



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

Version 2.0.5 Final - Summary
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A-SPEC Members

Victoria	WA	NSW

Table of Contents

A-SPEC MEMBERS.....	2
TABLE OF CONTENTS	3
EXECUTIVE SUMMARY.....	5
INTRODUCTION.....	5
A-SPEC PROGRAM	5
S-SPEC STANDARD SPECIFICATION.....	6
USE OF THE SPECIFICATION.....	6
THE A-SPEC ACCOMPANYING DOCUMENT	7
IN SUMMARY	8
GLOSSARY OF TERMS AND DEFINITIONS.....	9
SUBMISSION OF “AS CONSTRUCTED INFORMATION” AS GIS READY DATA.....	11
CONSULTANT REGISTER	11
A-SPEC MEMBER CONTACT.....	11
INTELLECTUAL PROPERTY	11
DISCLAIMER.....	11
DELIVERABLES	11
CERTIFICATION FORM - README / METADATA FILE	12
1.3 THEME/LAYER STRUCTURE.....	13
1.4 GRAPHICAL DATA CONSTRUCTION PRINCIPLES	15
1.5 GRAPHICAL REPRESENTATION PRINCIPLES	15
1.6 ACCEPTANCE TESTING.....	15
1.7 MATCH TO AS 5488 – 2013	18
2 ATTRIBUTE & VALIDATION FILE SPECIFICATIONS.....	23
3 S-SPEC CODELISTS	25
ACCESS POINT ACCESS METHOD.....	25
ACCESS POINT CONSTRUCTION METHOD	25
ACCESS POINT MATERIAL.....	25
ACCESS POINT / MANHOLE / PIT TYPE	26
ASSET STATUS	26
BACKUP POWER TYPE	26
BEDDING / BACKFILL MATERIAL.....	27
CABLE TYPE	27
CONDUIT MATERIAL	27
CONTROL TYPE.....	28
DROP TYPE.....	28
ELECTRICAL EQUIPMENT TYPE	28
EQUIPMENT MATERIAL.....	28
EQUIPMENT PURPOSE.....	29
FEATURE TYPE.....	29
FILTER TYPE.....	29
FITTING TYPE	30
FUEL TYPE.....	30
GROUND SOIL TYPE	30
HEALTH AND SAFETY ISSUES.....	31
IMPELLER MATERIAL.....	31
IMPELLER TYPE	31
INSTRUMENT TYPE	32
JOINTING METHOD.....	32
LIFT TYPE	32
LINING MATERIAL	33
MECHANICAL EQUIPMENT TYPE.....	33
NETWORK	33
OTHER NETWORK STRUCTURE TYPES	33

PIPE INSTALLATION METHOD	34
PIPE MATERIAL	34
PIPE PRESSURE CLASS	35
PIPE RENEWAL / LINING MATERIAL	35
PIPE RENEWAL METHOD	36
PIPE SHAPES	36
PIPE STIFFNESS CLASS	37
POSITION	37
PROPERTY CONNECTION TYPE	37
PROTECTION TYPE	37
PROTECTIVE MATERIAL TYPE	38
PUMP PURPOSE	38
PUMP STATION TYPE	38
PUMP USE	38
SOURCE	39
SPINDLE TYPE	39
SUPPORT STRUCTURE MATERIAL	39
SUPPORT STRUCTURE TYPE	40
UNIT OF MEASURE REFERENCE	40
VALVE TYPE	40
VALVE PURPOSE	41
VOLTAGE TYPE	41
WASTEWATER PIPE TYPE	41
4 S-SPEC DOCUMENT CONTROL	42
5 DOCUMENT REVISION HISTORY	42
6 SUMMARY OF SPECIFICATION CHANGES	42

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 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 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 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. 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 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.

The A-SPEC Accompanying Document

A document has been created called the **A-SPEC DDS – Introduction and Overview** ("A-SPEC DDS"). Where applicable please refer to the section of the document that stipulates the specific requirements of the relevant region where you are conducting your business.

It should also be noted that the **A-SPEC DDS** document contains a list of all asset types covered by the various specifications to enable easier identification for the detailed information.

It is the responsibility of the data providers to understand the specific requirements of their local government, utility or water authority clients. Assistance will be provided wherever possible by GISSA to clarify any issues or concerns.

To log a request for further information, the Data Provider may contact GISSA through the website www.a-specstandards.com.au.

The **A- SPEC DDS** document along with this document, provides the necessary information relating to common features (asset classes, feature types, attribute types and attribute value domains) that are required.

Including

1. generalisation rules for the graphical representation of each feature,
2. geodetic reference systems and
3. rules for validating the data supplied to ensure adherence and compliance.

The Already Constructed data 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.

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.

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.

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 **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.dspec.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.
- USB memory device, portable hard drive
- Cloud Mediums (FTP, Dropbox, Google Drive etc.)

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>Wannon Water</i>
DATE SUBMITTED	Date the digital data submitted to A-SPEC member	<i>20 November 2018</i>
DOCUMENT VERSION	Version of the document used	<i>S-Spec Digital Data Specifications – V2.0.5</i>
SOFTWARE FORMAT & VERSION	The software used to create the digital data	QGIS
PROJECT or SUBDIVISION	Project or Subdivision name	<i>Boggy Creek Main Sewer Extension</i>
STAGE	Subdivision Stage Name	<i>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>10 November 2018</i>
COORDINATES/DATUM	The coordinate system the data is in	<i>GDA94 Zone 54</i>
DATUM	Vertical Height Datum	<i>AHD71</i>
TRANSFORMATION	The coordinate system the data was transformed from	<i>N/A</i>
TRANSFORMATION BY	Who carried out the transformation from the original coordinate system to the relevant system	<i>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>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 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	Area_Extent	Polygon	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	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	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	Perimeter of the support structure	Yes
Other Network Structures	N_Structures	Polygon	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	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” or Survey Enhanced “As Constructed Measurement” data, 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

Please note an update to this standard was released by Standards Australia on 26 May 2019 and created into 2 parts. Following a review of the changes and their application to S-Spec, changes will be incorporated into S-Spec and distributed as an addendum.

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 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 CODELISTS under section 3.</p> <p>Please refer to 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 CODELISTS under section 3.</p> <p>Please refer to 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 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 CODELIST under section 3.</p> <p>Please refer to 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 – 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 CODELIST under section 3</p> <p>Please refer to 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 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	CODELIST entry	SIPHON	Value derived from AS 5488-2013 requirement
Status	CODELIST entry	INUSE	Value derived from AS 5488-2013 requirement
Pipe_No	Text	1-2	To be populated to comply with S-Spec
Owner	Text	Wellington City Council	Value derived from AS 5488-2013 requirement
Up_AP_No	Text	2	To be populated to comply with S-Spec
Dn_AP_No	Text	1	To be populated to comply with S-Spec
Class_S	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	Text	Jones Dr	To be populated to comply with S-Spec
Location	Text	NA	To be populated to comply with S-Spec
Pipe_Shape	CODELIST entry	CIRC	To be populated to comply with S-Spec
Joint_Mtd	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	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	CODELIST entry	TR	To be populated to comply with S-Spec
Protection	CODELIST entry	BITUMEN	To be populated to comply with S-Spec
Bedding	CODELIST entry	SAND	To be populated to comply with S-Spec
Backfill	CODELIST entry	CR	To be populated to comply with S-Spec
RI_Rn_Mtd	CODELIST entry	BURST	To be populated to comply with S-Spec
RI_Rn_Mat	CODELIST entry	FIBRE	To be populated to comply with S-Spec
cctv_Ref	Text	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
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	CODELIST entry	uVPC	Value derived from AS 5488-2013 requirement
Flow_Rate	Whole-number	100	To be populated to comply with S-Spec
Gradient	2 decimal places	60.00	To be populated to comply with S-Spec
Currency	Text	AUD	To be populated to comply with S-Spec

Gravity Sewer Pipe Attribute & Validation File Format Instructions			
Column Name	Details	Values	Notes
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
Source	Text	COMB_1	Value derived from AS 5488-2013 requirement
Comments	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	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	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	NA	To be populated to comply with S-Spec
Transfrm	Text	NA	To be populated to comply with S-Spec
Transf_By	Text	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

This section provides details of the attribute fields and their respective validation requirements for each asset table and includes the following information.

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.

For further detail and definitions of the Attribute Data Types and Column name explanations, please refer to the document **A-SPEC DDS – Introduction & Overview V2.1.0 Final**.

Attribute Data Field Requirements

This section details the attribute field data entry requirements that data providers are to adhere to for all data submissions of asset types listed in [Section 1.3 – Theme/Layer Structure](#).

Please note that the Project related data needs to be provided only once.

The following are the key requirements for the structure of the data to be provided in each submission.

- Maximum field widths are specified for Alpha/Numeric and Alpha data.
 - These are to be adhered to.
- For 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 and structures 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 CODELISTS 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 CODELISTS.
- If a Code does not exist the new asset feature is to be recorded in the “**Comments**” field and a note sent via the A-SPEC website **ContactUs** form so a new code can be created.
- ~~Fields that are highlighted in grey are common to all tables.~~
- All fields that are common to all tables are captured in the Area of Work Extent table
- 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 is provided as a guide to assist Developer/Consultants when putting together information for submission.

Coordinate fields

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.

3 S-Spec CODELISTS

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 CODELIST entry number.

Consultants please note that should an entry not exist within a CODELIST please Use the '**SeeComment**' value.

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

Access Point Access Method

Code	Description
STIRON	Step Iron
STDLAD	Standard Ladder
MONLAD	Monorail Ladder
SeeComment	To be used when a Access Point Access Method is not listed. The new Access Point Access Method is to be listed in the ' Comments ' field.

Access Point Construction Method

Code	Description	Code	Description
AN	Annealed	LB	Lock Bar
CAST	Cast Insitu	MC	Mandrill Cast
CORR	Corrugated	PC	Precast
EX	Extruded	RIV	Riveted
FOLD	Folded	S	Seamless
GC	Gravity Cast	SC	Spun Cast
HD	Hard Drawn	SeeComment	To be used when a Access Point Construction Method is not listed. The new Access Point Construction Method is to be listed in the ' Comments ' field.

Access Point Material

Code	Description	Code	Description
BRK	Brick	IRON	Iron
CCONC	Coloured Concrete	PCONC	Precast concrete
CONC	Concrete	PSTYB	Polystyrene blocks
CONCM	Concrete Masonry	PVC	Polyvinylchloride
CORR	Corrugated Steel/Aluminium	RC	Reinforced Concrete – No Class/Unknown
FCEM	Fibre Cement Sheets	SeeComment	To be used when a Access Point Material is not listed. The new Access Point Material is to be listed in the ' Comments ' field.
GEW	Glazed Earthenware	STEEL	Steel
ICONC	In-situ concrete	TMBR	Timber

Access Point / Manhole / Pit Type

Code	Description	Code	Description
BIF	Bifurcation	RMDMH	Rising Main Discharge Maintenance Hole
CHM	Chambered	SeeComment	To be used when a Access Point Type is not listed. The new Access Point Type is to be listed in the ' Comments ' field.
CWWPS	Combined Wet well & Pump Station	SEPT	Septic Tank
ERS	Emergency Relief Overflow Structure or Overflow Maintenance Hole	SIPHON	Siphon
GSCK	Gas Check		
GCMH	Grit Collector Maintenance Hole	SHAFT	Sewer Maintenance Shaft / Inspection Shaft / Lamphole / Rodding Eye [AS 5488 – 2013 Component]
JP	Junction Pit / Maintenance Hole	TANK	Storage Tank / Collection Tank
OUTLET	Outlet	VCLFT	Vacuum Lift
PEN	Penstock	VVP	Valve Pit
PMST	Pump Station	VSMH	Vacuum Sewer Maintenance Hole
PSFP	Pressure Sewer Flush Point	WETW	Wet well

Asset Status

Code	Description
ABN	Abandoned or Disused
FILL	Filled (for access points/pits etc.)
INUSE	In-Use
OTHER	Other Use (for cables etc.)
REM	Removed

Backup Power Type

Code	Description
BATTERY	Battery
EUPS	UPS
GEN	Generator
SOLAR	Solar Panels
SeeComment	To be used when a Backup Power Type is not listed. The new Backup Power Type is to be listed in the ' Comments ' field.

Bedding / Backfill Material

Code	Description	Code	Description
AGGR	Aggregate	CONCH	Concrete Haunching
BENT	Bentonite Sand Mixture	QWST	Quarry Waste
CONCB	Concrete Blocks	RC	Reinforced Concrete
CLAY	Clay	SAND	Sand
CLSLRY	Clay Slurry	SCOR	Scoria
CONC	Concrete	SeeComment	To be used when a Bedding/Backfill Material is not listed. The new Bedding/Backfill Material is to be listed in the ' Comments ' field.
CR	Crushed Rock	SEMAT	Selected Excavated Material
CSROCK	Cement Stabilised Crushed Rock	SLCS	Sand Lime Cement Slurry
EXCMAT	Excavated Material	TOPP	Topping
CGLASS	Crushed Glass		
GROUT	Grout		

Cable Type

Code	Description
FLEX	Flexible
HLX	Heliac
MCORE	Multicore
MTLSTH	Metallic sheathed
NMTLSTH	Non-metallic sheathed
PAIR	Paired
PORT	Portable
RBN	Ribbon
SHLD	Shielded
SNG	Single
SUB	Submersible
TWNL	Twin lead
TWNX	Twinax
SeeComment	To be used when a Cable Type is not listed. The new Cable Type is to be listed in the ' Comments ' field.

Conduit Material

Code	Description
LDPE	Low Density Polyethylene
MDPE	Medium Density PE (PE80B)
mPVC	Modified Polyvinyl Chloride
oPVC	Oriented PVC (EG: Blue Brute)
PE	Polyethylene (Used for UG Conduits)
PVC	Polyvinyl chloride
SeeComment	To be used when a Conduit Material is not listed. The new Conduit Material is to be listed in the ' Comments ' field.
uPVC	Un-plasticised PVC

Control Type

Code	Description
AUTO	Automatic
LOCAL	Local
MAN	Manual
SCADA	SCADA
SEMI	Semi-automatic
SeeComment	To be used when a Control Type is not listed. The new Control Type is to be listed in the ' Comments ' field.

Drop Type

Code	Description
INT	Internal
EXT	External
INTEXT	Internal and External
NA	Not Applicable

Electrical Equipment Type

Code	Description
CAB	Cabinet
CONT	Controller
CONTP	Control panel
DRV	Drive
EGSB	Generator Set – Batteries
PUMP	Pump
SUPPLY	Supply
SWITCHB	Switchboard
SeeComment	To be used when an Electrical Equipment Type is not listed. The new Electrical Equipment Type is to be listed in the ' Comments ' field.

Equipment Material

Code	Description	Code	Description
BRASS	Brass	LDPE	Low Density Polyethylene
DI	Ductile Iron	MI	Malleable Iron
FBE	Fusion Bonded Epoxy	MSW	Mild Steel Welded
FBPE	Fusion Bonded PE	NA	Not Applicable
GW	Galvanised Wrought Iron (Also known as Galvanised Mild Steel)	SeeComment	To be used when an Equipment Material is not listed. The new Equipment Material is to be listed in the ' Comments ' field.
HAL	Helicore Aluminium	WI	Wrought Iron

Equipment Purpose

Code	Description
COMM	Communication
DISP	Display
LIGHT	Light
MON	Monitor
POWER	Power
SOUND	Sound
SeeComment	To be used when an Equipment Purpose is not listed. The new Equipment Purpose is to be listed in the ' Comments ' field.

Feature Type

Code	Description
APOINT	Access Point
CEIL	Ceiling
CONDUIT	Conduit
DOOR	Door
ENDWALL	Endwall
FLOOR	Floor
HEADWALL	Headwall
LIFT	Lift
MTR	Motor
PIPE	Pipe
PUMP	Pump
ROOF	Roof
VALVE	Valve
WINDOW	Window
SeeComment	To be used when a Feature Type is not listed. The new Feature Type is to be listed in the ' Comments ' field.

Filter Type

Code	Description
CLSCR	Coalescer
DCSN	Debris control screen
FBED	Filter Bed
FLTP	Flat panel
UPFL	Upflow
SeeComment	To be used when a Filter Type is not listed. The new Filter Type is to be listed in the ' Comments ' field.

Fitting Type

Code	Description	Code	Description
BEND11.25	11.25° Bend	GIBJ	Gibault Joint
BEND22.5	22.5° Bend	METP	Meter Point
BEND45	45° Bend	REDCR	Reducer
BEND90	90° Bend	SeeComment	To be used when a Fitting Type is not listed. The new Fitting Type is to be listed in the ' Comments ' field.
CRS	Cross	TEE	Tee Junction
EP	End Cap / End of Pipe / Blank End	WYE	Wye Joint
FCN	Flexible Connector		

Fuel Type

Code	Description
DIES	Diesel
ELEC	Electricity
GAS	Gas
PETROL	Petrol
OIL	Oil
SFUEL	Solid Fuel
SeeComment	To be used when a Fuel Type is not listed. The new Fuel Type is to be listed in the ' Comments ' field.

Ground Soil Type

Code	Description	Code	Description
BAS	Basalt	LIMES LS	Limestone
CLAY	Clay	LOAM	Loam
CLBS	Clay and Basalt	MDSTN	Mudstone
CLGR	Clayey Gravel	RCK	Rock
CLRK	Clay and Rock	SeeComment	To be used when a Ground Soil Type is not listed. The new Ground Soil Type is to be listed in the ' Comments ' field.
CLSN	Clayey Sand	SAND	Sand
CLSI	Clayey Silt	SACL	Sandy Clay
CLSTN	Clay and Stone	SNGR	Sandy Gravel
COBL	Cobble	SASI	Sandy Silt
DACT	Dacite	SNST	Sandstone
DOL	Dolerite	SHAL	Shale
FILL	Fill	SLST	Siltstone
GFILL	General Fill	SILT	Silt
GRT	Granite	SICL	Silty Clay
GRVL	Gravel	SIGR	Silty Gravel
GRSI	Gravelly Silt	SISN	Silty Sand
GRCL	Gravelly Clay	SOIL	Soil
GRSN	Gravelly Sand	SSRF	Sandstone and Reef
HNFS	Hornfels	STNE	Stone

Health and Safety Issues

Code	Description
CONFINED	Confined Spaces
ENERG_SRC	Energy Source
EXCAVATION	Excavation and Trenching
FORKLIFTS	Forklifts Operating
HAZ_SUB	Hazardous Substances
HEIGHT	Working At Height
HIGH_VOLT	High Voltage
LIFT_EQUIP	Cranes and Lifting Equipment
NIL	No Requirement
PLANT	Mobile Plant
POWER_EQ	Power Plant and Equipment
RESTRICTED	Restricted Space
SeeComment	To be used when a Health and Safety Issue is not listed. The new Health and Safety Issue is to be listed in the 'Comments' field.
TRAFFIC	Live Traffic

Impeller Material

Code	Description
AL	Aluminium
BRASS	Brass
BRONZE	Bronze
IRON	Iron
NA	Not Applicable
PLASTIC	Plastic
RUB	Rubber
SeeComment	To be used when an Impeller Material is not listed. The new Impeller Material is to be listed in the 'Comments' field.
STEEL	Steel

Impeller Type

Code	Description
CENSC	Centrifugal screw
CLCH	Closed channel
HHCLCC	High head closed channel
MFLOW	Mixed flow
PRPL	Propeller
SEMIOP	Semi-open
SHRED	Shredder
SLUR	Slurry
VOR	Vortex
SeeComment	To be used when an Impeller Type is not listed. The new Impeller Type is to be listed in the 'Comments' field.

Instrument Type

Code	Description
ANALYT	Analytical
CONT	Controllers
FMET	Flowmeters
LEVEL	Level
MET	Meters
POS	Position
PRS	Pressure
RDLV	Radar levels
TEMP	Temperature switch
TRQ	Torque
TRNSMTR	Transmitters
VIBR	Vibration
WEAT	Weather
WEIGHT	Weight
SeeComment	To be used when an Instrument Type is not listed. The new Instrument Type is to be listed in the 'Comments' field.

Jointing Method

Code	Description	Code	Description
BAIO	BAIO Flangeless Coupling System	PF	Push Fit
BFJ	Butt Fusion Weld Joint (PE)	PFJ	Polyester Fairing Joint
BSWJ	Ball and Socket Weld Joint (Steel)	PUJ	Polyurethane Joint
BWJ	Butt Weld Joint (Steel)	RRJ	Rubber Ring Joint
CJ	Compression Joints	RRJL	Rubber Ring Joint embedded with metallic locking segments (EG: Tyton-Lock)
CWJ	Collar Weld Joint (Steel)	SCJ	Solvent Cement Joint
EFJ	Electro fusion Coupling Weld Joint	SeeComment	To be used when a Joint Method is not listed. The new Joint Method is to be listed in the 'Comments' field.
FLGFLG	Flange to Flange	SOCFLG	Socket to Flange
FJ	Flanged Joint	SOCSOC	Socket to Socket
LJ	Lead Joint	SPWJ	Spherical Slip-In Weld Joint (Steel)
MCJ	Mechanical Coupling Joint	TL	Tyton Lock
PJ	Plumbite Joint	WM	Welded - Metal

Lift Type

Code	Description
CABLE	Cable
GRIND	Grinder
HYDRAULIC	Hydraulic
PNEUMATIC	Pneumatic
SHAND	Solid Handling
SeeComment	To be used when a Lift Type is not listed. The new Lift Type is to be listed in the 'Comments' field.

Lining Material

Code	Description	Code	Description
ABS	Acrylonitrile Butadiene Styrene	GFBR	Glass Fibre
AS	Asbestos	GRER	Glass Reinforced Epoxy Resin
ALS	Aluminium Spray	GRP	Glass Reinforced Plastic
BITP	Bitumen Paint	GUNN	Gunnite
BRK	Brick	PE	Polyethylene
CML	Cement Mortar Lining	PLHS	Plastic Heat Shrink Sleeve
CADP	Cadmium Plated	PSTY	Polystyrene
CU	Copper	PVCP	PVC – Plastalon
CMSL	Cement Mortar Spun Lining	PVCS	PVC – Sintacote
CTEW	Coal Tar Enamel & Wrapped	SeeComment	To be used when a Lining Material is not listed. The new Lining Material is to be listed in the ' Comments ' field.
EEN	Epoxy Enamel	TILE	Tile
EN	Enamel	uPVC	Un-plasticised PVC
FRP	Fibre Reinforced Plastic	ZNP	Zinc Plate
GAL	Galvanised	ZNS	Zinc Spray

Mechanical Equipment Type

Code	Description
ACTU	Actuator
BLW	Blower
CMP	Compressor
GRB	Gearbox
SCRN	Screens
SeeComment	To be used when a Mechanical Equipment Type is not listed. The new Mechanical Equipment Type is to be listed in the ' Comments ' field.

Network

Code	Description
POTABLE	Potable Water
RAW	Raw
RECYCLED	Recycled
STRMW	Stormwater
WSTW	Wastewater
SeeComment	To be used when a Network is not listed. The new Network is to be listed in the ' Comments ' field.

Other Network Structure Types

Code	Description
SeeComment	To be used when a Source is not listed. The new Source is to be listed in the ' Comments ' field.
SLDGLAG	Sludge Lagoon
STLAG	Sewerage Treatment Lagoon
WWSDBASIN	Wet Weather Sewerage Detention Basin

Pipe Installation Method

Code	Description
ABG	Above Ground
BORE	Bored
SUS	Suspended
TR	Trench
TU	Tunnel

Pipe Material

Code	Description	Code	Description
AG	AG Drains	HDPE	High Density PE (PE100)
BRASS	Brass	mPVC	Modified Polyvinyl Chloride
BKBRT	Black Brute	NA	Not Applicable
CI	Grey Cast Iron	NYL	Nylon
CICL	Cast Iron Cement Lined	oPVC	Oriented PVC (EG: Blue Brute)
CLAY	Clay	PE	Polyethylene
CLIS	Cement Lined In-Situ	PVC	Polyvinylchloride
CLS	Concrete Lined Steel	RC0	Reinforced Concrete – No Class/Unknown
CLSC	Cement Lined Steel Coat	RC1	Reinforced Concrete – Class 1
CU	Copper	RC2	Reinforced Concrete – Class 2
CONC	Concrete	RC3	Reinforced Concrete – Class 3
CORR	Corrugated Steel/Aluminium	RC4	Reinforced Concrete – Class 4
DI	Ductile Iron	RCPL	Reinforced Concrete Plastic Lined
FBPE	Fusion Bonded PE	SeeComment	To be used when a Pipe Material is not listed. The new Pipe Material is to be listed in the ' Comments ' field.
FIBRE	Fibreglass	SSTEEL	Stainless Steel
FRC	Fibre Reinforced Cement	SSTEEL316	Stainless Steel (grade 316)
FRP	Fibre Reinforced Plastic	STEEL	Steel
FSP	Fibre Reinforced Pipe	uPVC	Un-plasticised PVC
GEW	Glazed Earthenware	uPVC-S	Un-plasticised PVC - Sewer grade
GSW	Glazed Stoneware	VC	Vitreous Clay (or Earthen Ware)

Pipe Pressure Class

Code	Description
PN4.5	0.45 MPa
PN6	0.6 MPa
PN8	0.8 MPa
PN9	0.9 MPa
PN10	1 MPa
PN12	1.2 MPa
PN12.5	1.25 MPa
PN15	1.5 MPa
PN16	1.6 MPa
PN18	1.8 MPa
PN20	2.0 MPa
SeeComment	To be used when a Pipe Pressure Class is not listed. The new Pipe Pressure Class is to be listed in the 'Comments' field.

Pipe Renewal / Lining Material

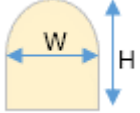
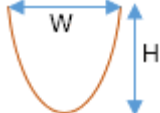

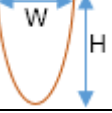
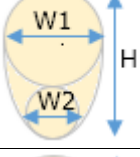
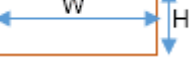
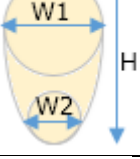



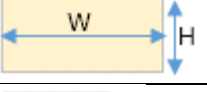
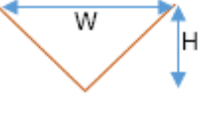
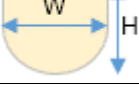
Code	Description	Code	Description
ABS	Acrylonitrile Butadiene Styrene	GRP	Glass Reinforced Plastic
ALS	Aluminium Spray	GUNN	Gunnite
AS	Asbestos	INC	Incoloy
BITP	Bitumen Paint	IZS	Inorganic Zinc Silicate
CMSL	Cement Mortar Spun Lining	NA	Not Applicable
CML	Cement Mortar Lining	PLHS	Plastic Heat Shrink Sleeve
CTEW	Coal Tar Enamel & Wrapped	PU	Polyurethane
EEN	Epoxy Enamel	PUA	Polyurea
FBE	Fusion Bonded Epoxy	PVCS	PVC – Sintakote
FIBRE	Fibreglass	SeeComment	To be used when a Pipe Renewal Material is not listed. The new Pipe Renewal Material is to be listed in the 'Comments' field.
FRC	Fibre Reinforced Cement	ZNP	Zinc Plate
GRER	Glass Reinforced Epoxy Resin	ZNS	Zinc Spray

Pipe Renewal Method

Code	Description
BURST	Pipe Burst
CURED	Cured in Place
NA	Not Applicable
SeeComment	To be used when a Pipe Renewal Method is not listed. The new Pipe Renewal Method is to be listed in the ' Comments ' field.
SLIP	Slip Lined

Pipe Shapes

H = "Height" field; W/W1 = "Dia_Width" field;
W2 = "Width2" field (Second diameter for non-circular pipes)

Pipes			Channels		
Code	Description	Comment	Code	Description	Comments
ARCH	Arch shaped pipe		PARB	Parabolic shaped channel (broad)	
CIRC	Circular pipe		PARN	Parabolic shaped channel (narrow)	
EGG	Egg shaped pipe (Touching Circle)		RCTC	Rectangular channel	
EGG2	Egg shaped pipe (not touching)		TRAP	Trapezoidal channel	
OVAL	Oval pipe		USCH	U-shaped channel	
RECT	Rectangular pipe		VSCH	V-Shaped Channel	
UTOP	U-shaped pipe				

Pipe Stiffness Class

Code	Description
SN10000	Landfill, Well pipes
SN2500	Relining, Buried
SN5000	Minor roads
SeeComment	To be used when a Pipe Stiffness Class is not listed. The new Pipe Stiffness Class is to be listed in the 'Comments' field.

Position

Code	Description
OVRHD	Overhead
ABG	Above Ground
PRTBRD	Partially Buried
UNDGRD	Underground

Property Connection Type

Code	Description
COMG	Commercial – Gravity
COMP	Commercial – Pressure
INDG	Industrial – Gravity
INDP	Industrial – Pressure
RESG	Residential – Gravity
RESP	Residential – Pressure

Protection Type

Code	Description
BITUMEN	Bitumen
CATH	Cathodic
DENT	Denso Taped
FBE	Fusion Bonded Epoxy
GAL	Galvanised
NA	Not Applicable
PAINT	Painted
PE	Polyethylene
SCEN	Sintakote Concrete Encased
SeeComment	To be used when a Protection Type is not listed. The new Protection Type is to be listed in the 'Comments' field.
SHETH	Sheathed
SINTK	Sintakote
UNC	Uncoated

Protective Material Type

Code	Description
BRASS	Brass
BRK	Brick
DICL	Ductile Iron Cement Lined
FBE	Fusion Bonded Epoxy
GUNN	Gunnite
GWICL	GWl Cement Lined
PLASTIC	Plastic
BRASS	Brass
BRK	Brick
DICL	Ductile Iron Cement Lined
FBE	Fusion Bonded Epoxy
SeeComment	To be used when a Protective Material Type is not listed. The new Protective Material Type is to be listed in the 'Comments' field.

Pump Purpose

Code	Description
BOOST	Booster
SeeComment	To be used when a Pump Purpose Type is not listed. The new Pump Purpose Type is to be listed in the 'Comments' field.
SUCTN	Suction

Pump Station Type

Code	Description
CNVNT	Conventional
ING	Inground
SUB	Submersible
SeeComment	To be used when a Pump Station Type is not listed. The new Pump Station Type is to be listed in the 'Comments' field.

Pump Use

Code	Description
NONSTDBY	Non-Standby
SeeComment	To be used when a Pump Use Type is not listed. The new Pump Use Type is to be listed in the 'Comments' field.
STDBY	Standby

Source

Code	Description
AS5488	Using the Sub Surface Utility Australian Standard AS5488-2013
ASCON	As Constructed Drawing
CHNOFF	Chainage and Offset
COMB_1	Combination Engineers, Contractors and Field Survey Work
COMB_2	Combination Engineers and Field Survey Work
COMB_3	Combination Contractors and Field Survey Work
COMB_4	Combination Landscape Company and Field Survey Work
CONTRACTOR	Contractor who built the asset
DESPLAN	Design Plan. DESPLAN is only to be used if the asset has not been constructed at time of Practical Completion
DESPLANC	Design Plans issued for Construction. DESPLANC is only to be used if the asset has not been constructed at time of Practical Completion
ENGINEER	Consulting Engineer who designed the asset and or supervised the construction work
FIELD	Field Survey
NA	Not Applicable
REFER	Refer to the individual tables
SeeComment	To be used when a Source is not listed. The new Source is to be listed in the 'Comments' field.

Spindle Type

Code	Description
NA	Not Applicable
NON-R	Non rising
RISING	Rising
SeeComment	To be used when a Spindle Type is not listed. The new Spindle Type is to be listed in the 'Comments' field.

Support Structure Material

Code	Description
CONC	Concrete
RC	Reinforced Concrete – No Class/Unknown
STEEL	Steel
TMBR	Timber
SeeComment	To be used when a Support Structure Material is not listed. The new Source is to be listed in the 'Comments' field.

Support Structure Type

Code	Description
ANCHOR	Anchor Block
ANCHORSTD	Anchor Block Non-Standard
ANTISCOUR	Anti Scour Block
NONSTD	Thrust Block Non-Standard
RECTANGLE	Thrust Block Rectangular
TRIANGLE	Thrust Block Triangular
SeeComment	To be used when a Support Structure Type is not listed. The new Support Structure Type is to be listed in the 'Comments' field.

Unit of Measure Reference

Code	Description
AREA	Area
CM	Cubic metre
HA	Hectare
KILO	Kilogram
LM	Linear metre
SCHEDULE	To be used when a schedule of rates is provided
SeeComment	To be used when a Unit of Measure is not listed. The new Unit of Measure is to be listed in the 'Comments' field.
SQM	Square Metre

Valve Type

Code	Description	Code	Description
AIR	Air	GATEK	Gate knife
B/F	Butterfly	SeeComment	To be used when a Valve Type is not listed. The new Valve Type is to be listed in the 'Comments' field.
CHK	Check	PLUG	Plug
CTRL	Control	SCOUR	Scour
GAS	Gas	SHUT	Shut off
GATE	Gate		

Valve Purpose

Code	Description	Code	Description
AIRIN	Air In	ISO	Isolation
AIROUT	Air Out	NONE	No Special Function
AIRINOUT	Air In & Out	NRV	Non-return/Backflow
BURSTC	Burst Control	PRESRG	Pressure Regulation
BYP	Bypass	PRM	Pressure Maintaining
CTRLFLOW	Control - Flow	PRV	Pressure Reducing
CTRLPRESS	Control - Pressure	SeeComment	To be used when a Valve Purpose is not listed. The new Valve Purpose is to be listed in the 'Comments' field.
CTRLFLPR	Control Flow & Press	SERV	Customer Service
EMRO	Emergency Only	VACSO	Vacuum Shut Off
EMWR	Emergency Waste Removal		

Voltage Type

Code	Description
1PHASE	Single Phase
3PHASE	Three Phase
LOWVOLT	Low Voltage
SeeComment	To be used when a Voltage Type is not listed. The new Voltage Type is to be listed in the 'Comments' field.

Wastewater Pipe Type

Code	Description	Comment
INTERCEPT	Interceptor	A gravity main that is used as a "collector" of a number of catchments generally larger than a trunk main
OUTFALL	Outfall	Pipes that convey treated water from treatment plant to a water body
OVERFLOW	Overflow	Mains that discharge sewage out of the network
PRESSURE	Pressure Reticulation Main	A pressure system that collects wastewater from properties with pressure discharge drains [AS 5488 – 2013 Component]
PRIVATE	Private	Non authority owned assets
RETIC	Reticulation Main	Mains generally less than 300 dia.
RISING	Rising Main	Pressure pipe used to pump [AS 5488 – 2013 Component]
SeeComment	To be used when a Wastewater Pipe Type is not listed. The new Wastewater Pipe Type is to be listed in the 'Comments' field.	
SIPHON	Siphon Main	A gravity main where a section of middle of the siphon is lower (or higher) than its outlet.
STUB	Stub pipe	Pipes shorter than 2.5 m. These pipes are left for future sewer connections and are capped at the end.
TRUNK	Trunk Main	Primary wastewater collection mains drains to the point of treatment generally 300 dia or greater
VACM	Vacuum Main	A system that uses the differential pressure between atmospheric pressure and a partial vacuum maintained in the piping network and vacuum station collection vessel [AS 5488 – 2013 Component]

4 S-Spec Document Control

Project Name	Sewer/Wastewater Module
Document Type	Specification
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Written by	M. Wood, D. Brooks and G. Havakis
Reviewed by	George Havakis
Authorised by	S-Spec Technical Working Groups

5 Document Revision History

Revision Number	Date	Comments
0.5	01/05/2012	Draft document – Distributed to technical working group
1	31/01/2013	Incorporated technical working group comments
1.0.1	14/11/2014	Removal of typographic errors
1.1.0	1/03/2017	Restructure of document to combine Graphical and Attribute requirements by asset class
1.1.0	1/03/2017	Document date changed to coincide with release date NZVD2016 now height datum for NZ
1.1.0	11 April 2017	Updated Bass Coast logo
2.0.0	10 September 2018	Changes adopted and finalised
2.0.1	15 November 2018	Incorporate feedback from members
2.0.5	31 May 2019	Incorporating Addendums and other feedback from members

6 Summary of Specification Changes