

AI-01-AS-BUILT AND GIS DATA FOR PIPELINES AND STRUCTURES

Ver.1.2 Date: March 2016

1. SCOPE

This standard outlines the data required when new pipelines, structures, and associated facilities are constructed or when alterations are made to existing facilities on Watercare's Transmission infrastructure. Records of changes to the signed-off design shall be updated through the course of the construction and supplied to Watercare for capturing in the engineering record management system (ProjectWise). At completion of the works the full detailed information shall be handed over to Watercare for record keeping purposes.

2. AS-BUILT CONSTRUCTION DRAWINGS

Interim as-built information shall be provided in the form of pdf files of all construction drawings, clearly marked up in red to show all changes.

Drawings shall show the whole of the works as completed, without any reference to equipment or structures that have already been removed. There shall be no reference to "new", "proposed" or similar words that refer to works that have already been carried out by the time the as-built works are being recorded.

The red line drawings shall be signed by the engineer responsible for the supervision of the works and made available before any commissioning work, temporary tie-ins or progressive liveing of infrastructure that will become operational for control by Watercare.

On completion of the works, final as-builts shall be supplied as original AutoCAD drawing files together with any required additional drawings and shall be amended or produced in accordance with the current Watercare CAD manual "Standards and Procedures for the Production and Registration of AutoCAD Drawings", document reference no. 7363.

Drawings are to be supplied without any copyright or other restraint on use or modifications of the drawings by Watercare.

For structures, the drawings shall show the:

- Position and dimensions, construction details, and equipment information;
- Coordinates and general information for all connected pipework and services;
- Floor levels and soffit levels;
- Ground levels and cover over underground services;
- Abandoned or decommissioned structures associated with the contract works; and
- Any other approved change from the original contract drawings.

For pipelines (including chambers and manholes), the drawings shall show:

- Pipeline plan and longitudinal section, including ground levels between significant changes in grade;
- Pipe sizes and wall thickness;
- Chamber and manhole position, dimensions, and lid coordinates;
- Position, size and level of all connections to manholes;
- Pipeline bend positions and angles;
- Thrust block dimensions;
- Valve and other fitting positions and functions, including pipeline electrical isolation points such as insulated flanges;

- Electrical cable and fitting positions and functions including cathodic protection, telemetry; and
- Any other approved change from contract drawings.

All drawings with any level or position information shall clearly show the coordinate system and level datum that has been utilised.

3. SURVEY AS-BUILT DIGITAL DATA FOR GIS

As-built information shall be confirmed as complete and accurate by a Registered Professional Surveyor or Chartered Professional Engineer.

Digital data of the following features shall be supplied for GIS records:

Pipeline

- Location of pipe centre line by coordinates (See Appendices A and D);
- Reduced level of top of pipe;
- Pipe invert levels inside chamber;
- Depth from ground level to top of pipe (to be included in the point code);
- Topographical features, fences kerbs etc. (at least one).

This data shall be supplied at the following locations:

- Changes in horizontal and vertical directions (by more than a normal pipe deflection);
- Pipe branches, cross-connections, Tee and Y junctions or any other intersection (including pipe intersections with chambers);
- Fittings (e.g. valves, meters, cathodic protection insulated flanges etc.).

Other features

- External extents of chambers: (See Appendices B and C)
 - for straight edged chambers, the external walls and corners,
 - for circular chambers, the centre and one point on the circumference;
- The centre of chamber access lids;
- Electrical cable and fitting positions including cathodic protection and telemetry
- Other services (e.g. power, gas, telephone) that cross over or run parallel to within 1m of a Watercare pipe or chamber and is exposed during construction; and
- External extents of any other structure above or below the ground that is deemed to be part of the contract construction.

3.1 GIS DATA FORMAT

GIS data shall be supplied in the following format.

- Digital data shall be supplied in dwg file format (line work data) and as a text file (survey points data);
- XY coordinates are to be to New Zealand Transverse Mercator (NZTM) Projection;
- Levels are to be to LINZ Auckland 1946 Datum;
- Minimum accuracy is to be to 0.05m in the X, Y, and Z direction, with pipe inverts to 0.01m in the Z direction;
- Point codes are to comply with Watercare standard codes shown in Clause 4;
- Any additional codes used must be documented.

Point Codes are to be structured in the following way:

e.g. **PI1C1.2** = shot taken on top of the pipe, the cover being 1.2m

e.g. **VA2C0.5** = shot taken at ground level, over an air valve and the cover being 0.5m

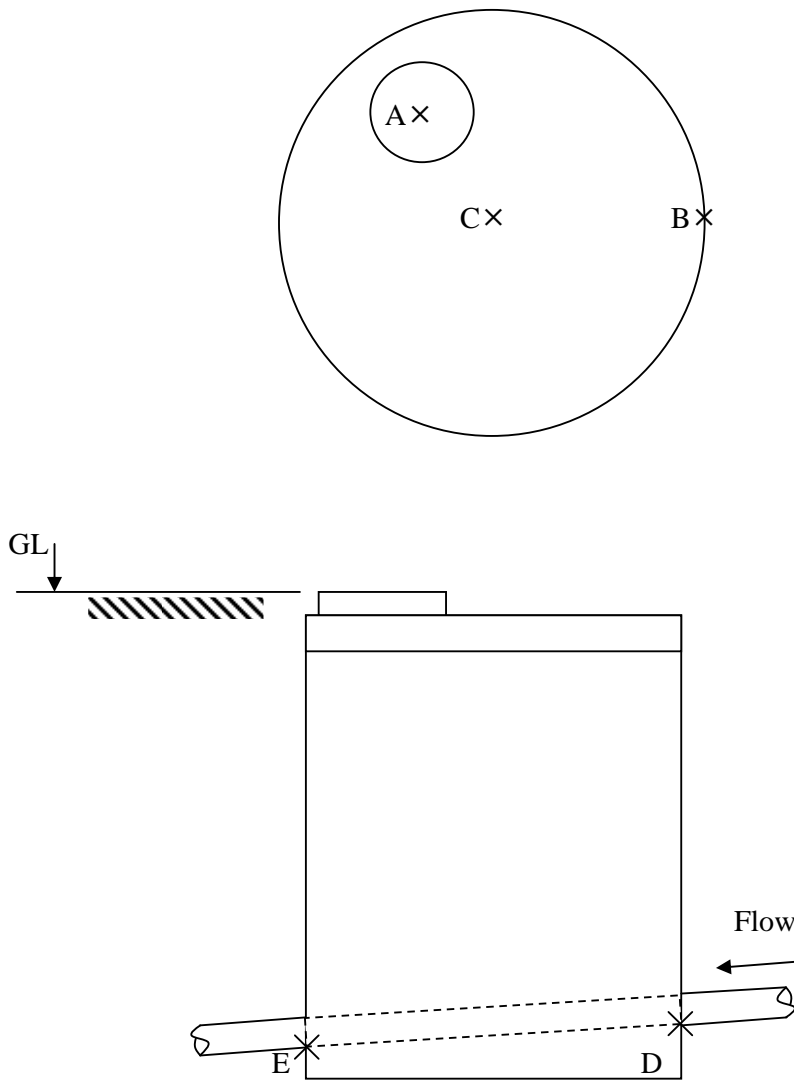
PI	Letters from the "Surveying Point Codes" list, or
VA	Letters from the "Surveying Point Codes" list
1	1 if shot is taken on the pipe or structure
2	2 if shot is taken at ground level over the pipe or structure
C	Cover
1	metre unit
.	decimal point
2	decimal unit

Refer to Appendix A for examples of code format

APPENDIX A: EXAMPLE OF SURVEY LIST FILE

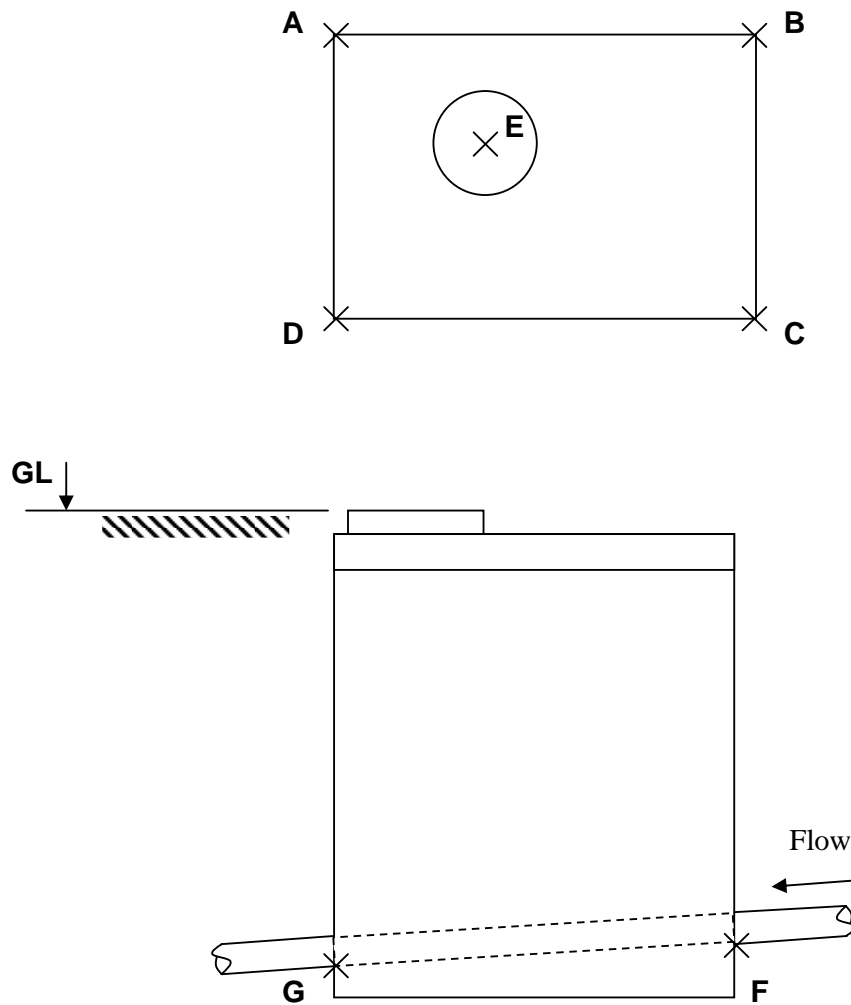
Project Name				
Date of survey				
Surveyor				
POINT	NZTM mE	NZTM mN	RED_LEV	SUR_CODE
1	1761073.59	5915981.66	62.106	BD1C1.00
2	1761074.25	5915985.55	75.721	YI1C1.10

APPENDIX B: AS BUILT DIGITAL DATA FOR CIRCULAR MANHOLES



Point	Northing	Easting	Reduced level	Code
A				LID
B				CHAP
C				CHAC
D				P4
E				P4
GL				GRO

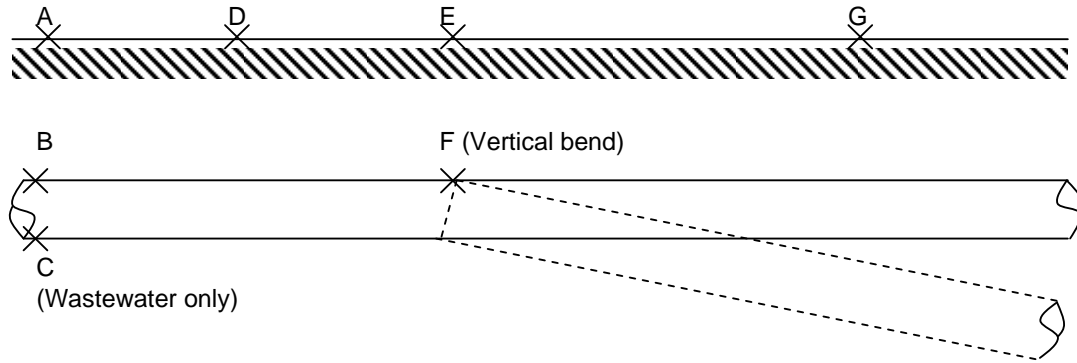
APPENDIX C: AS BUILT DIGITAL DATA FOR SQUARE MANHOLES



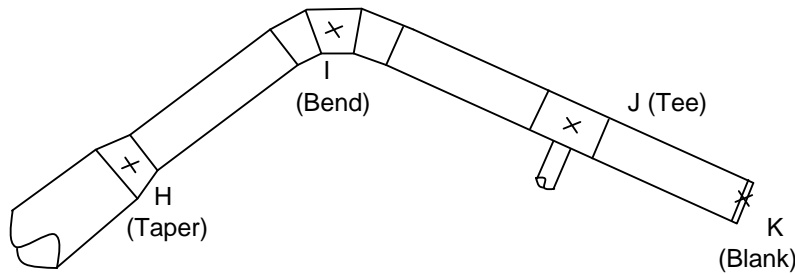
Point	Northing	Easting	Reduced level	Code
A				CHAP
B				CHAP
C				CHAP
D				CHAP
E				LID
F				P4
G				P4
GL				GRO

APPENDIX D: AS BUILT DIGITAL DATA FOR PIPE LENGTHS

Long section:



Plan:



Point	Northing	Easting	Reduced level	Code
A				PI3
B				PI1
C				PI4
D				PI2
E				PI3
F				PI1
G				PI2
H				TP
I				BD
J				TE
K				EC