THE SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LIMITED

CONTRACT SANRAL R.036-090-2020/1

FOR

RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 to N1 (KM 17.85)

BOOK OF DRAWINGS : ROADWORKS DRAWINGS

FEBRUARY 2023

VOLUME 4
BOOK 1 of 1

CHIEF EXECUTIVE OFFICER
SOUTH AFRICAN NATIONAL ROADS AGENCY LIMITED
48 TAMBOTIE AVENUE
VAL DE GRACE
PRETORIA
0184



No.	DATE	REVISION	CONSULT. ENG.

CONSTRUCTION RECORD

WORKS CONTRACT ENGINEER

Name :
Prof. Reg. No. :
Date :

SANRAL PROJECT MANAGER

Name :
Date :

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NAME	G. HUGHES
Prof. Reg. No.	200570073
DRAWN BY	
NAME	A. ENOCH

CONSULTANT APPROVAL

Name : G HUGHES
Prof. Reg. No. : 200570073
Date :

THE ABOVE SIGNATORY CERTIFIES THAT THE DESIGNER AND CHECKER HAVE CONSENTED TO THEIR NAMES BEING INSERTED ON THIS DRAWING AND THAT THEY HAVE SEEN AND APPROVED THE DRAWING.

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ACCEPTANCE

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for CEO: SA NATIONAL ROADS AGENCY SOC LTD.

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PROJECT DESCRIPTION

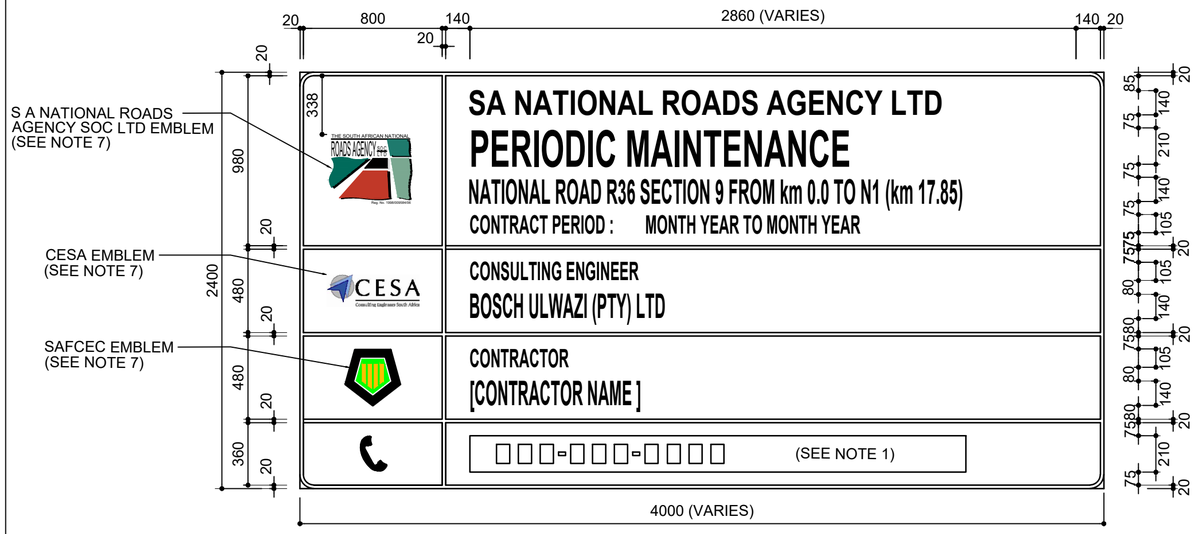
RESURFACING OF NATIONAL ROAD R36 SECTION 9
FROM KM 0.0 to N1 (km 17.85)

DRAWING DESCRIPTION

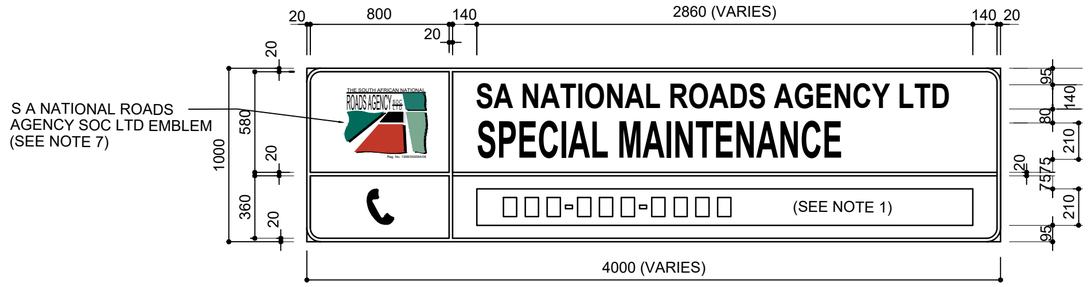
LOCALITY PLAN

SCALE : NTS | **SHEET** 1 **OF** 1

PROJECT NUMBER	R.036-090-2020/1		
DRAWING LOCATION DATA	START	END	
ROUTE	R36	R36	
SECTION	9	9	
DRAWING km DISTANCE	0.0	17.85	
DRAWING TYPE			
BRIDGE/STRUCTURE No.			
CONSULTANT DRAWING No.	FA	10996/003/001	VER
SANRAL DOCUMENT #			1



SIGN BOARD : TYPE 1
ELEVATION
SCALE 1 : 25



SIGN BOARD : TYPE 2
ELEVATION
SCALE 1 : 25

ROAD SIGN INFORMATION BOARD

BACKGROUND	: WHITE REFLECTORISED CLASS 1.
BORDER	: 20mm GREEN REFLECTORISED CLASS 1.
MATERIAL	: RETRO-REFLECTIVE MATERIAL TO COMPLY WITH SANS 1519.
REAR SIDE	: DARK GREY (SANS 1091 : G13).
TEXT	: CAPITAL LETTERS : DIN A, MATT-BLACK. TELEPHONE NUMBER : DIN B MOD, MATT- BLACK.
SUBSTRATE	: 1.0mm THICK "ISCOR CHROMADEK" OR SIMILAR.
MANUFACTURING	: 200mm STANDARD ROAD SIGN PROFILES TO THE DETAILS ON TYPICAL DRAWINGS 8013/010/003 & 8013/010/004
FLATNESS TOLERANCE OF ASSEMBLED BOARD	: 3mm MEASURED UNDER A 1m STRAIGHTEDGE.
LENGTH	: ADJUSTED TO SUIT LENGTH OF DESCRIPTION.
SUPPORTS	: 2 OR 3 WITH 200mm MIN. TOP END DIAMETER TIMBER POSTS.
ERECTION POSITION	: ON SITE AT POSITIONS APPROVED BY THE ENGINEER.
No. REQUIRED	: TYPE 1 : AT EACH END OF THE WORKS. (OR AS APPROVED BY THE ENGINEER). : TYPE 2 : AFTER MAJOR CENTRES OR APPROX. 50km APART. (AS APPROVED BY THE ENGINEER).
REMOVAL	: THE ROAD SIGN INFORMATION BOARDS SHALL BE REMOVED BEFORE A TAKING-OVER CERTIFICATE FOR THE ENTIRE WORKS IS ISSUED.

NOTES

1. AN ALL HOURS CONTACT TELEPHONE / CELL NUMBER SHALL BE SUPPLIED FOR THE SITE SAFETY OFFICER OR FOR A RESPONSIBLE PERSON APPROVED BY THE ENGINEER.
2. EMBLEMS MAY ONLY BE USED BY MEMBERS AND MUST BE DISPLAYED IN FULL COLOUR, EMBLEMS ARE AVAILABLE FROM THE RELEVANT ORGANISATIONS.

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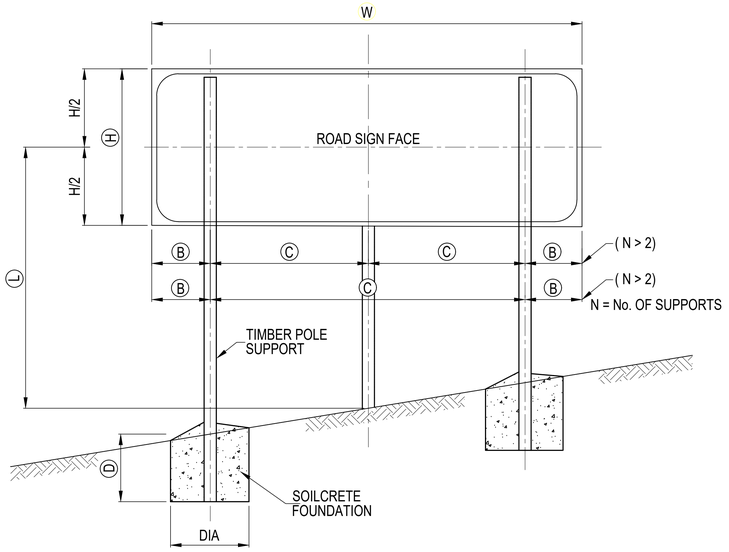
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PROJECT DESCRIPTION
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

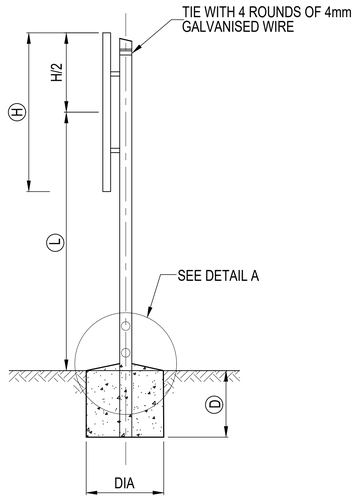
DRAWING DESCRIPTION
CONTRACT NAMEBOARD

SCALE : A2 SHEET 1 OF 1

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ROUTE	R36	R36	
SECTION	9	9	
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DRAWING TYPE			
BRIDGE/STRUCTURE No.			
CONSULTANT DRAWING No.	FA	10996/003/002	VER
SANRAL DOCUMENT #			



ELEVATION



TYPICAL SECTION

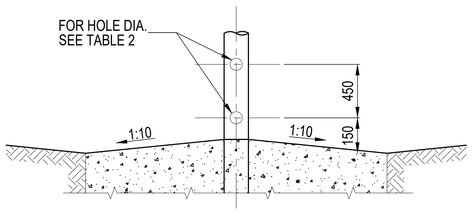
FREE STANDING SUPPORT

SCALE - N.T.S

TABLE 1

WIDTH OF SIGN	No. OF SUPPORTS	DIMENSIONS	
(W)	(N)	(B)	(C)
1,2m OR LESS	1	W/2	-
1,2m - 4,0m	2	W/5	3W/5
4,0m - 7,2m	3	W/2N	W/N
7,2m - 9,6m	4		
9,6m - 12,0m	5		

NOTE : MAXIMUM DISTANCE BETWEEN SUPPORTS = 2,4 m

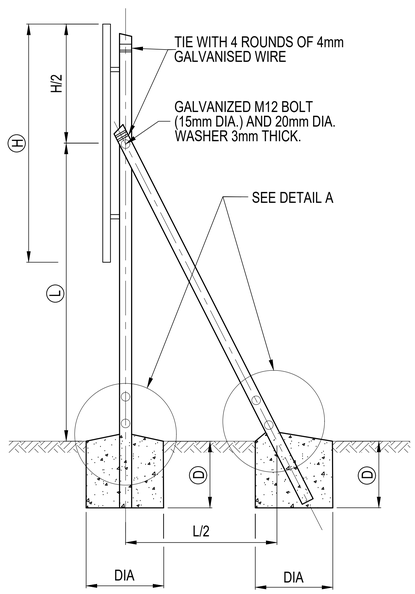


DETAIL A

SCALE - N.T.S

TABLE 2

TIMBER POLE DIA. AT GROUND LEVEL (mm)	HOLE DIA. (mm)
≤ 140	NONE
141 - 170	40
171 - 200	50
201 - 225	65



TYPICAL SECTION
BRACED SUPPORT

SCALE - N.T.S

GENERAL NOTES

SIZE AND SPACING OF ROAD SIGN SUPPORTS AND FOUNDATIONS
SIZE AND SPACING OF SUPPORTS AND FOUNDATIONS SHALL BE DETERMINED FROM INFORMATION SHOWN ON PLAN AND ON THE DESIGN CHARTS SHOWN ON DRAWING 8013/007/004. THE SIZES AND SPACING OBTAINED ARE FOR USE WITH THE SIGN FACE SHOWN ON DRAWING 8013/007/005. DETAILS OF SINGLE POLE SIGNS (LESS THAN 1,5m² IN AREA) ARE SHOWN ON DRAWING 8013/007/007.

POSITION
ROAD SIGNS SHALL BE ERECTED IN THE POSITIONS SHOWN ON THE DRAWINGS OR INDICATED BY THE ENGINEER. STANDARD CLEARANCES ARE SHOWN IN THE SADC ROAD TRAFFIC SIGNS MANUAL.

EXCAVATION
EXCAVATIONS FOR FOUNDATIONS MUST BE MADE TO THE NEAT DIMENSIONS SPECIFIED. WHERE THE FOUNDATION DEPTH IS 1,5m OR GREATER, EXCAVATIONS MUST BE SUITABLY SHORED FOR THE PROTECTION OF WORKMEN.

TIMBER POLE SUPPORTS
TIMBER SUPPORTS SHALL BE STRAIGHT ROUND POLES COMPLYING WITH THE REQUIREMENTS OF SANS 457-3 AND SHALL NOT EXHIBIT EXCESSIVE CRACKING AT THE ENDS

· LENGTH:
WHEREVER POSSIBLE POLE LENGTHS CORRESPONDING TO AVAILABLE NOMINAL LENGTHS SHALL BE USED.

· CUTTING:
WHERE CUTTING TO LENGTH AFTER PRESERVATIVE TREATMENT IS UNAVOIDABLE, ONLY ONE CUT PER POLE SHALL BE ALLOWED. THE CUT SHALL BE NEAR THE TOP END OF THE POLE AND THE EXPOSED SURFACE SHALL BE TREATED WITH TWO COATS OF THE APPLICABLE PRESERVATIVE AND THE POLE BANDED IN ACCORDANCE WITH SANS 457-3.

· PRESERVATIVE TREATMENT:
THE POLES SHALL BE TREATED WITH EITHER A MIXTURE OF COPPER-CHROMIUM-ARSENIC COMPOUNDS COMPLYING WITH THE REQUIREMENTS OF TYPE II OF SANS 673 (HICKSONS "TANALITH C" OR EQUAL) OR WITH CREOSOTE THAT COMPLIES WITH SANS 538 OR SANS 539.

· ERECTION:
POLES SHALL BE SELECTED FOR STRAIGHTNESS AND ERECTED AT AN ORIENTATION WHICH WILL PERMIT THE SIGN FACE TO BE FASTENED IN A VERTICAL PLANE WITHOUT UNDUE DISTORTION.

· BREAKAWAY HOLES:
ALL TIMBER POLES HAVING A DIAMETER >140mm SHALL BE DRILLED WITH TWO HOLES PERPENDICULAR TO THE DIRECTION OF TRAFFIC AS SHOWN IN DETAIL A. THE EXPOSED TIMBER SURFACES SHALL BE TREATED WITH TWO COATS OF THE APPLICABLE PRESERVATIVE.

SOILCRETE FOUNDATIONS
SOILCRETE SHALL CONSIST OF 12 PARTS APPROVED GRANULAR SOIL OR GRAVEL MIXED WITH 1 PART PORTLAND CEMENT AND ONLY SUFFICIENT WATER TO GIVE IT A CONSISTENCY THAT WILL PERMIT THE SOILCRETE TO BE VIBRATED OR TAMPED TO EXCLUDE VOIDS. TIMBER SUPPORT POLES SHALL BE SET VERTICAL AND FIRMLY PROPPED IN POSITION PRIOR TO PLACING OF THE SOILCRETE. PROPS SHALL REMAIN IN POSITION FOR A MINIMUM OF 12 HOURS AFTER PLACING THE SOILCRETE. THE SURFACE OF THE SOILCRETE SHALL BE NEATLY FINISHED WITH SUFFICIENT FALL TO ENSURE PROPER DRAINAGE. CONCRETE SHALL NOT BE SUBSTITUTED FOR SOILCRETE.TOPPING OF SOILCRETE FOUNDATION TO BE STEEL FLOATED.

BOLTS, NUTS AND WASHERS
EXCEPT WHERE OTHERWISE SPECIFIED STEEL BOLTS AND NUTS SHALL CONFORM TO SANS 135 OR SANS 1143 AND ALL COMPONENTS SHALL HAVE A HOT-DIP (GALVANIZED) ZINC COATING THAT COMPLIES WITH THE REQUIREMENTS OF SANS 121 : 2000 (ISO 1461 : 1999) FOR COATINGS ON TYPE C1 ARTICLES.

ROAD SIGN FACES
ROAD SIGN FACES SHALL BE MANUFACTURED STRICTLY IN ACCORDANCE WITH THE DETAILS SHOWN ON DRAWING TD-R-RS-100. TRANSPORTATION AND ERECTION OF SIGN FACES SHALL BE CARRIED OUT IN SUCH A WAY THAT DAMAGE TO THE SIGN IS PREVENTED. THE LOWER EDGE OF SIGN FACES SHALL BE HORIZONTAL AFTER COMPLETION OF ERECTION. THE MONTH AND YEAR OF ERECTION OF THE ROAD SIGN SHALL BE INDICATED BY MEANS OF WHITE PAINT ON THE BACK OF THE SIGN IN THE BOTTOM RIGHT HAND CORNER. THE LETTERS AND FIGURES SHALL BE 25mm HIGH.

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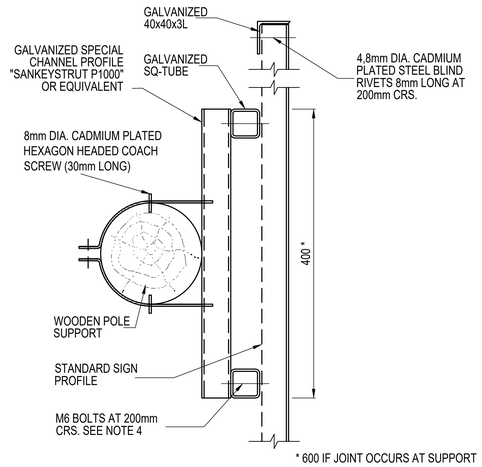
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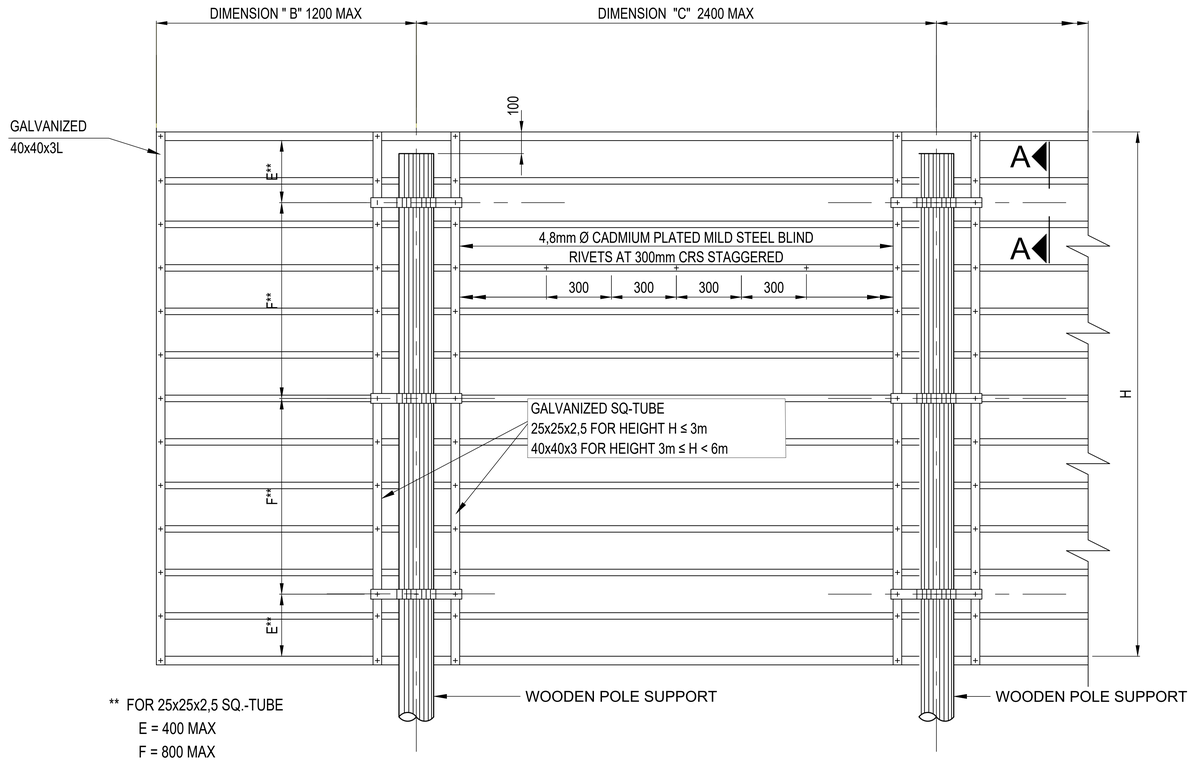
PROJECT DESCRIPTION
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)
DRAWING DESCRIPTION
SIGNAGE DETAILS - GENERAL
SCALE : NTS SHEET 1 OF 1

PROJECT NUMBER	R.036-090-2020/1		
DRAWING LOCATION DATA	START	END	
ROUTE	R36	R36	
SECTION	9	9	
DRAWING km DISTANCE	0.0	17.85	
DRAWING TYPE			
BRIDGE/STRUCTURE No.			
CONSULTANT DRAWING No.	FA	10996/003/003	VER
SANRAL DOCUMENT #			



SECTION B - B

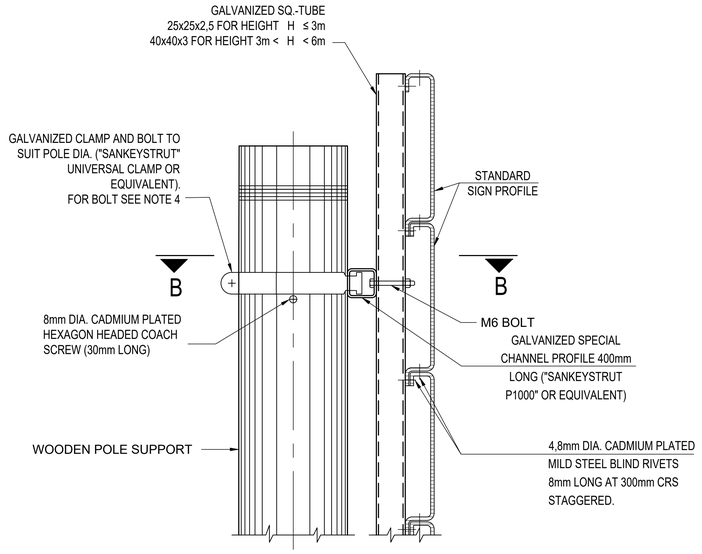
SCALE - 1 : 3



** FOR 25x25x2,5 SQ.-TUBE
E = 400 MAX
F = 800 MAX

REAR ELEVATION

SCALE 1:20



ELEVATION A-A

SCALE 1:3

NOTES :

THE ROAD SIGN FACES SHALL BE MANUFACTURED AND ERECTED IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS :

1. THE STANDARD SIGN PROFILE IF APPLICABLE SHALL BE MADE IN ACCORDANCE WITH THE DETAILS SHOWN ON DRAWING TD-R-RS-101.

2. A SIGN FACE WHICH EXCEEDS 6m LENGTH MAY BE MANUFACTURED IN TWO SECTIONS. THE JOINT SHALL BE MADE IN ACCORDANCE WITH DETAILS SHOWN ON DRAWING TD-R-RS-101.

3. STRUCTURAL STEEL SECTIONS SHALL BE MILD STEEL CONFORMING TO THE REQUIREMENTS OF SANS 1431, GRADE 300W. RECTANGULAR HOLLOW SECTION AND SPECIAL CHANNEL PROFILES MAY BE COLD FORMED OF COMMERCIAL QUALITY MILD STEEL. ALL SECTIONS SHALL BE HOT-DIP GALVANISED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 121 : 2000 (ISO 1461 : 1999).

4. BOLTS, WASHERS AND NUTS SHALL COMPLY WITH THE REQUIREMENTS OF SANS 1700-5-1 AND SHALL BE GALVANISED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 121 : 2000 (ISO 1461 : 1999).

5. BLIND RIVETS SHALL BE 4.8mm DIA CADMIUM PLATED MILD STEEL.

6. REFERENCE MUST BE MADE TO THE RELEVANT ROAD SIGNS DETAIL DRAWING FOR DETAILS OF THE ROAD SYMBOLS AND LEGEND FOR EACH INDIVIDUAL SIGN.

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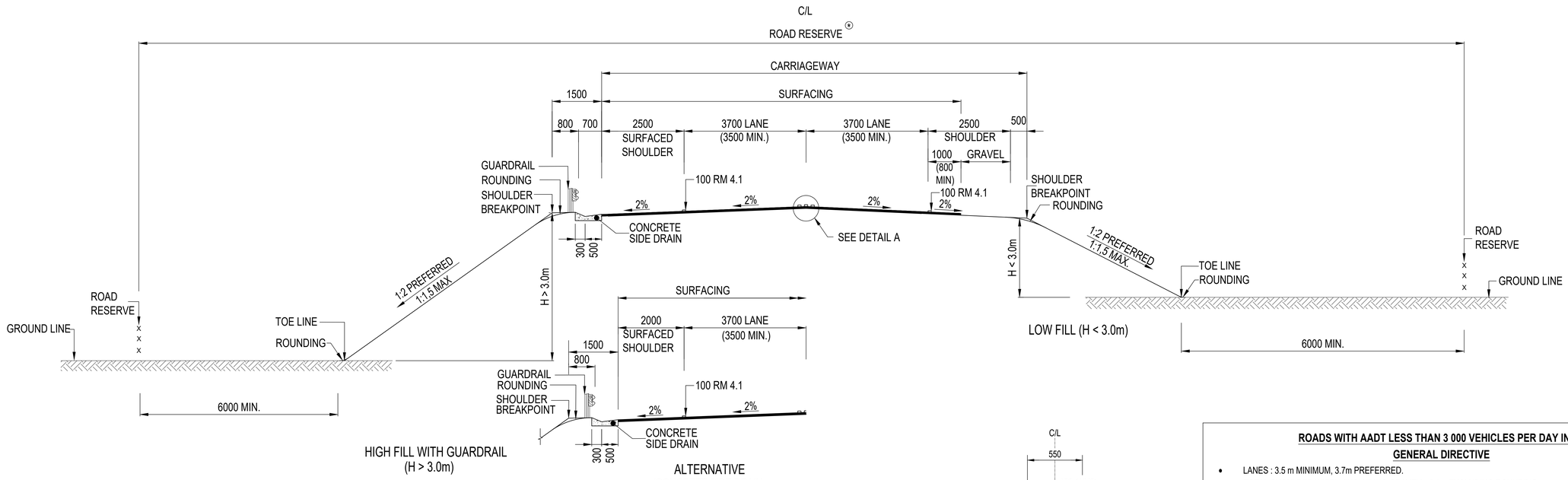
DRAWING DESCRIPTION
SIGN FACE DETAILS

SCALE : NTS
SHEET 1 OF 1

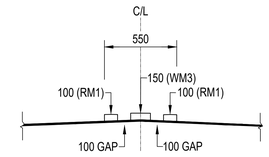
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TYPICAL CROSS SECTIONS
SINGLE CARRIAGEWAY ROADS
AADT < 3 000vpd IN 10 YEARS

ⓧ ROAD RESERVE DIRECTIVE (SINGLE CARRIAGEWAY)
- 30m MINIMUM (EXISTING ROADS WITH UPGRADES TO ACCOMMODATE A 20 YEAR DESIGN PERIOD).
- 50m MINIMUM (ROADS CARRYING < 8000 vpd AT THE END OF THE 30 YEAR DESIGN PERIOD).



FILL CONDITION
SCALE - 1 : 100

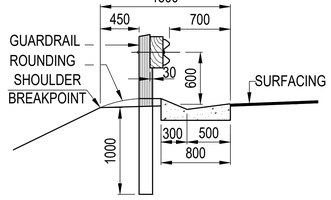


DETAIL A
SCALE : NTS

ROADS WITH AADT LESS THAN 3 000 VEHICLES PER DAY IN 10 YEARS

GENERAL DIRECTIVE

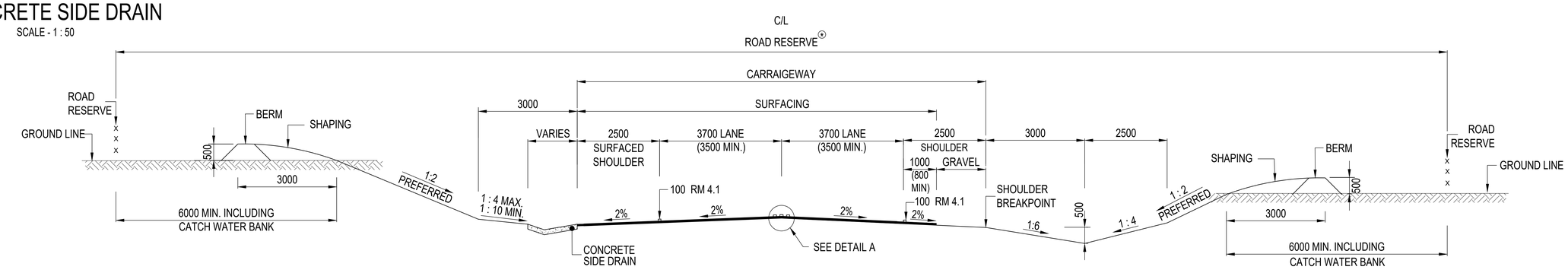
- LANES : 3.5 m MINIMUM, 3.7m PREFERRED.
- TOTAL SHOULDER WIDTH (INCLUDING GRAVEL) : 2.5m EXCLUDING ROUNDING.
- PAVED SHOULDER : 0.8m MINIMUM, 1.0m PREFERRED.
- SURFACED WIDTH : 8.6m MINIMUM (2 x 3.5m & 2 x 0.8m), 9.4m PREFERRED (2 x 3.7m & 2 x 1.0m) .
- CARRIAGEWAY :
  - * 12.0m MINIMUM FOR EXISTING ROADS.
  - * SHOULDER BREAKPOINT OF EXISTING ROAD
  - * 13.4m PREFERRED (INCLUDING ROUNDING).
- TOTAL SHOULDER WIDTH SURFACED WHERE CONCRETE SIDE DRAINS ARE INSTALLED (DEEP CUTS AND HIGH FILLS).
- ON EXISTING ROADS BEING UPGRADED, THE CARRIAGEWAY WIDTH DIMENSIONS CAN BE ADJUSTED SUBJECT, TO SANRAL APPROVAL, IN ORDER TO MAINTAIN THE POSITION OF THE SHOULDER BREAKPOINT.



POSITION OF TYPE 'A' CONCRETE SIDE DRAIN
SCALE - 1 : 50

ROAD MARKING LEGEND

RM1 : NO OVERTAKING LINE
RM4.1 : YELLOW LEFT EDGE LINE
WM3 : DIVIDING LINE



CUT CONDITION
SCALE - 1 : 100

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ACCEPTANCE
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Date:

PROJECT DESCRIPTION

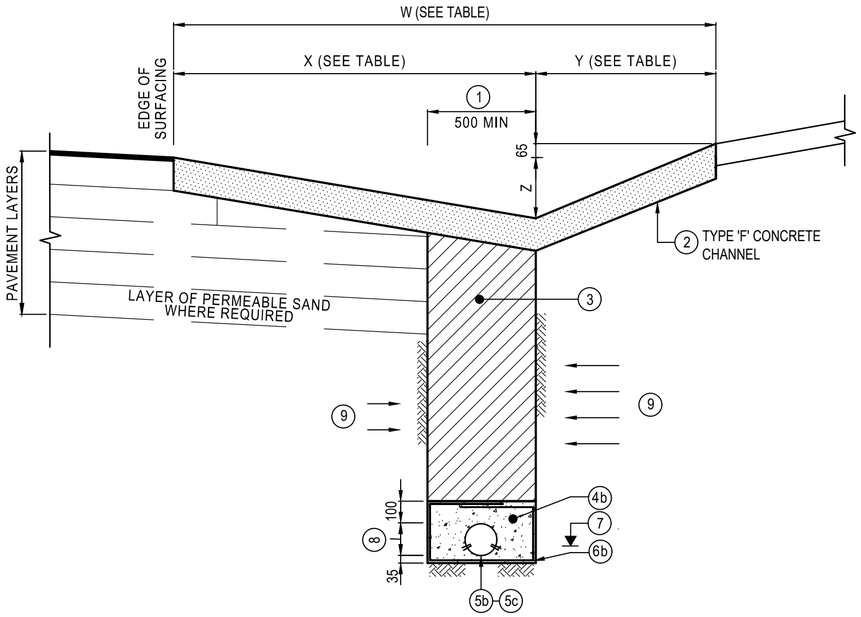
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

DRAWING DESCRIPTION

TYPICAL CROSS SECTION

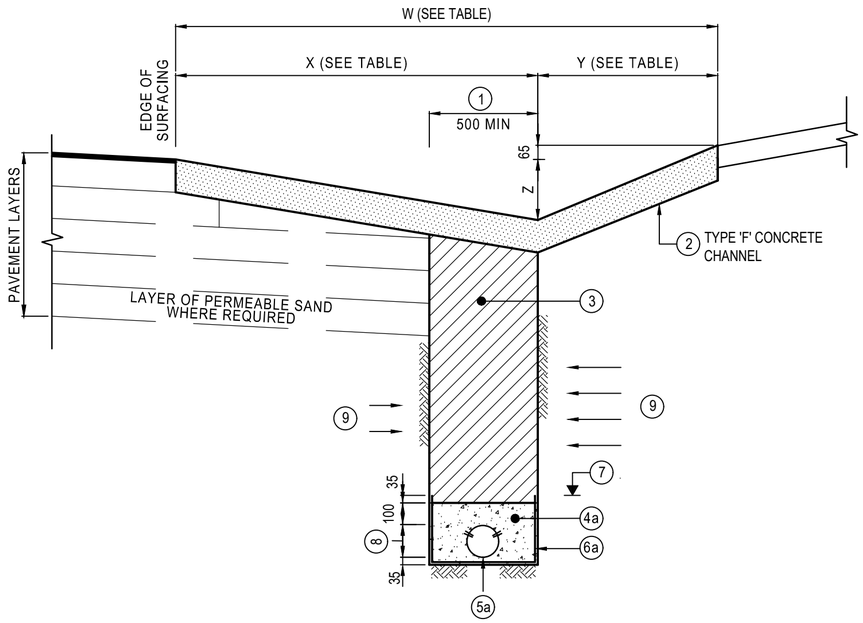
SCALE : NTS **SHEET** 1 **OF** 1

PROJECT NUMBER	R.036-090-2020/1	
DRAWING LOCATION DATA	START	END
ROUTE	R36	R36
SECTION	9	9
DRAWING km DISTANCE	0.0	17.85
DRAWING TYPE		
BRIDGE/STRUCTURE No.		
CONSULTANT DRAWING No.	FA 10996/003/005	VER
SANRAL DOCUMENT #		



SUBSOIL DRAIN WITH SYNTHETIC FIBRE FILTER FABRIC

SCALE 1:20



SUBSOIL DRAIN WITH POLYETHYLENE LINING

SCALE 1:20

W	X	Y	Z	D UNREINFORCED	D REINFORCED
1000	670	330	110	125	100
1500	1000	500	170	125	100
2000	1330	670	220	150	100
2500	1670	830	280	150	100

DIMENSIONS OF TYPE 'F' CONCRETE CHANNEL

No	DESCRIPTION
1	THIS DIMENSION MAY BE REDUCED TO A MINIMUM OF PIPE DIAMETER + 200mm PROVIDED THAT THE CROSS-SECTIONAL AREA IS ADEQUATE (SEE SUBCLAUSE 2104(b) OF THE STANDARD SPECIFICATIONS).
2	IMPERMEABLE BACKFILL MATERIAL. (MIN 150mm THICK) TAKEN TO TOP OF WATER BEARING LAYER IN CASES WHERE NO CONCRETE SIDE DRAIN IS PROVIDED.
3	FILTER SAND OF APPROVED SOURCE AND GRADE.
4a 4b	FILTER STONE: FINE OR COARSE GRADE AS REQUIRED. (SEE SUBCLAUSE 2104(a)(ii) OF THE STANDARD SPECIFICATIONS).
5a 5b 5c	PERFORATED / SLOTTED SUBSOIL DRAINAGE PIPES. (POSITION OF PERFORATIONS INDICATED).
6a	POLYETHYLENE 0.15mm THICKNESS.
6b	SYNTHETIC FIBRE FILTER FABRIC WITH 200mm OVERLAP (GRADE 2 OR APPROVED EQUIVALENT).
7	LEVEL TO WHICH SURROUNDING AREA IS TO BE DRAINED.
8	INTERNAL PIPE DIAMETER: 110mm OR 150mm.
9	WATER BEARING STRATA.

NOTES:

1. ALL CRITERIA ASSUMES THAT FILTER SAND AND FILTER STONE ARE CONTINUOUSLY GRADED FROM COARSE TO FINE.
2. USE THE ENVELOPE CURVES FOR THE WATER BEARING STRATA, FILTER SAND AND FILTER STONE GRADINGS AND APPLY TO MOST CRITICAL COMBINATIONS.
3. IF REQUIRED BY THE ENGINEER, SUBSOIL DRAINAGE MUST ALSO BE PROVIDED ON THE INSIDE OF BENCHING, WHERE USED.
4. WHERE SUBSOIL DRAINAGE IS INSTALLED IN SOLID ROCK THE POLYETHYLENE LINING MAY BE OMITTED.
5. TYPE A OUTLET PREFERABLY TO BE USED WHERE THE NATURAL GROUND LEVELS ALLOW IT. OUTLETS MAY ALSO BE COMBINED WITH CULVERT IN- OR OUTLETS.
6. ALL CONCRETE SHALL BE CLASS 20/19.
7. SPACING OF CLEANING EYES TO BE AS FOLLOWS:
   (a) 100m MAX ON STRAIGHT SECTIONS.
   (b) AT ALL BENDS.
   (c) OR AS DIRECTED BY THE ENGINEER.
8. TRANSVERSE SUBSOIL DRAINAGE TO BE PROVIDED AT ALL CUT TO FILL TRANSITIONS.
9. PLATE WITH THE INSCRIPTION "CLEANING EYE FOR SUBSOIL DRAIN". STAMPED ON TO BE AFFIXED TO CONCRETE COVER.
10. LETTER SIZE ON PLATE: 10mm SERIES C, CAPITAL LETTERS.
11. SYNTHETIC FIBRE FILTER FABRIC TO BE REPLACED WITH POLYETHYLENE LINING IN THE FOLLOWING INSTANCES:
    (a) WHERE THE SURROUNDING SOIL IS VERY PERMIOUS.
    (b) WHERE THE SURROUNDING SOIL HAS A HIGH FINES CONTENT WHICH COULD LEAD TO CLOGGING OF FILTER FABRICS.
12. STEEL PLATE TO BE FIXED TO TOP PORTION OF FENCE LINE OPPOSITE THE SUBSOIL OUTLET STRUCTURE.
13. BACKGROUND : MATT-WHITE
    TEXT : DIN A, MATT-BLACK

FILTER CRITERIA

A. "D x" IS THE SIZE OF SIEVE THROUGH WHICH x % OF THE FILTER MATERIAL WILL PASS.
O^{50} (GF) = AVERAGE SIZE OF THE OPENINGS OF THE SYNTHETIC FIBRE FILTER FABRIC.

B. FILTER SAND (FS) IN RELATION TO WATER BEARING STRATA (WS)

1. FOR D^{85} (WS) > 0.05mm:
   (a) TO PREVENT BLOCKING OF FILTER SAND:
   D^{15} (FS) < 5 x D^{85} (WS)
   D^{50} (FS) < 25 x D^{50} (WS)
   (b) FOR PERMEABILITY OF FILTER SAND:
   D^{15} (FS) > 5 x D^{15} (WS)
2. FOR D^{85} (WS) < 0.05mm:
   (a) TO PREVENT BLOCKING OF FILTER SAND:
   D^{15} (FS) < 0.25mm
   D^{05} (FS) > 0.075mm
   (b) PERMEABILITY REQUIREMENTS NOT NECESSARY

C. FILTER STONE (FSN) IN RELATION TO FILTER SAND (FS)

(a) TO PREVENT BLOCKING OF FILTER STONE:
D^{15} (FSN) < 5 x D^{85} (FS)
D^{50} (FSN) < 25 x D^{50} (FS)
(b) PERMEABILITY: FILTER STONE MUST BE COARSER THAN SAND AT ALL PERCENTAGES

D. FILTER STONE (FSN) IN RELATION TO PERFORATIONS IN PIPES

TO PREVENT BLOCKING OF PERFORATIONS IN PIPES:
D^{85} (FSN) > 1.2 x DIAMETER OF ROUND PERFORATIONS
D^{85} (FSN) > 1.2 x WIDTH OF SLOTS

E. SYNTHETIC FIBRE FILTER FABRIC (SF) IN RELATION TO FILTER SAND (FS)

(a) TO PREVENT CLOGGING OF SYNTHETIC FIBRE FILTER FABRIC:
O^{50} (SF) < D^{85} (FS)
(b) FOR PERMEABILITY OF SYNTHETIC FIBRE FILTER FABRIC:
O^{50} (SF) > D^{15} (FS)

No.	DATE	REVISION	CONSULT. ENG.

CONSTRUCTION RECORD
WORKS CONTRACT ENGINEER
Name :
Prof. Reg. No. :
Date
SANRAL PROJECT MANAGER
Name :
Date :

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NAME	G. HUGHES
Prof. Reg. No.	200570073
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NAME	A. ENOCH

CONSULTANT APPROVAL
Name : G HUGHES
Prof. Reg. No. : 200570073
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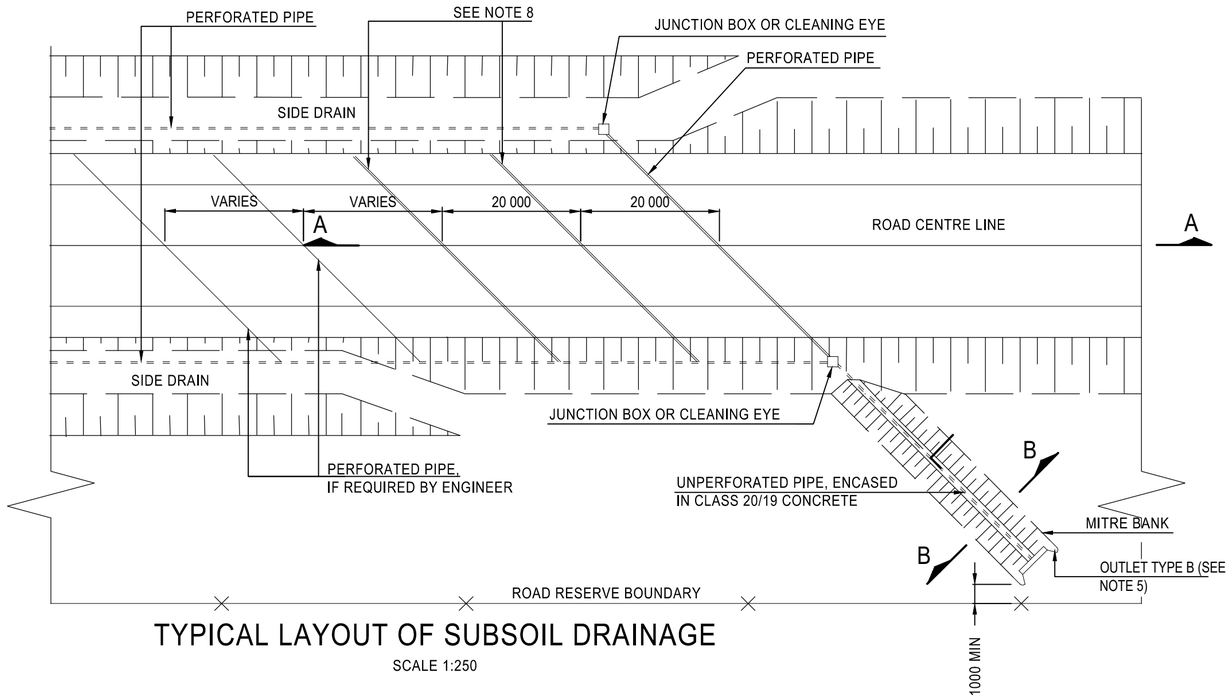
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Date:

PROJECT DESCRIPTION
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

DRAWING DESCRIPTION
SUBSURFACE DRAINAGE

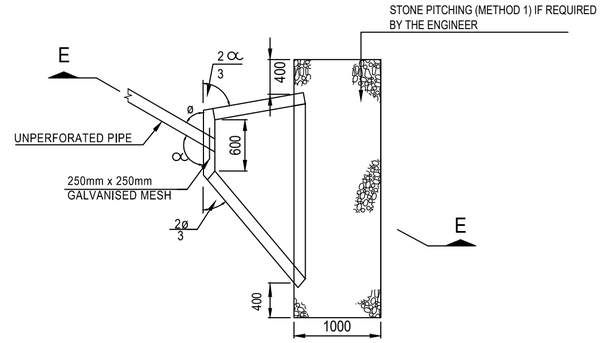
SCALE : A2 SHEET 1 OF 3

PROJECT NUMBER	R.036-090-2020/1	
DRAWING LOCATION DATA	START	END
ROUTE	R36	R36
SECTION	9	9
DRAWING km DISTANCE	0.0	17.85
DRAWING TYPE		
BRIDGE/STRUCTURE No.		
CONSULTANT DRAWING No.	FA 10996/003/006	VER
SANRAL DOCUMENT #		



TYPICAL LAYOUT OF SUBSOIL DRAINAGE

SCALE 1:250

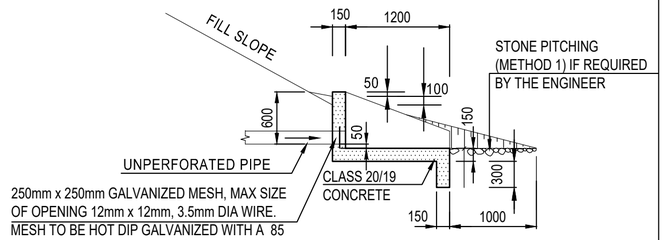


PLAN

SCALE 1:50

OUTLET TYPE A

(SEE NOTE 5 ON SHEET 3)



SECTION A-A
SUBGRADE DRAINAGE AT CUT TO FILL TRANSITION

SCALE: 1 : 50

FRONT ELEVATION
(OUTLET TYPE B)

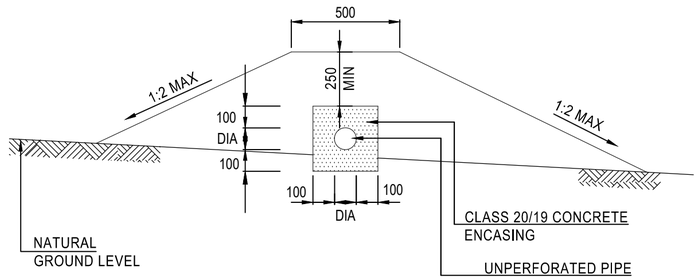
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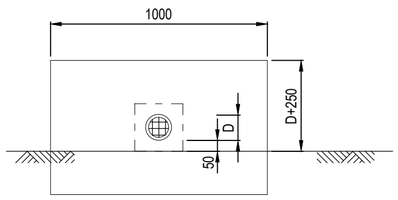
SCALE 1:20

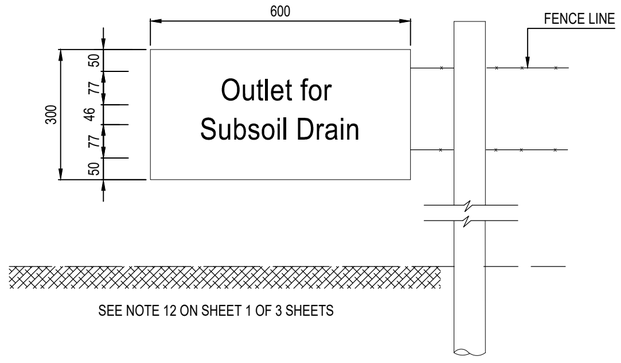
SECTION E-E

(WHERE ∝= 90°)

SCALE 1:50







No.	DATE	REVISION	CONSULT. ENG.

CONSTRUCTION RECORD

WORKS CONTRACT ENGINEER

Name :
Prof. Reg. No. :
Date

SANRAL PROJECT MANAGER

Name :
Date :

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Prof. Reg. No. : 200570073
Date :

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PROJECT DESCRIPTION

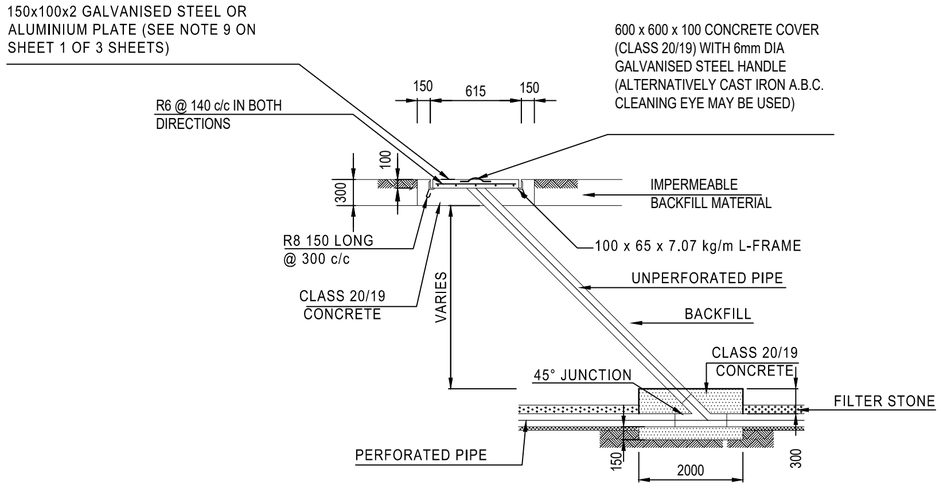
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

DRAWING DESCRIPTION

SUBSURFACE DRAINAGE

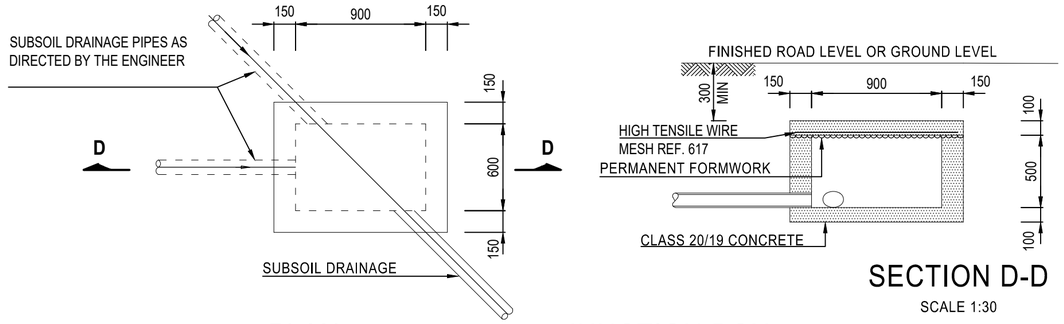
SCALE : A2 SHEET 2 OF 3

PROJECT NUMBER	R.036-090-2020/1	
DRAWING LOCATION DATA	START	END
ROUTE	R36	R36
SECTION	9	9
DRAWING km DISTANCE	0.0	17.85
DRAWING TYPE		
BRIDGE/STRUCTURE No.		
CONSULTANT DRAWING No.	FA 10996/003/007	VER
SANRAL DOCUMENT #		



CLEANING EYE IN SUBSOIL DRAIN

SCALE 1:50



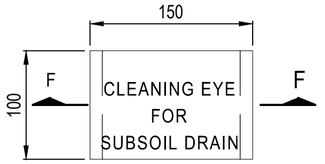
PLAN

SCALE 1:30

JUNCTION BOX

SECTION D-D

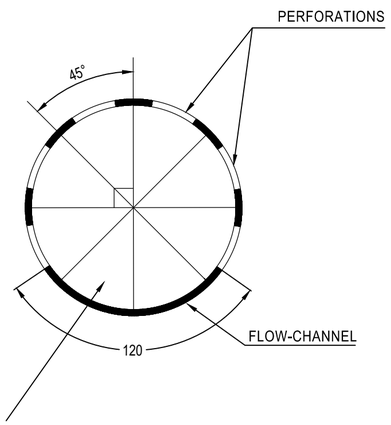
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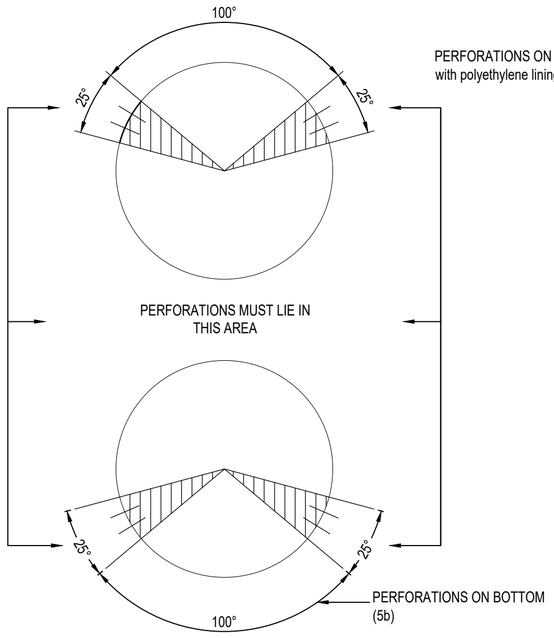
(SEE NOTE 10 ON SHEET 1 OF 3 SHEETS)

PLAN

SCALE 1:5



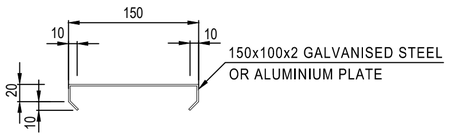
(8 SECTORS OF 45°) WITH PERFORATIONS IN 6 OF THE 8 AS INDICATED. POSITION OF PERFORATIONS (HDPE - PIPES) (5c) (CAN BE USED FOR BOTH POLYETHYLENE LININGS OR SYNTHETIC FIBRE FILTER FABRIC)



POSITION OF PERFORATIONS IN SUBSOIL DRAINAGE PIPES

(WHEN USED WITH SYNTHETIC FIBRE FILTER FABRIC)

SCALE 1;2



SECTION F-F

SCALE 1:5

No.	DATE	REVISION	CONSULT. ENG.

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CHECKED BY
NAME G. HUGHES
Prof. Reg. No. 200570073
DRAWN BY
NAME A. ENOCH

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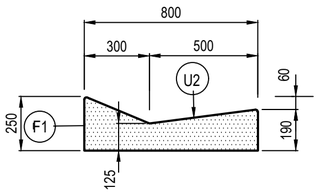
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PROJECT DESCRIPTION
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

DRAWING DESCRIPTION
SUBSURFACE DRAINAGE

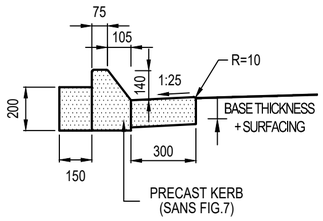
SCALE : A2 SHEET 3 OF 3

PROJECT NUMBER	R.036-090-2020/1	
DRAWING LOCATION DATA	START	END
ROUTE	R36	R36
SECTION	9	9
DRAWING km DISTANCE	0.0	17.85
DRAWING TYPE		
BRIDGE/STRUCTURE No.		
CONSULTANT DRAWING No.	FA 10996/003/008	VER
SANRAL DOCUMENT #		



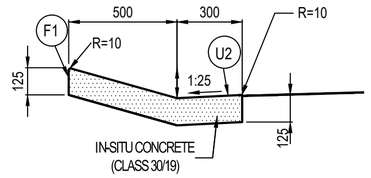
CROSS SECTION OF TYPE 'A' CONCRETE SIDE DRAIN

SCALE 1:20



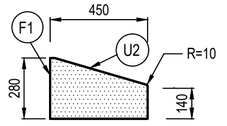
CROSS SECTION OF TYPE 'B' SEMI MOUNTABLE KERB (FIG. 7)

SCALE 1:20



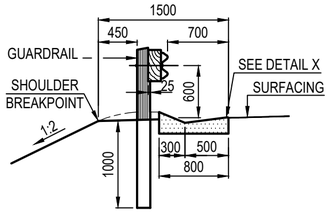
CROSS SECTION OF TYPE 'C' MOUNTABLE KERB (RURAL INTERSECTIONS)

SCALE 1:20



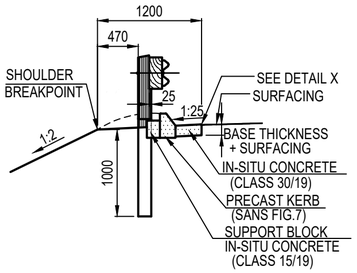
CROSS SECTION OF TYPE 'D' MOUNTABLE KERB

SCALE 1:20



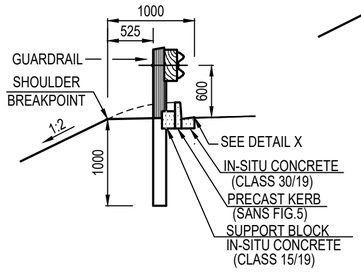
POSITION OF TYPE 'A' CONCRETE SIDE DRAIN

SCALE 1:50



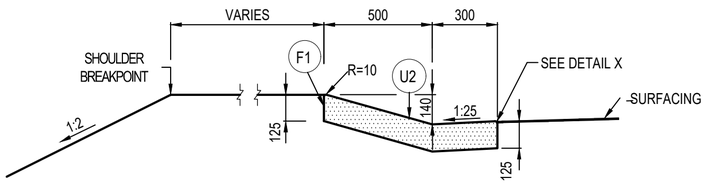
POSITION OF TYPE 'B' SEMI MOUNTABLE KERB(FIG. 7)

SCALE 1:50



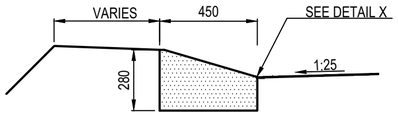
POSITION OF ALTERNATIVE TYPE 'B' NON MOUNTABLE KERB (FIG. 5)

SCALE 1:50



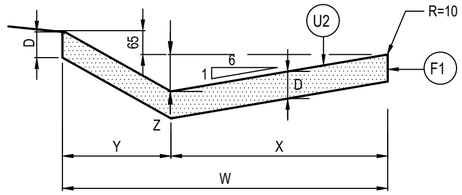
POSITION OF TYPE 'C' MOUNTABLE KERB

SCALE 1:20



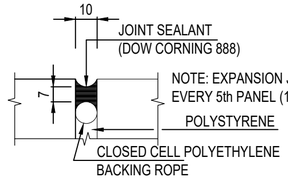
POSITION OF TYPE 'D' MOUNTABLE KERB (STREET SECTIONS)

SCALE 1:20



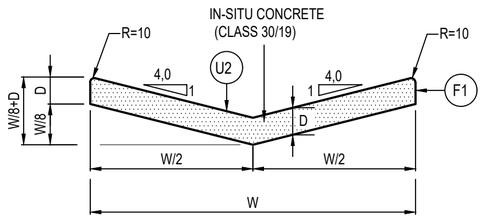
CROSS SECTION OF TYPE 'F' CONCRETE SIDE CHANNEL

N.T.S.



EXPANSION JOINT

N.T.S.



CROSS SECTION OF TYPE 'E' CONCRETE CHANNEL

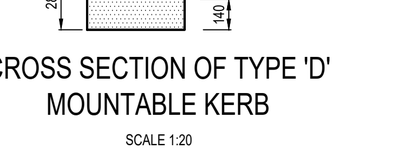
N.T.S

W	W/2	W/8	W/8+D	D UNREINFORCED	D REINFORCED
1000	500	125	250	125	100
1500	750	188	313	125	100
2000	1000	250	400	150	100
2500	1250	313	463	150	100

DIMENSIONS OF TYPE 'E' CONCRETE CHANNELS

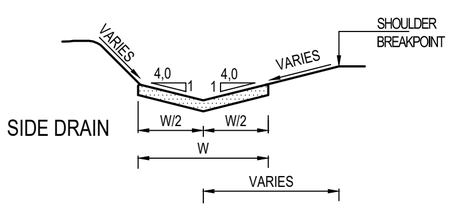
W	X	Y	Z	D UNREINFORCED	D REINFORCED
1000	670	330	110	125	100
1500	1000	500	170	125	100
2000	1330	670	220	150	100
2500	1670	830	280	150	100

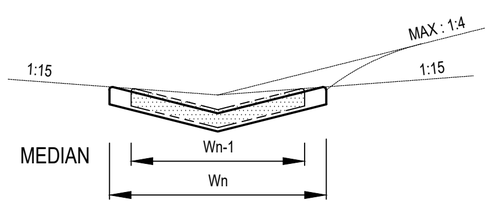
DIMENSIONS OF TYPE 'F' CONCRETE CHANNELS



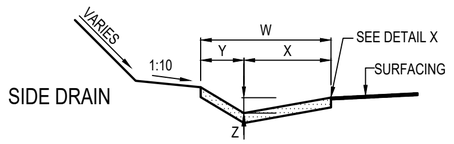
DETAIL X

SCALE 1:5





POSITION OF TYPE 'E' CONCRETE CHANNEL



POSITION OF TYPE 'F' CONCRETE CHANNEL

NOTES :

1. ALL CONCRETE CHANNELS AND OTHER DRAINAGE STRUCTURES ON THIS PLAN TO BE CAST USING CLASS 30/19 CONCRETE.
2. TYPES 'E' AND 'F' CONCRETE MUST BE CAST IN ALTERNATIVE LENGTHS OF 2.0m MAXIMUM WITH EXPANSION JOINTS EVERY 5th PANEL (10 m)
3. ALL EXPOSED CORNERS MUST BE ROUNDED OF TO A MINIMUM RADIUS OF 10mm.
4. THE TYPE OF SURFACE FINISH IS INDICATED AS F1 & U2.
   F - FORMED SURFACES
   U - UNFORMED SURFACES
5. PRECAST KERBING FIG. 5 & FIG. 7 REFER SANS. 927

No.	DATE	REVISION	CONSULT. ENG.

CONSTRUCTION RECORD
WORKS CONTRACT ENGINEER
Name :
Prof. Reg. No. :
Date :
SANRAL PROJECT MANAGER
Name :
Date :

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Prof. Reg. No. 200570073
DRAWN BY
NAME A. ENOCH

CONSULTANT APPROVAL
Name : G HUGHES
Prof. Reg. No. : 200570073
Date :
THE ABOVE SIGNATORY CERTIFIES THAT THE DESIGNER AND CHECKER HAVE CONSENTED TO THEIR NAMES BEING INSERTED ON THIS DRAWING AND THAT THEY HAVE SEEN AND APPROVED THE DRAWING.

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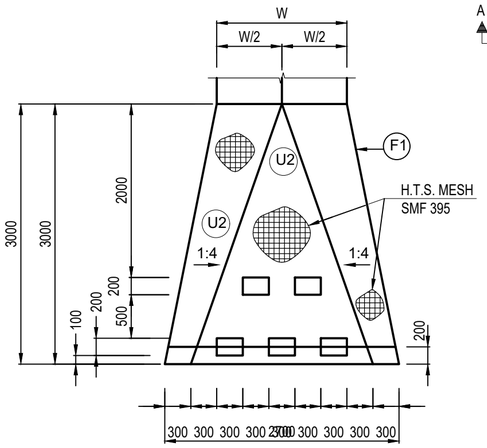
SANRAL
SOUTH AFRICAN NATIONAL ROADS AGENCY SOC LTD
Reg.No.1998/009884/30

NORTHERN REGION
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for CEO: SA NATIONAL ROADS AGENCY SOC LTD.
Date:

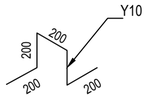
PROJECT DESCRIPTION
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)
DRAWING DESCRIPTION
TYPICAL DRAIN TYPES
SCALE : A2 SHEET 1 OF 1

PROJECT NUMBER	R.036-090-2020/1	
DRAWING LOCATION DATA	START	END
ROUTE	R36	R36
SECTION	9	9
DRAWING km DISTANCE	0.0	17.85
DRAWING TYPE		
BRIDGE/STRUCTURE No.		
CONSULTANT DRAWING No.	FA 10996/003/009	VER
SANRAL DOCUMENT #		



PLAN

SCALE 1:50



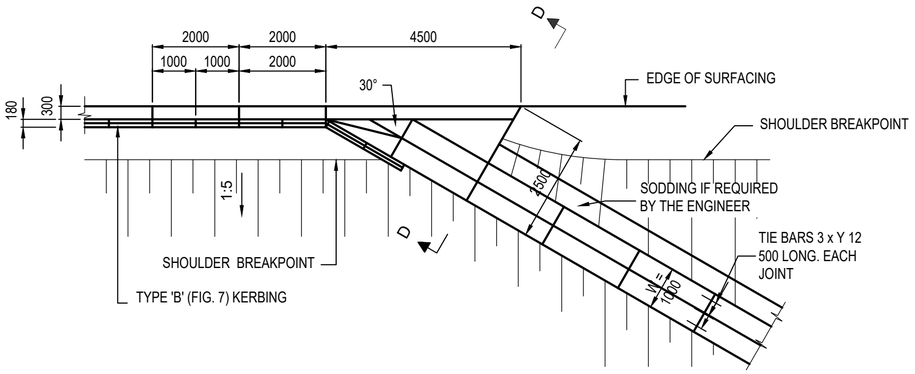
DETAIL OF STOOL

N.T.S.

TRANSITION AND DOWN CHUTE FOR TYPE 'A' CONCRETE SIDE DRAIN

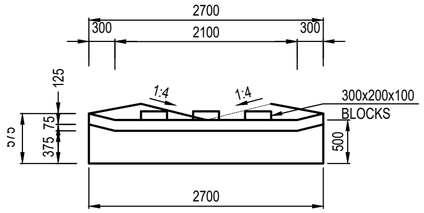
SCALE 1:100

PROVIDE EROSION PROTECTION IF FLOW VELOCITY > 1.5m/s



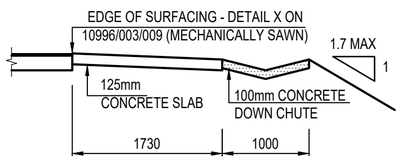
TRANSITION AND DOWN CHUTE FOR TYPE 'B' CONCRETE KERBING

SCALE 1:100



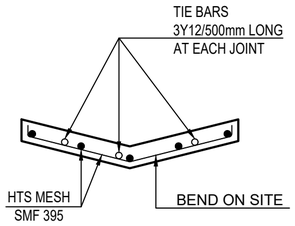
ELEVATION

SCALE 1:50



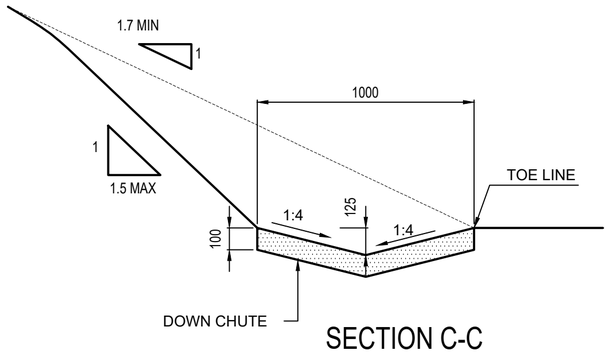
SECTION B-B

SCALE 1:50



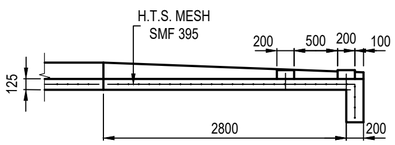
SECTION C-C

SCALE 1:20



SECTION C-C

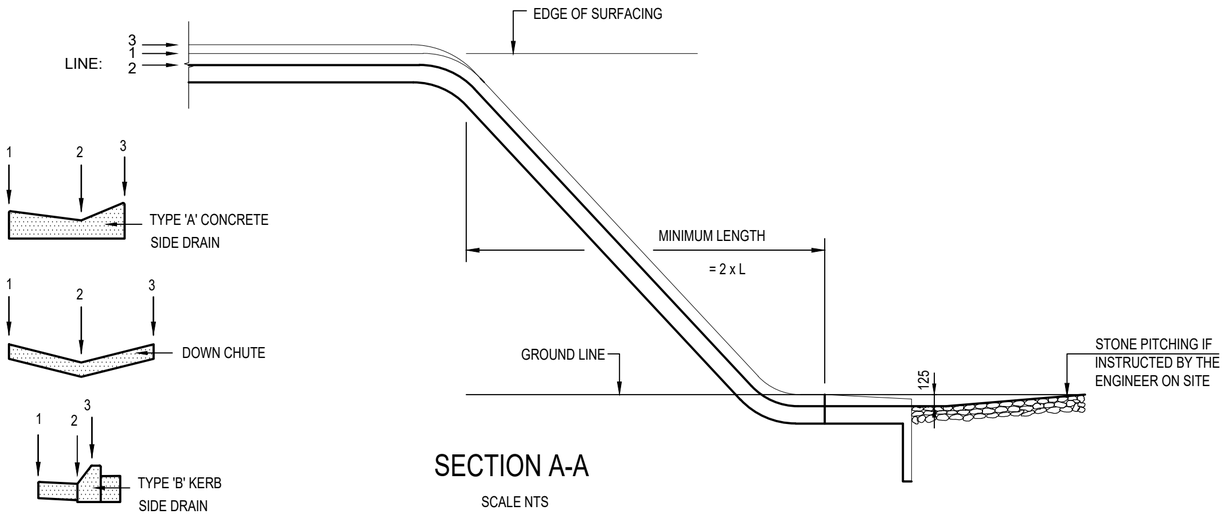
SCALE 1:20



SIDE ELEVATION

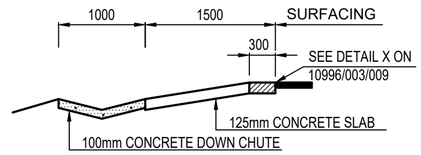
SCALE 1:50

ENERGY BREAKER FOR HIGH FLOW VELOCITIES



SECTION A-A

SCALE NTS



SECTION D-D

SCALE 1:50

NOTES :

1. REFER GENERAL NOTES REGARDING CONCRETE DRAINS ON 10996/003/009
2. DETAILS OF EXPANSION JOINTS IN CONCRETE DRAINS AND FINISHING OF SURFACING EDGE NEXT TO CONCRETE DRAINS SHOWN AS "DETAIL X" ON DWG 10996/003/009 APPLY TO ALL RELATED TYPICAL DRAWINGS.

No.	DATE	REVISION	CONSULT. ENG.

CONSTRUCTION RECORD
WORKS CONTRACT ENGINEER
Name :
Prof. Reg. No. :
Date :
SANRAL PROJECT MANAGER
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Date :

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NAME	G. HUGHES
Prof. Reg. No.	200570073
DRAWN BY	
NAME	A. ENOCH

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Prof. Reg. No. : 200570073
Date :
THE ABOVE SIGNATORY CERTIFIES THAT THE DESIGNER AND CHECKER HAVE CONSENTED TO THEIR NAMES BEING INSERTED ON THIS DRAWING AND THAT THEY HAVE SEEN AND APPROVED THE DRAWING.

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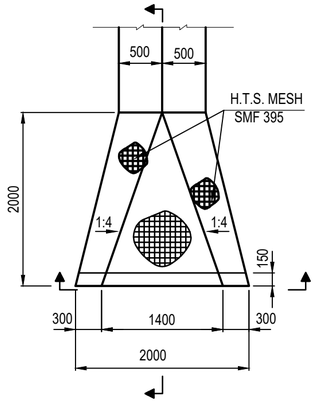
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for CEO: SA NATIONAL ROADS AGENCY SOC LTD.
Date:

PROJECT DESCRIPTION
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

DRAWING DESCRIPTION
DOWN CHUTE DETAIL

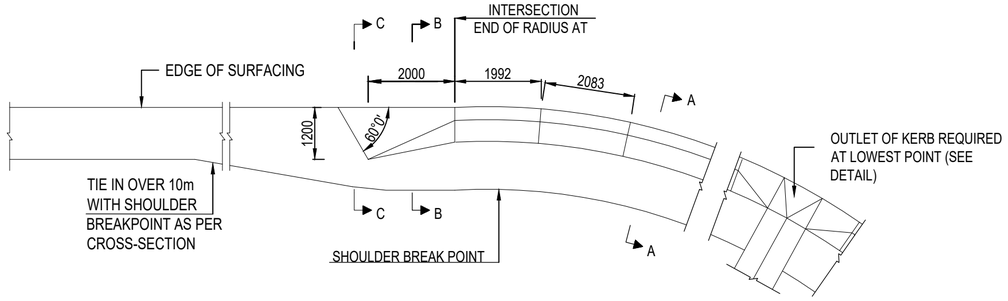
SCALE : A2 SHEET 1 OF 1

PROJECT NUMBER	R.036-090-2020/1		
DRAWING LOCATION DATA	START	END	
ROUTE	R36	R36	
SECTION	9	9	
DRAWING km DISTANCE	0.0	17.85	
DRAWING TYPE			
BRIDGE/STRUCTURE No.			
CONSULTANT DRAWING No.	FA	10996/003/010	VER
SANRAL DOCUMENT #			



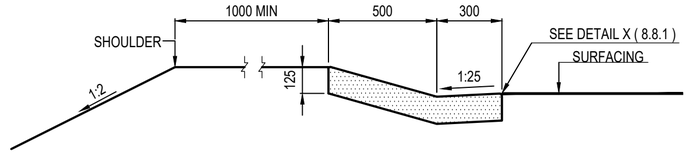
PLAN

SCALE 1:50



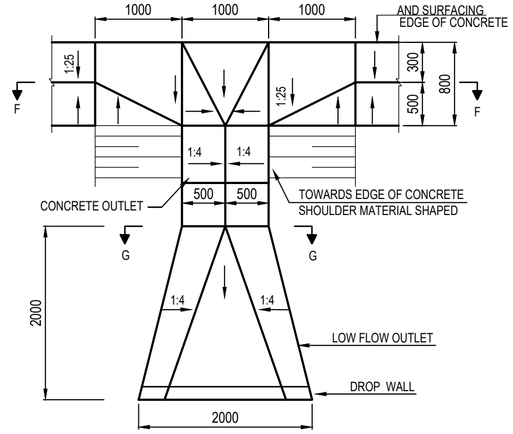
DETAIL OF TYPE 'C' IN SITU MOUNTABLE KERB AT INTERSECTIONS

SCALE 1:100



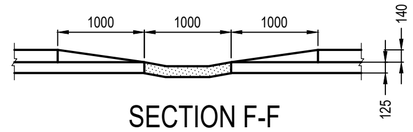
SECTION A-A

SCALE 1 : 20



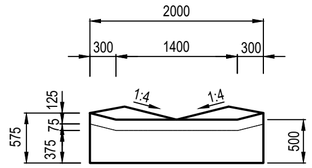
PLAN

SCALE 1:50



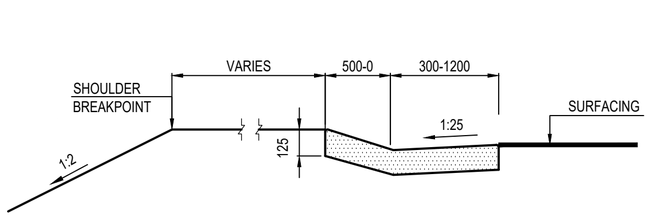
SECTION F-F

SCALE 1:40



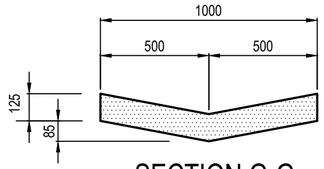
ELEVATION D-D

SCALE 1:50



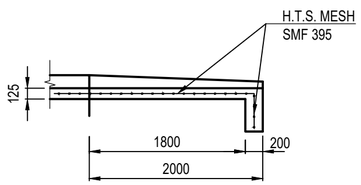
SECTION B-B

SCALE 1 : 20



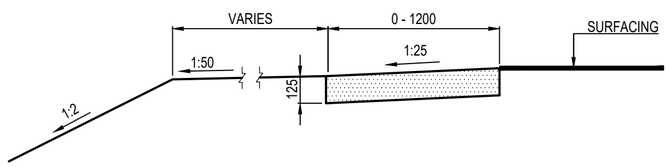
SECTION G-G

SCALE 1:20



SECTION E-E

SCALE 1:50



SECTION C-C

SCALE 1 : 20

DRAIN OUTLET FOR LOW FLOW AND LOW FLOW VELOCITY CONDITIONS

OUTER DETAIL AT LOWEST POINT FOR TYPE C KERB

NOTES :

1. ALL CONCRETE CHANNELS AND OTHER DRAINAGE STRUCTURES ON THIS PLAN TO BE CAST USING CLASS 30/19 CONCRETE.
2. ALL CONCRETE CHANNELS MUST BE CAST IN ALTERNATIVE LENGTHS OF 2.0m MAXIMUM WITH EXPANSION JOINTS EVERY 5th PANEL (10996/003/009)
3. ALL EXPOSED CORNERS MUST BE ROUNDED OFF TO A RADIUS OF 10mm.
4. THE CLASS OF SURFACE FINISH IS INDICATED AS 'F1' OR 'U2'.
5. PROVIDE EROSION PROTECTION IF FLOW VELOCITY AT END OF DRAIN OUTLET > 1.5M/S
6. REFER GENERAL NOTES REGARDING CONCRETE DRAINS ON DWG 10996/003/009
7. DETAILS OF EXPANSION JOINTS IN CONCRETE DRAINS AND FINISHING OF SURFACING EDGE NEXT TO CONCRETE DRAINS SHOWN AS "DETAIL X" ON DWG 10996/003/009 APPLY TO ALL RELATED TYPICAL DRAWINGS.

No.	DATE	REVISION	CONSULT. ENG.

CONSTRUCTION RECORD

WORKS CONTRACT ENGINEER

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Prof. Reg. No. :
Date :

SANRAL PROJECT MANAGER

Name :
Date :

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for CEO: SA NATIONAL ROADS AGENCY SOC LTD.
Date:

PROJECT DESCRIPTION

RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

DRAWING DESCRIPTION

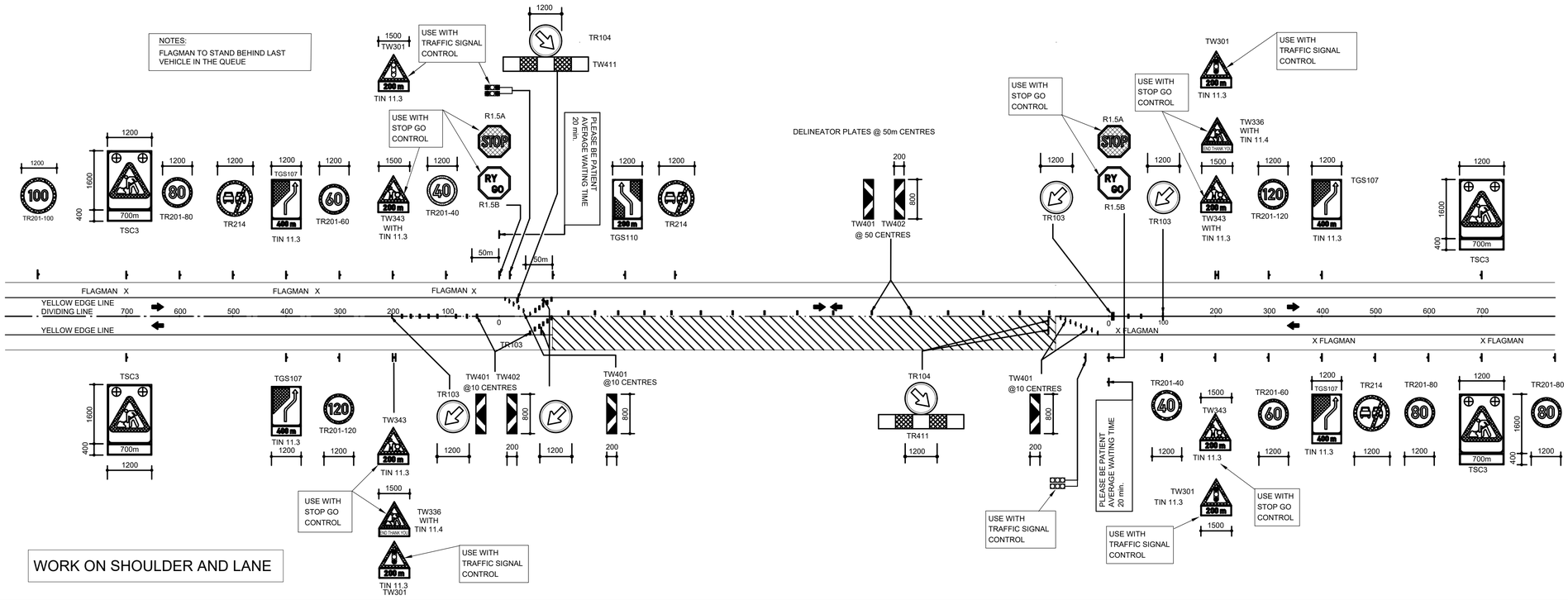
KERBS AT RURAL INTERSECTIONS

SCALE : A2 **SHEET** 1 **OF** 1

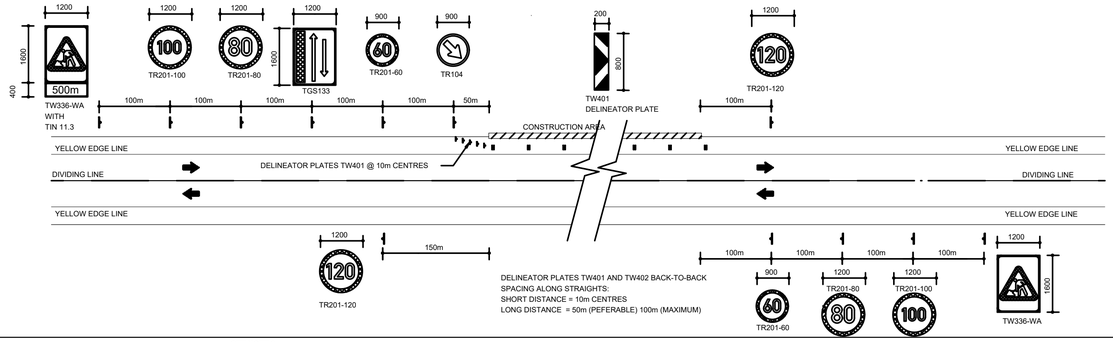
PROJECT NUMBER	R.036-090-2020/1		
DRAWING LOCATION DATA	START	END	
ROUTE	R36	R36	
SECTION	9	9	
DRAWING km DISTANCE	0.0	17.85	
DRAWING TYPE			
BRIDGE/STRUCTURE No.			
CONSULTANT DRAWING No.	FA	10996/003/011	VER
SANRAL DOCUMENT #			

WORK ON SHOULDER AND LANE

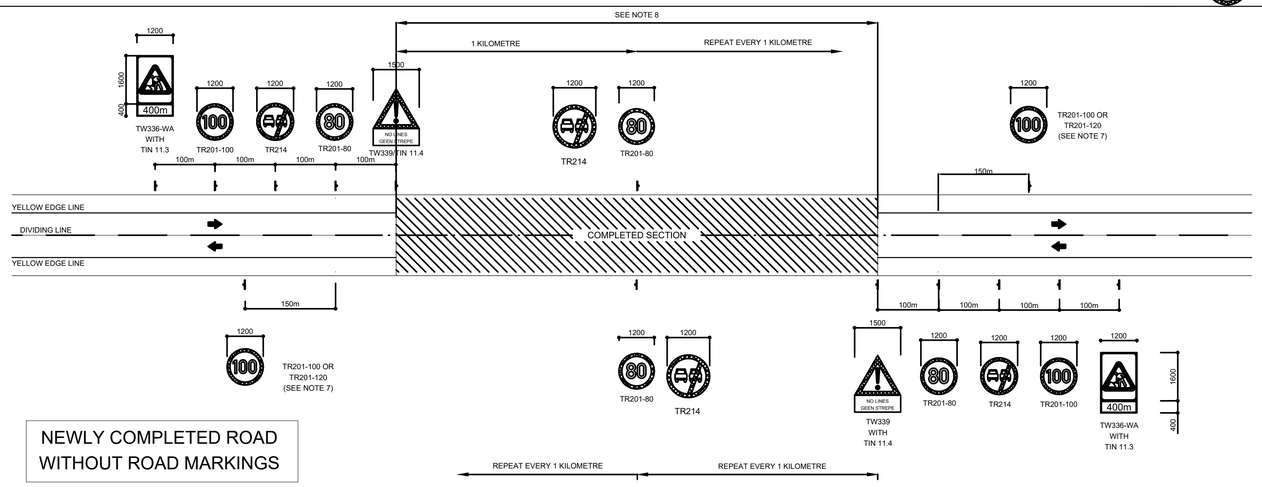
NOTES:
FLAGMAN TO STAND BEHIND LAST VEHICLE IN THE QUEUE

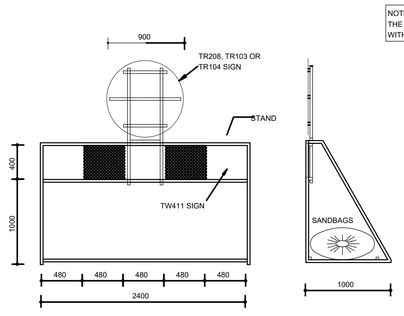


WORK ADJACENT TO ROADWAY



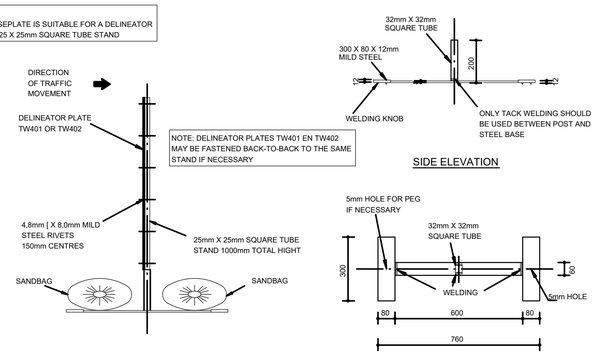
NEWLY COMPLETED ROAD WITHOUT ROAD MARKINGS





TYPICAL STAND FOR A TEMPORARY BARRICADE SIGN
SCALE 1:25

NOTE:
THE BASEPLATE IS SUITABLE FOR A DELINEATOR WITH A 25 X 25mm SQUARE TUBE STAND



TYPICAL STAND FOR DELINEATOR PLATE
SCALE 1:10

BASE PLATE FOR DELINEATOR STAND
SCALE 1:10

NOTES:
1. THE MINIMUM HEIGHT FOR TEMPORARY ROAD TRAFFIC SIGNS ABOVE THE ROAD SURFACE IS AS FOLLOWS:
   200mm - DELINEATOR PLATES
   750mm - ALL OTHER SIGNS, EXCEPT TW411-, TR103- AND TR104- SIGNS WHICH MUST ALWAYS BE HIGHER THAN THE DELINEATOR PLATES.
2. WHERE APPLICABLE THE DELINEATOR PLATES ARE PLACED BACK TO BACK OR A SINGLE PLATE WITH SIGNS BOTH SIDES CAN BE USED. SPACING OF SIGNS AS SHOWN.
3. DELINEATOR SPACING:
   50m CENTRES -- CONCENTRATED WORK ACTIVITY.
   100m CENTRES -- PREFERED.
   200m CENTRES -- LONG STRAIGHT SECTIONS.
4. PLASTIC STANDS FOR DELINEATOR PLATES MAY ONLY BE USED WHEN AUTHORISED BY THE ENGINEER.
5. THE TR201-80-SIGNS AND TR214 MUST BE REPEATED EVERY KILOMETER.
6. ALL ROAD TRAFFIC SIGNS MUST COMPLY WITH THE REQUIREMENTS OF PART 13 VOLUME 2 OF SOUTH AFRICAN ROAD TRAFFIC SIGN MANUAL
7. THE TR201-80, TR201-100 OR TR201-120 SIGN MUST BE SHOWN IN ACCORDANCE WITH THE STATUS OF THE ROAD IF NO OTHER WORK IS BEING UNDERTAKEN.
8. AFTER APPLICATION OF THE FIRST SLURRY THE FOLLOWING MUST BE DONE:
   - PREMARKING ON CENTRE LINE
   - ERECTING OF DELINEATORS ON EDGE OF SEAL AT 100m c/c ON CURVES AND 200m c/c ON THE STRAIGHTS
   - PLACING OF TEMPORARY ROADSTUDS ON CENTRE LINE WHERE INDICATED BY THE ENGINEER

No.	DATE	REVISION	CONSULT. ENG.

CONSTRUCTION RECORD
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Date :

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CONSULTANT APPROVAL
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THE ABOVE SIGNATORY CERTIFIES THAT THE DESIGNER AND CHECKER HAVE CONSENTED TO THEIR NAMES BEING INSERTED ON THIS DRAWING AND THAT THEY HAVE SEEN AND APPROVED THE DRAWING.

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ACCEPTANCE
THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE REVIEW PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR LIABILITY OF ANY KIND FROM WHATSOEVER CAUSE OR HOWEVER ARISING
for CEO: SA NATIONAL ROADS AGENCY SOC LTD.
Date:

PROJECT DESCRIPTION
RESURFACING OF NATIONAL ROAD R36 SECTION 9 FROM KM 0.0 TO N1 (KM 17.85)

DRAWING DESCRIPTION
TRAFFIC ACCOMMODATION

SCALE : A2 SHEET 1 OF 1

PROJECT NUMBER	R.036-090-2020/1	
DRAWING LOCATION DATA	START	END
ROUTE	R36	R36
SECTION	9	9
DRAWING km DISTANCE	0.0	17.85
DRAWING TYPE		
BRIDGE/STRUCTURE No.		
CONSULTANT DRAWING No.	FA 10996/003/012	VER
SANRAL DOCUMENT #		

100mm ON ORIGINAL DRAWING