VOLUME 2

BLOUBERG MUNICIPALITY

CONTRACT NO . BM07/23/24

FOR

REHABILITATION OF ALLDAY INTERNAL STREETS AND STORMWATER CONTROL - PHASE 1

VOLUME 2

TENDER DRAWINGS

JULY 2024

ISSUED BY:

BLOUBERG MUNICIPALITY
2ND BUILDING
MOGWADI/SENWABARAWNA ROAD
SENWABARWANA
0790

PREPARED BY:

SIZEYA CONSULTING ENGINEERS
OFFICE NO. 14
PRIVATE BAG X9676, POSTNET SUITE 141
POLOKWANE, 0700
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EMAIL : info@sizeya.co.za

No	DATE	DESCRIPTION	ISSUED BY
00	03/2024	INITIAL ISSUE	FIM

		SIGNATURE
DESIGNED BY	R.R. RAVELE	
DRAWN BY	F.I. MARAGENI	
CHECKED BY	H.L. THARAGA	

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CONSULTING ENGINEER — DATE

PROFESSIONAL REGISTRATION No.

EMPLOYER'S PROJECT MANAGER — DATE

CONTRACT No.:	BM06/23/24
PROJECT TITLE:	APPOINTMENT AS CIVIL ENGINEERING CONSULTANTS FOR REHABILITATION OF ALLDAY INTERNAL STREETS AND STORMWATER CONTROL
DRAWING TITLE:	LOCALITY PLAN

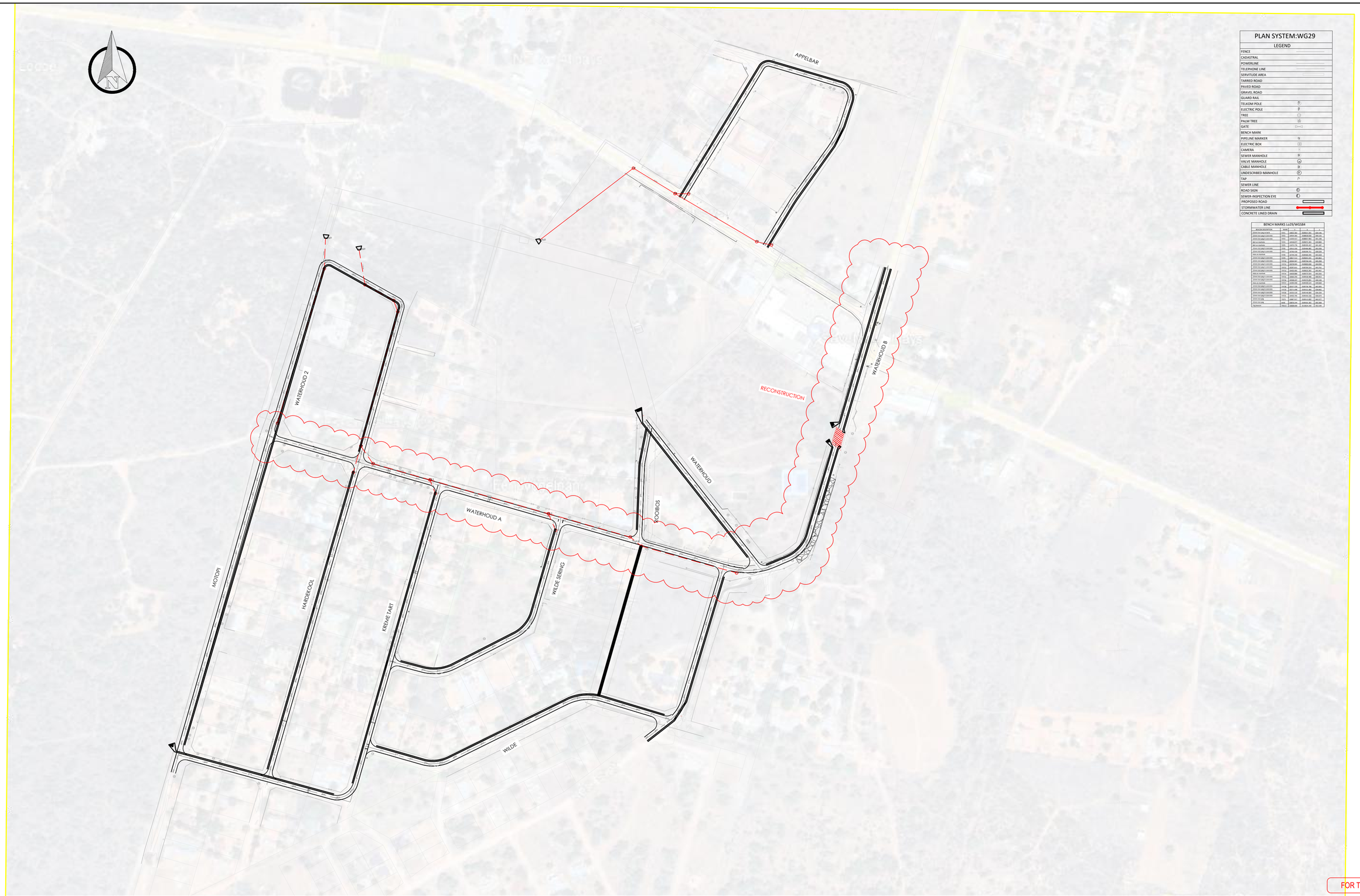
SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5 –	RD –	LOC –	01 –	PD –	00

PD: PRELIMINARY DESIGN / DD: DETAILED DESIGN / T: TENDER / C: CONSTRUCTION / A: AS-BUILT / I: FOR INFORMATION ONLY



PLAN SYSTEM:WG29

LEGEND	
FENCE	
CADASTRAL	
POWERLINE	
TELEPHONE LINE	
SERVITUDE AREA	
TARRED ROAD	
PAVED ROAD	
GRAVEL ROAD	
GUARD RAIL	
TELKOM POLE	T
ELECTRIC POLE	P
TREE	
PALM TREE	
GATE	
BENCH MARK	
PIPELINE MARKER	
ELECTRIC BOX	E
CAMERA	
SEWER MANHOLE	S
VALVE MANHOLE	W
CABLE MANHOLE	
UNDESCRIBED MANHOLE	
TAP	
SEWER LINE	
ROAD SIGN	
SEWER-INSPECTION EYE	
PROPOSED ROAD	
STORMWATER LINE	
CONCRETE LINED DRAIN	

BENCH MARKS Lo29/WG584

32mm Iron pipe in concrete	TMPL	28852.384	25000.021	458.546
32mm Iron pipe in concrete	TMPL	29004.383	24997.818	459.135
32mm Iron pipe in concrete	TMPL	31003.927	25000.917	461.189
32mm Iron pipe	TMPL	31000.000	25000.000	461.000
Bolt in manhole	TMPL	31015.776	25000.427	461.455
32mm Iron pipe in concrete	TMPL	28913.330	25000.882	462.928
32mm Iron pipe in concrete	TMPL	29784.439	25000.791	459.355
32mm Iron pipe	TMPL	32190.546	25000.325	461.628
32mm Iron pipe in concrete	TMPL	32190.000	25000.000	461.000
32mm Iron pipe in concrete	TMPL	28904.951	25000.106	463.186
32mm Iron pipe in concrete	TMPL	32278.903	25000.028	460.928
32mm Iron pipe in concrete	TMPL	28397.931	25000.315	465.765
32mm Iron pipe in concrete	TMPL	28397.000	25000.000	465.000
Bolt in manhole	TMPL	28900.000	25000.576	463.951
32mm Iron pipe in concrete	TMPL	28900.351	25000.408	464.011
32mm Iron pipe in concrete	TMPL	28308.021	25000.501	469.106
32mm Iron pipe	TMPL	28308.000	25000.000	469.000
32mm Iron pipe in concrete	TMPL	28422.000	25000.700	466.000
32mm Iron pipe in concrete	TMPL	28273.108	25000.081	468.983
32mm Iron pipe in concrete	TMPL	28303.015	25000.400	469.355
32mm Iron pipe in concrete	TMPL	28481.787	25000.132	464.677
32mm Iron pipe	TMPL	28481.000	25000.000	464.000
32mm Iron pipe	BMR	28853.041	25000.347	459.489
Fog spanner	TMPLS	28888.000	25000.000	462.000

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DRAWING TITLE:	PLAN LAYOUT (ROAD & STORMWATER)

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	– RD	– LAY	– 01	– T	–00

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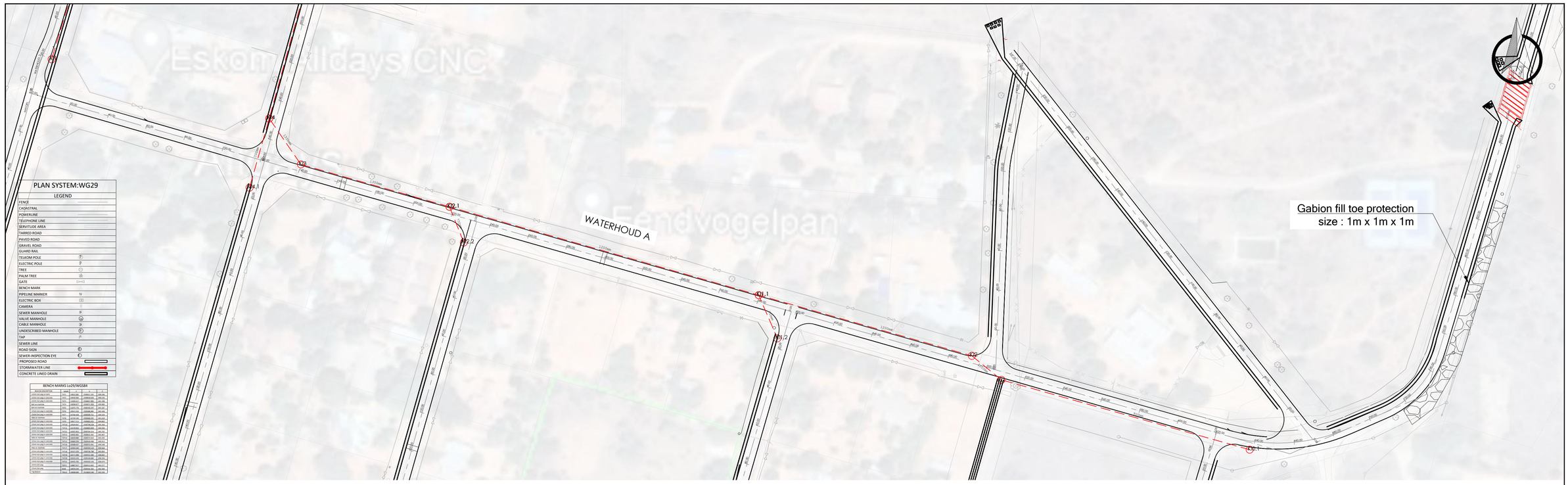
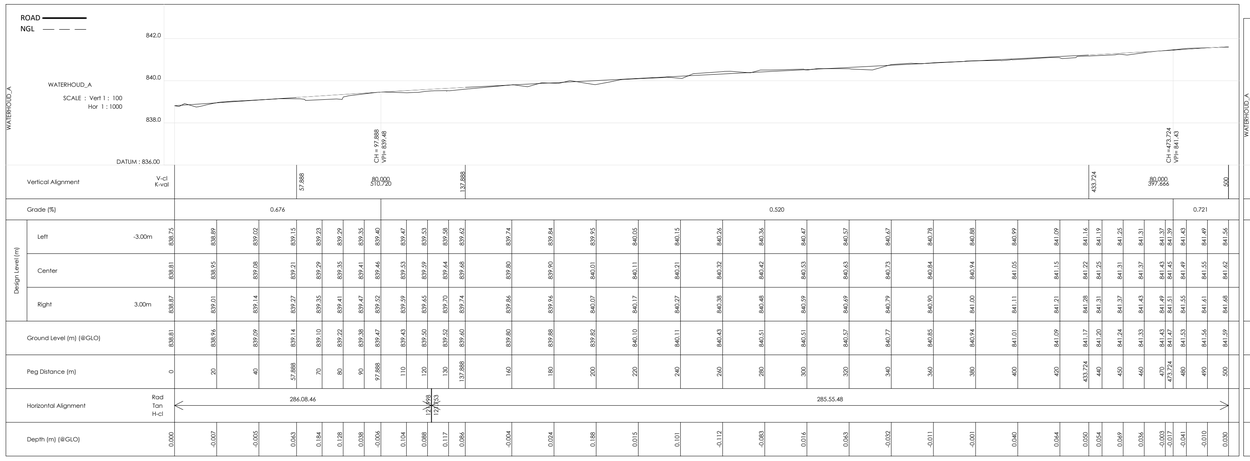


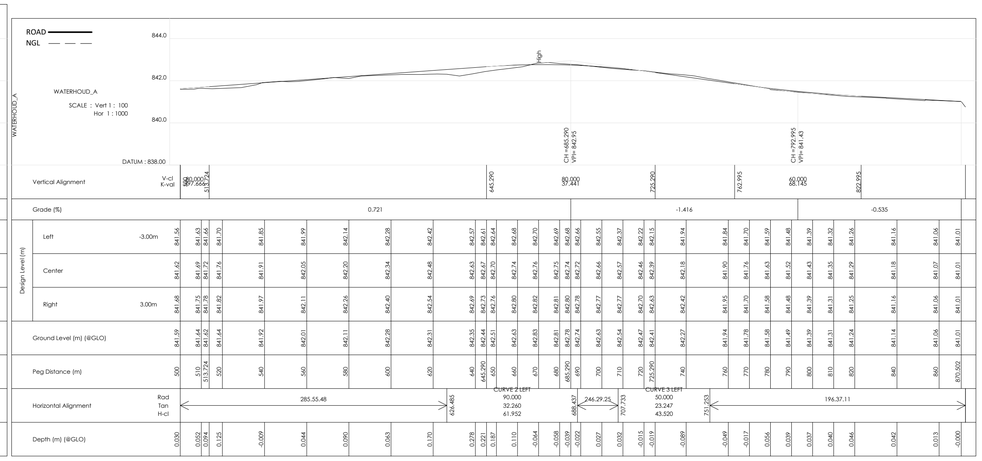
LAYERWORKS DETAIL

40mm Medium continuously grade using 50/70 pen grade bitumen

150mm thick G3 material

Rip & stabilise 150mm thick in situ material to C4 material





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DRAWING TITLE:	WATERHOUD A (LONGITUDINAL SECTION)

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
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DRAWING TITLE:	WATERHOUD A (CROSS SECTIONS)

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5 –	RD –	CS –	01 –	PD –	00

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PLAN SYSTEM:WG29

LEGEND
FENCE
CADASTRAL
POWERLINE
TELEPHONE LINE
SERVITUDE AREA
TARRED ROAD
PAVED ROAD
GRAVEL ROAD
GUARD RAIL
TELKOM POLE
ELECTRIC POLE
TREE
PALM TREE
GATE
BENCH MARK
PIPELINE MARKER
ELECTRIC BOX
CAMERA
SEWER MANHOLE
VALVE MANHOLE
CABLE MANHOLE
UNDESCRIBED MANHOLE
TAP
SEWER LINE
ROAD SIGN
SEWER-INSPECTION EYE
PROPOSED ROAD
STORMWATER LINE
CONCRETE LINED DRAIN

BENCH MARKS Ls29/WGS84

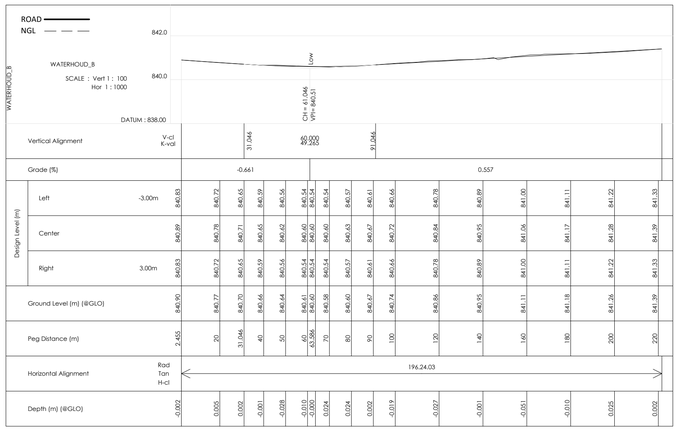
BENCH DESCRIPTION	NAME	Y	X	Z
32mm iron pipe in turn	TP11	2382.281	2439011.245	845.436
32mm iron pipe in concrete	TP12	2399.481	2438918.030	840.928
32mm iron pipe in concrete	TP13	2416.681	2438824.815	836.420
BM 50 MANHOLE	TP14	2430.017	2438751.327	833.081
BM 50 MANHOLE	TP15	2437.176	2438718.457	841.387
32mm iron pipe in concrete	TP16	2453.330	2438686.985	841.450
32mm iron pipe in concrete	TP17	2456.628	2438678.711	841.519
32mm iron pipe in concrete	TP18	2459.926	2438670.437	841.588
32mm iron pipe in concrete	TP19	2463.224	2438662.163	841.656
32mm iron pipe in concrete	TP20	2466.967	2438653.226	841.724
32mm iron pipe in concrete	TP21	2470.765	2438644.424	841.793
32mm iron pipe in concrete	TP22	2474.563	2438635.622	841.861
32mm iron pipe in concrete	TP23	2507.301	2438559.703	842.267
Pipe on manhole	TP24	2509.989	2438553.469	842.321
32mm iron pipe in concrete	TP25	2860.391	2438418.600	843.913
32mm iron pipe in concrete	TP26	2863.689	2438417.326	843.982
Pipe on manhole	TP27	2550.189	2438539.125	843.680
32mm iron pipe in concrete	TP28	2557.418	2438536.786	843.905
32mm iron pipe in concrete	TP29	2557.508	2438536.489	843.911
32mm iron pipe in concrete	TP30	2557.597	2438536.193	843.916
32mm iron pipe	TP31	2557.687	2438535.896	843.922
32mm iron pipe	TP32	2480.561	2438614.000	843.413
32mm iron pipe	BM1	2479.194	2438616.501	843.368
1.2m barrel	TP33	2509.600	2438561.104	843.600

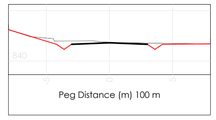
LAYERWORKS DETAIL

40mm Medium continuously grade using 50/70 pen grade bitumen

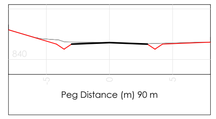
150mm thick G3 material

Rip & stabilise 150mm thick in situ material to C4 material

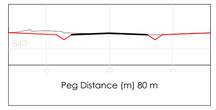




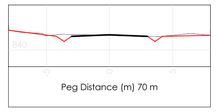
Peg Distance (m) 100 m



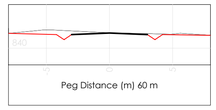
Peg Distance (m) 90 m



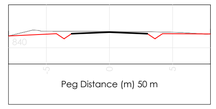
Peg Distance (m) 80 m



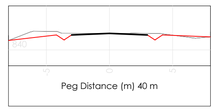
Peg Distance (m) 70 m



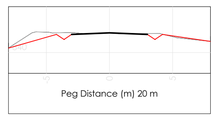
Peg Distance (m) 60 m



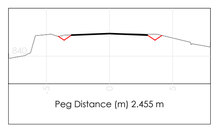
Peg Distance (m) 50 m



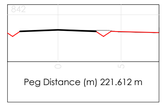
Peg Distance (m) 40 m



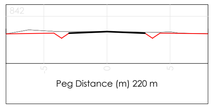
Peg Distance (m) 20 m



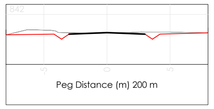
Peg Distance (m) 2.455 m



Peg Distance (m) 221.612 m

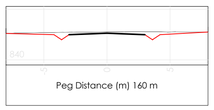


Peg Distance (m) 220 m

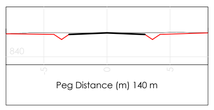


Peg Distance (m) 200 m

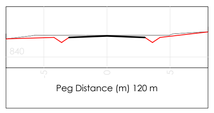
Peg Distance (m) 180 m



Peg Distance (m) 160 m



Peg Distance (m) 140 m



Peg Distance (m) 120 m

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DRAWING TITLE:	WATERHOUD B (LONGITUDINAL & CROSS SECTIONS)

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	– RD	– LS	– 02	–PD	– 00

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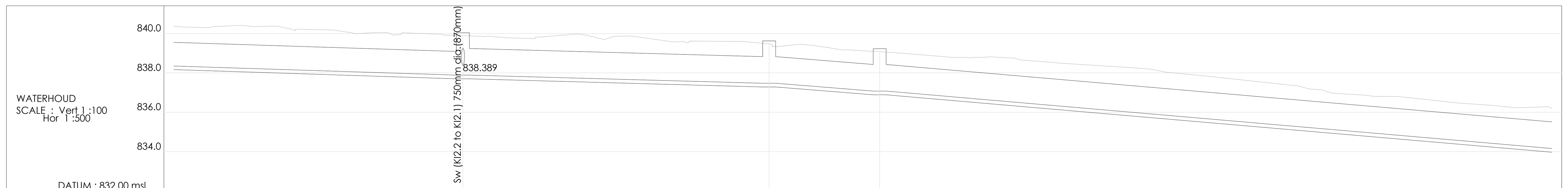
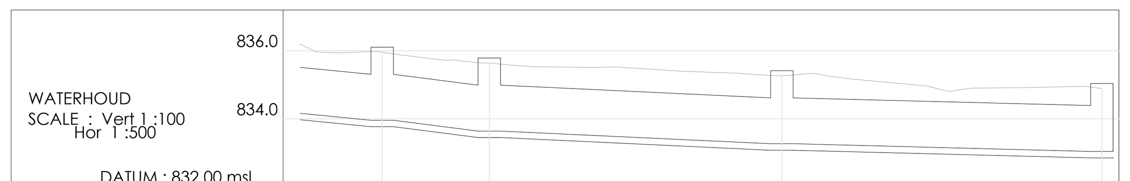
Reference	KI0.1	KI1	KI2	KI1.1
Peg Distance (m)	0.00	117.35	128.60	261.54
Ground level (m)	842.34	841.67	841.62	840.90
Invert Level (m)	840.84	839.87	839.62	838.90
Depth (m)	1.50	1.80	2.00	2.00

Section	Grade (%)	Horizontal Align.	Pipe description
KI0.1 – KI1	-0.86	105:52:40	900mm dia./Class75D - CONCRETE PIPE
KI1 – KI2	-3.14	145:28:52	1200mm dia./Class75D - CONCRETE PIPE
KI2 – KI1.1	-0.55	105:53:35	1200mm dia./Class100D - CONCRETE PIPE
KI1.1 –	-0.64	105:56:13	1200mm dia./Class75D - CONCRETE PIPE



Reference	KI2.1	KI3	KI4
Peg Distance (m)	423.43	501.22	529.29
Ground level (m)	839.89	839.47	839.08
Invert Level (m)	837.89	837.47	837.08
Depth (m)	2.00	2.00	2.00

Section	Grade (%)	Horizontal Align.	Pipe description
– KI2.1	-0.64	105:56:13	1200mm dia./Class75D - CONCRETE PIPE
KI2.1 – KI3	-0.56	105:55:00	1350mm dia./Class75D - CONCRETE PIPE
KI3 – KI4	-1.60	145:24:28	
KI4 –	-1.74	195:22:55	



Reference	KI5	KI6	KI7	OUTLET
Peg Distance (m)	712.08	727.84	770.87	817.94
Ground level (m)	835.96	835.64	835.27	834.89
Invert Level (m)	833.96	833.64	833.27	833.04
Depth (m)	2.00	2.00	2.00	1.85

Section	Grade (%)	Horizontal Align.	Pipe description
– KI5	-1.74	195:22:55	1350mm dia./Class75D - CONCRETE PIPE
KI5 – KI6	-2.56	160:20:02	
KI6 – KI7	-0.94	118:35:32	
KI7 – OUTLET	-0.51	170:32:33	

FOR TENDER

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		SIGNATURE
DESIGNED BY	R.R. RAVELE	
DRAWN BY	L MOJANAGA	
CHECKED BY	H.L. THARAGA	

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PROFESSIONAL REGISTRATION No.
EMPLOYER'S PROJECT MANAGER — DATE

CONTRACT NO.: BM07/23/24

PROJECT TITLE: APPOINTMENT AS CIVIL ENGINEERING CONSULTANTS FOR REHABILITATION OF ALLDAY INTERNAL STREETS AND STORMWATER CONTROL

DRAWING TITLE: BRANCH (LONGITUDINAL SECTION)

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	SW	LS	01	PD	00

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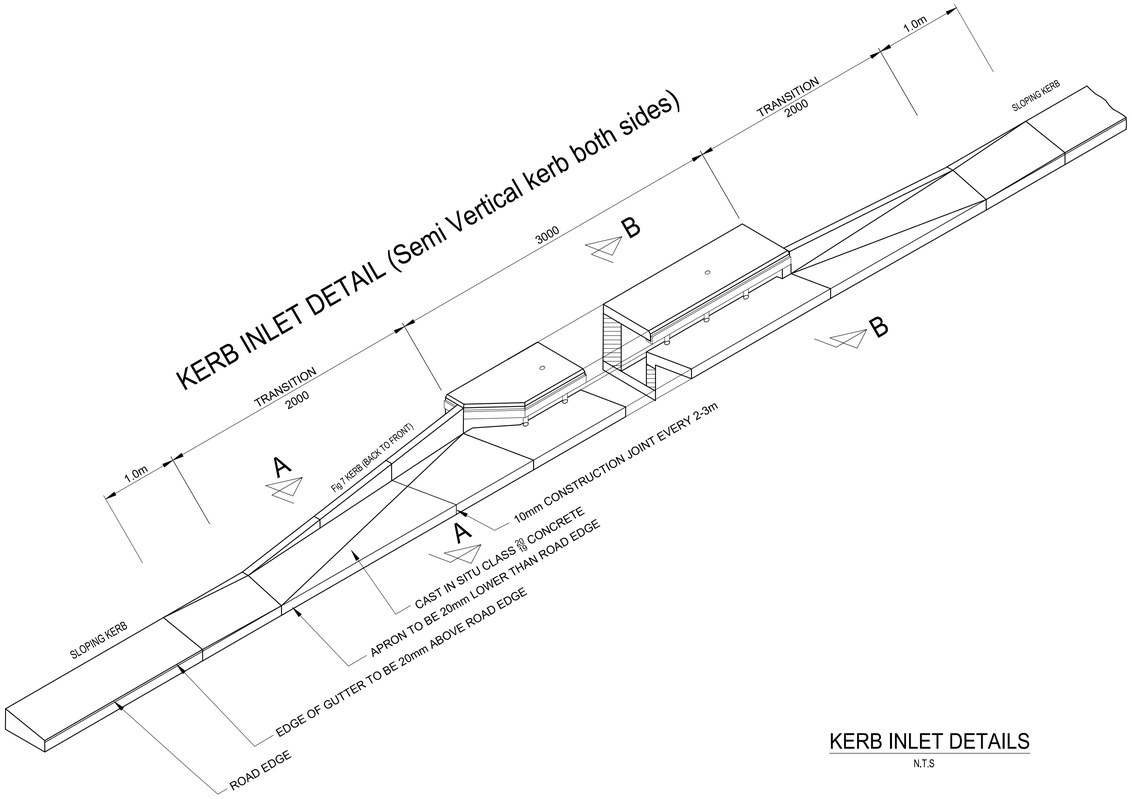
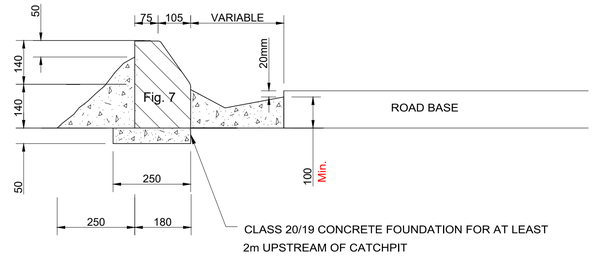


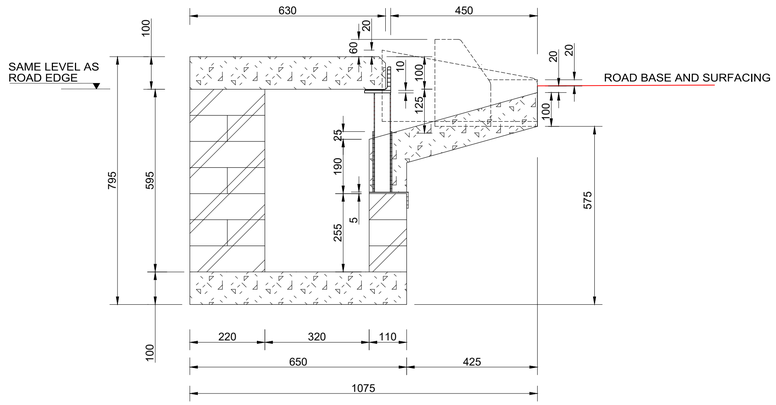
KERB INLET DETAILS

N.T.S



SECTION A-A

N.T.S



SECTION B-B

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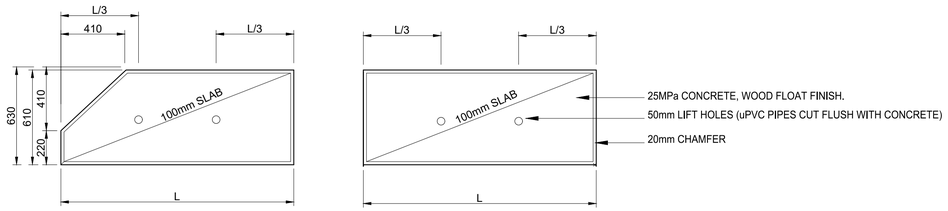
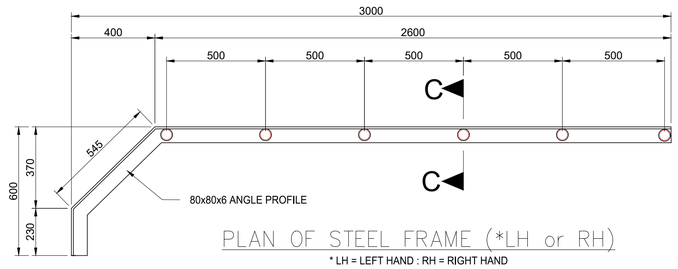


CONCRETE LAYOUT

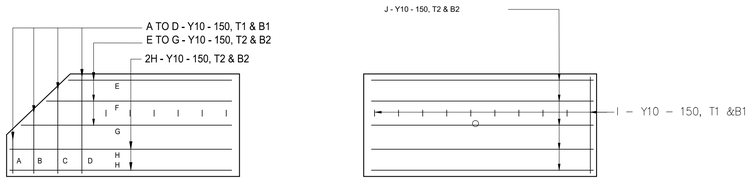
NTS



PLAN OF STEEL FRAME (*LH or RH)

* LH = LEFT HAND : RH = RIGHT HAND

NTS

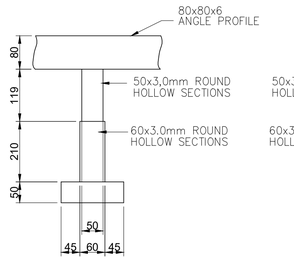


REINFORCEMENT LAYOUT

NTS

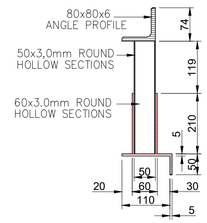
COVER DETAILS

NTS



ELEVATION OF STEEL FRAME

NTS



SECTION A – A

NTS

BENDING SCHEDULE 1,5m PRECAST CATCHPIT SLAB - Splayed corner

L	ITEM No.	BAR MARK.	No PER ITEM.	TOTAL	BAR SIZE	BAR LENGTH	BEND.
1500	1	A	2	2	Y10	150	STRAIGHT
		B	2	2	Y10	300	STRAIGHT
		C	2	2	Y10	450	STRAIGHT
		D	14	14	Y10	550	STRAIGHT
		E	2	2	Y10	1050	STRAIGHT
		F	2	2	Y10	1200	STRAIGHT
		G	2	2	Y10	1320	STRAIGHT
		H	4	4	Y10	1450	STRAIGHT
		STOOLS	15	15	R10	750	250 45o/a 205

BENDING SCHEDULE 1,5m PRECAST CATCHPIT SLAB - Splayed corner

L	ITEM No.	BAR MARK.	No PER ITEM.	TOTAL	BAR SIZE	BAR LENGTH	BEND.
1500	1	I	20	20	Y10	550	STRAIGHT
		J	10	10	Y10	1450	STRAIGHT
		STOOLS	15	15	R10	750	250 45o/a 205

BENDING SCHEDULE 1,5m PRECAST CATCHPIT SLAB - Splayed corner

L	ITEM No.	BAR MARK.	No PER ITEM.	TOTAL	BAR SIZE	BAR LENGTH	BEND.
2000	1	A	2	2	Y10	150	STRAIGHT
		B	2	2	Y10	300	STRAIGHT
		C	2	2	Y10	450	STRAIGHT
		D	22	22	Y10	550	STRAIGHT
		E	2	2	Y10	1550	STRAIGHT
		F	2	2	Y10	1700	STRAIGHT
		G	2	2	Y10	1820	STRAIGHT
		H	4	4	Y10	1950	STRAIGHT
		STOOLS	15	15	R10	750	250 45o/a 205

BENDING SCHEDULE 1,5m PRECAST CATCHPIT SLAB - Splayed corner

L	ITEM No.	BAR MARK.	No PER ITEM.	TOTAL	BAR SIZE	BAR LENGTH	BEND.
2000	1	I	28	28	Y10	550	STRAIGHT
		J	10	10	Y10	1950	STRAIGHT
		STOOLS	15	15	R10	750	250 45o/a 205

BENDING SCHEDULE 1,5m PRECAST CATCHPIT SLAB – Splayed corner

L	ITEM No.	BAR MARK.	No PER ITEM.	TOTAL	BAR SIZE	BAR LENGTH	BEND.
2500	1	A	2	2	Y10	150	STRAIGHT
		B	2	2	Y10	300	STRAIGHT
		C	2	2	Y10	450	STRAIGHT
		D	28	28	Y10	550	STRAIGHT
		E	2	2	Y10	2050	STRAIGHT
		F	2	2	Y10	2200	STRAIGHT
		G	2	2	Y10	2320	STRAIGHT
		H	4	4	Y10	2450	STRAIGHT
		STOOLS	20	20	R10	750	250 45o/a 205

BENDING SCHEDULE 1,5m PRECAST CATCHPIT SLAB - Splayed corner

L	ITEM No.	BAR MARK.	No PER ITEM.	TOTAL	BAR SIZE	BAR LENGTH	BEND.
2500	1	I	34	34	Y10	550	STRAIGHT
		J	10	10	Y10	2450	STRAIGHT
		STOOLS	20	20	R10	750	250 45o/a 205

BENDING SCHEDULE

FOR TENDER

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DRAWING TITLE:	KERB INLET DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5 –	RD –	STD –	002 –	T –	000

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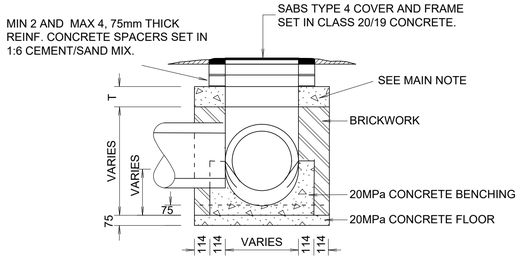
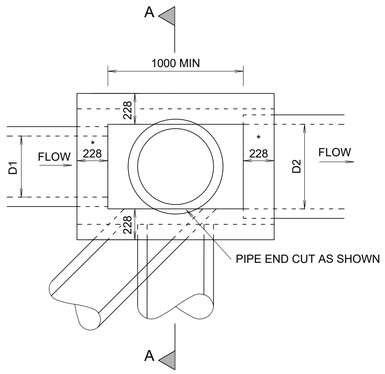
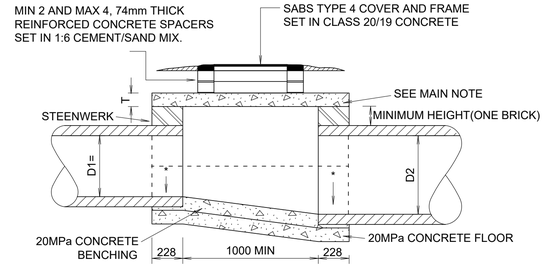


SECTION A-A



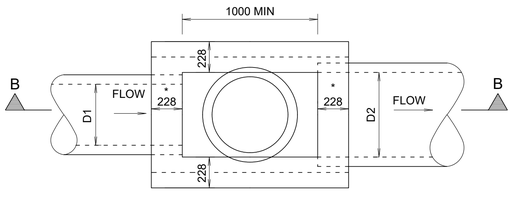
PLAN TYPE 1

MANHOLE/JUNCTION BOX TYPE 1



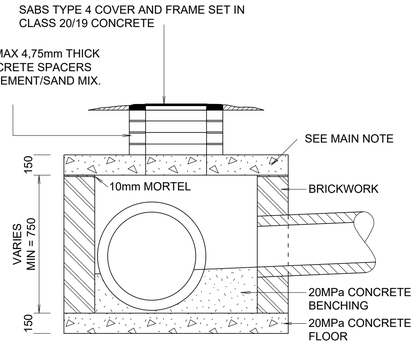
SECTION B-B

*NOTE:
INVERT LEVELS AS SPECIFIED
ON THE LONGITUDINAL SECTIONS.

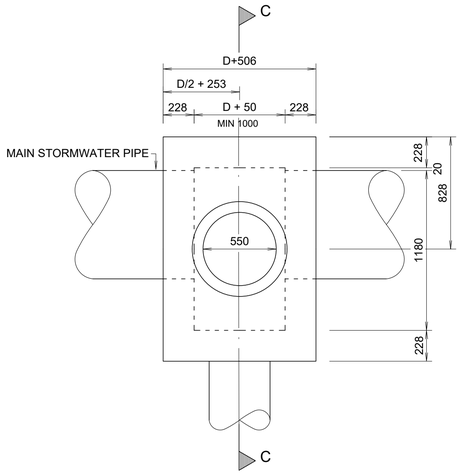


PLAN TYPE 2

MANHOLE/JUNCTION BOX TYPE 2



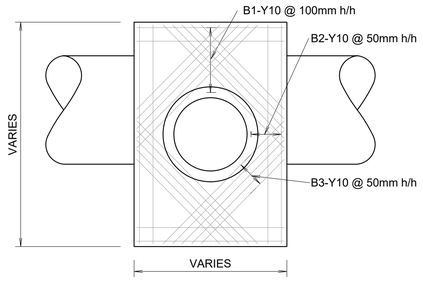
SECTION C-C



PLAN TYPE 3

MANHOLE/JUNCTION BOX TYPE 3

NOTE:
1. MIN. CONCRETE COVER 40mm.
2. ALL REINFORCEMENT IN CONCRETE BOTTOM OF SLAB.
3. B1, B2 AND B3 ARE STRAIGHT BARS.

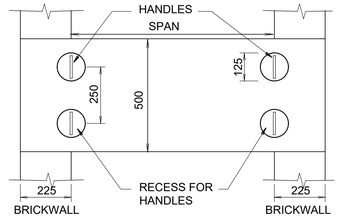


REINFORCEMENT DETAIL OF SLAB

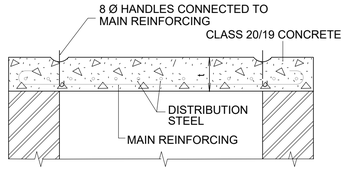
FOR ALL TYPES OF MANHOLES

NOTES:

JUNCTION BOXES OF ALL TYPES ARE COVERED WITH THE PRECAST CONCRETE SLABS SHOWN IN DETAIL A.
THIS REPLACES THE CONCRETE SLAB AND MANHOLE COVER PRESCRIBED FOR MANHOLES.



PLAN OF PRECAST COVER

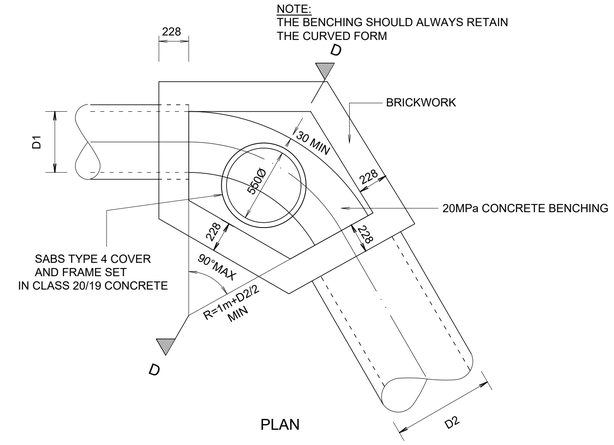


SECTION: PRECAST COVER

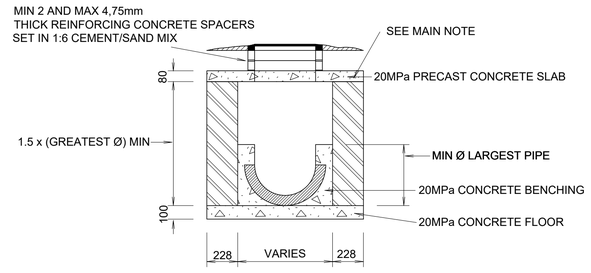
SLAB REINFORCING			
SPAN	t	MAIN REINFORCING	DISTR. STEEL
450	75	10 Ø @ 150	6 Ø @ 300
500	90	12 Ø @ 200	6 Ø @ 250
600	100	12 Ø @ 160	6 Ø @ 200
750	100	12 Ø @ 160	6 Ø @ 200
900	125	16 Ø @ 210	10 Ø @ 300
1 000	125	16 Ø @ 200	10 Ø @ 300
1 100	140	16 Ø @ 200	10 Ø @ 300
1 200	140	16 Ø @ 185	10 Ø @ 300
1 350	150	16 Ø @ 175	10 Ø @ 300
1 500	165	16 Ø @ 175	10 Ø @ 270
1 650	165	16 Ø @ 165	10 Ø @ 270
1 800	180	16 Ø @ 165	10 Ø @ 260
2 000	190	16 Ø @ 125	10 Ø @ 230
2 200	200	20 Ø @ 170	10 Ø @ 200
2 400	200	20 Ø @ 150	10 Ø @ 200
2 600	215	20 Ø @ 150	10 Ø @ 180

(20mm COVER FOR ALL REINFORCING)

NOTE:
THE BENCHING SHOULD ALWAYS RETAIN
THE CURVED FORM



PLAN



SECTION D-D

MANHOLE/JUNCTION BOX TYPE 4

FOR TENDER

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		SIGNATURE
DESIGNED BY	R.R. RAVELE	
DRAWN BY	L MOJANAGA	
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DRAWING TITLE:	JUNCTION BOX DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

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S35.5	RD	STD	003	T	000

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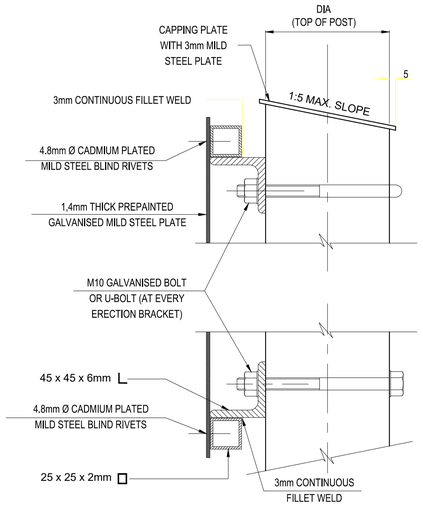
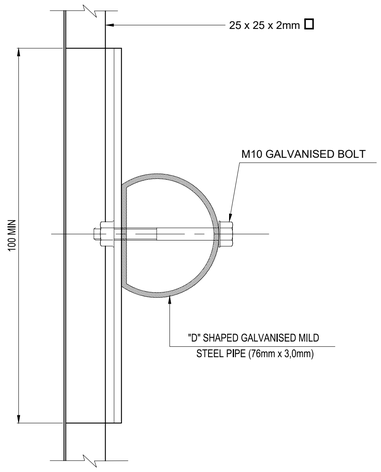


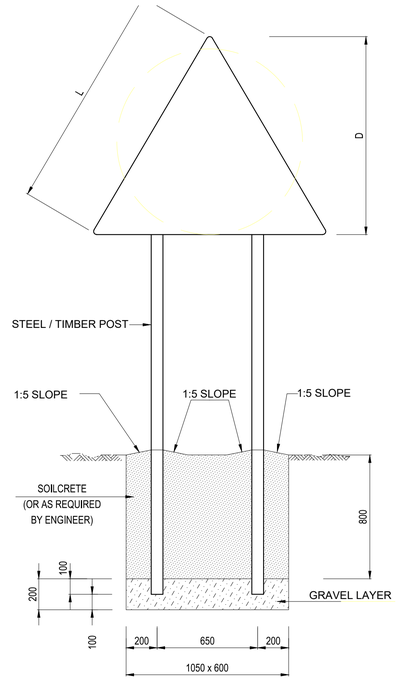
SIDE ELEVATION

SCALE 1 : 2,5



SIDE ELEVATION

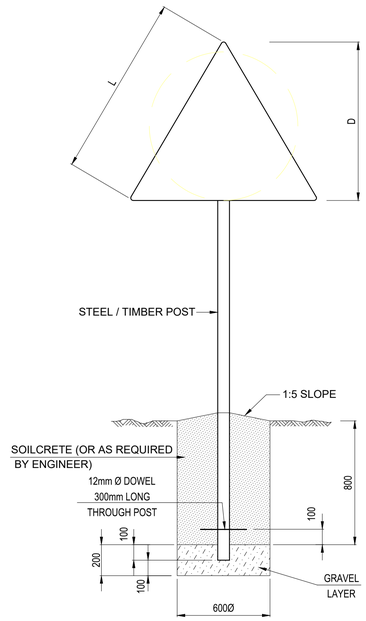
SCALE 1 : 2



FOUNDATION DETAIL

L = 1500 AND D = 1200

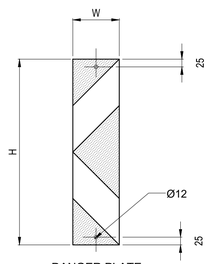
SCALE 1:20



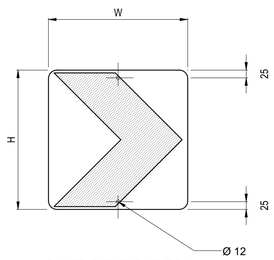
FOUNDATION DETAIL

L < 1200 AND D < 900

SCALE 1:20



DANGER PLATE
(W401 / W402)



SHARP CURVE CHEVRON
(W405 / W406)

MOUNTING HOLES FOR HAZARD MARKER SIGNS WITHOUT FRAMEWORK

HAZARD MARKER SIGNS		
	DANGER PLATE SIGN W401-RIGHT W402-LEFT	SHARP CURVE CHEVRON W405-RIGHT W406-LEFT
OPERATING SPEED (km/h)	SIZE H x W (mm)	SIZE H x W (mm)
120	800 x 200	600 x 600
100	800 x 200	600 x 600
80	600 x 150	450 x 450
60	600 x 150	450 x 450

NOTES :

THE ROAD SIGN FACES SHALL BE MANUFACTURED AND ERECTED IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS :

1. STRUCTURAL STEEL SECTIONS SHALL BE MILD STEEL CONFORMING TO THE REQUIREMENTS OF SANS 1431, GRADE 300W. RECTANGULAR HOLLOW SECTION AND SPECIAL CHANNEL PROFILES MAY BE COLD FORMED OF COMMERCIAL QUALITY MILD STEEL. ALL SECTIONS SHALL BE HOT-DIP GALVANISED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 121 : 2000 (ISO 1461 : 1999).

2. BOLTS, WASHERS AND NUTS SHALL COMPLY WITH THE REQUIREMENTS OF SANS 1700-5-1 AND SHALL BE GALVANISED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 121 : 2000 (ISO 1461 : 1999).

3. BLIND RIVETS SHALL BE 4.8mm DIA CADMIUM PLATED MILD STEEL.

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DRAWING TITLE:	ROAD SIGNS, ATTACHMENT AND FIXING DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

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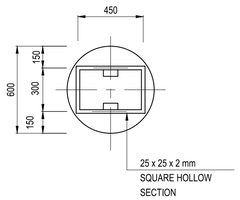
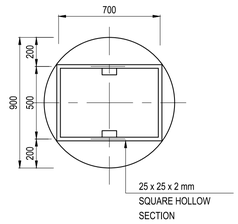


SINGLE SUPPORT



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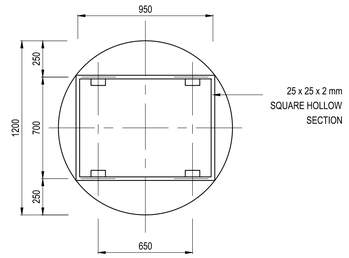


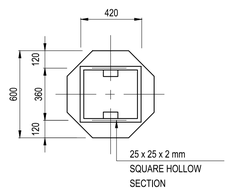
DOUBLE SUPPORT

REINFORCEMENT FOR CIRCULAR ROAD SIGNS

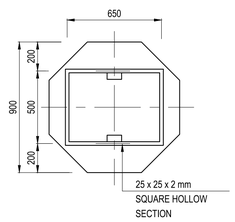
SCALE 1 : 20

MINIMUM REGULATORY SIGN SIZES			
	OPERATING SPEED (km/h)		
	100 - 120	70 - 90	60
CIRCULAR SIGN DIAMETER (mm)	1200	900	600
RECTANGULAR SIGN WxH (mm)	1200 x 900	900 x 675	600 x 450
TRIANGULAR SIGN SIDE LENGTH (mm)	1500	1200	900

ADVANCE WARNING SIGN LOCATION AND SIZE		
OPERATING SPEED (km/h)	LOCATION (DISTANCE FROM HAZARD) (m)	SIZE (mm)
120	330	1500
100	240	1500
80	160	1200
60	120	900



SINGLE SUPPORT



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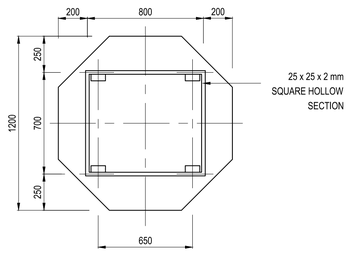
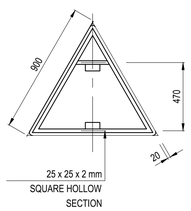


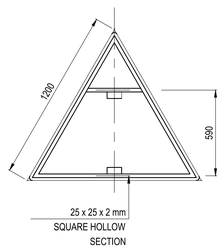
DOUBLE SUPPORT

REINFORCEMENT FOR STOP SIGNS

SCALE 1 : 20

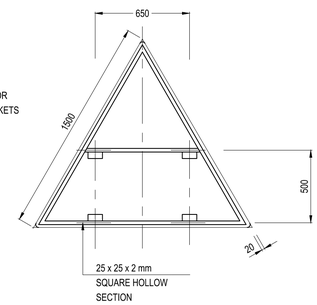


SINGLE SUPPORT



SINGLE SUPPORT

NOTE:
MINIMUM SIZE FOR
ERECTION BRACKETS
ON R/W SIGNS :
∟ 45 x 45 x 6
LENGTH : 100mm



DOUBLE SUPPORT

REINFORCEMENT FOR TRIANGULAR ROAD SIGNS

SCALE 1 : 20

NOTES :

THE ROAD SIGN FACES SHALL BE MANUFACTURED AND ERECTED IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS :

1. DETAILS ON THIS DRAWING ARE APPLICABLE TO ROAD SIGNS SMALLER THAN 1,5m² REQUIRING DOUBLE / SINGLE SUPPORTS.

2. STRUCTURAL STEEL SECTIONS SHALL BE MILD STEEL CONFORMING TO THE REQUIREMENTS OF SANS 1431, GRADE 300W. RECTANGULAR HOLLOW SECTION AND SPECIAL CHANNEL PROFILES MAY BE COLD FORMED OF COMMERCIAL QUALITY MILD STEEL. ALL SECTIONS SHALL BE HOT-DIP GALVANISED IN ACCORDANCE WITH THE REQUIREMENTS OF SANS 121 : 2000 (ISO 1461 : 1999).

FOR TENDER

No	DATE	DESCRIPTION	ISSUED BY
00	03/2024	INITIAL ISSUE	FIM

		SIGNATURE
DESIGNED BY	R.R. RAVELE	
DRAWN BY	L MOJANAGA	
CHECKED BY	H.L. THARAGA	

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CONSULTING ENGINEER — DATE

PROFESSIONAL REGISTRATION No.

EMPLOYER'S PROJECT MANAGER — DATE

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DRAWING TITLE:	ROAD SIGNS, ATTACHMENT AND FIXING DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	RD	STD	005	T	000

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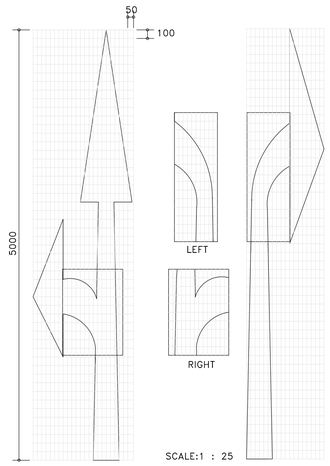
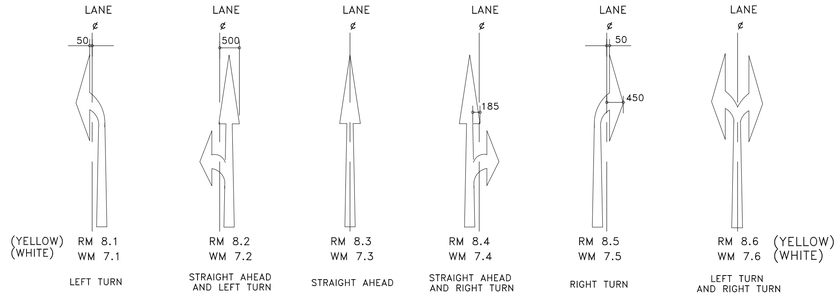


SCALE:1 : 25



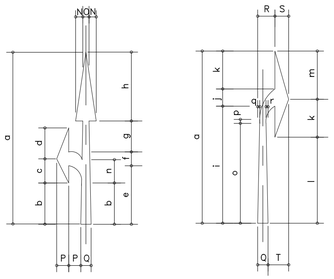
APPLICATIONS

SCALE: 1:50

DIMENSIONS (mm)

Operating Speed km/h	Typical Applications	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r
30 –40	City Centre	2500	600	350	450	884	200	417	1000	1700	250	550	1250	700	380	1450	58	30	29
50 – 90	Urban/Rural Expressways	4000	960	560	720	1406	320	666	1600	2720	400	880	2000	1120	608	2320	93	48	46
100 – 120	Rural and Freeways	5000	1200	700	900	1767	400	833	2000	3400	500	1100	2500	1400	760	2900	116	60	58
ALL	Special Applications	7500	1800	1050	1350	2651	600	1250	3000	5100	750	1650	3750	2100	1140	4350	174	90	87

All Operating Speeds and Applications	N	O	P	Q	R	S	T
	210	180	350	300	500	400	600

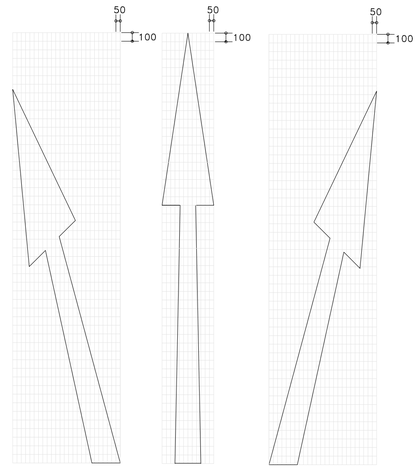


ARROW AREA / (m?)				
a	RM8.1/RM8.5 WM7.1/WM7.5	RM8.2/RM8.4 WM7.2/WM7.4	RM8.3 WM7.3	RM8.6 WM7.6
2500	0.67	0.89	0.66	1.03
4000	1.14	1.43	1.06	1.68
5000	1.45	1.78	1.32	2.12
7500	2.23	2.66	1.98	3.20

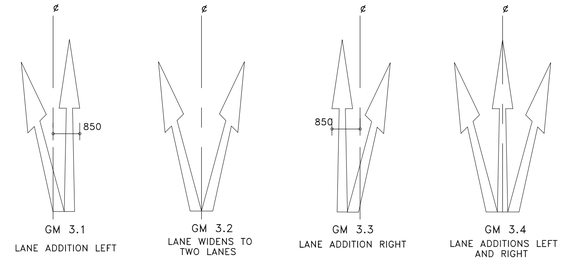
MANDATORY DIRECTION ARROWS

NOTES: (MANDATORY DIRECTION ARROWS)

1. THESE ARROWS MAY BE USED IN LANES TO INDICATE THAT DRIVERS SHALL PROCEED ONLY IN THE DIRECTION OR DIRECTIONS SHOWN. THEY SHOULD ONLY BE USED IF THE JUNCTION CONCERNED REQUIRED TURNING MOVEMENT CONTROL BY LANE.
2. THE FINAL ARROW NEAREST THE POINT OF TURN OR STRAIGHT ON MOVEMENT SHALL BE YELLOW. ANY ARROWS MARKED IN ADVANCE OF THIS POINT TO WARN DRIVERS OF THE MANDATORY MOVEMENT AHEAD SHALL BE WHITE.
3. A MANDATORY OR WARNING DIRECTION ARROW SHALL NOT BE USED IN ADVANCE OF A WIDENING OF THE ROADWAY TO A GREATER NUMBER OF LANES. THIS SHALL BE INDICATED IF NECESSARY, BY USING FURCATION ARROWS.



SCALE:1 : 25



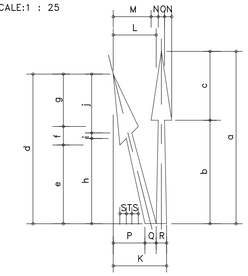
APPLICATIONS

SCALE 1 : 50

DIMENSIONS (mm)

Operating Speed km/h	Typical Applications	a	b	c	d	e	f	g	h	i	j
30 –40	City Centre	2500	1500	1000	2170	1141	268	761	1235	81	855
50 – 60	Urban Roads	4000	2400	1600	3472	1826	429	1218	1976	129	1367
70 – 90	Urban Arterial Roads/ Rural Expressways	5000	3000	2000	4340	2282	536	1522	2470	161	1709
100 – 120	Rural Roads and Freeways	7500	4500	3000	6510	3423	804	2283	3705	242	2564

All Operating Speeds and Applications	K	L	M	N	O	P	Q	R	S	T
	1700	1250	1100	210	180	921	329	300	188	161

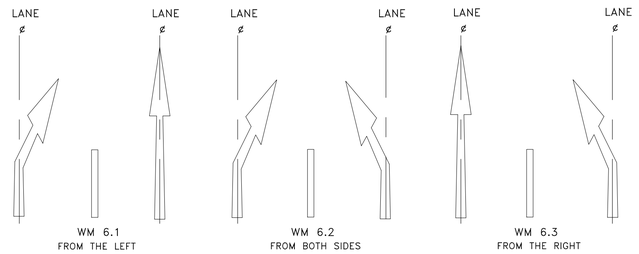


NOTES: (FURCATION ARROWS)

1. THESE ARROWS MAY BE USED TO INDICATE THAT THE NUMBER OF LANES IS INCREASING AHEAD. ONLY ONE SET OF ARROWS SHOULD BE USED UNLESS A LEFT AND RIGHT TURN LANE ARE ADDED TO A MULTI–LANE ROADWAY AT THE SAME POINT WHERE TWO SETS MAY BE USED.
2. DIRECTION ARROWS AHEAD SHALL NOT BE USED TO INDICATE THE ADDITION OF LANES AHEAD.
3. AS A GENERAL RULE BIFURACTION ARROWS SHOULD BE LOCATED TWO TO THREE MARKING MODULES BEFORE THE START OF THE LANE GENERATING TAPER OR CURVE.

ARROW AREA / (m?)			
a	GM3.1/GM3.3	GM3.2	GM3.4
2500	1.30	1.27	1.93
4000	2.07	2.04	3.09
5000	2.59	2.55	3.87
7500	3.89	3.82	5.80

FURCATION ARROWS



APPLICATIONS

SCALE 1 : 50

DIMENSIONS (mm)

Operating Speed km/h	Typical Applications	a	b	c	d	e	f	g	h	i	j	k
30 –40	City Centre	4000	2400	1600	3200	1271	847	227	855	1696	1277	1126
50 – 60	Urban Roads	5000	3000	2000	4000	1589	1058	284	1069	2120	1596	1407
70 – 90	Urban Arterial Roads/ Rural Expressways	7500	4500	3000	6000	2384	1587	426	1603	3180	2394	2111
100 – 120	Rural Roads and Freeways	12000	7200	4800	9600	3814	2539	681	2566	5089	3830	3377

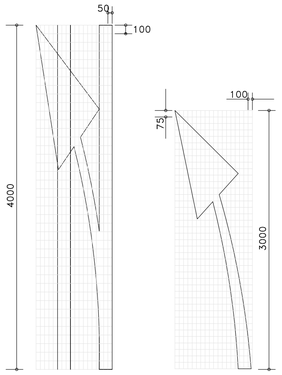
All Operating Speeds and Applications	M	N	O	P	Q	R	S	T	U	V
	300	210	180	1300	898	402	155	370	32	390

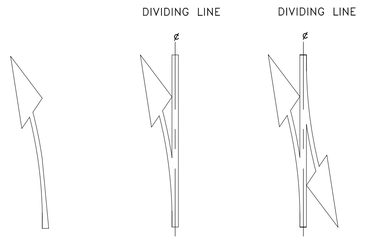
NOTES: (LANE REDUCTION ARROWS)

1. IT IS RECOMMENDED THAT THREE SETS OF ARROWS BE USED ON HIGH SPEED ROADS, SPACED AT FOUR MODULE INTERVALS BEFORE THE END OF THE LANE LINE. SINGLE ARROWS SETS MAY BE USED ON LOWER SPEED ROADS.
2. THE BENT ARROWS MAY BE USED IN ADDITION TO THE THREE–ARROW SETS ALONG THE LENGTH OF THE LANE REDUCTION TAPER.

ARROW AREA / (m?)		
a	WM6.1/WM6.3	WM6.2
4000	2.08	2.06
5000	2.61	2.58
7500	3.92	3.88
12000	6.56	6.20

LANE REDUCTION ARROWS





APPLICATIONS

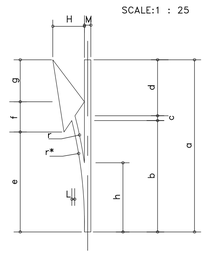
SCALE 1 : 50

LEGEND:
R = RED
W = WHITE
Y = YELLOW

DIMENSIONS (mm)

Typical Applications	a	b	c	d	e	f	g	h	r	r*
Urban	3000	1941	83	976	1741	528	731	1206	5620	5820
Rural	4000	2588	111	1301	2321	704	975	1608	9900	10000

All Applications	H	I	J	K	L	M
	735	260	181	219	75	100 or 150

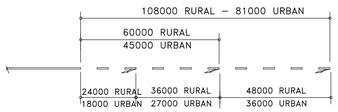


NOTES: (BARRIER LINE AHEAD ARROWS)

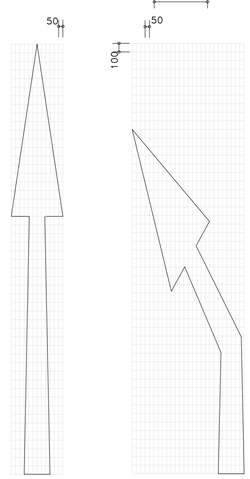
1. THESE ARROWS SHOULD BE USED IN MULTIPLES OF THREE (AT LEAST) IN ADVANCE OF THE START OF A SECTION OF NO OVERTAKING LINE , NO CROSSING LINE OR PAINTED ISLAND WHEN SUCH BARRIER LINES REPLACE A DIVIDING LINE.
2. THE ARROWS MAY BE MARKED ON TOP OF EXISTING DIVIDING LINE MARKINGS (IF THE EXISTING LINE IS A CENTRE LINE TO A 12m OR 7.2m MODULE THE POINT OF THE ARROW SHOULD BE LINED UP WITH THE FORWARD END OF THE LINE).
3. WHEN OVERTAKING SECTIONS ARE REGULARLY INTERSPERSED WITH NO OVERTAKING SECTIONS AND ARE SHORT IN LENGTH MARKING WM 8.2 MAY BE USED AT THE CENTRE OF THE OVERTAKING SECTION.

ARROW AREA / (m?)	
a	Per Arrow
3000	0.62
4000	0.82

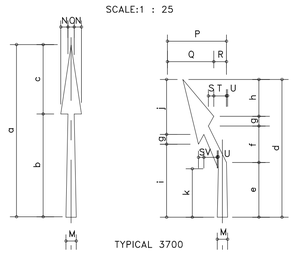
BARRIER LINE AHEAD ARROWS



MARKING SPACING



SCALE:1 : 25



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DRAWN BY	L MOJANAGA	
CHECKED BY	H.L. THARAGA	

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CONSULTING ENGINEER — DATE
PROFESSIONAL REGISTRATION No.
EMPLOYER'S PROJECT MANAGER — DATE

CONTRACT NO.:	BM07/23/24
PROJECT TITLE:	APPOINTMENT AS CIVIL ENGINEERING CONSULTANTS FOR REHABILITATION OF ALLDAY INTERNAL STREETS AND STORMWATER CONTROL
DRAWING TITLE:	ROAD MARKINGS DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5 –	RD –	STD –	006 –	T –	000

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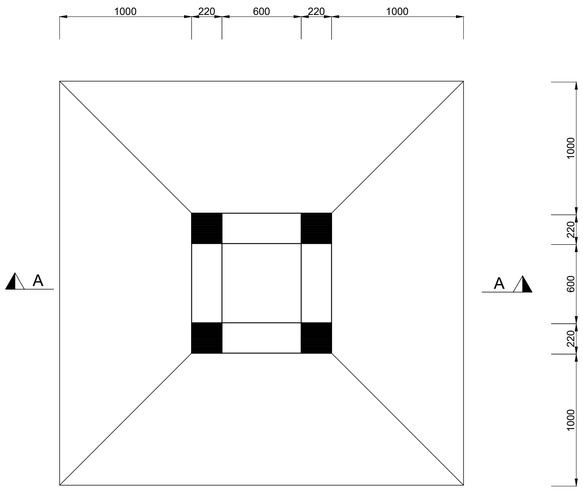
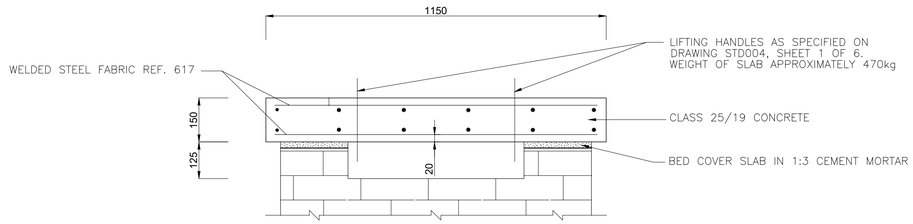
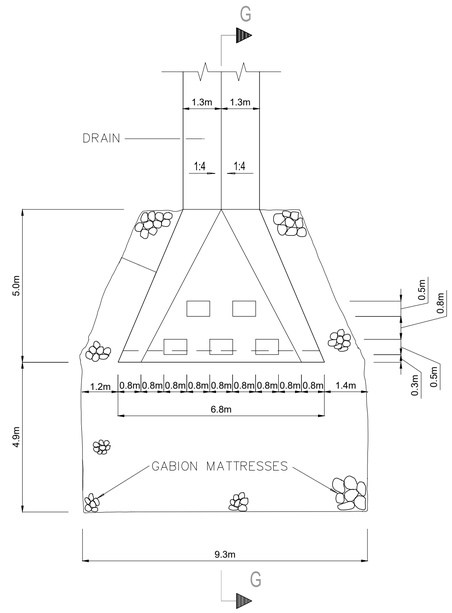


PLAN OF FIELD INLET (Without cover slab)

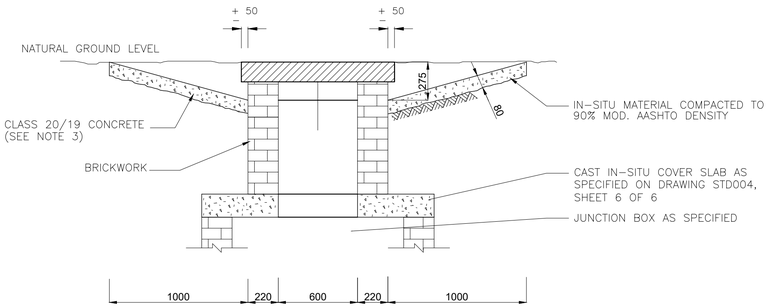


DETAIL OF PRECAST COVER SLAB

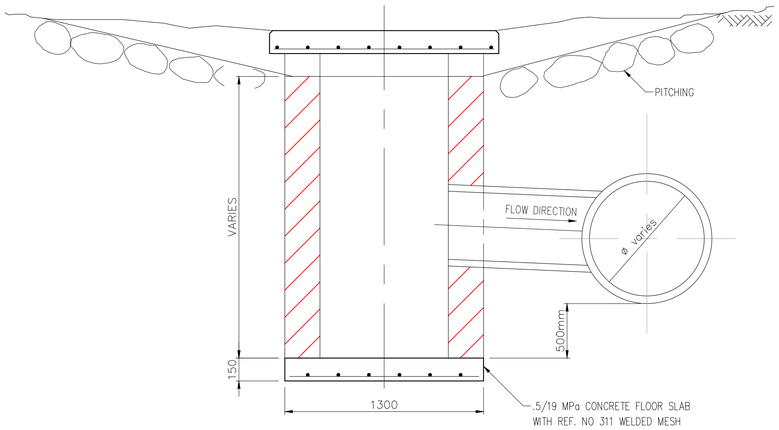


ENERGY BREAKER

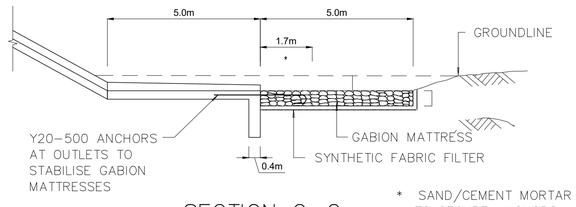
1: 40



SECTION A-A



FIELD INLET – DETAILS



SECTION G–G

1:40

* SAND/CEMENT MORTAR TO SECURE ANCHORS

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		SIGNATURE
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DRAWN BY	L MOJANAGA	
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DRAWING TITLE:	FIELD-INLET DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	RD	STD	007	T	00

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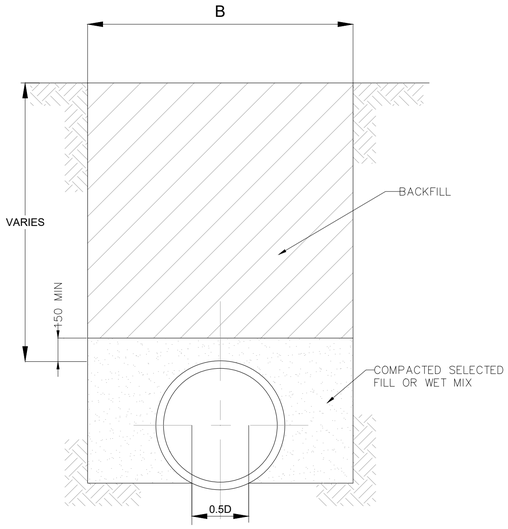
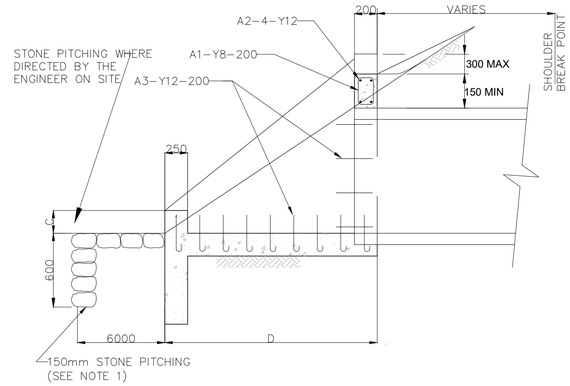


CLASS C PIPE BEDDING IN SOIL

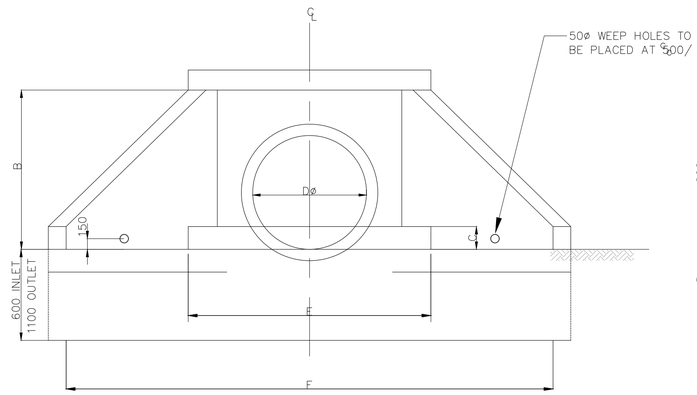
SCALE 1:20



SECTION A–A

(FOR DIMENSIONS SEE TABLE 1)
(FOR REINFORCEMENT SEE TABLE 2)

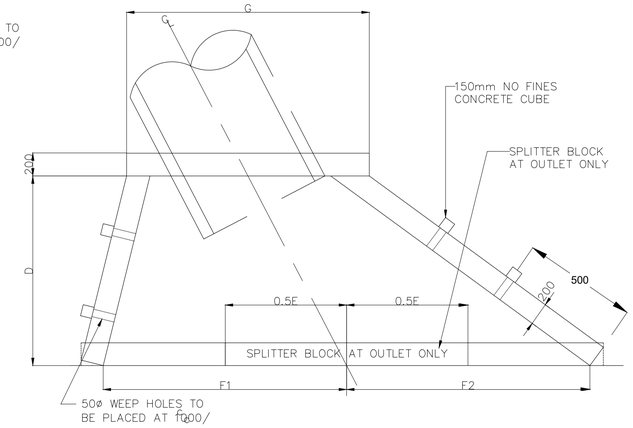
SCALE 1:20



FRONT ELEVATION – SINGLE PIPE

(FOR DIMENSIONS SEE TABLE 1)

SCALE 1:20



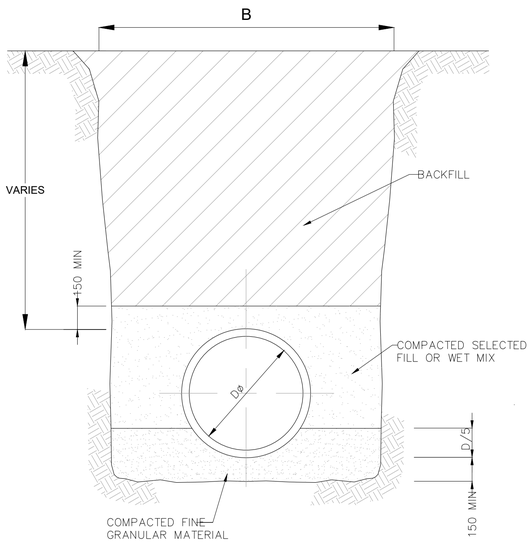
SKEW PIPE CULVERT

(FOR DIMENSIONS SEE TABLE 3)

SCALE 1:20

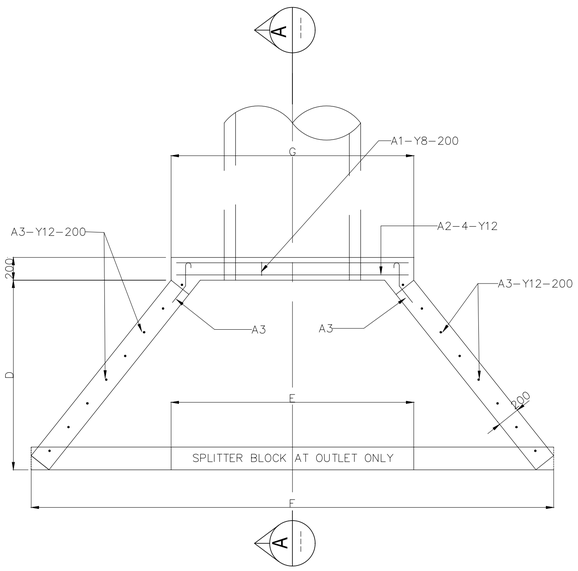
TABLE 3

NOMINAL DIAMETER	DIMENSIONS						
A	B	C	D	E	F1	F2	G
450	660	270	790	1140	1025	1025	1140
600	810	320	990	1300	1210	1210	1300
750	970	390	1160	1470	1410	1410	1470
900	1120	450	1340	1630	1590	1590	1630
1050	1280	510	1540	1800	1800	1800	1800
1200	1440	580	1730	1960	980	980	1960



CLASS C PIPE BEDDING IN ROCK

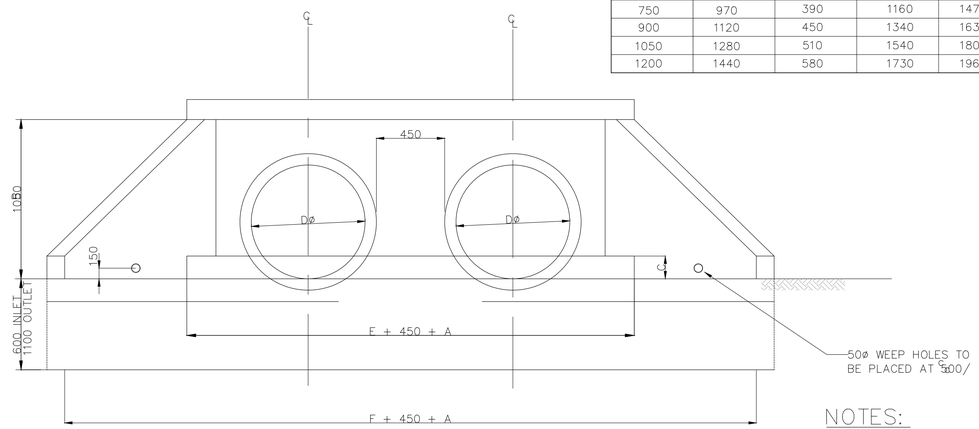
SCALE 1:20



PLAN

SCALE 1:20

(FOR DIMENSIONS SEE TABLE 1)
(FOR REINFORCEMENT SEE TABLE 2)



FRONT ELEVATION – MULTIPLE PIPES

(FOR DIMENSIONS SEE TABLE 1)

SCALE 1:20

	WIDTH 'B'	
Dø	SINGLE PIPE	DOUBLE PIPE
600	1600	2500
750	1750	2875
900	1900	3250

PIPE BEDDING DETAILS

TABLE 1

NOMINAL DIAMETER	DIMENSIONS					
A	B	C	D	E	F	G
450	660	270	790	1140	2050	1140
600	810	320	990	1300	2420	1300
750	970	390	1160	1470	2810	1470
900	1120	450	1340	1630	3180	1630
1050	1280	510	1540	1810	3570	1800
1200	1440	580	1730	1960	3960	1960

TABLE 2

ITEM	NUMBER	DIAMETER	CUT LENGTH	CODE	SHAPE
A1	VARIES	Y8	600	60	150 110
A2	4	Y12	VARIES	20	STRAIGHT
A3	VARIES	Y12	500	32	

NOTES:

1. INLET/OUTLET APPROACHES IN FILL CONDITION TO BE STONE PITCHED WHERE EROSION IS LIKELY TO OCCUR.
2. SPLITTER BLOCK MAY BE OMITTED IF DISCHARGE VELOCITY IS LESS THAN 1.50m/s AND PROVIDED AT OUTLETS ONLY.
3. CUT OFF WALLS MAY BE OMITTED IF STRUCTURE IS FOUNDED ON ROCK.
4. FOR MULTIPLE PIPE CULVERTS INCREASE DIMENSIONS "E" AND "F" BY (n–1(A+450))mm
   WHERE n = NUMBER OF PIPES
   WHERE A = NOMINAL DIAMETER OF PIPES
5. FOR SKEW PIPE CULVERTS THE HEADWALL SHALL BE PARALLEL TO THE CENTER LINE OF THE ROAD.
6. IF CORRUGATED METAL PIPES ARE USED 4 x 20mm x 150mm LONG GALVANISED ANCHOR BOLTS IN THE HOLLOWS OF THE CORRUGATIONS ARE TO BE USED.
7. ALL CONCRETE TO BE 20MPa. MIN COVER TO STEEL IS 40mm UNLESS OTHERWISE STATED.
8. SQUARE MESH FABRIC (REFERENCE S.M.F 311) TO BE PLACED CENTRALLY
9. DIMENSIONS IN TABLE 1 AND 3 ARE AS PER MANUFACTURING STANDARD OF ROCLA PIPE CULVERT TYPE SC TO SABS .

FOR TENDER

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DRAWN BY	L MOJANAGA	
CHECKED BY	H.L. THARAGA	

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CONSULTING ENGINEER — DATE

PROFESSIONAL REGISTRATION No.

EMPLOYER'S PROJECT MANAGER — DATE

CONTRACT NO.: BM07/23/24

PROJECT TITLE: APPOINTMENT AS CIVIL ENGINEERING CONSULTANTS FOR REHABILITATION OF ALLDAY INTERNAL STREETS AND STORMWATER CONTROL

DRAWING TITLE: HEADWALL AND BEDDING DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	RD	STD	008	T	00

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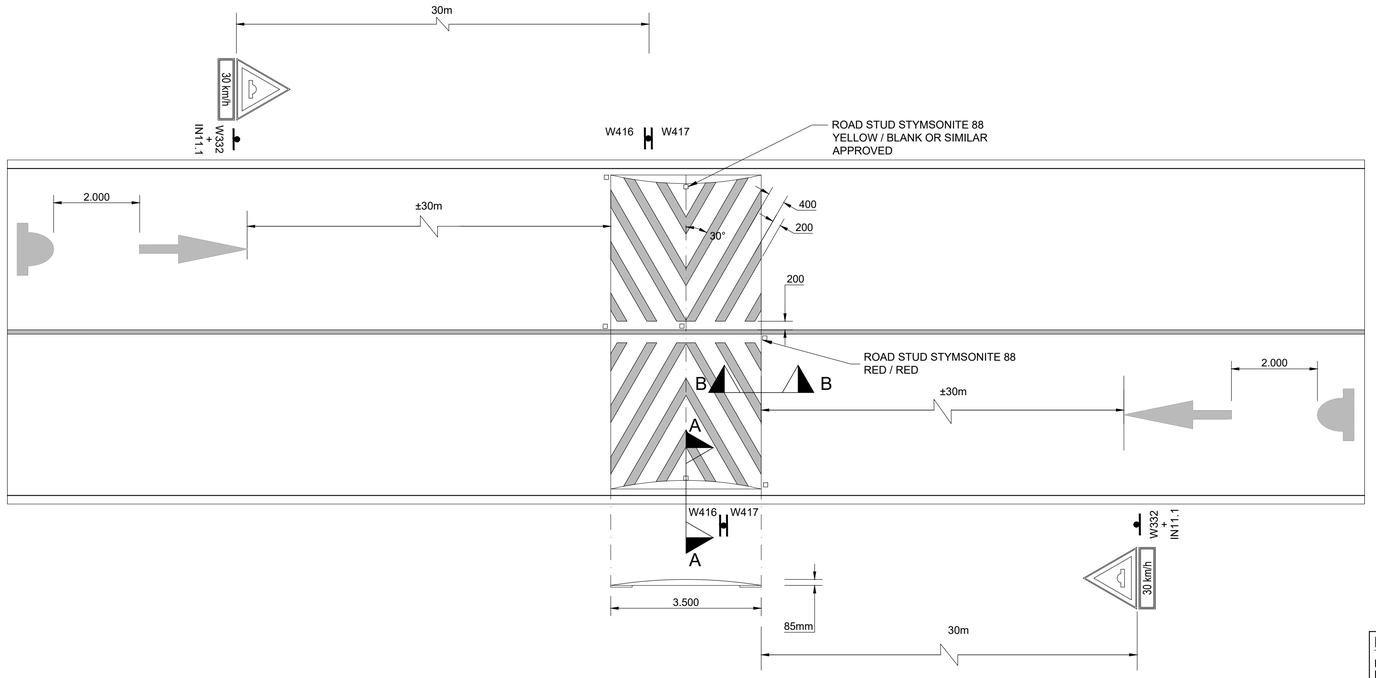
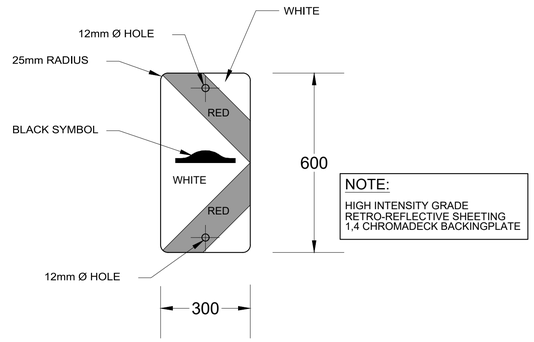


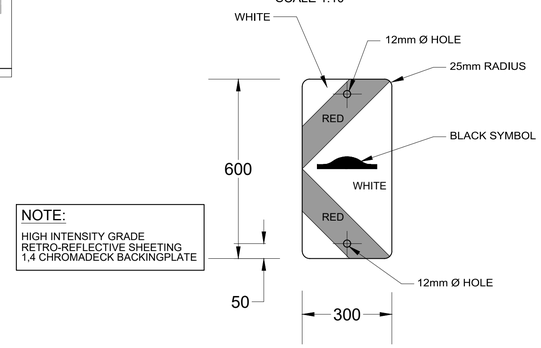
PLAN OF SPEED HUMP

SCALE 1:100



DANGER PLATE SPEEDHUMP (LEFT)
W416

SCALE 1:10



DANGER PLATE SPEEDHUMP (RIGHT)
W417

SCALE 1:10

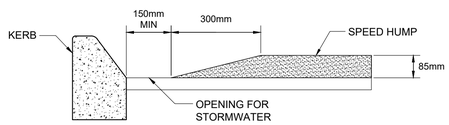
NOTES

CONSTRUCTION METHOD:

1. Setting out of hump - few days before construction.
2. Saw cuts one to two days before construction.

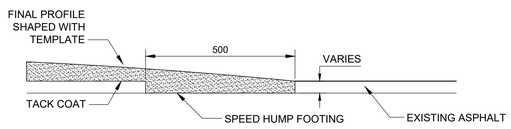
ON CONSTRUCTION DAY:

3. Remove 500 mm asphalt strips.
4. Start erecting road signs and paint warning road marking.
5. Place asphalt in strips and compact with two passes without vibrator.
6. Place templates - both sides of one lane at a time.
7. Place asphalt and rake till slightly higher than templates.
8. Shape asphalt with straight edge (channel section 6 m long).
9. Remove templates and compact without vibrator (three passes)
10. Measure profile and rectify if necessary.
11. Final compaction with three to four passes with vibrator.
12. Place road studs.
13. Paint speed hump the next day.

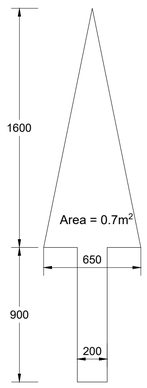


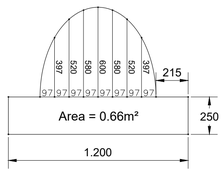
SECTION A-A:
CONSTRUCTION DETAIL OF SPEED HUMP

SCALE 1: 100



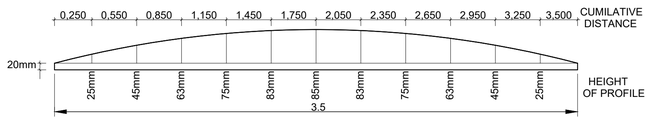
SECTION B-B:
CONSTRUCTION DETAIL OF SPEED HUMP



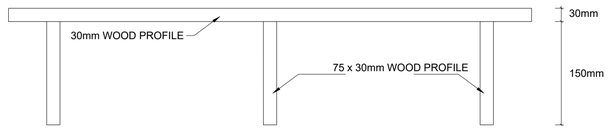


DETAIL OF SPEED HUMP ROAD MARKING

SCALE 1: 20



SIDE ELEVATION



PLAN

TEMPLATE DETAIL FOR CONSTRUCTION OF SPEED HUMP

FOR TENDER

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DESIGNED BY	R.R. RAVELE	
DRAWN BY	L MOJANAGA	
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DRAWING TITLE:	SPEED HUMP DETAILS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	RD	STD	009	T	00

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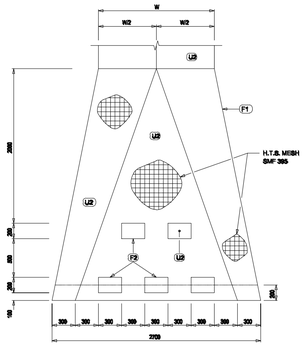
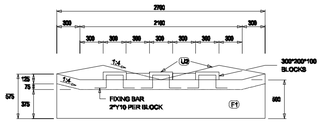
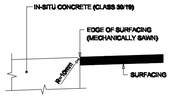


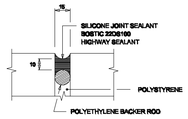
PLAN OF ENERGY BREAKER
SCALE 1:20



FRONT ELEVATION OF ENERGY BREAKER
SCALE 1:20

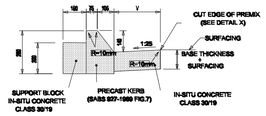


DETAIL X
SCALE 1:5

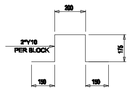


EXPANSION JOINT
SCALE : SCHEMATIC

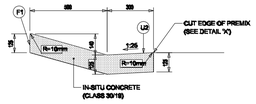
NOTE: EXPANSION JOINT EVERY 5th PANEL (10m)



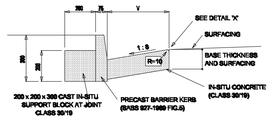
CROSS SECTION OF TYPE B SEMI MOUNTABLE KERB
AT INTERSECTIONS
SCALE 1:10



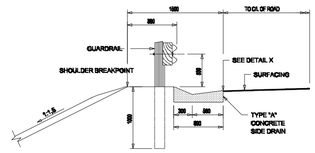
FIXING BAR
SCALE 1:10



CROSS SECTION OF TYPE C MOUNTABLE KERB
AT RURAL INTERSECTIONS
SCALE 1:10

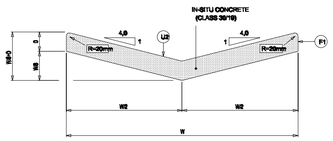


TYPE B1 KERB
SECTION THROUGH BARRIER KERB (FIG 5)
SCALE 1:10

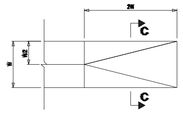


POSITION OF TYPE "A" CONCRETE SIDE DRAIN
SCALE 1:25

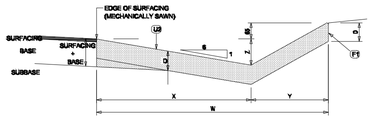
DETAIL OF ENERGY BREAKER SYSTEM AT DISCHARGE POINT OF TYPE 'F' CONCRETE SIDE DRAIN



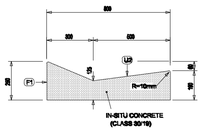
CROSS SECTION OF TYPE E CONCRETE CHANNEL IN OPEN DRAINS
SCALE : SCHEMATIC



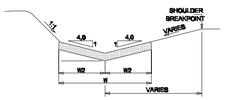
BEGINNING OF TYPE 'E' CONCRETE DRAIN
SCALE : SCHEMATIC



CROSS SECTION OF TYPE 'F' CONCRETE SIDE DRAIN IN CUTTINGS
SCALE : SCHEMATIC

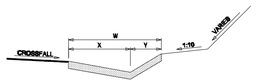


CROSS SECTION OF TYPE "A"
CONCRETE SIDE DRAIN
SCALE 1:10

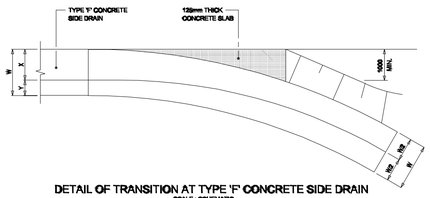


POSITION OF TYPE 'E' CONCRETE DRAIN
IN SHALLOW CUT
SCALE : SCHEMATIC

SECTION C-C
SCALE 1:20



POSITION OF TYPE 'F' CONCRETE SIDE DRAIN
SCALE : SCHEMATIC



DETAIL OF TRANSITION AT TYPE 'F' CONCRETE SIDE DRAIN
SCALE : SCHEMATIC

CASE(m)	W	W/2	W/8	D	W/8+D	VOLUME m³/m
1	1000	500	125	125	250	0.1250
2	1500	750	188	125	313	0.1875
3	2000	1000	250	150	400	0.3000
4	2500	1250	313	150	463	0.3750

DIMENSIONS OF TYPE E CONCRETE CHANNELS

CASE(m)	W	X	Y	Z	D	VOLUME m³/m²
1	1000	670	330	110	125	0.1250
2	1500	1000	500	170	125	0.1875
3	2000	1330	670	220	150	0.3000
4	2500	1670	830	280	150	0.3750

DIMENSIONS OF TYPE F CONCRETE CHANNELS

NOTES

1. ALL CONCRETE CHANNELS AND OTHER DRAINAGE STRUCTURES ON THIS PLAN TO BE CAST USING CLASS 30/19 CONCRETE
2. TYPES 'E' AND 'F' CONCRETE MUST BE CAST IN ALTERNATIVE LENGTHS OF 2.0 m MAXIMUM WITH EXPANSION JOINTS EVERY 5th PANEL (10 m)
3. ALL EXPOSED CORNERS MUST BE ROUNDED OFF TO A RADIUS OF 10 mm
4. THE CLASS OF SURFACE FINISH IS INDICATED AS 'F1' OR 'U2'
5. V MIN. = 150mm (PREFERRED = 300mm)

1m 0m 1m 2m 3m 4m 5m 6m 7m 8m 9m 10m 11m 12m 13m 14m
ORIGINAL SCALE: 1 : 100

FOR TENDER

No	DATE	DESCRIPTION	ISSUED BY
00	03/2024	INITIAL ISSUE	FIM

		SIGNATURE
DESIGNED BY	R.R. RAVELE	
DRAWN BY	L MOJANAGA	
CHECKED BY	H.L. THARAGA	

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Email : info@sizeya.co.za

CONSULTING ENGINEER — DATE
PROFESSIONAL REGISTRATION No.
EMPLOYER'S PROJECT MANAGER — DATE

CONTRACT NO.:	BM07/23/24
PROJECT TITLE:	APPOINTMENT AS CIVIL ENGINEERING CONSULTANTS FOR REHABILITATION OF ALLDAY INTERNAL STREETS AND STORMWATER CONTROL
DRAWING TITLE:	DRAIN DETAILS

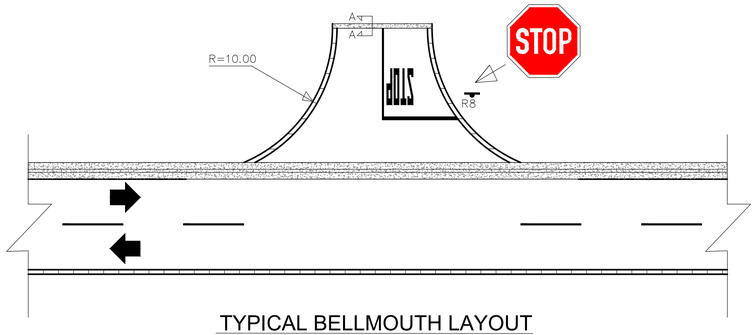
SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

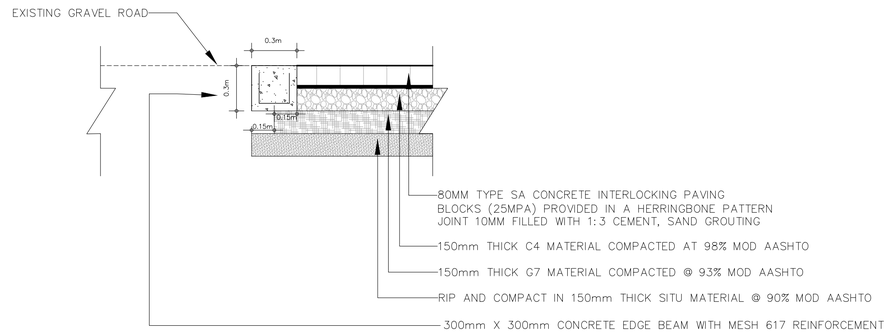
CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S35.5	RD	STD	010	C	00

PD: PRELIMINARY DESIGN / DD: DETAILED DESIGN / T: TENDER / C: CONSTRUCTION / A: AS-BUILT / I: FOR INFORMATION ONLY



TYPICAL BELLMOUTH LAYOUT



SECTION A-A

FOR TENDER

No	DATE	DESCRIPTION	ISSUED BY
00	03/2024	INITIAL ISSUE	FIM

		SIGNATURE
DESIGNED BY	R.R. RAVELE	
DRAWN BY	L MOJANAGA	
CHECKED BY	H.L. THARAGA	

CLIENTS DETAILS

BLOUBERG MUNICIPALITY

P.O Box 1593
SENWABARANA
0790

Tel: +27(15) 502 7100

CONSULTANTS DETAILS

SIZEYA CONSULTING ENGINEERS
civil engineers | quantity surveyors
structural engineers | project managers

No. 6 Hans Van Rensburg Street
Office no. 14
Private Bag X9676. Postnet Suite 141
Polokwane 0700
Tel : (015) 291 1020
Email : info@sizeya.co.za

CONSULTING ENGINEER — DATE

PROFESSIONAL REGISTRATION No.

EMPLOYER'S PROJECT MANAGER — DATE

CONTRACT NO.:	BM07/23/24
PROJECT TITLE:	APPOINTMENT AS CIVIL ENGINEERING CONSULTANTS FOR REHABILITATION OF ALLDAY INTERNAL STREETS AND STORMWATER CONTROL
DRAWING TITLE:	INTERSECTIONS

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
S33.3	RD	STD	010	DD	00

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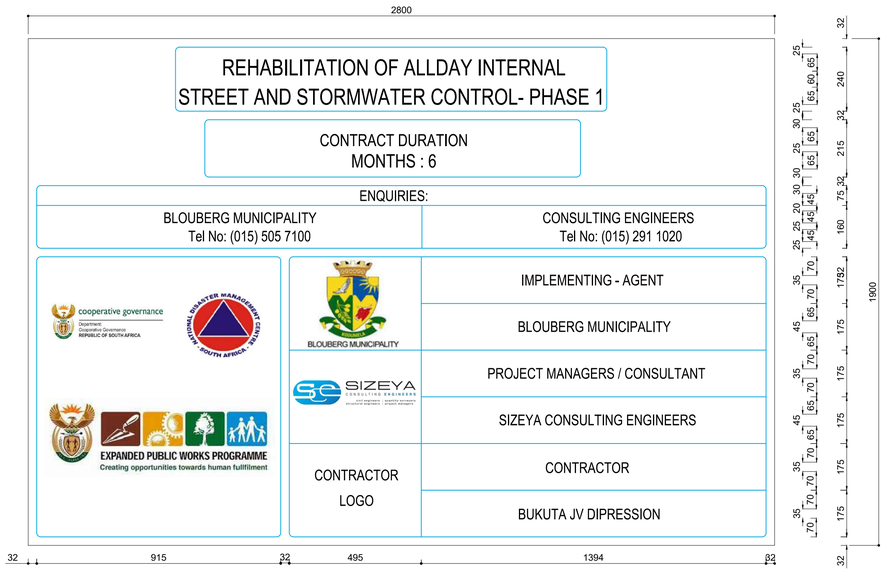
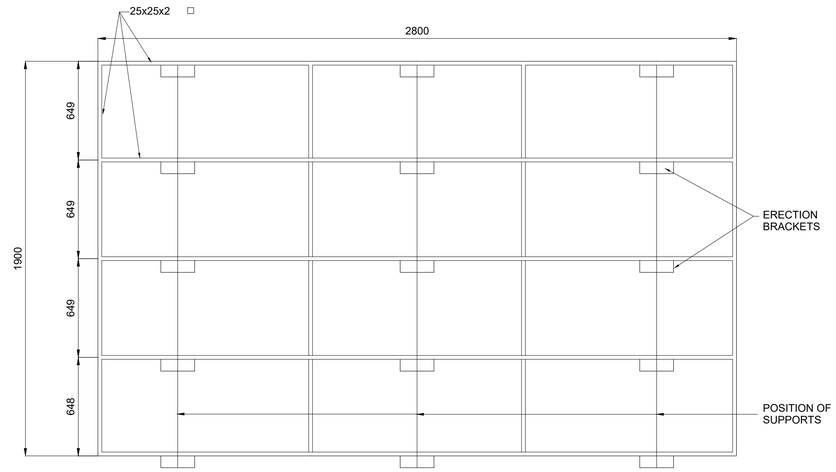


FRONT ELEVATION

N.T.S.



REAR SIDE BRACING

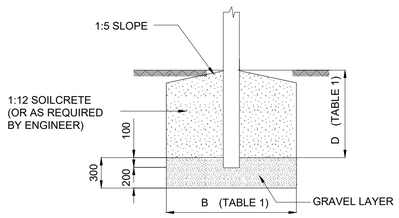
N.T.S.

SIGN BOARD DETAIL

NOTE:

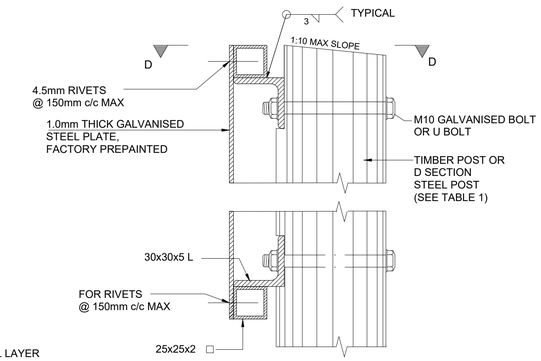
1. ALL EMBLEMS TO BE DISPLAYED IN FULL COLOUR ON A SEMI-MATT BACKGROUND.
2. DESCRIPTION: MATT-BLACK, SERIES DIN B LETTERS AND NUMBERS ON A SEMI-MATT BLUE BACKGROUND (PANTONE 429U).
3. BORDER : WHITE NON-REFLECTORIZED.
4. TWO SIGN BOARDS SHALL BE ERECTED AS DETERMINED BY THE ENGINEER.
5. SAFCEC EMBLEM ONLY, IF CONTRACTOR IS A MEMBER, ALL OTHER CASES, INCLUDING DEPARTMENTAL CONSTRUCTION, REMAIN BLANK.

TABLE 1				
ERECTION DETAILS				
TYPE POST	UPRIGHT	STAY	D	B
TIMBER POST AND STAY	80mm	80mm	600mm	750mm
TIMBER POST	160mm	-	900mm	1350mm
D SECTION STEEL POST	100mm x 4mm	-	900mm	1350mm



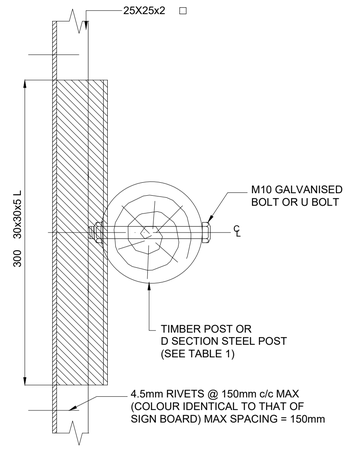
FOUNDATION DETAIL

N.T.S.



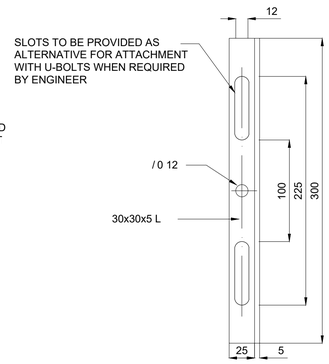
SIDE ELEVATION

N.T.S.



PLAN: SECTION D-D

N.T.S.



ELEVATION
ERECTION BRACKET

N.T.S.

FIXING DETAIL

FOR TENDER

No	DATE	DESCRIPTION	ISSUED BY
00	03/2024	INITIAL ISSUE	FIM

		SIGNATURE
DESIGNED BY	R.R. RAVELE	
DRAWN BY	L MOJANAGA	
CHECKED BY	H.L. THARAGA	

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EMPLOYER'S PROJECT MANAGER — DATE

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DRAWING TITLE:	CONTRACT NAMEBOARD

SHEET 1 OF 1

DRAWING SCALE
AS SHOWN

CONSULTANTS DRAWING No.:

PROJECT No.	DISCIPLINE	SUB-DISCIPLINE	DWG No.	STAGE	REV No.
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