Commissioning documentation should demonstrate that applicable commissioning and water quality requirements have been successfully achieved prior to connection or operational use.

10.10 CCTV Inspection Reports and Footage

Where required by Unitywater, CCTV inspection reports and associated footage shall be provided for gravity sewerage infrastructure.

CCTV inspections provide supporting evidence regarding the condition, integrity and serviceability of newly constructed or modified sewerage infrastructure and may be used to support asset acceptance activities.

Where applicable, CCTV submissions should:

- Cover the full extent of inspected infrastructure;
- Be consistent with submitted asset information;
- Clearly identify inspected assets;
- Include associated inspection reports; and
- Be suitable for review by Unitywater.

The provision of CCTV footage does not automatically constitute acceptance of the inspected infrastructure and may be subject to further review or clarification.

10.11 Asset Photographs

Asset photographs may be required to assist with asset identification, verification and future operational activities.

Where provided, photographs should:

- Clearly identify the asset;
- Be of suitable quality;

- Correspond with submitted asset information; and
- Assist in verifying installed infrastructure.

Examples may include photographs of:

- Asset nameplates;
- Pumps;
- Motors;
- Switchboards;
- Control Panels;
- Telemetry Equipment;
- Flow Meters; and
- Other significant operational assets.

10.12 Consistency of Supporting Documentation

Supporting documentation shall be consistent with:

- ADAC XML files;
- Asset Templates;
- Drawings;
- Commissioning Records;
- Equipment Schedules; and
- Other submitted project documentation.

Examples of inconsistencies that may require clarification include:

- Different model numbers;
- Different serial numbers;
- Different asset descriptions;
- Different commissioning dates;
- Different equipment ratings; and
- Documentation relating to assets not installed under the project.

10.13 Common Documentation Issues

The following issues are commonly identified during review activities:

- Missing manuals;

- Missing drawings;
- Incomplete documentation;
- Outdated manufacturer information;
- Documentation relating to superseded equipment;
- Incorrect model numbers;
- Incorrect serial numbers;
- Missing commissioning information;
- Documentation not aligned with installed assets;
- Duplicated information from unrelated projects; and
- Inconsistencies between supporting documentation and Asset Templates.

Such issues may result in additional review activities, clarification requests or resubmission requirements.

10.14 Unitywater Review Considerations

When reviewing supporting documentation, Unitywater may consider whether:

- All required documentation has been provided;
- Documentation accurately reflects the installed infrastructure;
- Documentation is complete and legible;
- Documentation is internally consistent;
- Information supports operational and maintenance activities;
- Documentation aligns with submitted asset information; and
- The information is suitable for ongoing operational use.

10.15 Documentation Acceptance

Supporting documentation may be considered acceptable when Unitywater is satisfied that:

- The documentation is complete;
- The documentation is relevant to the installed infrastructure;
- Information is accurate and consistent;
- Operational and maintenance requirements can be understood;
- Supporting records are available where required; and
- The information is suitable for future operational, maintenance and asset management activities.

11. Roles and Responsibilities

11.1 General

The successful preparation, submission, review and acceptance of asset information relies upon the coordinated involvement of multiple parties throughout the project lifecycle.

The responsibilities identified within this section are intended to provide general guidance regarding the typical roles associated with asset information activities.

Project-specific contractual, legislative, accreditation and regulatory obligations remain the responsibility of the relevant parties.

11.2 Submission Providers

Submission Providers are responsible for preparing and submitting asset information and supporting documentation in accordance with applicable requirements.

Submission Providers may include:

- Developers;
- Contractors;
- Consulting Engineers;
- Surveyors;
- ADAC Generators;
- Accredited Entities; and
- Other organisations responsible for preparing asset information.

Submission Providers should ensure that:

- Required asset information is provided;
- Submitted information is complete;
- Submitted information is accurate;
- Submitted information is internally consistent;
- Appropriate verification activities have been undertaken; and
- Supporting documentation has been included where required.

Submission Providers remain responsible for the quality of submitted information.

11.3 Registered Surveyors

Registered Surveyors are typically responsible for the capture, preparation and certification of survey information associated with completed works.

Responsibilities may include:

- Survey data capture;
- Spatial verification of infrastructure assets;
- Survey certification activities;
- Preparation of survey information;
- Support for ADAC XML generation; and
- Other activities associated with survey deliverables.

Survey information should accurately represent infrastructure observed and surveyed on site.

11.4 ADAC Generators

ADAC Generators are responsible for preparing ADAC XML files in accordance with applicable requirements.

Responsibilities may include:

- Asset attribution;
- Asset representation;
- Asset relationships;
- Connectivity representation;
- ADAC validation activities; and
- Preparation of associated ADAC deliverables.

ADAC XML files should accurately represent the infrastructure associated with the completed project scope.

11.5 Designers and Certifiers

Designers and Certifiers play a significant role in verifying that submitted information accurately reflects the infrastructure delivered under a project.

Responsibilities may include:

- Preparation of design documentation;
- Review of Redline Markup Drawings;
- Certification activities;
- Engineering verification;
- Review of infrastructure changes; and
- Support for asset information activities.

Designers and Certifiers should ensure that submitted information is consistent with the infrastructure delivered and associated project requirements.

11.6 Asset Information Reviewers

Unitywater reviewers may assess submitted asset information and supporting documentation to determine whether information is suitable to support asset acceptance activities.

Review activities may include:

- Completeness reviews;
- Quality reviews;
- Consistency reviews;
- ADAC reviews;
- Asset Template reviews;
- Drawing reviews;
- Documentation reviews; and
- Other project-specific review activities.

Review activities do not remove the responsibility of Submission Providers to verify submitted information prior to submission.

11.7 Operational and Asset Management Stakeholders

Operational, maintenance and asset management stakeholders may participate in the review of asset information where specialist operational knowledge or asset-specific expertise is required.

Their involvement may assist with:

- Verification of operational suitability;
- Asset management requirements;
- Maintenance considerations;
- Operational readiness activities;
- Asset identification requirements; and
- Review of specialist documentation.

Operational review activities may vary depending upon project scope and infrastructure type.

11.8 Unitywater Acceptance Authority

Asset information acceptance is undertaken by Unitywater in accordance with applicable business processes and asset acceptance requirements.

Acceptance activities consider:

- Submission completeness;
- Information quality;
- Supporting documentation;
- Operational suitability;
- Resolution of outstanding issues; and
- Compliance with applicable requirements.

Acceptance should be viewed as a confirmation that the asset information is considered suitable to support Unitywater business activities rather than a simple administrative process.

11.9 Shared Responsibility for Information Quality

The preparation, submission, review and acceptance of asset information is a shared responsibility involving multiple parties.

The quality of asset information is improved when asset information requirements are considered throughout the project lifecycle rather than solely at the point of submission.

All parties involved in the preparation and review of asset information should contribute to achieving the principles identified within this Guide, including:

- Completeness;
- Accuracy;
- Consistency;
- Verification; and
- Operational suitability.

12. Common Submission Issues and Leading Practices

12.1 General

Asset information submissions are generally reviewed against the principles outlined within this Guide, including completeness, accuracy, consistency and operational suitability.

While submission providers are often successful in delivering most of the required information, recurring issues continue to be identified during review and acceptance activities.

This section provides examples of common submission issues together with leading practices that may assist submission providers in improving the quality and completeness of submitted asset information.

12.2 Asset Information Quality

Common Issues

- Incomplete asset information.
- Incorrect asset descriptions.
- Missing asset attributes.
- Incorrect asset identifiers.
- Incorrect manufacturer information.
- Incorrect model numbers.
- Incorrect serial numbers.
- Inconsistent asset information across submission deliverables.
- Asset information copied from unrelated projects without adequate verification.

Leading Practices

- Verify asset information against installed infrastructure.
- Verify equipment details against asset nameplates.
- Review asset information against commissioning documentation.
- Undertake quality assurance reviews prior to submission.
- Ensure consistency between all submission deliverables.

12.3 ADAC XML Submissions

Common Issues

- Missing assets.
- Missing supporting infrastructure.
- Incorrect asset attribution.
- Connectivity errors.
- Incomplete asset representation.
- Validation errors and warnings not addressed prior to submission.
- ADAC information inconsistent with supporting drawings.

Leading Practices

- Validate ADAC XML files prior to submission.
- Review XML outputs using available viewing tools.
- Verify connectivity and asset relationships.
- Ensure all applicable assets are represented.
- Confirm consistency between ADAC XML files and supporting documentation.

12.4 Asset Templates

Common Issues

- Incomplete Asset Templates.
- Missing operational assets.
- Incorrect model numbers.
- Incorrect serial numbers.
- Incorrect equipment ratings.
- Inconsistent commissioning dates.
- Inconsistent asset identifiers.
- Asset information that does not match installed infrastructure.

Leading Practices

- Verify asset details during commissioning activities.
- Review Asset Templates against equipment schedules.
- Confirm manufacturer information directly from installed equipment.
- Verify operational assets have been included.
- Undertake final verification before submission.

12.5 Drawings

Common Issues

- Drawings inconsistent with submitted asset information.
- Missing drawing revisions.
- Redline Markup Drawings not reflecting completed works.
- Missing drawing sheets.
- Incorrect drawing references.
- Drawings that do not adequately identify project changes.
- Missing electrical, mechanical or control system drawings.

Leading Practices

- Verify drawing content against completed works.
- Ensure all revisions are current.
- Review Drawings against ADAC XML files and Asset Templates.

- Clearly identify all changes from approved design documentation.
- Undertake multidisciplinary reviews prior to submission.

12.6 Supporting Documentation

Common Issues

- Missing manuals.
- Missing commissioning documentation.
- Missing test results.
- Missing certifications.
- Outdated manufacturer information.
- Documentation relating to superseded equipment.
- Inconsistencies between documentation and Asset Templates.

Leading Practices

- Prepare supporting documentation throughout project delivery.
- Verify manuals correspond with installed assets.
- Confirm commissioning documentation is complete.
- Review all supporting documentation prior to submission.
- Ensure supporting information aligns with installed infrastructure.

12.7 Commissioning and Verification Information

Common Issues

- Missing commissioning records.
- Missing Site Acceptance Test documentation.
- Missing Factory Acceptance Test documentation.
- Missing pressure testing records.
- Missing water quality results.
- Missing CCTV inspection reports.
- Missing supporting evidence required to demonstrate readiness for operation.

Leading Practices

- Collect commissioning records progressively throughout the project.
- Ensure all testing activities are recorded and retained.

- Verify project-specific commissioning requirements have been satisfied.
- Confirm supporting evidence is included within the submission package.
- Review commissioning documentation for completeness prior to submission.

12.8 Operational Infrastructure

Common Issues

- Submissions focusing on primary assets only.
- Supporting operational assets omitted from submissions.
- Incomplete representation of facilities.
- Assets represented differently across submission deliverables.
- Missing infrastructure required to understand operational functionality.

Leading Practices

- Consider the complete infrastructure environment.
- Review infrastructure from an operational perspective.
- Confirm supporting assets have been represented.
- Verify consistency between drawings, ADAC XML files and Asset Templates.
- Consider how infrastructure will be operated and maintained following handover.

12.9 Submission Readiness Checklist

Prior to submission, submission providers should consider the following questions:

Asset Information

- Have all required assets been included?
- Has asset information been verified?
- Are asset identifiers consistent?

ADAC XML

- Has the XML been validated?
- Have validation issues been addressed?
- Is the XML consistent with supporting documentation?

Drawings

- Have all required drawings been provided?
- Are drawings consistent with installed infrastructure?

- Have Redline Markup Drawings been updated?

Asset Templates

- Have Asset Templates been completed?
- Have model numbers and serial numbers been verified?
- Have commissioning dates been confirmed?

Supporting Documentation

- Have all required manuals been provided?
- Have commissioning records been included?
- Are supporting documents complete and current?

Final Review

- Is the submission complete?
- Is the information internally consistent?
- Is the information suitable to support operational use?

12.10 Benefits of High-Quality Asset Information

High-quality asset information can assist in:

- Reducing review comments.
- Reducing rework and resubmissions.
- Improving operational readiness.
- Improving GIS and asset management outcomes.
- Improving confidence in asset records.
- Reducing handover delays.
- Supporting future maintenance activities.
- Supporting long-term asset management objectives.

Submission providers who invest time in preparing complete, accurate and consistent asset information are more likely to achieve efficient review and acceptance outcomes.