dspec
stormwater drainage specification

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

Aspec
digital data specifications

A-SPEC Members

Victoria	WA	NSW

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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 stake holders' (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 drainage 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.

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D-Spec Standard Specification

The **D-Spec** standard specification (Stormwater Drainage & Telecommunications – Optical Fibre standard) 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 development and capital works programs within their local jurisdiction.

The **D-Spec** standard specification was developed to streamline the processes undertaken to display all new stormwater drainage assets and telecommunication conduits within each **A-SPEC** member's geographic information system (GIS) and asset management information system (AMIS).

A common specification for the supply of digital drainage 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 Councils, Utilities and Water Authorities.

The **D-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 **D-Spec**.

The framework will consist of specifications for data content enabling data exchange. **D-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 **D-Spec** that also appear in **S-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"** digital data to be delivered along with the stormwater drainage 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 generalisation rules for the graphical representation of the features i.e. assets within drainage networks, 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.

D-Spec will lay the foundation for stormwater drainage 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 the works, as GIS Ready digital data of newly constructed drainage 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 **D-Spec** standard specification was developed and is being managed by GISSA International Pty Ltd.

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

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

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"**

ASSET MANAGEMENT SYSTEM (AMS)
– may also be referred to as **"Asset management Information System (AMIS)"**

GROSS POLLUTANT TRAP
– may also be referred to as "**Litter Trap"** or "**Hydrodynamic Separator"** or "**Sediment Trap"** or "**Oil and Grit Trap"** or "**Rubbish Trap"** or "**Proprietary Unit"** or "**Catchpit Filter"** or "**Oil and Water Separator"**. Use to remove gross pollutants, particulate bound contaminants, rubbish, grit, coarse sediment, oil and litter. Oil and water separator is only used to remove hydrocarbons.

INLET
– may also be referred to as **"Bay"** or **"Creek"**

PERMEABLE PAVEMENT
– May also be referred to as **"Porous Pavement"** or **"Treatment Trench"** or **"Rock Filter"**

PIPE
– may also be referred to as a **"Main"**

PIT
– may also be referred to as a**" Manhole"** or an **"Access Point"**

POND
– may also be referred to as **"Retarding Basin"** or **"Detention Basin"** or **"Depression Storage"**

PROPERTY CONNECTION
– 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)"**

RAIN GARDEN
– may also be referred to as **"Bio-Retention System"** or **"Storm Water Planter"**

ROOF GARDEN
– may also be referred to as **"Green Roof"** or **"Eco Roof"**

SWALE
– may also be referred to as **"Buffer Strip"** or **"Filter Strip"** or **"Treatment Wall"**

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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 drainage and/or telecommunication conduit assets in a GIS ready format to the Consortium of members using the **D-Spec** standard specification.

This document outlines the specifications for digital files containing: - stormwater drainage pipes, pits, property connections, water sensitive urban design elements underground telecommunications conduits and pits (for optical fibre) as well as the boundary showing the extent of the work. 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 your local point of contact with the organisation 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 **D-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.)

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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 may also be used as part of validating the data submission.

Label	Description	Example
COMPANY	Company name taking responsibility for the data	*GISSA International*
CONTACT	Contact name for this project	*George Havakis*
TELEPHONE	Telephone number	*(03) 9877 6972*
FACSIMILE	Facsimile number	*NA*
EMAIL	Email address (as applicable)	*george@gissa.com.au*
MAILING ADDRESS	Mailing address	*Suite 10, 476 Canterbury Rd, Forest Hill VIC 3131*
PHYSICAL ADDRESS	Physical business address	*'As Above'*
A-SPEC MEMBER	Participating Authority	*City of Gosnells* *~~Wyndham City Council~~*
DATE SUBMITTED	Date the digital data submitted to A-SPEC member	*31/1/2014*
DOCUMENT VERSION	Version of the document used	*D-Spec Digital Data Specifications – V9.0.5*
~~**SOFTWARE FORMAT & VERSION**~~	~~The software used to create the digital data~~	*~~QGIS~~*
PROJECT or SUBDIVISION	Project or Subdivision name	*Rockbank Rise*
STAGE	Subdivision Stage Name	*Stage 3B*
DESIGN COMPANY	Design Company Name	*Fred Charles & Associates*
PLAN NUMBER	As Constructed Plan Number	*6080R212*
CONSTRUCTION COMPANY	Construction Company Name	*Jamieson Construction*
CONSTRUCTION DATE	Date the asset was constructed/ built/ installed	*12/03/2017*
COORDINATES/DATUM	The coordinate system the data is in	*GDA94 Zone 50*
DATUM	Vertical Height Datum	*AHD71*
TRANSFORMATION	The coordinate system the data was transformed from	*Perth Coastal Grid to GDA94 Zone 50*
TRANSFORMATION BY	Who carried out the transformation from the original coordinate system to the relevant system	*City of Gosnells – Jack Dowling*
SOURCE OF DATA	The type of capture used	*Surveyed*
NOTES/COMMENTS	Important notes or information to be included here.	*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*

1.3 Theme/Layer Structure

The following information is provided as a guide to assist Consultants when putting together graphical information for members of the **A-SPEC** Consortium. The key principal is that each asset class must be delivered as a separate layer/theme and they 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 these levels/layers should only contain the listed features; any other features present will impede the automatic acceptance testing and may result in non-conformance with the requirements.

Feature	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 project	**Yes**
Pipe	Pipes	Line/Polyline	Specifies drainage linework	**Yes**
Pipe Miscellaneous text	Pipes_Txt	Text	Change of grade, Tangent points and chainages, horizontal /vertical curves, Pipe Offset and brackets	**No**
Pits	Pits	Polygon	Specifies pits/access points in network. Examples includes end of pipe symbols, pits	**Yes**
Head/End Walls	HEWalls	Polygon	Specifies head walls and end walls	**Yes**
Property Connection	Prop	Line/Polyline	Specifies property outlet to drainage network	**Yes**
Underground Conduits	Cond	Line/Polyline	Specifies underground optical fibre conduit linework in council owned infrastructure for telecommunications assets	**Yes**
Underground Conduit Pits	Cond_Pits	Polygon	Specifies pits/access points in council owned infrastructure for telecommunications assets	**Yes**
Bioretention Swale / Swale (linear), Buffer Strip (Filter Strip/Grass Filter) and Rain Garden (OSDS-Linear)	OSDS-Swale	Polygon	Specifies the area of the trench indicating the location of the swale	**Yes**
OSDS-Linear Centreline	OSDS-CLine	Line/Polyline	Specifies the centreline of swales	**Yes**
Sumps, Basins, Swales (area), Wetlands, Ponds (Retarding Basin) and Lakes (OSDS-Area)	OSDS-Area	Polygon	Specifies the area of the feature	**Yes**
Water Harvesting Devices ("WHD")	WHD	Polygon	Specifies the area of the feature	**Yes**
Collection pipes for swales	Pipes	Line/Polyline	Collection pipes for swales	**Yes**
Pits for Swales	Pits	Polygon	Specifies pits/access points in network. Examples of this includes inlet and outlet structures	**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**

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

There may be instances where other asset types are constructed as part of a drainage project such as a treatment plant.

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.

Kerbs and Channels	Please refer to **R-Spec** for requirements
Lighting	Please refer to **R-Spec** for requirements
Sewer Pipes and Pits and other infrastructure	Please refer to **S-Spec** for requirements
Trees	Please refer to **R-Spec** for requirements
Water Pipes and Pits and other infrastructure	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

Each of the following sections details the graphical data construction principles that must be followed for all linework, polygons and points to be provided. Where practicable, the alignment of all data, whether "As Constructed" or "As Built" measurements, must be related to the title/property boundaries abutting the road reserve.

It is requested to use sound computer-assisted design (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 identified in section 1.3 above the 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. Please refer to _Section 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.

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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 D-Spec, changes will be incorporated into D-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 the relevant section within each of the specifications if required to be provided as digital data.
Drawing showing the approximate location of the Utility/Asset	Layouts of required features are included under the relevant section within each of the specifications if required to be provided as digital data.
Drawing showing the possible location of the Utility/Asset	Layouts of required features are included under the relevant section within each of the specifications if required to be provided as digital data.
Horizontal Position relative to a structure	Layouts of required features are included under the relevant section within each of the specifications if required to be provided as digital data.
Vertical Position relative to a structure	Layouts of required features are included under the relevant section within each of the specifications if required to be provided as digital data.
Absolute Spatial Location/ Coordinates	Covered in every specification
Quality Level	This information can be provided in **'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

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

AS 5488		D-Spec		
Entity	**AS 5488 Term**	**Field name**	**Code or Descriptor**	**Notes**
Drainage	Drainage Junction Manhole	Type	JP	This is included as an attribute (**'Type'**) in **Pit** attribute table under section 2 and as a descriptor in the **Pit Types** CODELISTS under section 3. This pit type is referred to as a **'Junction Pit'**. Please refer to table **'2.3.2 – Pit Attribute & Validation File Format Instructions'** for the complete set of attributes required in **D-Spec**.
	Drainage Pit	Type	JP	There are specific pit types defined in **D-Spec**. Where there's a generic term has been used, a pre-defined default value/term would be applied. For Pit Types, **DEFAULT = 'Junction Pit'**. In this case, since 'Drainage Pit' is a generic descriptor, this pit type is referred to as a **'Junction Pit'**. This is included as an attribute (**'Type'**) in **Pit** attribute table under section 2 and as a descriptor in the **Pit Types** CODELISTS under section 3. Please refer to table **2.3.2 – Pit Attribute & Validation File Format Instructions** for the complete set of attributes required in **D-Spec**.
	Gully Pit	Type	GP	This pit type is referred to as **'Gully Pit/Grated Pit'**. This is included as an attribute (**'Type'**) in **Pit** attribute table under section 2 and as a descriptor in the **Pit Types** CODELISTS under section 3. Please refer to table **2.3.2 – Pit Attribute & Validation File Format Instructions** for the complete set of attributes required in **D-Spec**.
	Invert of Pipe	DS_IL US_IL IL	-	In **D-Spec**, Invert of pipe is included in two attribute tables; **Pipe** and **Property Connection**. In the Pipe table (table 2.2.2), this term is included as two attributes; **'Downstream Invert level (DS_IL)'** and **'Upstream Invert level (US_IL)'** In the Property Connection table (table 2.5.2), this term is included as **'Invert Level (IL)'.** Please refer to attribute tables **2.2.2 – Pipe Attribute & Validation File Format Instructions** and **2.5.2 – Property Connection Attribute & Validation File Format Instructions** for the complete set of attributes required in **D-Spec** relating to pipes.

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ROAD MAP TO COMPLY WITH D-Spec

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

Example:

Pipe Attribute & Validation File Format Instructions			
Column Name	**Details**	**Values**	**Notes**
Type	CODELIST entry	PIPE	Value derived from AS 5488 – 2013 requirement
Pipe_No	Text	1-2	To be populated to comply with **D-Spec**
Up_Pit_No	Text	1	To be populated to comply with **D-Spec**
Dn_Pit_No	Text	2	To be populated to comply with **D-Spec**
St_Name	Text	Geoffrey Street	To be populated to comply with **D-Spec**
Location	Text	NA	To be populated to comply with **D-Spec**
DS_IL	2 decimal places	12.45	To be populated to comply with **D-Spec**
DS_Pipe_E	3 decimal places	123456.12	To be populated to comply with **D-Spec**
DS_Pipe_N	3 decimal places	1234567.12	To be populated to comply with **D-Spec**
US_IL	2 decimal places	14.12	To be populated to comply with **D-Spec**
US_Pipe_E	3 decimal places	123456.12	To be populated to comply with **D-Spec**
US_Pipe_N	3 decimal places	1234567.12	To be populated to comply with **D-Spec**
~~Pipe_Con~~	~~Text~~	~~NA~~	~~To be populated to comply with D-Spec~~
Length	2 decimal places	15.25	To be populated to comply with **D-Spec**
Dia_Width	Whole mm	300	Value derived from AS 5488 – 2013 requirement
Height	Whole mm	-9999	To be populated to comply with **D-Spec**
Material	CODELIST entry	uPVC	Value derived from AS 5488 – 2013 requirement
Status	CODELIST entry	INUSE	Value derived from AS 5488 – 2013 requirement
PShape	CODELIST entry	CIRC	To be populated to comply with **D-Spec**
Width2	Whole mm	-9999	To be populated to comply with **D-Spec**
Rl_Rn_Mtd	CODELIST entry	NA	To be populated to comply with **D-Spec**
Rl_Rn_Mat	CODELIST entry	NA	To be populated to comply with **D-Spec**
Permit_No	Text	NA	To be populated to comply with **D-Spec**
Purpose	CODELIST entry	GRAVITY	To be populated to comply with **D-Spec**
Currency	Text	AUD	To be populated to comply with **D-Spec**
Unit_Cost	2 decimal points	**-9999.99**	To be populated to comply with **D-Spec**
Unit_Ref	Text	**SCHEDULE**	To be populated to comply with **D-Spec**
Source	CODELIST entry	Refer to Area of Works Extent	Value derived from AS 5488 – 2013 requirement
Comments	Text	Information from City of Gosnells Obtained on 14/08/2004. Located by Survey	Data fields populated as a combination of AS 5488 – 2013 requirements and **D-Spec** requirements

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Common Project Information

The following information is to be provided for all asset data and is to align with the **Error! Reference source not ound.** requirements within this document.

Area of Work Extent Attribute & Validation File Format Instructions			
Column Name	**Details**	**Values**	**Notes**
Permit_No	Text	N/A	To be populated to comply with **D-Spec**
Sub_Name	Text	Capital Works 2017/033	To be populated to comply with **D-Spec**
Stage_No	Text	N/A	To be populated to comply with **D-Spec**
Design_Co	Text	Icandoit Pty Ltd	To be populated to comply with **D-Spec**
Plan_No	Text	14A-Detail	To be populated to comply with **D-Spec**
Const_Co	Text	Dunit Pty Ltd	To be populated to comply with **D-Spec**
Const_Date	dd/mm/yyyy	12/07/2002	Value derived from AS 5488 – 2013 requirement
Origin	Text	N/A	To be populated to comply with **D-Spec**
Transfrm	Text	N/A	To be populated to comply with **D-Spec**
Transf_By	Text	N/A	To be populated to comply with **D-Spec**
Source	CODELIST entry	AS5488-D	To be populated to comply with **D-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 – D-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 is to be carried and is provided as a guide to assist Developer/Consultants when collating information for submissions.

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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 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 Vicmap property 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.

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3   D-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 tables 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.

Asset Status

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

Bank Foundation Material

Code	Description
CLAY	Clay
CLRK	Clay and Rock
CLSN	Clayey Sand
CR	Crushed Rock
EARTH	Earth
GRVL	Gravel
RCK	Rock
SNGR	Sandy Gravel
SAND	Sand
UNK	Unknown
SeeComment	To be used when a **Bank Foundation Material** is not listed. The **new Bank Foundation Material** is to be listed in the **'Comments'** field.

Construction Type

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

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Drain Liner Material

Code	Description
CLAY	Clay
CLRK	Clay and Rock
CLSN	Clayey Sand
PAM	Polyamide
POLY	Polyester
CR	Crushed Rock
LS	Limestone
PE	Polyethylene
PP	Polypropylene
PVC	Polyvinylchloride
RCK	Rock
SeeComment	To be used when a **Drain Liner Material** is not listed. The **new Drain Liner Material** is to be listed in the **'Comments'** field.

External Coating

Code	Description
FBE	Fusion bonded Epoxy
GAL	Galvanised
PE	Polyethylene
PNT	Paint
SeeComment	To be used when a **External Coating** is not listed. The **new External Coating** is to be listed in the **'Comments'** field.
SINTK	Sintakote
UNC	Uncoated

Filter / Drainage Material

Code	Description
CR	Crushed Rock
GRVL	Gravel
NA	Not Applicable
SNGR	Sandy Gravel
SAND	Sand
FINEGR	Fine Gravel (new code)
COARSESND	Coarse Sand (new code)
SANDYLM	Sandy Loam (new code)
SACL	Sandy Clay
SeeComment	To be used when a Filter Material is not listed. The new Filter Material is to be listed in the 'Comments' field.

Filling Method

Code	Description
NA	Not Applicable
NETWORK	Stormwater network by gravity
PUMPOS	Pumping from other source
RUNOFF	From Roof runoff
SeeComment	To be used when a **Filling Method** is not listed. The **new Filling Method** is to be listed in the 'Comments' field.

Geofabric/Transition Material

Code	Description
CR	Crushed Rock
GRVL	Gravel
SNGR	Sandy Gravel
SAND	Sand
FINEGR	Fine Gravel
COARSESND	Coarse Sand
SANDYLM	Sandy Loam
SACL	Sandy Clay
NA	Not Applicable
NIL	Nil Applied
PAM	Polyamide
PE	Polyethylene
POLY	Polyester
PP	Polypropylene
PVC	Polyvinylchloride
UNK	Unknown
SeeComment	To be used when a **Geo fabric Material** is not listed. The **new Geo fabric Material** is to be listed in the **'Comments'** field.

Head/End Wall Type

Code	Description
HEADWALL	Headwall
ENDWALL	Endwall

Inlet Protection Type

Code	Description
ASV	Automatic Shutoff Valve
NRV	Non-Return Valve
OPEN	Open flow – no restrictions
SeeComment	To be used when an **Inlet Protection Type** is not listed. The **new Inlet Protection** Type is to be listed in the 'Comments' field.

Structures – Material

Code	Description	Code	Description
CONC	Concrete (Not known if reinforced or if un-reinforced)	RC3	Reinforced Concrete – Class 3
CORR	Corrugated Steel/Aluminium	RC4	Reinforced Concrete – Class 4
PE	Polyethylene	RCPL	Reinforced Concrete Plastic Lined
PP	Polypropylene	SeeComment	To be used when a **Material** is not listed. The **new Material** is to be listed in the 'Comments' field.
PVC	Polyvinyl chloride	SSTEEL	Stainless Steel
RC	Reinforced Concrete – No Class	SSTEEL316	Stainless Steel (grade 316)
RC1	Reinforced Concrete – Class 1	STEEL	Steel
RC2	Reinforced Concrete – Class 2	STP	Stone Pitching

OSDS Feature

Code	Description
DETBAS	Detention Basin
RETBAS	Retention Basin
SEDBAS	Sediment Basin
SUMP	Sump
SWALE	Swale
WLAND	Wetland
LAKE	Lake
POND	Pond
SeeComment	To be used when a **OSDS Type** is not listed. The **new OSDS Type** is to be listed in the **'Comments'** field.

OSDS Purpose

Code	Description
BIOR	Bioretention
SeeComment	To be used when a **OSDS Purpose** is not listed. The **new OSDS Purpose** is to be listed in the **'Comments'** field.
VGTD	Vegetated

OSDS Type

Code	Description
BSTRIP	Buffer Strip
SeeComment	To be used when a **OSDS Type** is not listed. The **new OSDS Type** is to be listed in the **'Comments'** field.
SWALE	Swale

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Pipe Purpose

Code	Description
EXTRACTION	Pipe where the liquid is extracted by suction
GRAVITY	Pipe where the flow is driven by gravity
PRESSURE	Pipe where the flow is driven by pressure
SeeComment	To be used when a **Pipe Purpose** is not listed. The **new Pipe Purpose** is to be listed in the **'Comments'** field.
SIPHON	Pipe that conveys liquid upwards then downwards, typically this occurs by suction for the upward motion then gravity for the downward motion
VACUUM	A pipe system that uses pneumatic pressure to force the movement of liquid

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 / Lining Material** is not listed. The **new Pipe Renewal / Lining 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
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
NA	Not Applicable

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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)		**SeeComment**	To be used when a **Pipe Shape** is not listed. The **new Pipe Shape** is to be listed in the **'Comments'** field.	
OVAL	Oval pipe		**TRAP**	Trapezoidal channel	
RECT	Rectangular pipe		**USCH**	U-shaped channel	
UTOP	U-shaped pipe		**VSCH**	V-Shaped Channel	

Pipe Types

Code	Description	Comment
CHDRAIN	Channel Drain	
CLEAN	Clean water	A pipe that carries clean water – **Note**: A clean water pipe is a pipe designed for the removal of roof water separately to road runoff, and then is treated in a separate basin prior to discharge in to a lake or river
CULVERT	Minor Culvert	A drain or channel crossing under a road Culverts considered here have a total length less than 6m.
OPEN	Open	A flow channel not enclosed by a roof, arch or other structural lid – Open Drain
OUTFALL	Outfall	A point of discharge from drain to a water body
OVERFLOW	Overflow	A pipe or channel that carries excess water to or from a pit
PIPE	Pipe	A hollow cylinder or tube, solid or flexible, used to convey liquids
SUBSOIL	Subsoil	A slotted or perforated pipe laid below ground, and designed to remove excess water from the surrounding soil.

Pipe, Property Connection & Underground Conduit Material

Code	Description	Code	Description
AG	AG Drains	PE	Polyethylene (Used for UG Conduits)
BKBRT	Black Brute	PELS	PE Loose Sleeving
CORR	Corrugated Steel/Aluminium	PP	Polypropylene (Added for WA)
FBPE	Fusion Bonded PE	PVC	Polyvinyl chloride
FIBRE	Fibreglass	RC	Reinforced Concrete – No Class
FRC	Fibre Reinforced Cement	RC1	Reinforced Concrete – Class 1
FRP	Fibre Reinforced Plastic	RC2	Reinforced Concrete – Class 2
FSP	Fibre Reinforced Pipe	RC3	Reinforced Concrete – Class 3
GEW	Glazed Earthenware	RC4	Reinforced Concrete – Class 4
GRC	Glass Reinforced Concrete	RCPL	Reinforced Concrete Plastic Lined
GRP	Glass Reinforced Plastic	SeeComment	To be used when a Material is not listed. The new Material is to be listed in the 'Comments' field.
GSW	Glazed Stoneware	SSTEEL	Stainless Steel
GWI	Galvanised Wrought Iron (Also known as Galvanised Mild Steel)	SSTEEL316	Stainless Steel (grade 316)
GWICL	GWI Cement Lined	STEEL	Steel
HDPE	High Density PE (Also PE100)	uPVC	Un-plasticised PVC
LDPE	Low Density Polyethylene	uPVC-P	Profile –Wall Un-plasticised PVC (including Ultra-rib)
MDPE	Medium Density PE (PE80B)	uPVC-S	Un-plasticised PVC sewer profile
mPVC	Modified Polyvinyl Chloride	VC	Vitreous Clay (or Earthen Ware)
oPVC	Oriented PVC (EG: Blue Brute)		

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Pit Lid Type

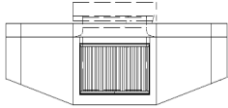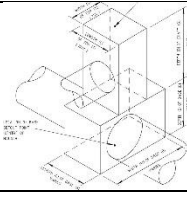| Code	Description
CA	Cast Iron
CONCI	Concrete insert
CONC	Concrete
FIBRE	Fibreglass
GA	Steel-Gatic
GRATE	Grate
NA	Not Applicable
SeeComment	To be used when a **Pit Lid Type** is not listed. The **new Pit Lid Type** is to be listed in the **'Comments'** field.

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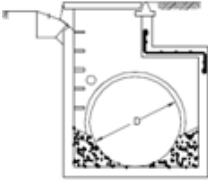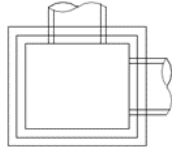
Code	Description	Code	Description
BRK	Brick	**IRON**	Iron
CCONC	Coloured Concrete	**PCONC**	Precast concrete
CONC	Concrete	**PSTYB**	Polystyrene blocks
CONCM	Concrete Masonry	**PVC**	Polyvinylchloride
CORR	Corrugated Steel/Aluminium	**RC**	Reinforced Concrete – No Class/Unknown
FCEM	Fibre Cement Sheets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

Pit Type
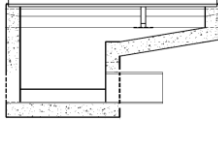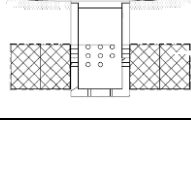
Code	Description	Comment
BUP	Bubble Up Pit (Raised Grated) (Added for WA)	
COD	Change of Vertical Direction	Please refer to TP
COG	Change of Grade	A symbol to be placed at a change of grade
CPIT	Catch Pit	
CSEP	Catch pit combined with Side Entry Pit	

Code	Description	Comment
DCP	Discharge Control Pit (with orifice plate) (Also known as Orifice Pit)	
DGP	Double Grated Pit	**Note:** 'Grate' is considered as a lid type. Pit types are identified by their function, not by the lid type.
DGUL	Double Gully Pit	
DGSEP	Double Grated Side Entry Pit	
DJP	Double Junction Pit	
DINP	Double Industrial Gully Pit	Added for WA. *<No diagram provided>*
DSEP	Double Side Entry Pit	
EP	End Pipe or Dead End or Blank End	EP's are not pits, but necessary codes to define pipe endings. *<No diagram provided>*
EXTRACTION	Extraction (Added for DoW)	
GF	Grated Footpath Pit	
GP	Grated Pit	*<No diagram provided>*
GGP	Grated Gully Pit	
GUL	Gully Pit	*<No diagram provided>*
GPT	Gross Pollutant Trap (Other types of GPTs : boulder trap, silt trap, trash rack, litter sock etc)	Gross Pollutant trap Trash Rack

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Code	Description	Comment
GSEP	Grated Side Entry Pit	
GSH	Grated House Connection Pit (Added for WA)	
GSOAK	Grated Soak Well	*<No diagram provided>* *Refer to SOAK for example of pit structure. Lid type for this code is grated*
GSP	Grated Swale Pit	*<No diagram provided>*
HDSEP	Haunched Double Side Entry Pit	
HGS	Haunched Grated Side Entry Pit	*<No diagram provided>*
HJP	Haunched Junction Pit	*<No diagram provided>*
HSEP	Haunched Side Entry Pit	
INL	Inlet from Basin (Compensating or drainage basin)	
INP	Industrial Gully Pit	Generally used in WA. *<No diagram provided>*
JUNC	Junction	Junctions are not pits, but necessary codes to define pipe endings. A junction is not to be mistakenly identified as a junction pit. A Junction is where two or more pipes intersect without a pit structure (whereas a junction pit is a pit where two or more pipes enter or leave a structure). *<No diagram provided>*
JP	Junction Pit	

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Code	Description	Comment
JPC	Junction Pit with Chamber	*<No diagram provided>*
JPD	Junction Pit with Drop	
JPEE	Junction Pit with Elevated Entry	
JSEP	Junction Pit combined with Side Entry Pit	(in this picture, junction pit has a grated lid)
JGP	Junction Pit combined with Grated Pit	
KSCP	Kerb-Side Catch Pit	
MRS	Maintenance Riser	
OUTB	Outfall to Bay/Sea/Ocean	
OUTC	Outfall to Basin	
OUTR	Outfall to River/Creek/Wetland	
PW	Pump Well	

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Code	Description	Comment
SeeComment	To be used when a **Pit Type** is not listed. The **new Pit Type** is to be listed in the **'Comments'** field.	
SEP	Side Entry Pit (Also known as 'Kerb Inlet)	
SEPET	Side Entry Pit with Extended Throat	
SEPG	Side Entry Gully Pit	**Note:** A gully pit sits directly on top of a pipe, therefore cannot have a side entry.
SWP	Swale Pit (Added for WA)	
SSOAK	Soak Pit combined with Side Entry Pit	
SOAK	Soak Well (Added for WA)	
SPIL	Spillway	
TGUL	Triple Gully Pit	*<No diagram provided>*
TGSEP	Triple Grated Side Entry Pit	*<No diagram provided>*
TP	Tangent Point or Change of Direction	To be placed for tangent points. *<No diagram provided>*
TRP	Trapped Gully Pit (Added for WA)	*<No diagram provided>*
TSE	Triple Side Entry Pit	
UNK	Unknown	If type is unknown use **Junction Pit** (**JP**) as the default

Code	Description	Comment
VP	V Throated Pit (Generally used during construction)	
WEIR	Weir	

Position

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

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.

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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

Water Harvesting Device Purpose

Code	Description
DETAIN	Detention of stormwater runoff
RETAIN	Retention of stormwater runoff for infiltration into the ground
SeeComment	To be used when a **Water Harvesting Device Purpose** is not listed**. The **new Water Harvesting Device Purpose** is to be listed in the **'Comments'** field.
STORAGE	Storage for use
TENUATE	Thinning out of stormwater flows
TREAT	Treatment of stormwater runoff

Water Harvesting Device Type

Code	Description	Comments
ICHAM	Infiltration Chamber/pit	Made out of Uniform Virgin Polymer Resin. Can define the type in comments field. EG: Stormtech chambers, Atlantic cells, underground cells etc) Stormtech Chamber Atlantis cell
SeeComment	To be used when a **Water Harvesting Device Type** is not listed**. The **new Water Harvesting Device Type** is to be listed in the **'Comments'** field.	
TANK	Tank	May be above, below ground or partially below ground.

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4   D-Spec Document Control

Project Name	Stormwater Drainage Module
Document Type	Specification
Document Number	DS-2019-0005
File Name	**D-Spec** DDS– Version 9.0.5 Final - Summary.docx
Version Date	31st May 2019
Written by	Samudrika Wilamuna & Duncan Brooks
Reviewed by	George Havakis and Duncan Brooks
Authorised by	**D-Spec** Technical Working Group

5   Document Revision History

Revision Number	Date	Comments
1	13 Dec 2002	Draft document
1.1	17 Dec 2002	Addition of drawings in Graphical Section
2	20 Mar 2003	Incorporate Changes
3	15 May 2003	Incorporate changes resulting from Workshop 1 May, 2003
4	31 Aug 2004	Incorporate changes resulting from Pilot Program
4.2	19 Nov 2004	Incorporate changes resulting from final review
4.2.1	6 Dec 2004	Update prospective members page
4.2.2	12 May 2005	Incorporate changes from Consortium Meeting March, 2005
5	19 October 2005	Incorporate changes resulting from final review
5.1	2 June 2006	Attribute names have been limited to a length of 10 characters
6	21 April 2008	Addition of Western Australian requirements and modification to Victorian requirements
6.5	23 Sept 2009	Draft Additions for MRWA
7	1 Feb 2010	WA Department of Water and completion of WSUD elements.
7.1	10 May 2010	Modification in wording to reflect use for Capital Works
7.2.1	10 June 2010	Addition of new council members
7.5	1 November 2013	Draft addition of New Zealand – WCC requirements
8.0	1 November 2014	Modifications and amendments
8.0.1	1 November 2014	Typos fixed
8.0.2	1 November 2014	Typos fixed
8.1.0	11 November 2016	Reformatted to group graphical and attribute capture requirements per asset type
8.1.0	1 February 2017	Document date changed to coincide with release date NZVD2016 now height datum for NZ
8.1.0	11 April 2017	Updated Bass Coast logo
8.2.0 - Draft V4	20 December 2017	Additions and modifications from WA working group requirements
8.2.0 - Draft v7	8 January 2018	Further modifications
9.0.0	10 September 2018	Changes adopted and finalised
9.0.1	15 November 2018	Incorporate feedback from members
9.0.5	31 May 2019	Incorporating Addendums and other feedback from members

6   Summary of Specification Changes

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