



CLIMATE PROOFED ARID AND SEMI ARID RURAL ROADS,

FINAL DETAILED DESIGN OF MARIMA - MAKUTANO ROAD

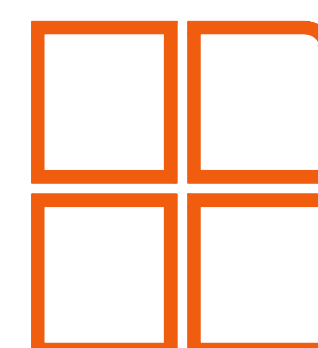
BATCH 2

MARCH 2025

EMPLOYER

**DIRECTOR GENERAL
KERRA
P.O BOX 48151-00100,
NAIROBI, Kenya**

CONSULTANT



Runji Consulting Group Ltd
3, Kindaruma Road, (Off Ngong Road)
P.O.Box 68053 - 00200 Nairobi, Kenya
Tel: (020) 271 72 13/4/271 30 66
Cell: +254 722 751 889/ +254 735 677627
Email: info@runji.co.ke Web: www.runji.co.ke

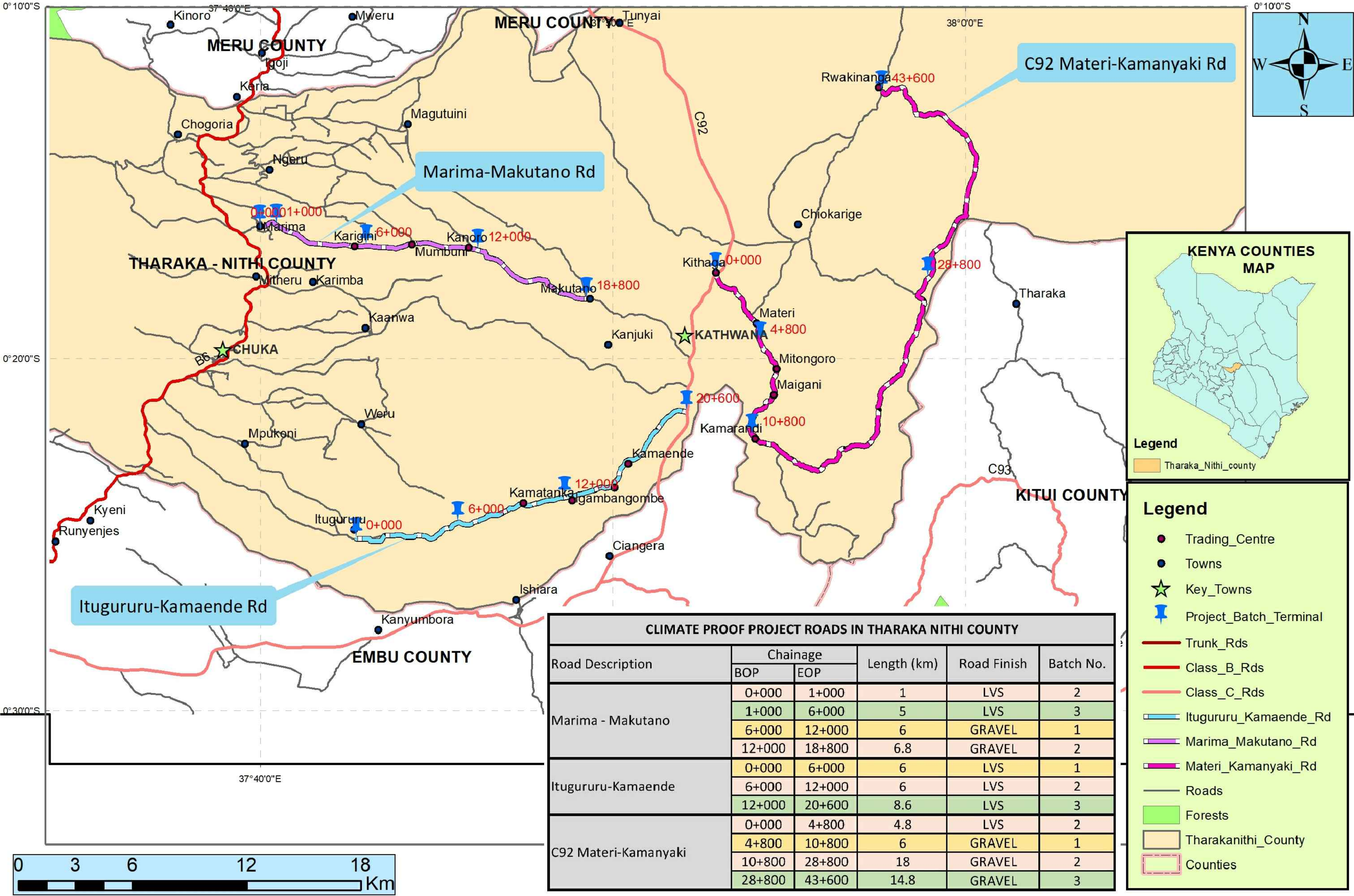
ENGINEER

**DIRECTOR
PLANNING, DESIGN & ENVIRONMENT
P.O BOX 48151-00100,
NAIROBI, Kenya**

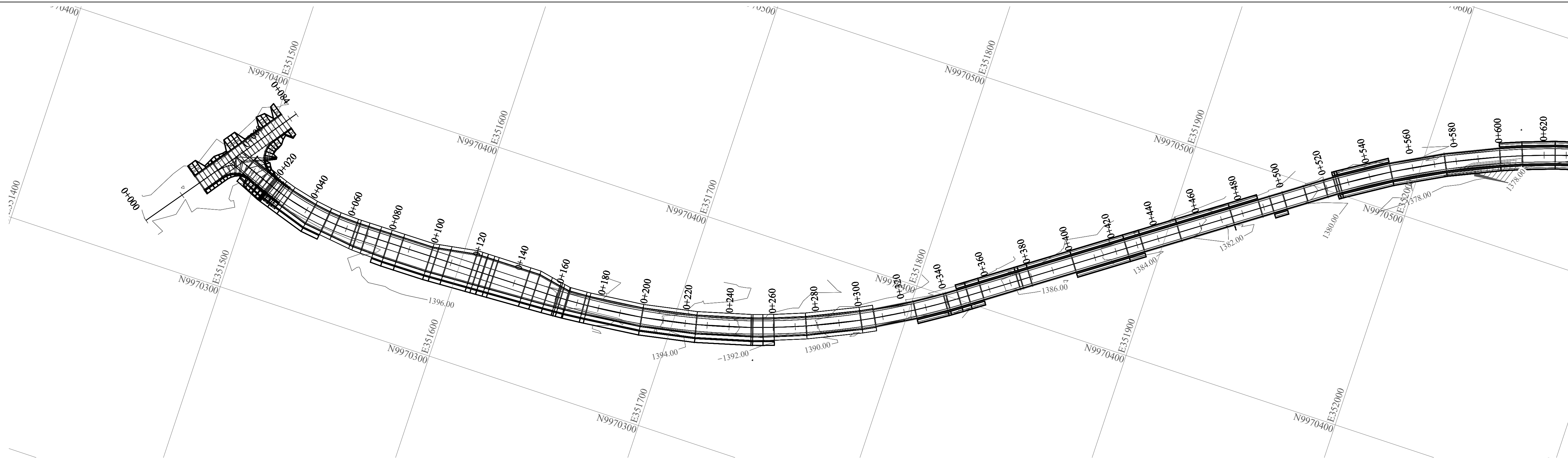
	MARIMA MAKUTANO ROAD DRAWINGS
	COVER PAGE
	DRAWING LIST
	GENERAL DRAWINGS
CE/1045/GD/MM/01	LOCATION MAP
	PLAN AND PROFILE
CE1045/PP/MM/01	PLAN AND PROFILE - 0+000 - 0+000
CE1045/PP/MM/02	PLAN AND PROFILE - 0+600 -1+200
CE1045/PP/MM/03	PLAN AND PROFILE - 1+200 - 1+800
CE1045/PP/MM/04	PLAN AND PROFILE - 1+800 - 2+400
CE1045/PP/MM/05	PLAN AND PROFILE - 2+400 - 3+000
CE1045/PP/MM/06	PLAN AND PROFILE - 3+000 - 3+600
CE1045/PP/MM/07	PLAN AND PROFILE - 3+600 - 4+200
CE1045/PP/MM/08	PLAN AND PROFILE - 4+200 - 4+800
CE1045/PP/MM/09	PLAN AND PROFILE - 4+800 - 5+400
CE1045/PP/MM/10	PLAN AND PROFILE - 5+400- 6+084.39
	TYPICAL CROSS-SECTION
CE1045/TD/MM/01	TYPICAL CROSS-SECTION FOR MARIMA - MAKUTANO ROAD OPTION 1
CE1045/TD/MM/02	TYPICAL CROSS-SECTION FOR MARIMA - MAKUTANO ROAD OPTION 2
	TYPICAL CULVERT DRAWINGS
CE1045/CDS/MM/O1	HEADWALL TYPE 1 (HEADWALL AND WINGWALLS)
CE1045/CDS/MM/O2	HEADWALL TYPE 2 (DROP INLETS)
CE1045/CDS/MM/O3	HEADWALL TYPE 4 (FOR ACCESS CULVERT)
CE1045/CDS/MM/O4	BEDDING AND HAUNCH PROFILES TYPE III& IV
CE1045/CDS/MM/O5	CULVERT ROAD SIGNS
	STANDARD DRAWINGS
CE1045/SD/MM/01	STANDARD DRAWING - STANDARD - ROAD SIGNS
CE1045/SD/MM/02	STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION
CE1045/SD/MM/03	STANDARD DRAWING - STANDARD - MISC MINOR JUNCTION
CE1045/SD/MM/04	STANDARD DRAWING - MISC URBAN ROAD DETAIL
CE1045/SD/MM/05	STANDARD DRAWING - TRAFFIC MANAGEMENT
CE1045/SD/MM/06	STANDARD DRAWING - PUBLICITY SIGN BOARD
CE1045/SD/MM/07	STANDARD DRAWING - ROAD MARKING
CE1045/SD/MM/08	STANDARD DRAWING - MISC MARKING ON JUNCTION
CE1045/SD/MM/09	STANDARD DRAWING - STANDARD - BUMPS

GENERAL DRAWINGS

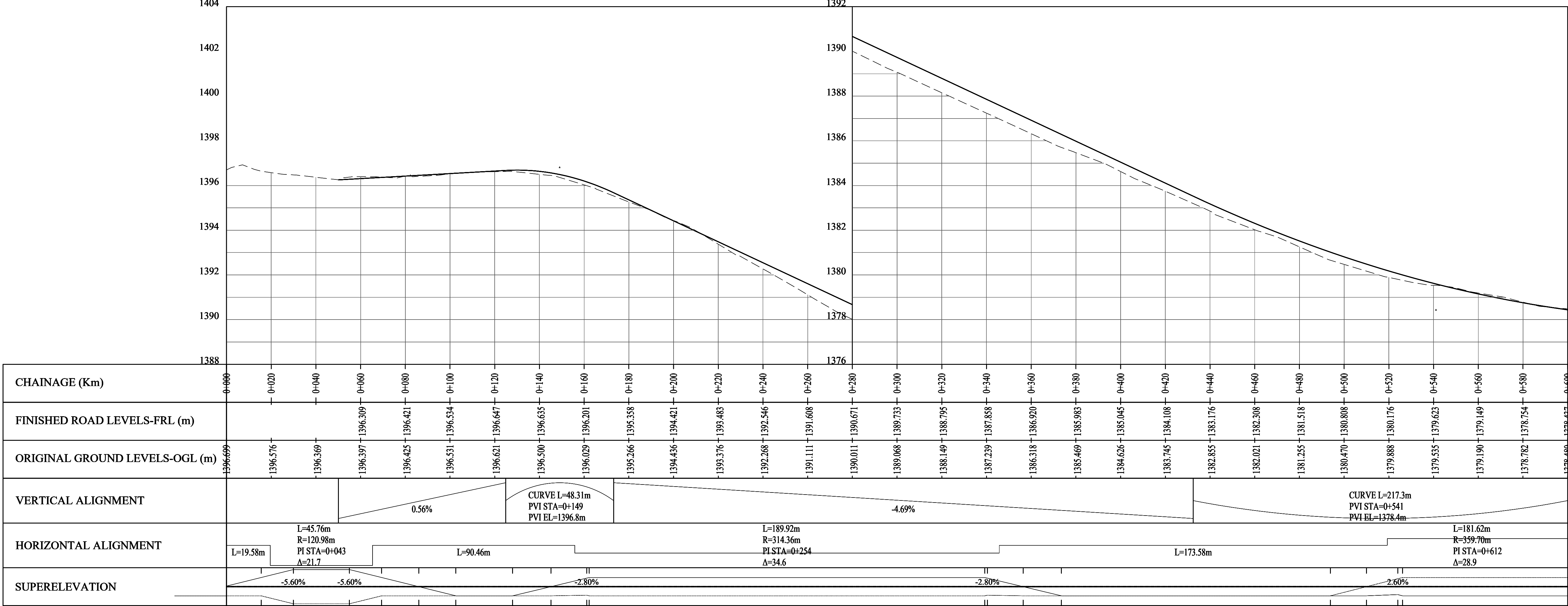
CLIMATE PROOFED PROJECT ROADS IN THARAKA NITHI COUNTY



PLAN AND PROFILE



MARIMA - MAKUTANO DESIGN B2 LVS PROFILE CHAINAGE 0+000 - 0+600



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)

CONSULTANT:
Runji Consulting Group Ltd
Engineering & Project Management.
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Tel. (020) 2717213/4

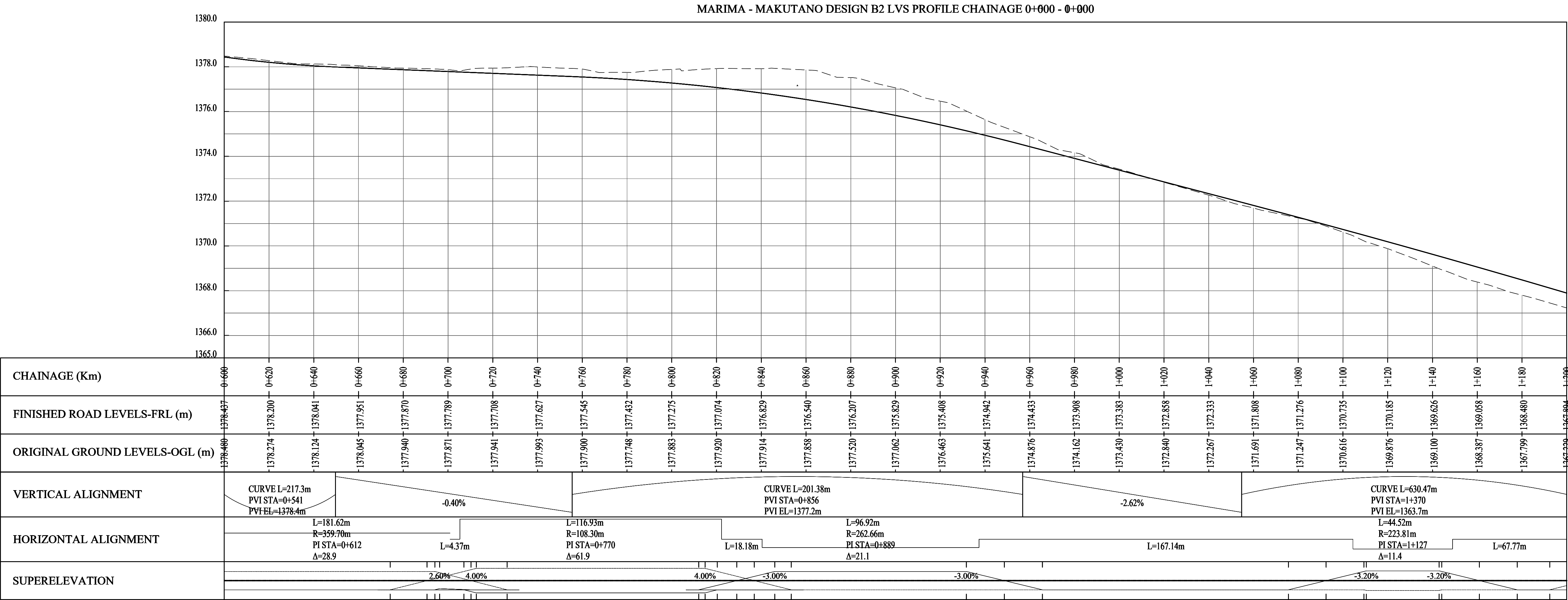
PROJECT TITLE:
FINAL AND DETAILED
ENGINEERING DESIGN OF
MARIMA - MAKUTANO ROAD
BACH 2

DRAWING TITLE:
PLAN AND PROFILE
CHAINAGE 0+000 - 0+600

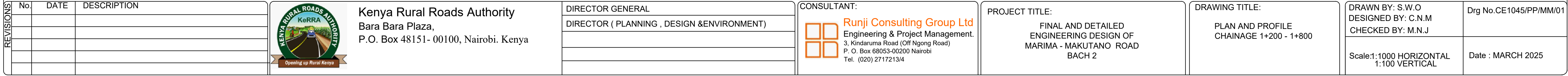
DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.N.J

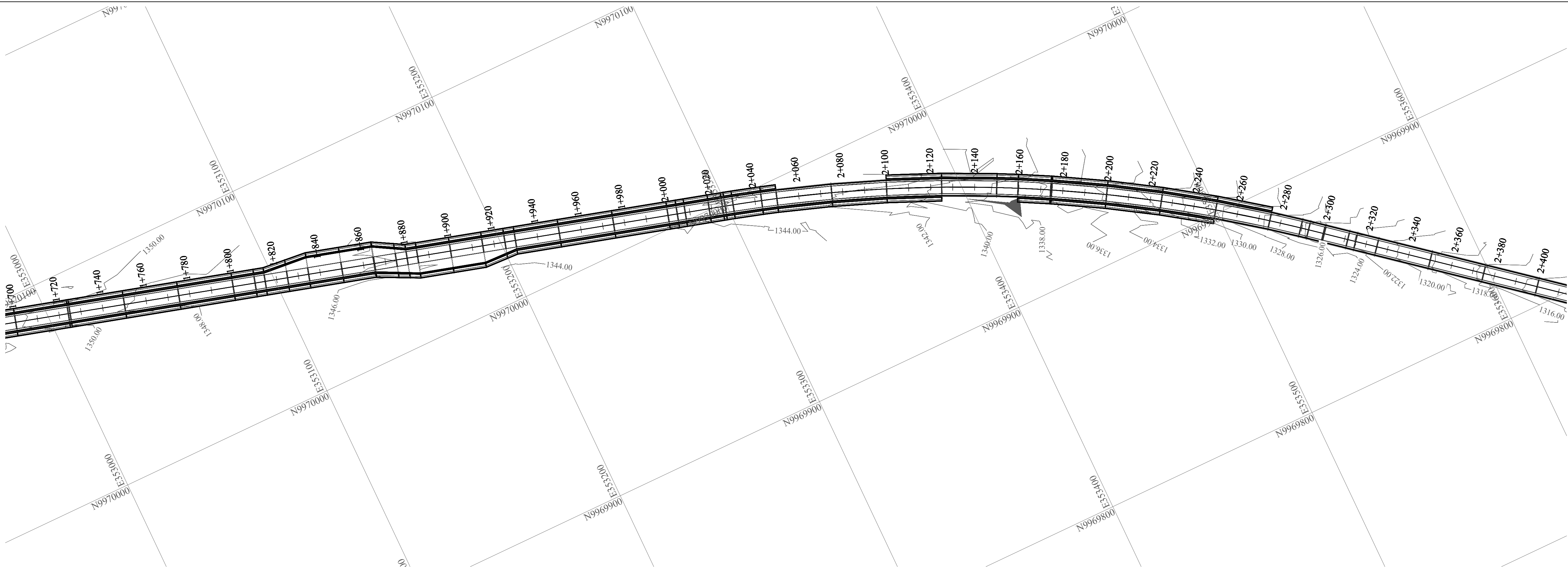
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Drg No.CE1045/PP/MM/01
Date : MARCH 2025

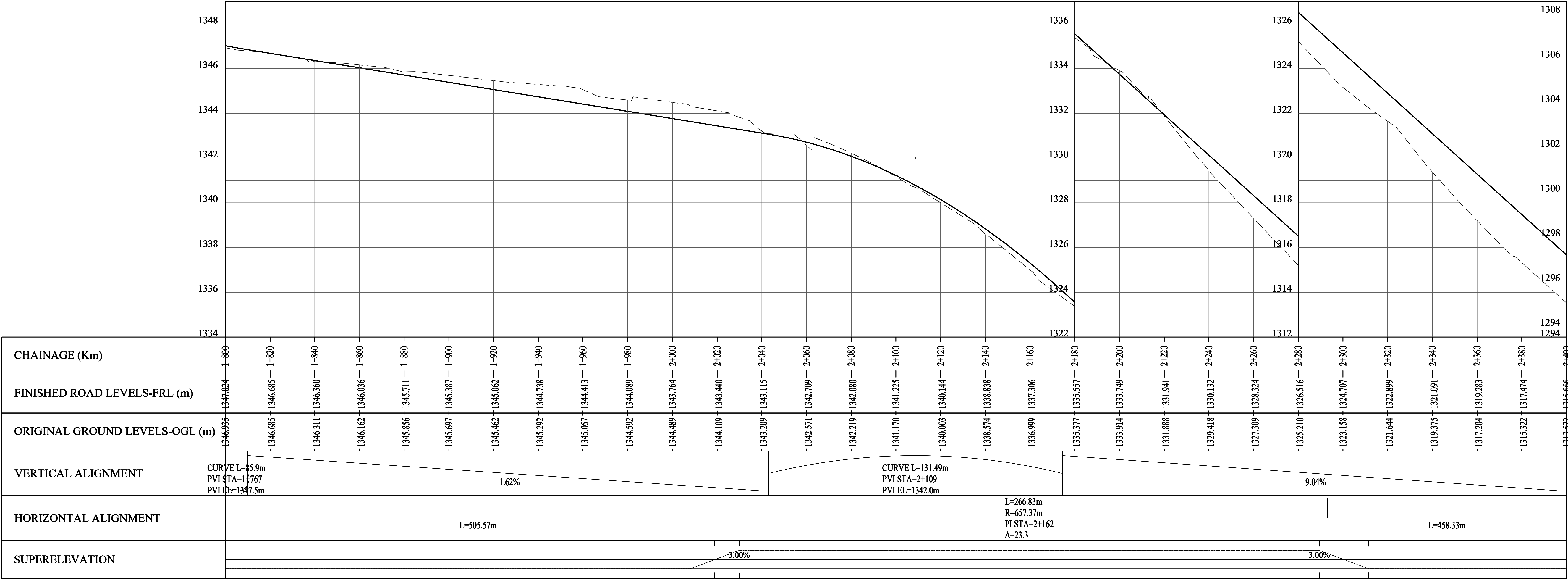


Date : MARCH 2025





MARIMA - MAKUTANO DESIGN B2 LVS PROFILE CHAINAGE 0+800 - 0+000



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
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DRAWING TITLE:
PLAN AND PROFILE
CHAINAGE 1+800 - 2+400

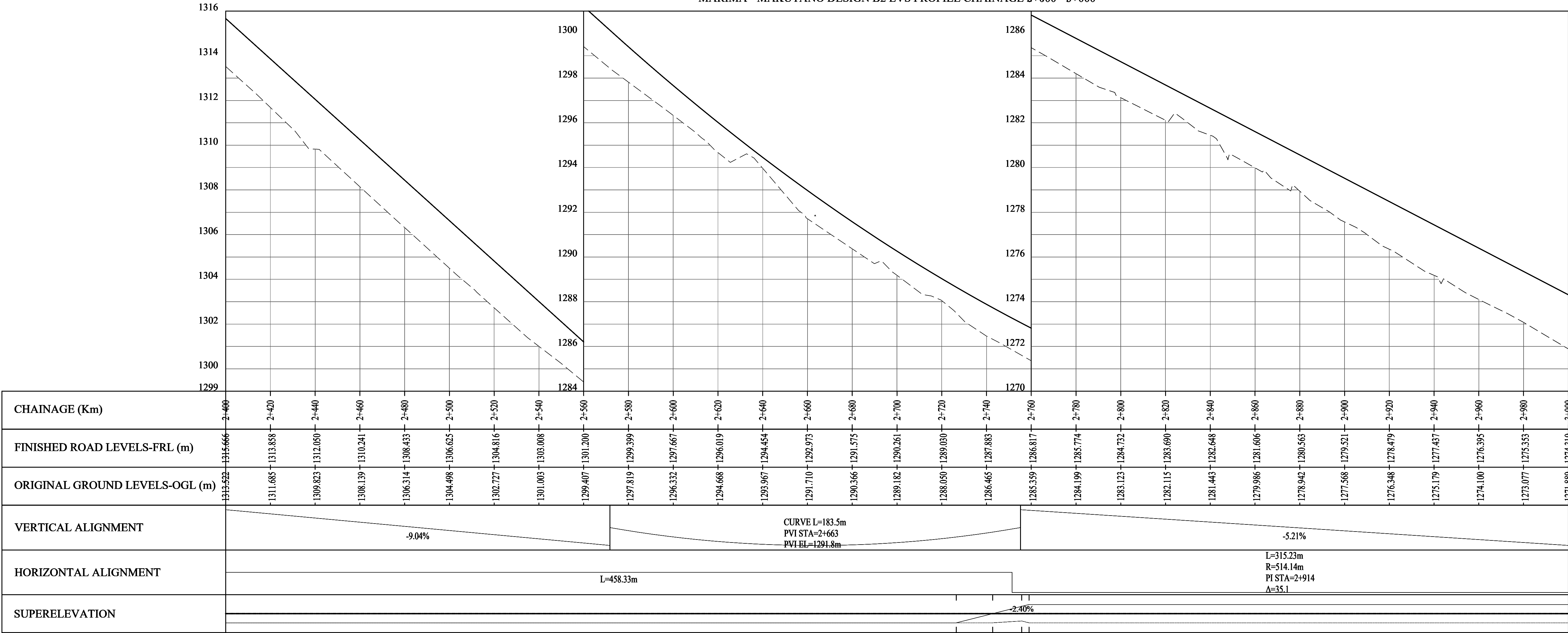
DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.N.J

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Drg No.CE1045/PP/MM/01
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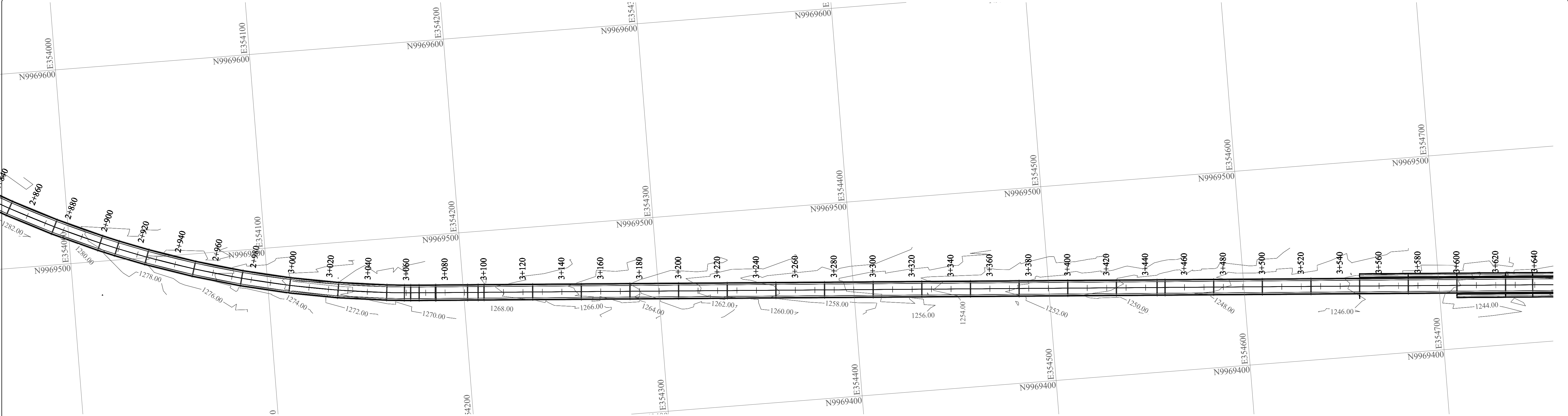
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ENGINEERING DESIGN OF
MARIMA - MAKUTANO ROAD
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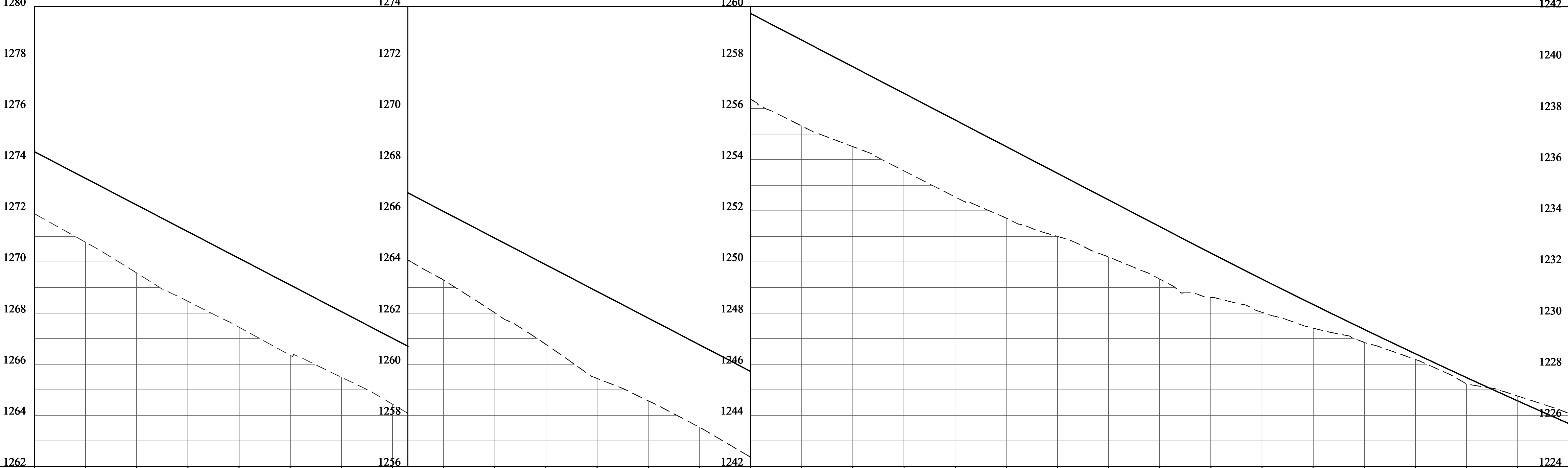
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DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.N.J
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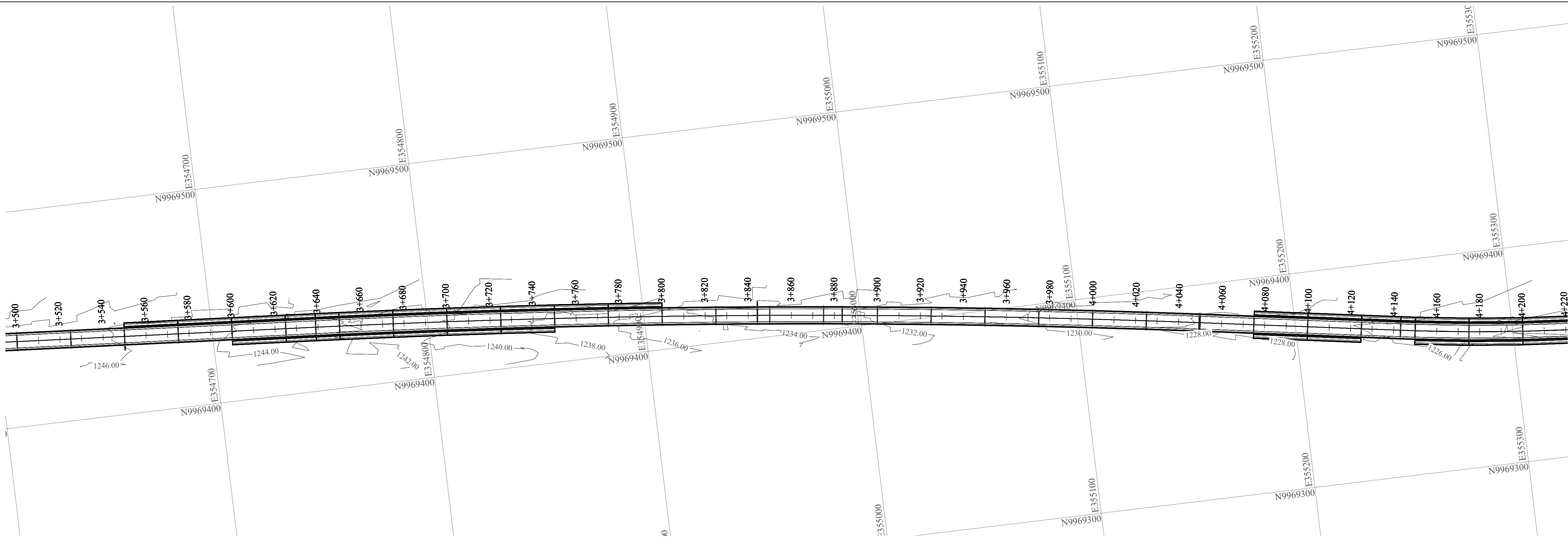
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Date : MARCH 2025



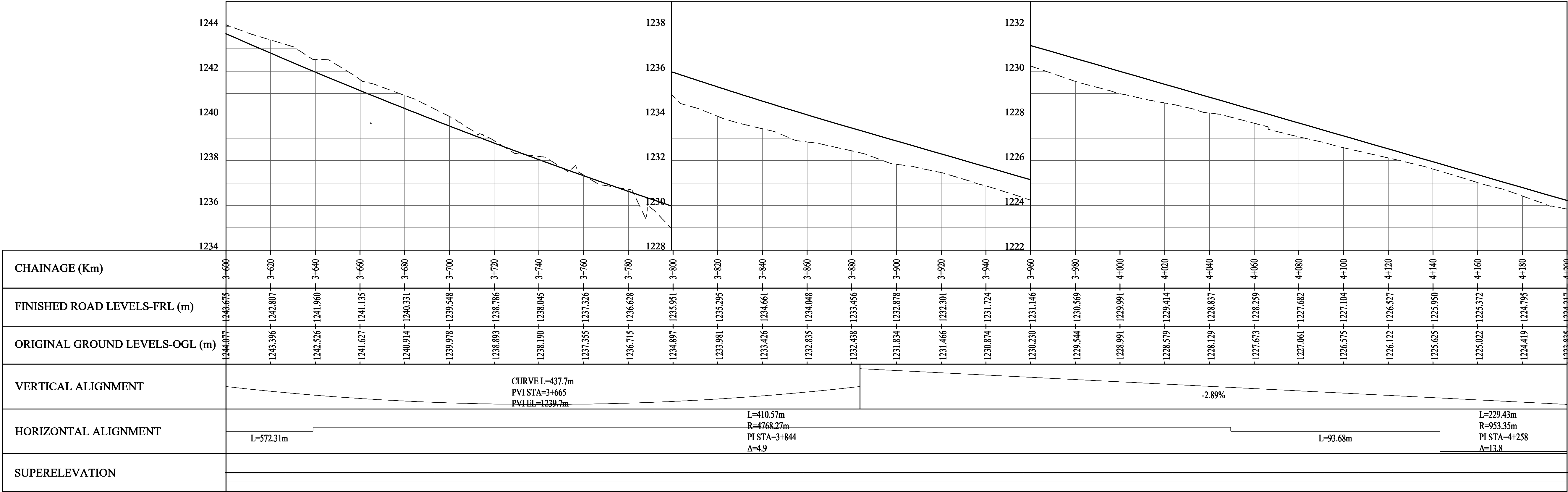
MARIMA - MAKUTANO DESIGN B2 LVS PROFILE CHAINAGE 0+000 - 0+000



CHAINAGE (Km)	2+840	2+860	2+880	2+900	2+920	2+940	2+960	2+980	3+000	3+020	3+040	3+060	3+080	3+100	3+120	3+140	3+160	3+180	3+200	3+220	3+240	3+260	3+280	3+300	3+320	3+340	3+360	3+380	3+400	3+420	3+440	3+460	3+480	3+500	3+520	3+540	3+560	3+580	3+600																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
FINISHED ROAD LEVELS-FRL (m)	1271.889	1271.870	1271.851	1271.832	1271.813	1271.794	1271.775	1271.756	1271.737	1271.718	1271.699	1271.680	1271.661	1271.642	1271.623	1271.604	1271.585	1271.566	1271.547	1271.528	1271.509	1271.490	1271.471	1271.452	1271.433	1271.414	1271.395	1271.376	1271.357	1271.338	1271.319	1271.300	1271.281	1271.262	1271.243	1271.224	1271.205	1271.186	1271.167	1271.148	1271.129	1271.110	1271.091	1271.072	1271.053	1271.034	1271.015	1270.996	1270.977	1270.958	1270.939	1270.920	1270.901	1270.882	1270.863	1270.844	1270.825	1270.806	1270.787	1270.768	1270.749	1270.730	1270.711	1270.692	1270.673	1270.654	1270.635	1270.616	1270.597	1270.578	1270.559	1270.540	1270.521	1270.502	1270.483	1270.464	1270.445	1270.426	1270.407	1270.388	1270.369	1270.350	1270.331	1270.312	1270.293	1270.274	1270.255	1270.236	1270.217	1270.198	1270.179	1270.160	1270.141	1270.122	1270.103	1270.084	1270.065	1270.046	1270.027	1270.008	1269.989	1269.970	1269.951	1269.932	1269.913	1269.894	1269.875	1269.856	1269.837	1269.818	1269.799	1269.780	1269.761	1269.742	1269.723	1269.704	1269.685	1269.666	1269.647	1269.628	1269.609	1269.590	1269.571	1269.552	1269.533	1269.514	1269.495	1269.476	1269.457	1269.438	1269.419	1269.400	1269.381	1269.362	1269.343	1269.324	1269.305	1269.286	1269.267	1269.248	1269.229	1269.210	1269.191	1269.172	1269.153	1269.134	1269.115	1269.096	1269.077	1269.058	1269.039	1269.020	1269.001	1268.982	1268.963	1268.944	1268.925	1268.906	1268.887	1268.868	1268.849	1268.830	1268.811	1268.792	1268.773	1268.754	1268.735	1268.716	1268.697	1268.678	1268.659	1268.640	1268.621	1268.602	1268.583	1268.564	1268.545	1268.526	1268.507	1268.488	1268.469	1268.450	1268.431	1268.412	1268.393	1268.374	1268.355	1268.336	1268.317	1268.298	1268.279	1268.260	1268.241	1268.222	1268.203	1268.184	1268.165	1268.146	1268.127	1268.108	1268.089	1268.070	1268.051	1268.032	1268.013	1267.994	1267.975	1267.956	1267.937	1267.918	1267.899	1267.880	1267.861	1267.842	1267.823	1267.804	1267.785	1267.766	1267.747	1267.728	1267.709	1267.690	1267.671	1267.652	1267.633	1267.614	1267.595	1267.576	1267.557	1267.538	1267.519	1267.500	1267.481	1267.462	1267.443	1267.424	1267.405	1267.386	1267.367	1267.348	1267.329	1267.310	1267.291	1267.272	1267.253	1267.234	1267.215	1267.196	1267.177	1267.158	1267.139	1267.120	1267.101	1267.082	1267.063	1267.044	1267.025	1267.006	1266.987	1266.968	1266.949	1266.930	1266.911	1266.892	1266.873	1266.854	1266.835	1266.816	1266.797	1266.778	1266.759	1266.740	1266.721	1266.702	1266.683	1266.664	1266.645	1266.626	1266.607	1266.588	1266.569	1266.550	1266.531	1266.512	1266.493	1266.474	1266.455	1266.436	1266.417	1266.398	1266.379	1266.360	1266.341	1266.322	1266.303	1266.284	1266.265	1266.246	1266.227	1266.208	1266.189	1266.170	1266.151	1266.132	1266.113	1266.094	1266.075	1266.056	1266.037	1266.018	1265.999	1265.980	1265.961	1265.942	1265.923	1265.904	1265.885	1265.866	1265.847	1265.828	1265.809	1265.790	1265.771	1265.752	1265.733	1265.714	1265.695	1265.676	1265.657	1265.638	1265.619	1265.600	1265.581	1265.562	1265.543	1265.524	1265.505	1265.486	1265.467	1265.448	1265.429	1265.410	1265.391	1265.372	1265.353	1265.334	1265.315	1265.296	1265.277	1265.258	1265.239	1265.220	1265.201	1265.182	1265.163	1265.144	1265.125	1265.106	1265.087	1265.068	1265.049	1265.030	1265.011	1264.992	1264.973	1264.954	1264.935	1264.916	1264.897	1264.878	1264.859	1264.840	1264.821	1264.802	1264.783	1264.764	1264.745	1264.726	1264.707	1264.688	1264.669	1264.650	1264.631	1264.612	1264.593	1264.574	1264.555	1264.536	1264.517	1264.498	1264.479	1264.460	1264.441	1264.422	1264.403	1264.384	1264.365	1264.346	1264.327	1264.308	1264.289	1264.270	1264.251	1264.232	1264.213	1264.194	1264.175	1264.156	1264.137	1264.118	1264.099	1264.080	1264.061	1264.042	1264.023	1264.004	1263.985	1263.966	1263.947	1263.928	1263.909	1263.890	1263.871	1263.852	1263.833	1263.814	1263.795	1263.776	1263.757	1263.738	1263.719	1263.700	1263.681	1263.662	1263.643	1263.624	1263.605	1263.586	1263.567	1263.548	1263.529	1263.510	1263.491	1263.472	1263.453	1263.434	1263.415	1263.396	1263.377	1263.358	1263.339	1263.320	1263.301	1263.282	1263.263	1263.244	1263.225	1263.206	1263.187	1263.168	1263.149	1263.130	1263.111	1263.092	1263.073	1263.054	1263.035	1263.016	1262.997	1262.978	1262.959	1262.940	1262.921	1262.902	1262.883	1262.864	1262.845	1262.826	1262.807	1262.788	1262.769	1262.750	1262.731	1262.712	1262.693	1262.674	1262.655	1262.636	1262.617	1262.598	1262.579	1262.560	1262.541	1262.522	1262.503	1262.484	1262.465	1262.446	1262.427	1262.408	1262.389	1262.370	1262.351	1262.332	1262.313	1262.294	1262.275	1262.256	1262.237	1262.218	1262.199	1262.180	1262.161	1262.142	1262.123	1262.104	1262.085	1262.066	1262.047	1262.028	1262.009	1261.990	1261.971	1261.952	1261.933	1261.914	1261.895	1261.876	1261.857	1261.838	1261.819	1261.800	1261.781	1261.762	1261.743	1261.724	1261.705	1261.686	1261.667	1261.648	1261.629	1261.610	1261.591	1261.572	1261.553	1261.534	1261.515	1261.496	1261.477	1261.458	1261.439	1261.420	1261.401	1261.382	1261.363	1261.344	1261.325	1261.306	1261.287	1261.268	1261.249	1261.230	1261.211	1261.192	1261.173	1261.154	1261.135	1261.116	1261.097	1261.078	1261.059	1261.040	1261.021	1261.002	1260.983	1260.964	1260.945	1260.926	1260.907	1260.888	1260.869	1260.850	1260.831	1260.812	1260.793	1260.774	1260.755	1260.736	1260.717	1260.698	1260.679	1260.660	1260.641	1260.622	1260.603	1260.584	1260.565	1260.546	1260.527	1260.508	1260.489	1260.470	1260.451	1260.432	1260.413	1260.394	1260.375	1260.356	1260.337	1260.318	1260.299	1260.280	1260.261	1260.242	1260.223	1260.204	1260.185	1260.166	1260.147	1260.128	1260.109	1260.090	1260.071	1260.052	1260.033	1260.014	1259.995	1259.976	1259.957	1259.938	1259.919	1259.900	1259.881	1259.862	1259.843	1259.824	1259.805	1259.786	1259.767	1259.748	1259.729	1259.710	1259.691	1259.672	1259.653	1259.634	1259.615	1259.596	1259.577	1259.558	1259.539	1259.520	1259.501	1259.482	1259.463	1259.444	1259.425	1259.406	1259.387	1259.368	1259.349	1259.330	1259.311	1259.292	1259.273	1259.254	1259.235	1259.216	1259.197	1259.178	1259.159	1259.140	1259.121	1259.102	1259.083	1259.064	1259.045	1259.026	1259.007	1258.988	1258.969	1258.950	1258.931	1258.912	1258.893	1258.874	1258.855	1258.836	1258.817	1258.798	1258.779	1258.760	1258.741	1258.722	1258.703	1258.684	1258.665	1258.646	1258.627	1258.608	1258.589	1258.570	1258.551	1258.532	1258.513	1258.494	1258.475	1258.456	1258.437	1258.418	1258.399	1258.380	1258.361	1258.342	1258.323	1258.304	1258.285	1258.266	1258.247	1258.228	1258.209	1258.190	1258.171	1258.152	1258.133	1258.114	1258.095	1258.076	1258.057	1258.038	1258.019	1258.000	1257.981	1257.962	1257.943	1257.924	1257.905	1257.886	1257.867	1257.848	1257.829	1257.810	1257.791	1257.772	1257.753	1257.734	1257.715	1257.696	1257.677	1257.658	1257.639	1257.620	1257.601	1257.582	1257.563	1257.544	1257.525	1257.506	1257.487	1257.468	1257.449	1257.430	1257.411	1257.392	1257.373	1257.354	1257.335	1257.316	1257.297	1257.278	1257.259	1257.240	1257.221	1257.202	1257.183	1257.164	1257.145	1257.126	1257.107	1257.088	1257.069	1257.050	1257.031	1257.012	1256.993	1256.974	1256.955	1256.936	1256.917	1256.898	1256.879	1256.860	1256.841	1256.822	1256.803	1256.784	1256.765	1256.746	1256.727	1256.708	1256.689	1256.670	1256.651	1256.632	1256.613	1256.594	1256.575	1256.556	1256.537	1256.518	1256.499	1256.480	1256.461	1256.442	1256.423	1256.404	1256.385	1256.366	1256.347	1256.328	1256.309	1256.290	1256.271	1256.252	1256.233	1256.214	1256.195	1256.176	1256.157	1256.138	1256.119	1256.100	1256.081	1256.062	1256.043	1256.024	1256.005	1255.986	1255.967	1255.948	1255.929	1255.910	1255.891	1255.872	1255.853	1255.834	1255.815	1255.796	1255.777	1255.758	1255.739	1255.720	1255.701	1255.682	



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MARIMA - MAKUTANO ROAD
BACH 2

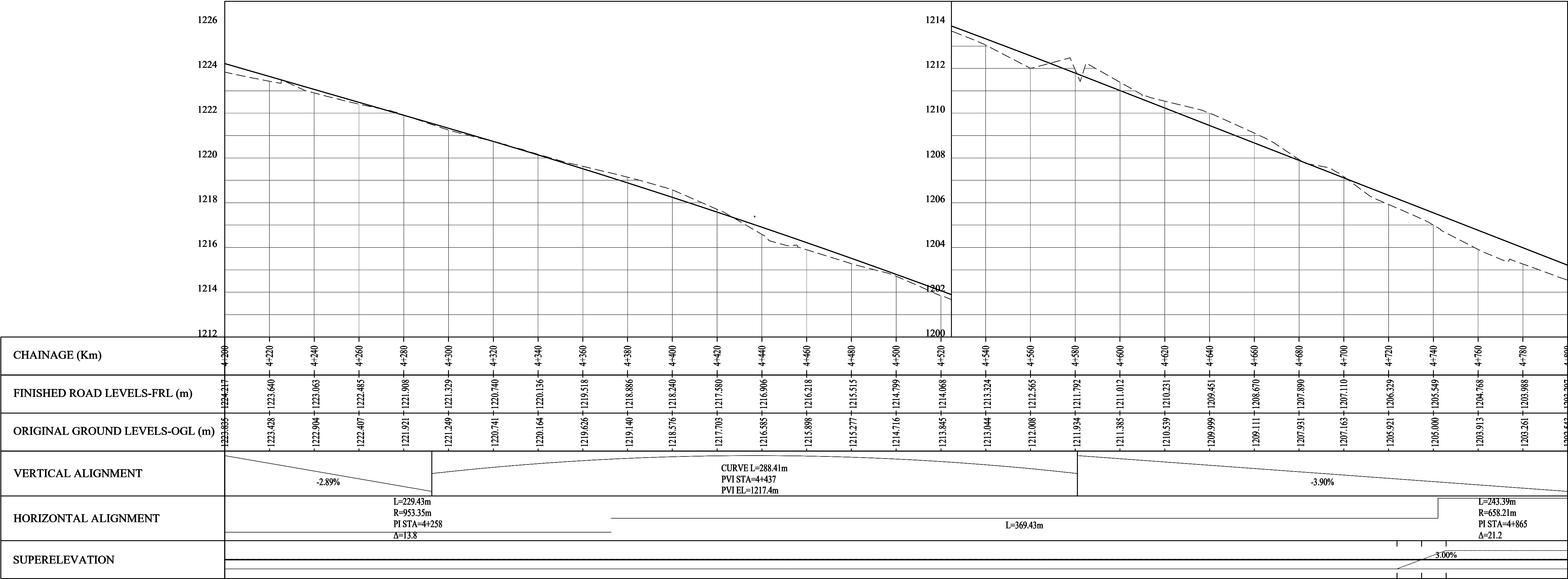
DRAWING TITLE:
PLAN AND PROFILE
CHAINAGE 3+600 - 4+200

DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.N.J
Scale:1:1000 HORIZONTAL
1:100 VERTICAL

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Date : MARCH 2025



MARIMA - MAKUTANO DESIGN B2 LVS PROFILE CHAINAGE 0+000 - 0+800



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)

CONSULTANT:



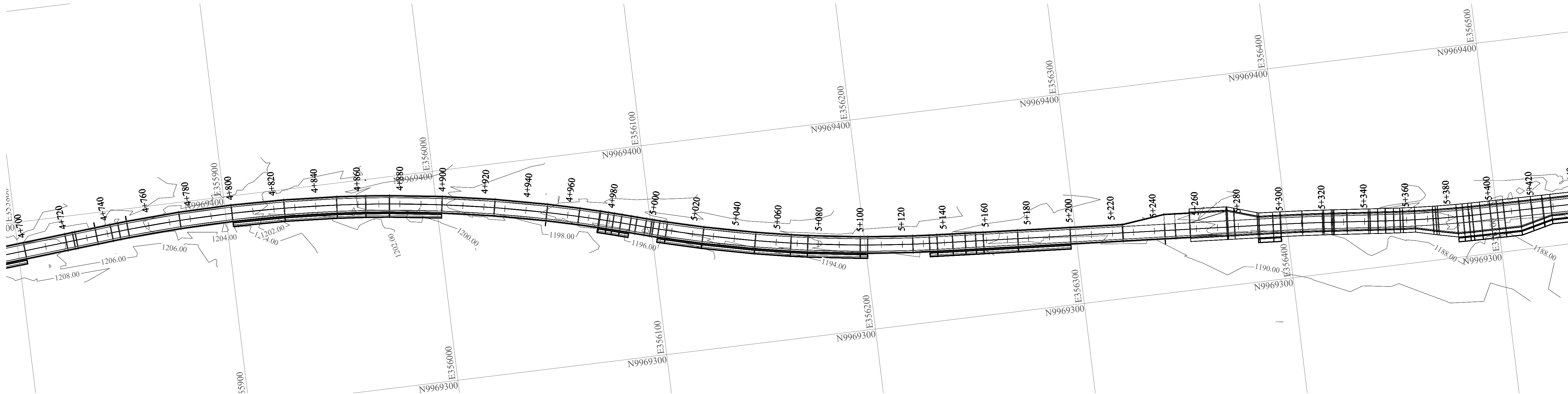
Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
FINAL AND DETAILED
ENGINEERING DESIGN OF
MARIMA - MAKUTANO ROAD
BACH 2

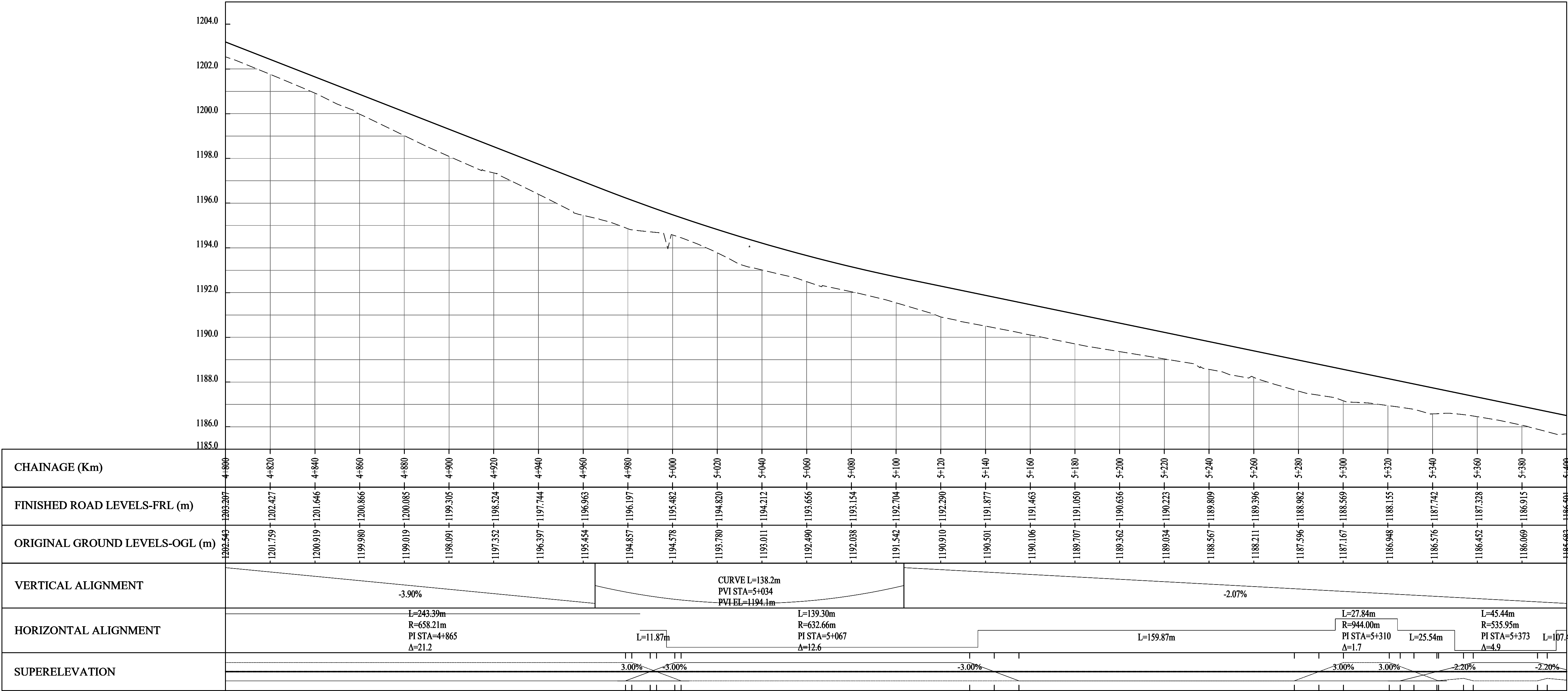
DRAWING TITLE:
PLAN AND PROFILE
CHAINAGE 4+200 - 4+800

DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.N.J
Scale:1:1000 HORIZONTAL
1:100 VERTICAL

Drg No.CE1045/PP/MM/01
Date : MARCH 2025



MARIMA - MAKUTANO DESIGN B2 LVS PROFILE CHAINAGE 4+800 - 5+400



REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)

CONSULTANT:
 **Runji Consulting Group Ltd**
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
FINAL AND DETAILED
ENGINEERING DESIGN OF
MARIMA - MAKUTANO ROAD
BACH 2

DRAWING TITLE:
PLAN AND PROFILE
CHAINAGE 4+800 - 5+400

DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.N.J

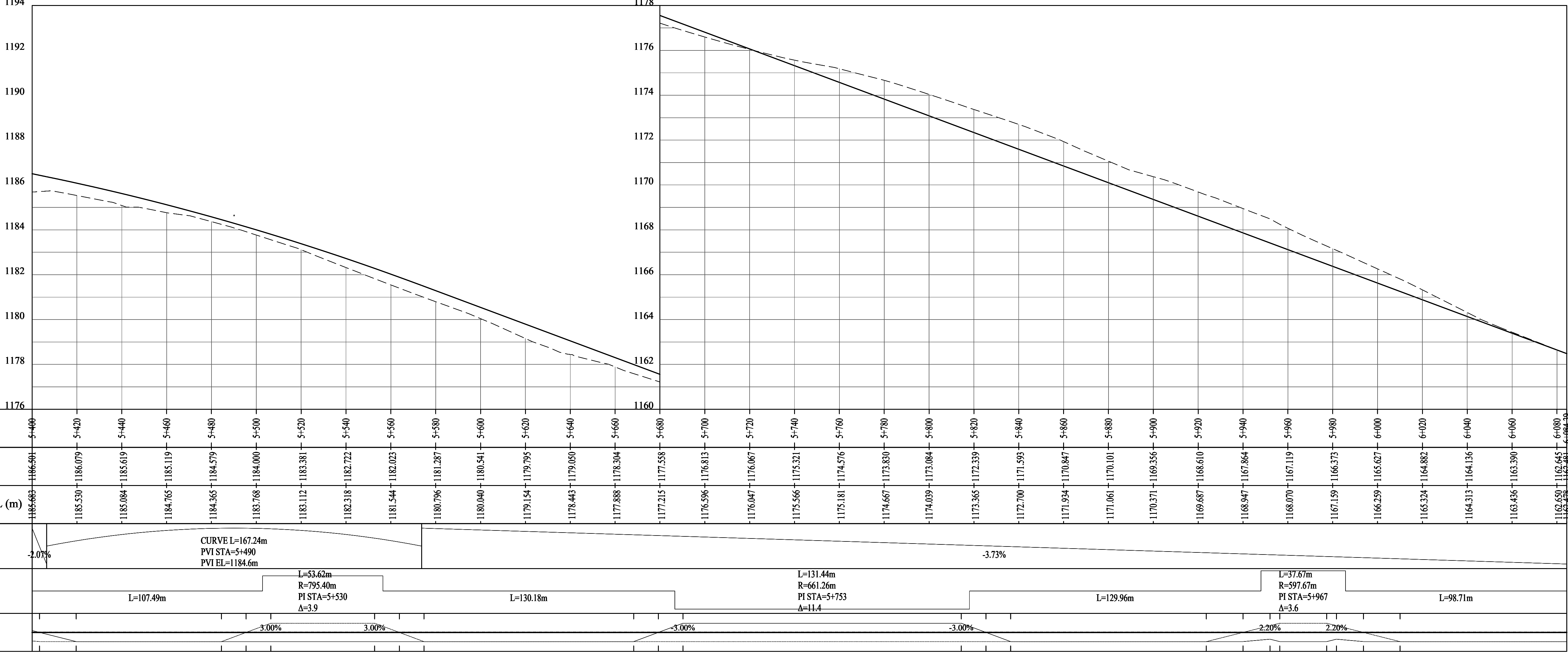
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Drg No.CE1045/PP/MM/01

Date : MARCH 2025



MARIMA - MAKUTANO DESIGN B2 LVS PROFILE CHAINAGE 5+400 - 0+084.39



MARIMA - MAKUTANO DESIGN B2 LVS PROFILE CHAINAGE 0+000 - 0+600

REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL
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Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
FINAL AND DETAILED
ENGINEERING DESIGN OF
MARIMA - MAKUTANO ROAD
BACH 2

DRAWING TITLE:
PLAN AND PROFILE
CHAINAGE 5+400 - 6+084.39

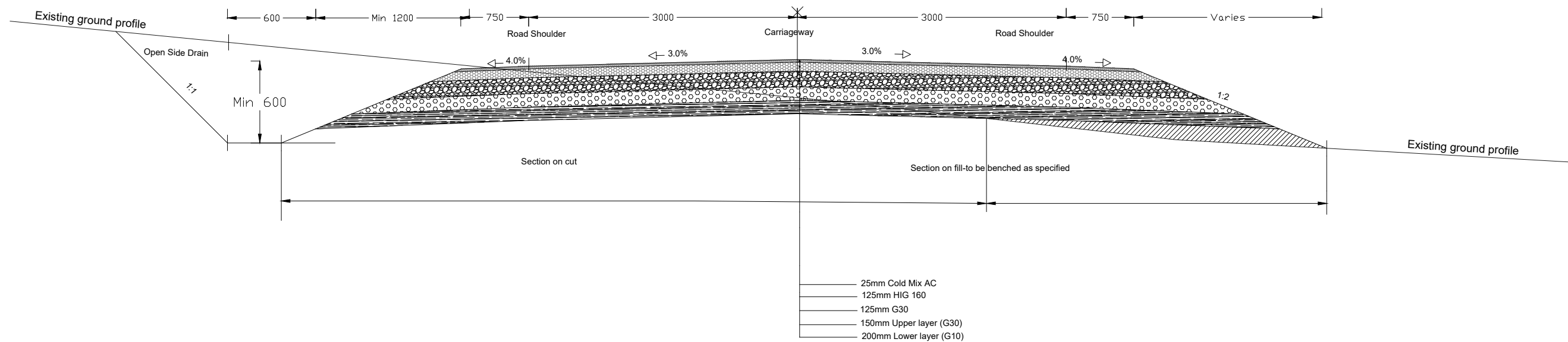
DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.N.J

Scale:1:1000 HORIZONTAL
1:100 VERTICAL

Drg No.CE1045/PP/MM/01

Date : MARCH 2025

TYPICAL CROSS-SECTION



MARIMA MAKUTANO TYPICAL CROSS-SECTION OPTION 1

SCALE 1:50

GENERAL NOTES:

1. Final fill slopes 1:4 where $H_f \leq 1.0\text{m}$
1:2 where $H_f \quad 1.0\text{m} \leq H \leq 3.0\text{m}$
1:1.5 where $H_f \leq 3.0\text{m}$
2. Cutting backslopes may be steepened as instructed at culvert locations to minimise pipe extensions.
3. Cutting Backslopes 1:3 where $H_c \leq 1.0\text{m}$
1:2 where $H_c \quad 1.0\text{m} \leq H \leq 3.0\text{m}$
1:1.5 where $H_c \leq 3.0\text{m}$
1:0.5 in rock cut
4. Width of side ditches 1.0m or wider as instruted by the Engineer.
5. Final shoulder width to be 2.0m where guard rails are instructed.

Slope benching details

REVISIONS	No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. BOX 8151-00100, Nairobi. Kenya

DIRECTOR GENERAL
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)

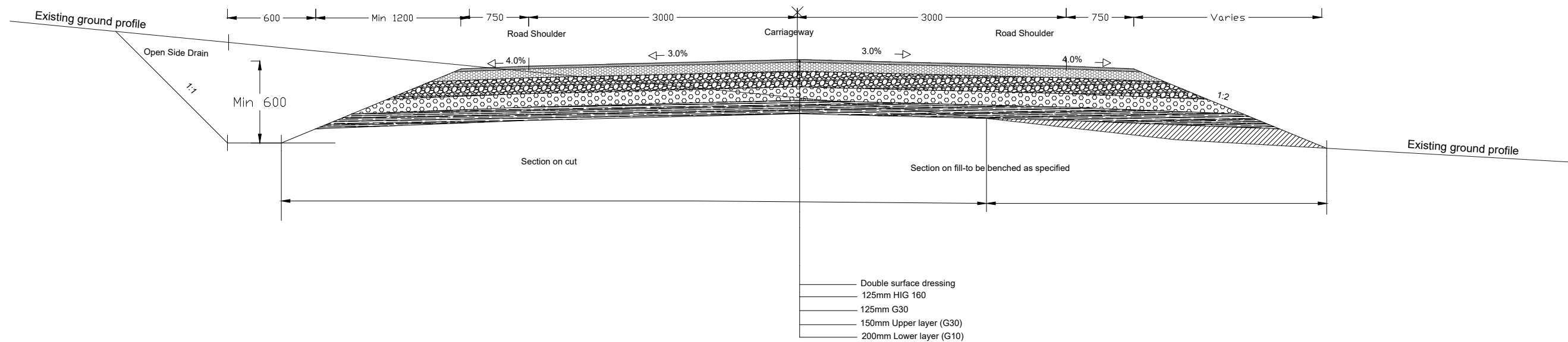
Consultant:
Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
FINAL DETAILED ENGINEERING DESIGN
OF MARIMA MAKUTANO ROAD

DRAWING TITLE:
TYPICAL CROSS SECTION FOR
MARIMA – MAKUTANO ROAD
PAVEMENT BATCH 2

DRAWN BY: SWD
DESIGNED BY: CNM
CHECKED BY: MJN
Scale: AS SHOWN

Drg No. CE1045/TD/MM/01
Date : MARCH 2025



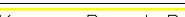
MARIMA MAKUTANO TYPICAL CROSS-SECTION OPTION 2

SCALE 1:50

GENERAL NOTES:

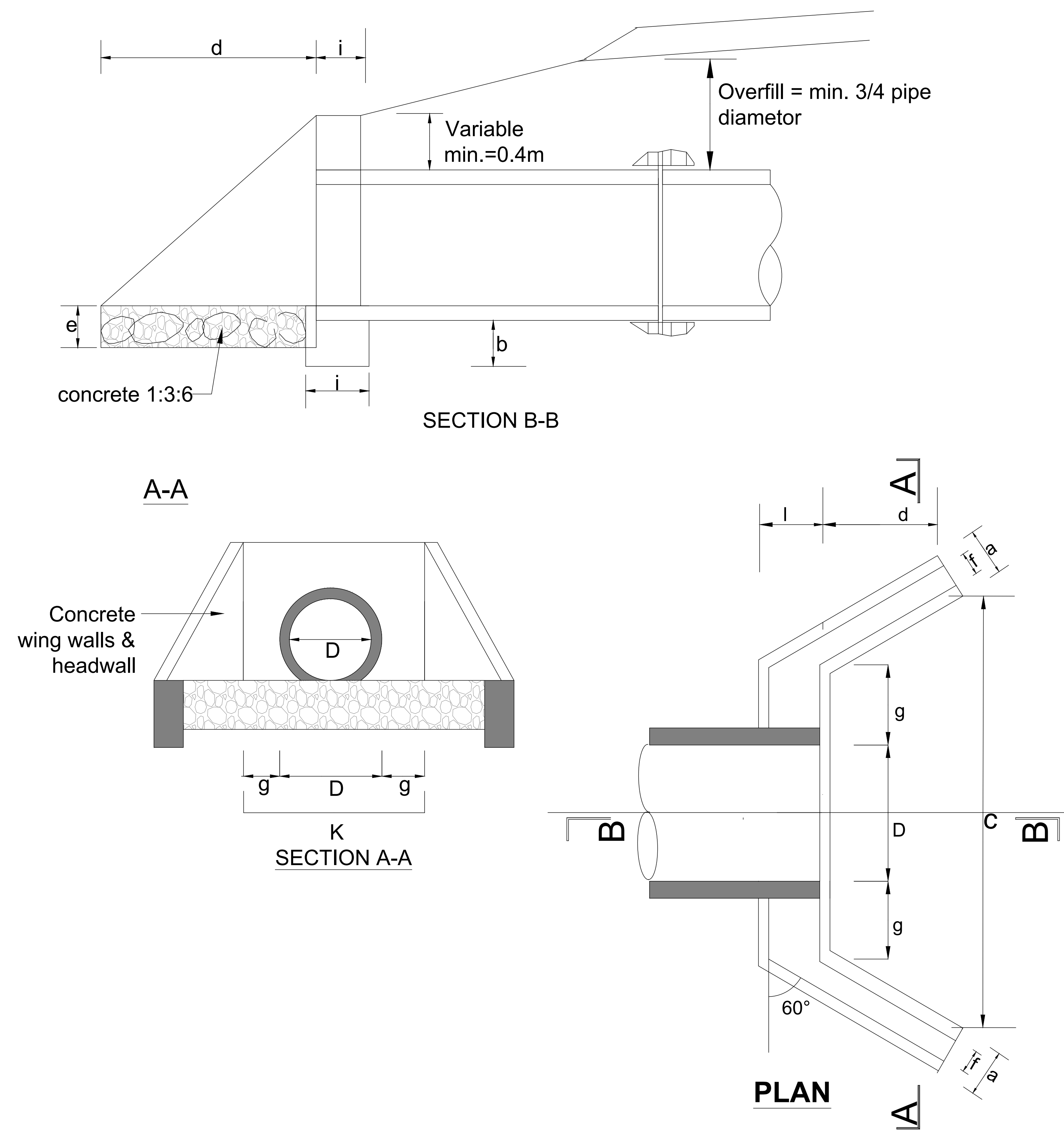
1. Final fill slopes 1:4 where $H_f \leq 1.0m$
1:2 where $H_f = 1.0m \leq H \leq 3.0m$
1:1.5 where $H_f \leq 3.0m$
2. Cutting backslopes may be steepened as instructed at culvert locations to minimise pipe extensions.
3. Cutting Backslopes 1:3 where $H_c \leq 1.0m$
1:2 where $H_c = 1.0m \leq H \leq 3.0m$
1:1.5 where $H_c \leq 3.0m$
1:0.5 in rock cut
4. Width of side ditches 1.0m or wider as instruted by the Engineer.
5. Final shoulder width to be 2.0m where guard rails are instructed.

Slope benching details

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 8151-00100, Nairobi. Kenya	DIRECTOR GENERAL		 Consultant: Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: FINAL DETAILED ENGINEERING DESIGN OF MARIMA MAKUTANO ROAD	DRAWING TITLE: TYPICAL CROSS SECTION FOR MARIMA – MAKUTANO ROAD PAVEMENT BATCH 2	DRAWN BY: SWD DESIGNED BY: CNM CHECKED BY: MJN		Drg No. CE1045/TD/MM/02				
					DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)											
								Scale: AS SHOWN				Date : MARCH 2025				

TYPICAL CULVERT DRAWINGS

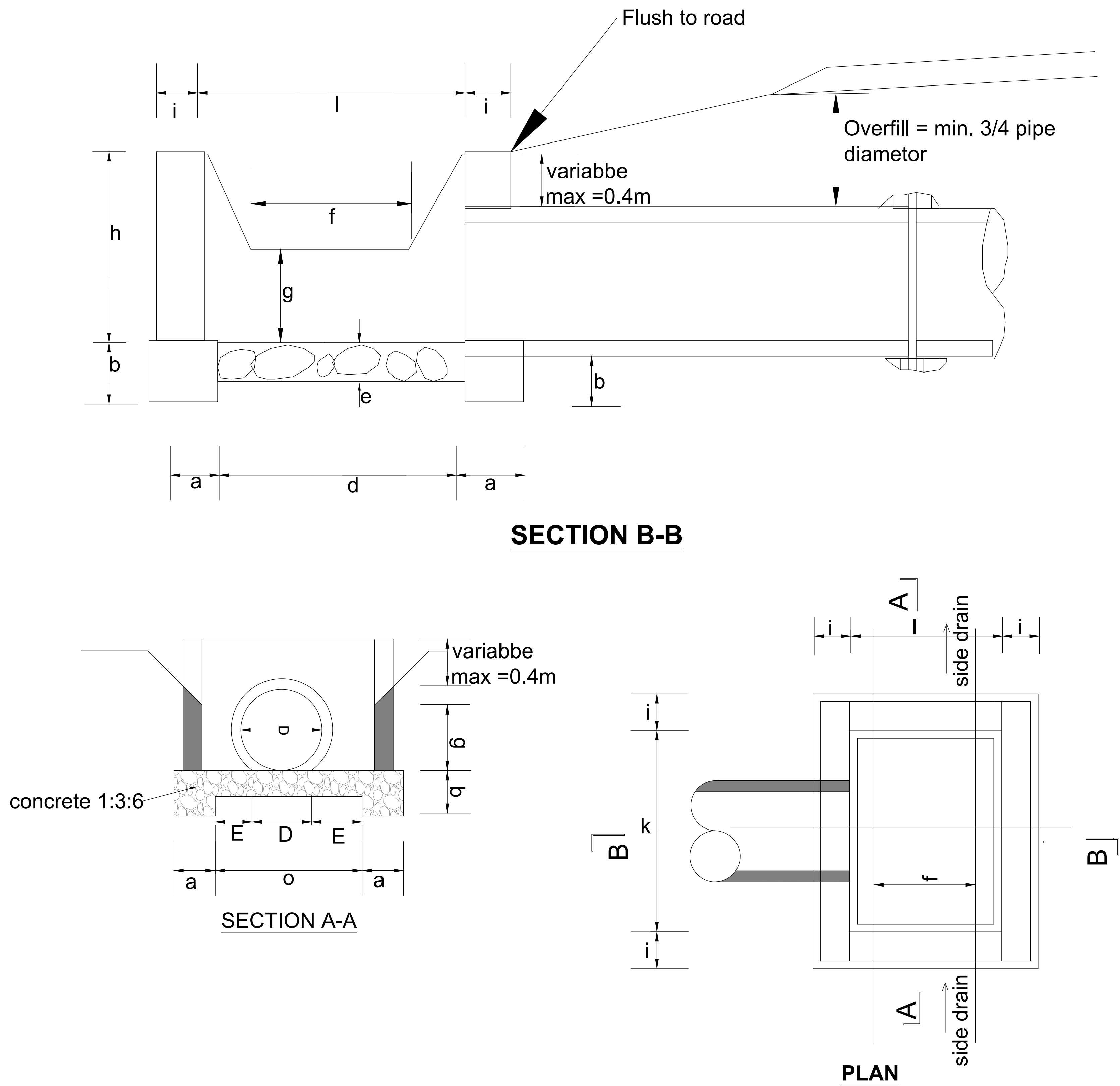
FIGURE H.8 - HEADWALL TYPE 1 (HEAD AND WINGWALLS)



DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS)			(STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION		UNIT						
a	FOUNDATION	m	0.30	0.30	0.30	0.40	0.40	0.60
b	FOUNDATION	m	0.30	0.30	0.40	0.30	0.30	0.40
c	FOUNDATION		2.20	2.35	2.89	2.20	2.35	2.89
d	APRON	m	1.00	1.00	1.20	1.00	1.00	1.20
e	APRON	m	0.20	0.20	0.20	0.20	0.20	0.20
f	WALL	m	0.20	0.20	0.20	0.40	0.40	0.40
g	WALL	m	0.30	0.30	0.30	0.30	0.30	0.30
h	WALL	m	1.15	1.15	1.39	1.15	1.15	1.39
i	WALL	m	0.20	0.20	0.20	0.40	0.40	0.40
k	APRON	m	1.05	1.20	1.50	1.05	1.20	1.50
MATERIAL REQUIREMENT								
FOUNDATION								
	(Concrete)	m3	0.3	0.32	0.51	0.4	0.42	1.03
HEAD/WINGWALLS								
	(Concrete/)	m3	0.4	0.47	0.67	0.8	0.93	1.35
APRON								
	(Concrete)	m3	0.33	0.36	0.53	0.33	0.36	0.53

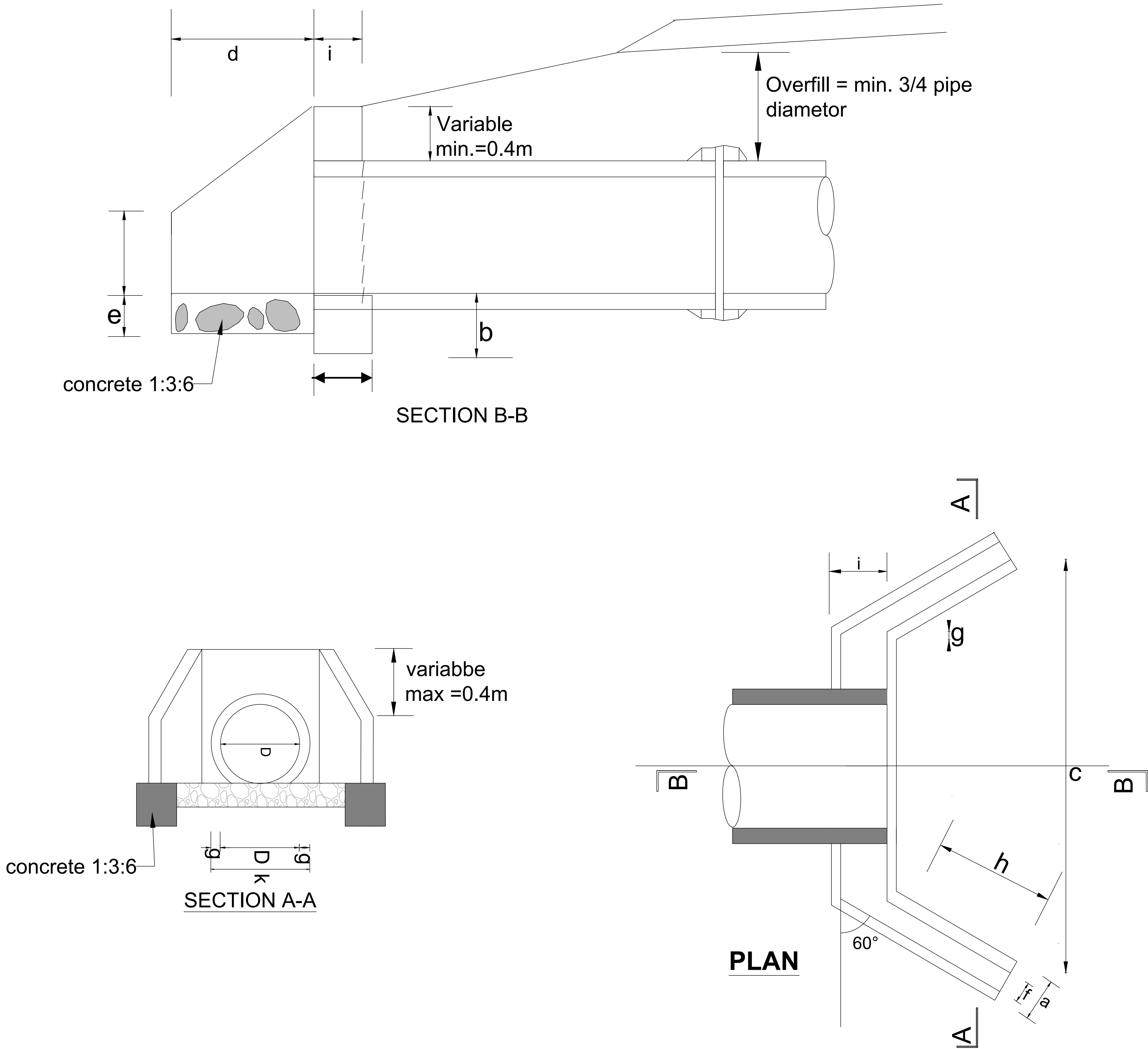
FIGURE H.9 - HEADWALL TYPE 2 (DROP INLETS)



DIMENSIONS AND MATERIAL REQUIREMENTS

PIPE DIAMETER IN (M)			TYPE A			TYPE B		
			(CONCRETE BLOCKS)			(STONE MASONRY)		
			450	600	900	450	600	900
DIMENSION	UNIT							
a	FOUNDATION	m	0.30	0.30	0.30	0.40	0.40	0.40
b	FOUNDATION	m	0.30	0.30	0.30	0.30	0.30	0.30
c	FOUNDATION	m	1.10	1.10	1.40	1.20	1.20	1.50
d	APRON	m	0.90	0.90	0.90	1.00	1.00	1.00
e	APRON	m	0.20	0.20	0.20	0.20	0.20	0.20
f	DROP INLET	m	0.60	0.60	0.60	0.60	0.60	0.60
g	DROP INLET	m	0.30	0.40	0.60	0.30	0.40	0.60
h	DROP INLET	m	0.60	0.80	1.20	0.60	0.80	1.20
i	DROP INLET	m	0.20	0.20	0.20	0.40	0.40	0.40
k	DROP INLET	m	1.20	1.20	1.50	1.20	1.20	1.50
l	DROP INLET	m	1.00	1.00	1.00	1.00	1.00	1.00
m	DROP INLET	m	0.38	0.30	0.30	0.38	0.30	0.30
MATERIAL REQUIREMENT								
FOUNDATION								
(Concrete)	m3		0.47	0.47	0.52	0.72	0.72	0.79
HEAD/WINGWALLS								
(Concrete/Masonry)	m3		0.53	0.69	1.11	1.24	1.63	2.61
APRON								
(Concrete)	m3		0.24	0.24	0.30	0.24	0.24	0.30

FIGURE H.12 - HEADWALL TYPE 4 (FOR ACCESS CULVERT)



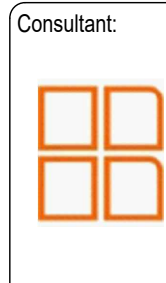
DIMENSIONS AND MATERIAL REQUIREMENTS							
PIPE DIAMETER IN (M)		TYPE A (CONCRETE BLOCKS)			TYPE B (STONE MASONRY)		
		450	600	900	450	600	900
DIMENSION		UNIT					
a	FOUNDATION	m	0.30	0.30		0.40	0.40
b	FOUNDATION	m	0.30	0.30		0.30	0.30
c	APRON		1.34	1.49		1.34	1.49
d	APRON	m	0.60	0.60		0.60	0.60
e	APRON	m		0.20		0.20	0.20
f	WINGWALLS	m	0.20	0.20		0.40	0.40
g	WINGWALLS	m	0.10	0.10		0.10	0.10
h	HEADWALLS	m	0.69	0.69		0.69	0.69
l	HEADWALLS	m	0.20	0.20		0.40	0.40
k	HEADWALLS	m	0.65	0.80		0.65	0.80
l	HEADWALLS	m	0.40	0.40		0.40	0.40
MATERIAL REQUIREMENT							
FOUNDATION							
(Concrete 1:2:4, 1:3:6)		m3	0.18	0.2		0.24	0.26
HEAD/WINGWALLS							
(Concrete/Masonry)		m3	0.25	0.29		0.50	0.58
APRON		m3	0.12	0.14		0.12	0.14

No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
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DIRECTOR GENERAL	
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	



Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:	FINAL DETAILED ENGINEERING DESIGN OF MARIMA- MAKUTANO ROAD BATCH 2
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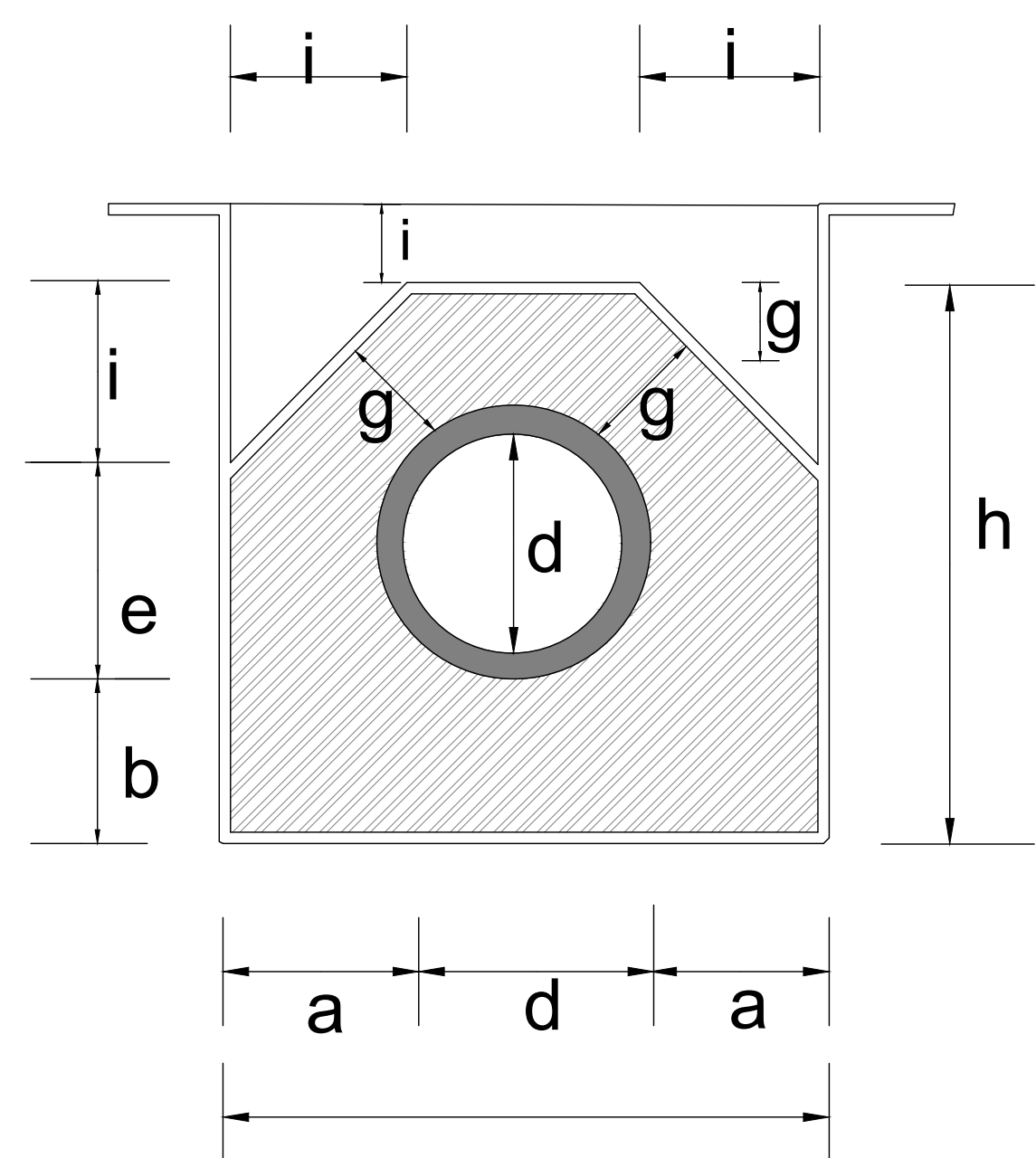
DRAWING TITLE:	HEADWALL TYPE 4 (FOR ACCESS CULVERT)
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DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/CDS/MM/O3
Scale: NTS	Date : MARCH 2025

FIGURE H.14-BEDDING AND HAUNCH PROFILES TYPE III& IV

PROFILE IV

(CONCRETE)



	450 (mm)	600 (mm)	900 (mm)
Dimensions in (m)			
	0.15	0.2	0.2
	0.15	0.15	0.15
	0.86	0.15	1.48
	0.56	0.72	1.08
	0.46	0.15	0.78
	0.15	0.15	0.15
	0.15	0.15	0.15
	0.81	1.02	1.38
	0.28	0.35	0.45
volume in (m3/m)			
	0.37	0.61	0.92
-fair to poor subgrade condition -overfill >$\frac{3}{4}$ Dia; -Seasonal waterflow only. -Use gravel material for. -backfill/overfill.			

No.	DATE	DESCRIPTION



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Consultant:
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P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
**FINAL DETAILED ENGINEERING DESIGN OF
MARIMA- MAKUTANO ROAD
BATCH 2**

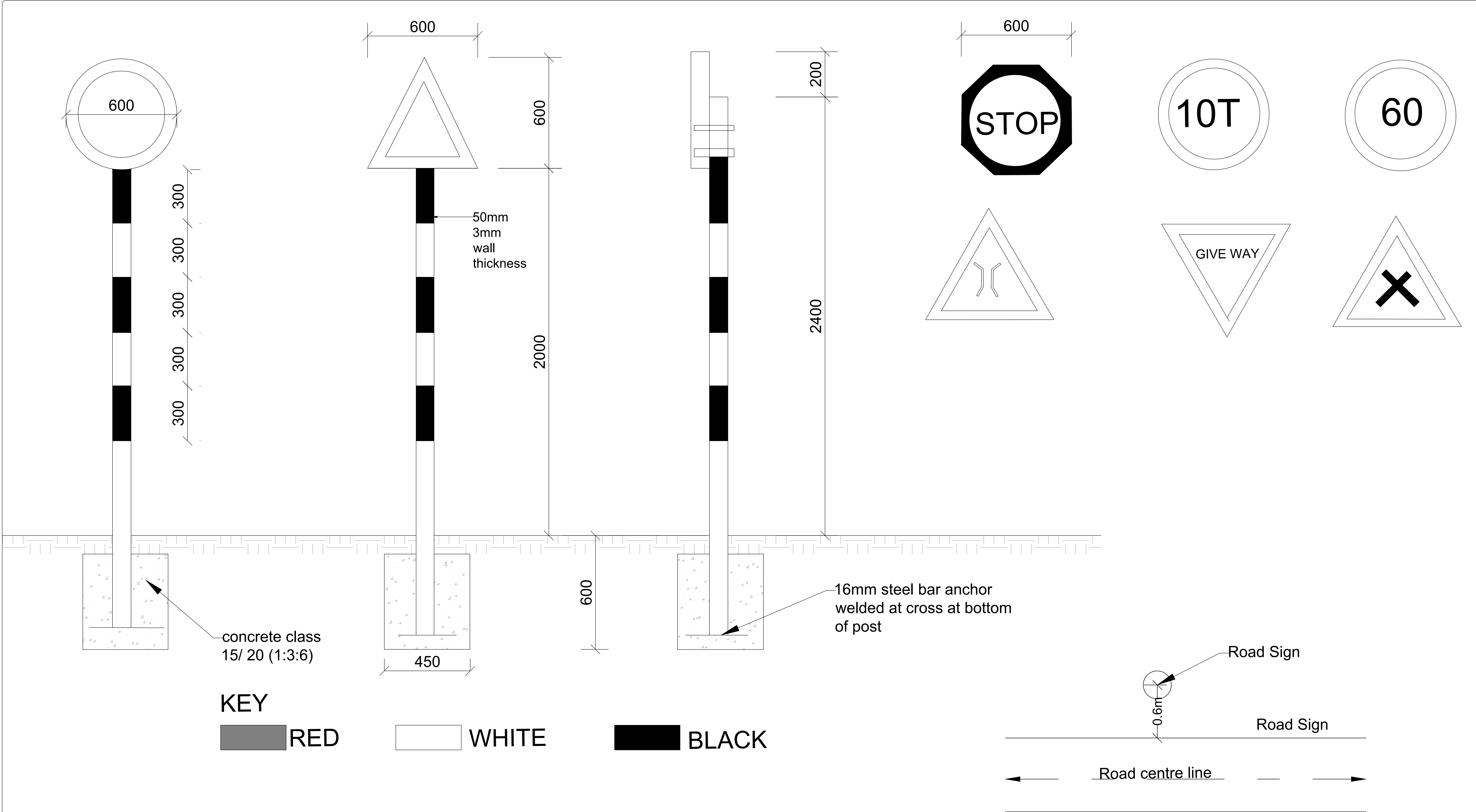
DRAWING TITLE:
**BEDDING AND HAUNCH PROFILES
TYPE III& IV**

DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.J.N

Scale: NTS

Drg No.
CE1045/CDS/MM/O4

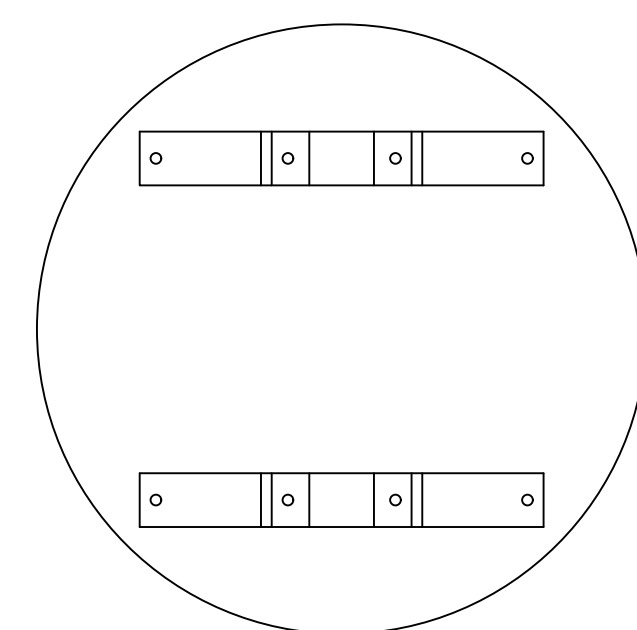
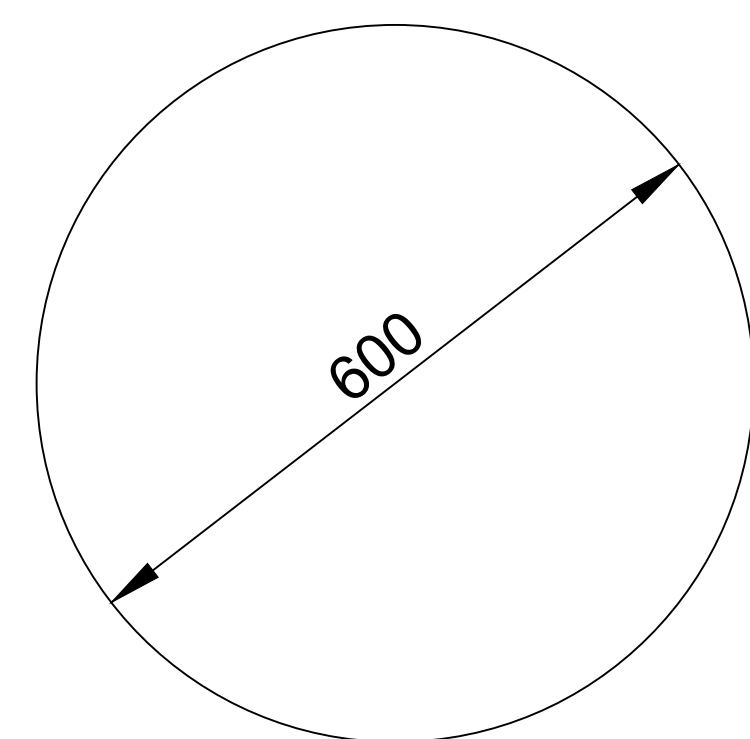
Date : MARCH 2025



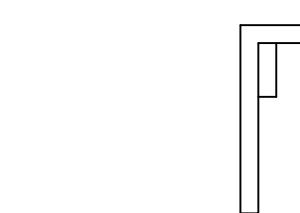
- 1.The type of sign required and their location shall de shown as road plan or as directed by engineer
- 2.signs plate to be 2mm thick mild steel plate
- 3.sign post to be 50mm fixing clamp/brackets
- 4.Sign plate to be fixed to steel tube by \$Nos M10 bolts and 50mm fixing clamp/brackets
- 5,Sign paints shall be reflective
- 6.The sign plate and post shall be treated by applying two coats of lead red oxide paint before applying a priming and two finish coats of approved paints. Paints used shall have a hard,durable and glossy finish.

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: FINAL DETAILED ENGINEERING DESIGN OF MARIMA- MAKUTANO ROAD BATCH 2	DRAWING TITLE: CULVERT ROAD SIGNS	DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N Scale: NTS	Drg No. CE1045/CDS/MM/O5

STANDARD DRAWINGS



SCALE 1:25



STIFFENING TO SIGNS

SCALE 1:20



1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL ROAD SIGNS ARE 3mm ALUMINIUM PLATES WITH REFLECTIVE MATERIALS.
3. PLASTIC WASHERS TO BE PLACED BETWEEN ALUMINIUM SIGNS AND STEEL BRACKETS.
4. ALL SIGN SUPPORTS AND FITTINGS TO BE GALVANISED MILD STEEL.
5. THE ENDS OF BOLTS TO BE HAMMERED OR SPOT WELDED.
6. ALL WHITE, RED, BLUE AND YELLOW PARTS ON SIGNS TO BE MADE OF RETRO-REFLECTIVE MATERIAL.
7. THE WIDTHS OF SIGN MARKINGS TO BE AS FOLLOWS;
 - RED BORDERS TO STANDARD SIGNS - 75mm
 - RED STRIPES ON COUNT DOWN SIGNS - 75mm
 - RED BORDER TO PRIORITY TRIANGLE SIGNS - 100mm
 - RED BORDER TO PROHIBITORY SIGNS - 50mm
 - RED BORDERS TO CRUCIFORM LEVEL "X" - 60mm
 - WHITE BORDER TO PRIORITY (OCTAGON) - 50mm
 - YELLOW STRIPES ON HAZARD SIGNS - 100mm.
 - BLACK STRIPES ON HAZARD SIGNS - 200mm.

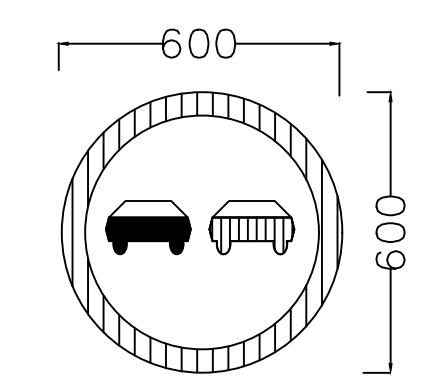
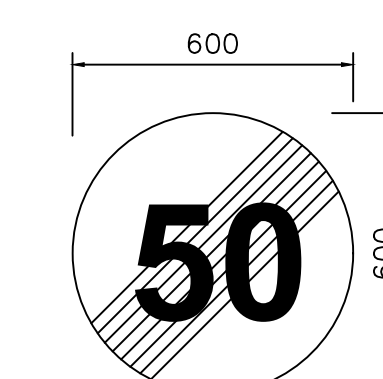
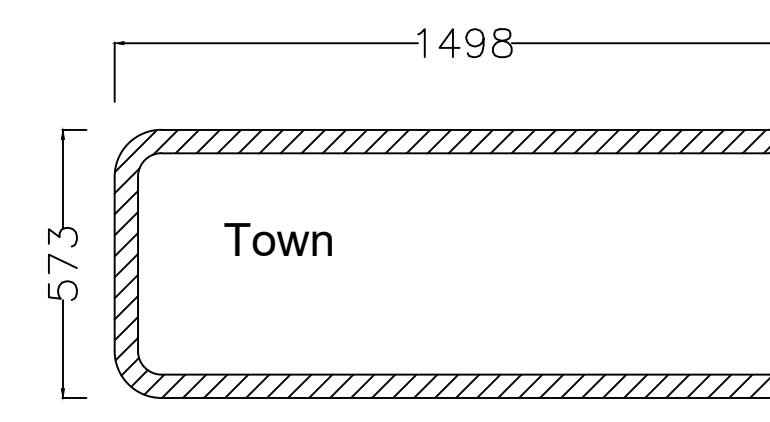
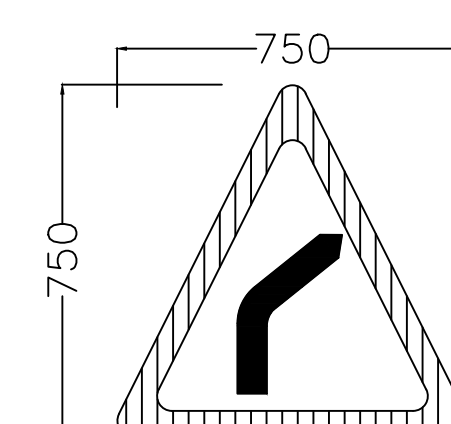
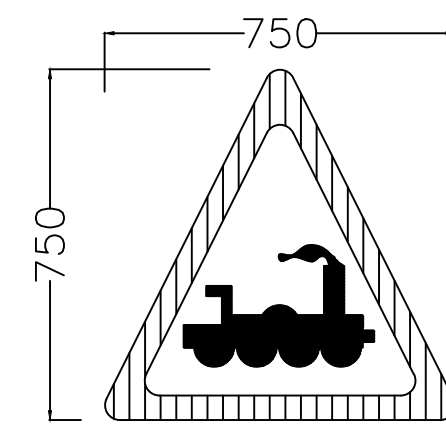
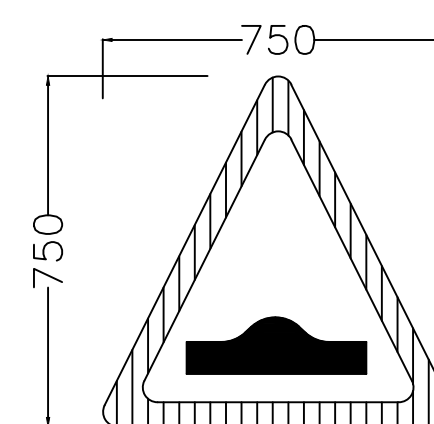
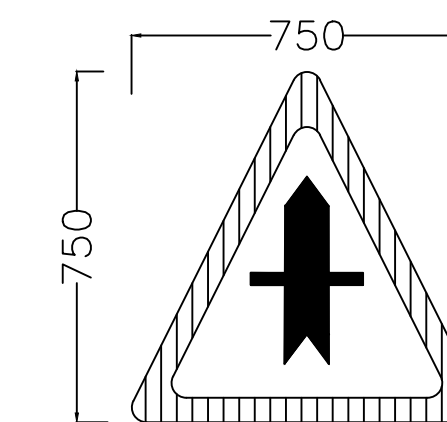
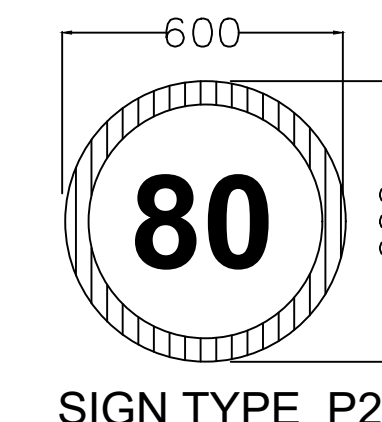
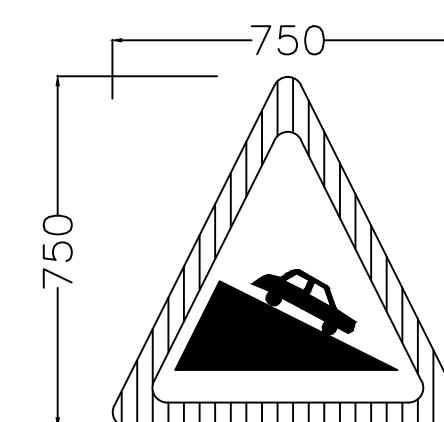
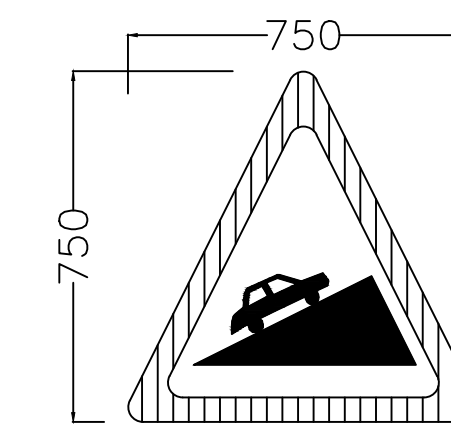
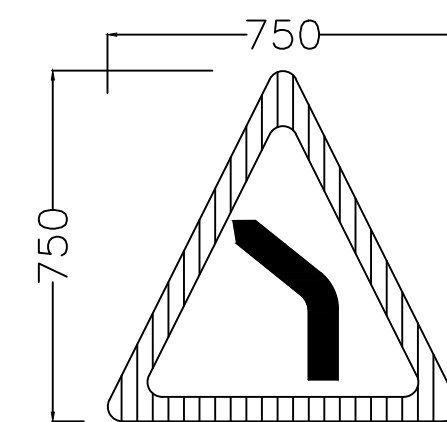
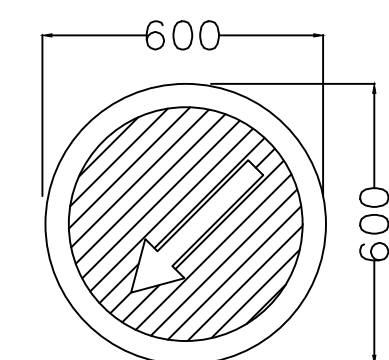
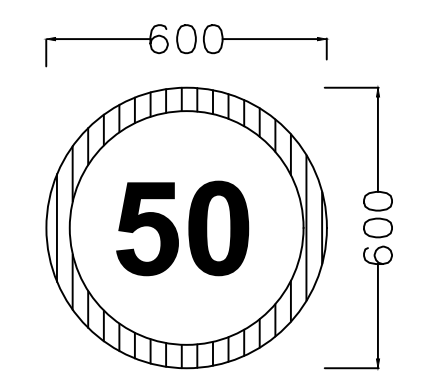
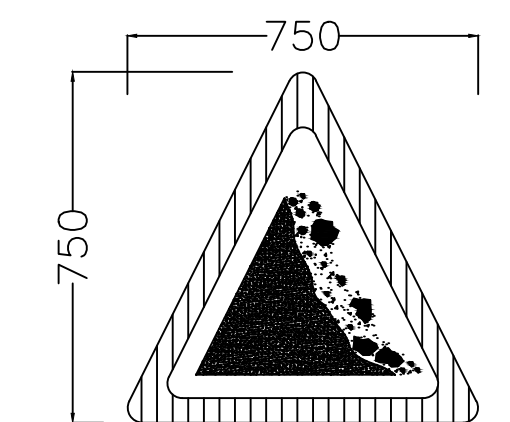
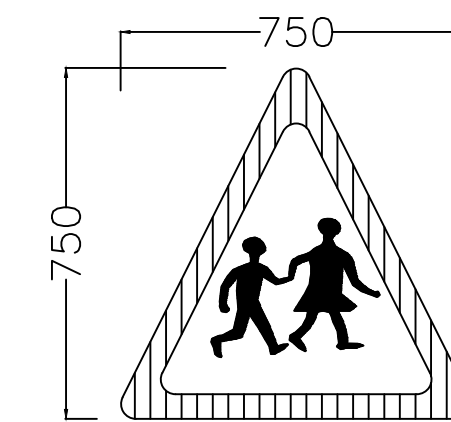
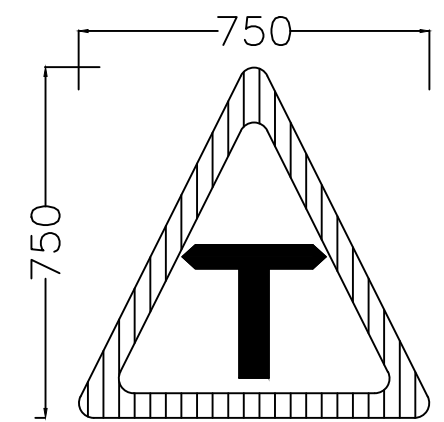
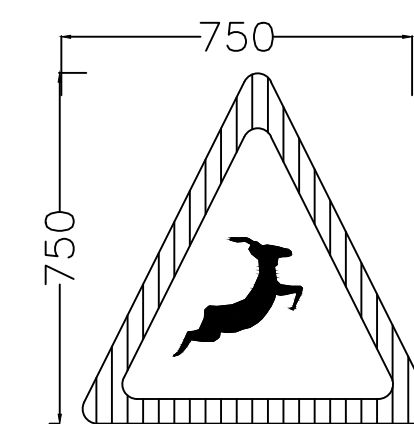
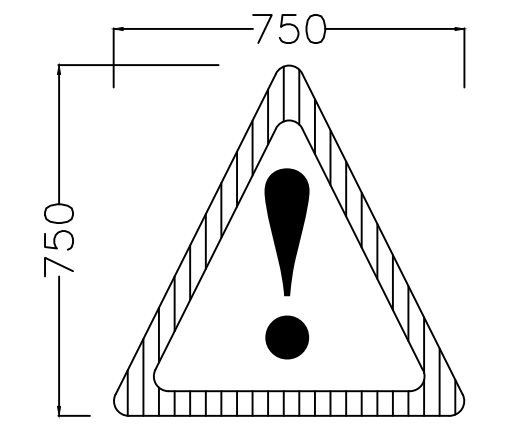
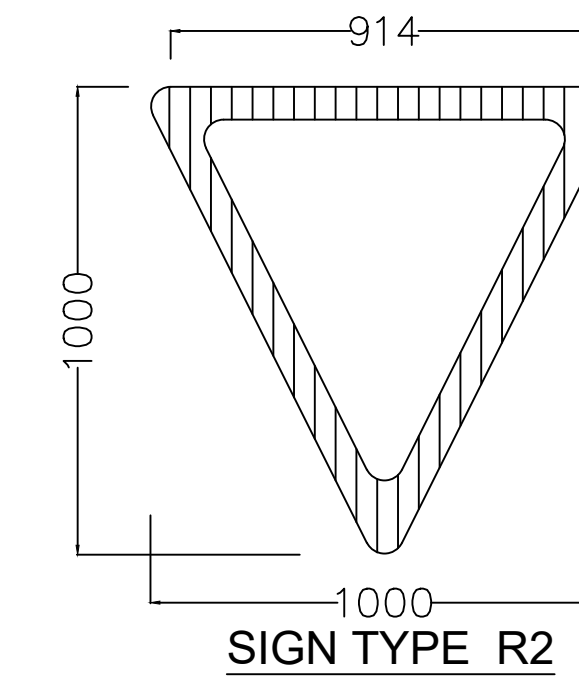
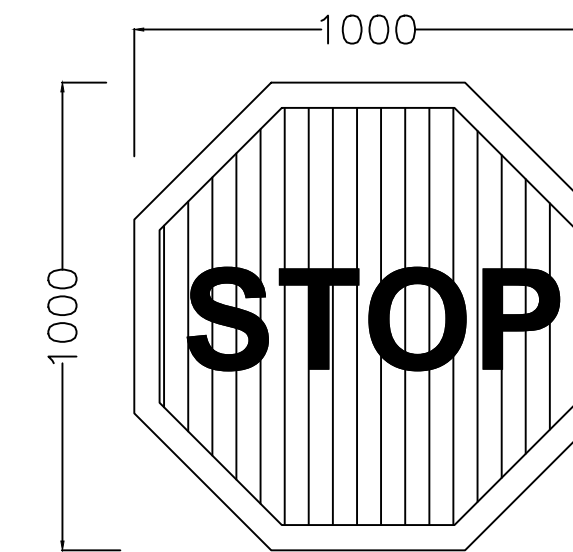
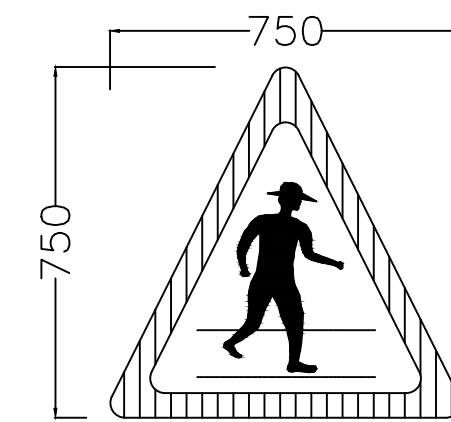
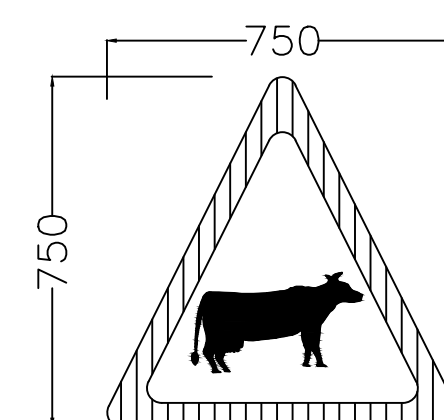
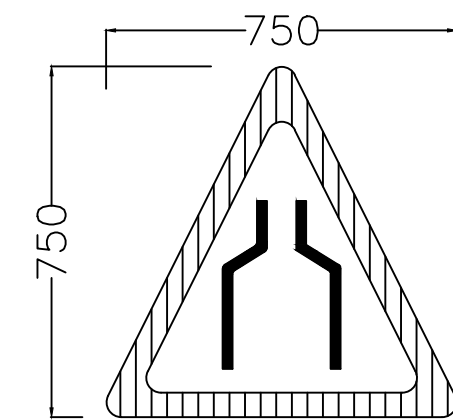
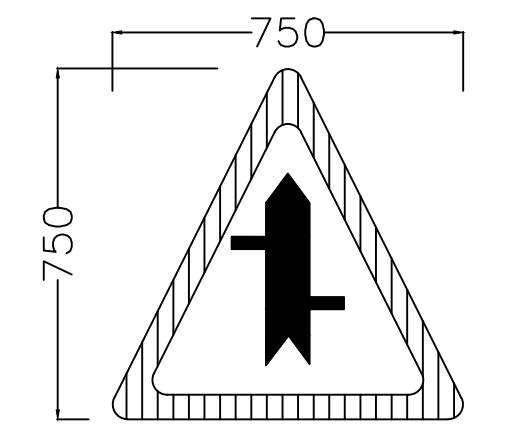
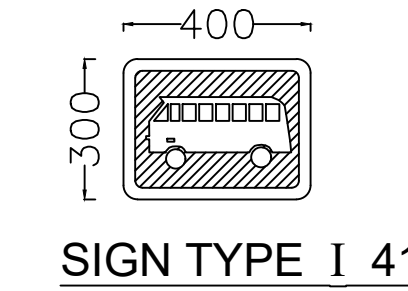
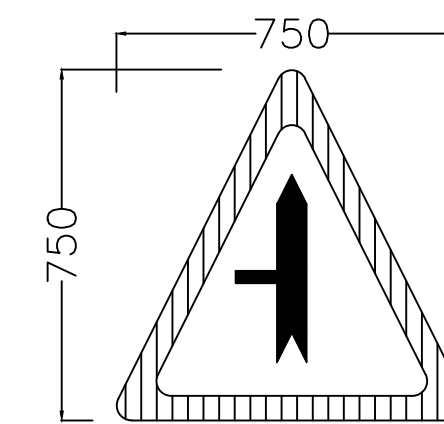
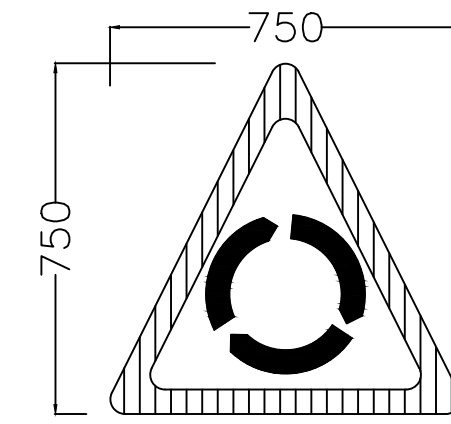
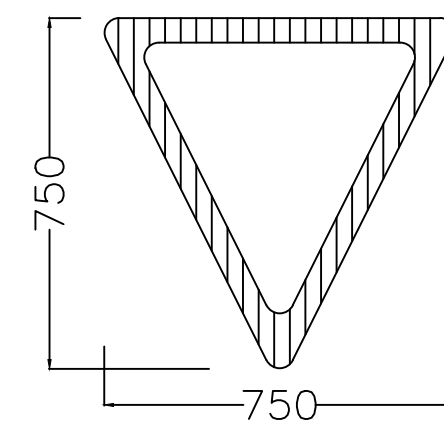
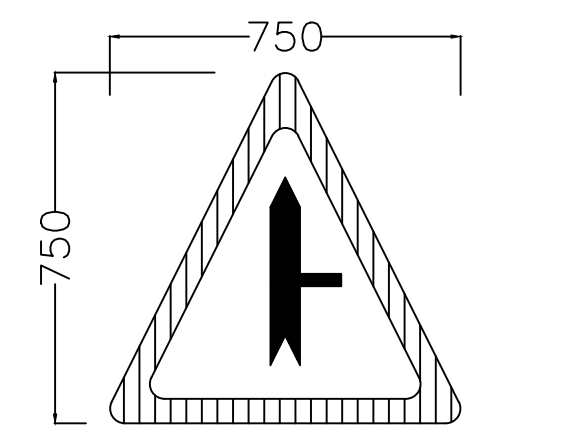
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FINAL DETAILED ENGINEERING DESIGN OF
MARIMA - MAKUTANO (ROAD)
BATCH 2

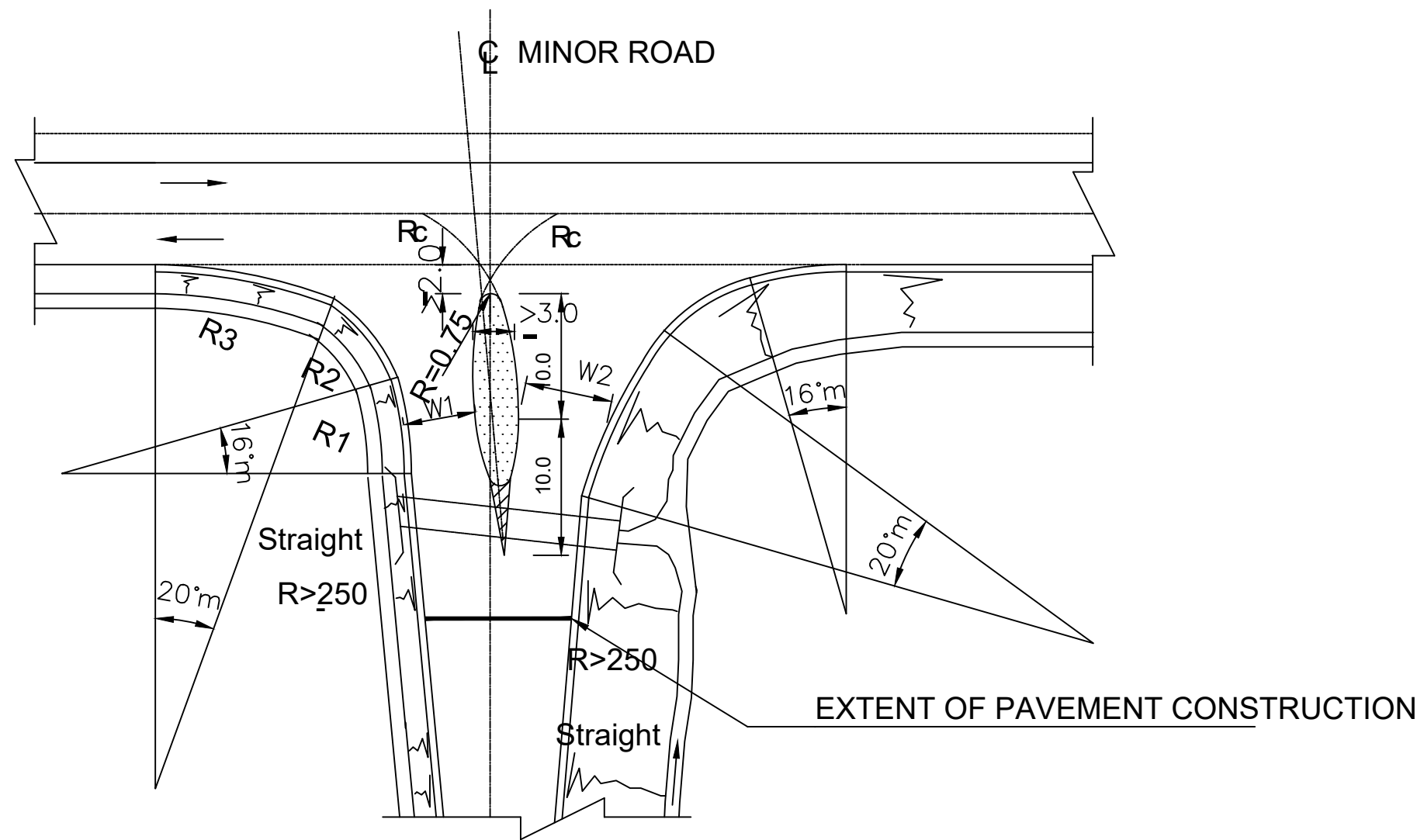
STANDARD DRAWING -
STANDARD - ROAD SIGNS

Scale: AS SHOWN

Date : MARCH 2025

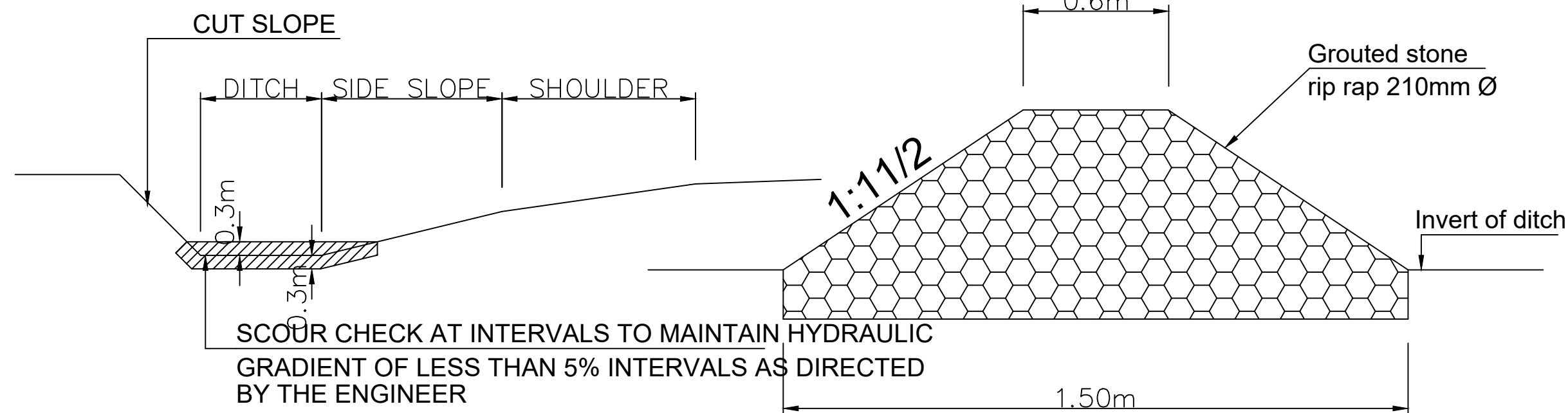


REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 481151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindarama Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: FINAL DETAILED ENGINEERING DESIGN OF MARIMA - MAKUTANO (ROAD) BATCH 2	DRAWING TITLE: STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION	DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N Scale: AS SHOWN	Drg No. CE/1045/SD/MM/02 Date : MARCH 2025
					DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)						



- NOTES
1. R_c =CONTROL RADIUS DEPENDANT UPON VEHICLE TURNING CHARACTERISTICS RECOMMENDED VALUE 15m.
 2. THE RATIO R_1 : R_2 : R_3 TO BE 2:1:3 AND THE RECOMMENDED VALUE FOR R_2 IS 12.0m
 3. W_1 SHALL EQUAL MINOR ROAD LANE WIDTH BUT SHALL NOT BE LESS THAN 3.0m
 4. W_2 SHALL EQUAL 5.5m (EXCLUDING OFFSETS TO RAISED KERBS)

JUNCTION TYPE I
1:75



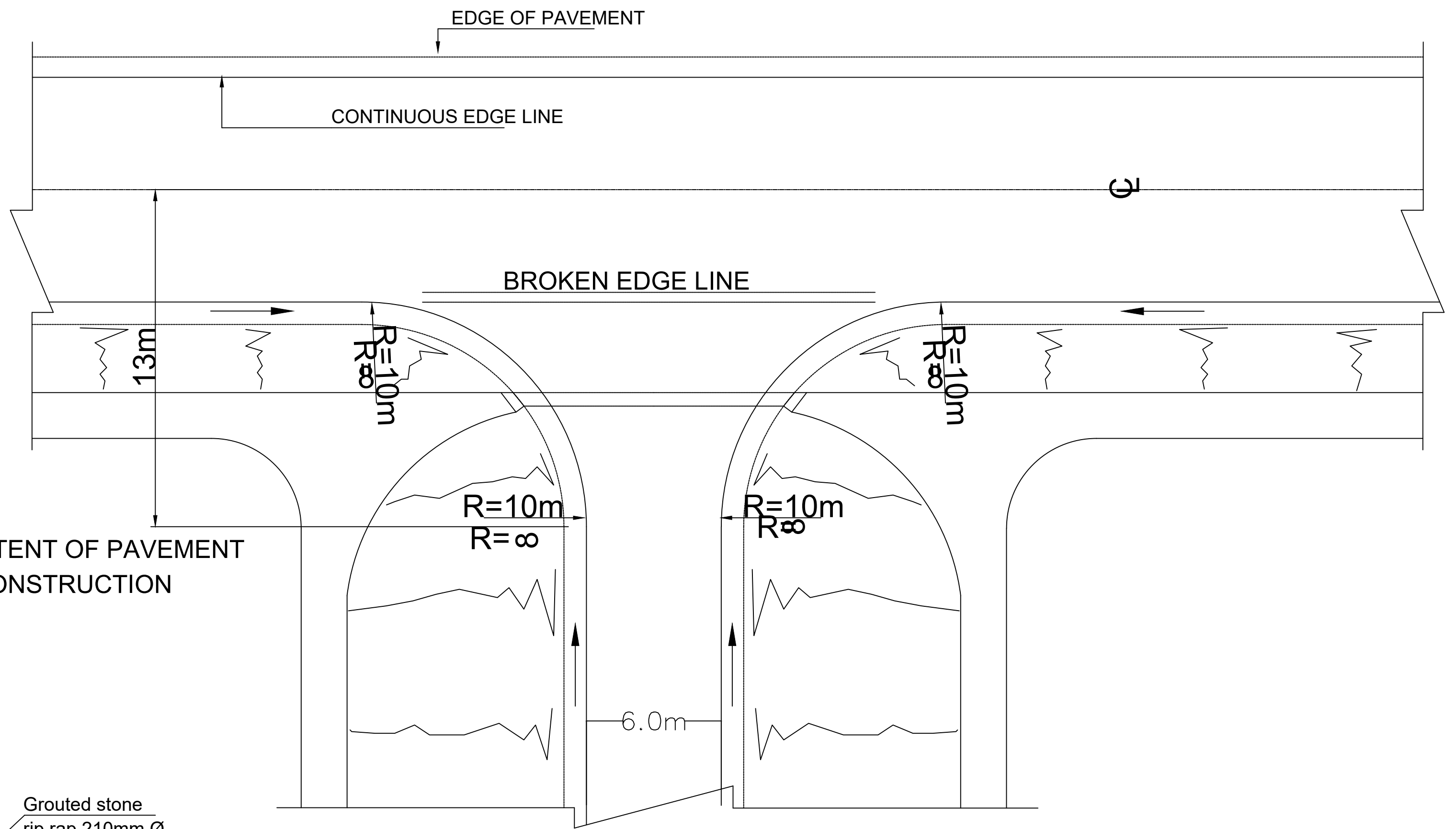
**TYPICAL ELEVATION
OF A SCOUR CHECK**

**TYPICAL SECTION
THROUGH A SCOUR CHECK**
1:50

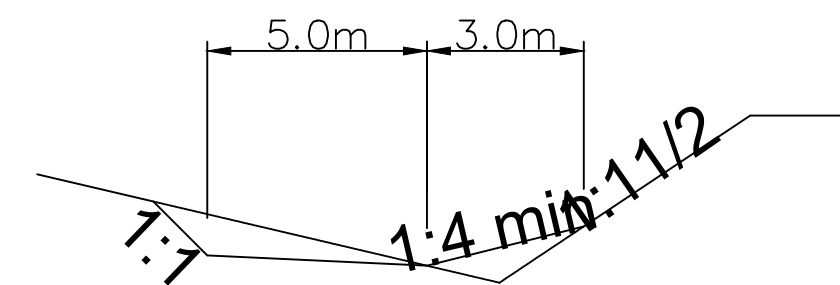
NOTES

- $R_1 = 24m$
 $R_2 = 12m$
 $R_3 = 36m$
 $R_c = 15m$
1. JUNCTION TYPE I WILL BE USED FOR ALL JUNCTION WITH CLASSIFIED ROADS AND TYPE II FOR THE OTHER JUNCTIONS EG SCHOOL ETC.
 2. DIMENSIONS IN METERS UNLESS STATED OTHERWISE.
 3. ROAD MARKINGS TO BE CARRIED OUT IN ACCORDANCE WITH M.O.P.W. ROAD DESIGN MANUAL.
 4. EXTENT OF PROTECTION WORKS AT INLET AND OUTLET OF 600mm PIPE CULVERT TO BE AS DIRECTED BY THE ENGINEER.
 5. CENTRE LINE OF SIDE DRAIN TO BE MAINTAINED AT CONSTANT DISTANCE FROM EGDE OF PAVEMENT.
 6. MAINROAD CROSS-SECTION TO BE APPLIED ON SIDE ROAD CONSTRUCTION TO LIMIT OF BITUMEN SURFACING.
 7. FOR PRIVATE ACCESSES OR AS DIRECTED, PAVEMENT BEYOND EDGE OF MAIN ROAD TO BE 150mm COMPACTED GRAVEL.

**EXTENT OF PAVEMENT
CONSTRUCTION**

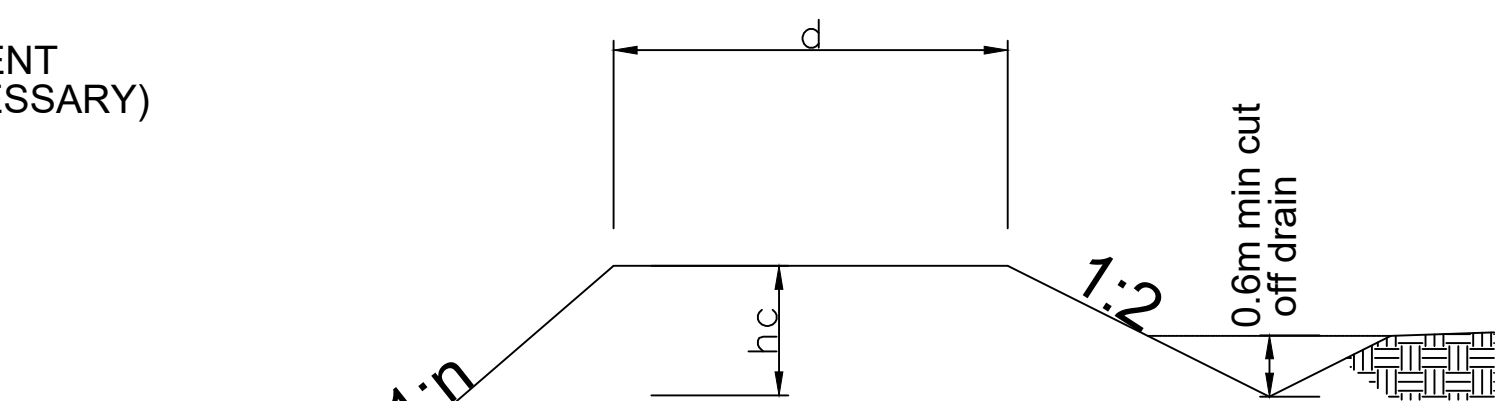


JUNCTION TYPE II
1:100



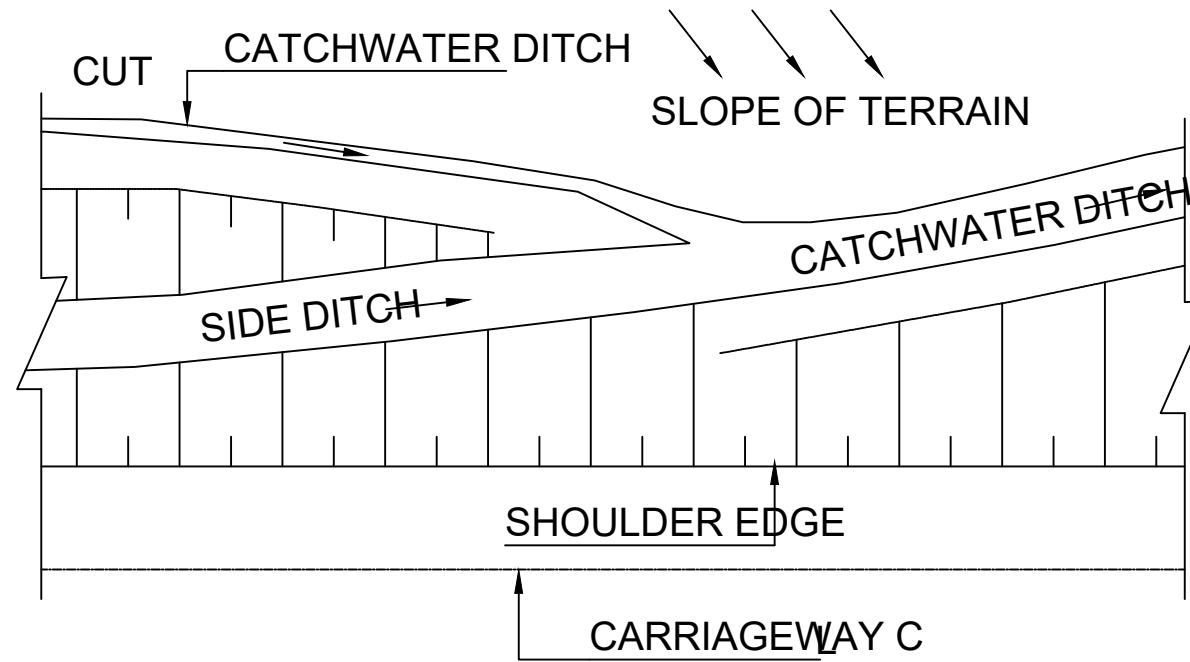
**CATCHWATER DITCH AT EMBANKMENT
FOOT FOR HIGH FILL (WHERE NECESSARY)**

LONGITUDINAL SECTION II



**CATCHWATER DITCH ON TOP OF
CUTTING (WHERE NECESSARY)**

LONGITUDINAL SECTION I



PLAN

No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
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DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	

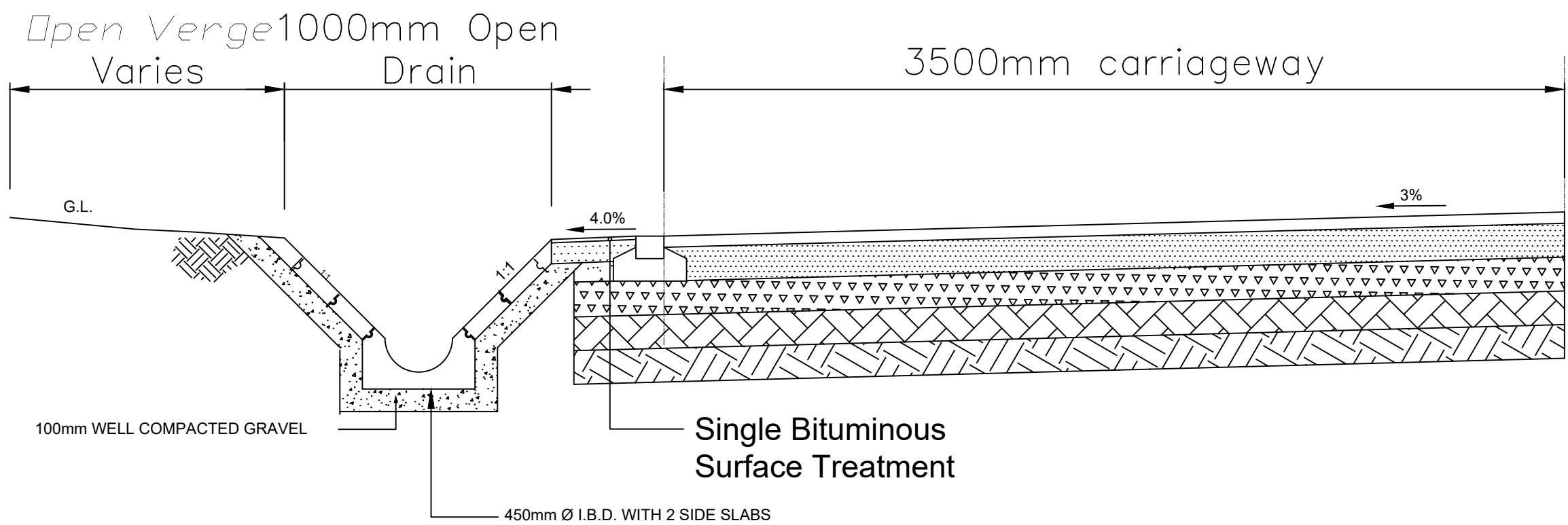
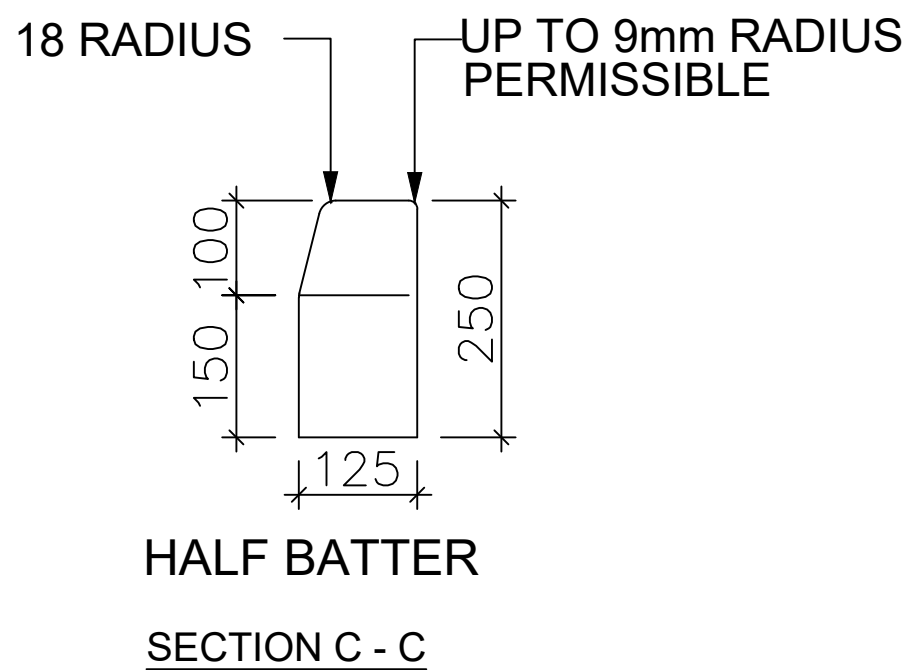
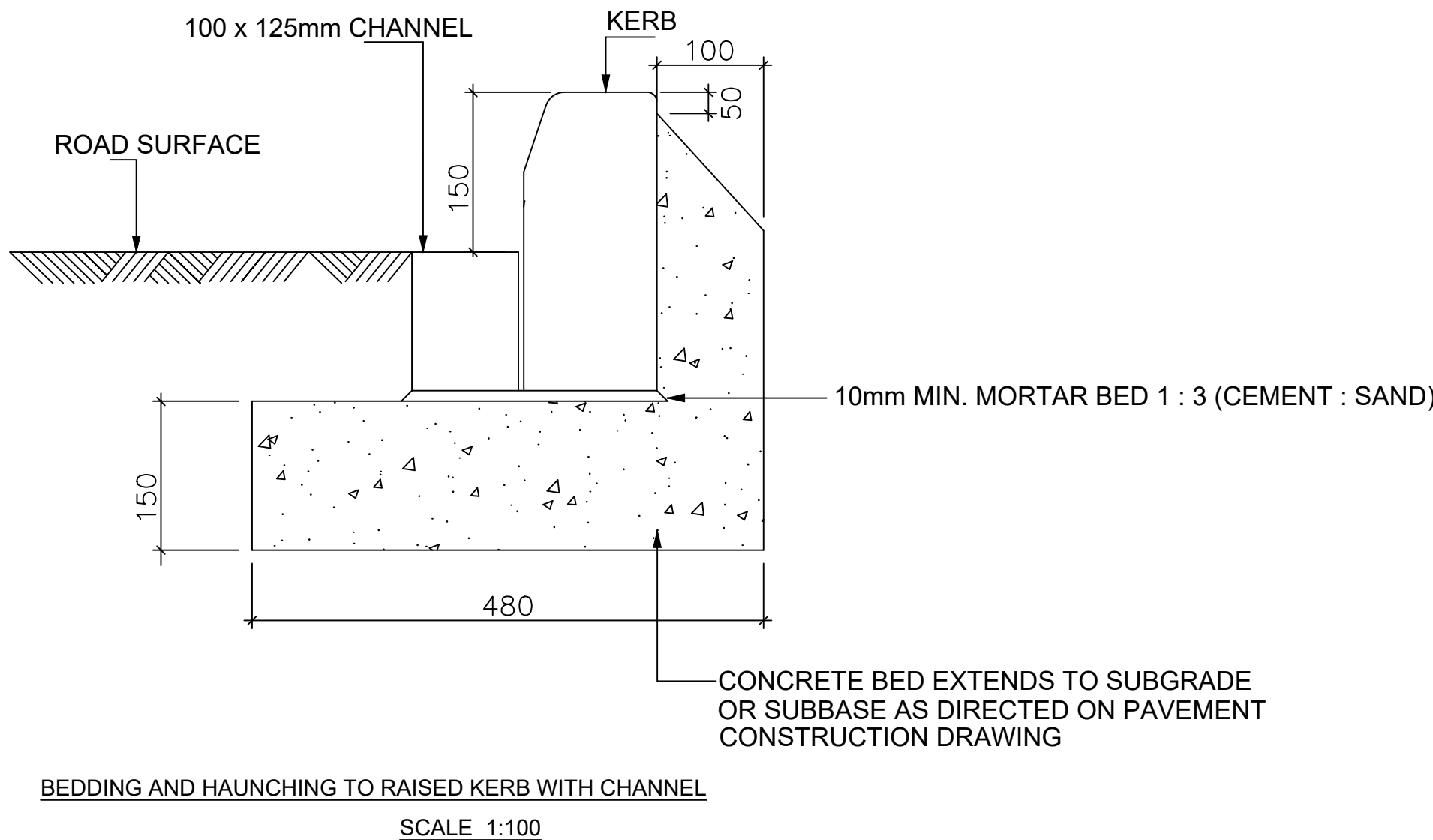
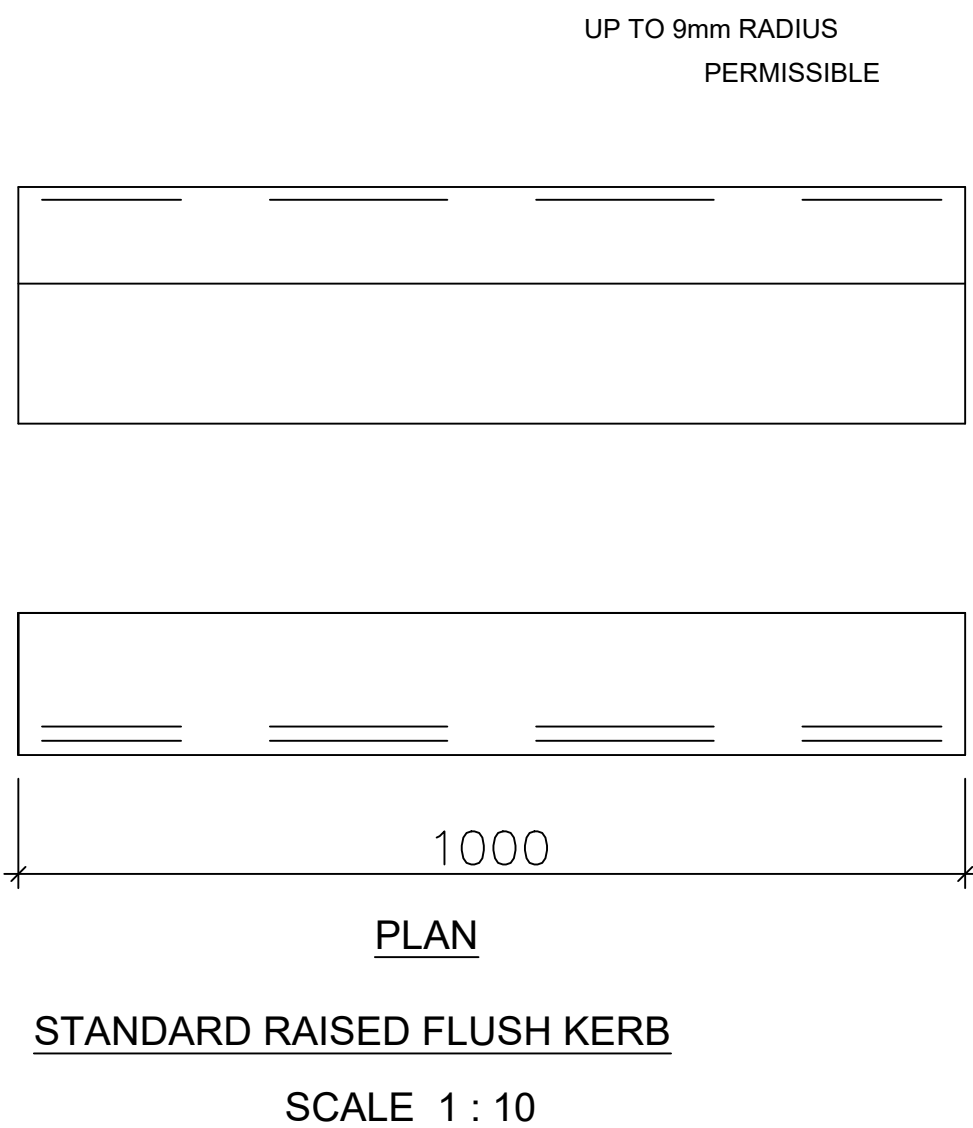
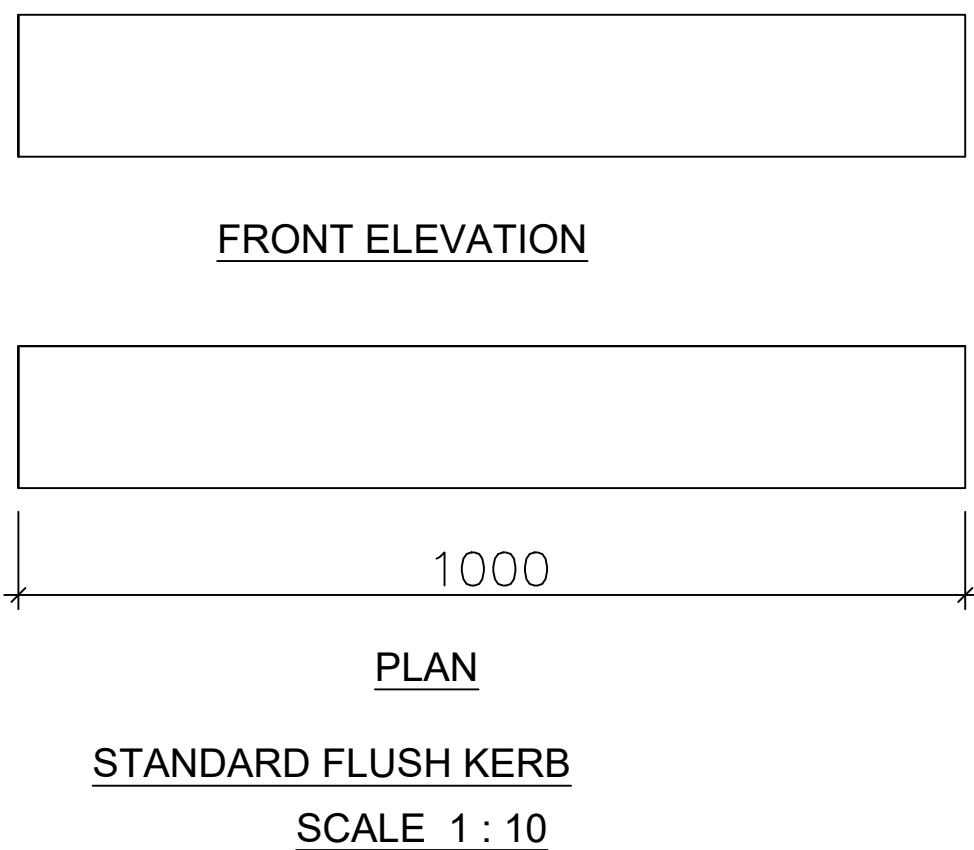
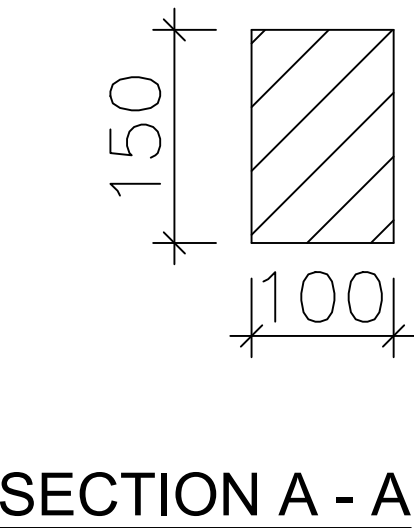
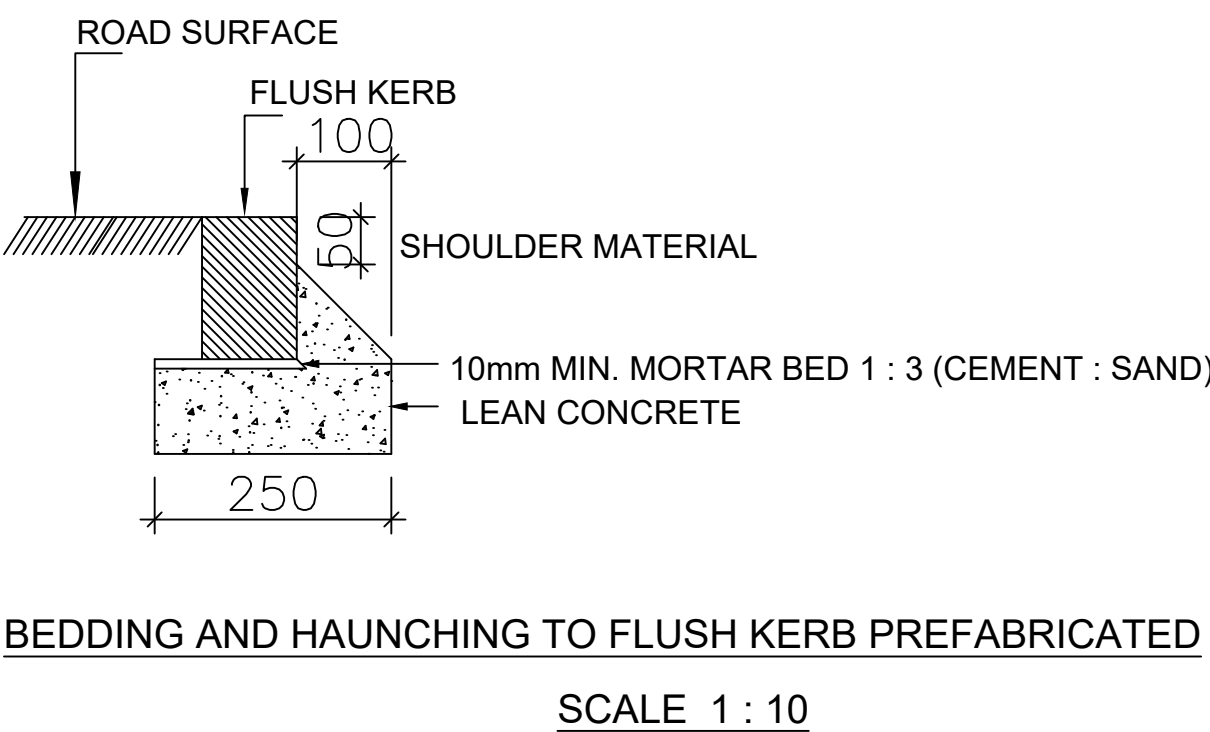
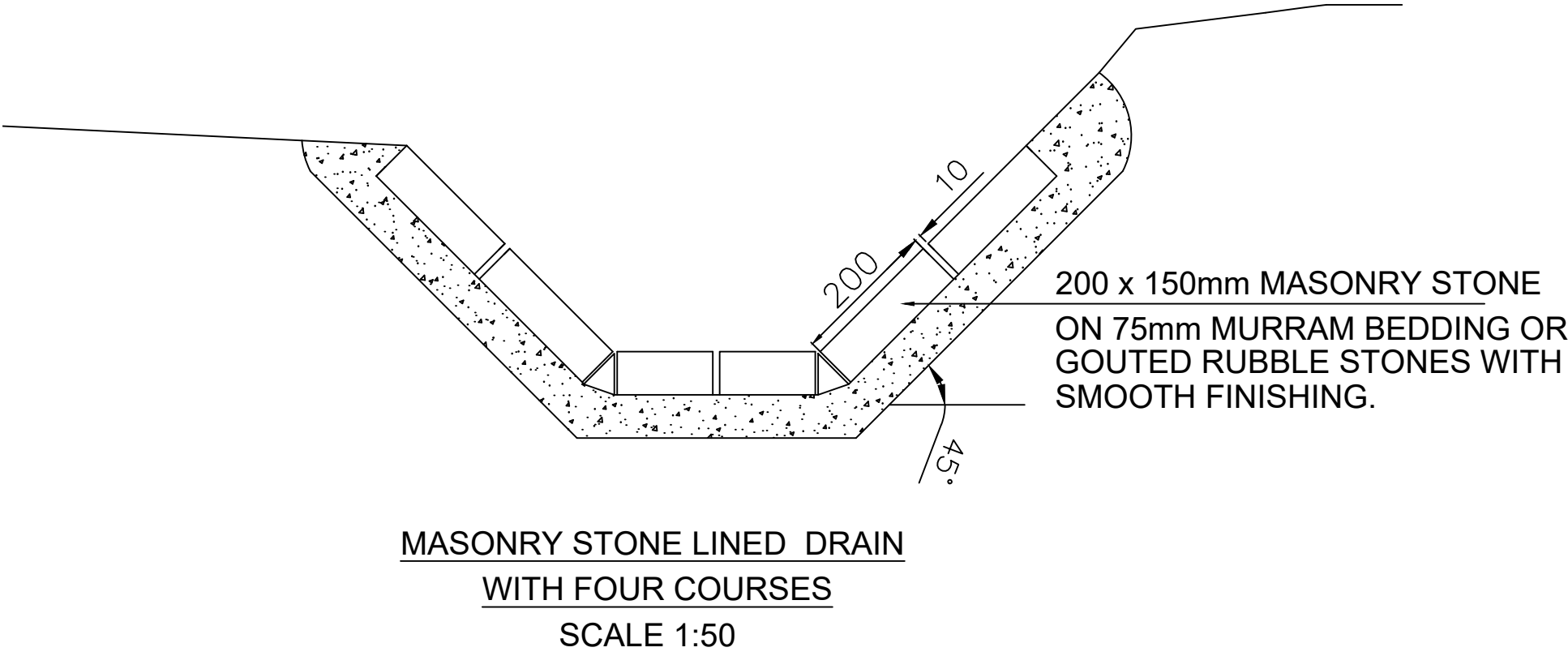
Consultant:
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Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
FINAL DETAILED ENGINEERING DESIGN OF
MARIMA - MAKUTANO (ROAD)
BATCH 2

DRAWING TITLE:
STANDARD DRAWING -
STANDARD - MISC MINOR
JUNCTION

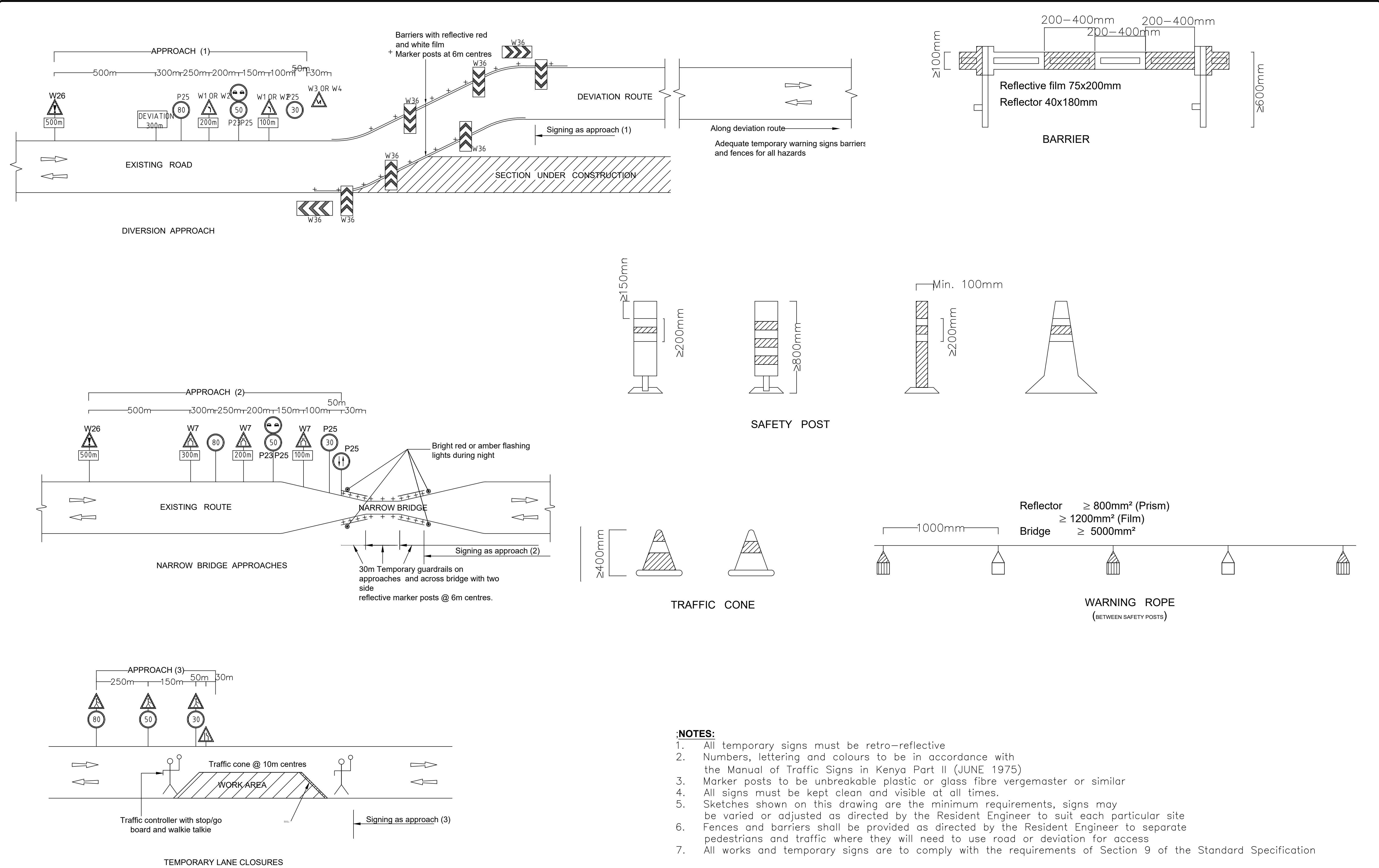
DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.J.N
Scale: AS SHOWN

Drq No.
CE1045/SD/MM/03
Date : MARCH 2025



TYPICAL ROAD CROSS-SECTION FOR TOWNSHIP ROADS AND PARKING

REVISIONS	No.	DATE	DESCRIPTION	 Kenya Rural Roads Authority Bara Bara Plaza, P.O. Box 48151- 00100, Nairobi. Kenya	DIRECTOR GENERAL		Consultant:  Runji Consulting Group Ltd Engineering & Project Management. 3, Kindaruma Road (Off Ngong Road) P. O. Box 68053-00200 Nairobi Tel. (020) 2717213/4	PROJECT TITLE: FINAL DETAILED ENGINEERING DESIGN OF MARIMA - MAKUTANO (ROAD) BATCH 2	DRAWING TITLE: STANDARD DRAWING - MISC URBAN ROAD DETAIL	DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N	Drg No. CE1045/SD/MM/04
					DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)					Scale: AS SHOWN	Date : MARCH 2025



NOTES:

1. All temporary signs must be retro-reflective
2. Numbers, lettering and colours to be in accordance with the Manual of Traffic Signs in Kenya Part II (JUNE 1975)
3. Marker posts to be unbreakable plastic or glass fibre vergemaster or similar
4. All signs must be kept clean and visible at all times.
5. Sketches shown on this drawing are the minimum requirements, signs may be varied or adjusted as directed by the Resident Engineer to suit each particular site
6. Fences and barriers shall be provided as directed by the Resident Engineer to separate pedestrians and traffic where they will need to use road or deviation for access
7. All works and temporary signs are to comply with the requirements of Section 9 of the Standard Specification

No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
Bara Bara Plaza,
P.O. Box 48151- 00100, Nairobi. Kenya

DIRECTOR GENERAL
DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)

Consultant:
Runji Consulting Group Ltd
Engineering & Project Management.
3, Kindaruma Road (Off Ngong Road)
P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
FINAL DETAILED ENGINEERING DESIGN OF
MARIMA - MAKUTANO (ROAD)
BATCH 2

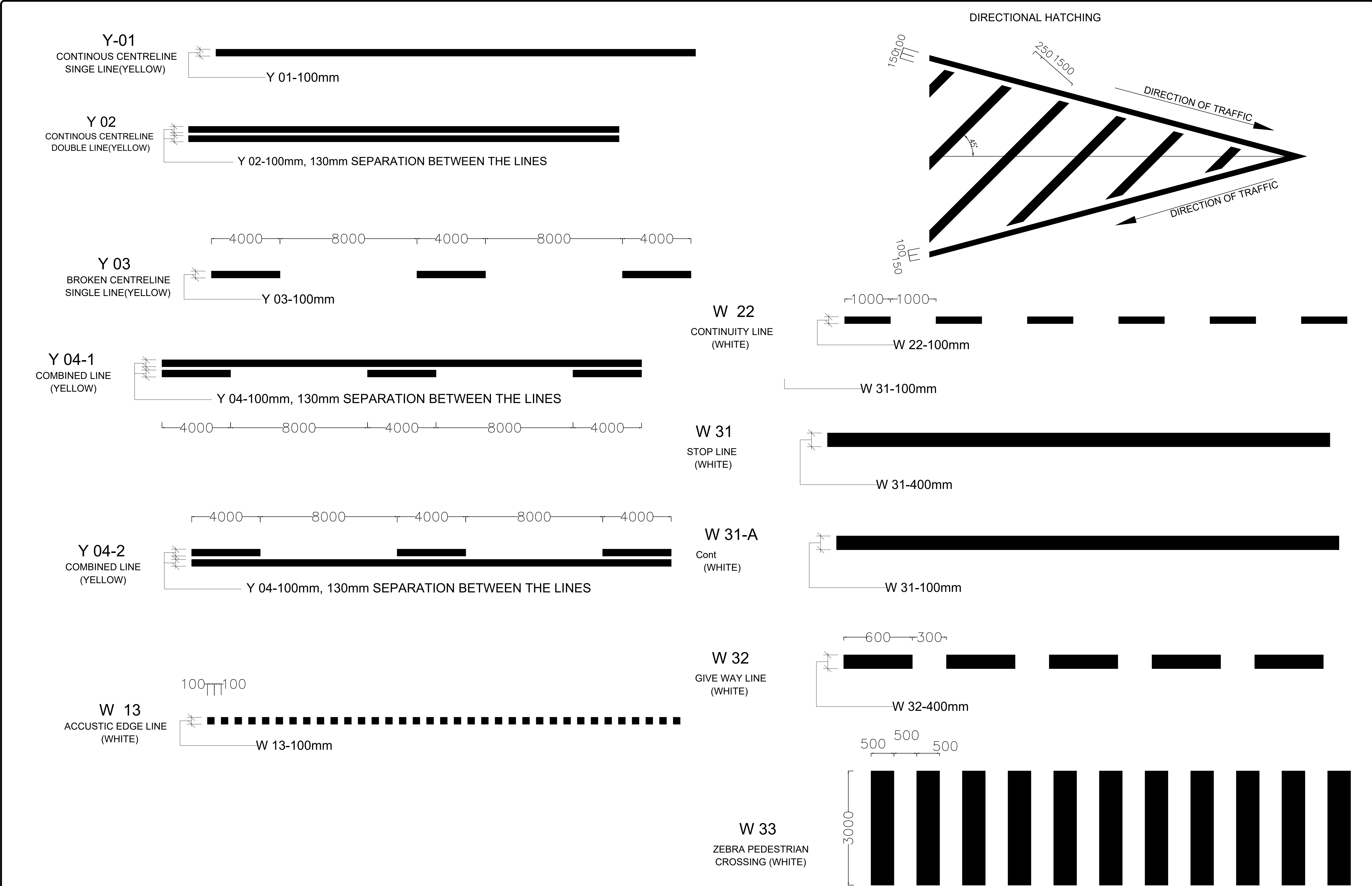
DRAWING TITLE:
STANDARD DRAWING -
TRAFFIC MANAGEMENT

DRAWN BY: S.W.O
DESIGNED BY: C.N.M
CHECKED BY: M.J.N

Scale: AS SHOWN

Drg No.
CE1045/SD/MM/05

Date : MARCH 2025



REVISIONS	No.	DATE	DESCRIPTION



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DIRECTOR (PLANNING , DESIGN &ENVIRONMENT)	

Consultant:



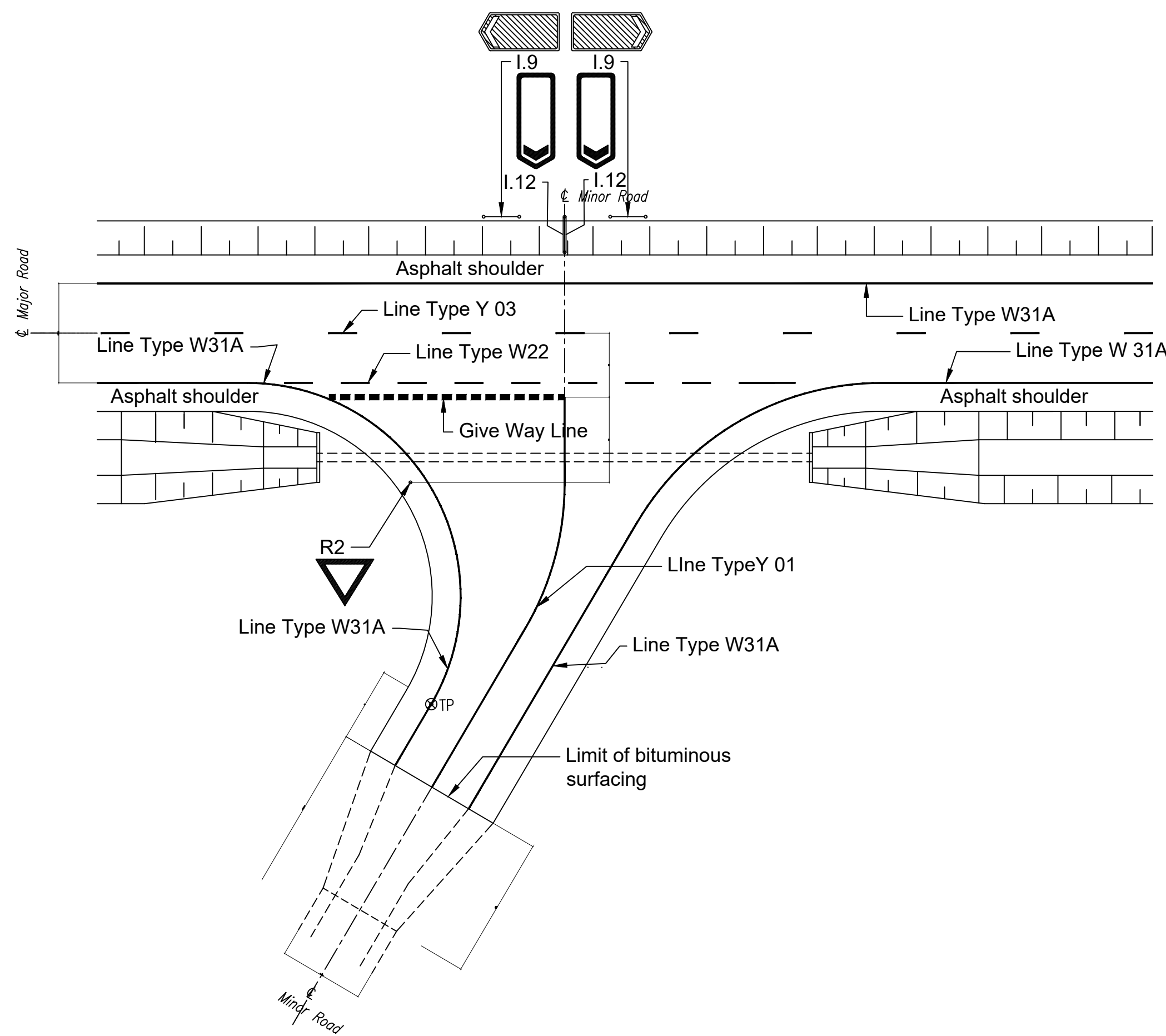
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3, Kindaruma Road (Off Ngong Road)
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Tel. (020) 2717213/4

PROJECT TITLE:
FINAL DETAILED ENGINEERING DESIGN OF MARIMA - MAKUTANO (ROAD) BATCH 2

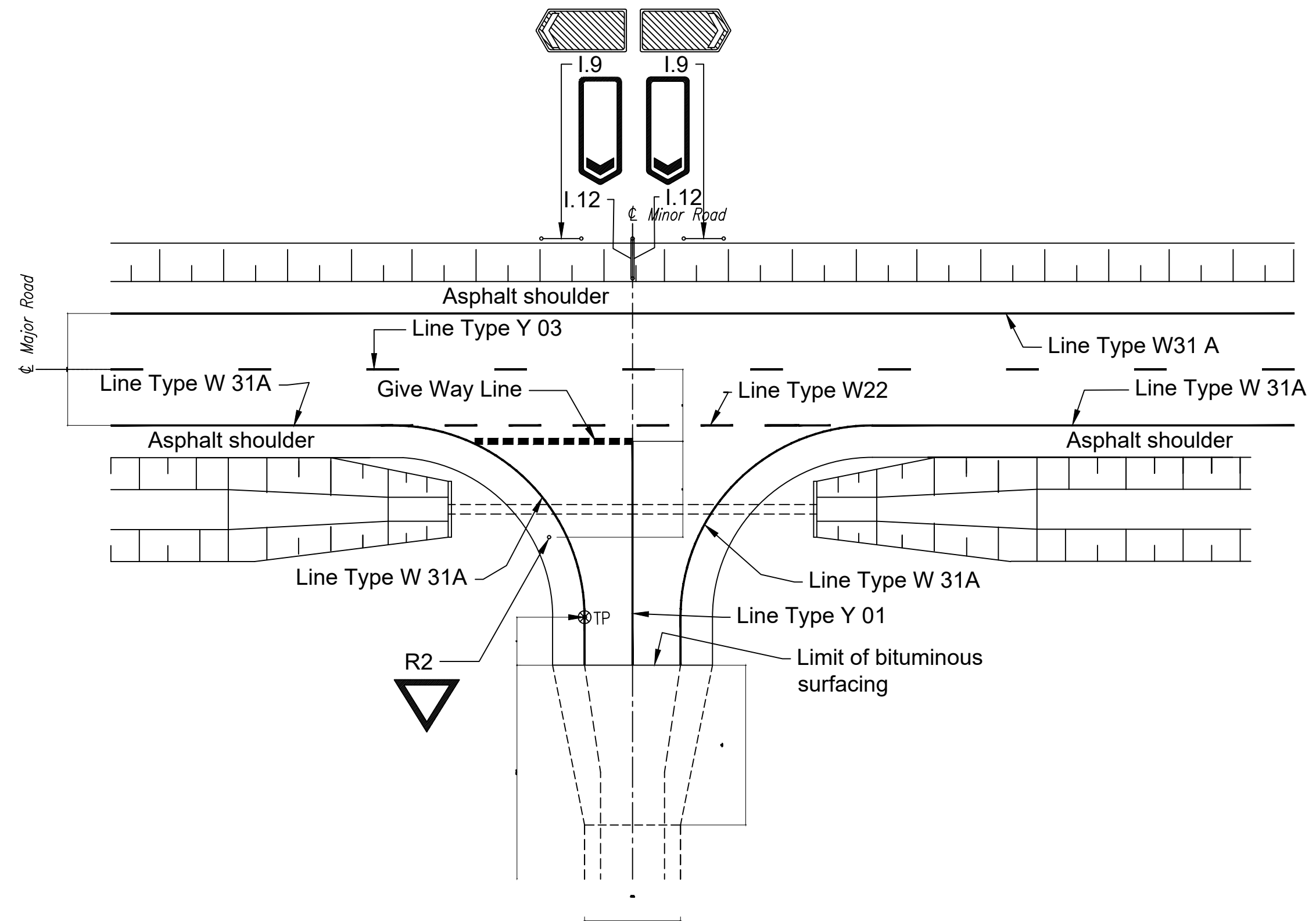
DRAWING TITLE:
STANDARD DRAWING - ROAD MARKING

DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N
Scale: AS SHOWN

Drg No. CE1045/SD/MM/07
Date : MARCH 2025



**ROAD MARKINGS AND SIGNS LAYOUT AT
TYPE C1 JUNCTIONS**
Scale 1:50



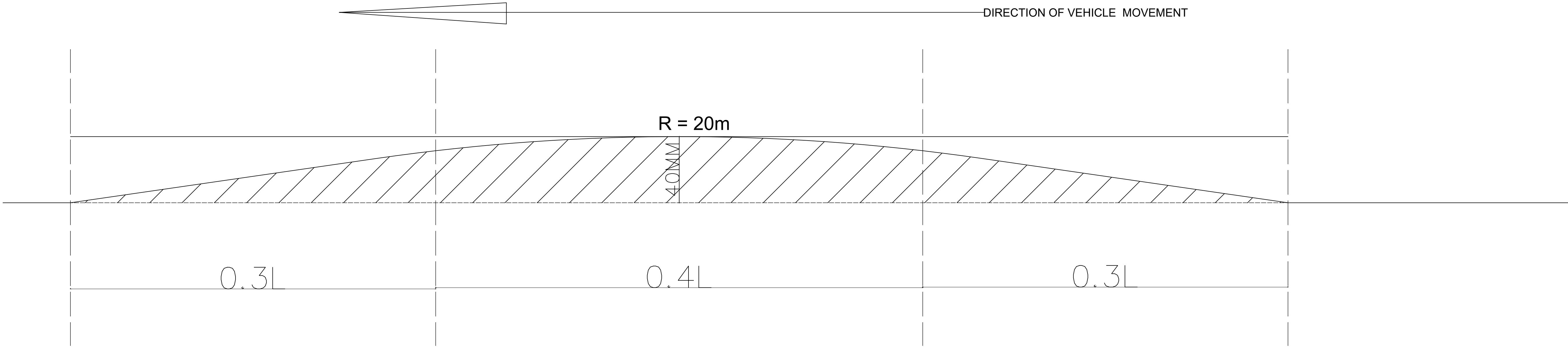
**ROAD MARKINGS AND SIGNS MOUNTING AT
TYPE C2 JUNCTIONS**
Scale 1:50

NOTES:

1. Dimensions and road sign position details are in metres.
2. For layout details of road junction/access types, see Dwg. no. TYP-ALG-003.
3. For standard road marking Line Type details, see Dwg. no. TYP-ALG-006.
4. For road sign details, see Dwg. nos. TYP-SIG-005 - 006.
5. For sign board support and mounting details, see Dwg no. TYP-SIG-003.
6. Sign mounting details at junction type A1 are similar to those at junction type C2, unless otherwise specified by the Resident Engineer

No.	DATE	DESCRIPTION	Kenya Rural Roads Authority		Consultant:		PROJECT TITLE:	DRAWING TITLE:	DRAWN BY: S.W.O	Org No.
			Bara Bara Plaza,		Runji Consulting Group Ltd		FINAL DETAILED ENGINEERING DESIGN OF	STANDARD DRAWING -	DESIGNED BY: C.N.M	CE1045/SD/MM/08
			P.O. Box 48151- 00100, Nairobi. Kenya		Engineering & Project Management.		MARIMA - MAKUTANO (ROAD)	MISC MARKING ON	CHECKED BY: M.J.N	
					3, Kindaruma Road (Off Ngong Road)		BATCH 2	JUNCTION	Scale: AS SHOWN	Date : MARCH 2025
					P. O. Box 68053-00200 Nairobi					
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SPEED BUMPS DETAILS



NOTE

When	Middle	Slope	Respective Speed
L =	0.4 x L	0.3 x L	
5m	2.0m	1.5m	50kph
4m	1.6m	1.2m	40kph
3m	1.2m	0.9m	30kph

No.	DATE	DESCRIPTION



Kenya Rural Roads Authority
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Consultant:



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Engineering & Project Management.
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P. O. Box 68053-00200 Nairobi
Tel. (020) 2717213/4

PROJECT TITLE:
FINAL DETAILED ENGINEERING DESIGN OF MARIMA - MAKUTANO (ROAD) BATCH 2

DRAWING TITLE:
STANDARD DRAWING - STANDARD - BUMPS

DRAWN BY: S.W.O DESIGNED BY: C.N.M CHECKED BY: M.J.N
Scale: AS SHOWN

Drg No. CE1045/SD/MM/09
Date : MARCH 2025