



NOTE:  
ALL EXISTING LEVELS AND DIMENSIONS  
MUST BE CHECKED BEFORE CONSTRUCTION  
CAN COMMENCE.  
ANY DISCREPANCIES MUST BE BROUGHT TO  
THE ATTENTION OF THE RESIDENT ENGINEER.

POINT	Y	X
A	3 504.755	2 688 203.632
B	3 502.772	2 688 203.682
C	3 490.537	2 688 205.489
D	3 481.584	2 688 206.674
E	3 478.611	2 688 206.834

NOTE:  
BEFORE DEMOLISHING OF PORTIONS OF THE EXISTING  
STRUCTURE CAN COMMENCE, MUST THE POSITIONS OF  
ALL EXISTING SERVICES eg. OPTICAL CABLES AND  
WATER MAINS etc BE RECORDED IN ORDER TO MAKE  
PROVISION TO PROTECT IT AGAINST ANY  
POSSIBLE DAMAGE.

#### DESIGN DATA

##### GENERAL DESIGN NOTES:

1) THE CULVERT CONSISTS OF 2/2.40m x 1.20m CELL OF  
IN-SITU CAST CONCRETE

2) DESIGN METHOD: LIMIT STATE

3) DESIGN CODE: TM47:PART 3 - 1989

##### DESIGN LOADINGS:

1) DESIGN CODES: TM47 - PARTS 1 AND 2,  
CORE OF PRACTICE FOR THE DESIGN  
OF HIGHWAY BRIDGES AND CULVERTS  
IN SOUTH AFRICA (AS AMENDED IN  
1989) \*

2) LIVE LOADS: TYPE NA LOADING  
TYPE NB-36 LOADING AND NC35 x 5 x40

3) DEAD LOADS: IN-SITU CONCRETE - 25.5kN/m<sup>3</sup>  
FRESH 24kN/m<sup>3</sup>  
COMPACTED EARTH FILL - 20kN/m<sup>3</sup>

4) DESIGN FILL HEIGHT: 1.3m

5) INTERNAL ANGLE OF FRICTION OF BACKFILL MATERIAL - 30°  
EARTH PRESSURE DUE TO BACKFILL MATERIAL 10 kPa/m  
(UNYIELDING STRUCTURE)

6) COMPUTER PROGRAM: PROKON

7) REFER TO THE COTO STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE WORKS  
FOR SOUTH AFRICAN ROAD AUTHORITIES (DRAFT STANDARD OCTOBER 2020)

##### DESIGN PARAMETERS

1) YOUNG'S MODULUS (E): PLAIN CONCRETE (f<sub>cu</sub>=30MPa) =286GPa  
REINFORCING STEEL =200GPa

##### MATERIALS

##### 1) FOUNDING

FOUNDING MATERIAL - CLAYEY SAND  
PERMISSIBLE BEARING PRESSURE - 250kPa  
DESIGN BEARING PRESSURE - 180kPa

##### 2) CONCRETE CHARACTERISTIC STRENGTHS (95%)

STRUCTURAL ELEMENT	f <sub>cu</sub> (MPa)	CLASS
BLINDING LAYERS	15	C12/15-20
FLOOR AND APRON SLABS	30	C25/30-XC3 (100) -20
WALLS AND WING WALLS	30	C25/30-XC3 (100) -20
DECK SLAB AND HEAD WALLS	30	C25/30-XC3 (100) -20

2.1) COEFFICIENT OF EXPANSION OF CONCRETE - 0.012mm/m/°C

##### 3) REINFORCING CHARACTERISTIC STRENGTHS

DESCRIPTION	f <sub>y</sub> (MPa)
MILD STEEL	250
HIGH TENSILE STEEL (SABS 920 1985)	450

##### GENERAL

##### 1) CONCRETE FINISH:

- 1.1 SHUTTERED SURFACES: FOUNDATIONS - F1  
UNEXPOSED SURFACES - F2  
EXPOSED SURFACES - F2
- 1.2 UNSHUTTERED SURFACES: TOP OF FLOOR SLABS - U2  
TOP OF WALLS - U2  
TOP OF ACCESS COVER SLAB - U2

2) CONCRETE COVER : 50mm

3) ALL VISIBLE CORNERS MUST BE CHAMFERED - 25mmx25mm

##### STRUCTURE NUMBER PLATES

- (1) LETTERS AND NUMERALS SHALL BE TYPE "B" LETTERS TO DIN 1451  
PART 2.
- (11) THE DATE ON THE CULVERT NUMBER PLATE SHALL BE THE YEAR IN WHICH  
THE CULVERT WAS COMPLETED.
- (111) THE CULVERT NUMBER SHALL HAVE A WHITE BACKGROUND WITH BLACK  
LETTERS, NUMERALS AND BORDER.

##### MANUFACTURE OF NUMBER PLATES

##### TYPE 1 NUMBER PLATE

- (1) THE NUMBER PLATES SHALL BE MANUFACTURED FROM NON-METALLIC,  
UV RESISTANT MATERIAL WITH EPOXY BLACK LETTERING

##### CONSTRUCTION OF NUMBER PLATES

##### TYPE 1 NUMBER PLATE

- (1) THE CULVERT NUMBER PLATES SHALL BE POSITIONED AS SHOWN.

- (11) THE NUMBER PLATE SHALL BE SECURELY FASTENED TO THE INSIDE  
FACE OF THE SHUTTER BY MEANS OF M10 ANCHOR BOLTS. THE  
PROTRUDING THREADS OF THE BOLTS SHALL BE COATED WITH AN  
APPROVED DEBONDING AGENT. ONCE THE CONCRETE HAS SET AND  
PRIOR TO STRIPPING THE SHUTTER THE M10 BOLTS SHALL BE  
REMOVED. THE BOLT HOLES SHALL BE MADE GOOD WITH EPOXY  
FILLER AND THE PAINT WORK TOUCHED UP.

##### CULVERT HYDRAULICS

1. CATCHMENT AREA (km <sup>2</sup> ):	6.574
2. RETURN PERIOD (yr):	20
3. DESIGN Q <sub>t</sub> (m <sup>3</sup> /s):	16.37
4. HEADWATER:	1.32
5. DESIGN FLOOD LEVEL:	78.170
6. FREEBOARD (m):	0.84
7. FLOW VELOCITY (m/s):	2.49
8. AVE SLOPE OF STREAMBED (m/s):	0.007
9. METHOD OF ANALYSIS:	SDF

FOR TENDER PURPOSES ONLY

No.	DATE	REVISION	CONSULT. ENG.	CONSTRUCTION RECORD	DESIGNED BY	CONSULTANT APPROVAL	HEAD OFFICE	NORTHERN REGION	ACCEPTANCE	PROJECT NUMBER	NRA N 011-130-2010/1
				WORKS CONTRACT ENGINEER	NAME	NAME	445 Tabor Avenue	38 Ida Street	THE ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATEVER CAUSE OR HOWEVER ARISING.	REHABILITATION OF NATIONAL ROUTE 11 SECTION 13 FROM R518 INTERSECTION(km 8.340) TO GROOTSANDSLOOT RIVER (km 24.280)	START
				Name : Prof. Reg. No. : Date :	Prof. Reg. No. :	Date :	Pretoria 0184	Menlo Park Pretoria		ROUTE	N11
				SANRAL PROJECT MANAGER	CHECKED BY		PO Box 415	Private Bag X17		SECTION	N11
				Name : Date :	NAME		PRETORIA 0001	Lynnwood Ridge		DRAWING km DISTANCE	9.843
					Prof. Reg. No.		South Africa	0940		DRAWING TYPE	STRUCTURES - CULVERTS
					DRAWN BY		Tel:(012) 844 8000	Tel: (012) 426 6200		BRIDGE/STRUCTURE No.	
					NAME					CONSULTANT DRAWING No.	251020-PPO-MC10-02
										SANRAL DOC #	VER V1
										SCALE: AS SHOWN	SHEET 2 OF 4