



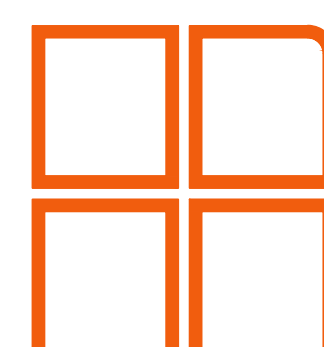
CLIMATE PROOFED ARID AND SEMI ARID RURAL ROADS, FINAL DESIGN OF SOSSIAN - MUOWARAK ROAD BATCH 2

MARCH 2025

EMPLOYER

**DIRECTOR GENERAL
KERRA
P.O BOX 48151-00100,
NAIROBI, Kenya**

CONSULTANT



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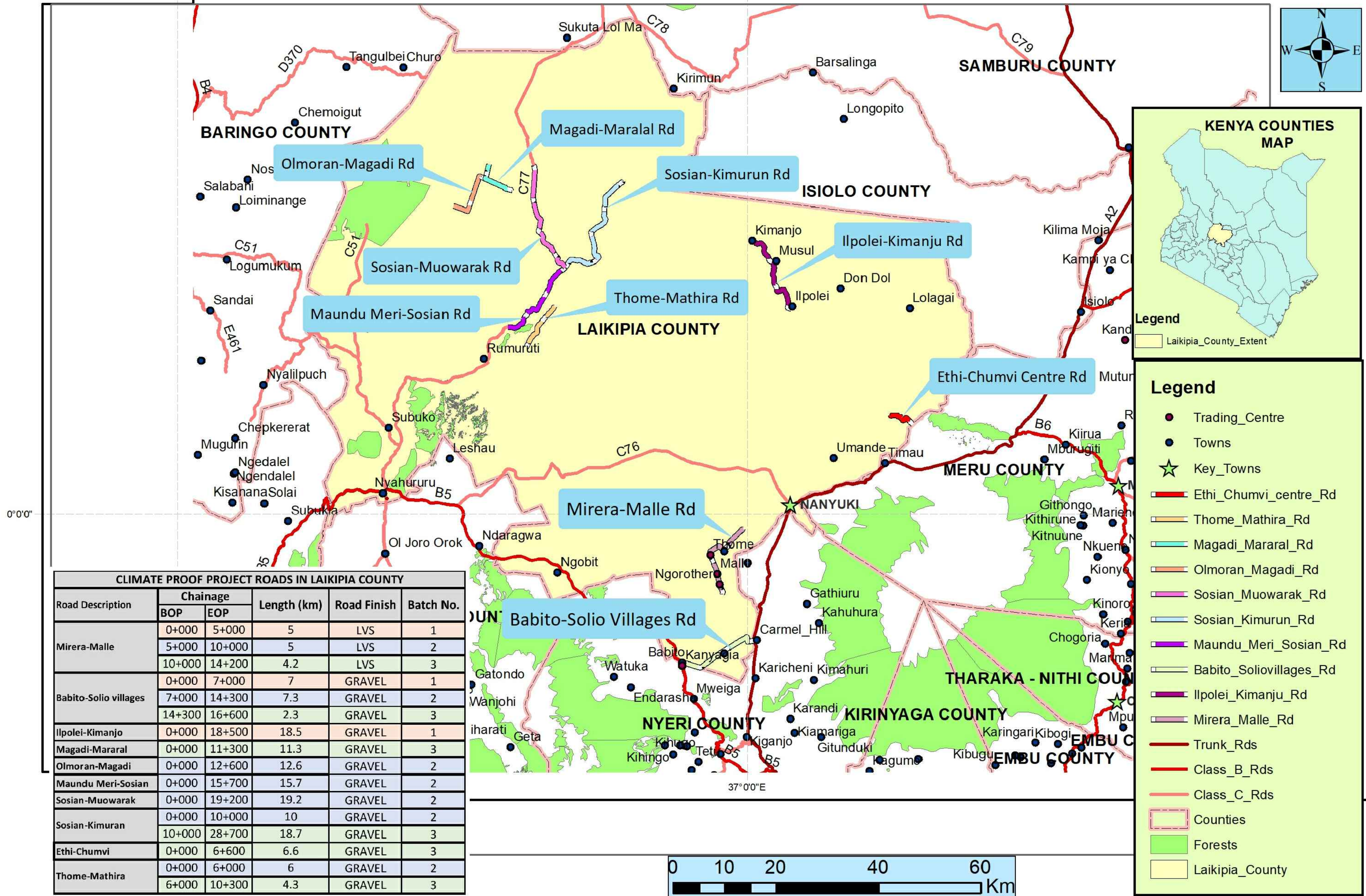
ENGINEER

**DIRECTOR
PLANNING, DESIGN & ENVIRONMENT
P.O BOX 48151-00100,
NAIROBI, Kenya**

	SOSSIAN - MOUWARAK ROAD DRAWINGS
	COVER PAGE
	DRAWING LIST
	GENERAL DRAWINGS
CE/1045/GD/SM/01	LOCATION MAP
CE/1045/GD/SM/01	SOSSIAN - MOUWARAK SKETCH MAP
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CE/1045/GD/SM/02	GENERAL LAYOUT CHAINAGE 4+100 - 8+500
CE/1045/GD/SM/03	GENERAL LAYOUT CHAINAGE 8+500 - 11+549
	TYPICAL CROSS SECTION
CE/1045/CD/SM/01	TYPICAL CROSS SECTION
	TYPICAL CULVERT DRAWINGS
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CE1045/CDS/SM/O2	HEADWALL TYPE 2 (DROP INLETS)
CE1045/CDS/SM/O3	HEADWALL TYPE 4 (FOR ACCESS CULVERT)
CE1045/CDS/SM/O4	BEDDING AND HAUNCH PROFILES TYPE III& IV
CE1045/CDS/SM/O5	CULVERT ROAD SIGNS
	STANDARD DRAWINGS
CE1045/SD/SM/01	STANDARD DRAWING - STANDARD - ROAD SIGNS
CE1045/SD/SM/02	STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION
CE1045/SD/SM/03	STANDARD DRAWING - TRAFFIC MANAGEMENT
CE1045/SD/SM/04	STANDARD DRAWING - PUBLICITY SIGN BOARD

GENERAL DRAWINGS

CLIMATE PROOFED PROJECT ROADS IN LAIKIPIA COUNTY





REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	

Consultant:



Runji Consulting Group Ltd
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PROJECT TITLE
DRAFT DETAILED ENGINEERING DESIGN OF SOSSIAN - MOUWARAK BATCH 2

DRAWING TITLE
SOSSIAN - MOUWARAK SKETCH MAP

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/SM/01
Scale: 1:5000	Date : DECEMBER 2024



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	

Consultant:



Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
DRAFT DETAILED ENGINEERING DESIGN OF SOSSIAN - MOUWARAK BATCH 2

DRAWING TITLE:
GENERAL LAYOUT SHEET 3 OF 3 CHAINAGE 0+000 - 4+100

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/SM/01
Scale: 1:5000	Date : DECEMBER 2024



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DIRECTOR GENERAL	
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Runji Consulting Group Ltd
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P. O. Box 68053-00200 Nairobi
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PROJECT TITLE:
DRAFT DETAILED ENGINEERING DESIGN OF
SOSSIAN - MOUWARAK BATCH 2

DRAWING TITLE:
GENERAL LAYOUT
SHEET 3 OF 3
CHAINAGE 4+100 - 8+500

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/SM/02
Scale: 1:5000	Date : DECEMBER 2024



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Bara Bara Plaza,
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DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	



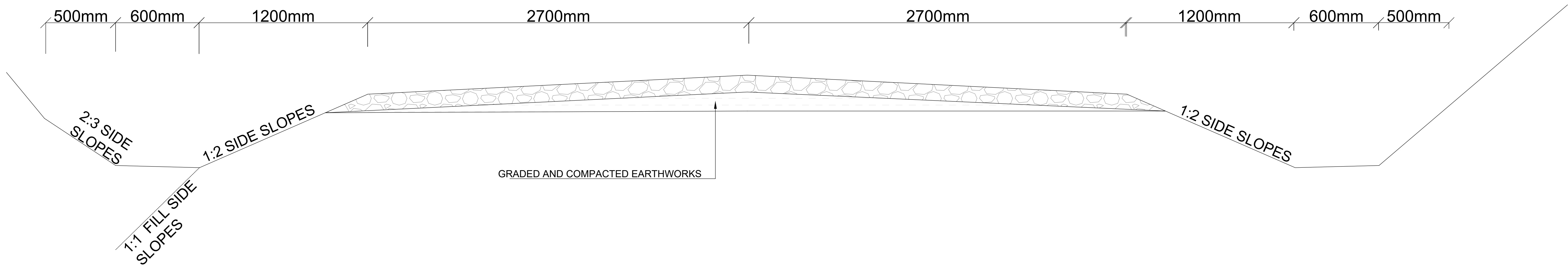
Runji Consulting Group Ltd
Engineering & Project Management.
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P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:	DRAFT DETAILED ENGINEERING DESIGN OF SOSSIAN - MOUWARAK BATCH 2
----------------	--

DRAWING TITLE:	GENERAL LAYOUT SHEET 3 OF 3 CHAINAGE 8+500 - 11+549
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DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/SM/03
Scale: 1:5000	Date : DECEMBER 2024

TYPICAL CROSS-SECTION



Slope benching details

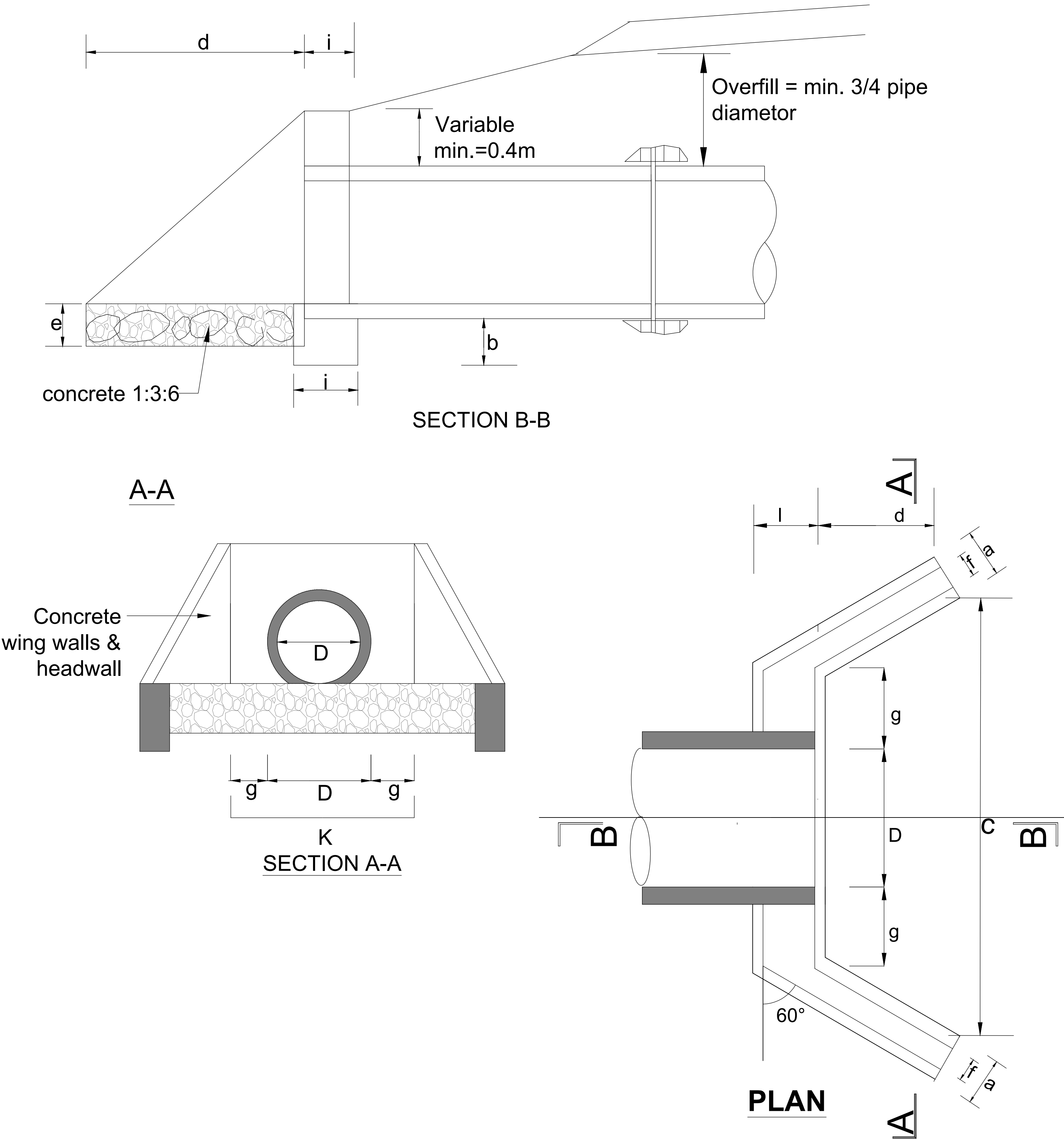
- GENERAL NOTES:
- 1. Final fill slopes 1:1
 - 2. Cutting backslopes may be steepened as instructed at culvert locations to minimise pipe extensions.
 - 3. Cutting Backslopes 2:3
 - 4. Width of side ditches 600Mm or wider as instruted by the Engineer.

Pavement Thickness

- GENERAL NOTES : GWC DESIGN THICKNESS
- 1. km0+000-Km 1+750- 500mm
 - 2. km1+750-Km 2+750- 350mm
 - 3. Km 2+750-Km 6+200- 500mm

TYPICAL CULVERT DRAWINGS

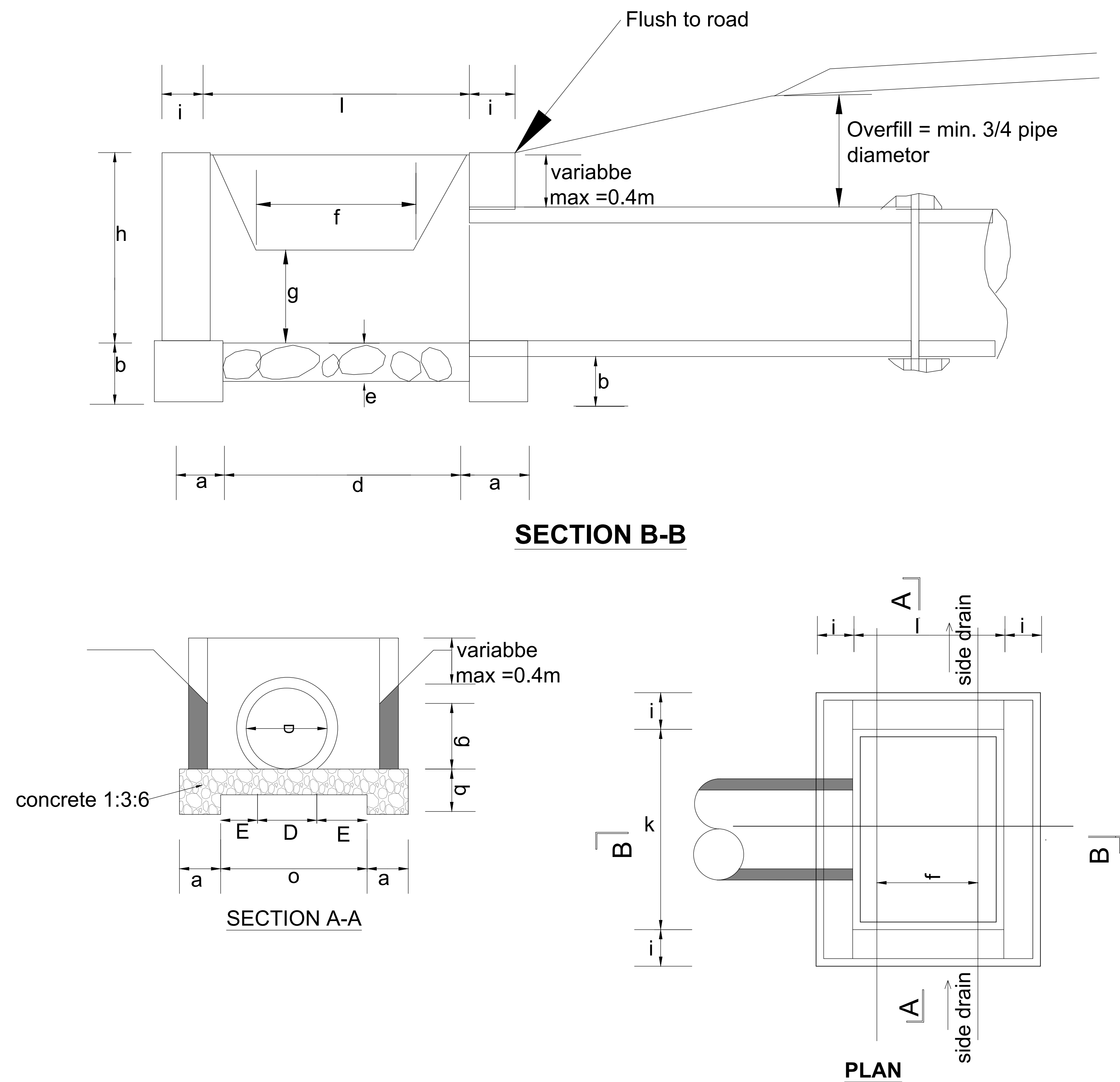
FIGURE H.8 - HEADWALL TYPE 1 (HEAD AND WINGWALLS)



DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS)			(STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION UNIT								
a	FOUNDATION	m	0.30	0.30	0.30	0.40	0.40	0.60
b	FOUNDATION	m	0.30	0.30	0.40	0.30	0.30	0.40
c	FOUNDATION		2.20	2.35	2.89	2.20	2.35	2.89
d	APRON	m	1.00	1.00	1.20	1.00	1.00	1.20
e	APRON	m	0.20	0.20	0.20	0.20	0.20	0.20
f	WALL	m	0.20	0.20	0.20	0.40	0.40	0.40
g	WALL	m	0.30	0.30	0.30	0.30	0.30	0.30
h	WALL	m	1.15	1.15	1.39	1.15	1.15	1.39
i	WALL	m	0.20	0.20	0.20	0.40	0.40	0.40
k	APRON	m	1.05	1.20	1.50	1.05	1.20	1.50
MATERIAL REQUIREMENT								
FOUNDATION								
	(Concrete)	m3	0.3	0.32	0.51	0.4	0.42	1.03
HEAD/WINGWALLS								
	(Concrete/)	m3	0.4	0.47	0.67	0.8	0.93	1.35
APRON								
	(Concrete)	m3	0.33	0.36	0.53	0.33	0.36	0.53

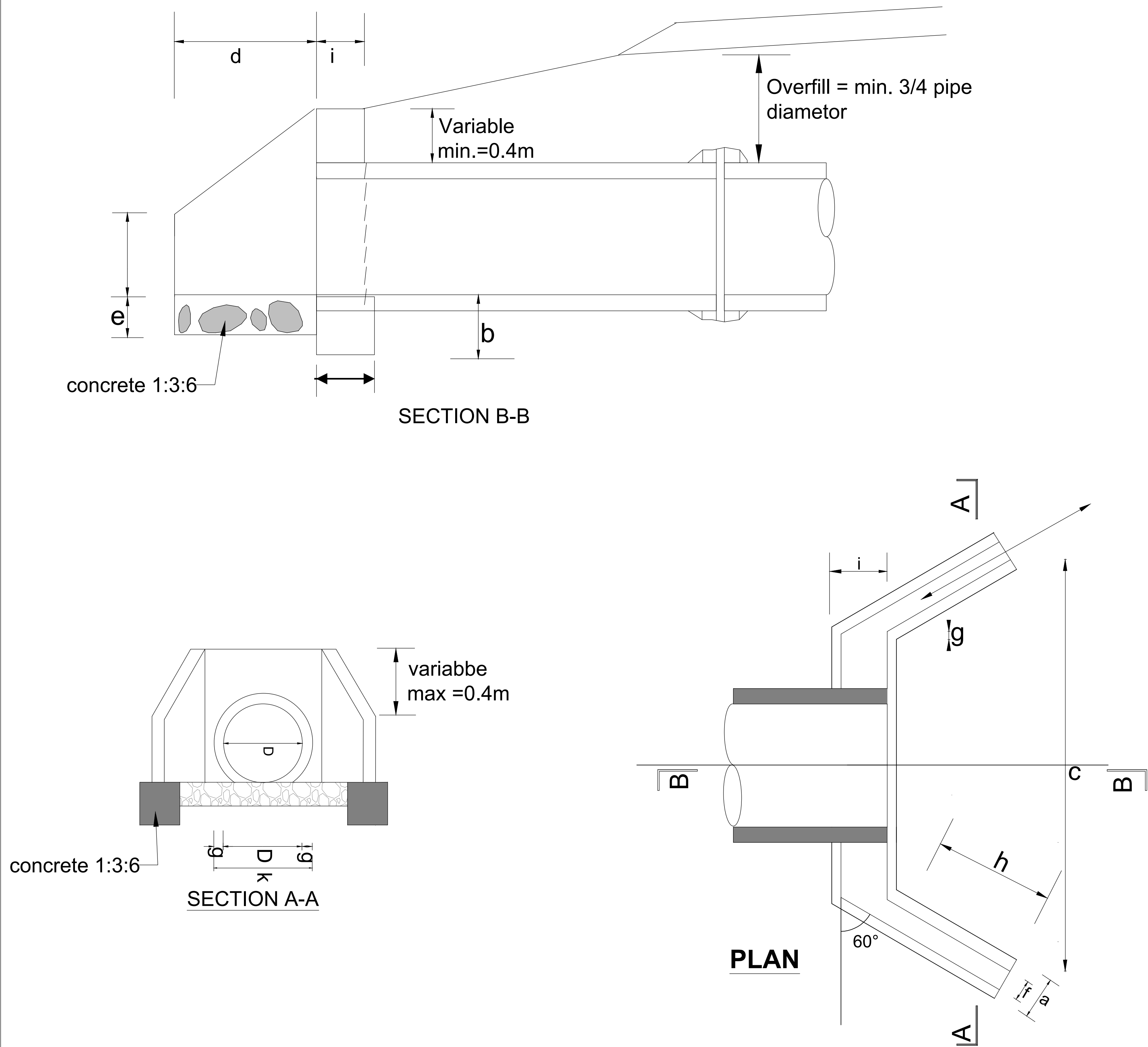
FIGURE H.9 - HEADWALL TYPE 2 (DROP INLETS)



DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS)			(STONE MASONRY)		
DIMENSION	UNIT		450	600	900	450	600	900
a	FOUNDATION	m	0.30	0.30	0.30	0.40	0.40	0.40
b	FOUNDATION	m	0.30	0.30	0.30	0.30	0.30	0.30
c	FOUNDATION	m	1.10	1.10	1.40	1.20	1.20	1.50
d	APRON	m	0.90	0.90	0.90	1.00	1.00	1.00
e	APRON	m	0.20	0.20	0.20	0.20	0.20	0.20
f	DROP INLET	m	0.60	0.60	0.60	0.60	0.60	0.60
g	DROP INLET	m	0.30	0.40	0.60	0.30	0.40	0.60
h	DROP INLET	m	0.60	0.80	1.20	0.60	0.80	1.20
l	DROP INLET	m	0.20	0.20	0.20	0.40	0.40	0.40
k	DROP INLET	m	1.20	1.20	1.50	1.20	1.20	1.50
l	DROP INLET	m	1.00	1.00	1.00	1.00	1.00	1.00
m	DROP INLET	m	0.38	0.30	0.30	0.38	0.30	0.30
MATERIAL REQUIREMENT								
FOUNDATION								
(Concrete)	m3		0.47	0.47	0.52	0.72	0.72	0.79
HEAD/WINGWALLS								
(Concrete/Masonry)	m3		0.53	0.69	1.11	1.24	1.63	2.61
APRON								
(Concrete)	m3		0.24	0.24	0.30	0.24	0.24	0.30

FIGURE H.12 - HEADWALL TYPE 4 (FOR ACCESS CULVERT)



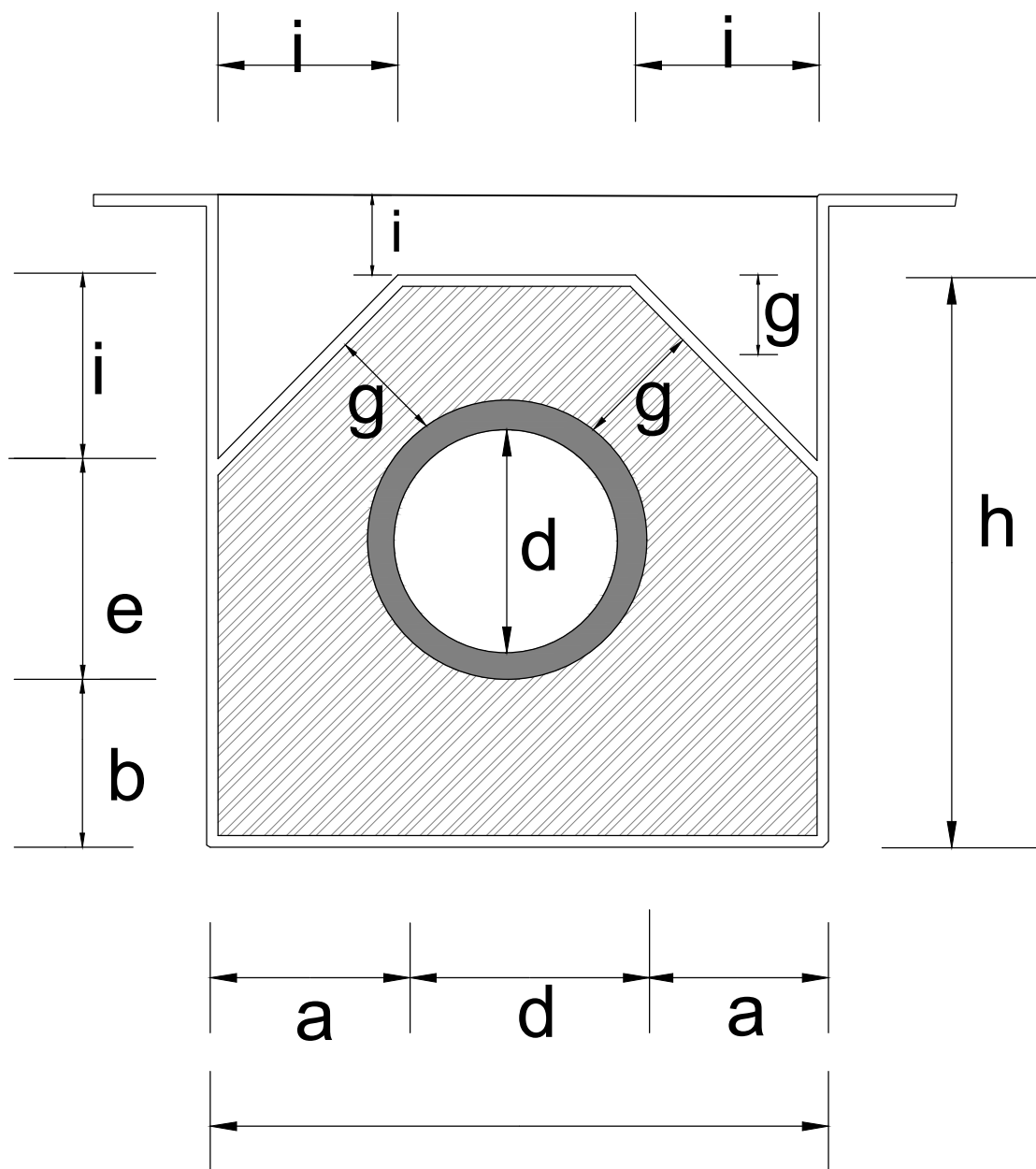
DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)		TYPE A (CONCRETE BLOCKS)			TYPE B (STONE MASONRY)		
		450	600	900	450	600	900
DIMENSION	UNIT						
a	FOUNDATION	m	0.30	0.30	0.40	0.40	
b	FOUNDATION	m	0.30	0.30	0.30	0.30	
c	APRON		1.34	1.49	1.34	1.49	
d	APRON	m	0.60	0.60	0.60	0.60	
e	APRON	m		0.20	0.20	0.20	
f	WINGWALLS	m	0.20	0.20	0.40	0.40	
g	WINGWALLS	m	0.10	0.10	0.10	0.10	
h	HEADWALLS	m	0.69	0.69	0.69	0.69	
i	HEADWALLS	m	0.20	0.20	0.40	0.40	
k	HEADWALLS	m	0.65	0.80	0.65	0.80	
l	HEADWALLS	m	0.40	0.40	0.40	0.40	
MATERIAL REQUIREMENT							
FOUNDATION							
(Concrete 1:2:4, 1:3:6)	m3	0.18	0.2		0.24	0.26	
HEAD/WINGWALLS							
(Concrete/Masonry)	m3	0.25	0.29		0.50	0.58	
APRON							
	m3	0.12	0.14		0.12	0.14	

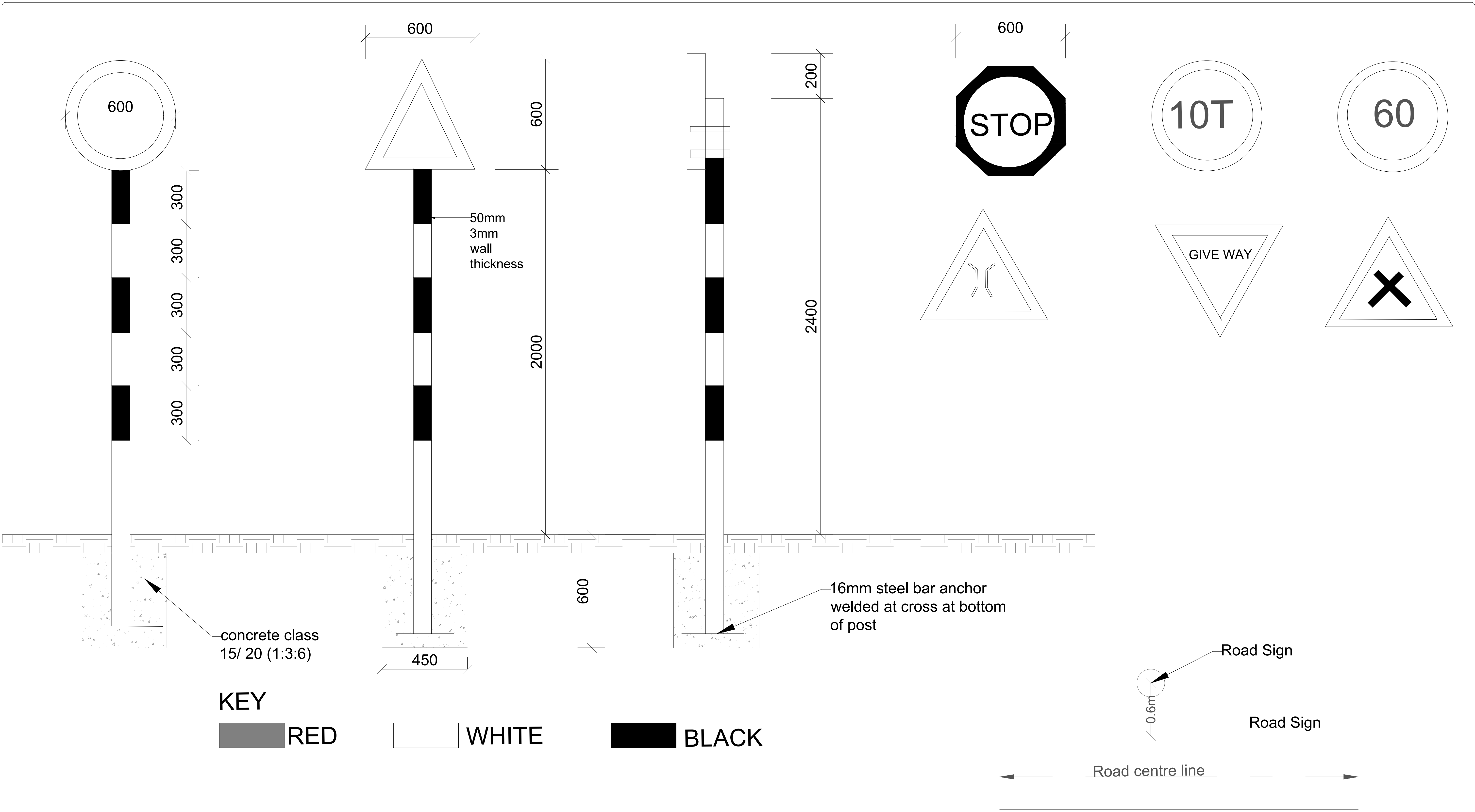
FIGURE H.14-BEDDING AND HAUNCH PROFILES TYPE III& IV

PROFILE IV

(CONCRETE)



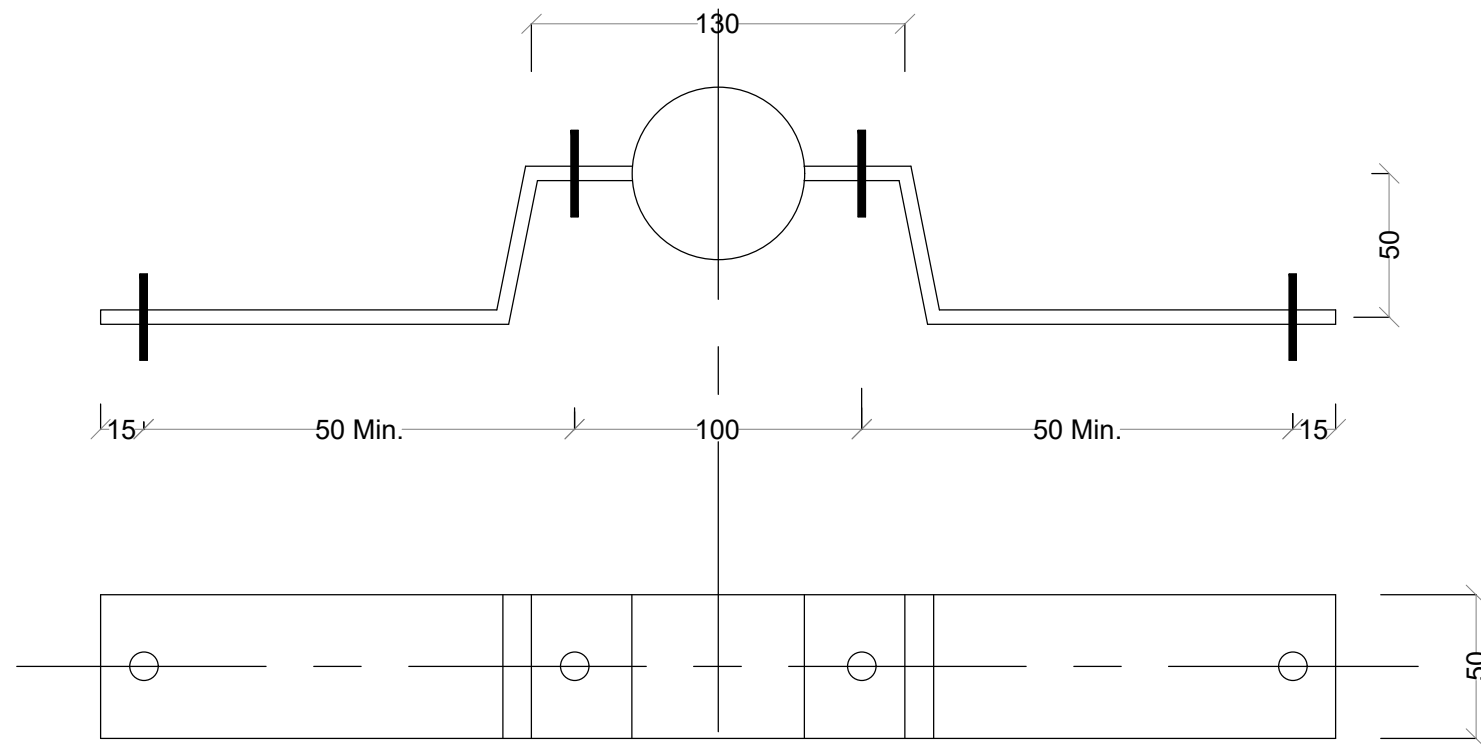
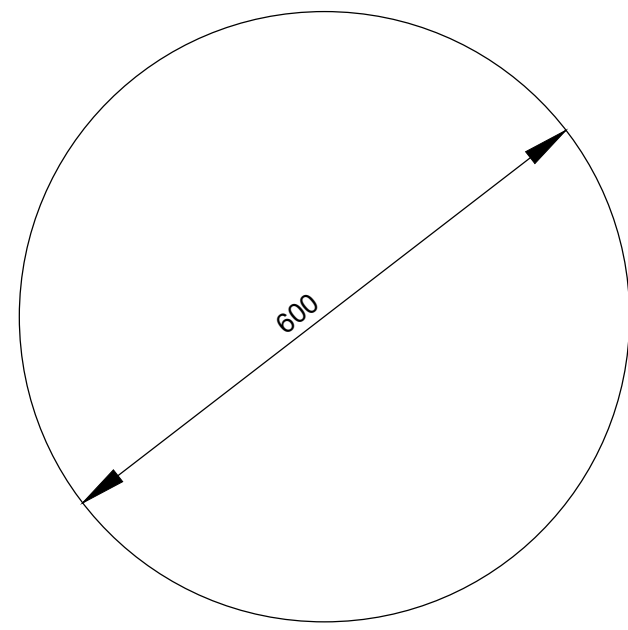
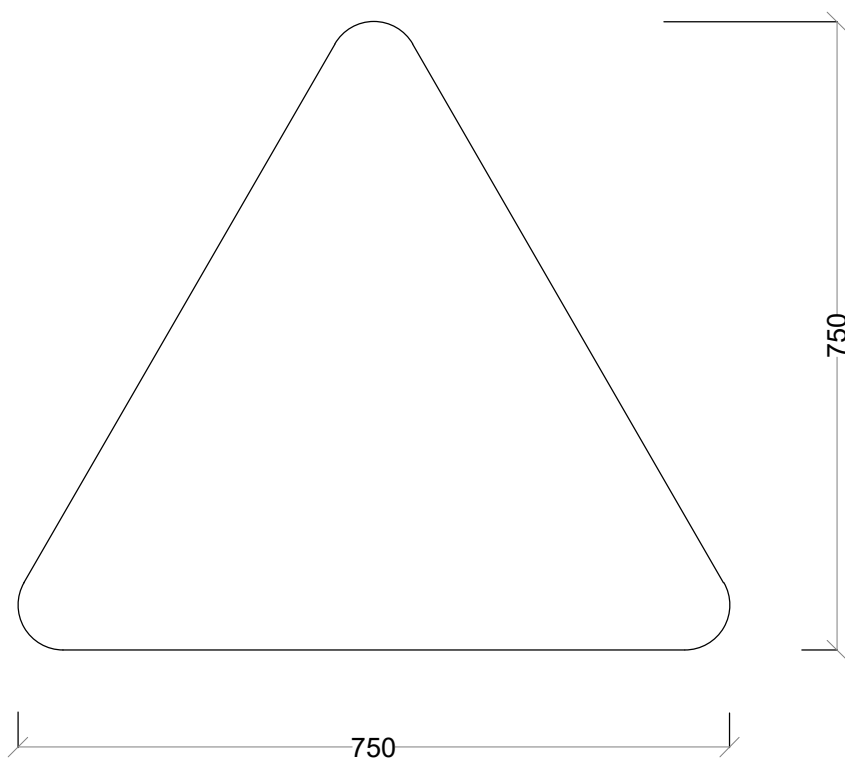
450 (mm)	600 (mm)	900 (mm)
Dimensions in (m)		
0.15	0.2	0.2
0.15	0.15	0.15
0.86	0.15	1.48
0.56	0.72	1.08
0.46	0.15	0.78
0.15	0.15	0.15
0.15	0.15	0.15
0.81	1.02	1.38
0.28	0.35	0.45
volume in (m3/m)		
0.37	0.61	0.92
-fair to poor subgrade condition -overfill >$\frac{3}{4}$ Dia; -Seasonal waterflow only. -Use gravel material for. -backfill/overfill.		



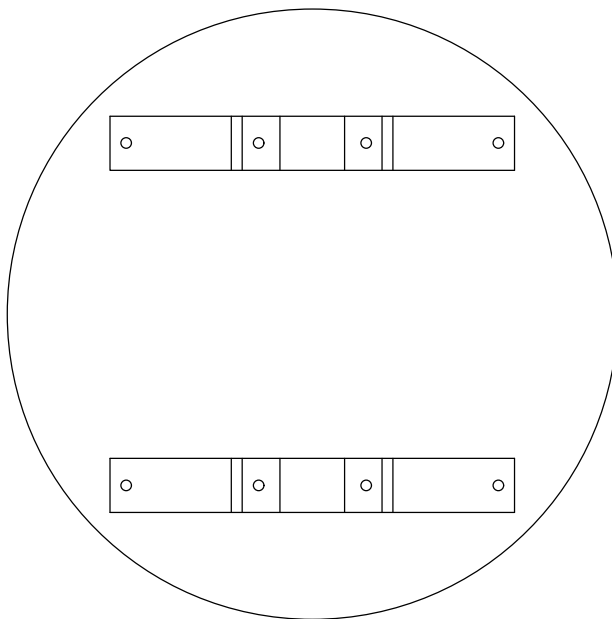
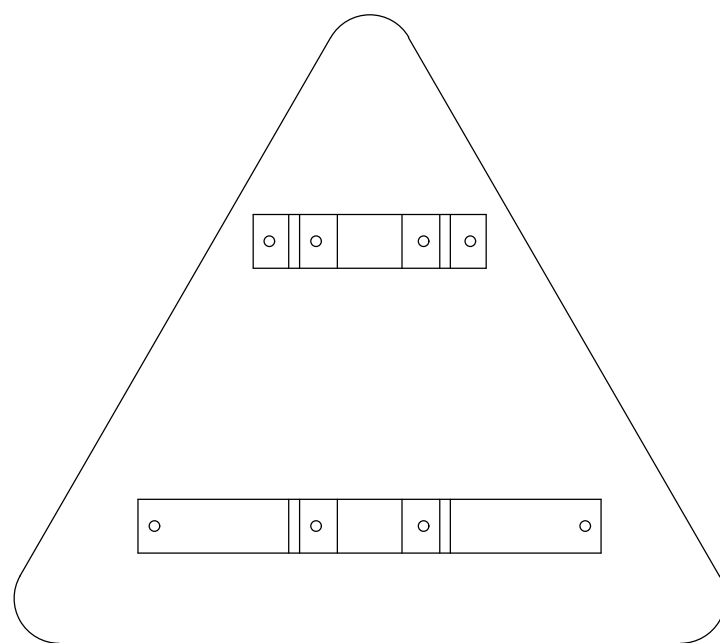
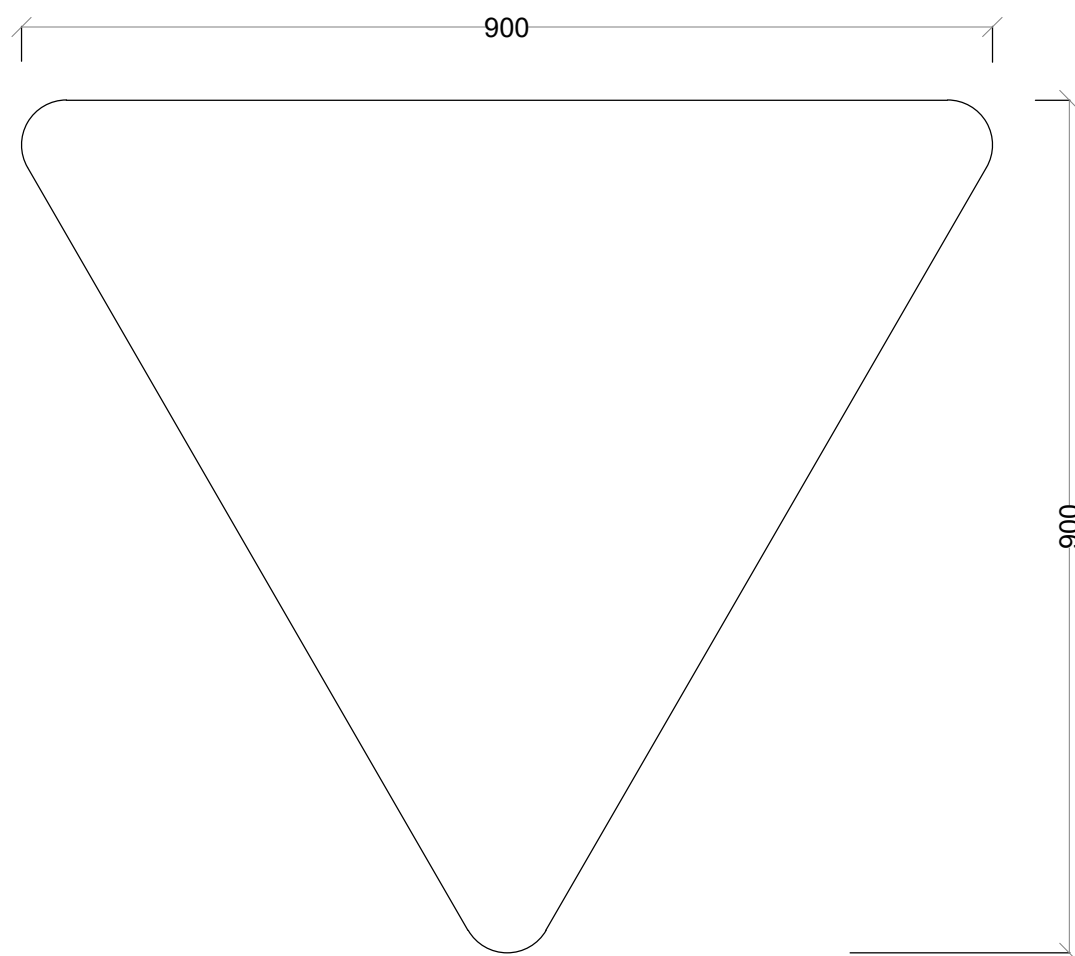
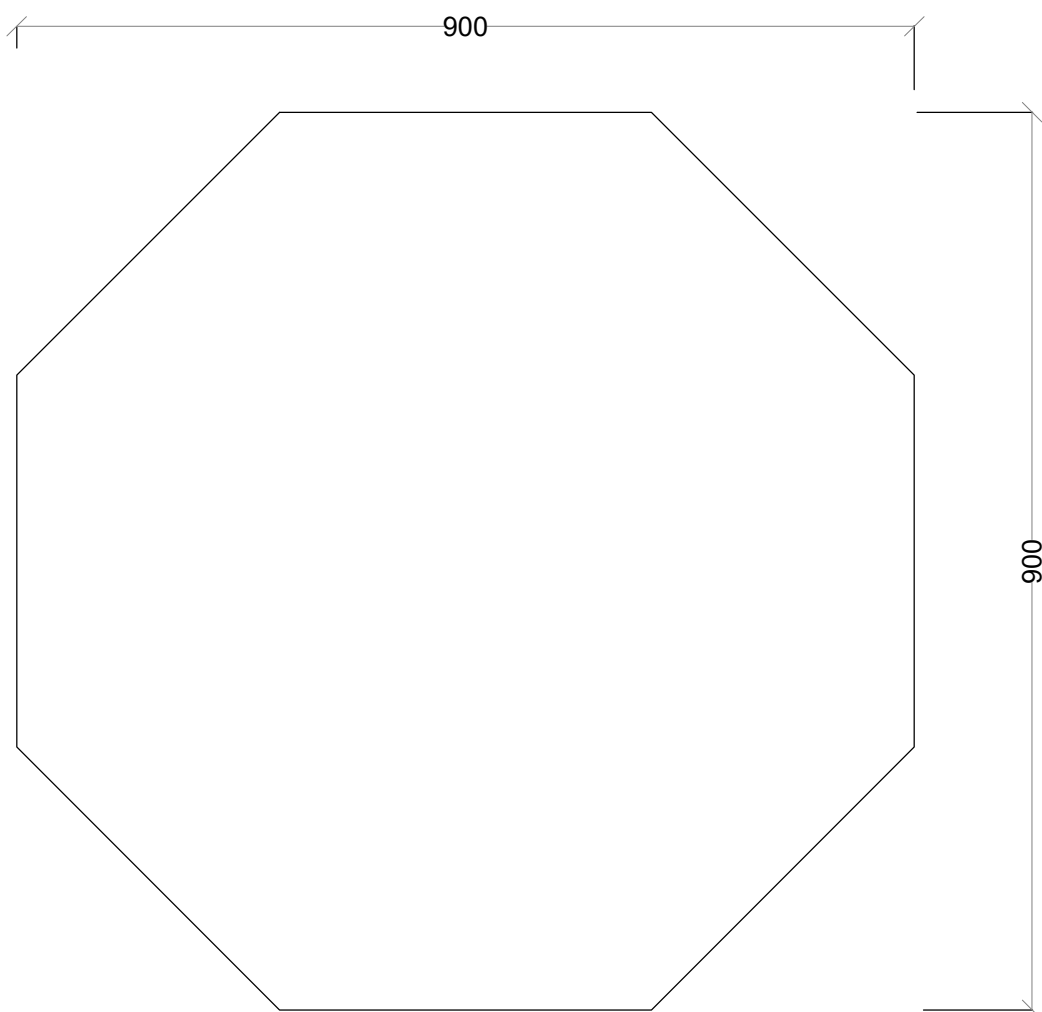
- 1.The type of sign required and their location shall de shown as road plan or as directed by engineer
- 2.signs plate to be 2mm thick mild steel plate
- 3.sign post to be 50mm fixing clamp/brackets
- 4.Sign plate to be fixed to steel tube by \$Nos M10 bolts and 50mm fixing clamp/brackets
- 5,Sign paints shall be reflective
- 6.The sign plate and post shall be treated by applying two coats of lead red oxide paint before applying a priming and two finish coats of approved paints. Paints used shall have a hard,durable and glossy finish.

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: DRAFT DETAILED ENGINEERING DESIGN OF SOSSIAN - MOUWARAK ROAD BATCH 2	DRAWING TITLE: CULVERT ROAD SIGNS	DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N Scale: NTS	Drg No. CE1045/CDS/SM/O5 Date : DECEMBER 2024	

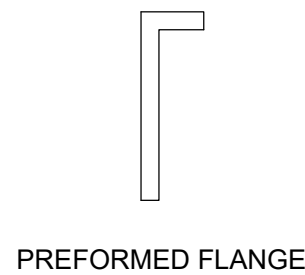
STANDARD DRAWINGS



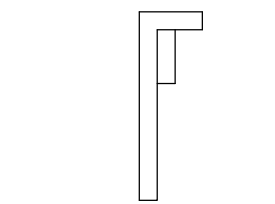
FIXING BRACKET DETAIL
SCALE 1:2.5



TYPICAL FIXING DETAILS
SCALE 1:25



PREFORMED FLANGE

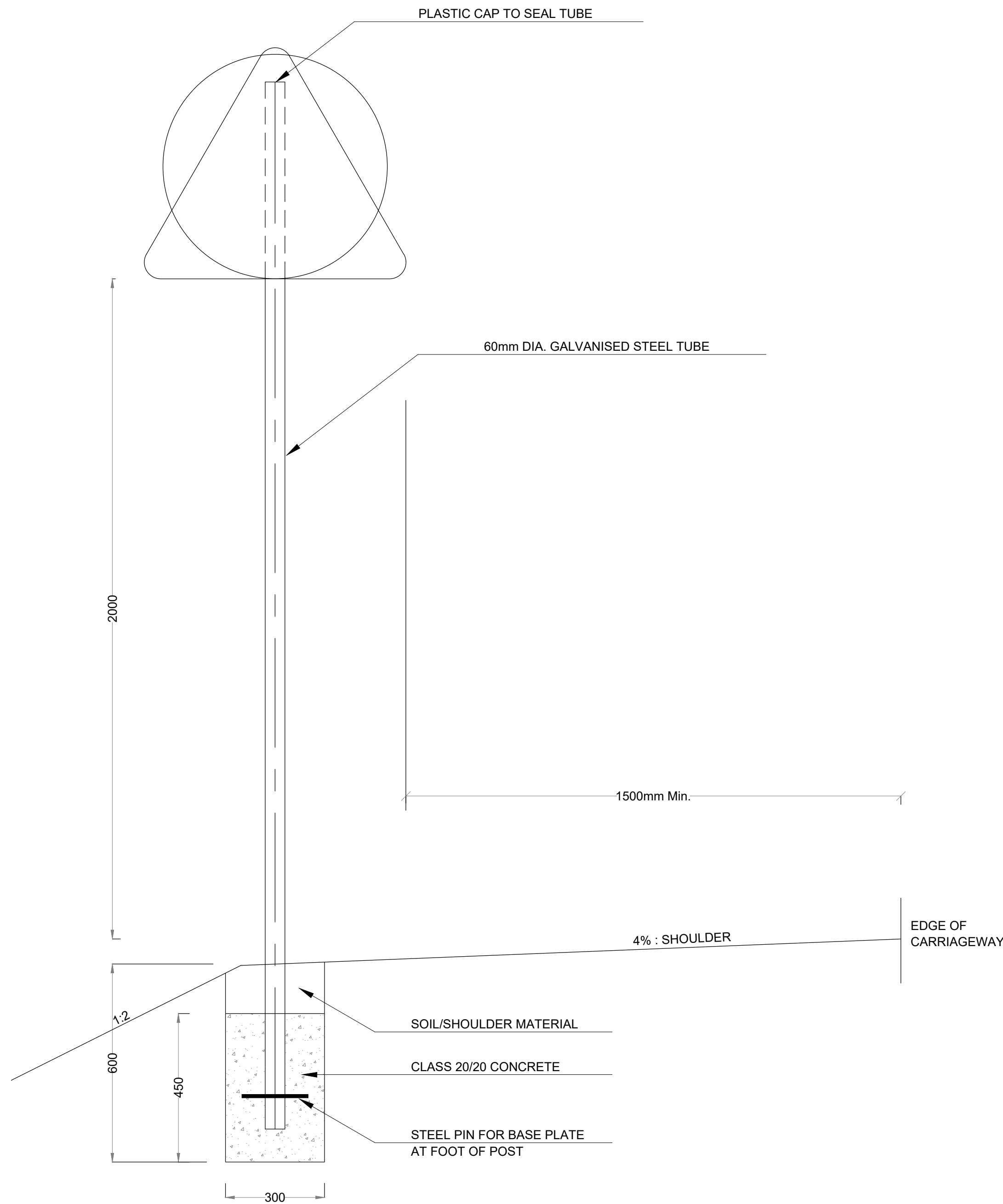


ANGLE STIFFENING

STIFFENING TO SIGNS
SCALE 1:20

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL ROAD SIGNS ARE 3mm ALUMINIUM PLATES WITH REFLECTIVE MATERIALS.
3. PLASTIC WASHERS TO BE PLACED BETWEEN ALUMINIUM SIGNS AND STEEL BRACKETS.
4. ALL SIGN SUPPORTS AND FITTINGS TO BE GALVANISED MILD STEEL.
5. THE ENDS OF BOLTS TO BE HAMMERED OR SPOT WELDED.
6. ALL WHITE, RED, BLUE AND YELLOW PARTS ON SIGNS TO BE MADE OF RETRO-REFLECTIVE MATERIAL.
7. THE WIDTHS OF SIGN MARKINGS TO BE AS FOLLOWS:
RED BORDERS TO STANDARD SIGNS - 75mm
RED STRIPES ON COUNT DOWN SIGNS - 75mm
RED BORDER TO PRIORITY TRIANGLE SIGNS - 100mm
RED BORDER TO PROHIBITORY SIGNS - 50mm
RED BORDERS TO CRUCIFORM LEVEL "X" - 60mm
WHITE BORDER TO PRIORITY (OCTAGON) - 50mm
YELLOW STRIPES ON HAZARD SIGNS - 100mm.
BLACK STRIPES ON HAZARD SIGNS - 200mm.



SIGN PLACEMENT
SCALE 1:25

REVISIONS	No.	DATE	DESCRIPTION



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Consultant:



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3, Kindaruma Road (Off Ngong Road)
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Tel. (020) 2717213/4

PROJECT TITLE:

DRAFT DETAILED ENGINEERING DESIGN OF
SOSSIAN - MOUWARAK (ROAD) BATCH 2

DRAWING TITLE:

STANDARD DRAWING -
STANDARD - ROAD SIGNS

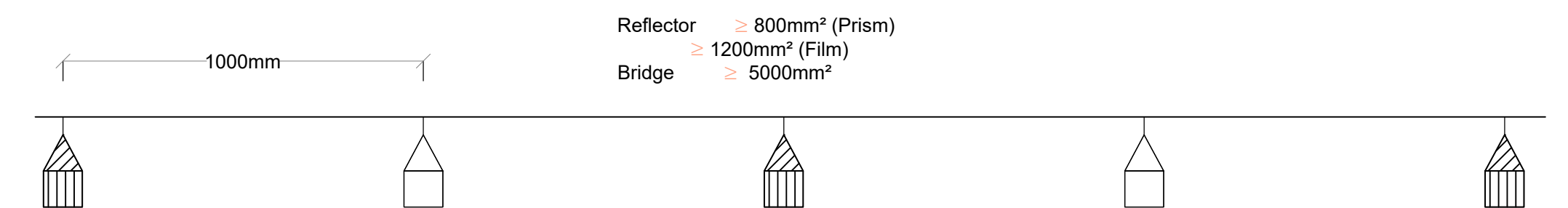
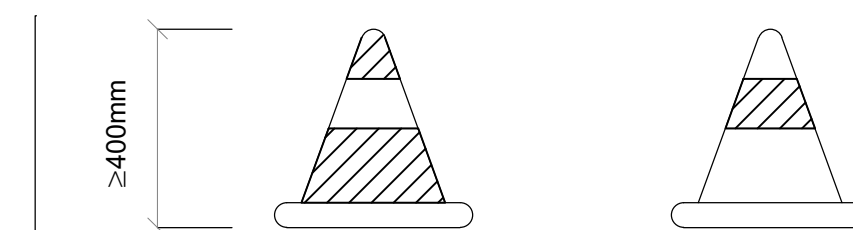
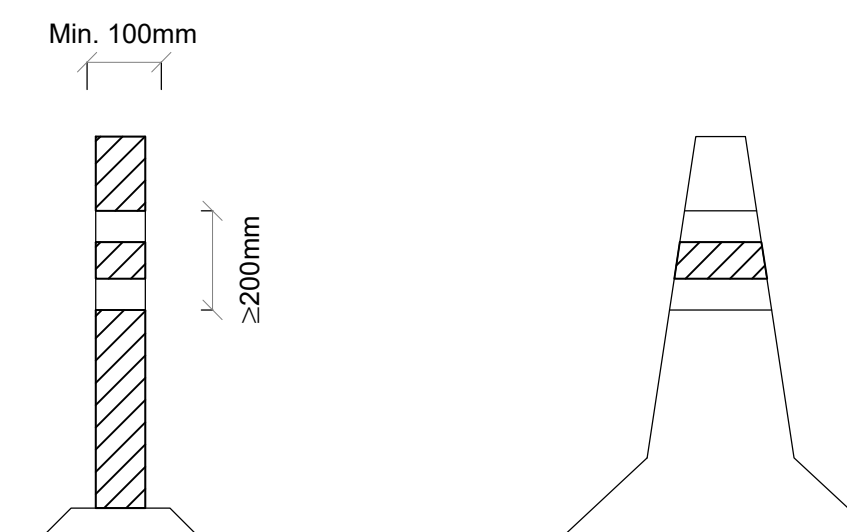
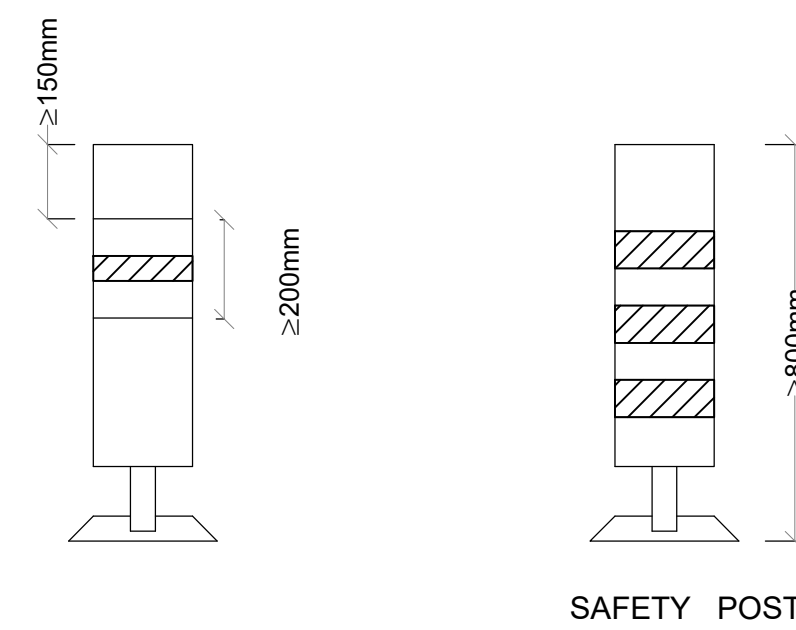
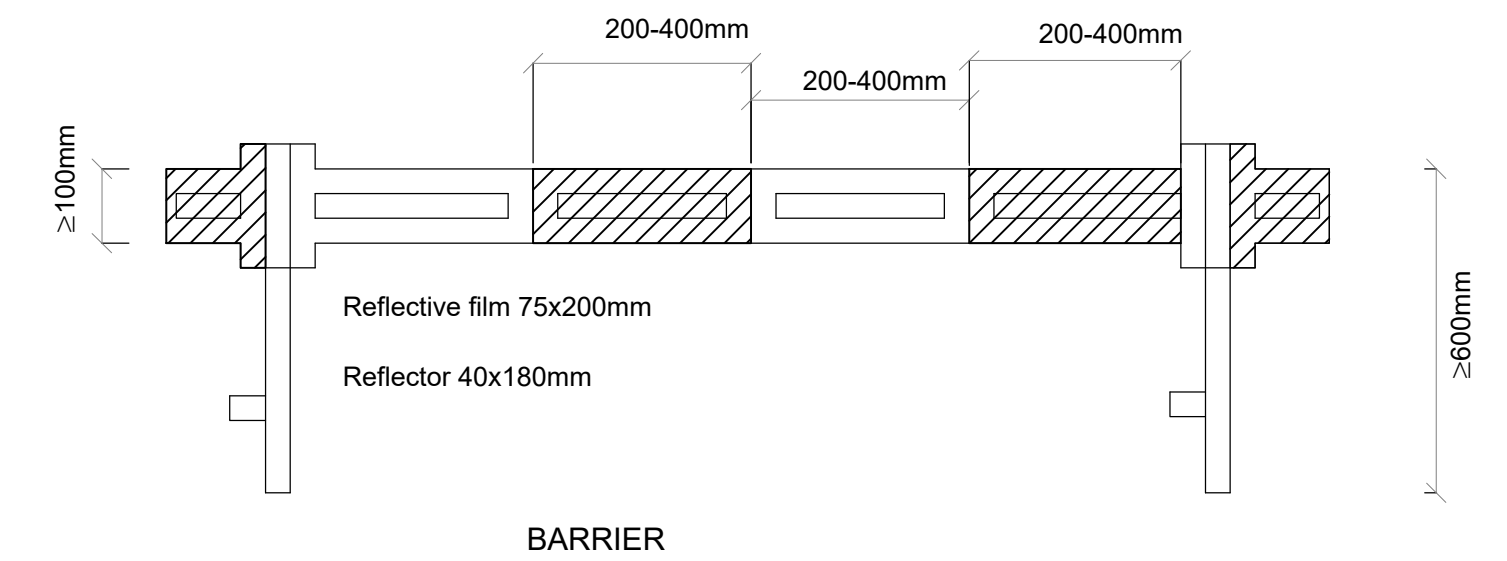
DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.J.N

Scale: AS SHOWN

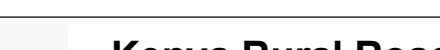
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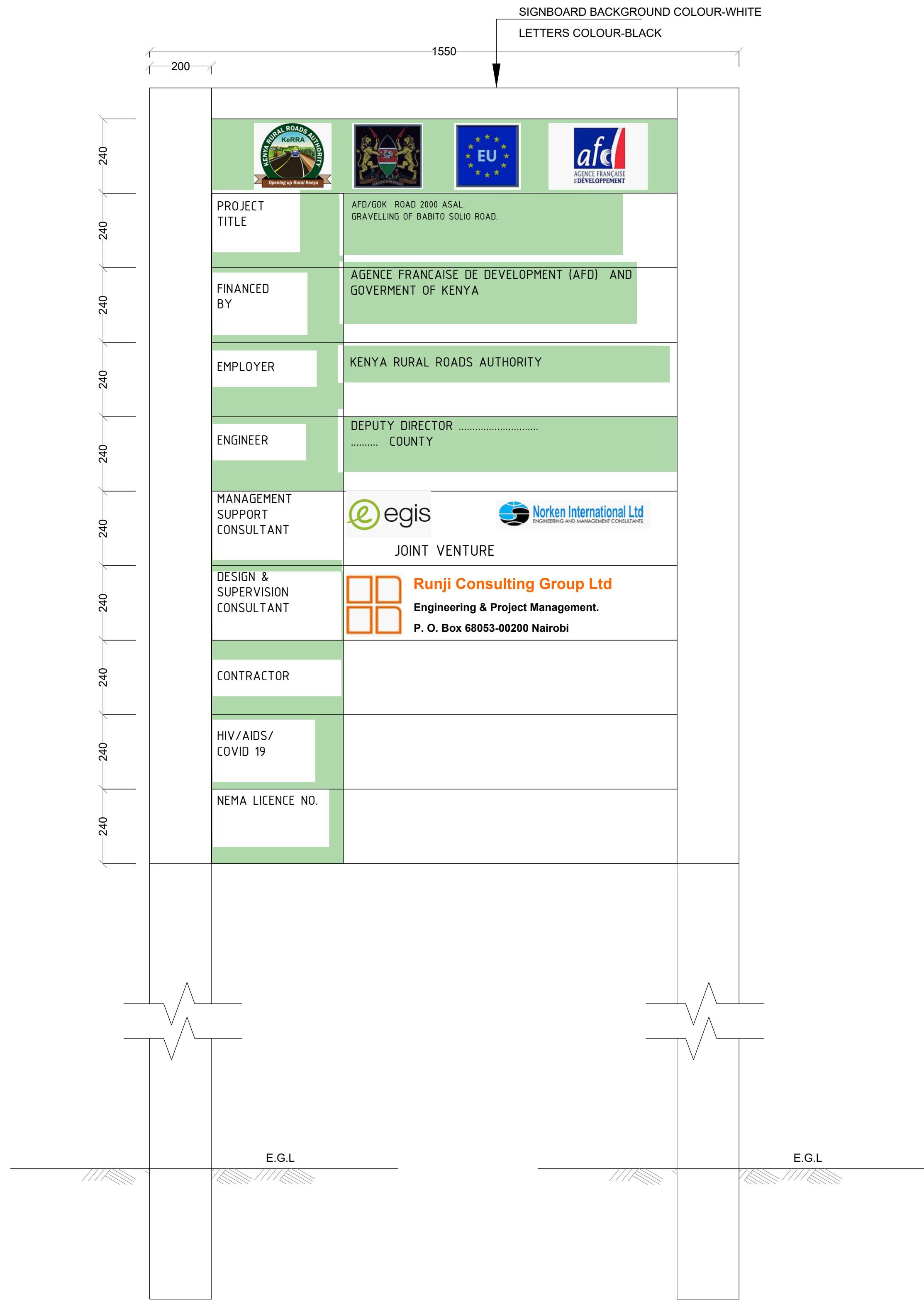
CE1045/SD/SM/01

Date : DECEMBER 2024

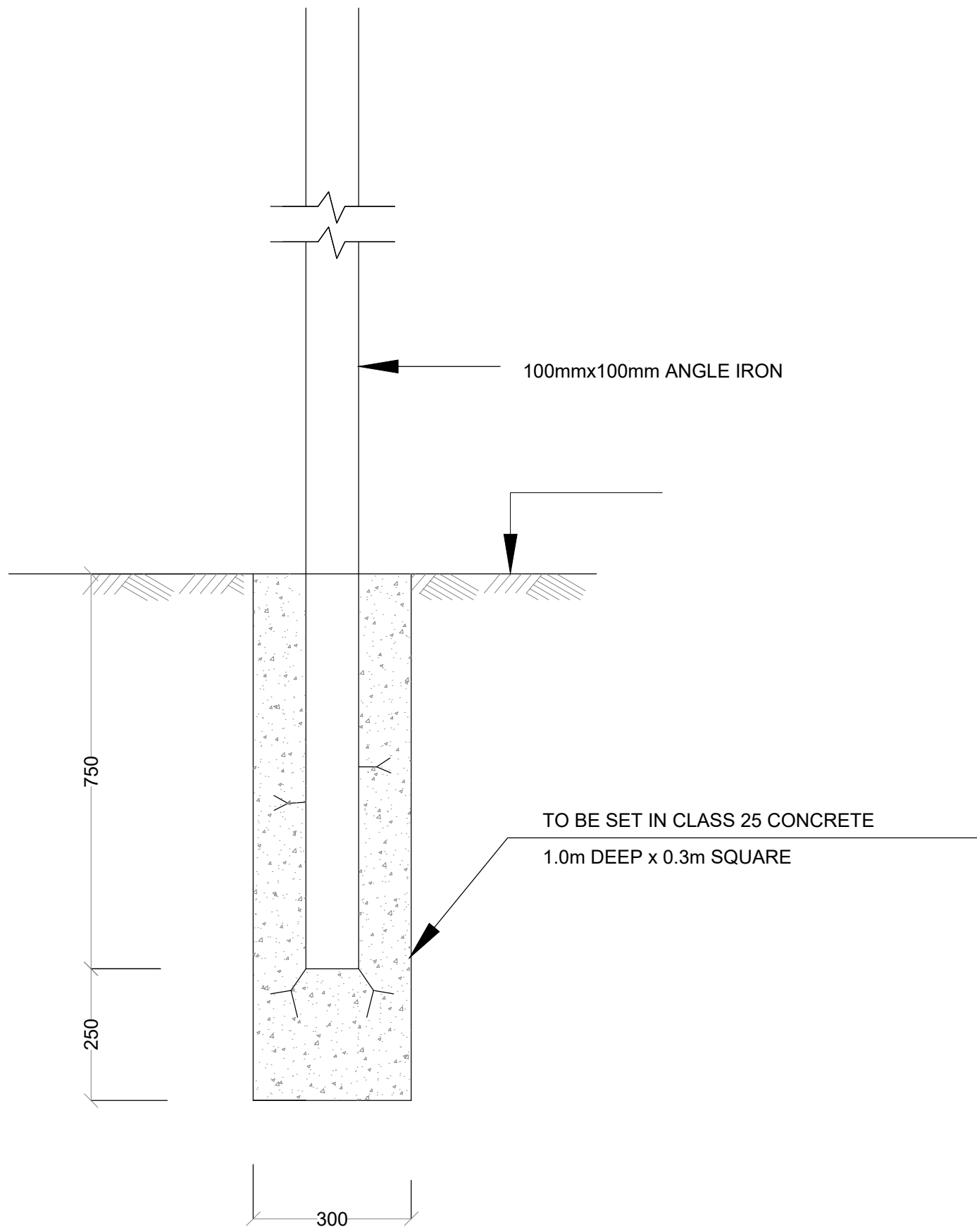


- NOTES:**
1. All temporary signs must be retro-reflective
 2. Numbers, lettering and colours to be in accordance with the Manual of Traffic Signs in Kenya Part II (JUNE 1975)
 3. Marker posts to be unbreakable plastic or glass fibre vergemaster or similar
 4. All signs must be kept clean and visible at all times.
 5. Sketches shown on this drawing are the minimum requirements, signs may be varied or adjusted as directed by the Resident Engineer to suit each particular site
 6. Fences and barriers shall be provided as directed by the Resident Engineer to separate pedestrians and traffic where they will need to use road or deviation for access
 7. All works and temporary signs are to comply with the requirements of Section 9 of the Standard Specification

No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL	Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE:	DRAWING TITLE: STANDARD DRAWING - TRAFFIC MANAGEMENT	DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/SD/SM/03	
REVISIONS				DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)						
								Scale: AS SHOWN	Date : DECEMBER 2024	



- NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
 2. SPACING BETWEEN LINES TO BE 50mm.
 3. SPACING BETWEEN EDGE AND LINE TO BE 50mm.
 4. ALL STEEL POSTS TO BE TO BS 3049 CLASS 'A' (HOT ROLLED).
 5. THE FINISH TO BE HOT DIP GALVANIZED TO BS 729.
 6. ALL BOLTS SHALL BE BUTTON-HEADED AND GALVANISED.



SIGNBOARD FIXING DETAIL
SCALE: 1:100

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