

			BARAGOI-MASIKITA-SEREOLIPi				
			GRAVEL ROADS BOOK OF DRAWING				
			DRAWING No.		GENERAL DRAWINGS		
			R2000/BMS/2023/GEN/01.		DRAWING INDEX		
			R2000/BMS/2023/GEN/02.		PROJECT LOCATION MAP		
			TYPICAL CROSS-SECTIONS				
			R2000/BMS/2023/TCS/01		CROSS-SECTION A(STANDARD CROSS-SECTION)		
			R2000/BMS/2023/TCS/02		CROSS-SECTION B (REDUCED CROSS-SECTION)		
			R2000/BMS/2023/TCS/03		CROSS-SECTION C (BLACK COTTON SOIL CROSS-SECTION)		
			R2000/BMS/2023/TCS/04		CROSS-SECTION D (SIDELONG GROUND CROSS-SECTION)		
			R2000/BMS/2023/TCS/05		DETAILED TYPICAL CROSS-SECTION AND BENCHING DETAILS		
			PIPE CULVERTS				
			R2000/BMS/2023/PC/01		HEAD WALL TYPE 1		
			R2000/BMS/2023/PC/02		HEAD WALL TYPE 2		
			R2000/BMS/2023/PC/03		HEAD WALL TYPE 3		
			R2000/BMS/2023/PC/04		HEAD WALL TYPE 4		
			R2000/BMS/2023/PC/05		PIPE CULVERT DETAILS		
			R2000/BMS/2023/PC/06		BEDDING AND HAUNCH		
			STANDARD DRAWINGS				
			R2000/BMS/2023/SD/01		STANDARD JUNCTION AND ACCESS DETAILS		
			R2000/BMS/2023/SD/02		STANDARD BUSBAY AND KERB DETAILS		
			R2000/BMS/2023/SD/03		STANDARD MARKER POST DETAILS		
			R2000/BMS/2023/SD/04		STANDARD GUARD RAIL DETAILS		
			GENERAL DRAINAGE				
			R2000/BMS/2023/GDR/01		MITRE DRAIN DETAILS		
			R2000/BMS/2023/GDR/02		SCOUR CHECKS		
			R2000/BMS/2023/GDR/03		SCOUR CHECKS		
			R2000/BMS/2023/GDR/04		SCOUR CHECKS		
			R2000/BMS/2023/GDR/05		ACCESS DRIFTS		
			TRAFFIC SIGNS				
			R2000/BMS/2023/TS/01		STANDARD TRAFFIC SIGNS		
			PUBLICITY SIGNBOARD				
			R2000/BMS/2023/PSB/01		PUBLICITY SIGNBOARD		

[illegible]

[illegible]

Min. 0.50

0.60

1.20

Carriageway 5.40

2.70

2.70

1.20

0.55

Min. 0.50

5%-8%

5%-8%

0.35

0.35

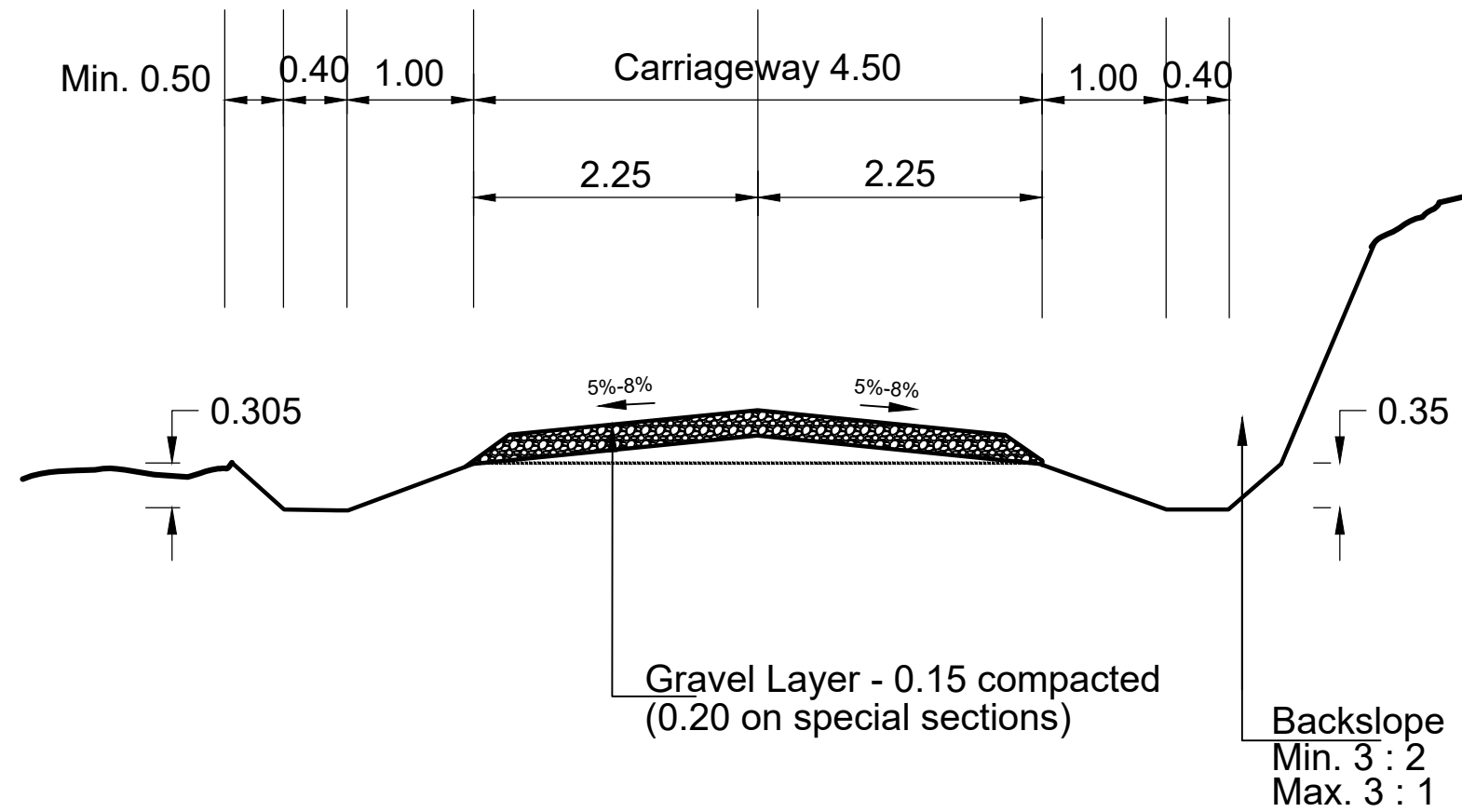
Gravel Layer = 0.15 compacted (0.20 on special sections)

Backslope
Min. 3 : 2
Max. 3 : 1

- TRAFFIC LEVELS OF MORE THAN 200 VPD MAY JUSTIFY RUNNING SURFACE WIDTH INCREASE TO 6.50 METRES

[illegible]

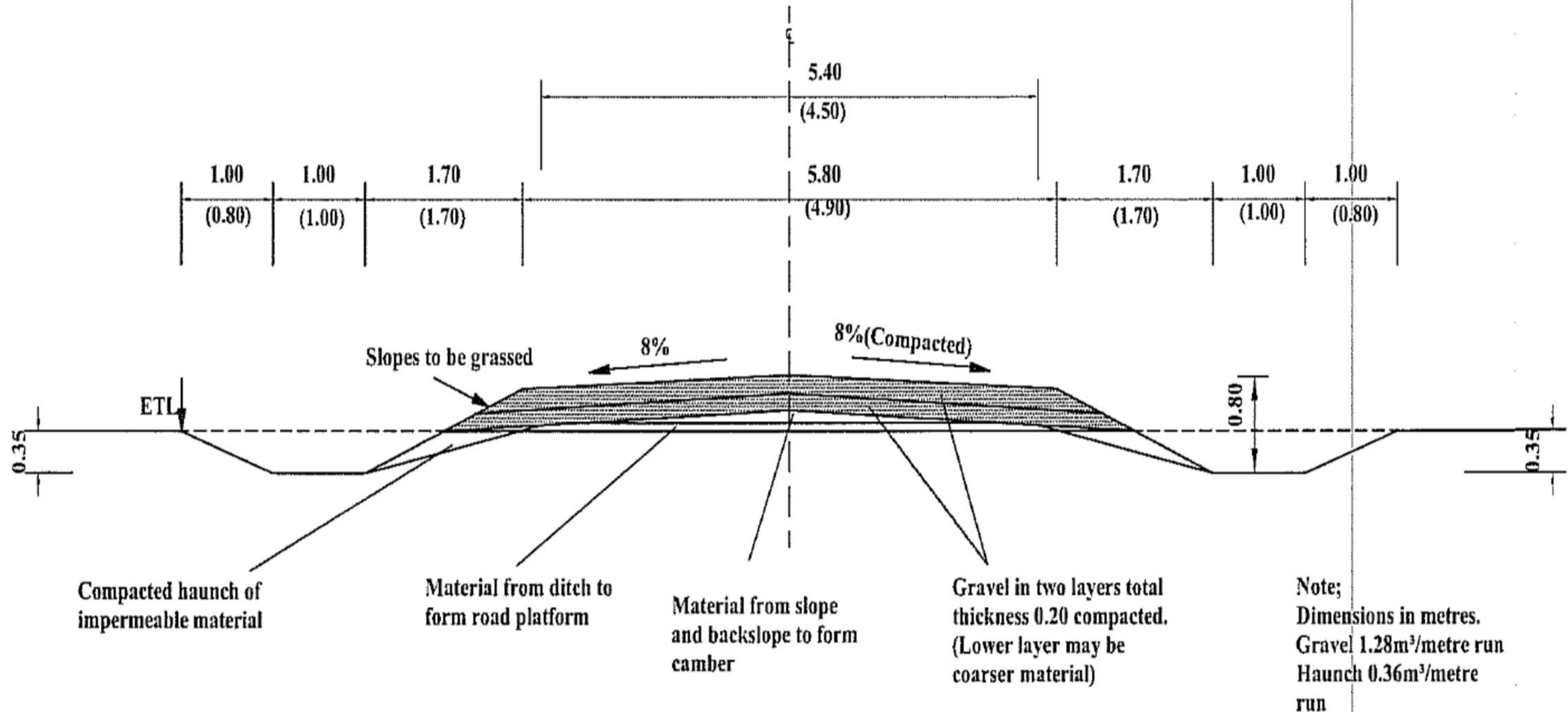
FIGURE H.2 - CROSS SECTION B (REDUCED CROSS-SECTION)



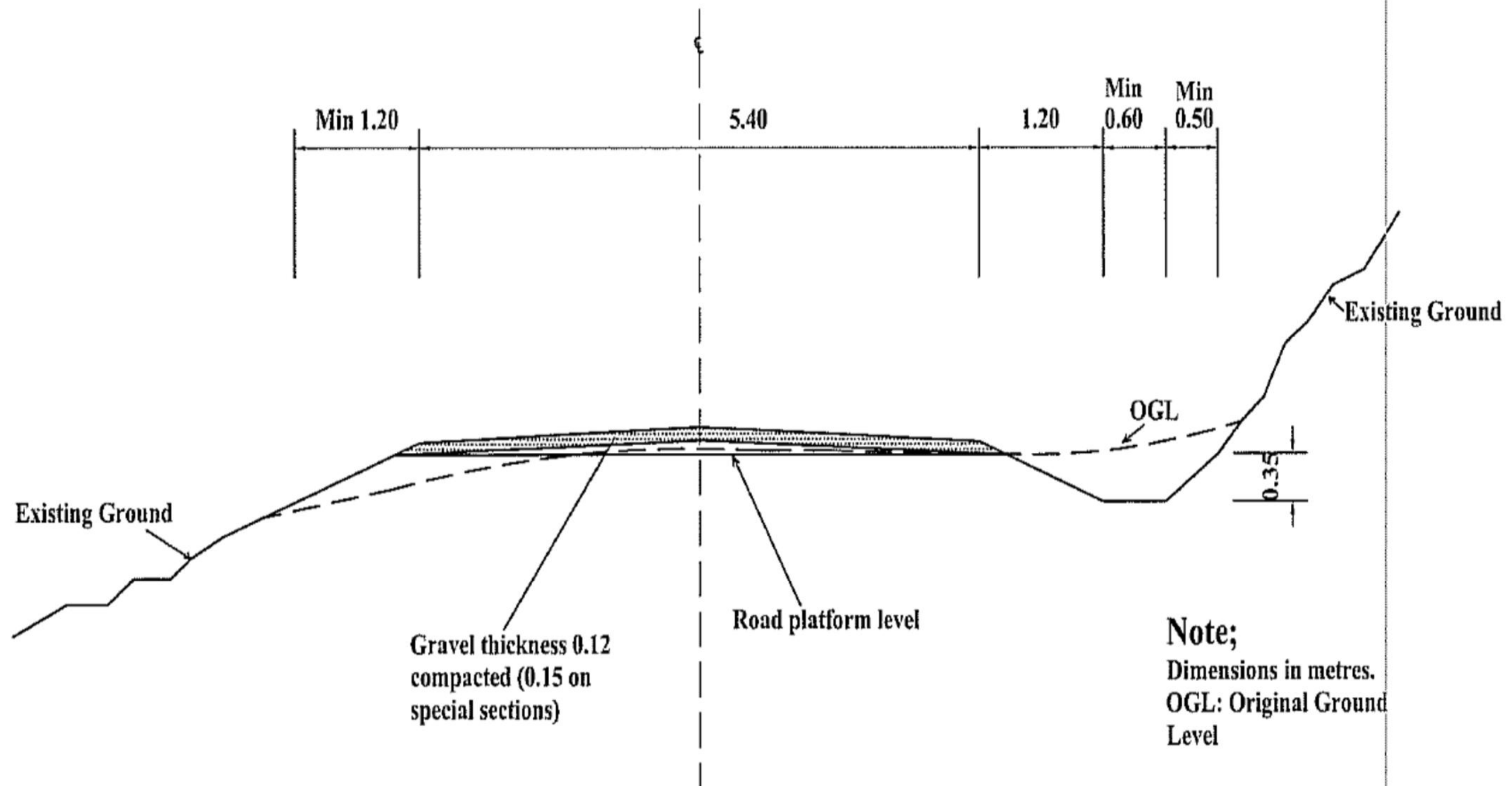
NOTE: - ALL SPECIFIED
DIMENSIONS IN m.

[illegible]

Cross Section C (Black Cotton Soil)



Cross Section D (Sidelong Ground)

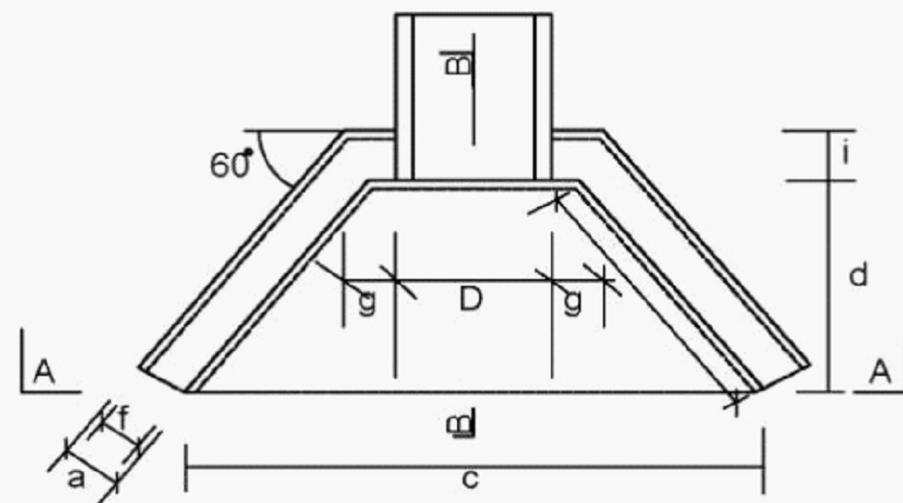
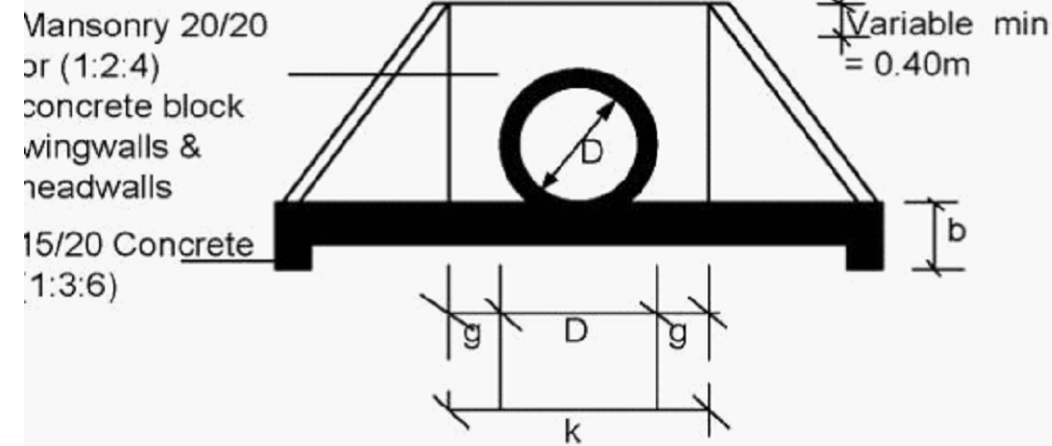


				Drg No.	: R2000/BMS/2023/TCS/003				

PIPE CULVERTS

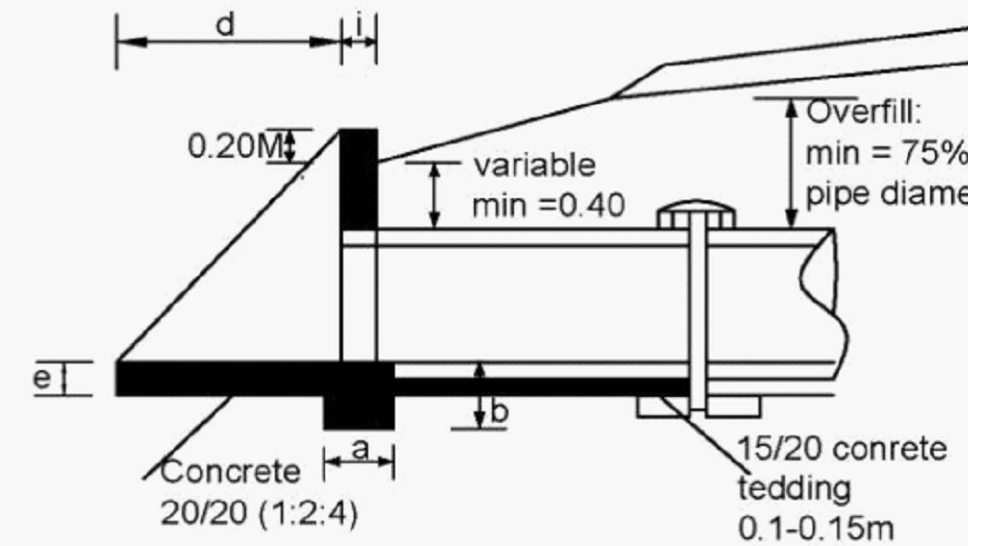
C8- HEADWALL TYPE 1 (HEAD AND WINGWALLS)

SECTION A-A



CULVERT TYPES	
X-SECTION WIDTH-M	No. of pipes
4.50	6.00
5.50	7.00
6.50	8.00

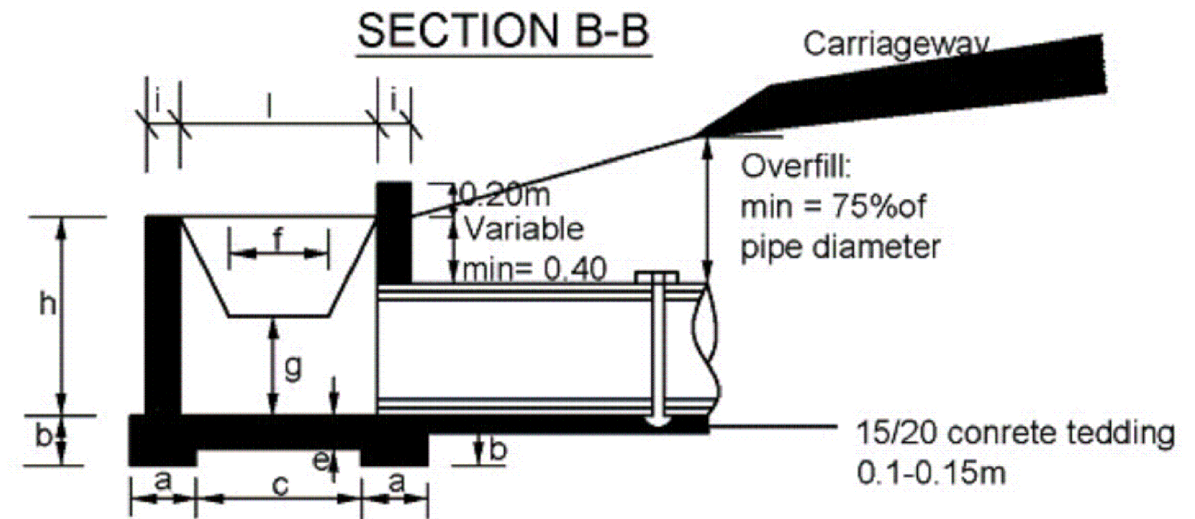
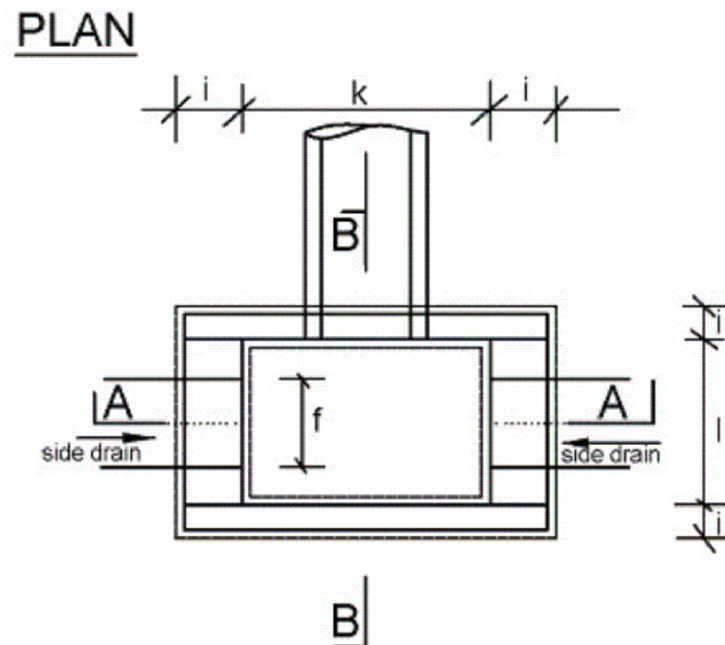
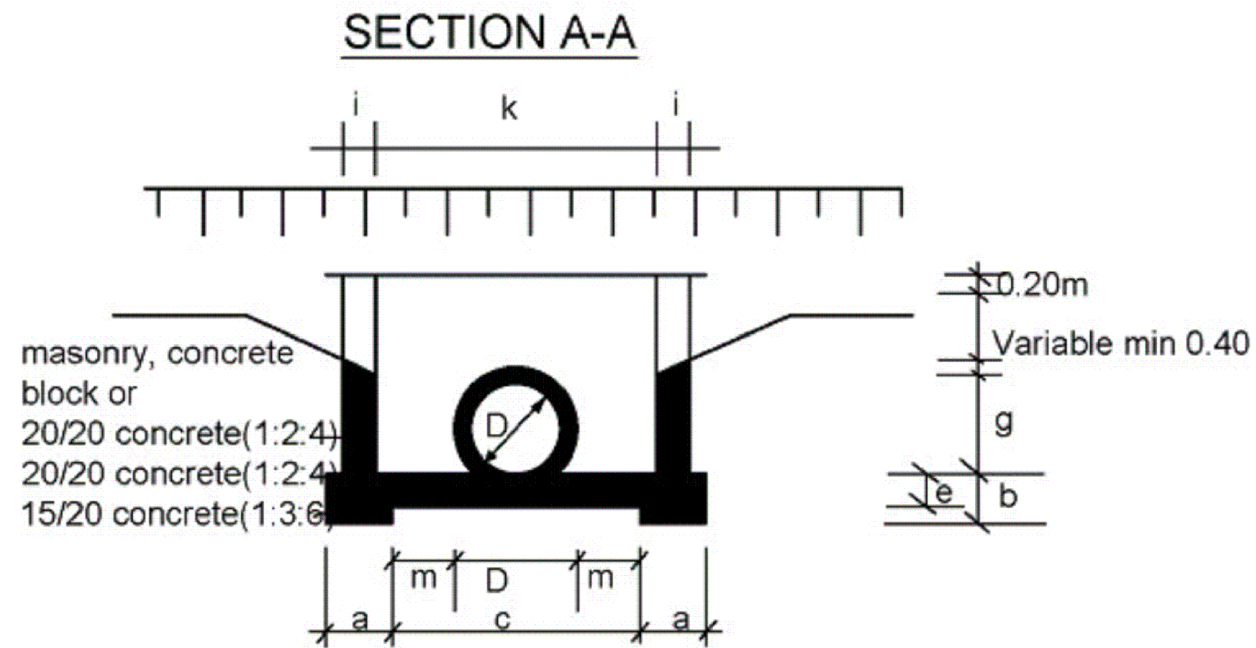
SECTION B-B



PIPE DIAMETER IN M			TYPE A and C 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	m		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		0.30	0.32	0.51	0.40	0.42	1.03
HEAD/WINGWALLS (Concrete/Masonry)	m3		0.42	0.49	0.70	0.84	0.96	1.40
APRON (cocrete)	m3		0.33	0.36	0.53	0.33	0.36	0.53

								Drg No. : R2000/BMS/2023/PC/001	

C9-HEADWALL TYPE 2(DROP INLET)



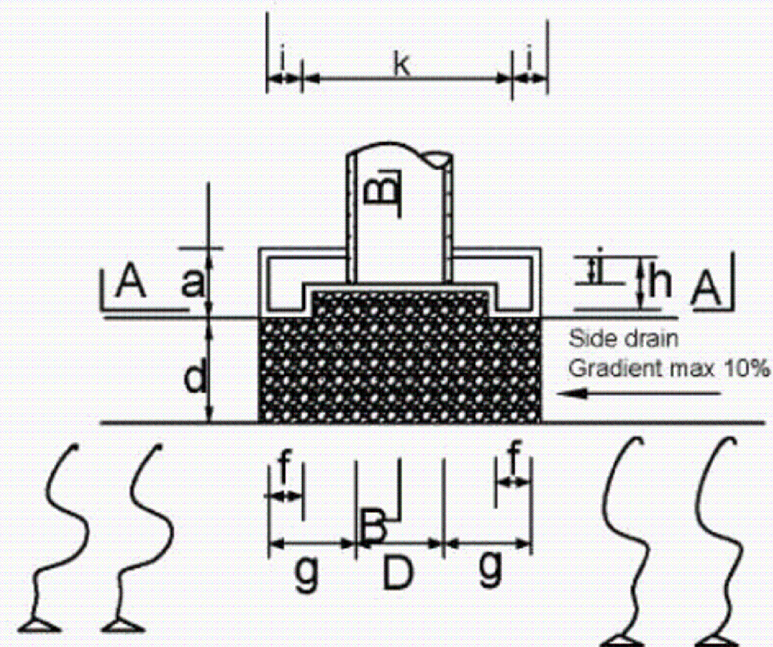
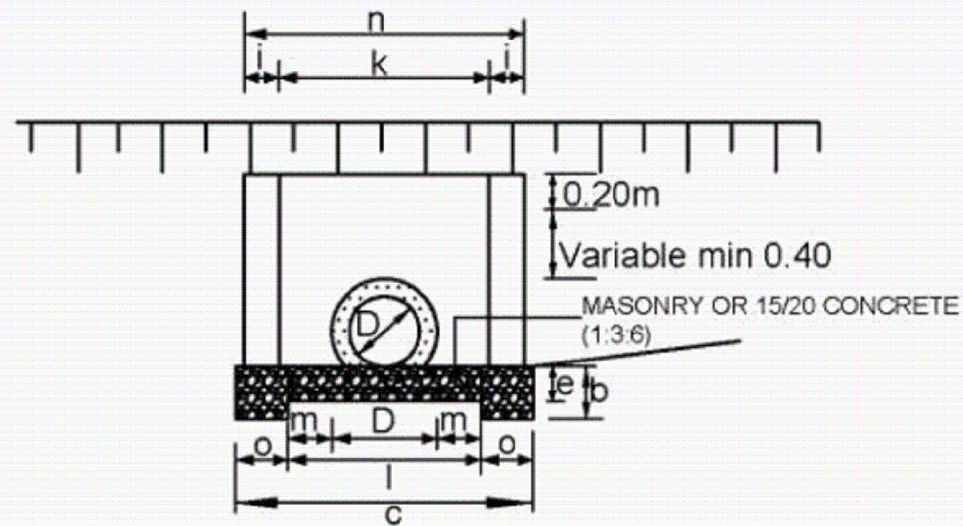
DIMENSIONS AND MATERIAL REQUIREMENTS

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	0.40
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
i	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	0.6	0.72	1.15	1.27	1.63	2.65
APRON (cocrete)		m3	0.24	0.24	0.30	0.24	0.24	0.30

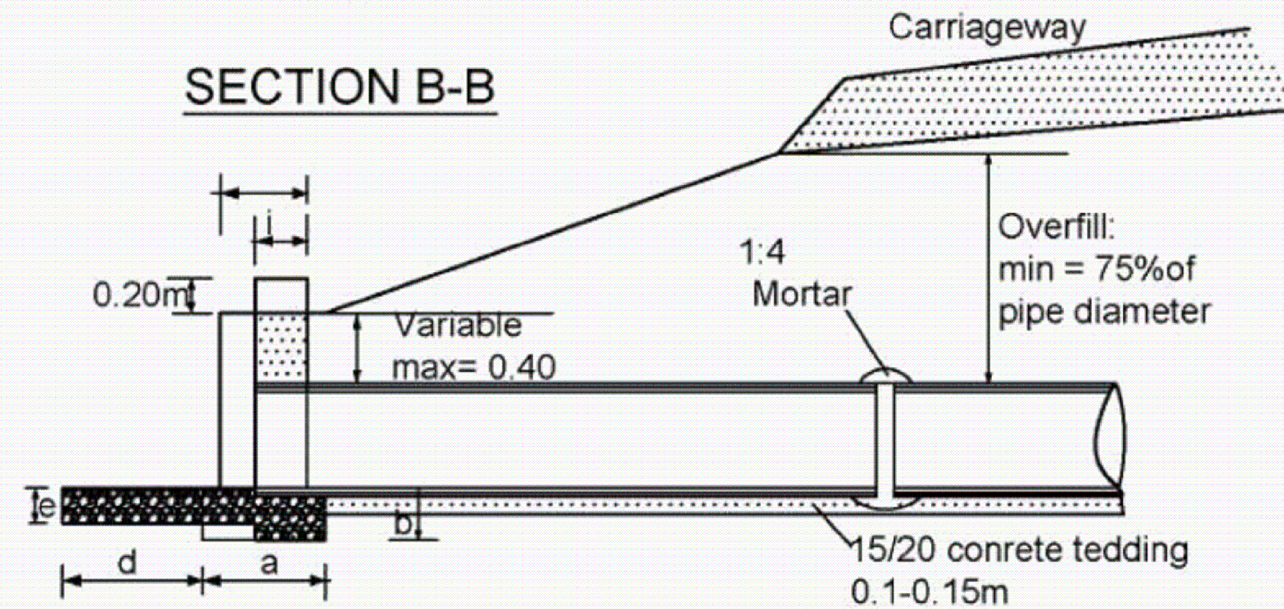
						Drg No.	: R2000/BMS/2023/PC/002		

C.10-HEADWALL TYPE 3A (CONCRETE/ BLOCK HEADWALLS)

SECTION A-A



SECTION B-B



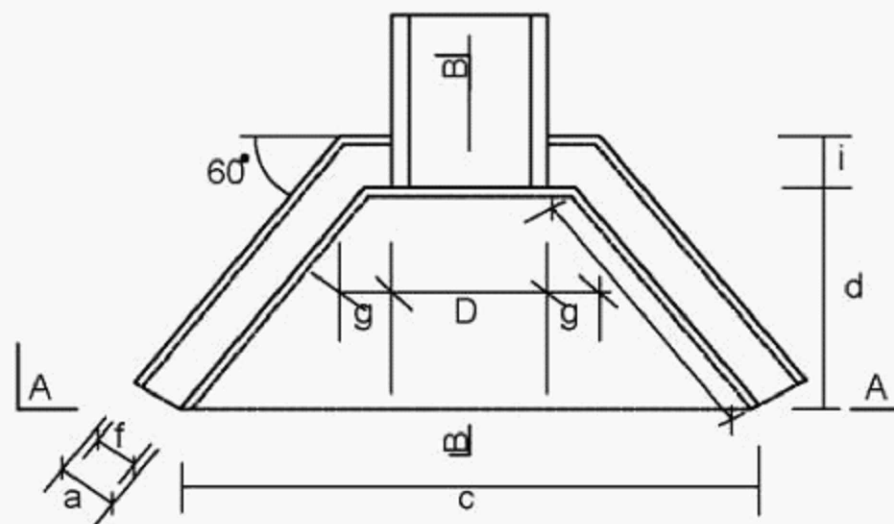
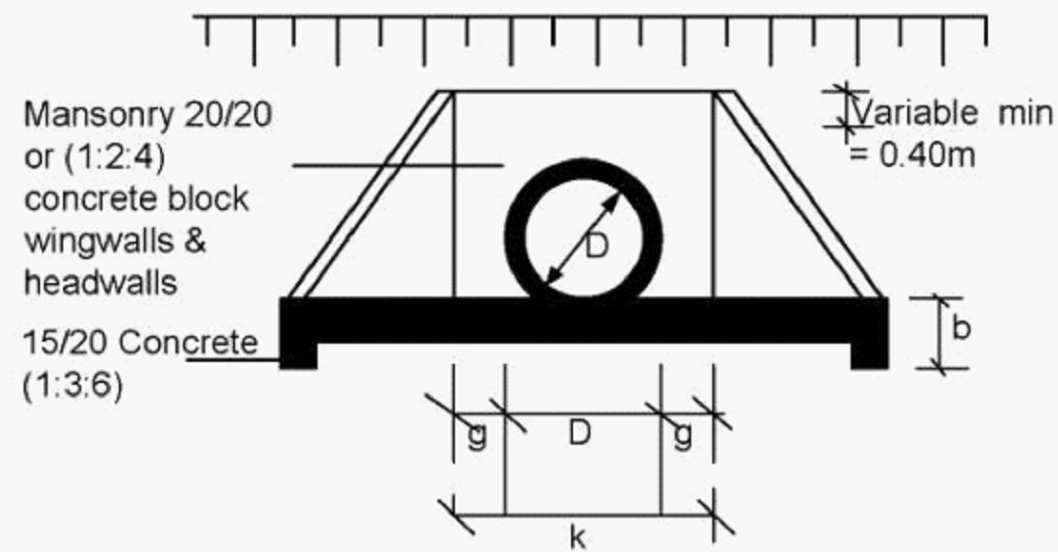
DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A and C CONCRETE BLOCK	
			450	600
DIMENSION	UNIT			
a FOUNDATION	m	0.50	0.50	
b FOUNDATION	m	0.30	0.30	
c FOUNDATION	m	1.55	1.70	
d APRON	m	0.60	0.60	
e APRON	m	0.20	0.20	
f HEADWALL	m	0.20	0.20	
g HEADWALL	m	0.50	0.50	
h HEADWALL	m	0.50	0.50	
i HEADWALL	m	0.50	0.50	
k HEADWALL	m	0.50	0.50	
l FOUNDATION	m	0.50	0.50	
m FOUNDATION	m	0.50	0.50	
n HEADWALL	m	0.50	0.50	
o FOUNDATION	m	0.50	0.50	
MATERIAL REQUIREMENT				
FOUNDATION (concrete)		0.23	0.19	
HEAD/WINGWALLS (Concrete/Masonry)		0.34	0.37	
APRON (concrete)		0.95	0.99	

						Drg No.	: R2000/BMS/2023/PC/003		

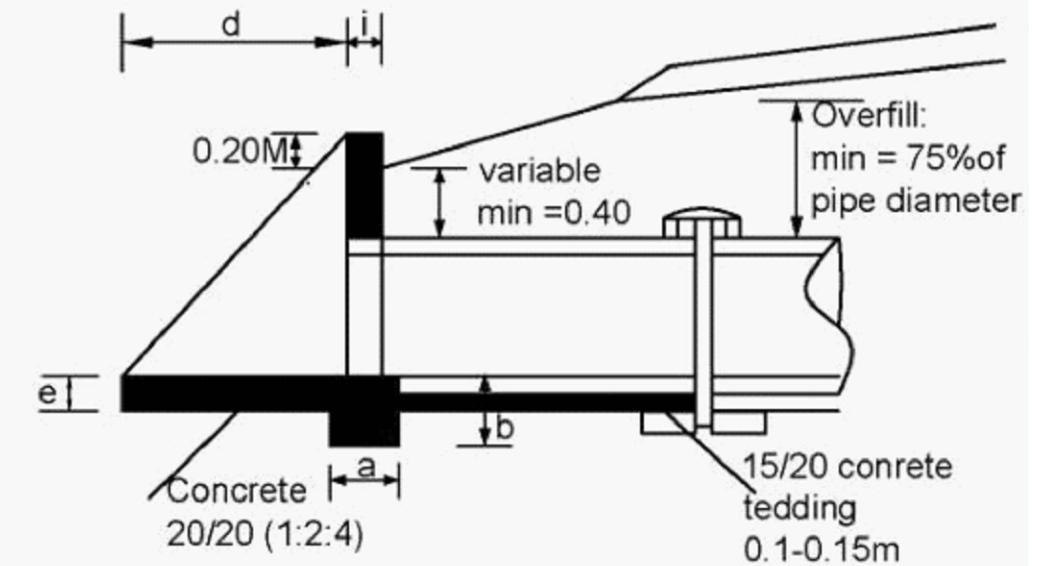
C12- HEADWALL TYPE 4 (FOR ACCESS CULVERTS)

SECTION A-A



CULVERT TYPES	
X-SECTION WIDTH-M	No. of pipes
4.50	6.00
5.50	7.00
6.50	8.00

SECTION B-B



PIPE DIAMETER IN M			TYPE A CONCRETE BLOCKS			TYPE B (STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION								
a	FOUNDATION	m	0.30	0.30		0.40	0.40	
b	FOUNDATION	m	0.30	0.30		0.30	0.30	
c	FOUNDATION	m	1.34	1.49		1.34	1.49	
d	APRON	m	0.6	0.6		0.60	0.60	
e	APRON	m	0.20	0.20		0.20	0.20	
f	WALL	m	0.20	0.20		0.40	0.40	
g	WALL	m	0.1	0.10		0.10	0.10	
h	WALL	m	0.69	0.69		0.69	0.69	
i	WALL	m	0.20	0.20		0.40	0.40	
k	APRON	m	0.4	0.40		1.05	1.20	
MATERIAL REQUIREMENT								
FOUNDATION (concrete)			m3	0.18	0.2		0.24	0.26
HEAD/WINGWALLS (Concrete/Masonry)			m3	0.28	0.32		0.53	0.61
APRON (concrete)			m3	0.12	0.14		0.12	0.14

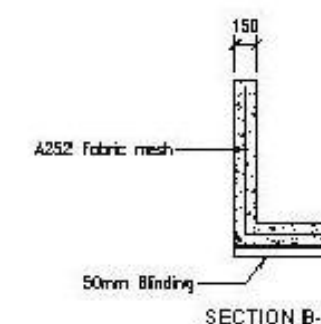
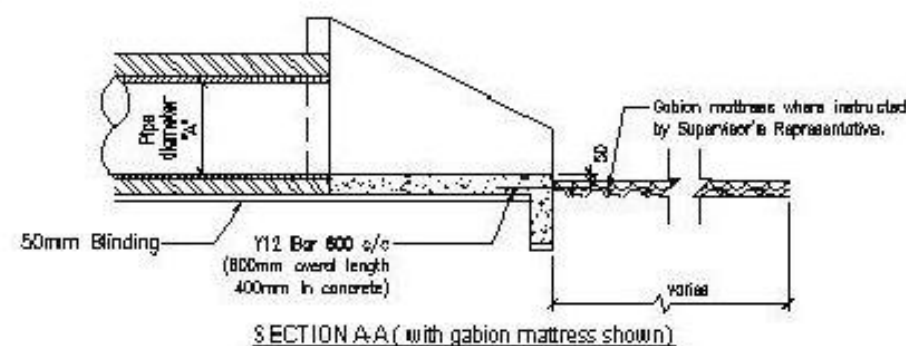
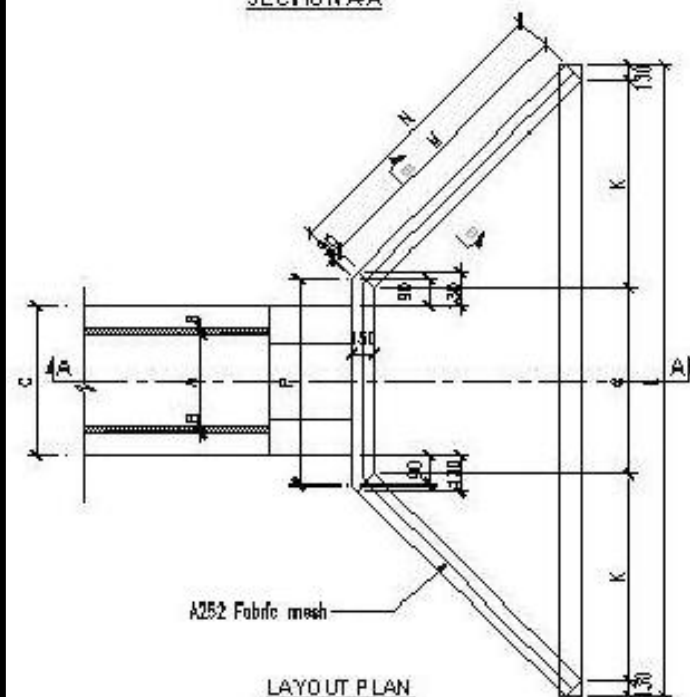
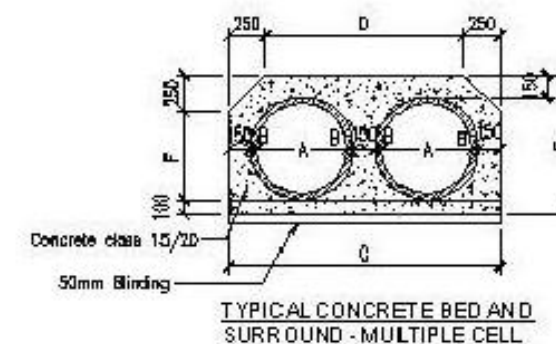
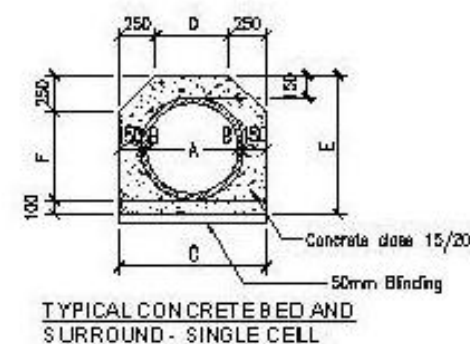
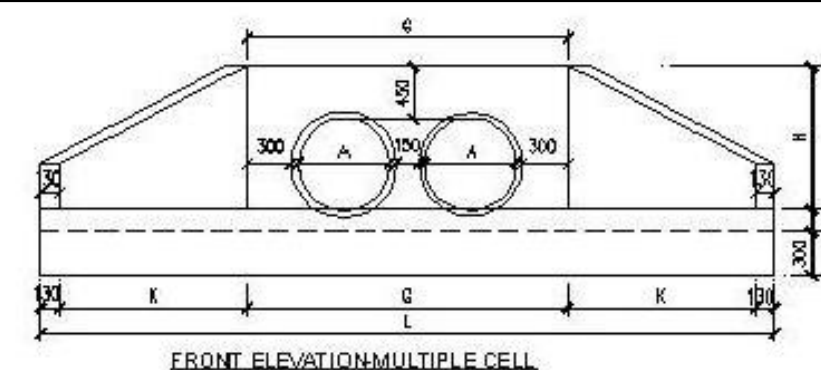
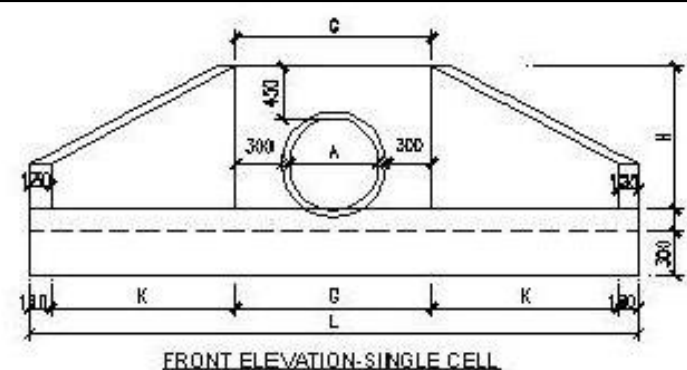


TABLE C-3-CELL CONCRETE PIPE CULVERTS

CULVERT	A (m)	B (m)	C (m)	D (m)	E (m)	F (m)	G (m)	H (m)	J (m)	K (m)	L (m)	M (m)	N (m)	P (m)	CONCRETE CLASS 20/20 Inlet & Outlet	CONCRETE CLASS 15/20 Surround & Bed per running m
Diameter 0.60m	0.60	0.05	1.00	0.50	0.95	0.60	1.20	0.95	1.25	0.72	3.00	1.44	1.53	1.18	1.58m ³	0.50m ³
Diameter 0.90m	0.90	0.09	1.38	0.88	1.33	0.98	1.50	1.25	2.25	1.30	4.54	2.60	2.68	1.58	4.07m ³	0.86m ³
Diameter 1.20m	1.20	0.10	1.80	1.30	1.70	1.35	1.80	1.55	2.85	1.65	5.56	3.29	3.38	1.88	5.92 m ³	1.48 m ³

CULVERTS	A (m)	B (m)	C (m)	D (m)	E (m)	F (m)	G (m)	H (m)	J (m)	K (m)	L (m)	M (m)	N (m)	P (m)	CONCRETE CLASS 20/20 Inlet & Outlet	CONCRETE CLASS 15/20 Surround & Bed per running m
Diameter 0.60m	0.60	0.06	2.70	2.20	0.95	0.60	3.00	0.95	1.25	0.72	4.70	1.44	1.53	2.88	2.66m ³	1.35m ³
Diameter 0.90m	0.90	0.09	3.84	3.34	1.33	0.98	4.14	1.25	2.25	1.30	7.00	2.60	2.68	4.02	5.88m ³	2.30m ³
Diameter 1.20m	1.20	0.10	4.80	4.30	1.70	1.35	5.10	1.55	2.85	1.65	8.88	3.28	3.38	4.98	8.73m ³	3.48m ³

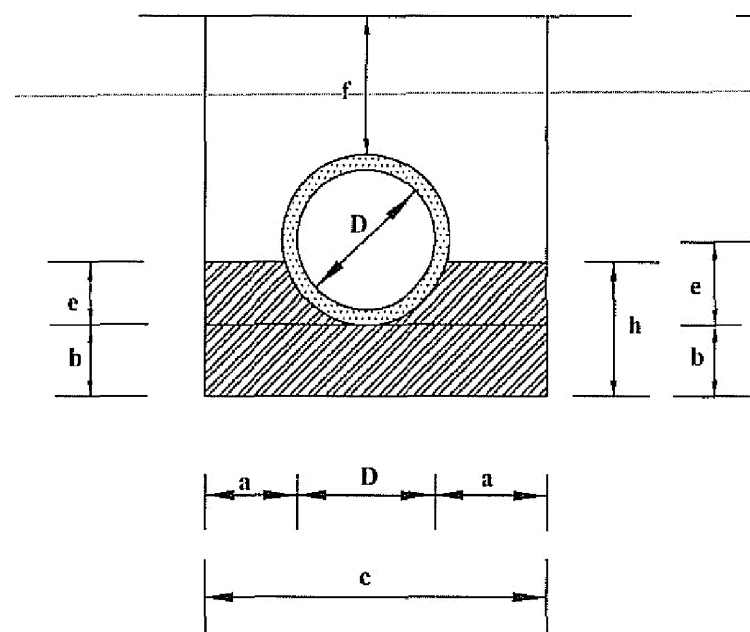
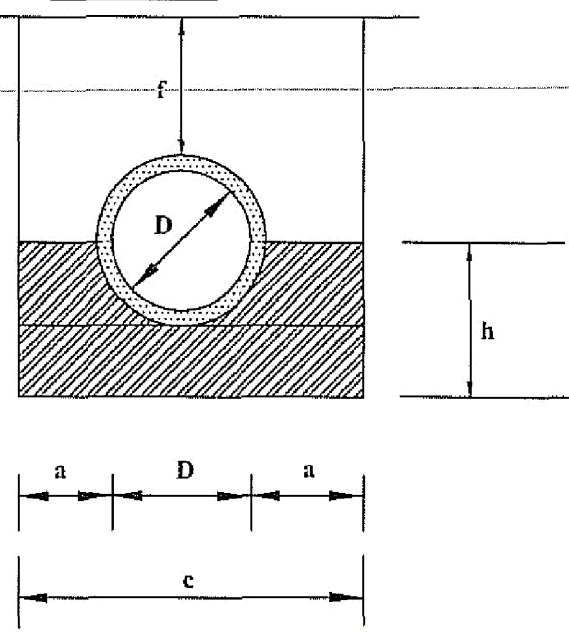
NOTES:

1. All dimensions are in millimetres unless otherwise indicated.

CULVERT	A (m)	B (m)	C (m)	D (m)	E (m)	F (m)	G (m)	H (m)	J (m)	K (m)	L (m)	M (m)	N (m)	P (m)	CONCRETE CLASS 20/20 Inlet & Outlet	CONCRETE CLASS 15/20 Surround & Bed per running m
Diameter 0.60m	0.60	0.05	1.85	1.35	0.95	0.60	2.15	0.95	1.25	0.72	3.85	1.44	1.53	2.03	2.22m ³	0.93m ³
Diameter 0.90m	0.90	0.08	2.61	2.11	1.33	0.98	2.91	1.25	2.25	1.30	5.77	2.60	2.68	2.79	4.89m ³	1.58m ³
Diameter 1.20m	1.20	0.10	3.25	2.75	1.70	1.35	3.55	1.55	2.85	1.65	7.11	3.29	3.38	3.43	7.24m ³	2.38m ³

				Drg No.	: R2000/BMS/2023/PC/00				

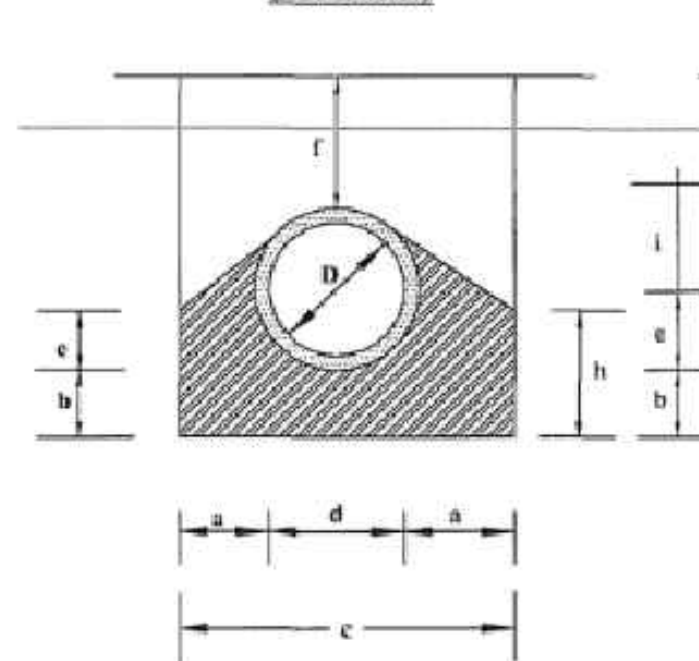
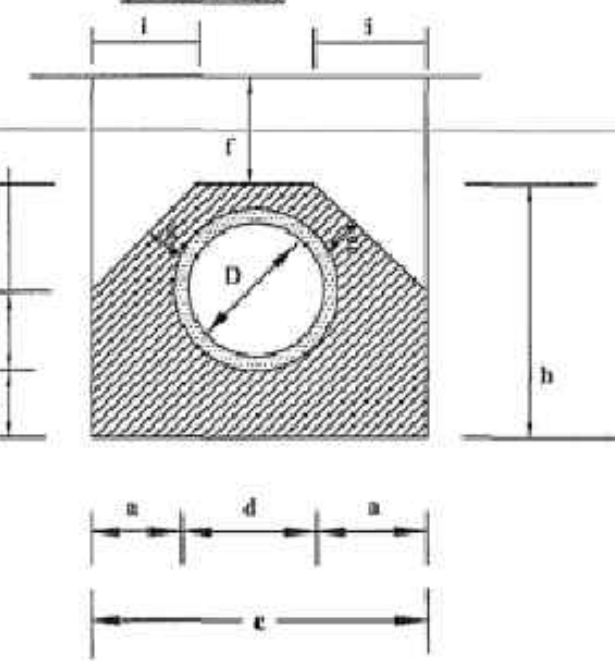
FIGURE C.13 - BEDDING AND HAUNCH PROFILES TYPES I & II

**PROFILE I
(CONCRETE)****PROFILE II
(CONCRETE)**

Diameter (D)	450 (mm)	600 (mm)	900 (mm)
a	0.15	0.20	0.20
b	0.10	0.15	0.15
c	0.86	1.12	1.48
d	0.56	0.72	1.08
e	0.14	0.18	0.27
f(min)	0.34	0.45	0.68
g	-	-	-
h	0.24	0.33	0.42
i	-	-	-
Concrete Class 15/20	Volume in (m3/m)		
	0.24	0.24	0.24
Application	-Fair subgrade condition -Overfill > 75% of the pipe diameter -Seasonal water flow only		
Remarks	Material for back/overfill shall be approved by the Engineer		

Diameter (D)	450 (mm)	600 (mm)	900 (mm)
a	0.15	0.20	0.20
b	0.10	0.15	0.15
c	0.86	1.12	1.48
d	0.56	0.72	1.08
e	0.28	0.36	0.54
f(min)	0.34	0.45	0.68
g	-	-	-
h	0.38	0.51	0.69
i	-	-	-
Concrete Class 15/20	Volume in (m3/m)		
	0.20	0.37	0.56
Application	-Fair to poor subgrade condition -Overfill > 75% of the pipe diameter -Seasonal water flow only		
Remarks	Material for back/overfill shall be approved by the Engineer		

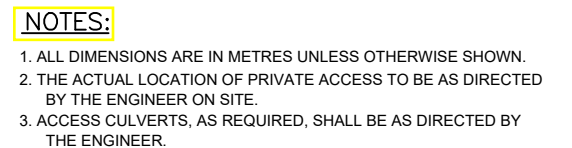
FIGURE C.14 - BEDDING AND HAUNCH PROFILES TYPES III & IV

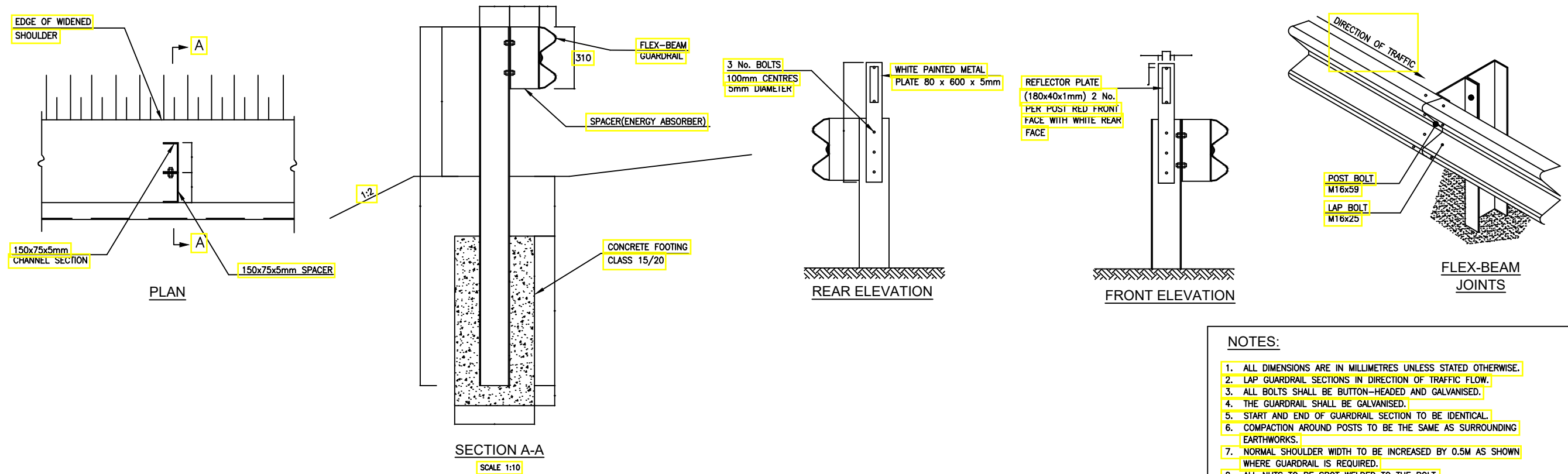
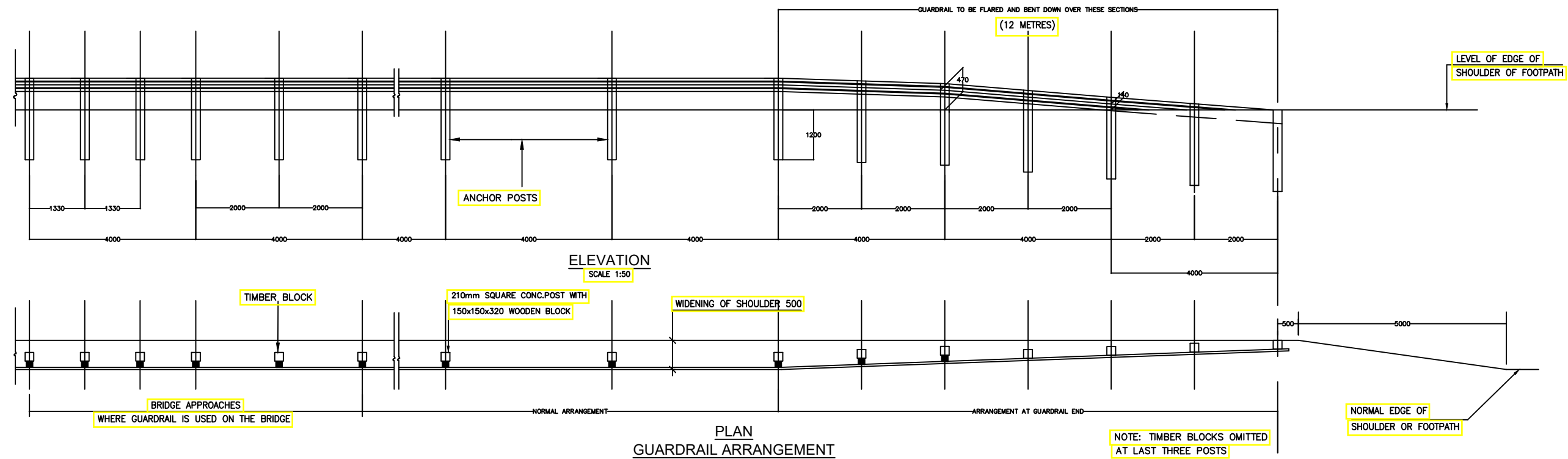
**PROFILE III
(CONCRETE)****PROFILE IV
(CONCRETE)**

Diameter (D)	450 (mm)	600 (mm)	900 (mm)
a	0.15	0.20	0.20
b	0.10	0.15	0.15
c	0.86	1.12	1.48
d	0.56	0.72	1.08
e	0.42	0.54	0.81
f(min)	0.23	0.3	0.45
g	-	-	-
h	0.52	0.69	0.96
i	-	-	-
Concrete Class 15/20	Volume in (m3/m)		
	0.26	0.47	0.71
Application	-Fair subgrade condition -Overfill > 75% of the pipe diameter -Seasonal water flow only		
Remarks	Material for back/overfill shall be approved by the Engineer		

Diameter (D)	450 (mm)	600 (mm)	900 (mm)
a	0.15	0.20	0.20
b	0.10	0.15	0.15
c	0.86	1.12	1.48
d	0.56	0.72	1.08
e	0.46	0.52	0.78
f(min)	0.15	0.15	0.15
g	0.15	0.15	0.15
h	0.81	1.02	1.38
i	0.28	0.35	0.45
Concrete Class 15/20	Volume in (m3/m)		
	0.37	0.61	0.92
Application	-Fair to poor subgrade condition -Overfill > 75% of the pipe diameter -Seasonal water flow only		
Remarks	Material for back/overfill shall be approved by the Engineer		

[illegible]

[illegible]



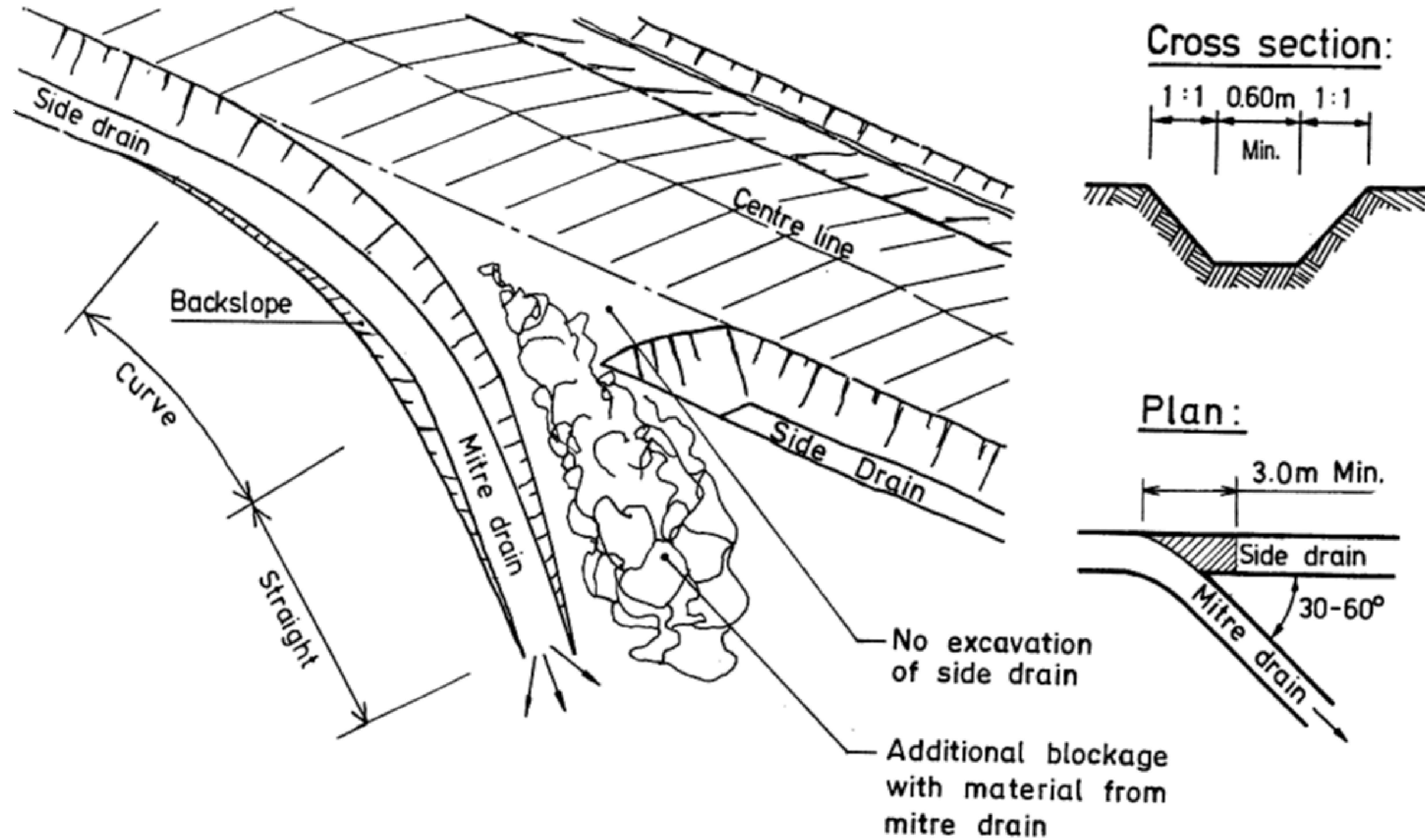
- NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. LAP GUARDRAIL SECTIONS IN DIRECTION OF TRAFFIC FLOW.
3. ALL BOLTS SHALL BE BUTTON-HEADED AND GALVANISED.
4. THE GUARDRAIL SHALL BE GALVANISED.
5. START AND END OF GUARDRAIL SECTION TO BE IDENTICAL.
6. COMPACTION AROUND POSTS TO BE THE SAME AS SURROUNDING EARTHWORKS.
7. NORMAL SHOULDER WIDTH TO BE INCREASED BY 0.5M AS SHOWN WHERE GUARDRAIL IS REQUIRED.
8. ALL NUTS TO BE SPOT WELDED TO THE BOLT.
9. STANDARD UNITS ALSO TO BE USED ON THE END SECTIONS.
10. THE POST SHALL BE DUG INTO THE FILL BY METHOD APPROVED BY THE ENGINEER.
11. GUARDRAIL TO BE LOCATED AS DIRECTED BY THE ENGINEER.
12. THE THICKNESS OF THE GUARDRAIL SHALL BE 3.0mm.
13. STRUCTURAL STEEL TO BE BS 4360 GRADE 43, PAINTED WITH 2 COATS OF RED OXIDE AND 2 COATS OF BITUMINOUS ALUMINIUM PAINT.

GENERAL DRAINAGE

[illegible]

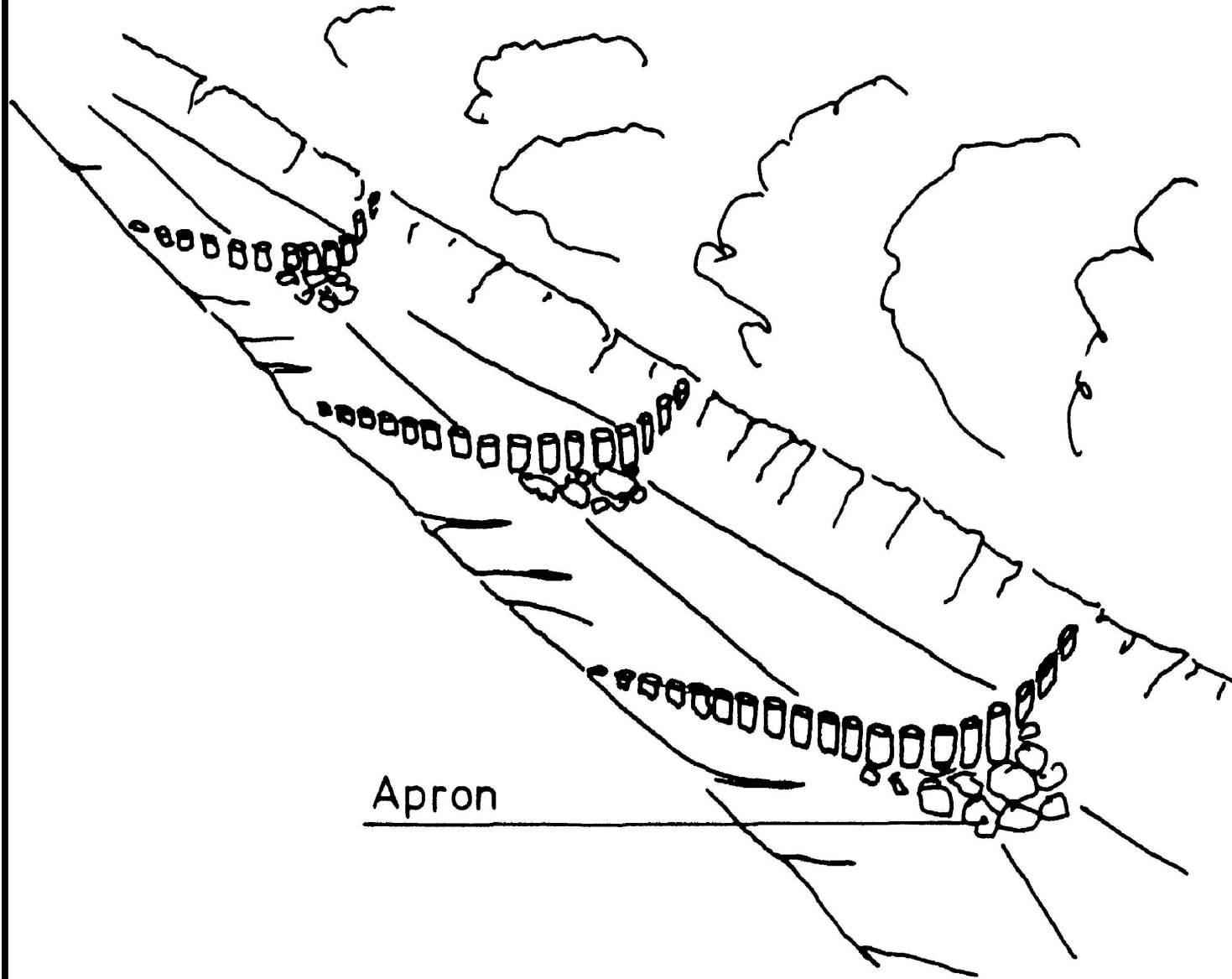
MITRE DRAIN



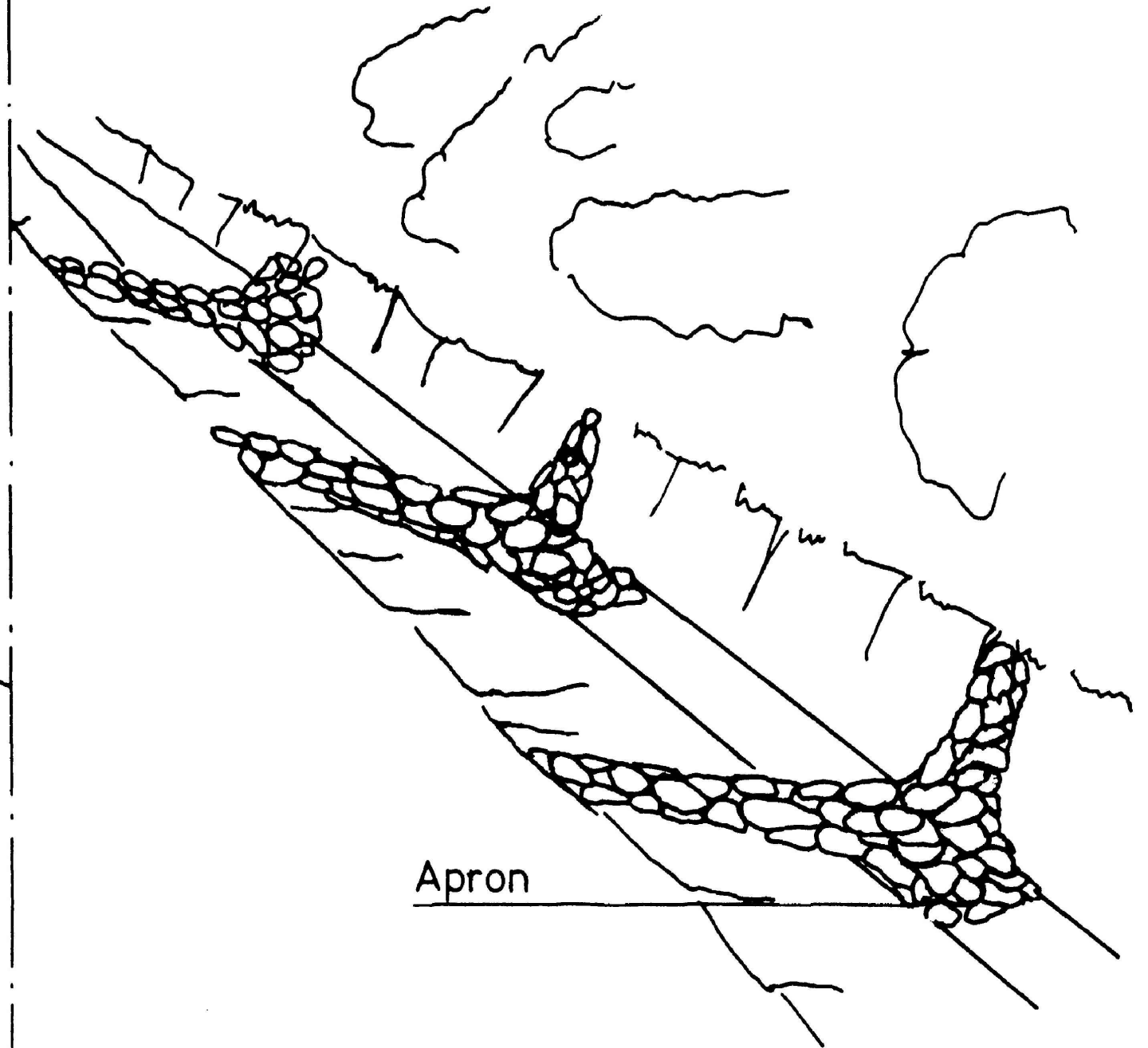
							Drg No.	: R2000/BMS/2023/GDR/001	

SCOUR CHECKS

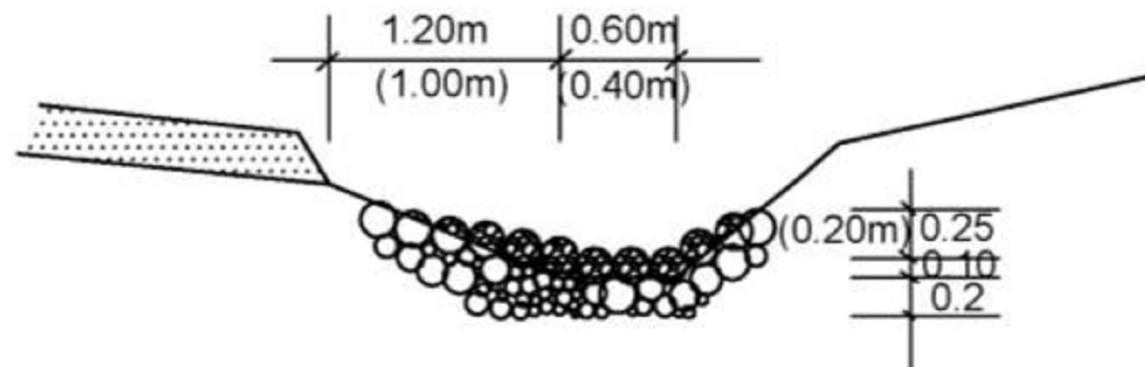
Scour checks made of wooden stakes:



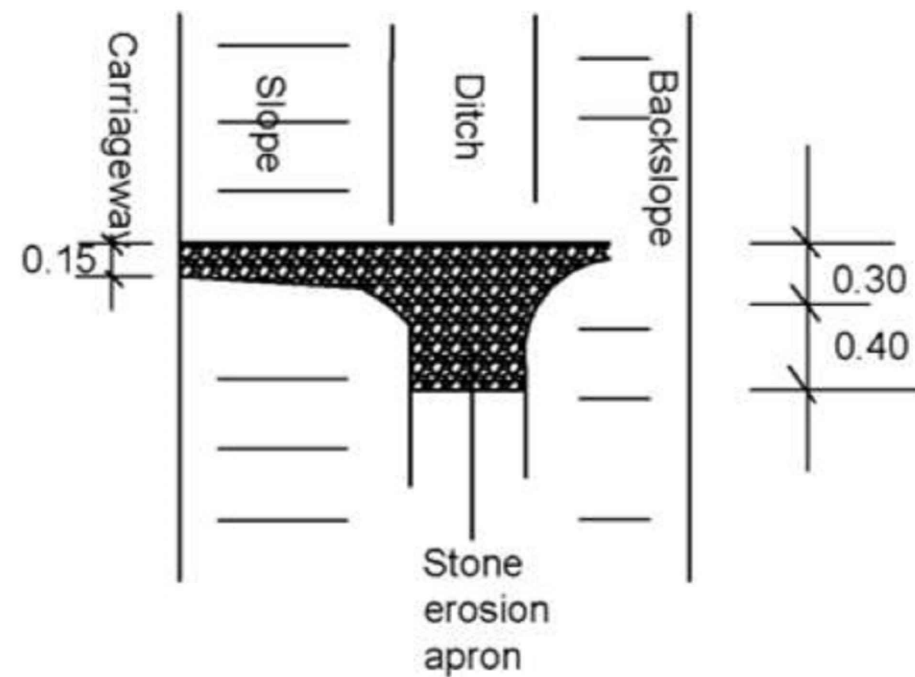
Scour checks made of stones:

[illegible]

Cross section



Ground plan

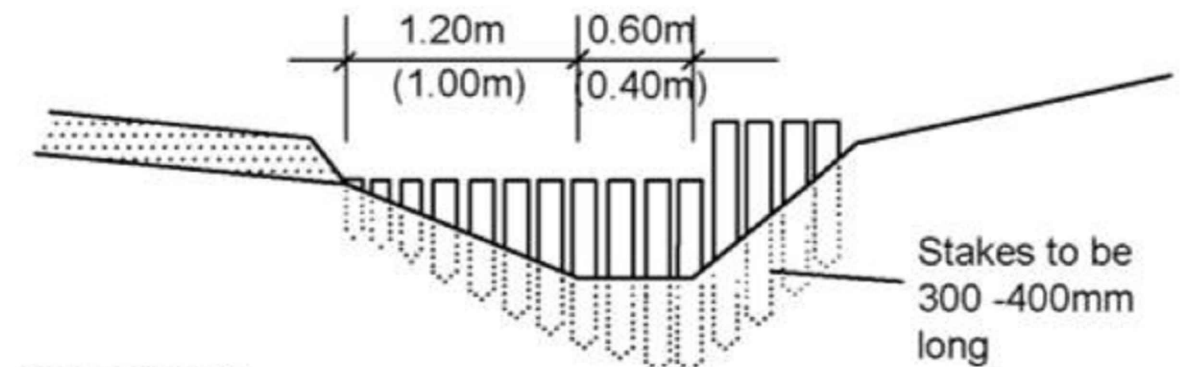


NOTE

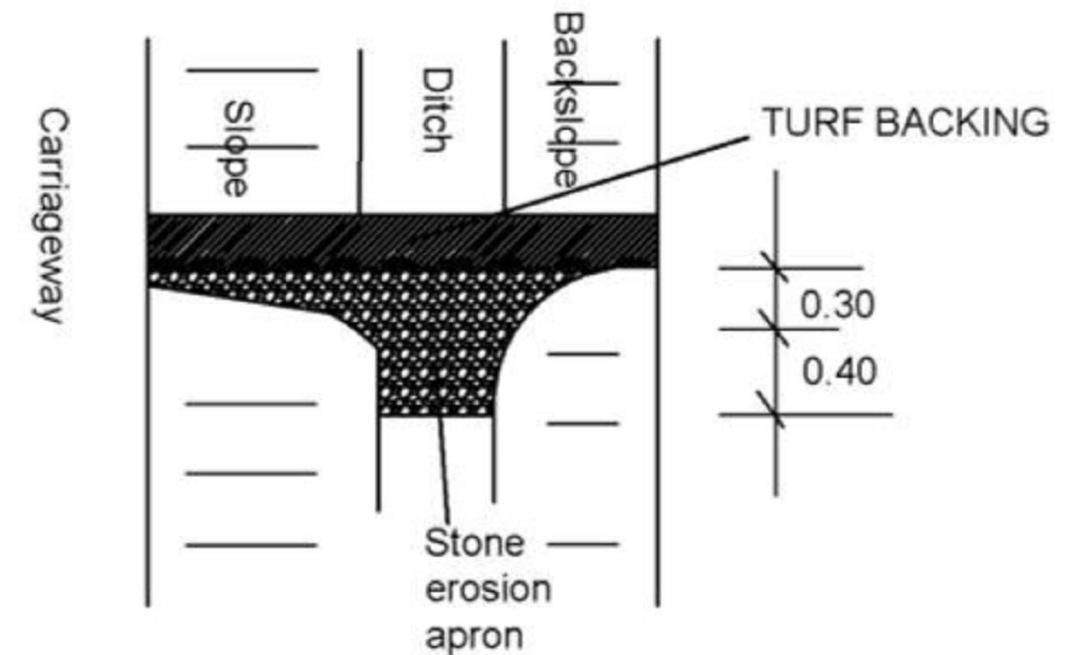
1Dimensions in metres

STONE WEIGHT: MIN 10KG
STAKE DIAMETER: MIN. 0.10m

Cross section

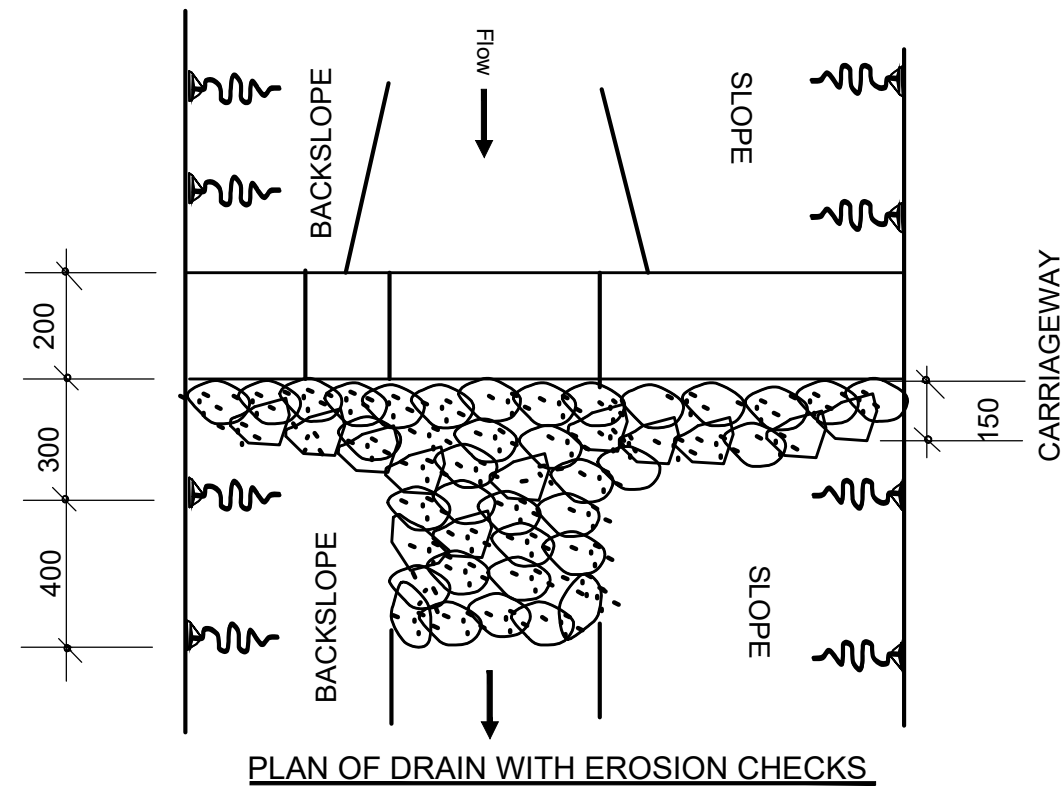
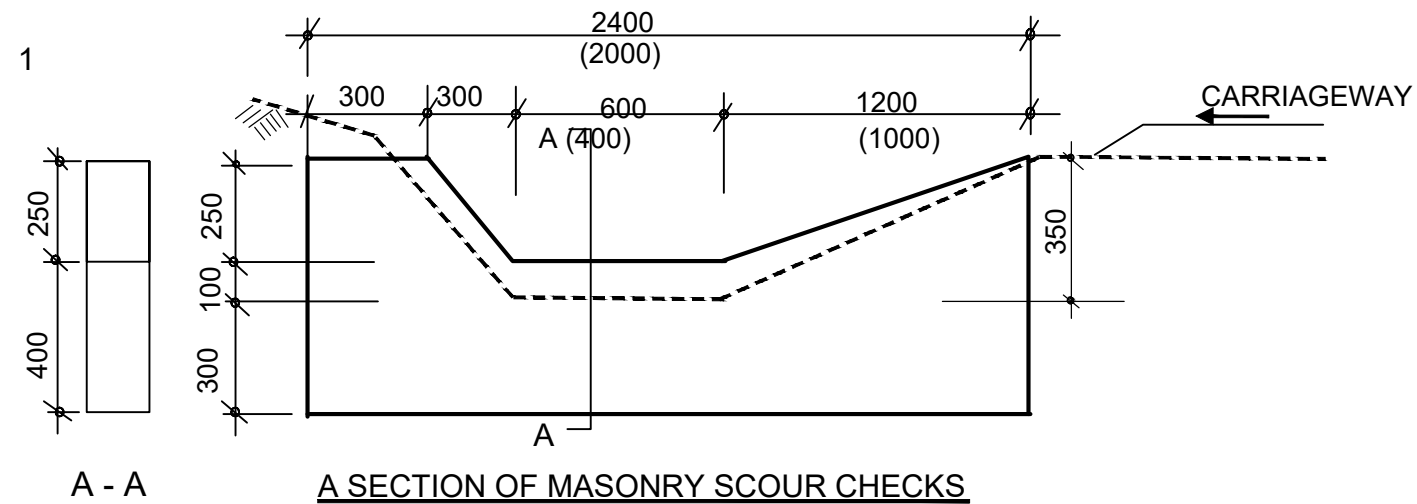


Ground plan



							Drg No.	: R2000/BMS/2023/GDR/003

- MASONRY SCOUR CHECKS



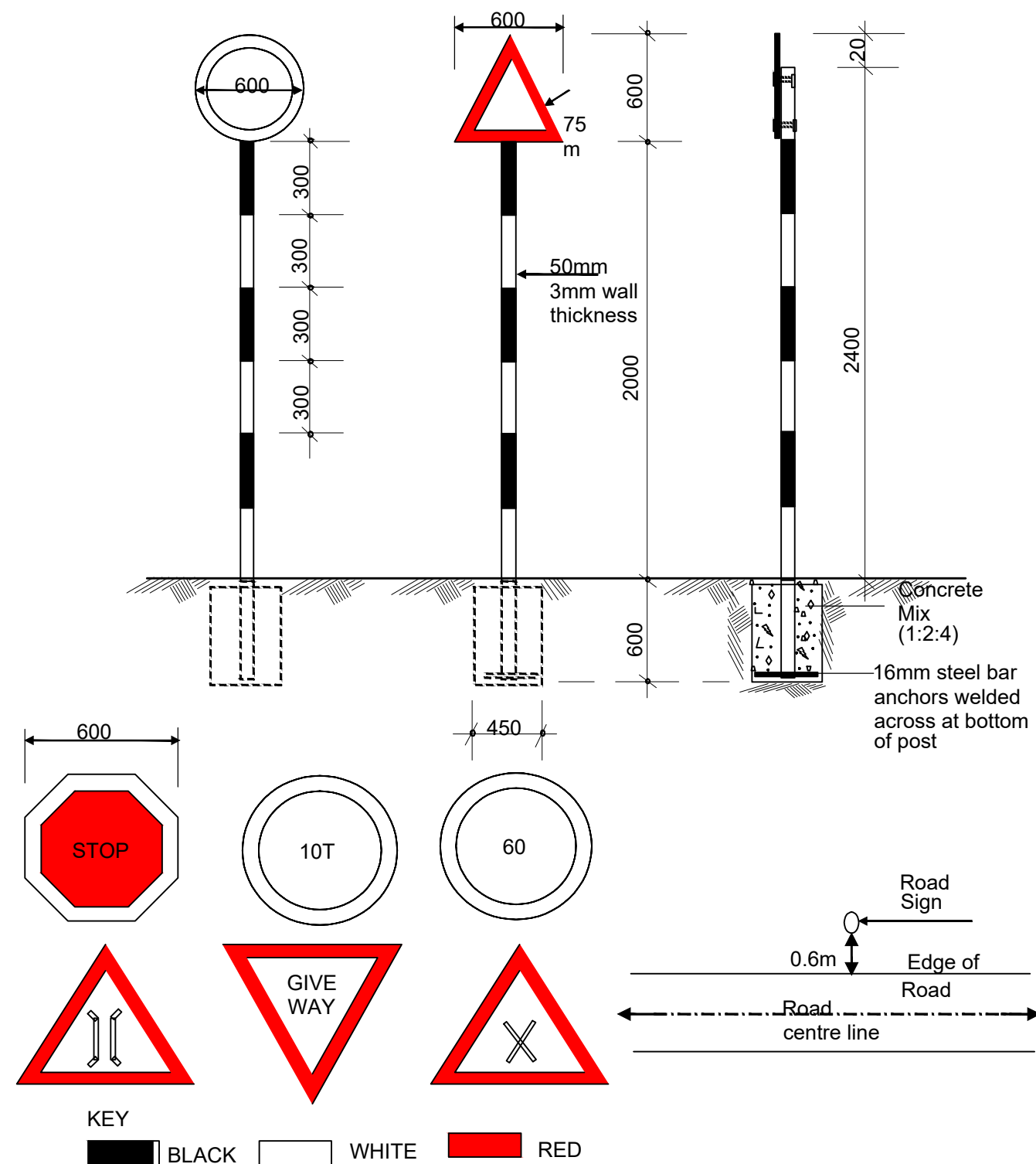
QUANTITIES TABLE

Cross-Section	Sizes in mm			Excav. (m3)	Stone masonry (m3)	Apron stone pitching (m3)
	Length	Width	Depth			
A	2400	200	550	0.22	0.25	0.18
B	2000	200	500	0.18	0.2	0.14

[illegible]

TRAFFIC SIGNS

TRAFFIC SIGNS



1. The type of sign required and their location shall be as shown on the improvement plan and as directed by the Engineer
2. Sign plate to be 2 mm thick mild steel plate
3. Sign post to be 50 mm internal diameter steel pipe with wall thickness of 3 mm.
4. Sign plate to fixed to steel tube by 4 Nos M10 bolts and 2 Nos 50 mm f fixing clamps/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 priming and two finish coats of approved paints . Paints used shall have a hard, durable and glossy finish.

TEMPORARY SIGNS



“Men Working”



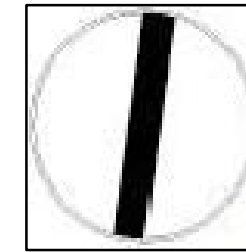
“Road narrows on Right Ahead”(sign may be reversed)



“Turn Left” (direction of arrow may be reversed)



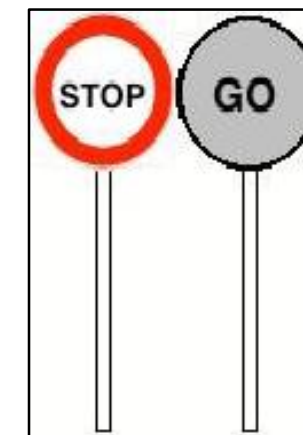
“Keep Left” (direction of Arrow may be reversed)



“Road Clear”



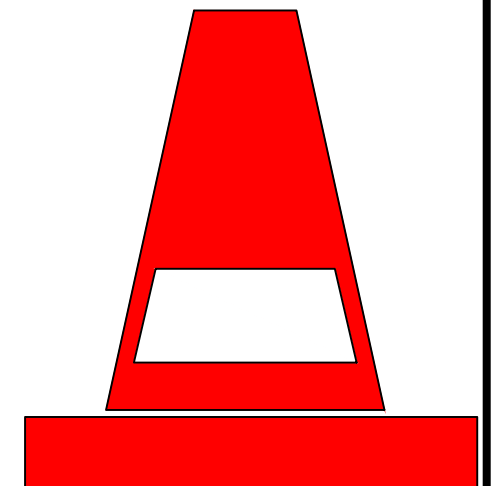
“Speed Limit”



Reversible stop/go signs



“No Overtaking”



Traffic cones

[illegible]

PUBLICITY SIGNBOARD

