

DESIGN AND CONSTRUCTION SUPERVISION WORKS FOR IMPLEMENTATION OF GOK/EU/AFD ROADS 2000 CLIMATE PROOFED RURAL ROADS IN ARID AND SEMI-ARID LANDS (ASAL) PROGRAMME

AREA 2-BATCH 1: SAMBURU COUNTY

REHABILITATION, IMPROVEMENT, AND ROUTINE MAINTENANCE WORK: MARALAL-OPIROI-BARSALOI (C606) (10KM)

FINAL DETAILED ENGINEERING DESIGN

BOOK OF DRAWINGS

AUGUST 2023

EMPLOYER:



DIRECTOR (PLANNING, DESIGN AND ENVIRONMENT KENYA RURAL ROADS AUTHORITY (KeRRA) P.O. BOX 48151 – 00100, NAIROBI

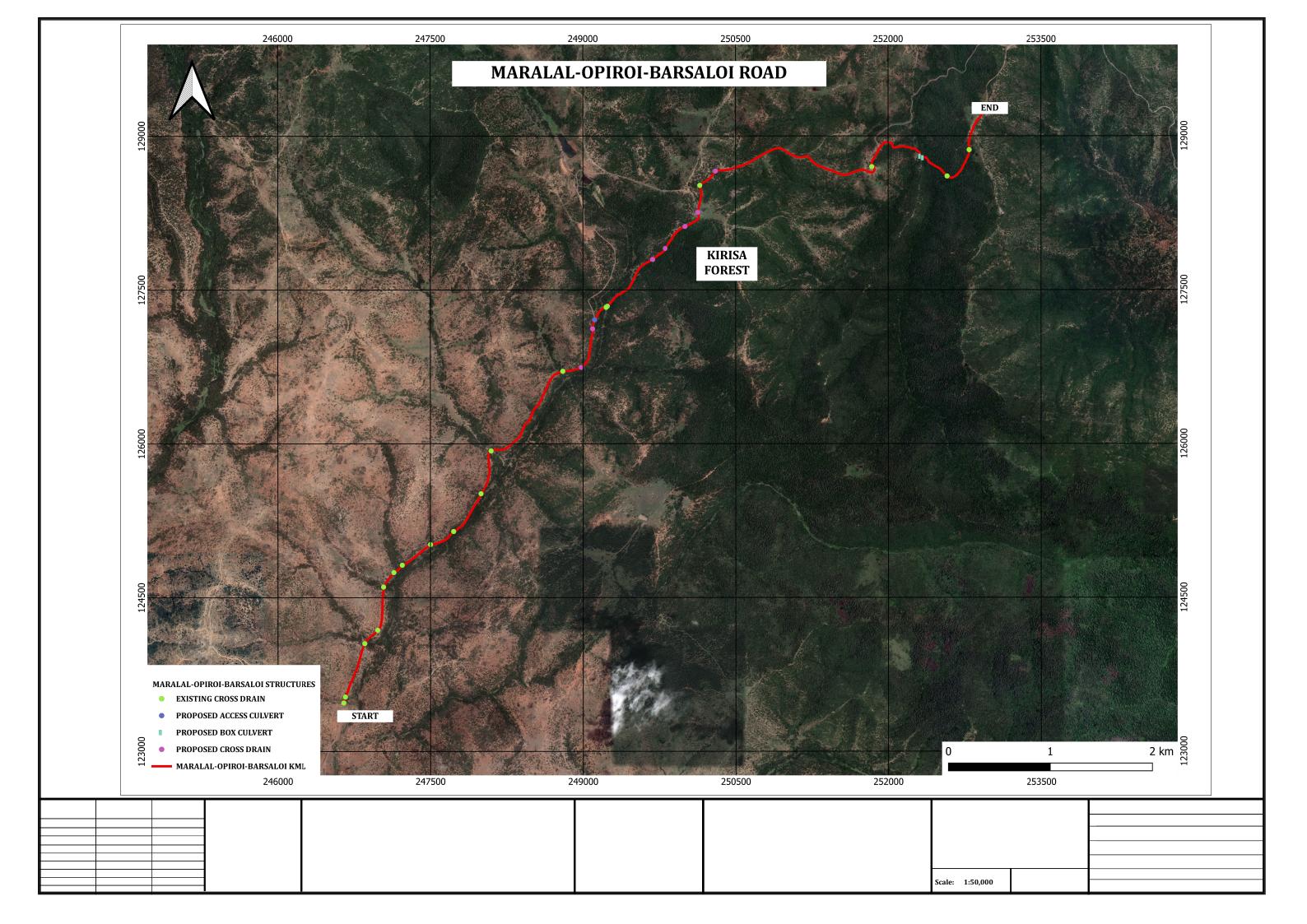
CONSULTANT:

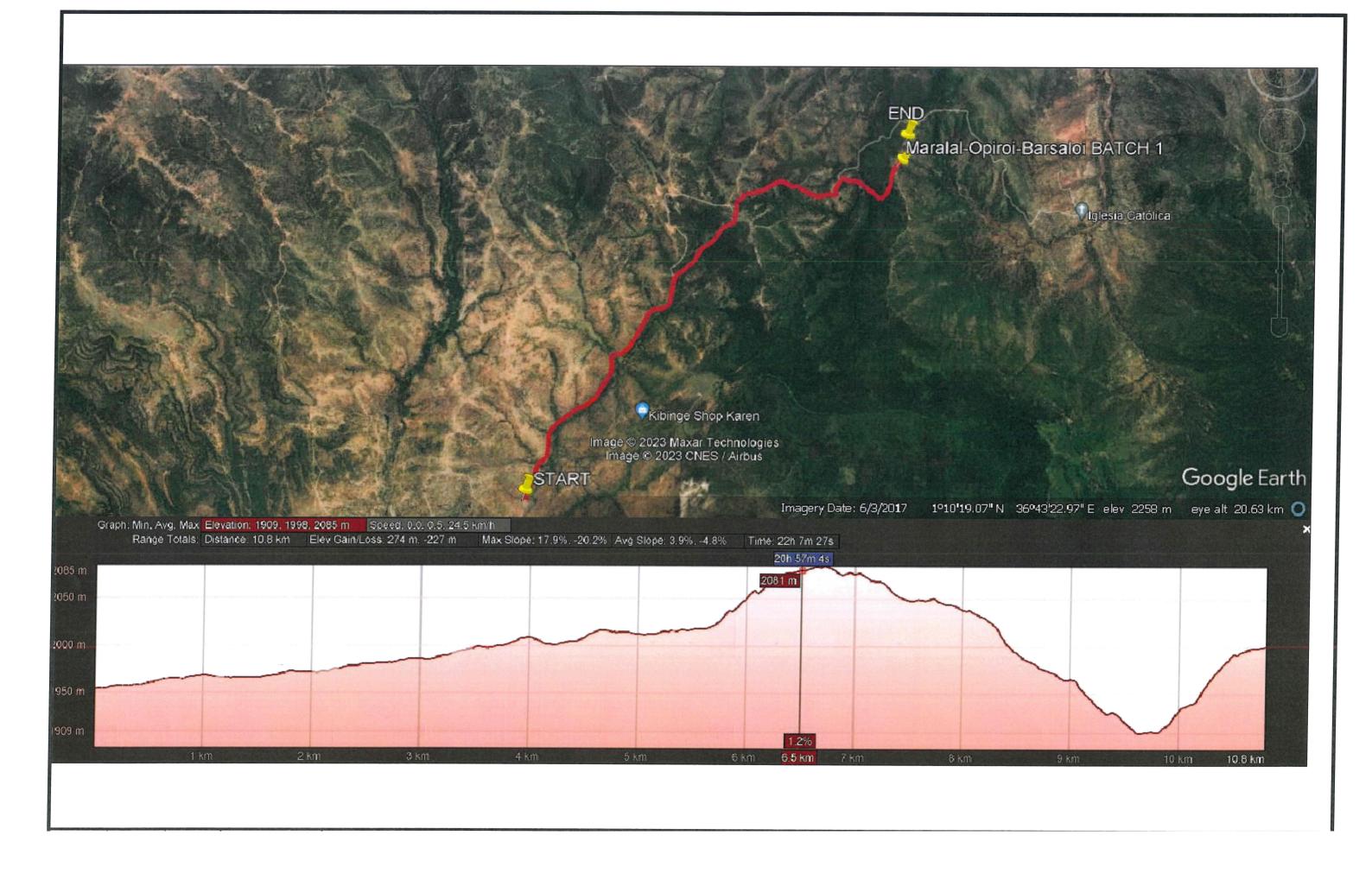


CAS CONSULTANTS LTD
LE'MAC BUILDING,1ST FLOOR, OFF
CHURCH ROAD, WESTLANDS,
NAIROBI, KENYA
P.O BOX 20023-0200
TEL: +254(020)4445265, +254722829554
EMAIL: info@casconsultants.co.ke

Maralal-Opiroi-Barsaloi (C606)									
DRAWING No.	GRAVEL ROADS BOOK OF DRAWING GENERAL DRAWINGS								
R2000/A2/2023/GEN/01.	DRAWING INDEX								
R2000/A2/2023/GEN/02.	PROJECT LOCATION MAP								
R2000/A2/2023/GEN/03.	GENERAL PLAN AND PROFILE								
	TYPICAL CROSS-SECTIONS								
R2000/A2/2023/TCS/01	CROSS-SECTION A(STANDARD CROSS-SECTION)								
R2000/A2/2023/TCS/02	CROSS-SECTION B (REDUCED CROSS-SECTION)								
R2000/A2/2023/TCS/03	CROSS-SECTION C (BLACK COTTON SOIL CROSS-SECTION)								
R2000/A2/2023/TCS/04	CROSS-SECTION D (SIDELONG GROUND CROSS-SECTION)								
R2000/A2/2023/TCS/05	DETAILED TYPICAL CROSS-SECTION AND BENCHING DETAILS								
	PIPE CULVERTS								
R2000/A2/2023/PC/01	HEAD WALL TYPE 1								
R2000/A2/2023/PC/02	HEAD WALL TYPE 2								
R2000/A2/2023/PC/03	HEAD WALL TYPE 3								
R2000/A2/2023/PC/04	HEAD WALL TYPE 4								
R2000/A2/2023/PC/05	PIPE CULVERT DETAILS								
R2000/A2/2023/PC/06	BEDDING AND HAUNCH								
	STANDARD DRAWINGS								
R2000/A2/2023/SD/01	STANDARD JUNCTION AND ACCESS DETAILS								
R2000/A2/2023/SD/02	STANDARD MARKER POST DETAILS								
R2000/A2/2023/SD/03	STANDARD GUARD RAIL DETAILS								
	GENERAL DRAINAGE								
R2000/A2/2023/GDR/01	MITRE DRAIN DETAILS								
R2000/A2/2023/GDR/02	SCOUR CHECKS								
R2000/A2/2023/GDR/03	SCOUR CHECKS								
R2000/A2/2023/GDR/04	SCOUR CHECKS								
R2000/A2/2023/GDR/05	ACCESS DRIFTS								
R2000/A2/2023/GDR/06	DRIFTS								
	TRAFFIC SIGNS								
R2000/A2/2023/TS/01	STANDARD TRAFFIC SIGNS								
	PUBLICITY SIGNBOARD								
R2000/A2/2023/PSB/01	PUBLICITY SIGNBOARD DETAILS								
		•							

LOCATION MAP





TYPICAL CROSS-SECTIONS













CAS CONSULTANTS LTD
Le'Mac Building, 1st Floor, off Church
Road, Westlands, Nairobi, Kenya
P.O. Box 20023,00200
Tel+254 (020) 4445265, +25472282955

Project:

DESIGN AND SUPERVISION WORKS FOR IMPLEMENTATION OF THE CLIMATE PROOFED RURAL ROADS IN ARID AND SEMI-ARID LANDS (ASAL) - AREA 2.

AFD/EU/GOK ROADS 2000 CLIMATE PROOFED, AREA 2: ISIOLO, SAMBURU AND MARSABIT COUNTIES

Drawing title:	
TYPICAL CROSS-SECTIONS	S

Scale: (AS SHOWN) Sheet:

Drawn by : R.T

Designed by : N.O

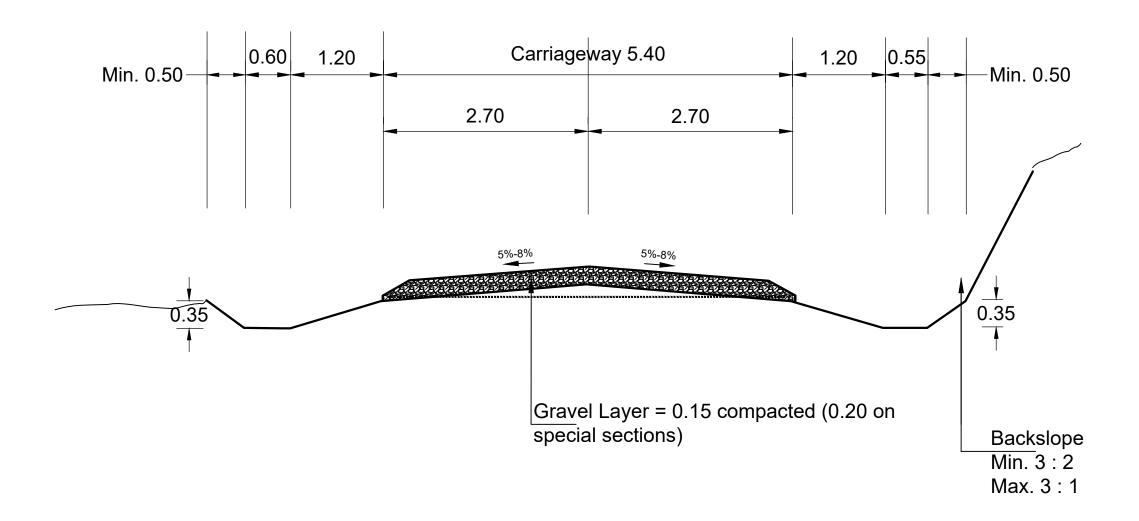
Checked by : C.O

Approved by : C.O

Date : MAY, 2023.

Client approval :

FIGURE H.1 - CROSS SECTION A (MINOR STANDARD CROSS-SECTION)

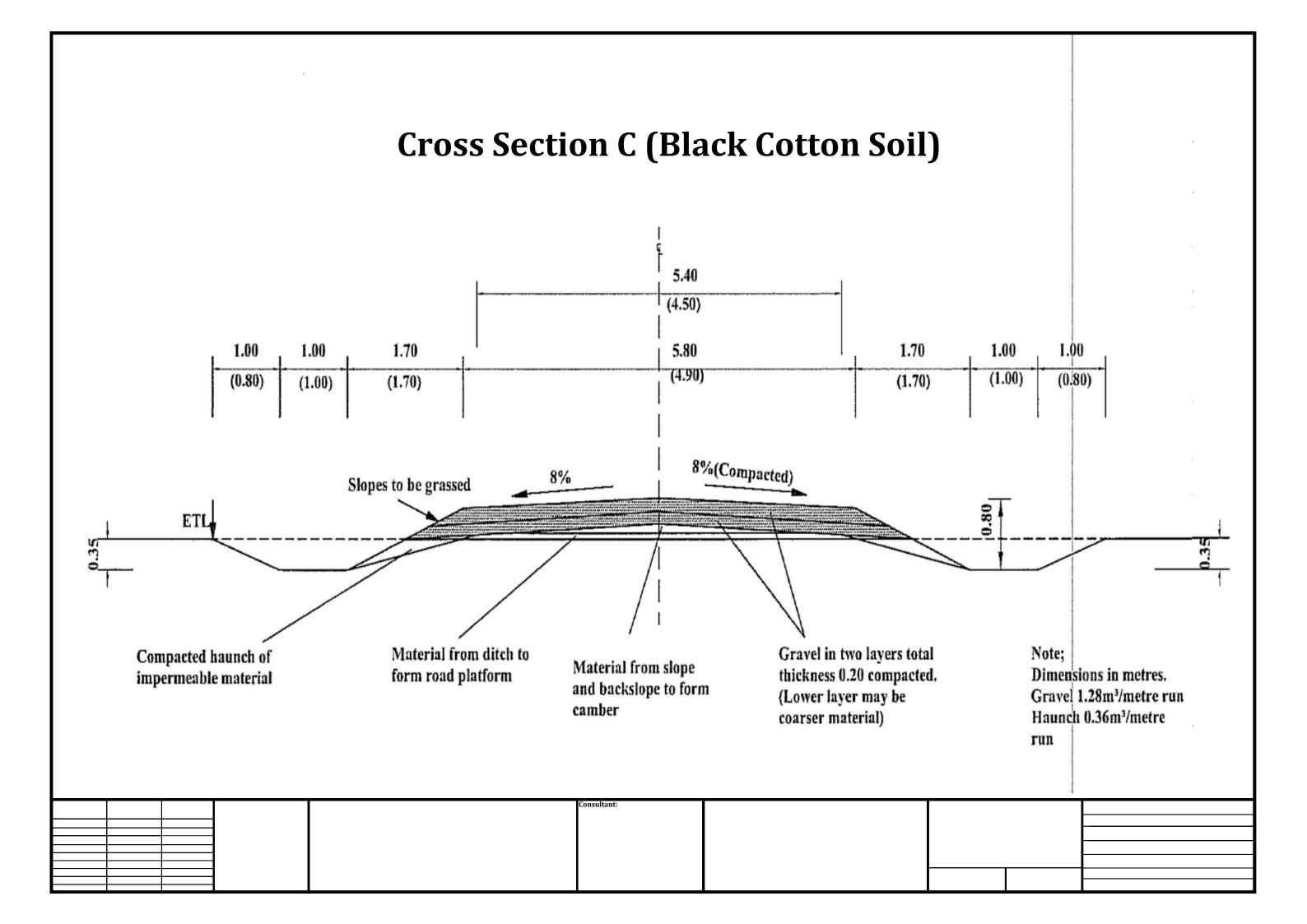


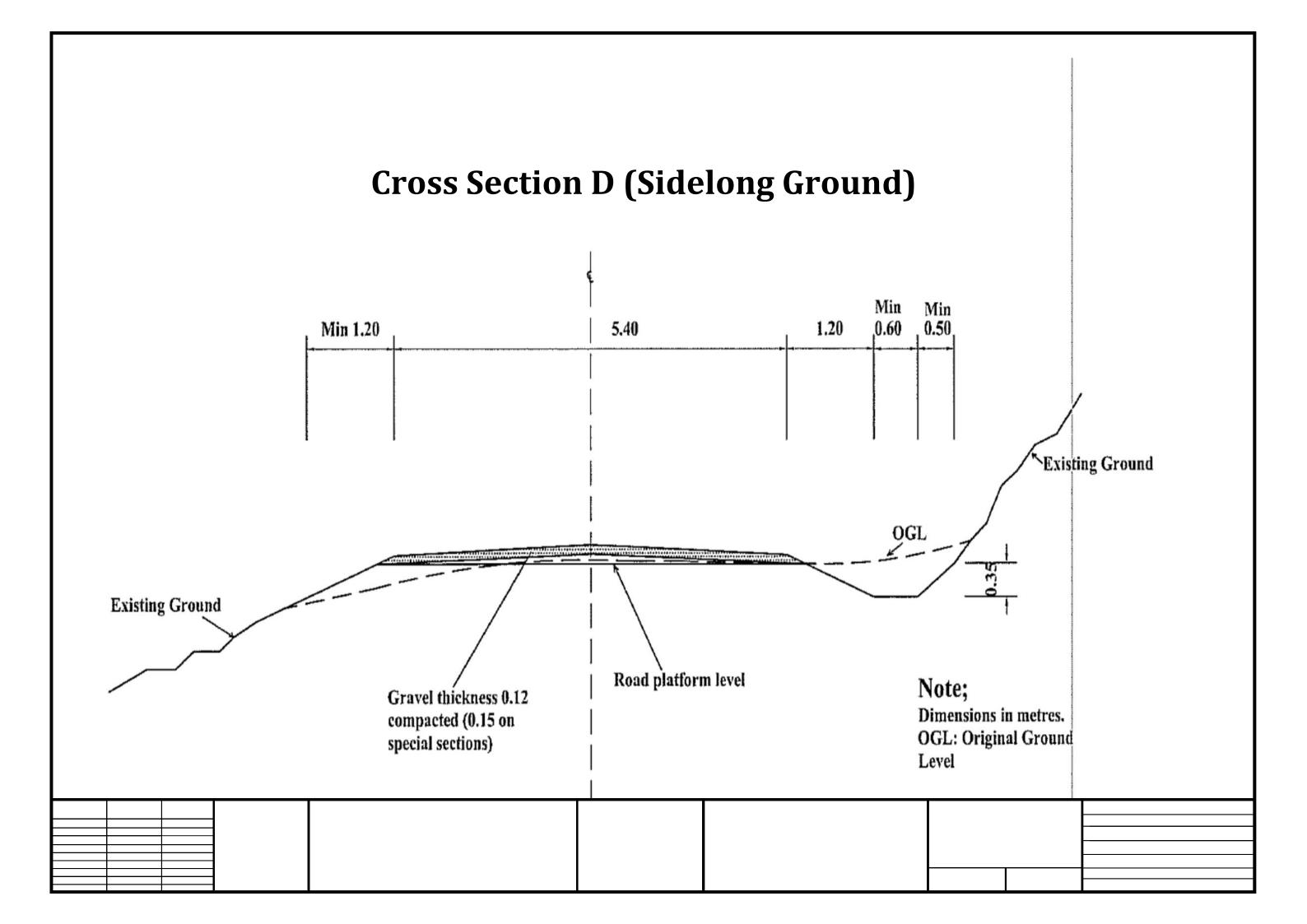
NOTE:

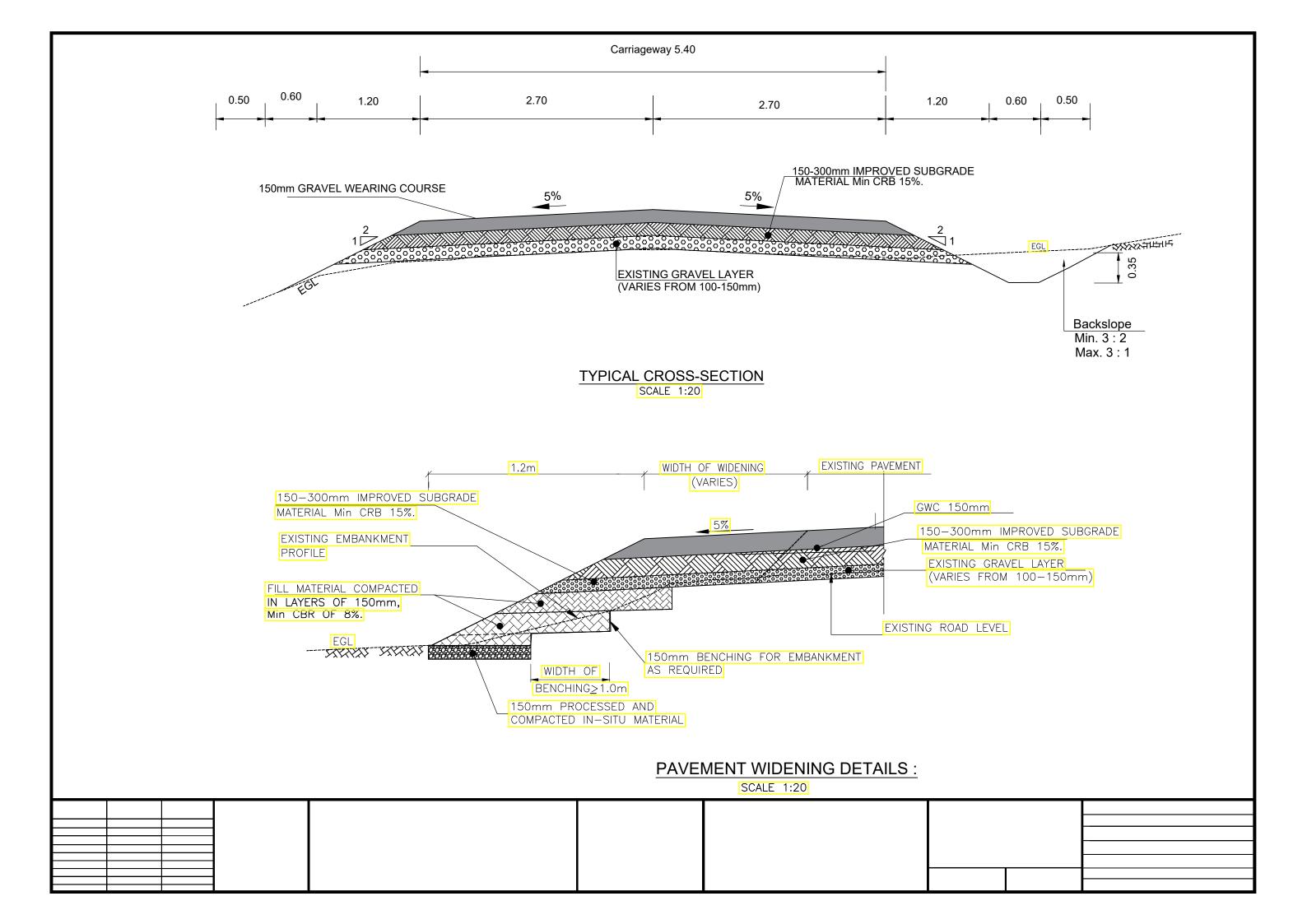
- ALL SPECIFIED DIMENSIONS IN m.
- TRAFFIC LEVELS OF MORE THAN 200 VPD MAY JUSTIFY RUNNING SURFACE WIDTH INCREASE TO 6.50 METRES

NO Revisions	Date: Approv	ed By: Client:	Financed by:			Consultant:	Project:	Drawing title:	Drawn by : R.T
1.		SAL ROADS		**** <u></u>		اجرا	DESIGN AND SUPERVISION WORKS FOR	CROSS SECTION DRAWINGS	Designed by : N.O
2.		AGE TO SEE	I() AFD	- *		رنت	IMPLEMENTATION OF THE CLIMATE		Checked by : C.O
			AI D	****		CAS CONSULTANTS LTD	PROOFED RURAL ROADS IN ARID AND	STANDARD CROSS-SECTION DETAILS	Approved by : C.O
		Received by Russel Houge	EDENCH	FURODEAN		Le'Mac Building, 1st Floor, off Church Road, Westlands,Nairobi, Kenya	SEMI-ARID LANDS (ASAL) - AREA 2.		Date : MAY, 2023.
		KENYA RURAL ROADS	FRENCH DEVELOPMENT	EUROPEAN UNION	KENVA	P.O.Box 20023,00200 Tel+254 (020) 4445265, +254722829554	AFD/EU/GOK ROADS 2000 CLIMATE PROOFED, AREA	Scale: (AS SHOWN) Sheet:	Client approval :
		AUTHORITY	AGENCY			Email: info@casconsultants.co.ke	2: ISIOLO, SAMBURU AND MARSABIT COUNTIES	1 of 1	Drg No. : R2000/A2/2023/TCS/01

FIGURE H.2 - CROSS SECTION B (REDUCED CROSS-SECTION) Carriageway 4.50 0.40 1.00 Min. 0.50 1.00 0.40 2.25 2.25 - 0.305 0.305 Gravel Layer - 0.15 compacted (0.20 on special sections) Backslope Min. 3 : 2 Max. 3 : 1 NOTE: - ALL SPECIFIED DIMENSIONS IN m.

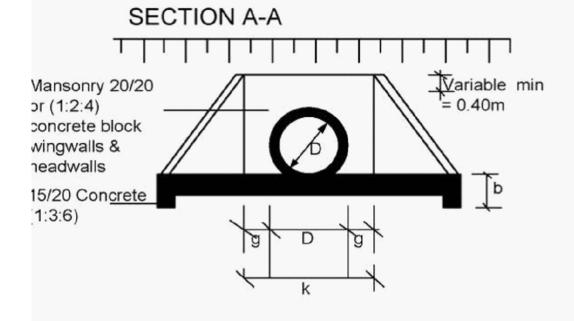


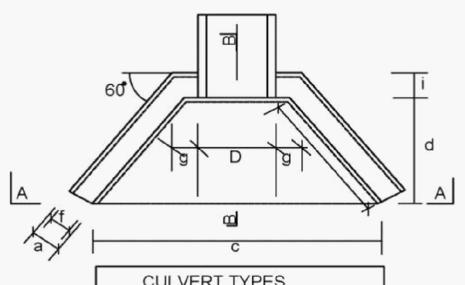




PIPE CULVERTS

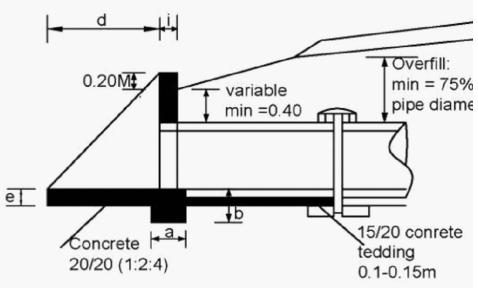
C8- HEADWALL TYPE 1 (HEAD AND WINGWALLS





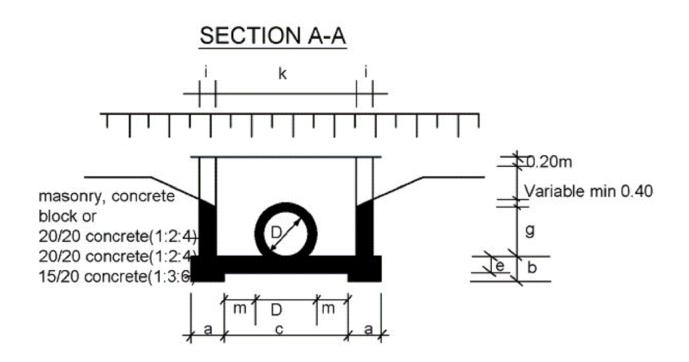
CULVERT TYPES						
X-SECTION WIDTH-M	No. of pipes					
4.50	6.00					
5.50	7.00					
6.50	8.00					

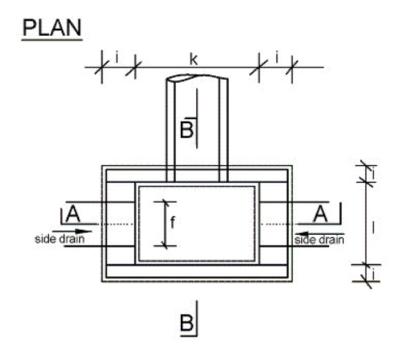


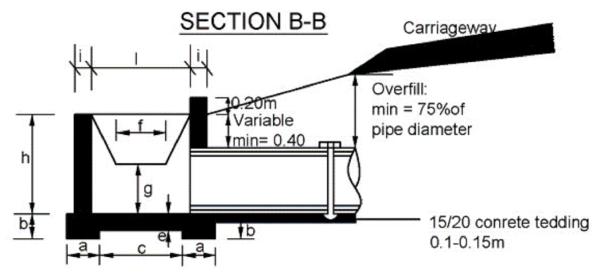


	PIPE DIAMETER IN M			PEA and O		TYPE B (STONE MASONRY)			
			450	600	900	450	600	900	
а	DIMENSION FOUNDATION	UNIT m	0.30	0.30	0.30	0.40	0.40	0.60	
b	FOUNDATION	m	0.30	0.30	0.40	0.30	0.30	0.40	
С	FOUNDATION	m	2.20	2.35	2.89	2.20	2.35	2.89	
d	APRON	m	1.00	1.00	1.20	1.00	1.00	1.20	
е	APRON	m	0.20	0.20	0.20	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 REQU	JIREMEN	T						
FC	FOUNDATION								
	(concrete) m3			0.32	0.51	0.40	0.42	1.03	
	HEAD/WINGWALLS (Conrete/Masonry) m3 APRON			0.49	0.70	0.84	0.96	1.40	
	(cocrete)	m3	0.33	0.36	0.53	0.33	0.36	0.53	

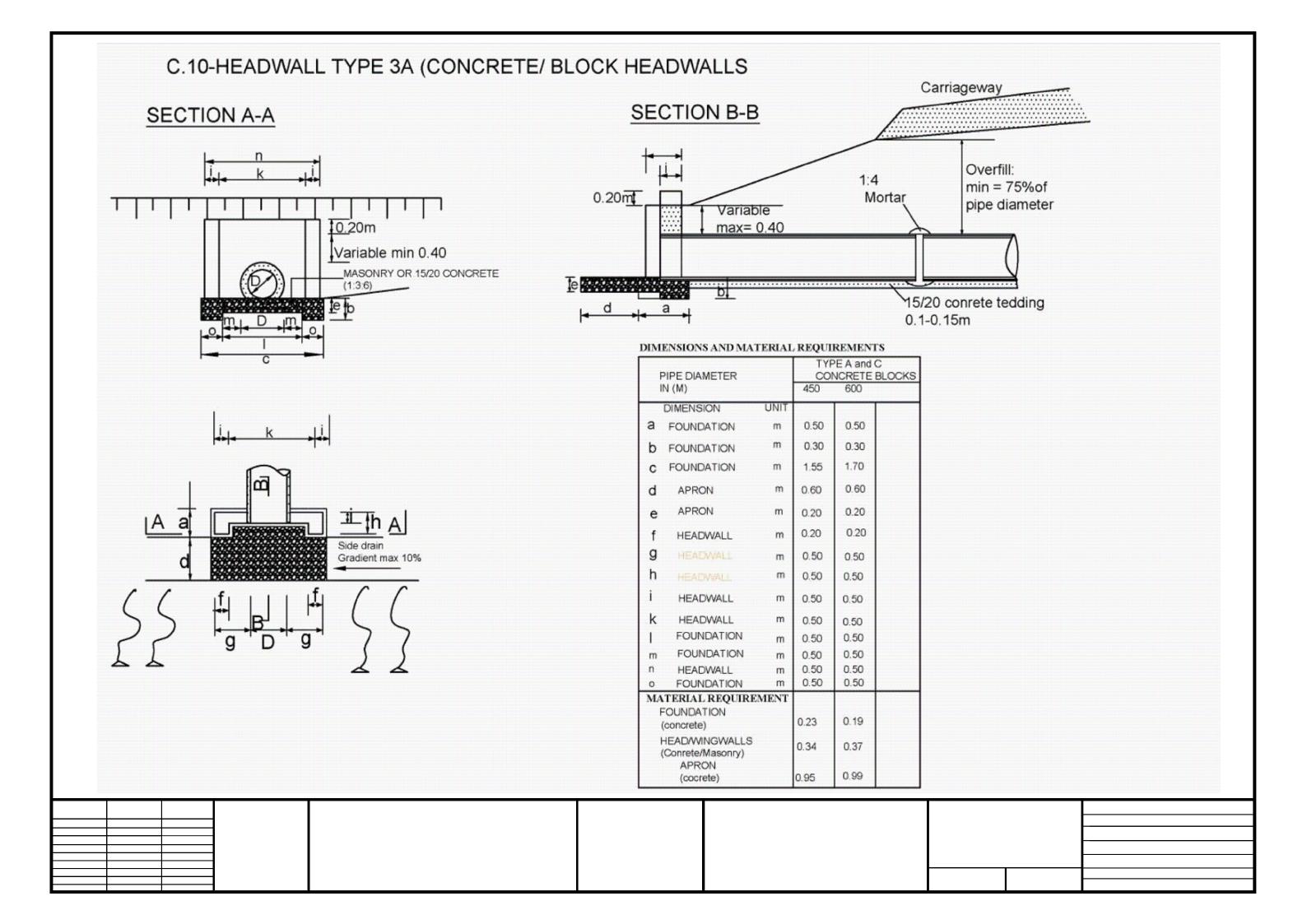
C9-HEADWALL TYPE 2(DROP INLET)



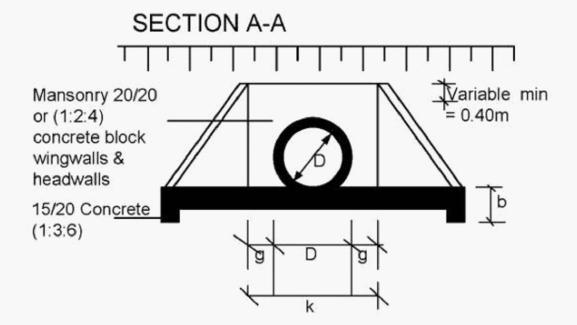


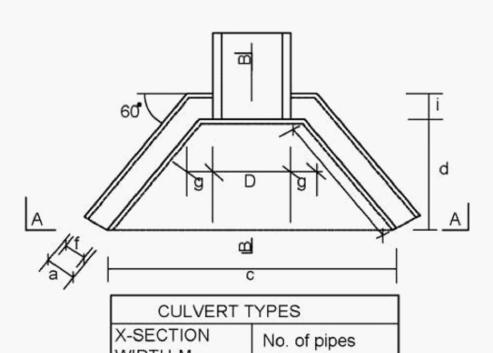


	DIMENSIONS AND MATERIAL REQUIREMENTS										
	PIPE DIAMETER IN (M)	TYPE A CONCRETE BLOCKS			TYPE B (STONE MASONRY)						
		450	600	900	450	600	900				
а	DIMENSION FOUNDATION	UNII m	0.30	0.30	0.30	0.40	0.40	0.40			
b	FOUNDATION	m	0.30	0.30	0.30	0.30	0.30	0.30			
С	FOUNDATION	m	1.10	1.10	1.40	1.20	1.20	1.50			
d	APRON	m.	0.90	0.90	0.90	1.00	1.00	1.00			
е	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			
1	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			
	ERIAL REQUIREM UNDATION	ENT									
(00	(concrete) m3			0.47	0.52	0.72	0.72	0.79			
	HEAD/WINGWALLS (Conrete/Masonry) m3 APRON			0.72	1.15	1.27	1.63	2.65			
	(cocrete)	m3	0.24	0.24	0.30	0.24	0.24	0.30			



C12- HEADWALL TYPE 4 (FOR ACCESS CULVERTS





6.00

7.00

8.00

WIDTH-M

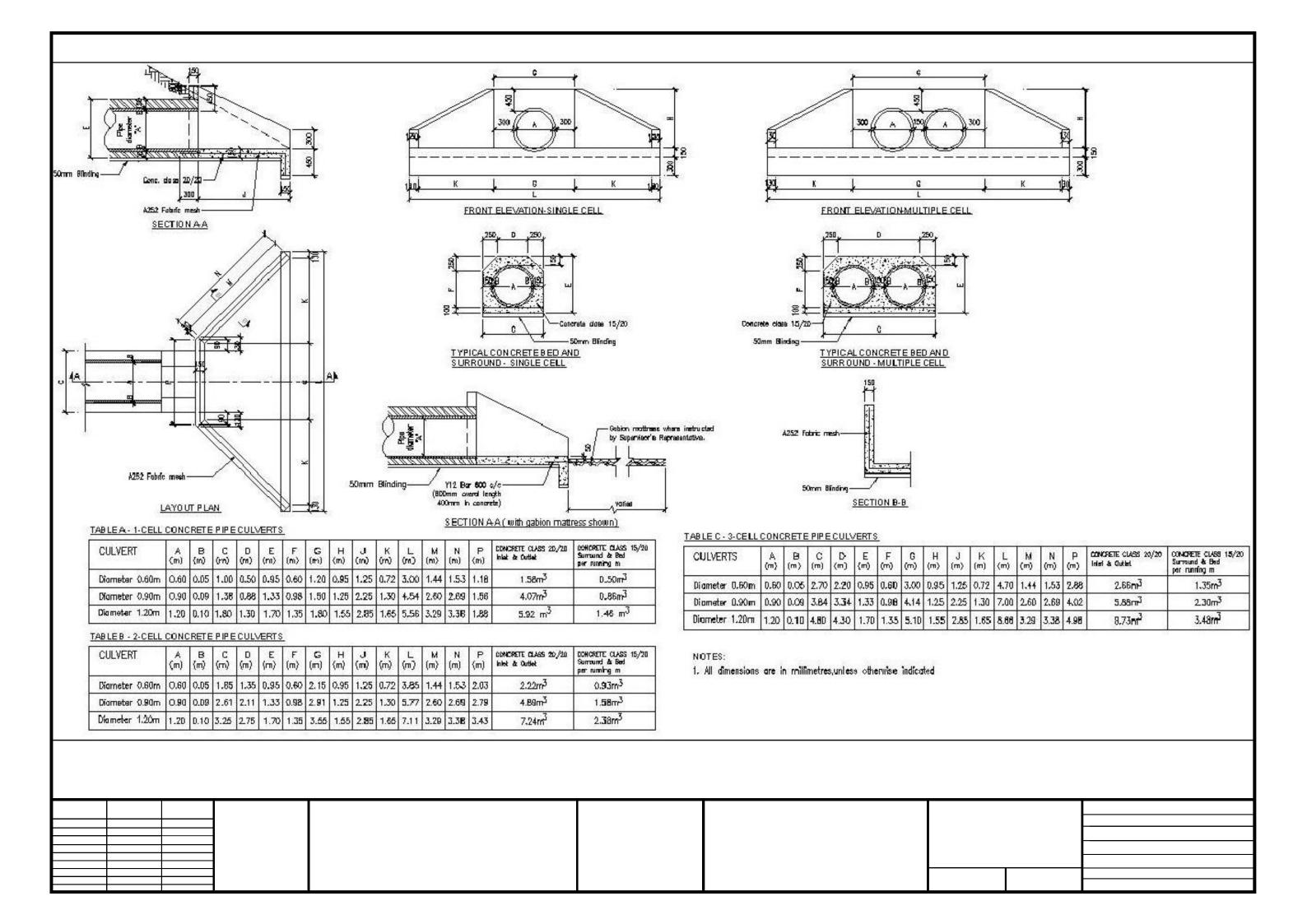
4.50

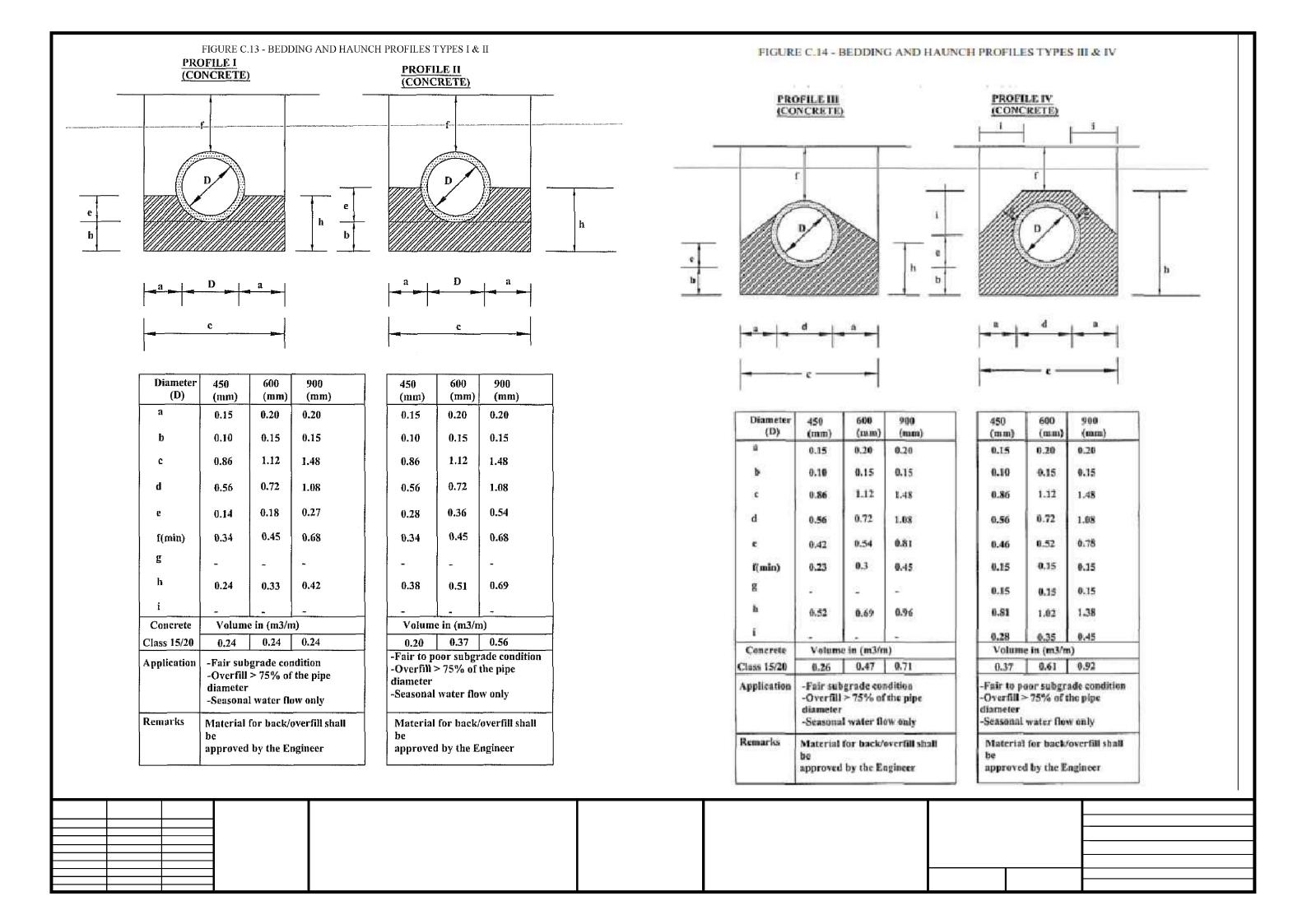
5.50

6.50

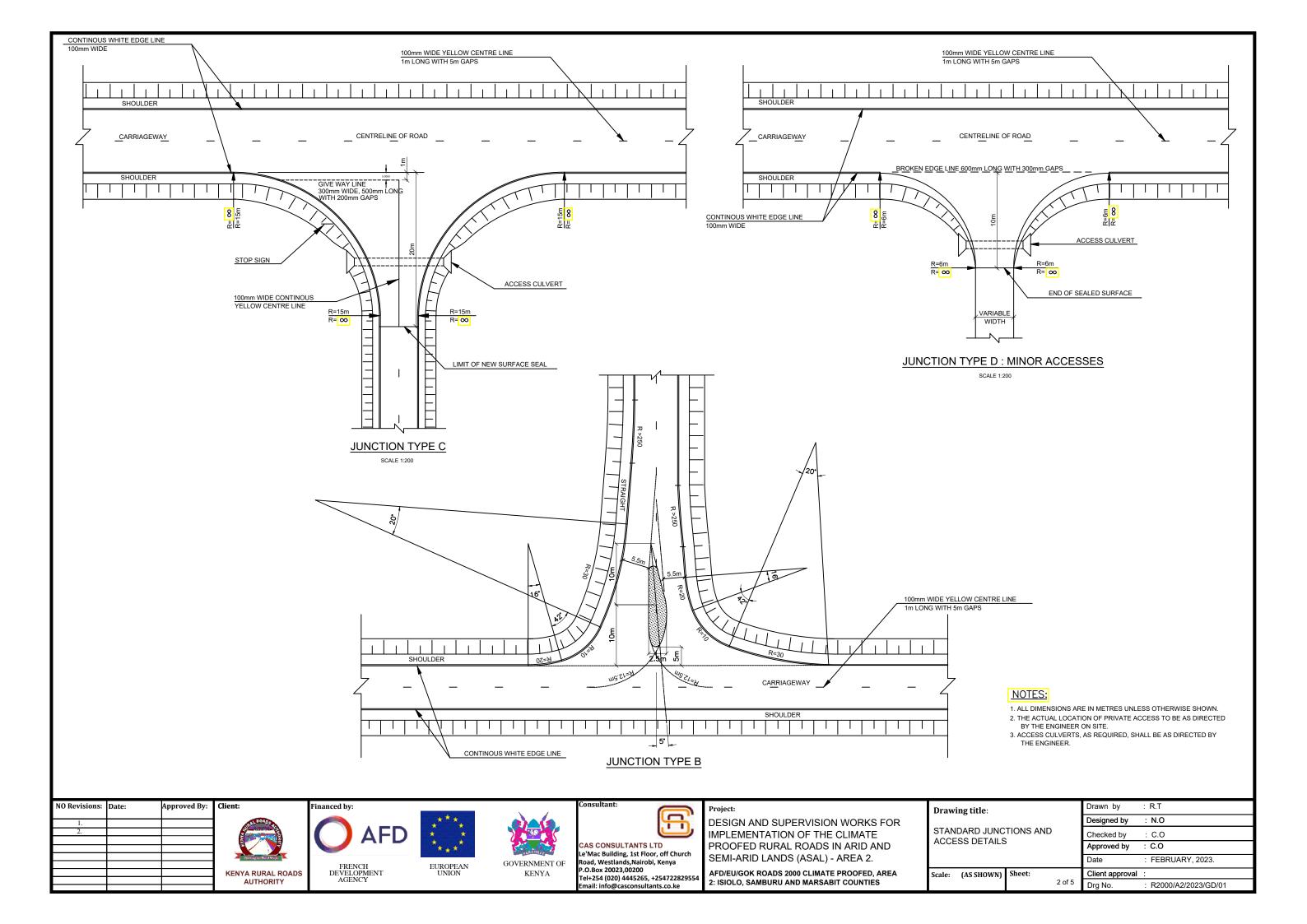
SECTION B-B	
d → i→	
0.20Mt	variable min = 75% of pipe diameter 15/20 conrete tedding
20/20 (1:2:4)	0.1-0.15m

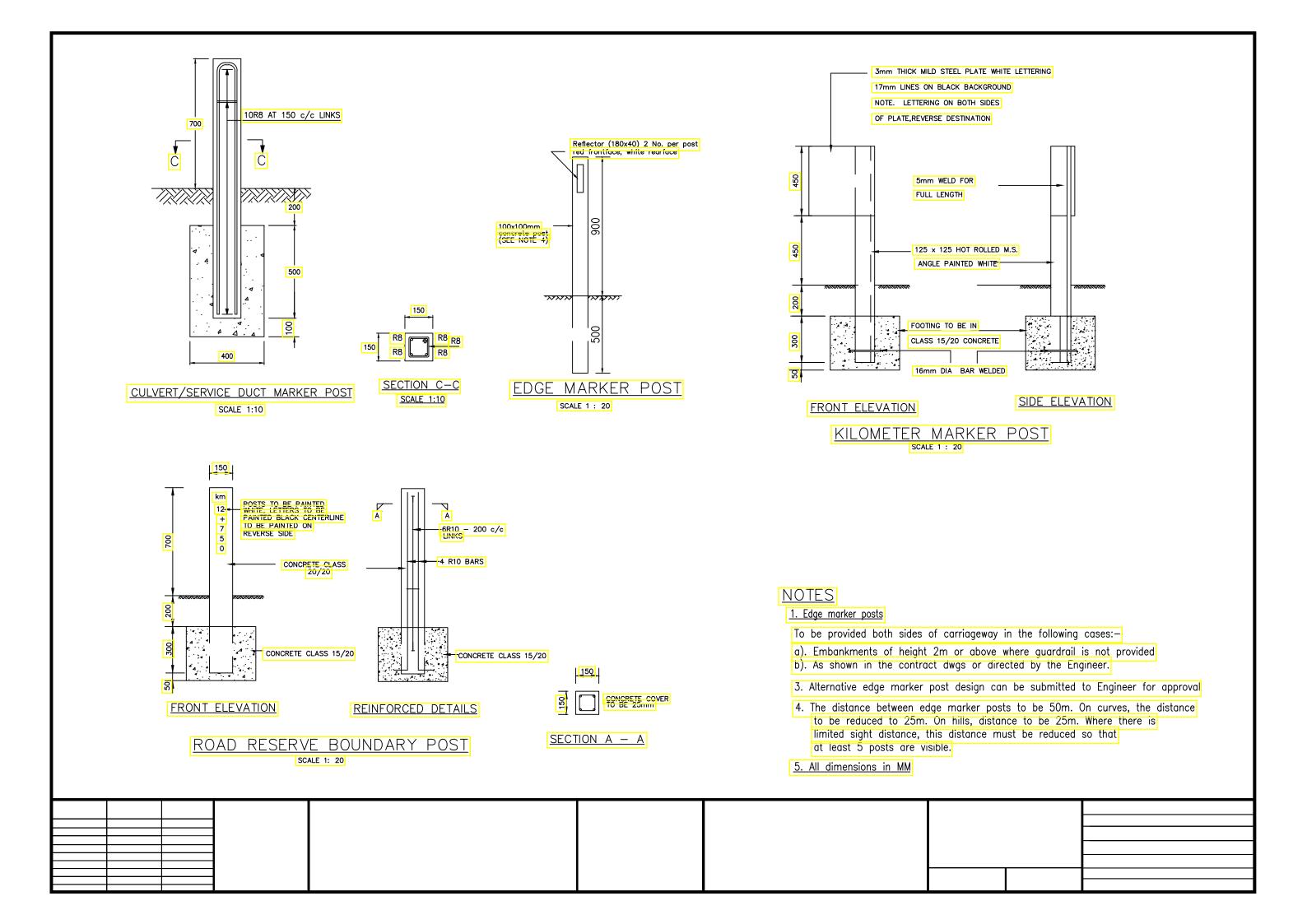
	PIPE DIAMETER IN M			PEACON	CRETE	TYPE B (STONE MASONRY)		
,e			450	600	900	450	600	900
а	DIMENSION FOUNDATION	UNIT m	0.30	0.30		0.40	0.40	
b	FOUNDATION	m	0.30	0.30		0.30	0.30	
С	FOUNDATION	m	1.34	1.49		1.34	1.49	
d	APRON	m	0.6	0.6		0.60	0.60	
е	APRON	m	0.20	0.20		0.20	0.20	
f	WALL	m	0.20	0.20		0.40	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 REQU	JIREMEN	Т					
FC	DUNDATION							
(c	(concrete) m3			0.2		0.24	0.26	
HEAD/WINGWALLS (Conrete/Masonry) m3 APRON			0.28	0.32		0.53	0.61	
	(cocrete)	m3	0.12	0.14		0.12	0.14	

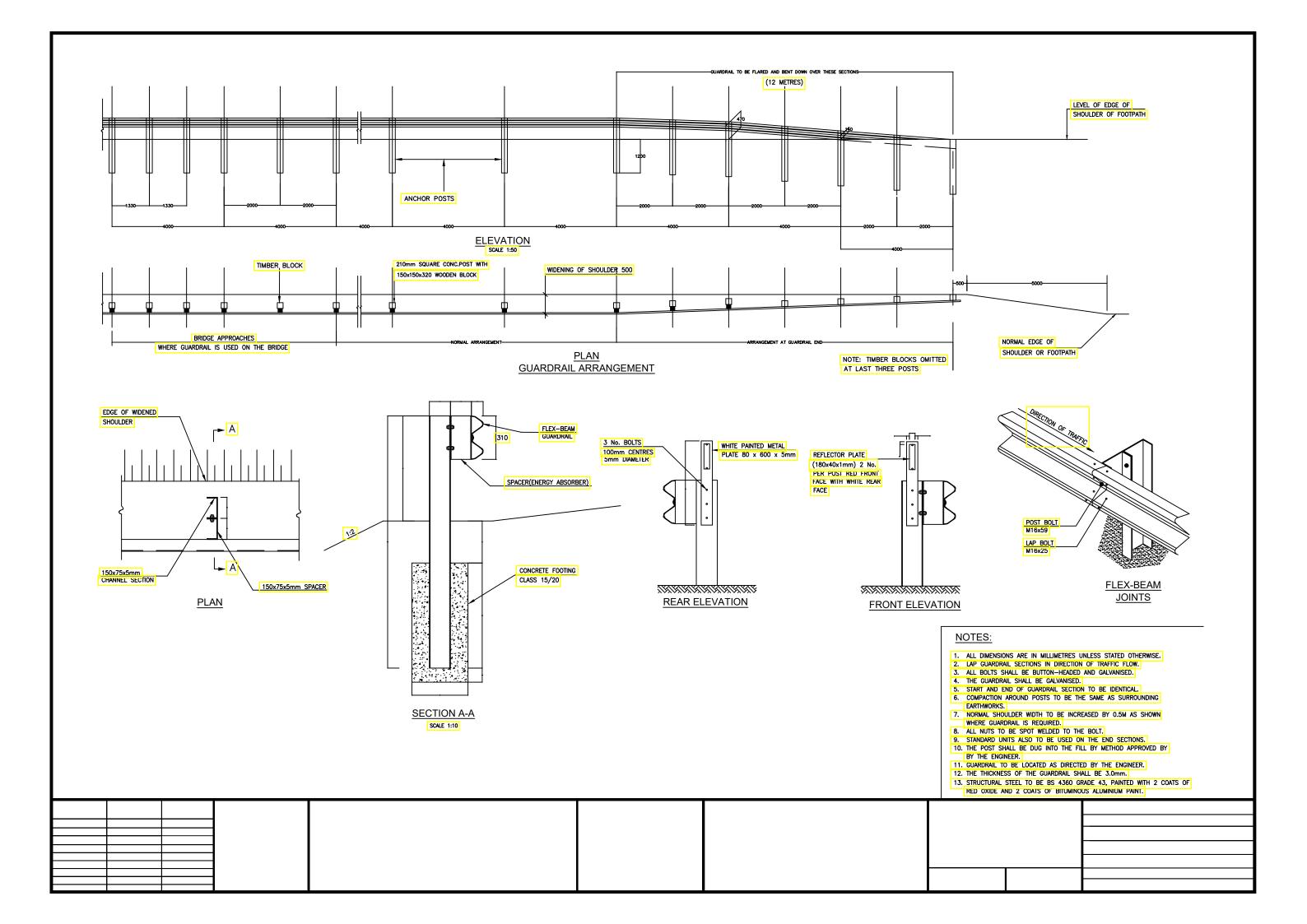




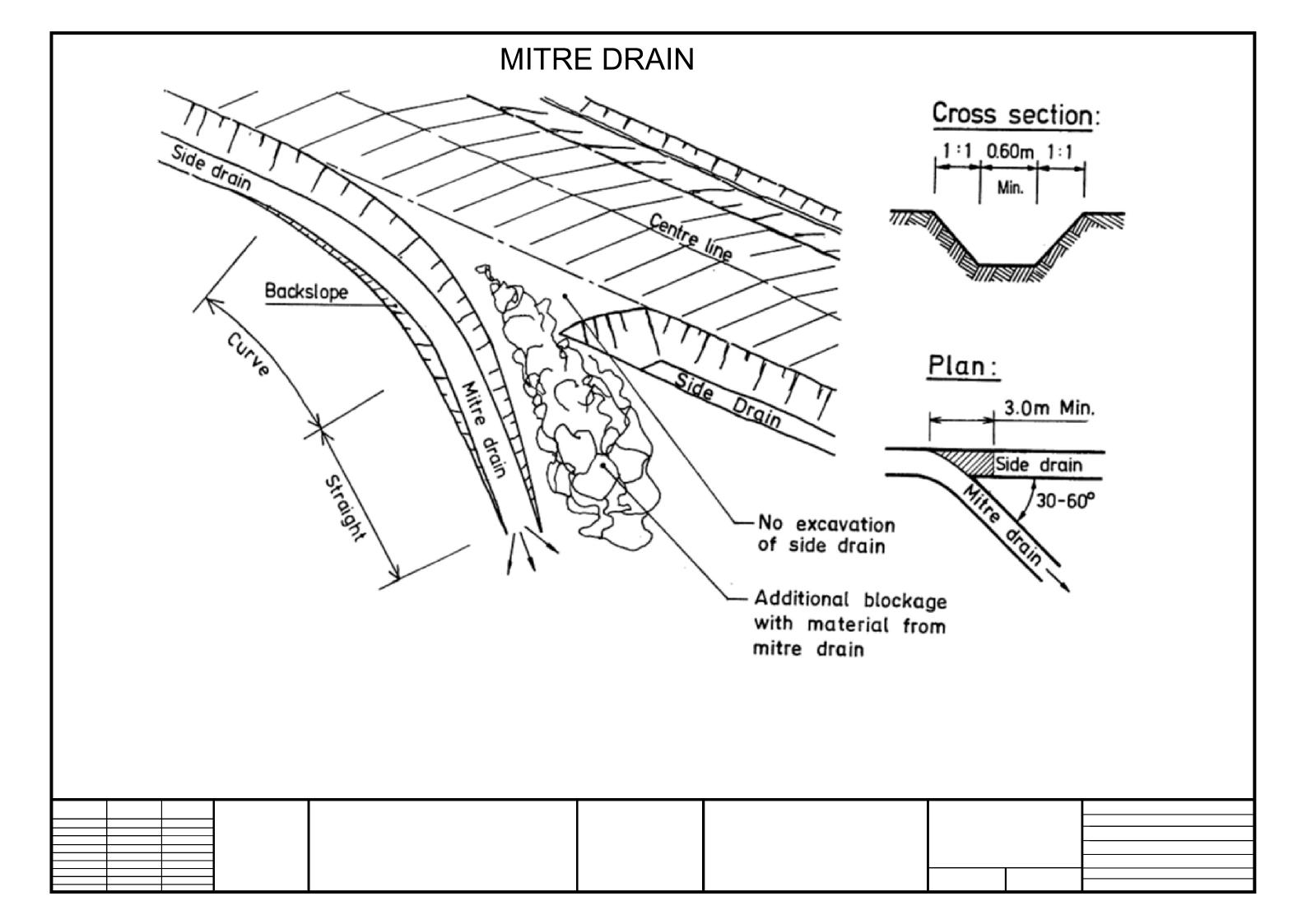
STANDARD DRAWINGS



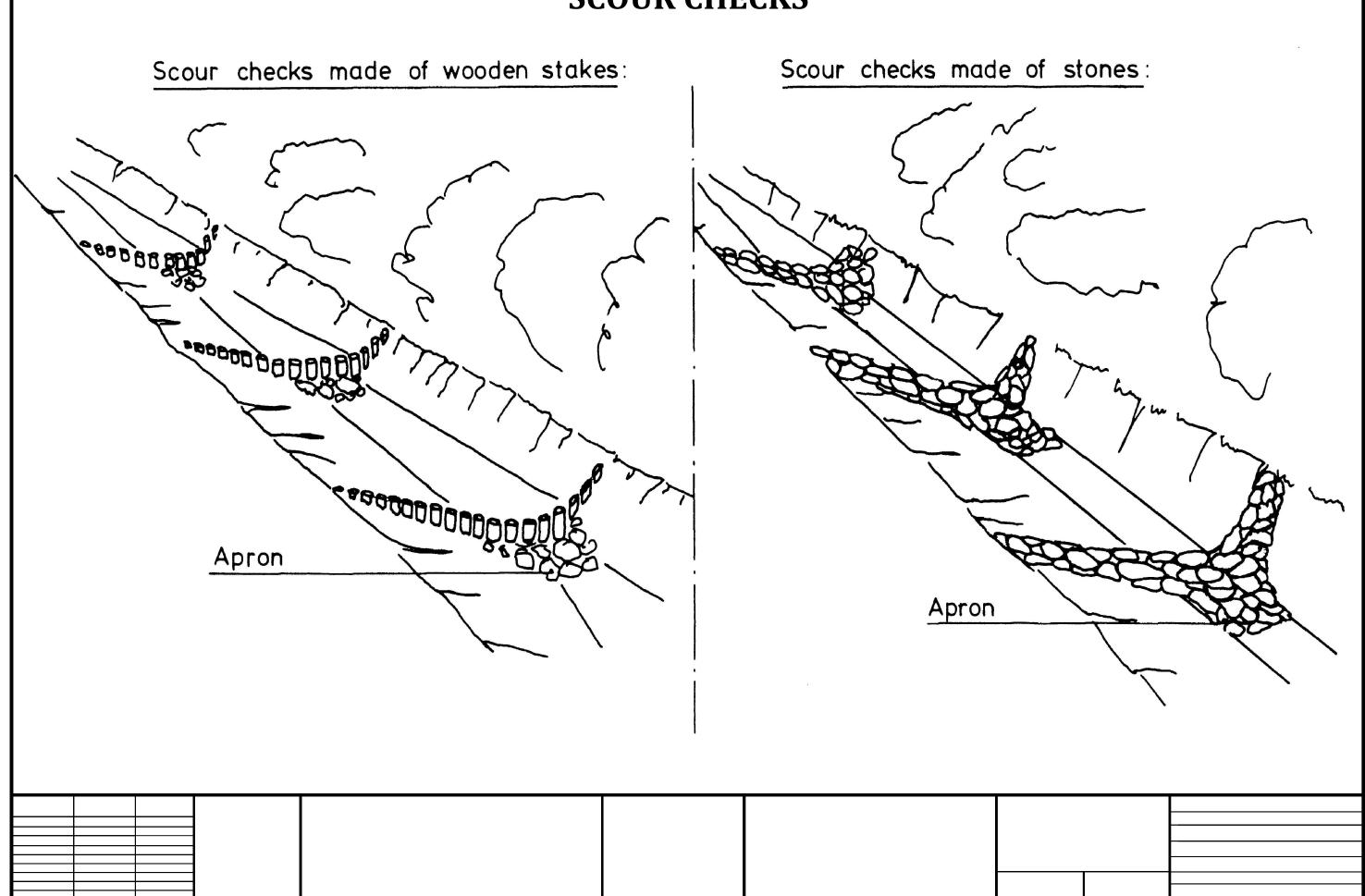




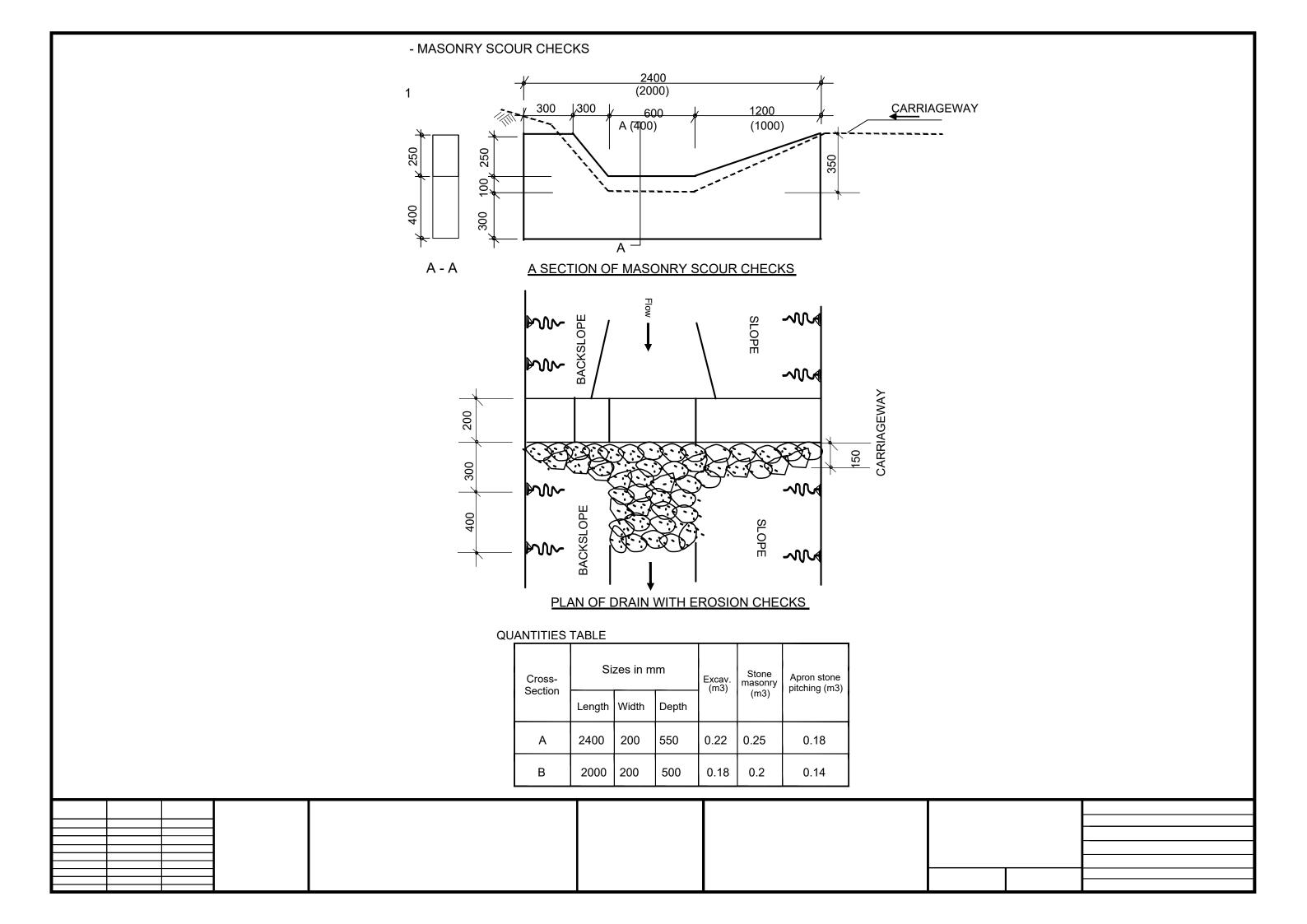
GENERAL DRAINAGE

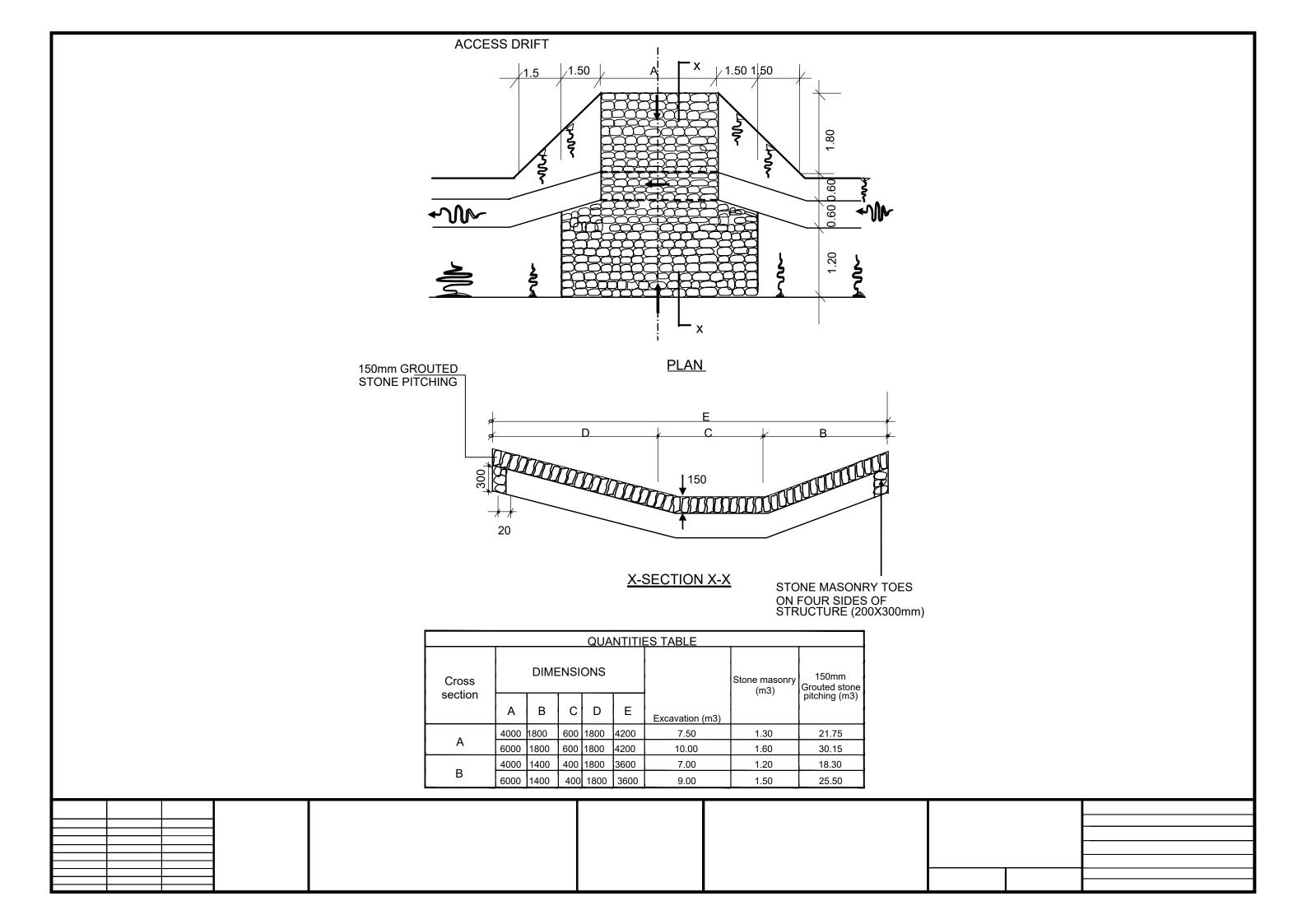


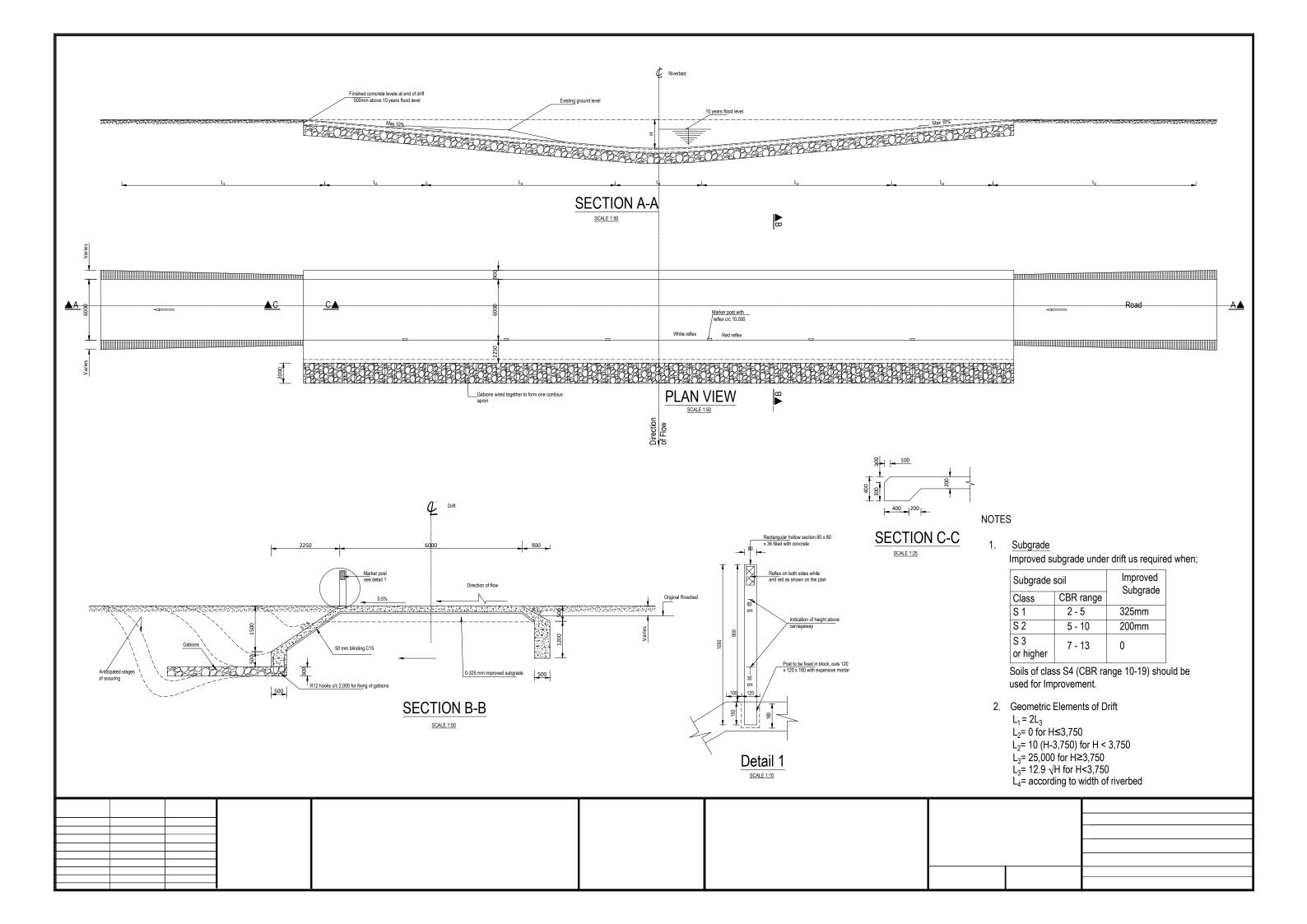
SCOUR CHECKS



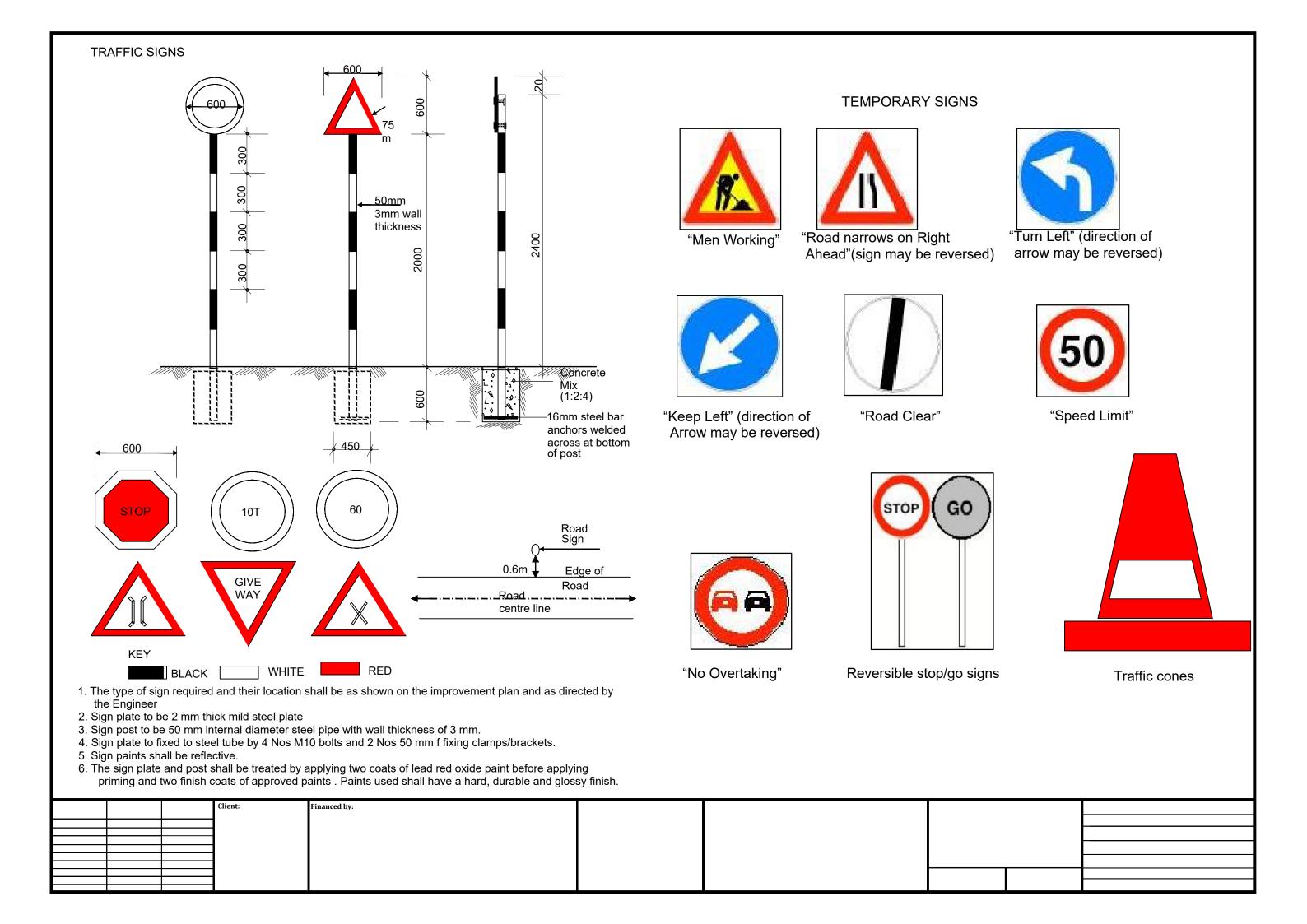
Scour checks made of stones Scour checks made of wooden stakes Cross section Cross section 1.20m 1.20m 10.60m 10.60m (1.00m)(1.00m)10.40n Stakes to be 300 -400mm long Ground plan Ground plan Carriageway 5.15 Ditch Ditch TURF BACKING Carriageway 0.30 0.30 0.40 0.40 Stone Stone erosion erosion apron STONE WEIGHT: MIN 10KG apron STAKE DIAMETER: MIN. 0.10m NOTE 1Dimensions in metres



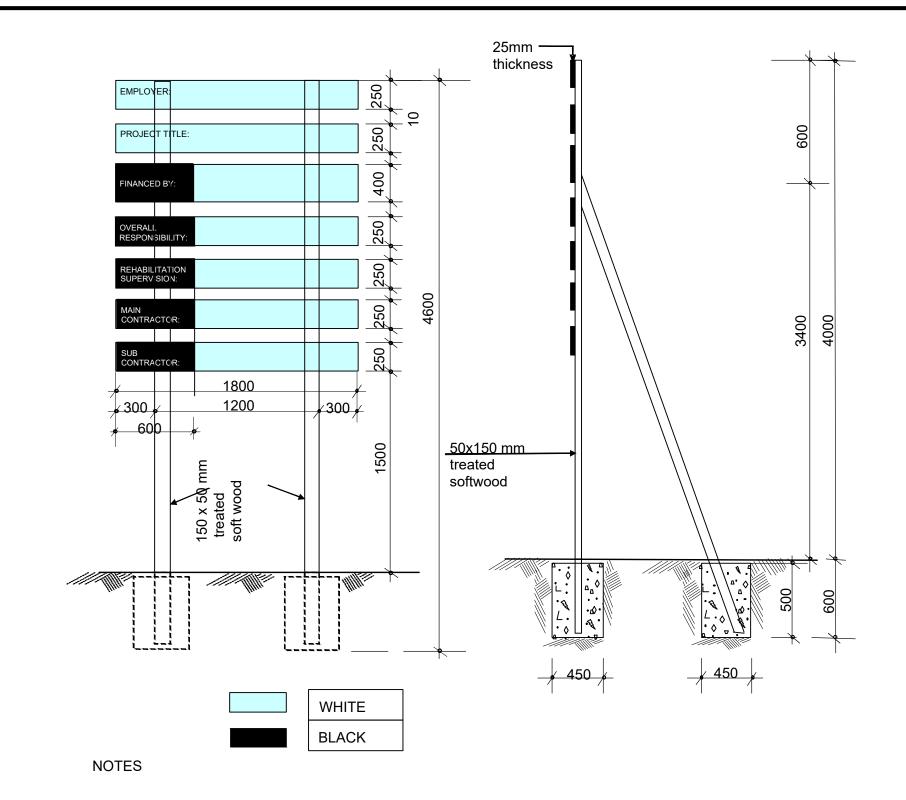




TRAFFIC SIGNS



PUBLICITY SIGNBOARD



- 1. The wording of the project signboard and the location to be installed to be as directed by the Engineer
- 2. Materials to be used for fabrication of signboard shall be pressure impregnated treated softwood timber sizes as indicated in the drawing
- 3. Wording boards to be nailed to the posts using nails.
- 4. Project board posts and struts to be embedded in concrete ratio 1:2:4

				1	