TANA WATER WORKS DEVELOPMENT AGENCY

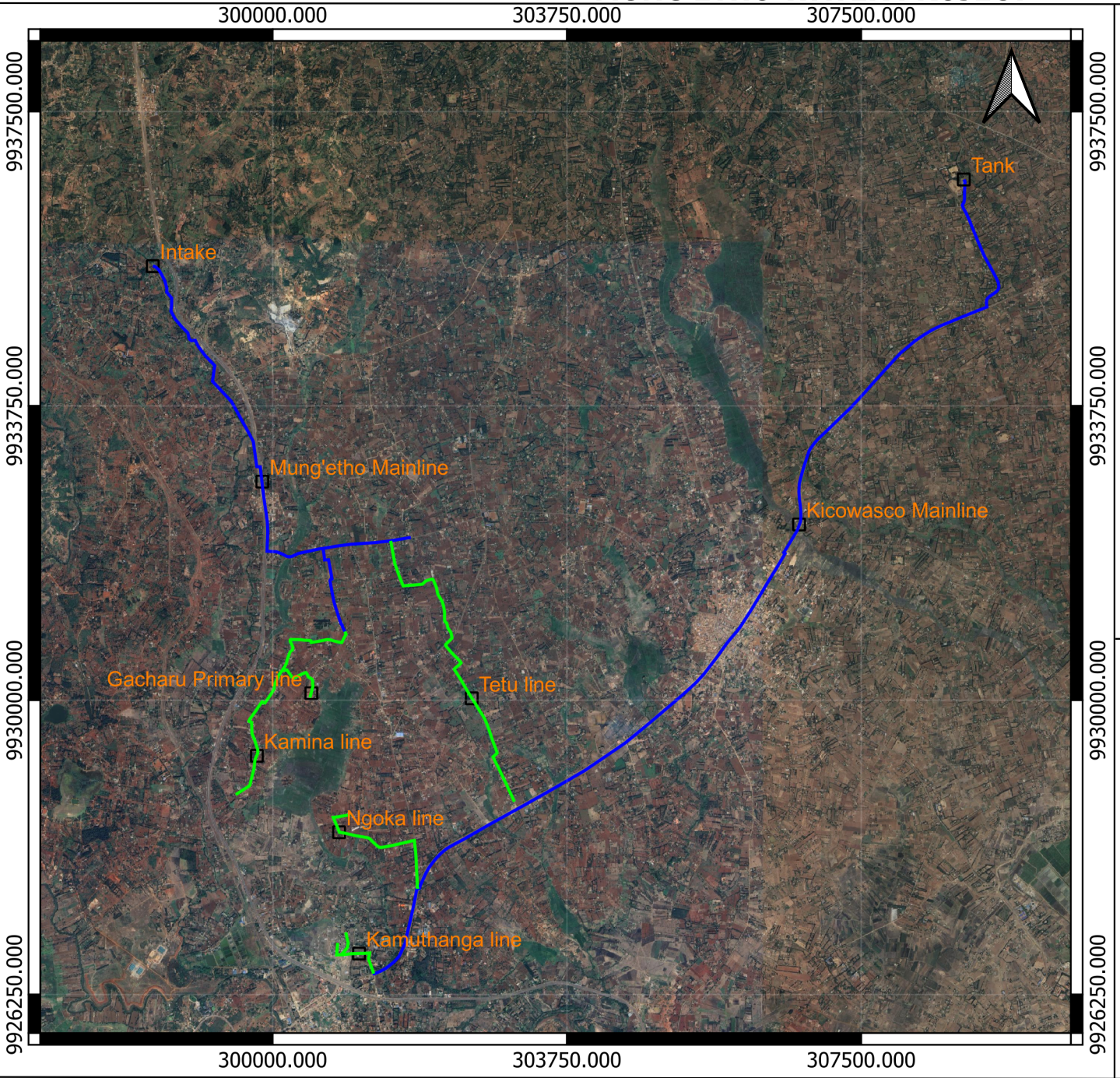
MUNG'ETHO-GACHARU WATER PROJECT

LAST MILE CONNECTIVITY

DESIGN DRAWINGS

MAY 2026

MUNG'ETHO WATER PROJECT



Legend

- Existing Main line
- Feature
- Proposed Distribution line

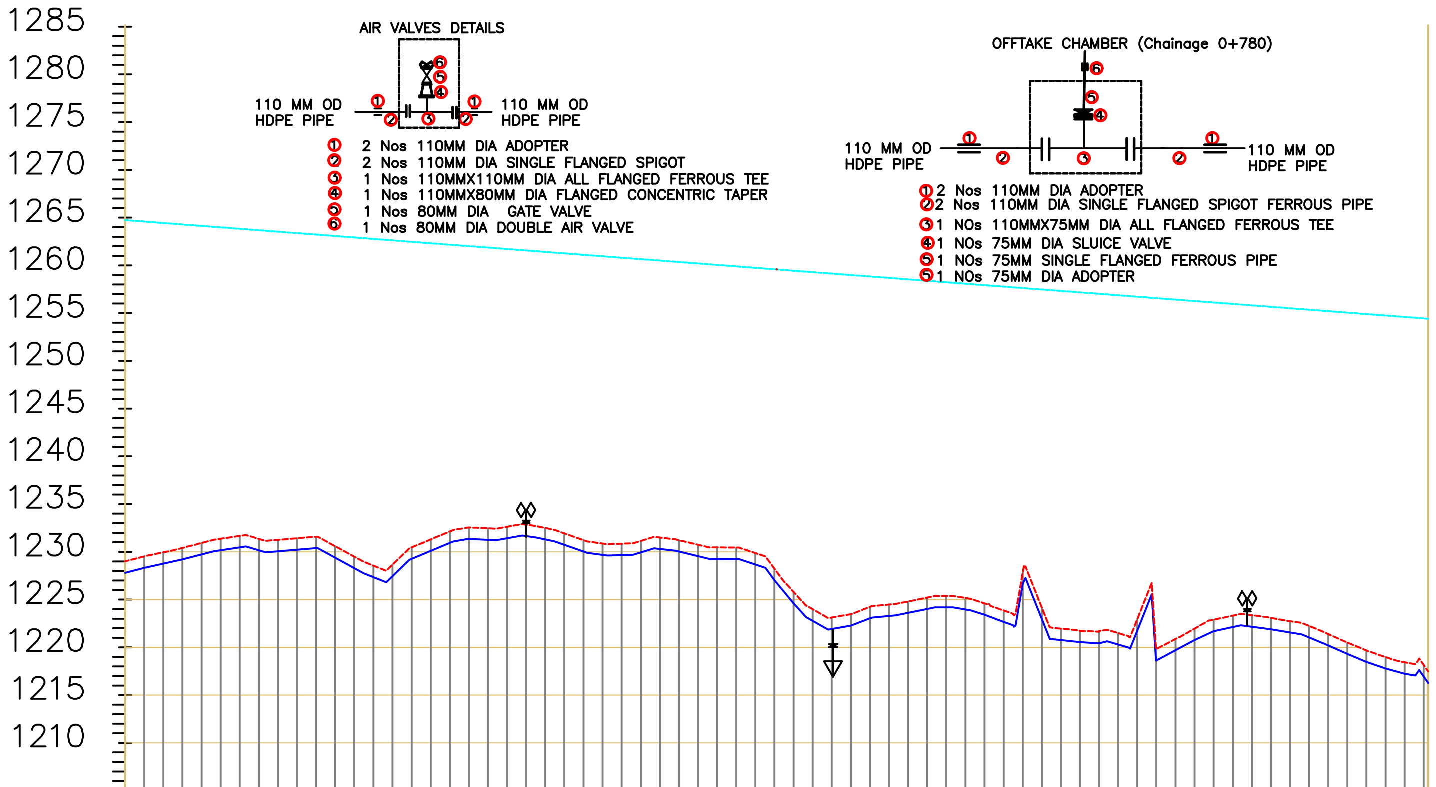
0 3,000 6,000 m

Scale 1:75,000

EPSG CODE : 32737

WGS 84 UTM 37S

TANA WATER WORKS DEVELOPMENT AGENCY



AIR VALVES DETAILS

110 MM OD HDPE PIPE — 110 MM OD HDPE PIPE

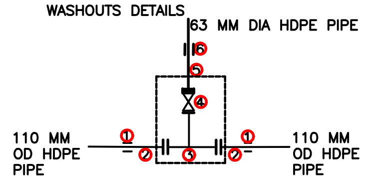
1. 2 Nos 110MM DIA ADOPTER
2. 2 Nos 110MM DIA SINGLE FLANGED SPIGOT
3. 1 Nos 110MMX110MM DIA ALL FLANGED FERROUS TEE
4. 1 Nos 110MMX80MM DIA FLANGED CONCENTRIC TAPER
5. 1 Nos 80MM DIA GATE VALVE
6. 1 Nos 80MM DIA DOUBLE AIR VALVE

OFFTAKE CHAMBER (Chainage 0+780)

110 MM OD HDPE PIPE — 110 MM OD HDPE PIPE

1. 2 Nos 110MM DIA ADOPTER
2. 2 Nos 110MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
3. 1 NOs 110MMX75MM DIA ALL FLANGED FERROUS TEE
4. 1 NOs 75MM DIA SLUICE VALVE
5. 1 NOs 75MM SINGLE FLANGED FERROUS PIPE
5. 1 NOs 75MM DIA ADOPTER

WASHOUTS DETAILS



1. 2 No 110MM DIA ADOPTER
2. 2 No 110MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
3. 1 No 110MM X 63MM DIA FLANGED FERROUS TEE
4. 1 No 63MM DIA FLANGED GATE VALVE
5. 1 No 63MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
6. 1 No 63MM DIA ADOPTER

DISTANCE DATUM (m)	0+000	0+020.00	0+040.00	0+060.00	0+080.00	0+100.00	0+120.00	0+140.00	0+160.00	0+180.00	0+200.00	0+220.00
GROUND LEVELS (m)		1229.52	1229.95	1230.41	1230.93	1231.37	1231.67	1231.36	1231.26	1231.42	1231.59	1230.59
INVERT LEVELS(m)		1228.32	1228.77	1229.21	1229.73	1230.17	1230.47	1230.16	1230.06	1230.22	1230.39	1229.39
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)			1.19		1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
HYDRAULIC GRADE LEVEL	1264.74	1264.59	1264.44	1264.29	1264.13	1263.98	1263.83	1263.68	1263.53	1263.38	1263.23	1263.08

DISTANCE DATUM (m)	0+240.00	0+260.00	0+280.00	0+300.00	0+320.00	0+340.00	0+360.00	0+380.00	0+400.00	0+420.00	0+440.00	0+460.00
GROUND LEVELS (m)	1229.50	1228.56	1228.66	1230.47	1231.30	1232.14	1232.55	1232.47	1232.62	1232.85	1232.50	1231.94
INVERT LEVELS(m)	1228.30	1227.36	1227.46	1229.27	1230.10	1230.94	1231.35	1231.27	1231.42	1231.65	1231.30	1230.74
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	1.20	1.20	1.20	1.20	1.20		1.20		1.20	1.20	1.20	1.20
HYDRAULIC GRADE LEVEL	1262.92	1262.77	1262.62	1262.47	1262.32	1262.17	1262.02	1261.86	1261.71	1261.56	1261.41	1261.26

DISTANCE DATUM (m)	0+480.00	0+500.00	0+520.00	0+540.00	0+560.00	0+580.00	0+600.00	0+620.00	0+640.00	0+660.00	0+680.00	0+700.00
GROUND LEVELS (m)	1231.23	1230.87	1230.86	1231.15	1231.50	1231.22	1230.74	1230.47	1230.45	1229.87	1228.24	1225.81
INVERT LEVELS(m)	1230.03	1229.68	1229.66	1229.95	1230.31	1230.04	1229.54	1229.26	1229.25	1228.68	1227.04	1224.61
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)		1.20	1.20	1.20	1.20	1.18		1.20	1.20	1.20		
HYDRAULIC GRADE LEVEL	1261.11	1260.96	1260.80	1260.65	1260.50	1260.35	1260.20	1260.05	1259.90	1259.75	1259.59	1259.44

DISTANCE DATUM (m)	0+720.00	0+740.00	0+760.00	0+780.00	0+800.00	0+820.00	0+840.00	0+860.00	0+880.00	0+900.00	0+920.00	0+940.00
GROUND LEVELS (m)	1224.00	1223.12	1223.47	1224.25	1224.48	1224.80	1225.22	1225.38	1225.17	1224.61	1223.86	1227.86
INVERT LEVELS(m)	1222.78	1221.93	1222.27	1223.05	1223.28	1223.61	1224.02	1224.18	1223.97	1223.41	1222.66	1226.66
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	1.23	1.20			1.20	1.19		1.20	1.20			
HYDRAULIC GRADE LEVEL	1259.29	1259.14	1258.99	1258.84	1258.69	1258.53	1258.38	1258.23	1258.08	1257.93	1257.78	1257.63

DISTANCE DATUM (m)	0+960.00	0+980.00	1+000.00	1+020.00	1+040.00	1+060.00	1+080.00	1+100.00	1+120.00	1+140.00	1+160.00	1+180.00
GROUND LEVELS (m)	1224.16	1221.96	1221.74	1221.72	1221.50	1222.96	1219.83	1220.87	1221.96	1222.90	1223.32	1223.37
INVERT LEVELS(m)	1222.97	1220.76	1220.54	1220.43	1220.29	1221.76	1218.63	1219.70	1220.76	1221.70	1222.13	1222.15
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	1.19	1.19		1.30	1.21	1.20	1.20	1.17			1.20	1.21
HYDRAULIC GRADE LEVEL	1257.48	1257.32	1257.17	1257.02	1256.87	1256.72	1256.57	1256.42	1256.26	1256.11	1255.96	1255.81

DISTANCE DATUM (m)	1+200.00	1+220.00	1+240.00	1+260.00	1+280.00	1+300.00	1+320.00	1+340.00	1+360.00
GROUND LEVELS (m)	1223.09	1222.74	1222.24	1221.39	1220.51	1219.67	1218.98	1218.43	1218.14
INVERT LEVELS(m)	1221.89	1221.56	1221.03	1220.19	1219.31	1218.47	1217.78	1217.23	1216.94
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)		1.18	1.21						1.20
HYDRAULIC GRADE LEVEL	1255.66	1255.51	1255.36	1255.21	1255.05	1254.90	1254.75	1254.60	1254.45

FLOW DATA	← 1.1 m/s — 0.6 m/s →
TYPE OF PIPE AND SIZE	← OD 110MM, PN10 HDPE PIPE → (A.V, W.O, AV)

TETU LAST MILE

SCALE: HOR 1:2000 VERT 1:1000

NOTES

1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
2. COORDINATES ARE BASED ON UTM.
3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

LEGEND:

- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- Section Valve
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

FOR TENDERING

signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV–4		BY			
		CHECKED			
REV–3		BY			
		CHECKED			
REV–2		BY			
		CHECKED			
REV–1		BY			
		CHECKED			

CLIENT

TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

PROJECT

MUNG'ETHO GACHARU WATER PROJECT– LAST MILE CONNECTIVITY

Engineer

CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title

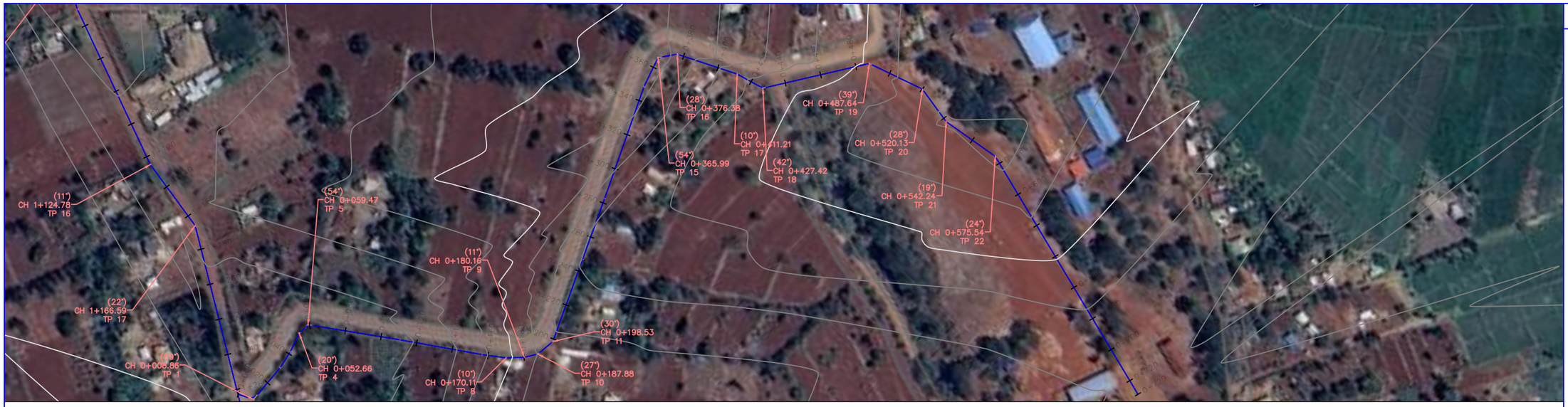
MUMBU LINE EXTENSION

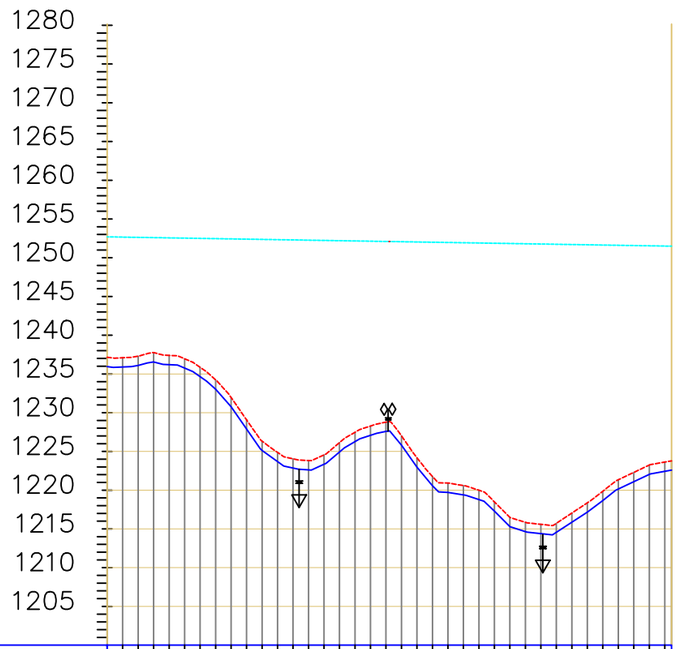
PLAN AND PROFILE

SHEET 1 OF 1

Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME

DRAWING No. TWWDA/MGWP–LMC/ML/01





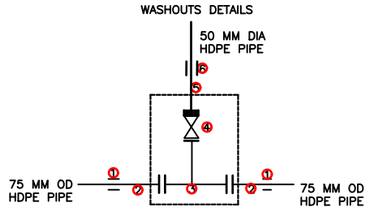
DISTANCE DATUM (m)	0+000.00	0+020.00	0+040.00	0+060.00	0+080.00	0+100.00	0+120.00	0+140.00	0+160.00	0+180.00	0+200.00	0+220.00	0+240.00	0+260.00	0+280.00	0+300.00	0+320.00	0+340.00	0+360.00	0+380.00	0+400.00	0+420.00	0+440.00	0+460.00	0+480.00	0+500.00	0+520.00	0+540.00	0+560.00	0+580.00	0+600.00	0+620.00	0+640.00	0+660.00	0+680.00	0+700.00	0+720.00
GROUND LEVELS (m)	1237.09	1237.29	1237.75	1237.40	1236.98	1235.86	1234.24	1231.97	1229.06	1226.32	1224.87	1224.05	1224.55	1226.14	1227.47	1228.28	1228.78	1227.01	1224.18	1221.77	1220.92	1220.59	1219.99	1218.49	1216.49	1215.85	1215.59	1215.72	1217.04	1218.37	1219.86	1221.34	1222.30	1223.25	1223.63
INVERT LEVELS(m)	1235.90	1236.58	1235.76	1234.66	1227.90	1225.13	1223.69	1222.85	1222.62	1224.94	1226.27	1227.08	1218.79	1215.30	1214.39	1214.56	1215.86	1220.14	1221.10	1222.05	1222.43														
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	1.19	1.20	1.20	1.20	1.16	1.19	1.18	1.20	1.21	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
HYDRAULIC GRADE LEVEL	1252.69	1252.66	1252.63	1252.60	1252.56	1252.53	1252.50	1252.43	1252.40	1252.36	1252.33	1252.30	1252.27	1252.23	1252.20	1252.17	1252.13	1252.10	1252.07	1252.03	1252.00	1251.97	1251.93	1251.90	1251.87	1251.84	1251.80	1251.77	1251.74	1251.70	1251.67	1251.64	1251.60	1251.57	1251.54	1251.50	1251.49
FLOW DATA	0.3 m/s																																		
TYPE OF PIPE AND SIZE	OD 75MM, PN10 HDPE PIPE																																		
	W.O																	A.V																	W.O	

TETU LAST MILE
SCALE: HOR 1:2000 VERT 1:1000

AIR VALVES DETAILS

① 2 Nos 75MM DIA ADOPTER
② 2 Nos 75MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
③ 1 Nos 75MMX75MM DIA ALL FLANGED FERROUS TEE
④ 1 Nos 75MMX50MM DIA FLANGED CONCENTRIC TAPER
⑤ 1 Nos 50MM DIA GATE VALVE
⑥ 1 Nos 50MM DIA DOUBLE AIR VALVE

WASHOUTS DETAILS



① 2 No 75MM DIA ADOPTER
② 2 No 75MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
③ 1 No 75MM X 50MM DIA FLANGED FERROUS TEE
④ 1 No 50MM DIA FLANGED GATE VALVE
⑤ 1 No 50MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
⑥ 1 No 50MM DIA ADOPTER

NOTES

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2. COORDINATES ARE BASED ON UTM.
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- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
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- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
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- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV–4		BY			
		CHECKED			
REV–3		BY			
		CHECKED			
REV–2		BY			
		CHECKED			
REV–1		BY			
		CHECKED			

CLIENT
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

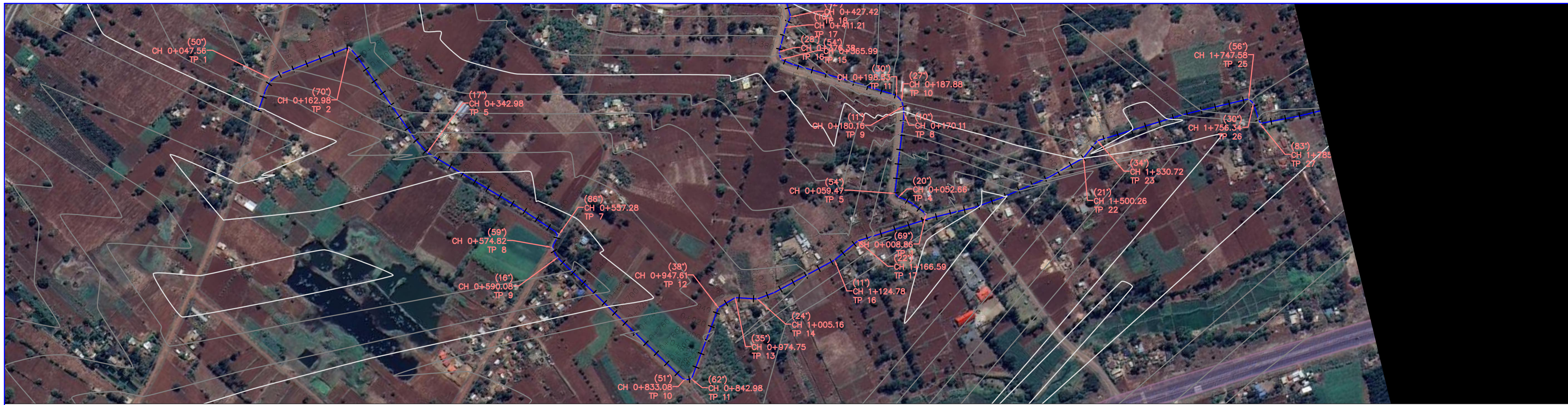
PROJECT
MUNG'ETHO WATER PROJECT

Engineer
CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title
GACHARU_PRIMARY_LINE
PLAN_AND_PROFILE
SHEET_1_OF_1

Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME

DRAWING No. TWWDA/MWP/GP/01



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- EXISTING STRUCTURE
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ISSUED FOR TENDERING
signed CMTS

AIR VALVES DETAILS

110 MM OD HDPE PIPE — 110 MM OD HDPE PIPE

1. 2 Nos 110MM DIA ADOPTER
2. 2 Nos 110MM DIA SINGLE FLANGED SPIGOT
3. 1 Nos 110MMX110MM DIA ALL FLANGED FERROUS TEE
4. 1 Nos 110MMX50MM DIA FLANGED CONCENTRIC TAPER
5. 1 Nos 50MM DIA GATE VALVE
6. 1 Nos 50MM DIA DOUBLE AIR VALVE

OFFTAKE CHAMBER
Chainage 1+260

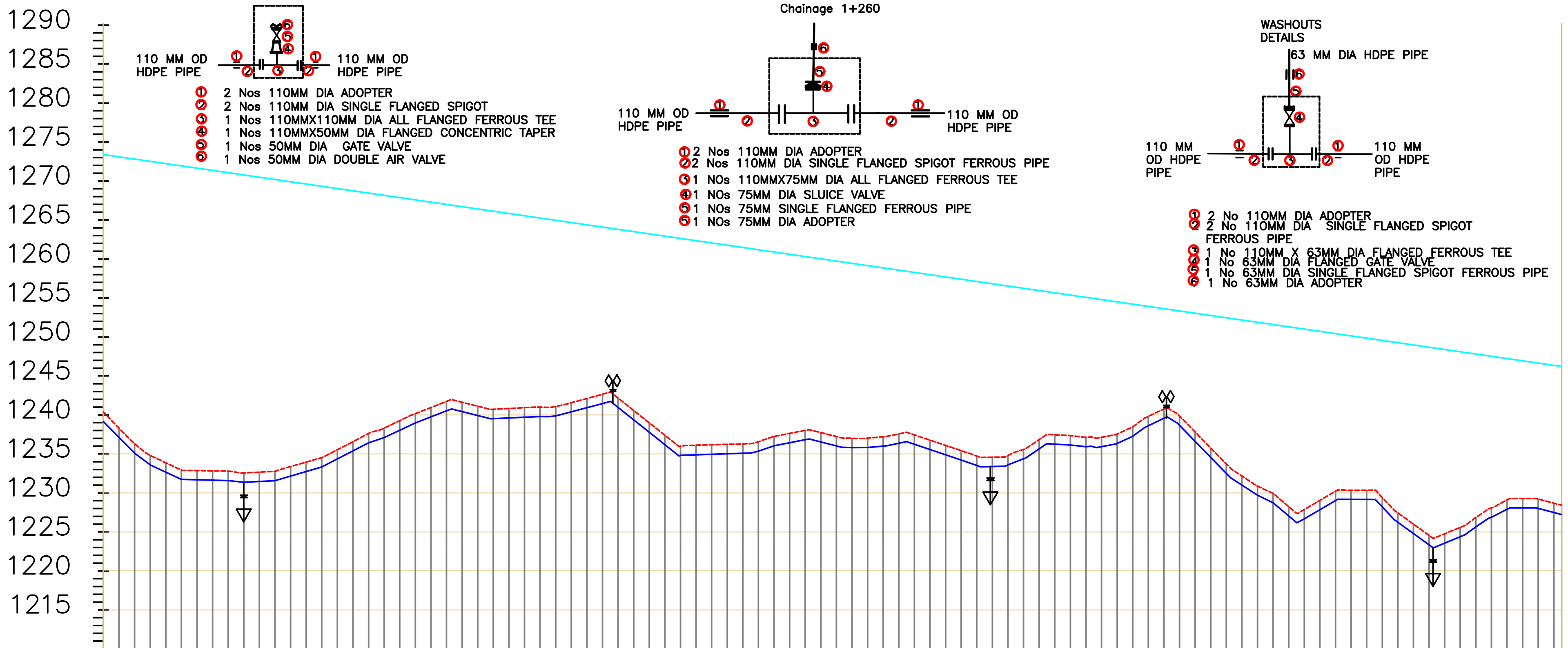
110 MM OD HDPE PIPE — 110 MM OD HDPE PIPE

1. 2 Nos 110MM DIA ADOPTER
2. 2 Nos 110MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
3. 1 NOs 110MMX75MM DIA ALL FLANGED FERROUS TEE
4. 1 NOs 75MM DIA SLUICE VALVE
5. 1 NOs 75MM SINGLE FLANGED FERROUS PIPE
5. 1 NOs 75MM DIA ADOPTER

WASHOUTS DETAILS

63 MM DIA HDPE PIPE
110 MM OD HDPE PIPE — 110 MM OD HDPE PIPE

1. 2 No 110MM DIA ADOPTER
2. 2 No 110MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
3. 1 No 110MM X 63MM DIA FLANGED FERROUS TEE
4. 1 No 63MM DIA FLANGED GATE VALVE
5. 1 No 63MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
6. 1 No 63MM DIA ADOPTER



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	HYDRAULIC GRADE LEVEL
				1273.39
0+020.00	1238.31			1273.10
0+040.00	1236.32	1235.13	1.19	1272.81
0+060.00	1234.80	1233.62	1.18	1272.52
0+080.00	1233.86	1232.67	1.20	1272.23
0+100.00	1232.93			1271.94
0+120.00	1232.86	1231.69	1.18	1271.65
0+140.00	1232.83	1231.64	1.19	1271.35
0+160.00	1232.79			1271.06
0+180.00	1232.56			1270.77
0+200.00	1232.66	1231.46	1.20	1270.48
0+220.00	1232.76			1270.19
0+240.00	1233.38	1232.15	1.23	1269.90
0+260.00	1233.95	1232.74	1.21	1269.61
0+280.00	1234.53			1269.32
0+300.00	1235.53	1234.36	1.17	1269.03
0+320.00	1236.56	1235.39	1.17	1268.74
0+340.00	1237.62			1268.45
0+360.00	1238.30			1268.16
0+380.00	1239.27	1238.04	1.23	1267.87
0+400.00	1240.17			1267.58
0+420.00	1240.95	1239.75	1.20	1267.29
0+440.00	1241.74			1267.00
0+460.00	1241.63	1240.43	1.20	1266.71
0+480.00	1241.12	1239.92	1.20	1266.42
0+500.00	1240.72	1239.52	1.20	1266.12
0+520.00	1240.83	1239.62	1.21	1265.83
0+540.00	1240.93	1239.71	1.22	1265.54
0+560.00	1241.00	1239.80	1.20	1265.25
0+580.00	1241.08			1264.96
0+600.00	1241.56	1240.41	1.15	1264.67
0+620.00	1242.11	1240.93	1.18	1264.38
0+640.00	1242.66			1264.09
0+660.00	1242.17	1240.97	1.20	1263.80
0+680.00	1240.57	1239.37	1.20	1263.51
0+700.00	1238.98	1237.78	1.20	1263.22
0+720.00	1237.39			1262.93
0+740.00	1236.01			1262.64
0+760.00	1236.12	1234.88	1.24	1262.35
0+780.00	1236.18	1234.95	1.23	1262.06
0+800.00	1236.23	1235.02	1.21	1261.77
0+820.00	1236.29			1261.48
0+840.00	1236.56			1261.18
0+860.00	1237.24			1260.89
0+880.00	1237.64	1236.44	1.20	1260.60
0+900.00	1238.03			1260.31
0+920.00	1237.74	1236.54	1.20	1260.02
0+940.00	1237.23			1259.73
0+960.00	1237.01			1259.44
0+980.00	1237.02			1259.15
1+000.00	1237.21	1236.01	1.20	1258.86
1+020.00	1237.57	1236.37	1.20	1258.57
1+040.00	1237.45	1236.24	1.20	1258.28
1+060.00	1236.77	1235.57	1.20	1257.99
1+080.00	1236.10	1234.89	1.21	1257.70
1+100.00	1235.41			1257.41
1+120.00	1234.73			1257.12
1+140.00	1234.58	1233.38	1.20	1256.83
1+160.00	1234.80			1256.54
1+180.00	1235.58			1256.25
1+200.00	1236.84	1235.64	1.20	1255.95
1+220.00	1237.45	1236.25	1.20	1255.66
1+240.00	1237.35			1255.37
1+260.00	1237.13			1255.08
1+280.00	1237.13	1235.94	1.20	1254.79
1+300.00	1237.54	1236.34	1.20	1254.50
1+320.00	1238.47	1237.27	1.20	1254.21
1+340.00	1239.82	1238.62	1.20	1253.92
1+360.00	1240.77	1239.57	1.20	1253.63
1+380.00	1239.85	1238.65	1.20	1253.34
1+400.00	1237.81	1236.61	1.20	1253.05
1+420.00	1235.76	1234.56	1.20	1252.76
1+440.00	1233.71			1252.47
1+460.00	1232.16	1231.00	1.16	1252.18
1+480.00	1230.86			1251.89
1+500.00	1229.94			1251.60
1+520.00	1228.24			1251.31
1+540.00	1227.87			1251.02
1+560.00	1229.05	1227.85	1.20	1250.72
1+580.00	1230.23			1250.43
1+600.00	1230.35	1229.17	1.17	1250.14
1+620.00	1230.35	1229.16	1.19	1249.85
1+640.00	1229.41	1228.21	1.20	1249.56
1+660.00	1227.44	1226.24	1.20	1249.27
1+680.00	1225.99	1224.79	1.20	1248.98
1+700.00	1224.54	1223.34	1.20	1248.69
1+720.00	1224.76	1223.56	1.20	1248.40
1+740.00	1225.58			1248.11
1+760.00	1226.85			1247.82
1+780.00	1228.07			1247.53
1+800.00	1229.10			1247.24
1+820.00	1229.28	1228.08	1.20	1246.95
1+840.00	1229.21	1228.01	1.20	1246.66
1+860.00	1228.69	1227.49	1.20	1246.37
				1246.22

FLOW DATA: 1.4 m/s — 1.2 m/s

TYPE OF PIPE AND SIZE: OD 110MM, PN10 HDPE PIPE (w.o, A.v, w.o, A.v, w.o)

TETU LAST MILE
SCALE: HOR 1:2000 VERT 1:1000

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1		BY			
		CHECKED			

CLIENT
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

PROJECT
MUNG'ETHO WATER PROJECT

Engineer
CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title
KAMINA LINE
PLAN AND PROFILE
SHEET 1 OF 2

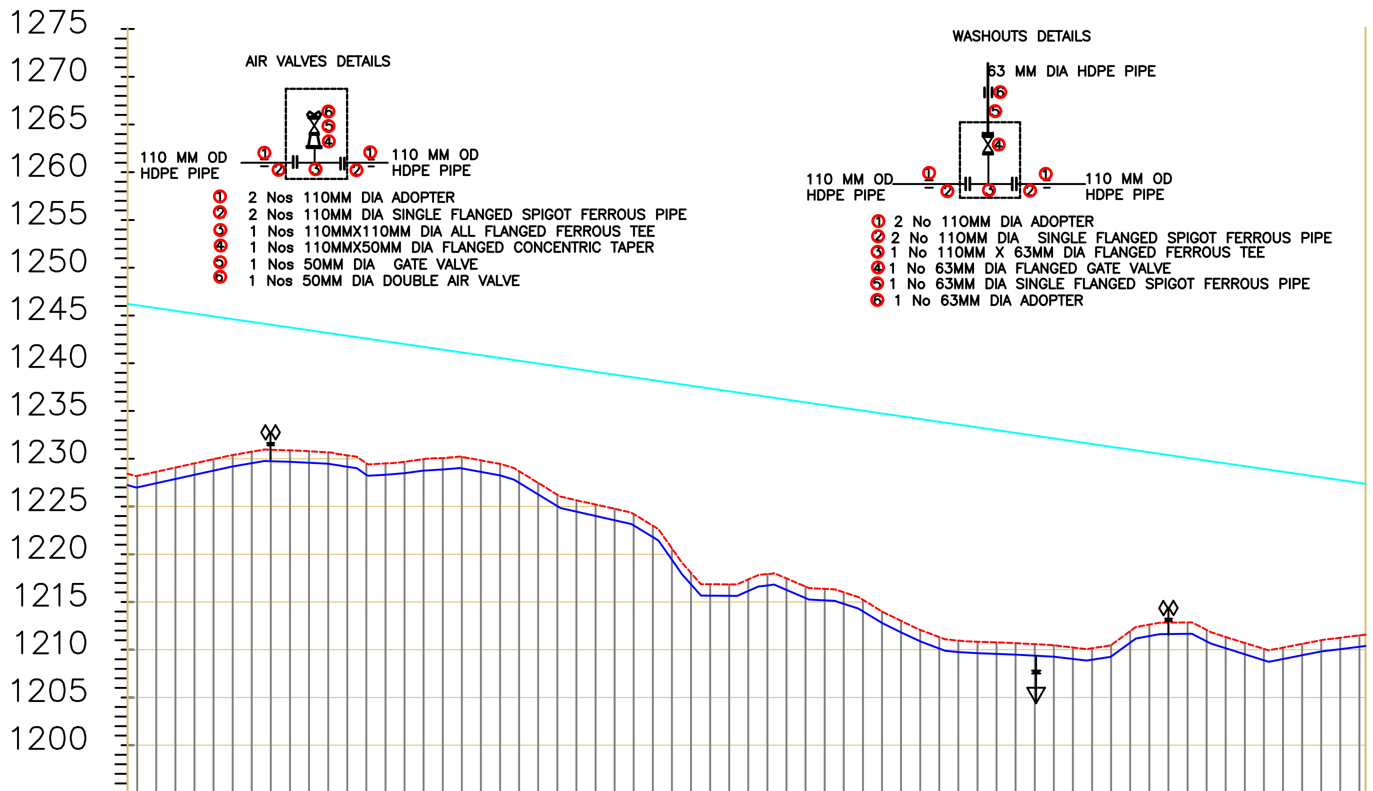
Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME
DRAWING No. TWWDA/MWP/KAM/01	

NOTES

1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
2. COORDINATES ARE BASED ON UTM.
3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

LEGEND:

- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- Section Valve
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	HYDRAULIC GRADE LEVEL
1+880.00	1228.20	1227.00	1.20	1246.23 / 1246.08
1+900.00	1228.64	1227.44	1.20	1245.78
1+920.00	1229.08	1227.88	1.20	1245.49
1+940.00	1229.52	1228.32	1.20	1245.20
1+960.00	1229.96			1244.91
1+980.00	1230.38			1244.62
2+000.00	1230.73	1229.53	1.20	1244.33
2+020.00	1230.94	1229.74	1.20	1244.04
2+040.00	1230.87			1243.75
2+060.00	1230.79	1229.57	1.22	1243.46
2+080.00	1230.67			1243.17
2+100.00	1230.35			1242.88
2+120.00	1229.51			1242.59
2+140.00	1229.52			1242.30
2+160.00	1229.68			1242.01
2+180.00	1229.96			1241.72
2+200.00	1230.07			1241.43
2+220.00	1230.20	1228.99	1.20	1241.14
2+240.00	1229.83	1228.63	1.20	1240.85
2+260.00	1229.46			1240.55
2+280.00	1228.69	1227.48	1.21	1240.26
2+300.00	1227.46	1226.26	1.21	1239.97
2+320.00	1226.23			1239.68
2+340.00	1225.65	1224.45	1.20	1239.39
2+360.00	1225.21	1224.00	1.21	1239.10
2+380.00	1224.76	1223.55	1.21	1238.81
2+400.00	1224.21	1223.01	1.20	1238.52
2+420.00	1222.99	1221.79	1.20	1238.23
2+440.00	1220.62			1237.94
2+460.00	1218.04	1216.84	1.20	1237.65
2+480.00	1216.86	1215.66	1.20	1237.36
2+500.00	1216.85	1215.65	1.20	1237.07
2+520.00	1217.36	1216.16	1.20	1236.78
2+540.00	1217.92			1236.49
2+560.00	1217.46	1216.26	1.20	1236.20
2+580.00	1216.61	1215.41	1.20	1235.91
2+600.00	1216.37	1215.17	1.20	1235.62
2+620.00	1216.02	1214.81	1.20	1235.32
2+640.00	1215.23	1214.02	1.20	1235.03
2+660.00	1214.01			1234.74
2+680.00	1213.02			1234.45
2+700.00	1212.07			1234.16
2+720.00	1211.32	1210.13	1.19	1233.87
2+740.00	1210.95			1233.58
2+760.00	1210.83			1233.29
2+780.00	1210.77	1209.56	1.21	1233.00
2+800.00	1210.69			1232.71
2+820.00	1210.58	1209.38	1.20	1232.42
2+840.00	1210.47			1232.13
2+860.00	1210.23	1209.03	1.20	1231.84
2+880.00	1210.15	1208.95	1.20	1231.55
2+900.00	1210.48	1209.28	1.20	1231.26
2+920.00	1211.95	1210.75	1.20	1230.97
2+940.00	1212.63	1211.43	1.20	1230.68
2+960.00	1212.84	1211.63	1.20	1230.38
2+980.00	1212.86			1230.09
3+000.00	1212.07	1210.87	1.20	1229.80
3+020.00	1211.34	1210.15	1.18	1229.51
3+040.00	1210.71	1209.52	1.19	1229.22
3+060.00	1210.09	1208.89	1.20	1228.93
3+080.00	1210.23	1209.03	1.19	1228.64
3+100.00	1210.61	1209.43	1.19	1228.35
3+120.00	1211.00	1209.82	1.18	1228.06
3+140.00	1211.26			1227.77
3+160.00	1211.51	1210.31	1.20	1227.48 / 1227.39

FLOW DATA: 1.2 m/s

TYPE OF PIPE AND SIZE: OD 110MM, PN10 HDPE PIPE — A.V (2+020), w.o (2+820), A.V (2+960)

TETU LAST MILE

SCALE: HOR 1:2000 VERT 1:1000

ISSUED FOR TENDERING

signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1		BY			
		CHECKED			

CLIENT

TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

PROJECT

MUNG'ETHO WATER PROJECT

Engineer

CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title

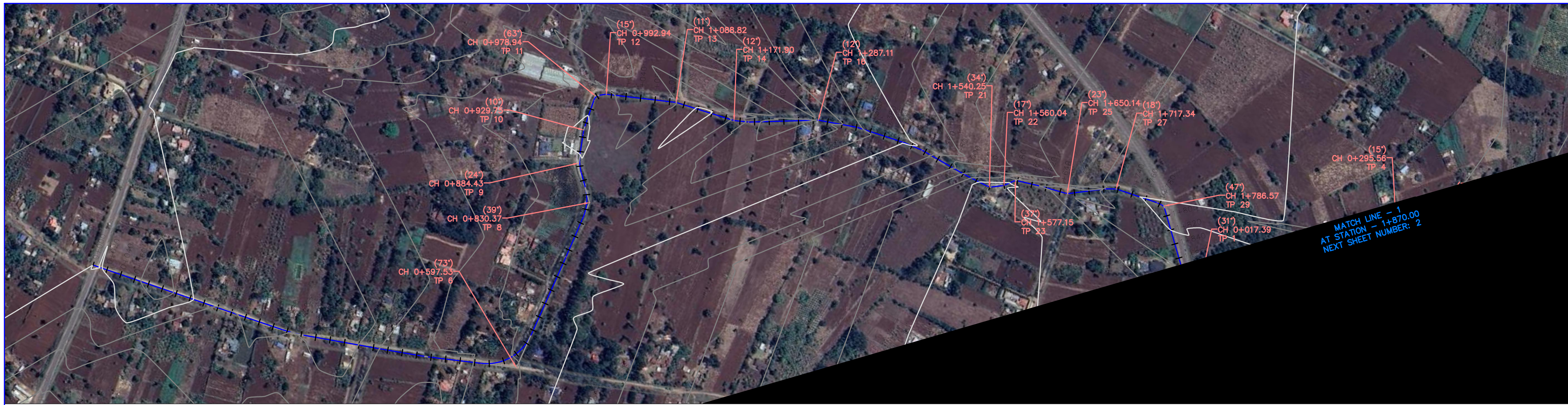
KAMINA LINE

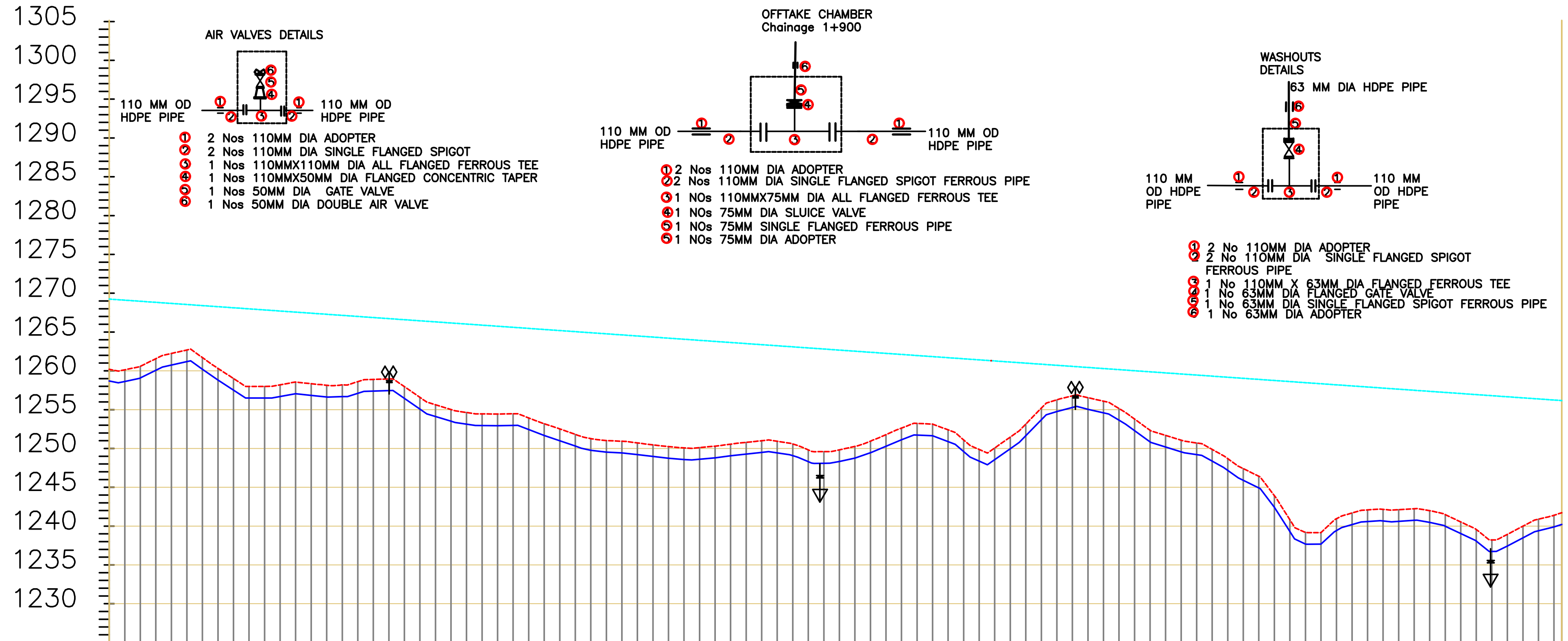
PLAN AND PROFILE

SHEET 2 OF 2

Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME

DRAWING No. TWWDA/MWP/KAM/02





DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	HYDRAULIC GRADE LEVEL
				1269.24
0+020.00	1260.14			1269.10
0+040.00	1260.58	1259.08	1.50	1268.96
0+060.00	1261.56			1268.82
0+080.00	1262.24	1260.74	1.50	1268.68
0+100.00	1262.69			1268.54
0+120.00	1261.71			1268.40
0+140.00	1260.32			1268.27
0+160.00	1259.01	1257.51	1.50	1268.13
0+180.00	1257.99	1256.49	1.50	1267.99
0+200.00	1258.00	1256.50	1.49	1267.85
0+220.00	1258.20	1256.70	1.50	1267.71
0+240.00	1258.55			1267.57
0+260.00	1258.34			1267.43
0+280.00	1258.13	1256.63	1.50	1267.29
0+300.00	1258.19	1256.69	1.50	1267.15
0+320.00	1258.61	1257.11	1.50	1267.01
0+340.00	1258.90	1257.40	1.50	1266.87
0+360.00	1258.96	1257.46	1.50	1266.73
0+380.00	1257.96	1256.46	1.50	1266.59
0+400.00	1256.58			1266.45
0+420.00	1255.63	1254.12	1.51	1266.31
0+440.00	1255.01			1266.17
0+460.00	1254.63	1253.13	1.50	1266.03
0+480.00	1254.46	1252.96	1.50	1265.89
0+500.00	1254.44			1265.75
0+520.00	1254.47	1252.97	1.50	1265.61
0+540.00	1253.94	1252.44	1.49	1265.47
0+560.00	1253.18			1265.33
0+580.00	1252.52	1251.00	1.53	1265.19
0+600.00	1251.81			1265.05
0+620.00	1251.27			1264.91
0+640.00	1251.02			1264.77
0+660.00	1250.93			1264.63
0+680.00	1250.72			1264.49
0+700.00	1250.47	1248.98	1.48	1264.35
0+720.00	1250.25			1264.21
0+740.00	1250.08			1264.07
0+760.00	1250.11	1248.61	1.50	1263.93
0+780.00	1250.30			1263.79
0+800.00	1250.56			1263.65
0+820.00	1250.78	1249.28	1.51	1263.51
0+840.00	1251.00	1249.50	1.50	1263.37
0+860.00	1250.93	1249.43	1.50	1263.23
0+880.00	1250.58			1263.09
0+900.00	1249.81			1262.95
0+920.00	1249.59			1262.81
0+940.00	1249.82			1262.67
0+960.00	1250.26			1262.53
0+980.00	1250.94	1249.45	1.49	1262.39
1+000.00	1251.78	1250.28	1.50	1262.25
1+020.00	1252.63			1262.11
1+040.00	1253.23	1251.73	1.50	1261.97
1+060.00	1253.13			1261.83
1+080.00	1252.39	1250.88	1.51	1261.69
1+100.00	1251.10			1261.55
1+120.00	1249.87	1248.37	1.50	1261.41
1+140.00	1250.07	1248.57	1.50	1261.27
1+160.00	1251.47			1261.13
1+180.00	1253.14	1251.65	1.50	1260.99
1+200.00	1255.20	1253.70	1.50	1260.85
1+220.00	1256.26			1260.71
1+240.00	1256.79	1255.28	1.50	1260.58
1+260.00	1256.54			1260.44
1+280.00	1256.09			1260.30
1+300.00	1255.15			1260.16
1+320.00	1253.79	1252.29	1.50	1260.02
1+340.00	1252.34	1250.84	1.50	1259.88
1+360.00	1251.69	1250.19	1.50	1259.74
1+380.00	1251.07			1259.60
1+400.00	1250.71	1249.21	1.50	1259.46
1+420.00	1249.88			1259.32
1+440.00	1248.69	1247.18	1.51	1259.18
1+460.00	1247.40	1245.90	1.50	1259.04
1+480.00	1246.42			1258.90
1+500.00	1243.92			1258.76
1+520.00	1240.80			1258.62
1+540.00	1239.20			1258.48
1+560.00	1239.18	1237.68	1.50	1258.34
1+580.00	1240.95	1239.43	1.53	1258.20
1+600.00	1241.69			1258.06
1+620.00	1242.09	1240.58	1.50	1257.92
1+640.00	1242.16	1240.66	1.50	1257.78
1+660.00	1242.12	1240.61	1.50	1257.64
1+680.00	1242.24			1257.50
1+700.00	1241.99			1257.36
1+720.00	1241.48			1257.22
1+740.00	1240.54	1239.04	1.50	1257.08
1+760.00	1239.56	1238.06	1.50	1256.94
1+780.00	1238.21	1236.73	1.48	1256.80
1+800.00	1238.94			1256.66
1+820.00	1239.99	1238.49	1.50	1256.52
1+840.00	1240.89	1239.40	1.49	1256.38
1+860.00	1241.39			1256.24
				1256.17

TYPE OF PIPE AND SIZE: ← OD 110MM, PN10 HDPE PIPE → (A.V, w.o, A.v, WO)

FLOW DATA: ← 0.9 m/s →

TETU LAST MILE
SCALE: HOR 1:2000 VERT 1:1000

NOTES

1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
2. COORDINATES ARE BASED ON UTM.
3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

LEGEND:

- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- Section Valve
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1		BY			
		CHECKED			

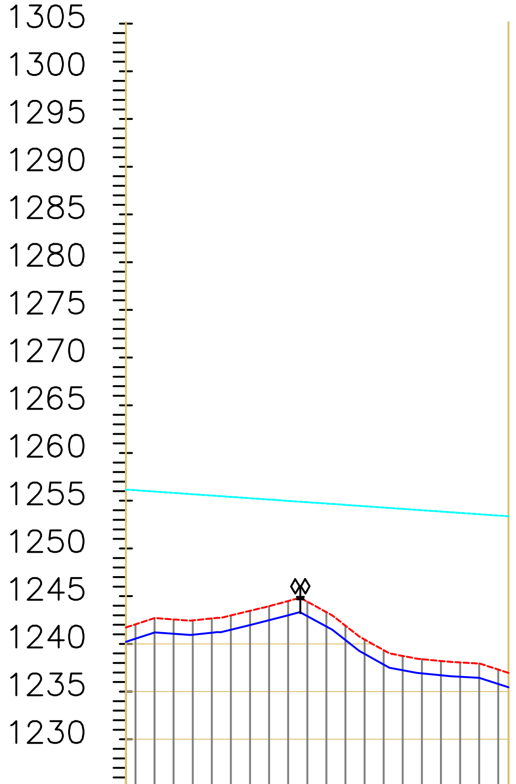
CLIENT
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

PROJECT
MUNG'ETHO WATER PROJECT

Engineer
CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title
TETU MAIN LINE
PLAN AND PROFILE
SHEET 1 OF 2

Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME
DRAWING No. TWWDA/MWP-/TML/01	



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)
1+880.00	1242.05		
1+900.00	1242.69	1241.19	1.50
1+920.00	1242.56	1241.06	1.50
1+940.00	1242.46	1240.96	1.50
1+960.00	1242.67		
1+980.00	1242.98	1241.48	1.50
2+000.00	1243.46		
2+020.00	1243.96	1242.48	1.48
2+040.00	1244.49	1242.99	1.50
2+060.00	1244.42	1242.90	1.52
2+080.00	1243.32		
2+100.00	1241.90	1240.40	1.50
2+120.00	1240.46	1238.96	1.50
2+140.00	1239.34		
2+160.00	1238.73	1237.23	1.50
2+180.00	1238.39	1236.90	1.49
2+200.00	1238.21	1236.71	1.50
2+220.00	1238.05	1236.55	1.50
2+240.00	1237.94		
2+260.00	1237.30	1235.80	1.51

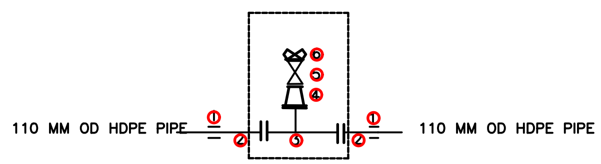
HYDRAULIC GRADE LEVEL: 1256.17, 1256.10, 1255.96, 1255.82, 1255.68, 1255.54, 1255.40, 1255.26, 1255.12, 1254.98, 1254.84, 1254.70, 1254.56, 1254.42, 1254.28, 1254.14, 1254.00, 1253.86, 1253.72, 1253.58, 1253.44, 1253.37

TYPE OF PIPE AND SIZE: ← OD 75MM, PN10 HDPE PIPE → A.V

FLOW DATA: ← 0.3 m/s →

TETU LAST MILE
SCALE: HOR 1:2000 VERT 1:1000

AIR VALVES DETAILS
CH 2+050



1. 2 Nos 110MM DIA ADOPTER
2. 2 Nos 110MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
3. 1 Nos 110MMX110MM DIA ALL FLANGED FERROUS TEE
4. 1 Nos 110MMX50MM DIA FLANGED CONCENTRIC TAPER
5. 1 Nos 50MM DIA GATE VALVE
6. 1 Nos 50MM DIA DOUBLE AIR VALVE

NOTES

1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
2. COORDINATES ARE BASED ON UTM.
3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

LEGEND:

- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- Section Valve
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1		BY			
		CHECKED			

CLIENT
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

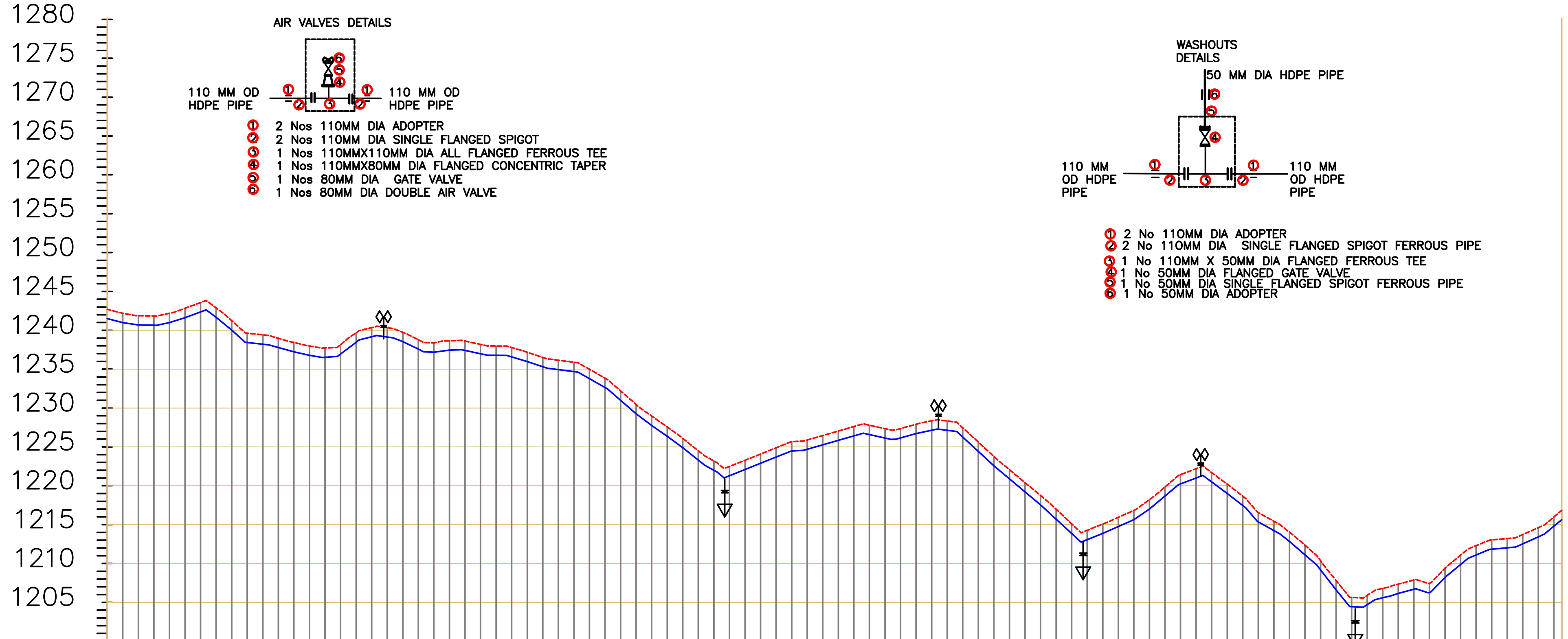
PROJECT
MUNG'ETHO WATER PROJECT

Engineer
CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title
TETU MAIN LINE
PLAN AND PROFILE
SHEET 2 OF 2

Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME

DRAWING No. TWWDA/MWP/TML/02



DISTANCE DATUM (m)	GROUND LEVELS (m)	INVERT LEVELS(m)	DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	HYDRAULIC GRADE LEVEL
				1296.76
0+020.00	1242.19			1296.61
0+040.00	1241.88			1296.46
0+060.00	1241.84			1296.30
0+080.00	1242.19			1296.15
0+100.00	1242.83			1296.00
0+120.00	1243.57	1242.37	1.20	1295.85
0+140.00	1242.88			1295.70
0+160.00	1241.24			1295.55
0+180.00	1239.63	1238.43	1.20	1295.39
0+200.00	1239.42	1238.22	1.20	1295.24
0+220.00	1238.97	1237.79	1.18	1295.09
0+240.00	1238.43			1294.94
0+260.00	1237.98			1294.79
0+280.00	1237.73	1236.52	1.21	1294.63
0+300.00	1238.15			1294.48
0+320.00	1239.67			1294.33
0+340.00	1240.34	1239.18	1.16	1294.18
0+360.00	1240.33	1239.13	1.20	1294.03
0+380.00	1239.74			1293.88
0+400.00	1238.78			1293.72
0+420.00	1238.39	1237.19	1.20	1293.57
0+440.00	1238.64			1293.42
0+460.00	1238.62	1237.42	1.20	1293.27
0+480.00	1238.18			1293.12
0+500.00	1237.98	1236.78	1.20	1292.96
0+520.00	1237.78			1292.81
0+540.00	1237.18			1292.66
0+560.00	1236.52	1235.32	1.20	1292.51
0+580.00	1236.15	1234.95	1.20	1292.36
0+600.00	1235.89	1234.69	1.20	1292.21
0+620.00	1234.98	1233.78	1.20	1292.05
0+640.00	1233.84			1291.90
0+660.00	1232.21	1231.00	1.20	1291.75
0+680.00	1230.46			1291.60
0+700.00	1228.97			1291.45
0+720.00	1227.56			1291.29
0+740.00	1226.09			1291.14
0+760.00	1224.50	1223.30	1.20	1290.99
0+780.00	1223.19	1221.99	1.20	1290.84
0+800.00	1222.49	1221.29	1.20	1290.69
0+820.00	1223.28	1222.09	1.19	1290.53
0+840.00	1224.08	1222.89	1.19	1290.38
0+860.00	1224.89			1290.23
0+880.00	1225.68	1224.48	1.20	1290.08
0+900.00	1225.89	1224.69	1.20	1289.93
0+920.00	1226.46	1225.27	1.19	1289.78
0+940.00	1227.04	1225.85	1.19	1289.62
0+960.00	1227.62	1226.42	1.20	1289.47
0+980.00	1227.79	1226.59	1.20	1289.32
1+000.00	1227.34	1226.14	1.20	1289.17
1+020.00	1227.36	1226.16	1.20	1289.02
1+040.00	1227.91			1288.86
1+060.00	1228.36	1227.14	1.22	1288.71
1+080.00	1228.33	1227.13	1.20	1288.56
1+100.00	1227.46	1226.26	1.20	1288.41
1+120.00	1225.62			1288.26
1+140.00	1223.77			1288.11
1+160.00	1222.07	1220.90	1.17	1287.95
1+180.00	1220.41	1219.22	1.19	1287.80
1+200.00	1218.75			1287.65
1+220.00	1217.00	1215.70	1.29	1287.50
1+240.00	1215.10	1213.86	1.24	1287.35
1+260.00	1214.27	1213.07	1.20	1287.19
1+280.00	1215.08			1287.04
1+300.00	1215.94	1214.76	1.18	1286.89
1+320.00	1216.83			1286.74
1+340.00	1218.22			1286.59
1+360.00	1219.85	1218.68	1.16	1286.44
1+380.00	1221.44	1220.23	1.20	1286.28
1+400.00	1222.20			1286.13
1+420.00	1221.69	1220.49	1.20	1285.98
1+440.00	1220.20			1285.83
1+460.00	1218.66			1285.68
1+480.00	1216.54	1215.35	1.19	1285.52
1+500.00	1215.43	1214.23	1.20	1285.37
1+520.00	1214.04			1285.22
1+540.00	1212.37	1211.11	1.25	1285.07
1+560.00	1210.36			1284.92
1+580.00	1207.80			1284.77
1+600.00	1205.64	1204.44	1.20	1284.61
1+620.00	1205.90	1204.70	1.20	1284.46
1+640.00	1206.80			1284.31
1+660.00	1207.35			1284.16
1+680.00	1207.89	1206.69	1.20	1284.01
1+700.00	1207.45			1283.85
1+720.00	1209.40	1208.20	1.20	1283.70
1+740.00	1211.07	1209.87	1.20	1283.55
1+760.00	1212.29			1283.40
1+780.00	1213.03	1211.83	1.20	1283.25
1+800.00	1213.21	1212.01	1.20	1283.09
1+820.00	1213.72	1212.52	1.20	1282.94
1+840.00	1214.62			1282.79
1+860.00	1215.99	1214.79	1.20	1282.64 1282.56

TYPE OF PIPE AND SIZE: OD 75MM, PN10 HDPE PIPE — A.V / WO / AV / WO / AV / WO

FLOW DATA: 0.7 m/s

TETU LAST MILE
SCALE: HOR 1:2000 VERT 1:1000

NOTES

1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
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LEGEND:

- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- Section Valve
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1		BY			
		CHECKED			

CLIENT
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

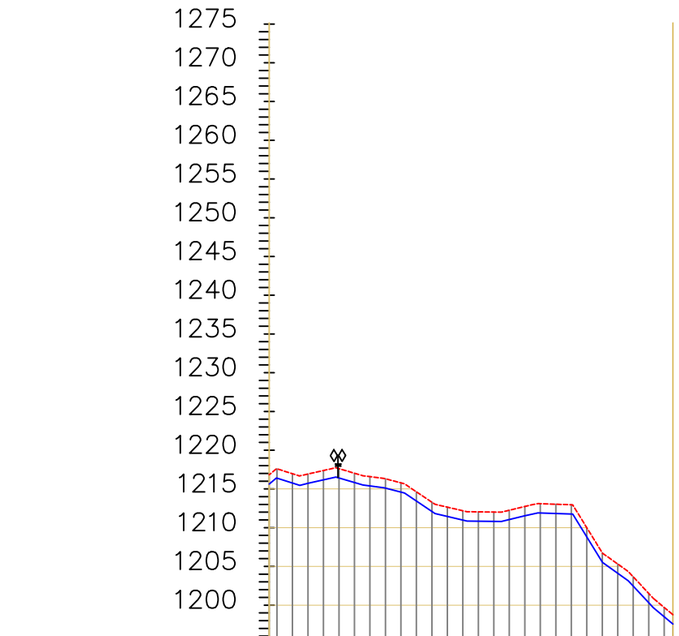
PROJECT
MUNG'ETHO WATER PROJECT

Engineer
CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title
TETU LAST MILE
PLAN AND PROFILE
SHEET 1 OF 2

Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME

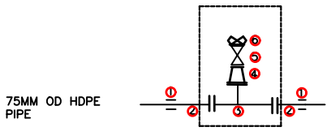
DRAWING No. TWWDA/MWP/TLM/01



DISTANCE DATUM (m)	0+000.00	0+020.00	0+040.00	0+060.00	0+080.00	0+100.00	0+120.00	0+140.00	0+160.00	0+180.00	0+200.00	0+220.00	0+240.00	0+260.00	0+280.00	0+300.00	0+320.00	0+340.00	0+360.00	0+380.00
GROUND LEVELS (m)	1216.96	1216.92	1217.36	1217.62	1217.02	1216.58	1216.31	1215.79	1214.63	1213.29	1212.65	1212.16	1212.04	1212.02	1212.25	1212.74	1213.10	1213.03	1212.95	1210.00	1206.75	1205.31	1203.66	1201.51	1199.70
INVERT LEVELS(m)	1215.77	1216.18	1216.42	1215.82	1215.38	1215.11	1214.59	1213.44	1211.45	1210.98	1210.84	1210.82	1211.05	1211.90	1211.83	1211.75	1208.80	1205.55	1204.11	1202.46	1198.50				
DEPTH FROM GROUND LEVEL TO INVERT LEVEL (m)	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.19	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
HYDRAULIC GRADE LEVEL	1282.56	1282.34	1282.18	1282.03	1281.88	1281.73	1281.58	1281.42	1281.27	1281.12	1280.97	1280.82	1280.67	1280.51	1280.36	1280.21	1280.06	1279.91	1279.75	1279.60	1279.45	1279.30	1279.15	1279.00	1278.84	1278.69	1278.61
TYPE OF PIPE AND SIZE	A.V	OD 75MM, PN10 HDPE PIPE																									
FLOW DATA	0.7 m/s																										

TETU LAST MILE
SCALE: HOR 1:2000 VERT 1:1000

AIR VALVES DETAILS



1. 2 Nos 75MM DIA ADOPTER
2. 2 Nos 75MM DIA SINGLE FLANGED SPIGOT FERROUS PIPE
3. 1 Nos 75MMX75MM DIA ALL FLANGED FERROUS TEE
4. 1 Nos 75MMX50MM DIA FLANGED CONCENTRIC TAPER
5. 1 Nos 50MM DIA GATE VALVE
6. 1 Nos 50MM DIA DOUBLE AIR VALVE

NOTES

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LEGEND:

- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- Section Valve
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1		BY			
		CHECKED			

CLIENT

TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

PROJECT

MUNG'ETHO WATER PROJECT

Engineer

CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title

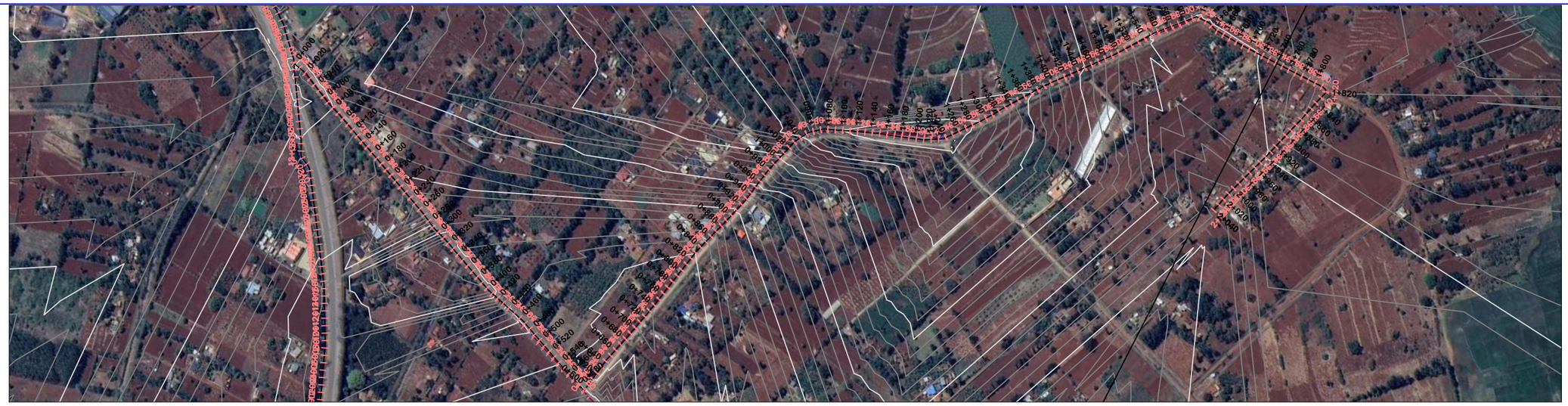
TETU LAST MILE

PLAN AND PROFILE

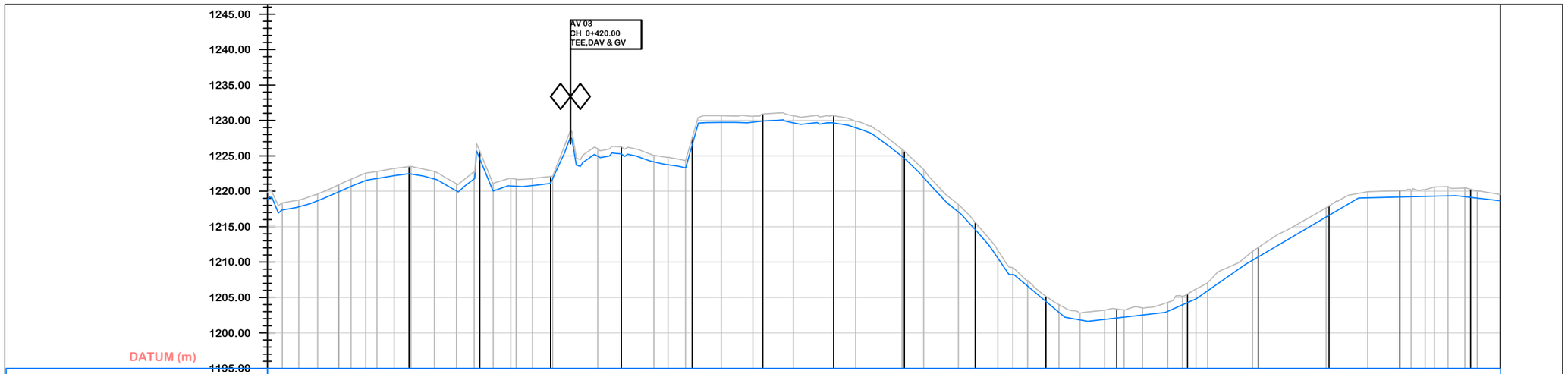
SHEET 2 OF 2

Designed by FGG	Drawn by FGG
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME

DRAWING No. TWWDA/MWP/TLM/02



PLAN



TYPE & SIZE OF PIPE	OD 110 MM HDPE PIPE PN 10
DESIGN FLOW RATE (m3/s)	1.203 M/S

CHAINAGE	EXISTING GROUND LEVEL (m)	TRENCH BOTTOM LEVELS (m)	DEPTH OF PIPE INVERT (m)	HYDRAULIC GRADIENT LEVEL(m)
0+000	1219.77			
0+020	1218.32	1217.31	1.009	1265.27
0+040	1218.68	1217.68	1.002	1265.14
0+060	1219.24	1218.23	1.008	1265.02
0+080	1219.99	1219.01	0.975	1264.89
0+100	1220.89	1219.88	1.01	1264.76
0+120	1221.78	1220.78	0.995	1264.64
0+140	1222.58	1221.56	1.012	1264.51
0+160	1222.88	1221.88	1.003	1264.39
0+180	1223.23	1222.22	1.014	1264.26
0+200	1223.47	1222.47	1.00	1264.14
0+220	1223.13	1222.15	0.988	1264.01
0+240	1222.60	1221.60	0.997	1263.88
0+260	1221.46	1220.44	1.025	1263.76
0+280	1221.81	1220.83	0.981	1263.63
0+300	1225.63	1224.60	1.03	1263.51
0+320	1221.07	1220.07	1.001	1263.38
0+340	1221.76	1220.77	0.987	1263.26
0+360	1221.68	1220.66	1.018	1263.13
0+380	1221.87	1220.86	1.013	1263.00
0+400	1222.08	1221.14	0.94	1262.88
0+420	1226.48	1225.46	1.015	1262.75
0+440	1224.55	1223.58	0.975	1262.63
0+460	1226.09	1225.07	1.016	1262.50
0+480	1225.91	1224.92	0.986	1262.37
0+500	1226.28	1225.28	1.01	1262.25
0+520	1225.98	1225.00	0.979	1262.12
0+540	1225.28	1224.29	0.986	1262.00
0+560	1224.86	1223.83	1.025	1261.87
0+580	1224.53	1223.54	0.989	1261.75
0+600	1227.48	1226.48	1.00	1261.62
0+620	1230.67	1229.70	0.973	1261.49
0+640	1230.67	1229.73	0.939	1261.37
0+660	1230.62	1229.73	0.893	1261.24
0+680	1230.62	1229.69	0.934	1261.12
0+700	1230.91	1229.92	0.99	1260.99
0+720	1231.04	1230.02	1.012	1260.87
0+740	1230.71	1229.71	0.999	1260.74
0+760	1230.52	1229.51	1.009	1260.61
0+780	1230.49	1229.49	0.999	1260.48
0+800	1230.66	1229.64	1.02	1260.36
0+820	1230.31	1229.33	0.982	1260.24
0+840	1229.66	1228.67	0.991	1260.11
0+860	1228.68	1227.70	0.984	1259.98
0+880	1227.24	1226.22	1.012	1259.86
0+900	1225.64	1224.64	1.00	1259.73
0+920	1223.74	1222.73	1.015	1259.61
0+940	1221.50	1220.51	0.989	1259.48
0+960	1219.40	1218.37	1.030	1259.36
0+980	1216.77	1215.76	0.997	1259.23
1+000	1217.76	1216.77	1.00	1259.10
1+020	1215.58	1214.58	0.965	1258.98
1+040	1213.27	1212.30	1.043	1258.85
1+060	1210.43	1209.39	0.806	1258.73
1+080	1208.59	1207.78	0.719	1258.60
1+100	1206.83	1206.11	0.72	1258.48
1+120	1205.15	1204.43	1.125	1258.35
1+140	1203.89	1202.76	1.140	1258.22
1+160	1203.12	1201.98	1.323	1258.10
1+180	1202.97	1201.65	1.294	1257.97
1+200	1203.17	1201.87	1.26	1257.85
1+220	1203.36	1202.10	1.196	1257.72
1+240	1203.53	1202.33	0.978	1257.59
1+260	1203.54	1202.56	1.113	1257.47
1+280	1203.90	1202.79	1.292	1257.34
1+300	1204.68	1203.39	1.21	1257.22
1+320	1205.48	1204.27	1.249	1257.09
1+340	1206.61	1205.36	1.544	1256.97
1+360	1206.30	1206.76	1.210	1256.84
1+380	1209.36	1208.15	0.993	1256.71
1+400	1210.54	1209.55	1.32	1256.59
1+420	1212.06	1210.74	1.496	1256.46
1+440	1213.41	1211.91	1.393	1256.34
1+460	1214.48	1213.08	1.351	1256.21
1+480	1215.61	1214.26	1.309	1256.09
1+500	1216.74	1215.43	1.32	1255.96
1+520	1217.92	1216.60	1.269	1255.83
1+540	1219.04	1217.77	1.269	1255.71
1+560	1219.67	1218.95	0.722	1255.58
1+580	1219.95	1219.08	0.866	1255.46
1+600	1220.02	1219.13	0.883	1255.33
1+620	1220.08	1219.18	0.90	1255.20
1+640	1220.30	1219.23	1.065	1255.08
1+660	1220.34	1219.28	1.061	1254.95
1+680	1220.64	1219.33	1.309	1254.83
1+700	1220.41	1219.37	1.043	1254.70
1+720	1220.27	1219.14	1.14	1254.58
1+740	1219.90	1218.91	0.997	1254.44
1+742	1219.84	1218.85	0.991	1254.44

NGOKA DISTIBUTION LINE
0+000.00 - 1+742.00

LONGITUDINAL SECTION OF MUNGETHO WATER PROJECTTY

NOTES

1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
2. COORDINATES ARE BASED ON UTM.
3. LOCATION OF AIR VALVES, WASHOUTS, BENDS AND OTHER FITTINGS AS SHOWN UNLESS OTHERWISE DIRECTED BY THE ENGINEER ON SITE.
4. GROUND AND INVERT LEVEL SHOWN ARE AS SHOWN ON DRAWING UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
5. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE.
6. ALL BENDS ARE HORIZONTAL UNLESS OTHERWISE STATED.
7. IN WATER LOGGED AREAS, PIPES TO BE BEDDED WITH SINGLE SIZED OR GRADED AGGREGATES AS PER CLAUSE 430.1 AND 216 OF TECHNICAL SPECIFICATIONS AND/OR ANCHOR BLOCKS AS MAY BE DIRECTED ON SITE BY THE ENGINEER.

LEGEND:

- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- PIPE INVERT PROFILE
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV–4		BY			
		CHECKED			
REV–3		BY			
		CHECKED			
REV–2		BY			
		CHECKED			
REV–	ISSUED FOR CONSTRUCTION	BY			
		CHECKED			

CLIENT
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

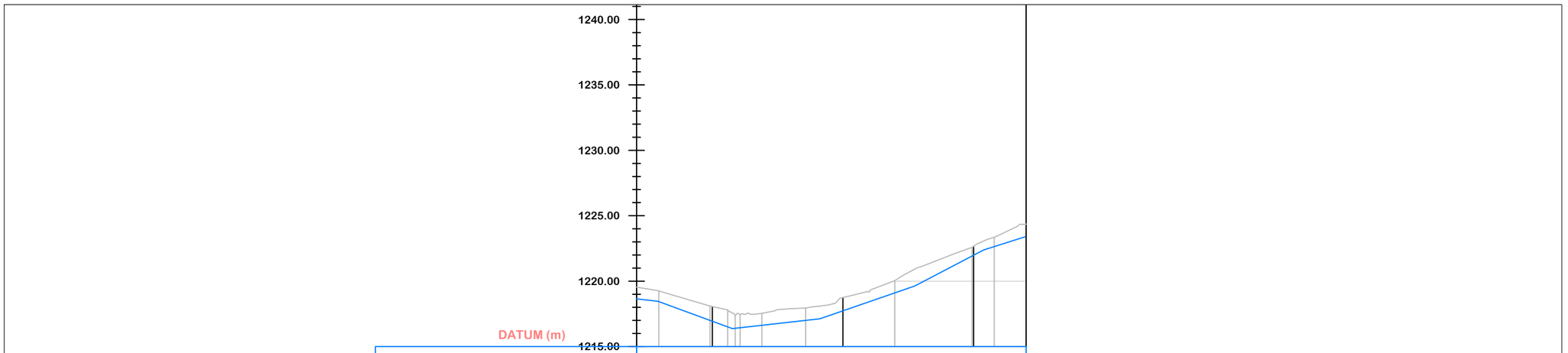
PROJECT
MUNG'ETHO WATER PROJECT

Civil/Structural Engineers
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title
NGOKA_DISTRIBUTION_LINE
PLAN_AND_PROFILE
SHEET_1_OF_2

Designed by SWW	Drawn by SWW
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME
DRAWING No. TWWDA/MWP/G/01	

PLAN



TYPE & SIZE OF PIPE	OD 110 MM HDPE PIPE PN 10																	
DESIGN FLOW RATE (m3/s)	1.203 M/S																	
CHAINAGE		1+760	1+780	1+800	1+820	1+840	1+860	1+880	1+900	1+920	1+940	1+960	1+980	2+000	2+020	2+040		
EXISTING GROUND LEVEL (m)	1219.54	1219.22	1218.63	1218.06	1217.52	1217.58	1217.90	1218.07	1218.74	1219.17	1220.07	1221.11	1221.89	1222.67	1223.55	1224.36		
TRENCH BOTTOM LEVELS (m)	1254.44	1254.32	1254.20	1254.07	1253.95	1253.82	1253.70	1253.57	1253.44	1253.32	1253.19	1253.07	1252.94	1252.81	1252.69			
DEPTH OF PIPE INVERT (m)	0.89	0.817	0.963	1.12	1.096	0.932	1.025	0.973	1.01	0.751	0.956	1.224	0.958	0.69	0.774			
HYDRAULIC GRADE LEVEL	1254.44	1254.32	1254.20	1254.07	1253.95	1253.82	1253.70	1253.57	1253.44	1253.32	1253.19	1253.07	1252.94	1252.81	1252.69			

NGOKA DISTIBUTION LINE
1+742.00 - 2+040.15

NOTES

1. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
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LEGEND:

- – PROPOSED PIPELINE
- – EXISTING GROUND PROFILE
- – PIPE INVERT PROFILE
- – EXISTING ROAD
- – AIR VALVE
- DAV – DOUBLE AIR VALVE
- – WASHOUT
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- – EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- – CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1	ISSUED FOR CONSTRUCTION	BY			
		CHECKED			

CLIENT
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

PROJECT
MUNG'ETHO WATER PROJECT

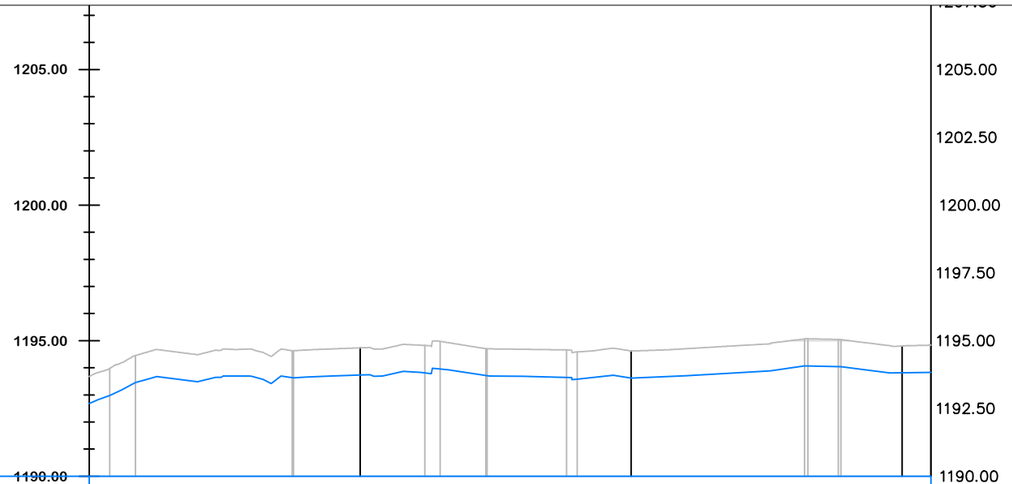
Civil/Structural Engineers
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

Drawing Title
NGOKA_DISTRIBUTION_LINE
PLAN_AND_PROFILE
SHEET_2_OF_2

Designed by SWW	Drawn by SWW
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME
DRAWING No. TWWDA/MWP/G/02	

LONGITUDINAL SECTION OF MUNGETHO WATER PROJECT

PLAN



DATUM (m)

TYPE & SIZE OF PIPE	OD 40 MM HDPE PIPE PN 10																
DESIGN FLOW RATE (m3/s)	1.203 M/S																
CHAINAGE		0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	0+300	
EXISTING GROUND LEVEL (m)	1193.68	1194.54	1194.48	1194.68	1194.65	1194.74	1194.84	1194.81	1194.68	1194.58	1194.62	1194.70	1194.82	1195.02	1195.01	1194.81	1193.83
TRENCH BOTTOM LEVELS (m)	1192.68	1193.54	1193.48	1193.68	1193.65	1193.74	1193.84	1193.81	1193.68	1193.58	1193.62	1193.70	1193.82	1194.02	1194.01	1193.82	1193.83
DEPTH OF PIPE INVERT (m)	1.00	1.000	1.000	1.000	1.000	1.00	1.000	1.000	1.000	1.004	1.00	1.000	1.000	1.000	1.000	0.99	1.00
HYDRAULIC GRADIENT LEVEL(m)		1262.34	1262.06	1261.79	1261.51	1261.24	1260.96	1260.68	1260.41	1260.13	1259.86	1259.58	1259.31	1259.03	1258.76	1258.48	

KAMUTHANGA LASTMILE
0+000.00 - 0+310.64

LONGITUDINAL SECTION OF MUNGETHO WATER PROJECT

NOTES

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- PROPOSED PIPELINE
- EXISTING GROUND PROFILE
- HYDRAULIC GRADE LEVEL
- EXISTING ROAD
- AIR VALVE
- DAV – DOUBLE AIR VALVE
- WASHOUT
- Section Valve
- WO1 – WASHOUT TYPE 1
- WO2 – WASHOUT TYPE 2
- DN – NOMINAL DIAMETER
- PN – NOMINAL PRESSURE
- VB – VERTICAL BEND
- HB – HORIZONTAL BEND
- EXISTING STRUCTURE
- ER – EARTH ROAD
- GR – GRAVEL ROAD
- CUT

ISSUED FOR TENDERING
signed CMTS

REV	REVISIONS		SIGN	DATE	APPROVED
REV-4		BY			
		CHECKED			
REV-3		BY			
		CHECKED			
REV-2		BY			
		CHECKED			
REV-1		BY			
		CHECKED			

CLIENT

TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

PROJECT

MUNG'ETHO WATER PROJECT

Engineer

CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P. O. BOX 1292-10100
NYERI

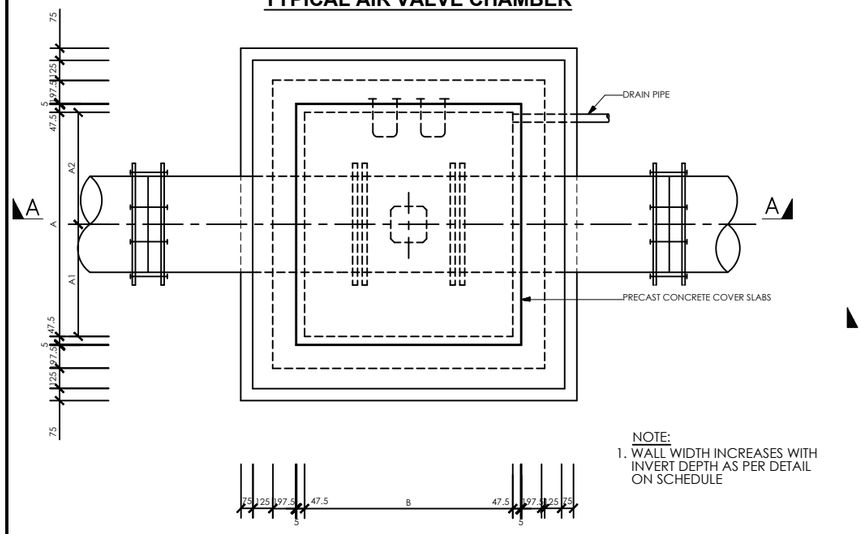
Drawing Title

GACHARU_PRIMARY_LINE
PLAN_AND_PROFILE
SHEET_1_OF_1

Designed by SWW	Drawn by SWW
Checked by EWW/KNG	Approved by DMN
Scale AS_SHOWN	Date MAY2026
Job No. 1.0	ACAD File: ACADFILENAME

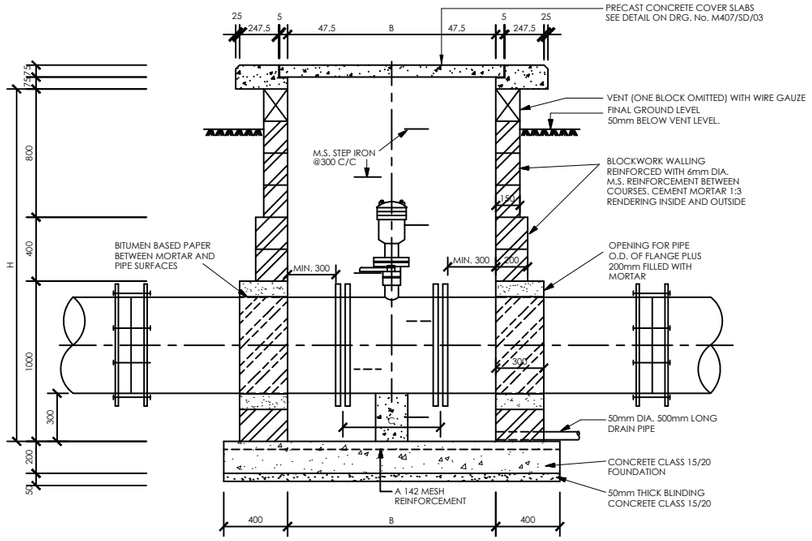
DRAWING No. TWWDA/MWP/G/02

TYPICAL AIR VALVE CHAMBER



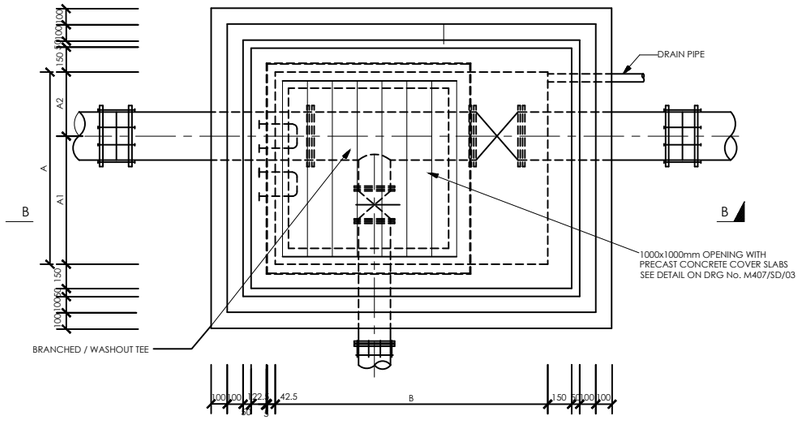
NOTE:
1. WALL WIDTH INCREASES WITH INVERT DEPTH AS PER DETAIL ON SCHEDULE

PLAN OF CHAMBER
SCALE 1:40



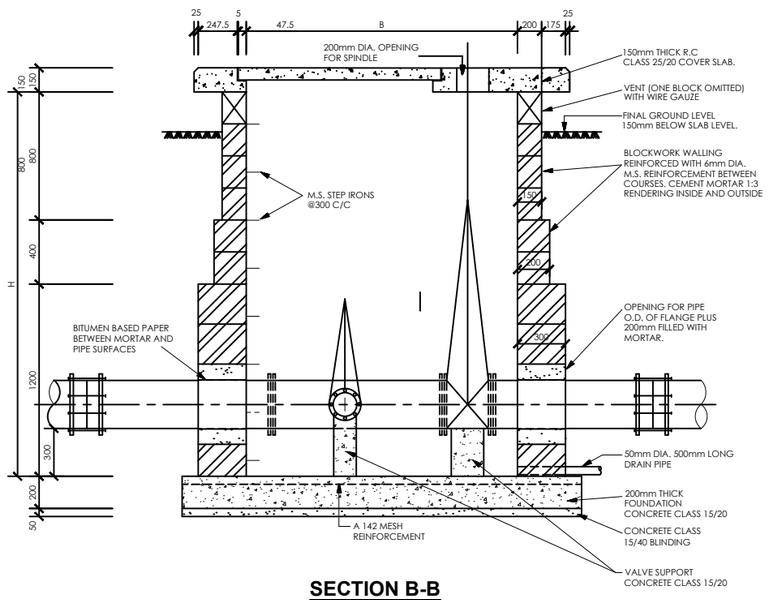
SECTION A-A
SCALE 1:40

TYPICAL VALVE CHAMBER DETAILS AT JUNCTIONS / WASHOUT VALVE (DEPTH > 1.0m)



NOTE:
1. WALL WIDTH INCREASES WITH INVERT DEPTH AS PER DETAIL ON SCHEDULE

PLAN OF CHAMBER
SCALE 1:40



SECTION B-B
SCALE 1:40

CONSTRUCTION DETAILS FOR VALVE CHAMBERS

MAINS DIAMETER (mm)	PLAN SIZE OF CHAMBER (INTERNAL DIMENSIONS) A(mm) x B(mm)
100	1200 x 1200
150	1200 x 1200
200	1400 x 1200
250	1500 x 1200
300	1500 x 1200
350	1800 x 1200
400	1800 x 1200
450	1800 x 1400
500	1800 x 1400

CHAMBER SIZE SCHEDULE FOR VARIOUS PIPE SIZES

INVERT DEPTHS (mm)	HEIGHT OF WALL (mm)	WALL WIDTH (mm)
0 - 800	800	150 - MASONRY WALL
800 - 1200	400	200 - MASONRY WALL
1200 - 2400	1200	300 - MASONRY WALL
2400 - 3000	600	350 - MASONRY WALL
DEPTH MORE THAN 3000		300mm REINFORCED CONCRETE (CLASS 25/20) WALL

CHAMBER DEPTHS & WALL THICKNESS SCHDULE

SECTION C-C
SCALE 1:20

NOTES

1. DIMENSIONS ARE SHOWN IN MILIMETRES UNLESS OTHERWISE STATED

ABBREVIATIONS

P.C.C. - PRECAST CONCRETE
mm - MILLIMETRES
O.D. - OUTSIDE DIAMETER
M.S. - MILD STEEL
DIA. - DIAMETER
NO. - NUMBER
R.C. - REINFORCED CONCRETE
c/c - CENTRE TO CENTRE

ISSUED FOR TENDERING

REVISIONS	BY	CHKD	DATE	APPROVED
	BY	CHKD		
	BY	CHKD		
	BY	CHKD		
	BY	CHKD		

CLIENT:
TANA WATER WORKS DEVELOPMENT AGENCY
P.O BOX 1292 - 10100,
NYERI, KENYA

EMPLOYER:
THE CHIEF EXECUTIVE OFFICER TANA WATER WORKS DEVELOPMENT AGENCY
P.O BOX 1292 - 10100,
NYERI, KENYA

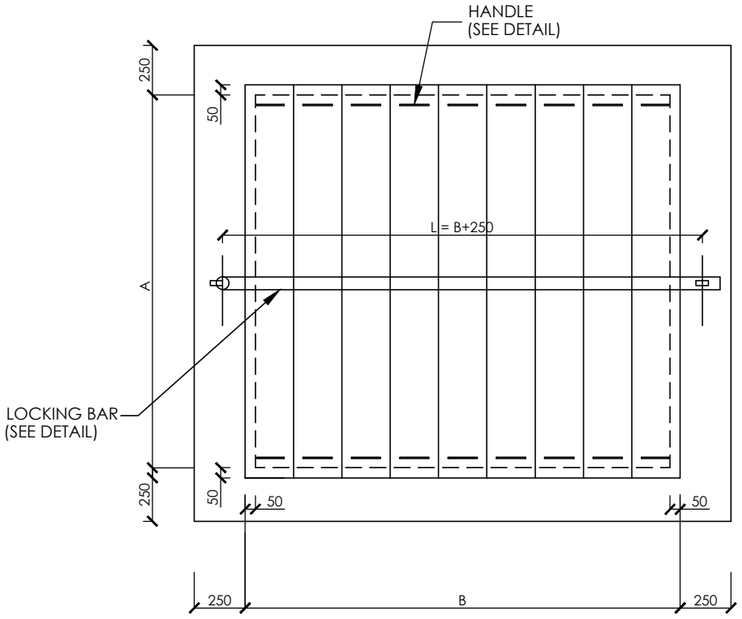
ENGINEER:
CHIEF MANAGER TECHNICAL SERVICES, TANA WATER WORKS DEVELOPMENT AGENCY
P.O BOX 1292 - 10100,
NYERI, KENYA

ENGINEER:
CHIEF MANAGER TECHNICAL SERVICES, TANA WATER WORKS DEVELOPMENT AGENCY
P.O BOX 1292 - 10100,
NYERI, KENYA

PROJECT TITLE:
MUNG'ETHO WATER PROJECT

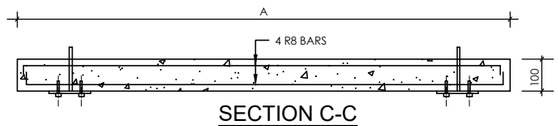
DRAWING TITLE:
STANDARD DRAWINGS
DETAILS OF VALVE CHAMBERS

Designed by:	FGG	Drawn by:	FGG
Checked by:	EWW/KNG	Approved by:	DMN
Scale:	1:50	Date:	MAY2026
DRG No.	TWWDA/MWP/SD-VC/01		



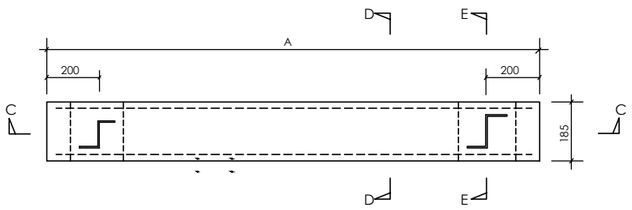
COVER FOR AIR VALVE CHAMBERS

SCALE A1 - 1:10
A3 - 1:20

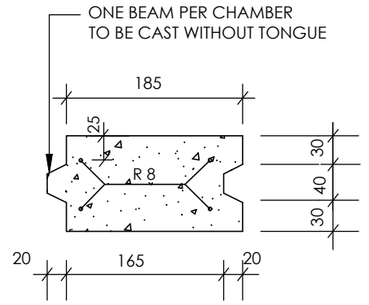


SECTION C-C

SCALE A1 - 1:10
A3 - 1:20

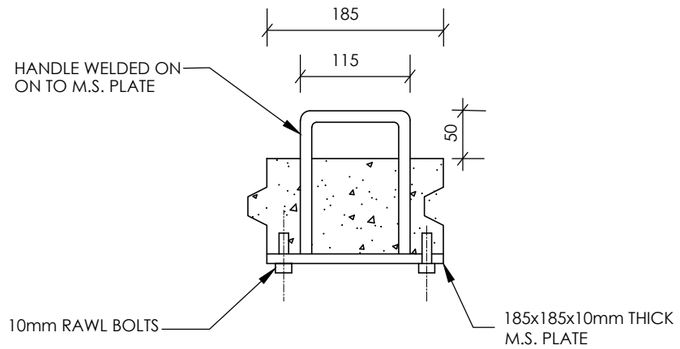


PLAN



SECTION D-D

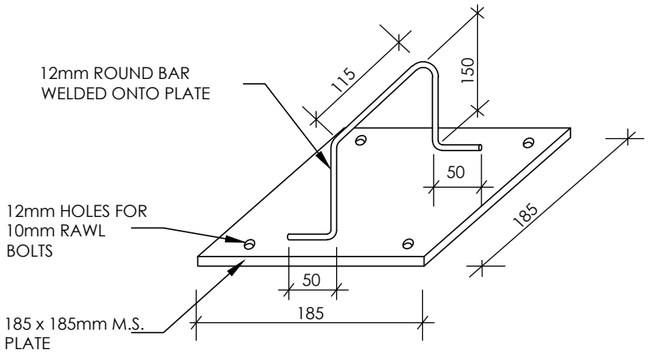
NTS



SECTION E-E

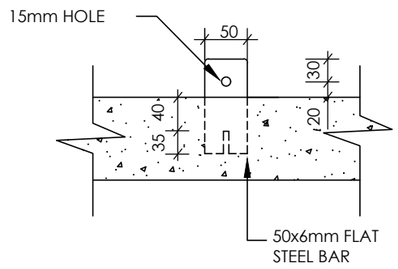
NTS

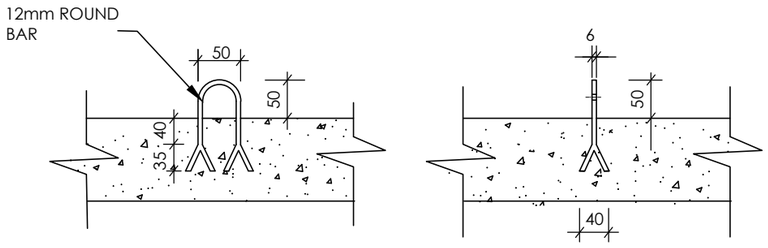
DETAIL OF PRECAST CONCRETE COVER SLAB



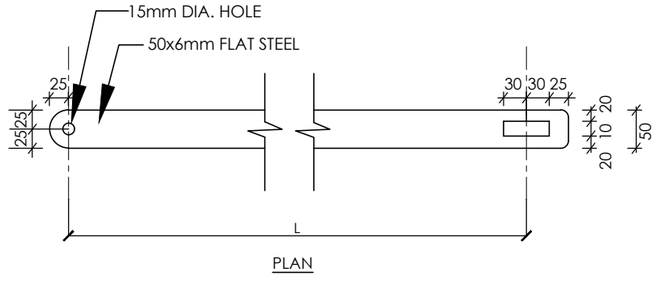
DETAIL OF HANDLE

NTS





SECTIONS



PLAN

DETAILS OF LOCKING BAR

NTS

COVER SIZE SCHDULE

CHAMBER INTERNAL DIMENSIONS (mm)	SIZE OF COVER A (mm) x B(mm)
1200 X 1200	1300 X 1300
1200 X 1200	1300 X 1300
1400 X 1200	1500 X 1500
1500 X 1200	1600 X 1300
1500 X 1200	1600 X 1300
1800 X 1200	1900 X 1300
1800 X 1200	1900 X 1300
1400 X 1400	1500 X 1500
1400 X 1200	1500 X 1300

NOTES

1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE STATED.

ABBREVIATIONS

M.S. = MILD STEEL.
mm - MILIMETER
Dia. - DIAMETER
NTS - NOT TO SCALE
Nr. - NUMBER

ISSUED FOR TENDERING

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

CLIENT:
TANA WATER WORKS DEVELOPMENT AGENCY
P.O BOX 1292 - 10100,
NYERI, KENYA

EMPLOYER: **THE CHIEF EXECUTIVE OFFICER**
TANA WATER WORKS DEVELOPMENT AGENCY
P.O BOX 1292 - 10100,
NYERI, KENYA

ENGINEER:
CHIEF MANAGER TECHNICAL SERVICES,
TANA WATER WORKS DEVELOPMENT AGENCY
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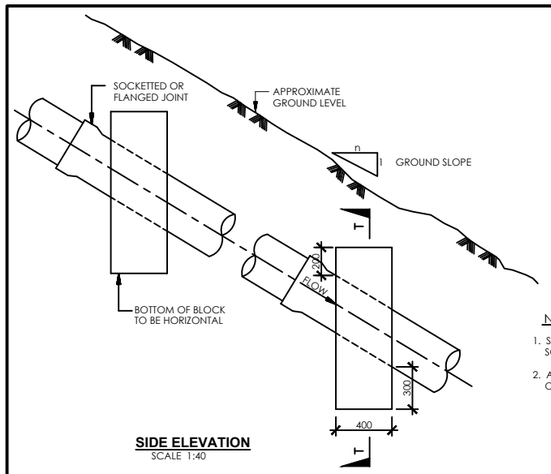
NYERI, KENYA

ENGINEER:
CHIEF MANAGER TECHNICAL SERVICES,
TANA WATER WORKS DEVELOPMENT AGENCY
P.O BOX 1292 - 10100,
NYERI, KENYA

PROJECT TITLE:
MUNG'ETHO WATER PROJECT

DRAWING TITLE:
STANDARD DRAWINGS
DETAILS OF PRECAST CONCRETE COVERS FOR VALVE CHAMBERS

Designed by:	FGG	Drawn by:	FGG.
Checked by:	FGG	Approved by:	DMN
Scale:	1:50	Date:	MAY2026
DRG No.	TWWDA/MWP/SD-VC/02		

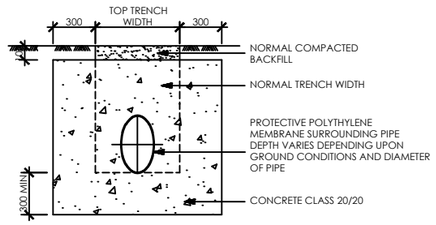


SIDE ELEVATION
SCALE 1:40

RANGE OF GROUND SLOPE (1:n)	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS (m)
1:6 - 1:5	24
1:5 - 1:4	18
1:4 - 1:2	12
>1:2	EVERY PIPE LENGTH TO BE ANCHORED (BASED ON PIPE LENGTH OF 6m)

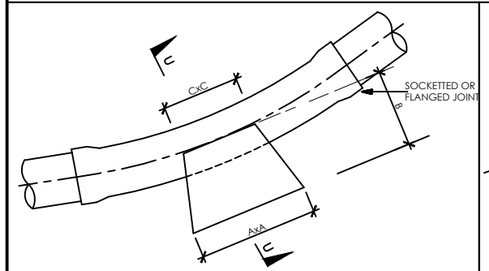
NOTES

1. SOCKETTED JOINT ARE LAID WITH SOCKET FACING UPSTREAM OF GRADE
2. ANCHOR BLOCK ARE CONSTRUCTED ON LOWER SIDE OF JOINT

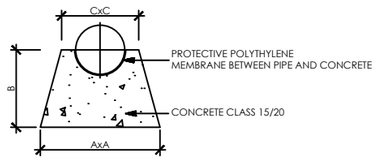


SECTION T-T
SCALE 1:40

ANCHOR BLOCK FOR STEEP GRADIENTS (SLOPES>1:6)

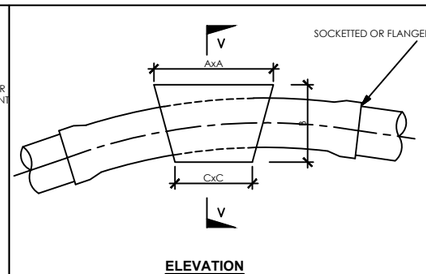


ELEVATION
SCALE 1:40

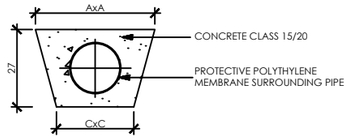


SECTION U-U
SCALE 1:40

THRUST BLOCKS ON VERTICAL BENDS (DOWN-THRUST)

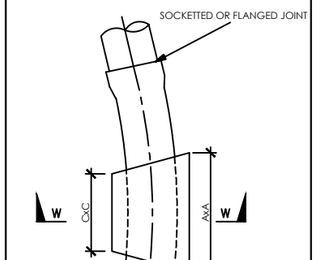


ELEVATION
SCALE 1:40

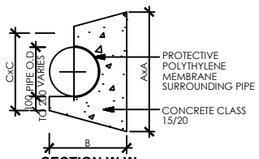


SECTION V-V
SCALE 1:40

THRUST BLOCKS ON VERTICAL BENDS (UP-THRUST)



PLAN
SCALE 1:40

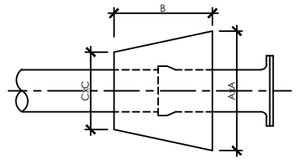


SECTION W-W
SCALE 1:40

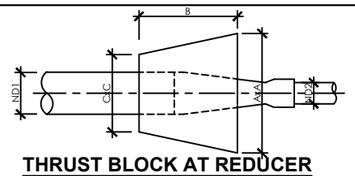
(ND) NOMINAL DIAMETER (mm)	THRUST BLOCK DIMENSIONS AxBxC(m), CONCRETE VOLUME (m³)						
	11 1/4° BENDS	22 1/2° BENDS	30°BENDS	45°BENDS	CAPPED ENDS & 90°TEES	90°BENDS	REDUCERS ND=ND1-ND2
80	0.2x0.2x0.2 (0.01m³)	0.25x0.2x0.2 (0.01m³)	0.25x0.2x0.2 (0.01m³)	0.3x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)	0.4x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)
100	0.2x0.2x0.2 (0.01m³)	0.3x0.2x0.2 (0.02m³)	0.35x0.2x0.2 (0.02m³)	0.4x0.2x0.2 (0.02m³)	0.45x0.25x0.25 (0.04m³)	0.55x0.3x0.3 (0.06m³)	0.45x0.25x0.25 (0.04m³)
150	0.3x0.25x0.25 (0.02m³)	0.4x0.25x0.25 (0.03m³)	0.5x0.3x0.3 (0.05m³)	0.55x0.3x0.3 (0.06m³)	0.65x0.35x0.35 (0.10m³)	0.8x0.4x0.35 (0.16m³)	0.65x0.35x0.35 (0.10m³)
200	0.4x0.3x0.3 (0.04m³)	0.55x0.35x0.35 (0.08m³)	0.6x0.4x0.4 (0.11m³)	0.75x0.4x0.4 (0.15m³)	0.85x0.45x0.4 (0.20m³)	1.0x0.5x0.4 (0.29m³)	0.85x0.45x0.4 (0.20m³)
250	0.5x0.35x0.35 (0.07m³)	0.65x0.4x0.4 (0.12m³)	0.75x0.45x0.45 (0.18m³)	0.9x0.45x0.45 (0.23m³)	1.1x0.55x0.45 (0.39m³)	1.2x0.6x0.45 (0.50m³)	1.1x0.55x0.45 (0.39m³)
300	0.55x0.45x0.45 (0.12m³)	0.8x0.5x0.5 (0.23m³)	0.9x0.5x0.5 (0.27m³)	1.1x0.6x0.5 (0.44m³)	1.25x0.65x0.5 (0.59m³)	1.5x0.75x0.5 (0.94m³)	1.25x0.65x0.5 (0.59m³)
350	0.6x0.5x0.5 (0.16m³)	0.85x0.55x0.55 (0.29m³)	1.0x0.55x0.55 (0.36m³)	1.2x0.6x0.55 (0.53m³)	1.4x0.7x0.55 (0.80m³)	1.6x0.8x0.55 (1.20m³)	1.4x0.7x0.55 (0.80m³)
400	0.7x0.6x0.6 (0.26m³)	0.95x0.6x0.6 (0.38m³)	1.1x0.6x0.6 (0.47m³)	1.3x0.65x0.6 (0.67m³)	1.6x0.8x0.6 (1.20m³)	1.8x0.9x0.6 (1.60m³)	1.6x0.8x0.6 (1.20m³)
450	0.8x0.65x0.65 (0.35m³)	1.1x0.65x0.65 (0.53m³)	1.3x0.65x0.65 (0.69m³)	1.5x0.75x0.65 (1.0m³)	1.8x0.9x0.65 (1.7m³)	2.0x1.0x0.65 (2.2m³)	1.8x0.9x0.65 (1.7m³)
500	0.9x0.7x0.7 (0.46m³)	1.2x0.7x0.7 (0.68m³)	1.4x0.7x0.7 (0.86m³)	1.7x0.85x0.7 (1.5m³)	2.0x1.0x0.7 (2.3m³)	2.3x1.2x0.7 (3.5m³)	2.0x1.0x0.7 (2.3m³)
600	1.1x0.8x0.8 (0.74m³)	1.5x0.8x0.8 (1.2m³)	1.7x0.9x0.8 (1.6m³)	2.0x1.0x0.8 (2.3m³)	2.3x1.2x0.8 (3.6m³)	2.7x1.4x0.8 (5.6m³)	2.3x1.2x0.8 (3.6m³)

NOTE:- THE ABOVE VALUES APPLY FOR SOCKETTED uPVC AND FLANGED OR COUPLED LINED STEEL PIPES SUBJECT TO A WORKING PRESSURE HEAD OF 12 BAR

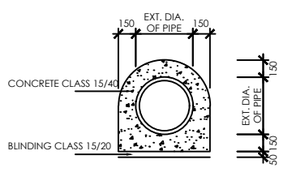
THRUST BLOCK ON HORIZONTAL BENDS AND TEES



THRUST BLOCK AT CAPPED ENDS
SCALE 1:40



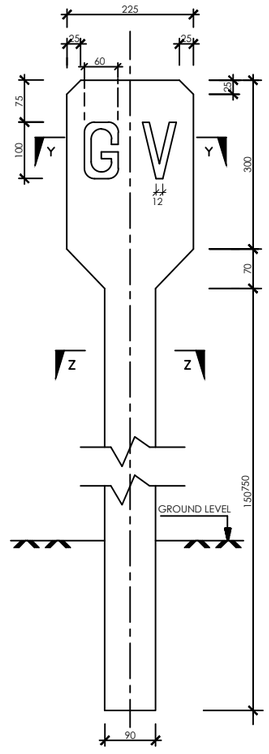
THRUST BLOCK AT REDUCER
SCALE 1:40



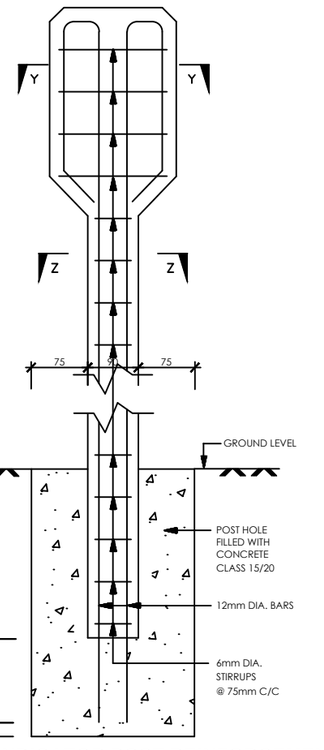
TYPE 'C'
SCALE 1: 50

PIPE DIAMETER mm	PIPE WALL THICKNESS mm	HAUNCH TYPE 'C'	
		100mmBED	150mmBED
100	25.4	0.1431	0.1666
150	25.4	0.1706	0.1968
225	28.57	0.2155	0.2450
300	31.75	0.2617	0.2965
375	34.92	0.3094	0.3485
450	38.10	0.3623	0.4059
525	44.45	0.4169	0.4652
600	50.80	0.4731	0.5259
675	53.98	0.5270	0.5841
750	57.15	0.5823	0.6436
900	63.50	0.6973	0.7672
1050	69.85	0.8181	0.8977
1200	76.20	0.9448	1.0318

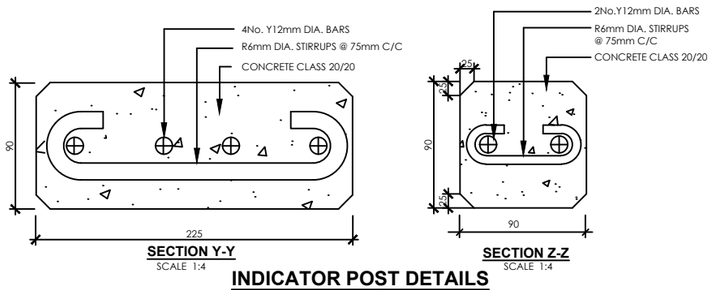
CONCRETE QUANTITIES IN BED AND SURROUNDS FOR O. G. CONCRETE PIPES (CU.M.PER LIN. METER)



GATE VALVE INDICATOR POST
SCALE 1:10



INDICATOR POST REINFORCEMENT DETAILS
SCALE 1:10



SECTION Y-Y
SCALE 1:4

SECTION Z-Z
SCALE 1:4

INDICATOR POST DETAILS

NOTES

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
2. ANCHOR BLOCKS INSTALLED FOR PIPES LAID AT SLOPES EXCEEDING 1:6 SLOPE
3. THRUST BLOCKS INSTALLED AT ALL HORIZONTAL AND VERTICAL BENDS, CAPPED ENDS, TEES, TAPERS AND GATE VALVES
4. DETAILS FOR ALL INDICATOR POSTS ARE AS FOR GATE VALVE BUT LETTERING TO BE AS FOLLOWS:

FOR	USE
GATE VALVE	GV
AIR VALVE	AV
WASHOUT	WO
WATER MAIN	WM
BULK METER	M
'Y'- JUNCTION	Y

5. ALL INDICATOR POSTS ARE PAINTED WITH 2 COATS BLUE OIL BASED PAINT AND WHITE LETTERING TO ENGINEER'S APPROVAL

ABBREVIATIONS

mm - MILLIMETRES
OD - OUTSIDE DIAMETR
ND - NOMINAL DIAMETR
Dia - DIAMETER
c/c - CENTRE TO CENTRE
No. - NUMBER
uPVC - UNPLASTICISED POLYVINYL CHLORIDE
m - METRE
℄ - CENTRE LINE
GV - GATE VALVE
AV - AIR VALVE
WO - WASH OUT
WM - WATER MAIN
M - BULK METER
m^3 - CUBIC METER

ISSUED FOR TENDERING

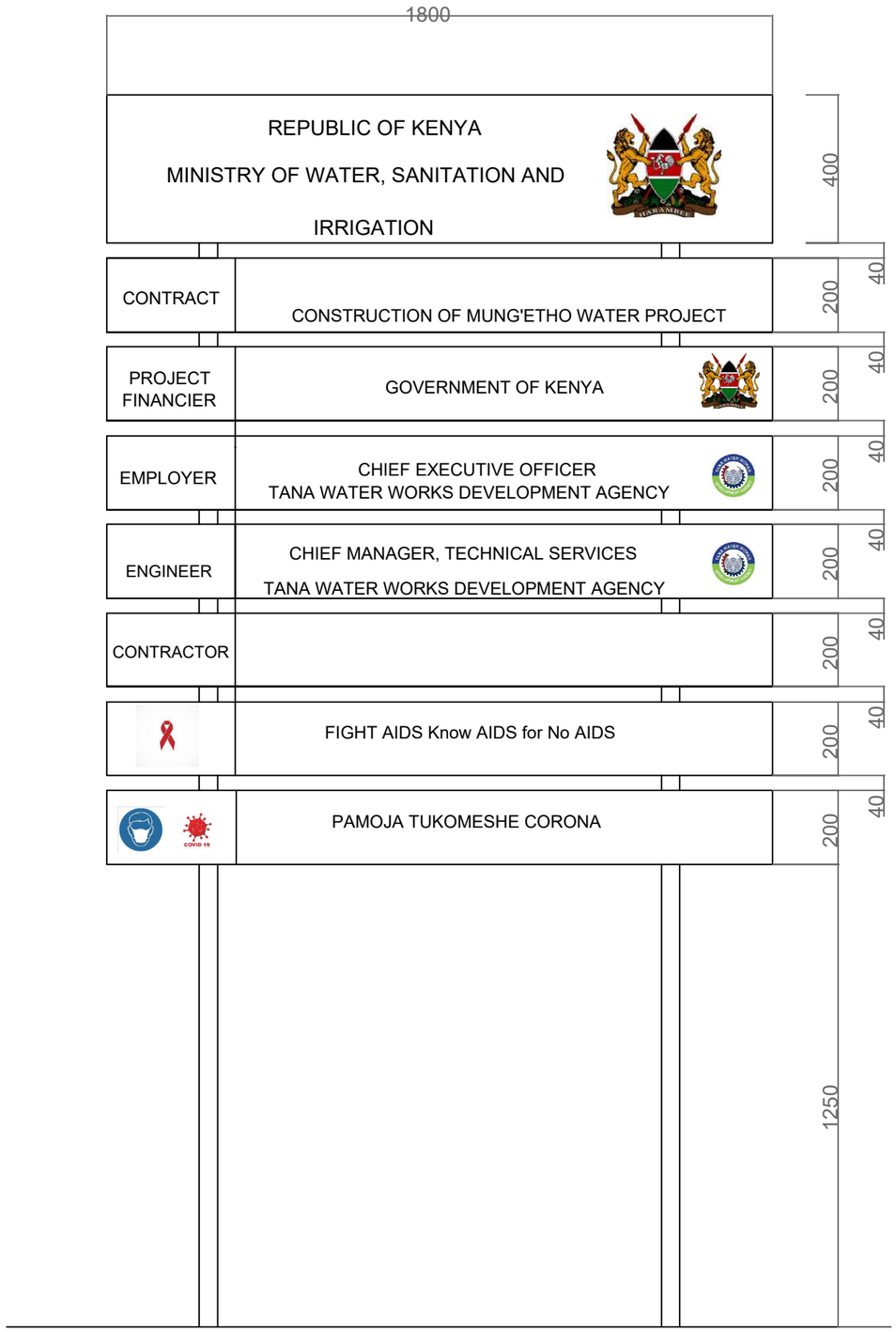
CLIENT:
THE CHIEF EXECUTIVE OFFICER
TANA WATER WORKS DEVELOPMENT AGENCY
P.O. BOX 1292 - 10100
NYERI, KENYA

ENGINEER:
THE CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
P.O. BOX 1292 - 10100
NYERI, KENYA

PROJECT TITLE:
MUNG'ETHO WATER PROJECT

DETAILS OF DRAWING:
STANDARD DRAWINGS
DETAILS OF THRUST BLOCKS & INDICATOR POSTS.

Designed by: FGG	Drawn by: FGG
Checked by: EXECUTIVE	Approved by: D.M.N
Scale: 1:100	Date: MAY 2026
ACAD File:	
DRG No. TWWDA/MWP/MP-01	



NOTES

1. ALL DIMENSIONS IN MILLIMETRES UNLESS OTHERWISE STATED
2. THE BOARD TO BE HIGH QUALITY BLOCKBOARD WITH HARDWOOD LIPPING ALL ROUND

NOTES

ISSUED FOR TENDERING

REVISIONS

REV	DESCRIPTION	DESIGNATION	DATE	CHECKED BY	APPROVED BY

CLIENT:

TANA WATER WORKS DEVELOPMENT AGENCY
MAJI HOUSE, BADEN POWELL ROAD
P.O.Box 1292 - 10100
NYERI, KENYA

PROJECT:

MUNG'ETHO WATER PROJECT

ENGINEER:

CHIEF MANAGER TECHNICAL SERVICES
TANA WATER WORKS DEVELOPMENT AGENCY
MAJI HOUSE, BADEN POWELL ROAD
P.O.Box 1292 - 10100
NYERI, KENYA

DRG No. MWP/TWWDA/SB/01

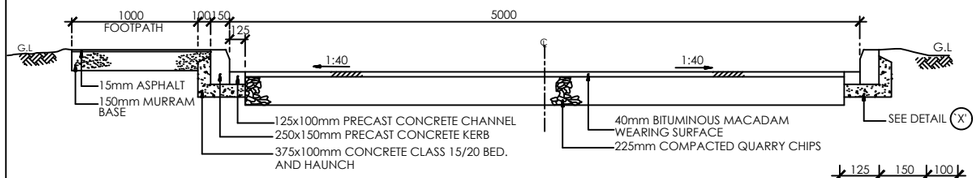
SHEET No. SHEET 1 OF 1

DRAWING TITLE:

STANDARD DRAWINGS:
PROJECT SIGN BOARD

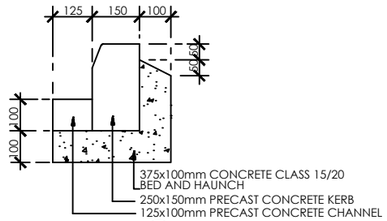
Designed by: FGG	Drawn by: FGG
Checked by: FGG	Approved by: FGG
Scale: 1 : 2000	Date: MAY 2026

TYPICAL BITUMINOUS ROAD DETAILS



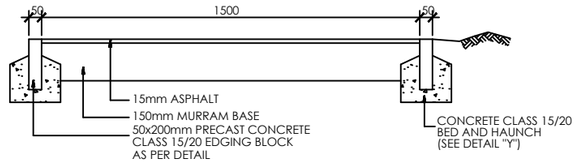
TYPICAL SECTION OF BITUMINOUS ROAD

SCALE 1:50



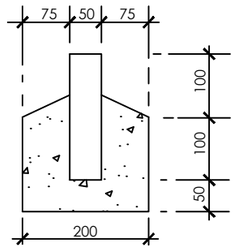
DETAIL 'X'

SCALE 1:20



TYPICAL SECTION OF FOOTPATH

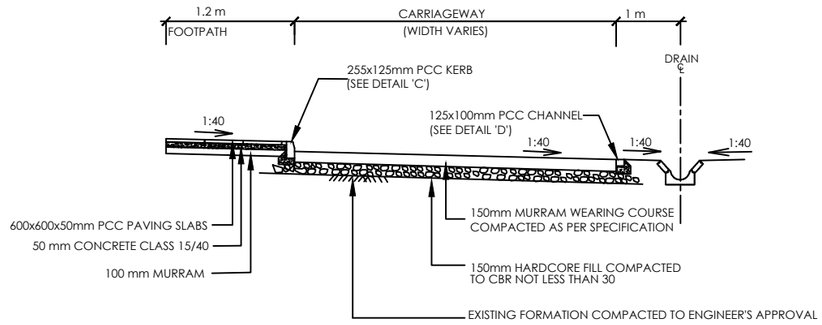
SCALE 1:25



DETAIL 'Y'

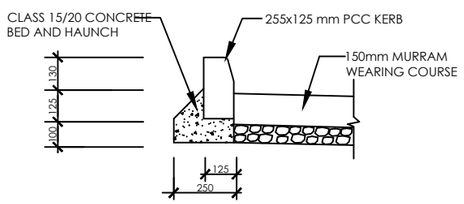
SCALE 1:10

TYPICAL MURRAM ROAD DETAILS



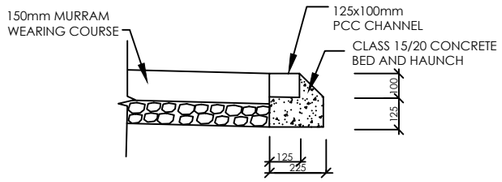
TYPICAL SECTION OF MURRAM ROAD

SCALE 1: 50



DETAIL 'C'
TYPICAL DETAIL OF KERB

SCALE 1:25



DETAIL 'D'
TYPICAL DETAIL OF CHANNEL

SCALE 1:25

NOTE

ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

ABBREVIATIONS

℄ - CENTRE LINE

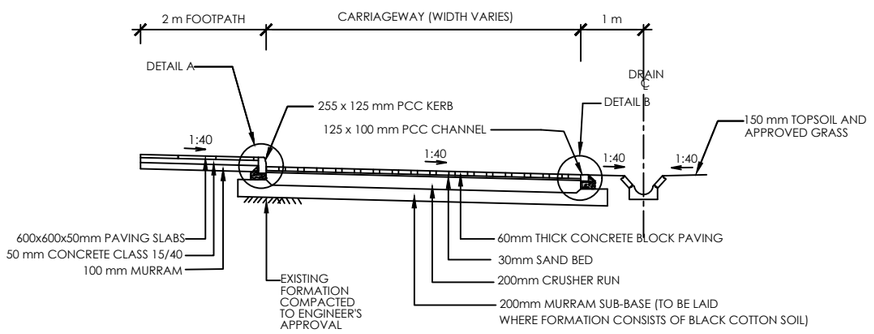
mm - MILIMETER

G.L. - GROUND LEVEL

m - METER

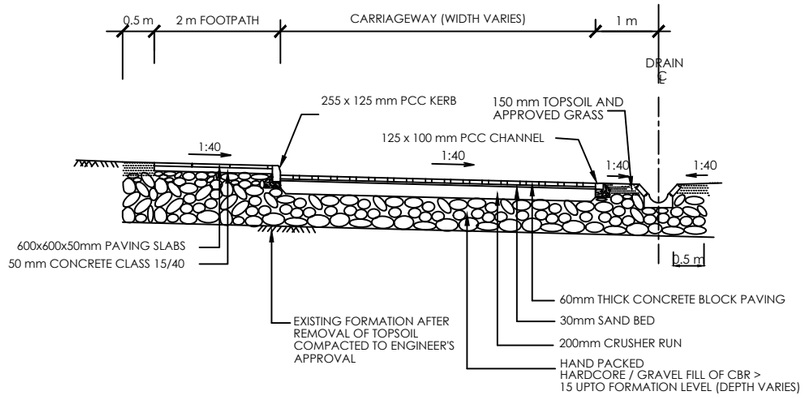
PCC - PRECAST CEMENT CONCRETE

TYPICAL CONCRETE BLOCKS SURFACE ROAD DETAILS



TYPICAL CROSS SECTION FOR CARRIAGEWAY IN CUT

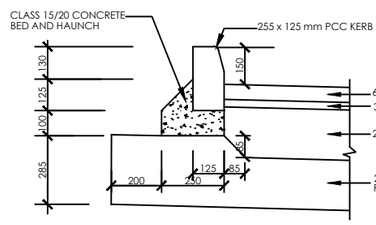
SCALE 1:100



TYPICAL CROSS SECTION FOR CARRIAGEWAY IN FILL

SCALE 1:100

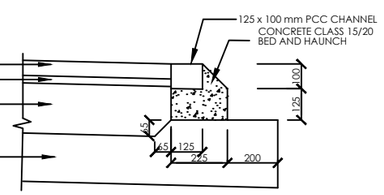
DETAIL A



DETAIL OF KERB

SCALE 1:25

DETAIL B



DETAIL OF CHANNEL

SCALE 1:25

ISSUED FOR TENDERING

	REVISIONS		SIGN	DATE	APPROVED
		BY			
		CHECKED			
		BY			
		CHECKED			
		BY			
		CHECKED			
		BY			
		CHECKED			

CLIENT:

TANA WATER WORKS DEVELOPMENT AGENCY

P.O. BOX 1292 - 10100
NYERI, KENYA

ENGINEER:

THE CHIEF MANAGER TECHNICAL SERVICES

TANA WATER WORKS DEVELOPMENT AGENCY

P.O. BOX 1292 - 10100
NYERI, KENYA

EMPLOYER:

THE CHIEF EXECUTIVE OFFICER

TANA WATER WORKS DEVELOPMENT AGENCY

P.O. BOX 1292 - 10100
NYERI, KENYA

PROJECT TITLE:

MUNG'ETHO WATER PROJECT

DRAWING TITTLE:

STANDARD DRAWINGS
ROAD CROSSING DETAILS

Designed by: FGG	Drawn by: FGG
Checked by: EWW/KNG	Approved by: DMN
Scale: AS SHOWN	Date: MAY 2026

DRG No. MWP/SD-RC/01