



Government
of South Australia



CONSULTANT ACCREDITATION SCHEME

SEWER DESIGN
DRAWING CRITERIA
AND
CHECKLIST

Produced by SA Water Services
Infrastructure Group

10th March 2011

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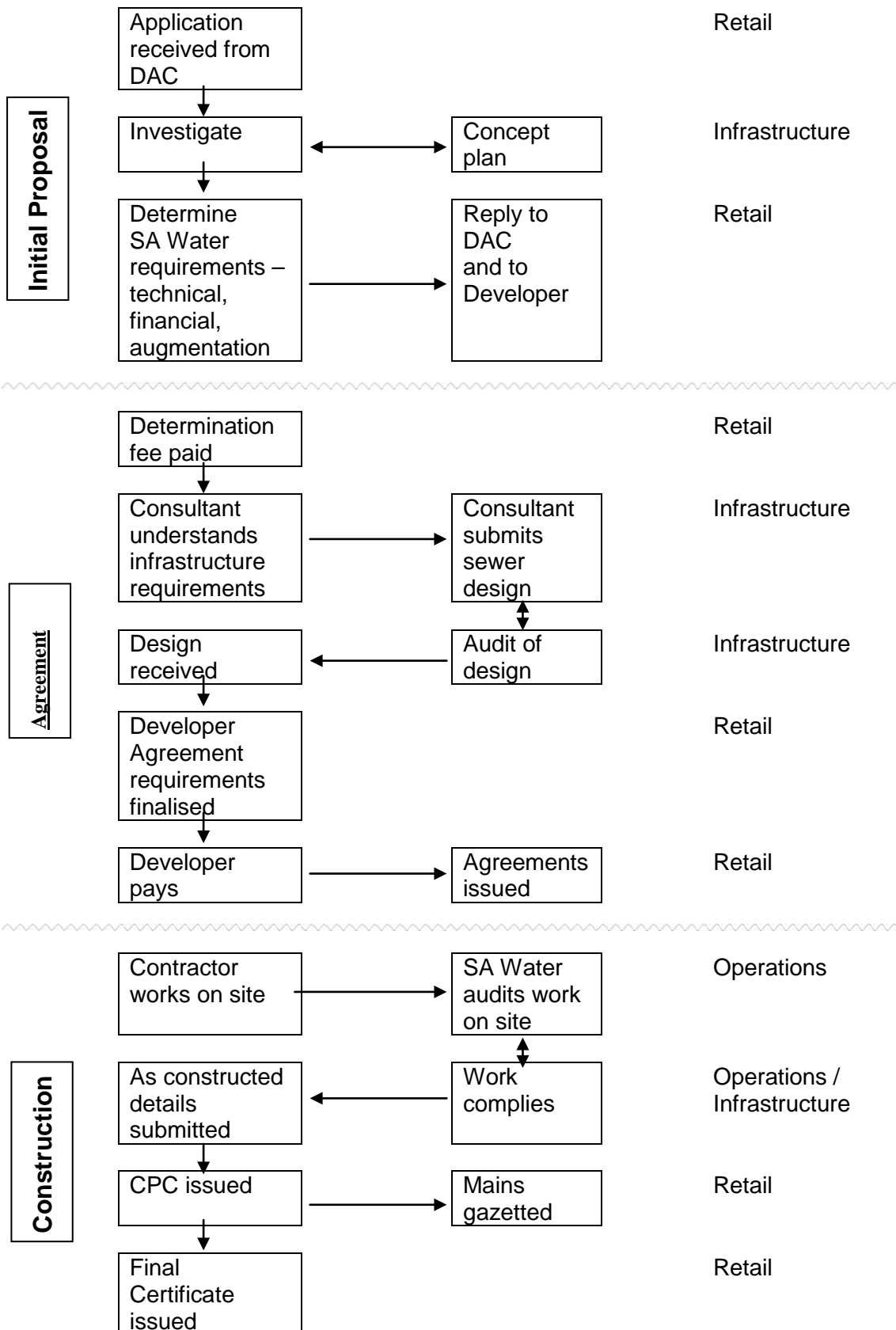
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MAJOR LAND DEVELOPMENT SEWER INFRASTRUCTURE FLOWCHART



GENERAL

1. When a land division proposal is lodged, SA Water's technical staff prepares a feasibility Concept Design to ensure that all allotments can be serviced whilst at the same time ensuring that SA Water's long term planning requirements are met.
2. A copy of this concept design is available to consultants. The design is conceptual only and is not the only way the land division can be serviced. Alternative designs are acceptable providing SA Water's long term planning requirements are catered for and the alternative does not include an increase in easements and/or additional sewer length.
3. A standard drawing template for consultants is available free from SA Water and will be e-mailed to consultants on request. Consultants will be advised when a change to the template or additional information is required on the drawings and a new template can be forwarded.
4. Appendix A is a copy of the Checklist, which will be used to ensure submitted designs meet the required criteria. It is recommended that Consultants also use the checklist to ensure everything has been covered prior to submitting the drawings for audit.
5. Appendix B to this document is a copy of a typical Design Drawing showing the required line thicknesses and other layout standards. These criteria must be followed because clarity of the drawing is essential to SA Water, as the drawing needs to be scanned and reproduced for future reference.

REQUIREMENTS

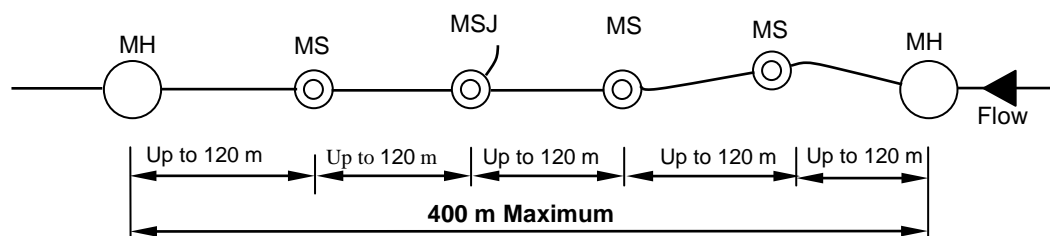
1. Clarity of drawings is essential. Consultant design drawings need to be scanned and reproduced – therefore the need to provide the line thicknesses detailed in Attachment B.
2. Drawing layout should be oriented so that the drawing text can be read looking from the bottom right of the drawing. Where possible the North Point should be upwards on the drawing sheet.
3. **Scales:**
Because of SA Water's digitising equipment set-up, only the following plan scales can be accepted:
Locality and layout Plans 1:500 and 1:1000.
Longitudinal Section 1:1000 horizontally and 1:100 vertically
An additional location plan (i.e. Scale 1:2500) may be necessary for large developments.
4. The Location Plan, Limit of Contract and Total Length of mains are to be included on sheet 1.
5. Drawings are to be submitted for initial auditing on A1 size sheets.

6. All design drawings submitted, including the initial submission, must be checked and signed by the responsible Consulting Engineer. Drawings will be returned immediately if they have not been signed by the Consulting Engineer.
7. When the consultant has been advised the drawings are satisfactory, the drawings are to be resubmitted for issue on both A1 and A3 size sheets.
 - 2 copies at A1 size and one copy at A3 size.
8. As a minimum, design drawings must be submitted on good quality (80 gsm) paper. Film copies of the design drawings are also acceptable. Do not fold or tightly roll the drawings when submitting for issue, as it can create problems during printing of additional copies. (Multiple copies of the drawings are required for contract documentation, and for issue to various contractors, inspectors and regional staff.)
9. If drawings are submitted on film the drawing is to be submitted on quality film of 100microns thickness as a minimum. Tracing paper is not acceptable.
10. The Consulting Engineer's Title block is to contain the company's current information e.g. phone number, fax number, printed name below signature etc. No company logos are permitted

“AS CONSTRUCTED” DRAWINGS

1. “As Constructed” drawings can be updated electronically.
2. It is no longer necessary to cross out the old text, distances, grades and levels; however this will still be accepted.
3. “As Constructed” drawings to be submitted on A1 sheets at the plan scales of 1:500 or 1:1000. See Appendix C for drawing requirement details.
4. Drawings can be submitted on good quality paper of 80 gsm minimum thickness or on film of 100 microns minimum thickness. Tracing paper is not acceptable.
5. “As Constructed” drawings are to be signed off by the responsible person, whether it is a licensed surveyor or chartered engineer.

CONFIGURATION AND SPACINGS FOR MS's AND MH's



Multiple MS's between consecutive MH's

For reticulation sewers the maximum distance between any two maintenance structures shall be 120 metres

VARIABLE BENDS

Horizontal

Short radius bends—635mm radius (1000mm available in the near future) up to 45 degrees can be used immediately upstream of straight through maintenance shafts and maintenance shaft junctions.

Long radius bends – 3000mm radius, up to 30 degrees total or combinations up to 30 degrees (i.e. 2 x 15degrees), are to be used for all variable bends located between maintenance structures. This is in addition to the 45 degree short radius bend mentioned above.

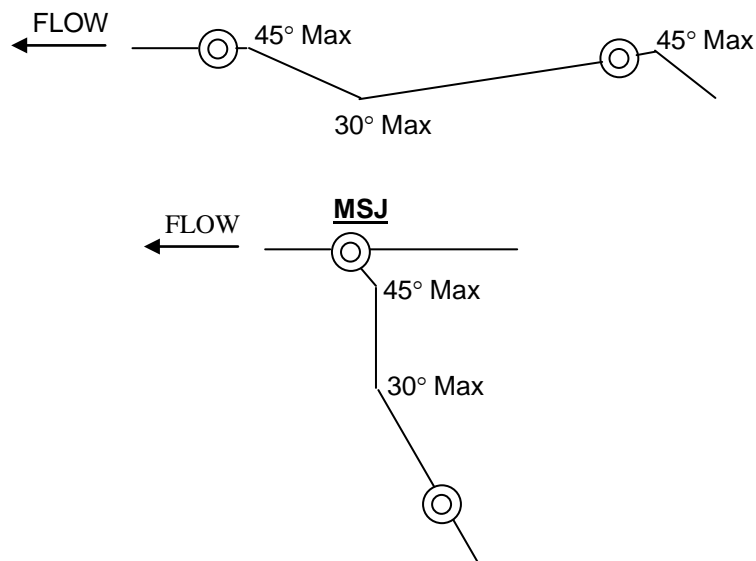
Vertical

Use long radius bends (R=3000) for vertical changes of grade.

At this stage unlimited vertical changes of grade are allowable between maintenance structures.

But anything out of the ordinary such as grading down steep slopes should be referred to SA Water before going too far into the design.

USE OF VARIABLE BENDS - Deflections between consecutive MS's



DEFINITIONS

AHD	- Australian Height Datum
Depth (in metres)	- Distance from the finished road level to the pipe invert level
Grade	- Grade of the pipe in % (must be positive for gravity sewers)
Longitudinal Section Plan (Sheet 01)	- Scales: - Horizontal – 1:1000 and Vertical - 1:100 - Scale: 1:500 OR 1:1000
Size	- Pipe size (nominal diameter in millimetres) and class
Invert EL	- Invert level of the sewer pipe at the corresponding distance
Centreline EL	- Finished ground level at the centreline of the road or easement at the corresponding distance and invert level.

Note: The Consultant Accreditation Process applies only to Wastewater designs greater than 100 metres in length

AUDIT CHECKLIST **FOR LAND DEVELOPMENT SEWERAGE DESIGNS**

THE SEWERAGE CODE OF AUSTRALIA SUPPLEMENTED BY THE SA WATER STANDARDS ARE TO BE ADHERED TO FOR ANY SEWERAGE DESIGN PROPOSAL.

Sewerage Design Drawings will ultimately be utilised as the permanent SA Water record of assets constructed. So clarity, neatness and accuracy are of utmost importance.

1. PRELIMINARY PROCEDURES.

All drawings to

- Conform to the current sheet layout.
- Clearly and neatly provide the appropriate design information.
- Contain correct drawing numbers.
- Contain correct docket numbers.
- Contain correct land development numbers.
- Contain correct contract numbers.
- Possess appropriate scales.
- Bear the signature of a Chartered Engineer

COVER SHEET
Does the cover sheet

- Contain benchmark details
- Contain a north point
- Provide a drawing of the Subdivision at a scale of 1: 1000 or 1: 500
- Provide Land Division/Stage Boundaries
- Provide road names, lot numbers, and ties to all structures (e.g. MHs, IOs, etc)
- Meet with the required drafting standards
- Show cross referencing to existing infrastructure and reference to any future sewer (size and grade) and ensure future sewers commence from the subdivision boundary
- Provide accurate and complete limits of contract
- Contain accurate and complete foot notes e.g. conformation with common service trench, or special connection
- Requirements, also a variable bend cutting table and fitting schedule where appropriate
- Show that all allotments in the subdivision/ stage are served by the design
- Show connections to be the correct size and type according to the SA Water and Australian Standards
- Show invert and surface levels at each allotment's connection point
- Show that sewerage appurtenances are in their correct allocation of space
- Show that there is no conflict between sewers and other existing or proposed services e.g. Water mains, stormwater etc
- Provide chainages to structures and cross references to line / sheet numbers
- Contain a completed "length set out " column
- Indicate all easement requirements and the correct sizes
- Contain appropriate amendment notices where an amendment has been made

LONGITUDINAL SECTIONS DRAWINGS
Do the longitudinal drawings provide the following:

- Have completed columns detailing
 - Connections
 - Distances along the sewer
 - Inverts along the sewer
 - Pipe size
 - Pipe grades
 - Pipe depth below ground
- Show cross references of critical data with the cover sheet (e.g. Variable bend information, maintenance shafts, maintenance holes, etc.)
- Include a length set out box containing accurate data related to the specific sizes of sewers being designed.
- Contain information on easements (internal and external as required) for the development including Docket References and special conditions
- Show the following-
 - Existing ground levels
 - Final ground surface levels
 - Proposed sewers
 - Proposed structures (e.g. MH's, IO's, MS's, etc)
 - Existing and proposed SWD's and connection depth indicators shown along the profile of the sewer.
 - Future sewers proposed indicating size, grade, and ground profile (if known)
 - Water seal requirements for connections to sewers 450 mm in diameter or larger
 - SWD crossings with pipe sizes and inverts included, and with any appropriate notes
 - Any large "Jump Ups" in the design. (are they designed as internal or external "Jump Ups")
 - All appropriate notes required e.g. Soil compaction notes, concrete encasement details, tankering MH, notes, etc.

- Availability of sewer for serving adjacent areas
- Appropriate amendment notices where a sheet is being amended

For pumping mains

- Are details of high points provided
- Are details of low points provided
- Are deflection details along the pipeline provided - including deflection at pipe joints
- Are pipe size and material details provided
- Has the pressure rating for the pipe system been specified