



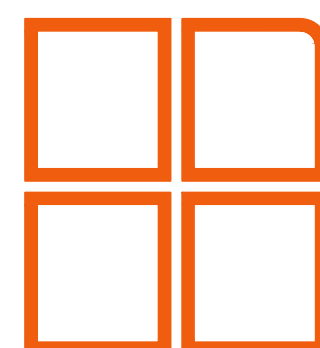
CLIMATE PROOFED ARID AND SEMI ARID RURAL ROADS, FINAL DESIGN OF BABITO SOLIO ROAD BATCH 2

MARCH 2025

EMPLOYER

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

CONSULTANT



Runji Consulting Group Ltd

3, Kindaruma Road, (Off Ngong Road)
P.O.Box 68053 - 00200 Nairobi, Kenya
Tel: (020) 271 72 13/4/271 30 66
Cell: +254 722 751 889/ +254 735 677627
Email: info@runji.co.ke Web: www.runji.co.ke

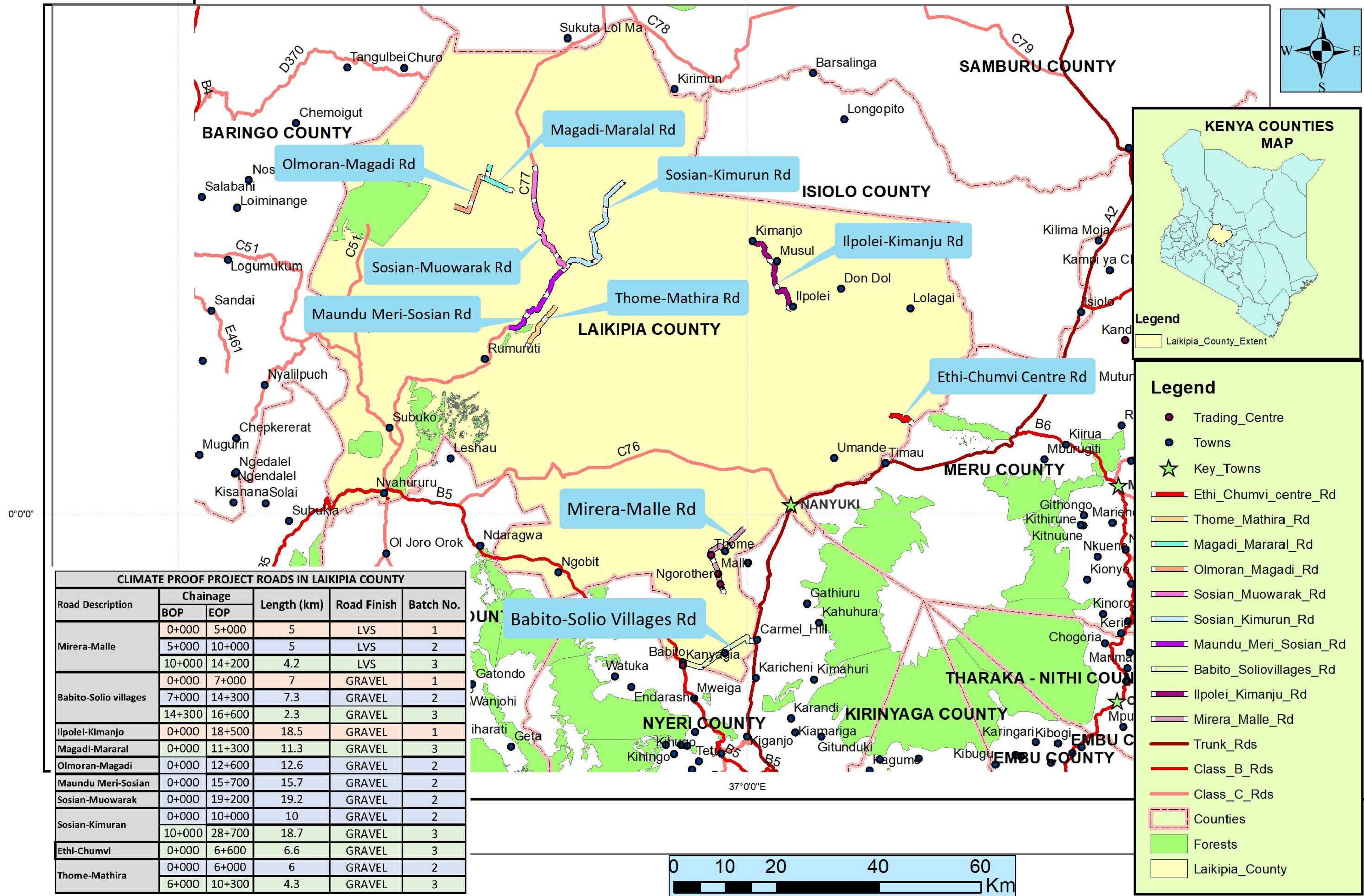
ENGINEER

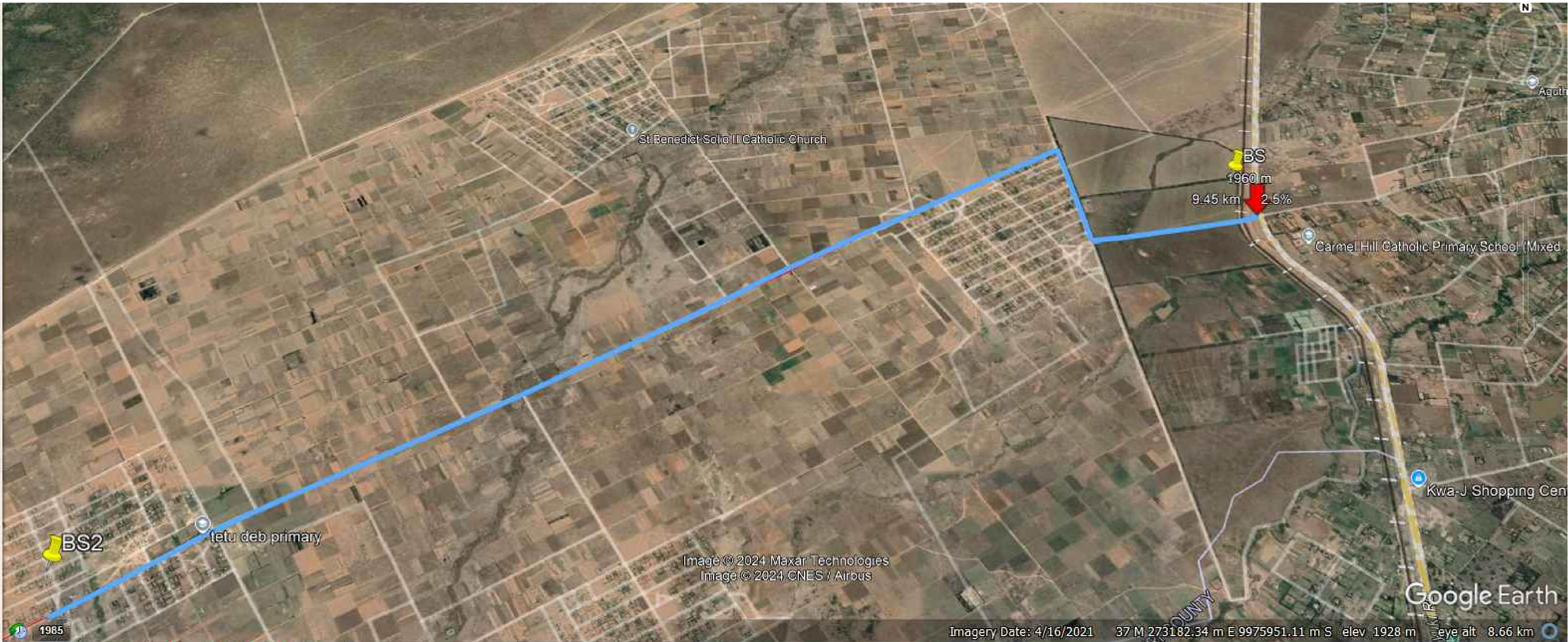
**DIRECTOR
PLANNING, DESIGN & ENVIRONMENT
P.O BOX 48151-00100,
NAIROBI, Kenya**

	BABITO SOLIO ROAD BATCH 2 DRAWINGS
	COVER PAGE
	DRAWING LIST
	GENERAL DRAWINGS
CE1045/GD/BS/01	LOCATION MAP
CE1045/GD/BS/01	BABITO SOLIO SKETCH MAP
CE1045/GD/BS/01	GENERAL LAYOUT (SHEET 1 OF 2) CHAINAGE 7+140 - 11+600
CE1045/GD/BS/02	GENERAL LAYOUT (SHEET 2 OF 5) CHAINAGE 11+600 - 16+668
CE1045/GD/BS/03	
	TYPICAL CROSS-SECTION
CE1045/TD/BS/01	TYPICAL CROSS-SECTION
	TYPICAL CULVERT DRAWINGS
CE1045/CDS/BS/O1	HEADWALL TYPE 1 (HEADWALL AND WINGWALLS)
CE1045/CDS/BS/O2	HEADWALL TYPE 2 (DROP INLETS)
CE1045/CDS/BS/O3	HEADWALL TYPE 4 (FOR ACCESS CULVERT)
CE1045/CDS/BS/O4	BEDDING AND HAUNCH PROFILES TYPE III& IV
CE1045/CDS/BS/O5	CULVERT ROAD SIGNS
	STANDARD DRAWINGS
CE1045/SD/BS/01	STANDARD DRAWING - STANDARD - ROAD SIGNS
CE1045/SD/BS/02	STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION
CE1045/SD/BS/03	STANDARD DRAWING - STANDARD - TRAFFIC MANAGEMENT
CE1045/SD/BS/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
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:

DRAFT DETAILEDENGINEERING DESIGN OF
BABITO SOLIO BATCH 2

DRAWING TITLE:

BABITO SOLIO
SKETCH MAP

DRAWN BY: M.M
DESIGNED BY: C.N.M
CHECKED BY: M.J.N

Scale: 1:5000

Drg No.

CE1045/GD/KG/01

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)	



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 DETAILEDENGINEERING DESIGN OF KACHULU GOTU BATCH 2
----------------	---

DRAWING TITLE:	GENERAL LAYOUT SHEET 1 OF 2 CHAINAGE 7+140 - 11+600
----------------	---

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



REVISIONS	No.	DATE	DESCRIPTION



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P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	

Consultant:



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

PROJECT TITLE:

DRAFT DETAILEDENGINEERING DESIGN OF
KACHULU GOTU BATCH 2

DRAWING TITLE:

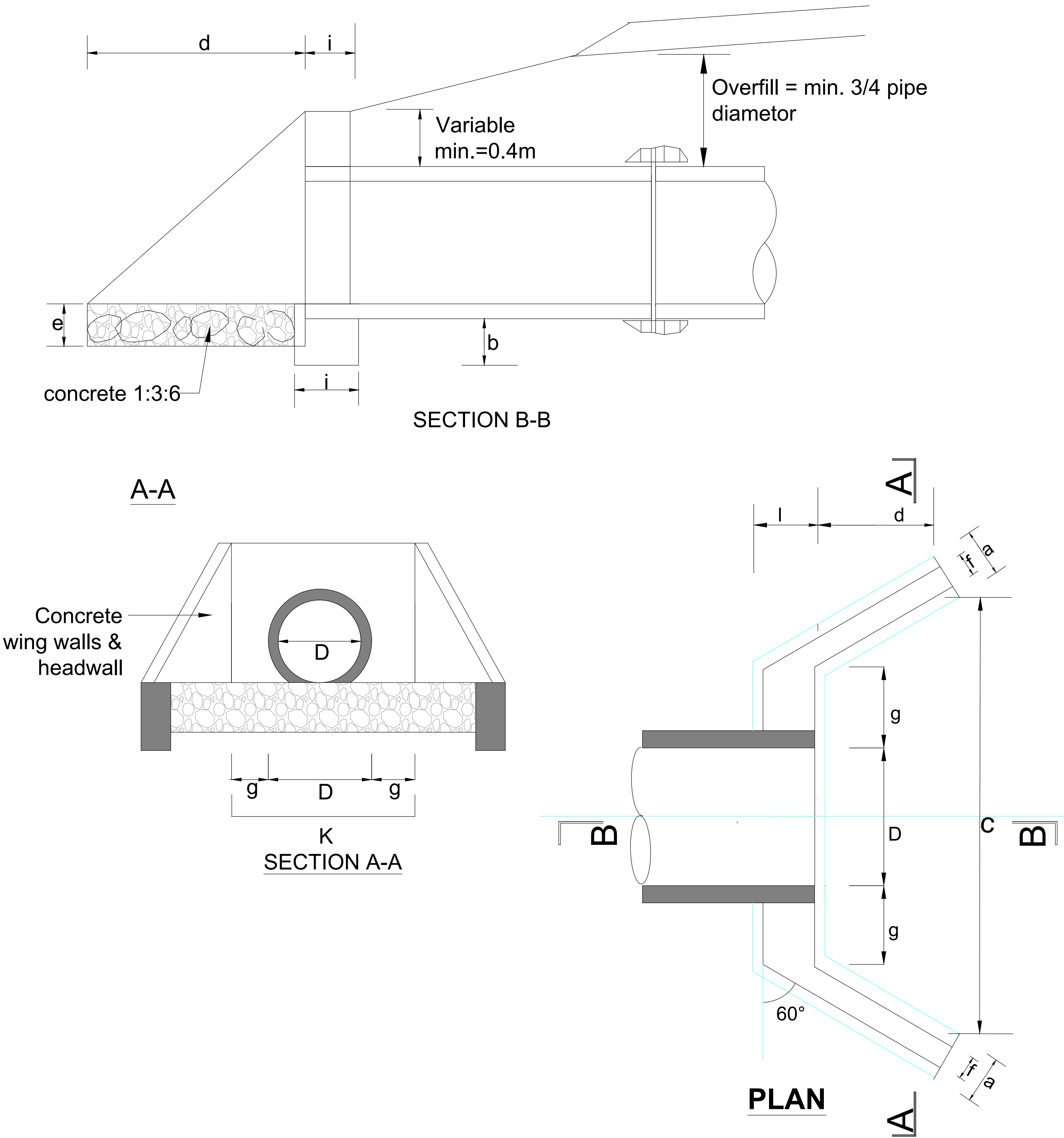
GENERAL LAYOUT
SHEET 2 OF 2
CHAINAGE 11+600 - 16+668

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

TYPICAL CROSS-SECTION

TYPICAL CULVERT DRAWINGS

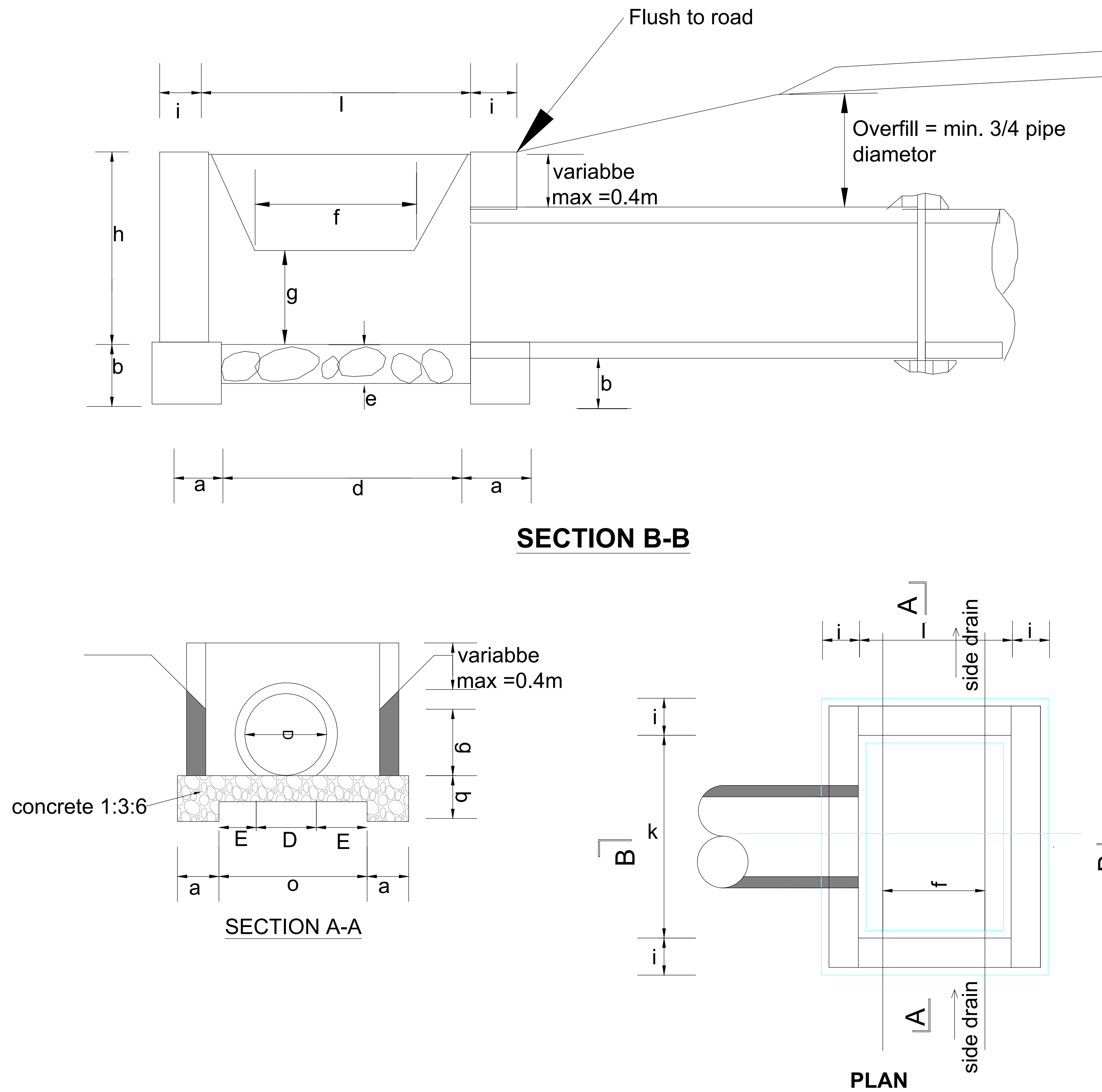
FIGURE H.8 - HEADWALL TYPE 1 (HEAD AND WINGWALLS)



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

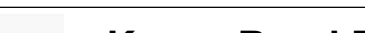
FIGURE H.9 - HEADWALL TYPE 2 (DROP INLETS)



DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS)			(STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION	UNIT							
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

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:



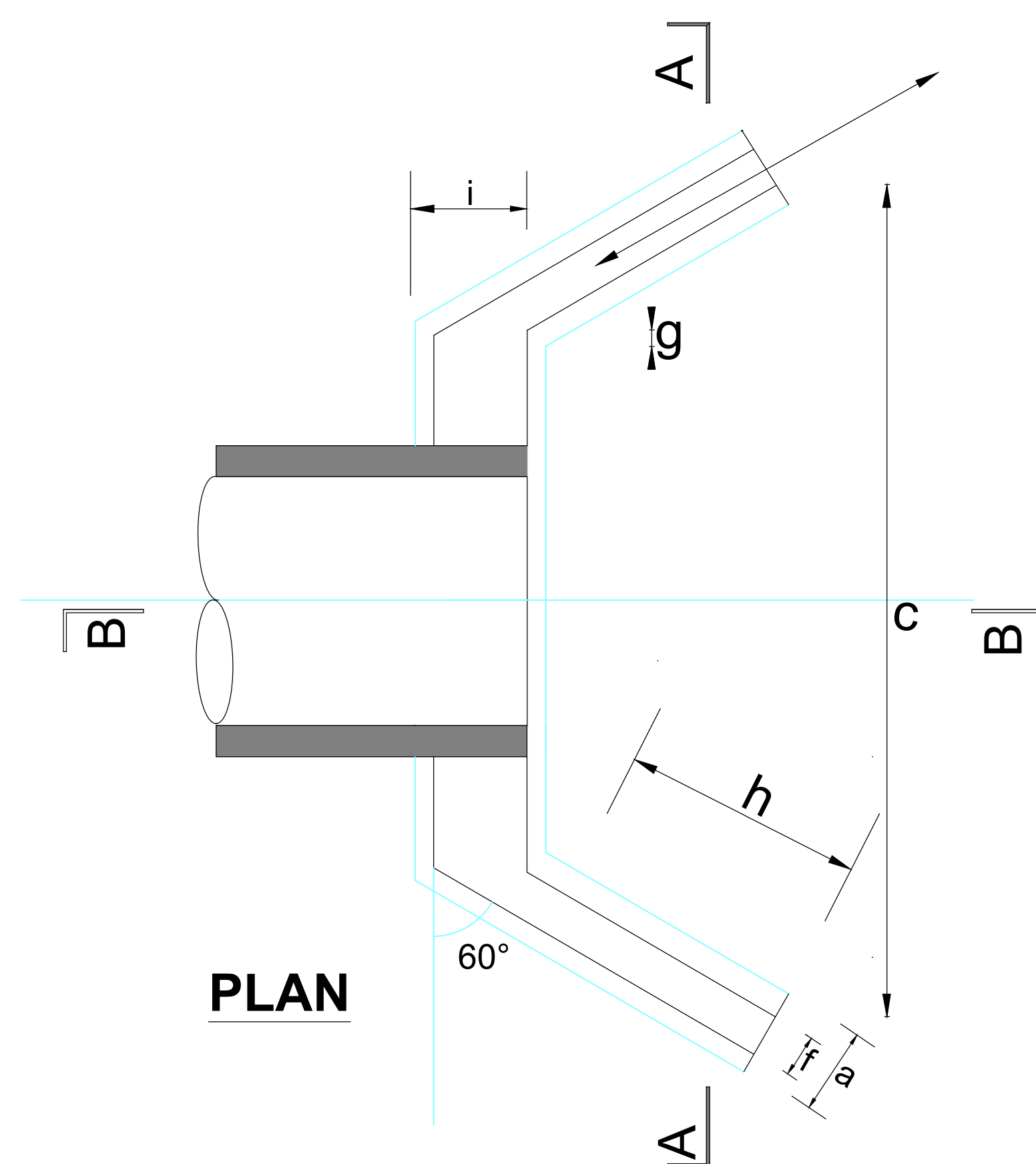
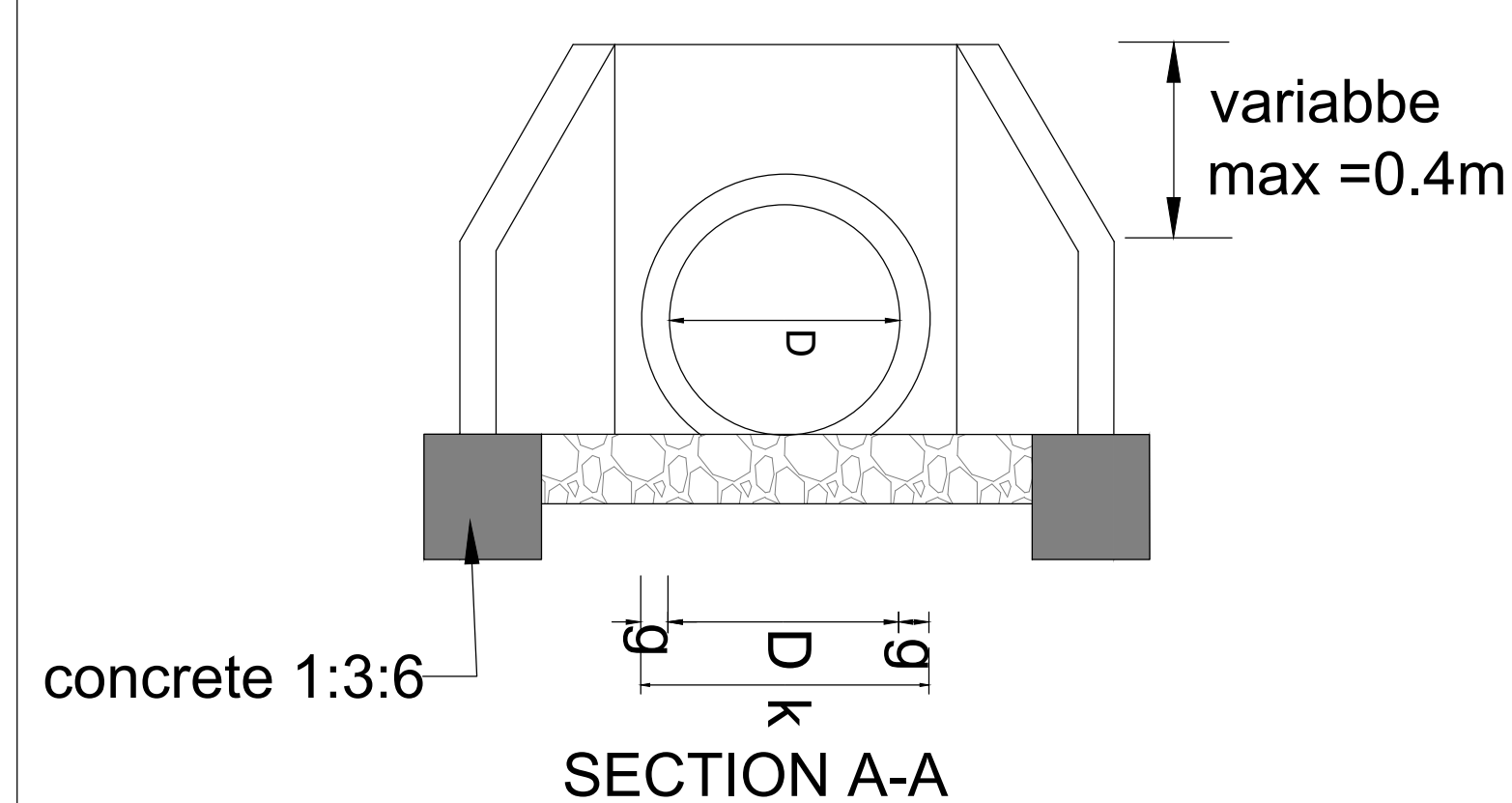
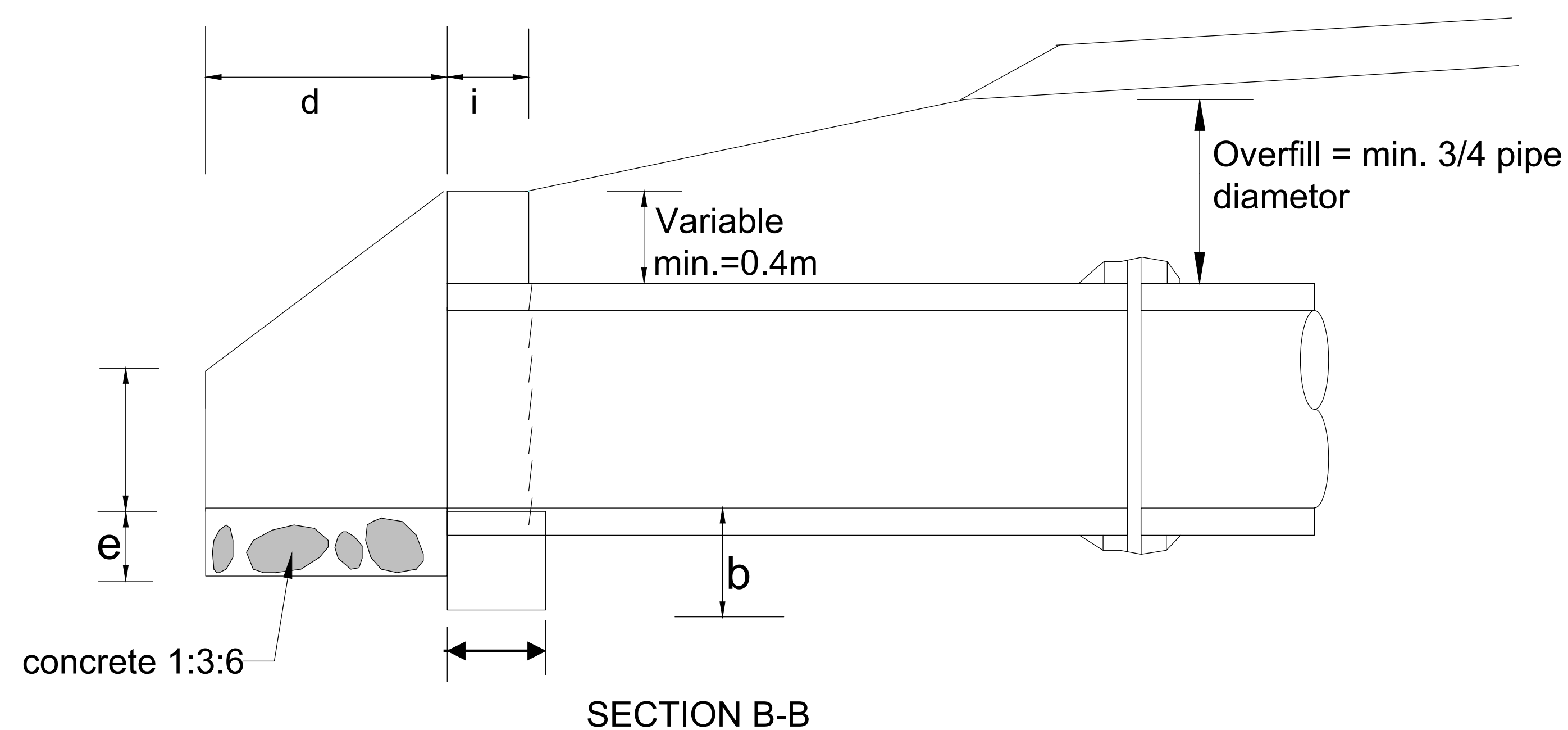
Runji Consulting Group Ltd
 Engineering & Project Management.
 3, Kindaruma Road (Off Ngong Road)
 P. O. Box 68053-00200 Nairobi
 Tel. (020) 2717213/4

PROJECT TITLE: DRAFT DETAILED ENGINEERING DESIGN OF BABITO- SOLIO ROAD BATCH 2
--

DRAWING TITLE: HEADWALL TYPE 2 (DROP INLETS)
--

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N Scale: NTS	Drg No. CE1045/CDS/BS/O2 Date : DECEMBER 2024
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FIGURE H.12 - HEADWALL TYPE 4 (FOR ACCESS CULVERT)

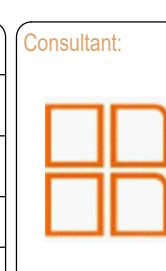


Dimensions and Material Requirements								
Pipe Diameter in (m)			Type A			Type B		
			(Concrete Blocks)			(Stone Masonry)		
			450	600	900	450	600	900
	Dimension	Unit						
a	Foundation	m	0.30	0.30		0.40	0.40	
b	Foundation	m	0.30	0.30		0.30	0.30	
c	Apron		1.34	1.49		1.34	1.49	
d	Apron	m	0.60	0.60		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	

[illegible]

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

DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	



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 BABITO- SOLIO ROAD BATCH 2

DRAWING TITLE:

HEADWALL TYPE 4 (FOR ACCESS CULVERT)

DRAWN BY: M.M
DESIGNED BY: C.N.M
CHECKED BY: M.J.N

Scale: NTS

	Drug No.
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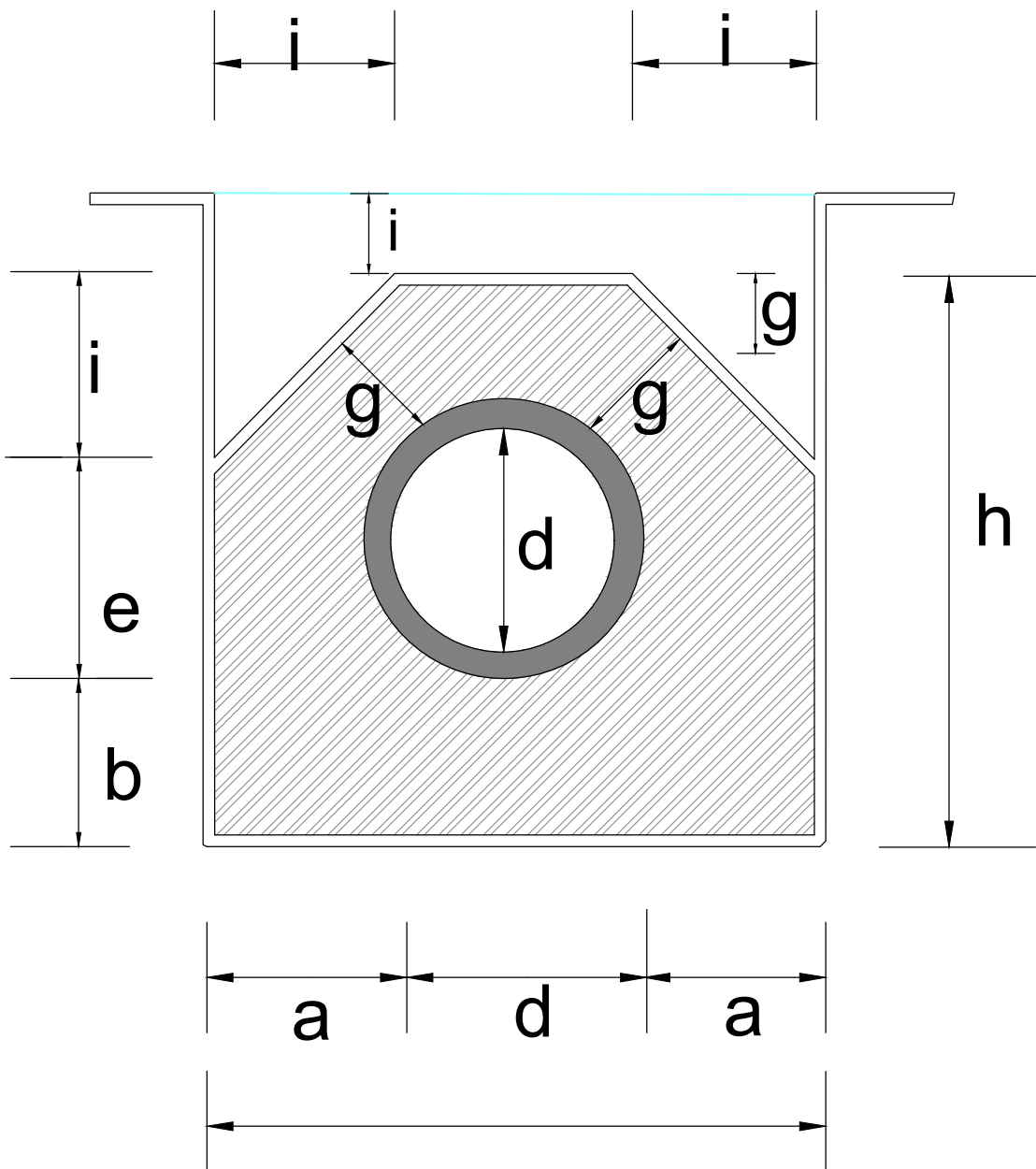
CE1045/CDS/BS/O3

Date : DECEMBER 2024

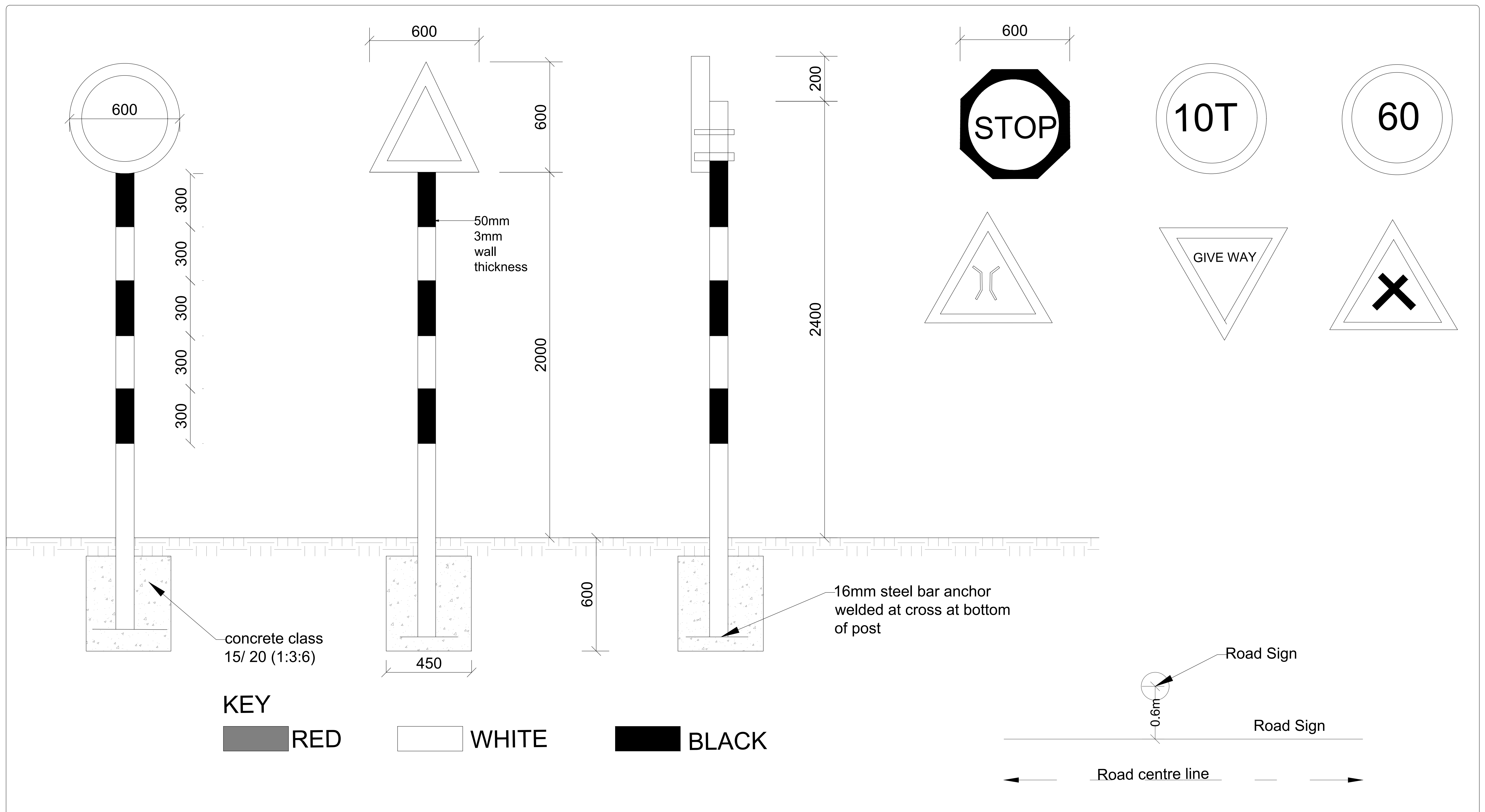
FIGURE H.14-BEDDING AND HAUNCH PROFILES TYPE III& IV

PROFILE IV

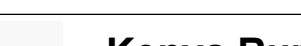
(CONCRETE)



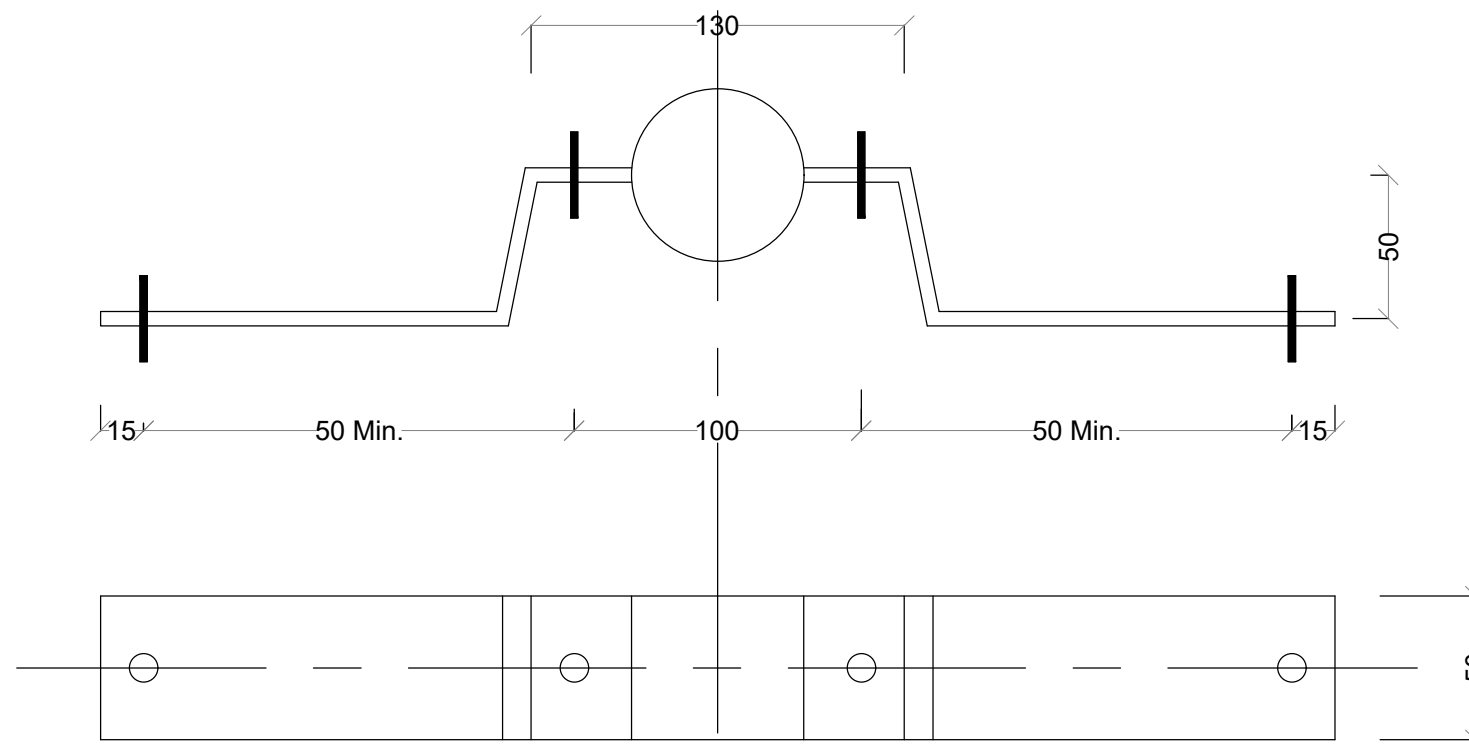
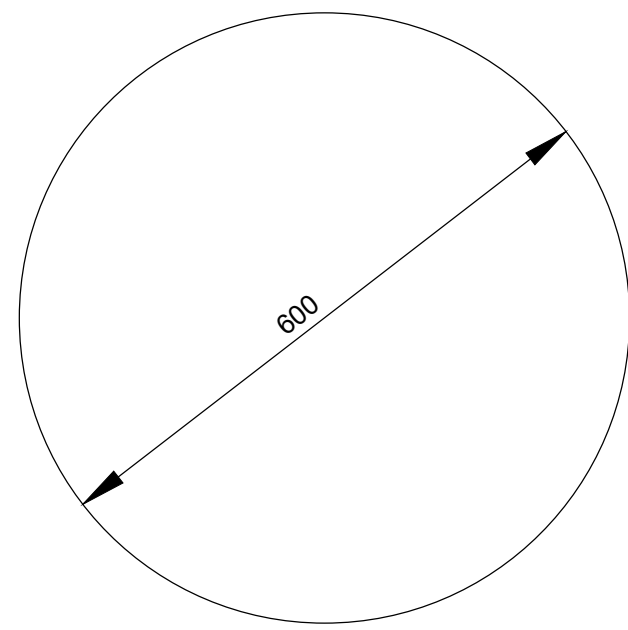
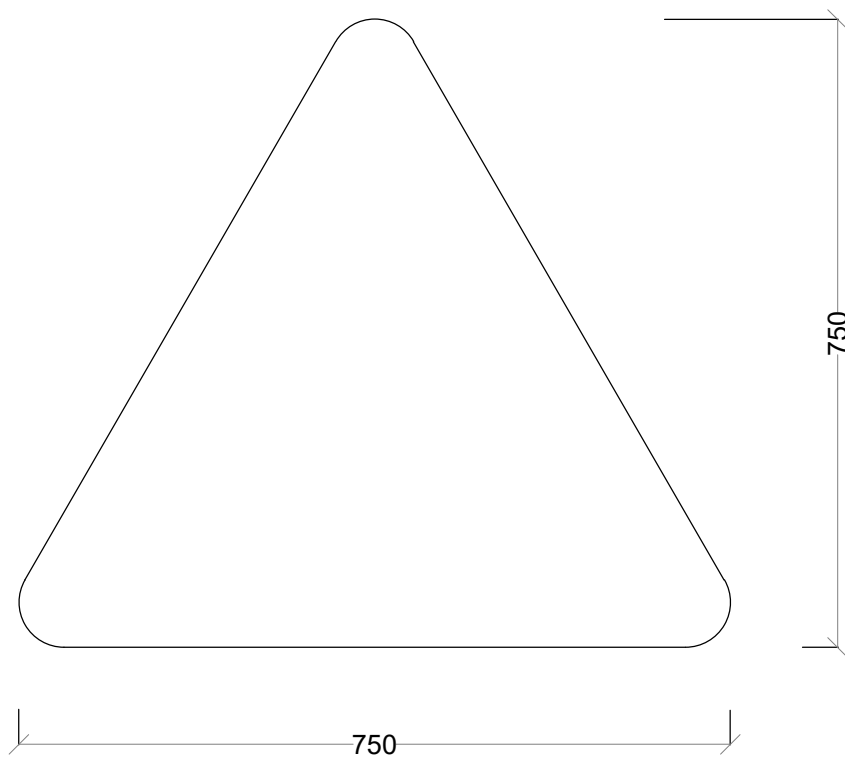
450 (mm)	600 (mm)	900 (mm)
Dimensions in (m)		
0.15	0.2	0.2
0.15	0.15	0.15
0.86	0.15	1.48
0.56	0.72	1.08
0.46	0.15	0.78
0.15	0.15	0.15
0.15	0.15	0.15
0.81	1.02	1.38
0.28	0.35	0.45
volume in (m3/m)		
0.37	0.61	0.92
-fair to poor subgrade condition -overfill > $\frac{3}{4}$ Dia; -Seasonal waterflow only.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



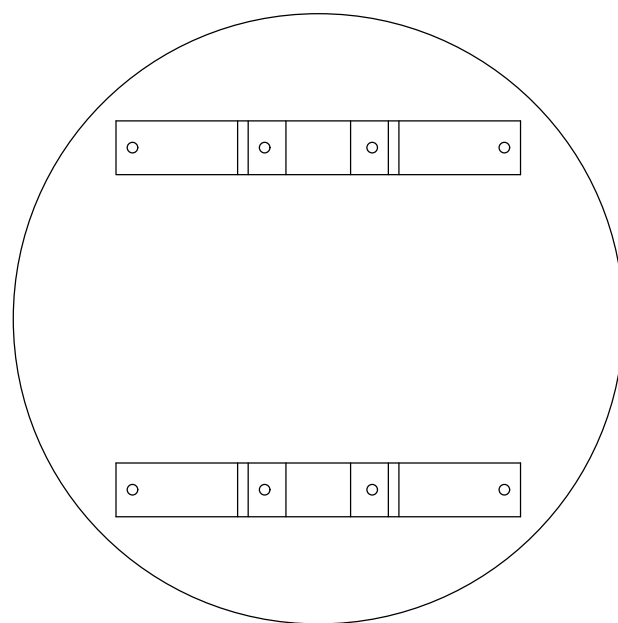
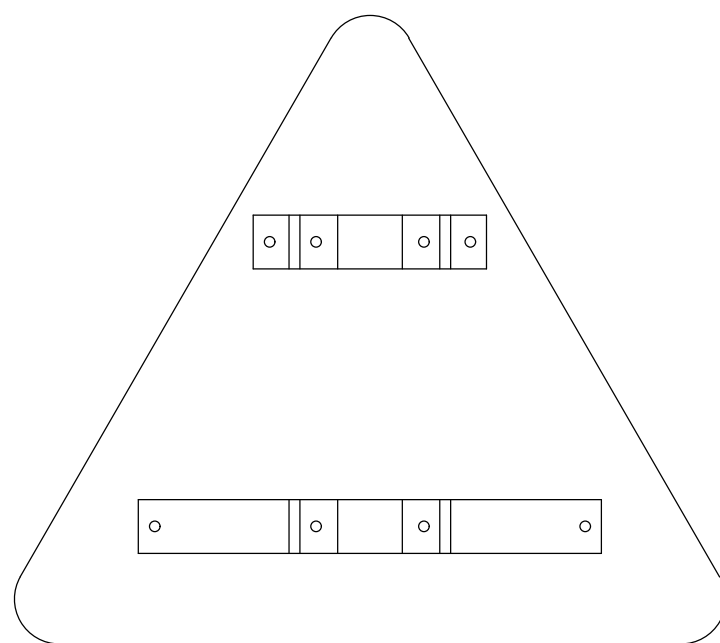
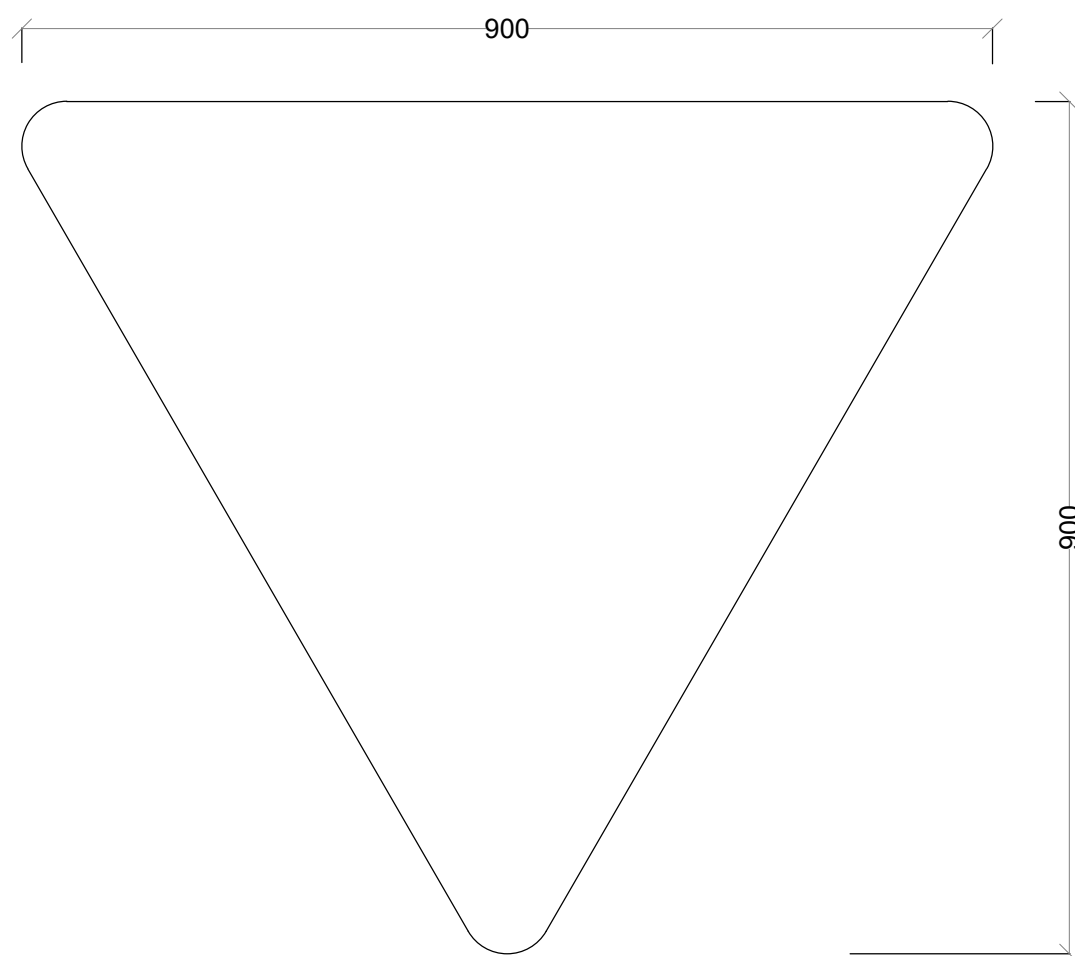
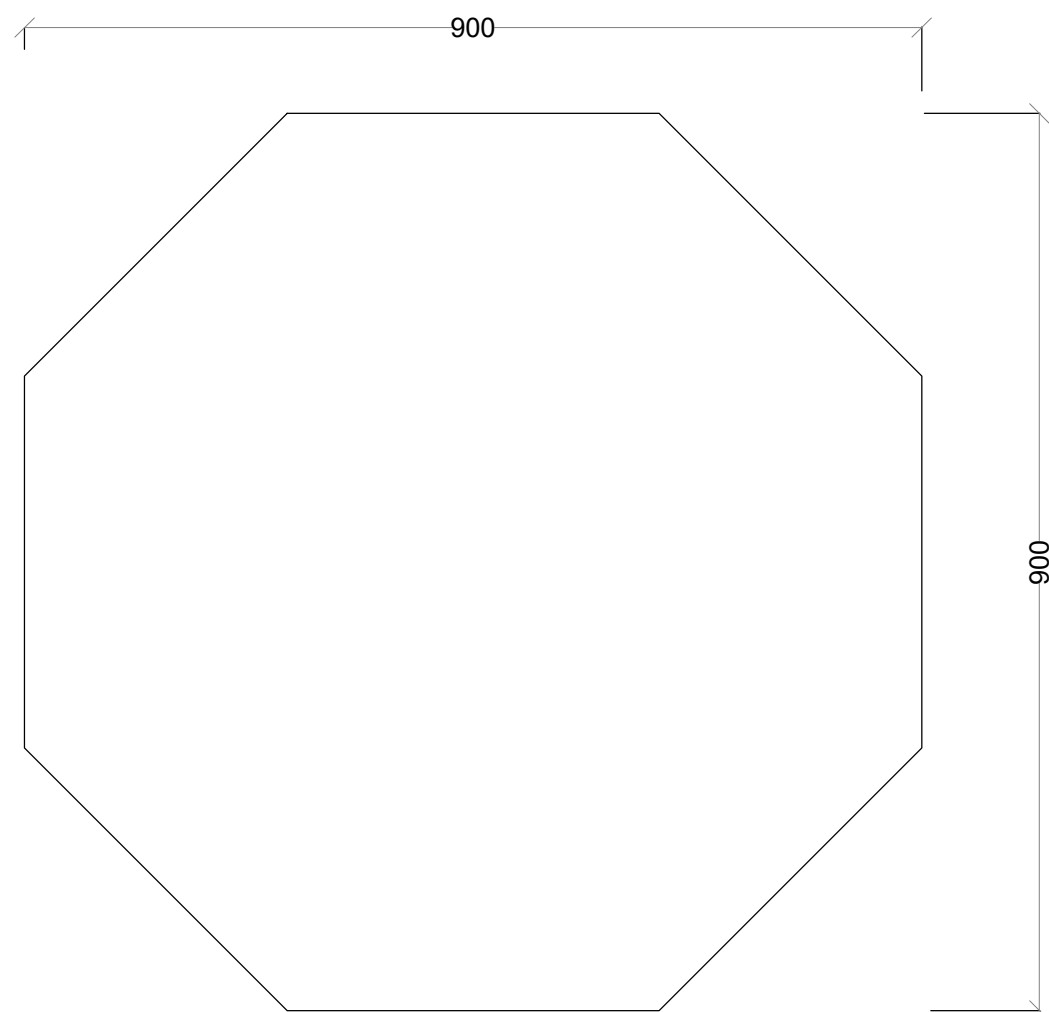
- 1.The type of sign required and their location shall de shown as road plan or as directed by engineer
2.signs plate to be 2mm thick mild steel plate
3.sign post to be 50mm fixing clamp/brackets
4.Sign plate to be fixed to steel tube by \$Nos M10 bolts and 50mm fixing clamp/brackets
5,Sign paints shall 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		 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 BABITO- SOLIO ROAD BATCH 2	DRAWING TITLE: CULVERT ROAD SIGNS	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/CDS/BS/O5						

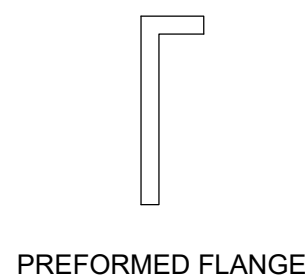
STANDARD DRAWINGS



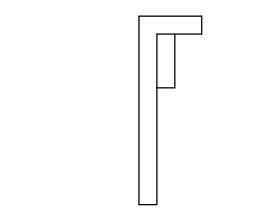
FIXING BRACKET DETAIL
SCALE 1:2.5



TYPICAL FIXING DETAILS
SCALE 1:25



PREFORMED FLANGE

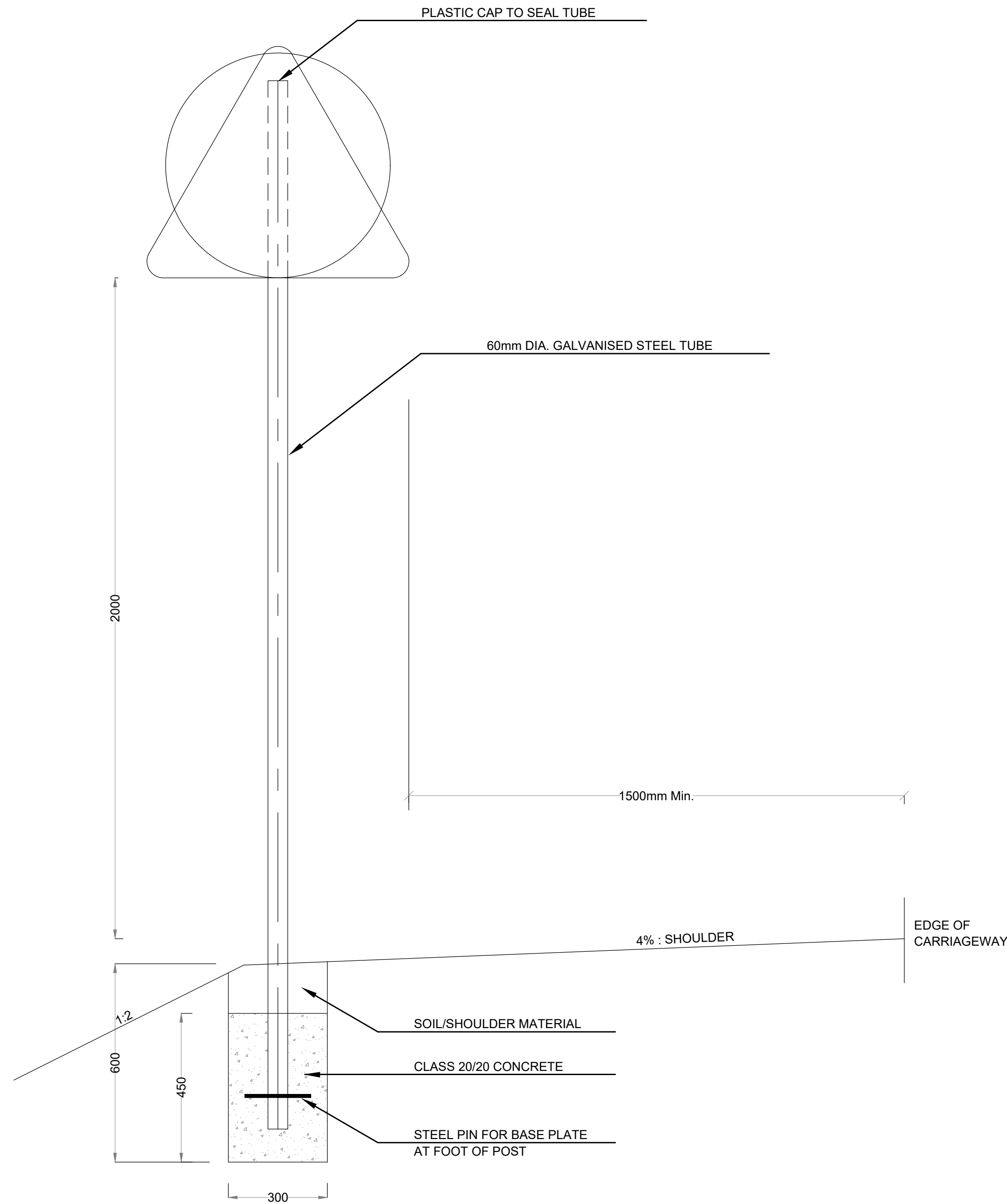


ANGLE STIFFENING

STIFFENING TO SIGNS
SCALE 1:20

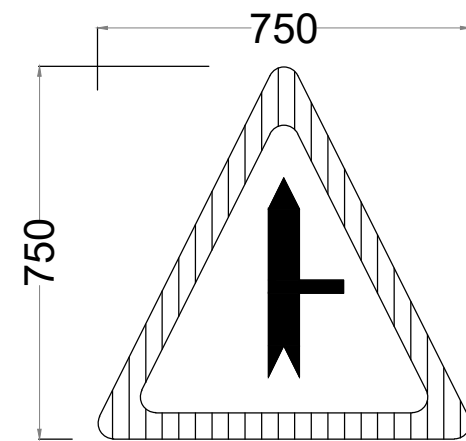
GENERAL NOTES:

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.

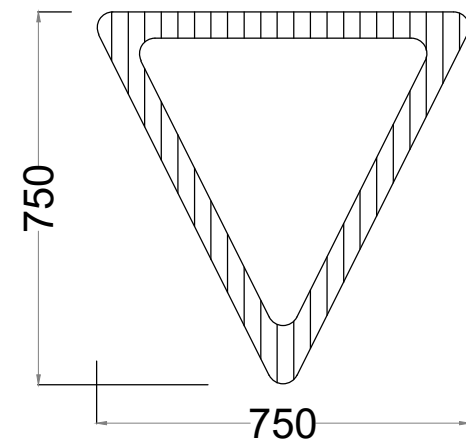


SIGN PLACEMENT
SCALE 1:25

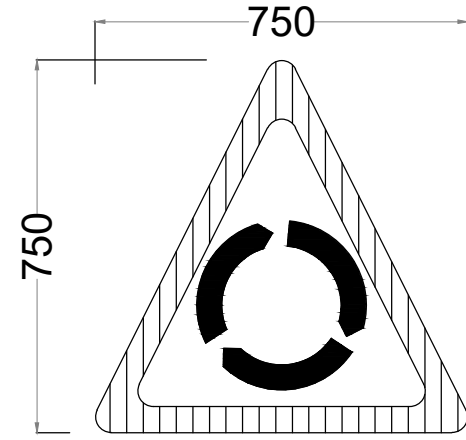
REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL	 Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: DRAFT DETAILED ENGINEERING DESIGN OF BABITO- SOLIO (ROAD) BATCH 2	DRAWING TITLE: STANDARD DRAWING - STANDARD - ROAD SIGNS	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/SD/BS/01
Scale: AS SHOWN									Date : DECEMBER 2024	



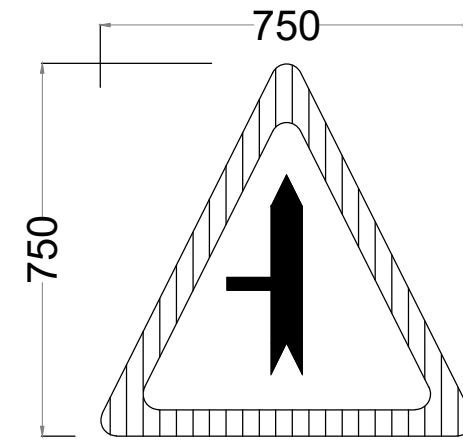
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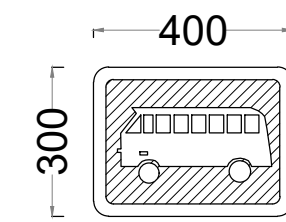
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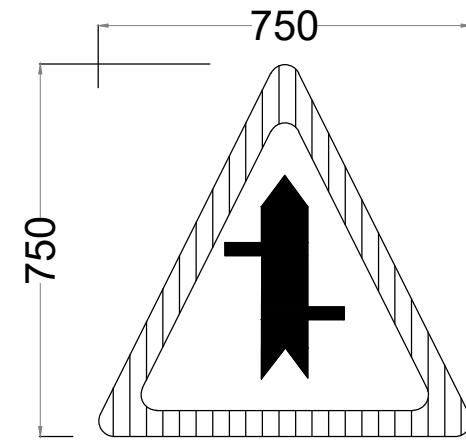
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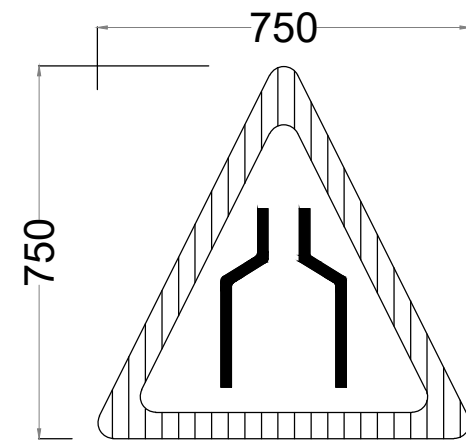
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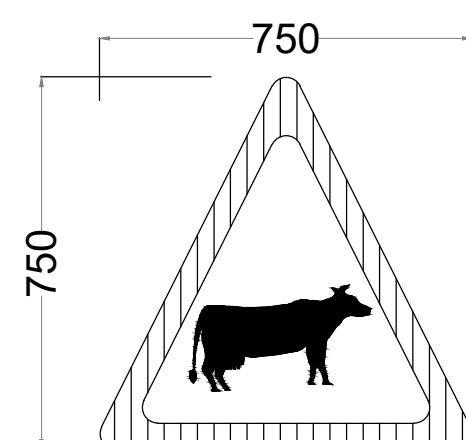
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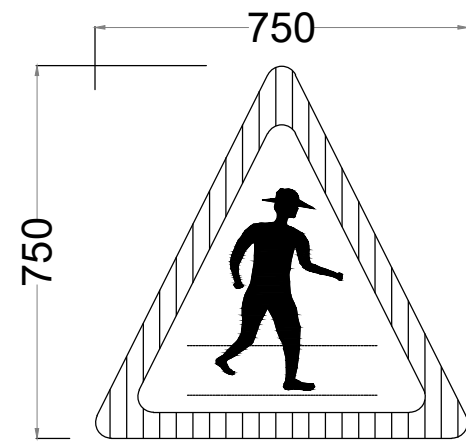
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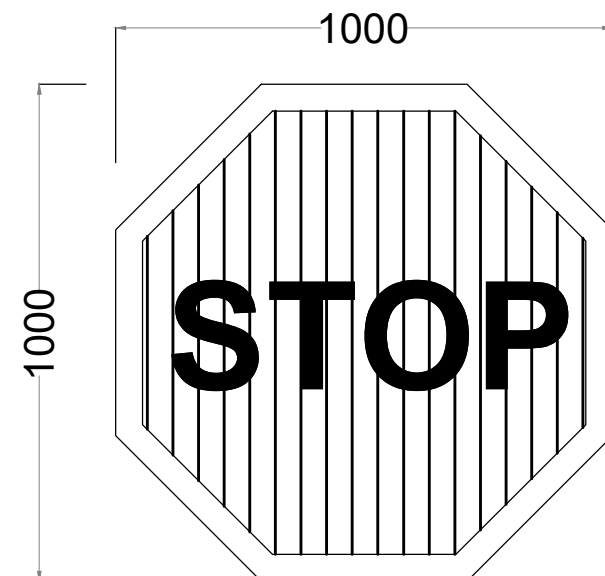
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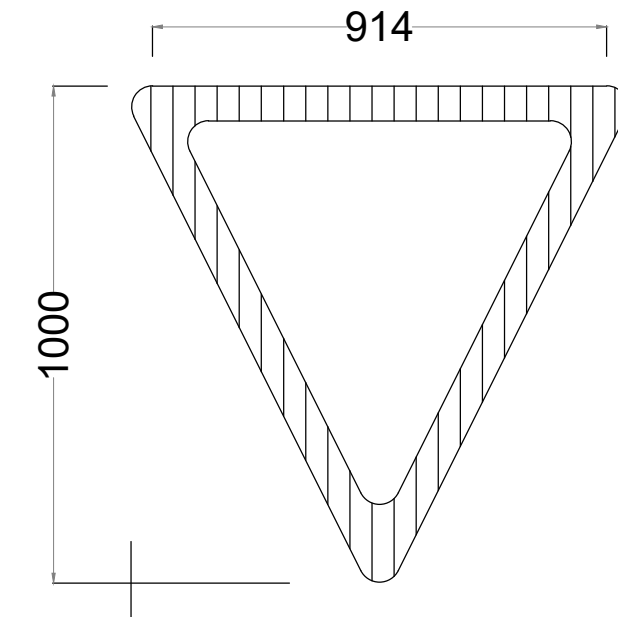
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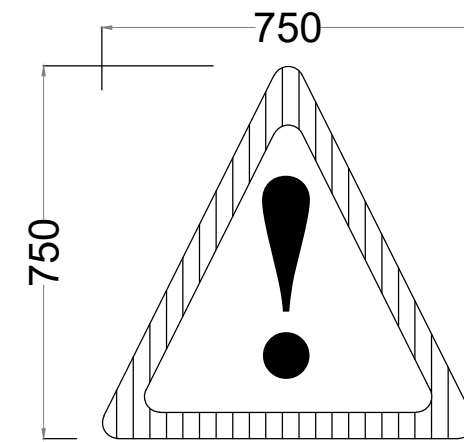
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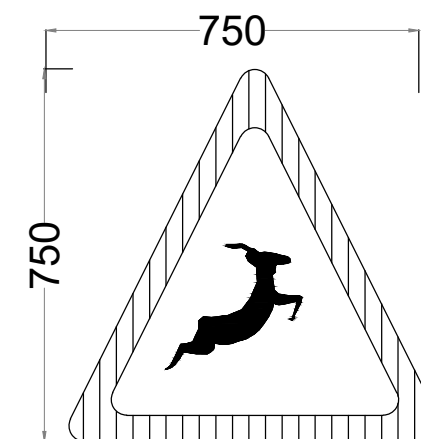
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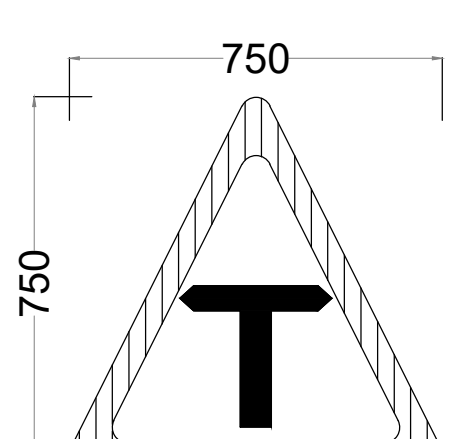
SIGN TYPE R2



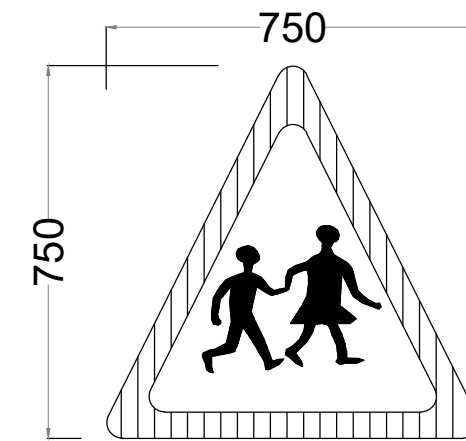
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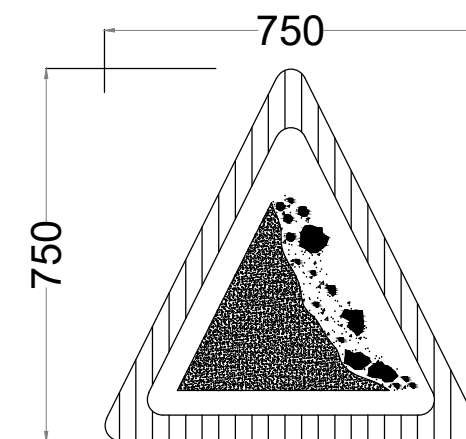
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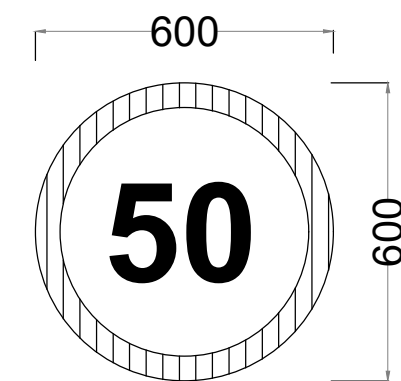
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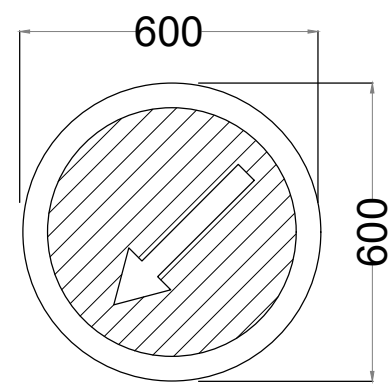
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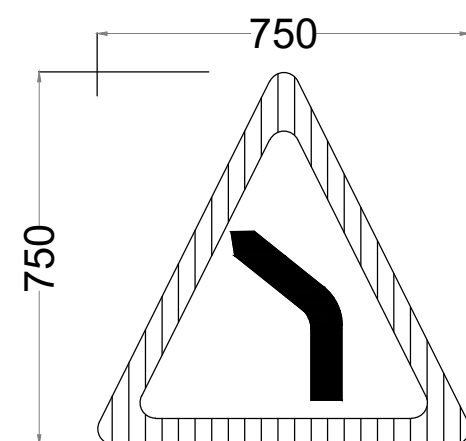
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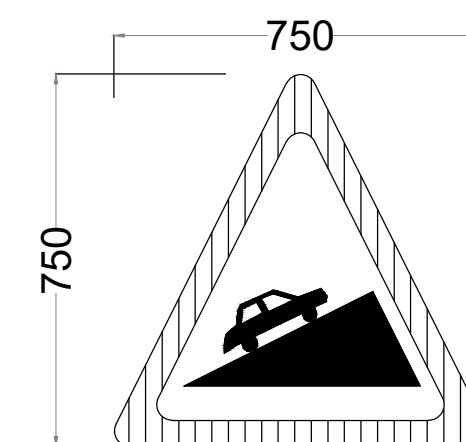
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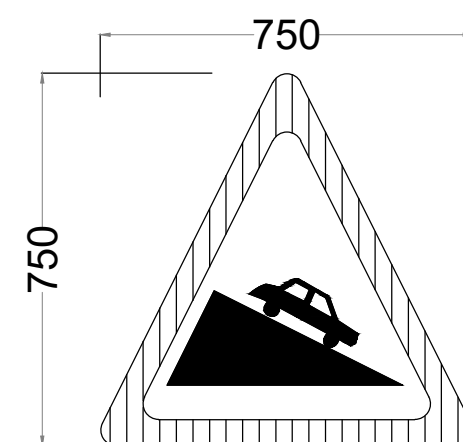
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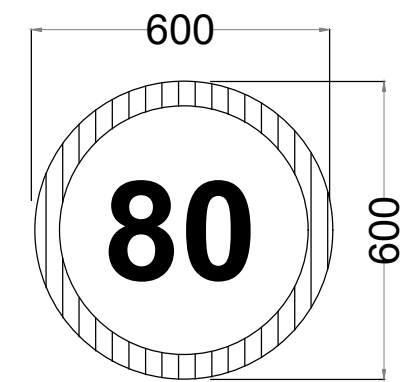
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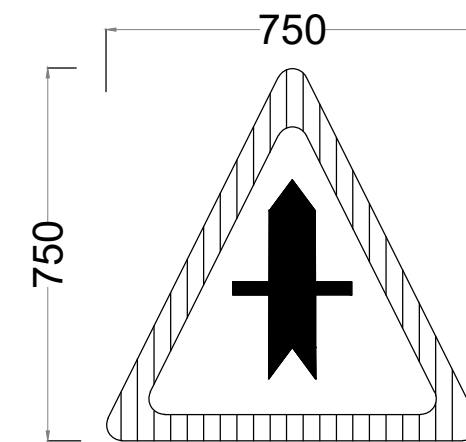
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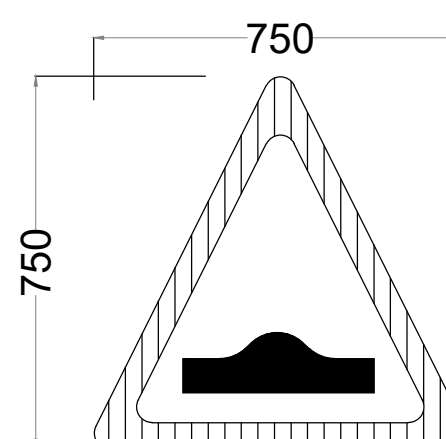
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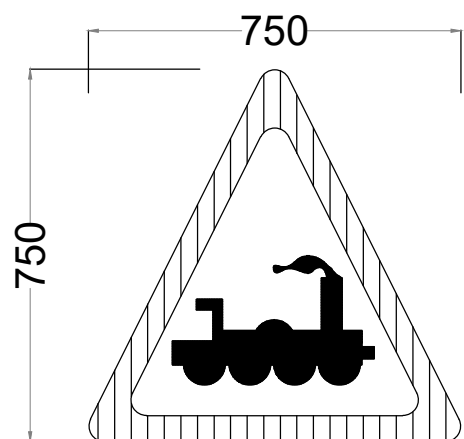
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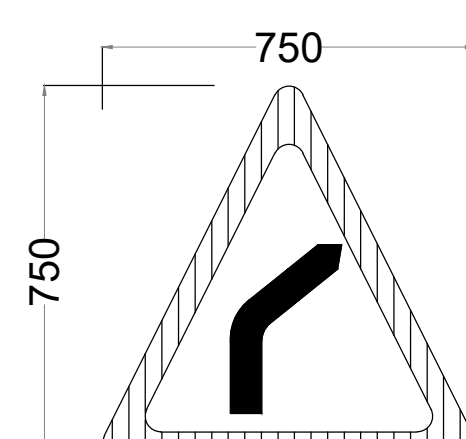
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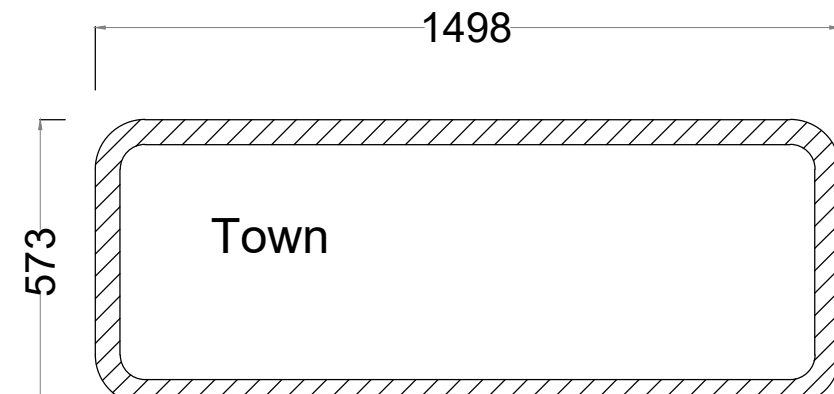
SIGN TYPE W 12



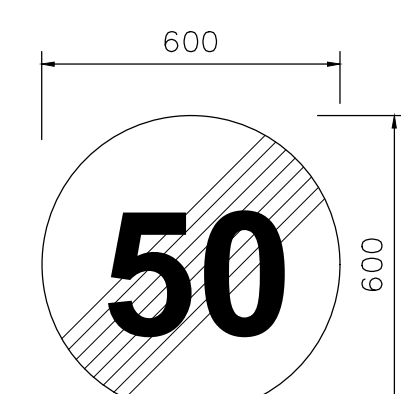
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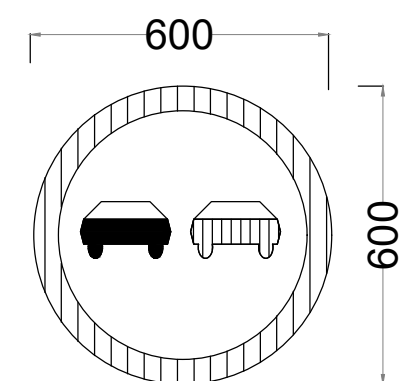
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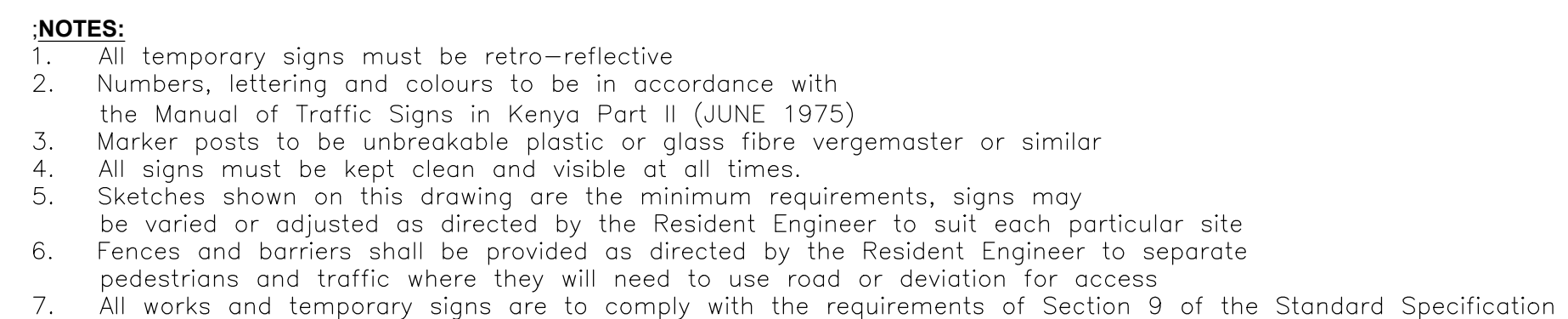
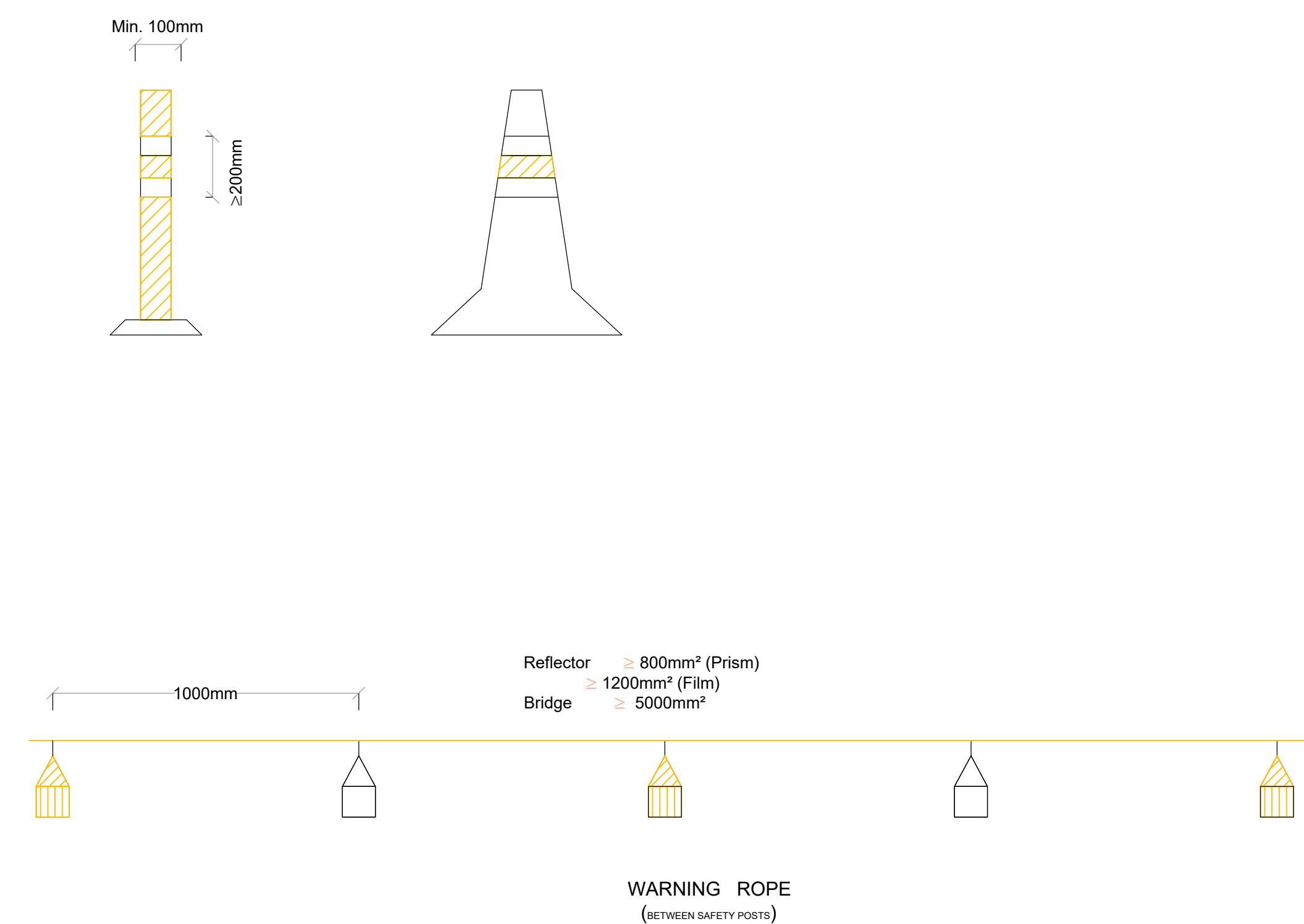
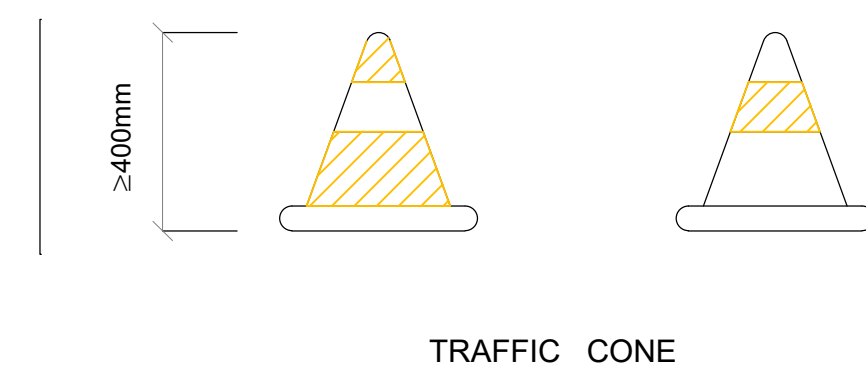
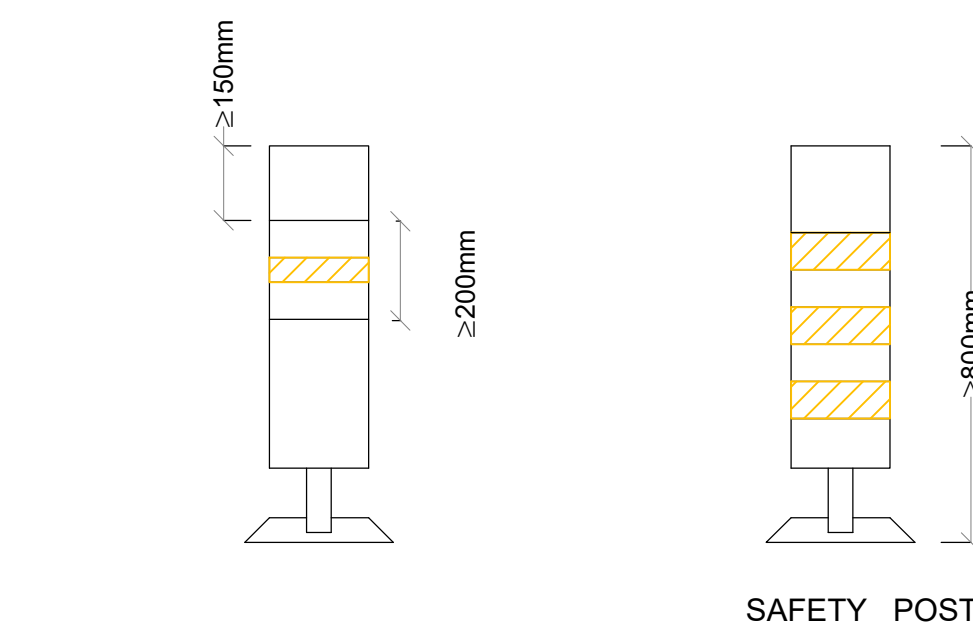
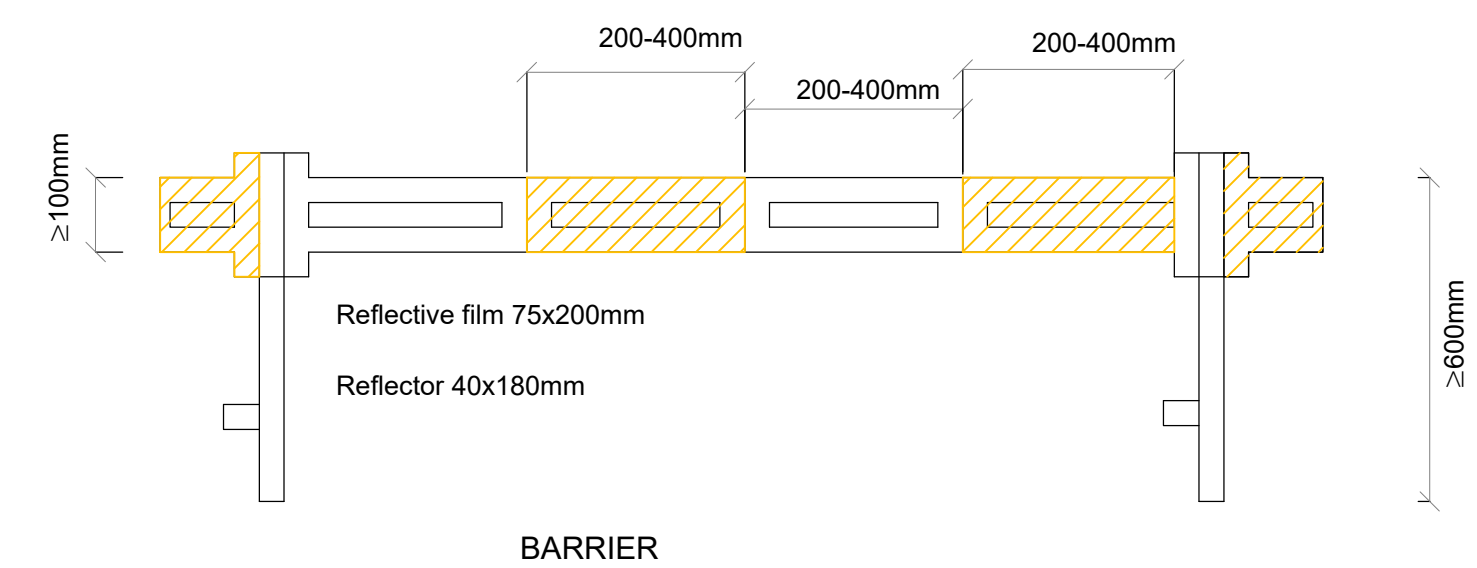
SIGN TYPE - I 27



SIGN TYPE P30



SIGN TYPE P23

[illegible]

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
BABITO- SOLIO (ROAD) BATCH 2

DRAWING TITLE:

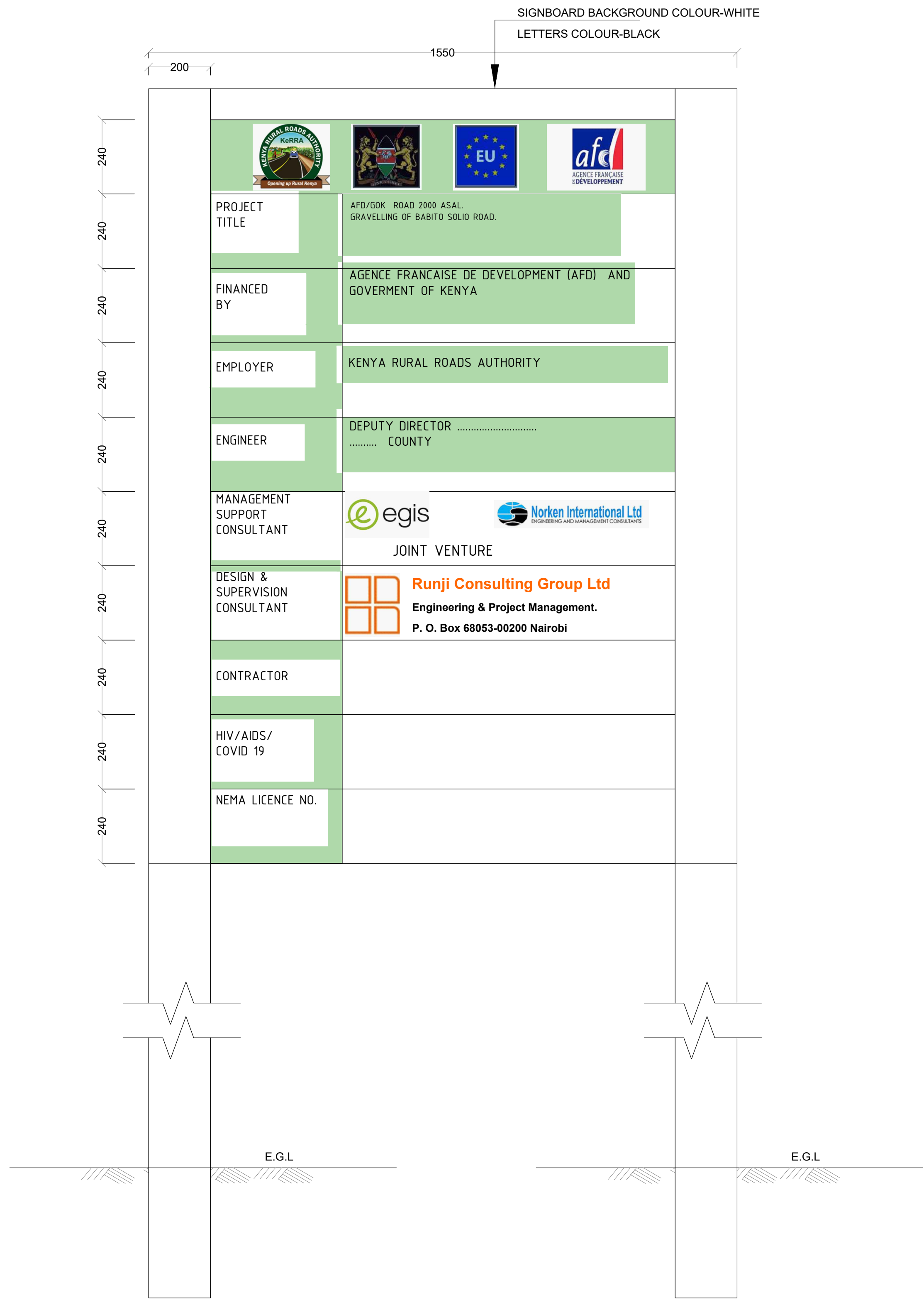
STANDARD DRAWING -
TRAFFIC MANAGEMENT

DRAWN BY: M.M
DESIGNED BY: C.N.M
CHECKED BY: M.J.N

Scale: AS SHOWN

Drg No.	CE1045/SD/BS/03
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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.

