



Sample Extract of
Consultant/Developer Specifications for the
Delivery of Digital Data to
Utilities and Local Government Authorities

Version 2.0.1 Final
15th November 2018



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A-SPEC Members

Victoria	WA	NSW

Table of Contents

A-SPEC MEMBERS.....	2
VICTORIA	2
WA.....	2
NSW.....	2
TABLE OF CONTENTS	3
INDEX OF DATA ATTRIBUTE TABLES.....	5
INDEX OF FIGURES.....	6
EXECUTIVE SUMMARY.....	7
INTRODUCTION.....	7
A-SPEC PROGRAM	7
S-SPEC STANDARD SPECIFICATION.....	8
USE OF THE SPECIFICATION.....	8
IN SUMMARY	9
GLOSSARY OF TERMS AND DEFINITIONS	10
SUBMISSION OF “AS CONSTRUCTED INFORMATION” AS GIS READY DATA.....	12
CONSULTANT REGISTER	12
A-SPEC MEMBER CONTACT.....	12
INTELLECTUAL PROPERTY	12
DISCLAIMER.....	12
DELIVERABLES	13
CERTIFICATION FORM - README / METADATA FILE	14
1.3 THEME/LAYER STRUCTURE.....	15
1.4 GRAPHICAL DATA CONSTRUCTION PRINCIPLES	17
1.5 GRAPHICAL REPRESENTATION PRINCIPLES	17
1.6 ACCEPTANCE TESTING.....	17
1.7 MATCH TO AS 5488 – 2013	20
2 ATTRIBUTE & VALIDATION FILE SPECIFICATIONS.....	26
3 S-SPEC CODELISTS CODE LISTS	27
ACCESS POINT ACCESS METHOD – NEW.....	27
ACCESS POINT CONSTRUCTION METHOD	27
ACCESS POINT MATERIAL – NEW.....	27
ACCESS POINT / MANHOLE / PIT TYPE	27
ASSET STATUS.....	27
BACKUP POWER TYPE – NEW	27
BEDDING / BACKFILL MATERIAL.....	27
CABLE TYPE – NEW	27
CONDUIT MATERIAL – NEW	27
CONTROL TYPE – NEW	27
DROP TYPE – NEW.....	27
ELECTRICAL EQUIPMENT TYPE – NEW	27
EQUIPMENT MATERIAL – NEW.....	27
EQUIPMENT PURPOSE – NEW	27
FEATURE TYPE – NEW.....	27
FILTER TYPE – NEW.....	27
FITTINGS TYPE.....	27
FUEL TYPE – NEW.....	27
GROUND SOIL TYPE	28
HEALTH AND SAFETY ISSUES – NEW.....	28
IMPELLER MATERIAL – NEW.....	28
IMPELLER TYPE – NEW.....	28
INSTRUMENT TYPE – NEW.....	28

JOINTING METHOD.....	28
LIFT TYPE – NEW.....	28
LINING MATERIAL – NEW.....	28
MATERIAL.....	28
MECHANICAL EQUIPMENT TYPE – NEW.....	28
NETWORK – NEW.....	28
OTHER NETWORK STRUCTURE TYPES – NEW.....	28
PIPE INSTALLATION METHOD.....	28
PIPE MATERIAL – NEW.....	28
PIPE PRESSURE CLASS – NEW.....	28
PIPE RENEWAL / LINING MATERIAL – NEW.....	28
PIPE RENEWAL METHOD – NEW.....	28
PIPE SHAPES.....	28
PIPE STIFFNESS CLASS – NEW.....	28
POSITION – NEW.....	28
PROPERTY CONNECTION TYPE.....	28
PROTECTION TYPE – NEW.....	28
PROTECTIVE MATERIAL TYPE – NEW.....	29
PUMP PURPOSE – NEW.....	29
PUMP STATION TYPE – NEW.....	29
PUMP USE – NEW.....	29
REPLACEMENT COST TYPE.....	29
SOURCE – NEW.....	29
SPINDLE TYPE – NEW.....	29
SUPPORT STRUCTURE MATERIAL – NEW.....	29
SUPPORT STRUCTURE TYPE – NEW.....	29
UNIT OF MEASURE REFERENCE – NEW.....	29
VALVES TYPE.....	29
VALVE PURPOSE – NEW.....	29
VOLTAGE TYPE – NEW.....	29
WASTEWATER PIPE TYPE.....	29

Index of Data Attribute Tables

NO TABLE OF FIGURES ENTRIES FOUND.

Index of Figures

Figure 1— Sample CD Label **DIAGRAM TO BE REMOVED**13

EXECUTIVE SUMMARY

Introduction

A-SPEC Program

A-SPEC is the acronym for the program involved in developing specifications for the delivery of newly constructed assets as Digital Data in a GIS ready format to Asset Owners and Managers in Local Governments, Utilities and Water Authorities **around the world**.

The **A-SPEC** management model enables Local Governments, Utilities and Water Authorities around **Australia and New Zealand** **the world** to participate in the development and use of the standard **specifications** developed under this program.

The key objectives of the **A-SPEC** initiative is to streamline stakeholders' (local government/utilities/water authorities) processes for receiving, handling and storing of **underground infrastructure data** related to newly constructed **infrastructure** assets either from subdivision developments or internal programs (e.g. capital works) in their GIS and AMIS.

This process will increase the efficiency of information access and result in greater customer satisfaction when dealing with inquiries from engineering consultants, surveyors, developers and prospective residents.

- **Eliminate duplication of effort.** Significant duplication of effort exists in the digitising of as constructed information. This duplication exists between the private sector (who capture as constructed information), and council, utility and water authority staff (who may digitise that information from paper plans);
- **Improve process efficiency**, in the process of accepting and processing lodgements, and in checking existing data against design criteria and/or design plans;
- **Improve customer service** to both internal and external customers of asset information;
- **Improve the quality** of Sewer information held in council, utility and water authority systems for audit and financial requirements, as well as operational and business requirements;
- **Provide a structure** for the consistent recording of all council, utility and water authority owned assets, including those created through internal programs such as capital works and renewals.
- And ultimately **manage assets better** to reduce the need for capital works and/or to reduce ongoing maintenance costs.

A-SPEC data is characterised by having an infrastructure role by:

- functioning as reference data - which means that other kinds of information can and will be linked to the core data.
- being of interest for many different kinds of applications (and being a common denominator and integrator between different data suppliers and product and service providers).
- containing information of specific interest for the public sector in its role to support asset management, efficient transportation, traffic safety, to handle environmental and social planning, etc.
- having a structure that is stable over time (even if parts of the data content changes due to user input).
- having specific interest for cross border (across State or National/International boundaries) applications.

S-Spec Standard Specification

The **S-Spec** standard specification (Wastewater/Sewer) was created to enable Local Government, Utilities and Water Authorities around **Australia and New Zealand** **the world** to participate in the use of a single specification when dealing with the creation of new Councils, Utilities and Water Authorities' assets. This enables Councils, Utilities and Water Authorities to deal more efficiently with the Land Development and Industry Consultants in relation to subdivision developments and capital works programs within their local jurisdiction.

The **S-Spec** standard specification was developed to streamline the processes undertaken to display all new Wastewater assets within each **A-SPEC** members' geographic information systems (GIS) and asset management information systems (AMIS).

A common specification for the supply of digital wastewater data was identified as a major opportunity for the members to achieve efficiency and cost savings in the process of maintaining their corporate GIS and AMIS. Moreover, a common specification shared between Councils, Utilities and Water Authorities would also provide efficiencies to the Land Development Industry by removing the need to maintain separate processes, standards and software tools for numerous Councils, Utilities and Water Authorities.

The **S-Spec** standard specification will enable consultants to provide "**As-Constructed/As Built**" data with the specific characteristics required as GIS ready data to comply with **S-Spec**.

The framework will consist of specifications for data content enabling data exchange. **S-Spec** will enable data to be collected and available in a harmonised, interoperable and quality assured way.

Use of the Specification

This standard specification is for use by Private Developers, the representatives of Private Developers, engineering consultants and surveyors (hereafter referred to as "Consultants") who undertake Land Development or Capital Works activities for one or more members of the **A-SPEC** Consortium.

This specification is not to be used for any other purpose.

Where applicable please refer to the section of the document that stipulates the specific requirements of the relevant region that you are conducting your business in within **Australia or New Zealand**. It is the responsibility of the consultants to understand the specific requirements of their local government, utility or water authority clients. Assistance will be provided wherever possible to clarify any issues or concerns.

It should also be noted that if there are similar elements in **S-Spec** that also appear in **D-Spec, R-Spec, B-Spec, W-Spec** and **O-Spec**, then the standard specification for those ~~asset types~~ **asset classes** are to be used to prepare the **As-Constructed/As Built information** digital data to be delivered along with the sewerage digital data requested.

This document, **along with the accompanying A-SPEC document**, includes a specification of common features (feature types, attribute types and attribute value domain). It also contains generalization rules for the graphical representation of the features i.e. Sewer assets, geodetic reference system and rules for validating the data supplied to ensure compliance.

The **As Constructed/As Built information** is to be supplied as features and attributes. Storing the information as attributes means attaching the information directly to the features. This document is a guide on what features to supply and which attributes to attach to the various features.

S-Spec will lay the foundation for Wastewater/Sewerage asset data infrastructure built on identified user requirements through a specification framework.

Please note the changes in this specification are indicated as follows:

1234	Blue highlighted text and text struck out	Text to be deleted
5678	Green Highlighted text	Existing attribute moved to another table
9101	Yellow highlighted text	New or modified text

An attribute which is specified as "Conditional" means, it is to be populated if certain conditions are met.

Example: The attribute 'Source' is to be populated in the Area of Work Extent table only if the 'Source' of the information is the same for the whole project. If the asset doesn't meet this condition, then the Code 'REFER', is to be used and each table is to be populated accordingly.

Read attribute descriptions carefully to ensure the conditions are met before populating.

In Summary

The key objective of this standard specification is to provide information to the Consultants that will be dealing with **A-SPEC Consortium** members. This document outlines the specific requirements for the submission of **"As-Constructed/As Built Information"** of works as GIS Ready digital data of newly constructed Wastewater assets as defined by the **A-SPEC Consortium** members in Australia. ~~and New Zealand.~~

Whilst all care has been taken with the preparation of this document it is the responsibility of the consultants to confirm that all details are current and relevant. For example there are specific references in this document that **only** relate to particular jurisdictions.

~~E.g. WAPC refers to a requirement for Western Australian only. Therefore does not need to be an included field for other jurisdictions.~~

Note the requirement for Western Australian A-SPEC users to record the WAPC reference number "WAPC_No", is now accommodated within the "Permit_No" attribute field as the "WAPC_No" attribute field was renamed to "Permit_No".

The project to determine the suitability of the ~~Q-Spec~~ **S-Spec** standard specification was developed and is being managed by GISSA International Pty Ltd.

The Atrium Suite 10, 476 Canterbury Road, Forest Hill Victoria 3131.

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Glossary of Terms and Definitions

With the introduction of additional jurisdictions there will be instances where different terms or words are used to describe identical features.

We have included this glossary to define terms; all defined words are in an alphabetical order. They are not used in this specification with any other meaning. As other terms are identified they will be added and therefore this section will be updated from time to time and provided on the relevant specification page on www.a-specstandards.com.au.

Wastewater, also known as 'sewage', originates from household activities (toilets, kitchens, bathrooms and laundries) and commercial and industrial premises. It is predominantly water but includes organic matter such as human waste, food scraps, fats, oil and grease, and pharmaceuticals, chemicals, paint and other debris.

SEWAGE - Historically

From Wikipedia, the free encyclopaedia



Sewage is water-carried waste, in solution or suspension that is intended to be removed from a community. Also known as [wastewater](#), it is more than 99% water and is characterized by [volume](#) or [rate of flow](#), physical condition, chemical constituents and the bacteriological organisms that it contains. In loose [American English](#) usage, the terms 'sewage' and '[sewerage](#)' are sometimes interchanged.^[1] Both words are descended from Old French *assewer*, derived from the Latin *exaquare*, "to drain out (water)" <http://en.wikipedia.org/wiki/Sewage>

A medieval waste pipe in [Stockholm Old Town](#) formerly deposited sewage on the street to be flushed away by rain

Please note that it is not the intention to detail every industry term in this glossary as many terms have already been pre-defined in many existing codes of practice, Land development manuals, infrastructure design manuals and Standards organisations. Also by State, Regional and central agencies and associations who develop the policies and practice notes for areas that cover planning, design and construction.

ACCESS POINTS

– may also be referred to as a “**Manhole**” or a “**Pit**” or a “**Maintenance Hole**” or “**Inspection Opening**”

AMG

– refers to “**Australian Map Grid**”

AHD

– refers to “**Australian Height Datum**” a level datum uniform throughout Australia

AMIS

– refers to “**Asset Management Information System**”. May also be referred to as “**Asset Management System (AMS)**”

AS CONSTRUCTED INFORMATION

– may also be referred to as “**As Builts**” or “**Work as Executed**” or “**Work as Constructed**” or “**As Cons**” or “**As Laid**”

BACKFILL

– refers to material used to fill an excavation

BEDDING

– refers to the zones around a pipe between the foundation and the bottom of a pipeline.

CCTV

– refers to “**Closed Circuit Television**”

END OF PIPE

– may also be referred to as “**Blank End**”

GRAVITY PIPES

– may also be referred to as a “**Main**” or a “**Trunk Main**”

INSTALLATION DATE

– may also be referred to as “**Construction Date**”

INVERT

– refers to Lowest point of the internal surface of a pipe or channel at any cross-section

JUNCTION

– refers to the connection of two or more sewers

MAINTENANCE HOLE

– may also be referred to as a “**Junction Pit**”

PRESSURE MAINS

– may also be referred to as “**Rising Mains**”

PROPERTY CONNECTIONS

– may also be referred to as a “**Lateral**” or a “**Service Connection**” or a “**Service Line**” or “**Property Discharge Lines**” or “**House Connection Branch**” (HCB)

PROPERTY SANITARY DRAIN

– may also be referred to as “**Property Service Drain**”

SEWER MAINTENANCE SHAFT

– may also be referred to as an “**Inspection Shaft**” or “**Lamphole**”

WASTEWATER SYSTEM

– may also be referred to as a “**Sewerage System**”

Submission of “As Constructed Information” as GIS Ready Data

The key objective of the specification is to provide “As Constructed Information” as digital data of Wastewater assets in a GIS ready format to the Consortium of members using the **S-Spec** standard specification.

This document outlines the specifications for the delivery of digital data containing: wastewater pipes for gravity and pressure systems, access points, property connections, wastewater fittings, pumping stations, lagoons and other structures as well as the boundary showing the extent of the works. This data is to be provided to the **A-SPEC** Consortium members as outlined in the Asset Table in [Section 1.3 Theme/Layer Structure](#).

Consultant Register

The **A-SPEC** Consortium will list Consultants who have registered through the **A-SPEC** website and will provide updates or revisions as necessary. You are advised to read this specification carefully and any comments or suggestions you have regarding this specification are welcomed.

- Consultants who have registered will be shown on the **A-SPEC** website; www.a-specstandards.com.au (formerly www.dspect.com.au)

A-SPEC Member Contact

All inquiries relating to the format of the digital information should be directed to the **A-SPEC** representative of the relevant organization:

- Please either contact GISSA International on +613 9877 6972 or by email at info@gissa.com.au or your local point of contact with the organization you are dealing with

Intellectual Property

The **A-SPEC** Consortium members own the intellectual property of the developed specifications in conjunction with **GISSA International** and Intellectual Property rights are not to be sold, transferred or assigned to any party (other than a new participating **A-SPEC** Consortium member) without the prior written approval of the **A-SPEC** Consortium and **GISSA International**.

The **S-Spec** Standard Specification will be available free of charge to the consulting & development industries. **A-SPEC** data structures are only to be used for the delivery of As Constructed data to **A-SPEC Consortium members only**.

All material is copyrighted and under a trademark.

Disclaimer

On occasion **A-SPEC** Consortium members may supply consultants with digital data to assist them with their planning and design phases. The **A-SPEC** Consortium accepts no liability for the accuracy or completeness of the information and it is the responsibility of the consultants to ensure that the data supplied is appropriate and applicable to the end use intended.

Deliverables

The following are acceptable media for providing the digital data files.

- Email files to **A-SPEC** member representative. (File size limitation is 5 megabytes)
- **CD-ROM / DVD**
- **USB memory device, portable hard drive**
- Cloud Mediums (FTP, Dropbox, Google Drive etc.)

The CD or DVD is to be labeled in the following way:

Estate Name and Stage or Project Name: _____

Property Description (prior to subdivision): _____

Individual Council, Utility and Water Authority Approval Number: _____

Signed by: _____

Date: _____

Name: _____

Consultant Company Name: _____

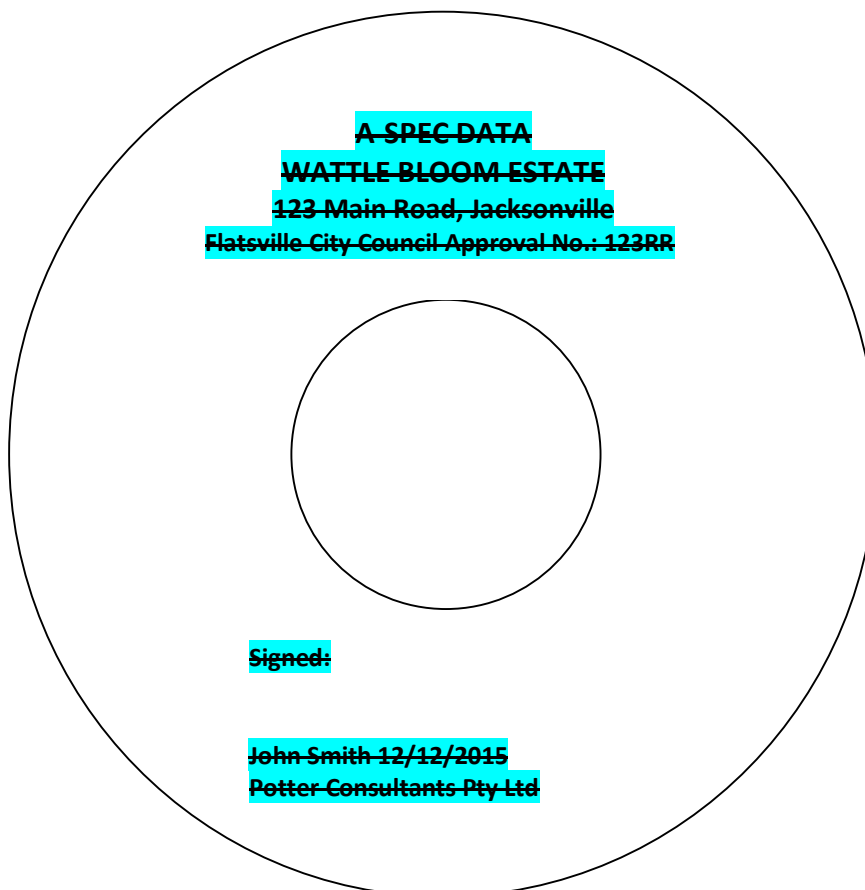


Figure 1 Sample CD Label **DIAGRAM TO BE REMOVED**

Certification Form - Readme / Metadata File

The readme.txt is a simple text file that contains information about the project the digital data is being provided for and must accompany **EVERY** digital data submission.

It is an expectation of the **A-SPEC** Consortium that all data be verified by the developer or their representatives (consultants) with relation to its completeness and graphical accuracy prior to submission.

Errors and omissions will result in the data being returned to the consultant for correction and may result in a non-conformance being placed on the data submission.

The following information will also be used as part of validating the data submission.

Label	Description	Example
COMPANY	Company name taking responsibility for the data	<i>GISSA International</i>
CONTACT	Contact name for this project	<i>George Havakis</i>
TELEPHONE	Telephone number	<i>(03) 9877 6972</i>
FACSIMILE	Facsimile number	<i>NA</i>
EMAIL	Email address (as applicable)	george@gissa.com.au
MAILING ADDRESS	Mailing address	<i>Suite 10, 476 Canterbury Rd, Forest Hill VIC 3131</i>
PHYSICAL ADDRESS	Physical business address	<i>'As Above'</i>
A-SPEC MEMBER	Participating Authority	<i>Wyndham City Council Wannon Water</i>
DATE SUBMITTED	Date the digital data submitted to A-SPEC member	<i>31/1/2008 20 November 2018</i>
DOCUMENT VERSION	Version of the document used	<i>S-Spec Digital Data Specifications – V1.2 V2.0.1</i>
SOFTWARE FORMAT & VERSION	The software used to create the digital data	<i>MapInfo v7.5 / AutoCAD Map 2008 QGIS</i>
PROJECT or SUBDIVISION	Project or Subdivision name	<i>Wyndham Estate Boggy Creek Main Sewer Extension</i>
STAGE	Subdivision Stage Name	<i>Stage 3B N/A</i>
DESIGN COMPANY	Design Company Name	<i>Fred Charles & Associates</i>
PLAN NUMBER	As Constructed Plan Number	<i>6080R212</i>
CONSTRUCTION COMPANY	Construction Company Name	<i>Jamieson Construction</i>
CONSTRUCTION DATE	Date the asset was constructed /built /installed	<i>12/12/2018 10 November 2018</i>
COORDINATES/DATUM	The coordinate system the data is in	<i>GDA94 Zone 4954</i>
DATUM	Vertical Height Datum	<i>AHD74</i>
TRANSFORMATION	The coordinate system the data was transformed from	<i>Perth Coastal Grid to GDA94 Zone49 N/A</i>
TRANSFORMATION BY	Who carried out the transformation from the original coordinate system to the relevant system	<i>City of Gosnells – Jack Dowling N/A</i>
SOURCE OF DATA	The type of capture used	<i>Field Asset Capture</i>
NOTES/COMMENTS	Important notes or information to be included here.	<i>Any other relevant information that the data custodian needs to be aware of. Information provided in this submission is a combination of data picked up in the field along with confirmation by the contractor responsible ICANDOIT Pty Ltd</i>

1.3 Theme/Layer Structure

The following level/layer structure is intended as a guide to assist Consultants when arranging their graphical information for members of the **A-SPEC** Consortium. The key principal is that each **asset type** **asset class** must be delivered on a separate level/layer and the files must be clearly labelled in accordance with the “**Universal File Name**” indicated below.

Depending on the asset to be captured, not all the levels/layers indicated here may appear in the submitted data.

It is important to note that each level/layer should only contain the listed features; any other features present will impede the acceptance testing and may result in non-conformance with the requirements.

Asset Type	Universal File Name	Data Type	Description	Attribute Table
Area of Work Extent	Graphics Area_Extent	Polygon/Shape /Region	Polygon representing the extents of the subdivision development or capital works	Yes
Gravity Sewer Pipe	Gravity	Line/Polyline	Line indicting the centreline position of gravity wastewater pipes.	Yes
Gravity pipe Miscellaneous Text	Gravity	Text	Change of grade, Tangent points and chainages, horizontal or vertical curves, Pipe Offset	No
Pressure Main Pipe	Pressure	Line/Polyline	Line indicting the centreline position of the pressure main wastewater pipe.	Yes
Pressure pipe Miscellaneous Text	Pressure	Text	Change of grade, Tangent points and chainages, horizontal or vertical curves, Pipe Offset	No
Pits/Access Points	Acc_Points	Point	Point representing the centre location of the access point.	Yes
Pits/Access Points	Acc_Poly	Polygon/Shape /Region	Polygon representing the actual size, location and rotation of the access point.	No
Property Connections	Prop_Conn	Line/Polyline	Line indicting the centreline position of the wastewater property connection / Lateral	Yes
Sewer Fitting	Fittings	Point	Point representing fittings used to connect, cap or plug a pipe carrying wastewater.	Yes
Sewer Valves	Valves	Point	Point representing the location of a Wastewater Valve.	Yes
Sewer Pump	Pumps	Point	Point representing pumps used in a wastewater network.	Yes
Pump Station	P_Station	Polygon/Shape /Region	Polygon representing facilities designed to remove the sewage. The shape must be representative of its actual size, location and rotation.	Yes
Pump Station Site	Pump_Station_Site	Polygon	Polygon representing the actual size and location of the pump station site	Yes
Support Structure	Supp_Strut	Polygon/Shape /Region	Perimeter of the support structure	Yes
Other Network Structures	N_Structures	Polygon/Shape /Region	Polygon Representing network structures. EG: Treatment Plants	Yes

Asset Type	Universal File Name	Data Type	Description	Attribute Table
Conduits	Conduits_S	Line/Polyline	Line indicating the centreline position of the conduits	Yes
Electrical Cabling	Elec_Cables	Line/Polyline	Line indicating the centreline position of the electrical cables	Yes
Electrical Equipment	Elec_Equips	Point	Point representing the central location of the electrical equipment	Yes
Instrumentation	Instruments	Point	Point representing the central location of the instrumentation	Yes
Mechanical Equipment	Mec_Equips	Point	Point representing the central location of the mechanical equipment	Yes
Matching to Existing Infrastructure	Problems	Polygon/Shape/Region	Circle of radius 10m and associated comments listing all problems with a unique number (i.e. 1,2,3 etc.)	Yes

1.3.1 Other Asset Types may be found in the Precinct of a Sewer Network

There may be instances where other asset types are constructed as part of a wastewater project such as a treatment plant or a large pumping station compound.

Where this occurs please refer to the relevant **A-SPEC** standard specifications to ensure compliance with the delivery of “As Constructed” information. The table below lists the relevant standard specification to refer to.

Stormwater Pipes & Pits	Please refer to D-Spec for requirements
Fences	Please refer to O-Spec for requirements
Open Spaces and Play Areas	Please refer to O-Spec for requirements
Kerbs and Channels	Please refer to R-Spec for requirements
Pathways	Please refer to R-Spec for requirements
Signs, Trees and Lighting	Please refer to R-Spec for requirements
Water Access Points and Pipes	Please refer to W-Spec for requirements

This will be updated from time to time so please do not hesitate to contact GISSA International on +61 3 9877 6972 or refer to the website on www.a-specstandards.com.au.

1.4 Graphical Data Construction Principles

This section details the graphical data construction principles that consultants must adhere to for all linework, polygons and points provided. Where practicable, the alignment of all data; whether “As Constructed Measurements” in Victoria or Survey Enhanced “As Constructed Measurement” data in Western Australia, must be related to the title/property boundaries abutting the road reserve.

- Please use sound CAD practices when recording data, such as snapping to lines and closing polygons.

1.5 Graphical Representation Principles

Each of the following sections details the requirements for how the graphics for each asset is to be provided. As mentioned in the previous section all data that is provided is to be a:

- Point
- Line (Polyline where multiple vertices are required) or a
- Polygon

1.6 Acceptance Testing

All graphical information will be checked against the Attribute file/table and the QA Report to ensure the submitted As Constructed Data reflects the changes. Please refer to **Sections 2** for guidelines designed to assist Consultants when putting together attribute information.

It is mandatory that each Consultant implement checks to ensure that their plans and data conform to the specification and that they run these checks prior to the submission of data to an **A-SPEC** Consortium member. Members will undertake random in-house testing to ensure compliance.

Following the acceptance of the digital data the, relevant Certificates will be issued and the ownership of the digital data reverts to the **A-SPEC** Consortium member.

1.6.1 Noting Deviation from Design

It is acknowledged that it is inevitable that changes occur due to local conditions and decisions may be made on site to alter from the agreed design issued for construction.

Where this occurs the table in **Attachment 2 – Quality Report** is to be completed and submitted as part of the digital As Constructed data submission.

The purpose of completing this form is to record “**the exceptions to the rule**”. That is, record details of which assets have been affected.

What does that mean?

That means, that assets that have been built outside of the acceptable positional tolerances are noted.

Please Note:

1. The following information has been extracted from the codes and specifications of the WSAA and MRWA standards. These are in accordance with the accepted tolerances for deviation from the original design.
2. It is not within the scope of the A-SPEC specification to determine if these changes are appropriate or not.
3. From a recording perspective it is incumbent upon the developer or their representative to ensure that the “**As Constructed Information**” provided is in accordance with these guidelines.
4. **Attachment 2 – Quality Report** refers to compliance with positional tolerances between design and construction and must be completed as part of every submission to record all of data for acceptance of data.

The following information is provided in accordance with information contained in MRWA Edition – Version 2 September 2015 Section 22 – Tolerances on As Constructed Work. This relates to all specified sewers and on-line structures (e.g. MHs, MCs, MSs, vents referred to as Access Points in this document).

For a comprehensive view of the WSAA requirements refer to the tolerances specified in Clauses 22.1 to 22.4.

Note 1

Information provided in this section is managed and controlled by WSAA and over time may change.

Note 2

It is important to note that It is the responsibility of the Developer or their representative to ensure that they are mindful of any changes to these requirements made by WSAA and adopt as required.

Note 3

Information is provided in this section to create awareness of the importance of recording changes from the design to assist the asset owner with their reconciliation process.

Horizontal Tolerances for Deviation from Original Design

In accordance with WSAA guidelines the horizontal alignment are not to exceed positional tolerances from design to final position as follows:

Asset Type	Tolerance
Sewers	±100mm lateral displacement from the design location
Pressure/Rising Mains	±100mm lateral displacement from the design location
Structures/wet wells	±100mm lateral displacement from the design location
Emergency storage Scour chambers, MHS and MSs	±200mm displacement (from the design location) along the sewer axis
Valves, Reflux scour, Gas Release etc	±100mm displacement (from the design location) along the sewer axis
Fittings and junctions	±100mm displacement (from the design location) along the sewer axis
Pumping stations	±200mm displacement (from the design location)

Vertical Tolerances for Deviation from Original Design

Asset Type	Tolerance
Invert levels	<30mm vertical displacement from the designed location. Please note this may be different depending upon terrain

Grade Tolerances for Deviation from Original Design

Asset Type		Tolerance
Sewer	<1 in 100	±10% displacement of design grade
Sewer	≤ 1 in 20	±15% displacement of design grade
Sewer	> 1 in 20	±20% displacement of design grade
Property Connection		±15% displacement of design grade

1.6.2 Asset Recording Accuracy Principles

Notwithstanding the tolerances noted above to record the departure from the design, the following guides are provided to assist the contractors undertaking the asset recording function for their clients for data that is to be submitted to the A-SPEC member.

Horizontal & Vertical Accuracy

- Horizontal Accuracy: $\pm 300\text{mm}$. measurements are to be taken from the centre of the pipe work wastewater/sewer feature.
- Length: $\pm 300\text{mm}$. Measurement is to be taken from the end point of the pipe segment.
- Vertical Accuracy: for sewer invert levels $<30\text{ mm}$.

Please note that in areas of flat terrain the tolerances for asset capture are critical and may be required to be at the lower end. It is the consultant's responsibility to confirm with the A-SPEC consortium member their specific requirements.

- Vertical Accuracy for Reduced Levels: $\pm 50\text{ mm}$.
- Vertical Accuracy for other infrastructure other than pipes: $\pm 30\text{mm}$.

Horizontal & Vertical Precision

All measurements (Levels, Heights, Lengths and Offsets) are to be recorded in metres to 2 decimal places.

1.7 Match to AS 5488 – 2013

Australian Standard Classification of Subsurface Utility Information (SUI)

The following is an extract from Section 1 of the Standard

SECTION 1 – SCOPE AND GENERAL

1.1 SCOPE

This Standard provides a framework for the classification of subsurface utility location and attributes information in terms of specified quality levels. This Standard applies to subsurface utilities and associated surface features that facilitate the location and identification of subsurface utility infrastructure. These features may include access chambers, stop valves, terminal pads and other surface related facilities. This Standard does not apply to utility infrastructure that is above the surface, such as overhead wires. This Standard applies to all existing (including redundant) and under-construction subsurface utility infrastructure. For the purpose of this Standard, the term ‘subsurface’ includes ‘submerged’ (see Clause 1.4.21).

1.2 APPLICATION

1.2.1 Intended audience

This Standard is intended to be used by those agencies and organizations that own, operate or regulate subsurface utility infrastructure and those that collect, depict and map such infrastructure. This Standard is also intended to be used by developers and consent authorities involved in the planning, approval and installation of subsurface utility infrastructure.

1.2.2 Depiction of Subsurface Utilities

The depiction of subsurface utilities on maps, plans and electronic records, in terms of symbology, line types and colours is the prerogative of the entity that owns or operates the utility. Although this Standard recommends how this information should be recorded (see Appendix B), nothing in this Standard is intended to prevent or encumber an entity that maps subsurface utilities from using its own symbology, line types and colours to depict and record subsurface utilities in its own geographic information systems, mapping databases, plans, drawings or other records.

This standard provides a framework for consistency through information classification for utility owners, locators and operators for identification of subsurface utilities.

The table below ‘B1 (modified)’ which forms part of AS 5488 – 2013 Standard specifies formats for attribute information and metadata requirements for practitioners to adopt. GISSA International has reviewed these requirements and has aligned the relevant **A-SPEC** standard data specifications to them.

Our review identified that the requirements outlined in the AS 5488 – 2013 document appear as either fields within our current data model structure or as codes which can be selected to describe characteristics of asset types.

As AS 5488 – 2013 is not intended to prevent or encumber any entity that maps subsurface utilities from using its own symbology in its own systems, this section has been created with the distinct purpose and objective to provide a succinct **ROAD MAP** to comply with the **A-SPEC** requirements.

In using this **Road Map** organisations will be able to deliver digital data to an **A-SPEC Consortium member** by directly linking their work with the **A-SPEC digital data model** in this document.

Please note where a term in the AS 5488 – 2013 Standard is not specific in its description of an asset type, an **A-SPEC default** term has been used.

Please note: AS 5488 – 2013 Table B1 (modified) –
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Table B1 (modified):

Attribute Information from AS5488	A-SPEC Coverage
Type of Utility/Asset	S-Spec – wastewater/sewerage; W-Spec – Potable water, re-use (recycled); D-Spec – Stormwater/Raw water Agnostic of colour and line styles. Therefore can accommodate directly.
Owner of the Utility/ Asset	Included as an attribute in appropriate tables in every specification
Codes for Features	Coding for all required features are specified in code lists CODELISTS in every specification
Size/Measurements	Included as an attribute in relevant attribute tables in every specification
Status of the Asset	Included as an attribute in relevant attribute tables in every specification
Material Type	Included as an attribute in relevant attribute tables in every specification
Asset Configuration	Layouts of required features are included under ' Section 1.4 – Graphical Data Construction Principles ' in every specification if required to be provided as digital data
Drawing showing the approximate location of the Utility/Asset	Layouts of required features are included under ' Section 1.4 – Graphical Data Construction Principles ' in every specification if required to be provided as digital data
Drawing showing the possible location of the Utility/Asset	Layouts of required features are included under ' Section 1.4 – Graphical Data Construction Principles ' in every specification if required to be provided as digital data
Horizontal Position relative to a structure	Layouts of required features are included under ' Section 1.4 – Graphical Data Construction Principles ' in every specification if required to be provided as digital data
Vertical Position relative to a structure	Layouts of required features are included under ' Section 1.4 – Graphical Data Construction Principles ' in every specification if required to be provided as digital data
Absolute Spatial Location/ Coordinates	Covered in every specification
Quality Level	This information can be provided in the ' Source ' and ' Comments ' fields
Information Source	This information can be provided in the ' Comments ' field
Date information obtained/recorded	This information can be provided in the ' Comments ' field
Locating Methods	This information can be provided in the ' Comments ' field
Survey Control Information	Not required in A-SPEC however, all data is provided on the correct projection and datum and is specified

The following table indicates how the **A-SPEC** standard data specifications **S-Spec** has been mapped to **Table B3** in the AS 5488 – 2013 Standard.

AS 5488		S-Spec		
Entity	AS 5488 Term	Field Name	Code or Descriptor	Notes
Sewer	House Connection	Type	-	<p>A 'House Connection' is referred to as 'Property Connection' in S-Spec.</p> <p>'House Connection' is included as an attribute ('Type') in Property Connection attribute table under section 2 and as descriptors in Property Connection Type code list CODELISTS under section 3.</p> <p>Please refer to 2.5 2.4.2 Property Connection / Lateral attribute & validation table for the complete set of attributes relating to House Connections required in S-Spec.</p>
	Lamphole	Type	LAMP	<p>In S-Spec, a pit is referred to as an access point or a manhole.</p> <p>This is included as an attribute ('Type') in Access Point/Pit/Manhole attribute table under section 2 and as a descriptor in the Pit Type code list CODELISTS under section 3.</p> <p>Please refer to 2.5 2.5.2 – Access Point/Pit/Manhole attribute & validation table for the complete set of attributes relating to access points required in S-Spec.</p>
	Main	Type	-	<p>'Main' types are defined in the Wastewater Pipe Types code list CODELIST under section 3 as 'Pressure Reticulation, Rising and Vacuum'.</p> <p>'Main' is included as an attribute ('Type') in Pressure Main attribute table under section 2 and as descriptors in Wastewater Pipe Type code list CODELIST under section 3.</p> <p>Please refer to 2.3 2.3.2 – Pressure Main attribute & validation table for the complete set of attributes relating to mains required in S-Spec.</p>
	Manhole Cover	-	-	<p>Attributes relating to a 'Manhole Cover' are not covered in S-Spec. However, 'Access Point Cover Material' is included in Access Point/Pit/Manhole attribute & validation table as an attribute.</p> <p>Please refer to table 2.5 2.5.2 – Access Point/Pit/Manhole attribute & validation table for the complete set of attributes relating to access points required in S-Spec.</p>
	Sewer Rising Main	Type	RISING	<p>'Rising Main' is included as an attribute ('Type') in Pressure Main attribute & validation table under section 2 and as a descriptor ('RISING') in Wastewater Pipe Type code list CODELIST under section 3</p> <p>Please refer to 2.3 2.3.2 – Pressure Main attribute & validation table for the complete set of attributes relating to mains required in S-Spec.</p>
	Vent Pipe	Vent Vent_H Vent_M	-	<p>'Vent Pipe' dimensions are included as attributes in Access Point/Pit/Manhole attribute table.</p>

ROAD MAP TO **COMPLY AND COMPLIANCE** WITH S-Spec

The example below shows a table populated with the fields which comply with AS 5488 – 2013. To comply with **S-Spec** requirements there are additional fields that are to be populated prior to providing data.

Example:

Gravity Sewer Pipe Attribute & Validation File Format Instructions			
Column Name	Details	Values	Notes
Type	No commas included CODELIST entry	SIPHON	Value derived from AS 5488-2013 requirement
Status	No commas included CODELIST entry	INUSE	To be populated to comply with S-Spec Value derived from AS 5488-2013 requirement
Pipe_No	No commas included Text	1-2	To be populated to comply with S-Spec
Owner	No commas included Text	Wellington City Council	Value derived from AS 5488-2013 requirement
Up_AP_No	No commas included Text	2	To be populated to comply with S-Spec
Dn_AP_No	No commas included Text	1	To be populated to comply with S-Spec
Class_S	No commas included CODELIST entry	SN4	To be populated to comply with S-Spec
Pipe_DesT	CODELIST entry	R	To be populated to comply with S-Spec
St_Name	No commas included Text	Jones Dr	To be populated to comply with S-Spec
Location	No commas included Text	N/A NA	To be populated to comply with S-Spec
Pipe_Shape	No commas included CODELIST entry	CIRC	To be populated to comply with S-Spec
Joint_Type Joint_Mtd	No commas included CODELIST entry	RRJ	To be populated to comply with S-Spec
Grnd_Water	Yes/No Field	N	To be populated to comply with S-Spec
Grnd_Type	No commas included CODELIST entry	BSLT	To be populated to comply with S-Spec
Rock_Excav	Yes/ No field	Y	To be populated to comply with S-Spec
Instl_Mthd	No commas included CODELIST entry	TR	To be populated to comply with S-Spec
Protection	No commas included CODELIST entry	BITUMEN	To be populated to comply with S-Spec
Bedding	No commas included CODELIST entry	SAND	To be populated to comply with S-Spec
Backfill	No commas included CODELIST entry	CR	To be populated to comply with S-Spec
RI_Rn_Mtd	No commas included CODELIST entry	BURST	To be populated to comply with S-Spec
RI_Rn_Mat	No commas included CODELIST entry	FIBRE	To be populated to comply with S-Spec
cctv_Ref	No commas included Text	N/A NA	To be populated to comply with S-Spec
cctv_Date	dd/mm/yyyy		To be populated to comply with S-Spec
DS_IL	2 decimal places	12.45	To be populated to comply with S-Spec
DS_Pipe_E	3 decimal places	123456.12	To be populated to comply with S-Spec
DS_Pipe_N	3 decimal places	1234567.12	To be populated to comply with S-Spec

Gravity Sewer Pipe Attribute & Validation File Format Instructions			
Column Name	Details	Values	Notes
US_IL	2 decimal places	14.12	To be populated to comply with S-Spec
US_Pipe_E	3 decimal places	123456.12	To be populated to comply with S-Spec
US_Pipe_N	3 decimal places	1234567.12	To be populated to comply with S-Spec
Length	2 decimal places	15.25	To be populated to comply with S-Spec
Dia_Width	Whole mm	300	Value derived from AS 5488-2013 requirement
Width2	Whole mm	200	To be populated to comply with S-Spec
Height	Whole mm	-9999	To be populated to comply with S-Spec
Material	No commas included CODELIST entry	uVPC	Value derived from AS 5488-2013 requirement
Capacity Flow_Rate	Whole mm number	100	To be populated to comply with S-Spec
Gradient	2 decimal places	60.00	To be populated to comply with S-Spec
WAPC_No	No commas included		To be populated to comply with S-Spec
RC_Type	No commas included		To be populated to comply with S-Spec
Currency	No commas included Text	AUD	To be populated to comply with S-Spec
Unit_Cost	2 decimal points	-9999.99	To be populated to comply with S-Spec
Unit_Ref	CODELIST entry	SCHEDULE	To be populated to comply with S-Spec
Value_Year	Whole number		To be populated to comply with S-Spec
Sub_Name	No commas included		To be populated to comply with S-Spec
Stage_No	No commas included		To be populated to comply with S-Spec
Design_Co	No commas included		To be populated to comply with S-Spec
Plan_No	No commas included		To be populated to comply with S-Spec
Const_Co	No commas included		To be populated to comply with S-Spec
Const_Date	dd/mm/yyyy	12/07/2002	'Installation date' is referred to as 'Construction Date' here. Value derived from AS 5488-2013 requirement
Origin	No commas included		To be populated to comply with S-Spec
Transfrm	No commas included		To be populated to comply with S-Spec
Transf_by	No commas included		To be populated to comply with S-Spec
Source	No commas included Text	As Designed Drawings COMB_1	Value derived from AS 5488-2013 requirement
Comments	No commas included Text	Information from Wellington City Council Information obtained on 14/08/2004 Located by Survey	Data fields populated as a combination of AS 5488-2013 requirements and S-Spec requirements

Common Project Information

The following information is to be provided for all asset data and is to align with the Area of Work Extent requirements within this document.

Area of Work Extent Attribute & Validation File Format Instructions			
Column Name	Details	Values	Notes
Permit_No	Text	N/A NA	To be populated to comply with S-Spec
Sub_Name	Text	Capital Works 2017/033	To be populated to comply with S-Spec
Stage_No	Text	N/A NA	To be populated to comply with S-Spec
Design_Co	Text	Icandoit Pty Ltd	To be populated to comply with S-Spec
Plan_No	Text	14A-Detail	To be populated to comply with S-Spec
Const_Co	Text	Dunit Pty Ltd	To be populated to comply with S-Spec
Const_Date	dd/mm/yyyy	12/07/2002	Value derived from AS 5488 – 2013 requirement
Origin	Text	N/A NA	To be populated to comply with S-Spec
Transfrm	Text	N/A NA	To be populated to comply with S-Spec
Transf_By	Text	N/A NA	To be populated to comply with S-Spec
Source	CODELIST entry	AS5488-D	To be populated to comply with S-Spec

2 Attribute & Validation File Specifications

All coordinates will be provided in the preferred datum of each individual **A-SPEC** Consortium member as specified on the **A-SPEC** website www.a-specstandards.com.au or as otherwise agreed to with the respective Consortium member.

Coordinate fields¹

The key objective of storing this information is to ensure that the practice of collecting the “As Constructed Information” meets the accuracy requirements of the **A-SPEC** Consortium. The accuracy of the information must be relative to the property boundary.

As all new cadastral information in Australia is placed on the MGA (Map Grid of Australia) grid it is an expectation that all data provided by consultants will be representative of this level of accuracy.

Where significant discrepancy occurs between the digital cadastral mapbase of the affected jurisdiction and the coordinates of the cadastral development as a result of the unavailability of the connection to the MGA grid, then the consultant will notify the Consortium member so that steps can be taken to record the adjusted coordinates.

The key objective of having this notification in place is to take into consideration occurrences where the cadastral mapbase exceeds a particular accuracy. This is to ensure that if required the assets can be located via means of a GPS or other distance measurement equipment.

In Australia – All Z coordinates (levels) will be provided in AHD metres in accordance with the jurisdictional requirements.

In New Zealand – All Z coordinates are to be provided in NZTM projection (NZVD2016 datum).

Attribute Data fields

Maximum field widths are specified for Alpha/Numeric and Alpha data.

For floating point decimal data the number of characters after the decimal point are specified.

Dates are to be provided as dd/mm/yyyy, EG: 07/06/2001.

All fields are to be populated in accordance with the notes supplied for each field.

All Attribute fields are to use the Column Names set out in [Section 2 – Attribute & Validation File Format Instructions](#).

Validation checks for each data field have also been provided in [Section 2 – Attribute & Validation File Format Instructions](#).

A set of code lists CODELIST are provided to standardise the capture of information in the Attribute files. They can be found in [Section 3 – S-Spec CODELISTS](#). The **A-SPEC** website will also contain the most current code list CODELIST.

Fields that are highlighted in grey are common to all tables.

Please take note of default values for specific fields. These have been provided for the relevant fields.

Please note that every attribute name is case sensitive. Use the given name format when creating your fields to supply the data.

Attribute Data Validation Requirements

Please note the column **QA Validation** stipulating the Validation Check to be carried out as a guide to assist Developer/Consultants when putting together information for submission.

¹ Discussions held with Land Victoria (Victoria) and Landgate (Western Australia) have confirmed that the coordinated cadastral information provided by surveyors is generally adopted and data of lesser accuracy is “massaged / modified” to suit. i.e. where the surrounding data, for example is based on 1:10,000 accuracy, then that data will be manipulated to “fit” with the survey accurate data.

3 S-Spec CODELISTS ~~Code Lists~~

Code lists CODELISTS are used to standardise terminology by providing a range of item descriptions relating to a particular attribute. A number of attributes specified in the ASCII file require the input of a code list CODELIST entry number.

Consultants please note that should an entry not exist within the a CODELIST code list please contact you're A-SPEC Consortium contact to make arrangements for its inclusion. Use the 'SeeComment' value.

Code list CODELIST entries will be constantly reviewed by the Consortium and additions and amendments made as the need arise.

Access Point Access Method – NEW

Access Point Construction Method

Access Point Material – NEW

Access Point / Manhole / Pit Type

Asset Status

Backup Power Type – NEW

Bedding / Backfill Material

Cable Type – NEW

Conduit Material – NEW

Control Type – NEW

Drop Type – NEW

Electrical Equipment Type – NEW

Equipment Material – NEW

Equipment Purpose – NEW

Feature Type – NEW

Filter Type – NEW

Fittings Type

Fuel Type – NEW

Ground Soil Type

Health and Safety Issues – NEW

Impeller Material – NEW

Impeller Type – NEW

Instrument Type – NEW

Jointing Method

Lift Type – NEW

Lining Material – NEW

Material

Mechanical Equipment Type – NEW

Network – NEW

Other Network Structure Types – NEW

Pipe Installation Method

Pipe Material – NEW

Pipe Pressure Class – NEW

Pipe Renewal / Lining Material – NEW

Pipe Renewal Method – NEW

Pipe Shapes

Pipe Stiffness Class – NEW

Position – NEW

Property Connection Type

Protection Type – NEW

Protective Material Type – NEW

Pump Purpose – NEW

Pump Station Type – NEW

Pump Use – NEW

~~Replacement Cost Type~~

Source – NEW

Spindle Type – NEW

Support Structure Material – NEW

Support Structure Type – NEW

Unit of Measure Reference – NEW

Valves Type

Valve Purpose – NEW

Voltage Type – NEW

Wastewater Pipe Type