

Infrastructure
Data Capture Guide

Guidelines for Capture, Presentation and Submission of

As-Constructed Infrastructure Data

Toowoomba Regional Council

TOOWOOMBA REGION

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VERSION HISTORY

	DISTRIBUTION	DATE	COMMENTS
1.0	COUNCIL WEBSITE	27/10/2026	

GLOSSARY

The following terms are used within this document.

Term/Acronym	Definition
GDA2020	The Geocentric Datum of Australia 2020 (GDA2020) is Australia's new national datum which replaces GDA94. GDA2020 is of higher accuracy than GDA94, aligns more closely with GPS and GNSS positioning services and supports nationally consistent datasets, free of the known distortions of GDA94. GDA2020 coordinates are approximately 1.8 metres to the northeast of GDA94 coordinates, which represents the tectonic motion of the Australian plate between 1994 and 2020
GDA94	Geocentric Datum of Australia 1994. Realised by the derived coordinates of the Australian Fiducial Network (AFN) geodetic stations, referenced to the GRS80 ellipsoid, and determined with respect to ITRF92 at epoch 1994.0.
AHD	The Australian Height Datum (1971) is the NGRS normal–orthometric height datum for mainland Australia. The datum sets mean sea level as "zero" elevation. Mean sea level was determined from observations recorded by 30 tide gauges around the coast of the Australian continent for the period 1966 - 1968. Refer to Geoscience Australia website for more information.
MGA 2020	Map Grid of Australia 2020. Universal Transverse Mercator projection of the Geocentric Datum of Australia 2020.
ADAC	"Asset Design As-Constructed" - The ADAC product is developed and maintained by a consortium of Local Councils and Water Utilities across Australia in conjunction with Institute of Public Works Engineering Australia - Queensland Branch (IPWEAQ). ADAC is used to facilitate the collection and lodgement of detailed information on civil infrastructure and associated assets that are either provided by the private development sector created in conjunction with other major project or upgrade works.
PSM	Permanent Survey Mark

1 INTRODUCTION

Toowoomba Regional Council operates a significant and increasing portfolio of community assets and infrastructure. On behalf of its growing and vibrant community, Council has important obligations for the efficient management of this substantial asset base.

The great majority of assets are acquired by Council through:

- Development and construction completed in conjunction with private investment in property development (subdivisional works) or other major public projects.
- Projects funded by Council and delivered by third parties under tender and contract arrangements; and
- As a result of works undertaken by the internal Council "day-labour" workforce.

Constructors are required to provide information about the assets prior to handover to Council. This "As-Constructed" package of information is both designed to ensure the quality of the assets received and provide a conduit for the data used to populate Council's asset management information systems. Ultimately, this As-Constructed data provides the vital knowledge to plan for necessary operations and maintenance as well as the timing and budgets for renewal activities.

2 PURPOSE OF THE DOCUMENT

The primary purpose of this document is to provide practical guidelines and general assistance with the preparation and supply of "As-Constructed" information supplied to Toowoomba Regional Council.

On completion of physical works and prior to asset handover, "As-Constructed" information is used to both check conformance with approval conditions and clearly identify the type and location of assets and infrastructure that will then become a part of the larger Council portfolio. As well as confirming conformance with design and the quality of the works and assets, the final "As-Constructed" data should accurately reflect survey-accurate locations, material types, specifications, and other asset-specific information.

3 GENERAL REQUIREMENTS FOR AS-CONSTRUCTED SUBMISSION

On completion of physical works and prior to asset handover or commissioning, the package of "As-Constructed" (also known "As-Built" or "Works-as-Executed") information is prepared for submission to council.

Along with evidence and testing relating to quality checks and compliance with approval conditions, the overall package of "As-Constructed" information is intended to provide clear and relevant details of asset types and materials, including survey levels and alignments.

This includes disclosure of any approved variations in the assets or associated construction methods that may have occurred during the operational works phase as compared to the original approved "*For Construction*" design plan(s).

The package of As-Constructed package will typically contain the following information related to the supply of asset data*:

- As-Constructed Drawings. Consisting of:
  - Redlined marked-up approved "For Construction" drawings, and
  - Clean As Constructed Plans.
- Compliant ADAC XML File(s).
- Other As-Constructed documentation or files that may be specified in the detailed Conditions of Approval.

* *Note: This list of requirements relates specifically to the provision of asset data. Be sure to check approval documents for any specific or additional obligations that may apply.*

3.1 AS-CONSTRUCTED DRAWINGS

As-Constructed drawings are designed to represent a true and correct record of the finished works, including a confirmation of all assets constructed, installed, replaced, removed, or retired in-situ. The drawings provide the necessary information for final checks prior to handover and illustrate relevant construction features and characteristics of the assets.

3.2 DRAWING REQUIREMENTS

- Council approved "For Construction" drawings are to marked-up (redlined) to indicate any changes from design. This includes any noting any changes or revision to locations and levels, alignments, asset information or other descriptions.

- Clean As-Constructed drawings are to be prepared showing all details of the final construction and asset details.

- Both the marked-up "For Construction" drawings and clean as-Constructed Plans are to be clearly stamped "***As-Constructed***".

- All drawings to include the relevant Operational Works Approval Number with the final "revision number" in the drawing title block notated "*As Constructed*".

3.3 REDLINE MARK-UPS OF "FOR CONSTRUCTION" DRAWINGS

- The Council approved "For Construction" drawings are to be marked-up (redlined) showing any variations in survey, asset materials and other relevant information (e.g. road names).

- Changes and modifications to the "For Construction" drawings are to be donated by a "strikethrough" redline with the new As-Constructed values (in red) noted adjacent to the original value or description.

- Marked-up "For Construction" drawings are to be provided in digital PDF file format.

- All individual pages to include "*Certification Text Blocks*" and signed by the registered engineer (RPEQ qualification). See Appendix "B" for copy of appropriate Certification Text Blocks.

3.4 PREPARATION OF "CLEAN" AS - CONSTRUCTED PLANS

- Clean As-Constructed Plans prepared from the final as-constructed survey data are to be provided in both .DWG and PDF file formats.
- Details must represent a true and correct record of the final works, including a description of all assets constructed, installed, refurbished, replaced, removed/disposed or "retired-in-situ".
- Illustrate the configuration, construction features and characteristics of all assets.
- Include accurate geometry data to survey to the required accuracy.
- Must show both new and/or upgraded assets as well as any disposed or retired assets. Note: All assets with a status of removed/disposed or "retired in-situ" are to be clearly shown and titled on the drawing.
- Clean As-Constructed plans must include:
    - Names, addresses and contact details of the relevant engineer/consultant.
    - a "North Arrow".
    - Table of Symbology.
    - Scale Bar, Level Datum and Permanent Survey Marks.
    - Approved Development Name and Stage Number; and
    - Approved Operational Works Number (OW/###/YYYY)

- Network connectivity or relationships with existing infrastructure must be shown. That is, where new assets connect to an existing network (e.g. stormwater, water, sewer) the locational details of these existing assets must be surveyed, including the invert levels of the connecting assets, with these details marked accordingly on the clean As-Constructed Plan(s).
- All individual pages to include "*Certification Text Blocks*" (see Appendix B) signed by both the registered engineer and surveyor who have a responsibility for the accuracy of the asset information and geometry data provided in the drawing(s).
- All Clean As-Constructed drawings are to conform to Toowoomba Regional Council's As-Constructed drawing standards as described in this document and found on Council's website by searching for "Standard Drawings".
- Clean "As-Constructed" drawings are to be prepared in "A1" size printable to "A3" size and provided in both DWG and PDF file formats.

4 ADAC XML DIGITAL FILES

ADAC XML files are a compulsory accompaniment to the "As-Constructed" bundle of asset information required by council as a part of the handover of nominated works and associated civil assets and infrastructure. Compliant ADAC XML files contain a structured and precise digital record of the assets described in the accompanying As-Constructed Drawings (i.e. clean as-constructed plans).

Details contained in the ADAC XML file include survey-accurate cadastral and boundary references, geometries, and relative levels as well as detailed asset records and their accompanying attributes and dimensions, material types and approved construction specifications.

4.1 BACKGROUND

The ADAC XML format (schema) is a non-propriety data specification and file transfer tool written in XML language. The schema is managed by the ADAC Consortium of Subscribers principally made up of local authorities and water utilities from across Australia. The schema and associated XML files are used to facilitate the collection and translation of data related to both new and existing assets and infrastructure.

More specifically, the XML files are used to check the completeness of the "As-Constructed" asset information and are used to upload the asset data to the organisation's electronic asset registers and GIS systems. The files also afford further confirmation of compliance with approval conditions as well as helping to verify specifications and other design-related requirements.

4.2 ADAC SCHEMA VERSION

This document is written in accordance with version 5.01 of the approved ADAC schema. XML files produced in version 5.01 is expected to be enforced from July 1, 2024.

4.3 ASSET DATA SPECIFICATION

While the schema version 5.01 of the Asset Design and As-Constructed (ADAC) data specification is published by the Public Works Engineering Australia (IPWEA) Queensland, this document also includes specific Toowoomba Regional Council assets that are not currently defined as part of ADAC 5.01.

Broadly, the physical nature of the individual assets will determine where/if assets are captured separately within the digital ADAC xml. For example, a footpath or pathway would be captured as individual and separate features to reflect any changes in properties such as widths or material type. Likewise, for road pavement and seals, where there is physical change in the dimensions and/or materials.

While the ADAC XML files are created from the survey-accurate “As-Constructed” information, particular attention must be given to how council wishes to have details captured and recorded for each particular asset class.

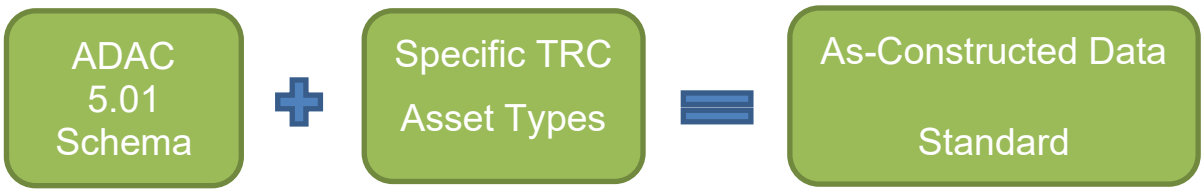
The following sections are provided to assist with the capture of ADAC data when using proprietary ADAC XML generators either during the “As-Con” survey pickup or when capturing the ADAC asset information as a part of the creation of the As-Constructed Plans and drawings in civil design (software) suites.

Please refer to the various photos, diagrams and images presented under the following sections that are intended to illustrate and guide on the appropriate capture requirements. Details on attribution (mandatory and non-mandatory) are presented in the relevant tables included with each of the asset classes. Guidance on “project” and “global” attribution is included below.

Note: When preparing the ADAC XML file, some types of assets are common to multiple asset classes e.g. “Lighting” assets may be related to either transport or open space. In those cases, recording assets (when preparing the digital ADAC XML file) under a different asset class rather than the actual asset use is valid and appropriate.

Where applicable, asset data specific to Toowoomba Regional Council is to be recorded in the “Notes” element for each Asset Feature type captured in an ADAC XML file.

Please refer to Toowoomba Regional Council's As-Constructed Data Dictionary for additional Attributes and allowable enumerations available on Council's website. The Data Dictionary document provides the full asset data specification and is to be used in conjunction with this handbook as per the image below.



4.4 SURVEY DATUM REQUIREMENTS

Data contained in the ADAC XML file(s) must precisely reflect survey values. All asset details recorded in the ADAC XML file are to be recorded exactly as shown on the accompanying clean "As-Constructed" Plan(s).

The following shall also apply:

- For subdivisions for 10 lots or less, survey details must be tied from at least two (2) relatively well spaced permanent survey marks (PSMs).
- For subdivisions of greater than 10 lots are to be tied to three (3) or more relatively well spaced permanent survey marks (PSMs).

Survey details to be derived from existing and/or newly placed permanent survey marks (PSMs) with Map Grid of Australia (MGA) GDA2020 - UTM Zone 56 coordinates for the survey area. All AHD levels to be to fourth (4^{th}) order standard or better as defined by the current ICSM[1] Standard.

4.5 SURVEY TOLERANCES

The Australian Standard AS5448-2013 "Classification of Subsurface Utility Information (SUI)" sets out a classification system for the quality of locational and attribute data of buried infrastructure (see table details below). For the purposes of these As-Constructed Guidelines, this classification system is considered to apply equally to both buried and surface objects and features.

[1] Intergovernmental Committee on Surveying & Mapping – http://www.icsm.gov.au

AS5488 Quality Level	Information Sources & Survey Requirements	"X/Y" Tolerance	"Z" Tolerance
A+	Positive identification of attributes and the absolute location of subsurface and surface features in three dimensions.	+/- 50mm	+/- 10mm
A	Positive identification of attributes and the absolute location of subsurface and surface features in three dimensions	+/- 50mm	+/- 50mm
B	Must include a survey of both the surface and buried features. Buried features of existing infrastructure may be carried out by no-dig survey techniques.	+/- 300mm	+/- 500mm
C	Site survey of visible evidence that may use relative or absolute positioning	+/- 300mm	N/A
D	Existing records, cursory site inspection, anecdotal evidence	N/A	N/A

Survey data collected in the preparation of As-Constructed ADAC xml files and the associated clean As-Constructed plans, including for the marking-up (redlining) of the approved "For Construction" drawings, is to be "Quality Level A+".

4.6 PROCESS

Depending on the tools[2] (ADAC XML generator) being used to produce the ADAC XML output, compliant files may initially be created during survey capture and then finalised in conjunction with the creation of the "As-Constructed" drawings. Alternatively, the XML files may be generated after the "As-Constructed" CAD drawings have been finalised.

In creating the ADAC XML file It is **essential** that:

[2] Various software tools (purpose-built ADAC XML generators) are available to capture necessary details and asset attributes required to produce a compliant ADAC XML file. Advice can be sort from providers of most civil engineering design suites (CAD) and survey tools.

- the “As-Constructed” drawings and ADAC XML files are prepared using complete and survey-accurate information to identify the precise locations of the assets being represented; and
- all details in the XML file and clean As-Constructed drawings match exactly.

Please Note: It is not within the scope of this document to provide detailed advice on how to operate the various specialist products and tools (ADAC XML generators) used in the creation and provision of the compliant ADAC XML files. Assistance with the use of any tool should be sourced from the vendor of the product who would necessarily be familiar with general ADAC requirements, processes and the current data model (ADAC XML schema).

The ADAC XML file must be produced using the ADAC XML schema release specified (e.g. ADAC XML Ver 5.01) and should be checked for compliance before being submitted to council. On receiving the “As-Constructed” bundle, council will undertake a data format and conformance check on both the clean As-Constructed drawings and ADAC XML file to confirm the completeness and validity of the details.

Please Note: If significant anomalies, errors, or missing information are identified during these comparison checks, the As-Constructed Plans and/or the ADAC XML file may be returned to the provider for correction and resubmission which can potentially delay the progress of asset handover, release of bonds or Certificates of Completion.

In producing compliant ADAC XML files, information on the following asset classes will need to be captured according to the approved ADAC data schema. Vendors of ADAC XML generators are provided with any updates to the ADAC schema free of charge and routinely have these updates incorporated into their various products for release to customers in a timely manner.

The physical nature of assets will determine where/if assets are captured separately within the ADAC XML file. For example, a footpath or a pathway would be captured as individual and separate sections (segments) to accurately reflect any changes such as width or material type.

Once the ADAC XML data file(s) are accepted by council they are uploaded to various internal asset information systems and used to assist in the maintenance planning, long-term management and timely renewal of these new assets and infrastructure.

Further information on the ADAC process, data schema, available tools and supporting agencies can be found on the ADAC website at: http://www.ipweaq.com/adac

4.7 ATTRIBUTION

The following attribution is included within the header-level information in all ADAC XML files.

Mandatory attributes (both ADAC and TRC) in the ADAC XML file are shown below:

ATTRIBUTE	ADAC Mandatory (Y/N)	Additional Information
ExportDateTime	Y	Should be auto populated from the XML generating software
Name	Y	Should be populated with a description of the project (and stage number for subdivisions)
Owner	Y	To be recorded as per the Owner table detailed below in Global Attribution
Receiver	Y	To be recorded as: **Toowoomba Regional Council**
WorksApprovalID	N	For a developer-contributed project, this will be Council's Operational Works reference number. For internal Toowoomba Regional Council capital works projects, this will be the Project Number
DrawingNumber	Y	
DrawingRevision	N	
ConstructionDate	Y	Must be populated with Surveyor's As-Constructed (AS-CON) date
HorizontalCoordinateSystem	Y	Must be "**MGA56**"
HorizontalDatum	Y	Must be "**GDA2020**"
VerticalDatum	Y	Must be "**AHD**"
IsApproximate	Y	Must be "**False**"
OriginMark	N	Should be the primary Permanent Survey Mark used to tie Asset's coordinates to MGA Zone 56.
Notes	N	
DrawingExtents-SouthWest	Y	Should never extend beyond: X: 270,000 m Y: 6,875,000 m
DrawingExtents-NorthEast	Y	Should never extend beyond: X: 429,000 m Y: 7,042,000 m
Description	Y	Typically, the type of capture e.g. Civil works, Rehab works etc.
ProjectStatus	Y	Should be "**As Constructed**"
Software.Product	Y	Auto populated from the XML generating software
Software.Version	Y	Auto populated from the XML generating software
Surveyor.Name	Y (Non-mandatory at the Surveyor level)	
Surveyor.DateFinalSurvey	**Y** (Non-mandatory at the Surveyor level)	

Surveyor.DateApproved	Y (Non-mandatory at the Surveyor level)	
Engineer.Name	Y (Non-mandatory at the Engineer level)	
Engineer.DateApproved	Y (Non-mandatory at the Engineer level)	

4.8 GLOBAL ATTRIBUTION

Global Asset Attribution relates to attributes that are common on **all** feature types in the ADAC schema.

Mandatory Attribution: The following attributes related to Global Types are to be considered mandatory for all asset types:

Element Name	ADAC Mandatory (Y/N)	TRC Mandatory (Yes?)	Additional Information
ADACId	Y	Y	This will be used as part of TRC data validation process to identify features which are non-compliant/incomplete. There is no naming/numbering convention defined except that all features within the file should be uniquely identified.
Infrastructure Code	N		
Owner	N	Y	This is a critical element within the XML, as defines the responsibility of the asset. Please note the Owner descriptions below.
DrawingNumber	N	Y *(If different to Project level)*	
DrawingRevision	N	Y *(If different to Project level)*	
ConstructionDate	N	Y *(If different to Project level)*	
Department	N		

Surveyor	N	Y *(If different to Project level)*	
Engineer	N	Y *(If different to Project level)*	
Status	Y		This is a critical element within the as-constructed information. As it is what TRC uses to load new and dispose existing assets into the asset register. It is very important the removal of redundant assets is included in the XML file.
DataQuality	N		Survey tolerances and Confidence levels.
Notes	N		Should be used to record any additional information regarding the asset, or to record attribute information which isn't available within the defined enumerations in the ADAC schema.
SupportingFiles	N		

Please note the descriptions for **Owner** below:

Owner (Roads, Drainage, Water, Sewerage and Open Space asset classes)	Description
Council	Ongoing asset management activities will be the responsibility of Council.
Private	Ongoing asset management is the responsibility of Property Owner, Gated Community or other Private Entity.
State	Ongoing asset management is the responsibility of a State Government Department.

Please note the descriptions for the Asset level **Status** below:

Status	Description
New	Newly constructed asset being passed to receiving entity
Existing	Existing asset described as encountered

Rehabilitated	Existing asset repaired, refitted or refurbished as part of works project
Removed	Previously existing asset described as it was prior to removal
Abandoned	Pre-existing asset no longer in use, but left in-situ

5 PHOTO REQUIREMENTS

In some cases, Toowoomba Regional Council may require photographs to be supplied for certain assets as part of the Work As-Executed package of information. These photographs may be used for subsequent identification of the asset and other practical purposes.

For additional information on whether a digital photograph is required please see table located at "Appendix A - Photo Requirements" located at the back of this document.

5.1 GENERAL GUIDELINES FOR PHOTOGRAPHS

- Where the Work-as-Executed data contains a few different assets of the same type (i.e. multiple shelters were constructed within a park), each photograph should be identified to the corresponding asset ID using the file name and description.
- Photographs must be date-stamped (the date that the photo was captured).
- Photos should be captured at a maximum of 3.1 megapixels (resolution 720 x 576), supplied as a JPG file format. This would **use approximately 1mb of file space per photograph as a maximum**:
- Photographs of entire assets are to be taken, where practical, to indicate shape, material, and other relevant attributes.
- Where assets are too large to clearly indicate shape, material, and other relevant attributes in one photograph, a photograph of a representative portion is required.
- A photo of a long asset (such as barrier continuous - fences) should clearly illustrate material and style, and not necessarily the entire object.
- Where assets consist of multiple components, a photograph of each component may be required if all components cannot be clearly illustrated in a single photo; and
- Photos should not have any recognisable persons depicted within the picture. Where individuals are captured, please take steps to "blur" or obscure personal features (i.e.

faces or other recognisable features) before providing to Council to satisfy provisions of the Information Privacy Act 2009.

5.2 EXAMPLE PHOTOGRAPHS



Figure 1

6 CADASTRE ASSETS

6.1 CADASTRAL CONNECTION

Asset Capture: Simple linear feature capturing the cadastral boundary connections as determined by survey methods and the acknowledged PSM's.

Spatial Relationship: Must be coincident to the vertices that define the Cadastre Lot Boundary features and relevant and relevant PSM's.

Mandatory Attribution: The following attribution is mandatory for *Cadastral Connections*:

Element Name	ADAC Mandatory (Y/N)
Bearing	Y
Distance_m	Y

6.2 CHAINAGE LINE

Asset Capture: Simple linear feature representing a Chainage line. Polyline shape is only an approximation of a true curve geometry, but the start and end points should coincide exactly with the actual start and end chainage.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Chainage Lines*:

Element Name	ADAC Mandatory (Y/N)
ChainageID	Y
StartChainage_m	Y
EndChainage_m	Y

6.3 EASEMENT

Asset Capture: Multi-patched area feature representing a new or existing Easement.

Spatial Relationship: May share boundaries Lot Parcels, Road Reserves or Water Course Reserves. Node points between shared boundaries must be coincident i.e. no overlaps or “slivers”.

Mandatory Attribution: The following attribution is mandatory for *Easements*:

Element Name	ADAC Mandatory (Y/N)
LotNo	Y
PlanNo	Y

6.4 LOT PARCEL

Asset Capture: Area feature representing the boundary of a titled or proposed Cadastral Lot.

Spatial Relationship: May share boundaries with Road Reserves, Easements or WaterCourseReserves. Node points between shared boundaries must be coincident i.e. no overlaps or “slivers”.

Mandatory Attribution: The following attribution is mandatory for *Lot Parcels*.

Element Name	ADAC Mandatory (Y/N)
LotNo	Y
PlanNo	Y
CancelledLotPlan	N
TitledArea_sqm	Y

6.5 ROAD RESERVE

Asset Capture: Multi-patched area feature representing a gazetted or soon to be gazetted road reserve boundary.

Spatial Relationship: May share boundaries with Water Course Reserves, Lot Parcels, Easements, or other Road Reserves. Node points between shared boundaries must be coincident i.e. no overlaps or “slivers”.

Mandatory Attribution: The following attribution is mandatory for *Road Reserves*:

Element Name	ADAC Mandatory (Y/N)
Name	Y

6.6 SURVEY MARK

Asset Capture: Simple point feature representing a Permanent Survey Mark.

Spatial Relationship: May be used in a Cadastral Connection (to Lot Parcels as noted above in Section 6.1.4)

Mandatory Attribution: The following attribution is mandatory for *Survey Marks:*

Element Name	ADAC Mandatory (Y/N)
MarkName	Y

6.7 WATER COURSE RESERVE

Asset Capture: Multi-patched area feature representing a boundary of a Water Course reserve.

Spatial Relationship: May share boundaries with Road Reserves, Lot Parcels and Easements. Node points between shared boundaries must be coincident i.e. no overlaps or “slivers”.

Mandatory Attribution:

Element Name	ADAC Mandatory (Y/N)
Name	Y

7 ASSETS

7.1 OPEN SPACE ASSETS

7.1.1 OPEN SPACE AREA

General Information: Examples include public parks, recreational and environmental reserves.

Asset Capture: Multi-patched area featuring representing the complete "footprint" of the Open Space area which may enclose other associated Open Space Assets. Refer to the Red solid polyline in Error! Reference source not found. **below**.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Open Space Areas*:

Element Name	Mandatory (Y/N)
Name	Y
Type#	Y

for TRC additional enumeration value, * for TRC additional attributes



Figure 2 - Typical example of Open Space ADAC data capture

7.1.2 ACTIVITY AREA

General Information: Examples include defined playgrounds, courts, sports fields, or animal free run/agility enclosures.

Asset Capture: Multi-patched area representing differing activities. Playgrounds will often align with soft-fall boundaries. Other courts or fields are donated by the practical extents of the playing or dedicated spectator area whereas Animal Agility Area's often align with the fencing surrounding the area. Refer to the dashed yellow line in **Figure 3** below. Line marking in Sports Fields does not need to be represented within the Asset Data capture.

Spatial Relationship: Feature must be totally within the parent Open Space area.

Mandatory Attribution: The following attribution is required for *Activity Areas:*

Element Name	Mandatory (Y/N)
Use#	Y
Type	Y
Material	Y
Thickness_mm*	Y
ActivityAreaName*	N
Lighting*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 0.5 metres



Figure 3 - Activity Areas (yellow dash lines)

7.1.3 EDGING

General Information: Landscape or Activity Area edging.

Asset Capture: Complex linear feature (polylines and including curves but not Bezier curves) representing the edging material.

Spatial Relationship: Not applicable.

Spatial Relationship: Must be coincident with an Activity or Landscaping Area feature.

Mandatory Attribution: The following attribution is mandatory for *Edging:*

Element Name	Mandatory (Y/N)
Material#	Y
Length_m	Y
Width_mm	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 0.5 metres

7.1.4 ACTIVITY POINT

General Information: Includes individual pieces of playground, fitness equipment, animal ability or sports equipment.

Asset Capture: Simple point feature representing individual assets such as an item of playground equipment. Objects may be located within defined activity areas such as a playground. Playground modules should be represented as a single point feature, located by its approximate centre point as per the yellow dot in **Figure 4** below.

Spatial Relationship: Point to be shown within the parent Open Space polygon and typically fall within a defined Activity Area feature.

Mandatory Attribution: The following attribution is required for *Activity Points:*

Element Name	ADAC Mandatory (Y/N)
Use	Y
Type	Y
Material#	Y
Theme	N
Units	Y
ParkName	N

Element Name	ADAC Mandatory (Y/N)
Manufacturer	N
ModelNumber	N
AgeGroupUse*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre



Figure 4 - Activity Point

7.1.5 BARBEQUE

General Information: Public Barbeque which may be a single or multi-plate unit.

Asset Capture: Simple point feature representing the centre of a barbeque as represented by the yellow dot in **Figure 5** below. Any hot water units, taps, lighting or shelters associated with the barbeque should be captured as separate features. The slab the barbeque is installed on is considered part of the asset and does not need to be separately captured.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Barbeques:*

Element Name	Mandatory (Y/N)
EnergySource#	Y
Plates	Y
SurroundingMaterial#	Y
TopMaterial	Y
Manufacturer	N
ModelNumber	N
IgnitionSystem*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 100 millimetres from centre of structure.



Figure 5 - Barbeque

7.1.6 TABLE

General Information: None.

Asset Capture: Simple point feature representing the centre of the table as per the yellow dot in **Figure 6** below.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Tables:*

Element Name	Mandatory (Y/N)
Type	Y
Seating.SeatType	Y *(If seating exists)*
Seating.Places	Y *(If seating exists)*
Material#	Y
Manufacturer	N
ModelNumber	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 6 - Table

7.1.7 SEAT

General Information: None.

Asset Capture: Simple point feature representing the centre of the seat or park bench configuration as per **Figure 7** below. Seating associated with a table are not to be captured separately. Any slab the seat is installed on is considered part of the asset and does not need to be captured separately.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Seats:*

Element Name	Mandatory (Y/N)
SeatType	Y
Places	Y
Material#	Y
Manufacturer	N
ModelNumber	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre



Figure 7 - Seat

7.1.8 WASTE COLLECTION POINT

General Information: Includes any poles, stands or enclosures associated with a bin.

Asset Capture: Simple point fingers representing the centre of asset as per the yellow dots in **Figure 8**Figure 8 below.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *waste collection points:*

Element Name	Mandatory (Y/N)
Type#	Y
Material#	Y
Manufacturer	N
ModelNumber	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 8 – Waste Collection Point

7.1.9 BICYCLE FITTING

General Information: None.

Asset Capture: Simple point feature representing the centre of a bicycle fitting. Any slab the bicycle fitting is installed on is considered part of the asset and does not need to be captured separately.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Bicycle Fittings:*

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

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.1.10 GENERAL FIXTURE

General Information: Includes Dog Bag Dispensers and Drinking Bowls, Fish Cleaning Stations, Flag Poles, Goal Posts and other specialised fixtures and fittings.

Asset Capture: Simple point feature representing the centre of an asset. Dog bag dispensers including a pole do not require the pole to be separately captured. Fish cleaning stations include any lighting, taps and slabs associated with it and these do not need to be captured separately.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *General Fixtures:*

Element Name	Mandatory (Y/N)
Type#	Y
Material#	Y
Manufacturer	N
ModelNumber	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.1.11 BARRIER CONTINUOUS

General Information: Includes fences, bollard runs, pedestrian fall protection (handrails) and gates but not Transport related crash barriers.

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing a barrier type asset. It is recommended, but not mandatory, that each vertex represents an upright, particularly for bollard runs. This allows geometry to be exploited to identify the individual features if necessary. Refer to the dashed yellow line in **Figure 10** and **Figure 11** below.

When capturing gates, please record the gate configuration in the Notes element as per the following values:

- Single (Dashed green line in **Figure 9** below)
- Double (Dashed orange line in **Figure 10** below)
- Boom Gate (Dashed red line in **Figure 11** below)
- Sliding / Roller

Spatial Relationship: Features must be within or coincident with the boundary of the Open space Functional Area feature.

Mandatory Attribution: The following attribution is mandatory for *Barrier Continuous:*

Element Name	Mandatory (Y/N)
Type#	Y
UprightMaterial#	Y
LInkMaterial#	Y
TopMaterial#	Y
Length_m	Y
Height_m	Y
UprightNumber	Y

for TRC additional enumeration value, * for TRC additional attributes

* Gate type to be recorded in the Notes element.

Positional Accuracy: Horizontal Accuracy of +/- 0.5 metre.



Figure 9 – Gates (Single and Double)



Figure 10 – Barrier Continuous



Figure 11 - Boom Gate

7.1.12 BARRIER POINT

General Information: Includes bollards and locking posts.

Asset Capture: Single Point Feature representing the centre of the asset as per the red dot in **Figure 12** and **Figure 13** below. Road guideposts are not to be captured as Barrier Points (these are not captured by Toowoomba Regional Council).

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Barrier Points:*

Element Name	Mandatory (Y/N)
Type#	Y
UprightMaterial#	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 0.5 metre.



Figure 13 - Barrier Point



Figure 12 - Barrier Point

7.1.13 RETAINING WALL

General Information: None.

Asset Capture: Complex linear feature (polylines including curves but Bezier curves) is used to represent a retaining wall. While recognised as a three-dimensional object, the retaining wall is to be captured as a linear course at the point where it intersects the ground. **Figure 14** below shows the capture location of a new retaining wall (yellow dashed line). Where the retaining wall gradually changes height over its length, the height is to be taken from the highest point of the wall.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for Retaining Walls:

Element Name	Mandatory (Y/N)
Use#	Y
Material#	Y
Construction#	Y
Length_m	Y
Height_m	Y
Width_m*	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 0.5 metre.



Figure 14 - Retaining Wall

7.1.14 SHELTER

General Information: None.

Asset Capture: Area feature (closed polygon) representing the structure as shown in the **Figure 15** below. Significant assets within the Shelter such as lighting, barbeques or park furniture are to be captured as separate objects. Shade sails with multiple shade panels may be captured as on asset where the panels share a common mounting point e.g. Centre Pole. Poles associated with shade sails / shelters do not need to be captured separately. Any slab the shelter is installed on is considered part of the asset and does not need to be captured separately.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for Shelter structures:

Element Name	Mandatory (Y/N)
Type#	Y
ConstructionType	Y
FloorMaterial#	Y
WallMaterial#	Y
RoofMaterial#	Y
Manufacturer	N
ModelNumber	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 15 - Shelter

7.1.15 ARTWORK

General Information: Includes entry statements, memorials, plaques, sculptures and statues.

Asset Capture: Simple Point Feature representing the centre of the asset as represented by the yellow dot in **Figure 16**and **Figure 17** below.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Artwork:*

Element Name	Mandatory (Y/N)
Type#	Y
Material#	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 16 - Artwork



Figure 17 - Artwork

7.1.16 BUILDING

General Information: Includes arbours, amenities, bandstands, amphitheatres, toilet blocks, sheds, grandstand / open seating etc.

Asset Capture: Area feature (closed polygon) representing the vertical Building footprint for a structure other than a shelter. Refer to red outline in **Figure 18** below.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Buildings:*

Element Name	Mandatory (Y/N)
Type#	Y
Material#	Y
DisabilityFriendly*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 2 metres



Figure 18 - Building

7.1.17 BOATING FACILITY

General Information: None.

Asset Capture: Area feature representing an individual boating facility such as a pontoon, ramp, or jetty.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Boating Facilities:*

Element Name	Mandatory (Y/N)
Type#	Y
Material#	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.1.18 ELECTRICAL FITTING

General Information: Includes Lights, Pits, Poles, Power Outlets and Switchboards. Please note: Traffic related Poles are to be captured as Supplementary features, refer to **Section 7.4.7.6 Pole**.

Asset Capture: Simple point feature representing the centre of each asset. Council requires all Rate 3 lighting installed to be captured. If a light is mounted on a pole, it is to be captured as a separate but coincident point feature. Bollard lighting is the exception.

Spatial Relationship: Shown coincident to supply conduit runs where applicable.

Mandatory Attribution: The following attribution is mandatory for *Electrical Fittings:*

Element Name	Mandatory (Y/N)
Type#	Y
Base	Y
Material#	Y
EnergySource#	Y
Manufacturer	N
ModelNumber	N
Lumins*	N
LightsPerPole*	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.1.19 ELECTRICAL CONDUIT

General Information: This excludes conduit relating to Transport infrastructure. Refer to **section 7.4.7.3 Conduit** for Transport Conduit capture.

Asset Capture: Complex linear feature (polylines and including curves but not Bezier curves) representing a conduit run.

Spatial Relationship: Conduit to be shown as a polyline starting and finishing at coincident points with terminating fittings.

Mandatory Attribution: The following attribution is mandatory for *Electrical Conduits:*

Element Name	ADAC Mandatory (Y/N)
Type#	Y
Material#	Y
Diameter_mm	Y
Length_m	Y
Protection#	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.1.20 LANDSCAPE AREA

General Information: None

Asset Capture: Multi-patched area feature representing the “footprint” of a landscaped area as represented by the solid red line in **Figure 19**Figure 19 - Landscape Area below. Individual areas are required where the type of Landscaping changes (e.g. garden beds, enclosed shrubs, physical protection around mature trees). Only gardens, grass and synthetic grass are required to be included in the as-constructed data.

Spatial Relationship: Must be within the Parent Open Space Area feature.

Mandatory Attribution: The following attribution is mandatory for *Landscaped Areas:*

Element Name	Mandatory (Y/N)
Type#	Y
RootBarrier	Y
Irrigated	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 0.5 metres



Figure 19 - Landscape Area

7.1.21 SIGN

General Information: Includes Open Space related signage.

Asset Capture: Simple point feature representing the centre of the sign. Poles associated with signs do not need to be captured / recorded separately. Some examples of park signs are shown in the **Figure 20**.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for *Signs:*

Element Name	Mandatory (Y/N)
Type#	Y
Material#	Y
Manufacturer	N
ModelNumber	N
Structure#	Y
SignText	N
Rotation	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 20 - Park Signs

7.1.22 TREE

General Information: None.

Asset Capture: Simple point feature approximating the centre of a tree.

Spatial Relationship: Not applicable.

Mandatory Attribution: The following attribution is mandatory for Trees:

Element Name	ADAC Mandatory (Y/N)
Species	N
Genus	N
RootBarrier	Y
Grate	Y
SpeciesCommonName#	Y
Age#	N
Height#	Y
AvgCanopyWidth#	N
Health#	N
Structure#	N

* The type of # for TRC additional enumeration value, * for TRC additional attributes Tree is to be recorded in the Notes element. This is mandatory.

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.2 SEWERAGE ASSETS

7.2.1 CONNECTION

General Information: None.

Asset Capture: Complex linear feature (Polyline not including Curves read: Straight line segments) representing the invert of the pipe asset. Enforced line direction from Inspection Opening to the Non-Pressure Pipe/Maintenance Hole due to gravitational flow. Please refer to the green lines in **Figure 21, Figure 22** and **Figure 23** below defines the connection dimension attributes.

Spatial Relationship: Gravity downstream end point of the linear feature must be coincident to anywhere on a Non-Pressure Pipe linear feature or the chamber wall of a Maintenance Hole/Shaft if the asset is a "Stub" connection.

Mandatory Attribution: The following attribution is applicable for *House Connections:*

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
IO_Distance_m	Y
SO_Nearest_m	Y
SO_Other_m	Y
Sediment_Trap	Y
OBDistance*	Y

for TRC additional enumeration value, * for TRC additional attributes

Note: Generic Enumerations e.g. "M_1"," M_2" etc are not acceptable. "Unknown" is not acceptable when Status = "Newly Constructed". "Other" is only acceptable if the enumeration isn't available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

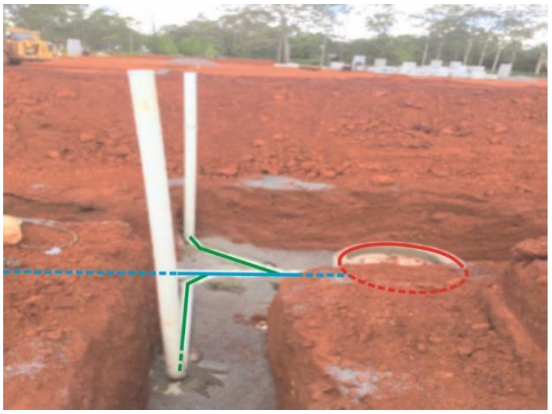


Figure 21



Figure 22

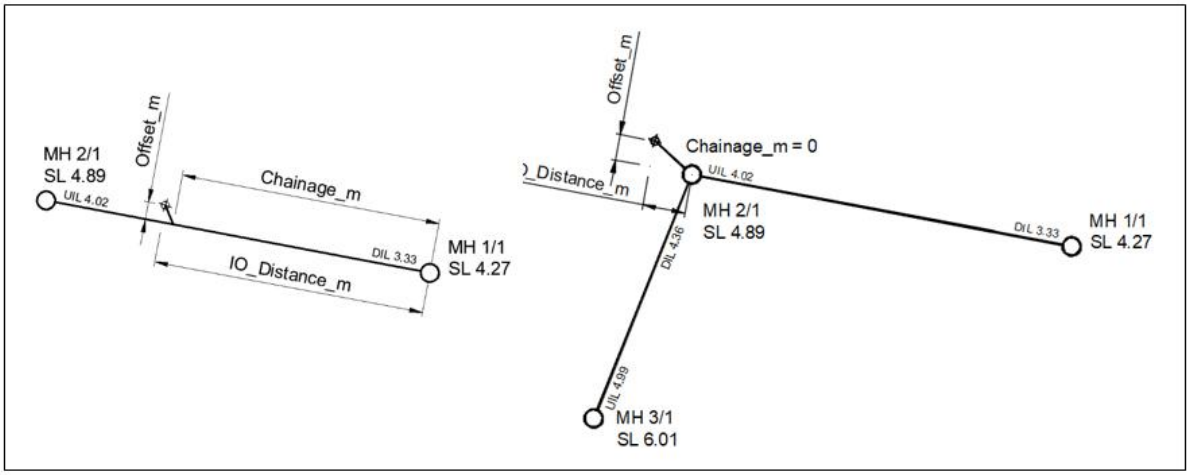


Figure 23

7.2.2 FITTING

General Information: Refer to **Figure 24** below for examples of fittings.

Asset Capture: Single point feature representing the centre point of the fitting. The Structure ID as shown in the design drawings must be recorded in the ADACId element.

Spatial Relationship: Must be coincident to the end of pipe assets or a pipe asset anywhere along its length.

Mandatory Attribution: The following attribution is mandatory for *Fittings:*

Element Name	Mandatory (Y/N)
Type	Y
Material	Y
Lining	N

Element Name	Mandatory (Y/N)
Protection	N
BodySize_mm	Y
BranchSize_mm	Y *(when different to BodySize_mm)*
Rotation	N

for TRC additional enumeration value, * for TRC additional attributes

* Generic Enumerations e.g. “M_1”,” M_2” etc are not acceptable. “Unknown” is not acceptable when Status = “Newly Constructed”. “Other” is only acceptable if the enumeration isn’t available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

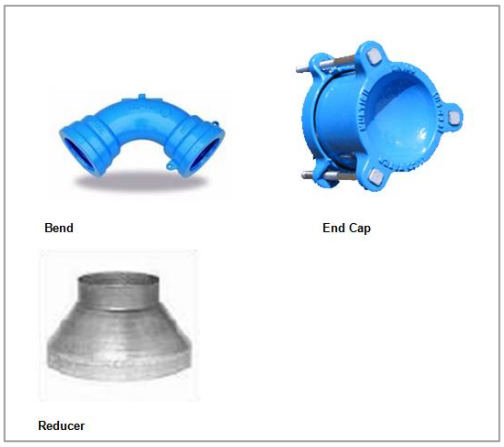


Figure 24

7.2.3 MAINTENANCE HOLE

General Information: Includes Inspection Openings at End-of-Line.

Asset Capture: Single point feature located at the centre of chamber on the top/lid surface. Refer to the blue dot in **Figure 25** below.

*Note: Capturing centre of lid is appropriate only when the **lid is centred over the chamber.***

The following information is to be recorded in the Notes element:

- Where applicable, the TRC Standard Drawing Access Structure type is to be provided.
- The TRC Standard Drawing Access Structure Cover Class (“B” or “D”) is to be provided.

Spatial Relationship: Not applicable due to disconnected Survey capture.

Mandatory Attribution: The following attribution is mandatory for *Maintenance Holes:*

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
Lining	Y
LidMaterial	Y
DropType	Y
CatchmentPS	Y
LineNumber	Y
MH_Number	Y
Chainage_m	Y
TieDistance_m	Y
OffsetDistance_m	Y
Rotation	Y
Depth_m*	Y
BoltDownLid*	N
HeightAboveGround*	Y
ChamberConstructionType*	Y
RoofLevel*	Y

for TRC additional enumeration value, * for TRC additional attributes

* Generic Enumerations e.g. “M_1”,” M_2” etc are not acceptable. “Unknown” is not acceptable when Status = “Newly Constructed”. “Other” is only acceptable if the enumeration isn’t available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).



Figure 25 - Maintenance Hole

7.2.4 NON-PRESSURE PIPE

General Information: None.

Asset Capture: Complex linear feature (read: polylines with no curves only straight-line segments) representing the invert of the pipe asset. Enforced line direction from Gravity Upstream (read: higher AHD level) to Gravity Downstream (read: lower AHD level) due to gravitation flow in each individual pipe.

The gravity upstream and downstream ends of an individual pipe are captured at the intersection between the pipe material and the wall of the chamber. Please refer to **Figure 26** below for a detailed diagram. Points 2 and 3 represent the intersection of pipe material and chamber wall whereas points 1 and 4 represent the Maintenance Holes capture. Pipes are to be captured based on their physical and spatial properties and attributes. For example, if a pipe changes size, material, class, embedment or direction etc. then it must be broken and captured separately. Sewer pipes should not be broken by property connections.

The following information is to be recorded in the Notes element:

Where the pipe use is *Overflow*, the point of discharge must be provided in the *Notes* attribute. The following values should be used:

- "STW" – Discharge to Stormwater system
- "OPEN" – Discharge to water course

Spatial Relationship: Not applicable due to disconnected Survey capture.

Mandatory Attribution: The following attribution is mandatory for *Non-Pressure Pipes:*

Element Name	Mandatory (Y/N)
LineNumber	Y
Use	Y
Diameter_mm	Y
Material	Y
Class	Y
Lining	Y
Protection	Y
JointType	Y
US_InvertLevel_m	Y

Element Name	Mandatory (Y/N)
DS_InvertLevel_m	Y
US_SurfaceLevel_m	Y
DS_SurfaceLevel_m	Y
Alignment_m	Y
Depth_m	Y
Embedment	Y
RockExcavated	N
PipeGrade	N
Length_m	N
CED*	N
InternalDiameter*	N
SPS_Upstream*	Y
InlineStorage*	Y

for TRC additional enumeration value, * for TRC additional attributes

Generic Enumerations e.g. “M_1”,” M_2” etc are not acceptable. “Unknown” is not acceptable when Status = “Newly Constructed”. “Other” is only acceptable if the enumeration isn’t available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

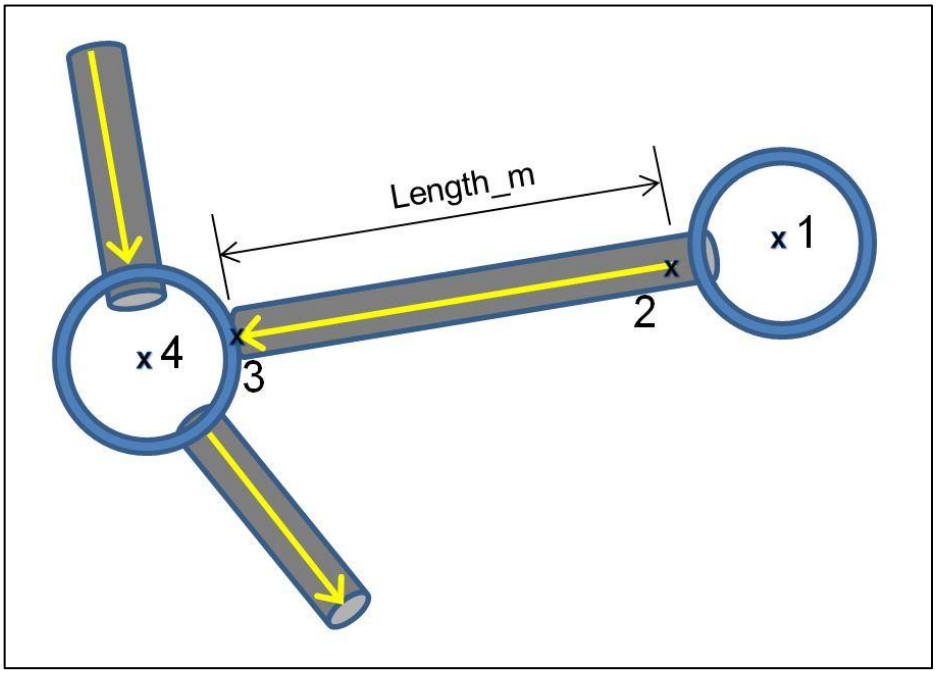


Figure 26

7.2.5 PRESSURE PIPE

General Information: None.

Asset Capture: Complex linear feature (read: polylines with no curves only straight-line segments) representing the invert of the pipe asset. Enforced line direction from Pump active asset to Discharge Maintenance Hole due to pumped flow. Pipes to be captured based on their physical and spatial properties and attributes. For example, if a pipe changes size, material, class, embedment, or direction then it must be broken and captured separately.

The Line Number as shown in the design drawings must be recorded in the ADACId element.

Spatial Relationship: Must be coincident to Pressure pipe point features in the pumped sewerage network.

Mandatory Attribution: The following attribution is mandatory for *Pressure Pipes:*

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

for TRC additional enumeration value, * for TRC additional attributes

* Generic Enumerations e.g. “M_1”,” M_2” etc are not acceptable. “Unknown” is not acceptable when Status = “Newly Constructed". “Other” is only acceptable if the enumeration isn’t available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

7.2.6 VALVE

General Information: None.

Asset Capture: Single point feature representing the centre of a valve body, typically the spindle.

The relationship between Valve Use and Valve Type is as per the below table.

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

Spatial Relationship: Must be coincident anywhere along its length or at the end of Pressure Pipe assets.

Mandatory Attribution: The following attribution is mandatory for *Valves:*

Element Name	Mandatory (Y/N)
Use	Y
Type	Y
Diameter_mm	Y
Lining *	Y
Protection *	Y
Manufacturer	N
ModelNumber	N
Rotation	N

Element Name	Mandatory (Y/N)
Material*	Y
IL*	Y
SL*	Y

for TRC additional enumeration value, * for TRC additional attributes

Note: Generic Enumerations e.g. "M_1"," M_2" etc are not acceptable. "Unknown" is not acceptable when Status = "Newly Constructed". "Other" is only acceptable if the enumeration isn't available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).



Gate Valve (commonly used as a Stop Valve).

Figure 27



Air Valve

Figure 28

7.3 STORMWATER / DRAINAGE

7.3.1 END STRUCTURE

General Information: Represents a stormwater headwall/endwall.

Asset Capture: To be represented as a "point feature" at the outlet of the pipe/culvert as per the example shown by the green cross in **Figure 29** below. Point to be located at top of the structure above the invert of the associated pipe/s and midway on the headwall. Fences surrounding the End Structure should be captured separately as Open Space Barrier Continuous (see **Figure 30** below).

NOTE: The ADAC Schema allows for an identical Polyline feature capture for End Structures however that is not accepted by TRC.

Spatial Relationship: Must be adjacent to the end point of a stormwater pipe feature.

Mandatory Attribution: The following attribution is mandatory for *End Structures:*

Element Name	Mandatory (Y/N)
StructureID	Y
StructureLevel_m	Y
EndWall.Type	Y *(if Endwall exists)*
EndWall.Size	Y *(if Endwall exists)*
EndWall.Length_m	Y *(if Endwall exists)*
EndWall.Height_m	Y *(if Endwall exists)*
EndWall.Thickness_m	Y *(if Endwall exists)*
EndWall.Material	Y *(if Endwall exists)*
EndWall.Construction	Y *(if Endwall exists)*
WingWall.LWW_Length_m	Y *(if Wingwall exists)*
WingWall.LWW_Height_m	Y *(if Wingwall exists)*
WingWall.LWW_Thickness_m	Y *(if Wingwall exists)*
WingWall.LWW_Material	Y *(if Wingwall exists)*
WingWall.LWW_Construction	Y *(if Wingwall exists)*
WingWall.RWW_Length_m	Y *(if Wingwall exists)*
WingWall.RWW_Height_m	Y *(if Wingwall exists)*
WingWall.RWW_Thickness_m	Y *(if Wingwall exists)*
WingWall.RWW_Material	Y *(if Wingwall exists)*
WingWall.RWW_Construction	Y *(if Wingwall exists)*
Apron.Apron_Width_m	Y *(if Apron exists)*
Apron.Apron_Thickness_m	Y *(if Apron exists)*
Apron.Apron_Area_m2	Y *(if Apron exists)*
Apron.Apron_Material	Y *(if Apron exists)*

Element Name	Mandatory (Y/N)
Apron.Apron_Construction	Y *(if Apron exists)*
GrateType	N
TideGate	N
Invert Level*	Y
Depth*	Y
OutletProtection*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 10 millimetres.



Figure 29



Figure 30

7.3.2 END STRUCTURE POLYLINE

Note: End Structure Polylines are **not** to be recorded in ADAC XML submissions for TRC. End Structure as a point feature detailed above is to be used instead.

7.3.3 FITTING

General Information: Represents a point fitting in a stormwater system.

Asset Capture: Single point feature representing the centre point of the fitting.

Spatial Relationship: Must be coincident to the end point of a stormwater pipe feature.

Mandatory Attribution: The following attribution is mandatory for *Fittings:*

Element Name	Mandatory (Y/N)
FittingType	Y
SurfaceLevel*	Y
InvertLevel*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 10 millimetres.

7.3.4 PIPE

General Information: None.

Asset Capture: Simple linear feature representing the invert of a pipe or midpoint of a box asset as per the red solid lines in **Figure 30** and yellow solid lines in **Figure 31** below. The Network is to be represented as a Disconnected Network from Chamber wall to Chamber wall with a Length value of Pipe Material Length as per **Figure 31** below. Multiple-celled culverts & pipes should always be represented individually; therefore, the number of cells attribute should always be "1". Enforced line direction from Gravity Upstream (read: higher AHD level) to Gravity Downstream (read: lower AHD level) due to gravitational flow.

Spatial Relationship: May be coincident to Stormwater point features.

Mandatory Attribution: The following attribution is mandatory for *Pipes:*

Element Name	Mandatory (Y/N)
US_InvertLevel_m	Y
DS_InvertLevel_m	Y
US_SurfaceLevel_m	Y
DS_SurfaceLevel_m	Y

Element Name	Mandatory (Y/N)
PipeStructure.CircPipe.Diameter_mm#	Y *(if circular)*
PipeStructure.CircPipe.Material#	Y *(if circular)*
PipeStructure.CircPipe.Class#	Y *(if circular)*
PipeStructure.CircPipe.JointType	Y *(if circular)*
PipeStructure.BoxPipe.Height_mm*	Y *(if box)*
PipeStructure.BoxPipe.Width_mm*	Y *(if box)*
PipeStructure.BoxPipe.Material	Y *(if box)*
PipeStructure.BoxPipe.Class	Y *(if box)*
Cells	Y
ConcreteCoverType	Y
Grade	Y
Length_m	Y
AverageDepth*	Y

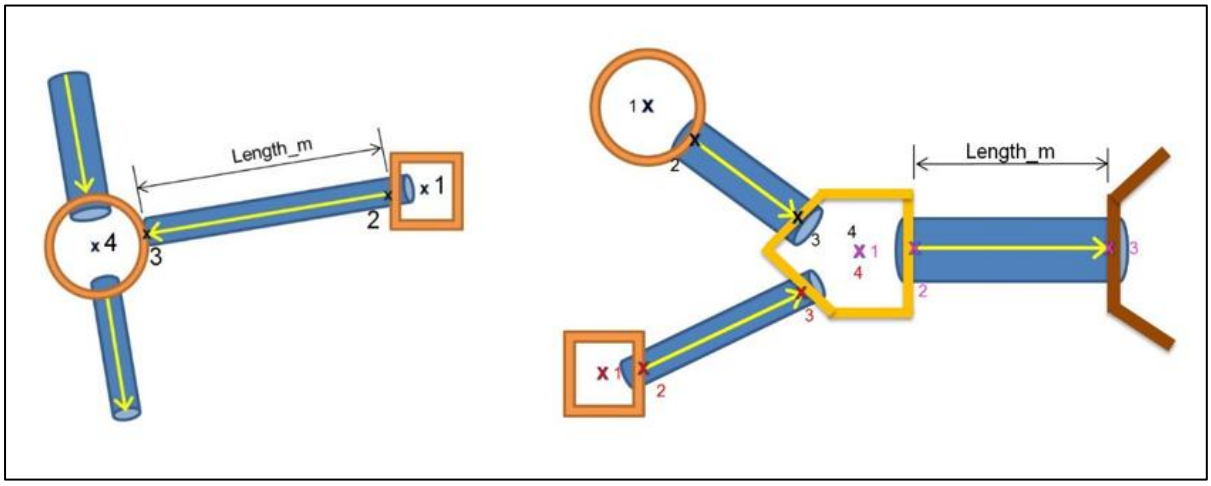
for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 80 millimetres in Urban areas and +/- 100 millimetres in Rural areas. Vertical Accuracy of +/- 10 millimetres.



Figure 30 – Stormwater Pipes and End Structure

Figure 31



7.3.5 PIT

General Information: None.

Asset Capture: To be captured and represented as a "point" located at the centre of chamber. The StructureID as shown in the design drawing must be provided in the PitNumber element.

Refer to the below matrix for common pit types & the attribution required.

Manholes	Use	Maintenance Hole or Roofwater Inspection Chamber
	Lid Type	Required
	Inlet	Not applicable
	Lintel	Not applicable
Gully Pits	Use	Kerb Inlet
	Lid Type	Not applicable
	Inlet	Required
	Lintel	Required (if exists)
Field Inlets	Use	Field Inlet
	Lid Type	Not applicable
	Inlet	Yes
	Lintel	Not applicable
All others	Use	Pit or Roofwater Outlet

	Lid Type	No
	Inlet	No
	Lintel	No

Note: The Dimensions of Rectangular, Circular or Extended relate to the Chamber size with the Inlet. the Inlet Size populated with the size of the grate when applicable.

Spatial Relationship: May be coincident with a GPTSimple feature.

Mandatory Attribution: The following attribution is mandatory for *stormwater Pits:*

Element Name	Mandatory (Y/N)
PitNumber	Y
Use	Y
ChamberConstruction	Y
ChamberSize.Rectangular.Length_mm	Y *(if rectangular)*
ChamberSize.Rectangular.Width_mm	Y *(if rectangular)*
ChamberSize.Circular.Diameter_mm	Y *(if circular)*
ChamberSize.Extended.Radius_mm	Y *(if extended)*
ChamberSize.Extended.Extension_mm	Y *(if extended)*
LidType	N
SurfaceLevel_m	Y
InvertLevel_m	Y
Depth_m	Y
Inlet.InletConfig	Y *(if Use = Kerb Inlet or Field Inlet)*
Inlet.InletType	Y *(if Use = Kerb Inlet or Field Inlet)*
Inlet.InletSize	Y *(if Use = Kerb Inlet or Field Inlet)*
Lintel.LintelConstruction	Y *(if Use = Kerb Inlet)*
Lintel.LintelLength_m#	Y *(if Use = Kerb Inlet)*
OutletType	Y
FireRetardant	Y
Rotation	N
Material*	Y

#for TRC additional enumeration value, * for TRC additional attributes

Note: LidSealed and SumpPit (recorded as "true" or "false") as well as SumpPitDepth_m is to be recorded in the Notes element.

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 10 millimetres.

7.3.6 STORMWATER QUALITY IMPROVEMENT DEVICES (SQIDS)

7.3.6.1 GPT COMPLEX (WSUD POINT)

General Information: Represents a complex Commercial or Custom built device (e.g. Humes Intercepter).

Asset Capture: Single point feature located at the centre of chamber on the top surface. Capturing centre of lid is appropriate only when the lid is centred over the chambers.

Spatial Relationship: GPTComplex features must be coincident to Pipe features as per Pit features.

Mandatory Attribution: The following attribution is mandatory for *GPT Complex SQIDs:*

Element Name	Mandatory (Y/N)
Sqid_Id	Y
Construction.Commerical.Manufacturer	N
Construction.Commerical.ModelNumber	N
Construction.Commerical.Size	N
Construction.Custom.Size	N
Function1	Y
Function2	N
Function3	N
US_PipeDiameter_mm	N
DS_PipeDiameter_mm	N
SurfaceLevel_m	Y
US_InvertLevel_m	Y
DS_InvertLevel_m	Y
CleanoutLevel_m	Y
Depth_m	N
SumpDepth_m	N
HasFilterMedia	N
HasBasket	N
HasBoards	N
DesignFlow_m3s	Y
MaxContaminantVolume_m3	N
MaxInternalVolume_m3	N
MaintenanceCycle_mnths	N
Rotation	N
Category*	N
SQIDType*	N
TrapType*	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 10 millimetres.

7.3.6.2 GPT SIMPLE (WSUD POINT)

General Information: Represents a Water Sensitive Urban Design point feature that is a simple grate, basket or net fitted to existing infrastructure. Includes custom In-Pit or End-of-Line features or In-Line features such as trash-racks on drainage lines.

Asset Capture: Point feature is to represent the centre of asset which is situated inside of a Pit or End Structure feature. Capturing centre of lid is appropriate only when the lid is centred over the chamber.

Spatial Relationship: GPTSimple features must collocate with end structures or placed on pipes or drainage lines. As they are housed within those structures and can be removed for maintenance purposes.

Mandatory Attribution: The following attribution is mandatory for *GPT Simple SQIDs:*

Element Name	Mandatory (Y/N)
Sqid_Id	Y
Construction	Y
Manufacturer	Y
ModelNumber	Y
TreatmentMeasure	Y
Function1	Y
Length_mm	Y
Width_mm	Y *(if Rectangular)*
Material	N
MaintenanceCycle_mnths	Y
Rotation	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 10 millimetres.

7.3.6.3 NON GPT SIMPLE (WSUD POINT)

General Information: Represents a WSUD point feature that is not a simple litter trap, such as a small sand filter, sediment pond, aquifer storage, and infiltration measure or energy dissipater.

Asset Capture: Single point feature located at the centre of asset. Non GPT Simple assets represent basic and minor sand filtration storage.

Spatial Relationship: *Non GPT Simple* features must be coincident to Pipe features as per Pit features.

Mandatory Attribution: The following attribution is mandatory for *Non GPT Simple SQIDs:*

Element Name	ADAC Mandatory (Y/N)
Sqid_Id	Y
Construction	Y
Manufacturer	Y
ModelNumber	Y
TreatmentMeasure	Y
Function1	Y
Function2	N
Function3	N
Length_mm	Y
Width_mm	Y *(if Rectangular)*
MaintenanceCycle_mnths	Y
Rotation	N

[#] for TRC additional enumeration value, [*] for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 10 millimetres.

7.3.6.4 FLOW MANAGEMENT DEVICE (WSUD POLYLINE)

General Information: Represents a Flow Management Device This is often called a Stormwater Quality Improvement Device (SQID). Levee, Spillway and Weir are types of stormwater flow management devices.

Asset Capture: To be represented as a polyline feature comprising of straight-line segments (read: no curves).

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Flow Management Devices:*

Element Name	Mandatory (Y/N)
Sqid_Id	Y
Type	Y
Material	Y
Length_m	N
CrestElevation_m	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 50 millimetres.

7.3.6.5 WATER SENSITIVE URBAN DESIGN (WSUD) AREA

General Information: Represents a Water Sensitive Urban Design (WSUD) area feature. Also often called a Stormwater Quality Improvement device (SQID).

Asset Capture: Typically, assets such as kerbside bio-filtration beds, drainage swales or bio-basins should be captured individually as a closed polyline/polygon representing the ponding area of the asset. Individual areas are to be recorded within the ADAC data capture fields defining class type within the ADAC data capture fields (e.g swale, buffer strip, bio-retention basin). Any associated infrastructure with the WSUD (e.g. vehicle accesses, fences, gates, etc.) should be captured separately. **Figure 32** below demonstrates the capture of a WSUD (black outlined polygon).

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *WSUD Areas:*

Element Name	Mandatory (Y/N)
Sqid_Id	Y
TreatmentMeasure	Y
Function1	Y
Function2	Y
Function3	Y
PondingArea_m2	Y
PondingDepth_m	Y
FilterArea_m2	Y
FilterDepth_m	Y
TransitionDepth_m	Y
DrainageDepth_m	Y

Element Name	Mandatory (Y/N)
MacrophyteZoneArea_m2	Y
MacrophyteZoneDepth_m	Y
CoarseSedimentArea_m2	Y
SedimentVolume_m3	Y
MinSurfaceLevel_m	Y
PermanentPondLevel_m	Y
OutletLevel_m	Y
DesignFlow_m3s	Y
HasSpillway	Y
MaintenanceCycle_mnths	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 50 millimetres. Vertical Accuracy of +/- 10 millimetres.



Figure 32

7.3.7 SURFACE DRAIN

General Information: None.

Asset Capture: To be captured as a Simple linear feature (read: polylines with no curves) representing the midpoint between batters/invert of channel and in direction of water flow. Surface Drains are to be captured based on their physical, spatial properties and attributes. For example, if a surface changes size, material, shape etc. then it must be captured separately**. Figure 33** below indicates the capture of a major surface drain (green and red dashed lines) as well as a smaller surface drain (blue solid lines) feeding into it. The main surface drain has been represented as a separate feature where the main change of width occurs (green and red dashed lines). The smaller surface drains (blue solid lines) end at the intersection of the main surface drain's outer edge.

Spatial Relationship: May be coincident to End Structures and WSUD region/polygons.

Mandatory Attribution: The following attribution is mandatory for *Surface Drains:*

Element Name	Mandatory (Y/N)
Type	Y
DrainShape	Y
LiningMaterial	Y
LinedWidth_m	Y
BatterMaterial	Y
BatterWidth_m	Y
US_InvertLevel_m	Y
DS_InvertLevel_m	Y
AverageGrade	Y
Length_m	Y
US_SurfaceLevel_m	Y
DS_SurfaceLevel_m	Y

** # for TRC additional enumeration value, * for TRC additional attributes

LowFlowChannel (recorded as "true" or "false") as well as CrossSectionalArea_m2, AverageDepth_m is to be recorded in the Notes element.

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 33

7.4 SUPPLEMENTARY

7.4.1 POINTFEATURE / POLYLINEFEATURE / POLYGONFEATURE

General Information: Supplementary features are used to record additional asset types or points of reference which isn't otherwise covered under the ADAC schema. Toowoomba Regional Council has specified additional asset types required to be supplied in the XML under its As-Constructed Data Specification. The details for these asset types have been supplied below.

Asset Capture: Simple Point, Complex Polyline or Multi-patch Area feature (depending on the feature type) representing objects or assets that add clarity or context to the strict ADAC features.

Mandatory Attribution: The following attribution is mandatory for Supplementary Features:

Element Name	Mandatory (Y/N)
Class	Y
Note	N

Attribute()TextValue	N
Attribute()IntegerValue	N
Attribute()DecimalValue	N
Attribute()DateValue	N
Attribute()TimeValue	N
Attribute()DateTimeValue	N

7.4.2 GENERAL SUPPLEMENTARY

7.4.2.1 STAGE BOUNDARIES

General Information: Represents the stage boundary for a subdivision development submission.

Asset Capture: Supplementary Polygon feature representing the boundary of a subdivision stage. The Class element must be populated with "Stage Boundary".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Stage Boundaries:*

Element Name	Custom Attribution Type	Additional Information
Class		Must be "Stage Boundary"
Note		

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 34

7.4.3 OPEN SPACE SUPPLEMENTARY

7.4.3.1 FIRE BREAK

General Information: None.

Asset Capture: Supplementary Polyline feature representing the centre of a Fire Break (refer to solid red line in **Figure 35** below). The Class element must be populated with “Fire Break”.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Fire Breaks:*

Element Name	Mandatory (Y/N)
Note	N
Location	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 35

7.4.3.2 IRRIGATION LINE

General Information: None.

Asset Capture: Supplementary Polyline feature representing the invert of an irrigation pipe. The Class element must be populated with "Irrigation Line".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Irrigation Lines:*

Element Name	Mandatory (Y/N)
IrrigationType	Y
WaterSource	Y
Location	Y
Diameter_mm	Y
NumPumpUps	N
ModelNumber	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.3.3 IRRIGATION POINT

General Information: None.

Asset Capture: Supplementary Point feature representing the centre of an irrigation fitting. The Class element must be populated with "Irrigation Point".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Irrigation Points:*

Element Name	Mandatory (Y/N)
IrrigationpointType	Y
Manufacturer	N
ModelNumber	N
Output_Lsec	N
Note	

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4 SEWERAGE SUPPLEMENTARY

7.4.4.1 PRESSURE SEWER UNIT

General Information: Pressure sewer units are installed in individual properties and transfer sewage from the property to the pressure sewer pipeline via the pressure sewer service. They consist of a prefabricated pump station and incorporate an electrical switchboard.

Asset Capture: Supplementary Point feature representing the centre of Sewer Unit. The Class element must be populated with "Pressure Sewer Unit".

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Pressure Sewer Units:*

Element Name	Mandatory (Y/N)
SurfaceLevel_m	Y
InvertLevel_m	Y
Manufacturer	N
Model	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4.2 SEWER ACCESS CHAMBER

General Information: Access Chambers (or pits) house one or more network devices and provide access to such devices for maintenance work.

Asset Capture: Supplementary Polygon feature representing the outline of the chamber. The Class element must be populated with "Access Chamber".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Access Chambers:*

Element Name	Mandatory (Y/N)
Class	Y
Use	Y
ChamberSize	Y
ChamberShape	Y
Length_mm	Y

Element Name	Mandatory (Y/N)
Width_mm	Y
Diameter_mm	Y
Depth_m	Y
RoofLevel_m	Y
FloorLevel_m	Y
SurfaceLevel_m	Y
HeightAboveGround	Y
ConstructionType	Y
FloorMaterial	Y
WallMaterial	Y
RoofMaterial	Y
LidMaterial	Y
Note	Y

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4.3 SEWER NETWORK METER

General Information: Represents the facility used to measure Sewage flow on a network.

Asset Capture: Supplementary Point feature representing the centre of Meter. The Class element must be populated with “Sewer Network Meter”.

Spatial Relationship: Must be coincident with Sewerage.PressurePipe assets.

Mandatory Attribution: The following attribution is mandatory for *Network Meters:*

Element Name	Mandatory (Y/N)
MeterType	Y
Diameter	Y
Configuration	Y
Manufacturer	N
Model	N
Make	N
SL	Y
IL	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4.4 SEWER NETWORK STRUCTURE

General Information: Represents the complex construction of many assets that work as one to perform a specific function and facility used to measure Sewage flow on a network. The network structures catered for are Treatment Plants (refer to the yellow dot in **Figure 37** below), Pump Stations (refer to the yellow dot in **Figure 36** below), Storage Facilities, Overflow Points and Manifold Storage Facilities.

Asset Capture: Supplementary Point feature representing the centre of area of complex structures. The Class element must be populated with "Sewer Network Structure".

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Network Structures:*

Element Name	Mandatory (Y/N)
StructureName	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 36: Sewerage Pump Station

7.4.4.5 SEWER CATCHMENT AREA

Figure 37

General Information: Represents the catchment area of the Sewerage network aligning with Property Boundaries serviced by the Sewerage network.

Asset Capture: Supplementary Polygon feature representing the outline of the catchment. The Class element must be populated with “Sewer Catchment Area”. The Catchment Identifier is to be recorded in the ADACId element.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Catchment Areas:*

Element Name	Mandatory (Y/N)
Catchment Area Name	Y
Catchment Area Id	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4.6 SEWER PUMP

General Information: Represents location and details of pump assets within the Sewerage network.

Asset Capture: Supplementary Point feature representing the centre of the pump. The Class element must be populated with “Sewer Pump”.



Figure 38: Pump located at a Sewer Network Structure

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Sewer Pumps:*

Element Name	Mandatory (Y/N)
Name	N
SurfaceLevel_m	Y
InvertLevel_m	Y
DutyHead	N
DutyFlow	N
Manufacturer	N
Model	N
SerialNo	N
Make	N
RatedkW	Y
VFD	Y
Catchment Area Id	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4.7 SEWER VENT

General Information: A vent is a facility to allow potentially dangerous gases to escape from the sewer network. The Vent represented by a single point includes the Vent itself plus riser or vertical pipe; connect to the sewer main via a Vent Pipeline.

Asset Capture: Supplementary Point feature representing the centre of Sewer Vent. The Class element must be populated with “Sewer Vent”.

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Sewer Vents:*

Element Name	Mandatory (Y/N)
SurfaceLevel_m	Y
InvertLevel_m	Y
Height	Y
MechVent	Y
CannisterFilter	Y
FilterType	Y
Catchment Area Id	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4.8 SEWER STRUCTURE FOOTPRINT

General Information: This represents the external boundary of storage areas, wells, and pump houses. Refer to the red polygons in **Figure 37** above in **section 7.4.4.4**.

Asset Capture: Supplementary Polygon feature representing the external footprint of structures. The Class element must be populated with "Sewer Structure Footprint".

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Structure Footprints:*

Element Name	Mandatory (Y/N)
Type	Y
Capacity	N
Length	Y(if footprint shape is rectangular)
Width	Y(if footprint shape is rectangular)
Diameter	Y(if footprint shape is circular)
RoofLevel	Y
FloorLevel	Y
Depth	Y
ConstructionType	Y
FloorMaterial	Y
WallMaterial	Y
RoofMaterial	Y
LidMaterial	Y
Lining	Y
GuiderailMaterial	Y
GuiderailProtection	N
WellPitConfiguration	N
StructureShape	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.4.9 VACUUM JUMP UP POINT

General Information: Vacuum Jump up Point is a feature that records the location of the discontinuity of the vertical alignment of vacuum mains. Vacuum mains have a saw tooth longitudinal section to create water traps, which enable vacuum pumps to transport 'slugs' of sewage down the vacuum main.

Asset Capture: Supplementary Point feature representing the location of the Vacuum Jump Up Point. The Class element must be populated with "Vacuum Jump Up Point".

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Vacuum Jump Up Points:*

Element Name	Mandatory (Y/N)
SurfaceLevel_m	Y
InvertLevel_m	Y
TopInvertLevel_m	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.5 STORMWATER SUPPLEMENTARY

7.4.6 STORMWATER CATCHMENT AREA

General Information: Represents the watershed catchment area of a particular Stormwater network.

Asset Capture: Supplementary Polygon feature representing the outline of the catchment. The Class element must be populated with "Stormwater Catchment Area". The Catchment Identifier is to be recorded in the ADACId element.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Catchment Areas:*

Element Name	Mandatory (Y/N)
Type	Y
Name	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.6.1 STORMWATER NETWORK STRUCTURE

General Information: Each structure may be a complex construction of many devices that work as one to perform a specific function and hence can be represented by a single point location on the network. The network structure types catered for include Energy Dissipaters, Weir Walls, and Sewer Entries.

Asset Capture: Supplementary Point feature representing the centre of a Network Structure. The Class element must be populated with "Network Structure".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Network Structures:*

Element Name	Mandatory (Y/N)
StructureName	N
Type	Y
SurfaceLevel_m	Y
InvertLevel_m	Y
Depth_m	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.6.2 WATER BODY

General Information: Representing a large body of water that differs from Stormwater.WSUDArea

Asset Capture: Supplementary Point feature representing the centre of a body of water. The Class element must be populated with "Water Body".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Water Bodies:*

Element Name	Mandatory (Y/N)
Type	Y
Name	N
SurfaceLevel_m	Y

Element Name	Mandatory (Y/N)
InvertLevel_m	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

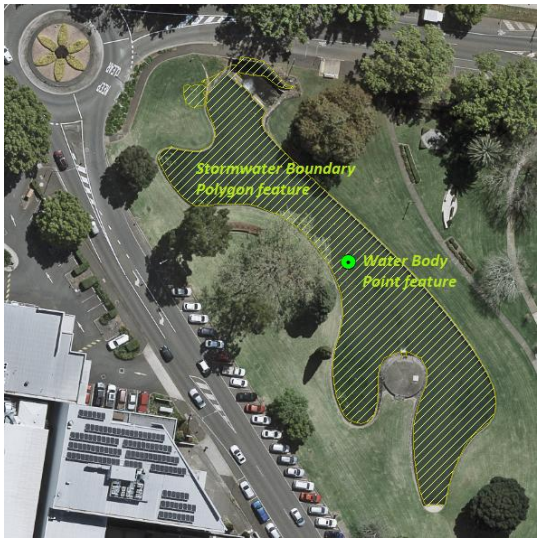


Figure 39

7.4.7 TRANSPORT SUPPLEMENTARY

7.4.7.1 BUS SHELTER

General Information: A Bus Shelter or Bus Stop Shelter is a shade structure erected adjacent to a bus stop, to shield potential passengers from rain and/or the sun.

Asset Capture: Supplementary Polygon feature representing the area of footprint of the bus shelter (refer to the red solid line in **Figure 40** below). The Class element must be populated with “Bus Shelter”.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Bus Shelters:*

Element Name	Mandatory (Y/N)
Seating	Y
DisabilityFacilities	Y
StructureMaterial	Y
PanelMaterial	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

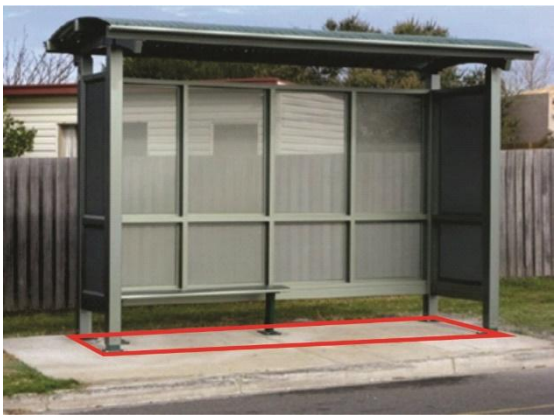


Figure 40 – Bus Shelter

7.4.7.2 CAMERA

General Information: Represents a traffic or city safe camera.

Asset Capture: Supplementary Point feature representing the centre of camera.
The Class element must be populated with “Camera”.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Cameras:*

Element Name	Mandatory (Y/N)
Height_m	Y
Outreach	Y
Bearing_deg	N
Manufacturer	N
ModelNumber	N
Purpose	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



7.4.7.3 CONDUIT

Figure 41 – Traffic Camera

General Information: Represents conduit carrying underground electrical or communications cables or wiring with a Transport function.

Asset Capture: Supplementary Polyline feature representing the centre of conduit. The Class element must be populated with “Conduit”.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Conduits:*

Element Name	Mandatory (Y/N)
Material	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.7.4 DRIVEWAY

General Information: None.

Asset Capture: Supplementary Point feature captured where the centre of a driveway width meets the line of kerb/channel. The Class element must be populated with “Driveway”.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Driveways:*

Element Name	Mandatory (Y/N)
Material	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.7.5 GUIDEPOST

General Information: A guidepost is a white timber or plastic post fitted with delineators that is used to mark and delineate roadside hazards, road widths, alignments and structures. They should be installed at a uniform distance from the edge of the road. Guide posts are spaced closely together on curves, and further apart on straight sections of road. A set of two closely spaced guideposts often signifies the presence of a culvert under the road.

Asset Capture: Supplementary Point feature representing a single post. The Class element must be populated with "Guidepost".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Guideposts:*

Element Name	Mandatory (Y/N)
MountType	Y
Material	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.7.6 POLE

General Information: Refers to traffic related poles only. These typically have a device mounted at the top such as street lighting, traffic lights or cameras.

Asset Capture: Supplementary Point feature representing a single pole. The Class element must be populated with "Pole".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Poles:*

Element Name	Mandatory (Y/N)
Material	Y
Decorative	Y

Element Name	Mandatory (Y/N)
BaseDiameter_mm	Y
Height_m	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.7.7 STREETLIGHT

General Information: Refers to a light source located adjacent to and/or above a road or walkway, which is automatically turned on during the night to provide illumination for both motorists and pedestrians. This is to be a feature captured separately to the pole feature.

Asset Capture: Supplementary Point feature representing the location of luminaire. The Class element must be populated with “Street Light”.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Street Lights:*

Element Name	Mandatory (Y/N)
Outreach	Y
Bearing_deg	N
LampWattage_w	N
LampType	N
Lux_lx	N
Height_m	Y
Manufacturer	N
Configuration	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.7.8 TRAFFIC SIGNAL

General Information: A Traffic Signal (or traffic light) is a signalling device positioned at a road intersection, pedestrian crossing, or other location. This is to be a feature captured separately to the pole features.

Asset Capture: Supplementary Point feature captured at the centre of the intersection. The Class element must be populated with "Traffic Signal".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Traffic Signals:*

Element Name	Mandatory (Y/N)
PoleType	Y
SignalType	Y
SignalAspect	N
LanternType	N
DisabilityFeatures	Y
Height_m	Y
Outreach	Y
Bearing_deg	N
SignalManufacturer	N
ControllerBoxManufacturer	N
ModelNumber	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.7.9 UNDERGROUND TRAFFIC SIGNAL INFRASTRUCTURE

General Information: This asset type stores the point location of underground traffic signal infrastructure such as Pits and Loops.

Asset Capture: Supplementary Point feature captured at the centre of pit or loop (refer to the yellow dot in Error! Reference source not found. below). The Class element must be populated with "UG Traffic Signal Infrastructure".

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Underground Traffic Signal Infrastructure:*

Element Name	Mandatory (Y/N)
Size	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 42

7.4.8 WATER SUPPLY SUPPLEMENTARY

7.4.8.1 BOND WIRE

General Information: A Bond Wire connects two nonadjacent sections of pipe to maintain the pipe in a "cathodic" state. This feature class is a complex edge feature because it is connected to other devices only at its ends and is used to perform traces to test the CP system.

Asset Capture: Supplementary Point feature representing the centre of the Chlorine Injection Point.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *the Bond Wire*.

Element Name	Mandatory (Y/N)
Material	Y
Color	Y
Depth	Y
WireSize	N
MeasuredLength	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.2 WATER CATHODE PROTECTION AREA

General Information: The Cathodic Protection area is a polygon feature delineating an area of the network that is fully covered by cathodic protection.

Asset Capture: Supplementary Point feature representing the centre of the Chlorine Injection Point.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *the Cathode Protection*.

Element Name	Mandatory (Y/N)
Name	Y
Note	N

7.4.8.3 WATER CHLORINE INJECTION POINT

General Information: None

Asset Capture: Supplementary Point feature representing the centre of the Chlorine Injection Point.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *the ChlorineInjectionPoint*.

Element Name	Mandatory (Y/N)
Depth	Y
Note	N

7.4.8.4 WATER CP ANODE

General Information: In This class represents an anode feature. The anode is connected to the pipe by means of wire and acts as the place of input for the current that is delivered. The anode

is "sacrificed" to protect the metal in the pipe from corroding. system.

Asset Capture: Supplementary Point feature representing the centre of the anode.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *the anode*.

Element Name	Mandatory (Y/N)
Material	Y
Quality	Y
Weight	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.5 WATER CP BOND JUNCTION

General Information: In cases where plastic pipe connects two metal pipes, bonding wire is used to maintain the electrical connectivity throughout the CP system.

Asset Capture: This feature class represents the location where two to four bonding wires converge.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *CP* Bond Junction.

Element Name	Mandatory (Y/N)
BondJunctionType	Y
CriticalIndicator	Y
ResistanceIndicator	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.6 WATER CP RECTIFIER CABLE

General Information: None.

Asset Capture: A rectifier cable carries power from the water main to the rectifier and to the anode as part of the Cathodic Protection (CP) system. This feature is represented as a complex edge feature because multiple connections to the network are made along its edge.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *CP Rectifier Cable:*

Element Name	Mandatory (Y/N)
Depth	Y
Gauge	N
MeasuredLength	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.7 WATER CP RECTIFIER

General Information: This feature class represents a rectifier, which is the source of direct current in the CP system. Wire connects the pipe to the negative pole of the rectifier. The positive pole is connected to the ground bed that contains anodes. Current flows from the rectifier through the ground bed, through the soil to the pipe, and back to the rectifier. The ground bed deteriorates over time, but the pipe is protected.

Asset Capture: Point feature captured at the rectifier.

Spatial Relationship: None

Mandatory Attribution: The following attribution is mandatory for *CP Rectifier:*

Element Name	Mandatory (Y/N)
Amperage	Y
CoolingMethod	N
InternalMeter	Y
RectifierType	Y
Voltage	N
Manufacturer	N
Model	N

Element Name	Mandatory (Y/N)
SerialNo	N
CPSystemObjectID	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.8 WATER NETWORK METER

General Information: Represents an in-line meter used by field operations to measure usage (flow) at a particular location on the network. Network meters are generally connected to SCADA.

Note: Customer meters are to be captured using WaterSupply.Meter.

Asset Capture: Supplementary Point feature representing the centre of a network meter. The Class element must be populated with "Water Network Meter

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Network Meters:*

Element Name	Mandatory (Y/N)
MeterType	Y
Diameter_mm	Y
Configuration	Y
Manufacturer	N
Model	N
Make	N
DSPressure	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.9 WATER NETWORK STRUCTURE

General Information: Network structures are used for many purposes within a water system. Each structure is likely to be a complex construction of many devices that work as one to perform a specific function and hence here are represented by a single point location on the network. The network structure types catered for include Pump Stations, Treatment Plants and Reservoirs. Reservoirs are elevated storage structures and serve as a distribution source for local areas. Pump Stations are used to pump water from a lower location on the network to a higher location, or for boosting water pressure. Treatment Plants purify raw water prior to distribution throughout the reticulated system.

Asset Capture: Supplementary Polygon feature representing the area of complex structures comprising the Network Structure. The Class element must be populated with “Water Network Structure”.

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Network Structures:*

Element Name	Mandatory (Y/N)
Name	
WaterPressureSystemStatus	
WaterSystemStatus	TextValue
Capacity	IntegerValue
ReservoirType	TextValue
BorePump	TextValue
BoreUse	TextValue
ReservoirPurpose	TextValue
Note	

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.10 WATER PUMP

General Information: Represents pump assets within the Water network.

Asset Capture: Supplementary Point feature representing the centre of a Pump. The Class element must be populated with “Water Pump”.

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Water Pumps:*

Element Name	Mandatory (Y/N)
Class	
Note	
Name	
Depth_m	
DutyHead_m	
DutyFlow_Lsec	
Manufacturer	
ModelNumber	
Make	
SerialNumber	
RatedkW	
VFD	

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.11 WATER SAMPLING STATION

General Information: Represents

Asset Capture: Supplementary Point feature. The Water Sampling Station point features may be scattered throughout the network and serve as points at which a water sample may be taken away for analysis at a pre-determined frequency.

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for Water Sampling Station*:*

Element Name	Mandatory (Y/N)
Depth	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.12 WATER SERVICE POINT

General Information: Represents

Asset Capture: Supplementary Point feature representing a customer service connection point. It is used for tracing functionality to calculate properties which are affected by an outage. A service point also represents the physical location of the customer meter.

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for Water Service Point:

Element Name	Mandatory (Y/N)
Metered	Y
MeterDiameter	Y
Depth	Y
Criticality	Y
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.13 WATER STRUCTURE FOOTPRINT

General Information: This represents the external boundary of reservoirs, pump houses and water treatment plants.

Asset Capture: Supplementary Polygon feature representing the external footprint of structures. The Class element must be populated with “Water Structure Footprint”.

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Structure Footprints:*

Element Name	Mandatory (Y/N)
Length_m	N
Width_m	N
InternalDiameter_m	N
Configuration	Y
RoofLevel_m	N
SurfaceLevel_m	N
FloorLevel_m	N
HeightAboveGround_m	N
Depth_m	Y
Capacity	Y
ConstructionType	Y

Element Name	Mandatory (Y/N)
FloorMaterial	Y
WallMaterial	Y
RoofMaterial	Y
Lining	N
ReservoirPurpose	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.4.8.14 WATER SURGE VESSEL

General Information: A Surge Vessel is a tank connected to a pumped pipeline which reduces the maximum value of water hammer related surge pressures. Water hammer is a hydraulic phenomenon associated with sudden starting activation of pumps or valves.

Asset Capture: Supplementary Point feature representing the centre of a Surge Vessel. The Class element must be populated with “Water Surge Vessel”.

Spatial Relationship: None.

Mandatory Attribution: The following attribution is mandatory for *Surge Vessels:*

Element Name	Mandatory (Y/N)
Type	N
Depth_m	Y
Manufacturer	N
Model	N
Make	N
SerialNumber	N

Element Name	Mandatory (Y/N)
Diameter_mm	Y
Length_mm	Y
MaxOperatingPressure	N
Volume_m3	N
Note	N

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.5 SURFACE

For Developer Contributed files, contour and spot height information is required to be supplied within the as-constructed data, for the purposes of assessing the as-constructed submission. For specific information regarding the capture of contours and spot heights, refer to *Spatial Data Capture Standards* of Toowoomba Regional Council.

7.5.1 BREAKLINE

Note: Profile Lines are not required to be recorded in ADAC XML submissions for TRC.

7.5.2 CONTOUR

General Information: None.

Asset Capture: Linear feature capturing a single contour feature.

Mandatory Attribution: The following attribution is mandatory for *Surface Features:*

Element Name	ADAC Mandatory (Y/N)
Status	Y
Elevation_m	Y

7.5.3 SPOT HEIGHT

General Information: None.

Asset Capture: Simple point feature representing a single elevation point.

Mandatory Attribution: The following attribution is mandatory for *Spot Heights:*

Element Name	ADAC Mandatory (Y/N)
Status	**Y**
Elevation_m	**Y**

7.5.4 PROFILE LINE

Note: Profile Lines are not required to be recorded in ADAC XML submissions for TRC.

7.6 TRANSPORT ASSETS

7.6.1 BRIDGE

General Information: None.

Asset Capture: Bridges can be represented using multiple feature types comprising the single Bridge extent encompassing the Deck, Superstructure, Abutments and Piers. A common identifier links all spatial and non-spatial features.

Pavement, Pathway and Guardrail features are to be captured using the usual Transport features.

7.6.1.1 ABUTMENT

General Information: None.

Asset Capture: Polygon feature representing a single Abutment located at each end of the bridge structure.

Spatial Relationship: Must be located within a Bridge Extent polygon.

Mandatory Attribution:

Element Name	Mandatory (Y/N)
BridgeID	Y
Material	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre

7.6.1.2 CONTAINMENT CLASS

General Information: None.

Asset Capture: Non spatial table.

Mandatory Attribution:

Element Name	ADAC Mandatory (Y/N)
BridgeID	Y
ContainmentClass	Y

7.6.1.3 DECK

General Information: None.

Asset Capture: Polygon feature representing each individual Deck feature located between abutments or supports.

Spatial Relationship: Must be located within a Bridge Extent polygon and spatial related to Pavement and Pathway features.

Mandatory Attribution:

Element Name	ADAC Mandatory (Y/N)
BridgeID	Y
Material	Y
NomWidth_m	Y
DeckLength_m	Y

Positional Accuracy: Horizontal Accuracy of +/- 1 metre

7.6.1.4 EXTENT

General Information: None.

Asset Capture: Polygon feature describing the footprint for the whole structure and all its parts including approach and departure assets.

Spatial Relationship: Must contain all other Bridge feature types.

Mandatory Attribution: The following attribution is mandatory for *Bridge Extents:*

Element Name	ADAC Mandatory (Y/N)
BridgeID	Y
Name	N

Element Name	ADAC Mandatory (Y/N)
Use	Y
Type	Y
CrossingType	Y
Spans	Y
MinimumClearance_m	N
PredominantMaterial	Y

Positional Accuracy: Horizontal Accuracy of +/- 1 metre

7.6.1.5 PIER

General Information: None.

Asset Capture: Polygon feature representing a single supporting structure.

Spatial Relationship: Must be located within a Bridge Extent polygon located under deck spans.

Mandatory Attribution:

Element Name	ADAC Mandatory (Y/N)
BridgeID	Y
Material	Y

Positional Accuracy: Horizontal Accuracy of +/- 1 metre

7.6.1.6 SUPERSTRUCTURE

General Information: None.

Asset Capture: Polygon feature representing a single Superstructure.

Spatial Relationship: Must be located within a Bridge Extent polygon and between abutments or supports.

Mandatory Attribution:

Element Name	ADAC Mandatory (Y/N)
BridgeID	Y
Material	Y

Positional Accuracy: Horizontal Accuracy of +/- 1 metre

7.6.2 FLUSH POINT

General Information: None.

Asset Capture: Simple point feature representing the outlet of Sub-soil drains into Drainage Pits/Maintenance Holes.

Spatial Relationship: Must be coincident to Subsoil Drain features.

Mandatory Attribution: The following attribution is mandatory for *Flush Points:*

Element Name	Mandatory (Y/N)
Function	Y

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.6.3 PARKING

General Information: None.

Asset Capture: Polygon capturing the area of a parking pavement.

Spatial Relationship: Multi-patch region/polygon feature representing the area of Parking. Asset capture is based on physicality therefore separate regions/polygons are required if any part of the pavement profile changes i.e. surface, base, sub-base, lower sub-base and/or subgrade.

Mandatory Attribution: The following attribution is mandatory for *Parking:*

Element Name	Mandatory (Y/N)
Name	Y
NoOfCarparks	Y
OnOffStreet#	Y
Surface.SurfaceType	Y
Surface.SurfaceThickness_mm	Y*(if surface exists)*
Surface.SurfaceArea_sqm	N
PavementStructure.PavementType	Y
PavementStructure.BaseLayer.LayerType	Y *(if Base exists)*
PavementStructure.BaseLayer.LayerDepth_mm	Y *(if Base exists)*

Element Name	Mandatory (Y/N)
PavementStructure.BaseLayer.Stabilisation	N
PavementStructure.SubBaseLayer.LayerType	Y *(if SubBase exists)*
PavementStructure.SubBaseLayer.LayerDepth_mm	Y *(if SubBase exists)*
PavementStructure.SubBaseLayer.Stabilisation	N
SubGrade.CBR	**Y**
SubGrade.Stabilisation	N

Table 1 # for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.6.4 PATHWAY

General Information: None.

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing the centre longitudinal axis of a pathway as per the red dashed lines in **Figure** below. Asset capture is based on physicality therefore separate polylines are required if any part of the pavement profile changes i.e. Surface type, finishing type.

Spatial Relationship: May be coincident to a Pathway Structure polyline. Please note the relationship with the Pram Ramp (yellow dot in **Figure 43** below).

Mandatory Attribution: The following attribution is mandatory for *Pathways:*

Element Name	Mandatory (Y/N)
Use	Y
Structure	Y
SurfaceMaterial	Y
Width_m	Y
Depth_mm	Y
RoadSeparation#	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 43

7.6.5 PATH STRUCTURE

General Information: Includes boardwalks, footbridges, stairs, ramps and underpasses.

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing the centre longitudinal axis of a pathway structure. Refer to the red dashed line in **Figure 43** below.

Spatial Relationship: May be coincident to Pathway polyline features.

Mandatory Attribution: The following attribution is mandatory for *Path Structures:*

Element Name	Mandatory (Y/N)
Use	Y
Structure	Y
SurfaceMaterial	Y
SubStructureMaterial	Y
Width_m	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 43

7.6.6 PAVEMENT

General Information: Please note Driveways are to be captured separately using Supplementary. Refer to section 7.4.4.1 above for details.

Asset Capture: Multi-patch region/polygon feature representing the area of Pavement. Asset capture is based on physicality therefore separate regions/polygons are required if any part of the pavement profile changes i.e. Surface, Base, Sub-Base, Lower Sub-Base and/or Subgrade. **Figure 44** below demonstrates the polygon boundary capture location of a section of Pavement. The blue dashed line represents the boundary of capture where kerb exists (back of kerb), the yellow line represents where no kerb exists (edge of seal) and the red line represents where separate pavement areas are recorded for each road.

Spatial Relationship: Must be coincident to other regions representing pavement / parking where there is a common boundary- no slivers/overlaps.

Mandatory Attribution: The following attribution is mandatory for *Pavements:*

	Mandatory (Y/N)
Surface.SurfaceType#	Y
Surface.SurfaceThickness_mm	Y
Surface.SurfaceNomWidth_m	Y
PavementStructure.PavementType	Y
PavementStructure.BaseLayer.LayerType	N
PavementStructure.BaseLayer.LayerDepth_mm	Y
PavementStructure.BaseLayer.Stabilisation#	N
PavementStructure.SubBaseLayer.LayerType#	N
PavementStructure.SubBaseLayer.LayerDepth_mm	Y
PavementStructure.SubBaseLayer.Stabilisation#	N
PavementStructure.LowerSubBaseLayer.LayerType#	N
PavementStructure.LowerSubBaseLayer.LayerDepth_mm	Y *(if LowerSubBase exists)*
PavementStructure.LowerSubBaseLayer.Stabilisation#	N
PavementGeoTextile	N
SubGrade.CBR	Y
SubGrade.Stabilisation#	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre



Figure 44

7.6.7 PRAM RAMP

General Information: None.

Asset Capture: Point feature as represented by the yellow dot in **Figure 44** above and **Figure 45** below.

NOTE: The ADAC Schema allows for an identical Polygon feature capture for Pram Ramps however that is not accepted by TRC.

Spatial Relationship: Must be coincident with a Road Edge Feature.

Mandatory Attribution:

Element Name	Mandatory (Y/N)
Rotation	N
Material*	N
Compliance*	N

for TRC additional enumeration value, * for TRC additional attributes



Figure 46

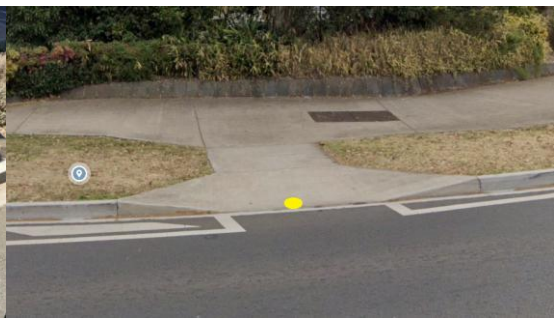


Figure 45

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.6.8 PRAM RAMP POLYGON

Note: Pram Ramps as polygon features are not to be recorded in ADAC XML submissions for TRC.

7.6.9 ROAD EDGE

General Information: None.

Asset Capture: Complex linear feature (read: polylines including curves but not bézier curves) representing the top(back) of kerb. In case of inverts, edge of concrete furthest from road centreline. Refer to the blue dashed line in **Figure 44** above**.** Kerb features around Road Islands are to be captured separately from the Road Island feature.

Spatial Relationship: Must be coincident to other polylines representing road edge where there is a common boundary between kerb types / material change i.e. no slivers and/or overlaps.

Mandatory Attribution: The following attribution is mandatory for *Road Edges:*

Element Name	Mandatory (Y/N)
Type#	Y
Material#	Y
Width_mm	Y
Length_m	N
PavementExtension_mm	Y
ConstructionType*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.6.10 ROAD ISLAND

General Information: None.

Asset Capture: Multi-patch region/polygon feature representing the area of Island/LATM bounded by the back of Kerb features. Asset capture is based on physicality therefore separate regions/polygons are required if the Type of Island or Infill changes. Please refer to the red and purple shaded polygons in **Figure 47** below for Road Island asset capture. Kerbs surrounding Road Islands are to be captured as Road Edge features.

Spatial Relationship: Must be coincident to other regions representing road islands where there is a common boundary i.e. no slivers and/or overlaps. Must be coincident to any Kerb (Road Edge) features surrounding the Road Island.

Mandatory Attribution: The following attribution is mandatory for *Road Islands:*

Element Name	Mandatory (Y/N)
Type	Y
Area_sqm	N
InfillType	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

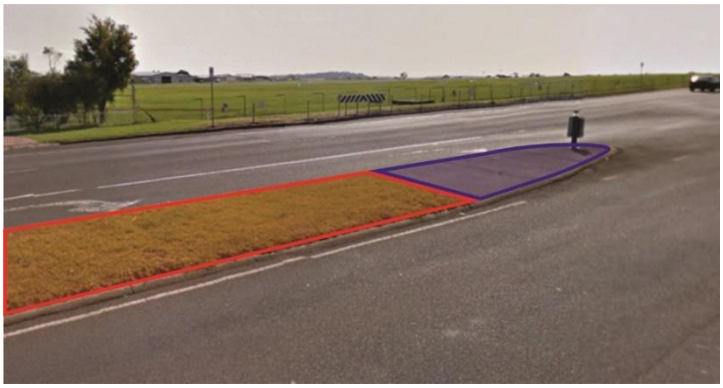


Figure 47

7.6.11 ROAD PATHWAY

General Information: None.

Asset Capture: Complex linear feature (polylines including curves but not Bezier curves) representing the centre longitudinal axis of a road pathway (on-road cycleway) refer to the red dashed lines in **Figure 48** below.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Road Pathways:*

Element Name	Mandatory (Y/N)
Use	Y
Structure	Y
SurfaceMaterial	Y
Width_m	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

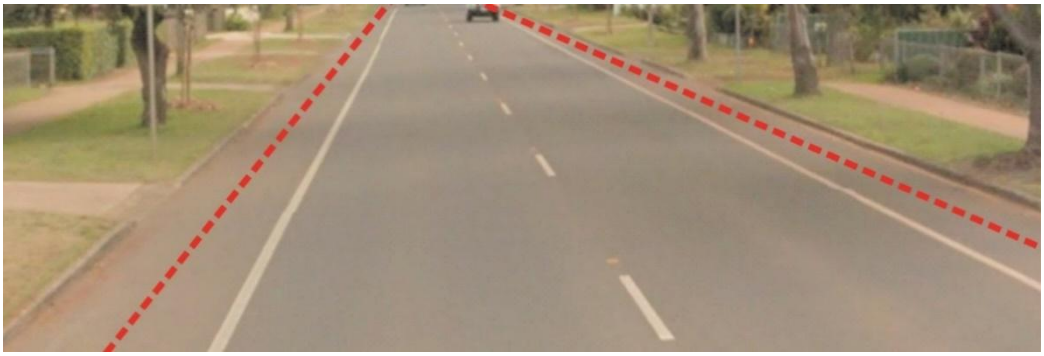


Figure 48

7.6.12 ROAD SAFETY BARRIER

General Information: Commonly referred to as a Crash barrier.

Asset Capture: Complex Polyline feature comprising of straight line segments (read: no curves) representing a guard rail or transport safety barrier as per the red solid line in **Figure 49** below.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Road Safety Barriers:*

Element Name	Mandatory (Y/N)
Type#	Y
LeadingEndTreatment#	Y
TrailingEndTreatment#	Y
StandardHeight	N
Height_m	N
Length_m	Y
MotorcyclistProtectionType	Y
PedestrianProtectionSheeting	Y
BridgeTransition	Y
StandardPostSpacing	N
PostSpacing_m	N
PostType#	N
RailType	Y
HorizontalAlignment	N
NumberOfBollards	N
Material*	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.



Figure 49

7.6.13 SUBSOIL DRAIN

General Information: None.

Asset Capture: Simple Linear feature (i.e. straight lines) representing the Invert of a circular sub-soil drainpipe asset. Pipes are typically broken where the Use and/or Type of drain changes.

Spatial Relationship: Must be coincident to Flush points.

Mandatory Attribution: The following attribution is mandatory for *Subsoil Drains:*

Element Name	Mandatory (Y/N)
Use	Y
Type	Y
Length_m	N
DrainHeight*	N
DrainWidth*	N
AverageDepth*	N
PipeDiameter*	N
PipeMaterial*	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: Horizontal Accuracy of +/- 1 metre.

7.7 WATER SUPPLY ASSETS

7.7.1 FITTING

General Information: Surge Vessels are not to be captured here. Instead refer to Supplementary section 7.4.7.14 for capture of Surge Vessels.

Asset Capture: Single point feature representing the centre point of the fitting. Please refer to the yellow circles in **Figure 50** below for representations of a “Tee” and “Gibault”.

Spatial Relationship: Must be coincident to a pipe asset in the water reticulation network.

Mandatory Attribution: The following attribution is mandatory for *Fittings:*

Element Name	Mandatory (Y/N)
Type	Y
Material *	Y

Lining *	Y
Protection *	Y
BodySize_mm	Y
BranchSize_mm	Y *(if different to BodySize_mm)*
Rotation	N
WaterQuality	Y

for TRC additional enumeration value, * for TRC additional attributes

* Generic Enumerations e.g. “M_1”,” M_2” etc are not acceptable. “Unknown” is not acceptable when Status = “Newly Constructed". “Other” is only acceptable if the enumeration isn’t available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).



Figure 50

7.7.2 HYDRANT

General Information: None.

Asset Capture: Single point feature representing the centre of the vertical hydrant branch. Note: Hydrant Diameter refers to the riser pipe diameter in millimetres not the connecting reticulation pipe size.

Spatial Relationship: Must be coincident to a pipe asset.

Mandatory Attribution: The following attribution is mandatory for *Hydrants:*

Element Name	Mandatory (Y/N)
Use	Y
Diameter_mm	Y
Rotation	N
WaterQuality	Y

Table 2 # for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).



Figure 51

7.7.3 MAINTENANCE HOLE

General Information: None.

Asset Capture: Single point feature located on the centre of the chamber. The Structure ID as shown in the design drawings must be recorded in the ADACId attribute.

Spatial Relationship: No connectivity is enforced due to the size and shape of the object.

Mandatory Attribution: The following attribution is mandatory for *Maintenance Holes:*

Element Name	Mandatory (Y/N)
Use	Y
ChamberSize.Rectangular.Length_mm	Y *(if rectangular)*
ChamberSize.Rectangular.Width_mm	Y *(if rectangular)*
ChamberSize.Circular.Diameter_mm	Y *(if circular)*
SurfaceLevel_m	Y
InvertLevel_m	Y
FloorConstruction	Y
FloorMaterial *	Y
WallConstruction	Y
WallMaterial *	Y
RoofMaterial *	Y
LidMaterial *	Y
Rotation	N

Table 3 # for TRC additional enumeration value, * for TRC additional attributes

* Generic Enumerations e.g. “M_1”,” M_2” etc are not acceptable. “Unknown” is not acceptable when Status = “Newly Constructed". “Other” is only acceptable if the enumeration isn’t available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

7.7.4 METER

General Information: None.

Asset Capture: Single point feature located at the centre point of the domestic meter itself.

Please note: The definition for the Offsets ide element is "*the offset from the left or the right-side boundary when looking from the road*."

Spatial Relationship: Must be coincident to a water service pipe or water pipe with a Use of "Commercial Service", "Fire Service", "Service" or "Fire Service Thru Meter".

Mandatory Attribution: The following attribution is mandatory for *Meters:*

Element Name	ADAC Mandatory (Y/N)
SerialNumber	Y
Type	Y
Diameter_mm	Y
Dials	N
Manufacturer	N
ModelNumber	N
InitialReading	N
PrivateBooster	Y
OffsetSide	Y
Offset_m	Y
InstallationDate	Y
LotNo	Y
PlanNo	Y
Rotation	N
WaterQuality	Y

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

7.7.5 PIPE

General Information: None.

Asset Capture: Simple Linear feature (i.e. straight lines) representing the Invert of a circular pipe asset. Pipe segments are to be captured based on the pipe attributes. If any physical element of a pipe changes (e.g. size, material, class etc.) then the pipe asset must be broken and captured separately. Please refer to the red dashed polylines in **Figure 52** below. Water pipes should not be broken by connections (Tapping Bands or Ready Taps).

Note: Service pipes less than and equal to 63mm in diameter are to be captured as Water Service, not Pipe.

Spatial Relationship: Pipes must be coincident to water valves and fittings that participate in a flow network.

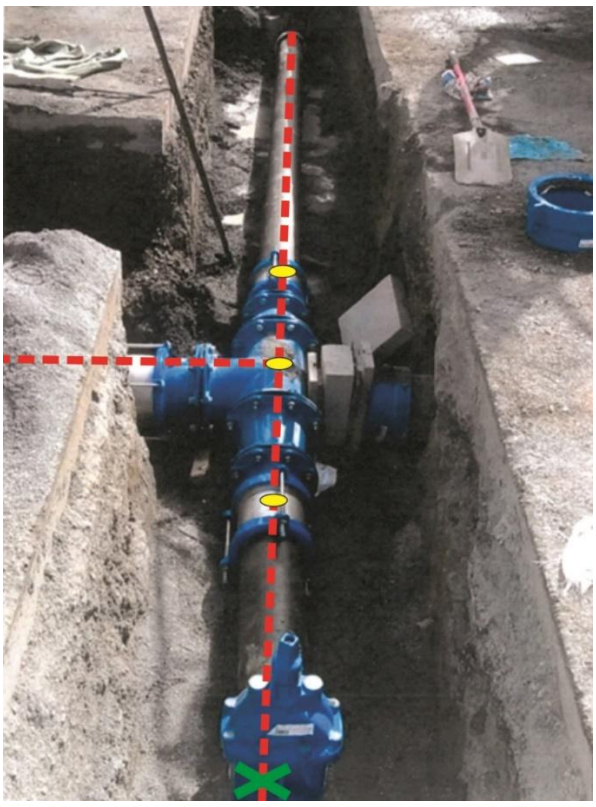
Mandatory Attribution: The following attribution is mandatory for *Pipes:*

Element Name	Mandatory (Y/N)
Use	Y
WaterQuality	Y
Alignment_m	N
Diameter_mm	Y
Material *	Y
Class *	Y
Lining *	Y
Protection *	Y
JointType *	Y
Depth_m	N
Embedment *	Y
Length_m	N

for TRC additional enumeration value, * for TRC additional attributes

* Generic Enumerations e.g. “M_1”,” M_2” etc are not acceptable. “Unknown” is not acceptable when Status = “Newly Constructed". “Other” is only acceptable if the enumeration isn’t available in the allowable values with the actual enumeration populated in the Notes element.

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).



7.7.6 SERVICE FIT ...

Figure 52

General Information: None.

Asset Capture: Single point feature representing the centre point of the service fitting. Identical to Fittings detailed above.

Spatial Relationship: Must be coincident to a pipe asset in the water reticulation network.

Mandatory Attribution: The following attribution is mandatory for *Service Fittings:*

Element Name	ADAC Mandatory (Y/N)
Type	Y
BelowGround	N
WaterSaver	N
AutoShutOff	N
Rotation	N
WaterQuality	Y

Table 4 # for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

7.7.7 STORAGE TANK

General Information: None.

Asset Capture: Single point feature representing the centre of chamber relating to a domestic storage tank feature.

Spatial Relationship: Not Applicable.

Mandatory Attribution: The following attribution is mandatory for *Storage Tanks:*

Element Name	Mandatory (Y/N)
Material	Y
Source	Y
Manufacturer	N
ModelNumber	N
Volume_m3	Y
Rotation	N

for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

7.7.8 VALVE

General Information: None.

Asset Capture: Single point feature representing the centre of a valve body, typically the spindle as represented by the green cross in **Figure 52 above**.

The relationship between Use and Type is as per the following table.

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

Spatial Relationship: Must be coincident to a Pipe asset in the network.

Mandatory Attribution: The following attribution is mandatory for *Valves:*

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

Positional # for TRC additional enumeration value, * for TRC additional attributes Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

7.7.9 WATER SERVICE

General Information: None.

Asset Capture: Simple Linear feature (i.e. straight lines) representing the Invert of a circular pipe asset. Only Service pipes less than and equal to 63mm are to be captured here. Larger sized Service pipes are to be captured in Water pipe with a Use of “Service” or “Commercial Service”. Where the Water Service does not align with the side property boundary, offsets from the side property boundary must be provided. These can be supplied in the *Dimensions* feature within the ADAC schema.

Spatial Relationship: Pipes must be coincident to water valves and fittings that participate in a flow network.

Mandatory Attribution: The following attribution is mandatory for *Water Services:*

Element Name	Mandatory (Y/N)
Daimeter_mm	Y
Material	Y
Class	Y
Protection	Y
Termination	Y
WaterQuality	Y
Length_m	N

Table 5 # for TRC additional enumeration value, * for TRC additional attributes

Positional Accuracy: AS5488 – A (Horizontal and Vertical Accuracy of +/- 50 mm).

APPENDICES

7.8 APPENDIX A – PHOTO REQUIREMENTS

Photos are to be in .JPG format, no less than 4 MB in size or 720x576 resolution. The file name is to match the ADACId element value in the ADAC XML file and be supplied to TRC on a storage media e.g. DVD, USB drive etc.

Definitions

Please refer to each Asset Type for photo requirement type.

Mandatory:	A photograph of the asset must be supplied as part of asset handover.
Desirable:	If a photograph was taken of the asset during construction, then it should be included as part of asset handover, however there is no requirement to take a photo specifically for the purposes of asset handover.
Not Required:	There is no requirement to take photographs of assets as part of asset handover.

7.9 APPENDIX B - PHOTO REQUIREMENTS MATRIX

Element	Feature	Photo Requirement
Cadastre	Cadastral Connection	Not Required
	Easement	Not Required
	Lot Parcels	Not Required
	Road Reserve	Not Required
	Survey Mark	Not Required
	Water Course Reserve	Not Required
Open Space Assets	Activity Area	Mandatory
	Activity Point	Mandatory
	Artwork	Mandatory
	Barbeque	Mandatory
	Barrier Continuous	Mandatory
	Barrier Point	Desirable
	Bicycle Fitting	Mandatory
	Boating Facility	Mandatory
	Building	Mandatory
	Electrical Conduit	Not Required
	Electrical Fitting	Mandatory
	Fixture	Mandatory
	Landscape Area	Desirable
	Open Space Area	Not Required
	Retaining Wall	Mandatory
	Seat	Mandatory
	Shelter	Mandatory
	Sign	Mandatory where sign is of a unique design. Not required otherwise
	Table	Mandatory
	Tree	Not Required
	Waste Collection Point	Mandatory
Sewerage Assets	Connections	Desirable
	Fittings	Desirable
	Maintenance Holes	Desirable
	Non Pressure Pipes	Desirable
	Pressure Pipes	Desirable
	Valves	Desirable

Element	Feature	Photo Requirement
Stormwater	End Structure	Desirable
	Fitting	Not Required
	GPT Complex	Desirable
	GPT Simple	Desirable
	Non GPT Simple	Desirable
	Pipe	Not Required
	Pit	Not Required
	Surface Drain	Desirable
	WSUD Complex Area	Desirable
Supplementary	Stage Boundaries (Polygon Feature)	Not Required
	Artificial Fauna Habitat	Mandatory
	Bridge	Mandatory
	Fire Management	Not Required
	Foreshore Protection	Not Required
	Platform	Mandatory
	Prepared Surface	Mandatory
	Swimming Pool	Mandatory
	Swimming Pool Heating Equipment	Desirable
	Swimming Pool Fixture	Mandatory
	Water Body (Polygon Feature)	Desirable
	Weighbridge (Polygon Feature)	Mandatory
Surface	Contour	Not Required
	Spot Heights	Not Required
Transport	Flush Point	Not Required
	Parking	Mandatory
	Path Structure	Desirable
	Pathway	Desirable
	Pavement	Not Required
	Pram Ramp	Desirable
	Road Edge	Desirable
	Road Island	Not Required
	Road Pathway	Not Required
	Sub Soil Drain	Not Required
Water Supply Assets	Fittings	Desirable
	Hydrants	Desirable
	Maintenance Holes	Desirable
	Meters	Desirable

Element	Feature	Photo Requirement
	Pipes	Desirable
	Service Fittings	Desirable
	Storage Tanks	Desirable
	Valves	Desirable
	Water Services	Desirable

7.10 APPENDIX C – AS-CONSTRUCTED CERTIFICATION BLOCKS

As-Constructed Drawings

It is certified that the As-Constructed Drawings for these works constitute an accurate record of the works constructed and able to be visibly inspected on site.

Signature ..... RPEQ No. .....

Date of Practical Completion.....

Company Title .....

As-Constructed Works

It is certified that the locations, levels and dimensions of the infrastructure shown herein are a true representation of the constructed works and that the As-Constructed survey was performed to the prescribed accuracy standards.

Registered/Licensed Surveyor's signature.....

Company Title .....