

94-0163-03

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DB 94-0163 Plot 05aa

6. PUMPING MAIN GRADING AND DESIGN CONSIDERATIONS

6.1 GRADING

Individually grade each pumping main in accordance with the following criteria:-

- . From the sump into and through the valve chamber and within the station site itself, the pumping main shall be graded 'level' (allowing due consideration for construction tolerances).
- . Thereafter, and wherever possible, grade each pumping main so that it is continuously rising, discharging at the highest point in the pumping main.
- . High points along the pumping main (changes from rising to falling gradients) are not permitted without the specific approval of the Superintendent's Representative.

High points are to be avoided by grading out wherever possible, avoiding the need for air-relief valves at these high points.

- . Where high points can not be avoided and no other viable alternative exists, the Superintendent's Representative may direct that air-relief valves and chambers be installed at the high points. In some cases, the Superintendent's Representative may specify the type and configuration of the air-relief valve assembly needed.

Otherwise, a standard DN80 air-relief valve assembly shall be used, and the standard note (Ref 'Air-Relief Valves' detailed below) shall be prominently shown on the Design Drawings.

- . Mains can be installed deeper than the minimum 750 final cover (where approved by the Superintendent's Representative) as a means of eliminating high points.

6.2 COVER AND MECHANICAL PROTECTION

- . During sewerage construction, earthworks, or road construction etc, the minimum cover to ensure mechanical protection of the pumping main shall be no less than 600. The design minimum cover (and final cover) to the pumping main shall be no less than 750.
- . Where the minimum depth of cover can not be achieved (beneath creeks or at crossings with other services etc), the pumping main may be protected by an unreinforced concrete surround of 150 minimum thickness, or preferably a 100 thick reinforced concrete slab over the main extending laterally at least 600 clear of the main on both sides, or as directed by the Manager Water and Wastewater Systems.

NOTE: The pumping main at the valve chamber may be considerably deeper than 750, to accommodate the minimum cover beneath the kerb and water table at the street boundary, and/or accommodate local depressions in the soil profile.

6.3 BEDDING

Bedding material for pumping mains shall be in accordance with SCM Section G.

6.4 ALIGNMENT AND GRADIENT CHANGES

For rubber-ring jointed pipelines, all alignment and/or gradient changes shall be made by:-

- . Using standard commercially available rubber ring jointed bends (long radius where available).
- . Minor rotation at the rubber ring joints in accordance with the manufacturer's specification; (greater rotation causes spigot to faucet binding and joint failure).
- . Using horizontal and vertical curves (for flexible pipelines only up to and including 150 diameter), by manually (not mechanically) cold bending the pipe barrel to a uniform radius of not less than 200 x OD of pipe, providing the ambient temperature exceeds 5 degrees C.

Restrain the socket, spigot and pipe barrel during the pipe bending operation to prevent any transmission of bending forces to the rubber ring joints.
- . Combination of the above.

6.5 BEND LOCATIONS AND JOINT DEFLECTIONS

The pumping main design drawings shall show all bend locations, and/or joint deflections where used, at their respective distances, and shall also quote the actual value of the bend/s (eg 45 degrees) and/or joint deflection (eg 1 degree).

6.6 CONNECTION INTO DISCHARGE STRUCTURE

Connect the pumping main to the discharge Access Chamber (obvert to obvert) in accordance with SCM Section H.

6.7 THRUST BLOCKS for pumping mains having rubber ring joints.

- . Install concrete thrust blocks (32 Mpa) at all bends (horizontal and vertical) and at all junctions, in-line stop valves (and dead-ends where applicable), to resist the hydraulic forces developed within the pumping main.
- . Thrust blocks shall be poured against sound undisturbed faces of excavations and the concrete shall be kept clear of the pipe joints.
Reference drawings:- (for Anchor and Thrust Block Design)

WCM Page B7 Drg 94-0032-01	WCM Page B12 Drg 94-0046-01
WCM Page B13 Drg 94-0047-01	WCM Page B14 Drg 94-0048-01
WCM Page B15 Drg 94-0049-01	WCM Page B16 Drg 94-0050-01
WCM Page B17 Drg 94-0035-01	WCM Page B18 Drg 94-0051-01
WCM Page B19 Drg 94-0054-01	

6.8 ISOLATING VALVES

Isolating valves shall be installed on pumping mains at regular intervals not exceeding 1600 metres. Air-relief valves (detailed below) shall be installed on the pipeline immediately adjacent to and on both sides of each isolating valve.

Chg		Amendment -	Des	JIS		SOUTH AUSTRALIAN WATER CORPORATION 	SEWER CONSTRUCTION MANUAL PAGE M3 STANDARD SUBMERSIBLE SEWAGE PUMPING STATION - STANDARD NOTES	(2 of 3)	94-0163-03
Drn			Drn	CLS					
Ckd			Exm						
Unit Ldr.			Unit Ldr.						
R.M.Jones Executive Manager 14 / 6 / 96 ENGINEERING GROUP									
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