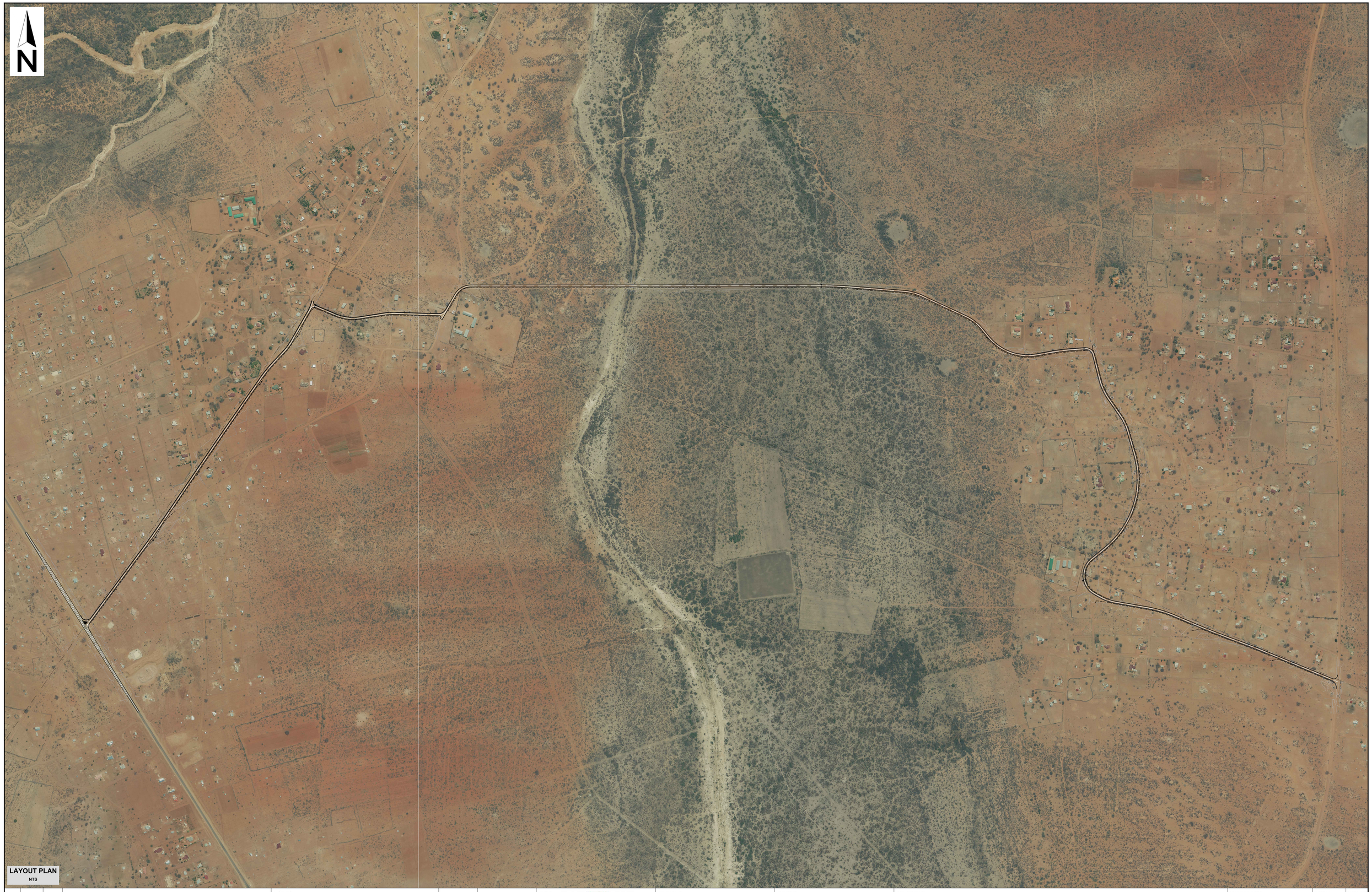


MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg.Nº. 2006/015088/07

SUITE 228
POSTNET X9307
POLOKWANE
0070

Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME:

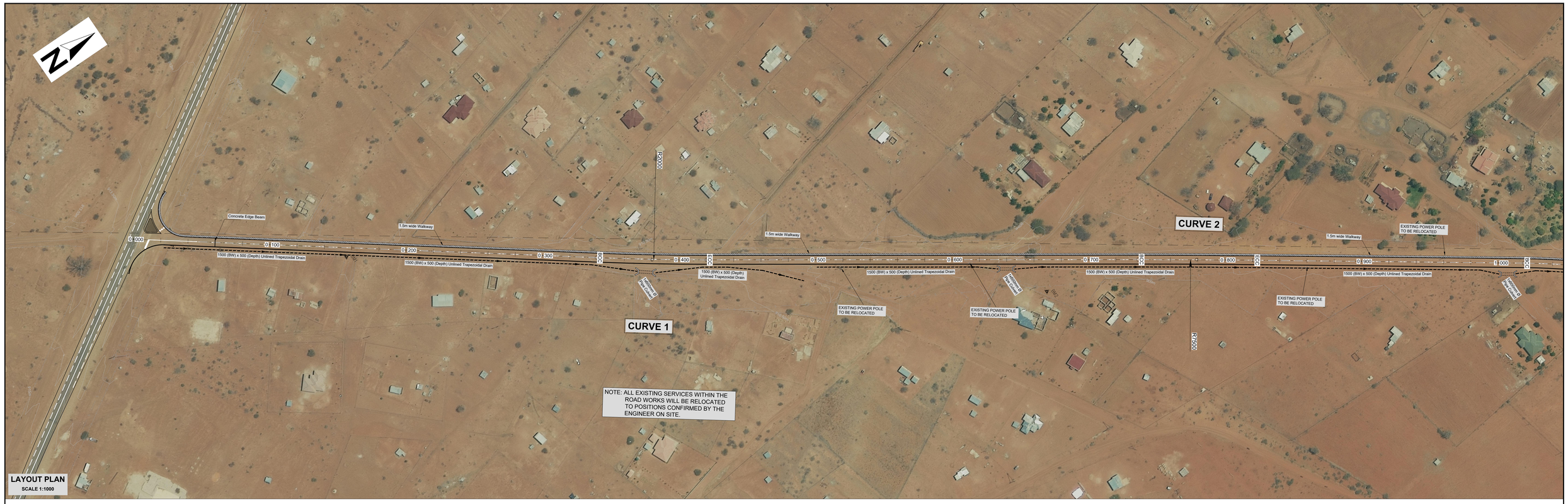
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

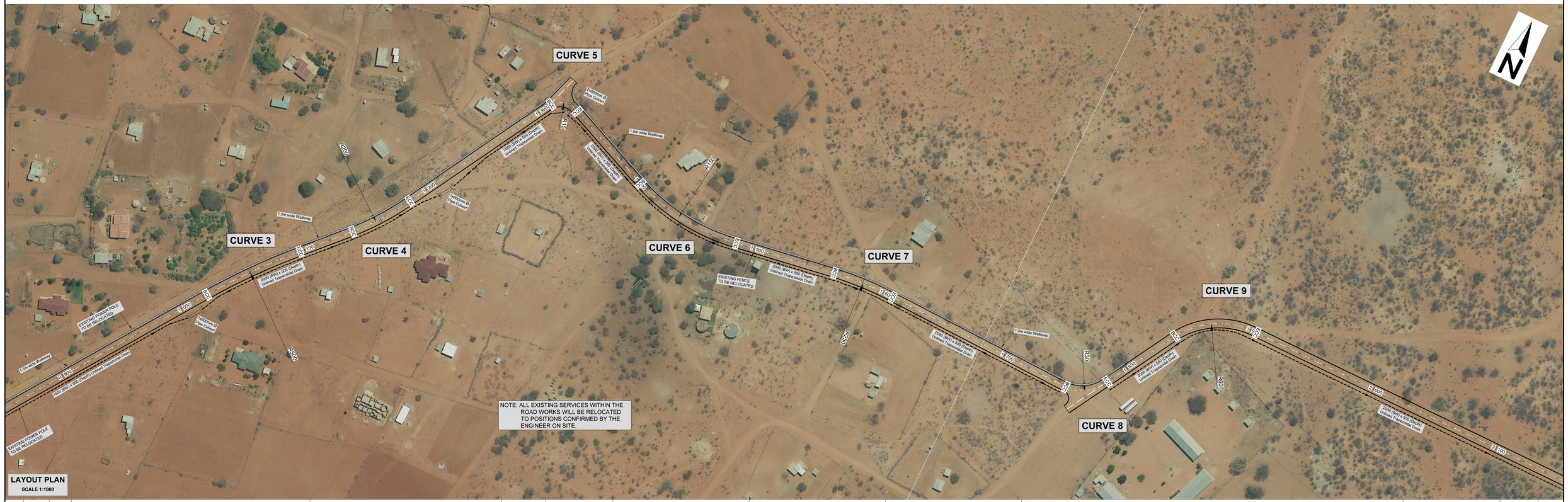
OVERALL LAYOUT PLAN:

KM 0,000 TO KM 5,843

DRAWING NUMBER: SMV-LET-PIC-100	SHEET No.: SHEET 1 OF 1	PAPER SIZE: A0
SMV PROJECT NUMBER	SCALE: AS SHOWN	
CONTRACT No.	DATE: 2023.04.18	REV No.: B



LAYOUT PLAN
SCALE 1:1000



LAYOUT PLAN
SCALE 1:1000

MARK	DATE	INITIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

SMV CIVIL ENGINEERS (PTY) LTD
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Reg.Nº. 2006/01608/07
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ARCHITECT:

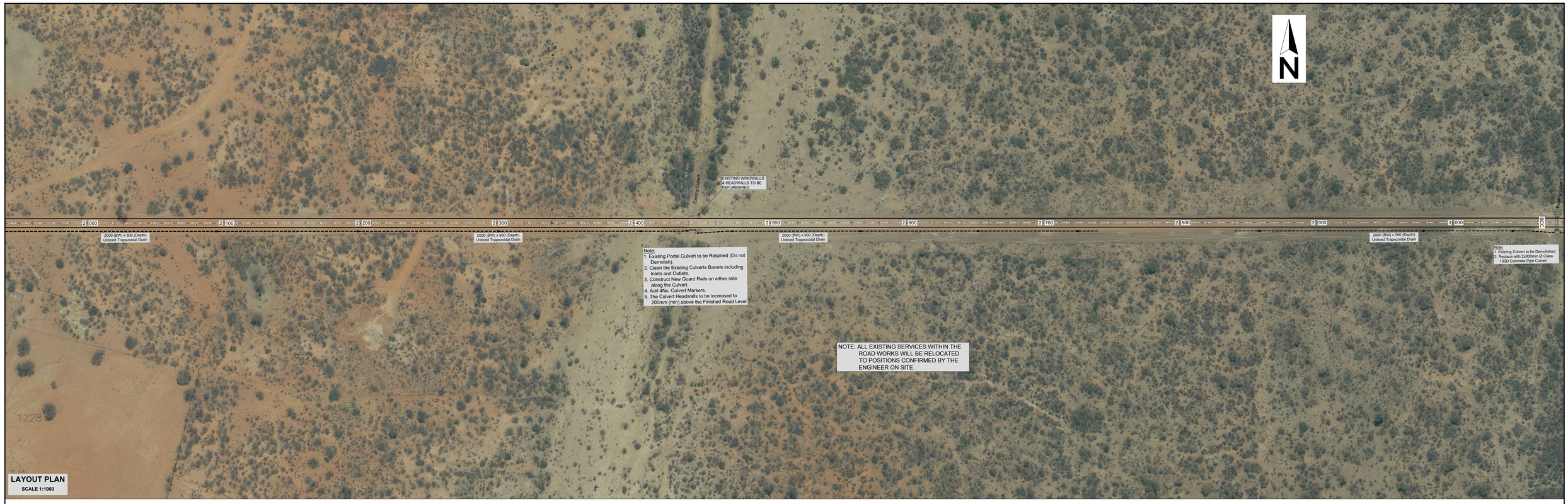
PROJECT NAME:

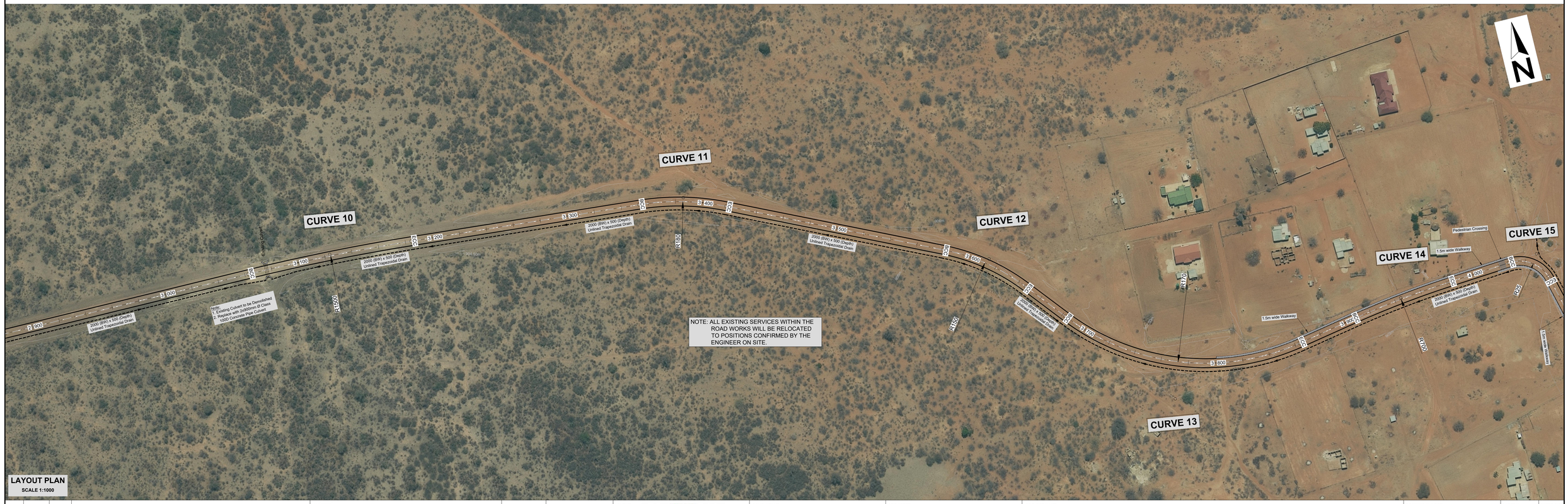
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

LAYOUT PLAN:
KM 0,000 TO KM 2,000

DRAWING NUMBER: SMV-LET-PIC-101	SHEET No.: SHEET 1 OF 3	PAPER SIZE: A0
SMV PROJECT NUMBER	SCALE: AS SHOWN	
CONTRACT No.	DATE: 2023.04.18	REV No.: B





MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

SEBEGO, MALOKA & VILJOEN (PTY) LTD
CIVIL ENGINEERS
Reg.Nº. 2006/01608/07
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Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME:

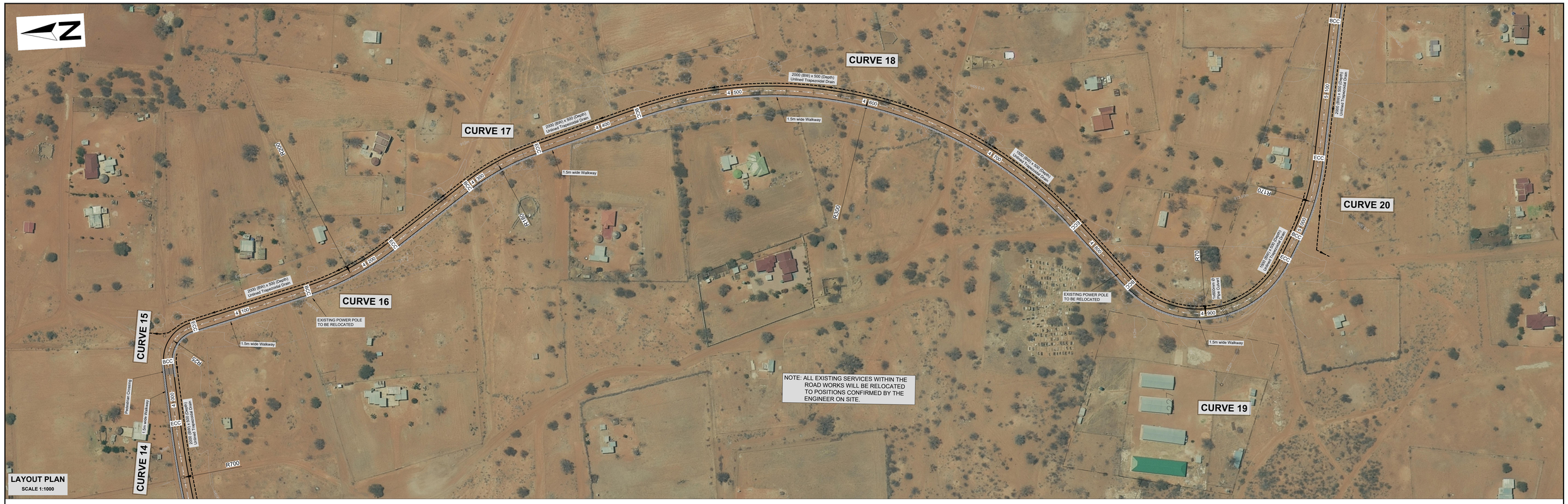
LETHALENG TO PICKUM ROAD UPGRADING

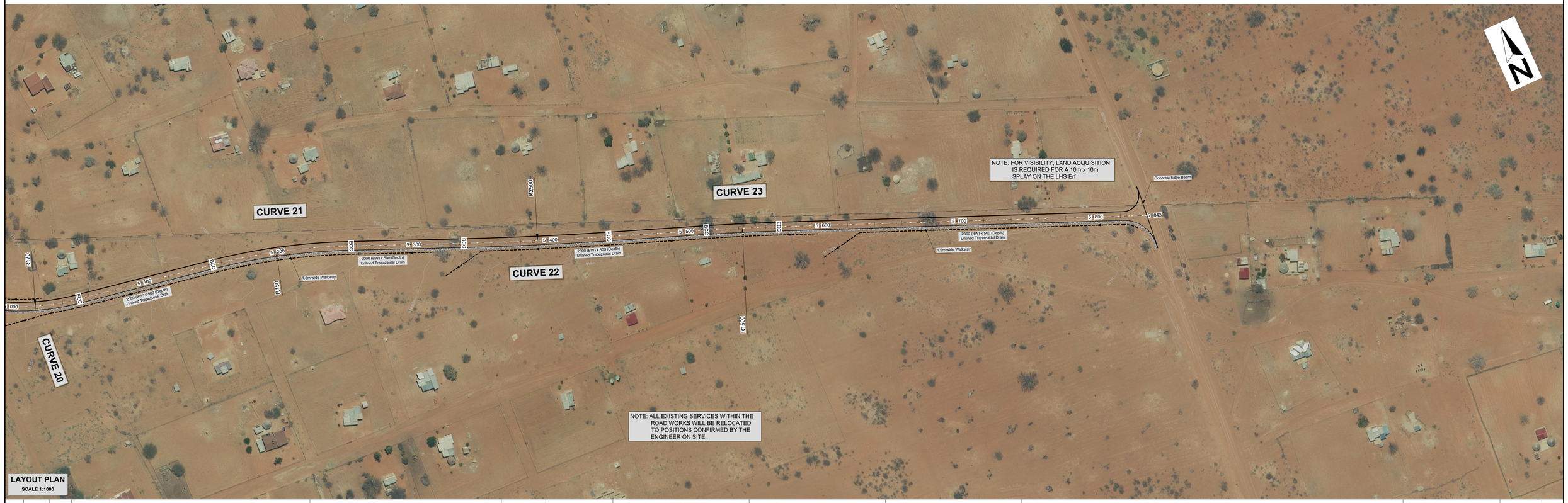
DRAWING TITLE:

LAYOUT PLAN:

KM 2,000 TO KM 4,000

DRAWING NUMBER	SHEET No.	PAPER SIZE
SMV-LET-PIC-102	SHEET 2 OF 3	A0
SMV PROJECT NUMBER	SCALE	
	AS SHOWN	
CONTRACT No.	DATE	REV No.
	2023.04.18	B





MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT: SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg.Nº. 2006/01608/07
SUITE 228
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POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

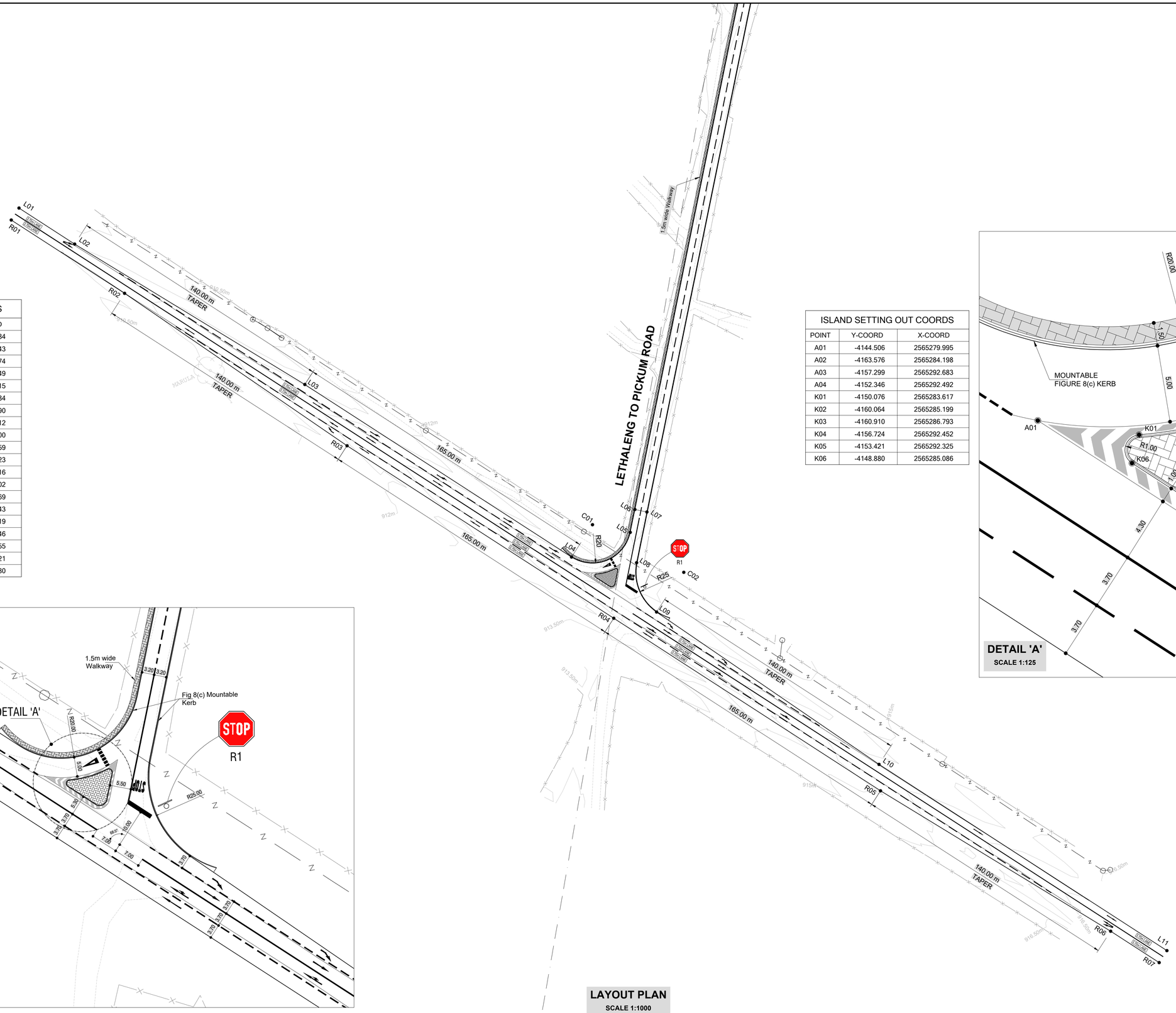
PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **LAYOUT PLAN: KM 4,000 TO KM 5,843**

DRAWING NUMBER: SMV-LET-PIC-103	SHEET No.: SHEET 3 OF 3	PAPER SIZE: A0
SMV PROJECT NUMBER	SCALE: AS SHOWN	
CONTRACT No.	DATE: 2023.04.18	REV No.: B

NOTES

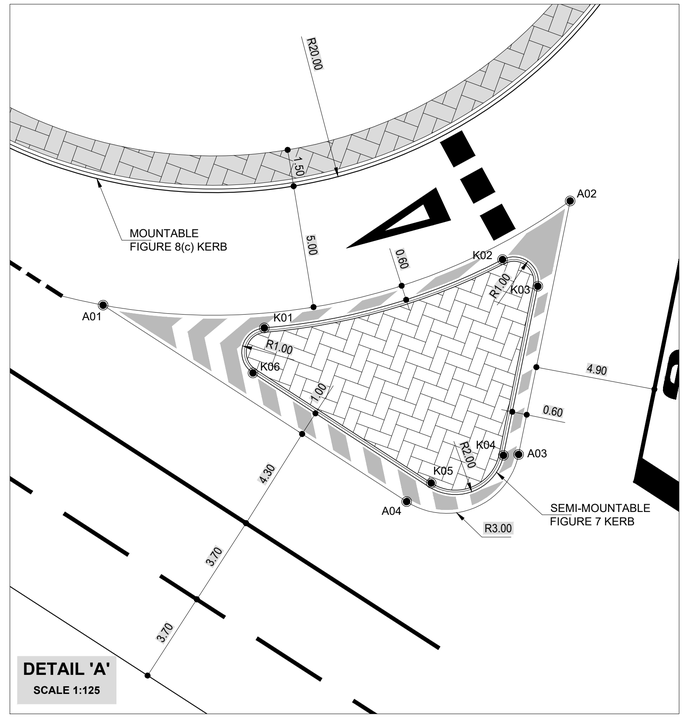
1. ALL ROAD MARKINGS AND SIGN POSTING TO BE IN ACCORDANCE THE SOUTH AFRICAN ROAD TRAFFIC SIGNS MANUAL.
2. EXISTING ROAD MARKING ARE TO BE REMOVED BY SANDBLASTING.
3. ALL TIE-IN COORDINATES TO BE CONFIRMED ON SITE PRIOR TO COMMENCEMENT OF THE WORKS



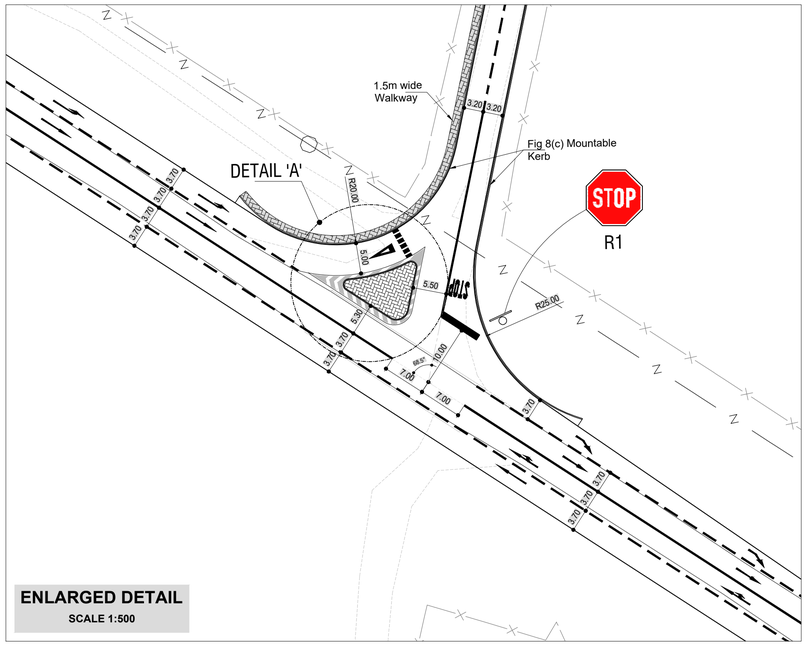
LAYOUT PLAN
SCALE 1:1000

SETTING OUT COORDINATES		
POINT	Y-COORD	X-COORD
L01	-3958.548	2564984.684
L02	-3976.840	2565013.843
L03	-4054.371	2565130.474
L04	-4142.052	2565270.249
L05	-4175.073	2565271.515
L06	-4182.271	2565261.784
L07	-4187.417	2565265.590
L08	-4171.422	2565287.212
L09	-4169.999	2565314.800
L10	-4241.258	2565435.359
L11	-4335.895	2565586.223
R01	-3952.279	2564988.616
R02	-3989.532	2565048.002
R03	-4060.797	2565168.569
R04	-4148.477	2565308.343
R05	-4236.159	2565448.119
R06	-4313.687	2565564.746
R07	-4329.626	2565590.155
C01	-4158.994	2565259.621
C02	-4191.520	2565302.080

ISLAND SETTING OUT COORDS		
POINT	Y-COORD	X-COORD
A01	-4144.506	2565279.995
A02	-4163.576	2565284.198
A03	-4157.299	2565292.683
A04	-4152.346	2565292.492
K01	-4150.076	2565283.617
K02	-4160.064	2565285.199
K03	-4160.910	2565286.793
K04	-4156.724	2565292.452
K05	-4153.421	2565292.325
K06	-4148.880	2565285.086



DETAIL 'A'
SCALE 1:125



ENLARGED DETAIL
SCALE 1:500

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT: SMV CIVIL ENGINEERS (PTY) LTD — SEBEGO, MALOKA & VILJOEN — Reg N°. 2004/014666/07

SUITE 228
POSTNET X9307
POLOKWANE
0070

Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **LETHALENG TO PICKUM ROAD / PROVINCIAL ROAD INTERSECTION LAYOUT PLAN**

DRAWING NUMBER	SMV-LET-PIC-104
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.24
REV No.	B

LAYOUT PLAN
SCALE 1:1000

CURVE SETTING OUT DATA

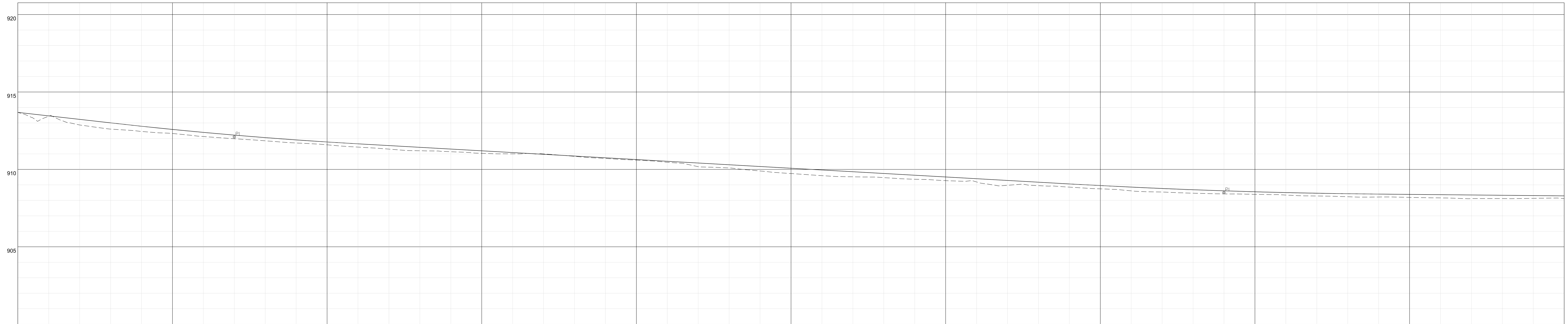
NAME	CH	Y	X	DETAILS
BCC1 PI1 ECC1	340.021 420.494	-4 356.926 -4 380.858 -4 403.470	2 565 031.070 2 564 998.718 2 564 965.430	R 2 000.000m DA 2°18'20" TL 40.242m AL 80.473m
BCC2 PI2 ECC2	736.790 821.550	-4 581.197 -4 605.010 -4 629.218	2 564 703.788 2 564 668.731 2 564 633.945	R 7 500.000m DA 0°38'50" TL 42.381m AL 84.760m

SETTING OUT COORDINATES

POINT	Y	X
0	-4154.708	2565304.424
100	-4214.180	2565224.031
200	-4273.652	2565143.638
300	-4333.124	2565063.244
400	-4391.868	2564982.323
500	-4448.144	2564899.662

SETTING OUT COORDINATES

POINT	Y	X
600	-4504.334	2564816.942
700	-4560.524	2564734.221
800	-4616.934	2564651.651
900	-4674.030	2564569.553
1000	-4731.151	2564487.473



SCALES:
Horizontal 1:1000
Vertical 1:100

DATUM 900.000

VERTICAL PROFILE GRADES

BVC 60.000 — VCL=160.000m K=282 — EVC 220.000
-1.130% — 140.000 | 912.100 — -0.563%
BVC 680.000 — VCL=200.000m K=429 — EVC 880.000
780.000 | 908.500 — -0.096%

FINAL DESIGN ROAD LEVELS

DISTANCE (m)	0	20	40	60	80	100	120	140	160	180	200	220	240
HL 3,1m LEFT	913.620	913.394	913.168	912.942	912.723	912.518	912.328	912.152	911.989	911.841	911.708	911.588	911.476
CENTRE LINE	913.682	913.456	913.230	913.004	912.785	912.580	912.390	912.214	912.051	911.903	911.770	911.650	911.538
HL 3,1m RIGHT	913.620	913.394	913.168	912.942	912.723	912.518	912.328	912.152	911.989	911.841	911.708	911.588	911.476
GROUND LEVELS ON CENTRE LINE	913.682	913.433	912.869	912.602	912.449	912.318	912.123	911.980	911.848	911.706	911.586	911.439	911.309

DISTANCE (m)	260	280	300	320	340	360	380	400	420	440	460	480	500
HL 3,1m LEFT	911.363	911.250	911.138	911.026	910.913	910.800	910.688	910.576	910.463	910.350	910.238	910.126	910.013
CENTRE LINE	911.425	911.312	911.200	911.088	910.975	910.862	910.750	910.638	910.525	910.412	910.300	910.188	910.075
HL 3,1m RIGHT	911.363	911.250	911.138	911.026	910.913	910.800	910.688	910.576	910.463	910.350	910.238	910.126	910.013
GROUND LEVELS ON CENTRE LINE	911.203	911.141	911.039	911.003	911.001	910.843	910.705	910.597	910.459	910.176	910.093	909.899	909.732

DISTANCE (m)	520	540	560	580	600	620	640	660	680	700	720	740	760
HL 3,1m LEFT	909.900	909.788	909.676	909.563	909.450	909.338	909.226	909.113	909.000	908.893	908.794	908.705	908.625
CENTRE LINE	909.962	909.850	909.738	909.625	909.512	909.400	909.288	909.175	909.062	908.955	908.856	908.767	908.687
HL 3,1m RIGHT	909.900	909.788	909.676	909.563	909.450	909.338	909.226	909.113	909.000	908.893	908.794	908.705	908.625
GROUND LEVELS ON CENTRE LINE	909.597	909.521	909.468	909.364	909.272	909.190	908.973	908.949	908.856	908.744	908.613	908.540	908.464

DISTANCE (m)	780	800	820	840	860	880	900	920	940	960	980	1000
HL 3,1m LEFT	908.555	908.493	908.442	908.399	908.366	908.342	908.323	908.303	908.284	908.265	908.246	908.248
CENTRE LINE	908.617	908.555	908.504	908.461	908.428	908.404	908.385	908.365	908.346	908.327	908.308	908.288
HL 3,1m RIGHT	908.555	908.493	908.442	908.399	908.366	908.342	908.323	908.303	908.284	908.265	908.246	908.226
GROUND LEVELS ON CENTRE LINE	908.418	908.390	908.344	908.282	908.233	908.215	908.192	908.159	908.112	908.117	908.129	908.113

SUPERELEVATION
LEFT ·······
RIGHT — —
-2.0%
-2.0%

HORIZONTAL ALIGNMENT
DIRECTION 216° 29' 30" — BCC 340.021 — R=2000.000m I=215° 20' 20" — ECC 420.494 — DIRECTION 214° 11' 10" — BCC 736.790 — R=7500.000m I=214° 30' 40" — ECC 821.550 — DIRECTION 214° 50' 10"

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:
BLOUBERG MUNICIPALITY

CONSULTANT:
SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg.Nº. 2006/015058/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:
LAYOUT AND LONGITUDINAL SECTION:
KM 0,000 TO KM 1,000

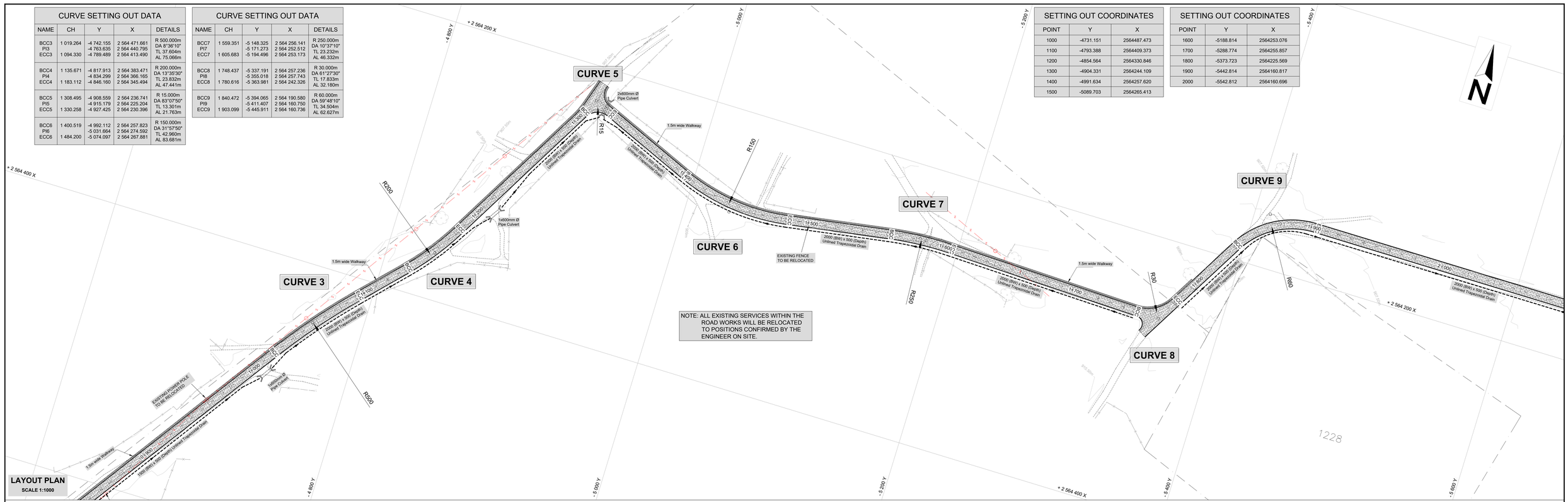
DRAWING NUMBER: SMV-LET-PIC-201	SHEET No.: SHEET 1 OF 6	PAPER SIZE: A0
SMV PROJECT NUMBER:	SCALE: AS SHOWN	
CONTRACT No.:	DATE: 2023.04.18	REV No.: B

CURVE SETTING OUT DATA				
NAME	CH	Y	X	DETAILS
BCC3 PI3 ECC3	1 019.264 1 094.330	-4 742.155 -4 763.635 -4 789.489	2 564 471.661 2 564 440.795 2 564 413.490	R 500.000m DA 8°36'10" TL 37.604m AL 75.066m
BCC4 PI4 ECC4	1 135.671 1 183.112	-4 817.913 -4 834.299 -4 846.160	2 564 383.471 2 564 366.165 2 564 345.494	R 200.000m DA 13°35'30" TL 23.832m AL 47.441m
BCC5 PI5 ECC5	1 308.495 -4 915.179 1 330.258	-4 908.559 -4 927.425	2 564 236.741 2 564 225.204 2 564 230.396	R 15.000m DA 83°07'50" TL 13.301m AL 21.763m
BCC6 PI6 ECC6	1 400.519 -5 031.664 1 484.200	-4 992.112 -5 074.097	2 564 257.823 2 564 274.592 2 564 267.881	R 150.000m DA 31°57'50" TL 42.960m AL 83.681m

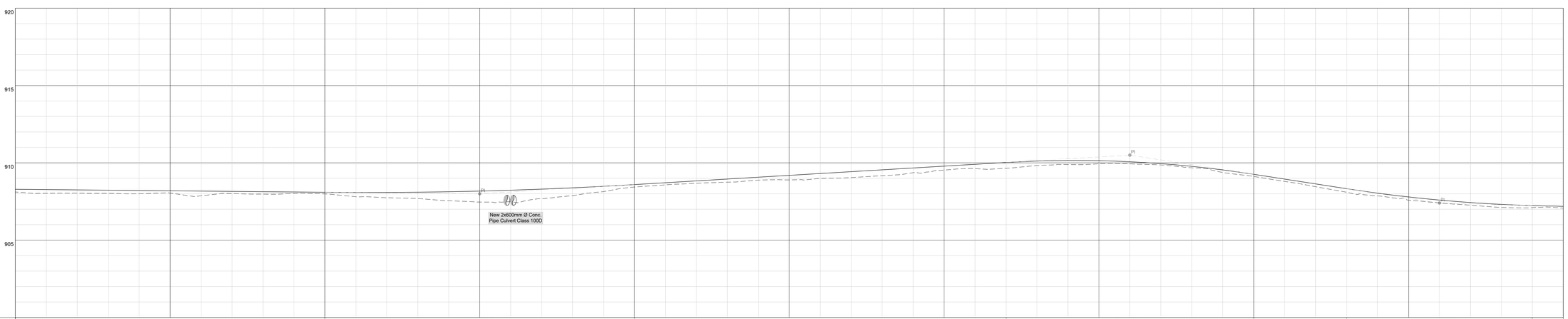
CURVE SETTING OUT DATA				
NAME	CH	Y	X	DETAILS
BCC7 PI7 ECC7	1 559.351 1 605.683	-5 148.325 -5 171.273 -5 194.496	2 564 256.141 2 564 252.512 2 564 253.173	R 250.000m DA 10°37'10" TL 23.232m AL 46.332m
BCC8 PI8 ECC8	1 748.437 1 780.616	-5 337.191 -5 355.018 -5 363.981	2 564 257.236 2 564 257.743 2 564 242.326	R 30.000m DA 61°27'30" TL 17.833m AL 32.180m
BCC9 PI9 ECC9	1 840.472 -5 394.065 1 903.099	-5 411.407 -5 445.911	2 564 190.580 2 564 160.750 2 564 160.736	R 60.000m DA 59°48'10" TL 34.504m AL 62.627m

SETTING OUT COORDINATES		
POINT	Y	X
1000	-4731.151	2564487.473
1100	-4793.388	2564409.373
1200	-4854.564	2564330.846
1300	-4904.331	2564244.109
1400	-4991.634	2564257.620
1500	-5089.703	2564265.413

SETTING OUT COORDINATES		
POINT	Y	X
1600	-5188.814	2564253.076
1700	-5288.774	2564255.857
1800	-5373.723	2564225.569
1900	-5442.814	2564160.817
2000	-5542.812	2564160.696



LAYOUT PLAN
SCALE 1:1000



SCALES:
Horizontal 1:1000
Vertical 1:100

DATUM 900.000

VERTICAL PROFILE GRADES

BVC 1200.000 — VCL=200.000m K=289 — EVC 1400.000
-0.096% — 1300.000 908.000 — 0.595%
BVC 1640.000 — VCL=160.000m K=75 — EVC 1800.000
1720.000 910.500 — -1.550%
BVC 1860.000 — VCL=120.000m K=94 — EVC 1980.000
1920.000 907.400 — -0.267%

FINAL DESIGN ROAD LEVELS

DISTANCE (m)	HL 3,1m LEFT	CENTRE LINE	HL 3,1m RIGHT	GROUND LEVELS ON CENTRE LINE
1000	908.248	908.288	908.226	908.113
1020	908.331	908.269	908.207	908.031
1040	908.337	908.250	908.163	908.042
1060	908.318	908.231	908.144	908.027
1080	908.298	908.212	908.125	908.001
1100	908.221	908.192	908.130	908.045
1120	908.111	908.173	908.171	907.870
1140	908.053	908.154	908.255	908.011
1160	908.017	908.135	908.252	907.977
1180	908.021	908.115	908.210	908.026
1200	908.034	908.096	908.088	907.990
1220	908.022	908.084	908.022	907.809
1240	908.023	908.085	908.023	907.746
1260	908.039	908.101	908.039	907.693
1280	908.068	908.130	908.068	907.549
1300	908.212	908.173	908.111	907.464
1320	908.354	908.230	908.106	907.483
1340	908.333	908.300	908.238	907.684
1360	908.323	908.385	908.323	907.878
1380	908.421	908.483	908.460	908.138
1400	908.515	908.595	908.675	908.433
1420	908.590	908.714	908.838	908.676
1440	908.709	908.833	908.957	908.676
1460	908.828	908.952	909.076	908.751
1480	908.947	909.071	909.176	908.884
1500	909.128	909.190	909.192	908.895
1520	909.248	909.310	909.348	908.886
1540	909.405	909.429	909.367	909.050
1560	909.625	909.548	909.470	909.167
1580	909.778	909.667	909.555	909.362
1600	909.889	909.786	909.682	909.533
1620	909.907	909.905	909.843	909.624
1640	909.962	910.024	909.962	909.649
1660	910.054	910.116	910.054	909.626
1680	910.093	910.155	910.093	909.891
1700	910.078	910.140	910.078	909.941
1720	910.009	910.071	910.009	909.935
1740	909.887	909.949	909.988	909.866
1760	909.649	909.773	909.897	909.685
1780	909.457	909.543	909.629	909.376
1800	909.198	909.260	909.243	909.118
1820	908.927	908.950	908.888	908.800
1840	908.720	908.640	908.560	908.458
1860	908.454	908.330	908.206	908.099
1880	908.155	908.041	907.917	907.863
1900	907.894	907.796	907.697	907.586
1920	907.588	907.592	907.530	907.405
1940	907.370	907.432	907.370	907.263
1960	907.253	907.315	907.253	907.114
1980	907.178	907.240	907.178	907.102
2000	907.125	907.187	907.125	907.076

SUPERELEVATION (LEFT / RIGHT)

2.8% — 2.8% — -2.0% -2.0% — 3.8% — 3.8% — -2.0% — -2.0% — 4.0 4.0% — -2.0% — -2.0% — 4.0% — 4.0% — -2.0% — -2.0% — 3.6% — 3.6% — -2.0% — -2.0% — 4.0% — 4.0% — -2.0% — -2.0% — 4.0% — 4.0% — -2.0%

HORIZONTAL ALIGNMENT

DIRECTION 214° 50' 10" — BCC 1019.264 — R=500.000m l=219° 08' 10" — ECC 1094.330 — DIRECTION 223° 26' 10" — BCC 1135.671 — R=200.000m l=216° 38' 30" — ECC 1183.112 — DIRECTION 209° 50' 50" — BCC 1308.495 — R=15.000m l=83° 07' 50" — ECC 1330.258 — DIRECTION 292° 58' 30" — BCC 1400.519 — R=150.000m l=276° 59' 40" — ECC 1484.200 — DIRECTION 261° 00' 40" — BCC 1559.351 — R=250.000m l=266° 19' 20" — ECC 1605.683 — DIRECTION 271° 37' 50" — BCC 1748.437 — R=30.000m l=240° 54' 18" — ECC 1780.616 — DIRECTION 210° 10' 20" — BCC 1840.472 — R=60.000m l=240° 04' 30" — ECC 1903.099 — DIRECTION 269° 58' 40"

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT: SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg.Nº. 2006/01508/07
SUITE 228
POSTNET X9307
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0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
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ARCHITECT:

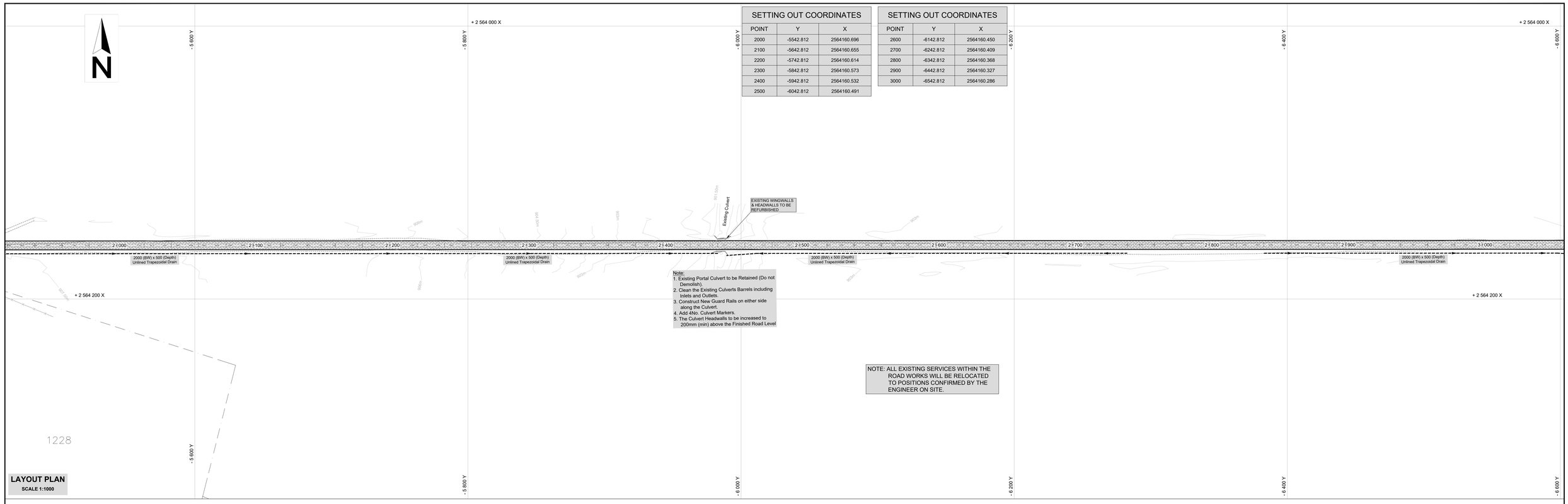
PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

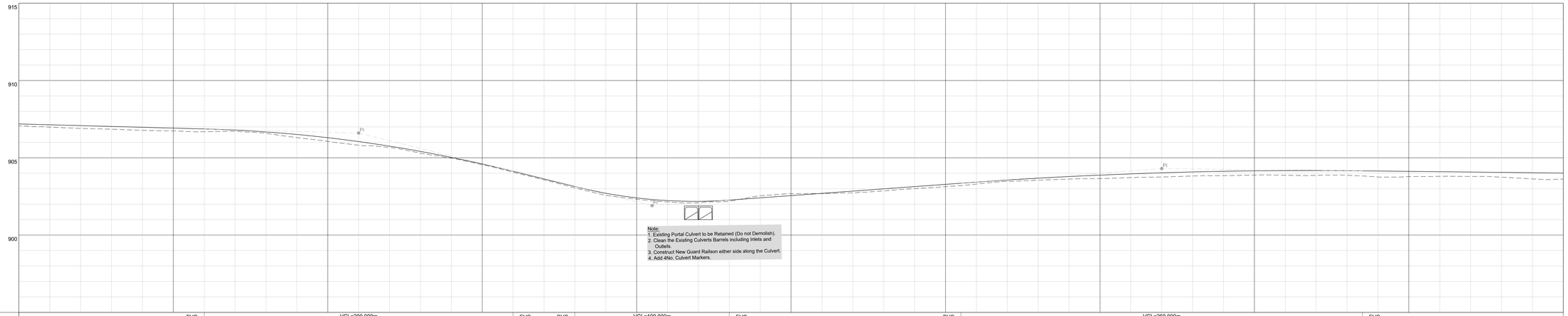
DRAWING TITLE: **LAYOUT AND LONGITUDINAL SECTION: KM 1,000 TO KM 2,000**

DRAWING NUMBER	SHEET No.	PAPER SIZE
SMV-LET-PIC-202	SHEET 2 OF 6	A0
SMV PROJECT NUMBER	SCALE	
	AS SHOWN	
CONTRACT No.	DATE	REV No.
	2023.04.18	B

SETTING OUT COORDINATES		
POINT	Y	X
2000	-5542.812	2564160.696
2100	-5642.812	2564160.655
2200	-5742.812	2564160.614
2300	-5842.812	2564160.573
2400	-5942.812	2564160.532
2500	-6042.812	2564160.491

SETTING OUT COORDINATES		
POINT	Y	X
2600	-6142.812	2564160.450
2700	-6242.812	2564160.409
2800	-6342.812	2564160.368
2900	-6442.812	2564160.327
3000	-6542.812	2564160.286





SCALES:
Horizontal 1:1000
Vertical 1:100

DATUM 895.000

VERTICAL PROFILE

GRADES					
-0.267%	BVC 2120.000	VCL=200.000m K=91	2220.000	906.600	EVC 2320.000
-2.474%	BVC 2360.000	VCL=100.000m K=31	2410.000	901.900	EVC 2460.000
0.727%	BVC 2610.000	VCL=260.000m K=310	2740.000	904.300	EVC 2870.000
-0.111%					

FINAL DESIGN ROAD LEVELS

DISTANCE (m)	HL 3,1m LEFT	CENTRE LINE	HL 3,1m RIGHT	GROUND LEVELS ON CENTRE LINE
2000	907.125	907.187	907.125	907.076
2020	907.071	907.133	907.071	906.881
2040	907.018	907.080	907.018	906.899
2060	906.965	907.027	906.965	906.850
2080	906.911	906.973	906.911	906.775
2100	906.858	906.920	906.858	906.738
2120	906.805	906.867	906.805	906.685
2140	906.729	906.791	906.729	906.711
2160	906.610	906.672	906.610	906.587
2180	906.446	906.508	906.446	906.304
2200	906.238	906.300	906.238	906.062
2220	905.986	906.048	905.986	905.815
2240	905.690	905.752	905.690	905.671
2260	905.350	905.412	905.350	905.301
2280	904.966	905.028	904.966	904.966
2300	904.537	904.599	904.552	904.552
2320	904.084	904.126	904.069	904.069
2340	903.570	903.632	903.575	903.575
2360	903.075	903.137	903.052	903.052
2380	902.644	902.706	902.465	902.465
2400	902.341	902.403	902.220	902.220
2420	902.167	902.229	902.145	902.145
2440	902.120	902.182	902.084	902.084
2460	902.202	902.264	902.182	902.182
2480	902.347	902.409	902.543	902.543
2500	902.493	902.555	902.677	902.677
2520	902.638	902.700	902.884	902.884
2540	902.783	902.845	902.738	902.738
2560	902.929	902.991	902.858	902.858
2580	903.074	903.136	903.005	903.005
2600	903.220	903.282	903.135	903.135
2620	903.364	903.426	903.302	903.302
2640	903.496	903.558	903.468	903.468
2660	903.616	903.678	903.551	903.551
2680	903.723	903.785	903.619	903.619
2700	903.816	903.878	903.656	903.656
2720	903.897	903.959	903.720	903.720
2740	903.966	904.028	903.759	903.759
2760	904.021	904.083	903.819	903.819
2780	904.063	904.125	903.847	903.847
2800	904.092	904.154	903.880	903.880
2820	904.109	904.171	903.869	903.869
2840	904.112	904.174	903.863	903.863
2860	904.103	904.165	903.869	903.869
2880	904.082	904.144	903.758	903.758
2900	904.060	904.122	903.786	903.786
2920	904.038	904.100	903.801	903.801
2940	904.016	904.078	903.793	903.793
2960	903.994	904.056	903.743	903.743
2980	903.971	904.033	903.634	903.634
3000	903.949	904.011	903.626	903.626

SUPERELEVATION — LEFT ····· RIGHT ——

HORIZONTAL ALIGNMENT — DIRECTION 269° 58' 40"

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT: SEBEGO, MALOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD Reg.Nº. 2006/01608/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **LAYOUT AND LONGITUDINAL SECTION: KM 2,000 TO KM 3,000**

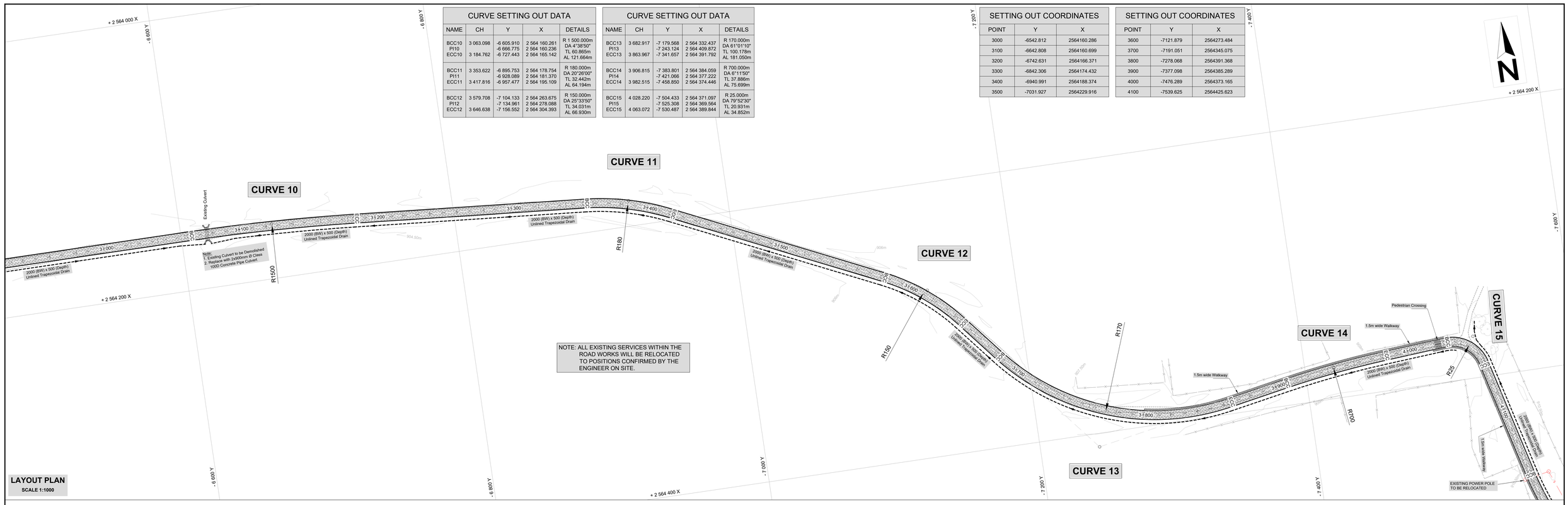
DRAWING NUMBER	SMV-LET-PIC-203
SHEET No.	SHEET 3 OF 6
PAPER SIZE	A0
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.18
REV No.	B

CURVE SETTING OUT DATA				
NAME	CH	Y	X	DETAILS
BCC10 PI10 ECC10	3 063.098 3 184.762	-6 605.910 -6 666.775 -6 727.443	2 564 160.261 2 564 160.236 2 564 165.142	R 1 500.000m DA 4°38'50" TL 60.865m AL 121.664m
BCC11 PI11 ECC11	3 353.622 3 417.816	-6 895.753 -6 928.089 -6 957.477	2 564 178.754 2 564 181.370 2 564 195.109	R 180.000m DA 20°26'00" TL 32.442m AL 64.194m
BCC12 PI12 ECC12	3 579.708 3 646.638	-7 104.133 -7 134.961 -7 156.552	2 564 263.675 2 564 278.088 2 564 304.393	R 150.000m DA 25°33'50" TL 34.031m AL 66.930m

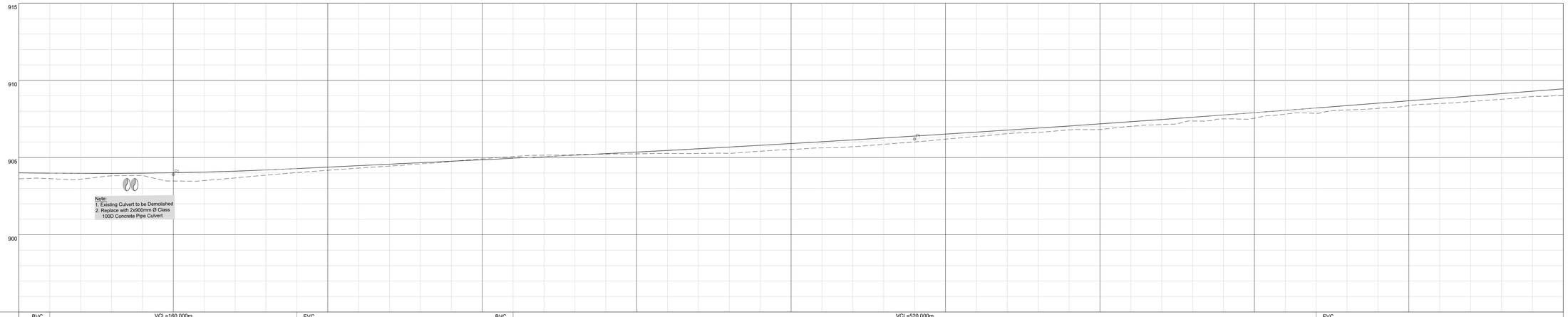
CURVE SETTING OUT DATA				
NAME	CH	Y	X	DETAILS
BCC13 PI13 ECC13	3 682.917 3 863.967	-7 179.568 -7 243.124 -7 341.657	2 564 332.437 2 564 409.872 2 564 391.792	R 170.000m DA 61°01'10" TL 100.178m AL 181.050m
BCC14 PI14 ECC14	3 906.815 3 982.515	-7 383.801 -7 421.066 -7 458.850	2 564 384.059 2 564 377.222 2 564 374.446	R 700.000m DA 6°11'50" TL 37.886m AL 75.699m
BCC15 PI15 ECC15	4 028.220 4 063.072	-7 504.433 -7 525.308 -7 530.487	2 564 371.097 2 564 369.564 2 564 389.844	R 25.000m DA 79°52'30" TL 20.931m AL 34.852m

SETTING OUT COORDINATES		
POINT	Y	X
3000	-6542.812	2564160.286
3100	-6642.808	2564160.699
3200	-6742.631	2564166.371
3300	-6842.306	2564174.432
3400	-6940.991	2564188.374
3500	-7031.927	2564229.916

SETTING OUT COORDINATES		
POINT	Y	X
3600	-7121.879	2564273.484
3700	-7191.051	2564345.075
3800	-7278.068	2564391.368
3900	-7377.098	2564385.289
4000	-7476.289	2564373.165
4100	-7539.625	2564425.623



LAYOUT PLAN
SCALE 1:1000



SCALES:
Horizontal 1:1000
Vertical 1:100

DATUM 895.000

VERTICAL PROFILE GRADES

BVC 3020.000 — VCL=160.000m K=271 — EVC 3180.000 — BVC 3320.000 — VCL=520.000m K=1763 — EVC 3840.000

-0.111% — 3100.000 903.900 — 0.479% — 3580.000 906.200 — 0.774%

FINAL DESIGN ROAD LEVELS

DISTANCE (m)	HL 3,1m LEFT	CENTRE LINE	HL 3,1m RIGHT	GROUND LEVELS ON CENTRE LINE
3000	903.949	904.011	903.949	903.626
3020	903.927	903.989	903.927	903.633
3040	903.912	903.974	903.912	903.597
3060	903.912	903.974	903.912	903.817
3080	903.927	903.989	903.927	903.838
3100	903.956	904.018	903.956	903.478
3120	904.000	904.062	904.000	903.511
3140	904.059	904.121	904.059	903.682
3160	904.133	904.195	904.133	903.861
3180	904.221	904.283	904.221	904.025
3200	904.317	904.379	904.317	904.176
3220	904.413	904.475	904.413	904.317
3240	904.509	904.571	904.509	904.446
3260	904.605	904.667	904.605	904.995
3280	904.700	904.762	904.700	904.748
3300	904.796	904.858	904.796	904.914
3320	904.892	904.954	904.892	905.863
3340	905.063	905.051	904.969	905.154
3360	905.266	905.150	905.055	905.189
3380	905.376	905.252	905.128	905.227
3400	905.480	905.356	905.232	905.237
3420	905.533	905.462	905.390	905.266
3440	905.538	905.570	905.508	905.265
3460	905.619	905.681	905.619	905.266
3480	905.731	905.793	905.731	905.410
3500	905.847	905.909	905.847	905.528
3520	905.964	906.026	905.964	905.626
3540	906.084	906.146	906.084	905.705
3560	906.248	906.288	906.206	905.867
3580	906.476	906.392	906.308	906.015
3600	906.642	906.518	906.394	906.194
3620	906.771	906.647	906.523	906.388
3640	906.895	906.778	906.661	906.549
3660	906.925	906.911	906.876	906.635
3680	906.979	907.047	907.114	906.794
3700	907.061	907.165	907.309	908.816
3720	907.201	907.325	907.449	907.622
3740	907.343	907.467	907.591	907.140
3760	907.488	907.612	907.736	907.397
3780	907.635	907.759	907.883	907.506
3800	907.784	907.908	908.032	907.553
3820	907.935	908.059	908.183	907.815
3840	908.089	908.213	908.337	907.865
3860	908.265	908.368	908.471	908.086
3880	908.461	908.523	908.522	908.189
3900	908.691	908.677	908.615	908.359
3920	908.907	908.832	908.758	908.501
3940	909.061	908.987	908.913	908.628
3960	909.216	909.142	909.068	908.778
3980	909.380	909.297	909.234	908.950
4000	909.498	909.452	909.390	909.020

SUPERELEVATION (LEFT / RIGHT)

-2.0% | 4.0% | -2.0% | -2.0% | 4.0% | -2.0% | -2.0% | 4.0% | -2.0% | 0% | 2.4% | 2.4%

-2.0% | -4.0% | -2.0% | -2.0% | -4.0% | -2.0% | -2.0% | -4.0% | -2.0% | 0% | -2.4% | -2.4%

HORIZONTAL ALIGNMENT

DIRECTION 269° 58' 40" — BCC 3063.098 — R=1500.000m I=272° 18' 00" — ECC 3184.762 — DIRECTION 274° 37' 30" — BCC 3353.622 — R=180.000m I=284° 50' 30" — ECC 3417.816 — DIRECTION 295° 03' 30" — BCC 3579.708 — R=150.000m I=307° 50' 20" — ECC 3646.638 — DIRECTION 320° 37' 20" — BCC 3682.917 — R=170.000m I=290° 06' 40" — ECC 3863.967 — DIRECTION 259° 36' 10" — BCC 3906.815 — R=700.000m I=262° 42' 00" — ECC 3982.515 — DIRECTION 265° 47' 50"

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT: SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg.Nº. 2006/01608/07
SUITE 228
POSTNET X0307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **LAYOUT AND LONGITUDINAL SECTION: KM 3,000 TO KM 4,000**

DRAWING NUMBER	SHEET No.	PAPER SIZE
SMV-LET-PIC-204	SHEET 4 OF 6	A0
SMV PROJECT NUMBER	SCALE	
	AS SHOWN	
CONTRACT No.	DATE	REV No.
	2023.04.18	B

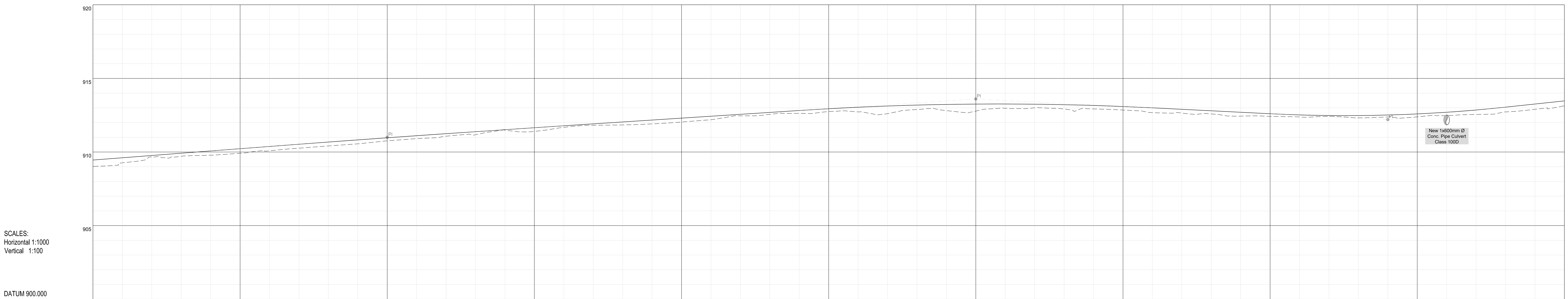
CURVE SETTING OUT DATA				
NAME	CH	Y	X	DETAILS
BCC15 PI15 ECC15	4 028.220 4 063.072	-7 504.433 -7 525.308 -7 530.487	2 564 371.097 2 564 369.564 2 564 389.844	R 25.000m DA 79°52'30" TL 20.931m AL 34.852m
BCC16 PI16 ECC16	4 150.144 4 221.879	-7 552.034 -7 561.006 -7 581.738	2 564 474.208 2 564 509.337 2 564 539.081	R 200.000m DA 20°33'00" TL 36.257m AL 71.734m
BCC17 PI17 ECC17	4 291.054 4 349.504	-7 621.294 -7 638.154 -7 646.416	2 564 595.831 2 564 620.019 2 564 648.322	R 180.000m DA 18°36'20" TL 29.485m AL 58.450m

CURVE SETTING OUT DATA				
NAME	CH	Y	X	DETAILS
BCC18 PI18 ECC18	4 427.344 4 777.995	-7 668.227 -7 723.833 -7 570.270	2 564 723.044 2 564 913.545 2 565 039.248	R 300.000m DA 66°58'10" TL 198.451m AL 350.651m
BCC19 PI19 ECC19	4 836.919 4 972.265	-7 524.673 -7 446.181 -7 534.102	2 565 076.571 2 565 140.823 2 565 191.411	R 70.000m DA 110°46'50" TL 101.436m AL 135.345m
BCC20 PI20 ECC20	4 990.916 5 050.573	-7 550.268 -7 576.391 -7 606.089	2 565 200.713 2 565 215.744 2 565 220.878	R 170.000m DA 20°06'20" TL 30.139m AL 59.658m

SETTING OUT COORDINATES		
POINT	Y	X
4000	-7476.289	2564373.165
4100	-7539.625	2564425.623
4200	-7570.233	2564520.484
4300	-7626.225	2564603.294
4400	-7660.565	2564696.796
4500	-7679.982	2564794.564

SETTING OUT COORDINATES		
POINT	Y	X
4600	-7667.587	2564893.326
4700	-7623.559	2564982.597
4800	-7553.242	2565053.186
4900	-7499.022	2565131.880
5000	-7558.259	2565205.031
5100	-7654.793	2565229.299

LAYOUT PLAN
SCALE 1:1000



SCALES:
Horizontal 1:1000
Vertical 1:100

DATUM 900.000

VERTICAL PROFILE GRADES:
BVC 4080.000 — VCL=240.000m, K=1932, PI 4200.000 / 911.000 — EVC 4320.000
BVC 4480.000 — VCL=240.000m, K=209, PI 4600.000 / 913.600 — EVC 4720.000
BVC 4800.000 — VCL=160.000m, K=103, PI 4880.000 / 912.200 — EVC 4960.000
Grades: 0.774% — 0.650% — -0.500% — 1.057%

FINAL DESIGN ROAD LEVELS

DISTANCE (m)	4000	4020	4040	4060	4080	4100	4120	4140	4160	4180	4200	4220	4240
HL 3,1m LEFT	909.408	909.647	909.885	910.015	910.066	910.163	910.315	910.464	910.556	910.701	910.845	911.016	911.181
CENTRE LINE	909.452	909.606	909.761	909.916	910.071	910.225	910.377	910.526	910.674	910.819	910.963	911.104	911.243
HL 3,1m RIGHT	909.390	909.544	909.637	909.818	910.009	910.163	910.315	910.553	910.792	910.937	911.081	911.192	911.229
GROUND LEVELS ON CENTRE LINE	909.020	909.265	909.665	909.711	909.780	909.914	910.082	910.259	910.410	910.555	910.758	910.906	911.073

DISTANCE (m)	4260	4280	4300	4320	4340	4360	4380	4400	4420	4440	4460	4480	4500
HL 3,1m LEFT	911.319	911.541	911.773	911.904	912.034	912.068	912.108	912.238	912.462	912.665	912.795	912.925	913.046
CENTRE LINE	911.381	911.516	911.649	911.780	911.910	912.040	912.170	912.300	912.430	912.560	912.690	912.820	912.940
HL 3,1m RIGHT	911.319	911.454	911.525	911.656	911.786	911.978	912.108	912.238	912.368	912.455	912.585	912.715	912.835
GROUND LEVELS ON CENTRE LINE	911.172	911.485	911.401	911.674	911.817	911.838	911.910	912.036	912.188	912.458	912.559	912.621	912.746

DISTANCE (m)	4520	4540	4560	4580	4600	4620	4640	4660	4680	4700	4720	4740	4760
HL 3,1m LEFT	913.147	913.229	913.292	913.336	913.360	913.366	913.352	913.319	913.267	913.196	913.105	913.005	912.905
CENTRE LINE	913.042	913.124	913.187	913.230	913.255	913.260	913.247	913.214	913.162	913.090	913.000	912.900	912.800
HL 3,1m RIGHT	912.936	913.018	913.081	913.125	913.150	913.155	913.141	913.108	913.056	912.985	912.895	912.795	912.695
GROUND LEVELS ON CENTRE LINE	912.723	912.602	912.884	912.811	912.780	912.972	913.001	912.919	912.925	912.851	912.673	912.644	912.584

DISTANCE (m)	4780	4800	4820	4840	4860	4880	4900	4920	4940	4960	4980	5000
HL 3,1m LEFT	912.760	912.554	912.457	912.379	912.351	912.387	912.463	912.577	912.730	912.922	913.195	913.345
CENTRE LINE	912.700	912.600	912.519	912.478	912.475	912.511	912.587	912.701	912.854	913.046	913.257	913.469
HL 3,1m RIGHT	912.638	912.538	912.515	912.576	912.599	912.635	912.711	912.825	912.978	913.170	913.283	913.593
GROUND LEVELS ON CENTRE LINE	912.437	912.419	912.376	912.419	912.319	912.377	912.386	912.470	912.549	912.724	912.900	913.137

SUPERELEVATION (LEFT / RIGHT):
-2.0% / -2.0%; 4.0% / -4.0%; 4.0% / -4.0%; -2.0% / -2.0%; -2.0% / -2.0%; 3.8% / -3.8%; 3.8% / -3.8%; -2.0% / -2.0%; -2.0% / -2.0%; 4.0% / -4.0%; 4.0% / -4.0%; -2.0% / -2.0%; -2.0% / -2.0%; 3.4% / -3.4%; 3.4% / -3.4%; -2.0-2.0% / -2.0-2.0%; 4.0% / -4.0%; -2.0% / -4.0%; 4.0% / -4.0%

HORIZONTAL ALIGNMENT:
DIRECTION 265° 47' 50" — BCC 4028.220 — R=25.000m I=305° 44' 10" — ECC 4063.072 — DIRECTION 345° 40' 20" — BCC 4150.144 — R=200.000m I=335° 23' 50" — ECC 4221.879 — DIRECTION 325° 07' 20" — BCC 4291.054 — R=180.000m I=334° 25' 30" — ECC 4349.504 — DIRECTION 343° 43' 40" — BCC 4427.344 — R=300.000m I=17° 12' 50" — ECC 4777.995 — DIRECTION 50° 41' 50" — BCC 4836.919 — R=70.000m I=355° 18' 20" — ECC 4972.265 — DIRECTION 299° 55' ... — R=170.000m ... 40"

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT: SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg Nº. 2006/015058/07
SUITE 228
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POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME: LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE: LAYOUT AND LONGITUDINAL SECTION: KM 4,000 TO KM 5,000

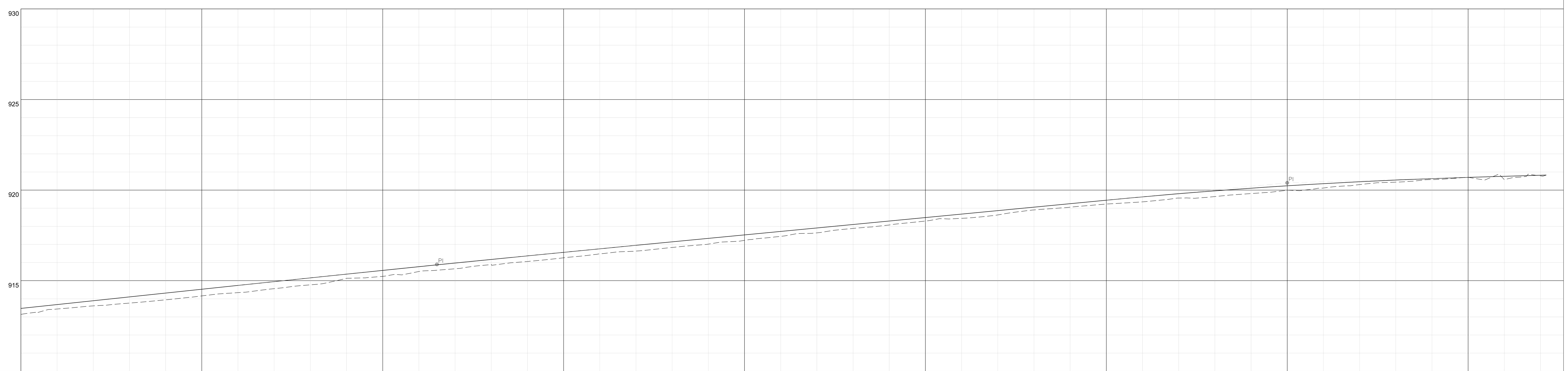
DRAWING NUMBER	SHEET No.	PAPER SIZE
SMV-LET-PIC-205	SHEET 5 OF 6	A0
SMV PROJECT NUMBER	SCALE: AS SHOWN	
CONTRACT No.	DATE: 2023.04.18	REV No.: B

CURVE SETTING OUT DATA				
NAME	CH	Y	X	DETAILS
BCC20 PI20 ECC20	4 990.916 5 050.573	-7 550.268 -7 576.391 -7 606.089	2 565 200.713 2 565 215.744 2 565 220.878	R 170.000m DA 20°06'20" TL 30.139m AL 59.658m
BCC21 PI21 ECC21	5 151.508 5 254.094	-7 705.549 -7 756.312 -7 803.778	2 565 238.074 2 565 246.850 2 565 266.872	R 450.000m DA 13°03'40" TL 51.516m AL 102.586m
BCC22 PI22 ECC22	5 336.712 5 442.906	-7 879.901 -7 928.831 -7 978.594	2 565 298.982 2 565 319.621 2 565 338.164	R 2 500.000m DA 2°26'00" TL 53.105m AL 106.194m
BCC23 PI23 ECC23	5 514.573 5 567.785	-8 045.750 -8 070.684 -8 095.273	2 565 363.188 2 565 372.479 2 565 382.648	R 1 500.000m DA 2°02'00" TL 26.609m AL 53.212m

SETTING OUT COORDINATES		
POINT	Y	X
5000	-7558.259	2565205.031
5100	-7654.793	2565229.299
5200	-7752.794	2565248.891
5300	-7846.075	2565284.713
5400	-7938.519	2565322.838

SETTING OUT COORDINATES		
POINT	Y	X
5500	-8032.094	2565358.099
5600	-8125.042	2565394.960
5700	-8217.450	2565433.179
5800	-8309.859	2565471.398
5843	-8349.697	2565487.874

LAYOUT PLAN
SCALE 1:1000



SCALES:
Horizontal 1:1000
Vertical 1:100

DATUM 910.000

VERTICAL PROFILE GRADES:
- 1.057% — BVC 5120.000; VCL=220.000m, K=2207; PI 5230.000, 915.900; EVC 5340.000
- 0.957% — BVC 5600.000; VCL=200.000m, K=305; PI 5700.000, 920.400; EVC 5800.000
- 0.302%

FINAL DESIGN ROAD LEVELS

DISTANCE (m)	HL 3,1m LEFT	CENTRE LINE	HL 3,1m RIGHT	GROUND LEVELS ON CENTRE LINE
5000	913.345	913.469	913.593	913.137
5020	913.556	913.680	913.804	913.435
5040	913.767	913.891	914.015	913.609
5060	914.041	914.103	914.137	913.763
5080	914.252	914.314	914.252	913.943
5100	914.464	914.526	914.464	914.159
5120	914.675	914.737	914.675	914.339
5140	914.947	914.948	914.886	914.559
5160	915.243	915.156	915.070	914.771
5180	915.450	915.363	915.276	915.129
5200	915.655	915.568	915.482	915.239
5220	915.858	915.772	915.685	915.506
5240	916.060	915.973	915.886	915.658
5260	916.200	916.173	916.111	915.891
5280	916.309	916.371	916.309	916.060
5300	916.505	916.567	916.505	916.264
5320	916.699	916.761	916.699	916.483
5340	916.891	916.953	916.891	916.635
5360	917.083	917.145	917.083	916.835
5380	917.274	917.336	917.274	917.017
5400	917.466	917.528	917.466	917.226
5420	917.657	917.719	917.657	917.447
5440	917.849	917.911	917.849	917.640
5460	918.040	918.102	918.040	917.885
5480	918.232	918.294	918.232	918.075
5500	918.423	918.485	918.423	918.291
5520	918.615	918.677	918.615	918.441
5540	918.806	918.868	918.806	918.630
5560	918.998	919.060	918.998	918.907
5580	919.189	919.251	919.189	919.057
5600	919.381	919.443	919.381	919.232
5620	919.565	919.627	919.565	919.351
5640	919.737	919.799	919.737	919.562
5660	919.896	919.958	919.896	919.644
5680	920.042	920.104	920.042	919.808
5700	920.174	920.236	920.174	919.993
5720	920.293	920.355	920.293	920.116
5740	920.400	920.462	920.400	920.305
5760	920.493	920.555	920.493	920.438
5780	920.573	920.635	920.573	920.580
5800	920.640	920.702	920.640	920.707
5820	920.700	920.762	920.700	920.582
5840	920.761	920.823	920.761	920.784
5843	920.770	920.832	920.770	920.832

SUPERELEVATION (LEFT / RIGHT): -2.0% / -2.0%; 4.0% / -4.0%; -2.0% / -2.0%; -2.0% / -2.0%; 2.8% / -2.8%; 2.8% / -2.8%; -2.0% / -2.0%

HORIZONTAL ALIGNMENT:
- BCC 4990.916 — R=170.000m, I=289° 51' 40" — ECC 5050.573
- DIRECTION 279° 48' 30"
- BCC 5151.508 — R=450.000m, I=286° 20' 20" — ECC 5254.094
- DIRECTION 292° 52' 10"
- BCC 5336.712 — R=2500.000m, I=291° 39' 10" — ECC 5442.906
- DIRECTION 290° 26' 10"
- BCC 5514.573 — R=1500.000m, I=291° 27' 10" — ECC 5567.785
- DIRECTION 292° 28' 10"

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:
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DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT: SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg.Nº. 2006/015058/07
SUITE 228
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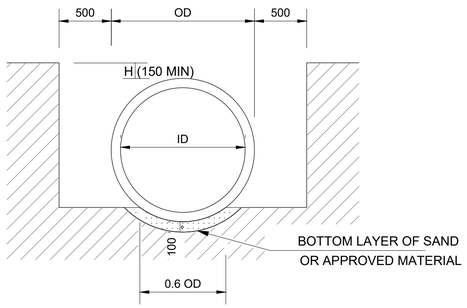
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

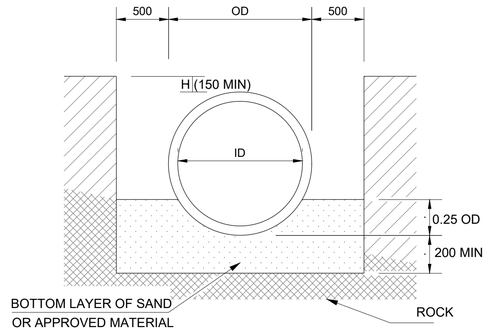
PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **LAYOUT AND LONGITUDINAL SECTION: KM 5,000 TO KM 5,853**

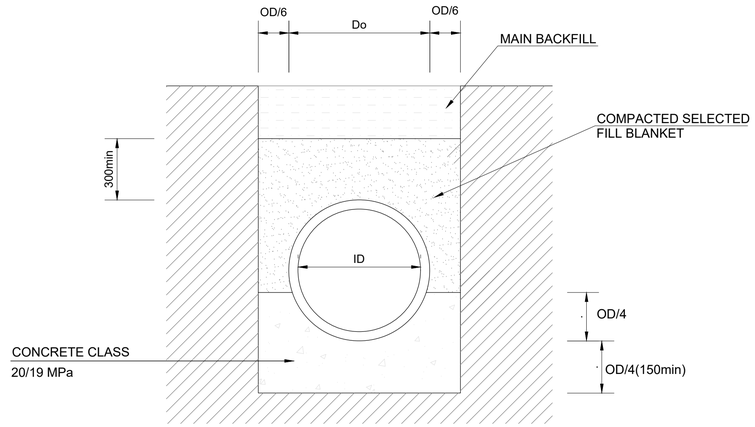
DRAWING NUMBER: SMV-LET-PIC-206	SHEET No.: SHEET 6 OF 6	PAPER SIZE: A0
SMV PROJECT NUMBER:	SCALE: AS SHOWN	
CONTRACT No.:	DATE: 2023.04.18	REV No.: B



CLASS B BEDDING ON SOFT MATERIAL (SINGLE PIPE)

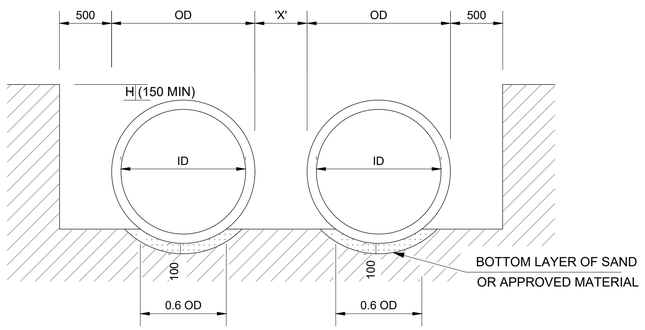


CLASS B BEDDING ON ROCK (SINGLE PIPE)

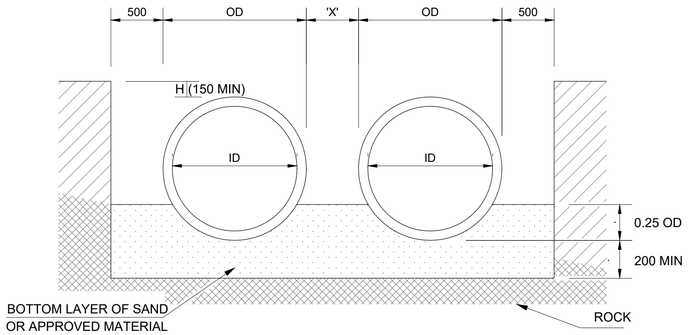


CLASS A BEDDING

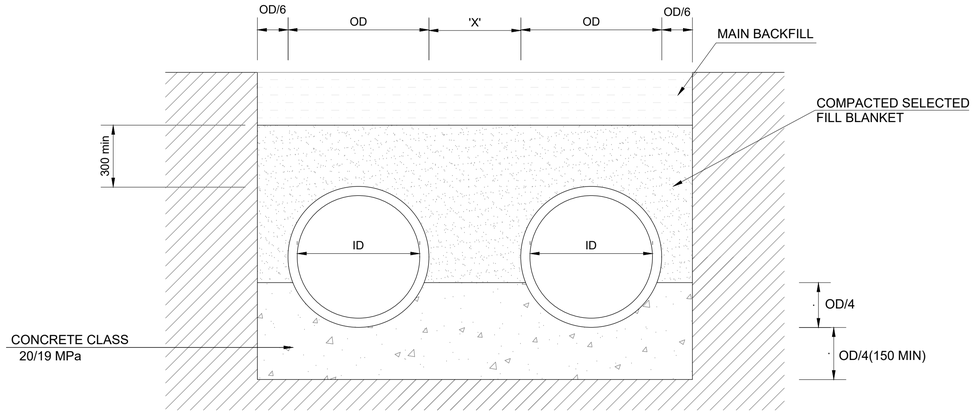
OD - OUTSIDE DIAMETER OF PIPE
ID - INSIDE DIAMETER OF PIPE



CLASS B BEDDING ON SOFT MATERIAL



CLASS B BEDDING ON ROCK



CLASS A BEDDING

NOTES

1 .01 ALL CONCRETE PIPE CULVERTS SHALL COMPLY WITH THE REQUIREMENTS OF SANS 677.

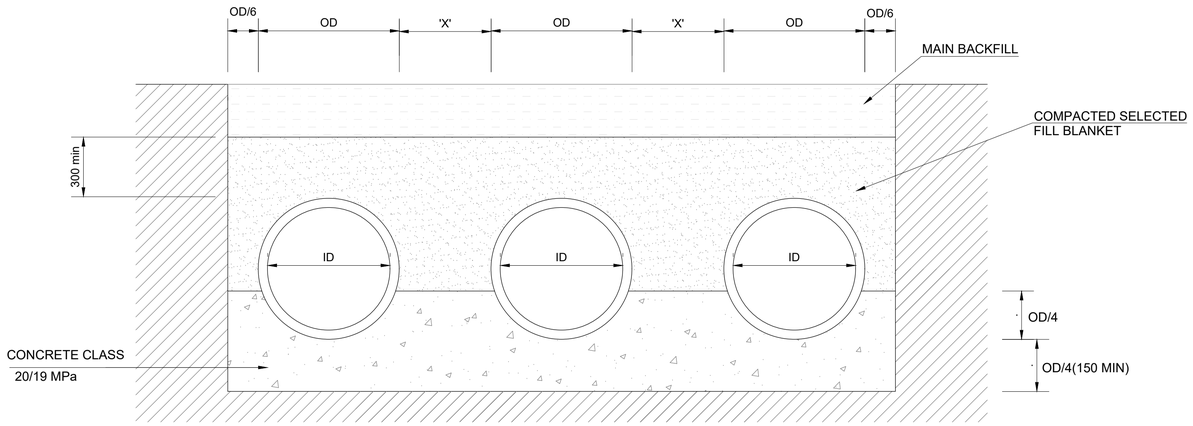
1 .02 ROAD DRAINAGE PIPES

- THE PIPE CLASS IS DETERMINED FROM THE WEIGHT OF THE PRISM OF FILL ABOVE THE PIPE CULVERT PLUS THE SNABC LOADINGS IN ACCORDANCE WITH TMH 7 (PARTS 1&2) "CODE OF PRACTICE FOR THE DESIGN OF HIGHWAY BRIDGES AND CULVERTS IN SOUTH AFRICA" AND STATED IN THE DRAINAGE SCHEDULE (TO BE ISSUED)

- THE MAXIMUM WHEEL LOAD ALLOWED ON THE PIPE IS 90KN WITH A MINIMUM FILL OF 150mm ON TOP OF THE PIPE FOR BOTH BEDDING CONDITIONS AND ALL PIPE DIAMETERS AS SHOWN.

1 .03 CONCRETE BACKFILL CLASS 20/19 MPa.

Pipe Ø (mm)	Dim ('x') (mm)
450 - 600	150
750 - 900	300
900 - 1200	500



CLASS A BEDDING

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

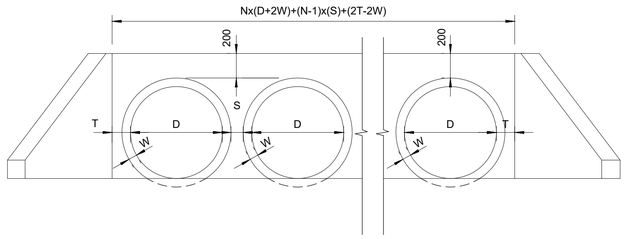
CONSULTANT:
SEBEGO, MALOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD
Reg.N°: 2006/018686/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

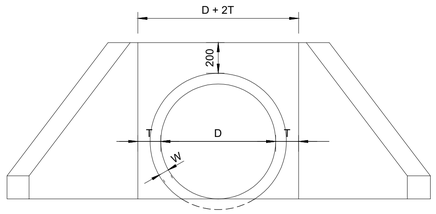
DRAWING TITLE:
STORMWATER DRAINAGE
PIPE CULVERT - BEDDING DETAILS

DRAWING NUMBER	SMV-LET-PIC-403
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.24
REV No.	B

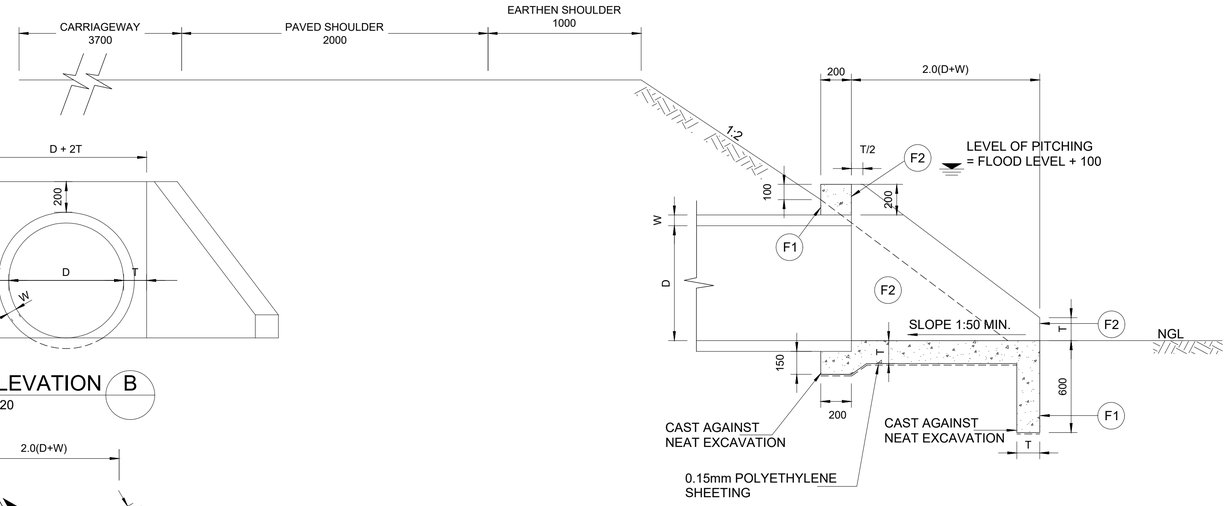


ELEVATION A
1 : 25

NOTE:
1. SPACING (S) BETWEEN PIPES TO BE 100mm ONLY IF SOILCRETE BACKFILLING IS USED.
2. N = NUMBER OF PIPES.

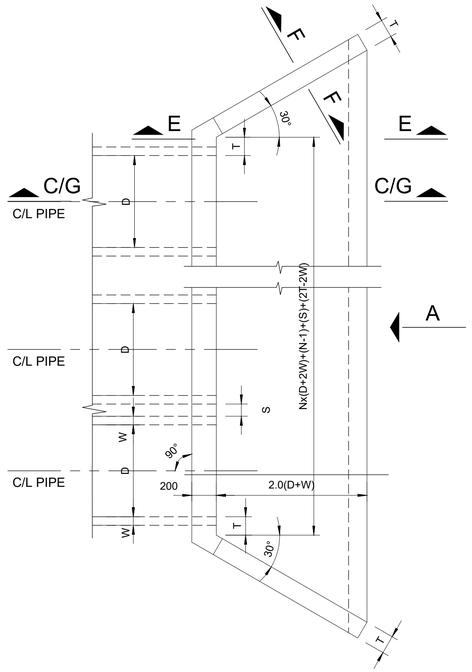


ELEVATION B
1 : 20



SECTION C
1 : 20

(INLET)

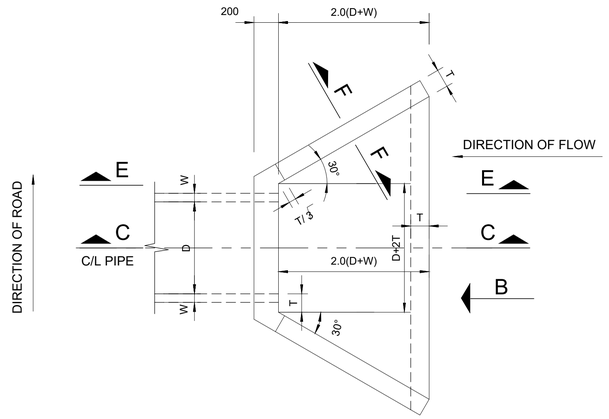


PLAN A
1 : 25

MULTIPLE PIPE CULVERT

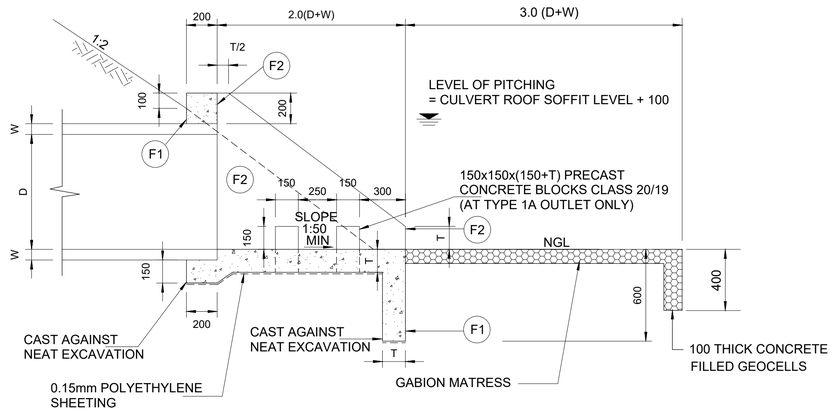
NOTE:
1. SPACING (S) BETWEEN PIPES TO BE 100mm ONLY IF SOILCRETE BACKFILLING IS USED.
2. N = NUMBER OF PIPES.
3. EROSION PROTECTION AND ENERGY BREAKING BLOCKS FOR MULTIPLE PIPE CULVERT SIMILAR TO SINGLE PIPE CULVERT.

INSIDE DIA. PIPE (D)	T (mm)	S (mm)
750	150	375
900	175	450
1050	200	500
1200	200	500



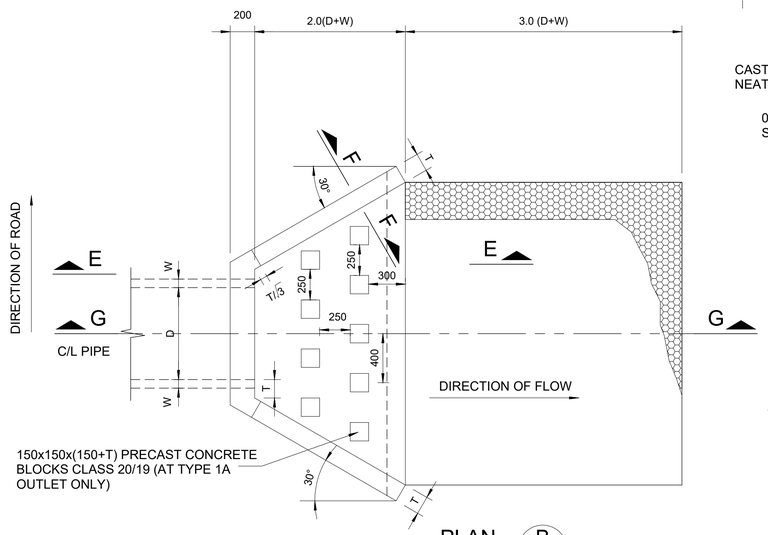
PLAN B
1 : 25

TYPE 1 INLET



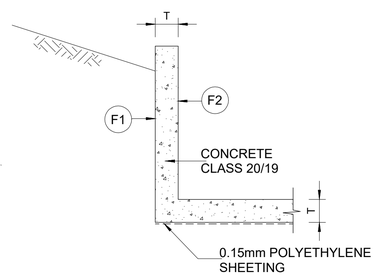
SECTION G
1 : 20

(OUTLET)

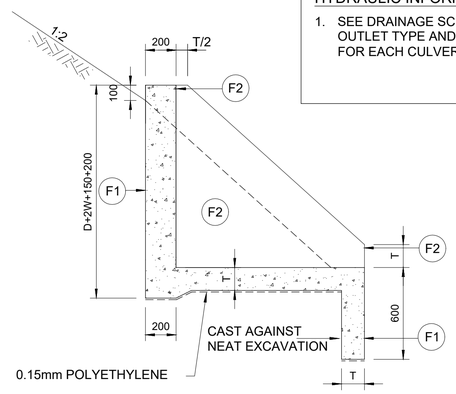


PLAN B
1 : 25

TYPE 1 AND TYPE 1A OUTLET



SECTION F
1 : 20



SECTION E
1 : 20

NOTES:

CONSTRUCTION

1. ALL EXPOSED CORNERS SHALL BE CHAMFERED 25 x 25
2. CONCRETE COVER TO REINFORCEMENT:-
   FLOOR SLAB & FOOTINGS = 50mm
   WINGWALLS = 40mm
3. CONCRETE FINISH:
   CONCEALED SURFACES = F1
   EXPOSED SURFACES = F2
4. POLYETHYLENE SHEET 0.15mm THICK SHALL BE PLACED UNDER ALL WINGWALL FOOTINGS AND INLET SLAB
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE COLTO STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES AS AMENDED TO DATE
6. THE UPPER LEVEL OF THE FILL ALWAYS PASSES THROUGH A POINT 100mm BELOW THE TOP OF THE HEAD WALL
7. THE MAXIMUM SLOPE OF EARTHWORKS SURROUNDING A CULVERT INLET OR OUTLET SHALL BE 1 : 2

MATERIAL SPECIFICATION:

1. INLET/OUTLET CONCRETE SLABS AND WINGWALLS - CLASS 20/19
   CHARACTERISTIC STRENGTH 20 MPa
   YOUNG'S MODULUS 28 000 MPa
2. REINFORCEMENT (SABS 920 - 1985)
   YIELD STRENGTH TYPE:
   MILD STEEL BARS 250 MPa
   HIGH TENSILE STEEL BARS 450 MPa
   WELDED STEEL FABRIC 450 MPa

DESIGN METHOD:

1. LIMIT STATE DESIGN ACCORDING TO TMH7 PART 3 AS AMENDED 1989
2. INLET AND OUTLET STRUCTURES ARE DESIGNED FOR LOADING SPECIFIED IN TMH7 PART 1 AND 2 AS AMENDED 1988 "CODE OF PRACTICE FOR THE DESIGN OF HIGHWAY BRIDGES AND CULVERTS IN S.A."
3. TYPE OF REINFORCEMENT AND SPACING ARE SHOWN ON THE DRAWINGS. THE CONTRACTOR MUST SUBMIT WORKING DRAWINGS AND BENDING SCHEDULES FOR APPROVAL.

FOUNDING MATERIAL:

1. MAX. CALCULATED GROUND PRESSURE - 100kPa
2. FOUNDING LEVEL TO BE APPROVED BY THE PROJECT MANAGER.

HYDRAULIC INFORMATION:

1. SEE DRAINAGE SCHEDULE FOR FLOOD LEVELS, OUTLET TYPE AND HYDRAULIC DATA FOR EACH CULVERT.

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
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CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
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Reg N°. 2006/1858/07
SUITE 228
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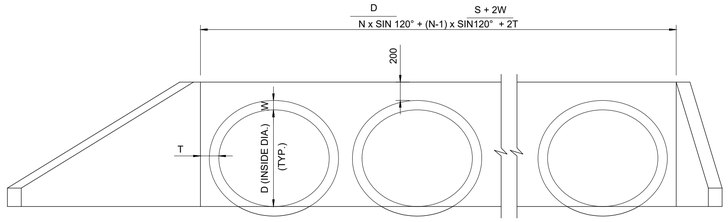
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za
ARCHITECT:

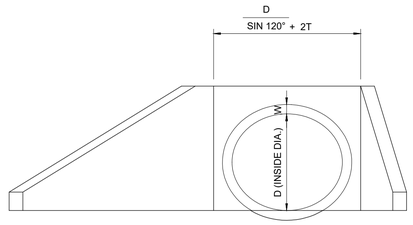
PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:
STORMWATER INLET/OUTLET CONCRETE DETAILS FOR PIPE CULVERTS @ 90° TO THE ROAD:
(Ø750mm TO Ø1200mm)

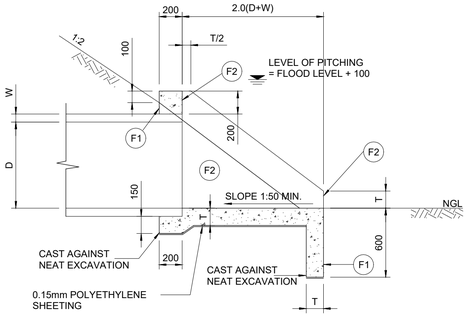
DRAWING NUMBER	SMV-LET-PIC-404
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.24
REV No.	B



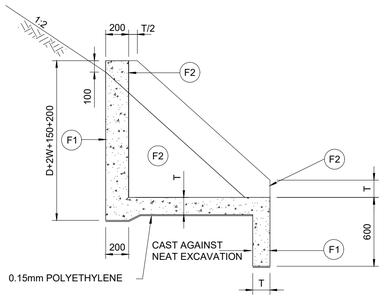
ELEVATION A
1 : 25



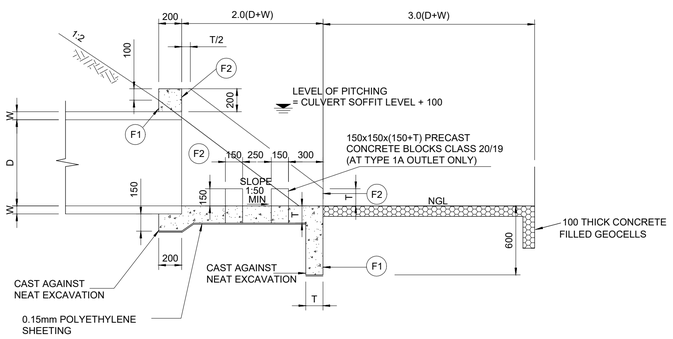
ELEVATION B
1 : 20



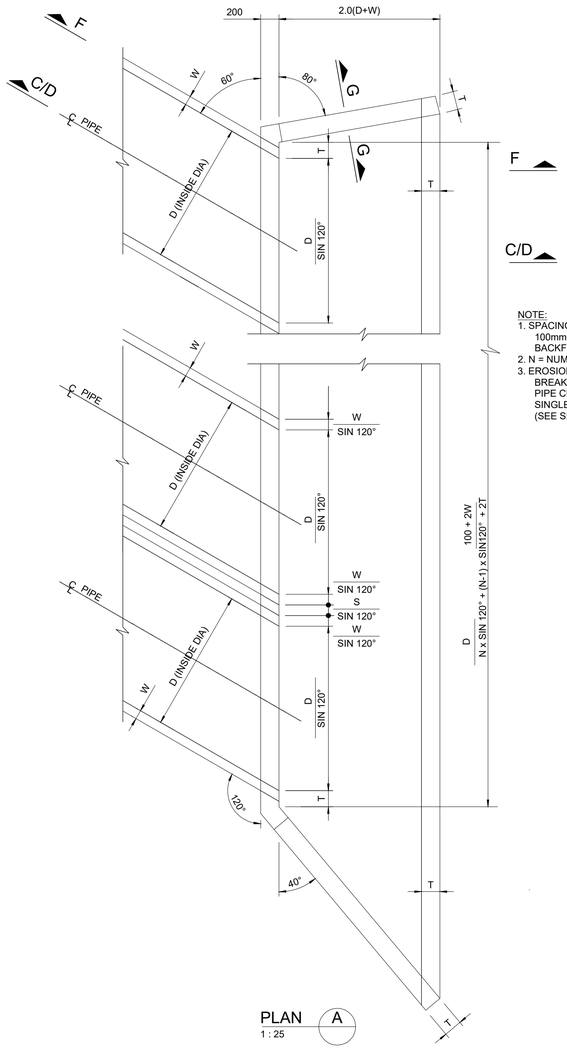
SECTION C
1 : 20
(INLET)



SECTION F
1 : 20



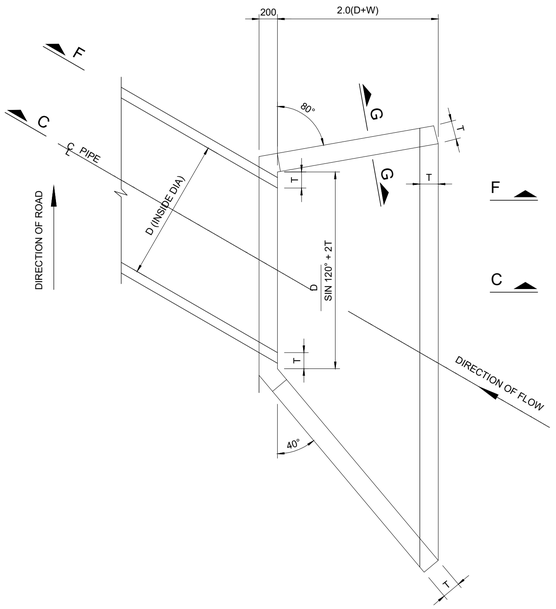
SECTION D
1 : 20
(OUTLET)



NOTE:
1. SPACING (S) BETWEEN PIPES TO BE 100mm ONLY IF SOILCRETE BACKFILLING IS USED.
2. N = NUMBER OF PIPES.
3. EROSION PROTECTION AND ENERGY BREAKING BLOCKS FOR MULTIPLE PIPE CULVERT SIMILAR TO SINGLE PIPE CULVERT. (SEE SINGLE PIPE CULVERT)

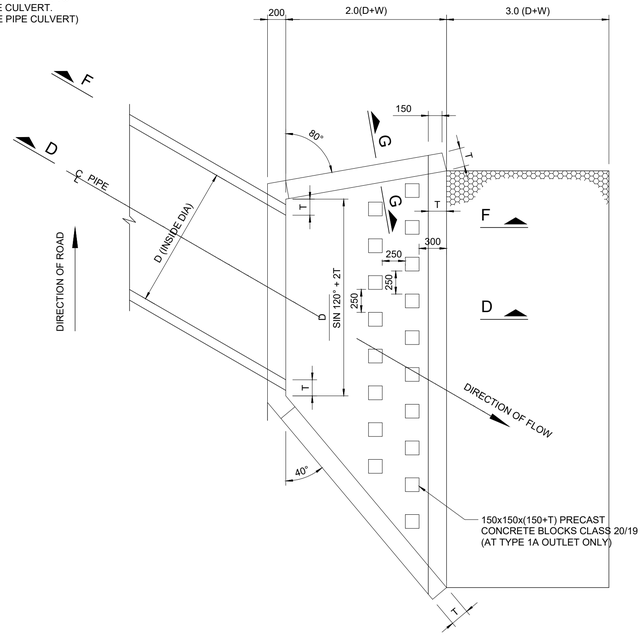
PLAN A
1 : 25

TYPICAL INLET AND OUTLET



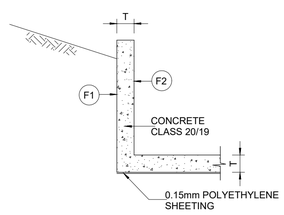
PLAN B
1 : 25

TYPE 1 INLET



PLAN B
1 : 25

TYPE 1 AND TYPE 1A OUTLET



SECTION G
1 : 20

INSIDE DIA. PIPE (D)	T (mm)	S (mm)
750	150	375
900	175	450
1050	200	500
1200	200	500

NOTES:

CONSTRUCTION

1. ALL EXPOSED CORNERS SHALL BE CHAMFERED 25 x 25
2. CONCRETE COVER TO REINFORCEMENT:-
   FLOOR SLAB & FOOTINGS = 50mm
   WINGWALLS = 40mm
3. CONCRETE FINISH:
   CONCEALED SURFACES = F1
   EXPOSED SURFACES = F2
4. POLYETHYLENE SHEET 0.15mm THICK SHALL BE PLACED UNDER ALL WINGWALL FOOTINGS AND INLET SLAB
5. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE COLTO STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE WORKS FOR STATE ROAD AUTHORITIES AS AMENDED TO DATE
6. THE UPPER LEVEL OF THE FILL ALWAYS PASSES THROUGH A POINT 100mm BELOW THE TOP OF THE HEAD WALL
7. THE MAXIMUM SLOPE OF EARTHWORKS SURROUNDING A CULVERT INLET OR OUTLET SHALL BE 1 : 2

MATERIAL SPECIFICATION:

1. INLET/OUTLET CONCRETE SLABS AND WINGWALLS - CLASS 20/19
   CHARACTERISTIC STRENGTH 20 MPa
   YOUNG'S MODULUS 28 000 MPa
2. REINFORCEMENT (SABS 920 - 1985)
   YIELD STRENGTH TYPE:
   MILD STEEL BARS 250 MPa
   HIGH TENSILE STEEL BARS 450 MPa
   WELDED STEEL FABRIC 450 MPa

DESIGN METHOD:

1. LIMIT STATE DESIGN ACCORDING TO TMH7 PART 3 AS AMENDED 1989
2. INLET AND OUTLET STRUCTURES ARE DESIGNED FOR LOADING SPECIFIED IN TMH7 PART 1 AND 2 AS AMENDED 1988 "CODE OF PRACTICE FOR THE DESIGN OF HIGHWAY BRIDGES AND CULVERTS IN S.A."
3. TYPE OF REINFORCEMENT AND SPACING ARE SHOWN ON THE DRAWINGS.
   THE CONTRACTOR MUST SUBMIT WORKING DRAWINGS AND BENDING SCHEDULES FOR APPROVAL.

FOUNDING MATERIAL:

1. MAX. CALCULATED GROUND PRESSURE - 100kPa
2. FOUNDING LEVEL TO BE APPROVED BY THE PROJECT MANAGER.

HYDRAULIC INFORMATION:

1. SEE DRAINAGE SCHEDULE FOR FLOOD LEVELS, OUTLET TYPE AND HYDRAULIC DATA FOR EACH CULVERT.

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

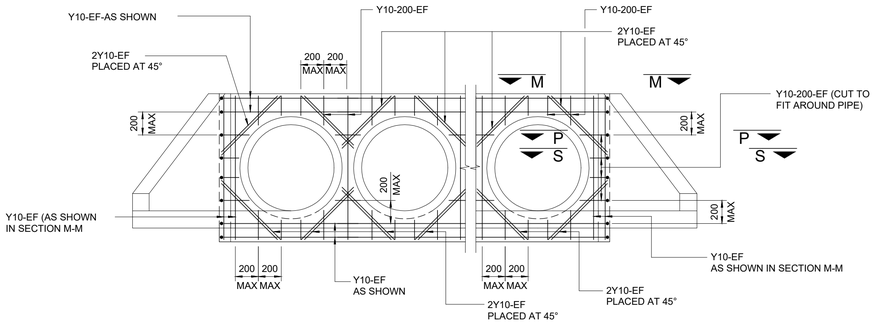
CONSULTANT:
SEBEGO, MALOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD
Reg.N°. 2006/018685/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

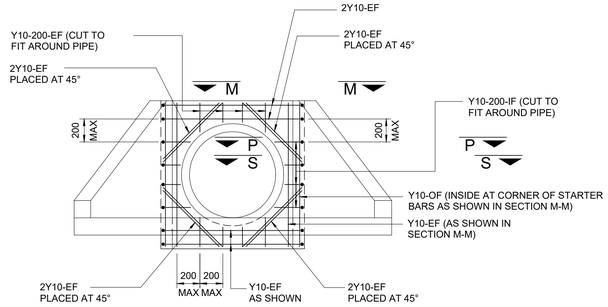
DRAWING TITLE:
STORMWATER INLET/OUTLET REINFORCEMENT DETAILS FOR SKEW PIPE CULVERTS AND @ 90° TO THE ROAD:
(Ø750mm TO Ø1200mm PIPES)

DRAWING NUMBER	SMV-LET-PIC-405
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.24
REV No.	B



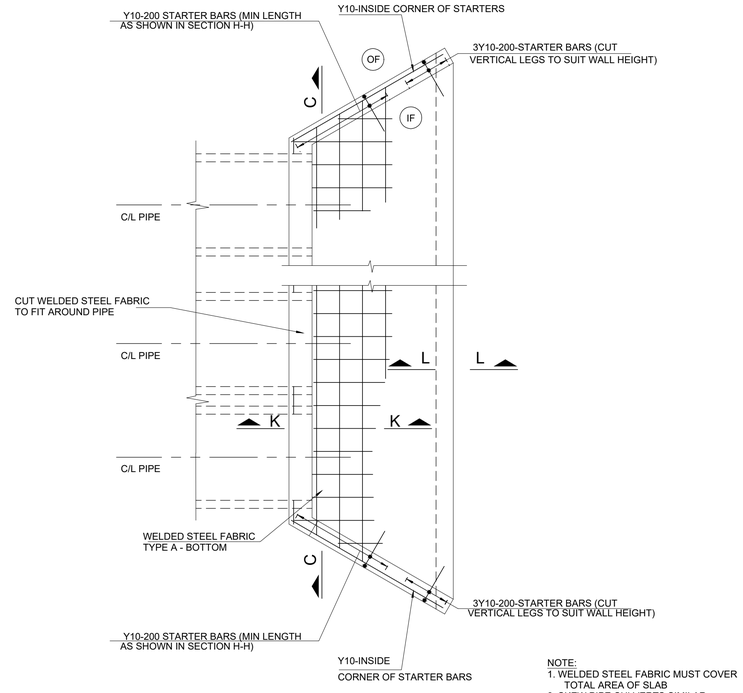
NOTE:
1. STEEL IN WINGWALL AND STARTER BARS NOT SHOWN FOR CLARITY
2. SKEW PIPE CULVERTS SIMILAR
3. COVER TO REINFORCEMENT 40mm

ELEVATION C
1 : 20



ELEVATION F
1 : 20

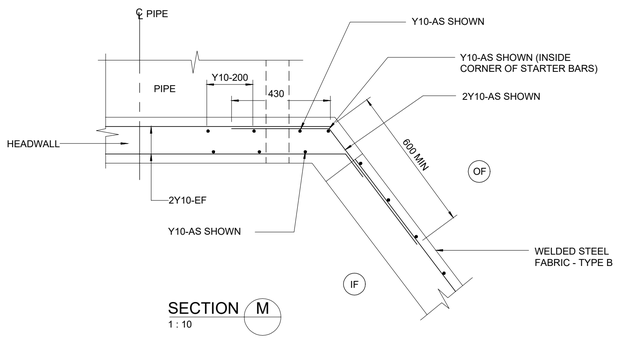
NOTE:
1. STEEL IN WINGWALL AND STARTER BARS NOT SHOWN FOR CLARITY
2. SKEW PIPE CULVERTS SIMILAR
3. COVER TO REINFORCEMENT 40mm



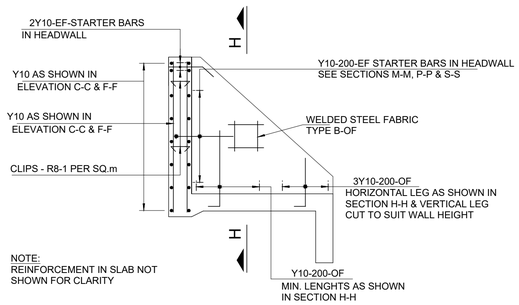
NOTE:
1. WELDED STEEL FABRIC MUST COVER TOTAL AREA OF SLAB
2. SKEW PIPE CULVERTS SIMILAR

PLAN A
1 : 20

FLOOR SLAB - MULTIPLE PIPE CULVERT

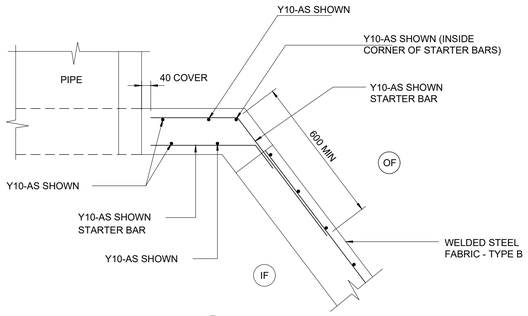


SECTION M
1 : 10

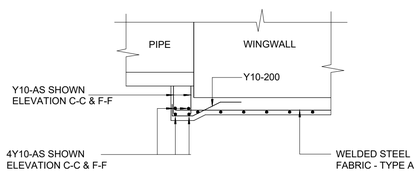


NOTE:
REINFORCEMENT IN SLAB NOT SHOWN FOR CLARITY

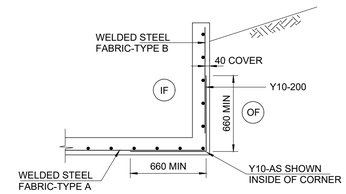
TYPICAL WINGWALL ELEVATION
1:20



SECTION P
1 : 10

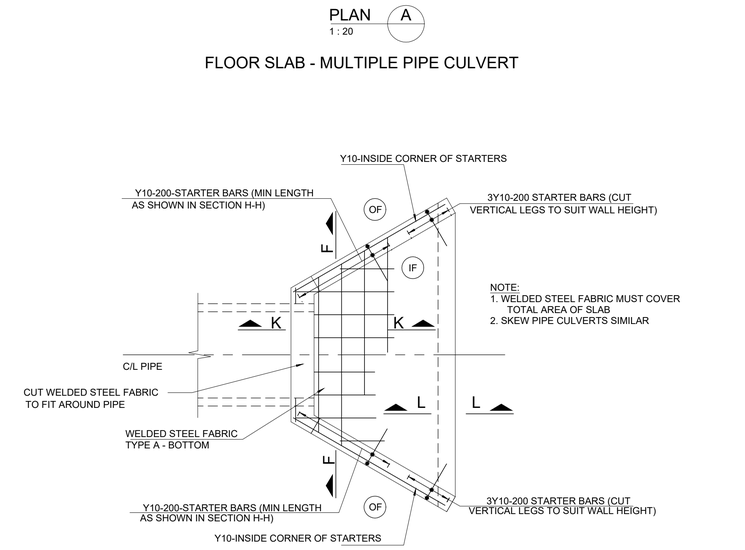


SECTION K
1 : 20



SECTION H
1 : 20

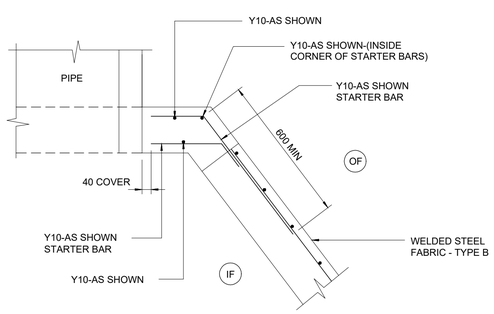
INSIDE DIA. PIPE (D)	T	WELDED FABRIC REF No	
		TYPE A	TYPE B
450	150	245	245
600	150	245	245
750	150	395	245
900	175	395	245



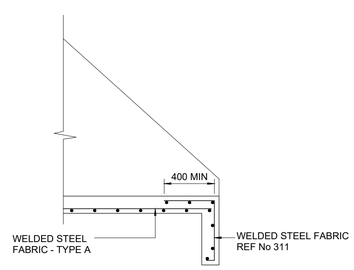
NOTE:
1. WELDED STEEL FABRIC MUST COVER TOTAL AREA OF SLAB
2. SKEW PIPE CULVERTS SIMILAR

PLAN B
1 : 20

FLOOR SLAB - SINGLE PIPE CULVERT



SECTION S
1 : 10



NOTE:
COVER TO REINFORCEMENT 40mm

SECTION L
1 : 20

LEGEND

EF = EACH FACE
OF = OUTSIDE FACE
IF = INSIDE FACE

20MPa CONCRETE - BAR LAP LENGTHS

BAR DIA.	10	12
LAP LENGTH	550	660

20MPa CONCRETE - MESH LAP LENGTHS

WELDED STEEL FABRIC REF. No.	245	311	395	500	617
MIN LAP LENGTH	450	500	600	650	750

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

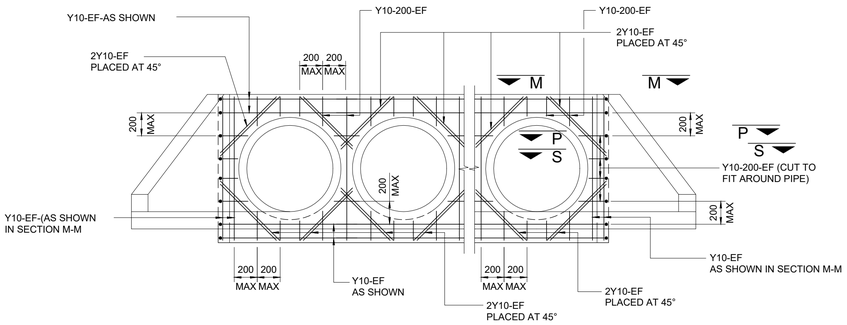
BLOUBERG MUNICIPALITY

CONSULTANT:
SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MAIOKA & VILJOEN
Reg.N°. 2006/018585/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za
ARCHITECT:

PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

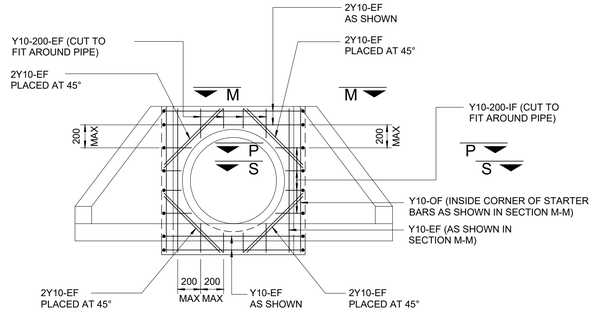
DRAWING TITLE:
STORMWATER INLET/OUTLET REINFORCEMENT DETAILS FOR SKEW PIPE CULVERTS AND @ 90° TO THE ROAD:
(Ø450mm TO Ø900mm PIPES)

DRAWING NUMBER	SHEET No.
SMV-LET-PIC-406	SHEET 1 OF 1
SMV PROJECT NUMBER	SCALE: AS SHOWN
CONTRACT No.	DATE: 2023.04.24 / REV No.: B



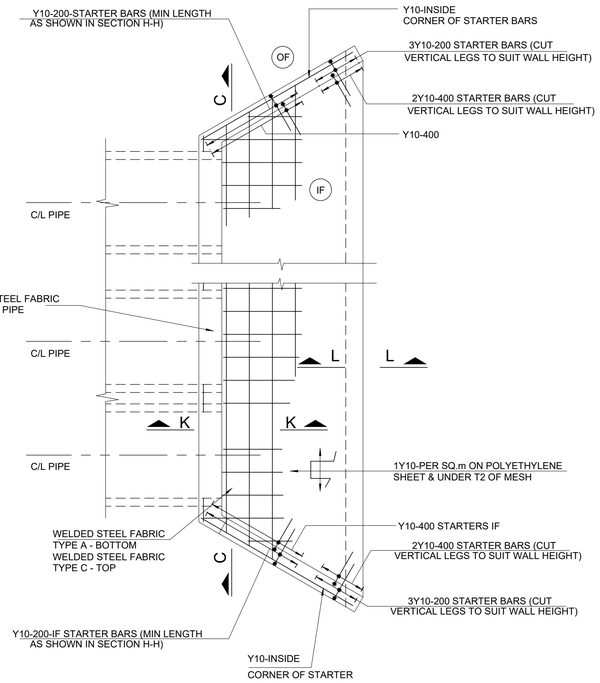
NOTE:
1. STEEL IN WINGWALL AND STARTER BARS NOT SHOWN FOR CLARITY
2. SKEW PIPE CULVERTS SIMILAR
3. COVER TO REINFORCEMENT 40mm

ELEVATION C
1 : 20



ELEVATION F
1 : 20

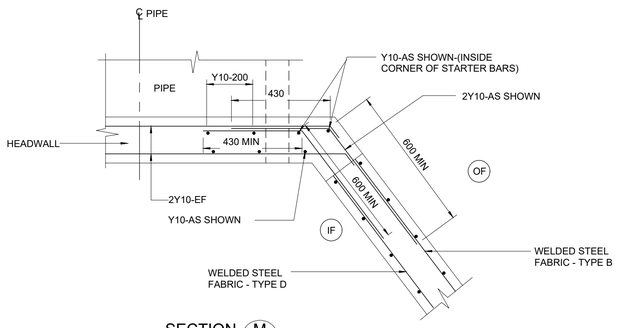
NOTE:
1. STEEL IN WINGWALL AND STARTER BARS NOT SHOWN FOR CLARITY
2. SKEW PIPE CULVERTS SIMILAR
3. COVER TO REINFORCEMENT 40mm



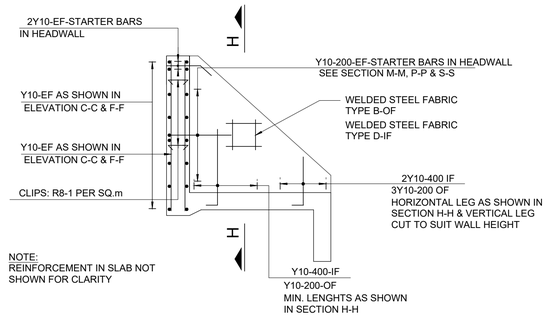
PLAN A
1 : 20

NOTE:
1. WELDED STEEL FABRIC MUST COVER TOTAL AREA OF SLAB
2. SKEW PIPE CULVERTS SIMILAR

FLOOR SLAB - MULTIPLE PIPE CULVERT

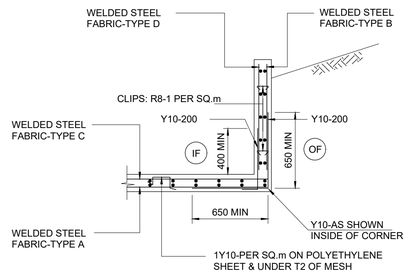


SECTION M
1 : 10



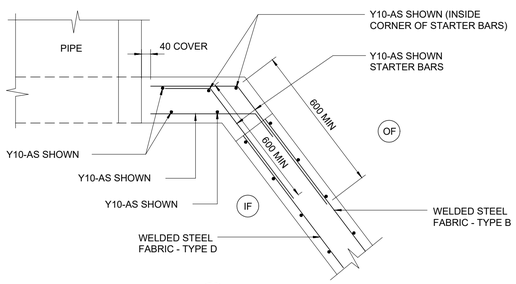
NOTE:
REINFORCEMENT IN SLAB NOT SHOWN FOR CLARITY

TYPICAL WINGWALL ELEVATION
1:20

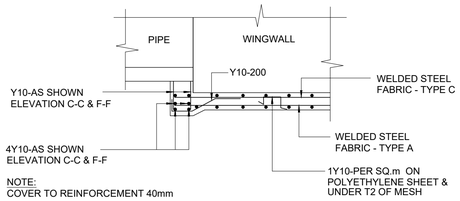


NOTE:
COVER TO REINFORCEMENT 40mm

SECTION H
1 : 20



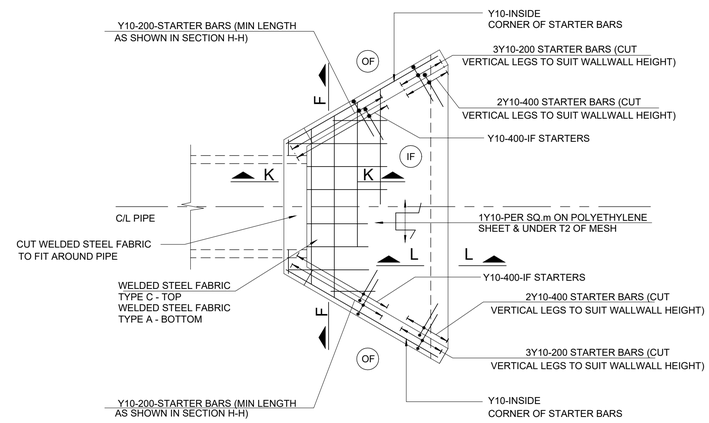
SECTION P
1 : 10



NOTE:
COVER TO REINFORCEMENT 40mm

SECTION K
1 : 20

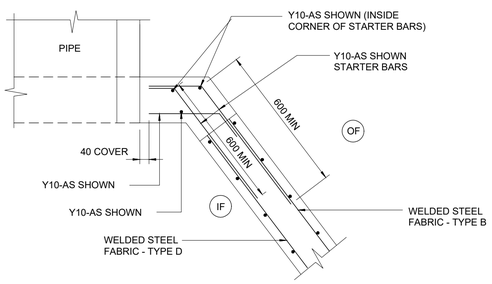
INSIDE DIA. PIPE (D)	T	WELDED FABRIC REF No			
		TYPE A	TYPE B	TYPE C	TYPE D
1050	200	500	311	245	245
1200	200	617	311	245	245



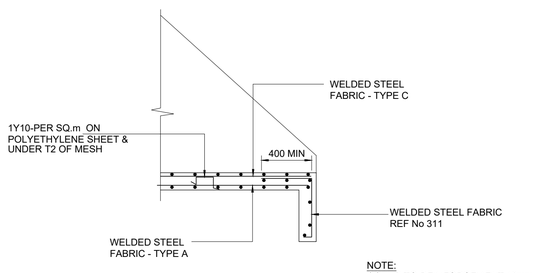
NOTE:
1. WELDED STEEL FABRIC MUST COVER TOTAL AREA OF SLAB
2. SKEW PIPE CULVERTS SIMILAR

PLAN PLN
SCALE REF

FLOOR SLAB - SINGLE PIPE CULVERT



SECTION S
1 : 10



NOTE:
COVER TO REINFORCEMENT 40mm

SECTION L
1 : 20

LEGEND

EF = EACH FACE
OF = OUTSIDE FACE
IF = INSIDE FACE

20MPa CONCRETE - BAR LAP LENGTHS

BAR DIA.	10	12
LAP LENGTH	550	660

20MPa CONCRETE - MESH LAP LENGTHS

WELDED STEEL FABRIC REF. No.	245	311	395	500	617
MIN LAP LENGTH	450	500	600	650	750

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
SMV CIVIL ENGINEERS (PTY) LTD
SESEGO, MALOKA & VILJOEN
Reg.N° 2006/018688/07
SUITE 228
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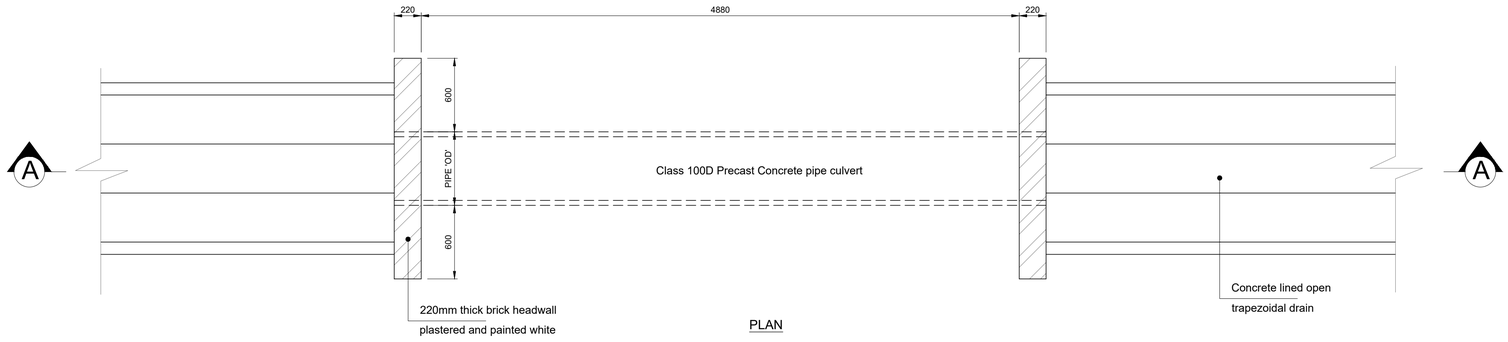
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

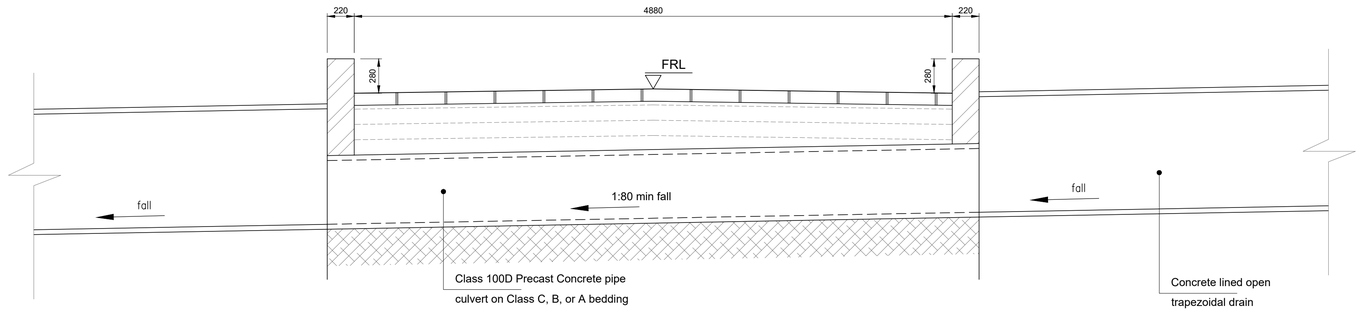
PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:
STORMWATER INLET/OUTLET REINFORCEMENT DETAILS FOR SKEW PIPE CULVERTS AND @ 90° TO THE ROAD:
(Ø1050mm TO Ø1200mm PIPES)

DRAWING NUMBER	SHEET No.
SMV-LET-PIC-407	SHEET 1 OF 1
SMV PROJECT NUMBER	SCALE
	AS SHOWN
CONTRACT No.	DATE / REV No.
	2023.04.24 / B



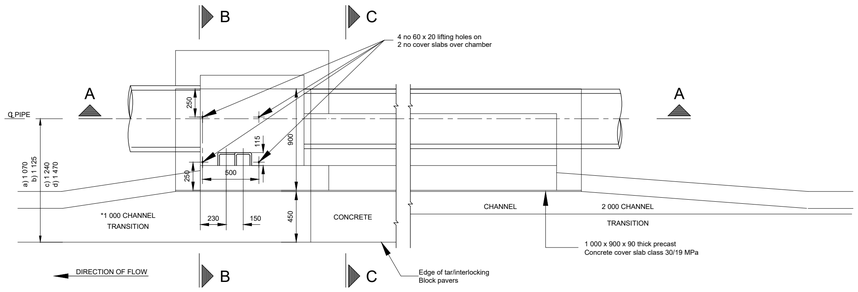
PLAN



SECTION A - A

STANDARD PROPERTY ACCESS CULVERT

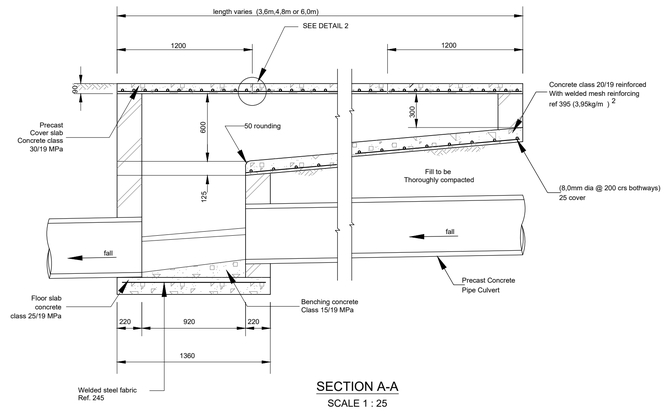
(ONLY WHERE INSTRUCTED BY THE ENGINEER ON STE)



* NOTE: K.r's AT LOW POINTS TO HAVE 2 000 TRANSITIONS BOTH SIDES

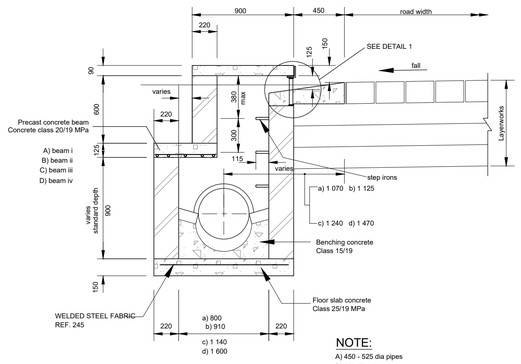
TYPICAL PLAN

SCALE 1 : 25



SECTION A-A

SCALE 1 : 25

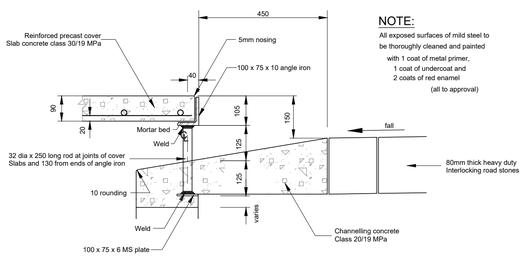


SECTION B-B

SCALE 1 : 25

NOTE:

A) 450 - 525 dia pipes
B) 600 dia pipe
C) 750 dia pipe
D) 825 - 1 350 dia pipes

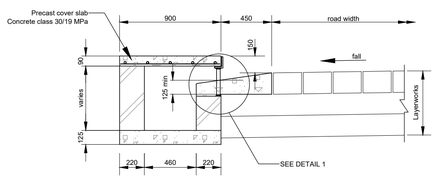


NOTE:

All exposed surfaces of mild steel to be thoroughly cleaned and painted with 1 coat of metal primer, 1 coat of undercoat and 2 coats of red enamel (all to approval)

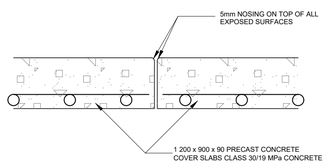
DETAIL 1 SCALE 1:10

ANGLE IRON SUPPORTS



SECTION C-C

SCALE 1 : 25



DETAIL 2

SCALE 1:5

STANDARD KERB INLETS / STORMWATER DRAINAGE CATCHPITS

NOTES

1. All exposed steelwork to receive two coats of epoxy tar.
2. Top of precast concrete cover slabs to be clearly marked.
3. Finishes a) top of precast concrete cover slab wood float.
   b) benching - granolithic finish.
   c) cement plaster to inside walls 10mm thick.
4. Concrete for bases and cover slabs to be class 25/19 and for blinding to be 15/19.
5. Cover to reinforcement = 40mm
6. All brickwork to be constructed from best quality engineering bricks. to S.A.B.S.227.

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
SMV CIVIL ENGINEERS (PTY) LTD
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Reg.N°. 2006/018585/07
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Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

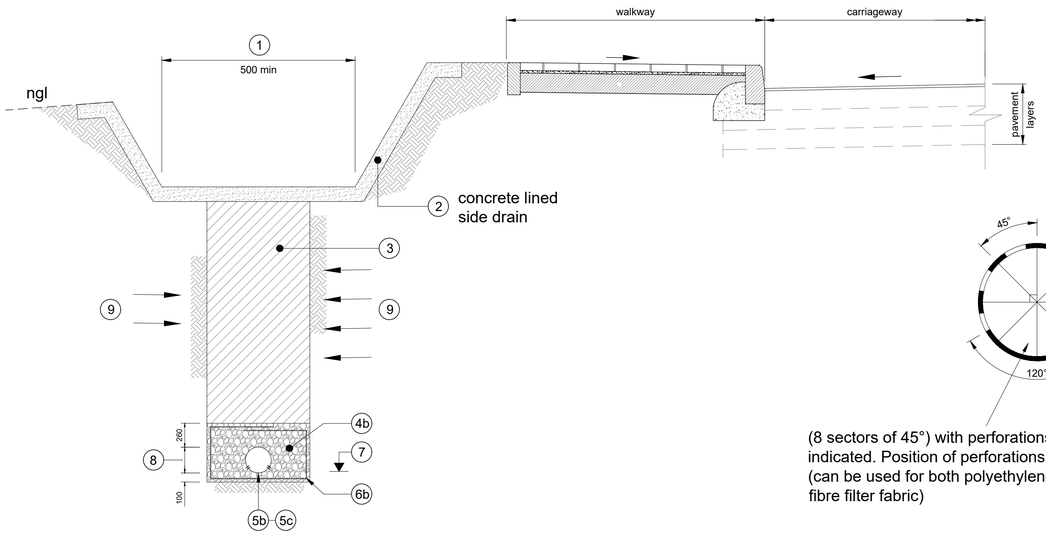
PROJECT NAME:

LETHALENG TO PICKUM ROAD UPGRADING

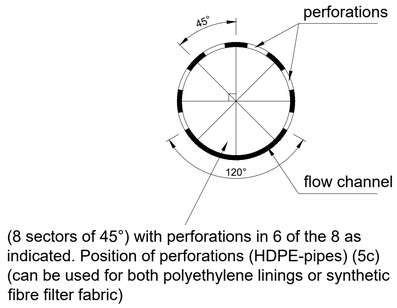
DRAWING TITLE:

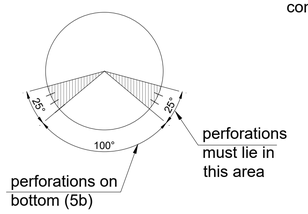
STANDARD PROPERTY ACCESS CULVERT & TYPICAL STORMWATER DETAILS

DRAWING NUMBER	SHEET No.
SMV-LET-PIC-408	SHEET 1 OF 1
SMV PROJECT NUMBER	SCALE: AS SHOWN
CONTRACT No.	DATE: 2023.04.24 / REV No.: B



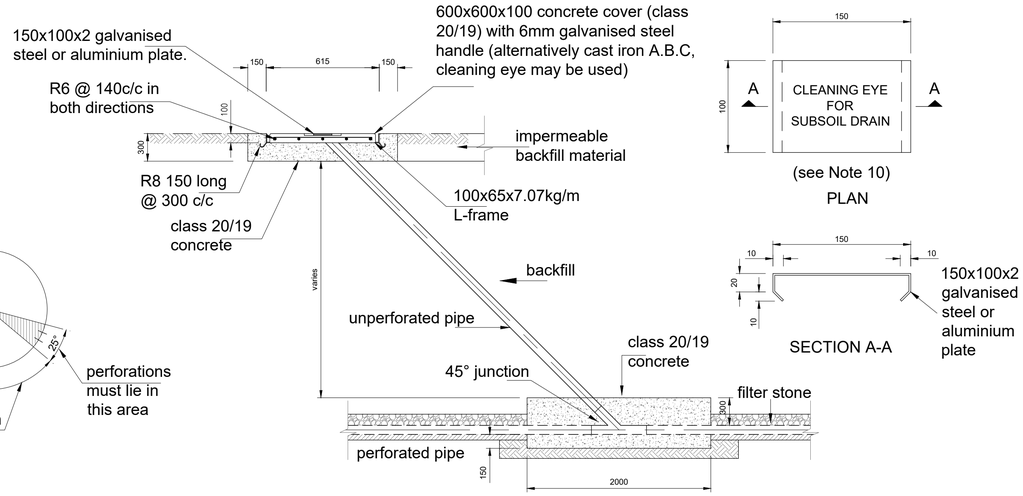
TYPICAL SECTION OF SUBSOIL DRAIN WITH SYNTHETIC FIBRE FILTER FABRIC





POSITION OF PERFORATIONS IN SUBSOIL DRAINAGE PIPES

(WHEN USED WITH SYNTHETIC FIBRE FILTER FABRIC)



CLEANING EYE IN SUBSOIL DRAIN

NO.	DESCRIPTION
1	This dimension may be reduced to a minimum of pipe diameter + 200mm provided that the cross-sectional area is adequate (see subclause 2101(b) of the standard specifications).
2	Impermeable backfill material (min 150mm thick) taken to top of water bearing layer in cases where no concrete side drain is provided.
3	Filter sand of approved source and grade.
4a 4b	Filter stone: fine or coarse grade as required, (see subclause 2104(a)(ii)of the standard specifications).
5a 5b 5c	Perforated / slotted subsoil drainage pipes. (Position of perforations indicated).
6a	Polyethylene 0.15mm thickness.
6b	Synthetic fibre filter fabric with 200mm overlap (grade 2 or approved equivalent).
7	Level to which surrounding area is to be drained.
8	Internal diameter: 110mm or 150mm.
9	Water bearing strata.

NOTES:

1. All criteria assumes that filter sand and filter stone are continuously graded from coarse.
2. Use the envelope curves for the water bearing strata, filter sand and filter stone gradings and apply to most critical combinations.
3. If required by the Engineer, subsoil drainage must also be provided on the inside of benching, where used.
4. Where subsoil drainage is installed in solid rock the polyethylene lining may be omitted.
5. Type A outlet preferably to be used where the natural ground levels allow it. Outlets may also be combined with culvert in or outlets.
6. All concrete shall be class 20/19.
7. Spacing of cleaning eyes to be as follows:
   a) 100mm max. on straight sections,
   b) at all bends,
   c) or as directed by the Engineer.
8. Transverse subsoil drainage to be provided at all cut to fill transitions.
9. Plate with the inscription "cleaning eye for subsoil drain", stamped on to be affixed to concrete cover.
10. Letter size on plate: 10mm Series C, capital letters.
11. Synthetic fibre filter fabric to be replaced with polyethylene lining in the following instances;
    a) where the surrounding soil is very permious,
    b) where the surrounding soil has a high fines content which could lead to clogging of filter fabrics.
12. Steel plate to be fixed to top of fenceline opposite the subsoil outlet stucture.
13. Background: Matt-white
    Text : din A, Matt-black

FILTER CRITERIA:

A. "Dx" is the size of sieve through which x% of the filter material will pass.
O_{50}(GF) = average size of the openings of the synthetic fibre filter fabric.

B. FILTER SAND (FS) IN RELATION TO WATER BEARING STRATA (WS).

1. For D_{85}(WS) > 0.05mm;
   (a) to prevent blocking of filter sand:
   D_{15}(FS) < 5 x D_{85}(WS)
   D_{50}(FS) < 25 x D_{50}(WS)
   (b) for permeability of filter sand:
   D_{15}(FS) > 5 x D_{15}(WS)

2. For D_{85}(WS) < 0.05mm:
   (a) to prevent blocking of filter sand:
   D_{15}(FS) < 0.25mm
   D_{85}(FS) > 0.075mm
   (b) for permeability requirements not necessary.

C. FILTER STONE (FSN) IN RELATION TO FILTER SAND (FS).

(a) To prevent blocking of filter stone:
D_{15}(FSN) < 5 x D_{85}(FS)
D_{50}(FSN) < 25 x D_{50}(FS)
(b) Permeability: filter stone must be coarser than sand all percentages.

D. FILTER STONE (FSN) IN RELATION TO PERFORATIONS IN PIPES.

(a) To prevent blocking of perforations in pipes:
D_{85}(FSN) > 1.2 x Diameter of round perforations
D_{85}(FSN) > 1.2 x Width of slots

E. SYNTHETIC FIBRE FILTER FABRIC (SF) IN RELATION TO FILTER SAND (FS)

(a) To prevent clogging of synthetic fibre filter fabric:
O_{50}(SF) < D_{85}(FS)
(b) For permeability of synthetic fibre filter fabric:
O_{50}(SF) > D_{15}(FS)

MARK	DATE	INITIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
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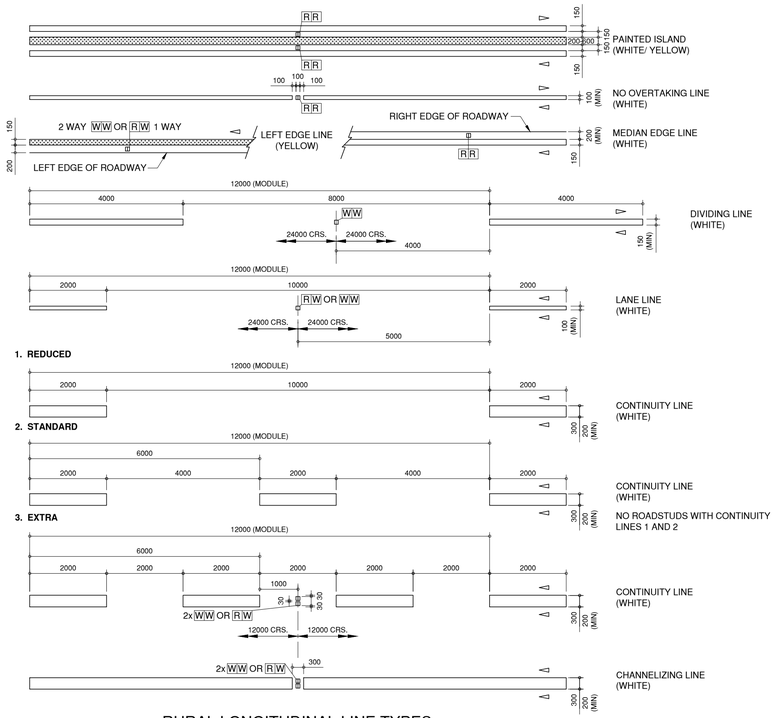
ARCHITECT:

PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:
SUBSURFACE DRAINAGE DETAILS

DRAWING NUMBER	SMV-LET-PIC-409
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.24
REV No.	B

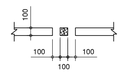


RURAL LONGITUDINAL LINE TYPES

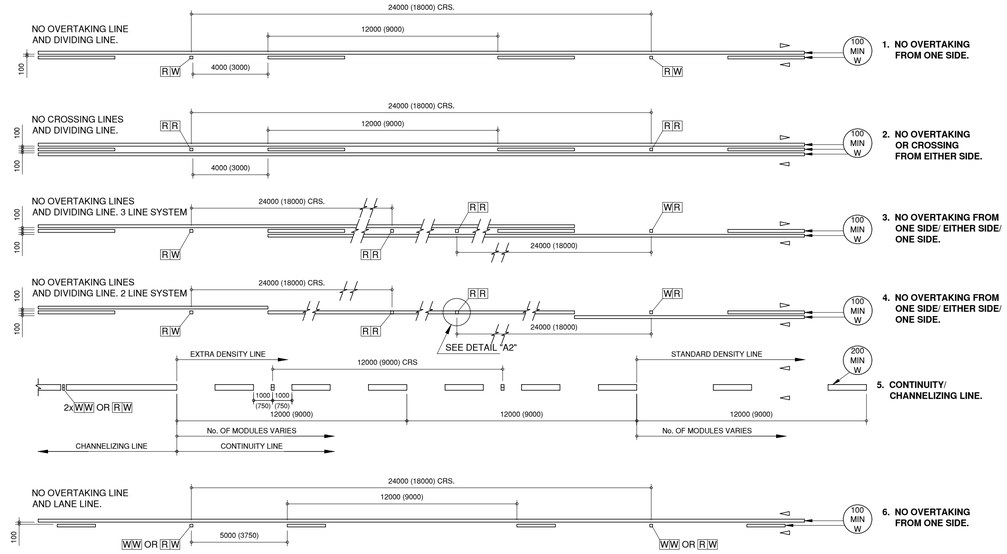
NOTES: (RURAL LONGITUDINAL LINE TYPES)

1. DIRECTION OF TRAFFIC MOVEMENT WITH RESPECT TO LINE MARKING INDICATED THUS OR .
2. PAINTED ISLAND MARKINGS SHALL BE USED AS A STANDARD DIVIDING MARKING ON ALL 4-LANE 2-WAY ROADWAYS. (SEE URBAN LONGITUDINAL LINE TYPES).
3. A NO OVERTAKING LINE MAY BE USED TO REPLACE A DIVIDING LINE MARKING ON MINOR ROADS OR TO MATCH PROVINCIAL ROAD MARKING POLICY ON AN INTERSECTING ROADWAY AS APPROPRIATE. A NO OVERTAKING LINE MAY BE USED IN COMBINATION WITH A LANE LINE. (NORMALLY ON A FREEWAY CARRIAGEWAY).
4. A LEFT EDGE LINE MARKING SHALL NOT EXTEND ACROSS THE POINT OF DEPARTURE FROM A THROUGH PORTION OF ROADWAY.
5. A RIGHT EDGE LINE MARKING IS ONLY REQUIRED TO DEMARCATE AN UNKERBED MEDIAN. (A MEDIAN GUARDRAIL OR CONCRETE SEPARATOE BARRIER DOES NOT CONSTITUTE A KERBED MEDIAN.)
6. THE DIVIDING LINE MARKING REPLACES THE PREVIOUS "CENTRE LINE" MARKING AND SHALL ONLY BE USED BETWEEN LANES CARRYING OPPOSING TRAFFIC FLOWS WHERE OVERTAKING IS PERMITTED.
7. A CONTINUITY LINE MAY BE SPECIFIED IN ONE OF THREE DENSITIES 1. REDUCED, 2. STANDARD OR 3. EXTRA. A CONTINUITY LINE MAY BE USED TO DEFINE THE LIMIT OF THE THROUGH PORTION OF A ROADWAY, EITHER AT A HIGH SPEED EXIT (OFF-RAMP OR SLIP ROAD), A DEDICATED EXIT LANE ON FREEWAY, OR AT-GRADE SLIP ROAD GORE AREA.
9. A LANE LINE, CONTINUITY LINE OR CHANNELIZING LINE SHALL NOT BE USED BETWEEN OPPOSING TRAFFIC MOVEMENTS.
10. THE WIDTHS OF LINES SHOWN ARE RECOMMENDATIONS ONLY (SEE LONGITUDINAL LINE COMBINATIONS).

LEGEND:
- R = RED
- W = WHITE
- Y = YELLOW



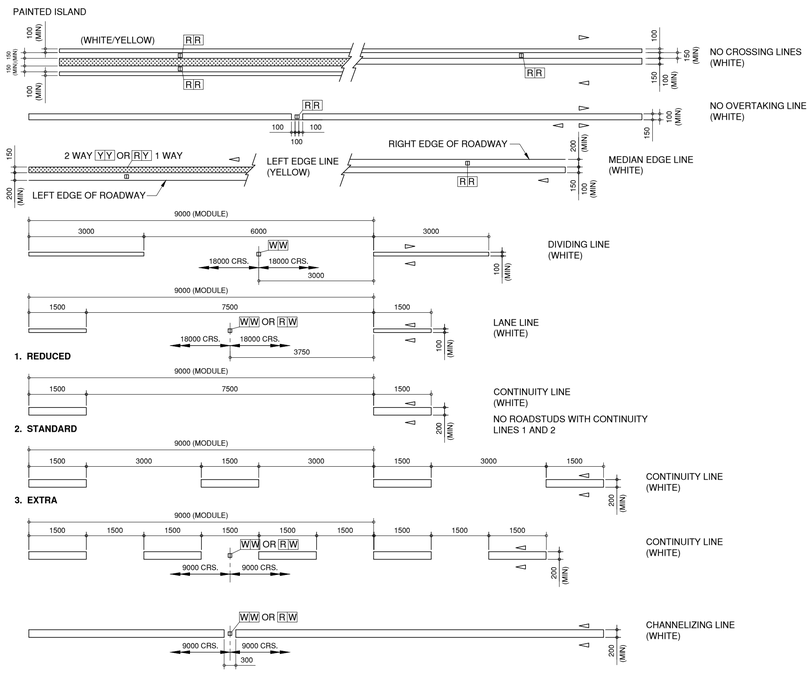
DETAIL "A2"



NOTES: (LONGITUDINAL LINE COMBINATIONS)

1. DIRECTION OF TRAFFIC MOVEMENT WITH RESPECT TO THE MARKING INDICATED THUS OR .
2. FOR FULL LONGITUDINAL DIMENSIONS OF COMPONENT MARKINGS SEE RURAL AND URBAN LONGITUDINAL LINE TYPES.
3. COMBINATION MARKINGS 1 TO 4 ARE FOR TWO WAY TRAFFIC AND ARE APPLICABLE TO NATIONALNON-FREEWAY ROUTES WHICH INTERSECT FREEWAYS.
4. COMBINATION MARKING 5 SHALL BE USED TO INDICATE THE DIVISIONS BETWEEN THE THROUGH ROADWAY AND ANY EXCLUSIVE EXIT/ TURN LANES. WHEREVER POSSIBLE A CONTINUITY LINE SHOULD LEAD TO, OR TERMINATE IN A CHANNELIZING LINE WHICH MAY BE SHORT. RECOMMENDED MINIMUM LENGTH IS 12m FOR RURAL AND 9m FOR URBAN APPLICATIONS.
5. FOR MARKINGS 1 TO 4 ROADSTUDS SHOULD BE LOCATED ON CENTRELINE OF THE DIVIDING LINE (OR SINGLE NO OVERTAKING LINE MARKING 4).
6. WHERE POSSIBLE THE LENGTH OF CHANNELIZING MARKING SHOULD BE ADJUSTED SO THAT THE CONTINUITY LINE ROADSTUDS MATCH OTHER ROADSTUDS ON CROSS SECTION AND FALL IN THE CENTRE OF A GAP IN THE CONTINUITY LINE.
7. DIMENSIONS FOR URBAN APPLICATIONS ARE INDICATED IN BRACKETS.
8. ROADSTUDS ON THE SINGLE NO OVERTAKING LINE IN MARKING 4 MAY BE COVERED DURING LINE MARKING OR PLACED AS INDICATED IN DETAIL "A2"..

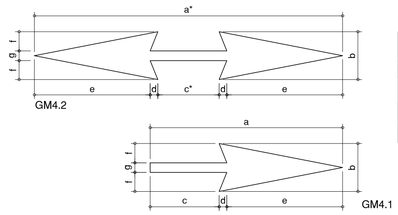
LONGITUDINAL LINE COMBINATIONS



URBAN LONGITUDINAL LINE TYPES

NOTES: (URBAN LONGITUDINAL LINE TYPES)

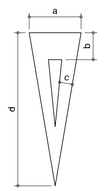
1. DIRECTION OF TRAFFIC MOVEMENT WITH RESPECT TO LINE MARKING INDICATED THUS OR .
2. A NO CROSSING LINE MAY BE USED AS A FORM OF DIVIDING LINE MARKING, IN PLACE OF A NO OVERTAKING LINE, TO PROHIBIT ACCESS TO OR FROM PROPERTIES AT THE SIDE OF AN URBAN ROAD. A PAINTED ISLAND MAY BE USED AS AN ALTERNATIVE MARKING FOR THIS PURPOSE.
3. A NO OVERTAKING LINE MAY BE USED TO REPLACE A DIVIDING LINE MARKING TO PROHIBIT OVERTAKING IN THE PATH OF ON-COMING TRAFFIC. A NO OVERTAKING LINE MAY BE USED IN COMBINATION WITH A LANE LINE.
4. LEFT EDGE LINE MARKING SHALL NOT BE EXTENDED ACROSS THE POINT OF DEPARTURE FROM A THROUGH PORTION OF ROADWAY.
5. A RIGHT EDGE LINE MARKING IS ONLY REQUIRED TO DEMARCATE AN UNKERBED MEDIAN. (A MEDIAN GUARDRAIL OR CONCRETE SEPARATOR BARRIER DOES NOT CONSTITUTE A KERBED MEDIAN.)
6. THE DIVIDING LINE MARKING REPLACES THE PREVIOUS "CENTRE LINE" MARKING AND SHALL ONLY BE USED BETWEEN LANES CARRYING OPPOSING TRAFFIC FLOWS WHEN OVERTAKING IS PERMITTED.
7. A CONTINUITY LINE MAY BE SPECIFIED IN ONE OF THREE DENSITIES 1. REDUCED, 2. STANDARD OR 3. EXTRA. THROUGH PORTION OF A ROADWAY EITHER AT A HIGH SPEED EXIT (OFF-RAMP OR SLIPROAD), A DEDICATED EXIT LANE ON A FREEWAY, OR AT-GRADE ROAD (RIGHT OR LEFT TURN).
8. A CHANNELIZING LINE MAY BE USED AS AN EXTENSION OF A CONTINUITY LINE OR INSTEAD OF A PAINTED ISLAND TO CHANNELIZE TRAFFIC MOVEMENT WHERE SPACE IS LIMITED.
9. A LANE LINE, CONTINUITY LINE OR CHANNELIZING LINE SHALL NOT BE USED BETWEEN OPPOSING TRAFFIC MOVEMENTS.
10. THE WIDTHS OF LINES SHOWN ARE RECOMMENDATIONS ONLY (SEE LONGITUDINAL LINE COMBINATIONS).



GM4.2 REVERSIBLE FLOW ARROW / GM4.1 INFORMATION ARROW

DIMENSIONS (mm)

Operating Speed km/h	Typical Applications	a	a*	b	c	c*	d	e	f	g
30 - 40	City Centre	1250	2000	1250	450	400	50	750	500	250
50 - 60	Urban	2500	4000	1250	900	800	100	1500	500	250
70 - 90	Urban Arterial / Rural Expressway	4000	6400	1250	1440	1280	160	2400	500	250
100 - 120	Rural and Freeways	5000	8000	1250	1800	1600	200	3000	500	250

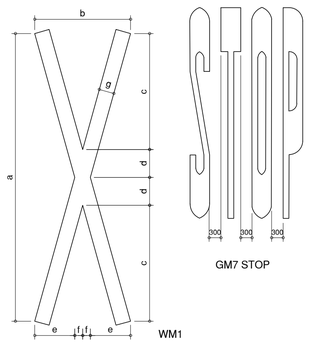


WM5

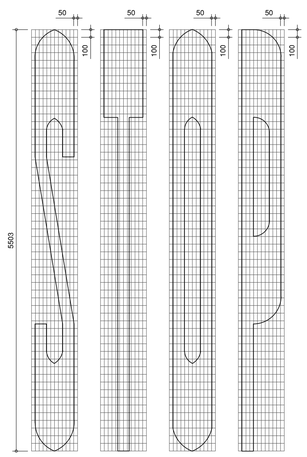
Marking	a	Area	a*	Area
		Area m²		
WM1	4000	1.84		
	7500	6.00		
GM4.1/ GM4.2(a*)	1250	0.59	2000	1.05
	2500	1.17	4000	2.10
	4000	1.88	6400	3.36
	5000	2.35	8000	4.20
WM5	450	0.20		
	850	0.83		
	1350	2.15		
GM7	5500	6.90		

NOTES:

1. THIS DRAWING DETAILS A RANGE OF GENERAL WARNING OR GUIDANCE SYMBOLS. APPLICATION SHALL BE IN ACCORDANCE WITH THE SOUTH AFRICAN ROAD TRAFFIC SIGNS MANUAL.
2. MARKING WM5 - YIELD CONTROL AHEAD MAY BE REPEATED 1m FROM THE YIELD LINE



WM1 RAILWAY LEVEL CROSSING AHEAD



GM7

WM5 YIELD CONTROL AHEAD

DIMENSIONS (mm)

Operating Speed km/h	Typical Applications	Distance from Yield Line	a	b	c	d
30 - 40	City Centre	90m	450	250	100	1250
50 - 60	Urban	120m	850	450	150	2500
70 - 120	Rural	155m	1350	700	100	4000

DIMENSIONS (mm)

Typical Applications	a	b	c	d	e	f	g
Urban	4000	2500	1797	203	1135	115	200
Rural	7500	2500	3003	747	1042	208	400

REGULATORY/ WARNING/ GUIDANCE SYMBOLS

MARK	DATE	INITIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:

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Reg.N°. 2006/018685/07

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POLOKWANE

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ARCHITECT:

PROJECT NAME:

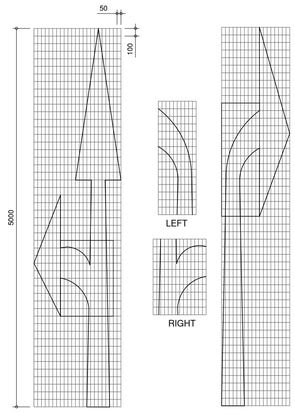
LETHALENG TO PICKUM ROAD UPGRADING

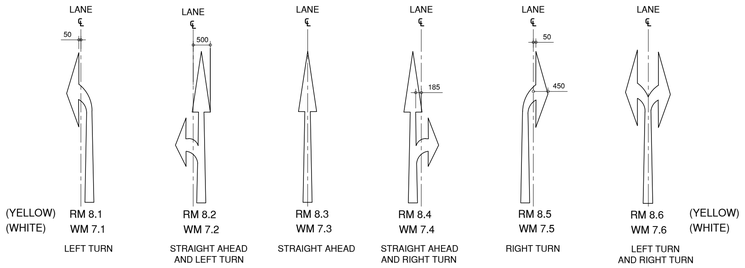
DRAWING TITLE:

ROAD CARRIAGEWAY MARKINGS DETAILS

SHEET 1 OF 2

DRAWING NUMBER	SMV-LET-PIC-501
SHEET No.	SHEET 1 OF 2
SMV PROJECT NUMBER	
SCALE	NTS
CONTRACT No.	
DATE	2023.04.24
REV No.	B



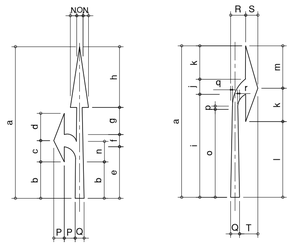


APPLICATIONS

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 Expressway	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	1850	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

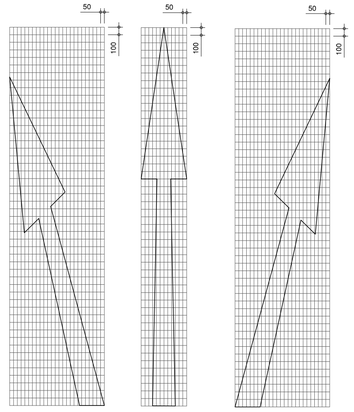


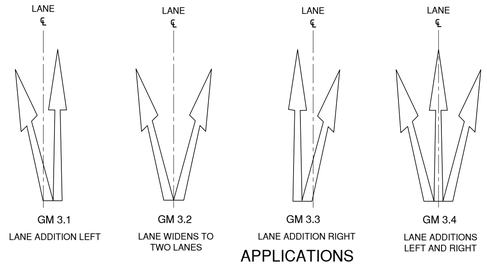
ARROW AREA / (m²)				
a	RM8.1/RM8.5 WM7.1/WM7.5	RM8.2/RM8.4 WM7.2/WM7.4	RM8.3 WM7.3	RM8.6 WM7.6
2500	0.67	0.89	0.66	1.03
4000	1.14	1.43	1.06	1.68
5000	1.45	1.78	1.32	2.12
7500	2.23	2.66	1.98	3.20

NOTES: (MANDATORY DIRECTION ARROWS)

1. THESE ARROWS SHOULD 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 REQUIRES 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.

MANDATORY DIRECTION ARROWS



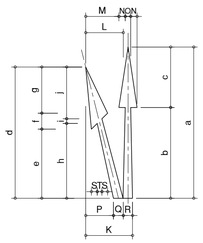


APPLICATIONS

DIMENSIONS (mm)

Operating Speed km/h	Typical Applications	a	b	c	d	e	f	g	h	i	j
30 - 40	City Centre	2500	150	1000	2170	1141	268	761	1235	81	855
50 - 60	Urban / Roads	4000	240	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

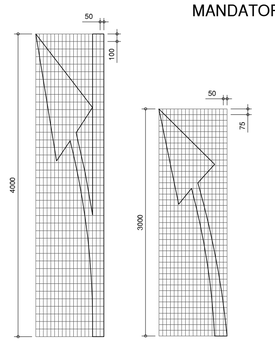


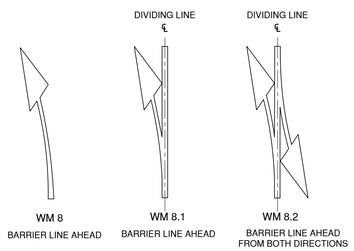
NOTES: (FURCATION ARROWS)

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 BIFURCATION ARROWS SHOULD BE LOCATED TWO TO THREE MARKING MODULES BEFORE THE START OF THE LANE GENERATING TAPER OR CURVE.

ARROW AREA / (m²)			
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





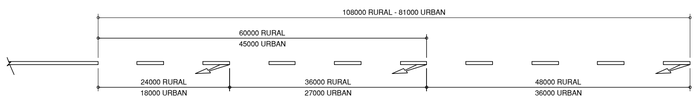
APPLICATIONS

LEGEND:
R = RED
W = WHITE
Y = YELLOW

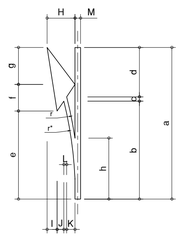
DIMENSIONS (mm)

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



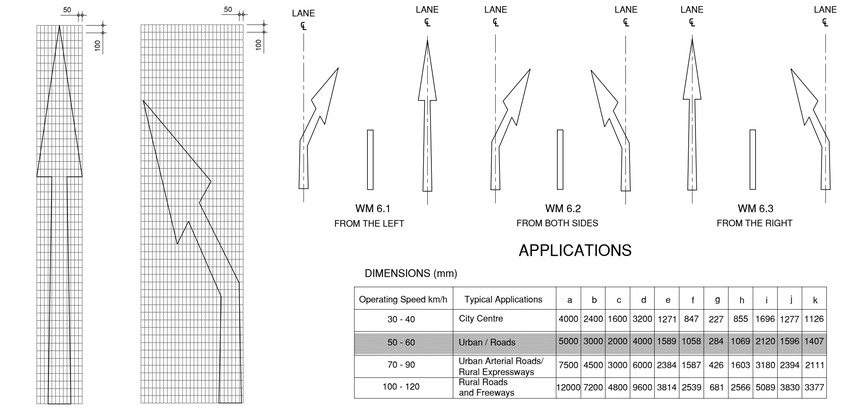
MARKING SPACING



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 CENTRELINE 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 WM8.2 MAY BE USED AT THE CENTRE OF THE OVERTAKING SECTION.

ARROW AREA / (m²)	
a	Per Arrow
3000	0.62
4000	0.82

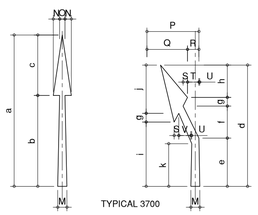


APPLICATIONS

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



LANE REDUCTION ARROWS

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 / (m²)		
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

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
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Reg.N° 2005/01856/07
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POSTNET X9307
POLOKWANE
0070
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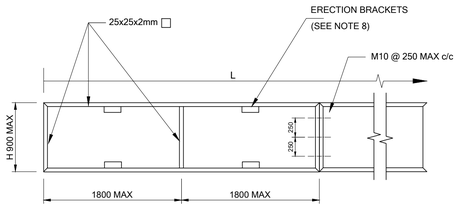
ARCHITECT:

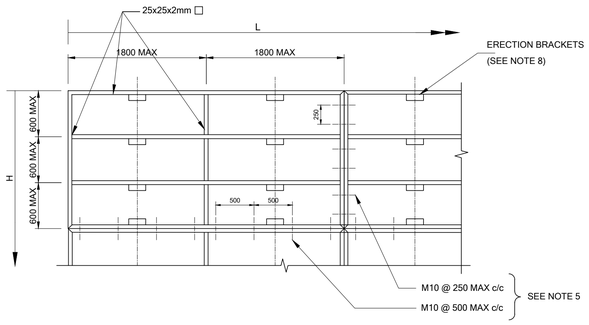
PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:
ROAD CARRIAGEWAY MARKINGS DETAILS
SHEET 2 OF 2

DRAWING NUMBER	SMV-LET-PIC-502
SHEET No.	SHEET 2 OF 2
SMV PROJECT NUMBER	
SCALE	NTS
CONTRACT No.	
DATE	2023.04.24
REV No.	B

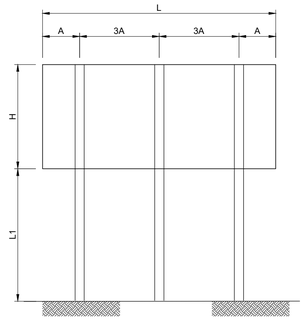


TYPE 'A' FRAMEWORK PANELS
(FOR SIGN BOARDS WHERE H < 900mm

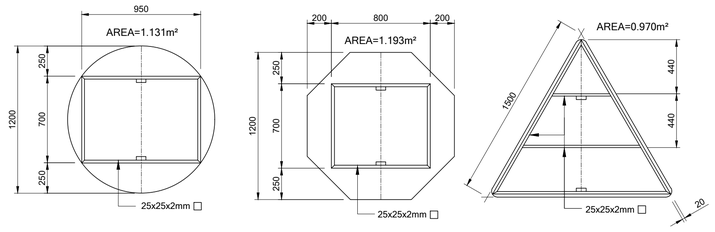


TYPE 'B' FRAMEWORK PANELS
(FOR SIGN BOARDS WHERE H > 900mm

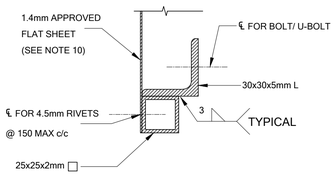
TABLE 1				
POSITIONING OF ERECTION BRACKETS				
L (mm)	NUMBER OF SUPPORTS	H	A	A MAX
600 - 1500	1	R/W SIGNS	-	-
0 - 1500	1	≤ 900	L/2	L/2
		> 900	L/2	L/2
1500 - 3600	2	≤ 900	L/5	≤ 800
		> 900	L/5	≤ 700
3600 - 5400	3	≤ 900	L/8	≤ 800
		> 900	L/8	< 700
5400 - 7200	4	≤ 900	L/11	< 800
		> 900	L/11	≤ 700



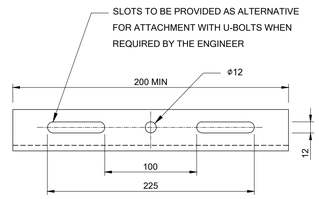
POSITIONING OF SUPPORTS AND ERECTION BRACKETS



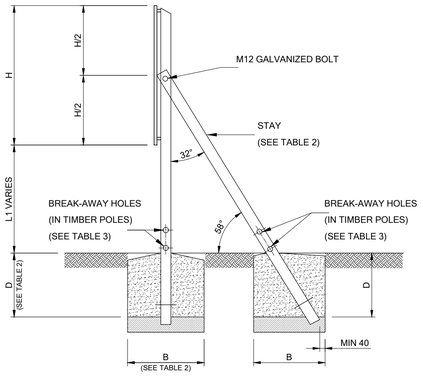
REINFORCEMENT FOR STANDARD ROAD SIGNS



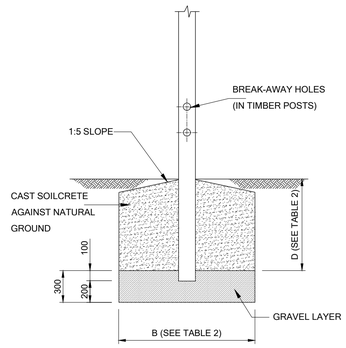
END ELEVATION



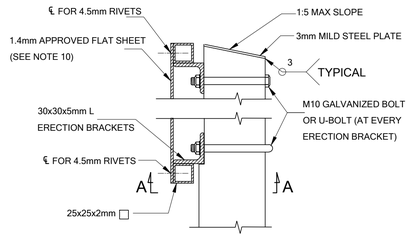
FRONT ELEVATION
TYPICAL ERECTION BRACKETS



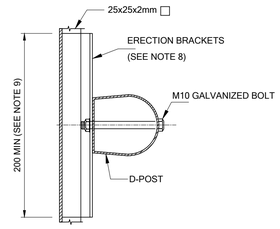
SIDE ELEVATION OF ROAD SIGN



FOUNDATION DETAIL

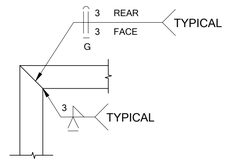


SIDE ELEVATION



SECTION A-A
(THROUGH D-SECTION STEEL POSTS)

ATTACHMENT DETAIL FOR SIGN BOARDS



TYPICAL WELDING DETAIL

TABLE 3	
BREAK-AWAY HOLES IN TIMBER POSTS	
NOMINAL ϕ OF POST	ϕ OF BREAK-AWAY HOLES
100-124mm	NONE
125-149mm	35mm
150-174mm	40mm
175-199mm	50mm
> 200mm	65mm
DISTANCE BETWEEN HOLES = 350mm	

NOTES:

1. DESIGN PARAMETERS
   WIND - 1:10 YR RETURN PERIOD (V=36m/s)
   SIGN HEIGHT : 5m (PRESSURE = 1.1kPa)
   PERMISSIBLE STEEL STRESS = 165MPa
2. FRAMEWORK : 25x25x2mm COMMERCIAL GRADE MILD STEEL
3. HORIZONTAL MEMBERS OF FRAMEWORK TO BE CONTINUOUS.
4. LARGE SIGN BOARDS TO BE MADE IN SECTIONS NOT EXCEEDING 3600mm IN LENGTH AND 900mm HIGH (TYPE 'A' PANELS) OR 3600mm IN LENGTH AND 1800mm HIGH (TYPE 'B' PANELS).
5. SECTIONS SHALL BE JOINED WITH GALVANIZED M10 BOLTS AND NUTS AT THE POSITIONS SHOWN.
6. ALL FRAMEWORK WELDS TO BE WELDED ALL ROUND. WELDS ON SIGN FACE SIDE TO BE GROUND TO PROVIDE SMOOTH SURFACE IN SAME PLANE AS FRAMEWORK.
7. FRAMEWORK TO BE PAINTED OR GALVANIZED AS PER PROJECT SPECIFICATIONS.
8. ERECTION BRACKETS SHALL BE WELDED TO ALL HORIZONTAL FRAMEWORK TUBES AT THE POSITION OF EACH SUPPORT, SUCH THAT THEY ARE VERTICALLY TRUE TO LINE.
9. MINIMUM LENGTH OF THE ERECTION BRACKETS TO R/W SIGNS: 100mm.
10. SIGN SUBSTRATE SHALL BE GALVANIZED MILD STEEL, FACTORY PREPAINTED WITH AN APPROVED SILICONE POLYESTER PAINT SYSTEM.

TABLE 2											
FOUNDATION AND SUPPORT SIZES											
SIGN HEIGHT H (mm)	L1 (mm)	FREE STANDING SUPPORTS				BRACED SUPPORTS					
		FOUNDATION		POSTS		POSTS			STAYS		
		BASE SIZE B (mm)	BASE DEPTH D (mm)	TIMBER POLE DIA (mm)	D-SECTION DIA x t (mm)	BASE SIZE B (mm)	BASE DEPTH D (mm)	TIMBER POLE DIA (mm)	BASE SIZE B (mm)	BASE DEPTH D (mm)	TIMBER POLE DIA (mm)
400-900	≤2900	950	700	120	76 x 2	500	450	80	500	450	80
	2900-3400	1000	700	120	76 x 2	500	450	80	500	450	80
	3400-5600	1150	800	120	76 x 2	550	450	80	550	450	100
900-1200	≤2900	1000	800	120	76 x 2	550	500	80	550	500	80
	2900-3400	1050	800	120	76 x 2	550	500	80	550	500	80
	3400-5600	1300	800	140	76 x 2	600	500	80	600	500	100
1200-1800	≤2900	1200	800	140	76 x 2	700	500	80	550	500	80
	2900-3400	1300	800	140	100 x 4	700	500	80	700	500	80
	3400-5600	1450	900	160	100 x 4	700	500	80	700	600	120
1800-2400	≤2900	1350	900	160	100 x 4	750	600	80	750	600	80
	2900-3400	1400	900	160	100 x 4	750	600	80	750	600	80
	3400-5600	1550	1000	180	100 x 4	750	600	80	750	600	120
2400-3000	≤2900	1450	1000	180	100 x 4	850	600	100	850	600	80
	2900-3400	1500	1000	180	100 x 4	750	700	100	750	700	80
	3400-5600	1750	1000	200	100 x 4	800	700	100	800	700	120
3000-3600	≤2900	1600	1000	180	100 x 4	850	700	100	850	700	80
	2900-3400	1650	1000	200	100 x 4	850	700	100	850	700	100
	3400-5600	1900	1000	220	100 x 4	900	700	120	900	700	120
3600-4200	≤2900	1700	1000	180	100 x 4	900	700	120	900	700	80
	2900-3400	1750	1000	200	100 x 4	900	700	120	900	700	100
	3400-5600	2000	1000	220	100 x 4	950	700	120	950	700	120
4200-4800	≤2900	1850	1000	220	100 x 4	950	700	120	950	700	100
	2900-3400	1900	1000	220	100 x 4	1000	700	140	1000	700	100
	3400-5600	2300	1000	220	100 x 4	1150	700	140	1150	700	140
SINGLE POST REGULATORY AND WARNING SIGNS											
4600-1500	≤3000	950	700	-	76 x 2	USE ONLY FREE STANDING SUPPORTS					

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:
1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
SMV CIVIL ENGINEERS (PTY) LTD
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POSTNET X9307
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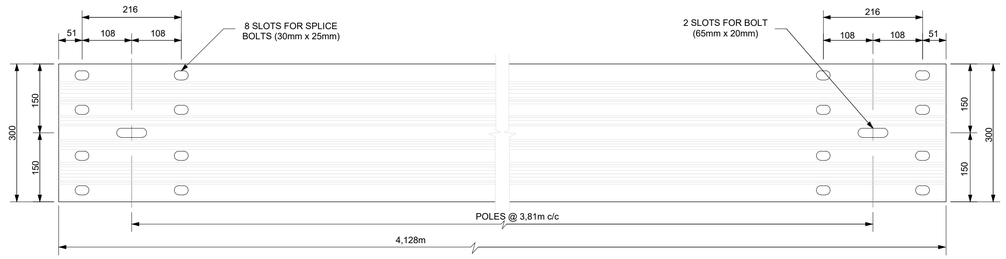
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME:
LETHALENG TO PICKUM ROAD UPGRADING

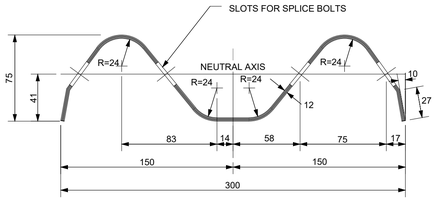
DRAWING TITLE:
ROAD SIGNS - TYPICAL MANUFACTURING AND ERECTION DETAILS

DRAWING NUMBER	SMV-LET-PIC-503
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	NTS
CONTRACT No.	
DATE	2023.04.24
REV No.	B



TYPICAL GUARDRAIL SECTION

SCALE 1:5

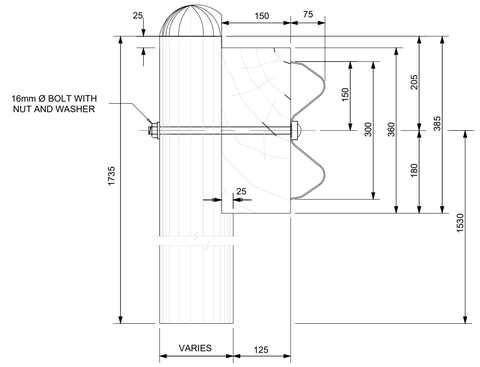


SECTION THROUGH GUARDRAIL

SCALE 1:2

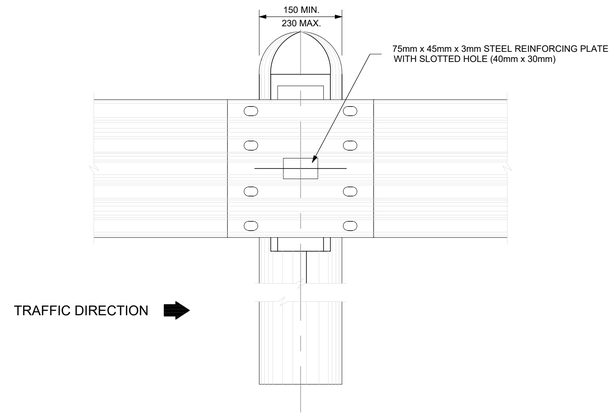
NOTE:

1. GUARDRAILS WILL ONLY BE PLACED WHERE REQUIRED BY THE ENGINEER.
2. ALL GUARDRAILS MUST BE GALVANIZED AS SPECIFIED (NOT PAINTED).



ELEVATION OF GUARDRAIL

SCALE 1:5



DETAIL A: FRONT ELEVATION NORMAL SPACING OF POSTS

SCALE 1:5

NOTES ON ERECTION DETAILS

1. THE HOLES FOR TIMBER POSTS SHALL BE OF SUFFICIENT SIZE TO ALLOW PROPER SETTING OF THE POSTS AND SUFFICIENT ROOM FOR BACKFILLING.
2. AT LEAST 1,0m OF POST SHALL BE EMBEDDED IN THE GROUND
3. HOLES FOR TIMBER POSTS SHALL BE SPACED TO SUIT STANDARD LENGTHS OF GUARDRAILS SUPPLIED.
4. HOLES SHALL BE BACKFILLED WITH 12:1 SOIL : CEMENT MIXTURE AT OPTIMUM MOISTURE CONTENT IN COMPACTED LAYERS NOT EXCEEDING 100mm.

GUARDRAIL WARRANTS

1. WHERE THE FILL IS HIGHER THAN 4,0m FOR SURFACED ROADS, AND 6,0m FOR GRAVEL ROADS.
2. WHERE WATER NEXT TO THE ROAD FORMATION IS DEEPER THAN 1,5m.
3. AT ALL BRIDGES WITH BALUSTRADES.
4. ON THE OUTSIDE OF CURVES WITH RADII LESS THAN 200m ONLY WHEN THE ROAD IS IN FILL.
5. WHERE OBSTRUCTIONS ARE LESS THAN 1,0m FROM THE SHOULDER BREAKPOINT.
6. WHERE AN OBSTRUCTION APPEARS TO BE MORE DANGEROUS THAN A GUARDRAIL WOULD BE.

THESE RULES ARE TO BE APPLIED WITH DISCRETION AND THE POSITION OF ALL GUARDRAILS MUST BE CONFIRMED ON SITE BY THE ENGINEER PRIOR TO THE ERECTION THEREOF.

SPECIFICATIONS

1.BOLT:
HIGH TENSILE STEEL 16mm Ø

2.WASHERS:
3mm THICK

3.SPACER BLOCK:
PINE OR GUM, PRESSURE IMPREGNATED WITH CREOSOTE WHICH COMPLIES WITH SABS 538 OR 539

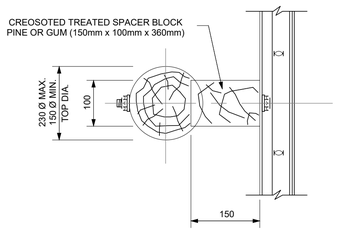
4.POSTS:
150mm Ø MIN - 230mm Ø MAX, PINE OR GUM, PRESSURE IMPREGNATED WITH CREOSOTE WHICH COMPLIES WITH SABS 538 OR SABS 539.

5.GALVANIZING:
GUARDRAILS:SABS 763:TYPE A1 ARTICLES. BOLTS AND WASHERS: SABS 763 TYPE C1 ARTICLES

6.TIMBER POSTS:
POSTS SHALL COMPLY WITH THE REQUIREMENTS OF SABS AND SHALL CARRY THE SABS MARK.

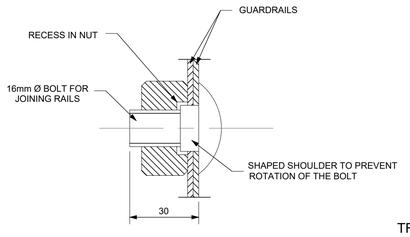
7.CREOSOTE TREATMENT:
TIMBER POSTS AND SPACER BLOCKS SHALL BE TREATED IN ACCORDANCE WITH SABS 05 WITH CREOSOTE WHICH COMPLIES WITH SABS 538 OR 539F.

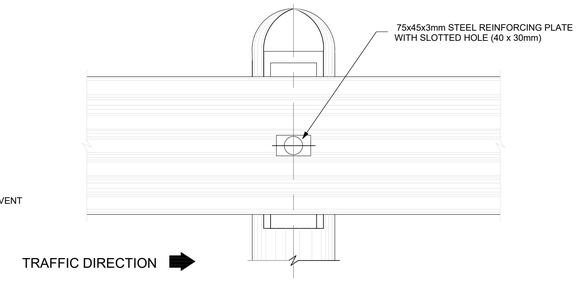
8.REFLECTIVE PLATES:
THE OUTER SURFACES SHALL BE COATED WITH ENGINEERING GRADE RETRO-REFLECTIVE MATERIAL WHICH COMPLIES WITH THE PROVISIONS OF CKS 191 IN THE COLOURS SHOWN ON THIS DRAWING.



PLAN

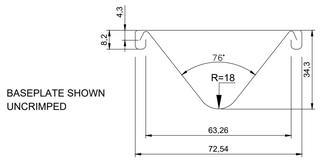
SCALE 1 : 5



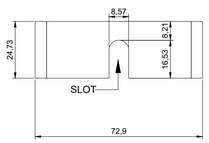


DETAIL B: FRONT ELEVATION HALF SPACING OF POSTS

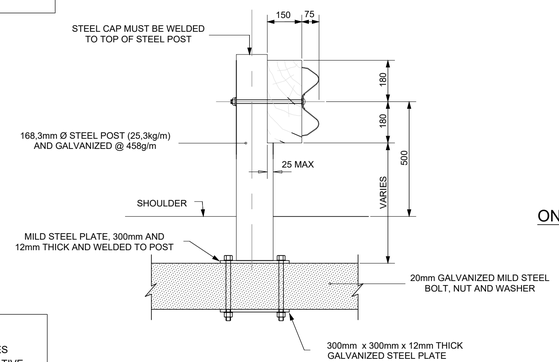
SCALE 1:5



SECTION PLAN

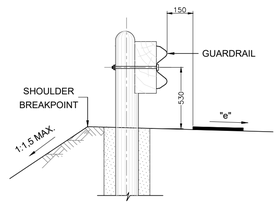


DETAIL OF BASEPLATE



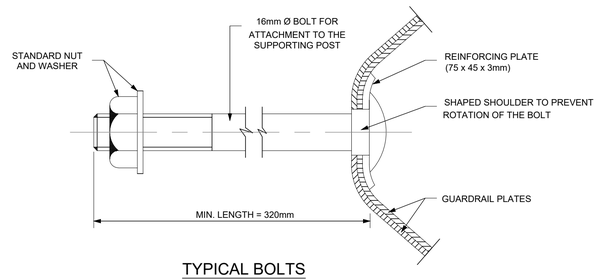
DETAIL OF STEEL GUARDRAIL POST

SCALE 1:10



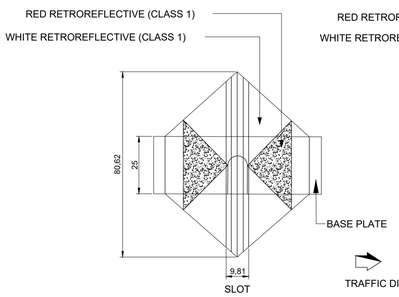
SECTION C - C ON OUTSIDE OF HORIZONTAL CURVE

nts

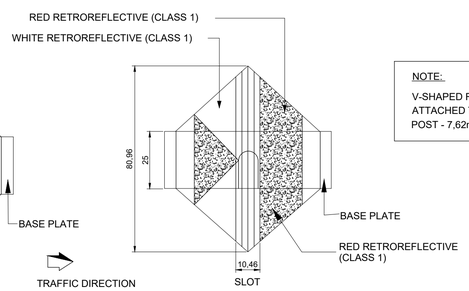


TYPICAL BOLTS

SCALE 1:1



FRONT ELEVATION : TYPE D1 (A)

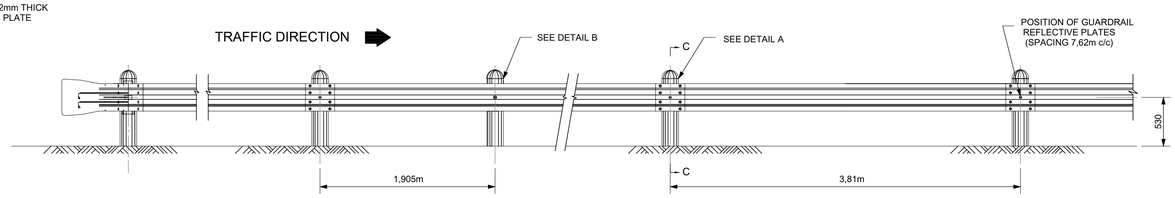


FRONT ELEVATION : TYPE D1 (B)

NOTE:

V-SHAPED REFLECTIVE PLATES ATTACHED TO EACH ALTERNATIVE POST - 7,62m c/c.

DETAIL OF GUARDRAIL REFLECTIVE PLATES



HALF-SPACING OF GUARDRAIL POSTS

NORMAL SPACING OF GUARDRAIL POSTS

SPACING OF POSTS AND POSITION OF REFLECTIVE PLATES

SCALE 1:25

MARK	DATE	INITIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MAIDKA & VILJOEN
Reg.N° 2006/018585/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za
ARCHITECT:

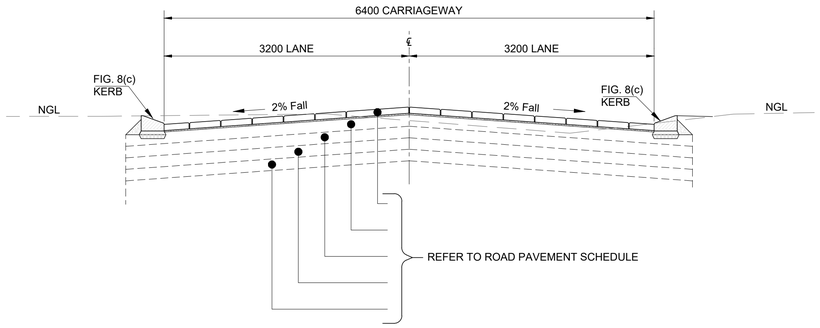
PROJECT NAME:

LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

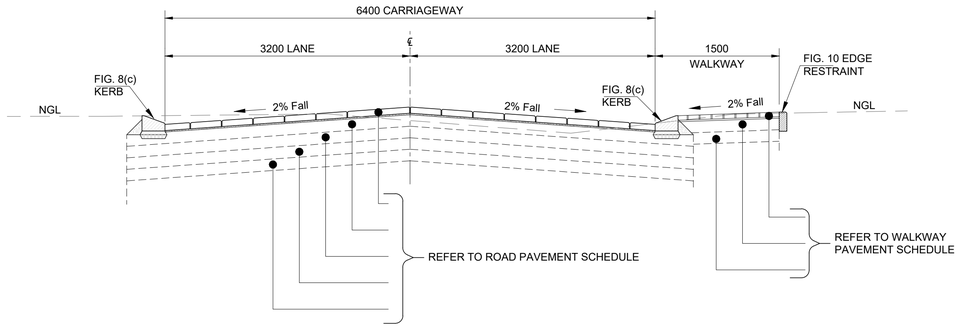
GUARD RAIL ELEMENTS & MOUNTING DETAILS

DRAWING NUMBER	SMV-LET-PIC-504
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.24
REV No.	B



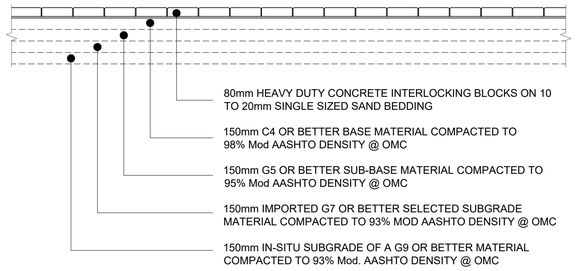
TYPICAL ROAD CROSS SECTION WITHOUT SIDEWALKS

(AS DIRECTED BY THE ENGINEER ON SITE)



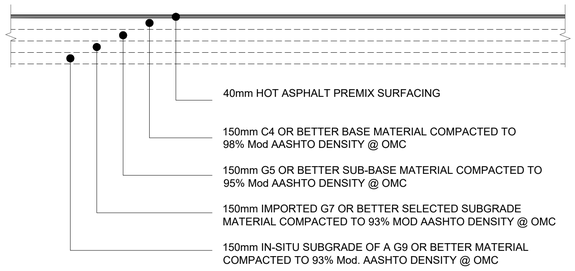
TYPICAL ROAD CROSS SECTION WITH SIDEWALKS

CH 0+060 TO CH 5+843



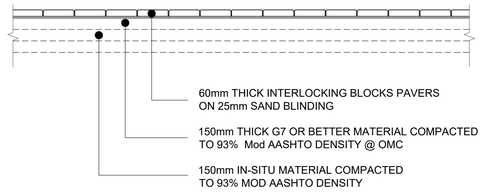
TYPICAL ROAD PAVEMENT SCHEDULE

CH 0+060 TO CH 5+843



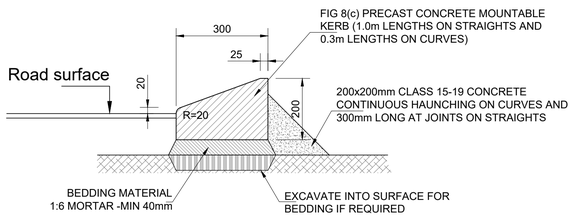
TYPICAL ROAD PAVEMENT SCHEDULE

CH 0+000 TO CH 0+060

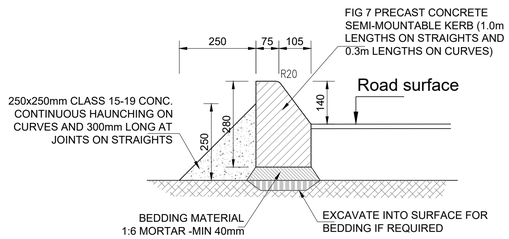


TYPICAL WALKWAY PAVEMENT SCHEDULE

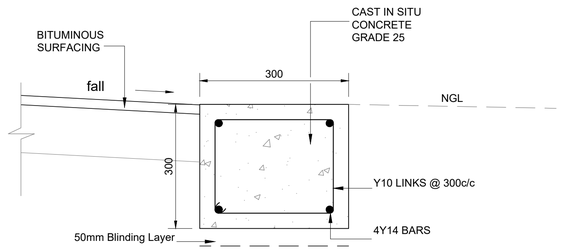
CH 0+060 TO CH 5+843



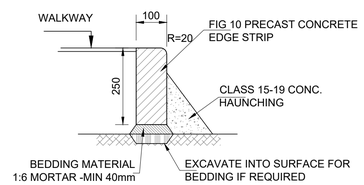
STANDARD FIG 8(c) PRECAST MOUNTABLE KERB DETAILS



STANDARD FIG 7 PRECAST SEMI-MOUNTABLE KERB



EDGE BEAM DETAIL



STANDARD FIG 10 KERB DETAILS

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.24	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	PM
DRAWN BY	CDN
CHECKED BY	

BLOUBERG MUNICIPALITY

CONSULTANT:
SMV CIVIL ENGINEERS (PTY) LTD
SEBEGO, MALOKA & VILJOEN
Reg.N° 2006/018068/07
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0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

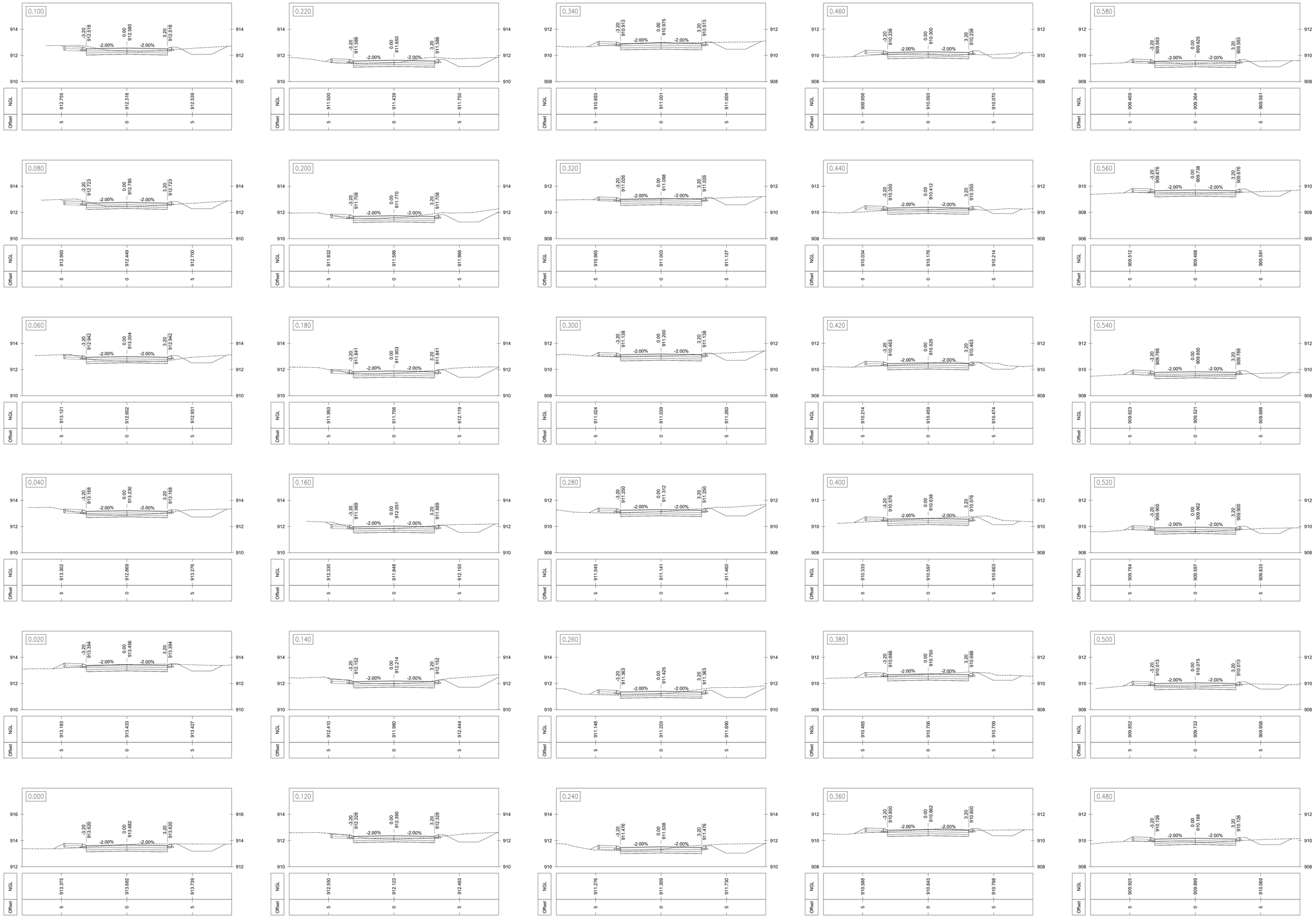
PROJECT NAME:

LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

TYPICAL ROAD CROSS SECTION, PAVEMENT SCHEDULE & KERBING DETAILS

DRAWING NUMBER	SMV-LET-PIC-600
SHEET No.	SHEET 1 OF 1
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.24
REV No.	B



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
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DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

SEBEGO, MALOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD
Reg.Nº. 2006/015058/07

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POLOKWANE
0070

Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelaet@ion.co.za

ARCHITECT:

PROJECT NAME:

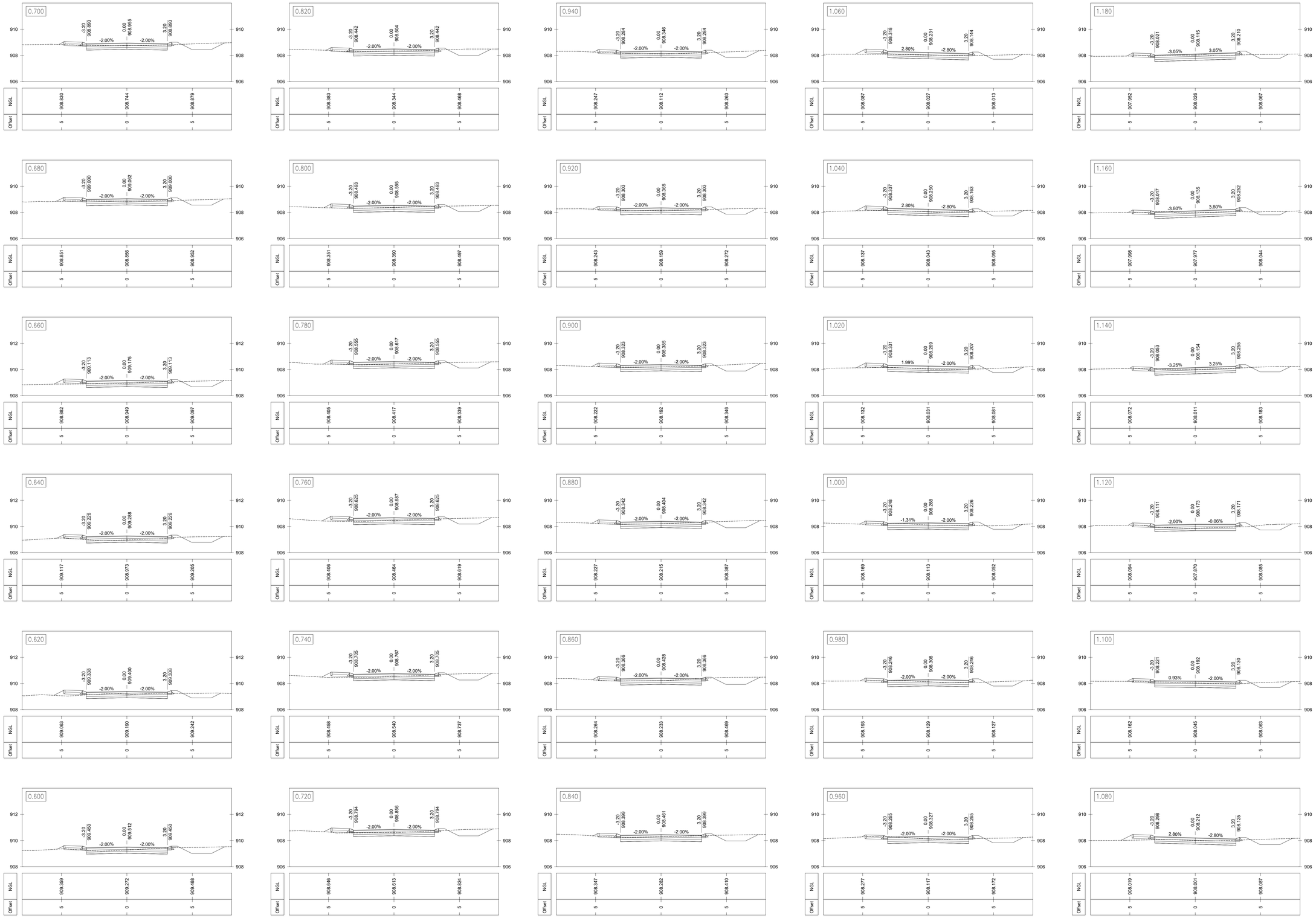
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

ROAD CROSS SECTIONS:

KM 0,000 TO KM 0,580

DRAWING NUMBER	SHEET No.	PAPER SIZE	
SMV-LET-PIC-601	SHEET 1 OF 10	A0	
SMV PROJECT NUMBER	SCALE		
	AS SHOWN		
CONTRACT No.	DATE	REV No.	
	2023.04.18	B	



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

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DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
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SEBEGO, MALOKA & VILJOEN
Reg.Nº. 2006/015058/07

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Fax: 015 - 291 5379
Email: phelaet@icon.co.za

ARCHITECT:

PROJECT NAME:

LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

ROAD CROSS SECTIONS:

KM 0,600 TO KM 1,180

DRAWING NUMBER	SHEET No.	PAPER SIZE	
SMV-LET-PIC-602	SHEET 2 OF 10	A0	
SMV PROJECT NUMBER	SCALE		
	AS SHOWN		
CONTRACT No.	DATE	REV No.	
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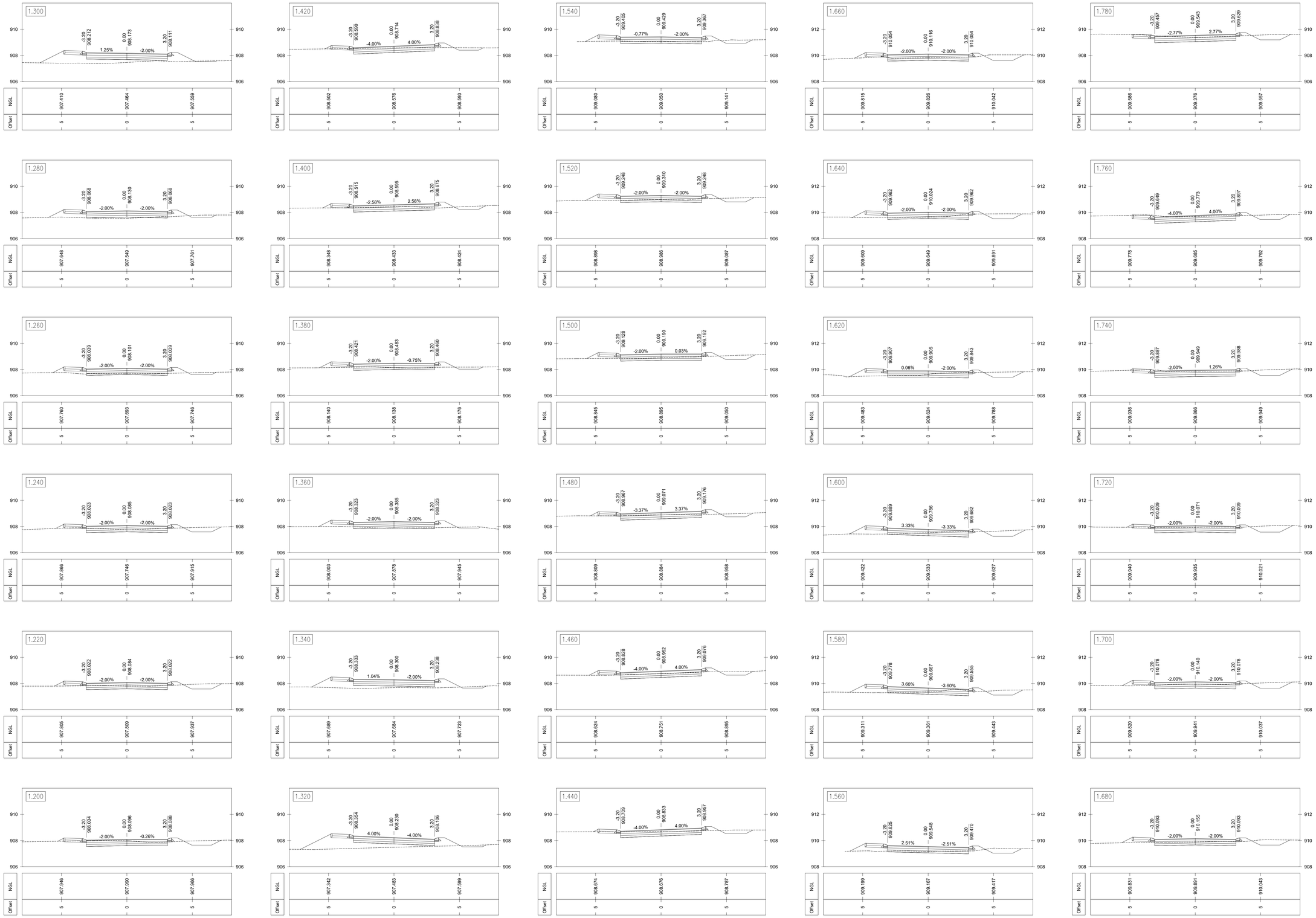

MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

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CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

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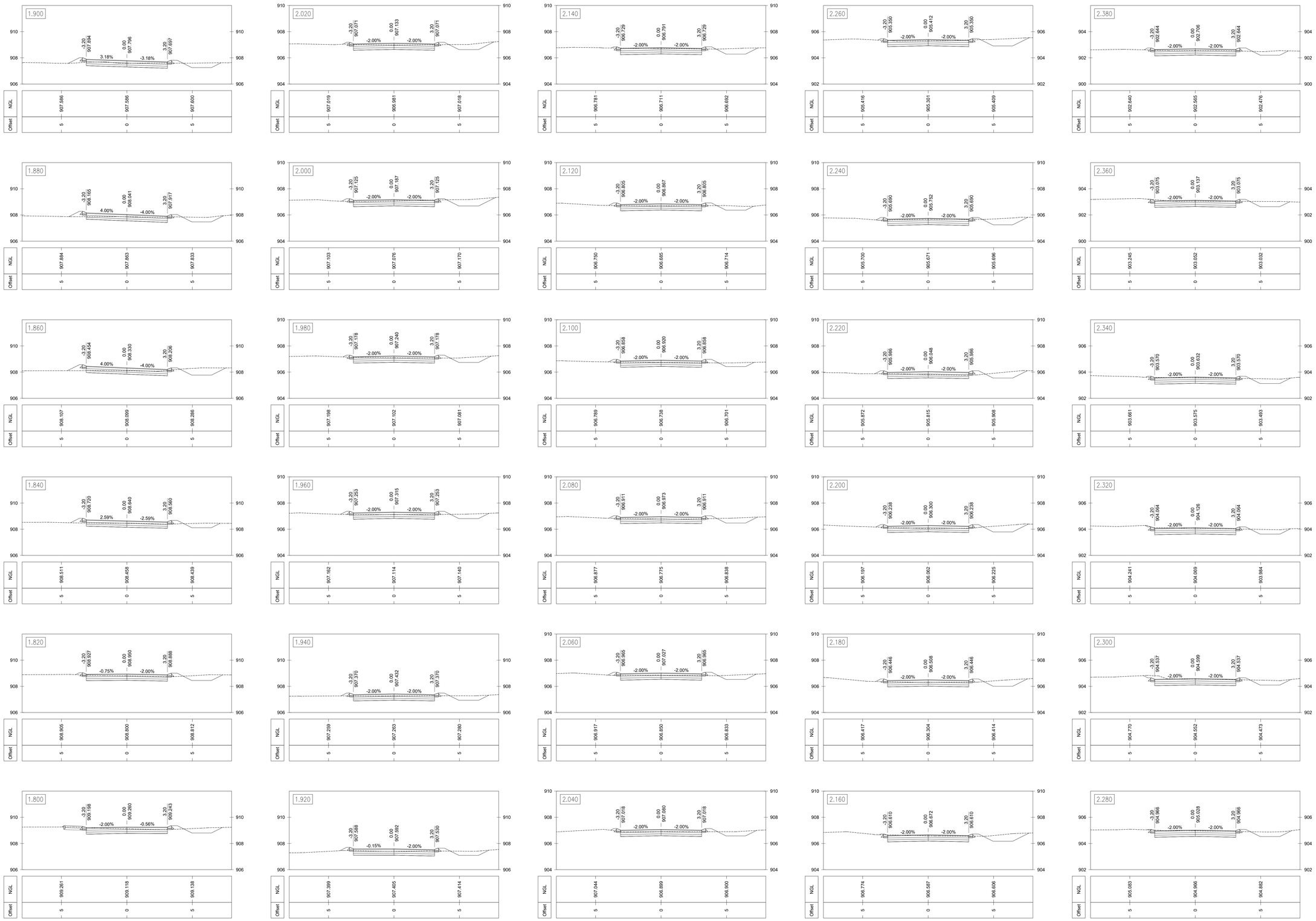
Reg.Nº. 2006/015058/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelaet@ion.co.za

ARCHITECT:

PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **ROAD CROSS SECTIONS: KM 1,200 TO KM 1,780**

DRAWING NUMBER: SMV-LET-PIC-603	SHEET No.: SHEET 3 OF 10	PAPER SIZE: A0	
SMV PROJECT NUMBER	SCALE: AS SHOWN		
CONTRACT No.	DATE: 2023.04.18	REV No.: B	



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

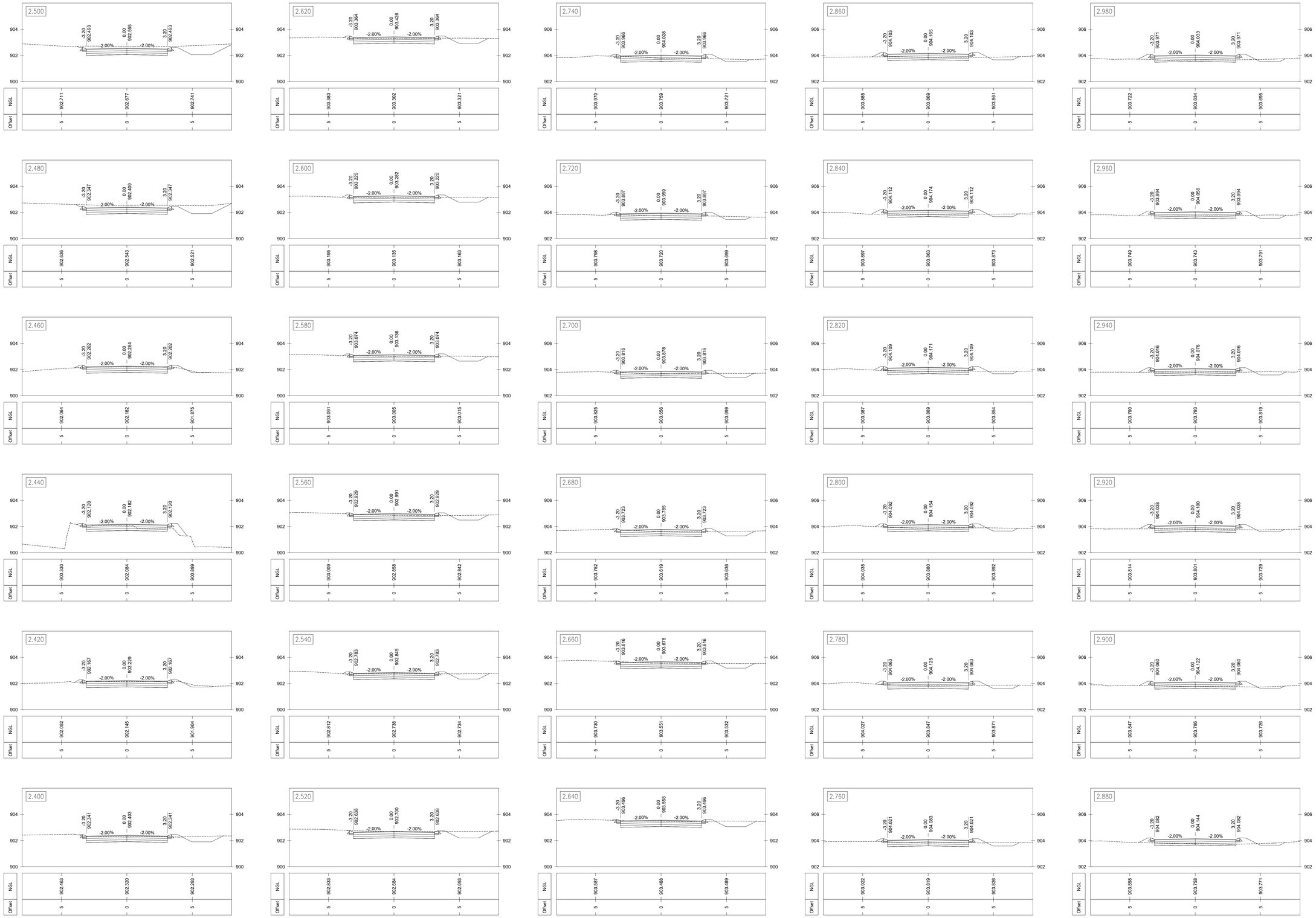
CONSULTANT: SEBEGO, MALOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD Reg.N°. 2006/01608/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **ROAD CROSS SECTIONS: KM 1,800 TO KM 2,380**

DRAWING NUMBER	SMV-LET-PIC-604
SHEET No.	SHEET 4 OF 10
PAPER SIZE	A0
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.18
REV No.	B



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

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CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

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Reg.Nº. 2006/015058/07

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0070

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Fax: 015 - 291 5379
Email: phelael@ion.co.za

ARCHITECT:

PROJECT NAME:

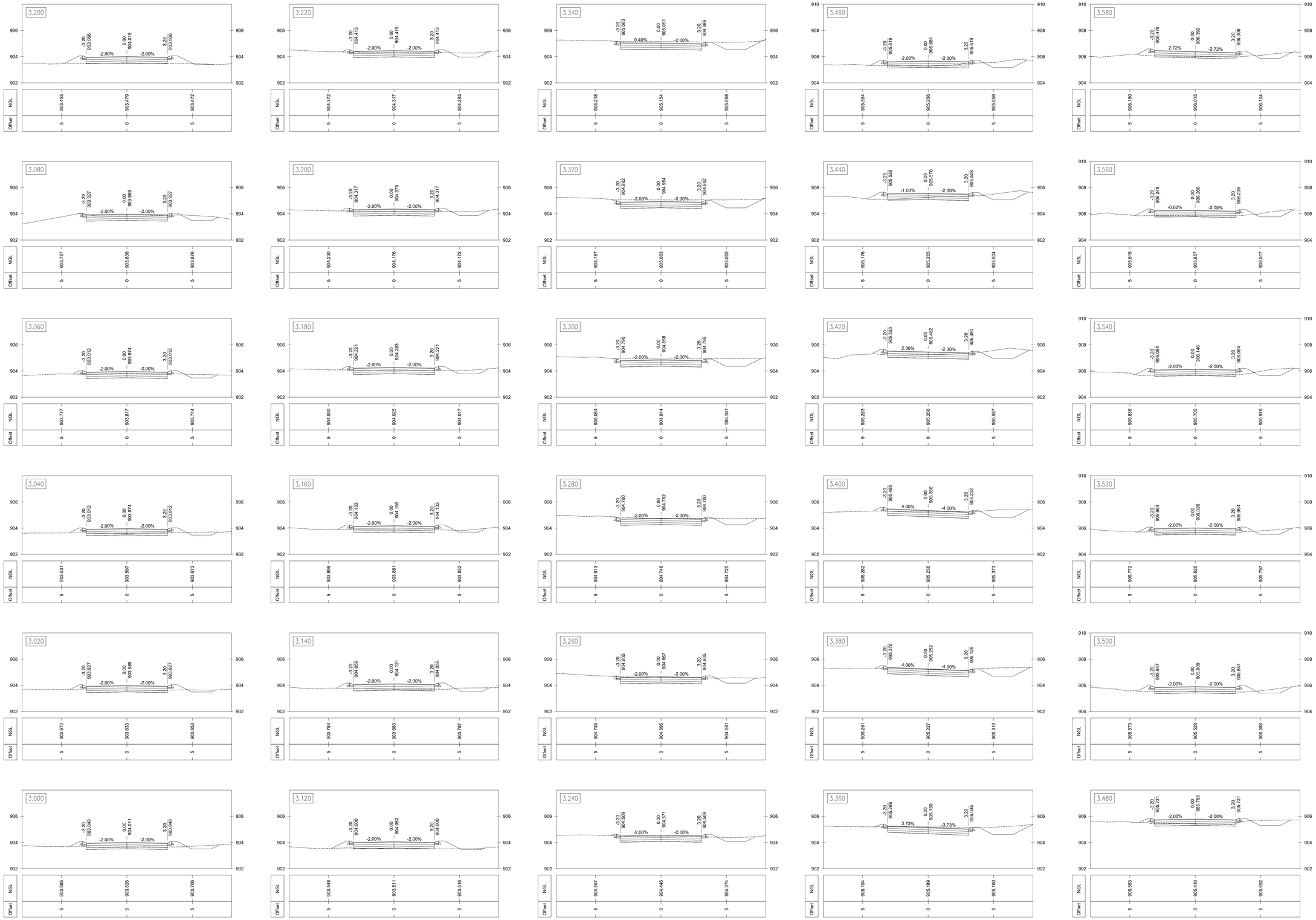
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

ROAD CROSS SECTIONS:

KM 2,400 TO KM 2,980

DRAWING NUMBER: SMV-LET-PIC-605	SHEET No.: SHEET 5 OF 10	PAPER SIZE: A0
SMV PROJECT NUMBER	SCALE: AS SHOWN	
CONTRACT No.	DATE: 2023.04.18	REV No.: B



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

SEBEGO, MAIOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD
Reg.Nº. 2006/015058/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME:

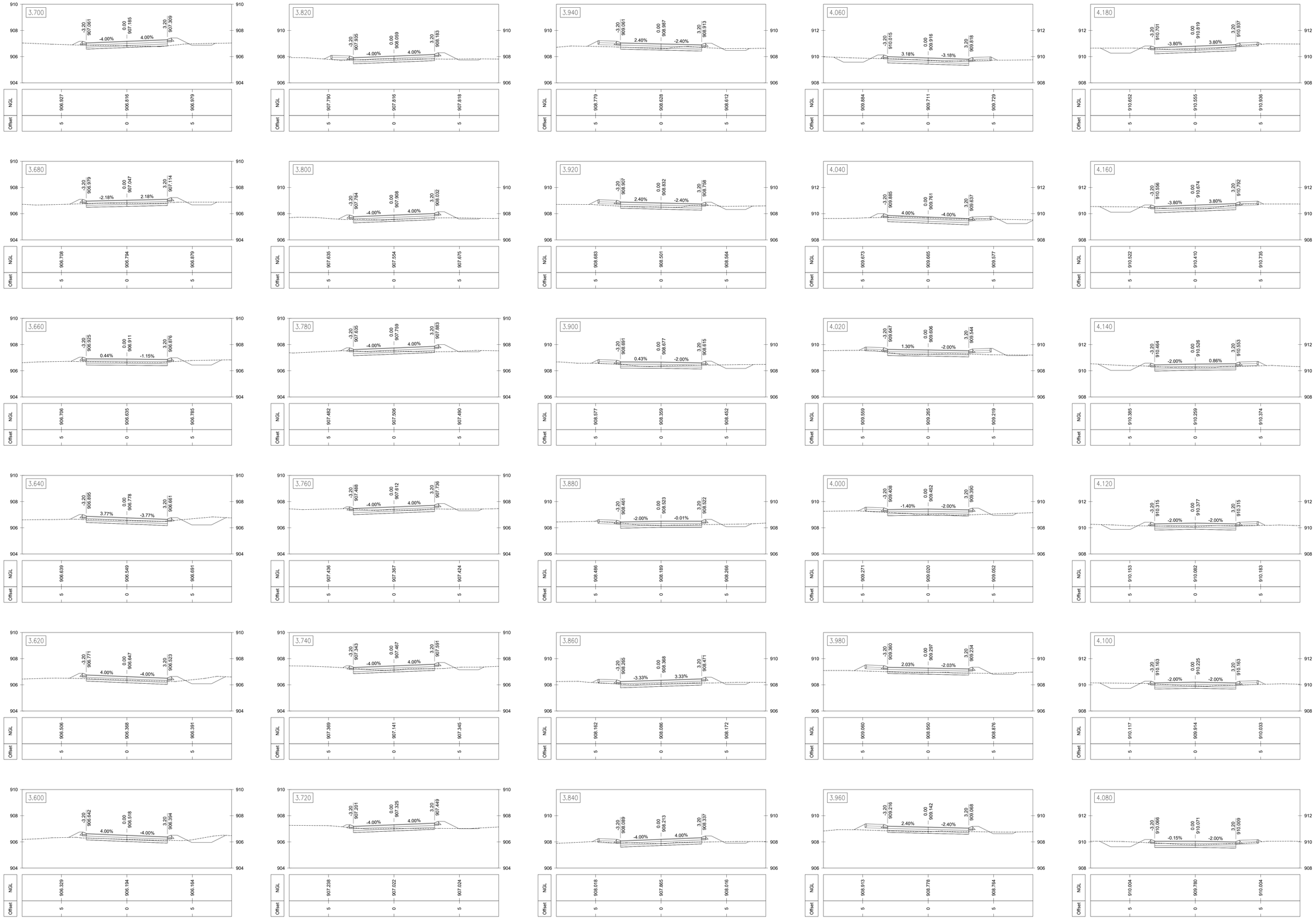
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

ROAD CROSS SECTIONS:

KM 3,000 TO KM 3,580

DRAWING NUMBER: SMV-LET-PIC-606	SHEET No.: SHEET 6 OF 10	PAPER SIZE: A0	
SMV PROJECT NUMBER	SCALE: AS SHOWN		
CONTRACT No.	DATE: 2023.04.18	REV No.: B	



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

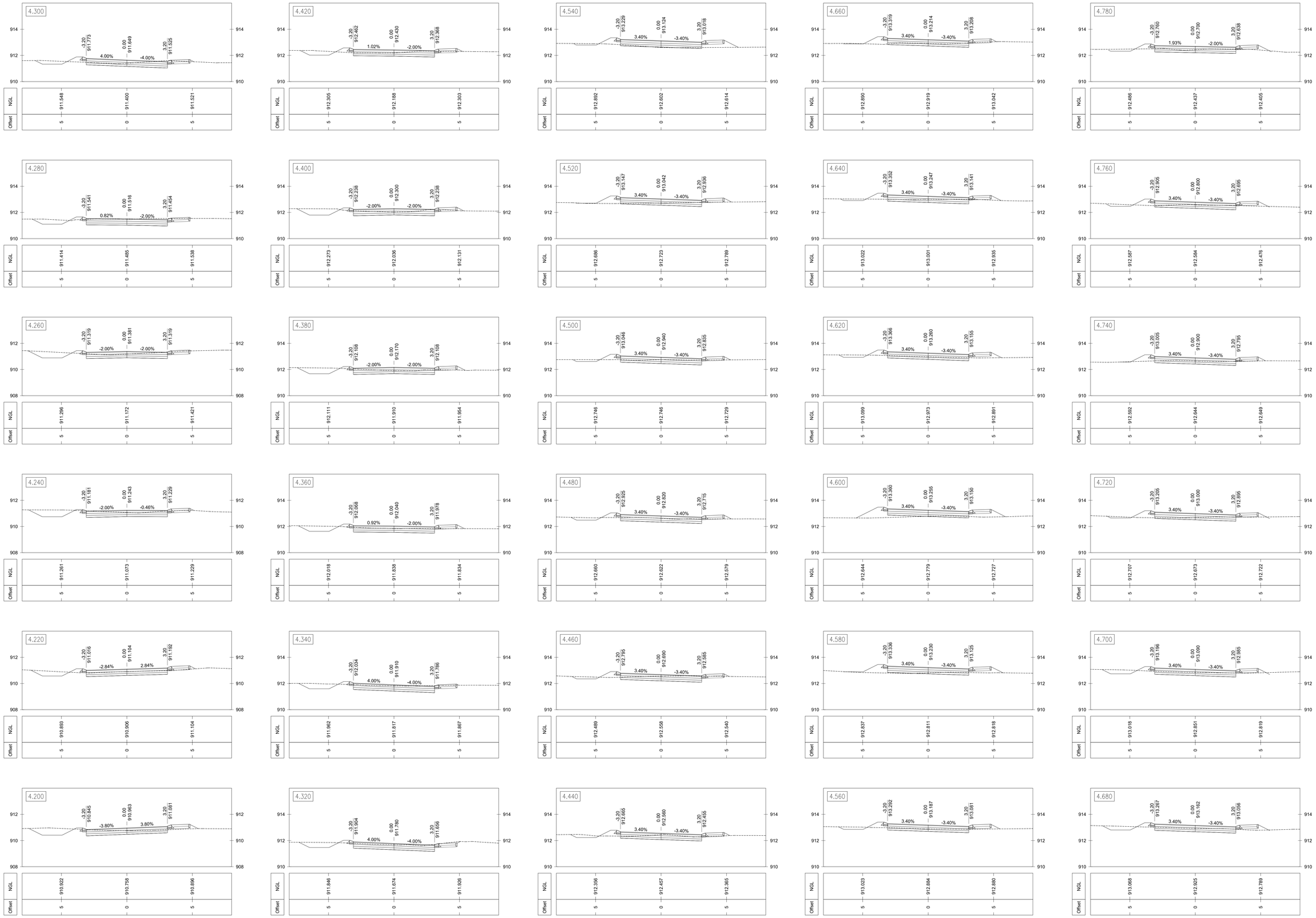
CONSULTANT: SEBEGO, MAIOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD
Reg.N°. 2006/015058/07
SUITE 228
POSTNET X9307
POLOKWANE
0070
Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelad@icon.co.za

ARCHITECT:

PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **ROAD CROSS SECTIONS: KM 3,600 TO KM 4,180**

DRAWING NUMBER: SMV-LET-PIC-607	SHEET No.: SHEET 7 OF 10	PAPER SIZE: A0	
SMV PROJECT NUMBER	SCALE: AS SHOWN		
CONTRACT No.	DATE: 2023.04.18	REV No.: B	



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

SEBEGO, MALOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD
Reg.Nº. 2006/015058/07

SUITE 228
POSTNET X9307
POLOKWANE
0070

Tel: 015 - 291 5376/7
Fax: 015 - 291 5379
Email: phelael@ion.co.za

ARCHITECT:

PROJECT NAME:

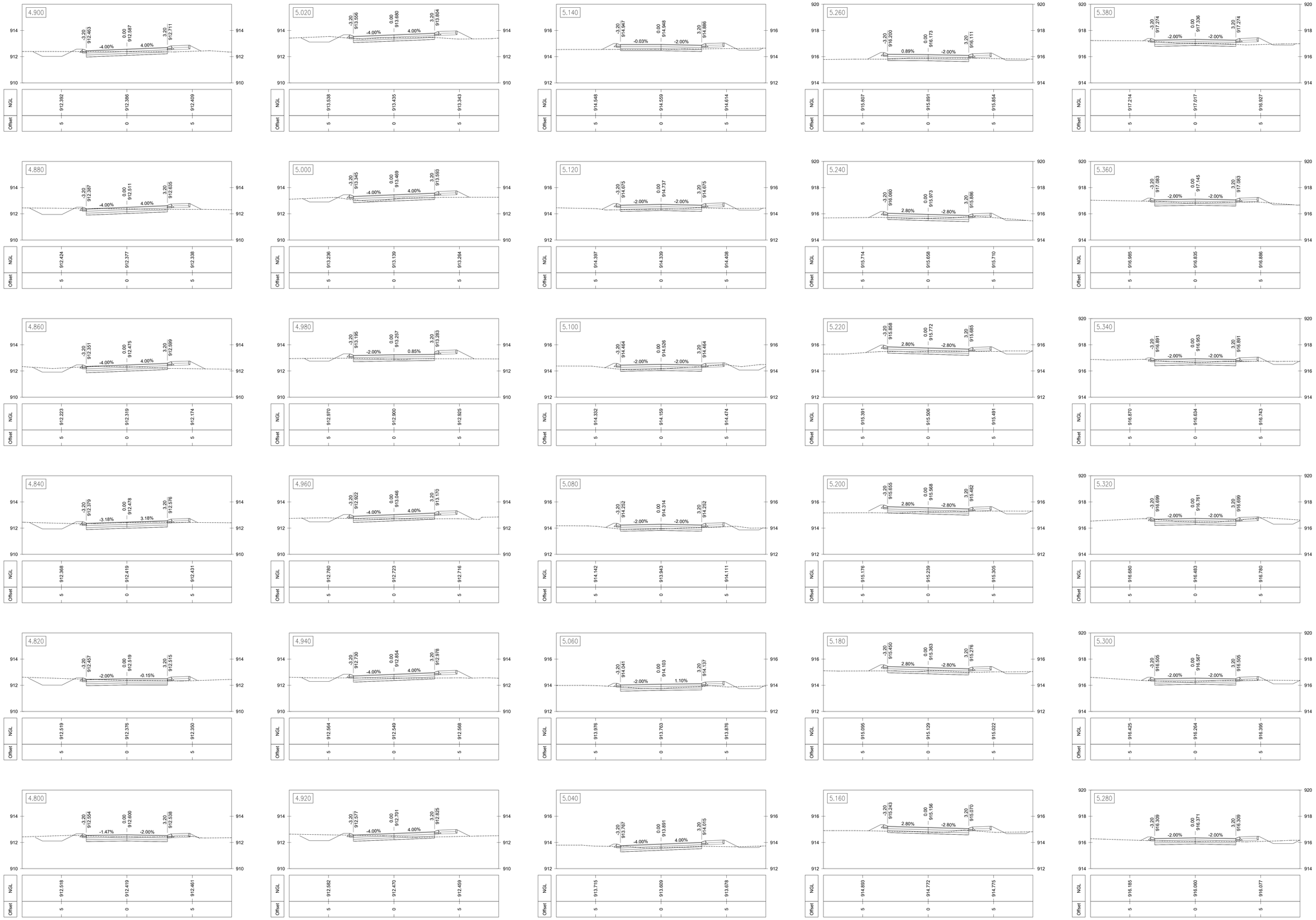
LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

ROAD CROSS SECTIONS:

KM 4,200 TO KM 4,780

DRAWING NUMBER	SMV-LET-PIC-608
SHEET No.	SHEET 8 OF 10
PAPER SIZE	A0
SMV PROJECT NUMBER	
SCALE	AS SHOWN
CONTRACT No.	
DATE	2023.04.18
REV No.	B



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT: BLOUBERG MUNICIPALITY

CONSULTANT:

SEBEGO, MALOKA & VILJOEN CIVIL ENGINEERS (PTY) LTD
Reg.N°. 2006/015058/07
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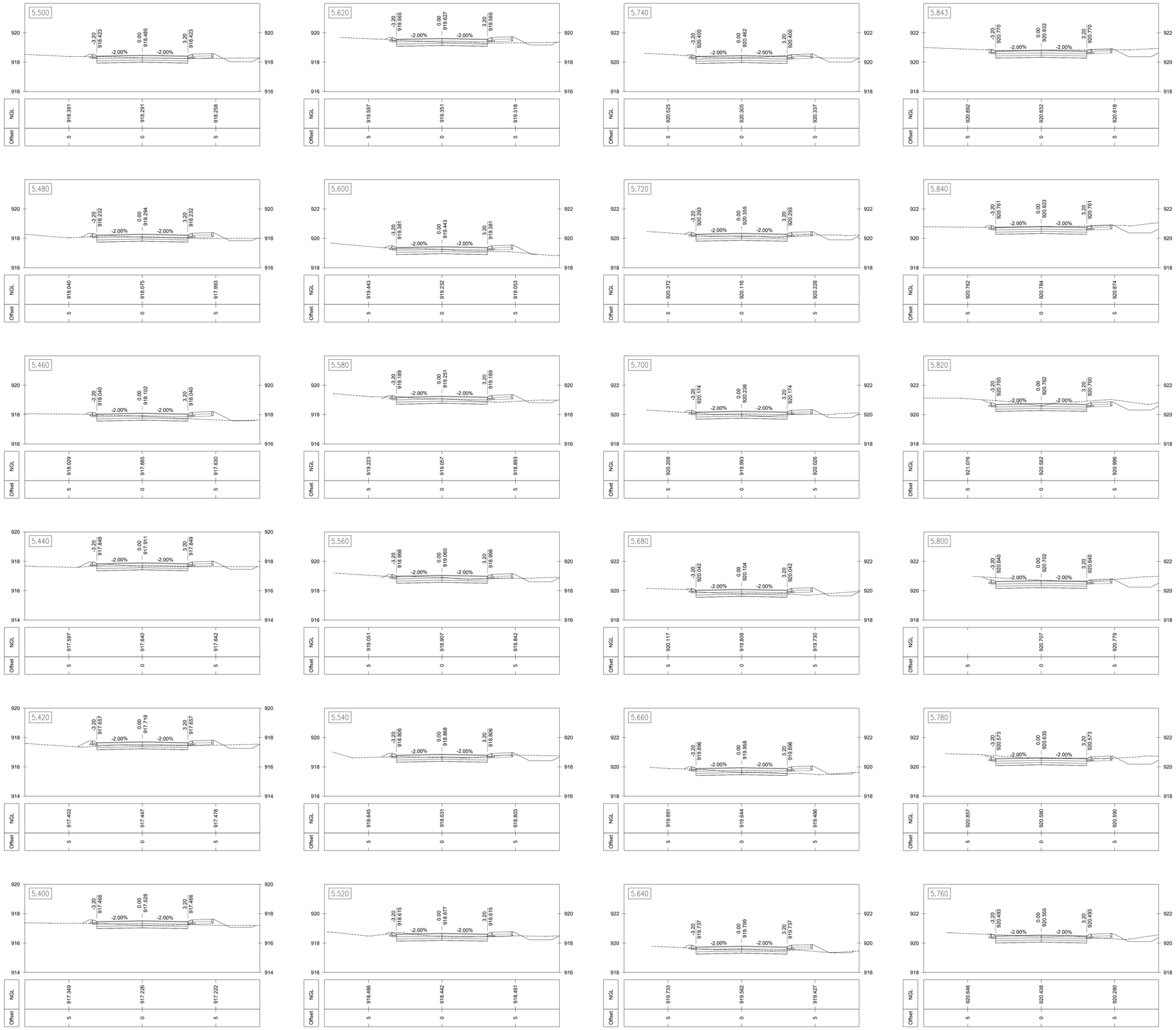
ARCHITECT:

PROJECT NAME: **LETHALENG TO PICKUM ROAD UPGRADING**

DRAWING TITLE: **ROAD CROSS SECTIONS: KM 4,800 TO KM 5,380**

DRAWING NUMBER: SMV-LET-PIC-609	SHEET No.: SHEET 9 OF 10	PAPER SIZE: A0	
SMV PROJECT NUMBER	SCALE: AS SHOWN		
CONTRACT No.	DATE: 2023.04.18	REV No.: B	



MARK	DATE	INTIALS	REVISION
B	2023.05.12	KM	ISSUED FOR TENDER
A	2023.04.18	KM	PRELIMINARY DESIGN

NOTES:

1. DO NOT SCALE OFF THIS DRAWING

DESIGNED BY	KM
CHECKED BY	KM
DRAWN BY	CDN
CHECKED BY	

CLIENT:

BLOUBERG MUNICIPALITY

CONSULTANT:

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ARCHITECT:

PROJECT NAME:

LETHALENG TO PICKUM ROAD UPGRADING

DRAWING TITLE:

ROAD CROSS SECTIONS:
KM 5,400 TO KM 5,843

DRAWING NUMBER	SHEET No.	PAPER SIZE
SMV-LET-PIC-610	SHEET 10 OF 10	A0
SMV PROJECT NUMBER	SCALE	
	AS SHOWN	
CONTRACT No.	DATE	REV No.
	2023.04.18	B