



**CLIMATE PROOFED ARID AND SEMI ARID RURAL ROADS,**

**FINAL DETAILED DESIGN OF ITUGURURU - KAMAENDE ROAD**

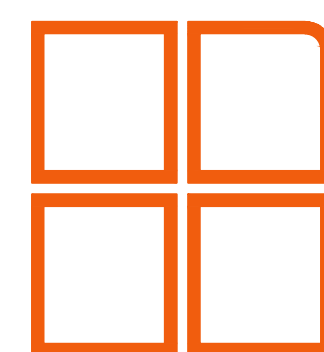
**BATCH 2**

**MARCH 2025**

**EMPLOYER**

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

**CONSULTANT**



**Runji Consulting Group Ltd**  
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Email: [info@runji.co.ke](mailto:info@runji.co.ke) Web: [www.runji.co.ke](http://www.runji.co.ke)

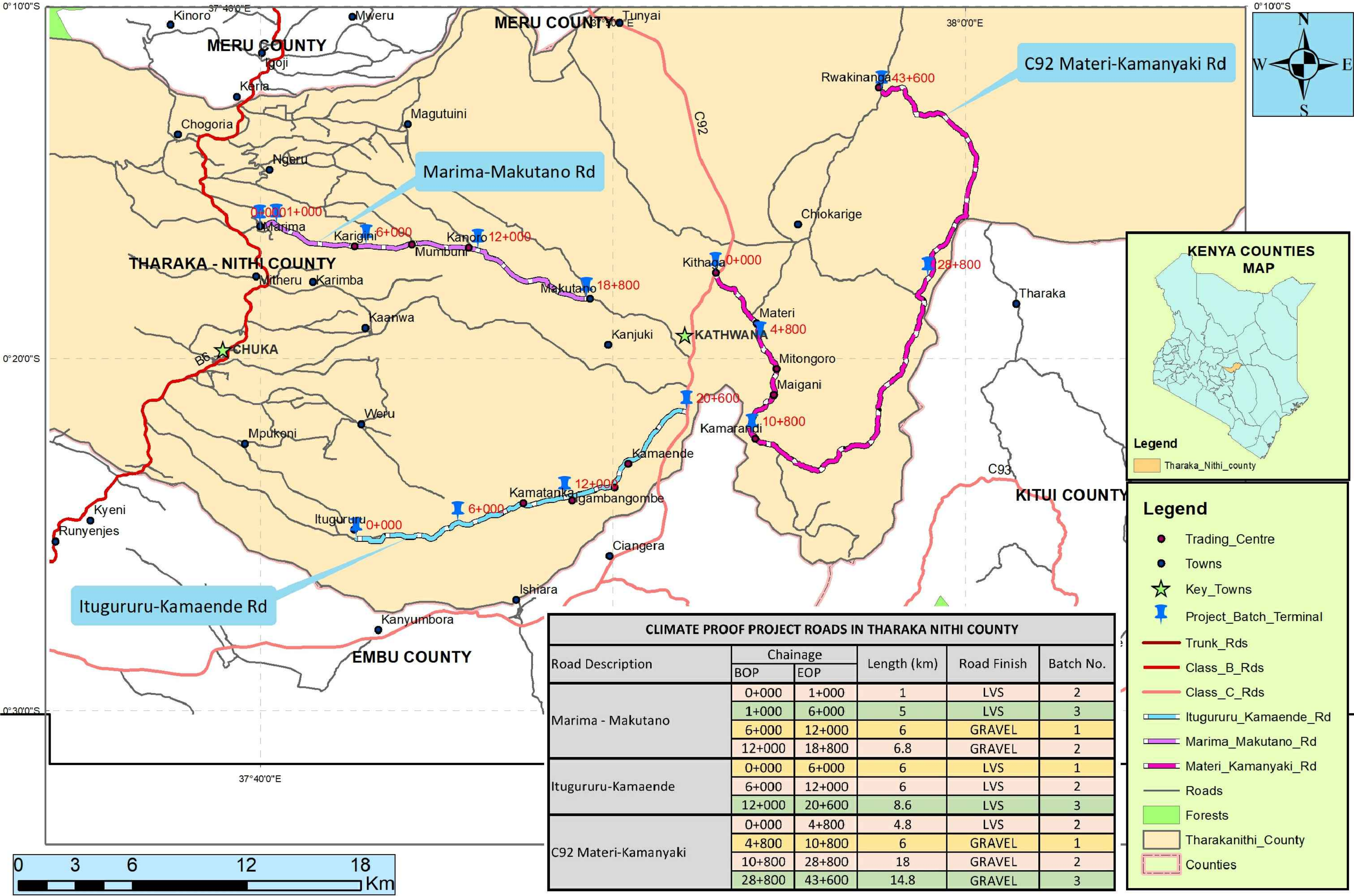
**ENGINEER**

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

|                  |                                                              |
|------------------|--------------------------------------------------------------|
|                  | ITUGURURUR- KAMAENDE ROAD DRAWINGS                           |
|                  | COVER PAGE                                                   |
|                  | DRAWING LIST                                                 |
|                  | GENERAL DRAWINGS                                             |
| CE/1045/GD/MB/01 | LOCATION MAP                                                 |
|                  | PLAN AND PROFILE                                             |
| CE1045/PP/MB/01  | PLAN AND PROFILE - 0+000 - 0+600                             |
| CE1045/PP/MB/02  | PLAN AND PROFILE - 0+600 - 1+200                             |
| CE1045/PP/MB/03  | PLAN AND PROFILE - 1+200 - 1+800                             |
| CE1045/PP/MB/04  | PLAN AND PROFILE - 1+800 - 2+400                             |
| CE1045/PP/MB/05  | PLAN AND PROFILE - 2+400 - 3+000                             |
| CE1045/PP/MB/06  | PLAN AND PROFILE - 3+000 - 3+600                             |
| CE1045/PP/MB/07  | PLAN AND PROFILE - 3+600 - 4+200                             |
| CE1045/PP/MB/08  | PLAN AND PROFILE - 4+200 - 4+800                             |
| CE1045/PP/MB/09  | PLAN AND PROFILE - 4+800 - 5+400                             |
| CE1045/PP/MB/10  | PLAN AND PROFILE - 5+400- 6+000                              |
| CE1045/PP/MB/11  | PLAN AND PROFILE - 6+000 - 6+600                             |
| CE1045/PP/MB/12  | PLAN AND PROFILE - 6+600 - 7+200                             |
| CE1045/PP/MB/13  | PLAN AND PROFILE - 7+200 - 7+806.66                          |
|                  | TYPICAL CROSS-SECTION                                        |
| CE1045/TD/MB/01  | TYPICAL CROSS-SECTION FOR MAILI KUMI - BARRIER ROAD OPTION 1 |
| CE1045/TD/MB/02  | TYPICAL CROSS-SECTION FOR MAILI KUMI - BARRIER ROAD OPTION 2 |
|                  | TYPICAL CULVERT DRAWINGS                                     |
| CE1045/CDS/MB/O1 | HEADWALL TYPE 1 (HEADWALL AND WINGWALLS)                     |
| CE1045/CDS/MB/O2 | HEADWALL TYPE 2 (DROP INLETS)                                |
| CE1045/CDS/MB/O3 | HEADWALL TYPE 4 (FOR ACCESS CULVERT)                         |
| CE1045/CDS/MB/O4 | BEDDING AND HAUNCH PROFILES TYPE III& IV                     |
| CE1045/CDS/MB/O5 | CULVERT ROAD SIGNS                                           |
|                  | STANDARD DRAWINGS                                            |
| CE1045/SD/MB/01  | STANDARD DRAWING - STANDARD - ROAD SIGNS                     |
| CE1045/SD/MB/02  | STANDARD DRAWING - STANDARD - ROAD SIGNS INSTALLATION        |
| CE1045/SD/MB/03  | STANDARD DRAWING - STANDARD - MISC MINOR JUNCTION            |
| CE1045/SD/MB/04  | STANDARD DRAWING - MISC URBAN ROAD DETAIL                    |
| CE1045/SD/MB/05  | STANDARD DRAWING - TRAFFIC MANAGEMENT                        |
| CE1045/SD/MB/06  | STANDARD DRAWING - PUBLICITY SIGN BOARD                      |
| CE1045/SD/MB/07  | STANDARD DRAWING - ROAD MARKING                              |
| CE1045/SD/MB/08  | STANDARD DRAWING - MISC MARKING ON JUNCTION                  |
| CE1045/SD/MB/09  | STANDARD DRAWING - STANDARD - BUMPS                          |
|                  |                                                              |

# GENERAL DRAWINGS

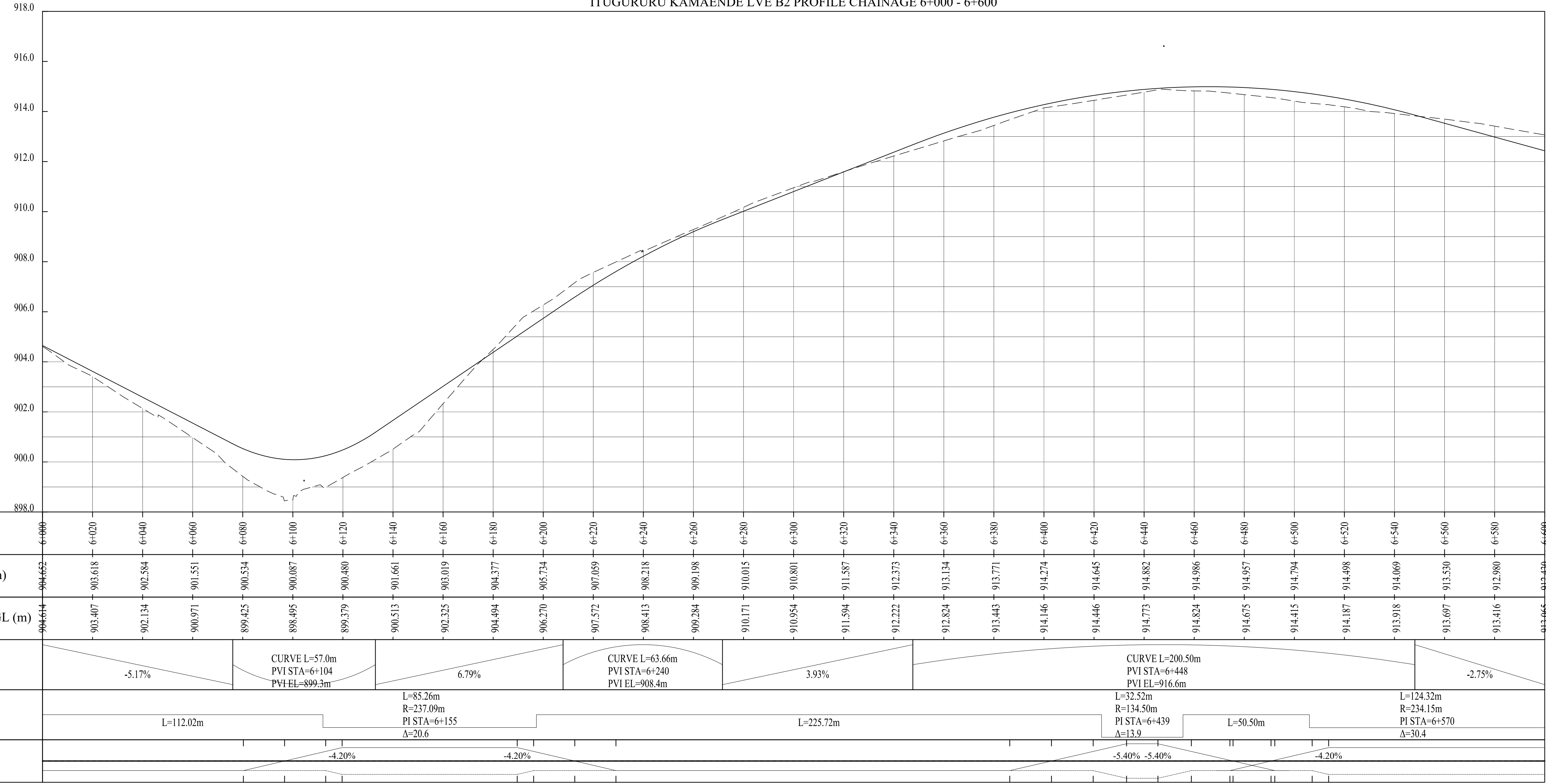
CLIMATE PROOFED PROJECT ROADS IN THARAKA NITHI COUNTY



# PLAN AND PROFILE



ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 6+000 - 6+600



| REVISIONS | No. | DATE | DESCRIPTION |
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Tel. (020) 2717213/4

PROJECT TITLE:  
FINAL DETAILED ENGINEERING DESIGN OF  
ITUGURURU - KAMAENDE ROAD  
BACH 2

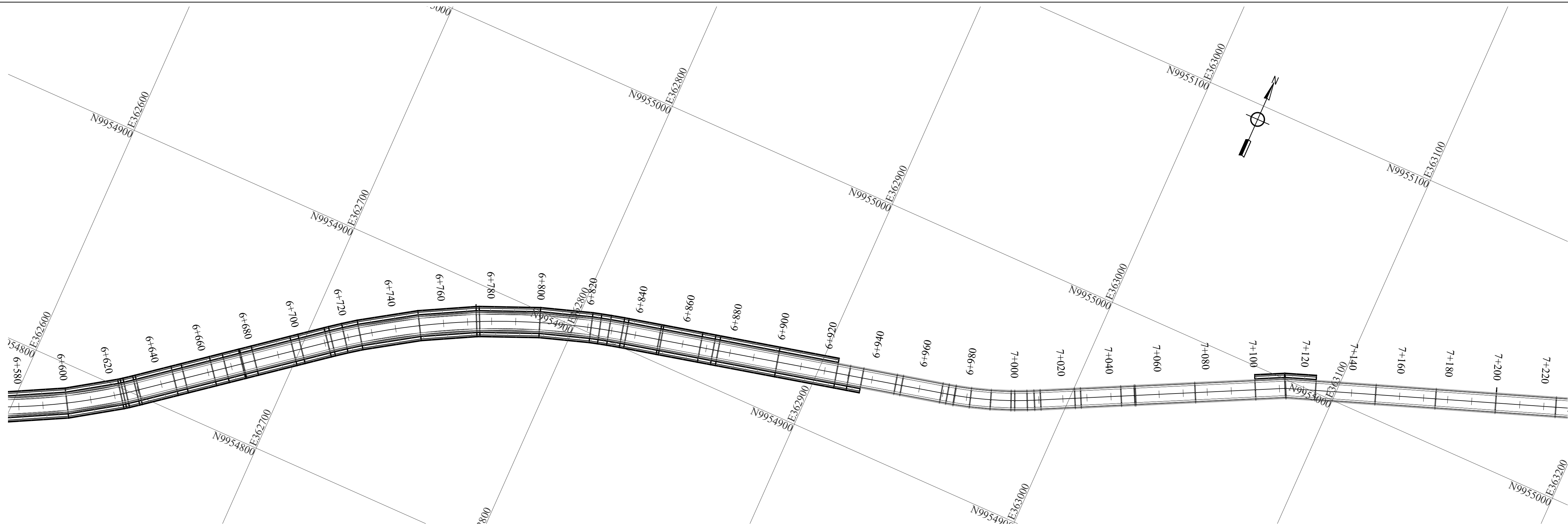
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CHAINAGE 6+000 - 6+600

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

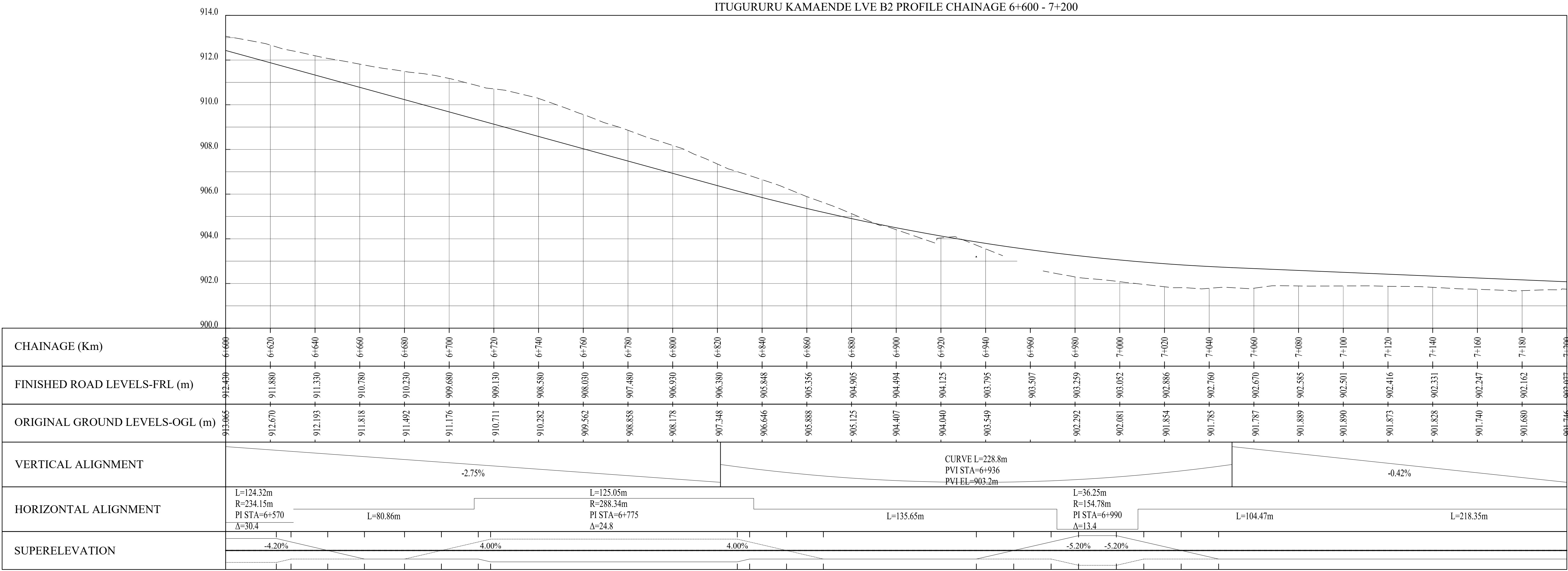
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1:100 VERTICAL

Drg No.CE1045/PP/IK/01

Date : MARCH 2025



ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 6+600 - 7+200



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BACH 2

DRAWING TITLE:

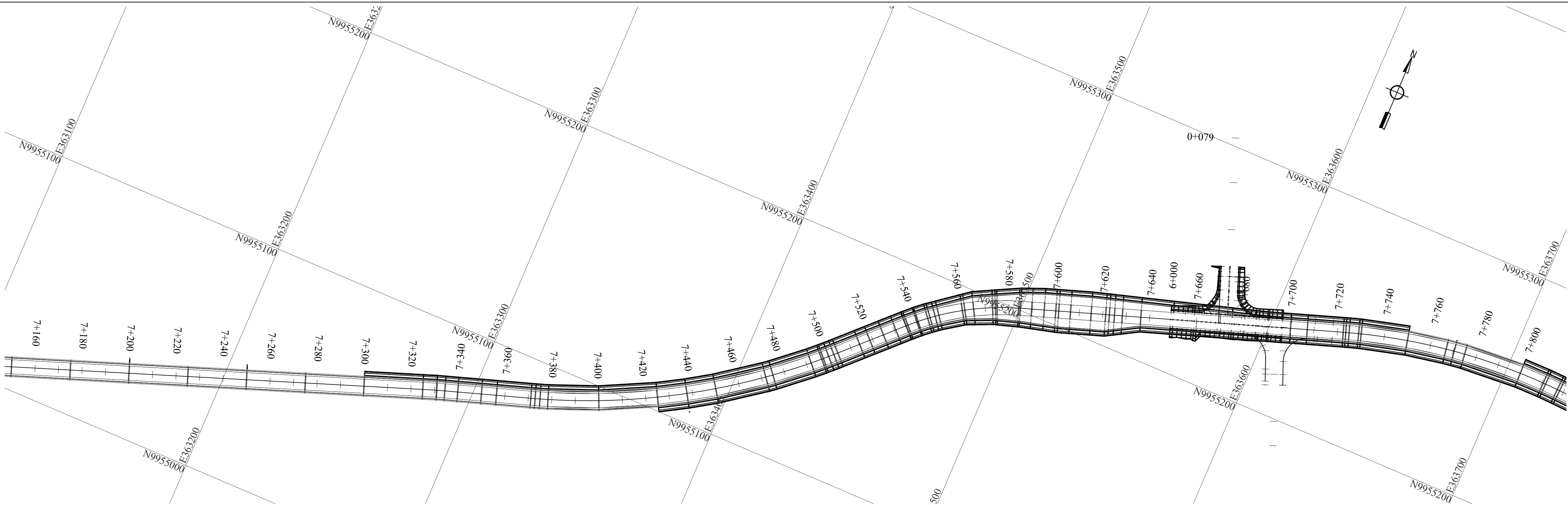
PLAN AND PROFILE  
CHAINAGE 6+600 - 7+200

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

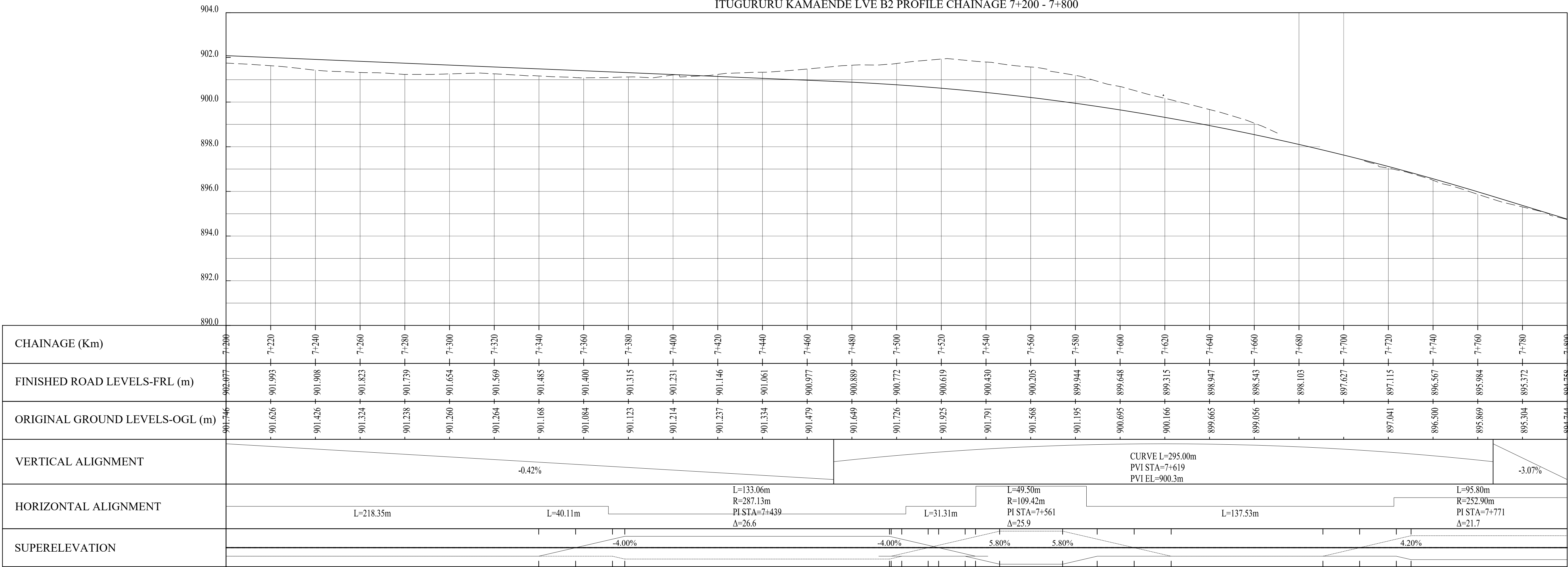
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Drg No.CE1045/PP/IK/02

Date : MARCH 2025



ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 7+200 - 7+800



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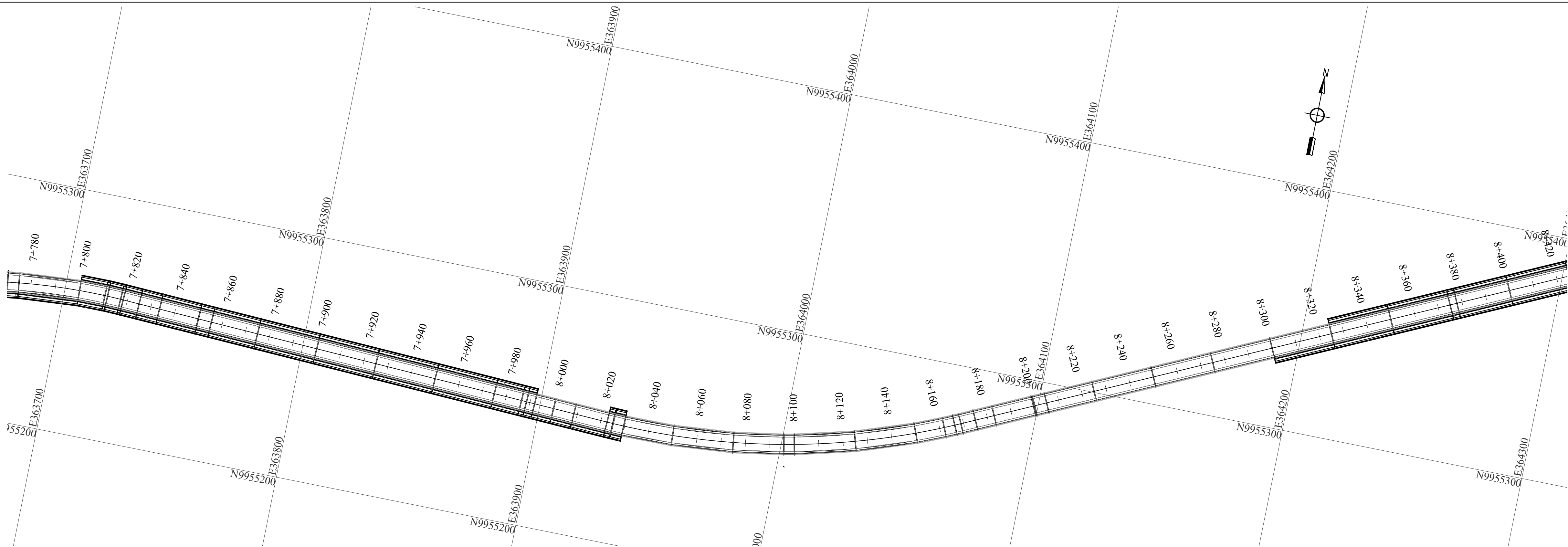
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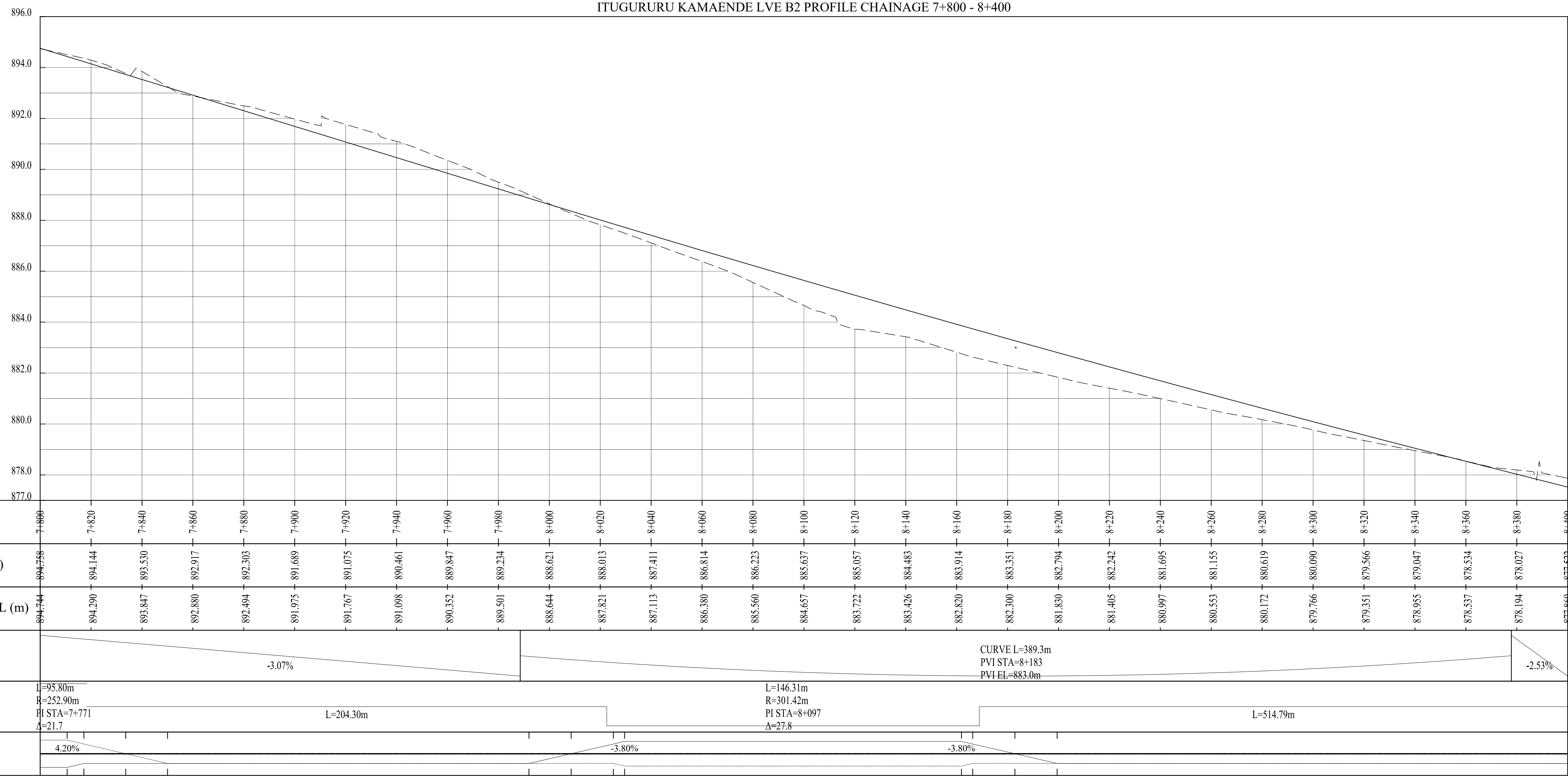
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PLAN AND PROFILE  
CHAINAGE 6+600 - 7+200

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

Drg No.CE1045/PP/IK/03  
Date : MARCH 2025



ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 7+800 - 8+400



|                                |                                                                                            |         |         |         |         |         |         |         |         |         |                                                                                      |         |         |         |         |         |         |         |         |         |                                                                                             |         |         |         |         |         |         |                   |         |         |                                 |  |
|--------------------------------|--------------------------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------------------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------------------------------------------------------------------------------------------|---------|---------|---------|---------|---------|---------|-------------------|---------|---------|---------------------------------|--|
| CHAINAGE (Km)                  | 7+800                                                                                      | 7+820   | 7+840   | 7+860   | 7+880   | 7+900   | 7+920   | 7+940   | 7+960   | 7+980   | 8+000                                                                                | 8+020   | 8+040   | 8+060   | 8+080   | 8+100   | 8+120   | 8+140   | 8+160   | 8+180   | 8+200                                                                                       | 8+220   | 8+240   | 8+260   | 8+280   | 8+300   | 8+320   | 8+340             | 8+360   | 8+380   | 8+400                           |  |
| FINISHED ROAD LEVELS-FRL (m)   | 894.758                                                                                    | 894.144 | 893.530 | 892.917 | 892.303 | 891.689 | 891.075 | 890.461 | 889.847 | 889.234 | 888.621                                                                              | 888.013 | 887.411 | 886.814 | 886.223 | 885.637 | 885.057 | 884.483 | 883.914 | 883.351 | 882.794                                                                                     | 882.242 | 881.695 | 881.155 | 880.619 | 880.090 | 879.566 | 879.047           | 878.534 | 878.027 | 877.522                         |  |
| ORIGINAL GROUND LEVELS-OGI (m) | 894.744                                                                                    | 894.290 | 893.847 | 892.880 | 892.494 | 891.975 | 891.767 | 891.098 | 890.352 | 889.501 | 888.644                                                                              | 887.821 | 887.113 | 886.380 | 885.560 | 884.657 | 883.722 | 883.426 | 882.820 | 882.300 | 881.830                                                                                     | 881.405 | 880.997 | 880.553 | 880.172 | 879.766 | 879.351 | 878.955           | 878.537 | 878.194 | 877.869                         |  |
| VERTICAL ALIGNMENT             | <div>-3.07%</div>                                                                          |         |         |         |         |         |         |         |         |         | <div><div>CURVE L=389.3m</div><div>PVI STA=8+183</div><div>PVI EL=883.0m</div></div> |         |         |         |         |         |         |         |         |         |                                                                                             |         |         |         |         |         |         | <div>-2.53%</div> |         |         |                                 |  |
| HORIZONTAL ALIGNMENT           | <div><div>L=95.80m</div><div>R=252.90m</div><div>PI STA=7+771</div><div>Δ=21.7</div></div> |         |         |         |         |         |         |         |         |         | <div><div>L=204.30m</div></div>                                                      |         |         |         |         |         |         |         |         |         | <div><div>L=146.31m</div><div>R=301.42m</div><div>PI STA=8+097</div><div>Δ=27.8</div></div> |         |         |         |         |         |         |                   |         |         | <div><div>L=514.79m</div></div> |  |
| SUPERELEVATION                 | <div><div>4.20%</div></div>                                                                |         |         |         |         |         |         |         |         |         | <div><div>-3.80%</div></div>                                                         |         |         |         |         |         |         |         |         |         | <div><div>-3.80%</div></div>                                                                |         |         |         |         |         |         |                   |         |         |                                 |  |

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**PROJECT TITLE:**  
FINAL DETAILED ENGINEERING DESIGN OF  
ITUGURURU - KAMAENDE ROAD  
BACH 2

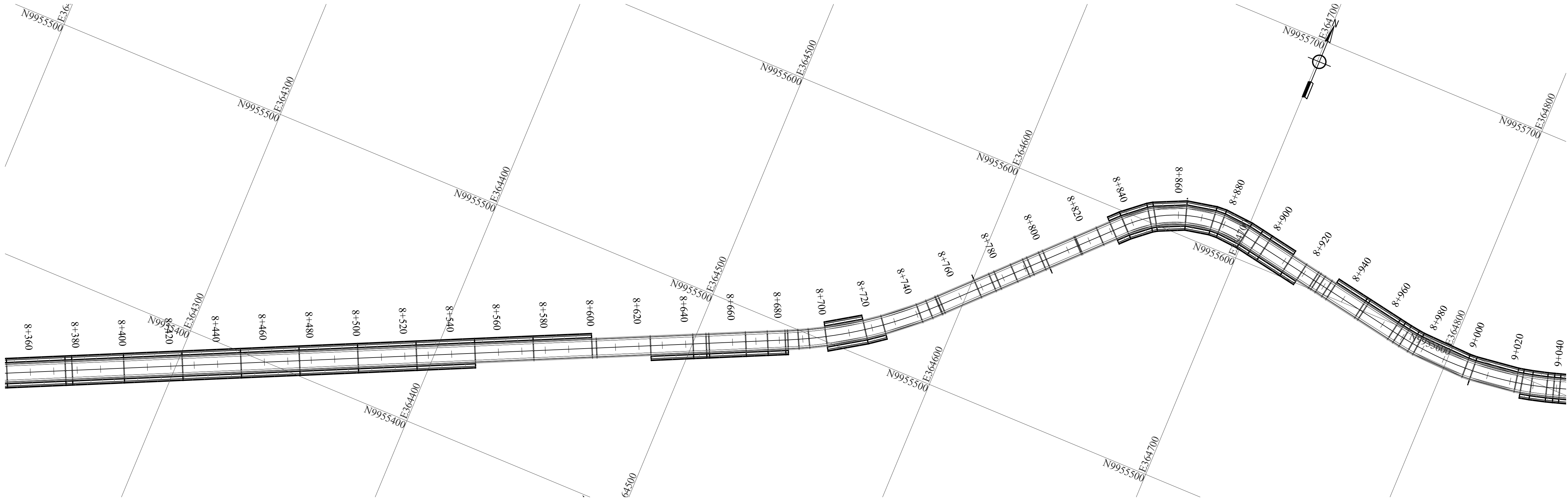
**DRAWING TITLE:**  
PLAN AND PROFILE  
CHAINAGE 6+600 - 7+200

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

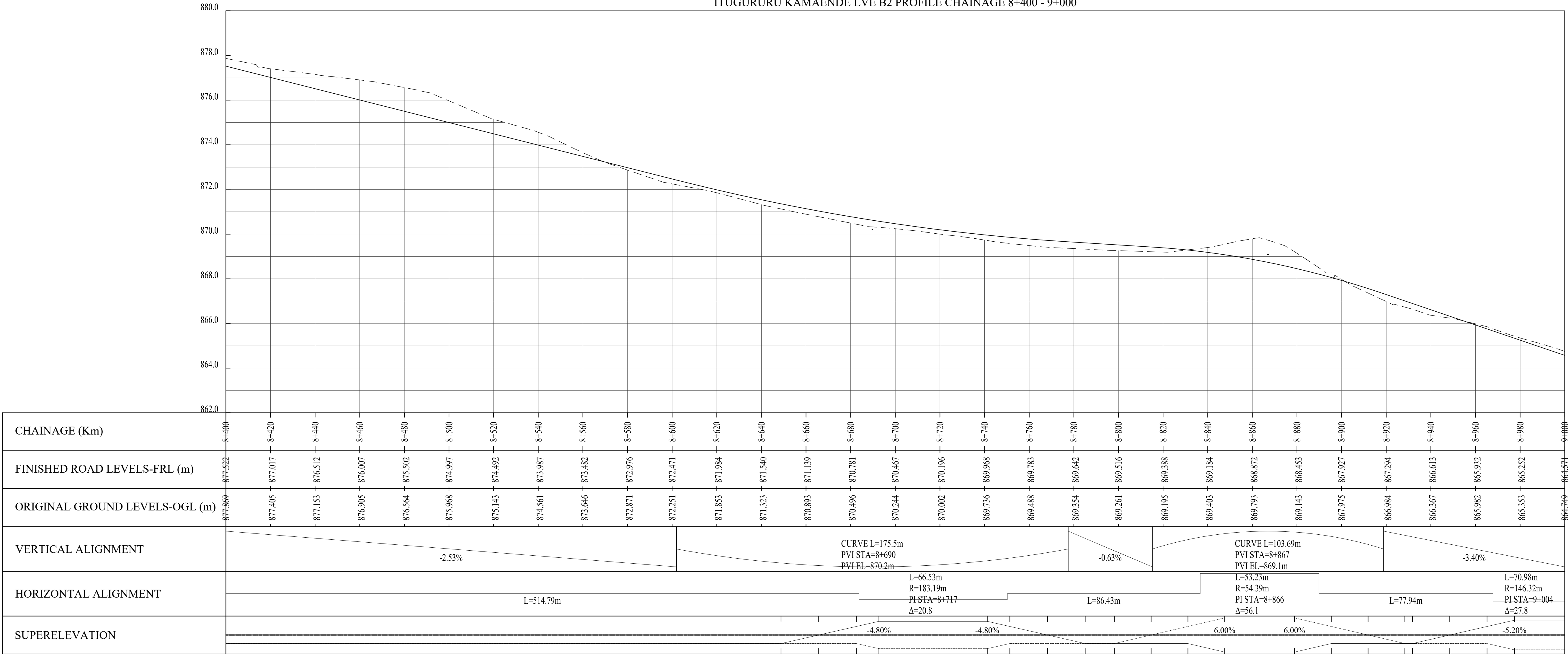
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ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 8+400 - 9+000



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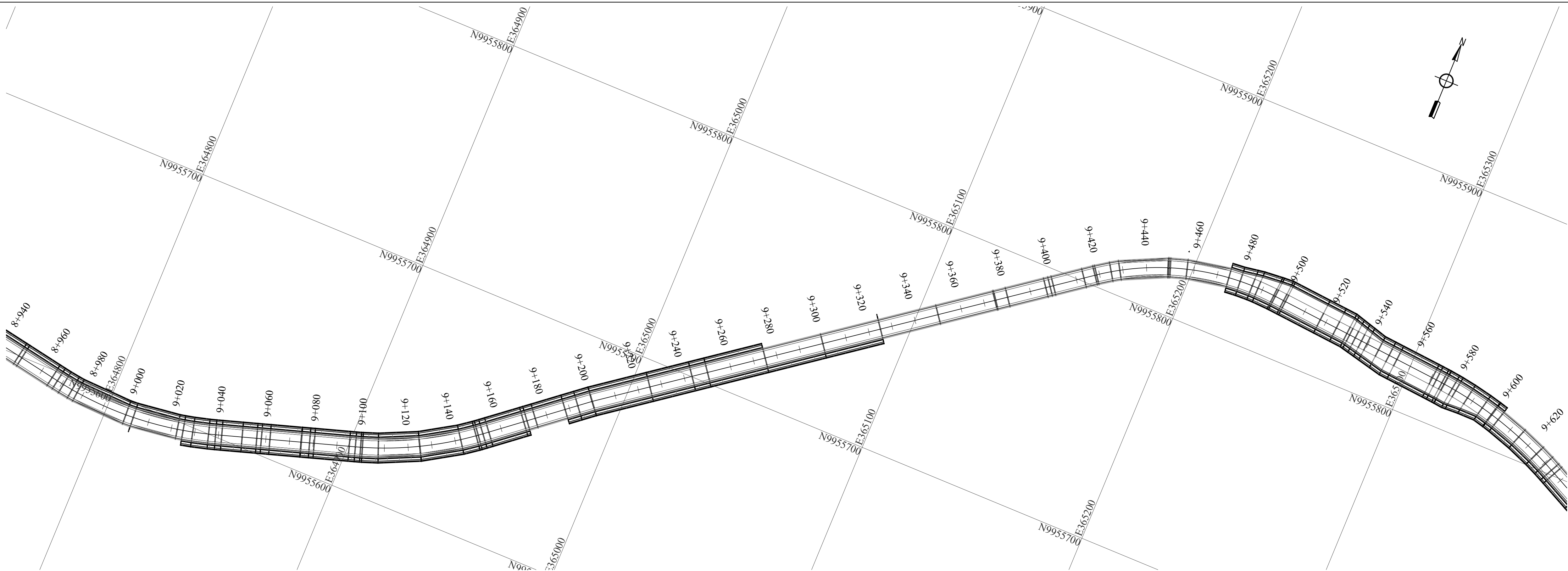
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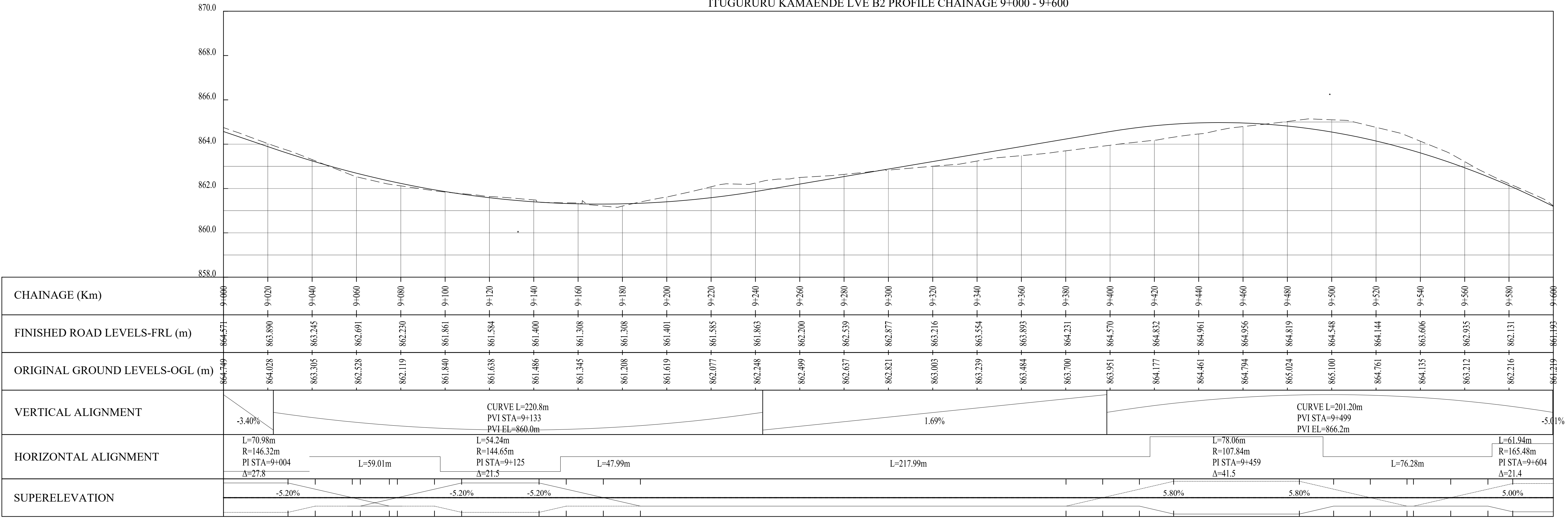
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ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 9+000 - 9+600



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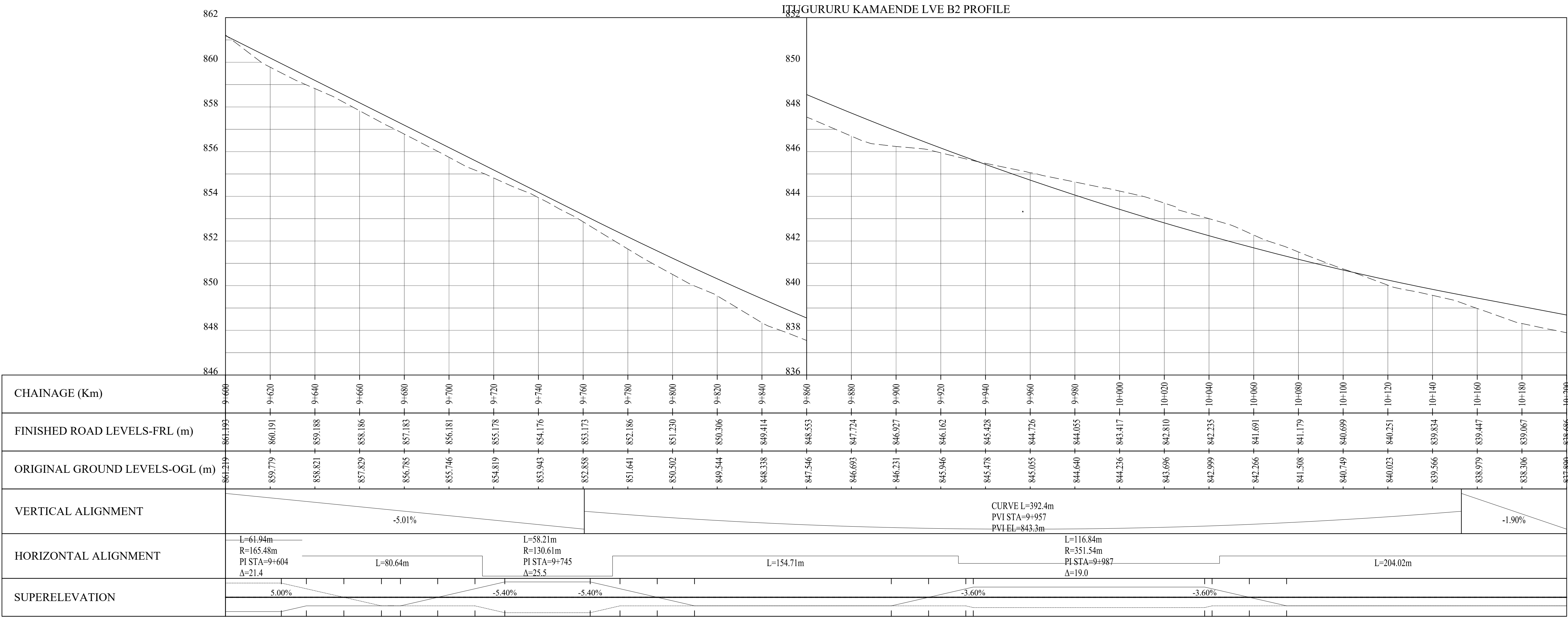
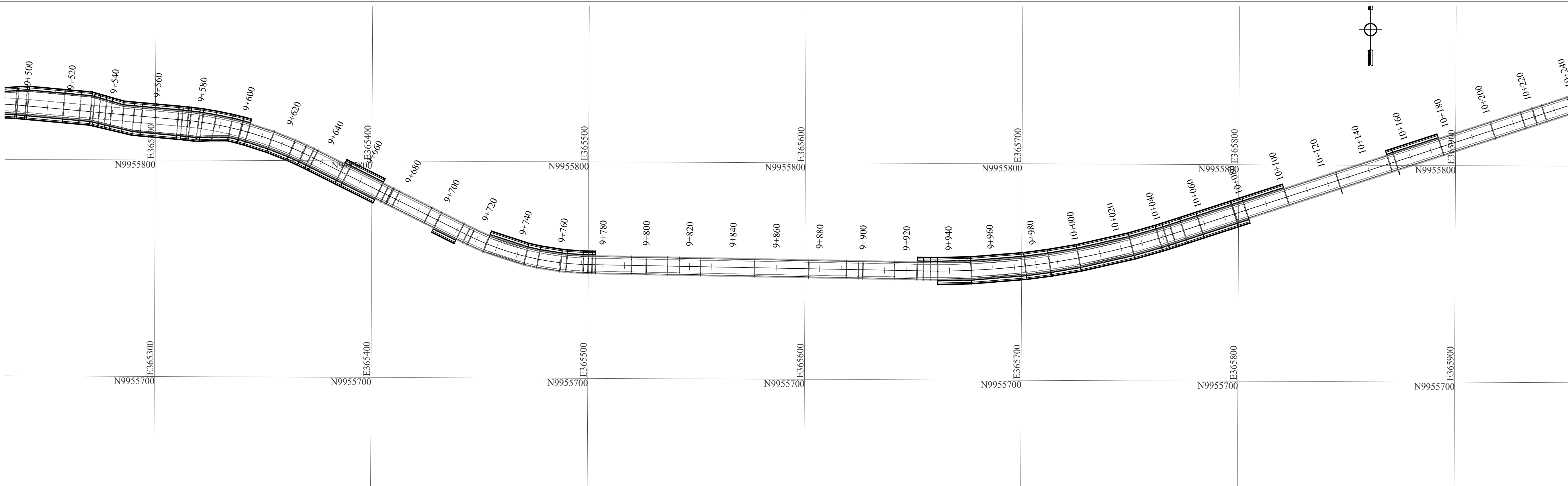
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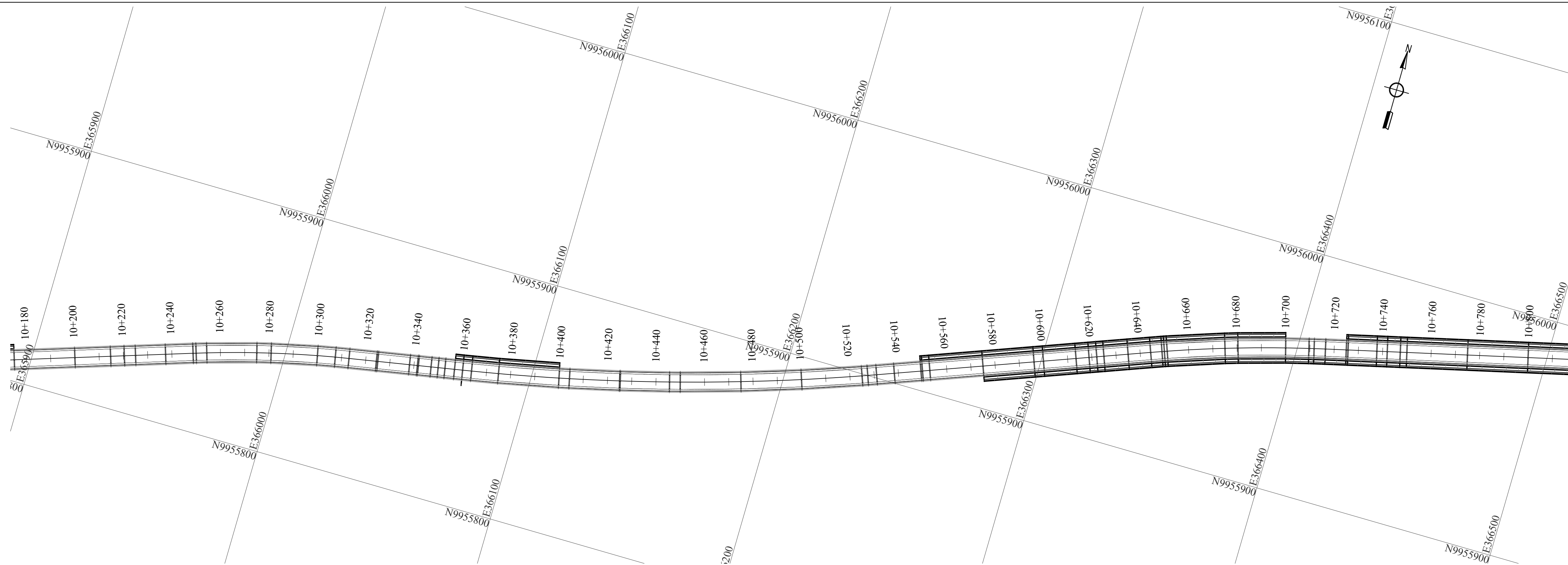
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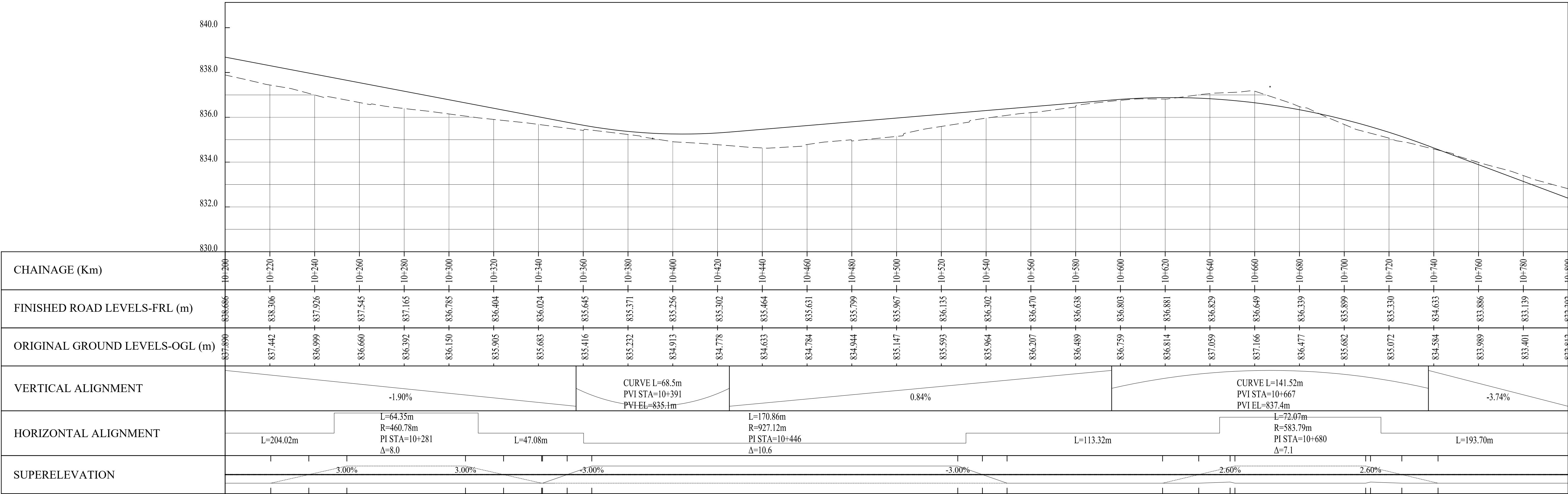
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ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 10+200 - 10+800



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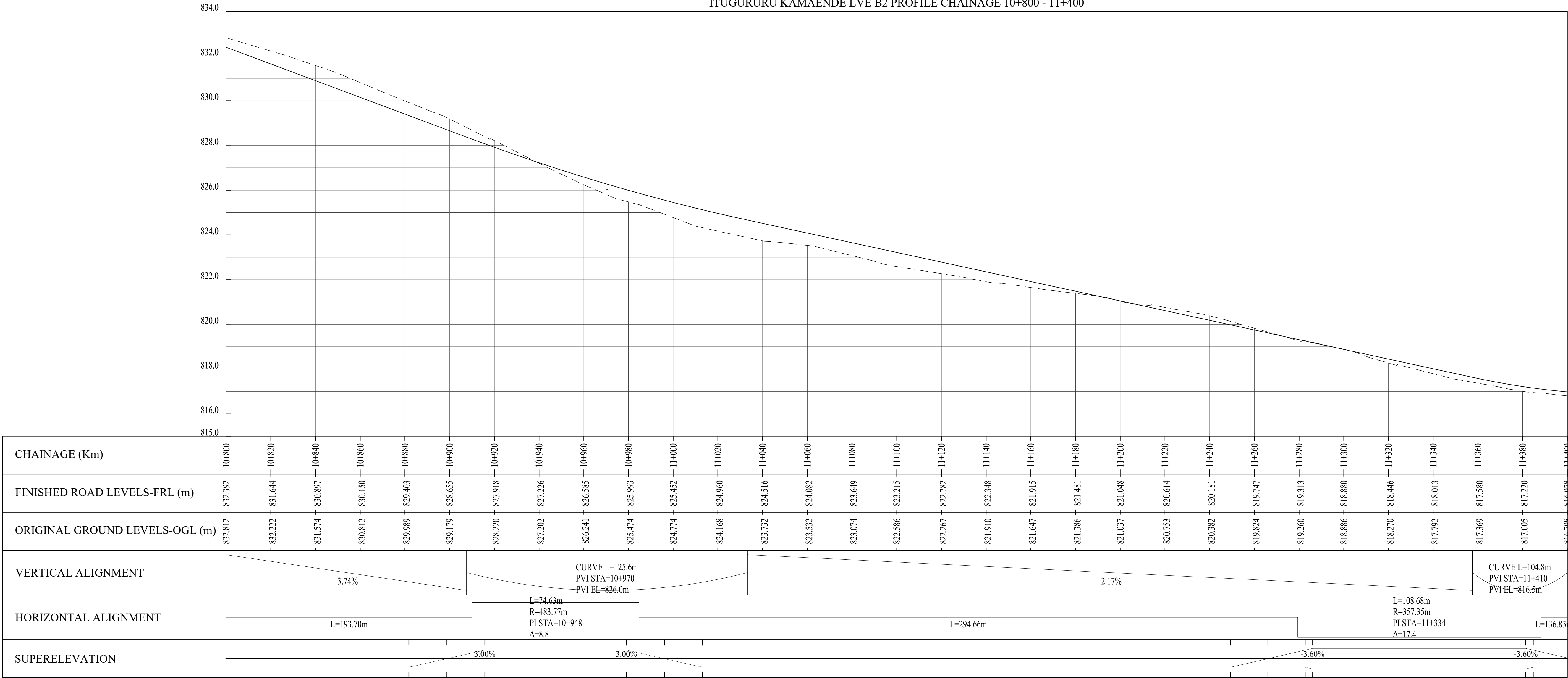
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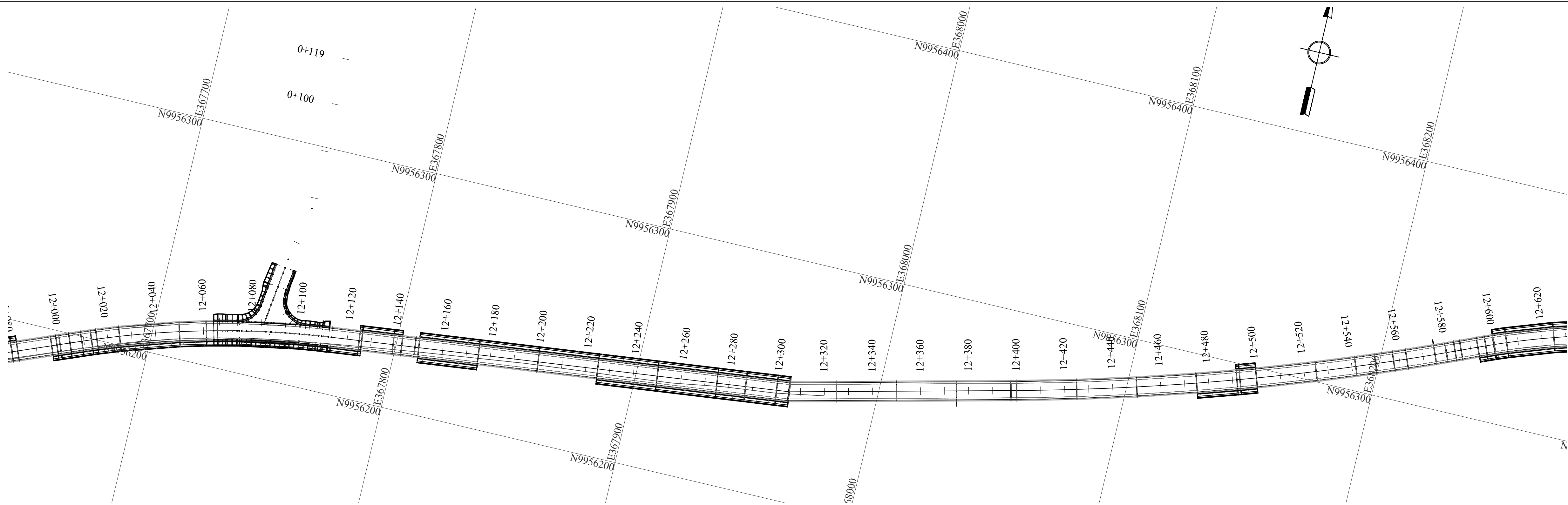
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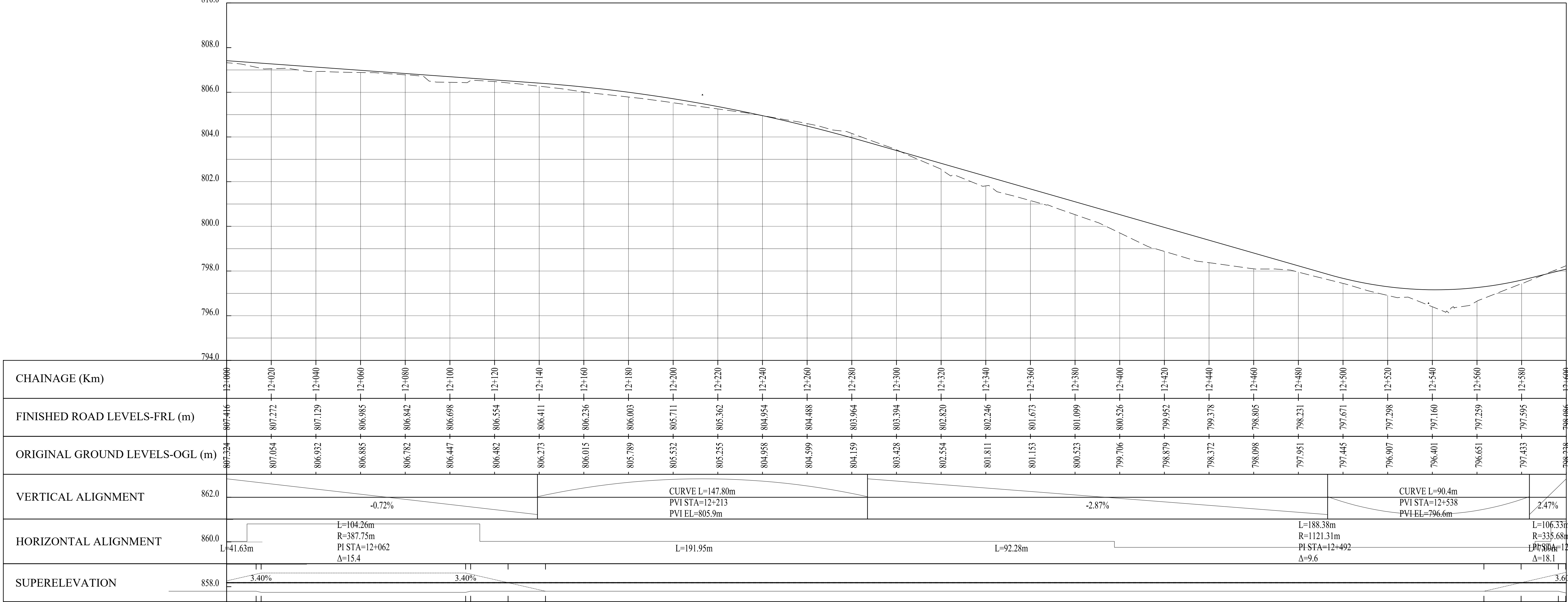
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ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 12+000 - 12+600



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

PROJECT TITLE:  
FINAL DETAILED ENGINEERING  
DESIGN OF ITUGURURU -  
KAMAENDE ROAD  
BACH 2

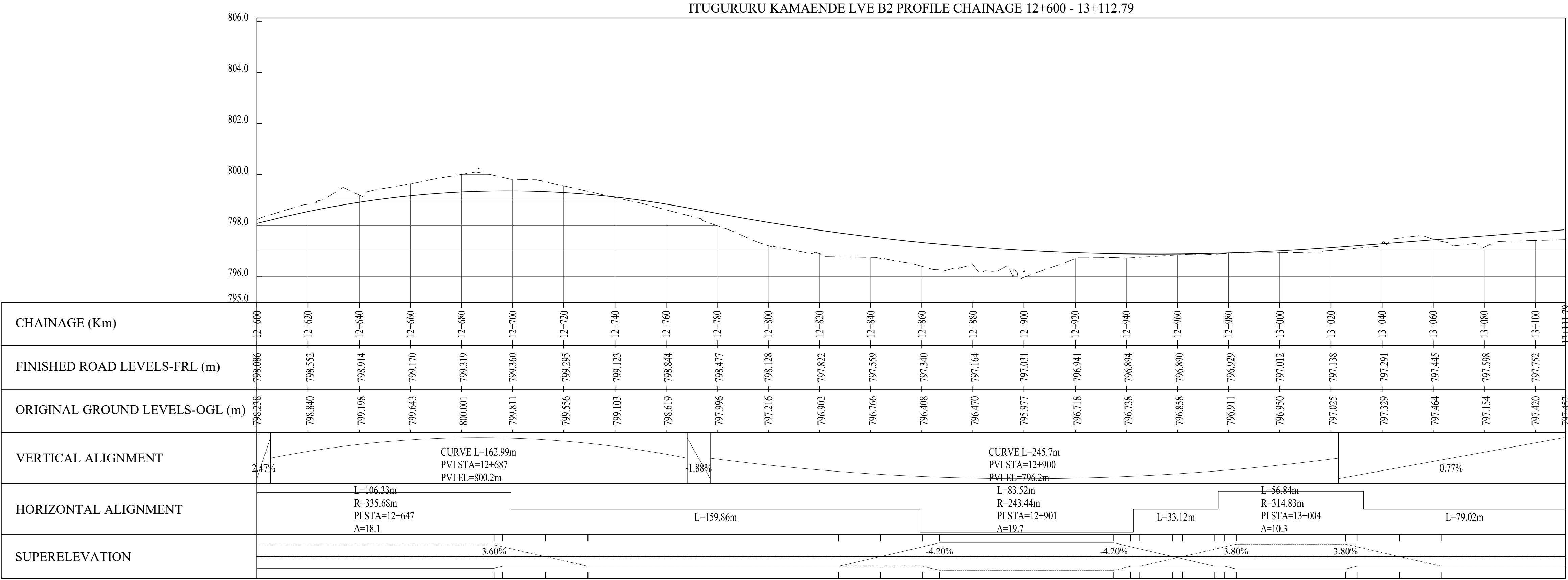
DRAWING TITLE:  
PLAN AND PROFILE  
CHAINAGE 6+600 - 7+200

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/IK/11  
  
Date : MARCH 2025



ITUGURURU KAMAENDE LVE B2 PROFILE CHAINAGE 12+600 - 13+112.79



| REVISIONS | No. | DATE | DESCRIPTION |
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P.O. Box 48151- 00100, Nairobi. Kenya

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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 ITUGURURU -  
KAMAENDE ROAD  
BACH 2

DRAWING TITLE:  
PLAN AND PROFILE  
CHAINAGE 6+600 - 7+200

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/IK/12  
  
Date : MARCH 2025

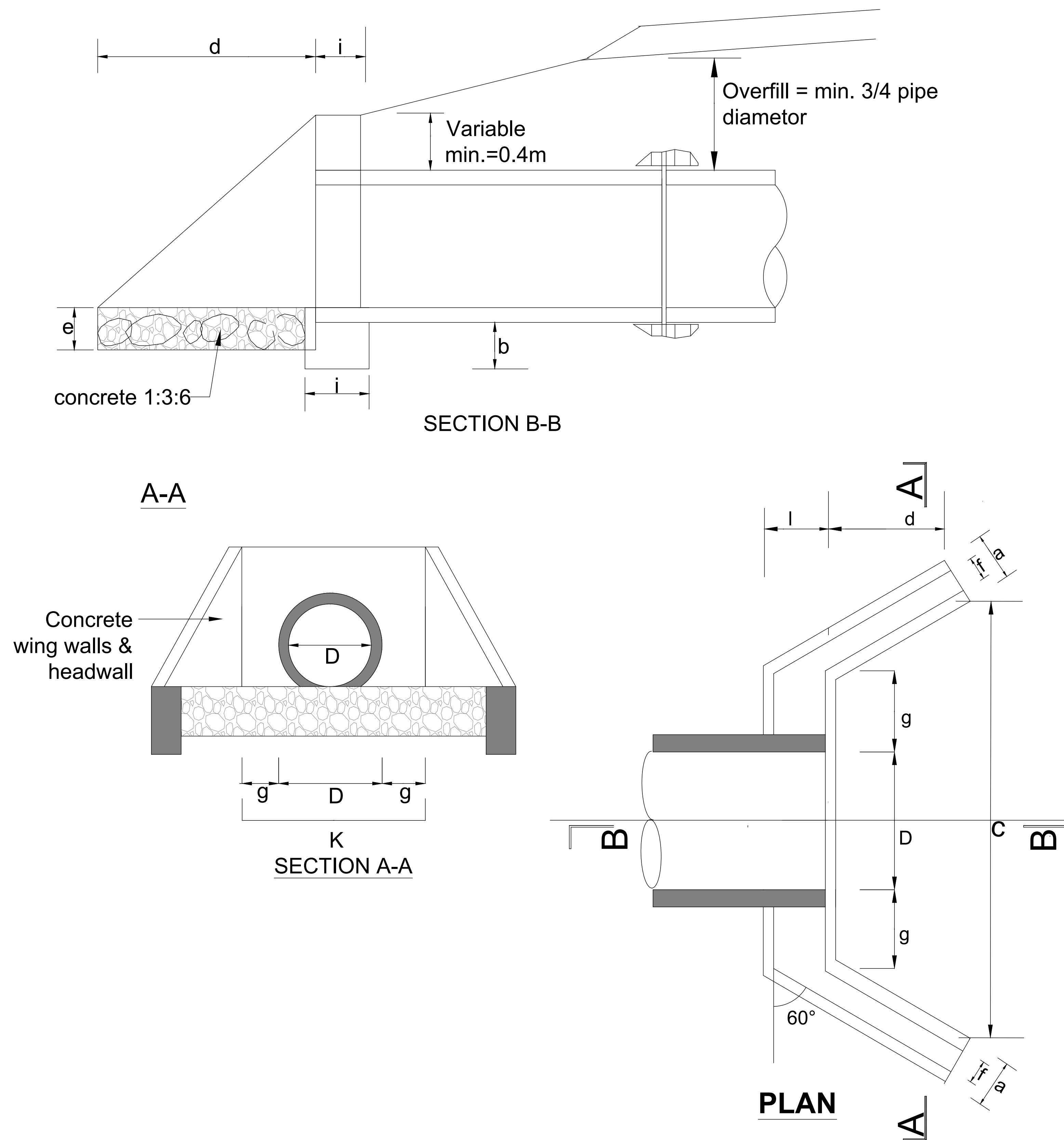
# **TYPICAL CROSS-SECTION**





# **TYPICAL CULVERT DRAWINGS**

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



## DIMENSIONS AND MATERIAL REQUIREMENTS

| PIPE DIAMETER IN (M) |             |      | TYPE A<br>(CONCRETE BLOCKS) |      |      | TYPE B<br>(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 |
| l                    | 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 |

[illegible]

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| DIRECTOR ( PLANNING , DESIGN &ENVIRONMENT) |  |
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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  
ITUGURURU- KAMAENDE ROAD  
BATCH 2

DRAWING TITLE:

**HEADWALL TYPE 1 (HEADWALL  
AND WINGWALLS)**

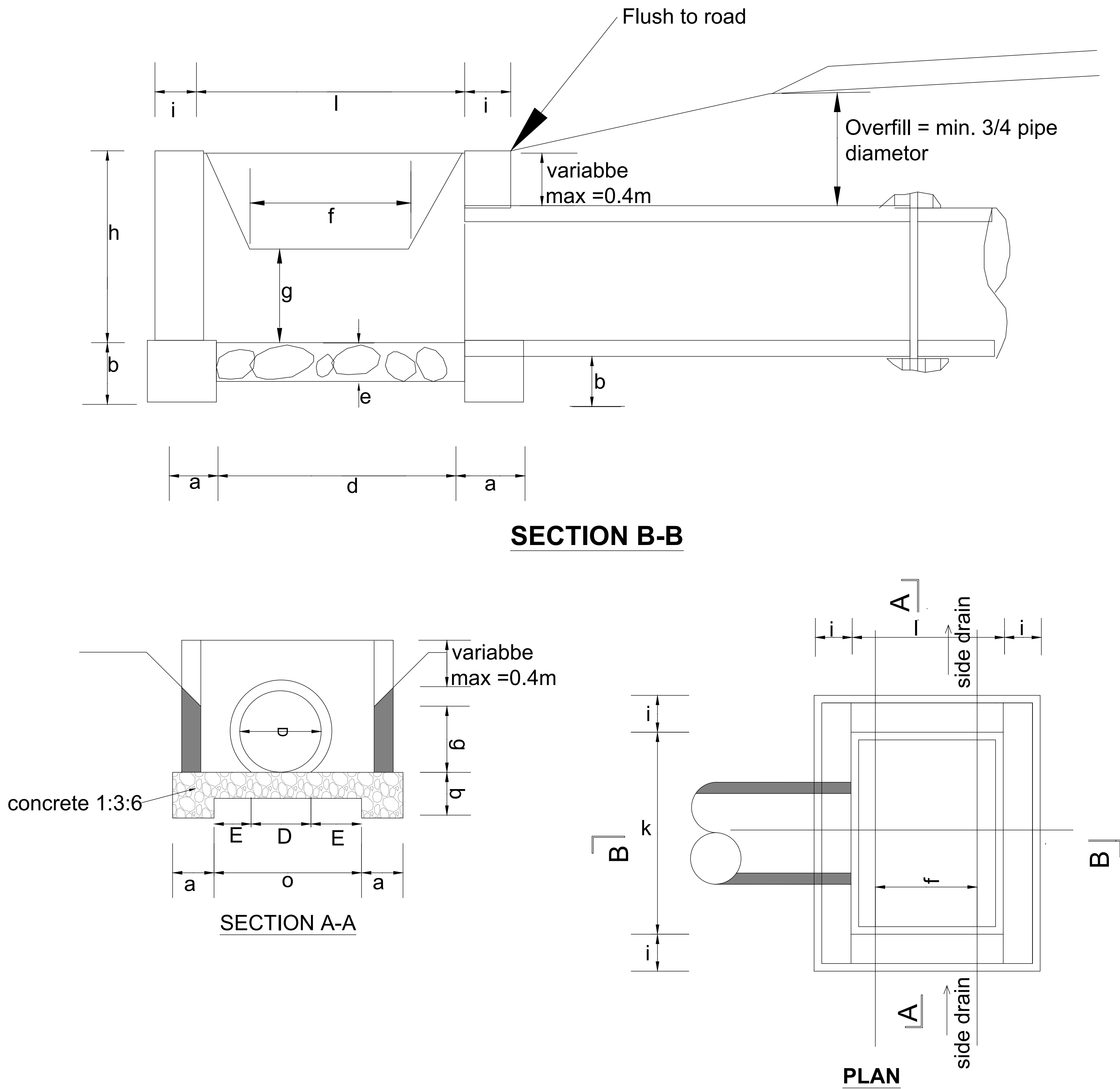
DRAWN BY: S.W.O  
DESIGNED BY: C.N.M  
CHECKED BY: M.J.N

Scale: NTS

Drg No.  
CE1045/CDS/IK/O1

Date : MARCH 2025

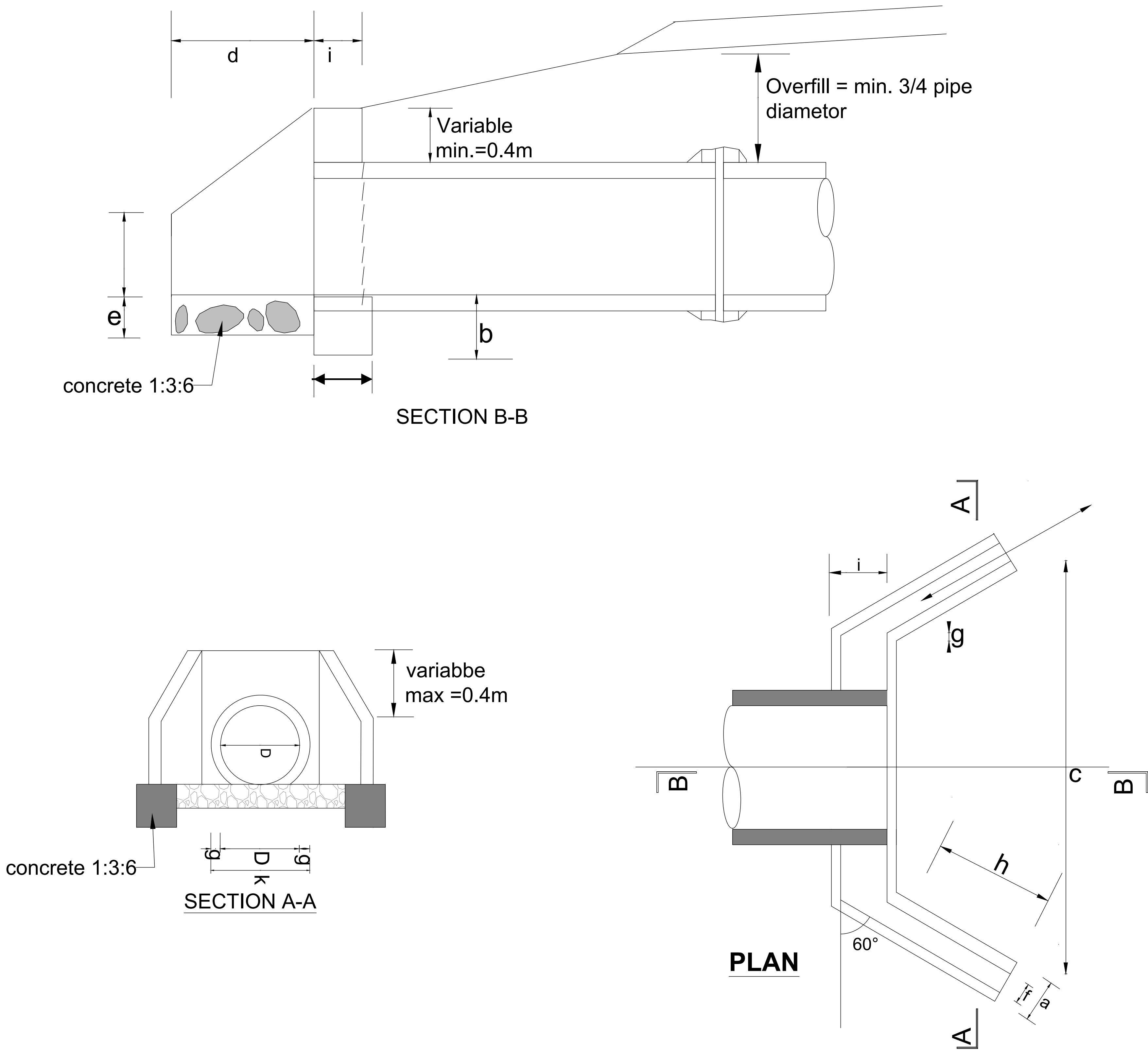
FIGURE H.9 - HEADWALL TYPE 2 (DROP INLETS)



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 |
| l                    | 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<br>(CONCRETE BLOCKS) |      |      | TYPE B<br>(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 |
|-----|------|-------------|
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Consultant:  
**Runji Consulting Group Ltd**  
Engineering & Project Management.  
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P. O. Box 68053-00200 Nairobi  
Tel. (020) 2717213/4

PROJECT TITLE:  
FINAL DETAILED ENGINEERING DESIGN OF  
ITUGURURU- KAMAENDE ROAD  
BATCH 2

DRAWING TITLE:  
HEADWALL TYPE 4 (FOR ACCESS  
CULVERT)

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

Scale: NTS

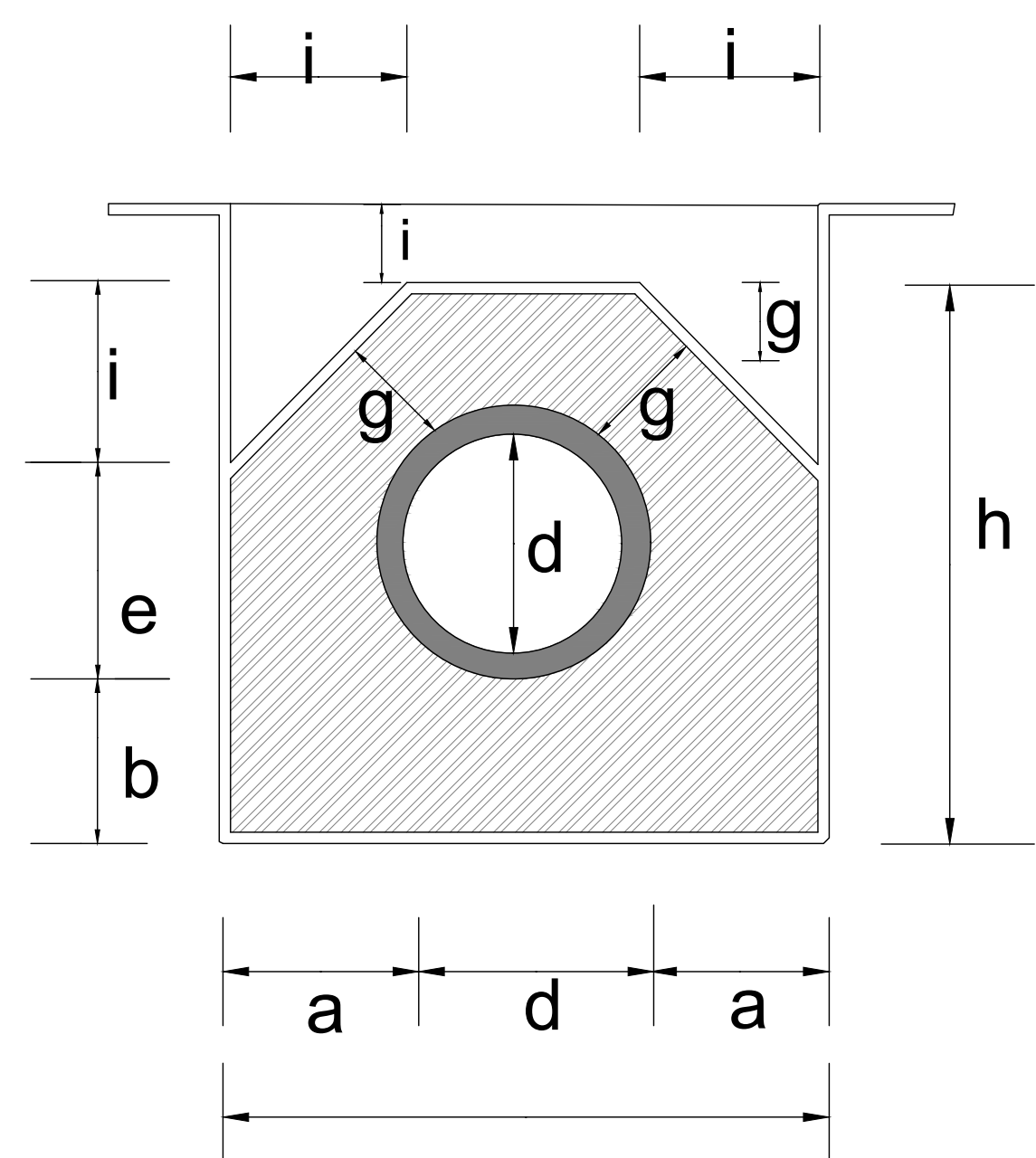
Drg No.  
CE1045/CDS/IK/O3

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     |
| <div>-fair to poor subgrade condition</div> <div>-overfill &gt;<math>\frac{3}{4}</math> Dia;</div> <div>-Seasonal waterflow only.</div> <div>-Use gravel material for.</div> <div>-backfill/overfill.</div> |          |          |          |

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
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| DIRECTOR ( PLANNING , DESIGN &ENVIRONMENT) |  |
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P. O. Box 68053-00200 Nairobi  
Tel. (020) 2717213/4

PROJECT TITLE:

**FINAL DETAILED ENGINEERING DESIGN OF  
ITUGURURU- KAMAENDE ROAD  
BATCH 2**

DRAWING TITLE:

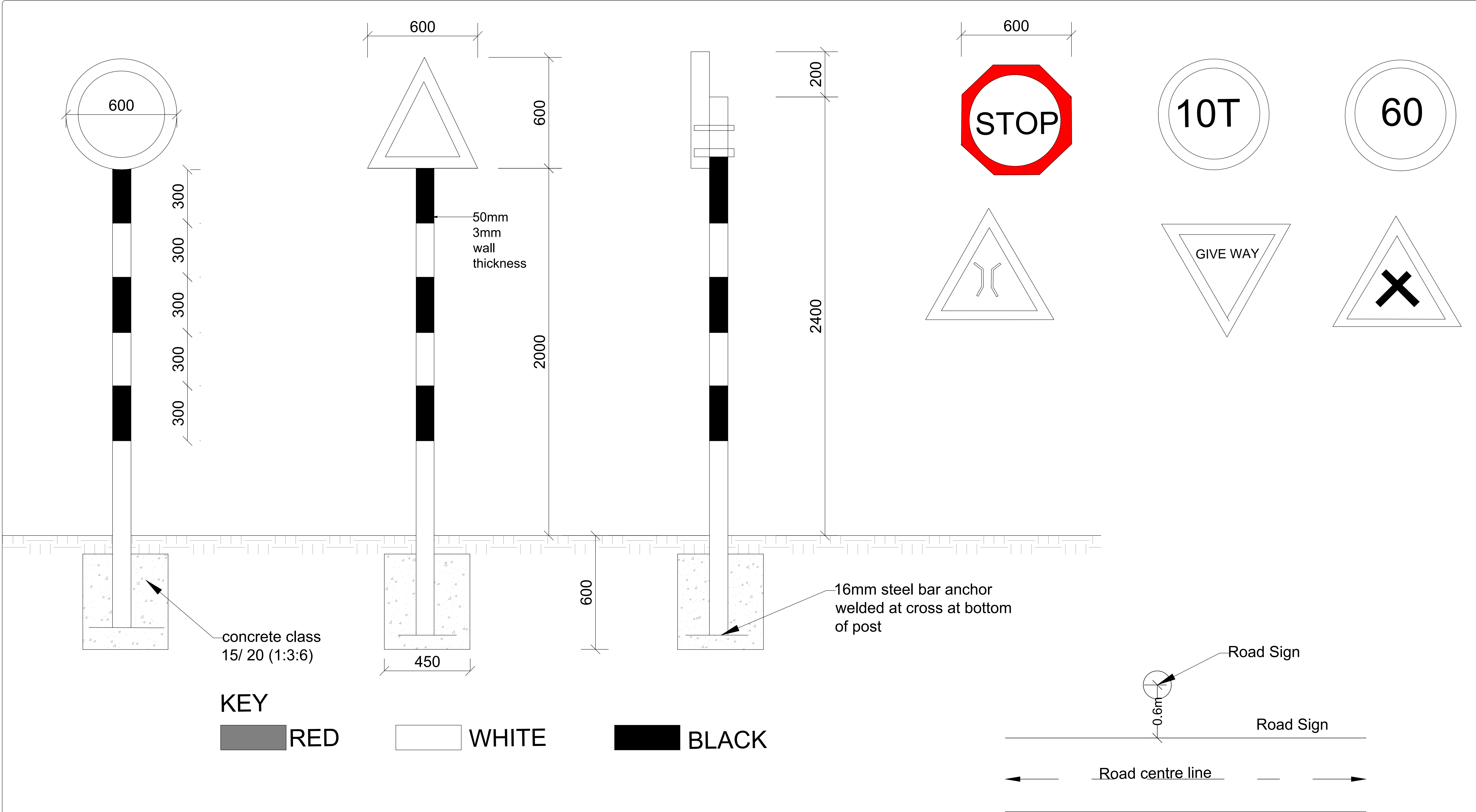
**BEDDING AND HAUNCH PROFILES  
TYPE III& IV**

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

Scale: NTS

Drg No.  
CE1045/CDS/IK/O4

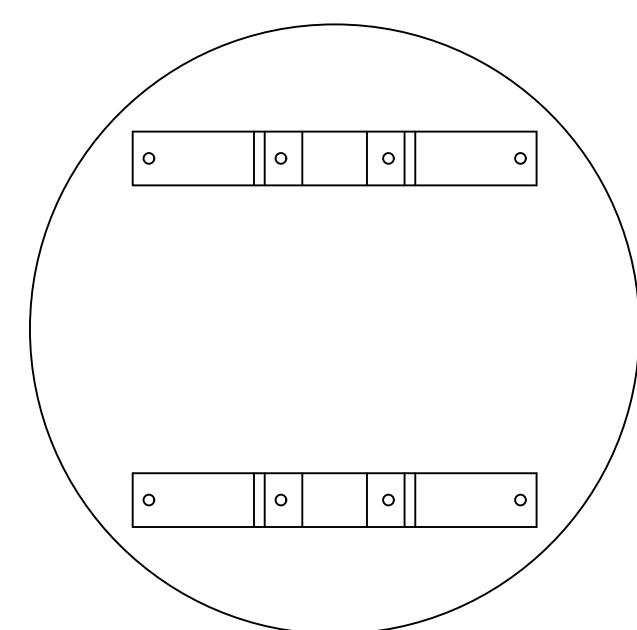
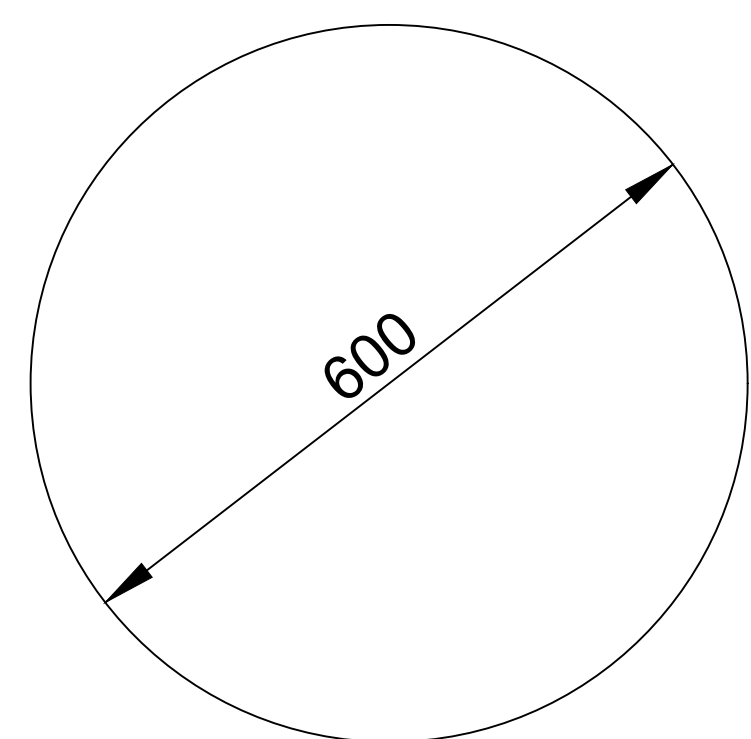
Date : MARCH 2025



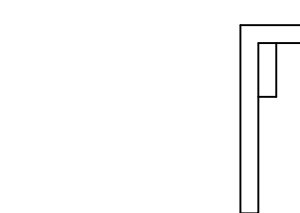
- 1.The type of sign required and their location shall de shown as road plan or as directed by engineer
- 2.signs plate to be 2mm thick mild steel plate
- 3.sign post to be 50mm fixing clamp/brackets
- 4.Sign plate to be fixed to steel tube by \$Nos M10 bolts and 50mm fixing clamp/brackets
- 5,Sign paints 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 |  <b>Kenya Rural Roads Authority</b><br>Bara Bara Plaza,<br>P.O. Box 48151- 00100, Nairobi. Kenya | DIRECTOR GENERAL |  | Consultant:<br> <b>Runji Consulting Group Ltd</b><br>Engineering & Project Management.<br>3, Kindaruma Road (Off Ngong Road)<br>P. O. Box 68053-00200 Nairobi<br>Tel. (020) 2717213/4 | PROJECT TITLE:<br><b>FINAL DETAILED ENGINEERING DESIGN OF<br/>ITUGURURU- KAMAENDE ROAD<br/>BATCH 2</b> | DRAWING TITLE:<br><b>CULVERT ROAD SIGNS</b> | DRAWN BY: S.W.O<br>DESIGNED BY: C.N.M<br>CHECKED BY: M.J.N<br><br>Scale: NTS | Drg No.<br><b>CE1045/CDS/IK/O5</b> |
|           |     |      |             |                                                                                                                                                                                     |                  |  |                                                                                                                                                                                                                                                                            |                                                                                                        |                                             |                                                                              |                                    |
|           |     |      |             |                                                                                                                                                                                     |                  |  |                                                                                                                                                                                                                                                                            |                                                                                                        |                                             |                                                                              |                                    |
|           |     |      |             |                                                                                                                                                                                     |                  |  |                                                                                                                                                                                                                                                                            |                                                                                                        |                                             |                                                                              |                                    |
|           |     |      |             |                                                                                                                                                                                     |                  |  |                                                                                                                                                                                                                                                                            |                                                                                                        |                                             |                                                                              |                                    |

# STANDARD DRAWINGS

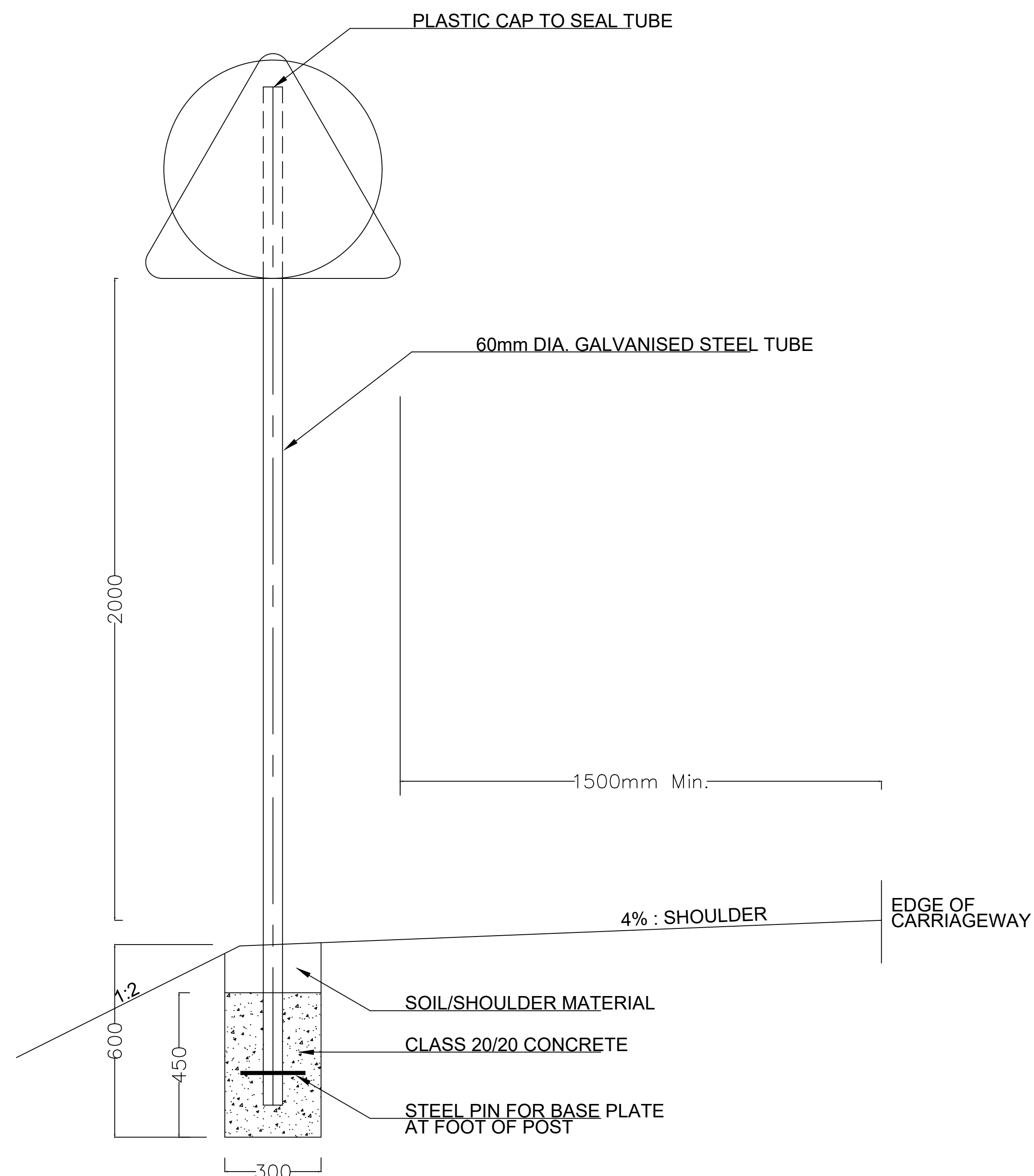


## SCALE 1:25



## STIFFENING TO SIGNS

SCALE 1:20



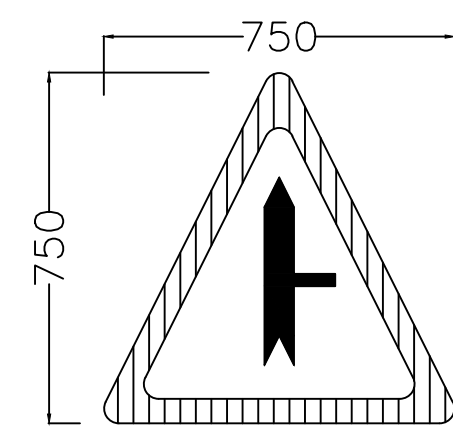
## SIGN PLACEMENT

SCALE 1:10

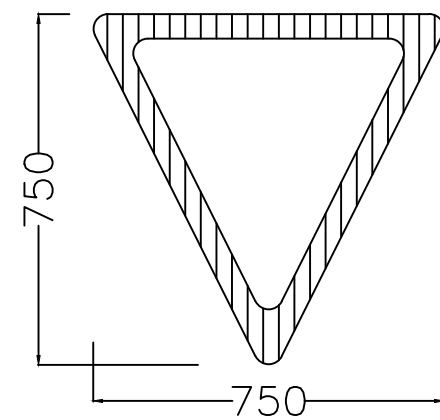
GENERAL NOTES:

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.

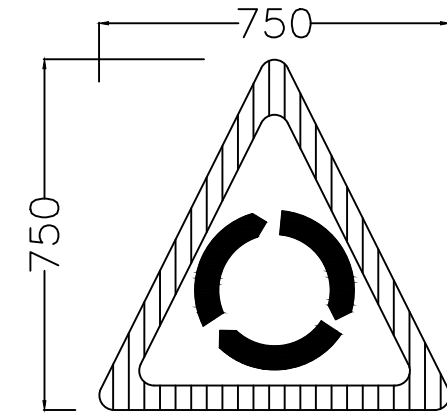
|          |     |      |             |                                                                                                                                                                                                  |                  |  |                                                                                                                                                                                                                                                                                                         |                |  |                                                                   |                                                            |                                |
|----------|-----|------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--|-------------------------------------------------------------------|------------------------------------------------------------|--------------------------------|
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|          |     |      |             |                                                                                                                                                                                                  |                  |  |                                                                                                                                                                                                                                                                                                         |                |  |                                                                   |                                                            |                                |
|          |     |      |             |                                                                                                                                                                                                  |                  |  |                                                                                                                                                                                                                                                                                                         |                |  |                                                                   |                                                            |                                |
|          |     |      |             |                                                                                                                                                                                                  |                  |  |                                                                                                                                                                                                                                                                                                         |                |  |                                                                   |                                                            |                                |
|          |     |      |             |                                                                                                                                                                                                  |                  |  |                                                                                                                                                                                                                                                                                                         |                |  |                                                                   |                                                            |                                |
|          |     |      |             |                                                                                                                                                                                                  |                  |  |                                                                                                                                                                                                                                                                                                         |                |  |                                                                   | Scale: AS SHOWN                                            | Date : MARCH 2025              |



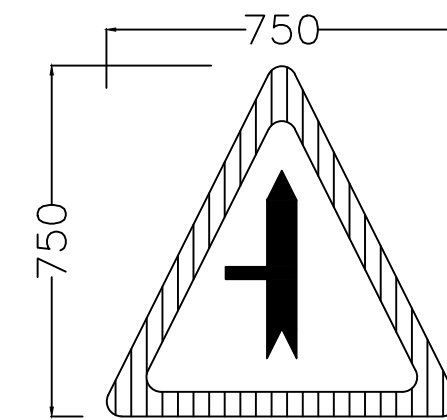
SIGN TYPE W 28C



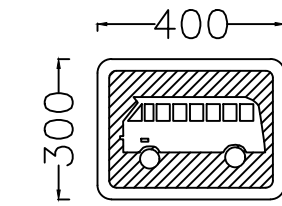
SIGN TYPE R2



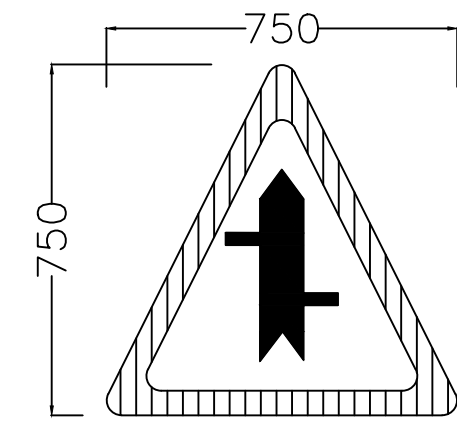
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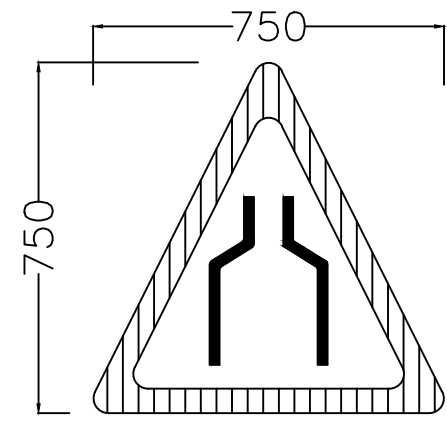
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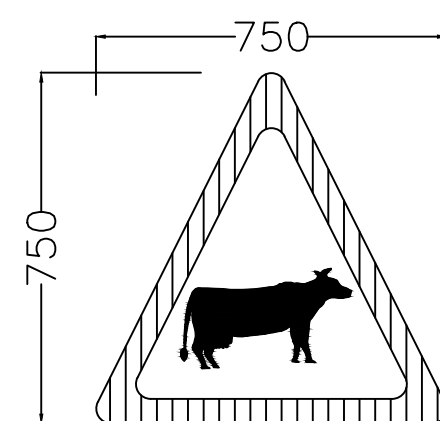
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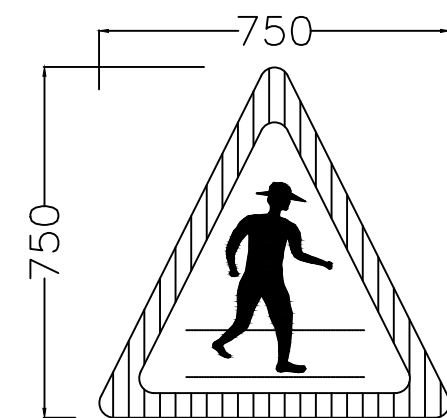
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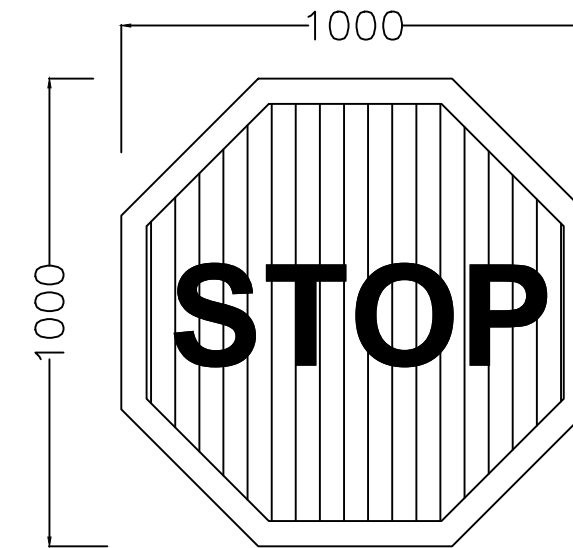
SIGN TYPE W 7



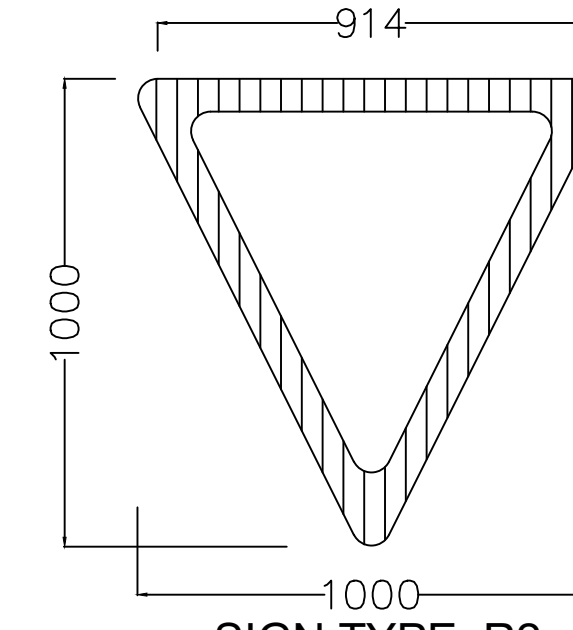
SIGN TYPE W 20



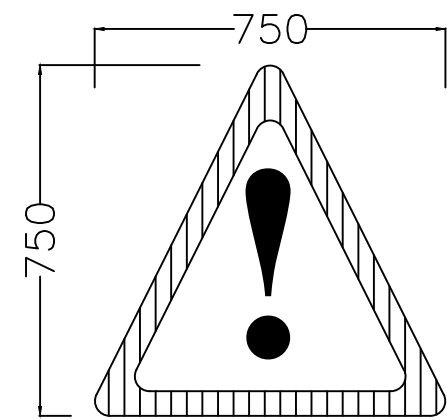
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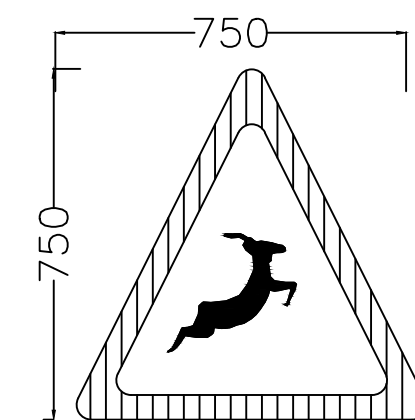
SIGN TYPE R 1



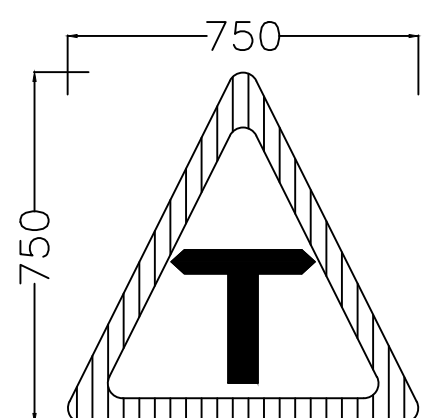
SIGN TYPE R2



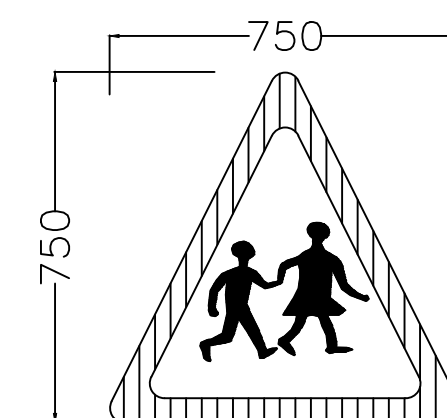
SIGN TYPE W26



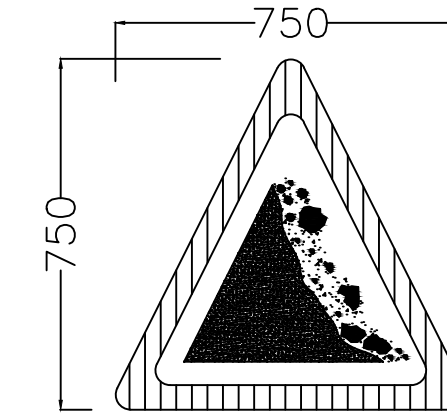
SIGN TYPE W 21



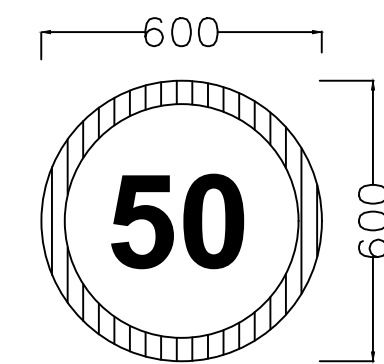
SIGN TYPE W 27



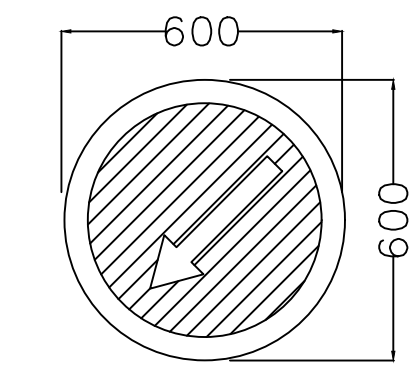
SIGN TYPE W 18



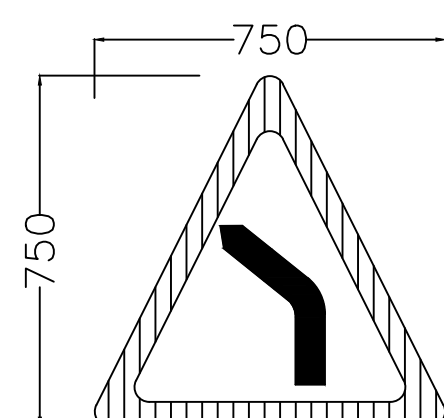
SIGN TYPE W16



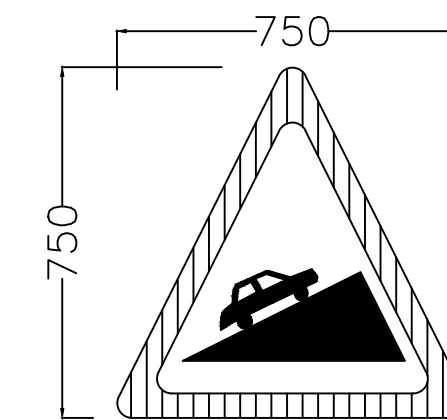
SIGN TYPE P25



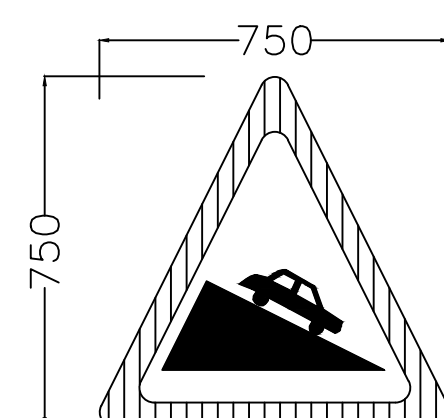
SIGN TYPE M5



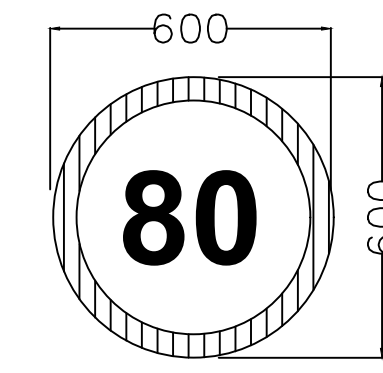
SIGN TYPE W 1



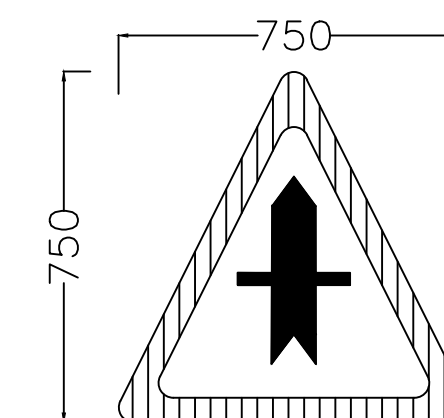
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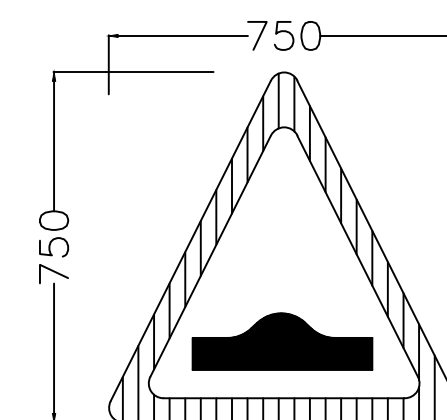
SIGN TYPE W 5



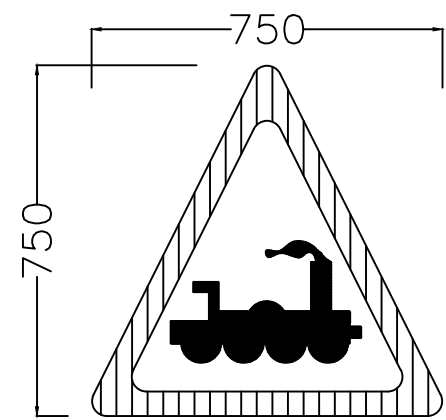
SIGN TYPE P25



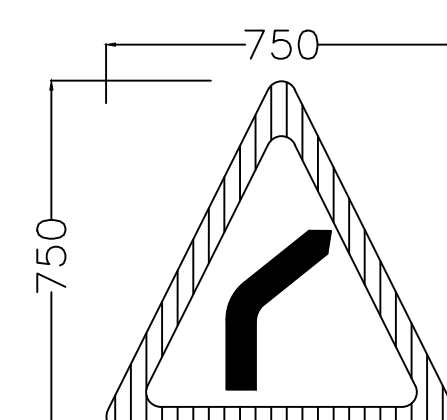
SIGN TYPE W 28A



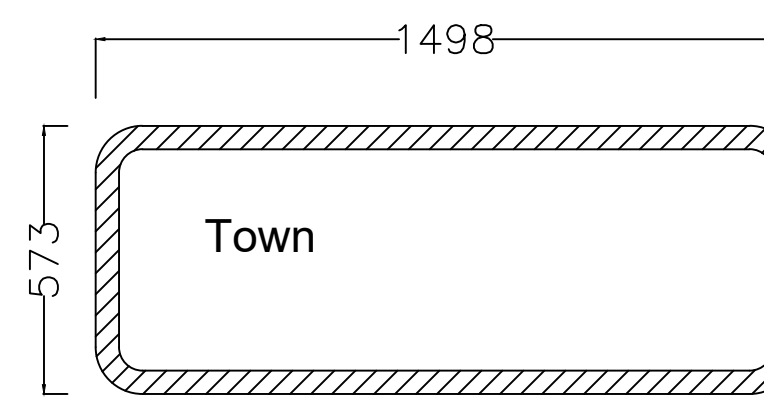
SIGN TYPE W 12



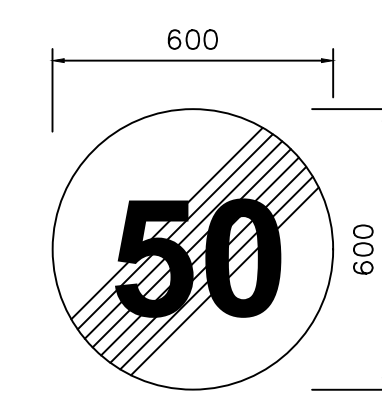
SIGN TYPE W 32



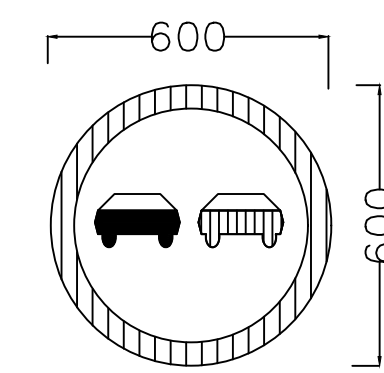
SIGN TYPE W 2



SIGN TYPE - I 27

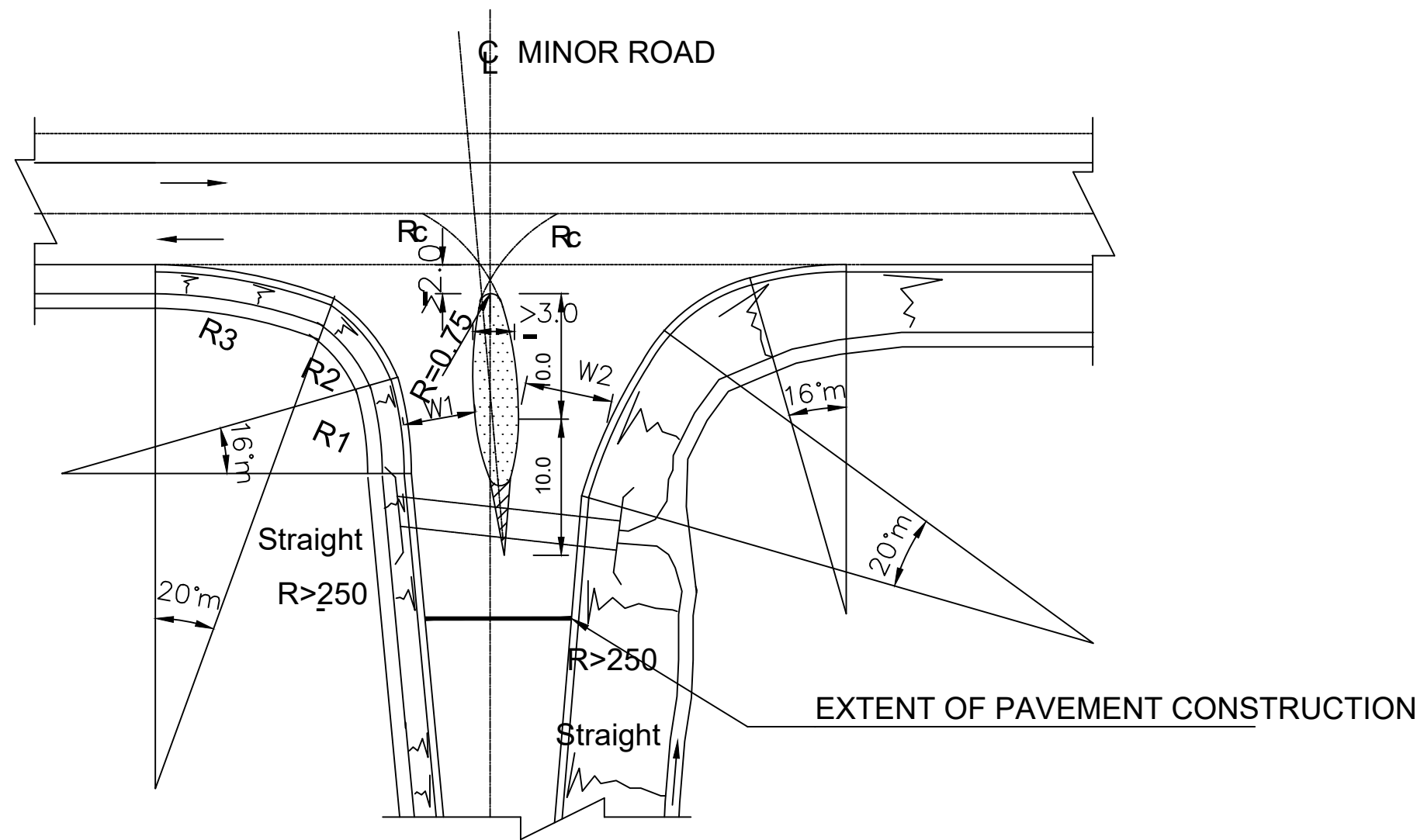


SIGN TYPE P30



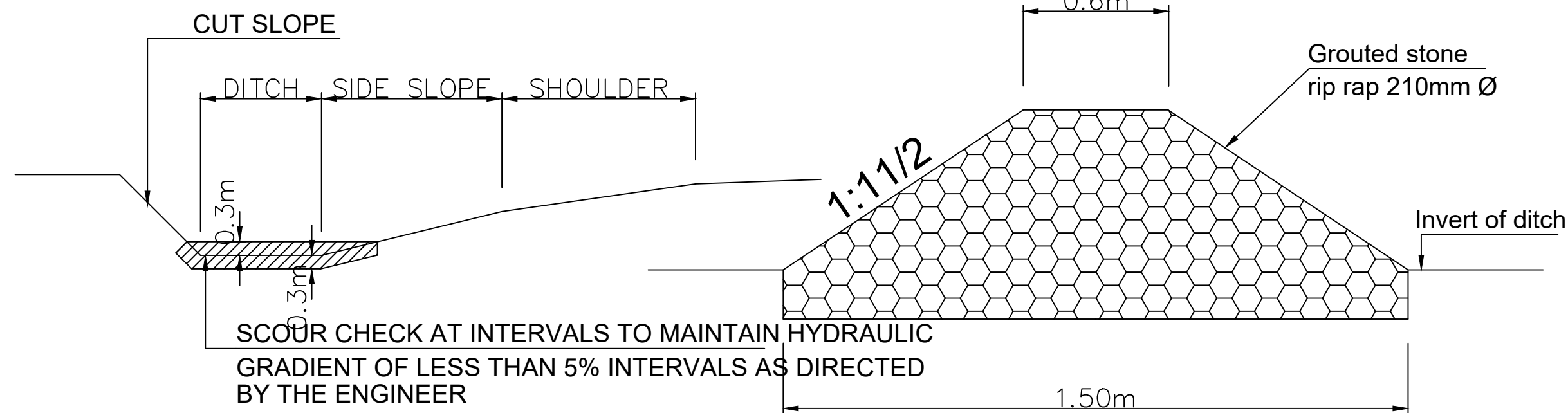
SIGN TYPE P23

|           |     |      |             |                                                                                                                                                                                     |                  |  |                                                                                                                                                                                                                                                                            |                                                                                                  |                                                                               |                                                            |                            |  |  |  |  |
|-----------|-----|------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------|--|--|--|--|
| REVISIONS | No. | DATE | DESCRIPTION |  <b>Kenya Rural Roads Authority</b><br>Bara Bara Plaza,<br>P.O. Box 48151- 00100, Nairobi. Kenya | DIRECTOR GENERAL |  | Consultant:<br> <b>Runji Consulting Group Ltd</b><br>Engineering & Project Management.<br>3, Kindaruma Road (Off Ngong Road)<br>P. O. Box 68053-00200 Nairobi<br>Tel. (020) 2717213/4 | PROJECT TITLE:<br>FINAL DETAILED ENGINEERING DESIGN OF<br>ITUGURURU - KAMAENDE (ROAD)<br>BATCH 2 | DRAWING TITLE:<br>STANDARD DRAWING -<br>STANDARD - ROAD SIGNS<br>INSTALLATION | DRAWN BY: S.W.O<br>DESIGNED BY: C.N.M<br>CHECKED BY: M.J.N | Drg No.<br>CE1045/SD/IM/02 |  |  |  |  |
|           |     |      |             |                                                                                                                                                                                     |                  |  |                                                                                                                                                                                                                                                                            |                                                                                                  |                                                                               |                                                            |                            |  |  |  |  |
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|           |     |      |             |                                                                                                                                                                                     |                  |  |                                                                                                                                                                                                                                                                            |                                                                                                  |                                                                               | Scale: AS SHOWN                                            | Date : MARCH 2025          |  |  |  |  |



- 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



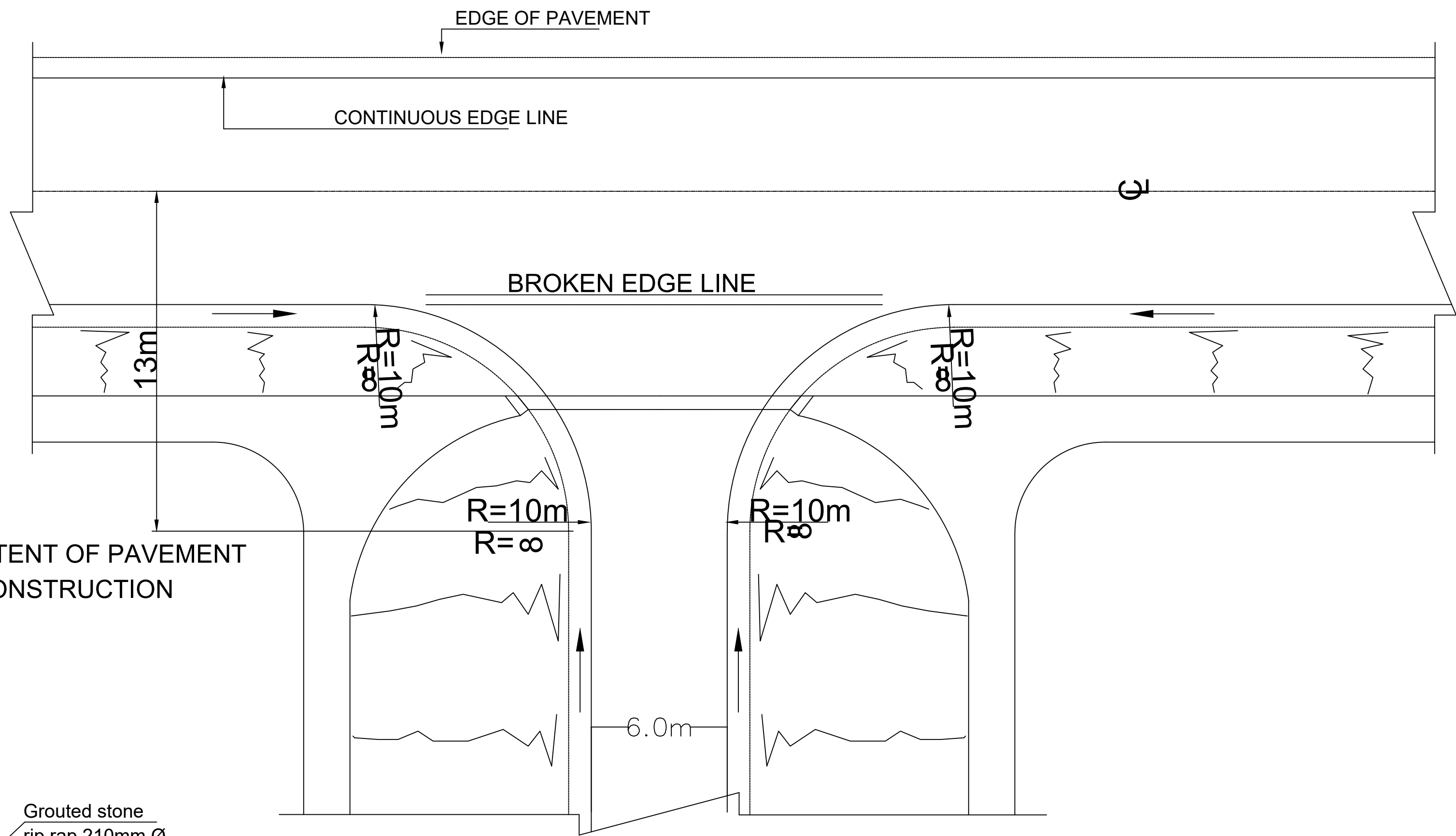
**TYPICAL ELEVATION  
OF A SCOUR CHECK**

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

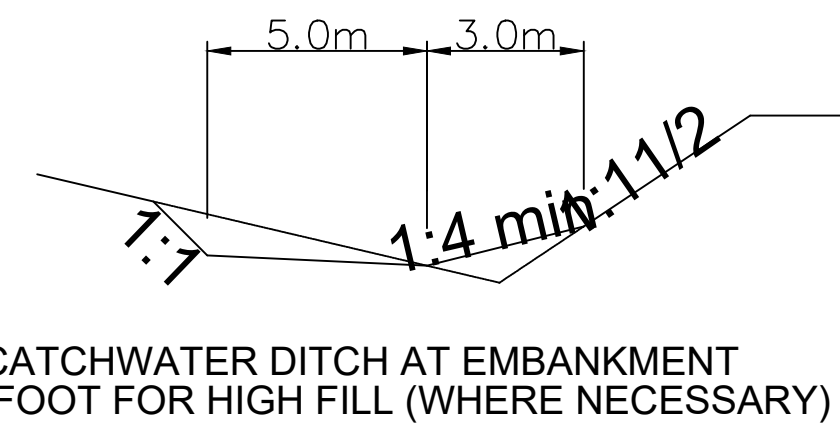
**NOTES**

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

**EXTENT OF PAVEMENT  
CONSTRUCTION**

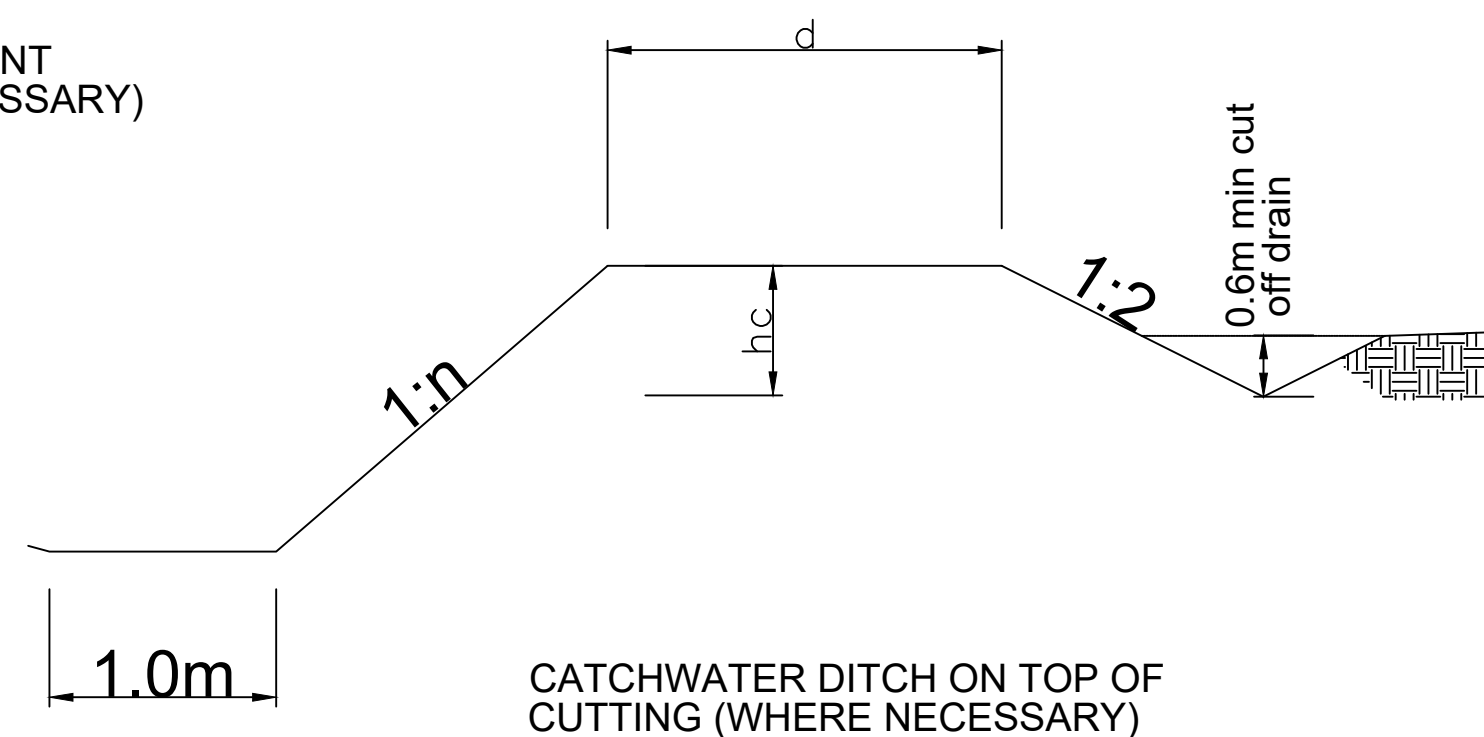


**JUNCTION TYPE II**  
1:100



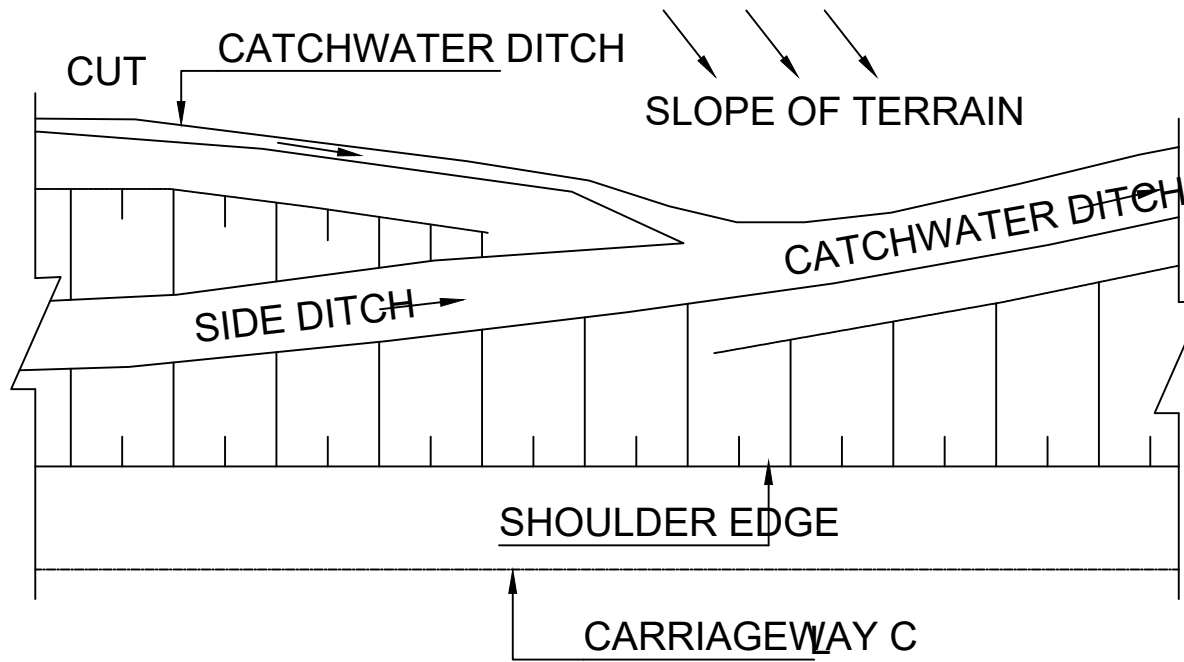
**CATCHWATER DITCH AT EMBANKMENT  
FOOT FOR HIGH FILL (WHERE NECESSARY)**

**LONGITUDINAL SECTION II**



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

**LONGITUDINAL SECTION I**



**PLAN**

| No. | DATE | DESCRIPTION |
|-----|------|-------------|
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|     |      |             |
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**Kenya Rural Roads Authority**  
Bara Bara Plaza,  
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| DIRECTOR GENERAL                           |  |
| DIRECTOR ( PLANNING , DESIGN &ENVIRONMENT) |  |
|                                            |  |
|                                            |  |

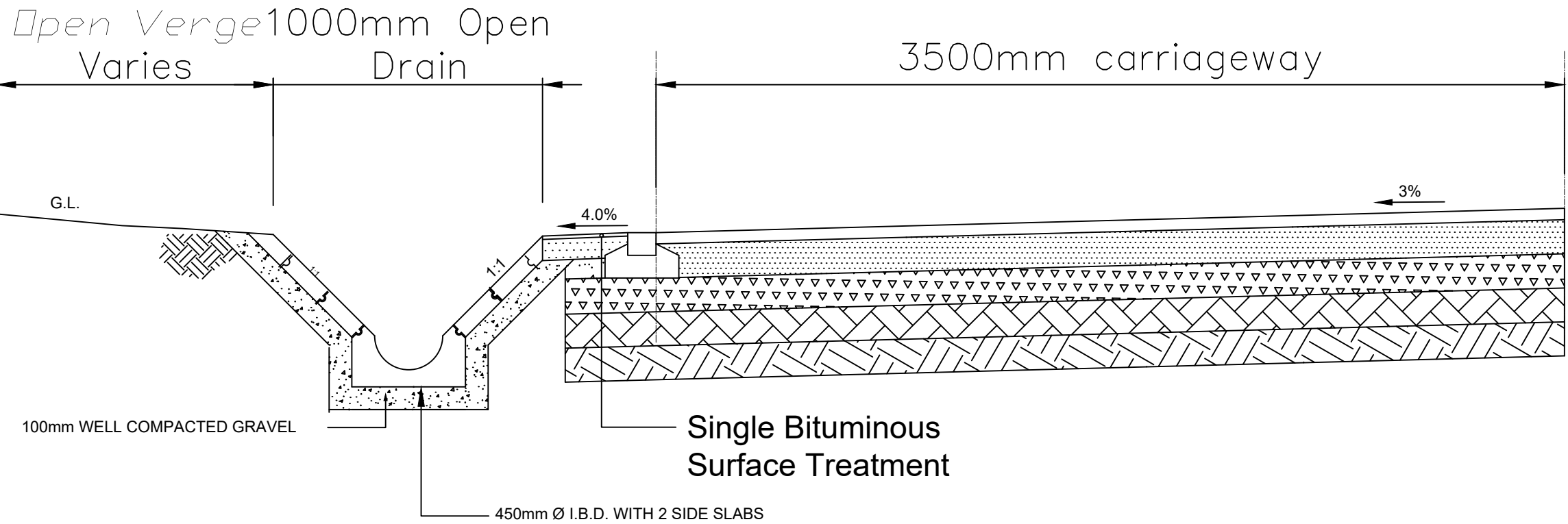
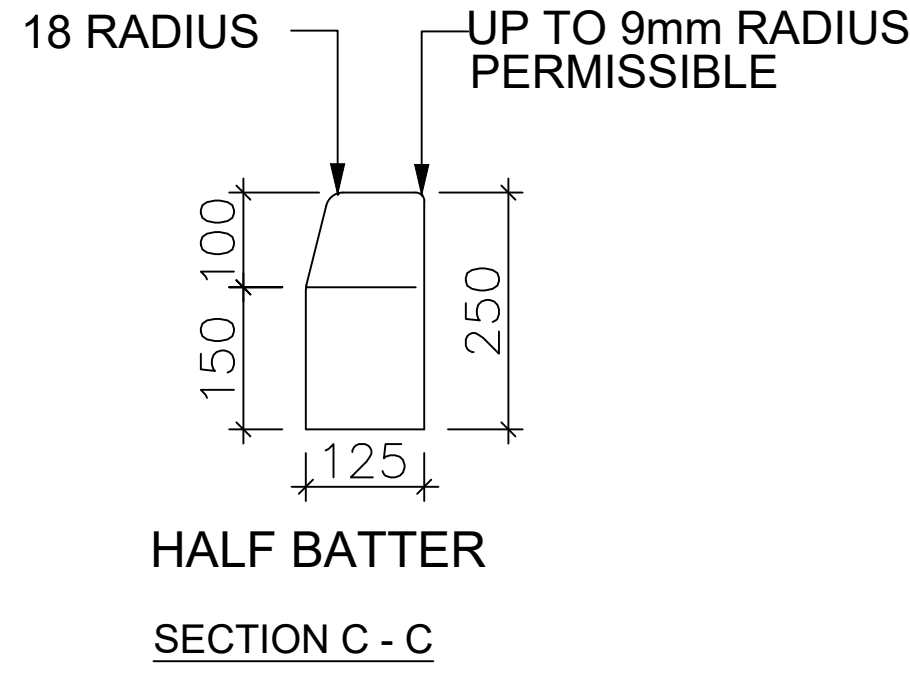
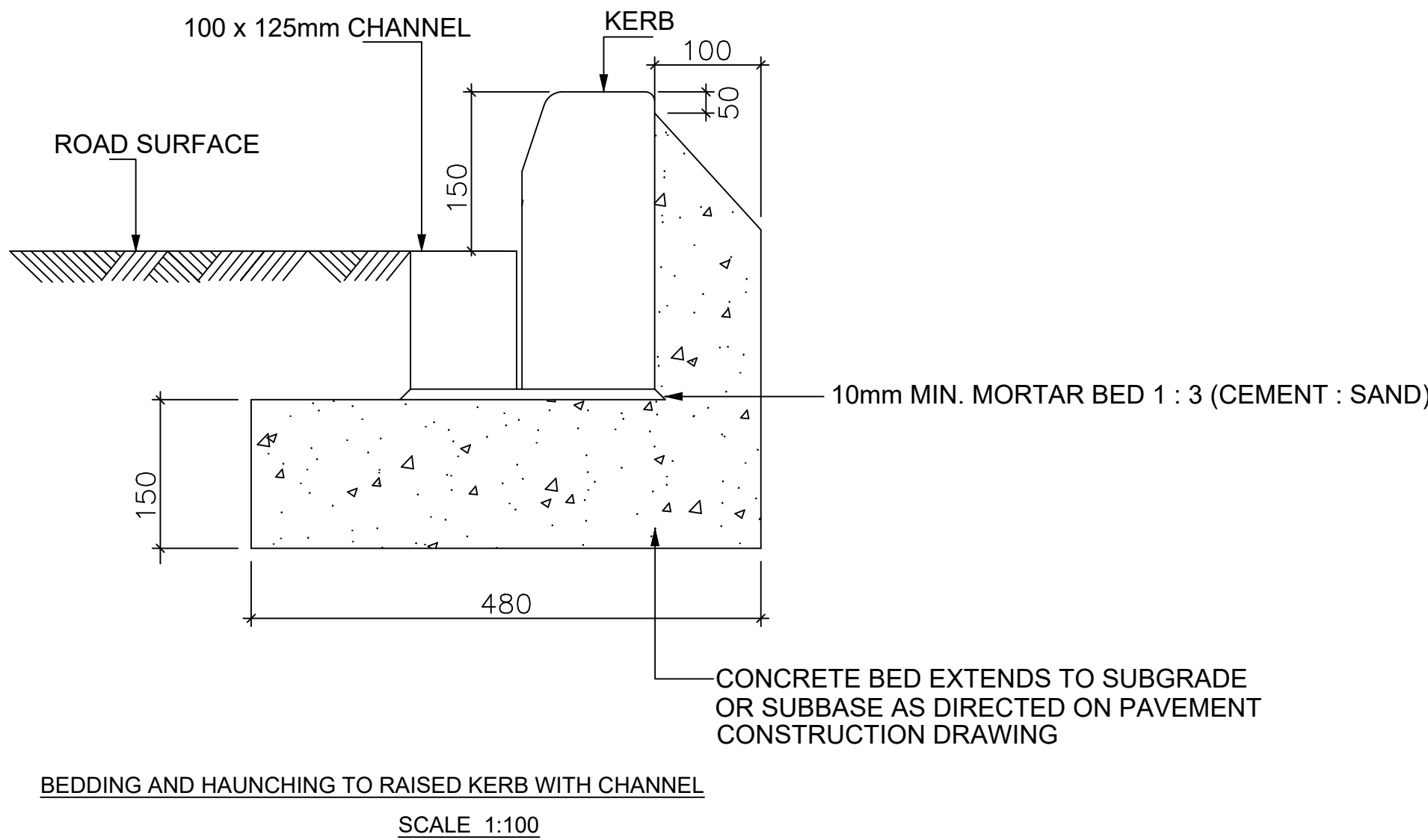
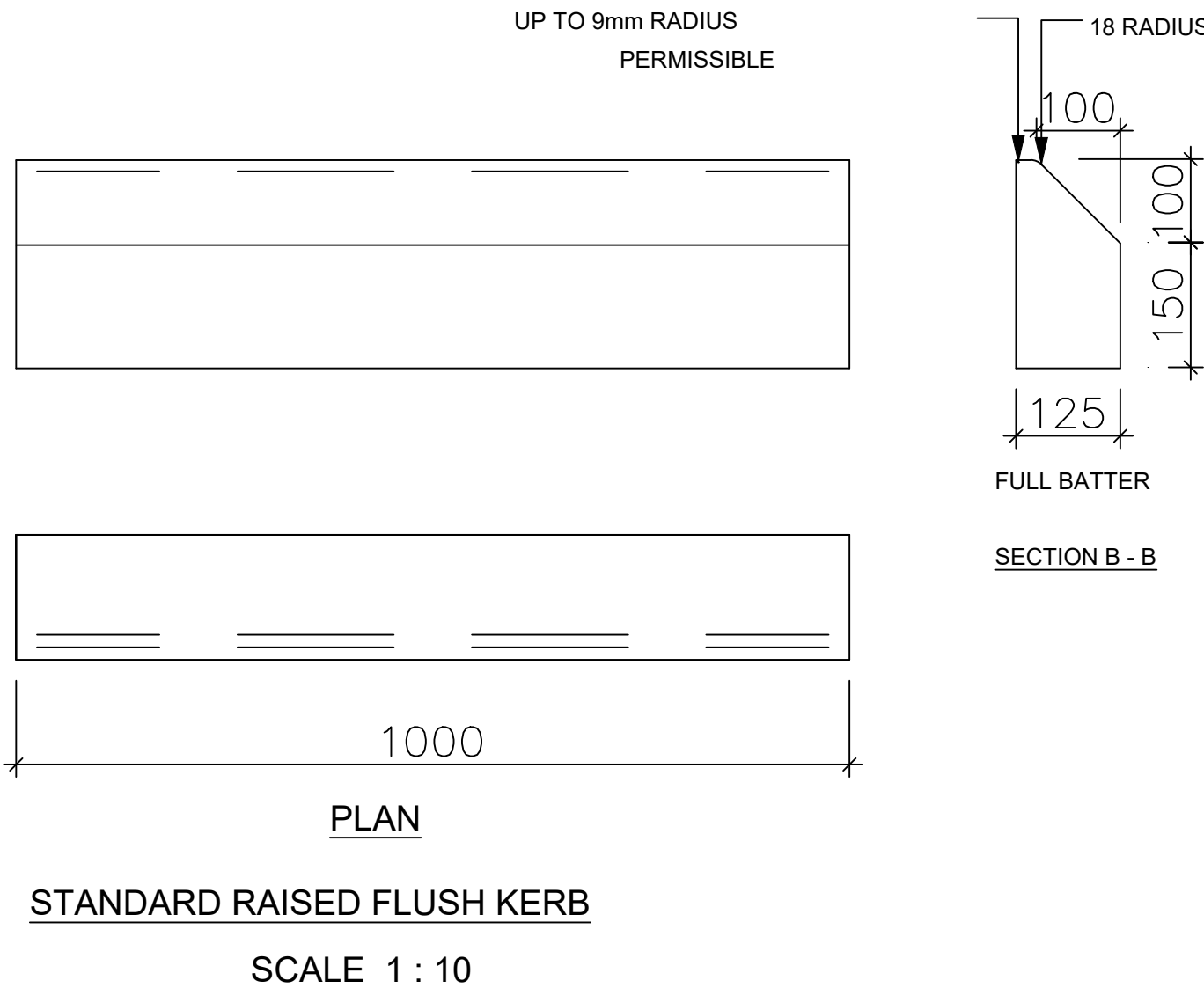
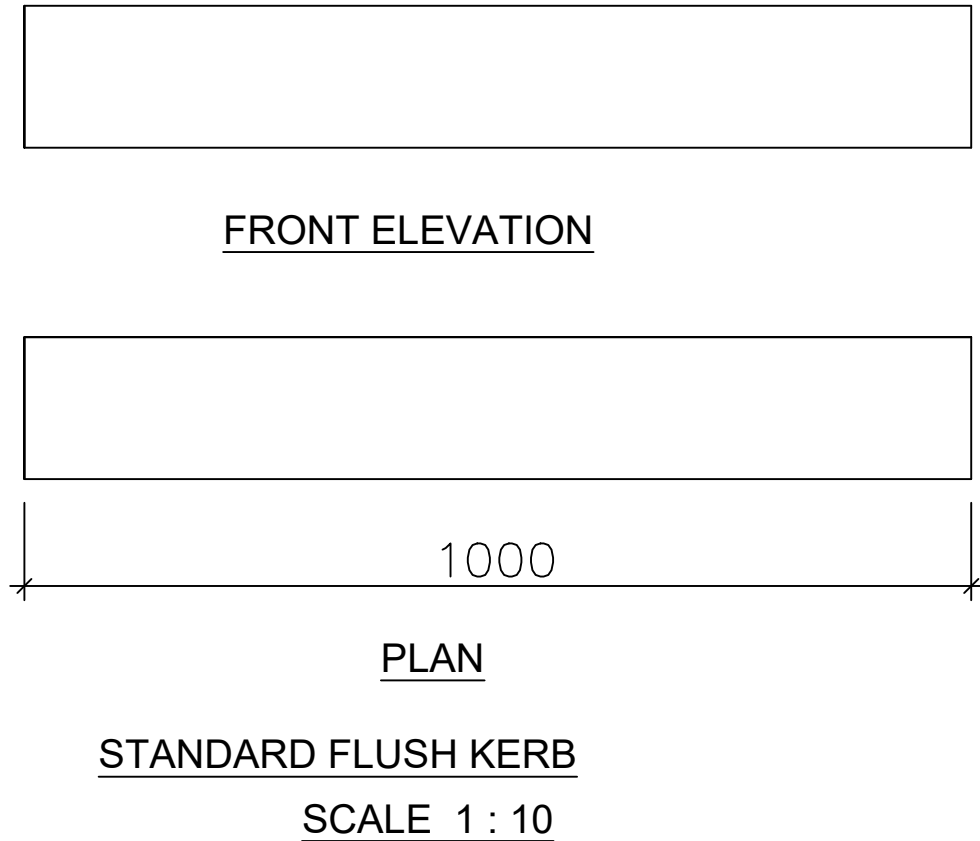
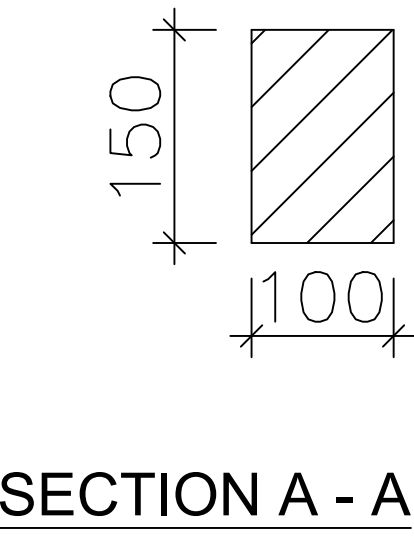
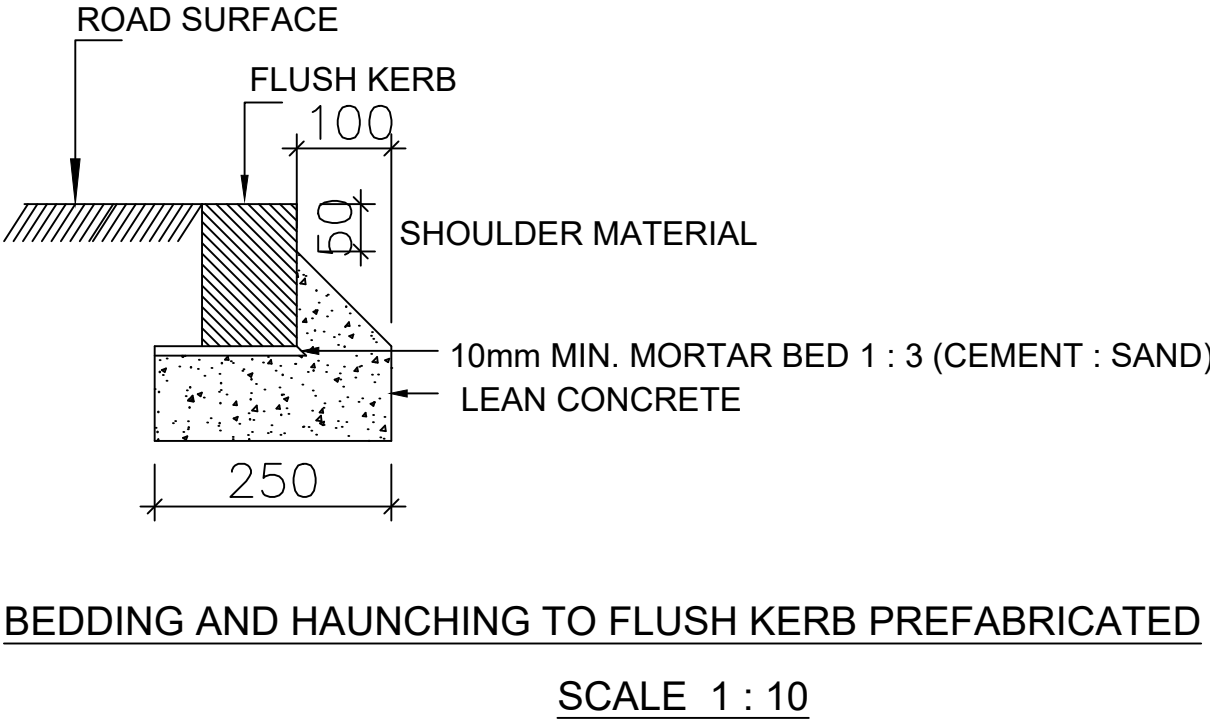
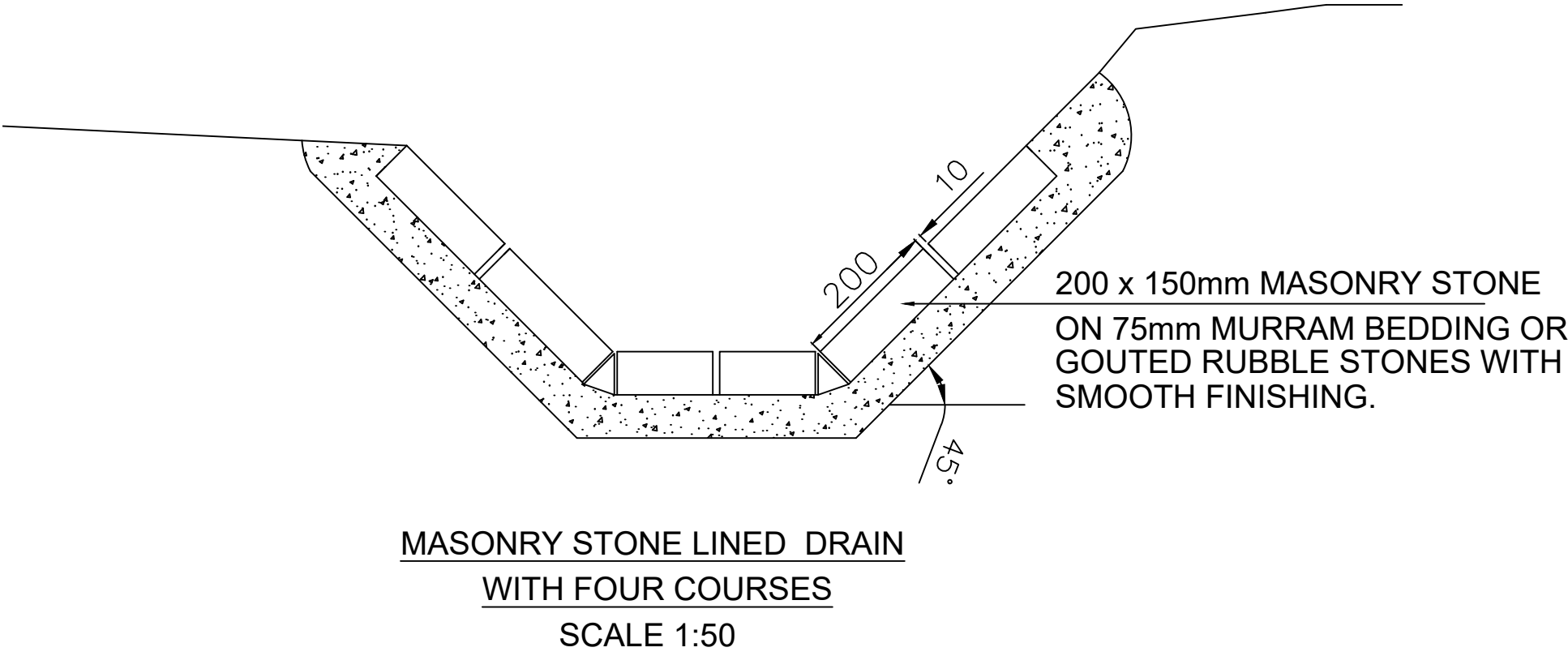
Consultant:  
**Runji Consulting Group Ltd**  
Engineering & Project Management.  
3, Kindaruma Road (Off Ngong Road)  
P. O. Box 68053-00200 Nairobi  
Tel. (020) 2717213/4

PROJECT TITLE:  
FINAL DETAILED ENGINEERING DESIGN OF  
ITUGURURU - KAMAENDE (ROAD)  
BATCH 2

DRAWING TITLE:  
STANDARD DRAWING -  
STANDARD - MISC MINOR  
JUNCTION

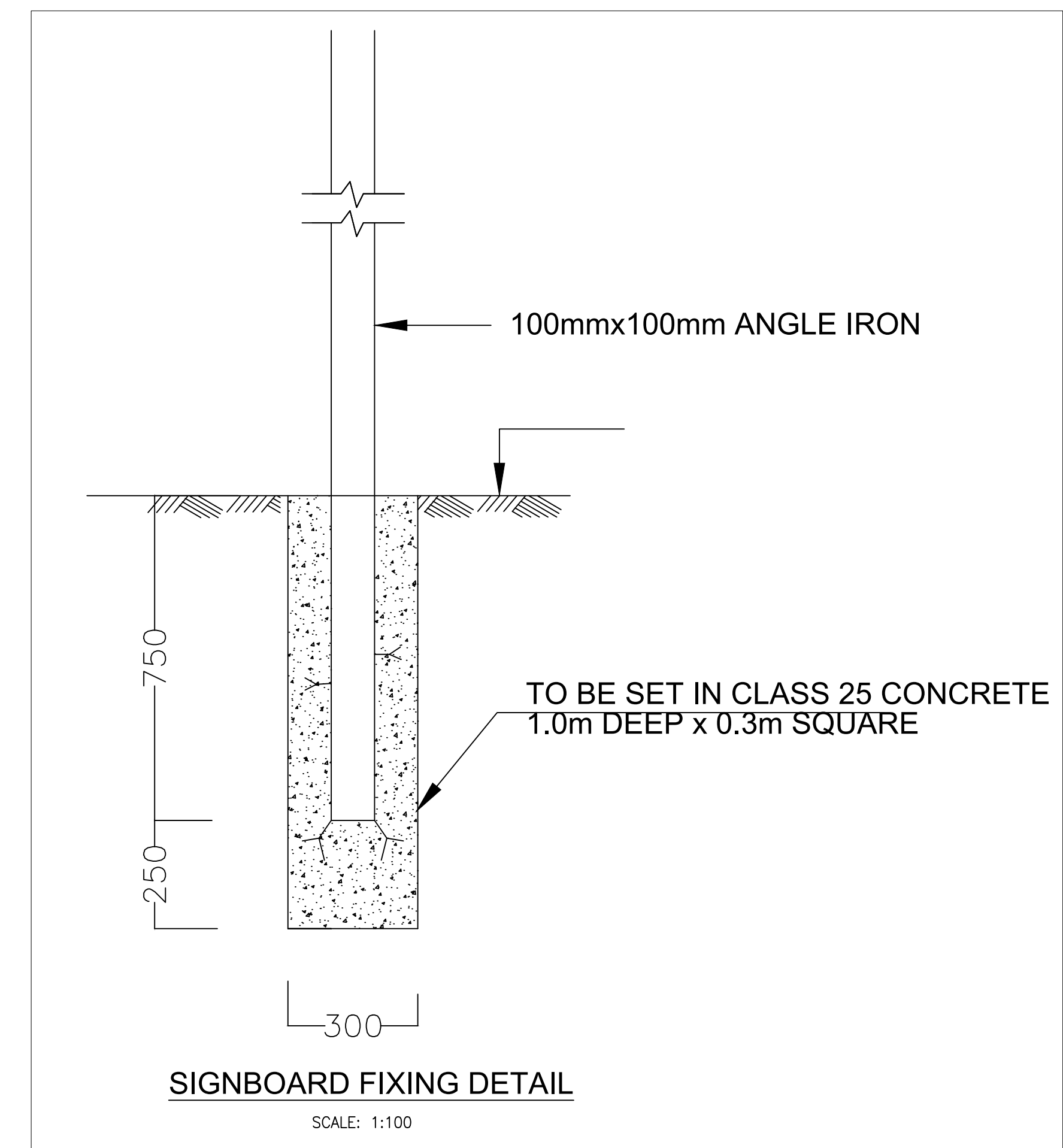
DRAWN BY: S.W.O  
DESIGNED BY: C.N.M  
CHECKED BY: M.J.N  
Scale: AS SHOWN

Drp No.  
CE1045/SD/IM/03  
Date : MARCH 2025

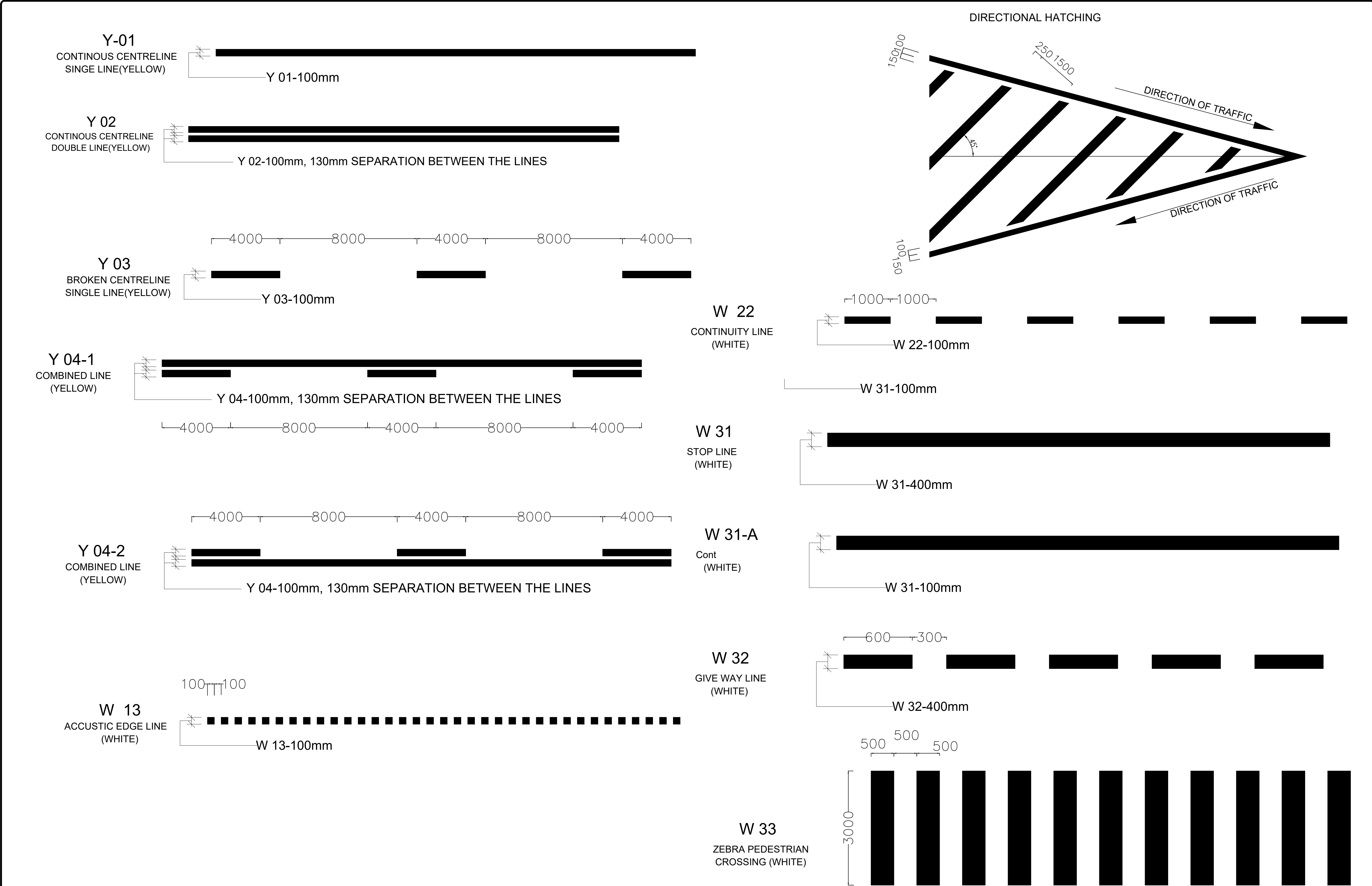


TYPICAL ROAD CROSS-SECTION FOR TOWNSHIP ROADS AND PARKING





|           |     |      |             |                                                                                                                                                                                              |                                            |                                                                                                                                                                                                                                                                                               |                                                                                                               |                                                                          |                                                                                            |                                                             |
|-----------|-----|------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| REVISIONS | No. | DATE | DESCRIPTION |  <p><b>Kenya Rural Roads Authority</b><br/>Bara Bara Plaza,<br/>P.O. Box 48151- 00100, Nairobi. Kenya</p> | DIRECTOR GENERAL                           | <p>Consultant:</p>  <p><b>Runji Consulting Group Ltd</b><br/>Engineering &amp; Project Management.<br/>3, Kindaruma Road (Off Ngara Road)<br/>P. O. Box 68053-00200 Nairobi<br/>Tel. (020) 2717213/4</p> | <p>PROJECT TITLE:</p> <p>FINAL DETAILED ENGINEERING DESIGN OF<br/>ITUGURURU - KAMAENDE (ROAD)<br/>BATCH 2</p> | <p>DRAWING TITLE:</p> <p>STANDARD DRAWING -<br/>PUBLICITY SIGN BOARD</p> | <p>DRAWN BY: S.W.O<br/>DESIGNED BY: C.N.M<br/>CHECKED BY: M.J.N</p> <p>Scale: AS SHOWN</p> | <p>Drg No.<br/>CE1045/SD/IM/06</p> <p>Date : MARCH 2025</p> |
|           |     |      |             |                                                                                                                                                                                              | DIRECTOR ( PLANNING , DESIGN &ENVIRONMENT) |                                                                                                                                                                                                                                                                                               |                                                                                                               |                                                                          |                                                                                            |                                                             |
|           |     |      |             |                                                                                                                                                                                              |                                            |                                                                                                                                                                                                                                                                                               |                                                                                                               |                                                                          |                                                                                            |                                                             |
|           |     |      |             |                                                                                                                                                                                              |                                            |                                                                                                                                                                                                                                                                                               |                                                                                                               |                                                                          |                                                                                            |                                                             |
|           |     |      |             |                                                                                                                                                                                              |                                            |                                                                                                                                                                                                                                                                                               |                                                                                                               |                                                                          |                                                                                            |                                                             |
|           |     |      |             |                                                                                                                                                                                              |                                            |                                                                                                                                                                                                                                                                                               |                                                                                                               |                                                                          |                                                                                            |                                                             |



| REVISIONS | No. | DATE | DESCRIPTION |
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**Kenya Rural Roads Authority**  
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| DIRECTOR ( PLANNING , DESIGN &ENVIRONMENT) |  |
|                                            |  |
|                                            |  |

Consultant:



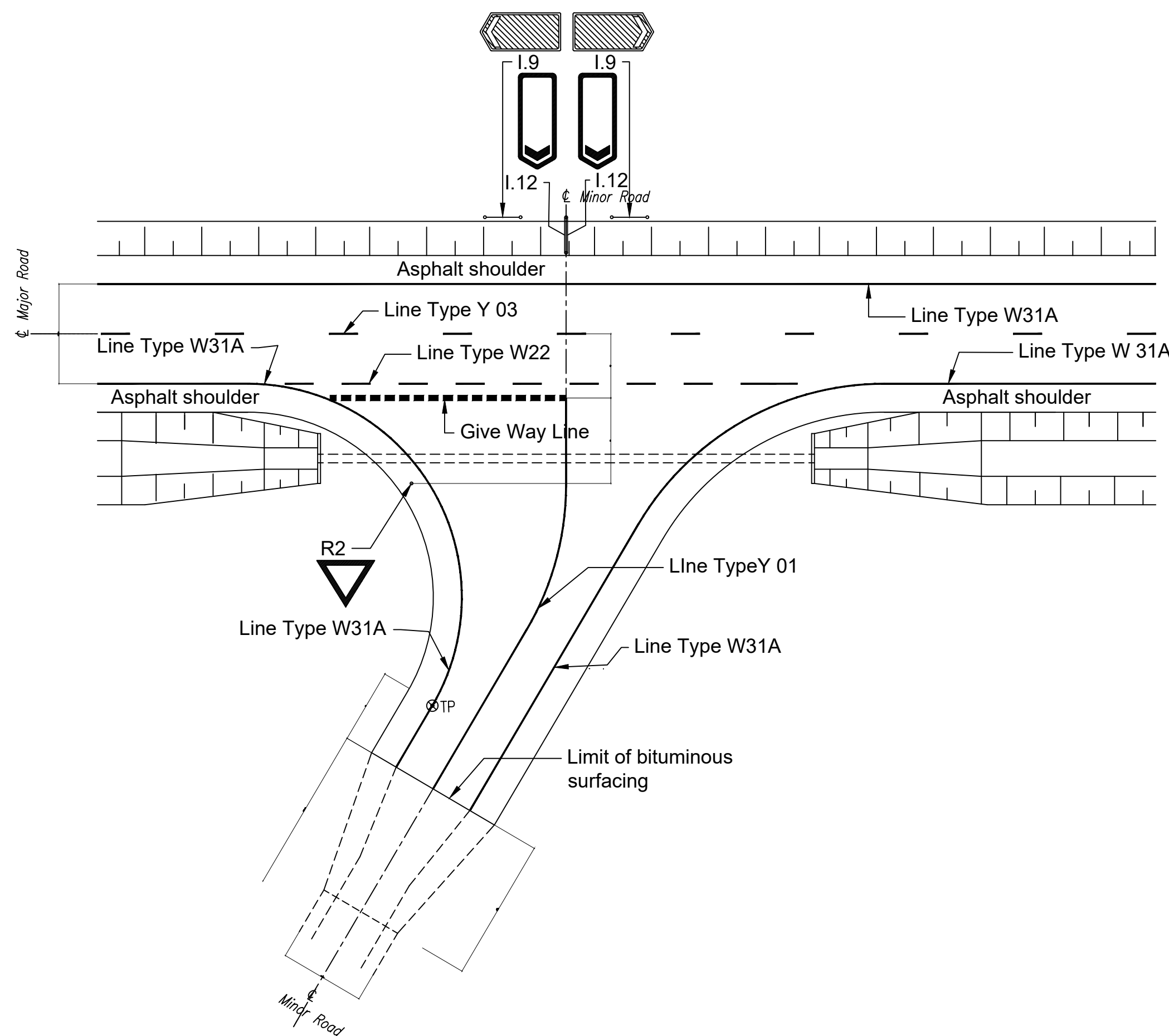
**Runji Consulting Group Ltd**  
Engineering & Project Management.  
3, Kindaruma Road (Off Ngong Road)  
P. O. Box 68053-00200 Nairobi  
Tel. (020) 2717213/4

|                                                                                |
|--------------------------------------------------------------------------------|
| PROJECT TITLE:                                                                 |
| FINAL DETAILED ENGINEERING DESIGN OF<br>ITUGURURU - KAMAENDE (ROAD)<br>BATCH 2 |

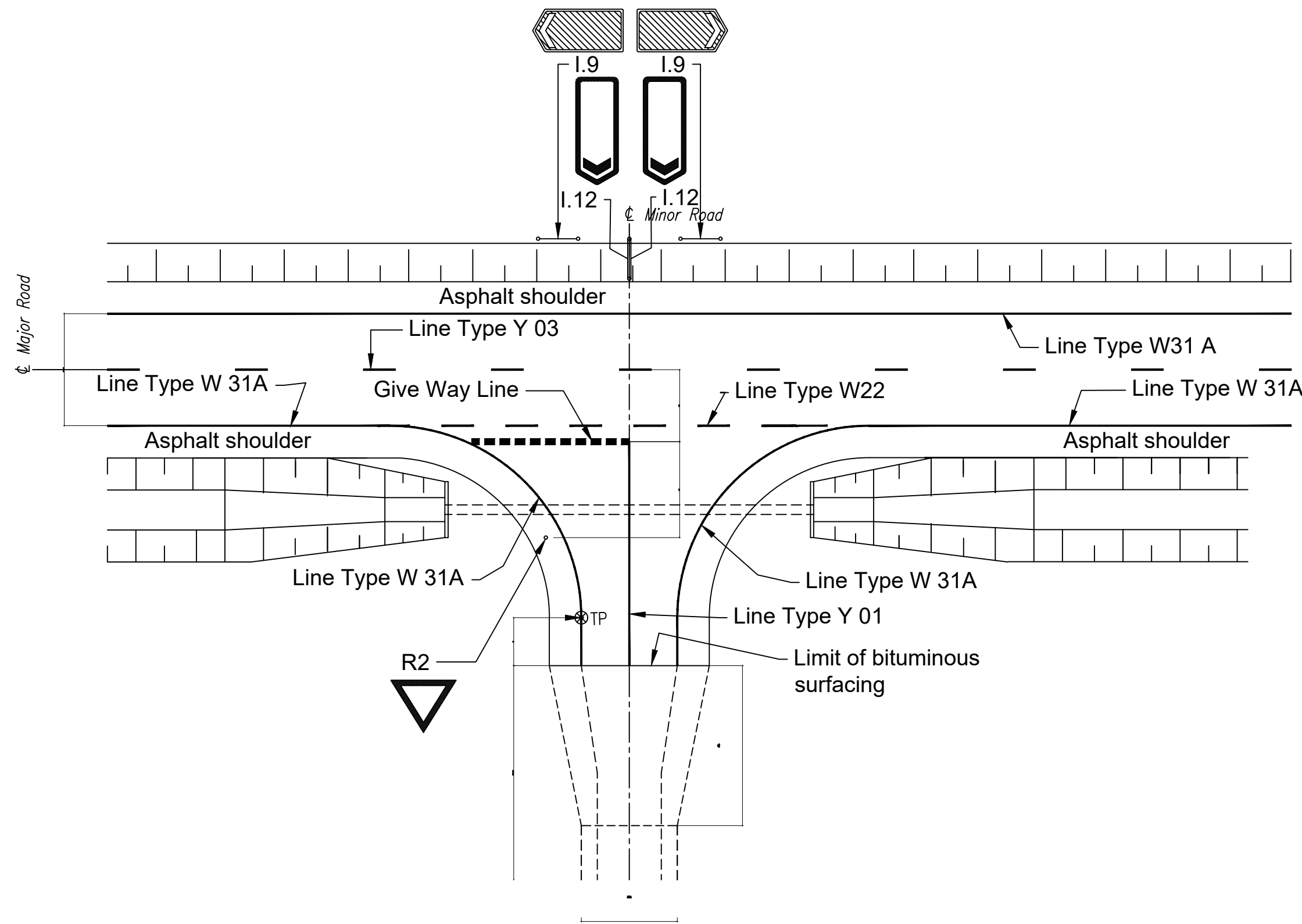
|                                    |
|------------------------------------|
| DRAWING TITLE:                     |
| STANDARD DRAWING -<br>ROAD MARKING |

|                                                            |
|------------------------------------------------------------|
| DRAWN BY: S.W.O<br>DESIGNED BY: C.N.M<br>CHECKED BY: M.J.N |
| Scale: AS SHOWN                                            |

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|----------------------------|
| Drg No.<br>CE1045/SD/IM/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 |
|-----|------|-------------|
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P. O. Box 68053-00200 Nairobi  
Tel. (020) 2717213/4

PROJECT TITLE:  
FINAL DETAILED ENGINEERING DESIGN OF  
ITUGURURU - KAMAENDE (ROAD)  
BATCH 2

DRAWING TITLE:  
STANDARD DRAWING -  
MISC MARKING ON  
JUNCTION

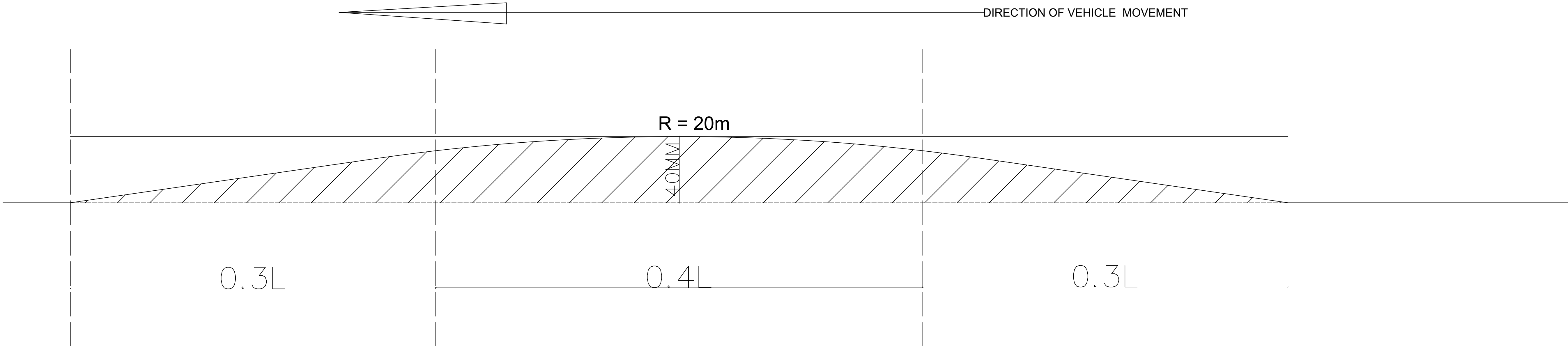
DRAWN BY: S.W.O  
DESIGNED BY: C.N.M  
CHECKED BY: M.J.N

Scale: AS SHOWN

Dwg No.  
CE1045/SD/IM/08

Date : MARCH 2025

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 |
|-----|------|-------------|
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**Kenya Rural Roads Authority**  
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| DIRECTOR ( PLANNING , DESIGN &ENVIRONMENT) |  |
|                                            |  |
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|--------------------------------------------------------------------------------|
| PROJECT TITLE:                                                                 |
| FINAL DETAILED ENGINEERING DESIGN OF<br>ITUGURURU - KAMAENDE (ROAD)<br>BATCH 2 |

|                                        |
|----------------------------------------|
| DRAWING TITLE:                         |
| STANDARD DRAWING -<br>STANDARD - BUMPS |

|                                                            |
|------------------------------------------------------------|
| DRAWN BY: S.W.O<br>DESIGNED BY: C.N.M<br>CHECKED BY: M.J.N |
| Scale: AS SHOWN                                            |

|                            |
|----------------------------|
| Drg No.<br>CE1045/SD/IM/09 |
| Date : MARCH 2025          |