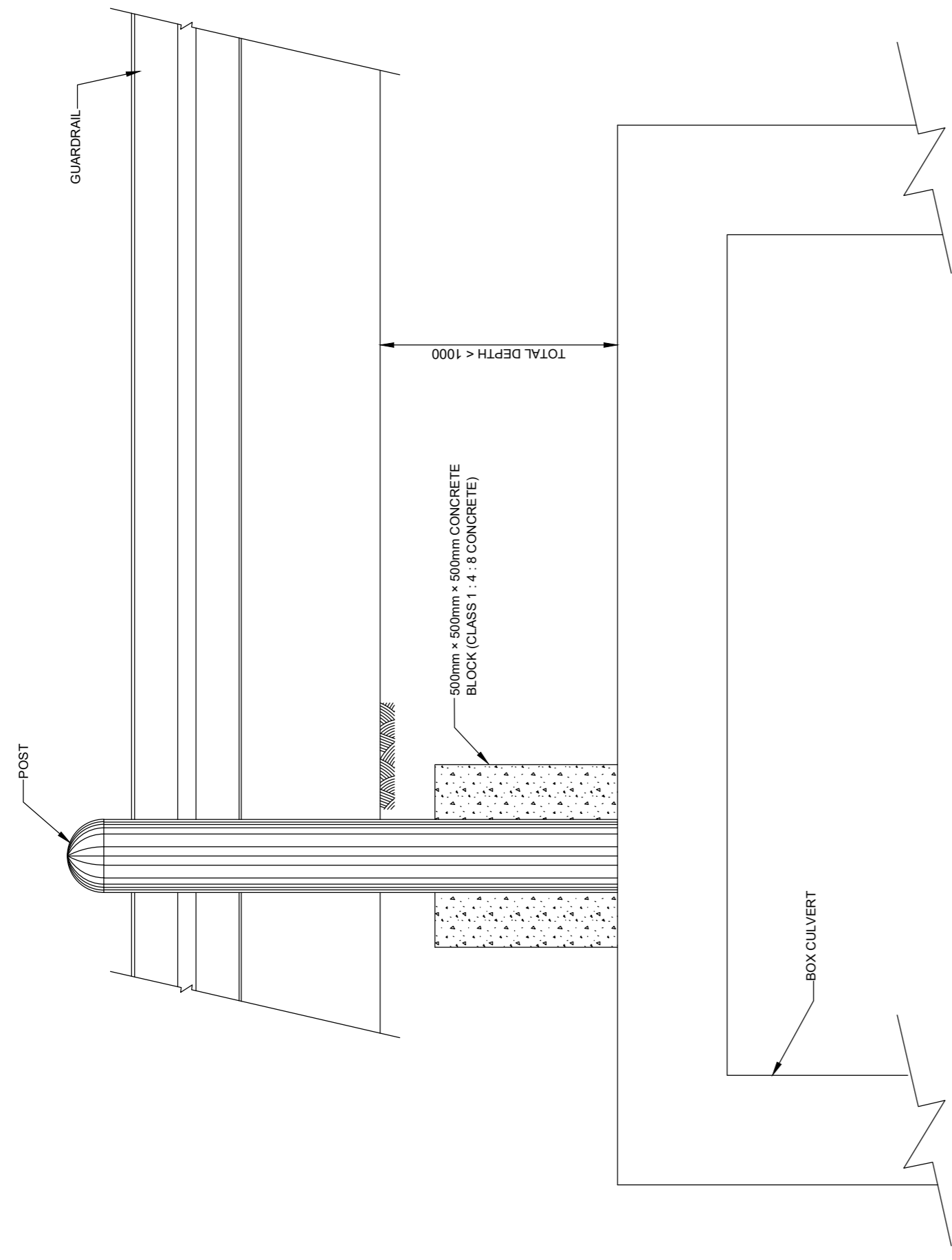
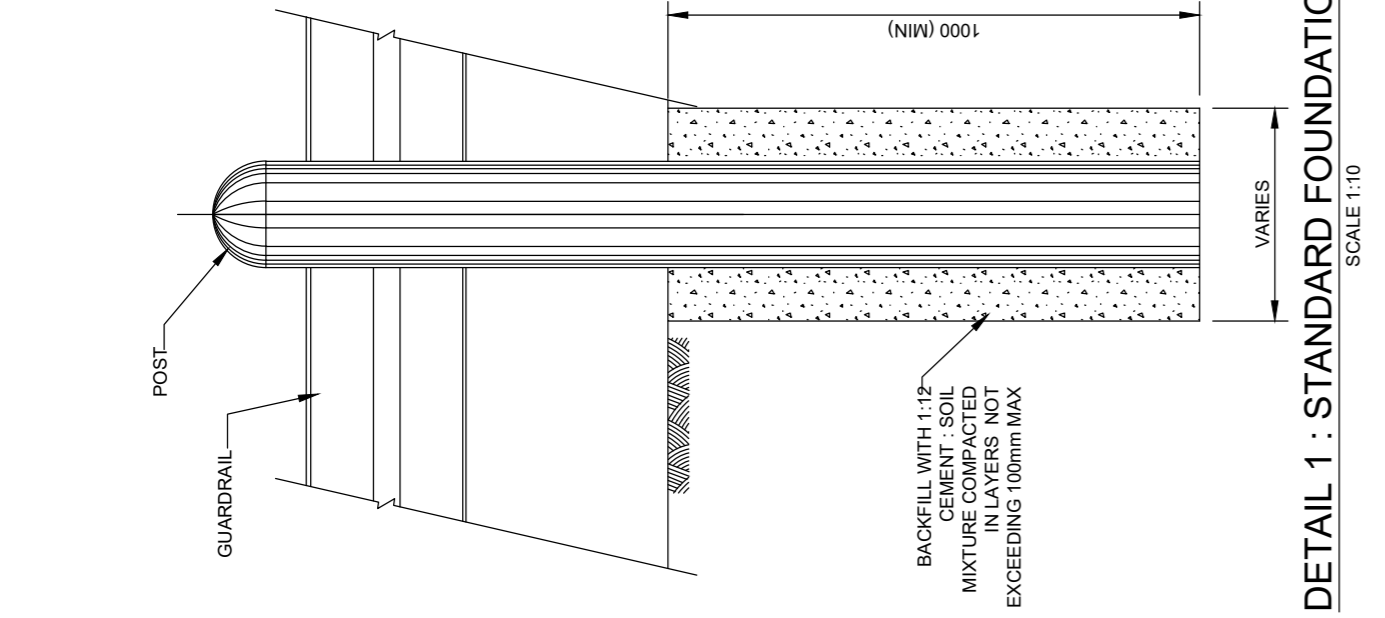


Property	Value
Pipe Dia.	600mm
PIPE SLOPE	0.2%
Existing Ground Levels	730.071
Cover and Invert	Start Inv 727.956 End Inv 728.42
Chainage	00.000
Pipe Length	14.329

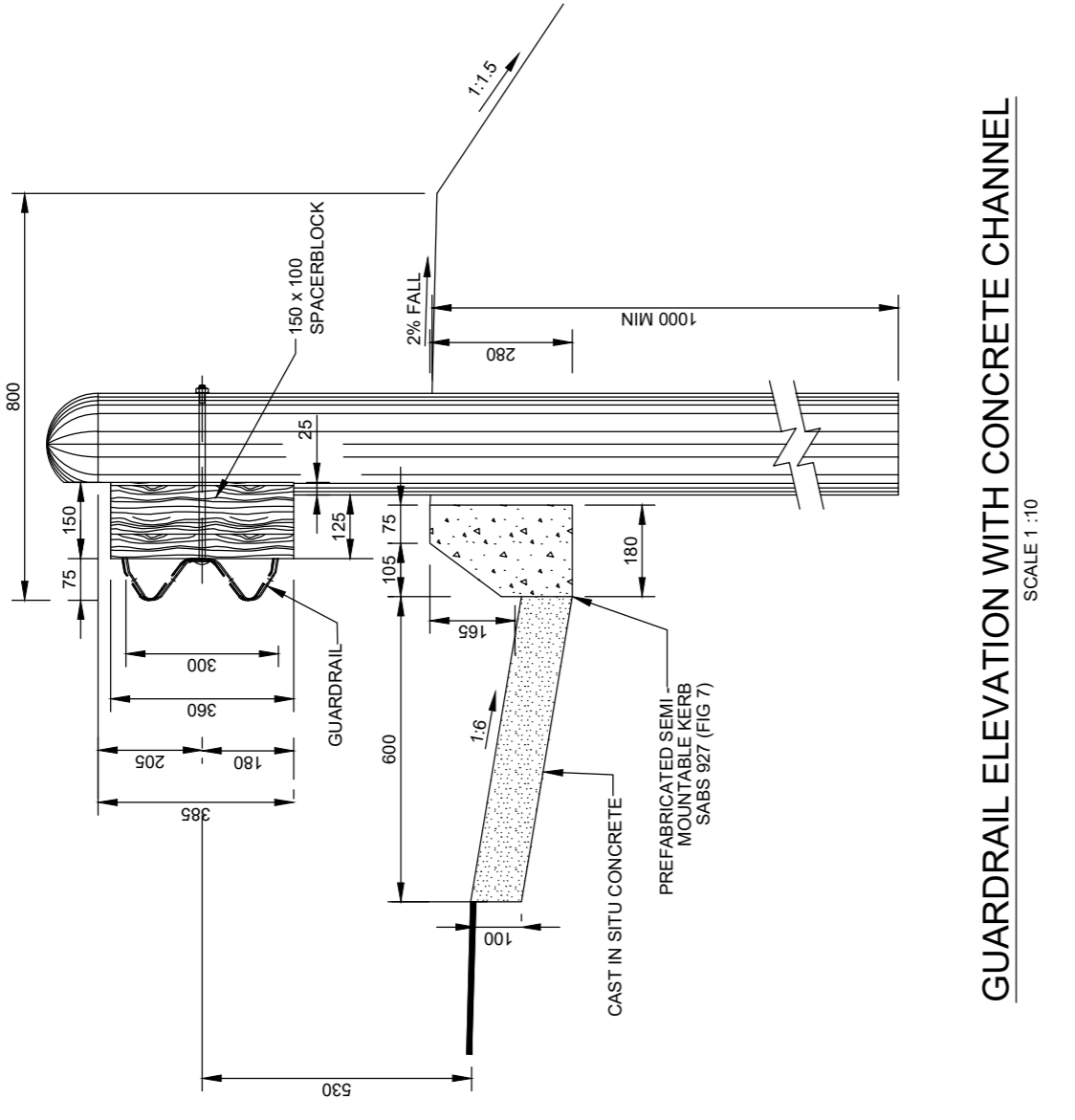
PEROZZI 14 LOST TRAIL STREET NELSPRUIT EXTENSION P.O. BOX 3072 MBOMBELA 1200 TEL: 013 755 4026 FAX: 013 755 4026 CELL: 073 185 6632 email: sambourne@gmail.com 1200		CITY OF MBOMBELA 1 MEL STREET, MBOMBELA P.O. BOX 45 NELSPRUIT TEL: (013) 759 2041 FAX: (013) 753 2274	Project description: UPGRADING OF MAMINDZA ROAD WITH A VEHICULAR BRIDGE IN WARD 28 MBOMBELA Drawing name: ROAD 2 AND PIPE CULVERT LONGITUDINAL SECTION Drawing number: KM 1+600 - KM 2+254
Client project number: 213/2020 XXXVII Scale: H1:1000/1:100 Original size: A1	Consultant Approval: Name: M. MAMINDZA Date: 10/06/2025 Prof. Reg. No.: 20090205 THE ABOVE SIGNATORY CERTIFIES THAT HE HAS REVIEWED THE DRAWING AND THAT HE IS A REGISTERED PROFESSIONAL ENGINEER AND THAT HEY HAVE SEEN AND APPROVED THE DRAWING.	Client Acceptance: THIS ACCEPTANCE IS FOR PROCEDURAL AND ADMINISTRATIVE PURPOSES ONLY AND DOES NOT ATTRACT LEGAL LIABILITY OR WARRANTIES OF ANY KIND WHATSOEVER IN THE EVENT OF ANY DISCREPANCY OR POWER BEING ASSIGNED.	Sheet: 1 of 1 Drawing number: PER-MDZA-LS2-003 Revision: 0



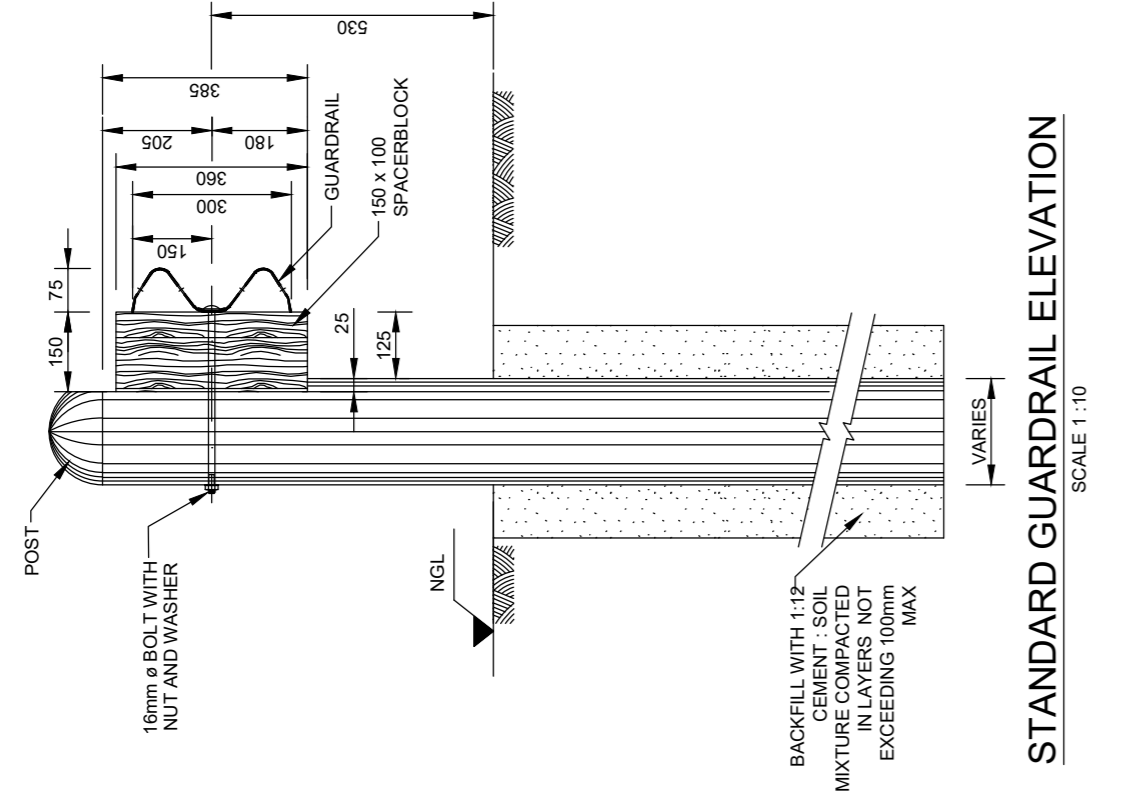
DETAIL 2 : FOUNDATION DETAILS FOR PLACEMENT ON CONCRETE STRUCTURES
SCALE 1:10



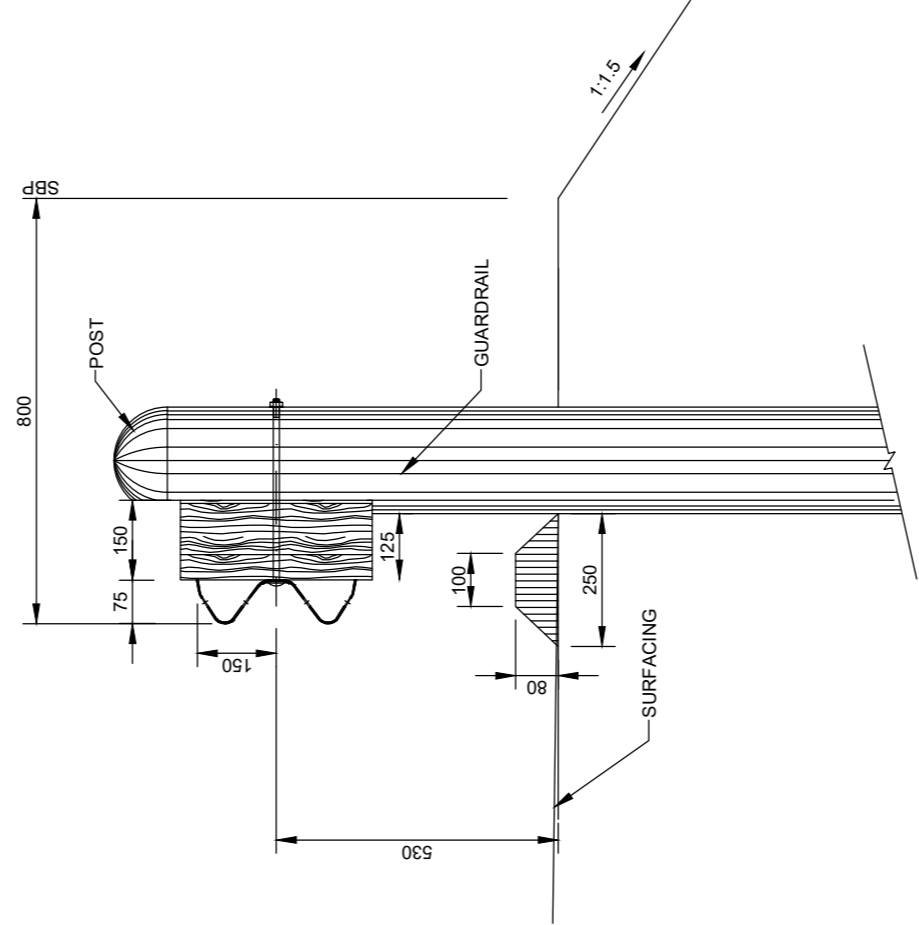
DETAIL 1 : STANDARD FOUNDATION DETAIL
SCALE 1:10



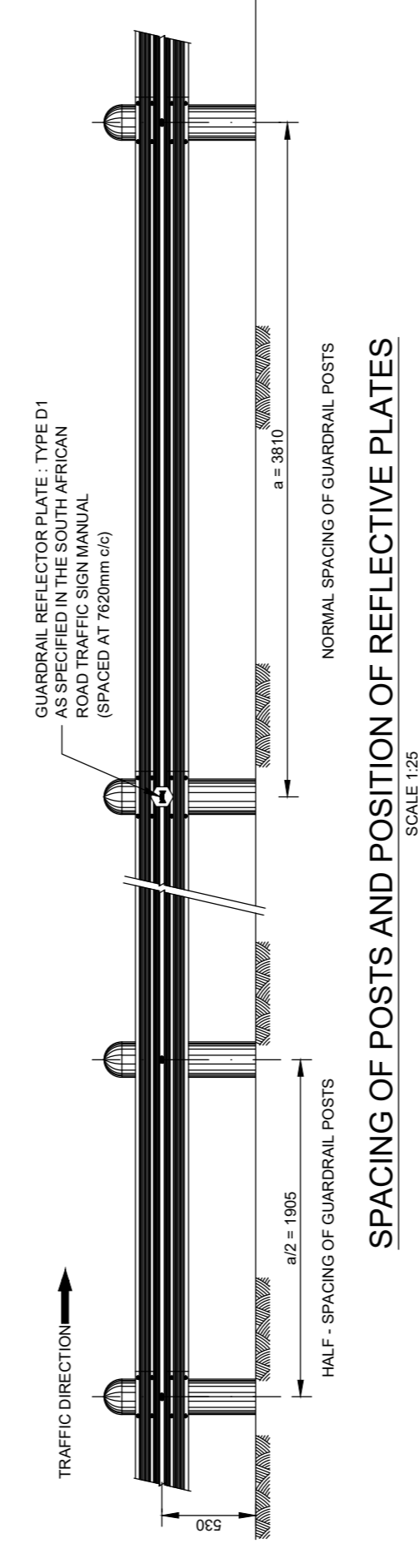
GUARDRAIL ELEVATION WITH CONCRETE CHANNEL
SCALE 1:10



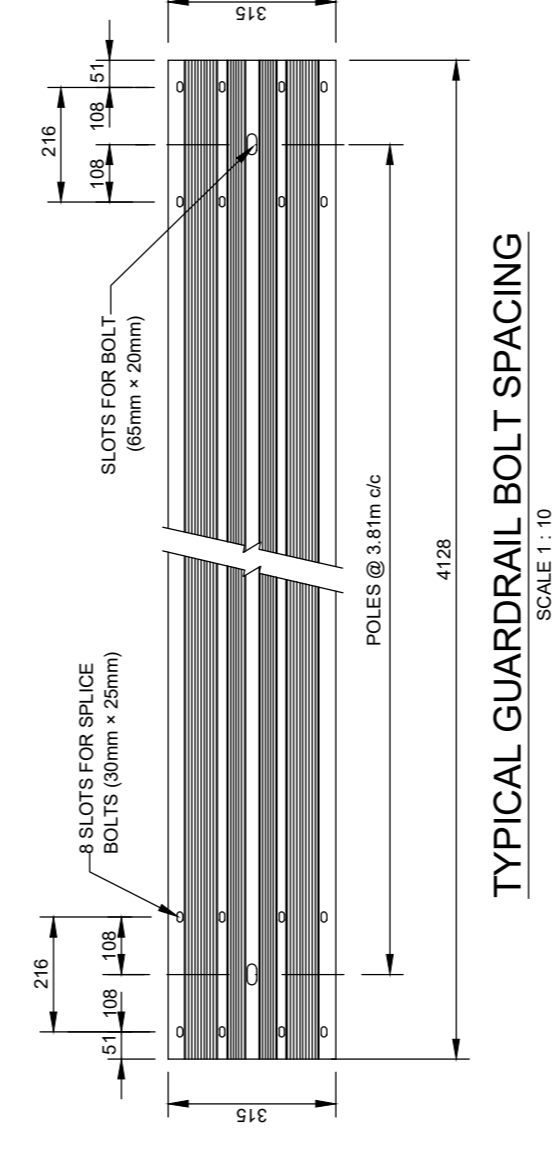
STANDARD GUARDRAIL ELEVATION
SCALE 1:10



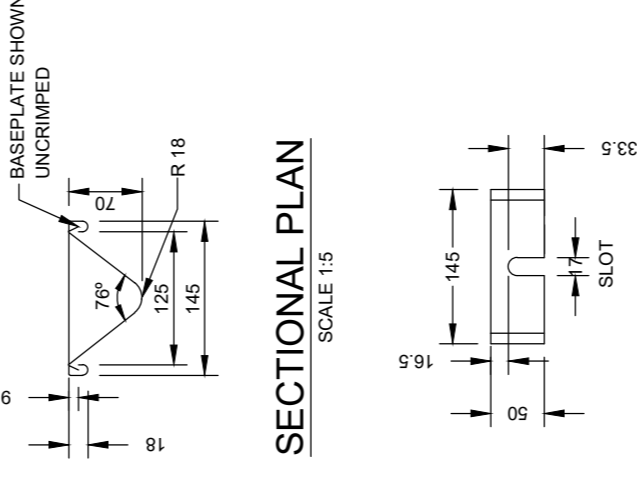
DETAIL OF ASPHALT BERM
SCALE 1:10



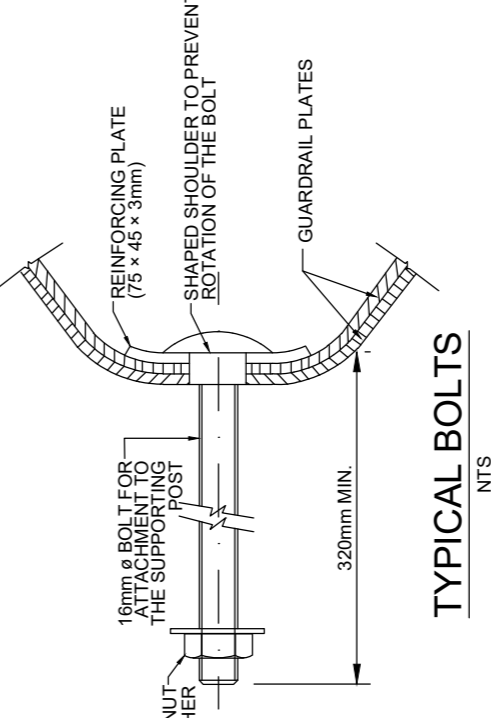
SPACING OF POSTS AND POSITION OF REFLECTIVE PLATES
SCALE 1:25



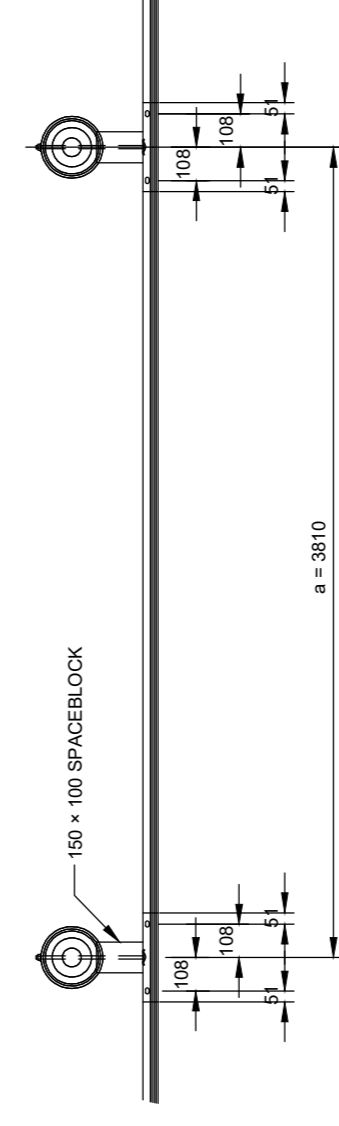
TYPICAL GUARDRAIL BOLT SPACING
SCALE 1:10



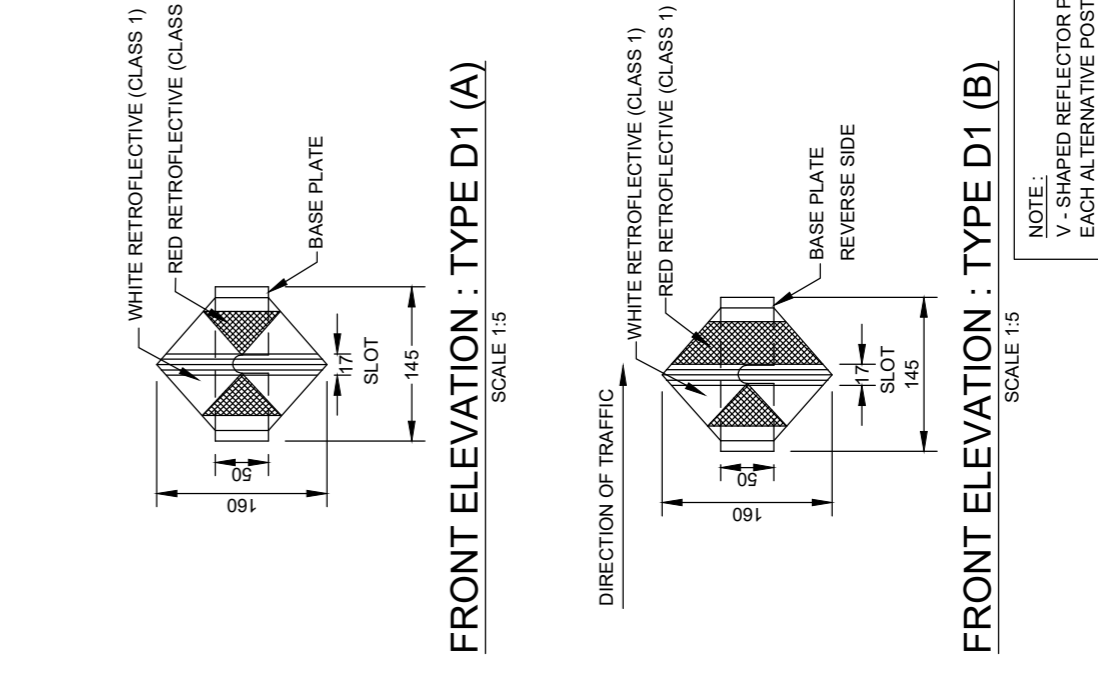
DETAIL OF BASEPLATE
SCALE 1:5



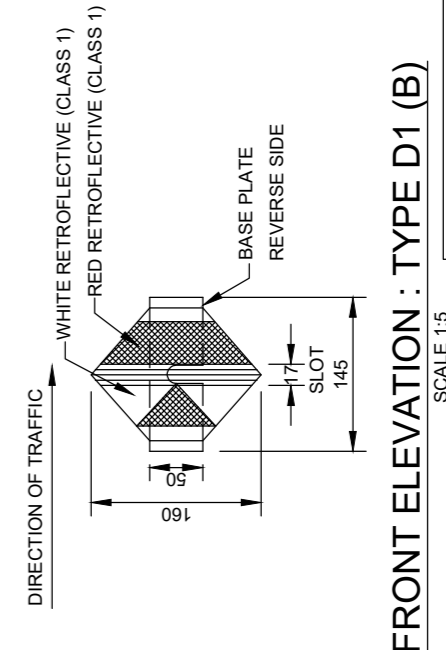
TYPICAL BOLTS
SCALE 1:5



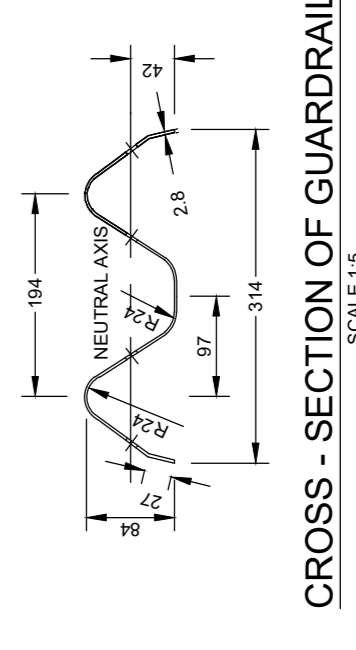
GUARDRAIL PLAN
SCALE 1:25



FRONT ELEVATION : TYPE D1 (A)
SCALE 1:5

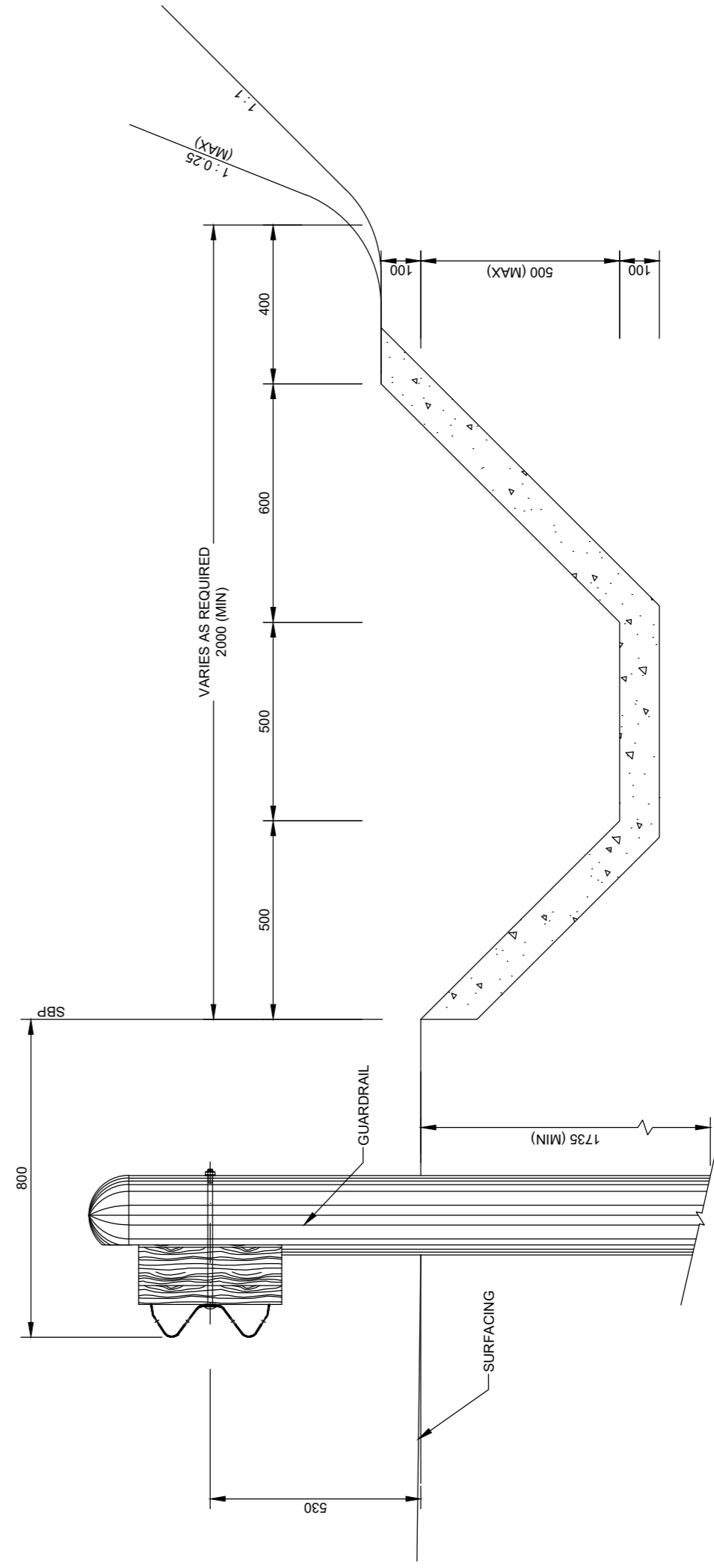


FRONT ELEVATION : TYPE D1 (B)
SCALE 1:5

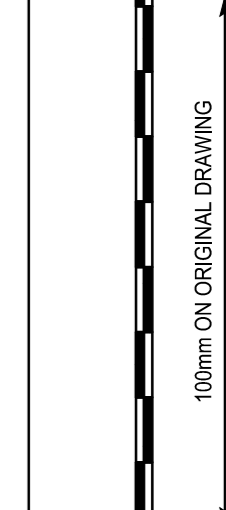


CROSS-SECTION OF GUARDRAIL
SCALE 1:5

- SPECIFICATIONS**
1. BOLT: HIGH TENSILE STEEL, 16mm Ø
 2. WASHERS: 3mm THICK SPRING STEEL
 3. SPACER BLOCK: PINE OR GUM, PRESSURE IMPREGNATED WITH CREOSOTE ACCORDING TO WITH SABS S38 OR S39
 4. POSTS: 150mm Ø MIN - 200mm Ø MAX, PINE OR GUM, PRESSURE IMPREGNATED WITH CREOSOTE ACCORDING TO WITH SABS S38 OR SABS S39
 5. ALL GUARDRAILS TO BE GALVANIZED ACCORDING TO SABS 763
 6. TIMBER POSTS: POSTS SHALL COMPLY WITH THE REQUIREMENTS OF SABS AND SHALL CARRY THE SABS MARK
 7. FOR TERMINAL DETAILS REFER TO DRAW. NO. MRS010101052

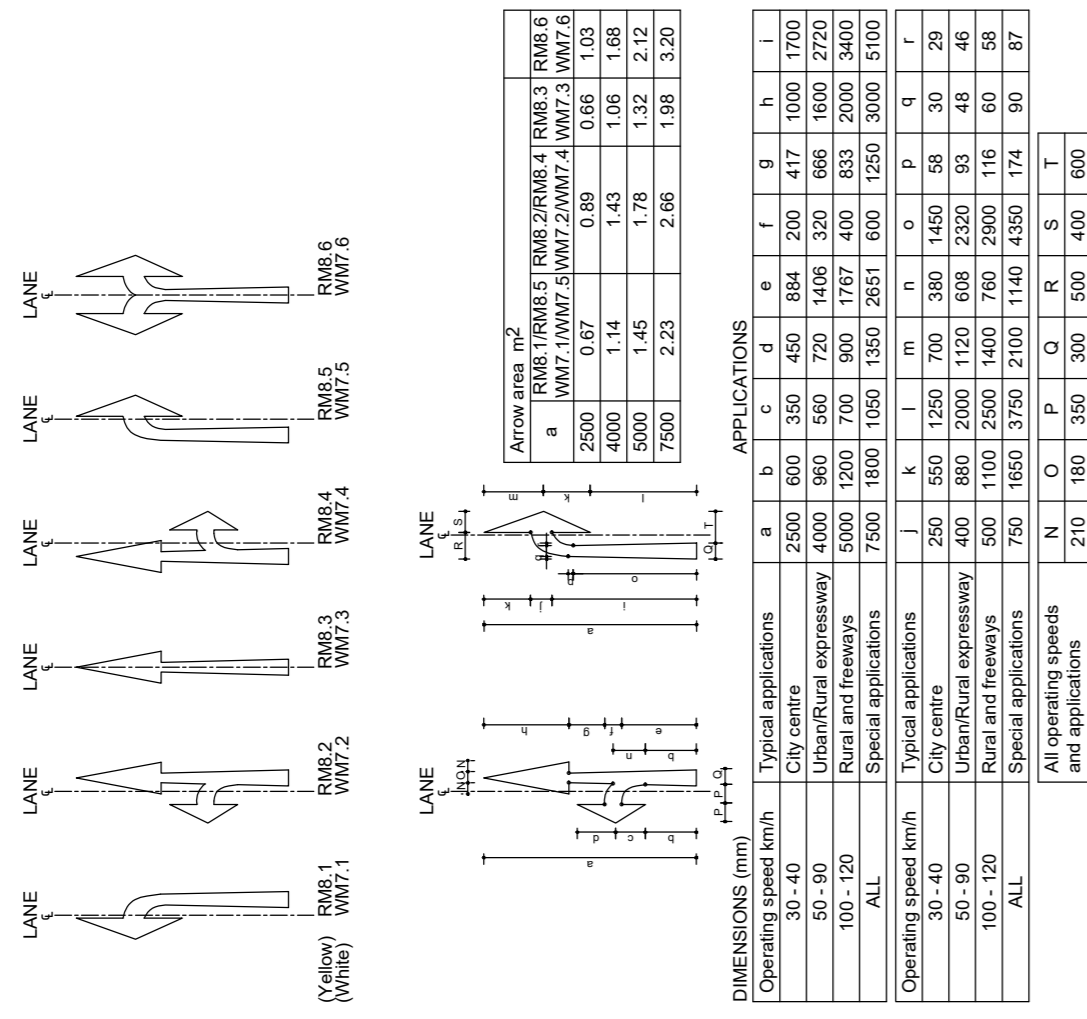


ALTERNATIVE SOFTHARD MATERIAL
SCALE 1:10

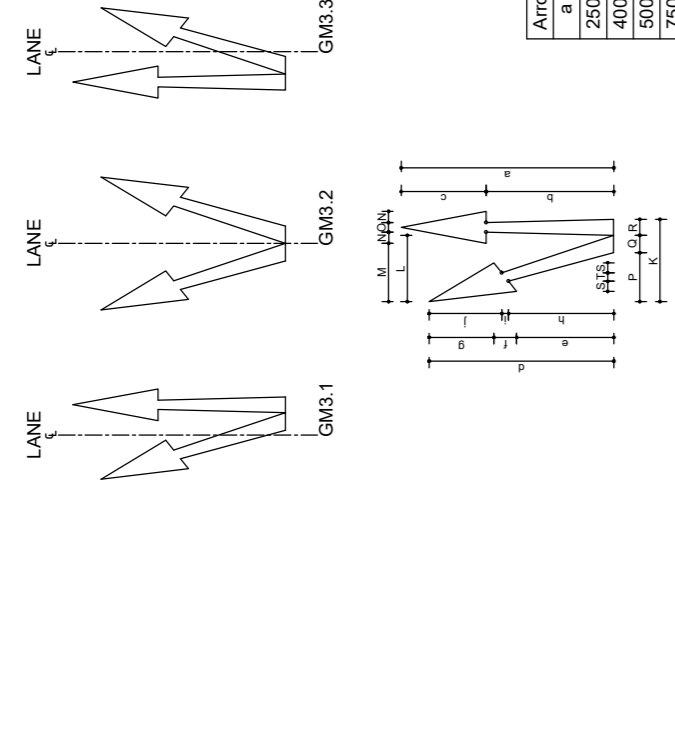


100mm ON ORIGINAL DRAWING
SCALE 1:10

<p>CONSULTANT APPROVAL</p> <p>Name: M. MAMMUDA Prof Reg No.: 2009/0205 Date: 10/01/2011 Signature: [Signature]</p>		<p>CLIENT ACCEPTANCE</p> <p>PROVINCIAL AND MUNICIPAL ENGINEER MAMMUDA NOT AFFILIATED WITH ANY OF THE MEMBERS OF THE ENGINEERING COUNCIL OF SOUTH AFRICA ADDRESS: 14 LOST TRAIL STREET NELSPRUIT EXTENSION PO BOX 3072 MAMMUDA MAMMUDA, 0400</p>		<p>CONTRACT APPROVAL</p> <p>Project Name: UPGRADING OF MAMMUDA ROAD WITH A VEHICULAR BRIDGE IN WARD 26 MBOMBELA Scale: NTS Drawing No: A1 Sheet: 1 of 1 Type of Design: DETAIL DESIGN Drawing number: PER-MDZA-ST-008 Revision: 0</p>	
<p>CITY OF MBOMBELA</p> <p>PO BOX 415 NELSPRUIT MAMMUDA TEL: (013) 759 2041 FAX: (013) 753 2274 Email: info@mbombela.gov.za</p>		<p>PEROZZ</p> <p>14 LOST TRAIL STREET NELSPRUIT EXTENSION PO BOX 3072 MAMMUDA MAMMUDA, 0400 TEL: 013 755 4028 FAX: 013 755 4028 CELL: 093 165 8832 Email: info@perozz.co.za</p>		<p>CITY OF MBOMBELA</p> <p>PO BOX 415 NELSPRUIT MAMMUDA TEL: (013) 759 2041 FAX: (013) 753 2274 Email: info@mbombela.gov.za</p>	

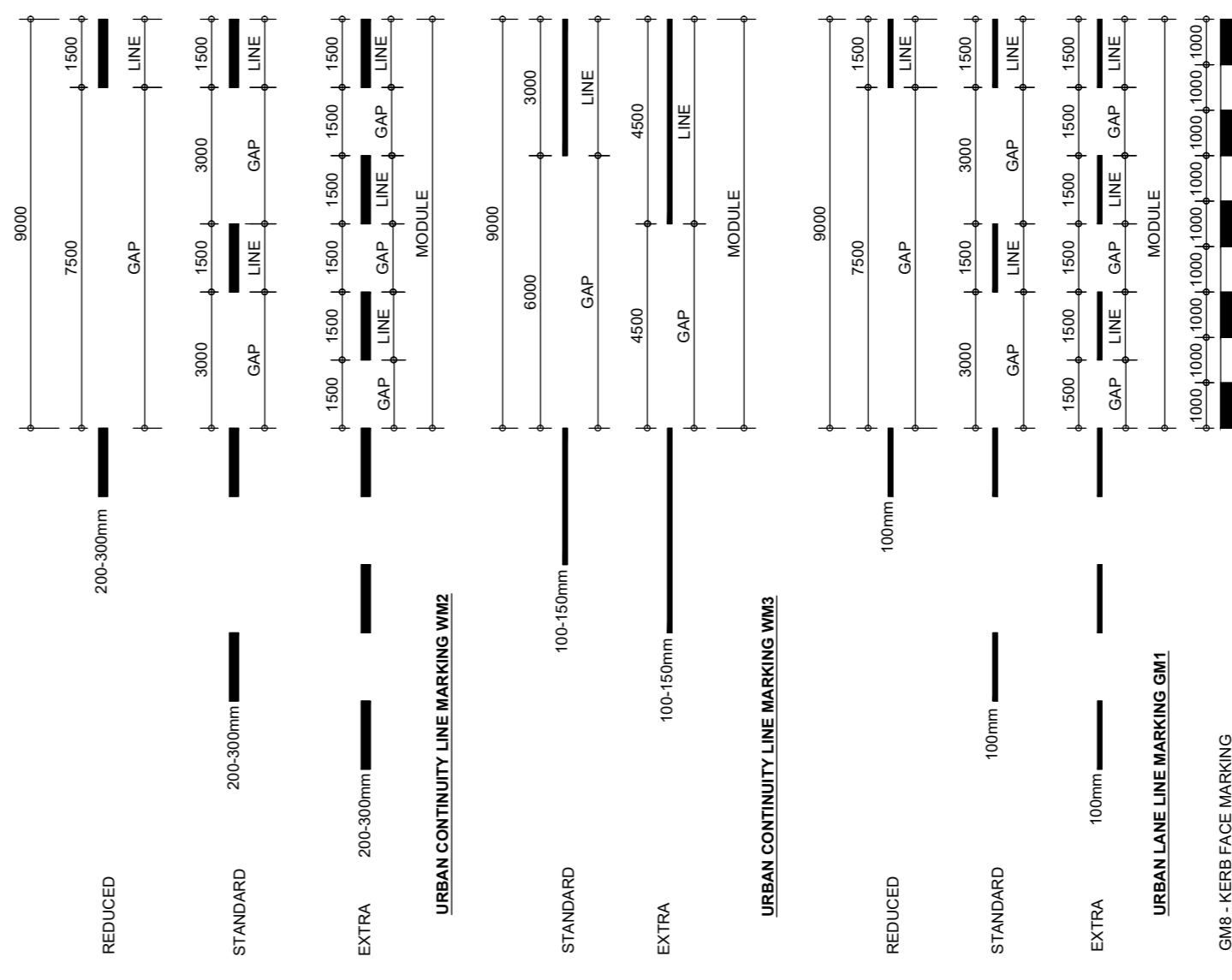


WM7 - MANDATORY DIRECTION ARROW AHEAD
N.T.S.

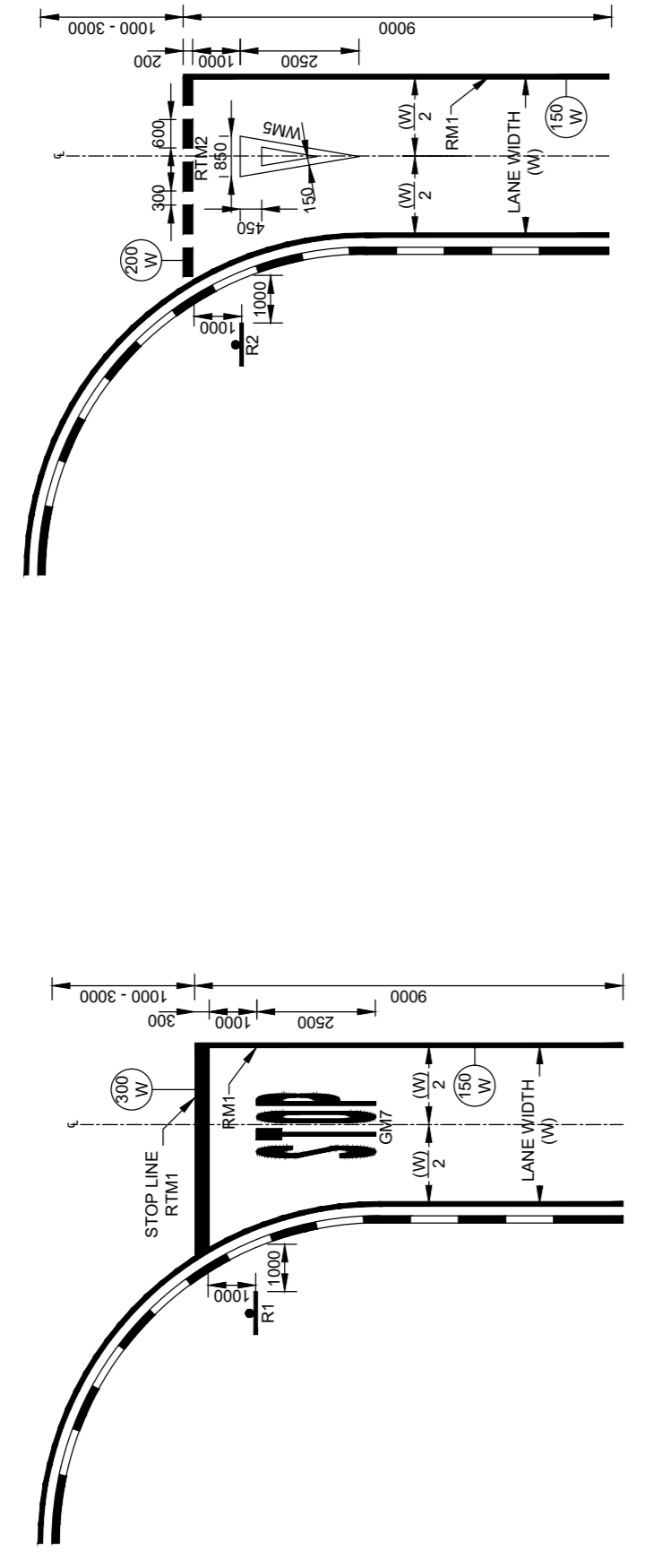


GM3 - BIFURCATION ARROWS
N.T.S.

Operating speed km/h	a	b	c	d	e	f	g	h	i	j
Typical applications	1500	1500	1000	2170	1141	288	761	1235	81	855
City centre	2500	1500	1000	2170	1141	288	761	1235	81	855
Urban arterial	5000	3000	2000	4340	2282	576	1522	2470	161	1709
Rural and freeways	7500	4500	3000	6510	3423	864	2283	3705	242	2564
All operating speeds and applications	1700	1250	1100	2100	180	921	329	300	188	181

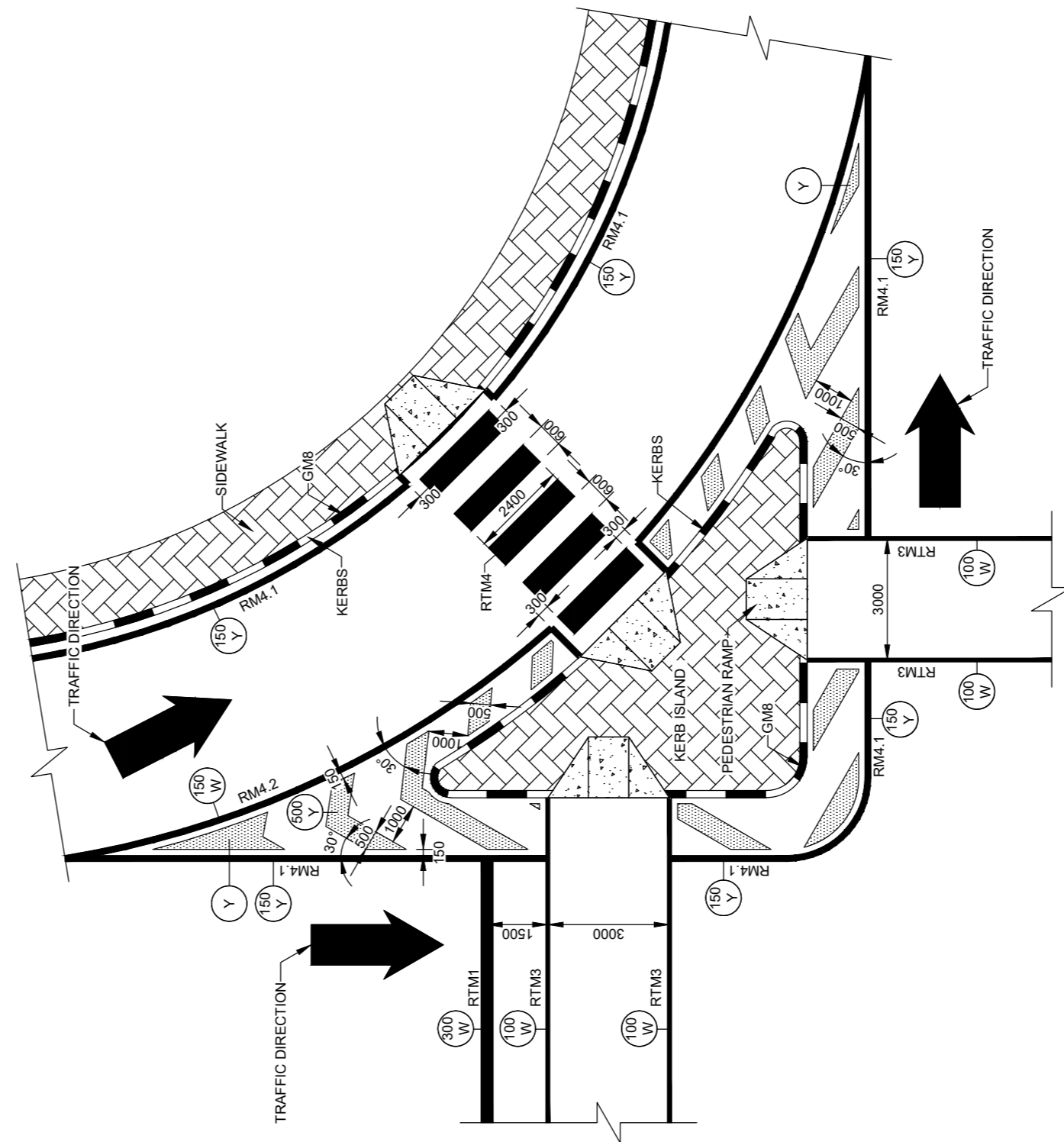


URBAN BROKEN LINE MODULE CHARACTERISTICS
SCALE 1:100

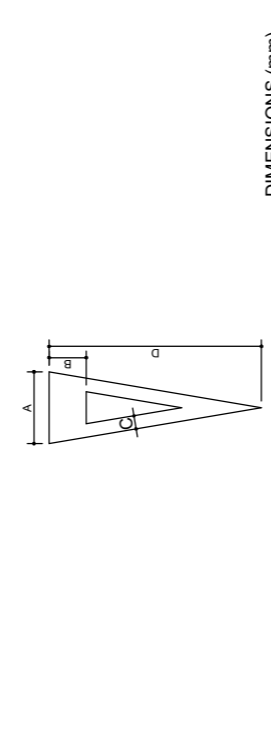


STOP LINE DETAIL AT URBAN INTERSECTION
SCALE 1:100

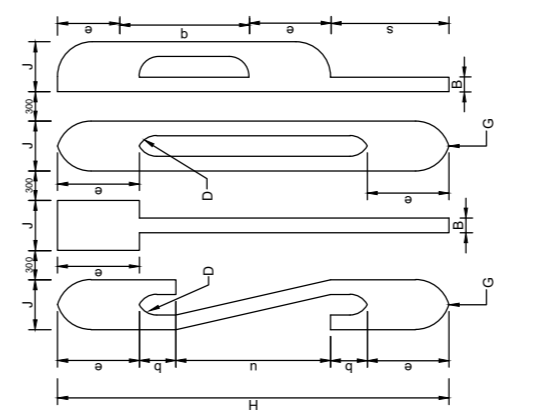
YIELD LINE DETAIL AT URBAN INTERSECTION
SCALE 1:100



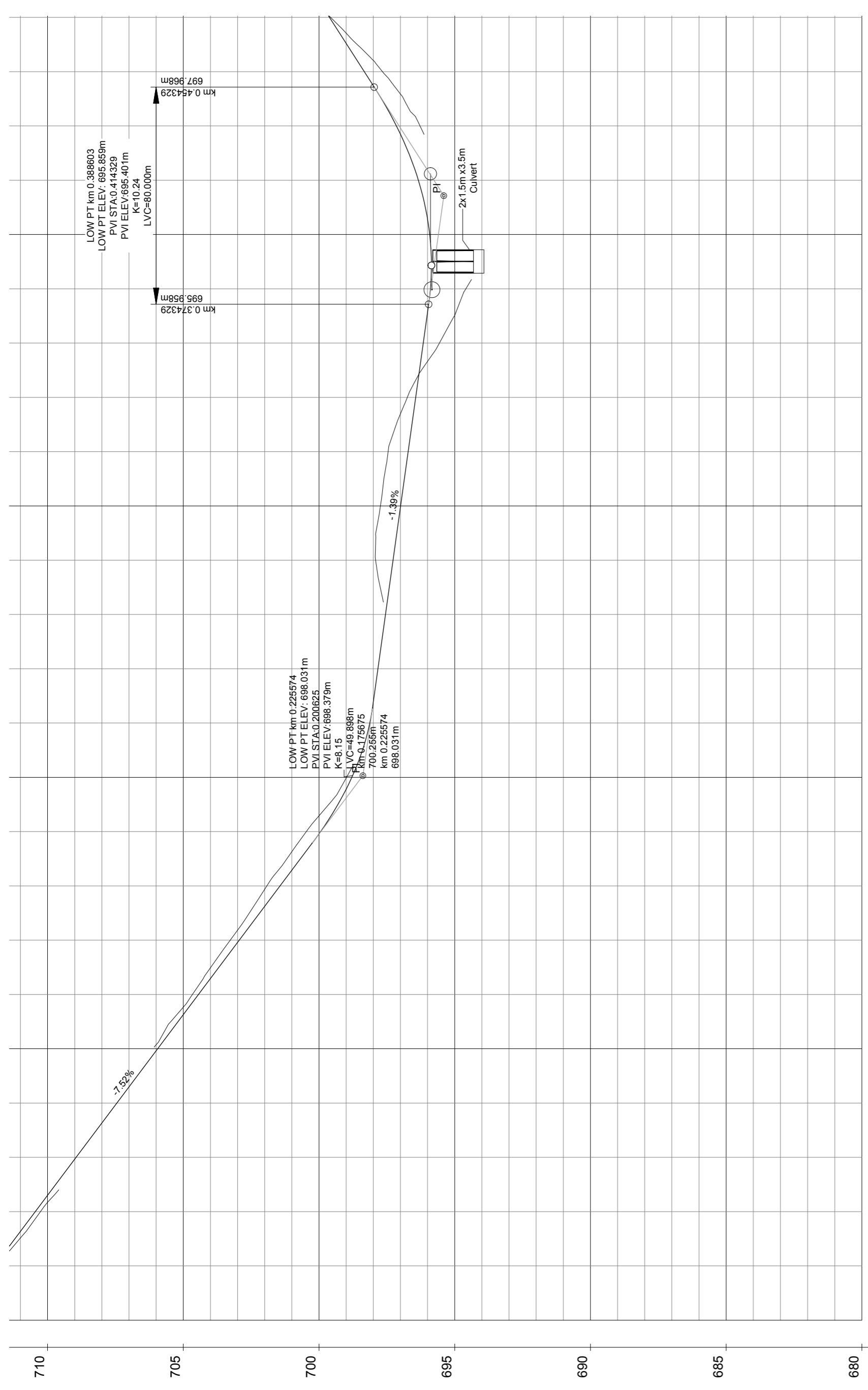
TYPICAL RMS PAINTED ISLAND
SCALE 1:100



WM5 - YIELD CONTROL AHEAD SYMBOL
N.T.S.



GM7 STOP MARKING
N.T.S.



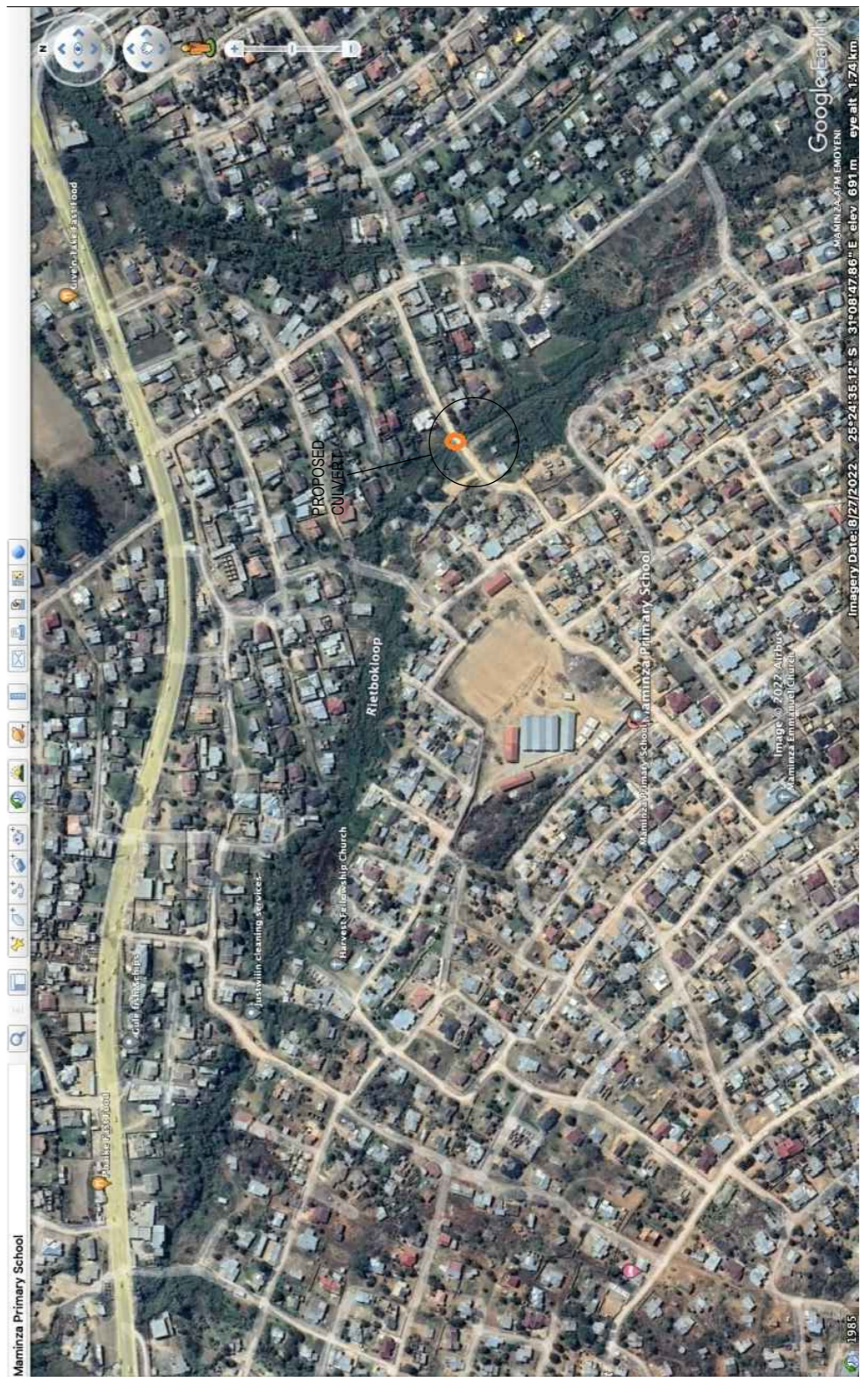
Chainages (km)	Left Edge	Centre Line	Right Edge
0.000	713.401	713.461	713.521
0.020	711.898	712.018	711.848
0.040	710.394	710.514	710.258
0.060	708.891	709.011	708.769
0.080	707.387	707.507	707.265
0.100	705.884	706.004	706.117
0.120	704.380	704.500	704.664
0.140	702.877	702.997	703.269
0.160	701.373	701.493	701.921
0.180	699.861	699.941	700.001
0.200	698.349	698.819	698.986
0.220	696.836	697.296	697.465
0.240	695.323	695.773	695.944
0.260	693.810	694.250	694.423
0.280	692.297	692.727	692.902
0.300	690.784	691.204	691.377
0.320	689.271	690.681	690.854
0.340	687.758	690.158	690.331
0.360	686.245	689.635	689.808
0.380	684.732	689.112	689.285
0.400	683.219	688.589	688.762
0.420	681.706	688.066	688.239
0.440	680.193	687.543	687.716
0.460	678.680	687.020	687.193
0.473	677.167	686.497	686.670

C/L Ground Levels	Design Road Levels
713.401	713.461
711.898	712.018
710.394	710.514
708.891	709.011
707.387	707.507
705.884	706.004
704.380	704.500
702.877	702.997
701.373	701.493
699.861	699.941
698.349	698.819
696.836	697.296
695.323	695.773
693.810	694.250
692.297	692.727
690.784	691.204
689.271	690.681
687.758	690.158
686.245	689.635
684.732	689.112
683.219	688.589
681.706	688.066
680.193	687.543
678.680	687.020
677.167	686.497

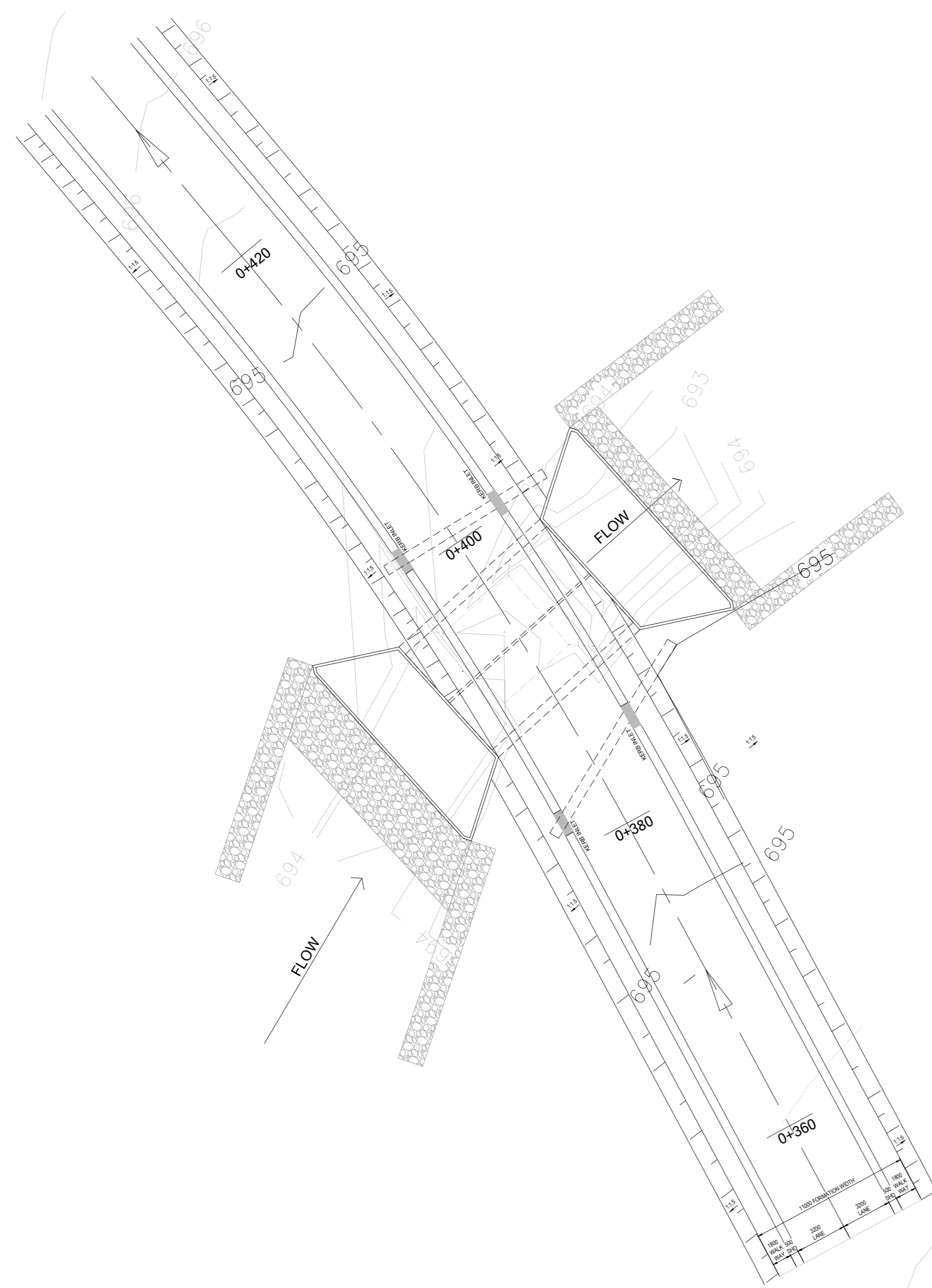
Vertical Curves	Super Elevation	Horizontal Curves
VC=50m	-7.51824%	
VC=65m	-1.39422%	

Vertical Curves	Super Elevation	Horizontal Curves
VC=50m	-7.51824%	
VC=65m	-1.39422%	

LONG SECTION



KEY PLAN

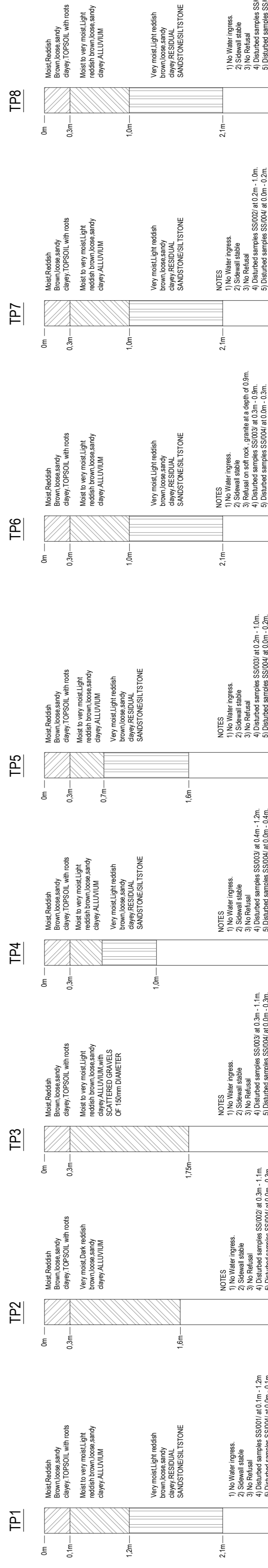


LOCALITY PLAN

BENCH MARK CO-ORDINATE TABLE

NAME	WGS 84 Lo 31		
	Y CO-ORD	X CO-ORD	Z
MS 1	14883.0	2 811 160.00	708.791
MS 2	14811.4	2811 370.00	696.015
MS 3	14869.5	2 811 470.00	712.524
MS 4	14838.8	2 811 800.00	746.811
MS 5	13967.6	2 811 905.00	737.584
MS 6	13820.0	2 811 681.00	730.860

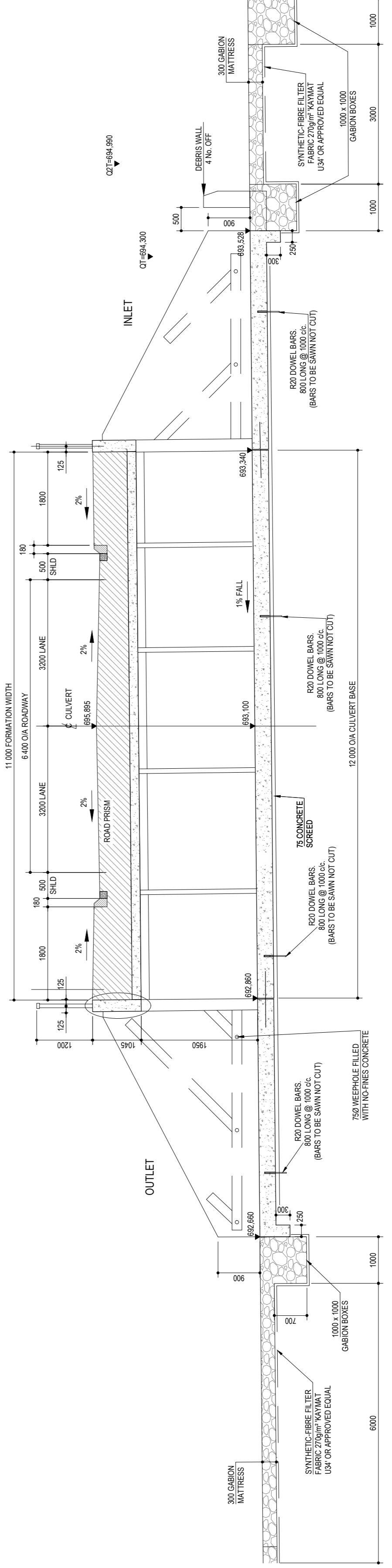
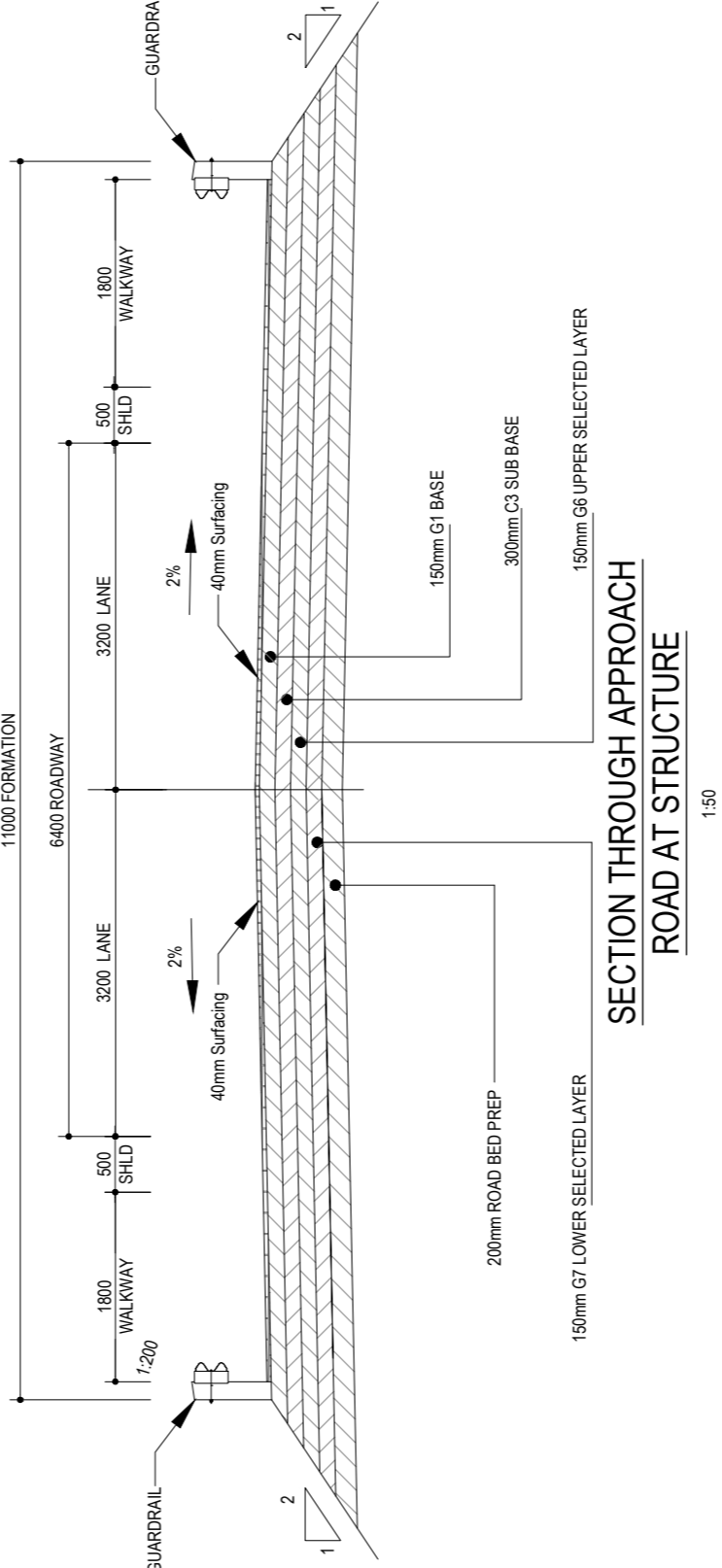
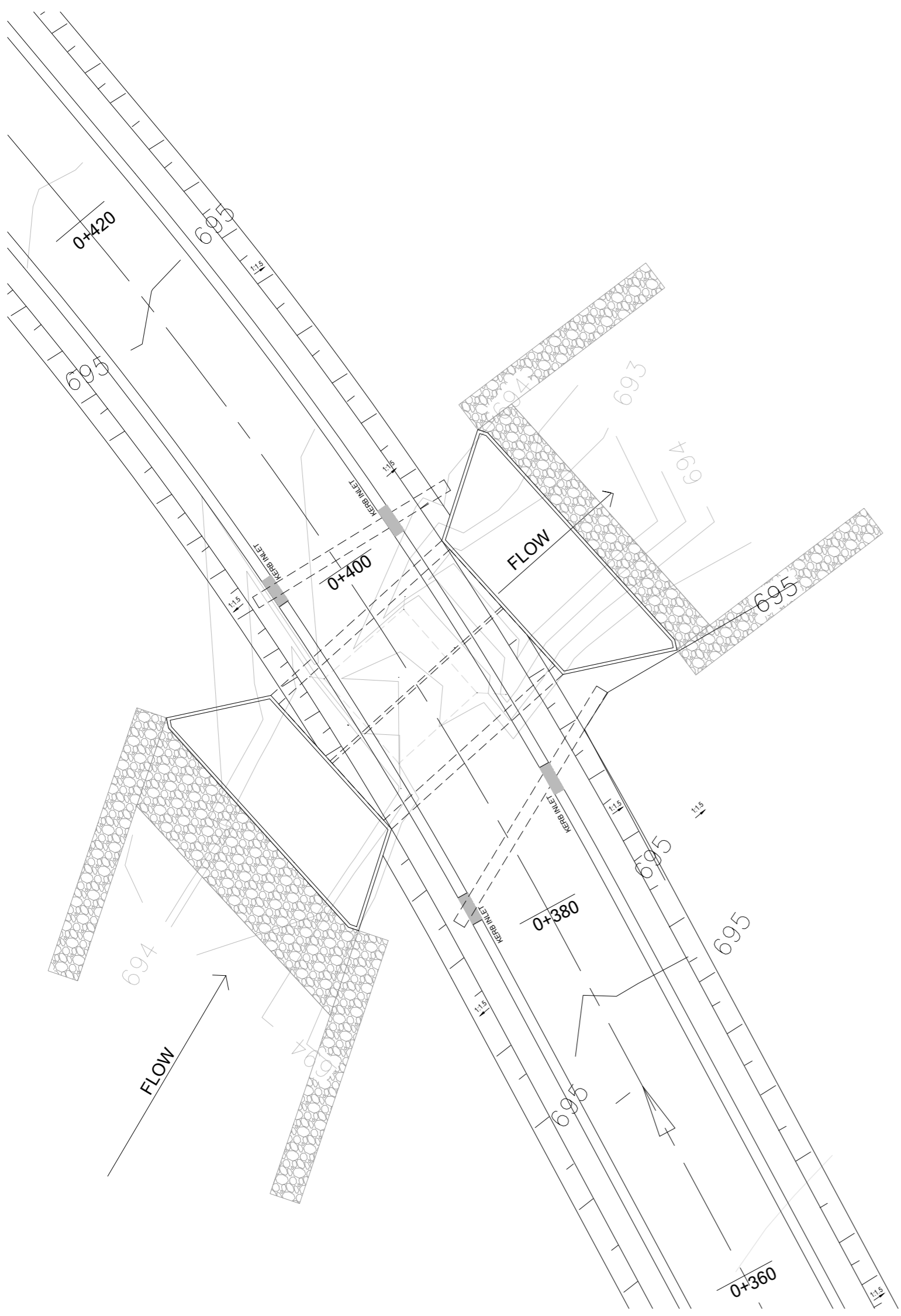
LEVEL DATUM = 0.000 MSL



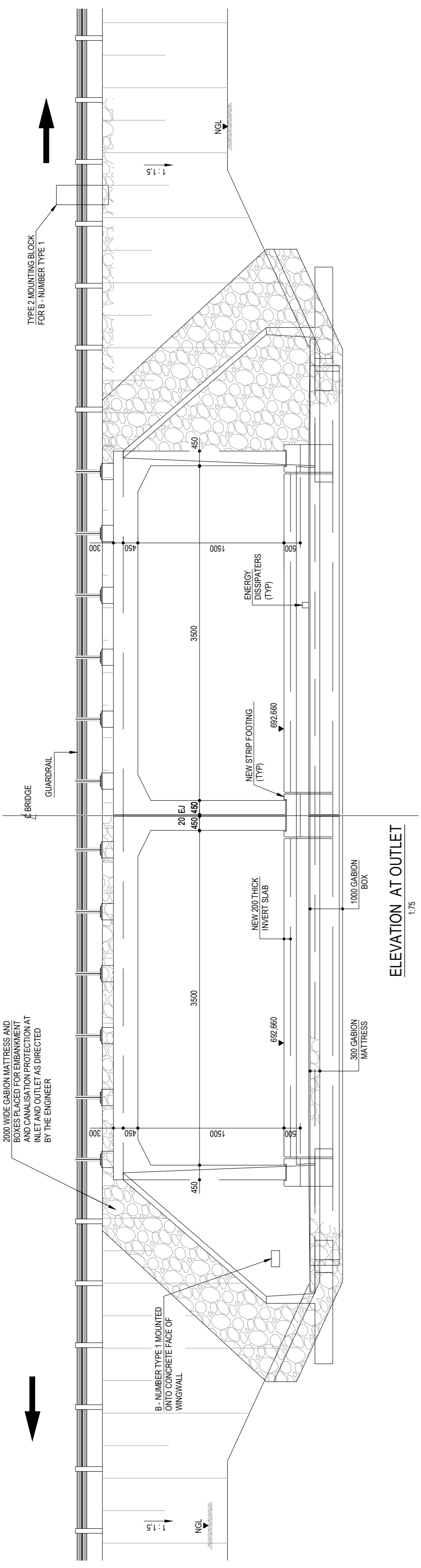
TEST PITS

PREPARED BY: ROME FANLINGS: GEOTECHNICAL
DECEMBER 2022

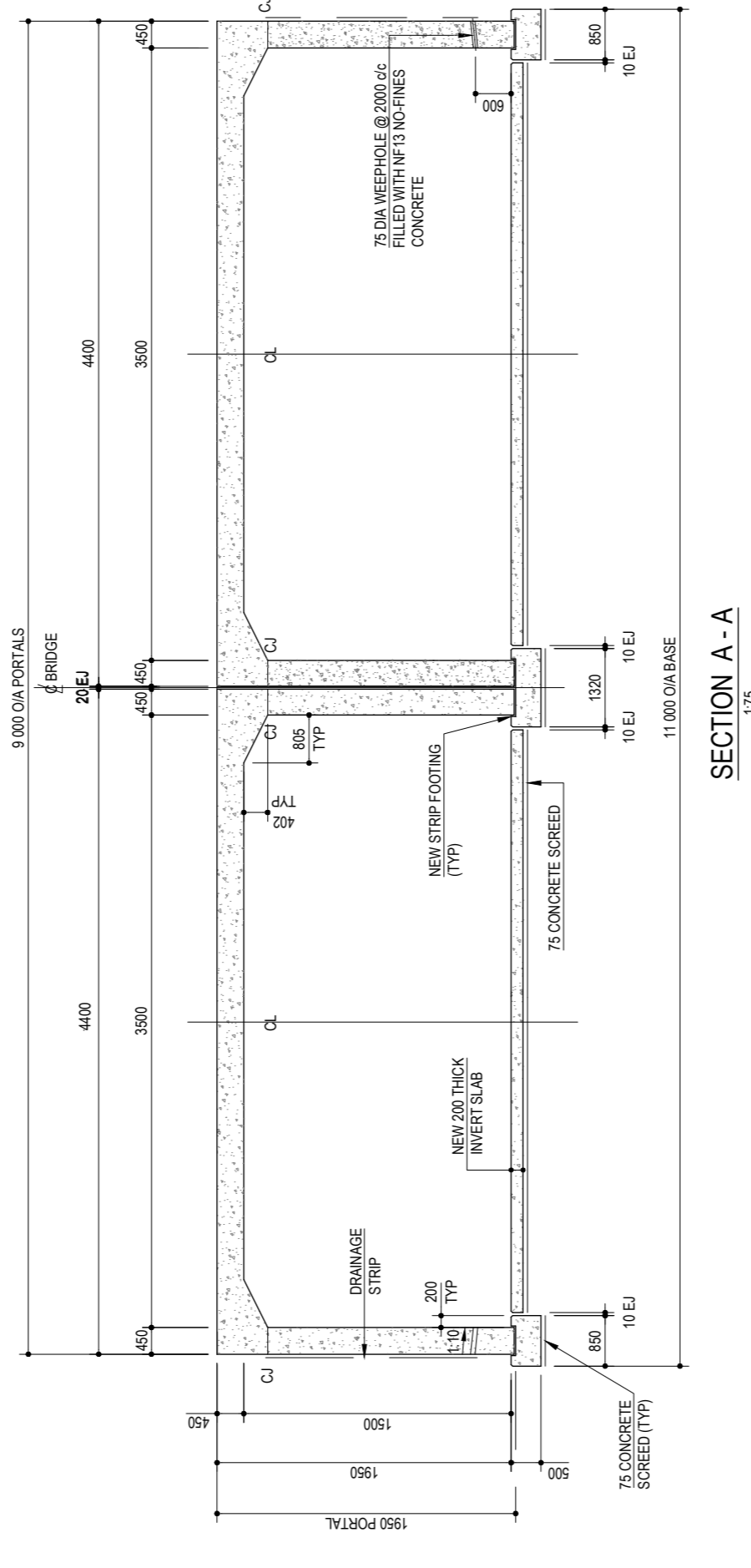
NO.	DATE	ORIGINAL VERSION	REVISION
	A1	28.08.2023	
DESIGNED BY:		APPROVED	
Prof. Reg. No.		For client	
DRAWN BY:		For Client/Engineer	
CHECKED BY:			
ISSUED BY:			
RMASENDEKE 20120270		MBOBELA LOCAL MUNICIPALITY	
N.L.CHAMBEKO		PEROZZ CONSULTING ENGINEERS & PROJECT MANAGERS	
RMASENDEKE		TEL: (013)755-4026 FAX: (013)755-4026	
M.BIZURE		OFFICE: 407.32 BELL STREET, NELSPRUIT 1200	
SCALE: AS SHOWN		PROJECT: UPGRADING OF MAMINDZA VEHICLE BRIDGE WARD 26	
DRAWING NO.		TITLE:	
STR. 001/MAIN		SITE PLAN	
REVISION: A1			



LONGITUDINAL SECTION B-B THROUGH CULVERT
1:50



ELEVATION AT OUTLET
1:15



SECTION A-A
1:15

DESIGN NOTES & DATA

1.0 GENERAL NOTES

- 1.1 DESCRIPTION OF RIVER BRIDGE TO BE 2x DOUBLE CELL REINFORCED CONCRETE BOX TYPE STRUCTURE WITH SPRAED CANTILEVER TYPE WINDOWS.
- 1.2 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.3 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.4 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.5 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.6 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.7 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.8 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.9 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).
- 1.10 THE BRIDGE SHALL BE DESIGNED IN ACCORDANCE WITH THE NATIONAL ROAD DESIGN MANUAL FOR STANDARD BOX CULVERTS BOOK 1 - DESIGN (1981).

2.0 DESIGN LOADINGS

- 2.1 UNIT WEIGHTS OF REINFORCEMENT LOADS
- 2.2 VERTICAL EARTH LOADING FOR BARREL DESIGN
- 2.3 HORIZONTAL EARTH PRESSURE
- 2.4 TRANSVERSE WIND LOADS
- 2.5 RESTRAINT ACTIONS

3.0 DESIGN PARAMETERS

- 3.1 MATERIAL PROPERTIES
- 3.2 QUALITY OF MATERIALS
- 3.3 CONCRETE CLASS AND YOUNG'S MODULUS
- 3.4 REINFORCEMENT
- 3.5 MAXIMUM ALLOWABLE GROUND BEARING PRESSURE

4.0 CONSTRUCTION REQUIREMENTS

- 4.1 FOUNDATION CONDITIONS
- 4.2 SURFACE FINISHES
- 4.3 EXPOSED CORNERS
- 4.4 CONCRETE COVER
- 4.5 BACKFILLING AGAINST OR OVER STRUCTURAL MEMBERS
- 4.6 BARBANKET PROTECTION

5.0 HYDRAULIC DATA

Q (m³/s)	A (m²)	V (m/s)	Fr	h _f (m)
0.1	4.43	0.23	0.0001	0.0001
0.2	4.43	0.45	0.0004	0.0004
0.3	4.43	0.68	0.0009	0.0009
0.4	4.43	0.90	0.0016	0.0016
0.5	4.43	1.13	0.0025	0.0025
0.6	4.43	1.36	0.0036	0.0036
0.7	4.43	1.58	0.0049	0.0049
0.8	4.43	1.81	0.0064	0.0064
0.9	4.43	2.04	0.0081	0.0081
1.0	4.43	2.27	0.0100	0.0100

PROJECT: UPGRADING OF MAMINDZA VEHICLE BRIDGE WARD 26

PEROZZ
PEROZZ CONSULTING ENGINEERS & PROJECT MANAGERS
TEL: (013)755-4026 FAX: (013)755-4026
OFFICE: 407.32 BELL STREET, MELBSPRUIT 1200

MBOMBELA LOCAL MUNICIPALITY
CITY OF MBOMBELA
THE ULTIMATE DESTINATION

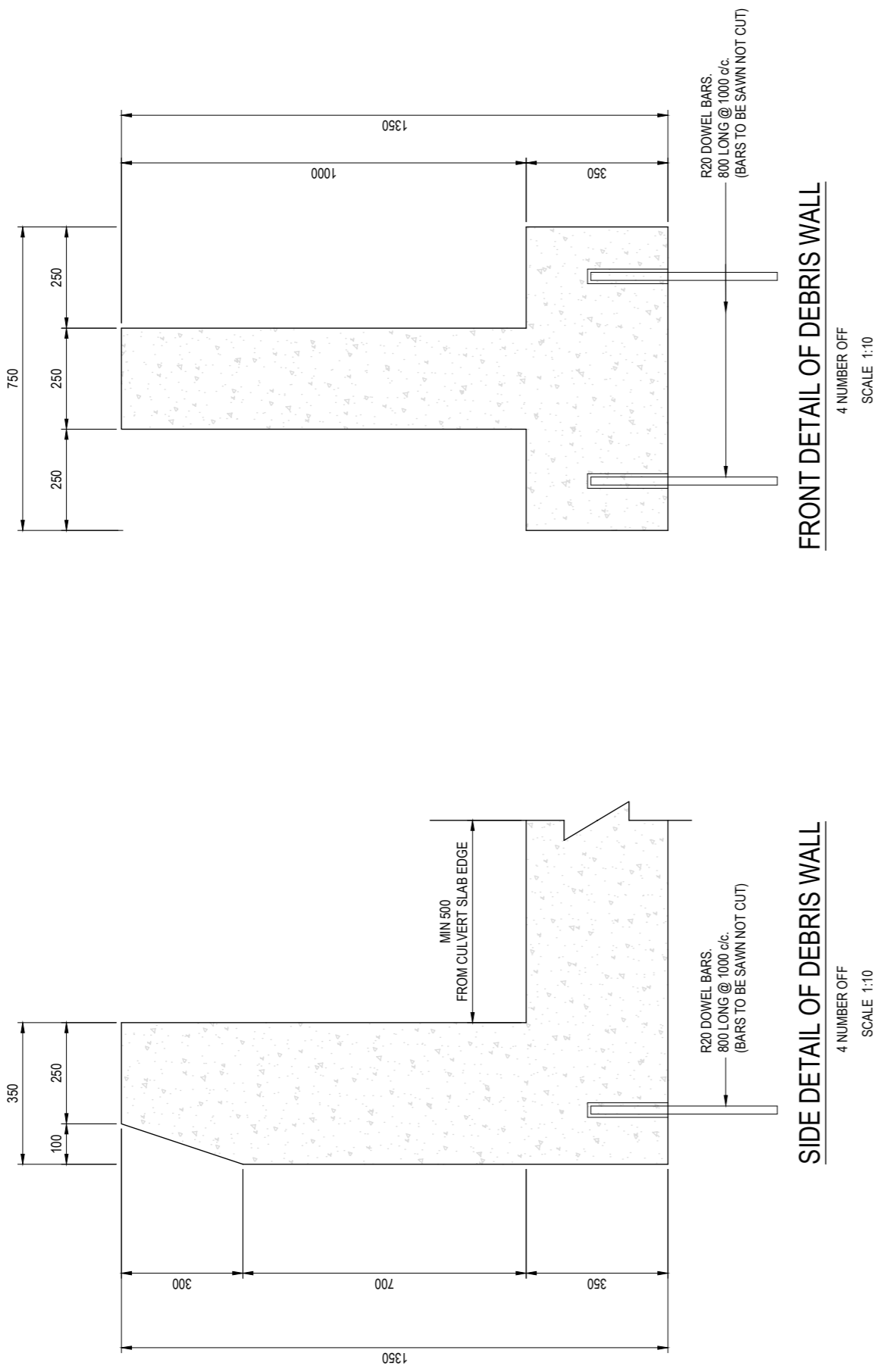
APPROVED
For client
For Consulting Engineer

DESIGNED BY: R.MASENDEKE
Prof. Reg. No. 20120270
N. CHAMBOKO
DRAWN BY: R.MASENDEKE
CHECKED BY: M.BIZURE
ISSUED BY: M.BIZURE

No.	DATE	ORIGINAL VERSION	REVISION
A1	28.08.2023	NLOMBENKO CONSULT. ENG.	

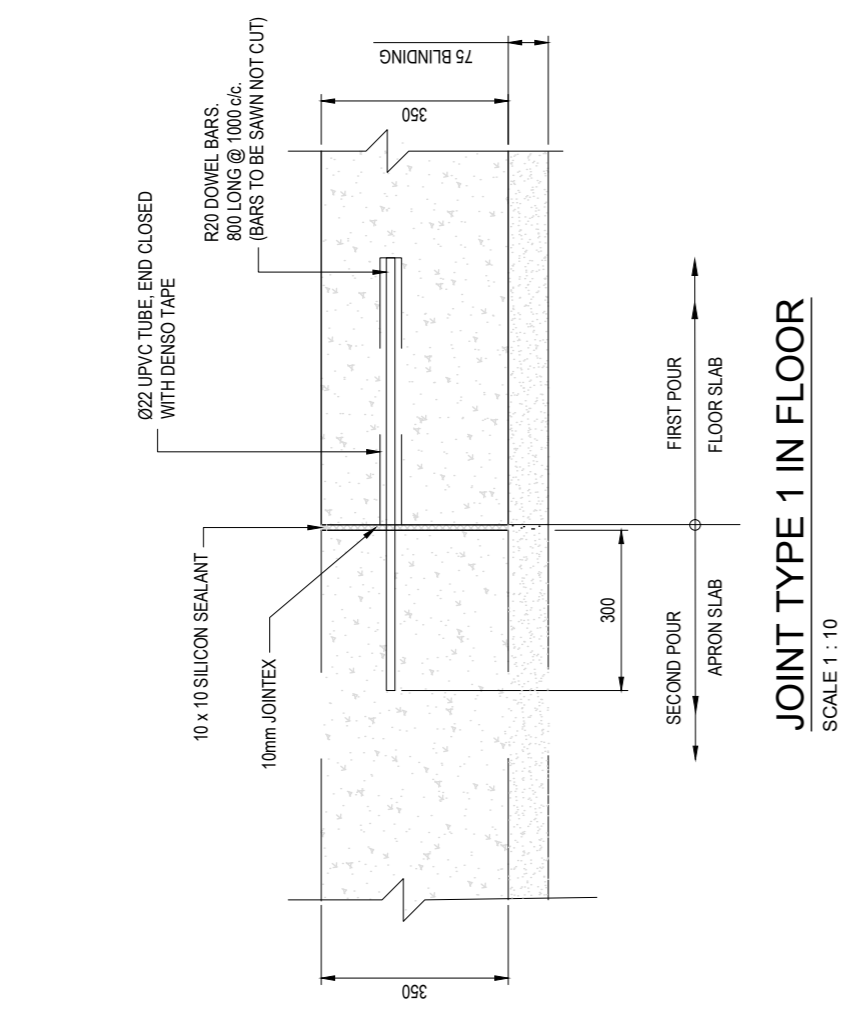
SCALE: AS SHOWN
DRAWING NO. STR 002/AMIN
REVISION: A1

TITLE: GENERAL ARRANGEMENT

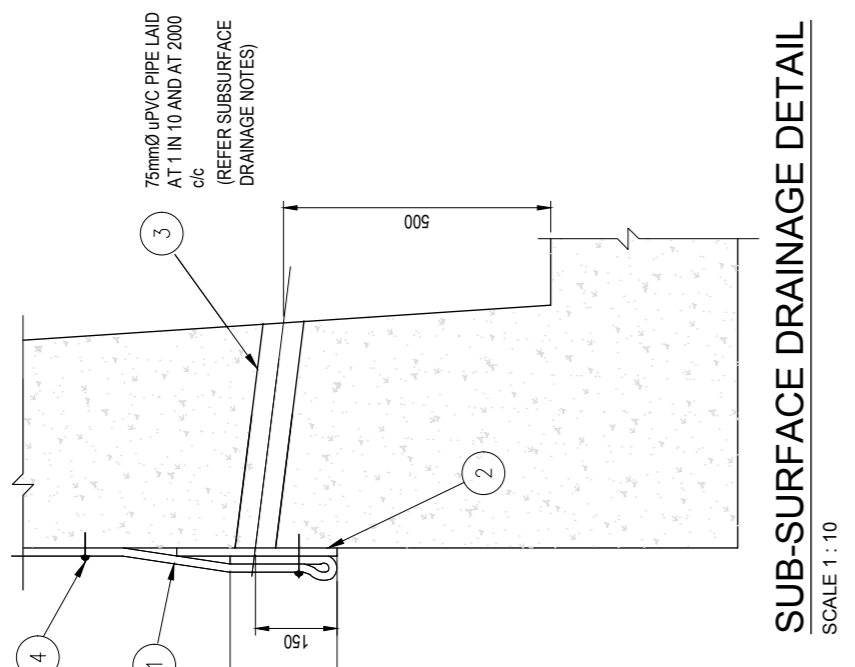


FRONT DETAIL OF DEBRIS WALL
4 NUMBER OF
SCALE 1:10

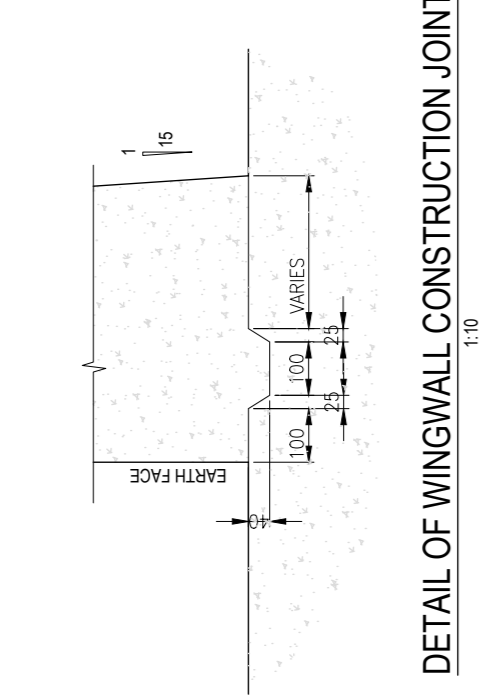
SIDE DETAIL OF DEBRIS WALL
4 NUMBER OF
SCALE 1:10



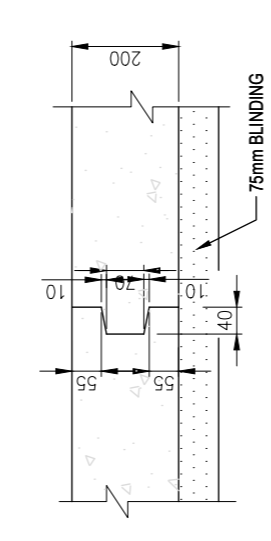
JOINT TYPE 1 IN FLOOR
SCALE 1:10



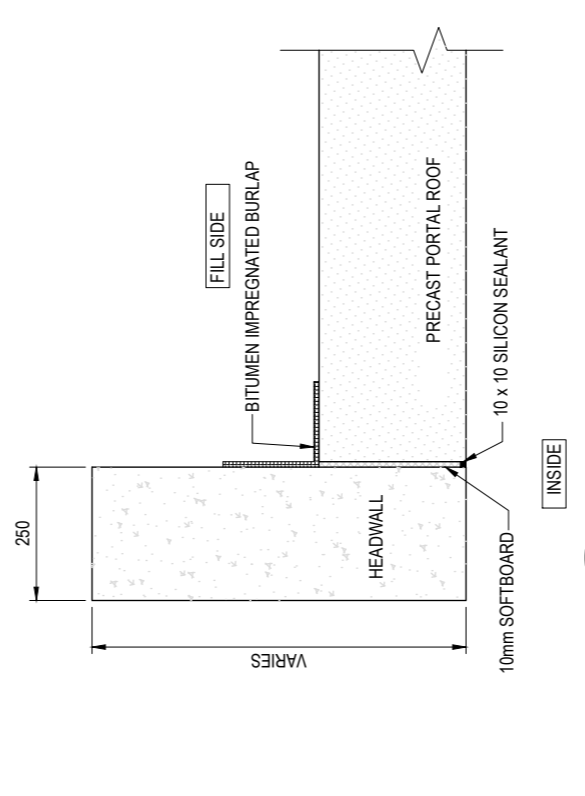
SUB-SURFACE DRAINAGE DETAIL
SCALE 1:10



DETAIL OF WINGWALL CONSTRUCTION JOINT
SCALE 1:10

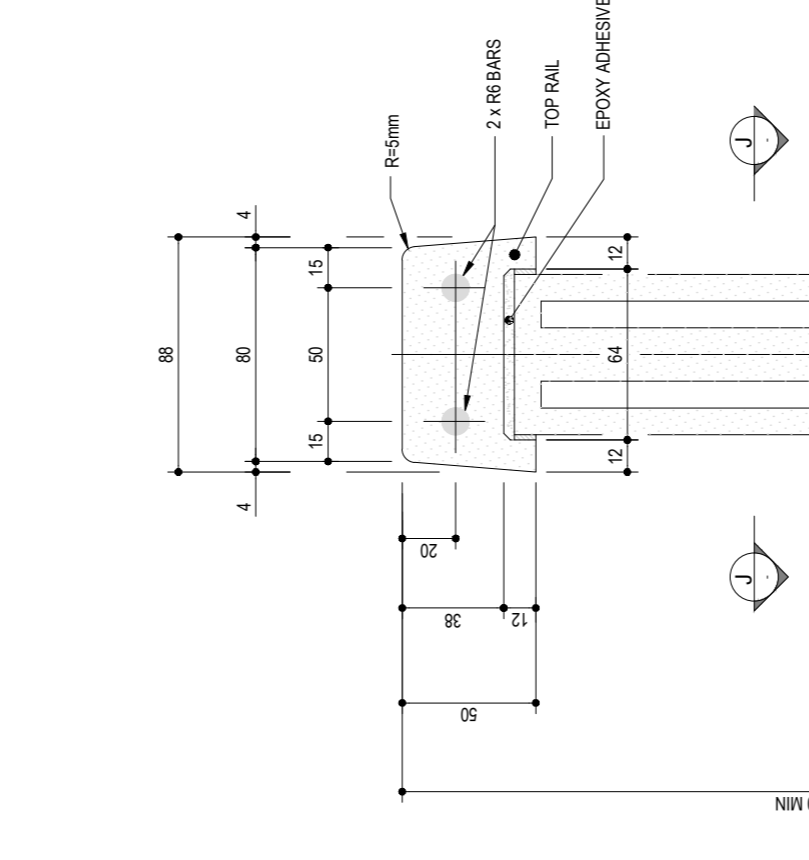


APRON SLAB JOINT TYPE 2 (SECTION)
SCALE 1:10



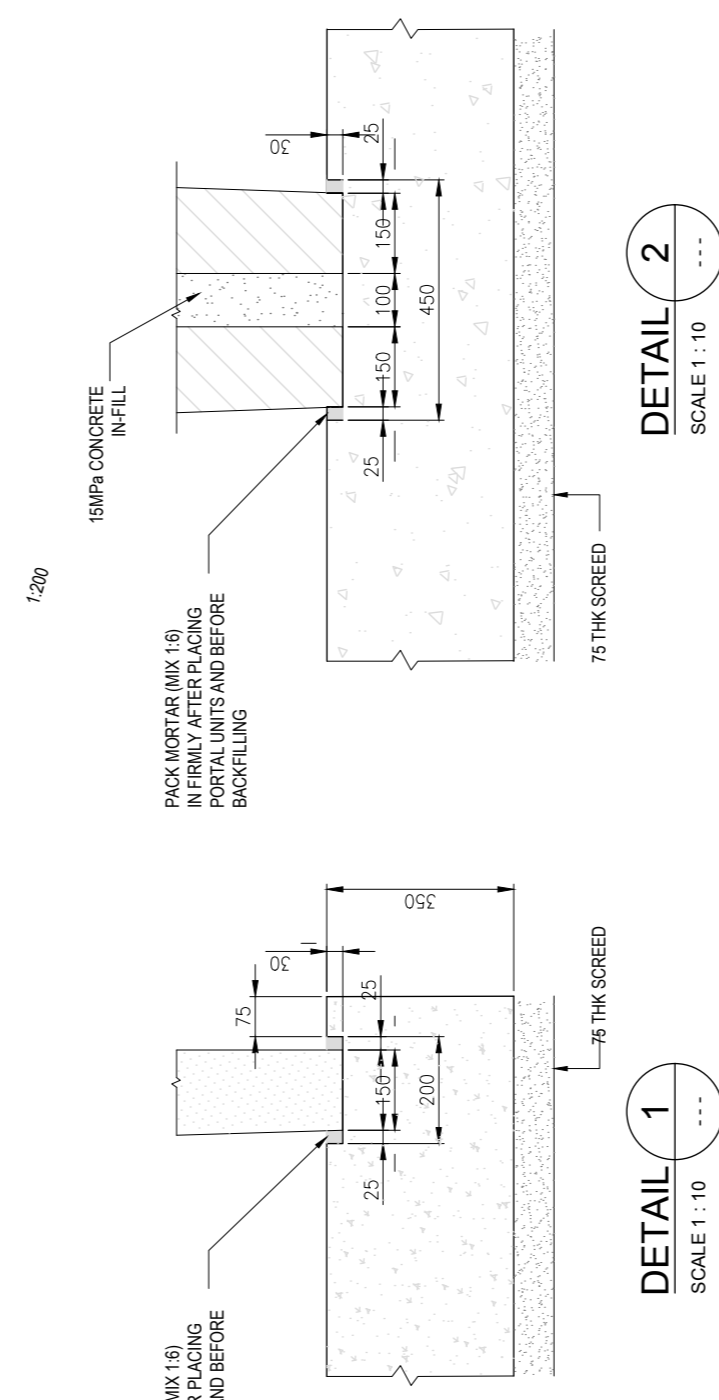
DETAIL 5
SCALE 1:10

JOINT TYPE (J5B) BETWEEN IN-SITU CONCRETE HEADWALL AND PRECAST PORTAL - PLAN
SCALE 1:10



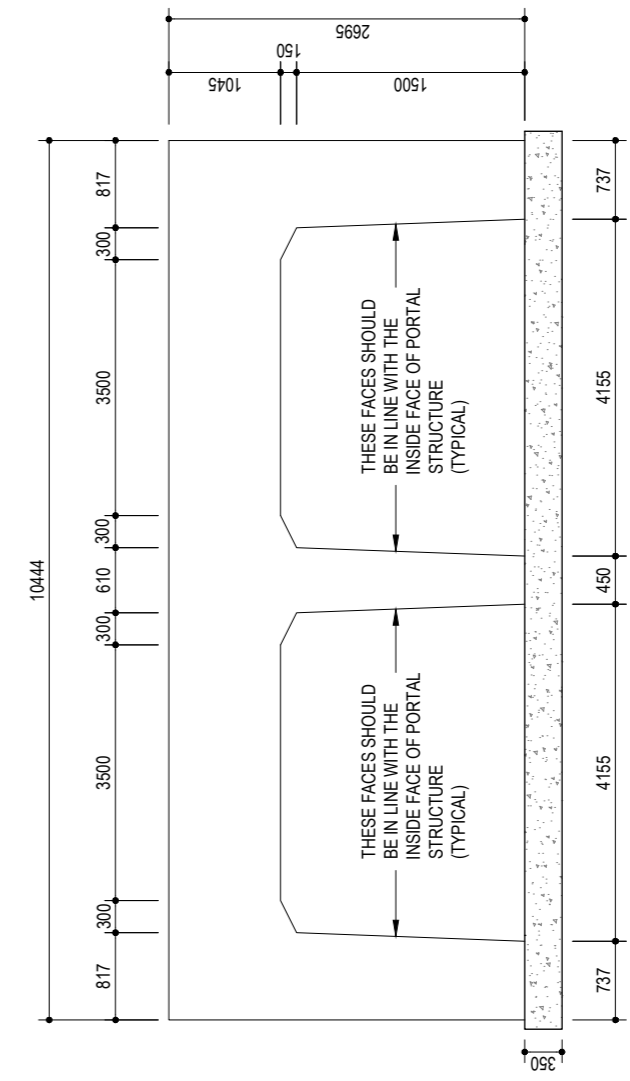
DETAIL 6
SCALE 1:10

JOINT TYPE (J5A) BETWEEN IN-SITU CONCRETE HEADWALL AND PRECAST PORTAL - SECTION
SCALE 1:10

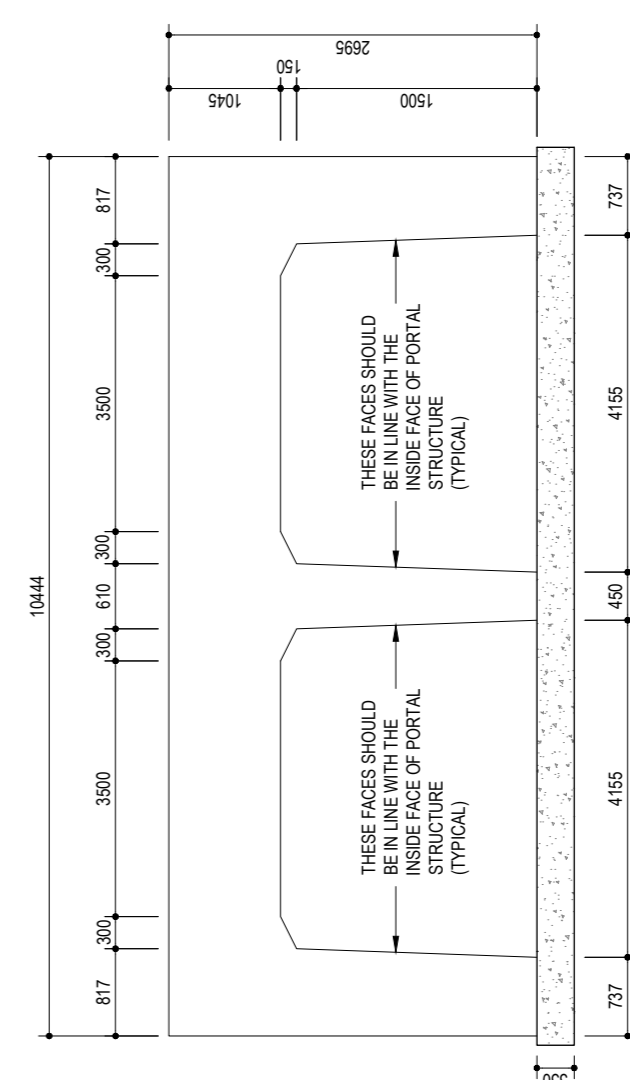


DETAIL 1
SCALE 1:10

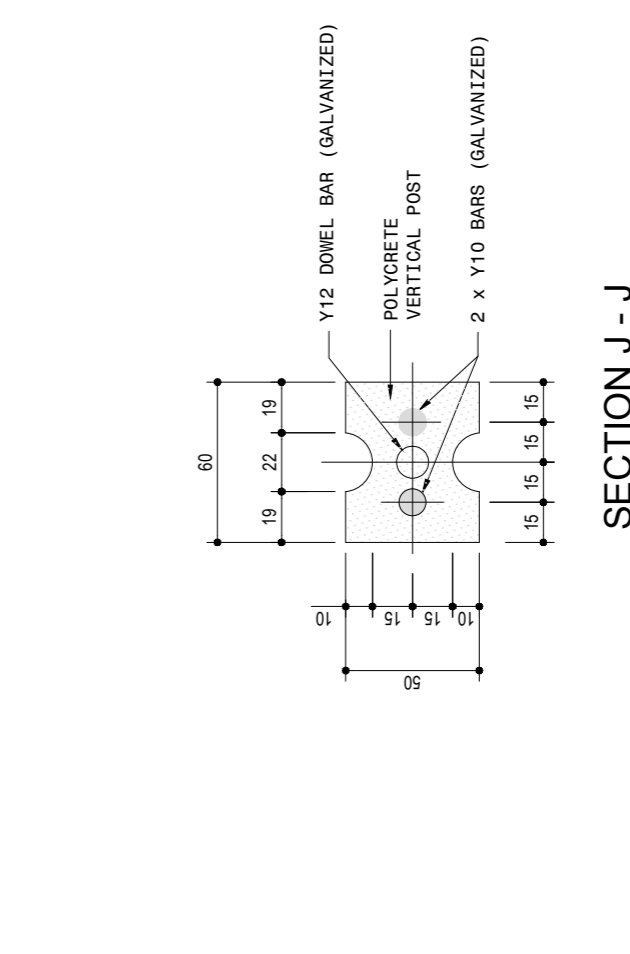
DETAIL 2
SCALE 1:10



HEADWALL 2 DETAIL
SECTION G-G
SCALE 1:30



HEADWALL 1 DETAIL
SECTION H-H
SCALE 1:30



SECTION J - J
SCALE 1:2

- NOTES:**
- CONCRETE CLASSES:
MASS CONCRETE 15/38
BARREL, WINDWALLS & APRON SLABS M32/19
 - FORMWORK:
CLASSES OF FINISH
TYPE OF SURFACE
EXPOSED TO VIEW
TOP OF INVERT SLAB
CLASS U2
CLASS U3
 - ALL VISIBLE SHARP CORNERS (INCLUDED ANGLE $\times 100$) TO BE CHAMFERED 25, 25 UNLESS OTHERWISE INDICATED.

SUB-SURFACE DRAINAGE

LEGEND

- 200mm WIDE FILTER ELEMENTS SECURED TO BACKFACE OF STRUCTURE AT 10' SLOPE - SEE NOTES (a) TO (f).
- 300mm WIDE HORIZONTAL FILTER ELEMENT LOCATED OVER GRANULAR AND SECURED TO BACKFACE OF STRUCTURE.
- 75mm DIA. WEEDPICKER - UPVC PIPES TO SUBSIFY SOIL. WEEDPICKERS TO BE INSTALLED AT 10' SLOPE. WEEDPICKERS ARE TO BE CLEAR BEFORE INSTALLATION OF THE FILTER ELEMENTS COMMENCES.
- CONCRETE WALLS WITH SPERMIOID WADERS TO SECURE THE FILTER ELEMENTS TO THE STRUCTURE AT 100' CENTRES.

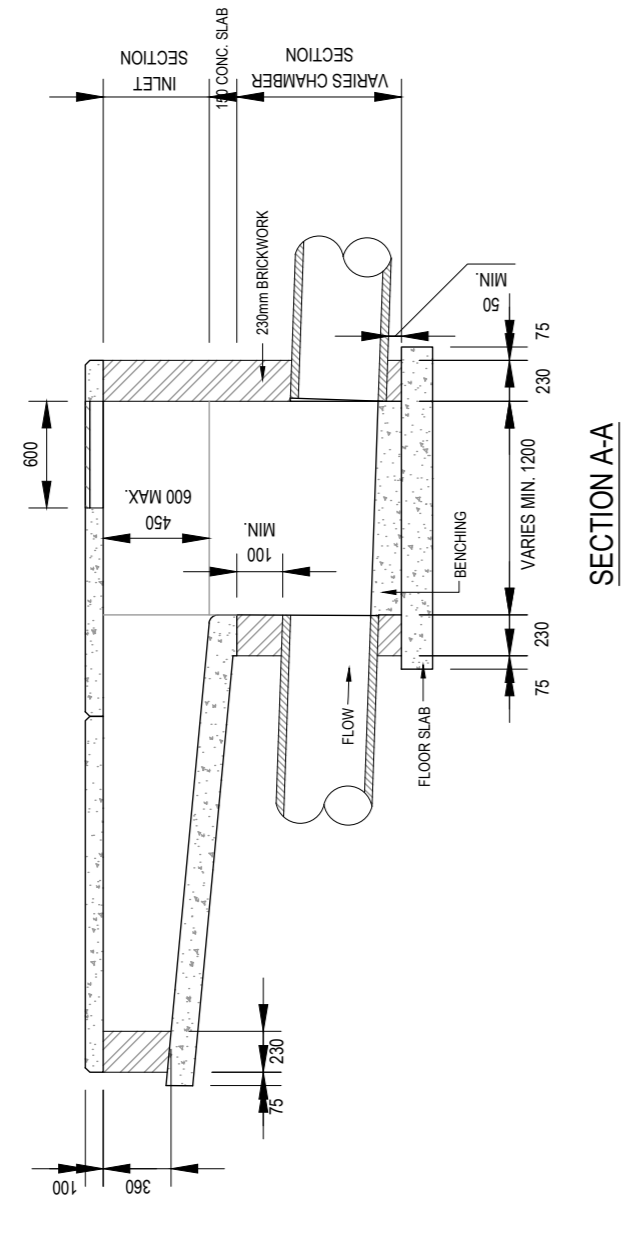
NOTES

- THE FILTER ELEMENT SHALL CONSIST OF A NET/DRAINAGE ELEMENT WITH A 100 MICRON SIZING. THE NET/DRAINAGE ELEMENT SHALL BE SECURED TO THE STRUCTURE AT 100' CENTRES. THE NET/DRAINAGE ELEMENT SHALL BE SECURED TO THE STRUCTURE AT 100' CENTRES.
- THE GEO-TEXTILE SLOTTED SHALL BE RESISTANT TO RESIST THE PASSAGE OF 100 MICRONS OR LARGER SOIL PARTICLES.
- THE GEO-TEXTILE SLOTTED SHALL BE OVERLAPPED NOT LESS THAN 100mm AT THE SEAM AND 250mm STITCHED FOR THE FULL LENGTH OF THE SLOTTED (NOT LESS THAN 3 STITCHES PER CENTIMETER).
- BOTH ENDS OF THE FILTER ELEMENTS SHALL BEAD BACK TO PREVENT INGRESS OF BACKFILL MATERIAL (SEE WEEDPICKER DETAIL).
- THE CONTRACTOR SHALL ENSURE THAT THE FILTER ELEMENTS ARE NOT DAMAGED AND/OR TORN DURING THE USE OF TEMPORARY PROTECTIVE BOARDS BASED PROGRESSIVELY WITH BACKFILL LAYERS IS RECOMMENDED.

FIXING OF POSTS

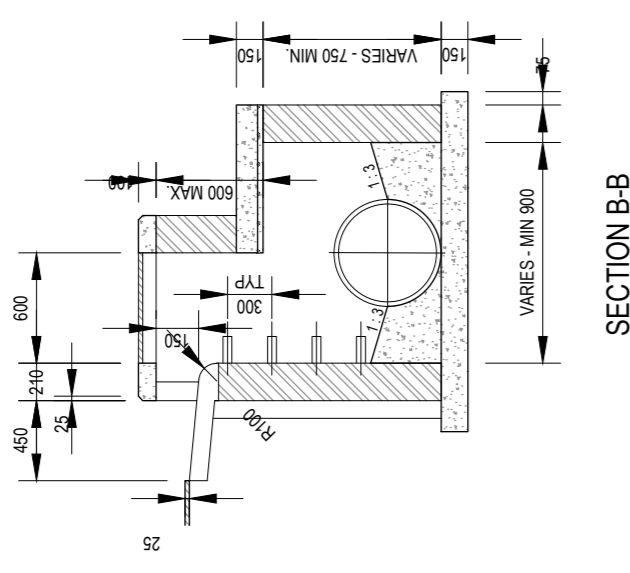
SCALE 1:2

PROJECT: UPGRADING OF MAMINDZA VEHICLE BRIDGE WARD 26		SCALE: AS SHOWN	
DRAWING NO. STR 004/AMN		REVISION: A1	
TITLE: CONCRETE DETAILS SHEET 2			
MOMBELA LOCAL MUNICIPALITY		PEROZZ CONSULTING ENGINEERS & PROJECT MANAGERS	
CITY OF MOMBELA THE ULTIMATE DESTINATION		TEL: (013)755-4026 FAX: (013)755-4026 OFFICE: 407,32 BELL STREET, NELSPRUIT 1200	
APPROVED		For Client	
DESIGNED BY: R.MASENDEKE 20120270 N. CHAMBOKO		FOR CONSULTING ENGINEER	
DRAWN BY: R.MASENDEKE			
CHECKED BY: M.BIZURE			
ISSUED BY:			
ORIGINAL VERSION		REVISION	
NLOCHAMBOKO CONSULT. ENG.			
No. DATE			



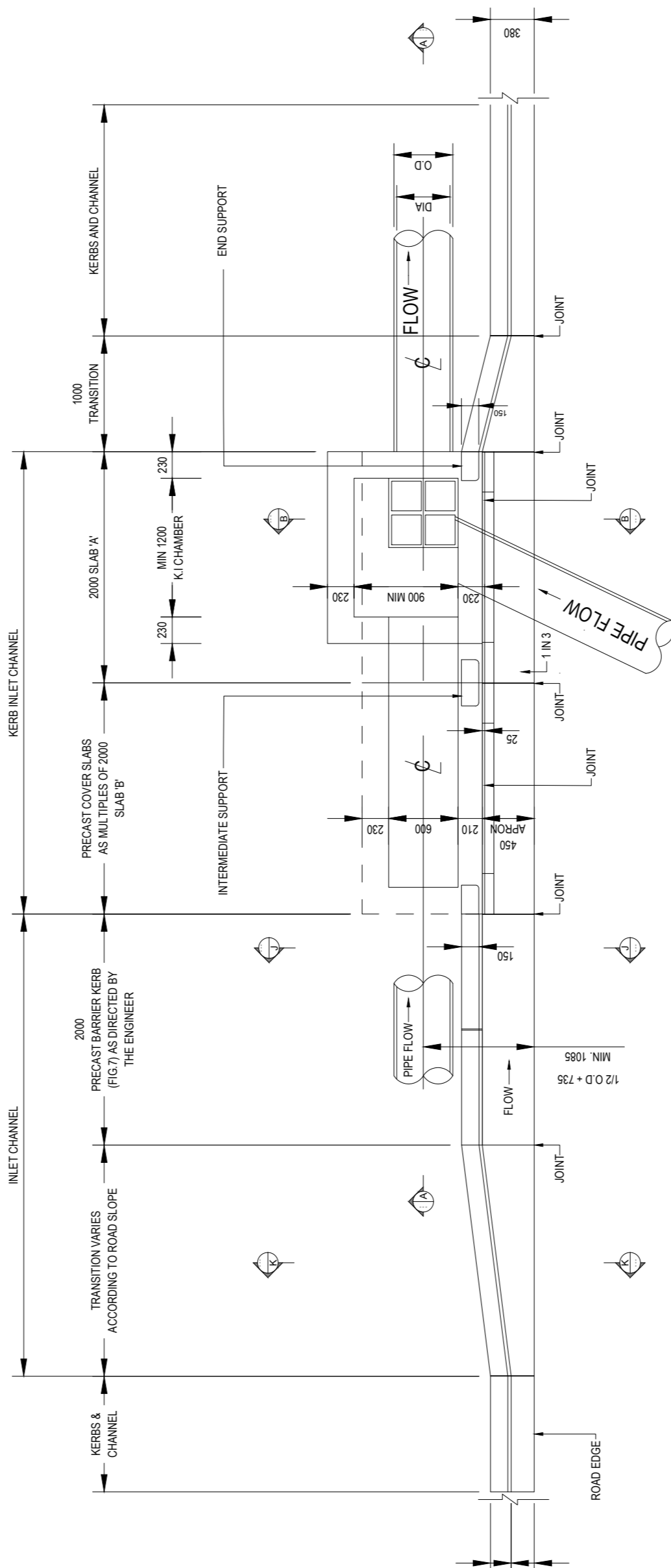
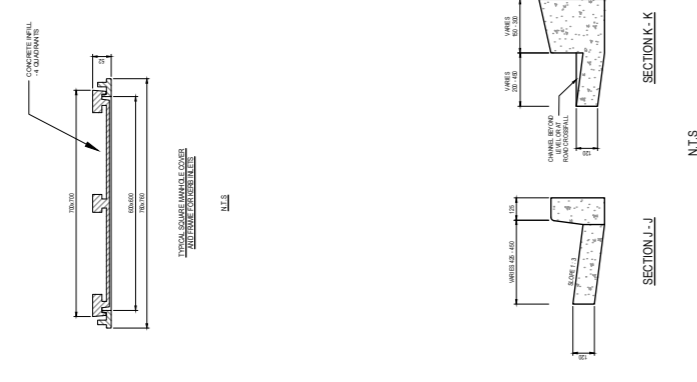
SECTION A-A

NTS

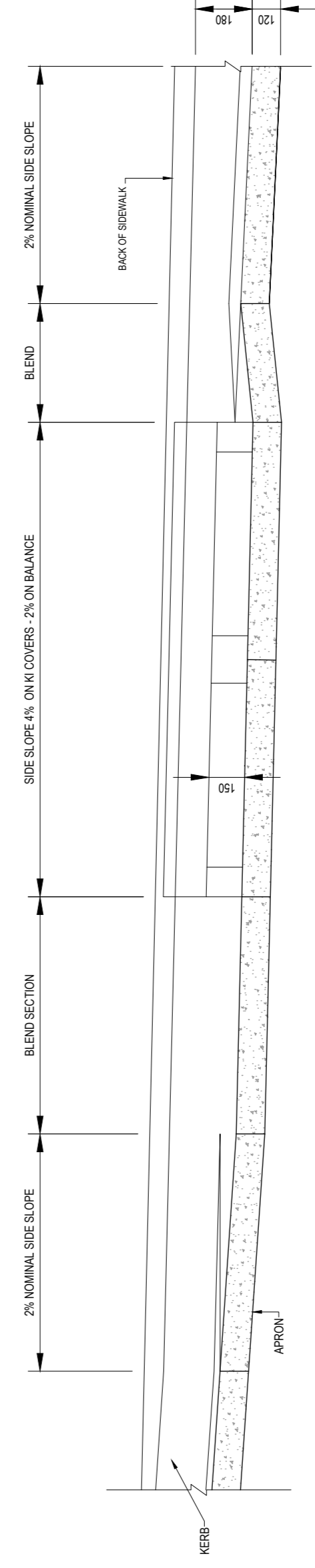


SECTION B-B

NTS

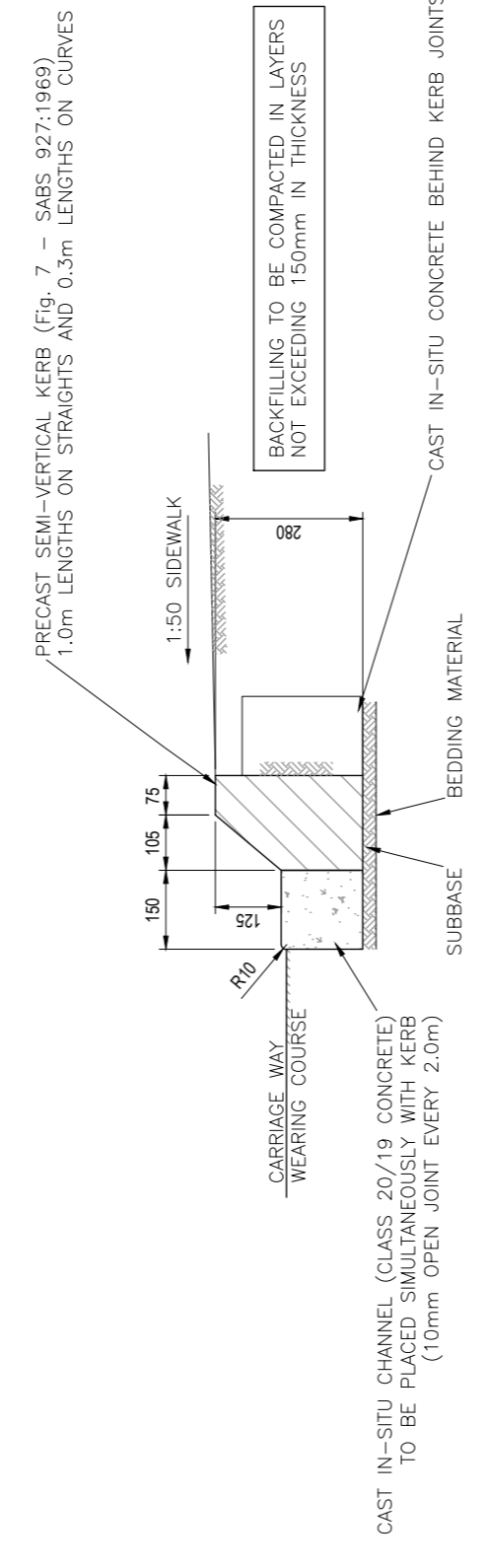


KERB INLET: BASIC PLAN



SECTIONAL ELEVATION ON E-E (NOTE: VERTICAL SCALE EXAGGERATED 2 TO 1)

NTS



SEMI-VERTICAL KERB WITH CHANNEL
(FIG 7 - SABS 927:1969)

SCALE 1:10

- NOTES:
- REFER TO RELATIVE DRAWINGS FOR PL-ELEVATION ON KERB INLET.
 - CONCRETE STRENGTH TO BE AS FOLLOWS:
 - CAST IN-SITU CONCRETE CLASS 20/19
 - CAST IN-SITU BECK SLABS & FOUNDATION CLASS 20/19
 - PRECAST COVER SLABS & OTHER ITEMS CLASS 20/19
 - CAST IN-SITU KERBS, APRONS ETC. - CLASS 20/19
 - ALL FLOORS AND BENCHING TO BE STEEL TROWELED WITH MANHOLE & KERB INLET INTERNAL WIDTHS AND DEPTHS:
 - WIDTH: 225mm PIPES AND MORE - 100mm
 - DEPTH: 100mm
 - SOME MANHOLE SIZES TO BE DETERMINED ON SITE TO PERMIT SUFFICIENT DISCHARGE HEAD TO DEVELOP INCREASED FLOW CAPACITY FOR MANHOLES.
 - BELOW 300mm SPECIAL ENGINEERING DESIGN REQUIRED FOR INCREASED TO 340mm
 - BELOW 300mm SPECIAL ENGINEERING DESIGN REQUIRED FOR INCREASED TO 340mm
 - PROVIDE STEP IRONS WHEN DEPTH > 1200mm
 - PIPES AT INLET AND OUTLET TO BE JOINTED TO SLOPE GREATER OF THE TWO SHOULD BE USED TO DETERMINE THE POSITIONING OF THE JOINTS
 - ALL BRICKS TO BE OF QUALITY FREE TO SABS 27:2007 WITH WATER ABSORPTION < 10% AND EFFLORESCENCE < 10% BE DISCONTINUED TO BE REBUILT ON SPOTS
 - ALL BRICKS TO BE OF QUALITY FREE TO SABS 27:2007 WITH WATER ABSORPTION < 10% AND EFFLORESCENCE < 10% BE DISCONTINUED TO BE REBUILT ON SPOTS
 - ALL BRICKS TO BE OF QUALITY FREE TO SABS 27:2007 WITH WATER ABSORPTION < 10% AND EFFLORESCENCE < 10% BE DISCONTINUED TO BE REBUILT ON SPOTS
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 - ALL BRICKS TO BE OF QUALITY FREE TO SABS 27:2007 WITH WATER ABSORPTION < 10% AND EFFLORESCENCE < 10% BE DISCONTINUED TO BE REBUILT ON SPOTS

PROJECT: UPGRADING OF MAMINDZA VEHICLE BRIDGE WARD 26		SCALE: AS SHOWN	
DRAWING NO. STR 005/AMIN		DRAWING NO. STR 005/AMIN	
TITLE: DRAINAGE DETAILS		REVISION: A1	
 PEROZZ CONSULTING ENGINEERS & PROJECT MANAGERS TEL: (013)755-4026 FAX: (013)755-4026 OFFICE: 407,32 BELL STREET, MELBSPRUIT 1200		MBOMBELA LOCAL MUNICIPALITY CITY OF MBOMBELA THE ULTIMATE DESTINATION	
APPROVED		DESIGNED BY: R.MASENDEKE	
For client		20/20270	
For Consulting Engineer		N. CHAMBEKO	
		CHECKED BY: R.MASENDEKE	
		ISSUED BY: M.BIZURE	
		Client Drawing No.	
		ORIGINAL VERSION	
		REVISION	
No. DATE		REVISION	
A1 26-08-2023		N/CHAMBEKO CONSULT. ENG.	

MEMBER	MARK	TYP AND SIZE	No. OF MEMBERS	No. PER MEMBER	TOTAL LENGTH	SHAPE CODE	A	B	C	D	E/R
FOUNDATION BAR	01	Y12	3	56	168	2350	37	190	2190		
	02	Y12	3	56	168	5650	37	190	5820		
	03	Y12	3	74	222	1150	38	130	1090	140	(310)
	04	Y12	3	56	168	2650	38	280	240	(2190)	
	05	Y12	3	56	168	6000	38	300	240	(6520)	
	06	R10	3	77	231	1300	83	350	200	300	
	21a	Y12	1	4	4	550	38	170	250	(170)	
	21b	Y12	1	4	4	1000	38	175	710	(175)	
	22a	Y12	1	2	2	1350	38	140	1100	(140)	
	22b	Y12	1	2	2	1700	38	140	1450	(145)	
	22c	Y12	1	2	2	2000	38	140	1800	(140)	
	22d	Y12	1	2	2	2350	38	140	2145	(145)	
	22e	Y12	1	2	2	2700	38	140	2490	(145)	
	22f	Y12	1	2	2	3050	38	135	2835	(140)	
	22g	Y12	1	2	2	3400	38	135	3180	(140)	
	22h	Y12	1	2	2	3750	38	135	3530	(140)	
	22i	Y12	1	2	2	4100	38	135	3875	(140)	
	22j	Y12	1	2	2	4450	38	135	4220	(140)	
	22k	Y12	1	2	2	4800	38	135	4565	(140)	
	22l	Y12	1	2	2	5150	38	135	4910	(140)	
	22m	Y12	1	2	2	5500	38	135	5255	(140)	
	22n	Y12	1	2	2	5850	38	135	5600	(140)	
	22o	Y12	1	2	2	6200	38	135	5945	(140)	
	22p	Y12	1	2	2	6550	38	135	6290	(140)	
	22q	Y12	1	2	2	6900	38	135	6635	(140)	
	22r	Y12	1	2	2	7250	38	135	6980	(140)	
	22s	Y12	1	2	2	7600	38	135	7325	(140)	

MEMBER	MARK	TYP AND SIZE	No. OF MEMBERS	No. PER MEMBER	TOTAL LENGTH	SHAPE CODE	A	B	C	D	E/R	
FOUNDATION BAR	23a	Y12	1	2	2	3300	55	305	240	2145	240	(310)
	23b	Y12	1	2	2	3450	55	305	240	2490	240	(310)
	23c	Y12	1	2	2	3600	55	300	240	2935	240	(310)
	23d	Y12	1	2	2	4150	55	300	240	3185	240	(310)
	23e	Y12	1	2	2	4500	55	300	240	3530	240	(310)
	23f	Y12	1	2	2	4850	55	300	240	3875	240	(310)
	23g	Y12	1	2	2	5200	55	300	240	4220	240	(310)
	23h	Y12	1	2	2	5550	55	300	240	4565	240	(310)
	23i	Y12	1	41	41	4850	38	140	4590	(120)		
	23j	Y12	1	41	41	5200	38	140	4935	(120)		
	23k	Y12	1	41	41	5550	38	140	5280	(120)		
	23l	Y12	1	1	1	6700	38	170	6430	(170)		
	23m	Y12	1	1	1	7100	38	170	6780	(170)		
	23n	Y12	1	1	1	7500	38	170	7130	(170)		
	23o	Y12	1	2	2	7900	38	170	7475	(170)		
	23p	Y12	1	2	2	8300	38	170	7820	(170)		
	23q	Y12	1	2	2	8700	38	170	8165	(170)		
	23r	Y12	1	2	2	9100	38	170	8510	(170)		
	23s	Y12	1	2	2	9500	38	170	8855	(170)		
	23t	Y12	1	2	2	9900	38	170	9200	(170)		
	23u	Y12	1	2	2	10300	38	170	9545	(170)		
	23v	Y12	1	2	2	10700	38	170	9890	(170)		
	23w	Y12	1	2	2	11100	38	170	10235	(170)		
	23x	Y12	1	2	2	11500	38	170	10580	(170)		
	23y	Y12	1	2	2	11900	38	170	10925	(170)		
	23z	Y12	1	2	2	12300	38	170	11270	(170)		

MEMBER	MARK	TYP AND SIZE	No. OF MEMBERS	No. PER MEMBER	TOTAL LENGTH	SHAPE CODE	A	B	C	D	E/R	
FOUNDATION BAR	24	Y12	1	2	2	3600	55	305	240	2145	240	(310)
	25	Y12	1	2	2	3750	55	305	240	2490	240	(310)
	26	Y12	1	2	2	3900	55	300	240	2935	240	(310)
	27	Y12	1	2	2	4150	55	300	240	3185	240	(310)
	28	Y12	1	2	2	4500	55	300	240	3530	240	(310)
	29	Y12	1	2	2	4850	55	300	240	3875	240	(310)
	30	Y12	1	2	2	5200	55	300	240	4220	240	(310)
	31	Y12	1	2	2	5550	55	300	240	4565	240	(310)
	32	Y12	1	2	2	5900	55	300	240	4910	240	(310)
	33	Y12	1	2	2	6250	55	300	240	5255	240	(310)
	34	Y12	1	2	2	6600	55	300	240	5600	240	(310)
	35	Y12	1	2	2	6950	55	300	240	5945	240	(310)
	36	Y12	1	2	2	7300	55	300	240	6290	240	(310)
	37	Y12	1	2	2	7650	55	300	240	6635	240	(310)
	38	Y12	1	2	2	8000	55	300	240	6980	240	(310)
	39	Y12	1	2	2	8350	55	300	240	7325	240	(310)
	40	Y12	1	2	2	8700	55	300	240	7670	240	(310)
	41	Y12	1	2	2	9050	55	300	240	8015	240	(310)
	42	Y12	1	2	2	9400	55	300	240	8360	240	(310)
	43	Y12	1	2	2	9750	55	300	240	8705	240	(310)
	44	Y12	1	2	2	10100	55	300	240	9050	240	(310)
	45	Y12	1	2	2	10450	55	300	240	9395	240	(310)
	46	Y12	1	2	2	10800	55	300	240	9740	240	(310)
	47	Y12	1	2	2	11150	55	300	240	10085	240	(310)
	48	Y12	1	2	2	11500	55	300	240	10430	240	(310)
	49	Y12	1	2	2	11850	55	300	240	10775	240	(310)
	50	Y12	1	2	2	12200	55	300	240	11120	240	(310)

MEMBER	MARK	TYP AND SIZE	No. OF MEMBERS	No. PER MEMBER	TOTAL LENGTH	SHAPE CODE	A	B	C	D	E/R	
FOUNDATION BAR	51	Y12	1	2	2	3600	55	305	240	2145	240	(310)
	52	Y12	1	2	2	3750	55	305	240	2490	240	(310)
	53	Y12	1	2	2	3900	55	300	240	2935	240	(310)
	54	Y12	1	2	2	4150	55	300	240	3185	240	(310)
	55	Y12	1	2	2	4500	55	300	240	3530	240	(310)
	56	Y12	1	2	2	4850	55	300	240	3875	240	(310)
	57	Y12	1	2	2	5200	55	300	240	4220	240	(310)
	58	Y12	1	2	2	5550	55	300	240	4565	240	(310)
	59	Y12	1	2	2	5900	55	300	240	4910	240	(310)
	60	Y12	1	2	2	6250	55	300	240	5255	240	(310)
	61	Y12	1	2	2	6600	55	300	240	5600	240	(310)
	62	Y12	1	2	2	6950	55	300	240	5945	240	(310)
	63	Y12	1	2	2	7300	55	300	240	6290	240	(310)
	64	Y12	1	2	2	7650	55	300	240	6635	240	(310)
	65	Y12	1	2	2	8000	55	300	240	6980	240	(310)
	66	Y12	1	2	2	8350	55	300	240	7325	240	(310)
	67	Y12	1	2	2	8700	55	300	240	7670	240	(310)
	68	Y12	1	2	2	9050	55	300	240	8015	240	(310)
	69	Y12	1	2	2	9400	55	300	240	8360	240	(310)
	70	Y12	1	2	2	9750	55	300	240	8705	240	(310)
	71	Y12	1	2	2	10100	55	300	240	9050	240	(310)
	72	Y12	1	2	2	10450	55	300	240	9395	240	(310)
	73	Y12	1	2	2	10800	55	300	240	9740	240	(310)
	74	Y12	1	2	2	11150	55	300	240	10085	240	(310)
	75	Y12	1	2	2	11500	55	300	240	10430	240	(310)
	76	Y12	1	2	2	11850	55	300	240	10775	240	(310)
	77	Y12	1	2	2	12200	55	300	240	11120	240	(310)

MEMBER	MARK	TYP AND SIZE	No. OF MEMBERS	No. PER MEMBER	TOTAL LENGTH	SHAPE CODE	A	B	C	D	E/R	
FOUNDATION BAR	78	Y12	1	2	2	3600	55	305	240	2145	240	(310)
	79	Y12	1	2	2	3750	55	305	240	2490	240	(310)
	80	Y12	1	2	2	3900	55	300	240	2935	240	(310)
	81	Y12	1	2	2	4150	55	300	240	3185	240	(310)
	82	Y12	1	2	2	4500	55	300	240	3530	240	(310)
	83	Y12	1	2	2	4850	55	300	240	3875	240	(310)
	84	Y12	1	2	2	5200	55	300	240	4220	240	(310)
	85	Y12	1	2	2	5550	55	300	240	4565	240	(310)
	86	Y12	1	2	2	5900	55	300	240	4910	240	(310)
	87	Y12	1	2	2	6250	55	300	240	5255	240	(310)
	88	Y12	1	2	2	6600	55	300	240	5600	240	(310)
	89	Y12	1	2	2	6950	55	300	240	5945	240	(310)
	90	Y12	1	2	2	7300	55	300	240	6290	240	(310)
	91	Y12	1	2	2	7650	55	300	240	6635	240	(310)
	92	Y12	1	2	2	8000	55	300	240	6980	240	

MEMBER	MARK	TYPE AND SIZE	No. OF MEMBERS	LENGTH	SHAPE CODE	A	B	C	D	E/R
MEMBER 1	100	Y12	2	10	1400	37	250	(1150)		
	101	Y12	2	4	2250	37	250	(1865)		
	102	Y12	2	5	1250	99K	245	35	1025	
	103	Y12	2	4	2100	99K	245	35	1875	
	104a	Y12	2	1	1150	99K	245	35	925	
	104b	Y12	2	1	1250	99K	245	35	1010	
	104c	Y12	2	1	1350	99K	245	35	1095	
	104d	Y12	2	1	1400	99K	245	35	1175	
	104e	Y12	2	1	1500	99K	245	35	1260	
	104f	Y12	2	1	1600	99K	245	35	1340	
	104g	Y12	2	1	1650	99K	245	35	1425	
	104h	Y12	2	1	1750	99K	245	35	1510	
	104i	Y12	2	1	1850	99K	245	35	1590	
	104j	Y12	2	1	1900	99K	245	35	1675	
	104k	Y12	2	1	2000	99K	245	35	1760	
	104l	Y12	2	1	2100	99K	245	35	1840	
	104m	Y12	2	1	2200	99K	245	35	1920	
	104n	Y12	2	1	2300	99K	245	35	2000	
	104o	Y12	2	1	2400	99K	245	35	2175	
	104p	Y12	2	1	2500	99K	245	35	2260	
	104q	Y12	2	1	2600	99K	245	35	2340	
	104r	Y12	2	1	2650	99K	245	35	2425	

MEMBER	MARK	TYPE AND SIZE	No. OF MEMBERS	LENGTH	SHAPE CODE	A	B	C	D	E/R
MEMBER 1	105a	Y12	2	1	1150	37	250	(930)		
	105b	Y12	2	1	1250	37	250	(1015)		
	105c	Y12	2	1	1350	37	250	(1095)		
	105d	Y12	2	1	1400	37	250	(1180)		
	105e	Y12	2	1	1500	37	250	(1260)		
	105f	Y12	2	1	1600	37	250	(1345)		
	105g	Y12	2	1	1650	37	250	(1430)		
	105h	Y12	2	1	1750	37	250	(1515)		
	105i	Y12	2	1	1850	37	250	(1595)		
	105j	Y12	2	1	1900	37	250	(1680)		
	105k	Y12	2	1	2000	37	250	(1765)		
	105l	Y12	2	1	2100	37	250	(1845)		
	105m	Y12	2	1	2150	37	250	(1930)		
	105n	Y12	2	1	2250	37	250	(2010)		
	105o	Y12	2	1	2350	37	250	(2095)		
	105p	Y12	2	1	2400	37	250	(2180)		
	105q	Y12	2	1	2500	37	250	(2265)		
	105r	Y12	2	1	2600	37	250	(2345)		
	105s	Y12	2	1	2650	37	250	(2430)		
	105t	Y12	2	1	2700	37	250	(2515)		
	105u	Y12	2	1	2800	37	250	(2600)		
	105v	Y12	2	1	2900	37	250	(2685)		
	105w	Y12	2	1	3000	37	250	(2770)		
	105x	Y12	2	1	3100	37	250	(2855)		
	105y	Y12	2	1	3200	37	250	(2940)		
	105z	Y12	2	1	3300	37	250	(3025)		
	105aa	Y12	2	1	3400	37	250	(3110)		
	105ab	Y12	2	1	3500	37	250	(3195)		
	105ac	Y12	2	1	3600	37	250	(3280)		
	105ad	Y12	2	1	3700	37	250	(3365)		
	105ae	Y12	2	1	3800	37	250	(3450)		
	105af	Y12	2	1	3900	37	250	(3535)		
	105ag	Y12	2	1	4000	37	250	(3620)		
	105ah	Y12	2	1	4100	37	250	(3705)		
	105ai	Y12	2	1	4200	37	250	(3790)		
	105aj	Y12	2	1	4300	37	250	(3875)		
	105ak	Y12	2	1	4400	37	250	(3960)		
	105al	Y12	2	1	4500	37	250	(4045)		
	105am	Y12	2	1	4600	37	250	(4130)		
	105an	Y12	2	1	4700	37	250	(4215)		
	105ao	Y12	2	1	4800	37	250	(4300)		
	105ap	Y12	2	1	4900	37	250	(4385)		
	105aq	Y12	2	1	5000	37	250	(4470)		
	105ar	Y12	2	1	5100	37	250	(4555)		
	105as	Y12	2	1	5200	37	250	(4640)		
	105at	Y12	2	1	5300	37	250	(4725)		
	105au	Y12	2	1	5400	37	250	(4810)		
	105av	Y12	2	1	5500	37	250	(4895)		
	105aw	Y12	2	1	5600	37	250	(4980)		
	105ax	Y12	2	1	5700	37	250	(5065)		
	105ay	Y12	2	1	5800	37	250	(5150)		
	105az	Y12	2	1	5900	37	250	(5235)		
	105ba	Y12	2	1	6000	37	250	(5320)		
	105bb	Y12	2	1	6100	37	250	(5405)		
	105bc	Y12	2	1	6200	37	250	(5490)		
	105bd	Y12	2	1	6300	37	250	(5575)		
	105be	Y12	2	1	6400	37	250	(5660)		
	105bf	Y12	2	1	6500	37	250	(5745)		
	105bg	Y12	2	1	6600	37	250	(5830)		
	105bh	Y12	2	1	6700	37	250	(5915)		
	105bi	Y12	2	1	6800	37	250	(6000)		
	105bj	Y12	2	1	6900	37	250	(6085)		
	105bk	Y12	2	1	7000	37	250	(6170)		
	105bl	Y12	2	1	7100	37	250	(6255)		
	105bm	Y12	2	1	7200	37	250	(6340)		
	105bn	Y12	2	1	7300	37	250	(6425)		
	105bo	Y12	2	1	7400	37	250	(6510)		
	105bp	Y12	2	1	7500	37	250	(6595)		
	105bq	Y12	2	1	7600	37	250	(6680)		
	105br	Y12	2	1	7700	37	250	(6765)		
	105bs	Y12	2	1	7800	37	250	(6850)		
	105bt	Y12	2	1	7900	37	250	(6935)		
	105bu	Y12	2	1	8000	37	250	(7020)		
	105bv	Y12	2	1	8100	37	250	(7105)		
	105bv	Y12	2	1	8200	37	250	(7190)		
	105bv	Y12	2	1	8300	37	250	(7275)		
	105bv	Y12	2	1	8400	37	250	(7360)		
	105bv	Y12	2	1	8500	37	250	(7445)		
	105bv	Y12	2	1	8600	37	250	(7530)		
	105bv	Y12	2	1	8700	37	250	(7615)		
	105bv	Y12	2	1	8800	37	250	(7700)		
	105bv	Y12	2	1	8900	37	250	(7785)		
	105bv	Y12	2	1	9000	37	250	(7870)		
	105bv	Y12	2	1	9100	37	250	(7955)		
	105bv	Y12	2	1	9200	37	250	(8040)		
	105bv	Y12	2	1	9300	37	250	(8125)		
	105bv	Y12	2	1	9400	37	250	(8210)		
	105bv	Y12	2	1	9500	37	250	(8295)		
	105bv	Y12	2	1	9600	37	250	(8380)		
	105bv	Y12	2	1	9700	37	250	(8465)		
	105bv	Y12	2	1	9800	37	250	(8550)		
	105bv	Y12	2	1	9900	37	250	(8635)		
	105bv	Y12	2	1	10000	37	250	(8720)		

MEMBER	MARK	TYPE AND SIZE	No. OF MEMBERS	LENGTH	SHAPE CODE	A	B	C	D	E/R	
MEMBER 1	116	R10	2	1	2	550	85	140	255	60	(145)
	117	R10	2	4	8	500	85	145	215	60	(140)

MEMBER	MARK	TYPE AND SIZE	No. OF MEMBERS	LENGTH	SHAPE CODE	A	B	C	D	E/R
MEMBER 1	130	Y12	2	5	10	140	37	250	(1150)	
	131	Y12	2	4	8	2250	37	250	(1865)	
	132	Y12	2	5	10	1250	99K	245	35	1025
	133	Y12	2	4	8	2100	99K	245	35	1875
	134a	Y12	2	1	2	1550	37	250	(1030)	
	134b	Y12	2	1	2	1550	37	250	(1125)	
	134c	Y12	2	1	2	1450	37	250	(1215)	
	134d	Y12	2	1	2	1550	37	250	(1310)	
	134e	Y12	2	1	2	1650	37	250	(1405)	
	134f	Y12	2	1	2	1750	37	250	(1495)	
	134g	Y12	2	1	2	1850	37	250	(1590)	
	134h	Y12	2	1	2	1950	37	250	(1685)	
	134i	Y12	2	1	2	2000	37	250	(1775)	
	134j	Y12	2	1	2	2100	37	250	(1870)	
	134k	Y12	2	1	2	2200	37	250	(1965)	
	134l	Y12	2	1	2	2300	37	250	(2065)	
	134m	Y12	2	1	2	2400	37	250	(2150)	
	134n	Y12	2	1	2	2500	37	250	(2245)	
	134o	Y12	2	1	2	2600	37	250	(2335)	
	134p	Y12	2	1	2	2650	37	250	(2430)	
	134q	Y12	2	1	2	2700	37	250	(2520)	
	134r	Y12	2	1	2	2800	37	250	(2610)	
	134s	Y12	2	1	2	2900	37	250	(2700)	
	134t	Y12	2	1	2	3000	37	250	(2790)	
	134u	Y12	2	1	2	3100	37	250	(2880)	
	134v	Y12	2	1	2	3200	37	250	(2970)	
	134w	Y12	2	1	2	3300	37	250	(3060)	
	134x	Y12	2	1	2	3400	37	250	(3150)	
	134y	Y12	2	1	2	3500	37	250	(3240)	
	134z	Y12	2	1	2	3600	37	250	(3330)	
	135a	Y12	2	1						