



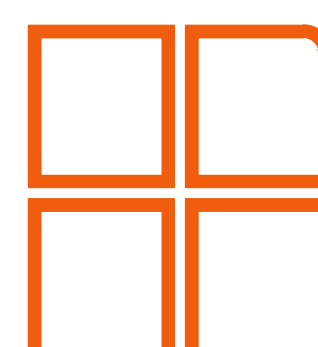
# **CLIMATE PROOFED ARID AND SEMI ARID RURAL ROADS, FINAL DESIGN OF THOME MATHIRA ROAD BATCH 2**

## **MARCH 2025**

### **EMPLOYER**

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

### **CONSULTANT**



**Runji Consulting Group Ltd**

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### **ENGINEER**

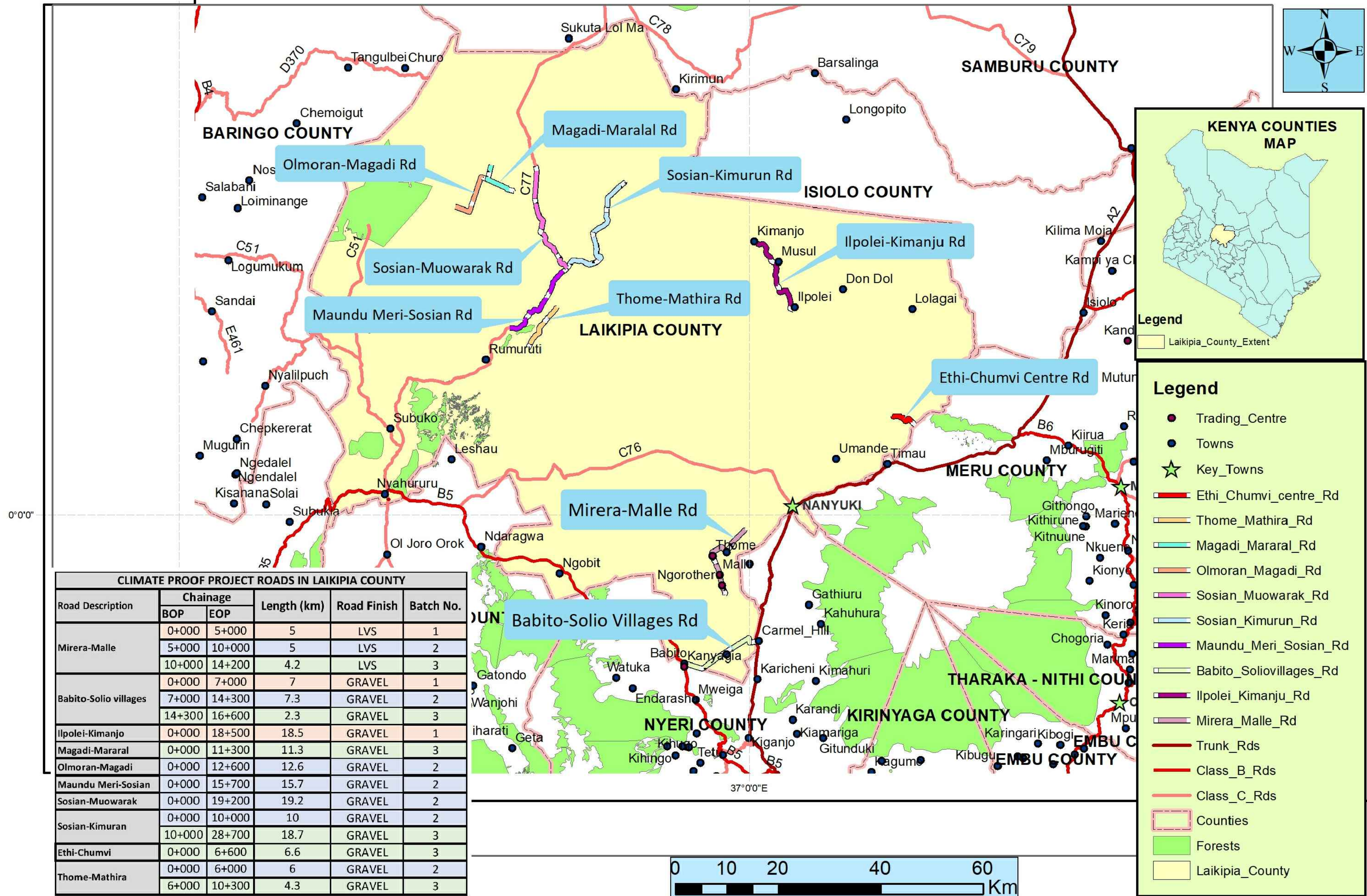
**DIRECTOR  
PLANNING, DESIGN & ENVIRONMENT  
P.O BOX 48151-00100,  
NAIROBI, Kenya**

	THOME MATHIRA BATCH 2 DRAWINGS
	COVER PAGE
	DRAWING LIST
	GENERAL DRAWINGS
CE1045/GD/TM/01	LOCATION MAP
CE1045/GD/TM/01	THOME MATHIRA SKETCH MAP
CE1045/GD/TM/01	GENERAL LAYOUT (SHEET 1 OF 3) CHAINAGE 0+000 - 2+400
CE1045/GD/TM/02	GENERAL LAYOUT (SHEET 2 OF 3) CHAINAGE 2+400 - 5+000
CE1045/GD/TM/03	GENERAL LAYOUT (SHEET 3 OF 3) CHAINAGE 5+000 - 6+258
	TYPICAL CROSS-SECTION
CE1045/TD/TM/01	TYPICAL CROSS-SECTION
	TYPICAL CULVERT DRAWINGS
CE1045/CDS/TM/O1	HEADWALL TYPE 1 (HEADWALL AND WINGWALLS)
CE1045/CDS/TM/O2	HEADWALL TYPE 2 (DROP INLETS)
CE1045/CDS/TM/O3	HEADWALL TYPE 4 (FOR ACCESS CULVERT)
CE1045/CDS/TM/O4	BEDDING AND HAUNCH PROFILES TYPE III& IV
CE1045/CDS/TM/O5	CULVERT ROAD SIGNS
	STANDARD DRAWINGS
CE1045/SD/TM/01	STANDARD DRAWING - STANDARD - ROAD SIGNS
CE1045/SD/TM/02	STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION
CE1045/SD/TM/03	STANDARD DRAWING - STANDARD - TRAFFIC MANAGEMENT
CE1045/SD/TM/04	STANDARD DRAWING - PUBLICITY SIGN BOARD

# GENERAL DRAWINGS



## CLIMATE PROOFED PROJECT ROADS IN LAIKIPIA COUNTY



CLIMATE PROOF PROJECT ROADS IN LAIKIPIA COUNTY					
Road Description	Chainage		Length (km)	Road Finish	Batch No.
	BOP	EOP			
Mirera-Malle	0+000	5+000	5	LVS	1
	5+000	10+000	5	LVS	2
	10+000	14+200	4.2	LVS	3
Babito-Solio villages	0+000	7+000	7	GRAVEL	1
	7+000	14+300	7.3	GRAVEL	2
	14+300	16+600	2.3	GRAVEL	3
Ilpolei-Kimanjo	0+000	18+500	18.5	GRAVEL	1
Magadi-Mararal	0+000	11+300	11.3	GRAVEL	3
Olmorani-Magadi	0+000	12+600	12.6	GRAVEL	2
Maundu Meri-Sosian	0+000	15+700	15.7	GRAVEL	2
Sosian-Muowarak	0+000	19+200	19.2	GRAVEL	2
Sosian-Kimuran	0+000	10+000	10	GRAVEL	2
	10+000	28+700	18.7	GRAVEL	3
Ethi-Chumvi	0+000	6+600	6.6	GRAVEL	3
Thome-Mathira	0+000	6+000	6	GRAVEL	2
	6+000	10+300	4.3	GRAVEL	3





REVISIONS	No.	DATE	DESCRIPTION



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

DIRECTOR GENERAL  
DIRECTOR ( PLANNING , DESIGN &ENVIRONMENT)


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

PROJECT TITLE:

DRAFT DETAILED ENGINEERING DESIGN OF  
THOME MATHIRA BATCH 2

DRAWING TITLE:

THOME MATHIRA SKETCH  
MAP

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

Scale: 1:5000


Drg No.  
CE1045/GD/TM/01

Date : DECEMBER 2024






REVISIONS	No.	DATE	DESCRIPTION



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

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Tel. (020) 2717213/4

PROJECT TITLE:

DRAFT DETAILED   ENGINEERING DESIGN OF  
THOME MATHIRA BATCH 2

DRAWING TITLE:


GENERAL LAYOUT  
SHEET 1 OF 3  
CHAINAGE 0+000 - 2+400

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






REVISIONS	No.	DATE	DESCRIPTION



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



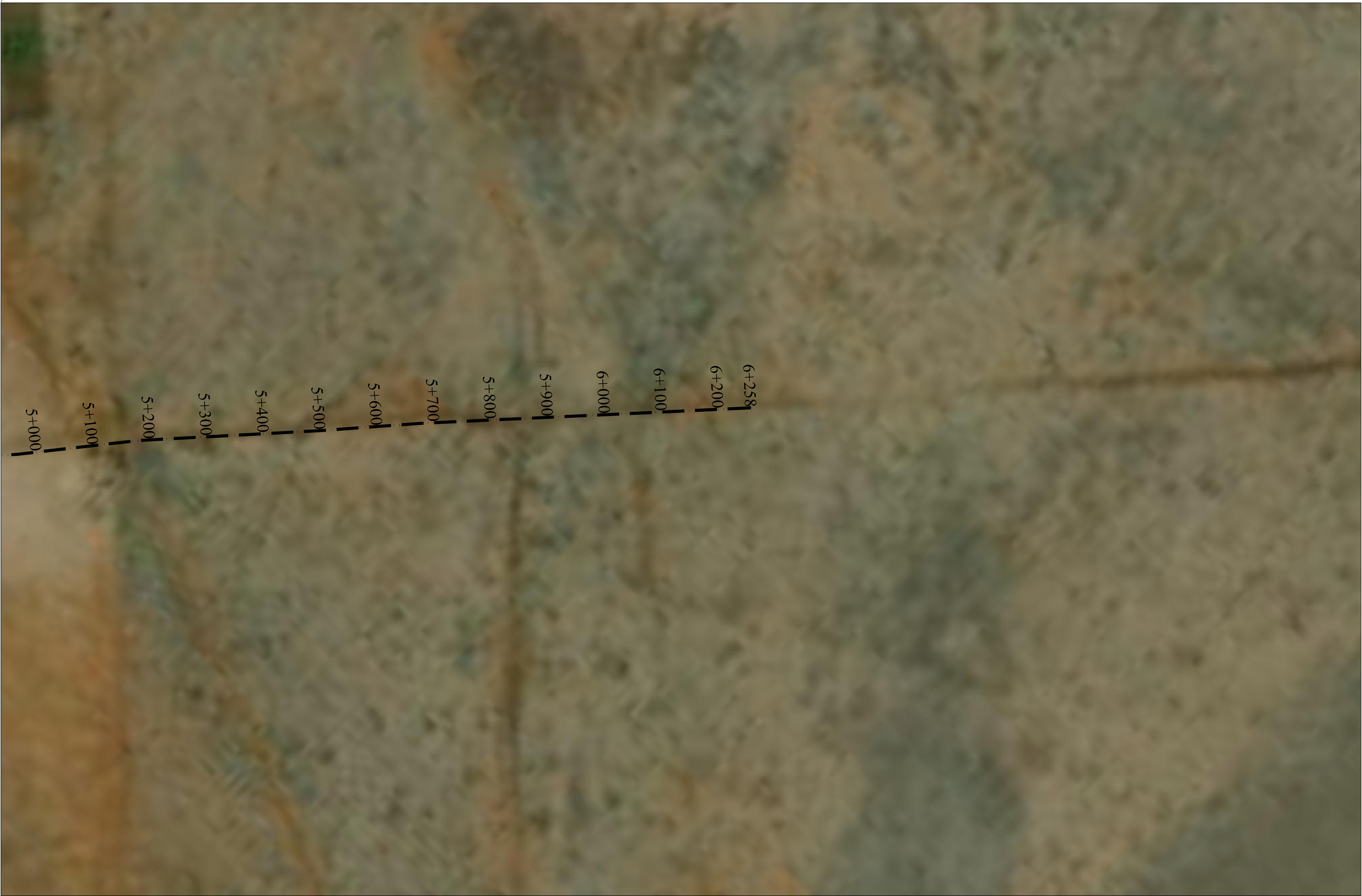
**Runji Consulting Group Ltd**  
Engineering & Project Management.  
3, Kindaruma Road (Off Ngong Road)  
P. O. Box 68053-00200 Nairobi  
Tel. (020) 2717213/4

PROJECT TITLE:	DRAFT DETAILED   ENGINEERING DESIGN OF THOME MATHIRA BATCH 2
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DRAWING TITLE:	GENERAL LAYOUT SHEET 1 OF 3 CHAINAGE 2+400 - 5+000
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DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/TM/02
Scale:   1:5000	Date : DECEMBER 2024






REVISIONS	No.	DATE	DESCRIPTION



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P. O. Box 68053-00200 Nairobi  
Tel. (020) 2717213/4

PROJECT TITLE:
DRAFT DETAILED   ENGINEERING DESIGN OF THOME MATHIRA BATCH 2

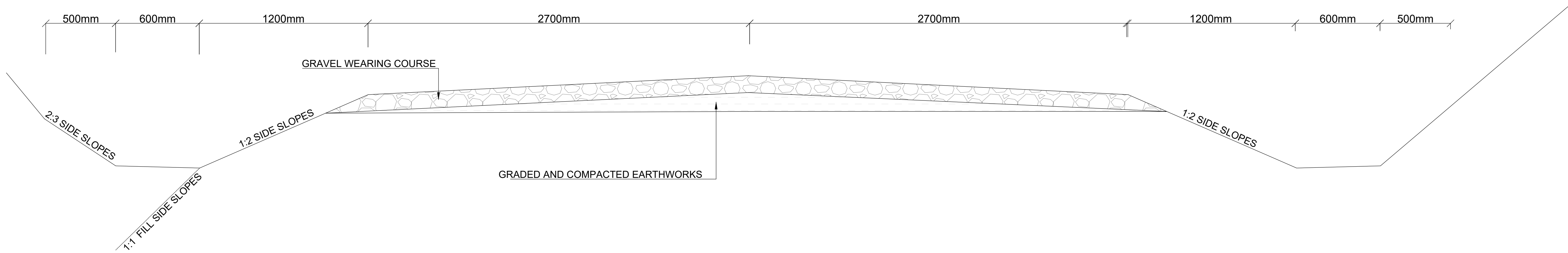
DRAWING TITLE:
GENERAL LAYOUT SHEET 3 OF 3 CHAINAGE 5+000 - 6+258

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/GD/TM/03
Scale:   1:5000	Date : DECEMBER 2024



# **TYPICAL CROSS-SECTION**


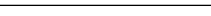




Pavement Thickness: 200mm

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.

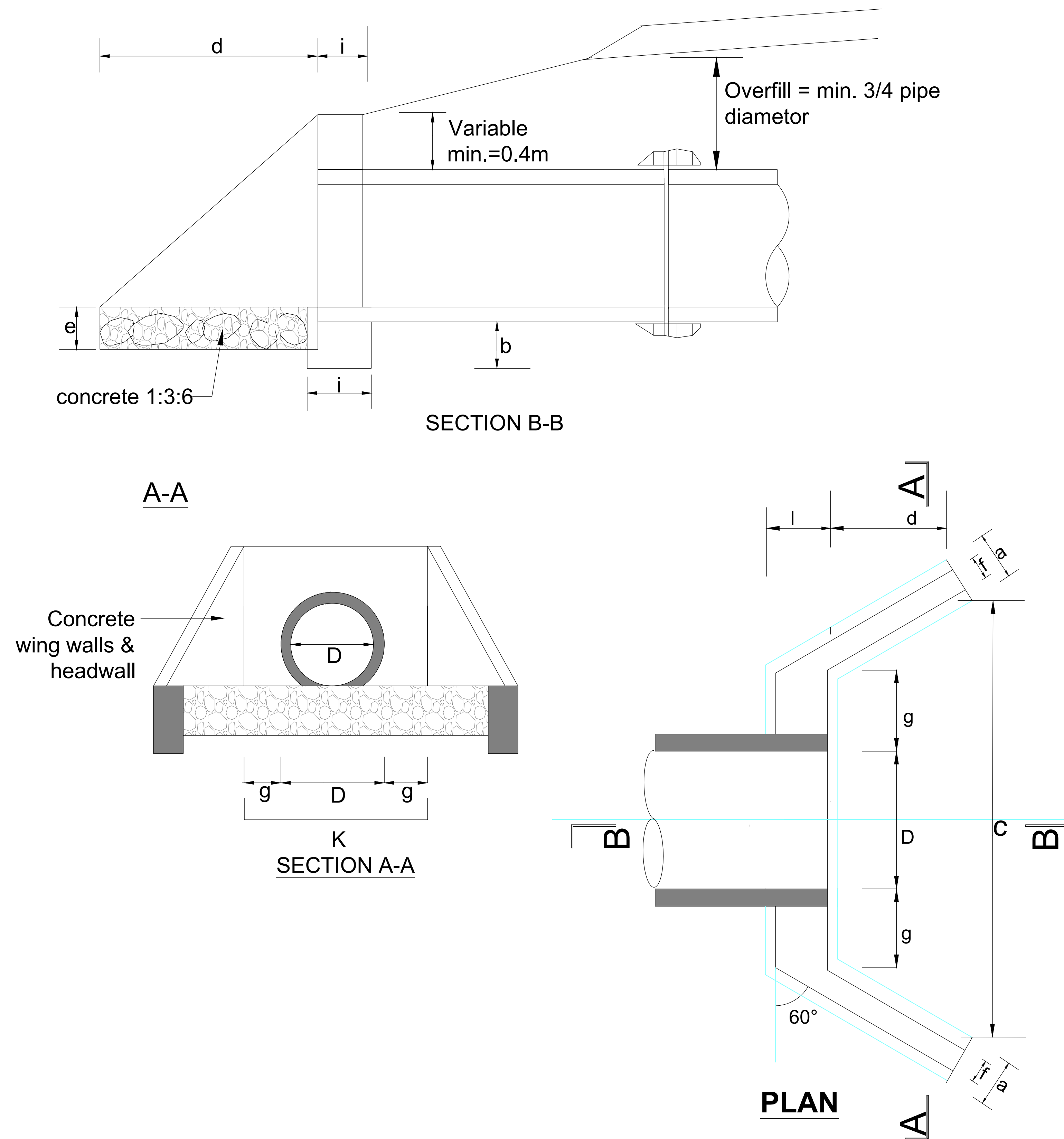
REVISIONS	No.	DATE	DESCRIPTION	 <div><b>Kenya Rural Roads Authority</b> Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya</div>	DIRECTOR GENERAL		Consultant:  <div><b>Runji Consulting Group Ltd</b> Engineering &amp; Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4</div>	PROJECT TITLE: <b>DRAFT DETAILED ENGINEERING DESIGN OF THOME MATHIRA ROAD BATCH 2</b>	DRAWING TITLE: <b>TYPICAL CROSS-SECTION</b>	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N  Scale: NTS	Drg No. <b>CE1045/CDS/TM/O5</b>



# **TYPICAL CULVERT DRAWINGS**




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



## 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	0.30	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
l	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

REVISIONS	No.	DATE	DESCRIPTION




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Tel. (020) 2717213/4

PROJECT TITLE:

DRAFT DETAILED  
ENGINEERING DESIGN OF  
THOME MATHIRA ROAD BATCH 2

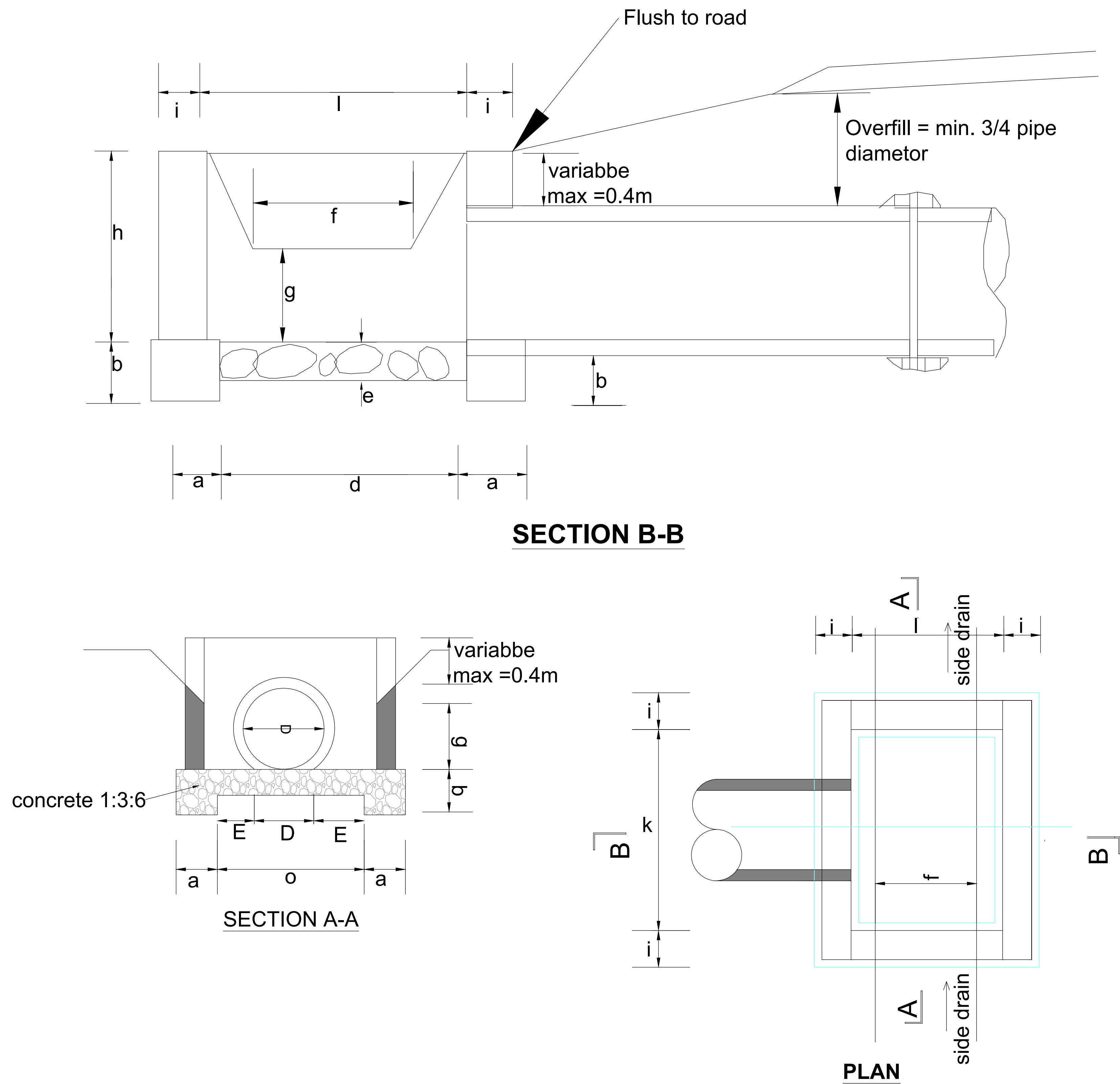
DRAWING TITLE:

**HEADWALL TYPE 1 (HEADWALL  
AND WINGWALLS)**

DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE10BER45/CDS/TM/O1
Scale: NTS	Date : DECEMBER 2024



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

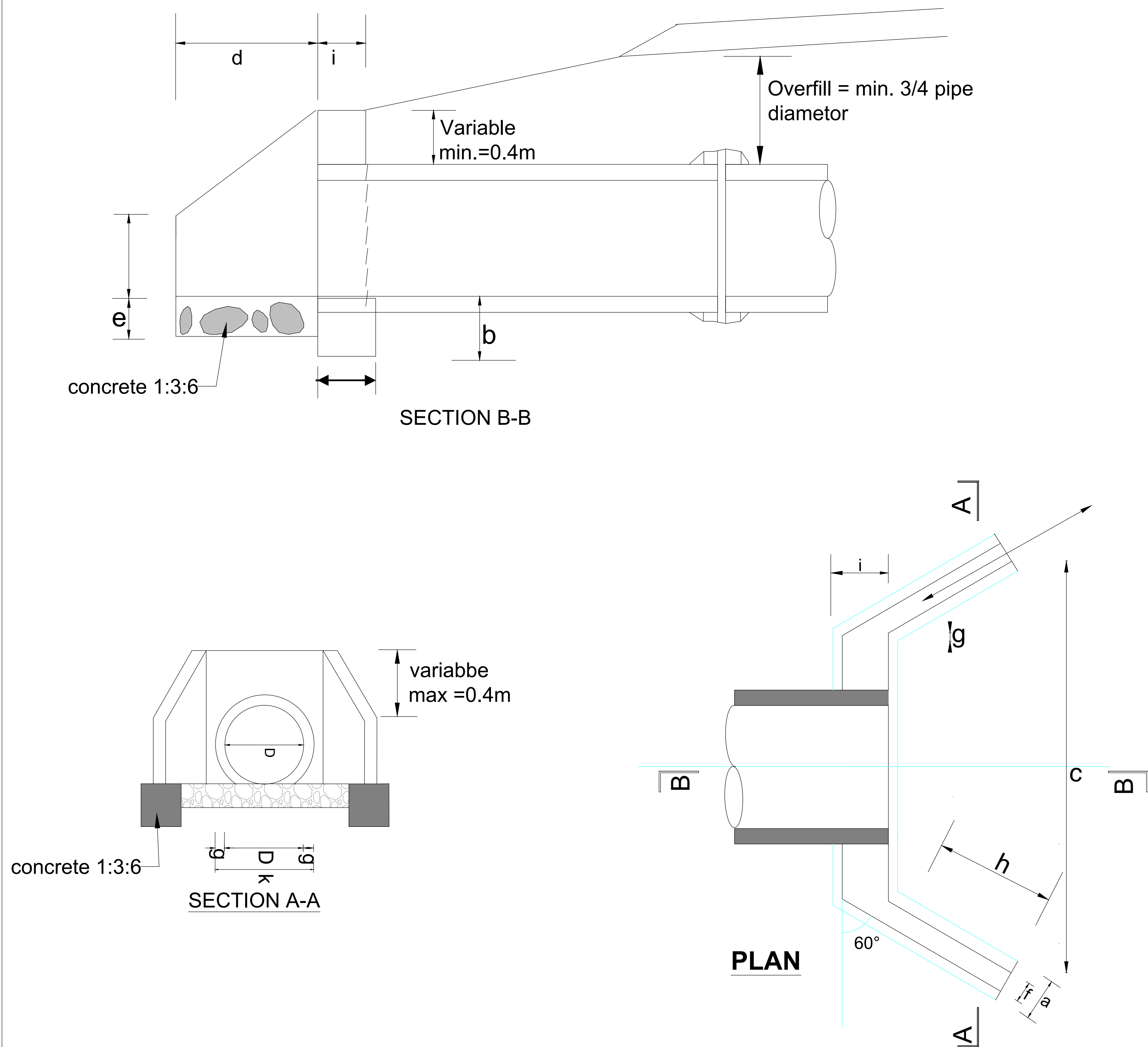


DIMENSIONS AND MATERIAL REQUIREMENTS

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



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



DIMENSIONS AND MATERIAL REQUIREMENTS

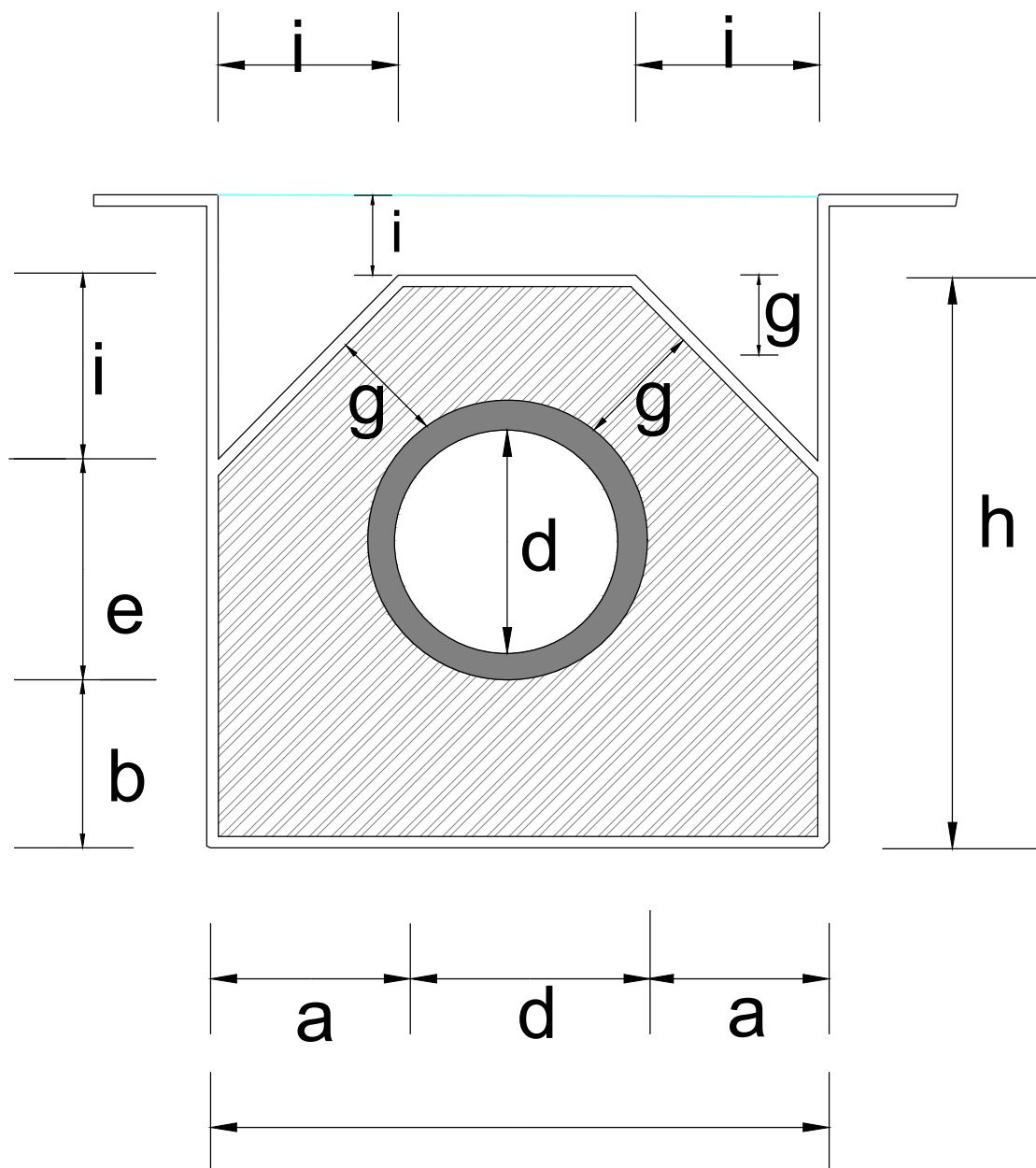
PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS)			(STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION	UNIT							
a	FOUNDATION	m	0.30	0.30		0.40	0.40	
b	FOUNDATION	m	0.30	0.30		0.30	0.30	
c	APRON		1.34	1.49		1.34	1.49	
d	APRON	m	0.60	0.60		0.60	0.60	
e	APRON	m		0.20		0.20	0.20	
f	WINGWALLS	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	
l	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)



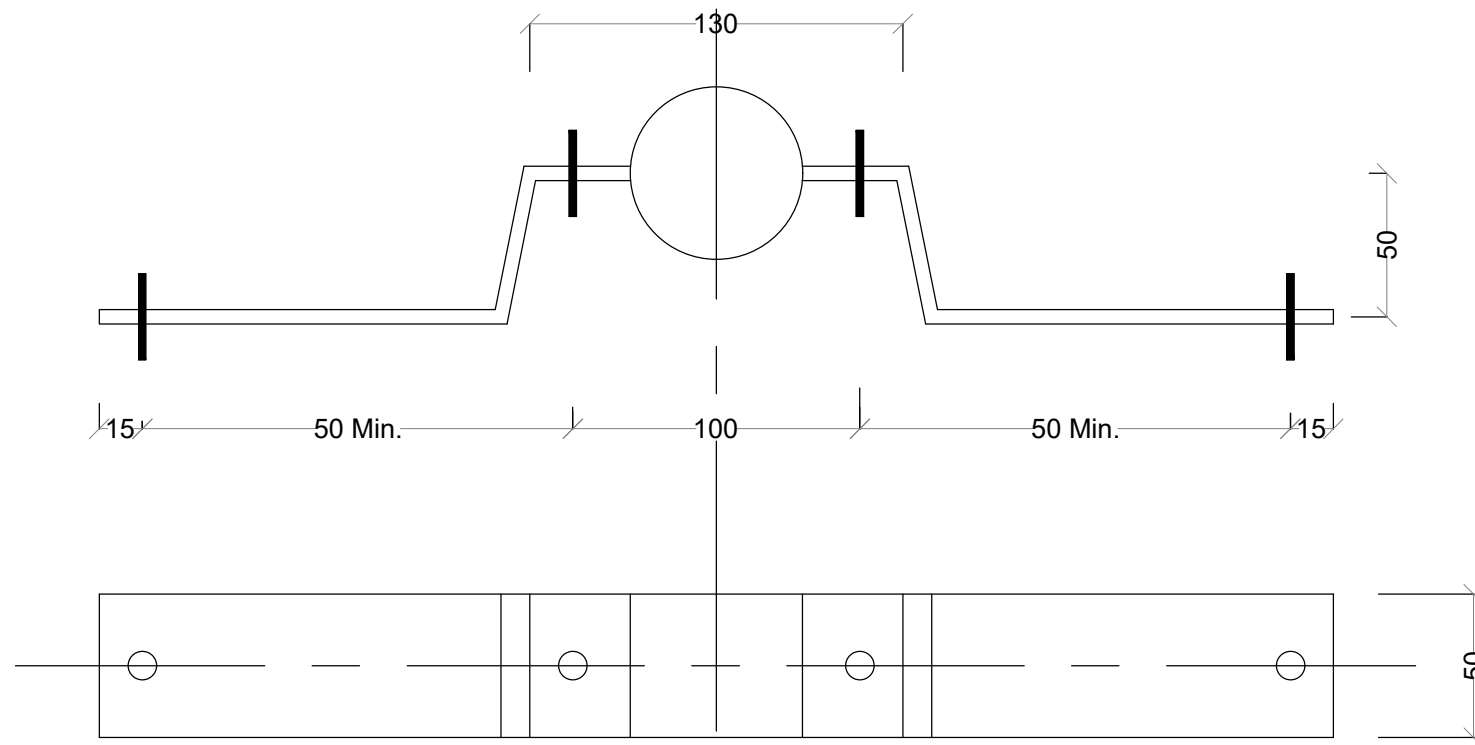
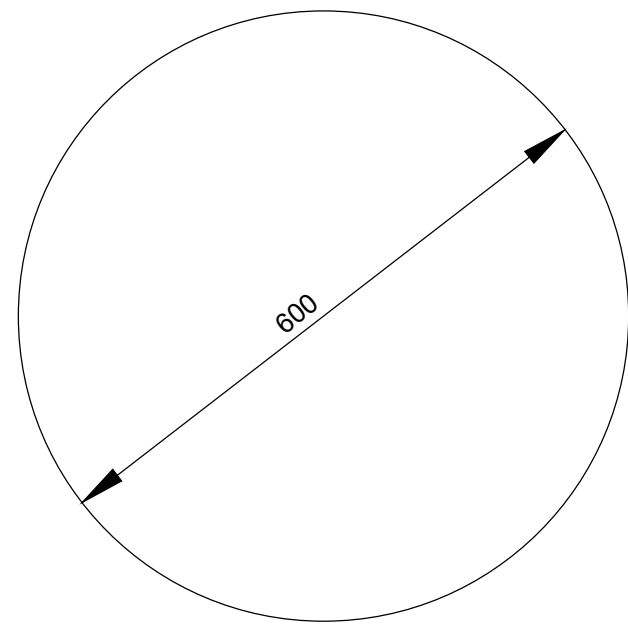
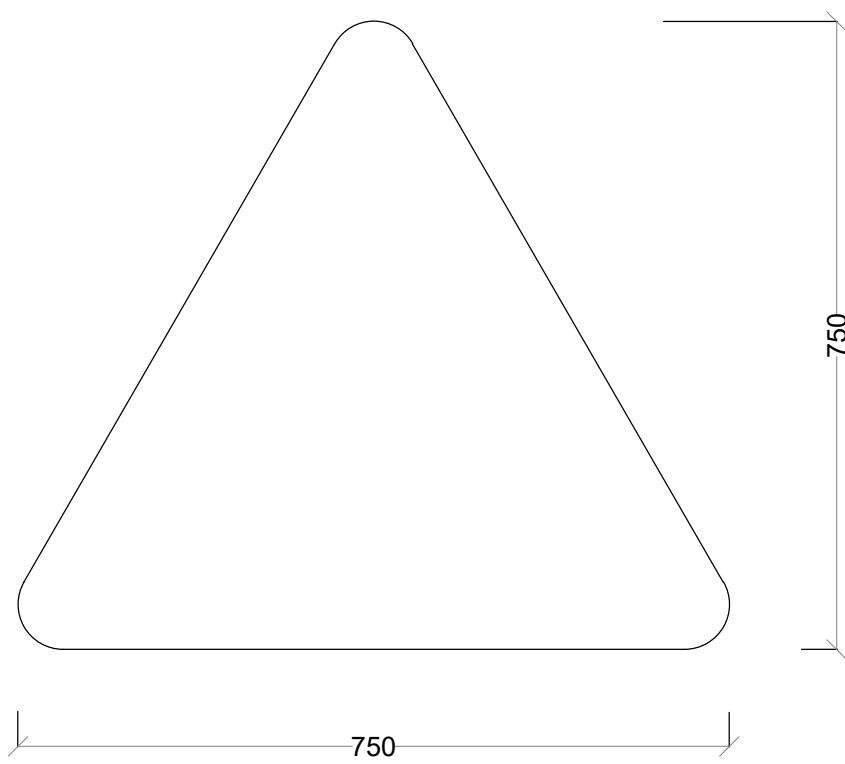
450 (mm)	600 (mm)	900 (mm)
Dimensions in (m)		
0.15	0.2	0.2
0.15	0.15	0.15
0.86	0.15	1.48
0.56	0.72	1.08
0.46	0.15	0.78
0.15	0.15	0.15
0.15	0.15	0.15
0.81	1.02	1.38
0.28	0.35	0.45
volume in (m3/m)		
0.37	0.61	0.92
<div>-fair to poor subgrade condition</div> <div>-overfill <math>&gt;\frac{3}{4}</math>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



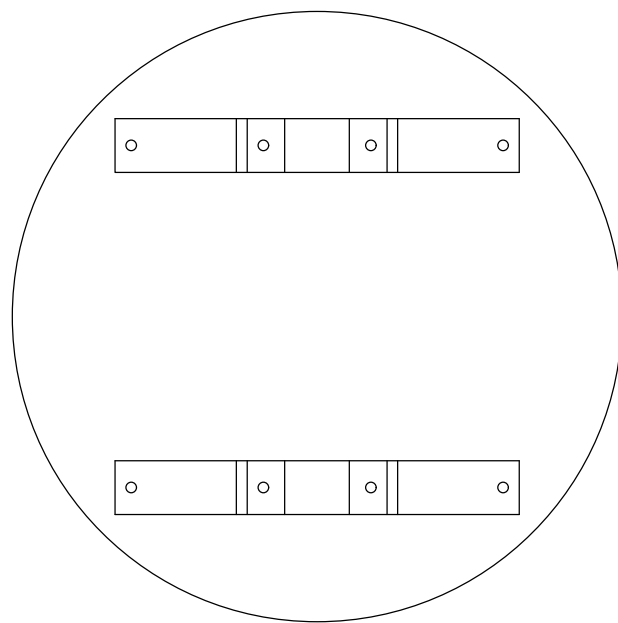
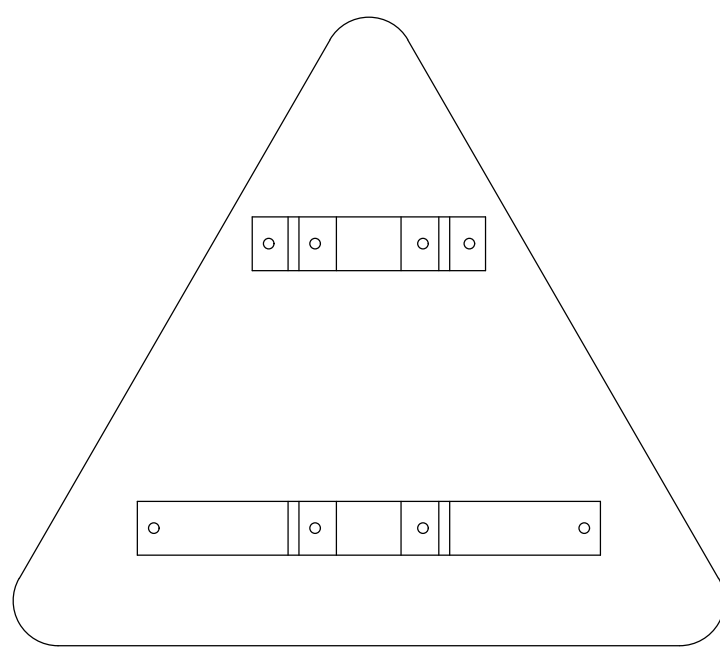
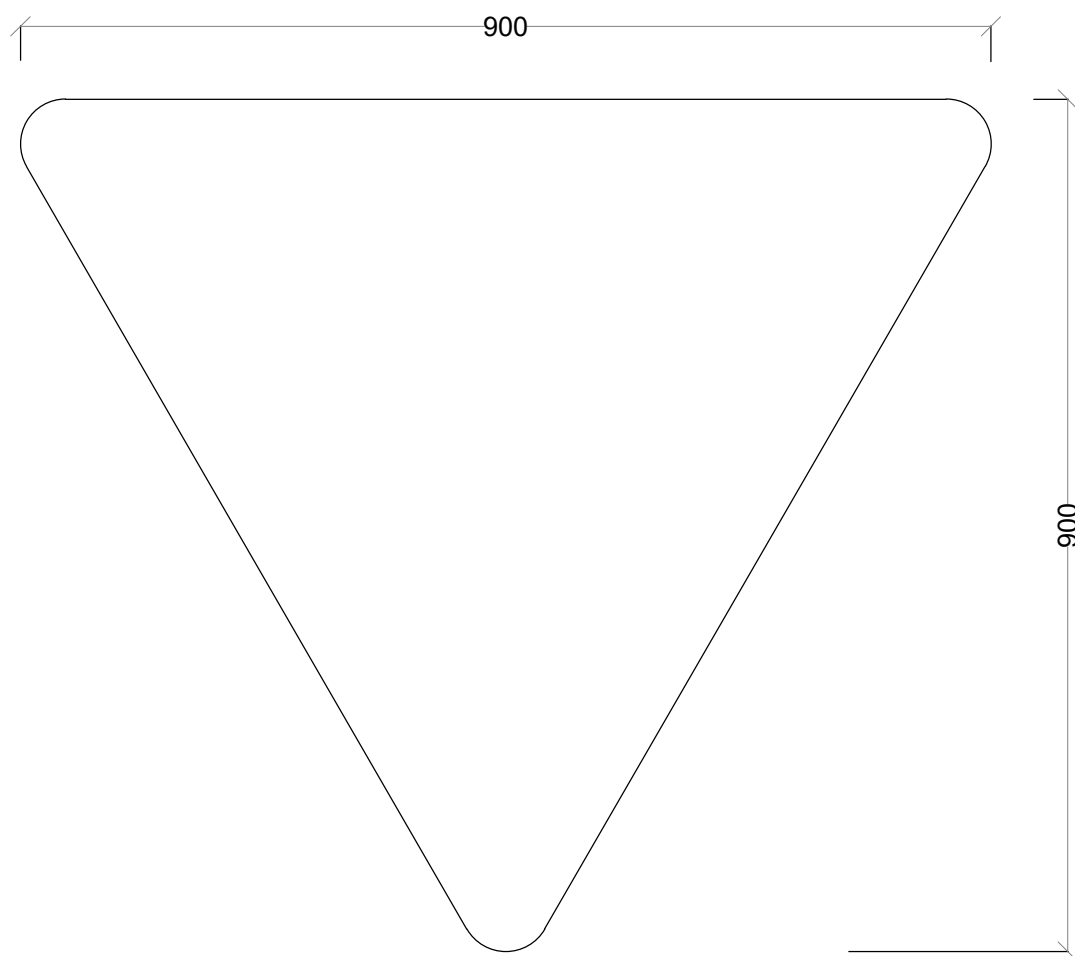
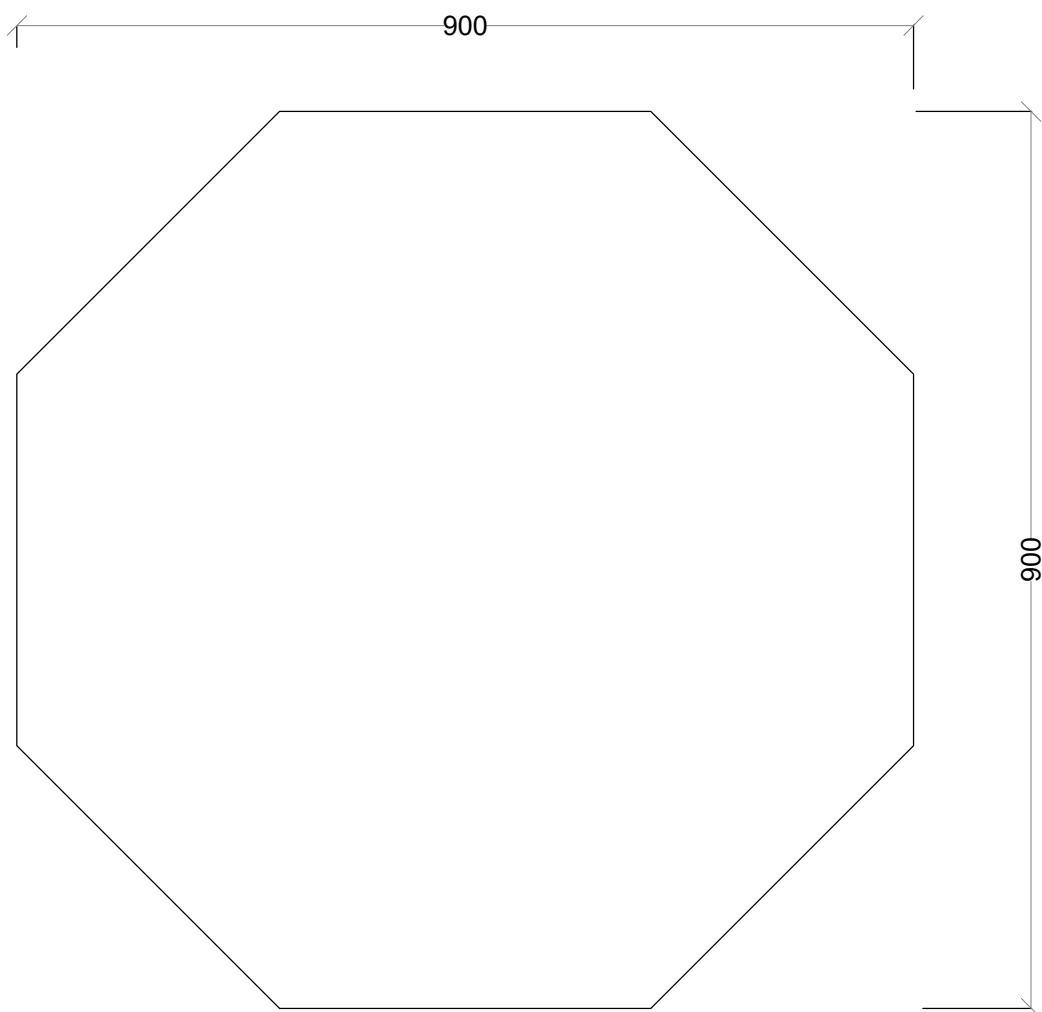




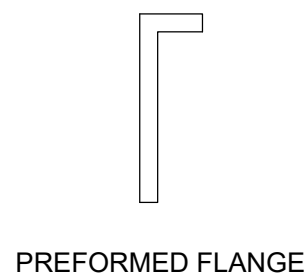
# STANDARD DRAWINGS



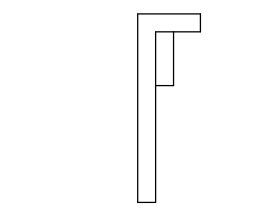
FIXING BRACKET DETAIL  
SCALE 1:2.5



TYPICAL FIXING DETAILS  
SCALE 1:25



PREFORMED FLANGE

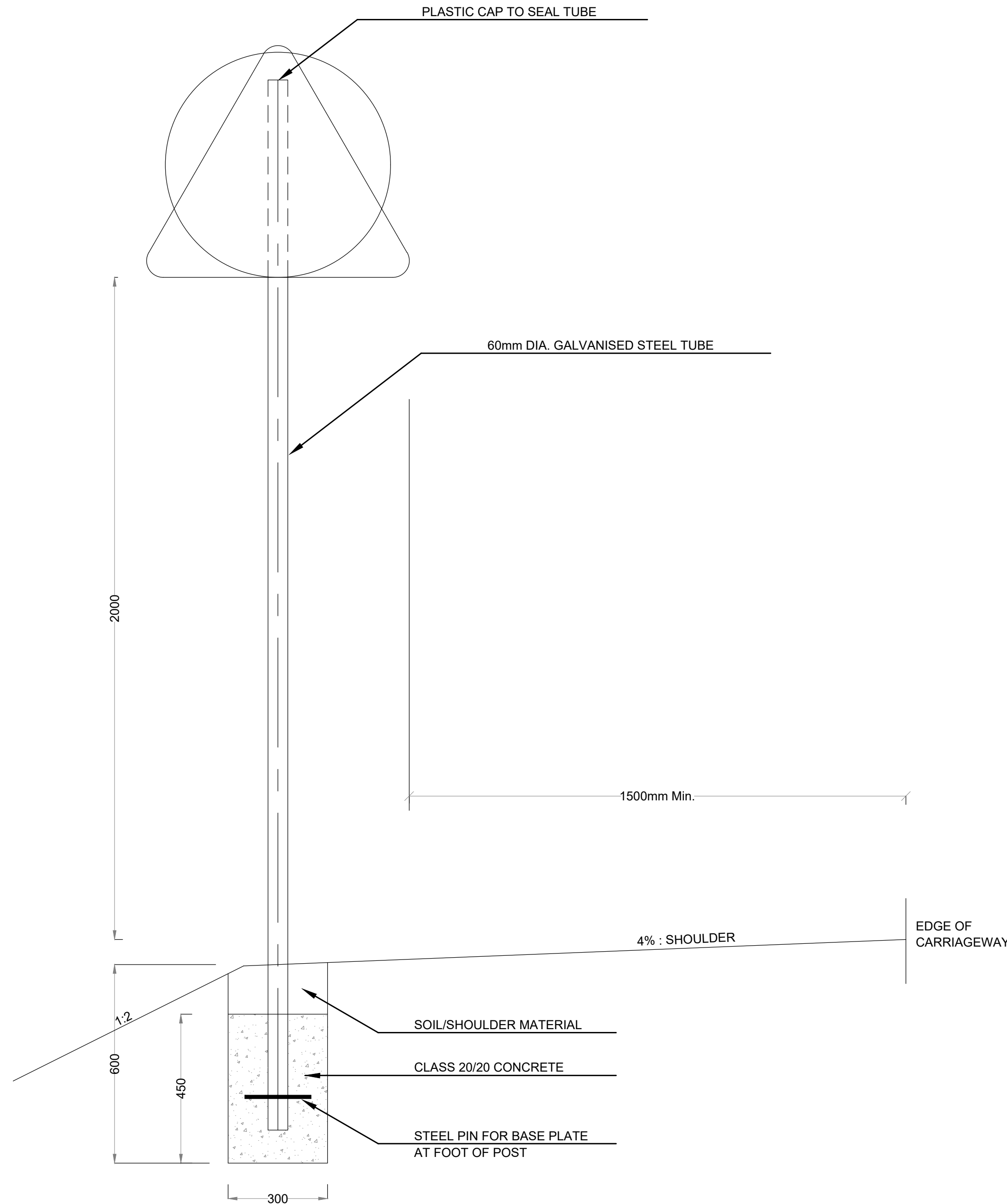


ANGLE STIFFENING

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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Tel. (020) 2717213/4

PROJECT TITLE:

DRAFT DETAILED  
ENGINEERING DESIGN OF  
THOME MATHIRA (ROAD) BATCH 2

DRAWING TITLE:

STANDARD DRAWING -  
STANDARD - ROAD SIGNS

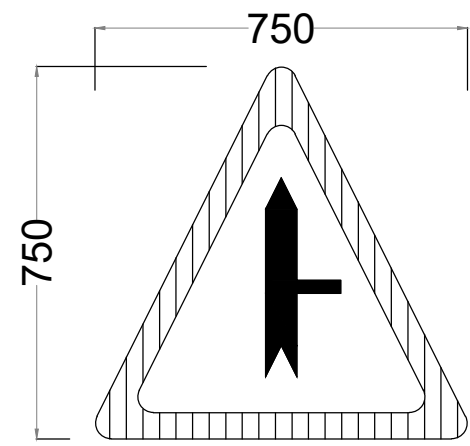
DRAWN BY: M.M  
DESIGNED BY: C.N.M  
CHECKED BY: M.J.N

Scale: AS SHOWN

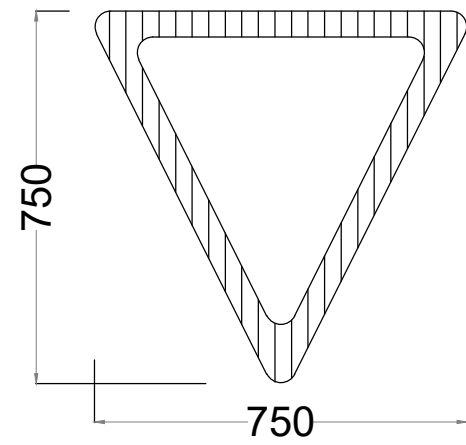
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CE1045/SD/TM/01

Date :DECEMBER 2024

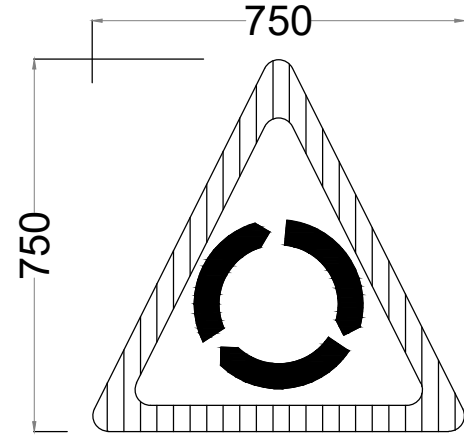




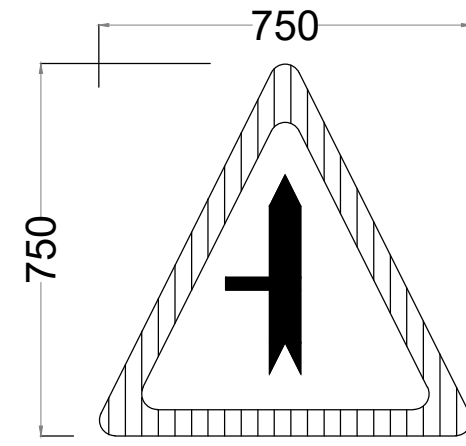
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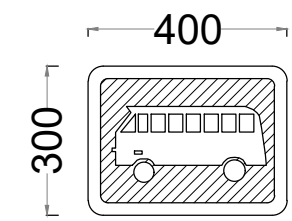
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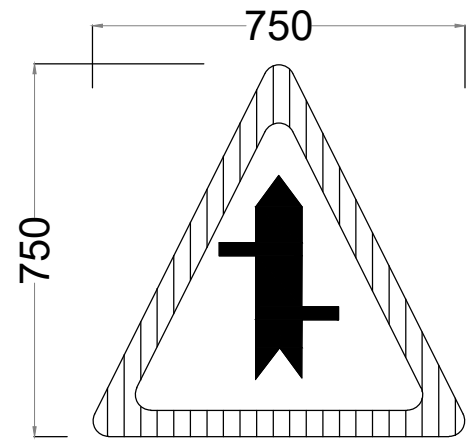
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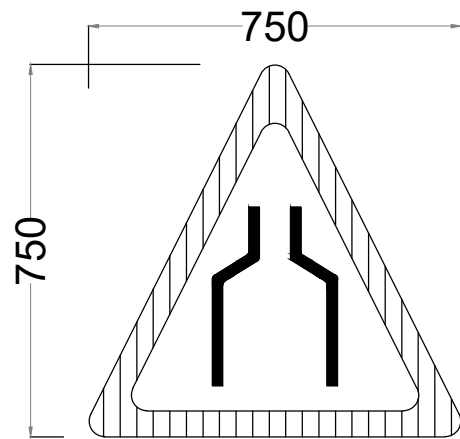
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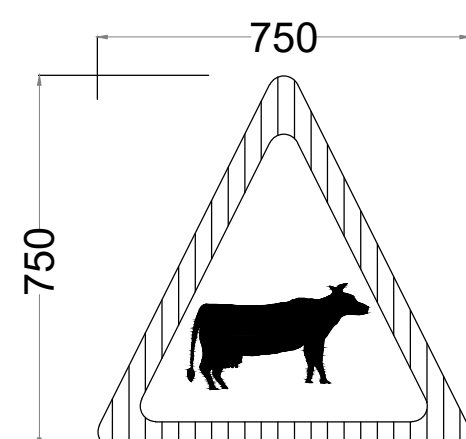
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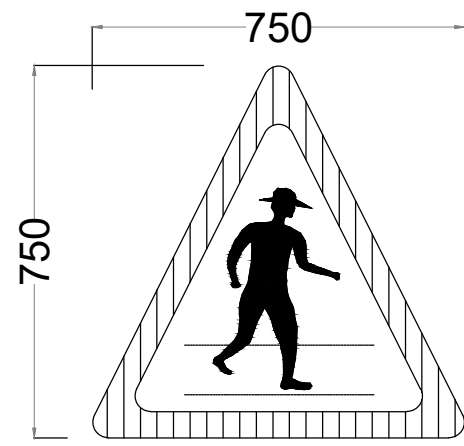
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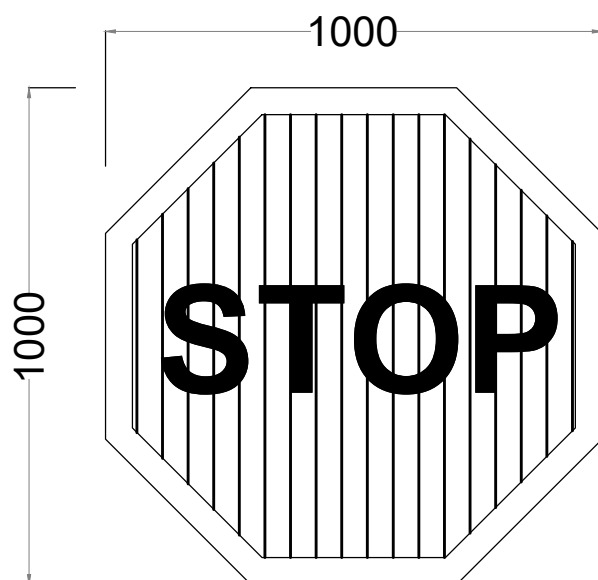
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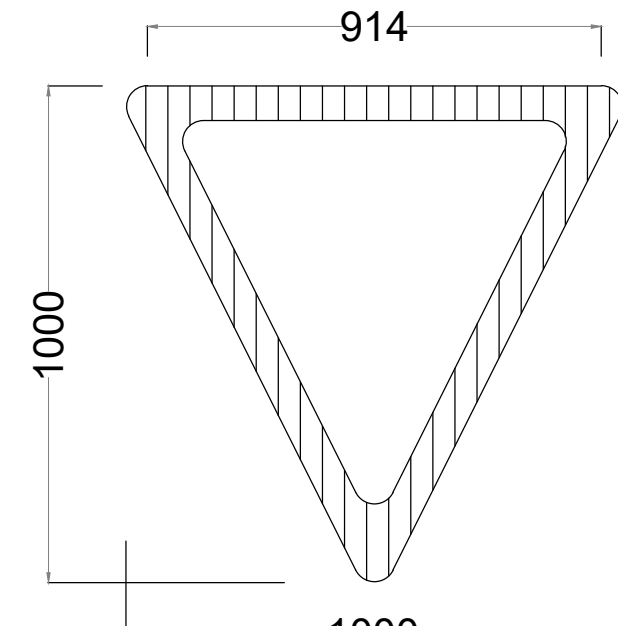
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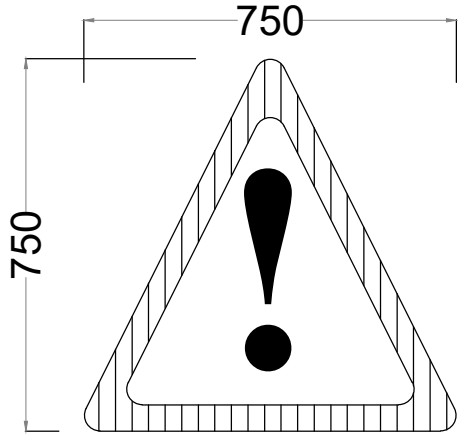
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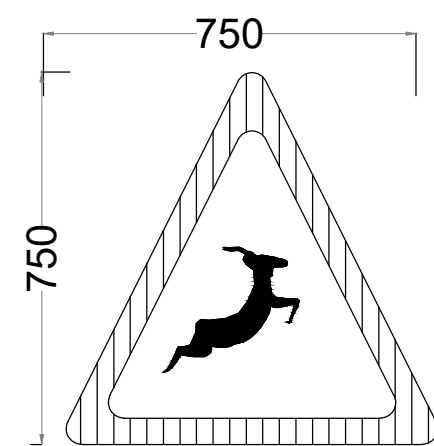
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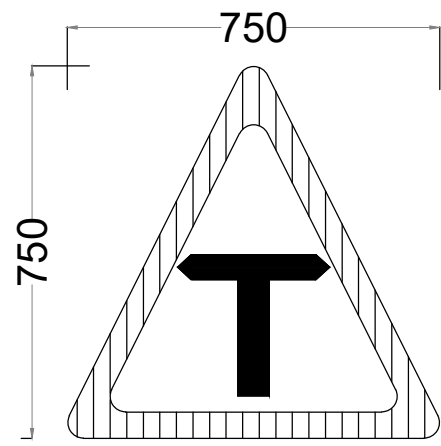
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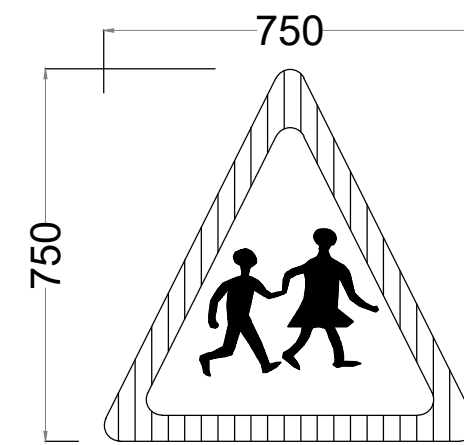
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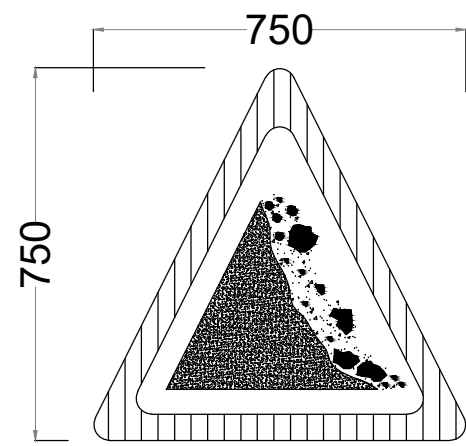
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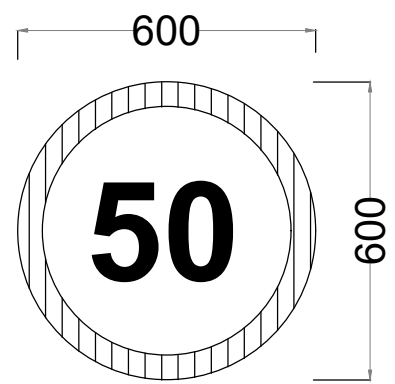
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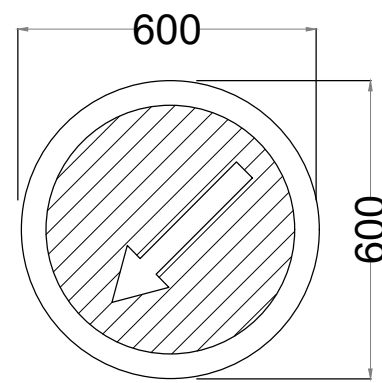
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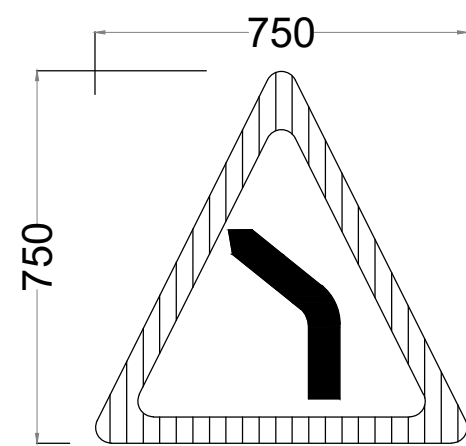
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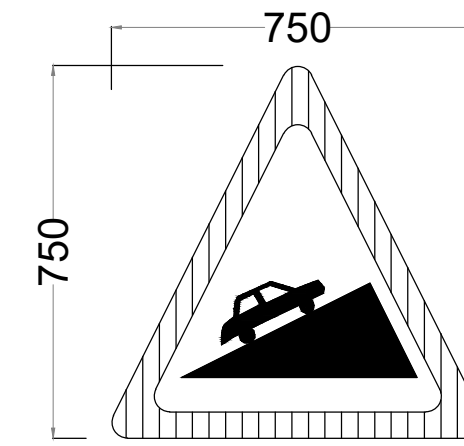
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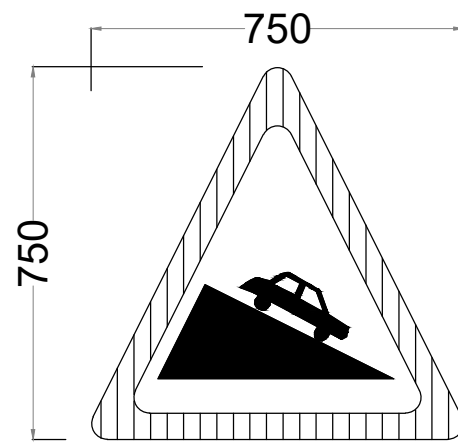
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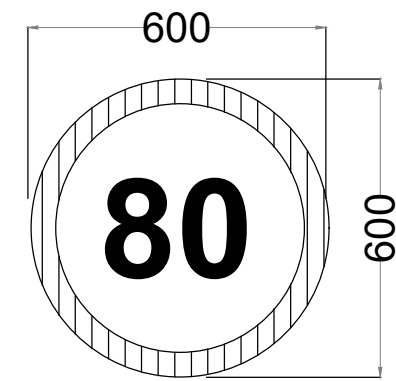
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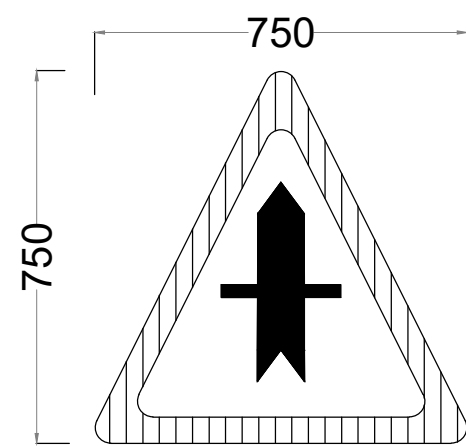
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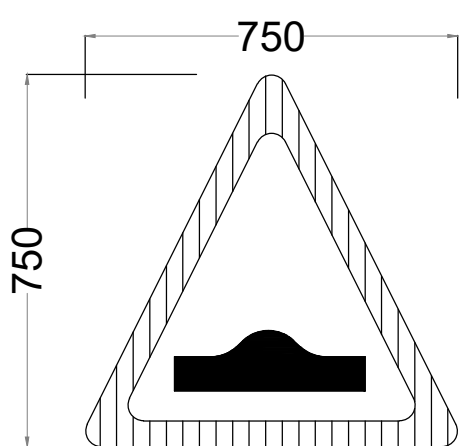
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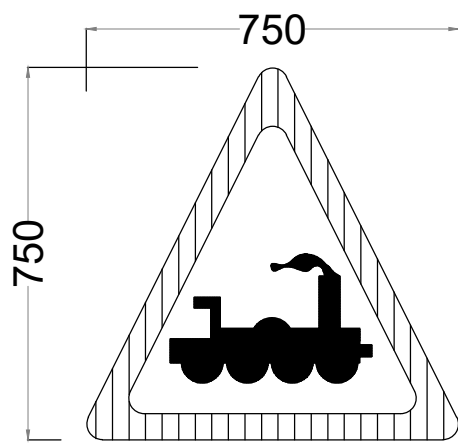
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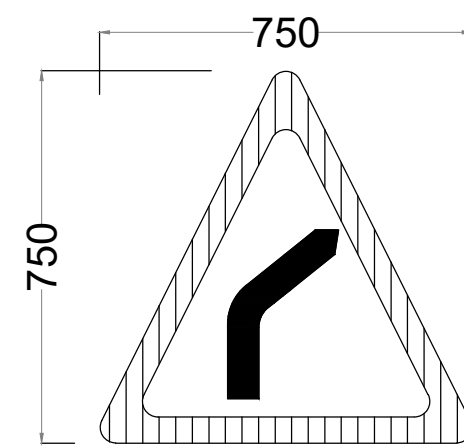
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SIGN TYPE W 12



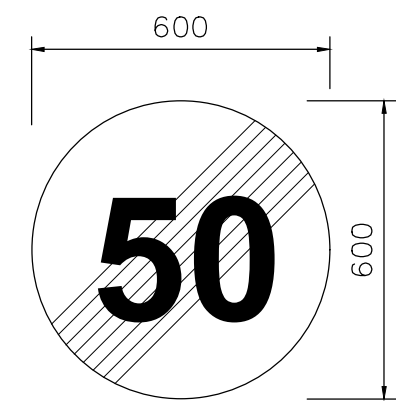
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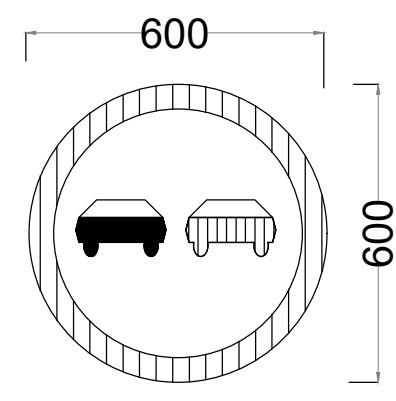
SIGN TYPE W 2





SIGN TYPE - I 27

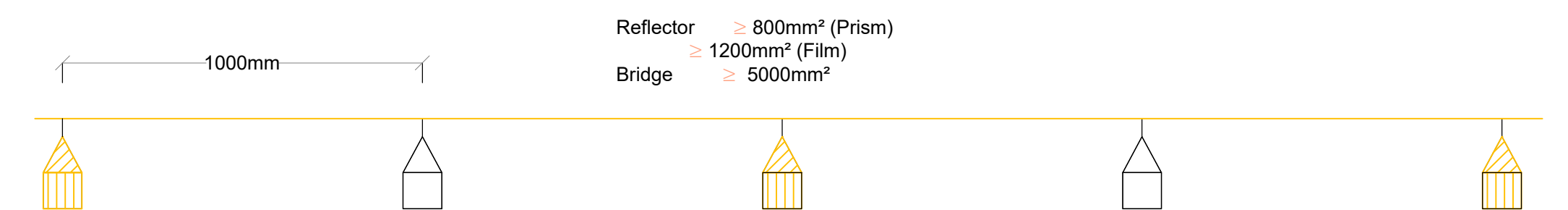
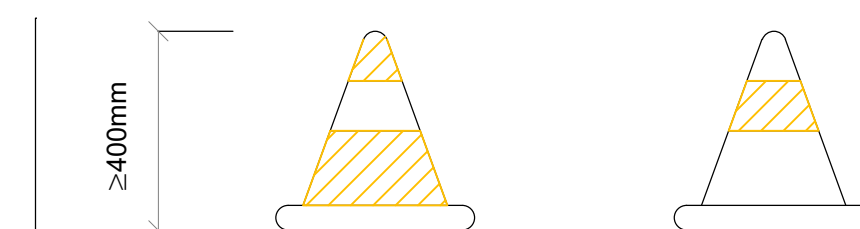
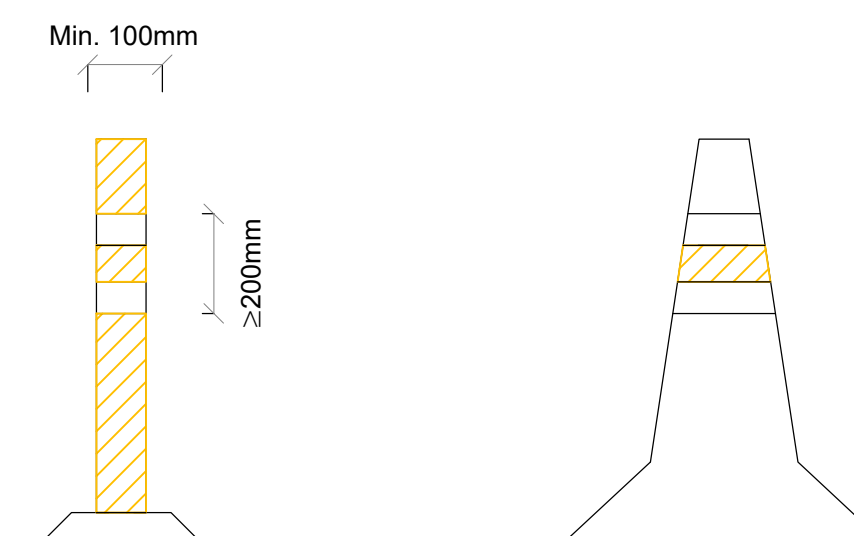
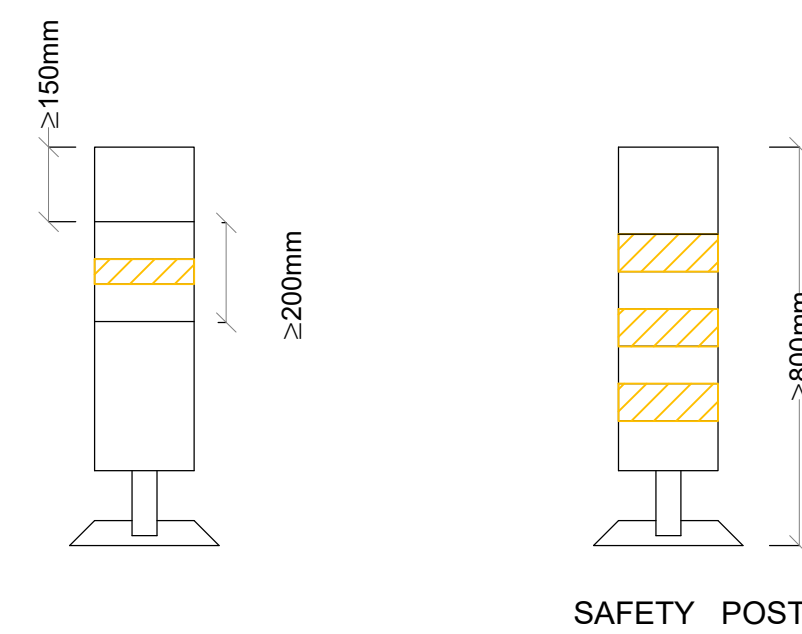
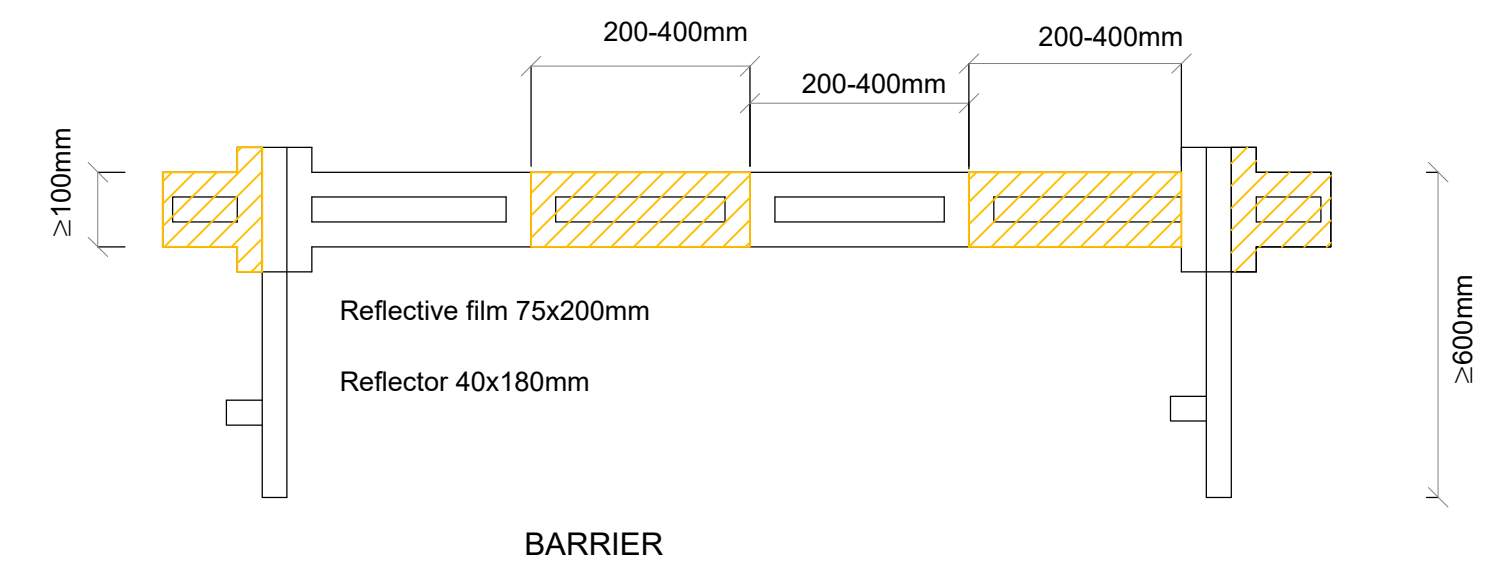


SIGN TYPE P30



SIGN TYPE P23

REVISIONS	No.	DATE	DESCRIPTION	 <div><b>Kenya Rural Roads Authority</b> Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya</div>	DIRECTOR GENERAL		Consultant:  <div><b>Runji Consulting Group Ltd</b> Engineering &amp; Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4</div>	PROJECT TITLE:  DRAFT DETAILED ENGINEERING DESIGN OF THOME MATHIRA (ROAD) BATCH 2	DRAWING TITLE:  STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N  Scale: AS SHOWN	Drg No. CE1045/SD/TM/02  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

[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  
THOME MATHIRA (ROAD) BATCH 2

DRAWING TITLE:

STANDARD DRAWING -  
TRAFFIC MANAGEMENT

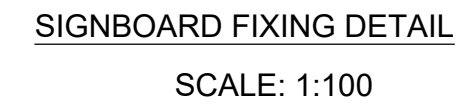
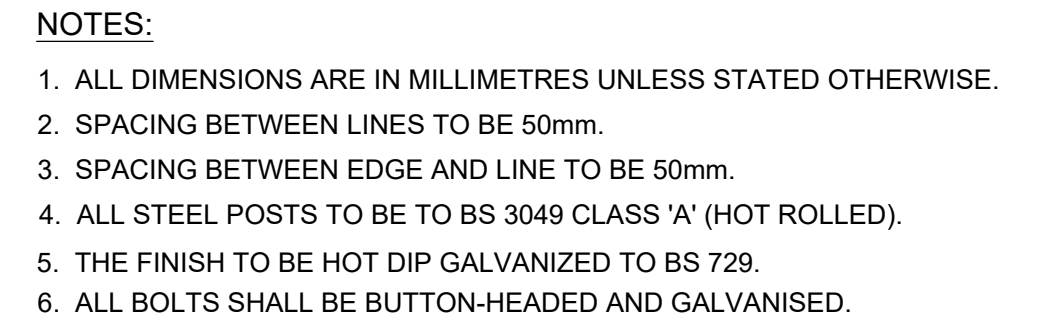
DRAWN BY: M.M  
DESIGNED BY: C.N.M  
CHECKED BY: M.J.N

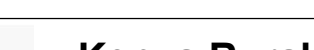
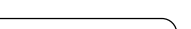
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Drg No.  
CE1045/SD/TM/03

Date :DECEMBER 2024





REVISIONS	No.	DATE	DESCRIPTION	 <div><b>Kenya Rural Roads Authority</b> Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya</div>	DIRECTOR GENERAL	<div>Consultant:</div> <div><div><b>Runji Consulting Group Ltd</b> Engineering &amp; Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4</div></div>	PROJECT TITLE: <div>DRAFT DETAILED ENGINEERING DESIGN OF THOME MATHIRA (ROAD) BATCH 2</div>	DRAWING TITLE: <div>STANDARD DRAWING - PUBLICITY SIGN BOARD</div>	DRAWN BY: M.M DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/SD/TM/04				
												Scale: AS SHOWN	DateDECEMBER2024	