# NOTES:

#### SA WATER DOCUMENTATION :

**AUTHORISED DOCUMENTATION COMPRISES:** 

- WATER SERVICES ASSOCIATION OF AUSTRALIA (WSAA) CODES.
  - GRAVITY SEWERAGE CODE OF AUSTRALIA, WSA02-2014.
  - SEWAGE PUMPING STATION CODE OF AUSTRALIA, WSA04-2005.
  - VACUUM SEWERAGE CODE OF AUSTRALIA, WSA06-2008.
  - PRESSURE SEWERAGE CODE OF AUSTRALIA, WSA07-2007.
- SA WATER SUPPLEMENTARY DOCUMENTATION TO EACH WSAA CODE.
- SA WATER CONSTRUCTION MANUAL DRAWINGS.
- SA WATER ENGINEERING STANDARDS & GUIDELINES.
- SA WATER AUTHORISED ITEMS FOR USE WITH EACH CATEGORY.

#### ORDER OF PRECEDENCE.

WHERE SA WATER PROVIDES SPECIFIC DETAIL, IT'S DRAWINGS AND DOCUMENTS TAKE PRECEDENCE OVER THAT ASPECT OF THE RELEVANT WSAA CODE.

**AUTHORISED ITEMS** 

• SA WATER HAS TECHNICAL STANDARDS IDENTIFYING SPÉCIFIC PRODUCTS APPROVED FOR USE.

TS 0502 SPECIFIES PRODUCTS THAT ARE AUTHORISED FOR USE IN THE FOLLOWING SEWER SYSTEMS:

- GRAVITY SEWER SYSTEMS UP TO A MAXIMUM SIZE OF DN 300.
- PRESSURE PUMPING MAINS UP TO A MAXIMUM SIZE OF DN 200.
- ONLY ITEMS INCLUDED IN TS 0502 SHALL BE USED WITHIN THE RETICULATION SYSTEMS.
- SHOULD A DEVELOPER PROJECT CONTAIN ANY PRODUCT OF DIAMETER LARGER THAN STATED ABOVE, SPECIFIC APPROVAL FROM SA WATER WILL BE REQUIRED FOR THE WORKS TO BE UNDERTAKEN BY MEANS OF THE DEVELOPER AGREEMENT. THE DEVELOPER'S CONSULTANT OR CONTRACTOR SHALL PROVIDE THE SA WATER REPRESENTATIVE WITH DATA SHEETS/ MANUFACTURER INFORMATION FOR ALL PRODUCTS LARGER THAN STATED ABOVE.
- •\SA WATER WILL REVIEW THE INFORMATION PROVIDED AND ADVISE REGARDING THE SUITABILITY OF THE PRODUC

#### 4. SA WATER REPRESENTATIVE:

THE CONTRACTOR SHALL SEEK APPROVAL FOR:

- NONCONFORMITY WITH THE SA WATER DRAWINGS.
- DEVIATION FROM THE APPROVED DESIGN DRAWINGS.
- UNFORESEEN SITE FACTORS IMPACTING THE PROPOSED LOCATION OF THE SA WATER INFRASTRUCTURE.

### 5. EXCAVATION:

- ALL EXCAVATION WORK SHOULD BE UNDERTAKEN IN SUCH A MANNER AS TO MINIMISE RISK TO WORKERS AND OTHERS. AT ALL TIMES SAFE WORK PRACTICES SHALL BE IMPLEMENTED THAT AS A MINIMUM REQUIREMENT COMPLY WITH THE REQUIREMENTS OF RELEVANT LEGISLATION AND INDUSTRY GUIDELINES INCLUDING BUT NOT LIMITED TO:
  - THE WORK HEALTH AND SAFETY ACT 2012 (SA).
  - THE WORK HEALTH AND SAFETY REGULATIONS 2012 (SA), (SPECIFICALLY CHAPTER 6, DIVISION 3 - EXCAVATION WORK.)
  - SAFE WORK AUSTRALIA'S EXCAVATION WORK CODE OF PRACTICE.
- SA WATER RESERVES THE RIGHT TO REVIEW SAFE WORK PRACTICES UNDERTAKEN BY ALL CONTRACTORS IN ACCORDANCE WITH THE ABOVE REQUIREMENTS.

#### EMBEDMENT & BACKFILL:

- EXCAVATION OF TRENCH, EMBEDMENT AROUND PIPES & MAINTENANCE STRUCTURES & CONNECTIONS, AND TRENCH BACKFILL SHALL BE IN ACCORDANCE WITH 4005-20003-01.
- ONLY MATERIALS APPROVED FOR PLACEMENT WITHIN TRENCHES & EXCAVATIONS SHALL BE USED.
- FOR GEOTECHNICAL AND GROUNDWATER REQUIREMENTS REFER 4005-20003-02.

#### CONCRETE

ALL IN-SITU CONCRETE SHALL BE IN ACCORDANCE WITH 1



#### **OBSTRUCTIONS & CLEARANCE REQUIREMENTS:**

- FOR MINIMUM HORIZONTAL & VERTICAL CLEARANCE BETWEEN SA WATER INFRASTRUCTURE AND OTHER AUTHORITY PIPES/ CABLES REFER WSA02, TABLE 5.4.
- CLEARANCE FROM PROPOSED STRUCTURES:

FOR THE MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PROPOSED PIPE EDGE AND A PROPOSED WALL OR BUILDING. REFER TABLE 2.1. TABLE (2.1)

	<b>\</b>
SEWER DIAMETER AND DEPTH	CLEARANCE TO WALL OR BUILDING (mm)
DN150 & DN225 ( < 3.3 m DEEP)	1500 *
DN150 & DN225 (>3.3 m DEEP)	2000 *
DN300 & DN375	2500 *

\* BASED UPON EASEMENT WIDTH REQUIREMENT SHOWN IN TABLE 2.5, 4005-20002-03

CLEARANCE FROM EXISTING STRUCTURES:

MINIMUM HORIZONTAL CLEARANCE BETWEEN THE PROPOSED PIPE EDGE AND AN EXISTING WALL OR BUILDING SHALL BE DISTANCE EQUIVALENT TO THE GREATER OF:

- THE DEPTH OF THE SEWER TRENCH PLUS HALF THE TRENCH WIDTH, OR
- A MINIMUM OF 1.5 m.
- REDUCED CLEARANCES ARE POSSIBLE IF THE BUILDING FOOTINGS ARE FOUNDED ON PIERS EXTENDING TO AT LEAST THE INVERT LEVEL OF THE SEWER. PRIOR TO PROCEEDINGS WITH THE DESIGN THE CONSULTANT SHALL APPROACH SA WATER FOR APPROVAL OF ANY REDUCED CLARENCE.

#### 9. CLEARANCE FROM TREES:

- CLEARANCE BETWEEN PIPES AND TREES SHALL BE THE GREATER OF THE FOLLOWING TWO CONDITIONS:
  - MINIMUM 1.5 m LATERAL CLEARANCE BETWEEN THE PIPE EDGE AND THE TRUNK OF A MATURE SMALL TREE, OR
  - LARGE CLEARANCES (COVERING MANY TREE TYPES) AS DETERMINED BY THE SA WATER "TREE PLANTING GUIDE. NOTE: WHERE IT IS NOT POSSIBLE TO ACHIEVE REQUIRED LATERAL CLEARANCE FROM TREES, BORING SHOULD BE CONSIDERED.

#### 10. COLD BENDING OF PVC PIPE

HORIZONTA

UP TO 10°

10° TO 22°

18% TO 40%

- COLD BENDING OF PVC PIPE IS PERMITTED FOR HORIZONTAL AND VERTICAL CURVES.
- COLD BENDING OF THE PIPE BARREL SHALL BE PERFORMED MANUALLY (NOT MECHANICALLY).
- ALL BENDING SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS SPECIFICATIONS.
- COLD BENDING SHALL NOT BE PERFORMED WHEN THE AMBIENT TEMPERATURE IS LESS THAN 5° C.

24 m

- BRANCH SEWERS AND CONNECTIONS SHALL NOT BE LOCATED ON A CURVE.
- PERMISSIBLE HORIZONTAL CURVE LENGTH AND VERTICAL CURVE LENGTH REFER TABLE 2.2.

TABLE 2.2 DEFLECTION (ANGLE OR %) MINIMUM CURVE LENGTH VERTICAL Ø150 mm Ø225 mm **UP TO 18%** 6 m 12 m

12 m

FOR ADDITIONAL NOTES REFER 4005-20002-02 & 4005-20002-03

	REVISION PANEL					DESIG	N PANEL	
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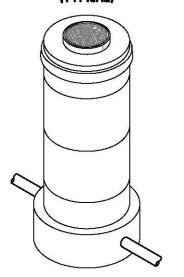
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> **GENERAL NOTES** SHEET 1 OF 3

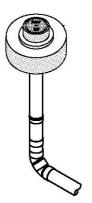
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# SEWER MAIN & PROPERTY CONNECTION (TYPICAL)



MAINTENANCE HOLE (TYPICAL)



INSPECTION OPENING (TYPICAL)



INSPECTION POINT (TYPICAL)

#### CONTINUED FROM 4005-20002-01

#### 11. PIPE MINIMUM GRADES:

#### TABLE 2.3

SEWER SYSTEMS	TERMINOLOGY	DN	MIN. Grade	PIPE END
INTERNAL DRAIN	OWNERS PIPE WITHIN		1.65%	
	BOUNDARY	150	1.00%	
PROPERTY CONNECTION	SA WATER PIPE FROM	100	2.00%	
	IP TO SEWER MAIN		0.80%	
SEWER - RETICULATION	SA WATER PIPE FOR THE	150	0.55%	1.00%
	COLLECTION OF SEWAGE	225	ر 0.33% خ	1.00%
	FROM CUSTOMER PROPERTIES	225	0.55%	1.00%
	FRUFERIJES	300	(0.25%)	1.00%
SEWER - BRANCH/ TRUNK	LARGER DIAMETER PIPES	375	0.15%	
	THAT COLLECT		0.14%	
RETICULATION SEW		525	0.12%	
	(GENERALLY NOT	600	0.10%	
	COVERED IN SCM).	750	0.08%	

(INDUSTRIAL/ COMMERCIAL)

#### TABLE 2.3 NOTES:

- 1. GRADE DEPENDENT UPON MIN. 600 ALLOTMENTS SERVICING PIPE.
- THE MINIMUM SEWER PIPE GRADES TO ACHIEVE SELF CLEANSING VELOCITY (OF GRIT & DEBRIS) ARE BASED UPON THE MANNING FORMULA AS PER AS 2200.

#### 12. MAINTENANCE STRUCTURES:

#### TABLE 2.4

SUBJECT	INSPECTION OPENING	MAINTENANCE SHAFT	MAINTENANCE HOLE		
RELEVANT DRAWINGS	4005-20005-02	4005-20005-09 TO 11	4005	-20005-03 1	0 08
SHAFT DIAMETER	DN 150	DN 225 OR 300	DN 1050	DN 1200	DN 1500
MAX. DEPTH TO INVERT	6 m	3 TO 5 m	6 m	6 m	6.5 m
MAX. DIA. PIPE	DN 225	DN 300	DN 300	DN 600	
STRUCTURE MAX. SPACING	4005-20005-01	4005-20005-01	4005-20005-01		01

# 13. MAINTENANCE HOLES:

- REFER TABLE 2.4 FOR REQUIRED CRITERIA AND RELEVANT DRAWINGS.
- ALL COMPONENTS SHALL BE OBTAINED FROM THE SAME MANUFACTURER (PRECAST LID, RINGS, SLABS, SHAFTS & JOINT SEALANT).
- PRECAST CONCRETE SHAFTS SHALL NOT BE SAWCUT.
- PRECAST COMPONENTS ARE AVAILABLE IN VARIOUS HEIGHTS TO ASSIST IN ACHIEVING THE REQUIRED FINISHED SURFACE LEVEL.
- THE FSL SHALL BE ACHIEVED BY A COMBINATION OF SHAFTS SECTIONS, CONVERSION SLABS & ADJUSTMENT RINGS.
- THE CONSTRUCTOR SHALL DETERMINE THE COMBINATION OF ITEMS REQUIRED TO ACHIEVE THE REQUIRED FSL PRIOR TO PLACEMENT OF THE BUTT SHAFT INCREMENT.
- FOR SLOPING & DIFFICULT LOCATIONS, THE PLACEMENT OF CONVERSION SLABS & ADJUSTMENT
  RINGS TO ACHIEVE THE FSL SHALL BE ACHIEVED USING APPROVED TECHNIQUES AS DEPICTED ON
  4005-20005-04. WHERE THE CONTRACTOR IS UNCERTAIN CONCERNING THE PERMISSIBLE
  COMBINATION OF CONVERSION SLABS & ADJUSTMENT RINGS, DIRECTION SHALL BE SOUGHT FROM
  THE SA WATER REPRESENTATIVE.
- SHAFT SECTION JOINTS, CONVERSION SLABS & ADJUSTMENT RINGS SHALL BE JOINED & SEALED BY AN APPROVED SEALANT. REFER 4005–20005–03.

#### 14. MAINTENANCE SHAFTS:

- REFER TABLE 2.4 FOR REQUIRED CRITERIA AND RELEVANT DRAWINGS.
- REFER 4005-20005-12 FOR INFORMATION ON VARIO BENDS & ASSOCIATED FITTINGS.
- SELECTION OF THE BRAND OF MS SHALL BE BASED UPON THE DESIGNED DEPTH OF THE MS.

#### 15. INSPECTION OPENINGS:

• REFER TABLE 2.4 FOR REQUIRED CRITERIA AND RELEVANT DRAWING.

## 16. PROPERTY CONNECTIONS:

ALL CONNECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SCM SECTION 6 DRAWINGS.

#### 17. PROTECTION OF EXISTING TREES/ VEGETATION:

- REFER WSA02, CLAUSE 14.3.
- THE DESIGN DRAWINGS SHALL BE EXAMINED FOR CONDITIONS ATTACHED TO THE RIGHT OF ENTRY.
- ALL EXISTING TREES AND SCRUBS ADJACENT TO THE SEWER LINE SHALL BE CAREFULLY SUPPORTED AND PROTECTED FROM DAMAGE. SPECIFIC CONSTRUCTION METHODS SUCH AS TUNNELLING OR BORING MAY BE IDENTIFIED TO PROTECT A DELICATE OR VALUABLE ENVIRONMENT.
- BEFORE CLEARING ANY TREES OR SCRUBS ALONG THE ROUTE, APPROVAL MUST BE OBTAINED FROM THE RELEVANT AUTHORITY AND IN THE CASE OF PRIVATE LAND, CONSENT MUST BE OBTAINED FROM THE OWNER.

#### 18. CORROSION PROTECTION

ALL BURIED STEEL PIPE AND FITTINGS SHALL BE PROTECTED AS FOLLOWS:

- DICL COMPONENTS SHALL BE PROTECTED BY EITHER:
- AN APPROVED (LLDPE) SLEEVING (REFER WSCM DRAWING 4005-30005-01).
- WRAPPING WITH PETROLATUM TAPE SYSTEM IN ACCORDANCE WITH TS 18.
- MSCL ITEMS SHALL BE PROTECTED AS FOLLOWS:
- SINTAKOTED PIPES:

WHERE SINTAKOTE HAS BEEN DAMAGED OR REMOVED, THE PIPE SHALL BE WRAPPED WITH BITUMEN MASTIC TAPE SYSTEM, IN ACCORDANCE WITH TS 18.

- NON-SINTAKOTED PIPES:

ALL PIPE SHALL BE WRAPPED WITH BITUMEN MASTIC TAPE SYSTEM, IN ACCORDANCE WITH TS 18.

- ALL BURIED METALLIC FLANGED FITTINGS SHALL BE COATED. PRIOR TO INSTALLATION, INSPECT
  ALL FITTINGS FOR DEFECTS. IF A FITTING IS FOUND TO HAVE A DEFECT IN THE COATING, THE ITEM
  SHALL BE WRAPPED WITH TS 18.
- ALL FLANGES SHALL BE WRAPPED IN ACCORDANCE WITH TS 18.

## 19. CATHODIC PROTECTION:

- CATHODIC PROTECTION IS GENERALLY ONLY REQUIRED FOR DOGLEGS LARGER THAN DN200.
   FOR MORE SIGNIFICANT LOCATIONS, EG. MAJOR ROAD OR CREEK CROSSINGS, DN100 & DN150 STEEL PIPE MAY REQUIRE CATHODIC PROTECTION.
- WHERE A LENGTH OF MSCL MAIN OR MSCL/ DICL SPECIALS REQUIRE CATHODIC PROTECTION, THE
  DESIGNER SHALL CONSULT THE SA WATER CATHODIC PROTECTION SPECIALIST FOR CONFIRMATION
  OF REQUIREMENTS.
- CATHODIC PROTECTION SHALL BE UNDERTAKEN IN ACCORDANCE WITH WSCM DRAWING 4005-30010-07 & THE APPROVED CATHODIC PROTECTION DESIGN.
- REFER TO THE SA WATER CATHODIC PROTECTION SPECIALIST FOR COPIES OF STANDARD DRAWINGS FOR CATHODIC PROTECTION.
- BONDING OF STOP VALVES AND SCOUR VALVES SHALL BE IN ACCORDANCE WITH WSCM DRAWING 4005–30010–07.

FOR ADDITIONAL NOTES REFER 4005-20002-01 & 4005-20002-03

			REVISION PANEL				DESIG	N PANEL
REV	DATE	DRN	DETAILS	APR	CURRENT REV 26/02/19	DESIGNED:	03/08/15	AUTHORISED: 31/03/16
					AUTHORISED:	RJP		T.GALEK
4	11/01/19	RP	MINIMUM GRADE CHANGE	TG		DRAWN:	25/09/15	SIGNATURE:
3	23/07/18	RP	NOTE 14 CHANGED	TG	SIGNATURE:	MS		
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# SA WATER STANDARD DRAWINGS SEWER CONSTRUCTION MANUAL

GENERAL NOTES
SHEET 2 OF 3

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	TOTAL SHEETS:	
	SUPERSEDES:	
	DRAWING NUMBER	
	4005-2000	2-02
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#### CONTINUED FROM 4005-20002-02

#### 20. EASEMENTS

- ALL SEWERS AND SEWER APPURTENANCES SHALL NORMALLY BE LOCATED IN ROADWAYS IN ACCORDANCE WITH THE REQUIREMENTS OF THE "SERVICES IN STREET CODE".
- REFER 4005 20004 01 FOR ALLOCATION OF SPACE IN NEW DIVISIONS.
- ONLY WHERE IT IS NEITHER PRACTICAL OR POSSIBLE TO LOCATE SEWERS IN ROADWAYS, DUE TO TOPOGRAPHICAL OR BACKFILL CONSTRAINTS, SEWERS MAY BE LOCATED IN EASEMENTS TAKEN SPECIFICALLY FOR THAT PURPOSE.
- SA WATER EASEMENTS MAY ONLY BE SHARED WITH STORMWATER PIPES.
- OTHER AUTHORITIES AND UTILITIES, ARE NOT PERMITTED TO SHARE THE SA WATER SEWER EASEMENT TO ACCOMMODATE THEIR RESPECTIVE ASSETS.
- FOR MINIMUM HORIZONTAL CLEARANCE BETWEEN THE OUTSIDE FACE OF THE SEWER AND AN EXISTING OR PROPOSED BUILDING OR STRUCTURE REFER 4005–20002–01,TABLE(2.1.)

UNDER NO CIRCUMSTANCES SHALL THE SEWER AND STORMWATER PIPELINE ARRANGEMENTS SHOWN IN SKETCH 1 BE ALTERED, RESULTING IN THE SEWER BEING CLOSER THAN THE PRESCRIBED DISTANCE FROM THE ALLOTMENT BOUNDARY / EDGE OF EASEMENT.

#### **CATEGORIES OF EASEMENTS:**

• EASEMENT REQUIREMENTS ARE DIVIDED INTO TWO CATEGORIES (REFER TABLE(2.5) SKETCH 1 (4005-20002-02)):

TABLE(2.5)

CATEGODY 1

FASFMF	NT CA	TECO	DIEC
LASLIAL	NILE	riruu	KILD

CATEGODY 2

		NOT SHARED	SHARED E			
DEPTH TO DIDE SIZE WINT		WIDTH	LOCATION	LOCATION		
INVERT (m)	INVERT PIPE SIZE (m)			D1 (m) (REFER SKETCH 1)	D2 (m) (REFER SKETCH 1)	
	DN150 & DN225	2.5	CENTRAL (*)	-		
≤1	DINIDO & DINZZO	3.0	=	1.0		
	DN300	5.0	CENTRAL (*)	1.5	MIN 1.2	
	DN150 & DN225	3.0	CENTRAL	-		
1 TO 3.3		4.0	-	1.5		
X,000 30 2000 NONESCO 02	DN300	5.0	CENTRAL	1.5		
	DN150 & DN225	4.0	CENTRAL	-		
> 3.3	DIVIDO & DIVERD	5.0	-	2.0	MIN 1.5	
	DNDAA	5.0	CENTRAL	-	11114 1.3	
	DN300	6.0	-	2.0		

(\* WHERE THERE ARE IMMOVABLE OBSTACLES ALONG THE CENTERLINE OF THE SEWER EASEMENT, OR ENCROACHING UPON THE EASEMENT (EG. NEARBY TREES) <u>AND</u> THE SEWER DESIGN TO INVERT IS LESS THAN OR EQUIVALENT TO 1.0 m, OFF THE EASEMENT BOUNDARY THAT IS MOST DISTANT FROM ANY BUILDING OR PROPOSED BUILDING.

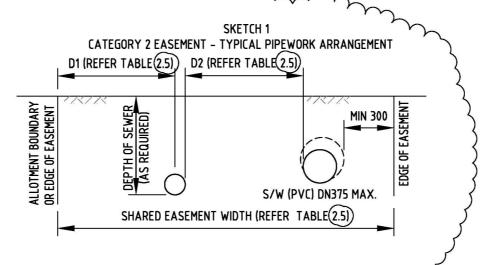
FOR THE FOLLOWING SPECIAL SITUATIONS, SA WATER SHALL DETERMINE EASEMENT WIDTHS (AND PIPELINE ALIGNMENTS WITHIN EASEMENTS), ON A CASE BY CASE BASIS:

- WHERE SITE SPECIFIC CONDITIONS WARRANT ADDITIONAL EVALUATION (EG. EXCESSIVE DEPTH OF SEWER, ANGLE OF REPOSE CONSIDERATIONS, DIFFICULT ACCESS REQUIREMENTS ETC.)
- FOR STORMWATER PIPELINES GREATER THAN DN375.
- WHERE BUTT JOINED CONCRETE STORMWATER PIPES ARE USED:
- LEAKAGE FROM THE STORMWATER PIPES INTO SINGLE SIZE GRANULAR SEWER EMBEDMENT MEDIA IS VERY LIKELY, THEREBY UNNECESSARILY EXACERBATING THE EXISTING 'TRENCH' DRAIN EFFECT ASSOCIATED WITH SEWERS.
- REPLACING A SECTION OF SEWER ADJACENT TO A DISCONTINUOUS STORMWATER PIPELINE (EG. BUTT JOINED CONCRETE PIPES) IS UNNECESSARILY DIFFICULT AND EXPENSIVE, REQUIRING SPECIAL SIDE SUPPORT FOR THE INDIVIDUAL CONCRETE PIPE LENGTHS.

REFER THE SA WATER SUPPLEMENT TO WSA 02-2014, CLAUSE 5.2.8 FOR PROVISION OF EASEMENTS REQUIREMENTS.

#### 21. BORING:

- REFER WSA02, CLAUSE 14.12.
- THE MINIMUM GRADE FOR ANY BORED SEWER PIPE SHALL BE 2.0%
- PRIOR TO APPROVAL FOR THIS OPTION THE DESIGNER/ CONTRACTOR SHALL PROVIDE THE SA WATER REPRESENTATIVE WITH A METHODOLOGY FOR THE BORING TECHNIQUE & DETAILS OF THE CONTRACTOR WHO WILL UNDERTAKE THE BORE.
- THE DESIGNER/ CONTRACTOR SHALL SUBMIT DETAILS OF THE BORED PIPE MATERIAL (& SLEEVE PIPE IF REQUIRED) TO THE SA WATER REPRESENTATIVE FOR APPROVAL.
- THE BORE SHALL BE SHALL NOT AFFECT OR ENDANGER THE HEALTH OR STABILITY OF ANY TREE/S.
- IF TREES WILL BE IMPACTED THE CONSULTANT SHALL PROVIDE SUPPORTING DOCUMENTATION FROM AN ARBORIST CONFIRMING SUCH WORK WILL NOT IMPACT THE TREE/S.



FOR ADDITIONAL NOTES REFER 4005-20002-01 & 4005-20002-02

			REVISION PANEL				DESIG	N PANEL	
REV	DATE	DRN	DETAILS	APR	CURRENT REV	DESIGNED:	03/08/15	AUTHORISED:	31/03/1
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GENERAL NOTES
SHEET 3 OF 3

A3 SHT SIZE	2 REVISION
TOTAL SHEETS: 3	
SUPERSEDES:	
DRAWING NUMBER	
4005-20002	-03
PREFIX NUMBER	SHEET