

	ZONE		MATERIAL	COMPACTION
Ş	SURFACE		REINSTATE WITH GOOD QUALITY TOPSOIL AND SEEDED, TURFED, ETC. TO MATCH EXISTING. MINIMUM 150 mm THICK	LIGHTLY COMPACTED TO MATCH EXISTING
TF	TRENCH FILL		MATERIAL OBTAINED FROM THE EXCAVATION OR IMPORTED MATERIAL. CONTAINING <u>NOT MORE THAN 20% ROCK.</u> ROCK SIZE MAY BE > 75 mm AND < 150 mm. NOTHING LARGER THAN 150 mm.	95% SMDD Refer note 4
IT FILL	OVERLAY		10 mm OR 14 mm SINGLE SIZE AGGREGATE, COMPLIANT WITH AS/NZ 2566.2	REFER 4005–20003–04,
PIPE EMBEDMENT FILL	SIDE SUPPORT	(TABLE G2. FOR SEWER PUMPING MAINS REFER NOTE 8.	NOTE 6.
	BEDDING	$ \langle$		PLACE & RAKE

NON-TRAFFICABLE AREAS EASEMENTS, ETC.

NOTES:

- REFER 4005-20002-01 TO 4005-20002-03 FOR GENERAL NOTES
- THE MINIMUM TRENCH WIDTH AT THE TOP OF THE PIPE BETWEEN THE FACES OF THE TRENCH OR SHORING, SHALL BE:
 - THE MINIMUM REQUIRED TO SAFELY LAY THE PIPE, AND,
- NO LESS THAN 600 mm.
- ALL MATERIALS SHALL BE PLACED IN MAXIMUM 200 mm (LOOSE) LAYERS. EACH LAYER SHALL BE COMPACTED SEPARATELY.
- IF MORE THAN 85% OF THE TRENCH FILL IS FINER THAN 2 mm, OR MORE THAN 15% OF THE TRENCH FILL IS FINER THAN 0.075 mm, GEOTEXTILE FABRIC SHALL BE POSITIONED AS A BARRIER TO SEPARATE THE MATERIALS.
 - WHERE SAND IS USED, IF THE SAND DOES NOT DISPLAY A DEFINED MOISTURE-DENSITY CURVE, (REFER AS1289.5.5.1, NOTE 1) THEN THE DENSITY INDEX (ID) METHOD (AS 1289.5.6.1) SHALL BE USED FOR COMPACTION CONTROL.
 - AN ID OF 75% SHALL BE TAKEN AS EQUIVALENT TO 95% SMDD AND
 - AN ID OF 90% SHALL BE TAKEN AS EQUIVALENT TO 100% SMDD.
- 6. SOIL COMPACTION CLASSIFICATIONS (AS 1289.5.2.1):
 - MMDD = MODIFIED MAXIMUM DRY DENSITY;
- SMDD = STANDARD MAXIMUM DRY DENSIFY WHERE THE REQUIRED COVER CANNOT BE ACHIEVED A PROTECTIVE CONCRETE COVER SLAB SHALL BE DESIGNED BY THE CONSULTANT.
 - APPROVAL SHALL BE SOUGHT FOR THE USE OF A PROTECTIVE SLAB.

- FOR SEWER PUMPING MAIN EMBEDMENT AND TRENCH FILL REQUIREMENTS REFER WSCM SECTION 3.
- PREVIOUS 4005-20003-02 RENUMBERED TO 4005-20003-04.
- ALL DIMENSIONS IN MILLIMETRES.

REVISION PANEL					DESIGN PANEL				
REV	DATE	DRN	DETAILS	APR	CURRENT REV	DESIGNED:	03/08/15	AUTHORISED:	31/03/16
					AUTHORISED:	RJP		RJP T.GALEK	
						DRAWN:	25/09/15	SIGNATURE:	
					SIGNATURE:	MS			
2	03/04/17	RP	INFORMATION RELOCATED FROM 4005-20003-01		T. Calele	REVIEWED:	21/03/16	ORIGINAL S	SIGNED
1	31/03/16	MS	2016 STANDARDS REVIEW	TG	1	TG			

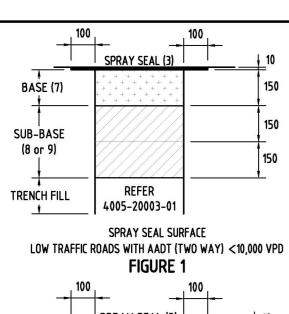


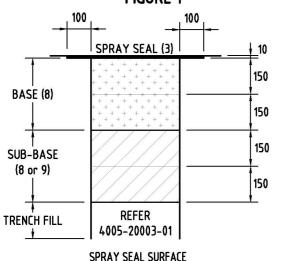
This drawing is the property of the SOUTH AUSTRALIAN WATER CORPORATION and shall not be copied or modified in part or in whole without authorization SA WATER STANDARD DRAWINGS **SEWER CONSTRUCTION MANUAL** PIPE EMBEDMENT & TRENCH FILL REQUIREMENTS NON TRAFFICABLE AREAS

A3 SHT SIZE	2 REVISION
TOTAL SHEETS:	
SUPERSEDES: 02-0296-01 (G1)	
DRAWING NUMBER	
4005-20003	-02

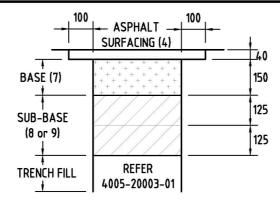
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SHEET

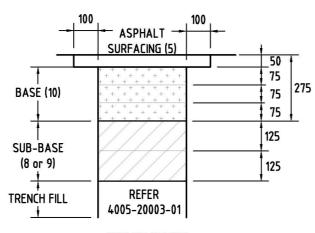




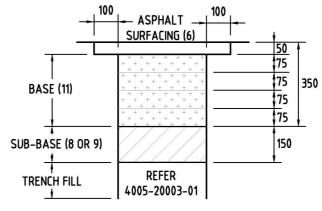
SPRAY SEAL SURFACE
HEAVY TRAFFIC ROADS WITH AADT
(TWO WAY) > 10,000 VPD
FIGURE 2



ASPHALT SURFACE
LOW TRAFFIC ROADS WITH AADT (TWO WAY) <2,000 VPD
FIGURE 3



ASPHALT SURFACE
HEAVY TRAFFIC ROADS WITH AADT
(TWO WAY)>2,000 VPD BUT <20,000 VPD
FIGURE 4



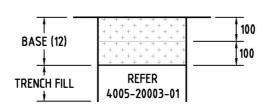
ASPHALT SURFACE
VERY HEAVY (COMMERCIAL) TRAFFIC ROADS
WITH AADT (TWO WAY) > 20,000 VPD
FIGURE 5



OR REINSTATE BRICK PAVING ,BITUMEN FOOTPATH, ETC TO MATCH EXISTING

VERGES
ALL TRAFFIC DENSITIES

FIGURE 7



UNSEALED ROAD PAVEMENTS AND SHOULDERS

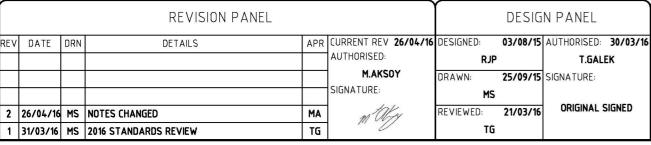
FIGURE 6

NOTES:

- THIS DRAWING IS TO BE USED FOR ALL PIPE INSTALLATIONS AND REPAIRS WITHIN EXISTING COUNCIL AND DPTI ROAD RESERVES. FOR INSTALLATION
 IN NEW SUBDIVISIONS PRIOR TO ROAD CONSTRUCTION THE ROAD PAVEMENT WILL BE SPECIFIED BY THE DESIGNER.
- 2. THE EXISTING ASPHALTIC CONCRETE PAVEMENT SHALL BE SAW CUT AND REMOVED FOR ITS FULL DEPTH AND NOT LESS THAN 100 mm WIDER EACH SIDE THAN THE EXCAVATED TRENCH WIDTH. ALL SURFACES SHALL BE CLEANED OFF AND EMULSION PRIMED PRIOR TO REINSTATEMENT. ALL ASPHALTIC CONCRETE SHALL BE OBTAINED FROM A DPTI AUTHORISED SUPPLIER.
- 3. SPRAY SEAL SPRAYED BITUMINOUS SURFACE SEAL TO MATCH THE EXISTING AND TO BE PLACED ON PRIMER SEAL AS PER CLAUSE 4.4 OF "CRC".

 THE SPRAY SEAL SHALL EXTEND 100 mm EITHER SIDE OF THE EXCAVATED TRENCH AND THE OUTER EDGE SHALL BE SAW CUT.
- ASPHALT SURFACING AC10 ASPHALTIC CONCRETE WEARING COURSE (LIGHT DUTY MIX) ON TACK COAT (EG CRS60) APPLIED AT 1.0 I/m².
- 5. ASPHALT SURFACING AC10 ASPHALTIC CONCRETE WEARING COURSE (MEDIUM DUTY MIX) ON TACK COAT (EG CRS60) APPLIED AT 0.2 TO 0.3 I/m².
- ASPHALT SURFACING AC10 ASPHALTIC CONCRETE WEARING COURSE (MEDIUM DUTY MIX WITH A35P BITUMEN) ON TACK COAT (EG CRS60) APPLIED AT 0.2 TO 0.3 I/m².
- 7. PM1/20 = 20 mm CLASS 1 QUARRIED PAVEMENT MATERIAL (PM1/20QG).
- 8. PM1/20 = 20 mm CLASS 1 QUARRIED PAVEMENT MATERIAL (PM1/20QG), OR 20 mm CLASS 1 RECYCLED PAVEMENT MATERIAL (PM1/20 RG). PLACED IN 2 EQUAL LAYERS TO 98% MODIFIED COMPACTION.

- 9. PM2/20 = 20 mm CLASS 2 QUARRIED PAVEMENT MATERIAL (PM2/20 QG) OR 20 mm CLASS 2 RECYCLED PAVEMENT MATERIAL (PM2/20 RG). PLACED IN 2 EQUAL LAYERS TO 98% MODIFIED COMPACTION.
- 10. AC14M PLACED IN 3 EQUAL LAYERS ON EMULSION PRIME (EG CRS60) APPLIED AT 1.0 I/m2.
- 11. AC14M PLACED IN 4 EQUAL LAYERS ON EMULSION PRIME (EG CRS60) APPLIED AT 1.0 L/m².
- 12. PM2/20 = 20 mm CLASS 2 QUARRIED PAVEMENT MATERIAL (PM2/20 QG) OR 20 mm CLASS 2 RECYCLED PAVEMENT MATERIAL (PM2/20 RG). PLACED IN 2 EQUAL LAYERS TO 95% MODIFIED COMPACTION.
- 13. OG14 WEARING COURSE (MEDIUM DENSITY MIX) ON 10 mm C170 SPRAY AT 1.8 L/m² WHERE AN EXISTING OPEN GRADE SURFACING LAYER IS TO BE REPLACED, THE LAYER THICKNESS SHALL MATCH EXISTING AT BOTH TOP OF EXISTING SURFACE AND SPRAY SEAL WITH BOTTOM SAMI.
- 14. FOR ASPHALT LAYERS, A TACK COAT SHALL BE EVENLY APPLIED TO THE BASE AND SIDES OF THE EXCAVATION. A TACK COAT IS NOT REQUIRED BETWEEN INDIVIDUAL ASPHALT LAYERS IF A HOT BOND IS ACHIEVED.
- 15. WHERE THERE IS AN EXISTING OPEN GRADE SURFACING LAYER GREATER THAN 5 YEARS OLD OR IT IS NO LONGER DRAINING, A DENSE MIX SHALL BE USED IN LIEU OF OPEN GRADED.
- ABBREVIATIONS: AADT = AVERAGE ANNUAL DAILY TRAFFIC; VPD = VEHICLES PER DAY; MMDD = MODIFIED MAXIMUM DRY DENSITY (AS 1289.5.2.1).





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SA WATER STANDARD DRAWINGS
SEWER CONSTRUCTION MANUAL
REINSTATEMENT OF ROAD PAVEMENTS,
HARD SHOULDERS AND VERGES IN ROAD
RESERVES

	A3	2
	SHT SIZE	REVISION
	TOTAL SHEETS:	
	SUPERSEDES: 02-0157-01 (G3)	
)	DRAWING NUMBER	
	4005-20003	-03
	PREFIX NUMBER	SHEET

GEOTECHNICAL INVESTIGATION

- WHERE THE SOIL CLASSIFICATION IS SAND OR SOFT CLAY OR WHERE GROUNDWATER IS PRESENT A GEOTECHNICAL INVESTIGATION SHALL BE PERFORMED PRIOR TO COMMENCEMENT OF CONSTRUCTION TO DETERMINE THE GROUND CONDITIONS ALONG THE PROPOSED ROUTE OF THE SEWER.
- ANY GROUNDWATER SHALL BE CONTROLLED BEFORE AND/OR DURING EXCAVATION AND PIPE LAYING.
- THE GEOTECHNICAL INVESTIGATION SHALL EXTEND TO MIN 1 m BELOW PROPOSED TRENCH FLOOR LEVEL
- TEST PITS ARE USUALLY SIMPLER AND MAY PROVIDE BETTER INFORMATION THAN TRIAL HOLES. IN SOME AREAS A VISUAL INSPECTION BY AN EXPERIENCED PERSON MIGHT SUFFICE.
- AGGREGATE SHALL NOT BE PLACED DIRECTLY ON OR AGAINST THE SAND OR SOFT CLAY. THE AGGREGATE SHALL BE SEPARATED FROM THE SOIL BY A BARRIER OF GEOTEXTILE.

2. GROUNDWATER CONTROL:

- ALL GROUNDWATER INFLOW SHALL BE CONTROLLED PRIOR TO PLACING ANY BEDDING MATERIAL.
- WHERE WATER IS ENTERING THE TRENCH SLOWLY, A GEOTEXTILE-WRAPPED GRAVEL DRAIN ON THE TRENCH FLOOR MAY BE SUFFICIENT. IF SO, OVER-EXCAVATE THE TRENCH FLOOR BY 100 mm, PLACE GEOTEXTILE ON THE FLOOR AND UP THE SIDES, FILL TO A DEPTH OF 100 mm WITH AGGREGATE, WRAP THE GEOTEXTILE OVER THE AGGREGATE, AND DRAIN TOWARDS A PUMP SUMP IN THE TRENCH. DRAINAGE TO THE SUMP MAY BE ASSISTED BY INCLUDING AN AGRICULTURAL DRAINAGE PIPE IN THE AGGREGATE (REFER FIGURE 2).
- WHERE THE STABILITY OF A TRENCH IS LIKELY TO BE COMPROMISED, OR WHERE THE INFLOW CANNOT BE CONTROLLED, WELLPOINT DEWATERING MAY BE REQUIRED. THE WELLPOINT SYSTEM SHALL LOWER THE GROUNDWATER TO BELOW THE FLOOR OF THE TRENCH.
- DEWATERING SYSTEM(S) SHALL OPERATE UNTIL SUCH TIME AS THERE IS NO DANGER OF FLOTATION OF THE NEWLY LAID PIPES AND THE TRENCH HAS BEEN BACKFILLED TO NOT LESS THAN 150 mm ABOVE NORMAL GROUNDWATER LEVEL.

3. TRENCH FLOOR PREPARATION

- THE DESIGN TRENCH FLOOR LEVEL LIMITS SHALL BE MIN 100 mm TO MAX 150 mm BELOW THE BOTTOM OF THE PIPE.
- ANY OVER-EXCAVATION SHALL BE MADE GOOD BY INCREASING THE THICKNESS OF THE BEDDING AGGREGATE, NOT BY USE OF ANY OTHER MATERIALS.
- IF THE TRENCH FLOOR IS:
 - WHOLLY IN ROCK IT MAY BE LEFT IRREGULAR AND THE BEDDING MAY PLACED DIRECTLY ON IT.
 - IN FIRM, STIFF OR HARD CLAY SOIL: TRIM IT SMOOTH, REMOVE ALL LOOSE MATERIAL AND PLACE THE BEDDING AGGREGATE DIRECTLY ON IT.
 - IN SOFT CLAY SOIL OR SAND: PLACE A LAYER OF GEOTEXTILE ACROSS THE FLOOR AND UP THE WALLS TO EMBEDMENT LEVEL (REFER FIGURE 2).
 - WHOLLY OR PARTIALLY VERY SOFT CLAY, OLD FILL REFUSE, OR HAS IRREGULAR OUTCROPS OF ROCK IN IT, OR HAS BEEN DISTURBED BY GROUNDWATER INFLOW. THE CONTRACTOR SHALL SEEK SPECIALIST GEOTECHNICAL ADVICE TO ENSURE ZERO POST INSTALLATION TOTAL AND/OR DIFFERENTIAL SETTLEMENT
- IF A SEWER IS TO BE LAID IN OR BELOW NEW FILL, THE CONTRACTOR SHALL SEEK SPECIALIST GEOTECHNICAL ADVICE FOR THE DESIGN OF THE FILL. DESIGN THE FILL TO ENSURE ZERO POST-INSTALLATION SETTLEMENT OF THE SEWER. LAY THE SEWER IN A TRENCH DUG INTO THE FILL AFTER THE FILL HAS BEEN BROUGHT UP TO NOT LESS THAN 500 mm ABOVE THE TOP OF THE SEWER.

BEDDING PLACEMENT:

SIMPLY PLACE THE AGGREGATE ON THE PREPARED TRENCH FLOOR (REFER NOTE 3) AND RAKE TO GRADE. ADDITIONAL COMPACTION IS NOT NECESSARY.

- WHERE PIPE SOCKETS ARE LOCATED, EXCAVATE POCKETS IN THE BEDDING TO CLEAR THE SOCKET.
- HOME THE PIPE AND ENSURE THAT THE PIPE IS SUPPORTED UNIFORMLY ALONG ITS BARREL BY ATTEMPTING TO PASS A HAND UNDER THE PIPE.
- IF VOIDS ARE PRESENT, REMOVE THE PIPE AND REGRADE THE BEDDING. ALTERNATIVELY HAND-PACK ADDITIONAL AGGREGATE UNDER THE PIPE.

SIDE SUPPORT AND OVERLAY PLACEMENT AND COMPACTION

- REMOVE OR RAISE SHORING BEFORE PLACING ANY SIDE SUPPORT OR OVERLAY AGGREGATE.
- PLACE AND COMPACT THE SIDE-SUPPORT AND OVERLAY AGGREGATE SUCH THAT THERE IS NO IMPACT ON THE INTERNAL VERTICAL DIAMETER OF THE PIPE. NOTE THAT CAREFULLY BRINGING UP THE AGGREGATE UNIFORMLY ON BOTH SIDES OF THE PIPE IN ONE SMOOTH OPERATION WILL NORMALLY ACHIEVE THIS WITHOUT THE NEED FOR ADDITIONAL MECHANICAL COMPACTION. AGGREGATE SHOULD ACHIEVE ID 70% COMPACTION AS PER AS 1289.5.6.1.
- WHERE COMPACTION IS REQUIRED, USE HAND TAMPERS OR INTERNAL VIBRATORS. THE LIFT THICKNESS SHALL NOT EXCEED 150 mm OR HALF THE PIPE DIAMETER, WHICHEVER IS GREATER.
- THE MINIMUM FINISHED THICKNESS OF THE OVERLAY IS 300 mm. REFER 4005-20003-01.

MATERIAL REQUIREMENTS

AGGREGATE: REFER 4005-20003-01.

1 | 03/04/16 | RP | RENUMBERING OF PREVIOUS 4005-20003-02

- DPTI ROADS: TRENCH FILL SHALL BE COMPLIANT WITH SA-C.
 - SEWER PUMPING MAINS: TRENCH FILL AND PIPE EMBEDMENT SHALL BE COMPLIANT WITH TS4.
- GEOTEXTILE: SHALL BE A MEDIUM-WEIGHT, NON-WOVEN, NEEDLE-PUNCHED FILTER FABRIC, EG. BIDIM A24 OR EQUIVALENT, UNLESS NOTED OTHERWISE.
- REFER 4005-20002-01 TO 4005-20002-03 FOR GENERAL NOTES.





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SA WATER STANDARD DRAWINGS **SEWER CONSTRUCTION MANUAL** TRENCH EXCAVATION & EMBEDMENT POOR SOIL CONDITIONS REQUIRING GEOTECHNICAL EVALUATION

A3 REVISION SHT SIZE TOTAL SHEETS: SUPERSEDES: 02-0156-01 (G2) DRAWING NUMBER

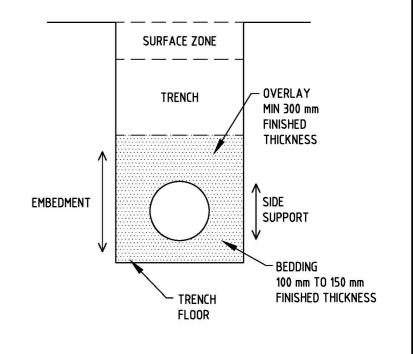
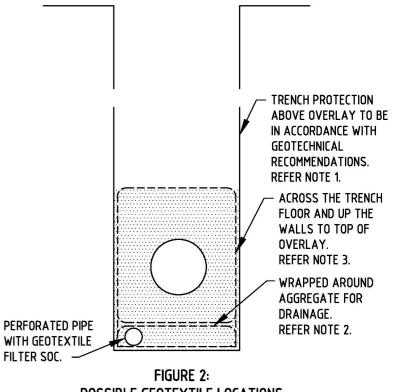


FIGURE 1: TERMINOLOGY



POSSIBLE GEOTEXTILE LOCATIONS OTHER THAN BETWEEN TRENCH FILL AND EMBEDMENT FILL