



REPUBLIC OF KENYA



TANA WATER WORKS DEVELOPMENT AGENCY

MAJI HOUSE, BADEN POWEL ROAD

P.O.BOX 1292 -10100,

NYERI.



AFRICAN DEVELOPMENT BANK

CONSTRUCTION OF GICHUGU WATER SUPPLY INFRASTRUCTURE

CONTRACT NO: TWSB/ADB/005/2024-2025

VOL. III BOOK OF DRAWINGS



CAS CONSULTANTS LTD

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P. O. Box 67693 – 00200

Nairobi - **KENYA**

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E-mail: casconsult@africaonline.co.ke

JUNE 2025

DRAWING ANNEX			DRAWING ANNEX			DRAWING ANNEX		
S/N	Drawing Number	Drawing Content	S/N	Drawing Number	Drawing Content	S/N	Drawing Number	Drawing Content
1	TWWDA/KK/GL/001	Project Location	36	TWWDA/KK/WS-A/33	Landscape Layout, Plan &Profile	73	TWWDA/KK/SD/002	Consumer Connection
2	TWWDA/KK/GL/003	Area Already Served by the project	37	TWWDA/KK/WS-A/34	Landscape Layout, Plan &Profile	74	TWWDA/KK/SD/003	Cover Details
3	TWWDA/KK/GL/002	General Layout of Mother Project	38	TWWDA/KK/WS-A/35	Landscape Layout, Plan &Profile	75	TWWDA/KK/SD/004	Deep Valve Chamber
4	TWWDA/KK/WS-A/01	New Scope	39	TWWDA/KK/WS-A/36	Landscape Layout, Plan &Profile	76	TWWDA/KK/SD/005	Checkered Plate Details
5	TWWDA/KK/WS-A/02	Landscape Layout, Plan &Profile	40	TWWDA/KK/WS-A/37	Landscape Layout, Plan &Profile	77	TWWDA/KK/SD/006	Details Of Fencing Posts
6	TWWDA/KK/WS-A/03	Landscape Layout, Plan &Profile	41	TWWDA/KK/WS-A/38	Landscape Layout, Plan &Profile	78	TWWDA/KK/SD/007	Fecing gate Details
7	TWWDA/KK/WS-A/04	Landscape Layout, Plan &Profile	42	TWWDA/KK/WS-A/39	Landscape Layout, Plan &Profile	79	TWWDA/KK/SD/008A	Details of Metal Cover
8	TWWDA/KK/WS-A/05	Landscape Layout, Plan &Profile	43	TWWDA/KK/WS-A/40	Landscape Layout, Plan &Profile	80	TWWDA/KK/SD/008B	Details of Metal Cover
9	TWWDA/KK/WS-A/06	Landscape Layout, Plan &Profile	44	TWWDA/KK/WS-A/41	Landscape Layout, Plan &Profile	81	TWWDA/KK/SD/010	Pipe Trench Details
10	TWWDA/KK/WS-A/07	Landscape Layout, Plan &Profile	45	TWWDA/KK/WS-A/42	Landscape Layout, Plan &Profile	82	TWWDA/KK/SD/010B	Details Of Valve Chamber
11	TWWDA/KK/WS-A/08	Landscape Layout, Plan &Profile	46	TWWDA/KK/WS-A/43	Landscape Layout, Plan &Profile	83	TWWDA/KK/SD/011	Details Of Water Kiosk
12	TWWDA/KK/WS-A/09	Landscape Layout, Plan &Profile	47	TWWDA/KK/WS-A/44	Landscape Layout, Plan &Profile	84	TWWDA/KK/SD/012	Door Schedule 01
13	TWWDA/KK/WS-A/10	Landscape Layout, Plan &Profile	48	TWWDA/KK/WS-A/45	Landscape Layout, Plan &Profile	85	TWWDA/KK/SD/013	Door Schedule 02
14	TWWDA/KK/WS-A/11	Landscape Layout, Plan &Profile	49	TWWDA/KK/WS-A/46	Landscape Layout, Plan &Profile	86	TWWDA/KK/SD/014	Floor Mesh
15	TWWDA/KK/WS-A/12	Landscape Layout, Plan &Profile	50	TWWDA/KK/WS-A/47	Landscape Layout, Plan &Profile	87	TWWDA/KK/SD/015	GMS Ladder Details
16	TWWDA/KK/WS-A/13	Landscape Layout, Plan &Profile	51	TWWDA/KK/TW/001	Muratiri Tworks - as proposed	88	TWWDA/KK/SD/016	IDB and Headwall
17	TWWDA/KK/WS-A/14	Landscape Layout, Plan &Profile	52	TWWDA/KK/TW/002	Muratiri Tworks - as proposed	89	TWWDA/KK/SD/017A	Manhole Details
18	TWWDA/KK/WS-A/15	Landscape Layout, Plan &Profile	53	TWWDA/KK/TW/003	Muratiri Tworks - as proposed	90	TWWDA/KK/SD/017B	Manhole Details
19	TWWDA/KK/WS-A/16	Landscape Layout, Plan &Profile	54	TWWDA/KK/SD/001	Sludge Lagoon	91	TWWDA/KK/SD/017C	Manhole Details
20	TWWDA/KK/WS-A/17	Landscape Layout, Plan &Profile	55	TWWDA/KK/SD/001	Sludge Lagoon	92	TWWDA/KK/SD/018	Septic Tank Plan and Sections
21	TWWDA/KK/WS-A/18	Landscape Layout, Plan &Profile	56	TWWDA/KK/SD/001	Sludge Lagoon	93	TWWDA/KK/SD/019	Standard Water Details
22	TWWDA/KK/WS-A/19	Landscape Layout, Plan &Profile	57	TWWDA/KK/SD/001	Sludge Lagoon	94	TWWDA/KK/SD/020A	Thrust Block
23	TWWDA/KK/WS-A/20	Landscape Layout, Plan &Profile	58	TWWDA/KK/SD/001	Sludge Lagoon	95	TWWDA/KK/SD/020B	Thrust Block
24	TWWDA/KK/WS-A/21	Landscape Layout, Plan &Profile	59	TWWDA/KK/db/002	Sludge Drying beds	96	TWWDA/KK/SD/020C	Thrust Block
25	TWWDA/KK/WS-A/22	Landscape Layout, Plan &Profile	60	TWWDA/KK/db/002	Sludge Drying beds	97	TWWDA/KK/SD/021	Thrust Block
26	TWWDA/KK/WS-A/23	Landscape Layout, Plan &Profile	61	TWWDA/KK/db/002	Sludge Drying beds	98	TWWDA/KK/SD/022	Road Crossing Details
25	TWWDA/KK/WS-A/22	Landscape Layout, Plan &Profile	62	TWWDA/KK/RT/003	Retaining wall	99	TWWDA/KK/SD/023	Window Schedule
26	TWWDA/KK/WS-A/23	Landscape Layout, Plan &Profile	63	TWWDA/KK/RT/003	Retaining wall	100	TWWDA/KK/SD/024	Door and Window Details
27	TWWDA/KK/WS-A/24	Landscape Layout, Plan &Profile	64	TWWDA/KK/RT/003	Retaining wall	101	TWWDA/KK/PS/001	Pipe shed
28	TWWDA/KK/WS-A/25	Landscape Layout, Plan &Profile	65	TWWDA/KK/CR-01	Control Rooom			
29	TWWDA/KK/WS-A/26	Landscape Layout, Plan &Profile	66	TWWDA/KK/SDBR/04	Sendimentation Bridge			
30	TWWDA/KK/WS-A/27	Landscape Layout, Plan &Profile	67	TWWDA/KK/AB/05	Ablution Block			
31	TWWDA/KK/WS-A/28	Landscape Layout, Plan &Profile	68	TWWDA/KK/BPT/06	Break Pressure Tanks			
32	TWWDA/KK/WS-A/29	Landscape Layout, Plan &Profile	69	TWWDA/KK/BPT/06	Break Pressure Tanks			
33	TWWDA/KK/WS-A/30	Landscape Layout, Plan &Profile	70	TWWDA/KK/BPT/06	Break Pressure Tanks			
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35	TWWDA/KK/WS-A/32	Landscape Layout, Plan &Profile	72	TWWDA/KK/SD/001	Aerial Crossing			

GENERAL LAYOUT DRAWINGS



No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	16 FEB 2017	 TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	APPENDIX 1: SERVICES CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF KILIGU WATER PROJECT, ER EXTENSION SUPPLY AND WEIRAGE PROJECT CONTRACT No. WWS/ADB/002/2016 - 2017	 TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nalleon Place, Rhapsa Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	KERUGOYA KUTUS WATER SUPPLY PROJECT GENERAL LAYOUT	Drawn By : E.O
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval : Date : 16 FEB 2017 Drawing No : WWS/KGL/01							

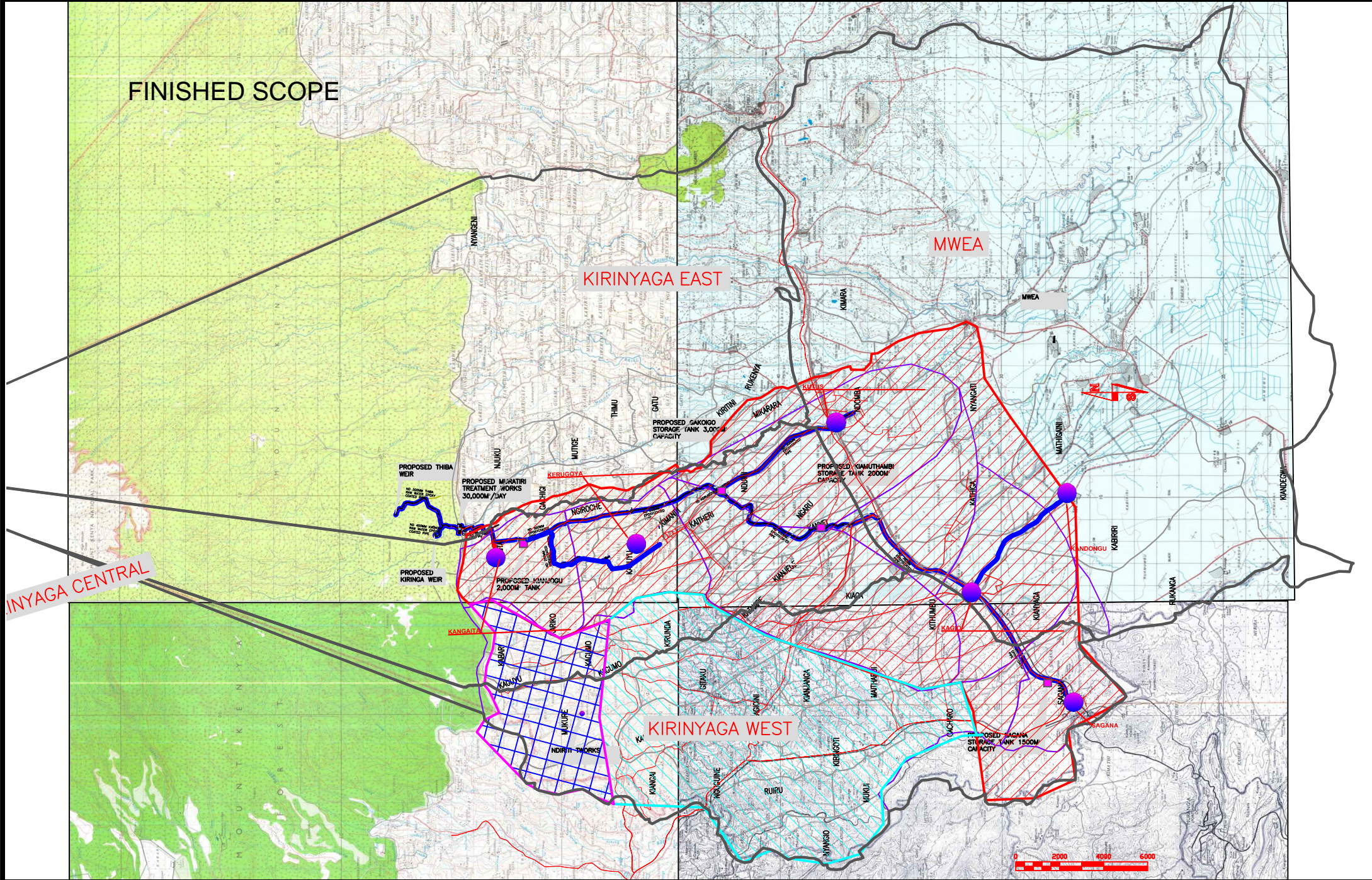
FINISHED SCOPE





KIRINYAGA CENTRAL

KIRINYAGA EAST

MWEA

KIRINYAGA WEST



No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	22/08/2025	 KENYA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK AFRICAN DEVELOPMENT FUND	<div>ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION</div> <div>CONTRACT No: TWS/ADP/002/2016 - 2017</div>	 KENYA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapsa Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	AREA SERVED BY PROPOSED WATER	Drawn By : D.G.M
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval : Date : 22/08/2025							
											Drawing No : TWS/ADP/002/2016 - 2017

FINISHED SCOPE

KIRINYAGA WEST

PROPOSED THIBA WEIR
NO. 300MM THIBA PIPE WATER EPDM COATED PIPE

PROPOSED MURATIRI TREATMENT WORKS
30,000M³/DAY

PROPOSED KIANJOGU 2,000M³ TANK

PROPOSED GAKOIGO STORAGE TANK 3,000M³ CAPACITY





PROPOSED KIAMUTHAMBI STORAGE TANK 2000M³ CAPACITY

PROPOSED SAGANA STORAGE TANK 1500M³ CAPACITY

PROPOSED NDIRITI TOWNSHIP

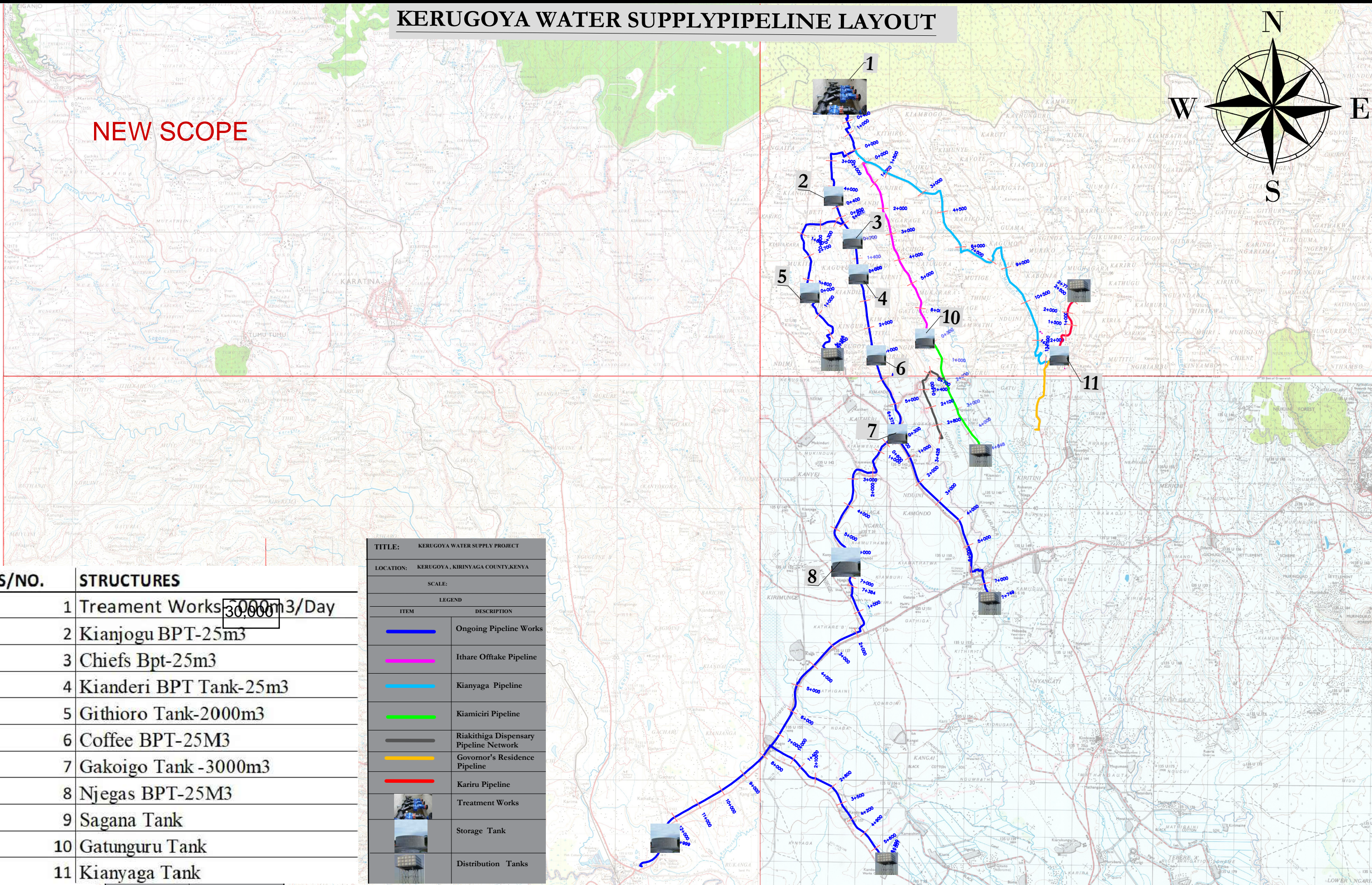
PROPOSED KERINGA WEIR
NO. 450MM KIRINGA PIPE WATER EPDM COATED PIPE

Scale: 0 2000 4000 6000

No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Design by	Reviewed By	Drawing Title	Designed By : LK				
1.		W.K	S.M.M	02-Feb-2025	 TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION SUPPLY AND SEWERAGE PROJECT CONTRACT NO. TWS/ADB/002/2016 - 2017	 Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nellore Place, Rhapsa Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	KERUGOYA KUTUS WATER SUPPLY PROJECT GENERAL LAYOUT	Drawn By : D.G.M				
2.															Checked By : W.K
3.															Approved By : S.M.M
4.															Client approval : Date : 02-Feb-2025 Drawing No : TWS/ADB/CL/002

CONVEYANCE

NEW SCOPE (ADDEDUM)



S/NO.	STRUCTURES
1	Treatment Works 30,000m ³ /Day
2	Kianjogu BPT-25m ³
3	Chiefs Bpt-25m ³
4	Kianderi BPT Tank-25m ³
5	Githioro Tank-2000m ³
6	Coffee BPT-25M ³
7	Gakoigo Tank -3000m ³
8	Njegas BPT-25M ³
9	Sagana Tank
10	Gatunguru Tank
11	Kianyaga Tank

TITLE: KERUGOYA WATER SUPPLY PROJECT	
LOCATION: KERUGOYA, KIRINYAGA COUNTY,KENYA	
SCALE:	
LEGEND	
ITEM	DESCRIPTION
	Ongoing Pipeline Works
	Ithare Offtake Pipeline
	Kianyaga Pipeline
	Kiamiciri Pipeline
	Riakithiga Dispensary Pipeline Network
	Governor's Residence Pipeline
	Kariru Pipeline
	Treatment Works
	Storage Tank
	Distribution Tanks

No	REVISIONS	CHECKED BY	APPROVED By	DATE
1.		W.K	S.M.M	February, 2025
2.				
3.				
4.				

Client


TANA WATER WORKS
DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O
Box 1292, Nyeri, Kenya

Financed By


AFRICAN DEVELOPMENT BANK

Project

CONSTRUCTION OF KERUGOYA KUTUS WATER AND
SEWERAGE INFRASTRUCTURE PROJECT-LOT I
ADDENDUM WORKS

CONTRACT No: TWSB/ADB/002/ 2016 - 2017

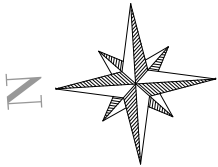
Designed By


CAS CONSULTANTS LIMITED
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P.O Box 67693 - 00200 - Nairobi, Kenya
Tel: 020 4445265 Fax: 020 4440049
E-mail: casconsult@africaonline.co.ke

Drawing Title

KERUGOYA WATER SUPPLY
GENERAL LAYOUT

Designed By : L.K
Drawn By : M.O
Checked By : L.K
Approved By : S.M.M
Client approval :
Date : FEB 2025
Drawing No : TWWDA/KK/WS-A/01



NOTES

- ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
- COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
- THE FINAL ALIGNMENT OF THE PIPELINE SHALL BE AGREED ON THE SITE WITH THE ENGINEER.
- THE FINAL LOCATION OF ANY STRUCTURES(VALVE CHAMBERS) ALONG THE PIPELINE SHALL BE AGREED WITH THE ENGINEER.
- CROSSINGS WITH EXISTING PIPELINES ARE NOT SHOWN IN ALL CASES.THE ALIGNMENT HAS TO BE ADJUSTED ON SITE AT CROSSING POINTS WITH EXISTING PIPELINES AS REQUIRED.
- ANY EXISTING STRUCTURES,RETAINING WALLS,TANKS ETC. ALONG THE PIPELINE CORRIDOR HAVE TO BE SECURED AND IF DAMAGED,REINSTALLED AS INSTRUCTED BY THE ENGINEER.
- AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
- HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
- AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



W.O
WASHOUT VALVE



A.V
AIR VALVE

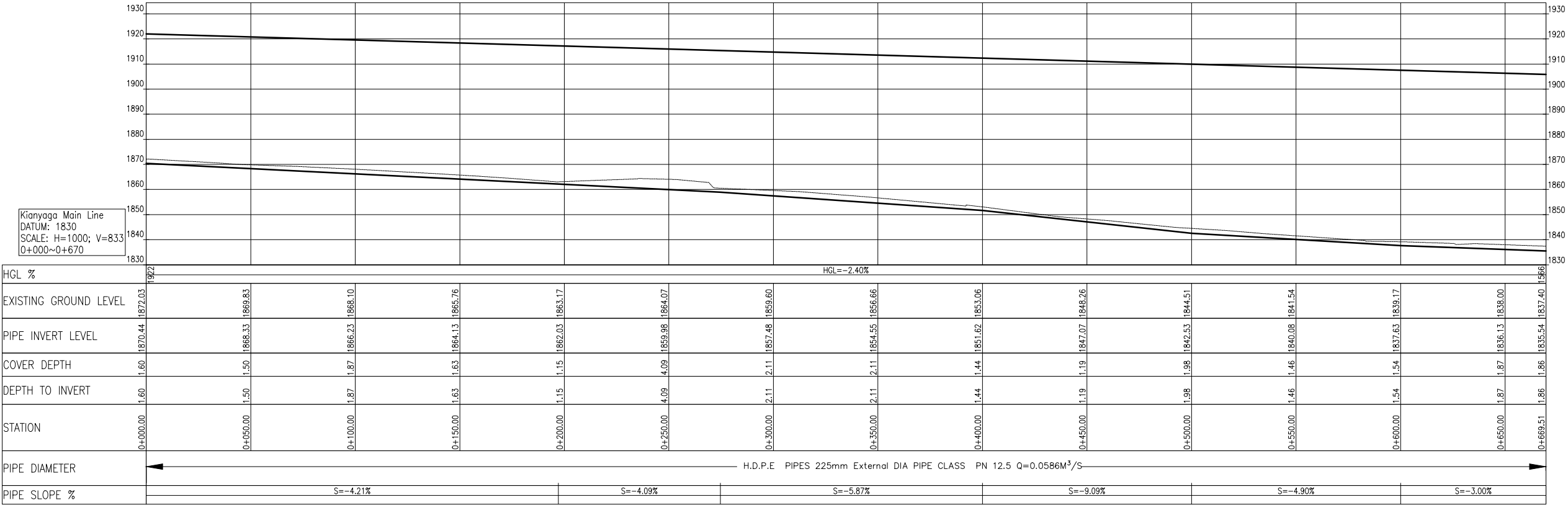


ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1830
SCALE: H=1000; V=833
0+000~0+670



No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

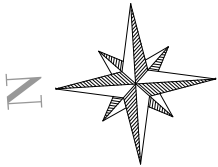


CAS CONSULTANTS LIMITED
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WEBSITE: www.casconsultants.co.ke

Drawing Title:

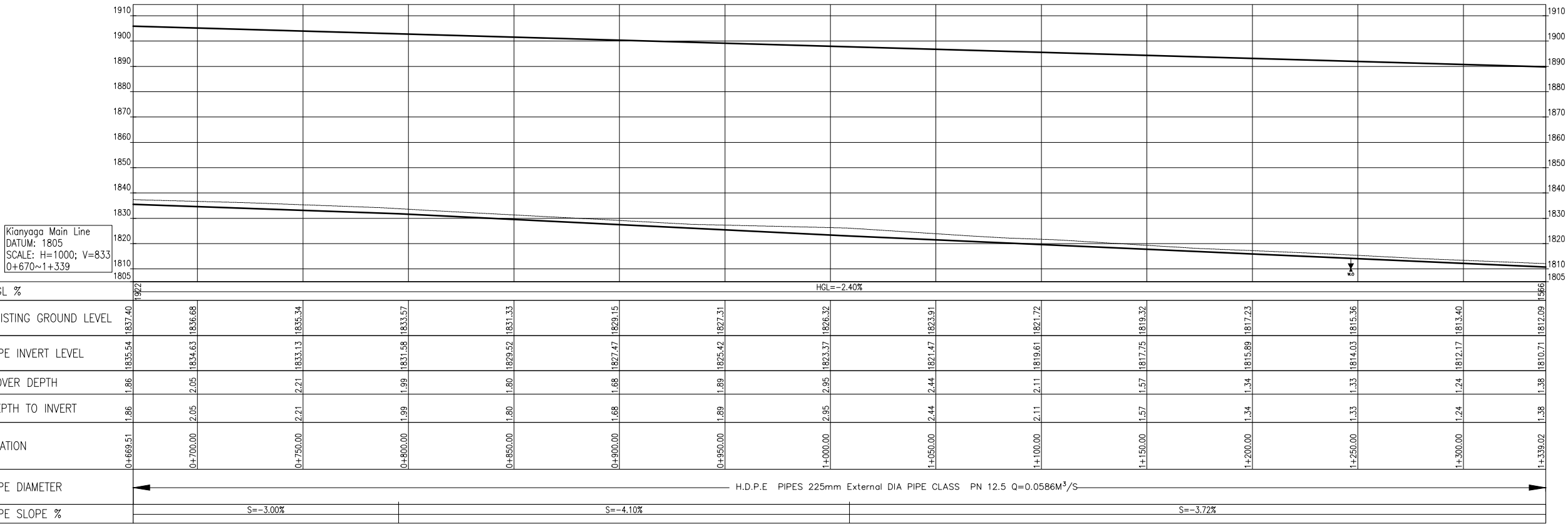
KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 0+000-0+670

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/02



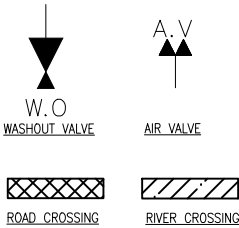
NOTES




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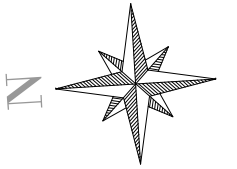


LEGEND

SYMBOLS



No	Revisions	Checked By	Approved By	Date	Client:	Financed By:	Project:	Designed By:	Drawing Title:	Designed By : M.O.O
1.					<div> TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya</div>	<div> AFRICAN DEVELOPMENT BANK</div>	CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No; TWSB/ADB/002/ 2016 - 2017	<div> CAS CONSULTANTS LIMITED LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAIROBI, KENYA TEL: 020 445565 E-MAIL: casconsa@geticaonline.co.ke WEBSITE: www.casconsultants.co.ke</div>	KERUGOYA WATER SUPPLY KIANYAGA MAIN CHAINAGE 0+670-1+340	Drawn By : Z.M.K
2.										Checked By : L.K.N
3.										Approved By : S.M.M
4.										Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/03



NOTES

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10. AT ALL CROSSING POINTS WITH LOCAL (DIRT) ROADS, THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



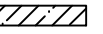
W.O
WASHOUT VALVE



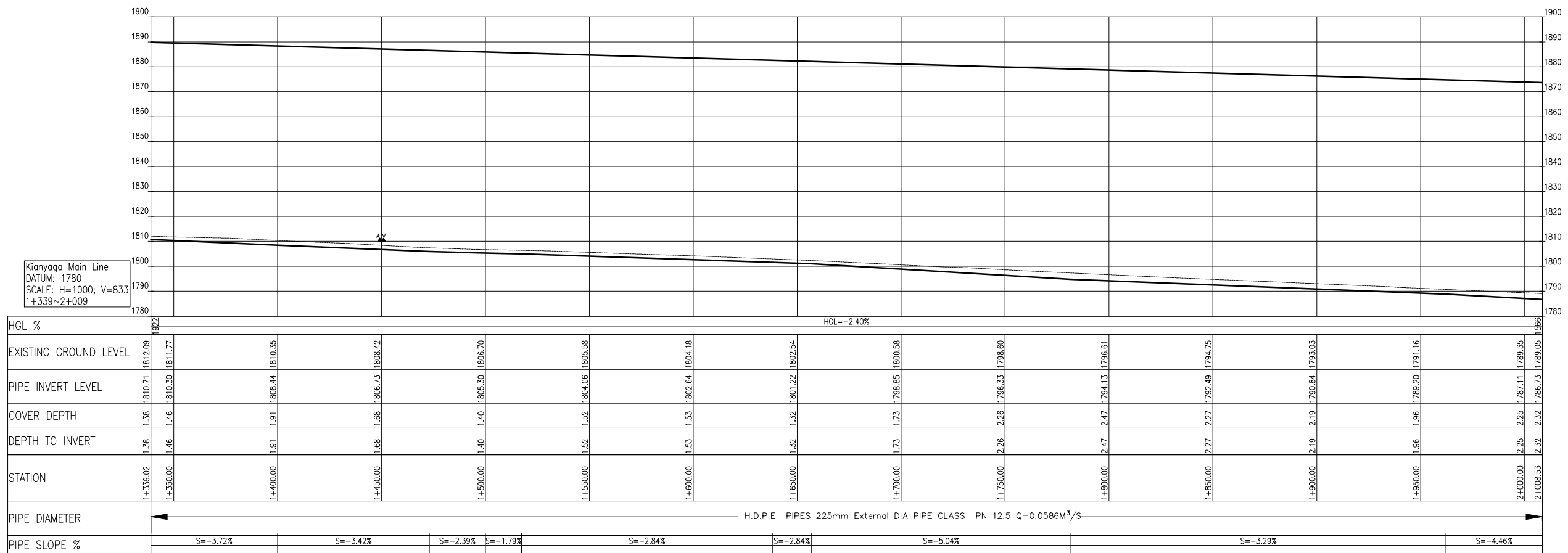
2. VALVE






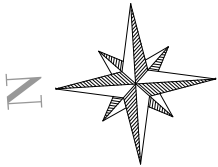
LOAD CROSSING



RIVER CROSSING



No	Revisions	Checked By	Approved By	Date	Client:	Financed By:	Project:	Designed By:	Drawing Title:	Designed By
1.					 TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No; TWSB/ADB/002/ 2016 - 2017	 CAS CONSULTANTS LIMITED 1 st MAC BUILDING, 4 th FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAROBALI KENYA TEL: 020 444295 E-MAIL: casconsults@afriiconline.co.ke WEBSITE: www.casconsultants.co.ke	KERUGOYA WATER SUPPLY KIANYAGA MAIN CHAINAGE 1+340.2+009	: M.O.O
2.				Drawn By						
3.				Checked By						
4.				Approved By						
										Client Approval :
										Date
										: FEB, 2025
										Drawing No
										: TWWDA/KK/WS-A/04



NOTES

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9. HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
10. AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



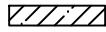
W.O
WASHOUT VALVE



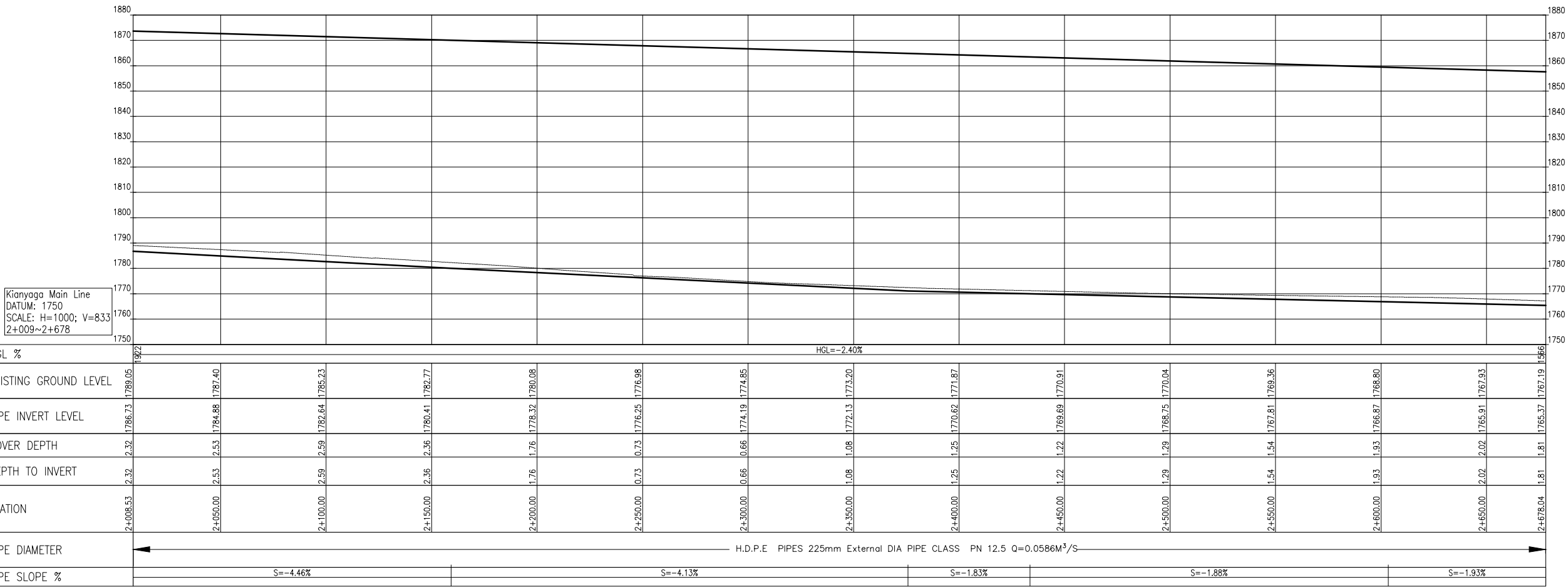
A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING



Kianyaga Main Line
DATUM: 1750
SCALE: H=1000; V=833
2+009~2+678

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

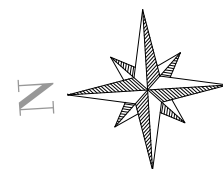


CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@gettriconline.co.ke
WEBSITE: www.casconsultants.co.ke

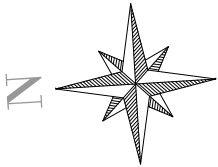
Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 2+009-2+679

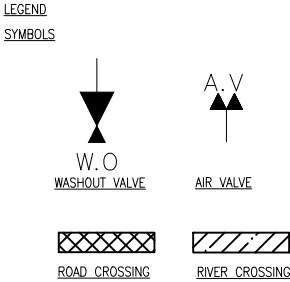
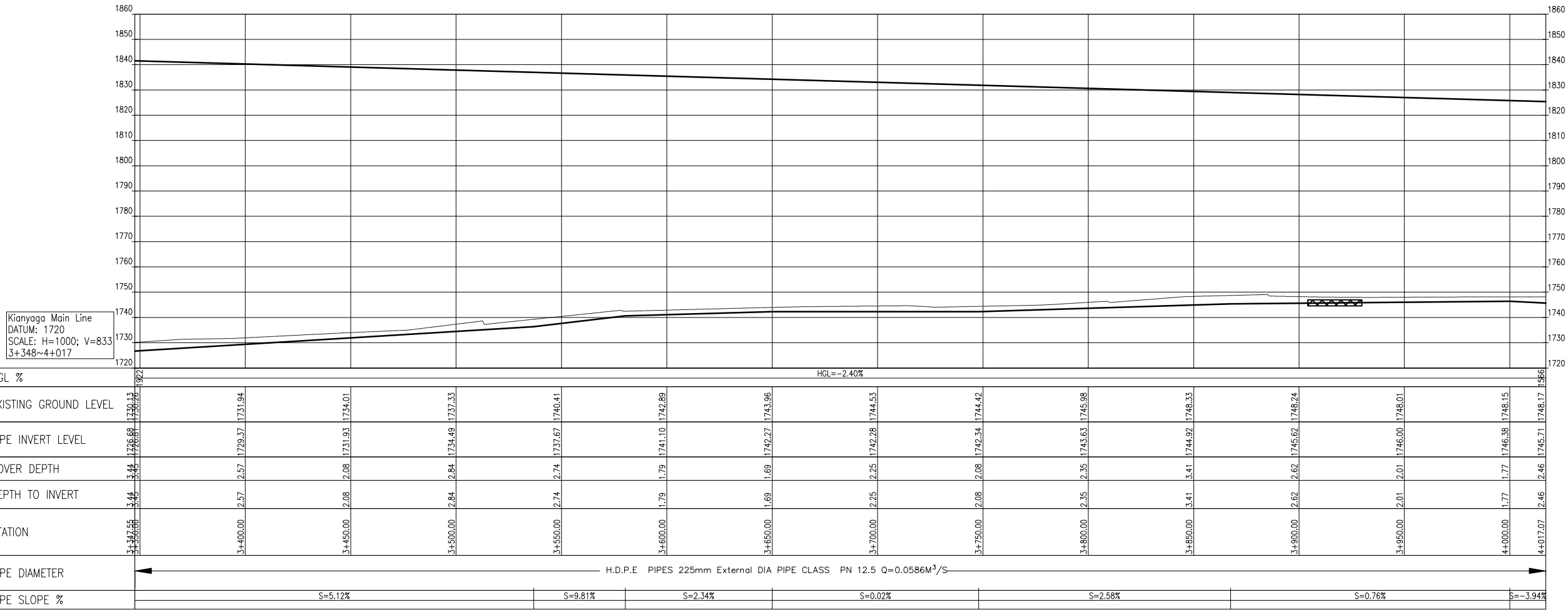
Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/05



Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/06



- NOTES
1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
 2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
 3. COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
 4. THE FINAL ALIGNMENT OF THE PIPELINE SHALL BE AGREED ON THE SITE WITH THE ENGINEER.
 5. THE FINAL LOCATION OF ANY STRUCTURES(VALVE CHAMBERS) ALONG THE PIPELINE SHALL BE AGREED WITH THE ENGINEER.
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 8. AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
 9. HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
 10. AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.



No	Revisions	Checked By	Approved By	Date
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2.				
3.				
4.				

Client:

TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:

AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

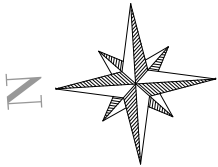
Designed By:

CAS CONSULTANTS LIMITED
1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@geticaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 3+348-4+018

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/07



NOTES

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LEGEND

SYMBOLS



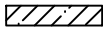
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1700
SCALE: H=1000; V=833
4+017~4+687

HGL %	HGL=-2.40%															1922
EXISTING GROUND LEVEL	1748.17	1747.67	1746.05	1742.93	1739.08	1735.18	1731.88	1728.02	1724.71	1721.68	1719.53	1717.36	1716.34	1715.16	1713.60	1926
PIPE INVERT LEVEL	1745.71	1744.41	1742.19	1739.41	1736.62	1733.34	1730.03	1726.73	1723.42	1720.11	1717.17	1715.91	1714.65	1713.39	1711.60	
COVER DEPTH	2.46	3.26	3.85	3.53	2.46	1.84	1.84	1.30	1.29	1.57	2.36	1.45	1.70	1.77	2.00	
DEPTH TO INVERT	2.46	3.26	3.85	3.53	2.46	1.84	1.84	1.30	1.29	1.57	2.36	1.45	1.70	1.77	2.00	
STATION	4+017.07	4+050.00	4+100.00	4+150.00	4+200.00	4+250.00	4+300.00	4+350.00	4+400.00	4+450.00	4+500.00	4+550.00	4+600.00	4+650.00	4+686.58	
PIPE DIAMETER	H.D.P.E PIPES 200mm External DIA PIPE CLASS PN 12.5 Q=0.0426M ³ /S															
PIPE SLOPE %	S=-3.94%		S=-5.57%			S=-6.61%					S=-2.52%			S=-7.44%		

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

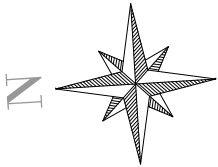


CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
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E-MAIL: casconsau@casconsaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 4+018.4+687

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/08



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
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LEGEND

SYMBOLS



W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1670
SCALE: H=1000; V=833
4+687~5+356

HGL %	HGL=-2.40%														
EXISTING GROUND LEVEL	1713.60	1712.95	1710.06	1706.17	1702.27	1698.93	1695.72	1697.94	1690.18	1687.75	1686.30	1685.11	1683.47	1682.39	1681.16
PIPE INVERT LEVEL	1711.60	1710.60	1706.88	1703.16	1699.44	1695.71	1691.99	1689.03	1686.93	1684.84	1684.53	1683.31	1682.08	1680.26	1678.09
COVER DEPTH	2.00	2.35	3.18	3.01	2.83	3.21	3.73	8.92	3.25	2.91	1.77	1.81	1.38	2.13	3.07
DEPTH TO INVERT	2.00	2.35	3.18	3.01	2.83	3.21	3.73	8.92	3.25	2.91	1.77	1.81	1.38	2.13	3.07
STATION	4+686.58	4+700.00	4+750.00	4+800.00	4+850.00	4+900.00	4+950.00	5+000.00	5+050.00	5+100.00	5+150.00	5+200.00	5+250.00	5+300.00	5+350.00
PIPE DIAMETER	H.D.P.E PIPES 200mm External DIA PIPE CLASS PN 12.5 Q=0.0426M³/S														
PIPE SLOPE %	S=-7.44%					S=-4.19%					S=-0.51%			S=-2.45%	

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:



CAS CONSULTANTS LIMITED
LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
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E-MAIL: casconsau@casconsaonline.co.ke
WEBSITE: www.casconsultants.co.ke

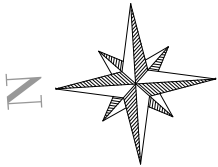
Drawing Title:

KERUGOYA WATER SUPPLY

KIANYAGA MAIN

CHAINAGE 4+687-5+357

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/09



NOTES

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LEGEND

SYMBOLS



W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1655
SCALE: H=1000; V=833
5+356~6+026

HGL %	HGL=-2.40%														
EXISTING GROUND LEVEL	1681.01	1679.12	1676.72	1674.23	1672.37	1670.58	1669.17	1668.62	1667.90	1667.41	1666.41	1665.58	1664.68	1664.07	1664.17
PIPE INVERT LEVEL	1677.83	1676.07	1674.24	1672.41	1670.57	1668.74	1667.88	1667.02	1666.16	1665.31	1664.49	1663.68	1662.87	1662.50	1662.34
COVER DEPTH	3.18	3.05	2.49	1.82	1.79	1.84	1.29	1.59	1.74	2.11	1.92	1.90	1.80	1.58	1.83
DEPTH TO INVERT	3.18	3.05	2.49	1.82	1.79	1.84	1.29	1.59	1.74	2.11	1.92	1.90	1.80	1.58	1.83
STATION	5+356.09	5+400.00	5+450.00	5+500.00	5+550.00	5+600.00	5+650.00	5+700.00	5+750.00	5+800.00	5+850.00	5+900.00	5+950.00	6+000.00	6+025.60
PIPE DIAMETER	H.D.P.E PIPES 200mm External DIA PIPE CLASS PN 12.5 Q=0.0426M ³ /S														
PIPE SLOPE %	S=-4.34%	S=-3.66%					S=-1.72%					S=-1.62%		S=-0.62%	

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:



CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67663 - 00200 - NAIROBI, KENYA
TEL: 020 445265
E-MAIL: casconsau@getinfoonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 5+357-6+026

Designed By : M.O.O

Drawn By : Z.M.K

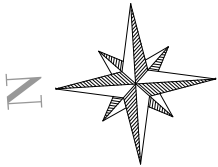
Checked By : L.K.N

Approved By : S.M.M

Client Approval :

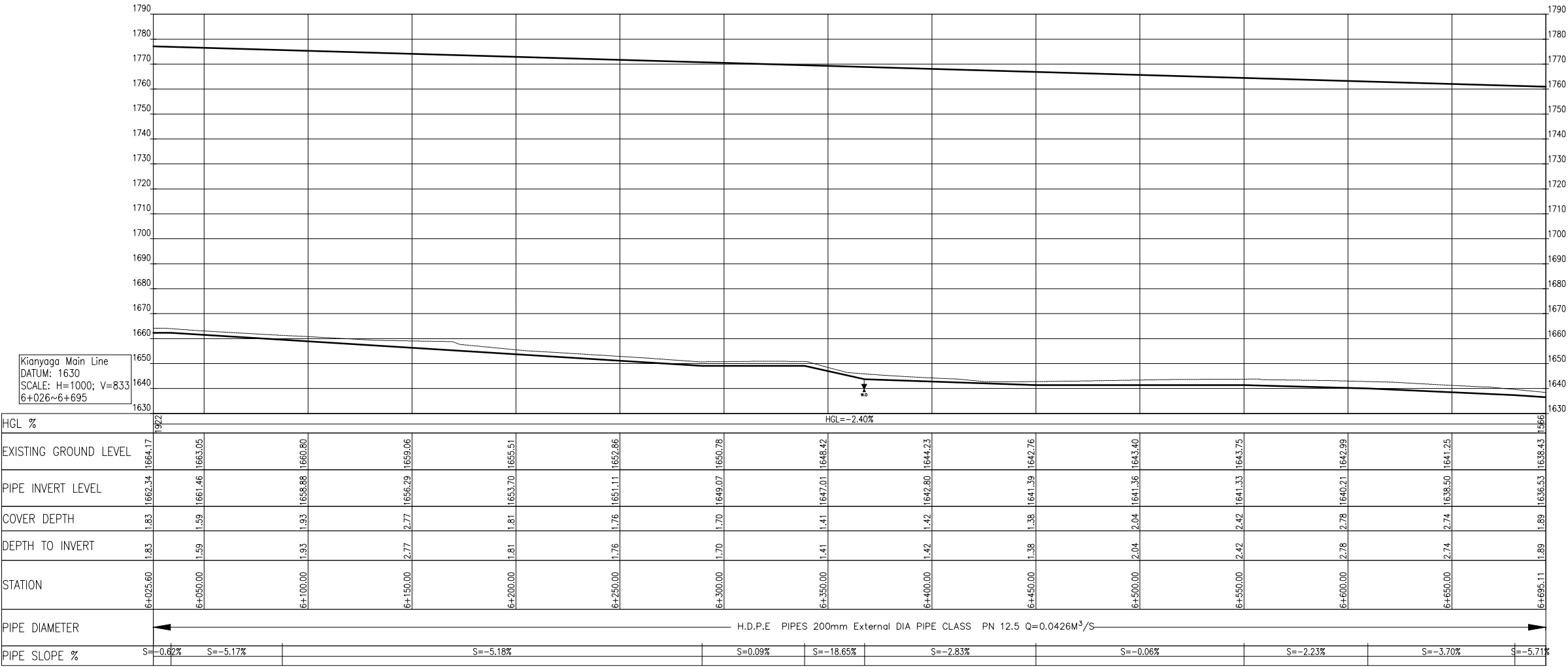
Date : FEB, 2025

Drawing No : TWWDA/KK/WS-A/10



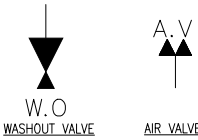
NOTES




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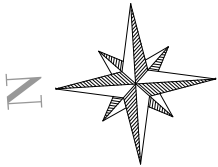


LEGEND

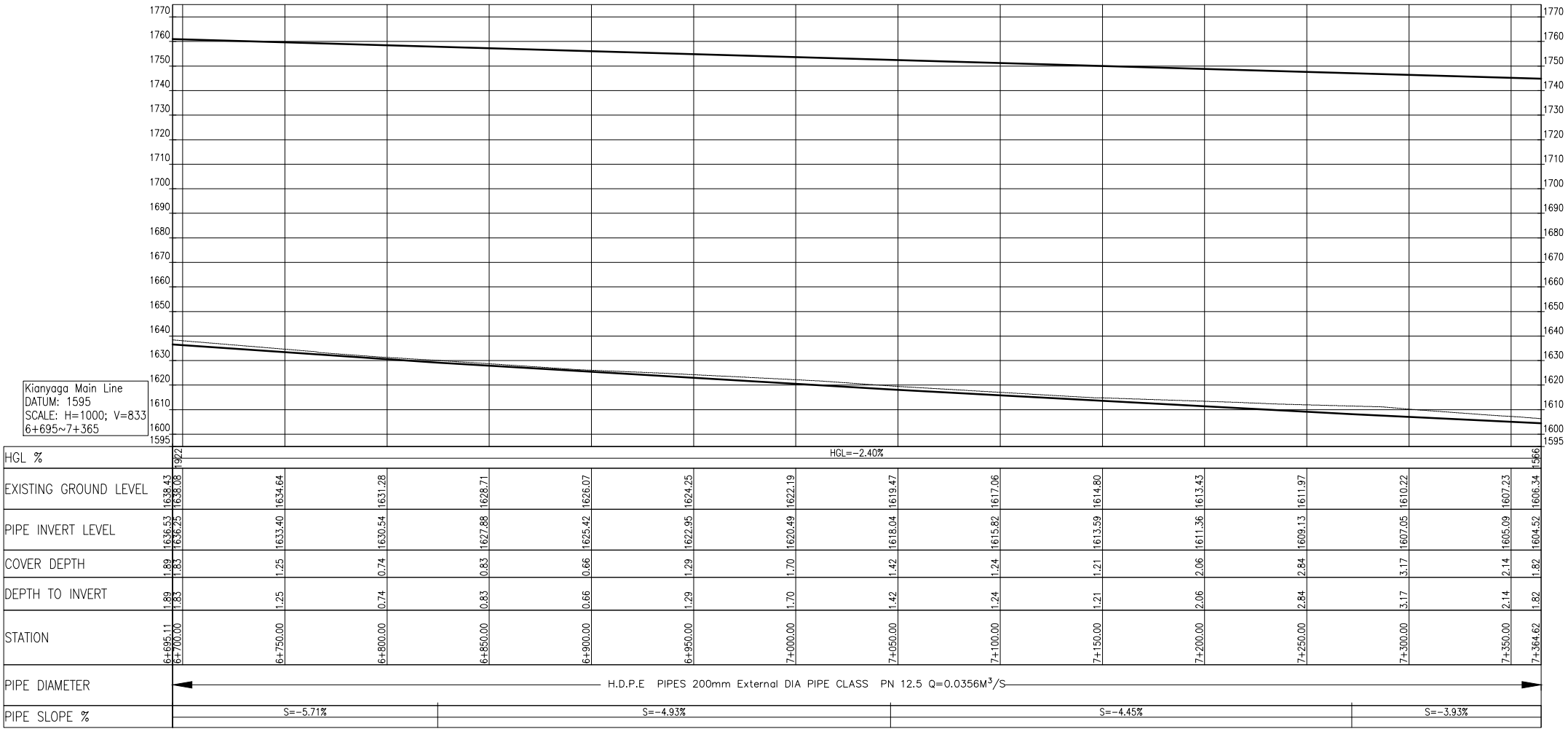
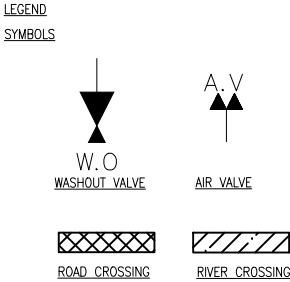
SYMBOLS



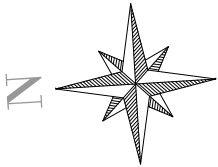
No	Revisions	Checked By	Approved By	Date	<div>Client:</div> <div></div> <div>TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya</div>	<div>Financed By:</div> <div></div> <div>AFRICAN DEVELOPMENT BANK</div>	<div>Project:</div> <div>CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS</div> <div>CONTRACT No; TWSB/ADB/002/ 2016 - 2017</div>	<div>Designed By:</div> <div></div> <div>CAS CONSULTANTS LIMITED 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAIROBI, KENYA TEL: 020 4445265 E-MAIL: casconsult@afriiconline.co.ke WEBSITE: www.casconsultants.co.ke</div>	<div>Drawing Title:</div> <div>KERUGOYA WATER SUPPLY KIANYAGA MAIN CHAINAGE 6+026-6+696</div>	Designed By	: M.O.O
1.										Drawn By	: Z.M.K
2.										Checked By	: L.K.N
3.										Approved By	: S.M.M
4.										Client Approval:	:
										Date	: FEB, 2025
					Drawing No	: TWWDA/KK/WS-A/11					



- NOTES
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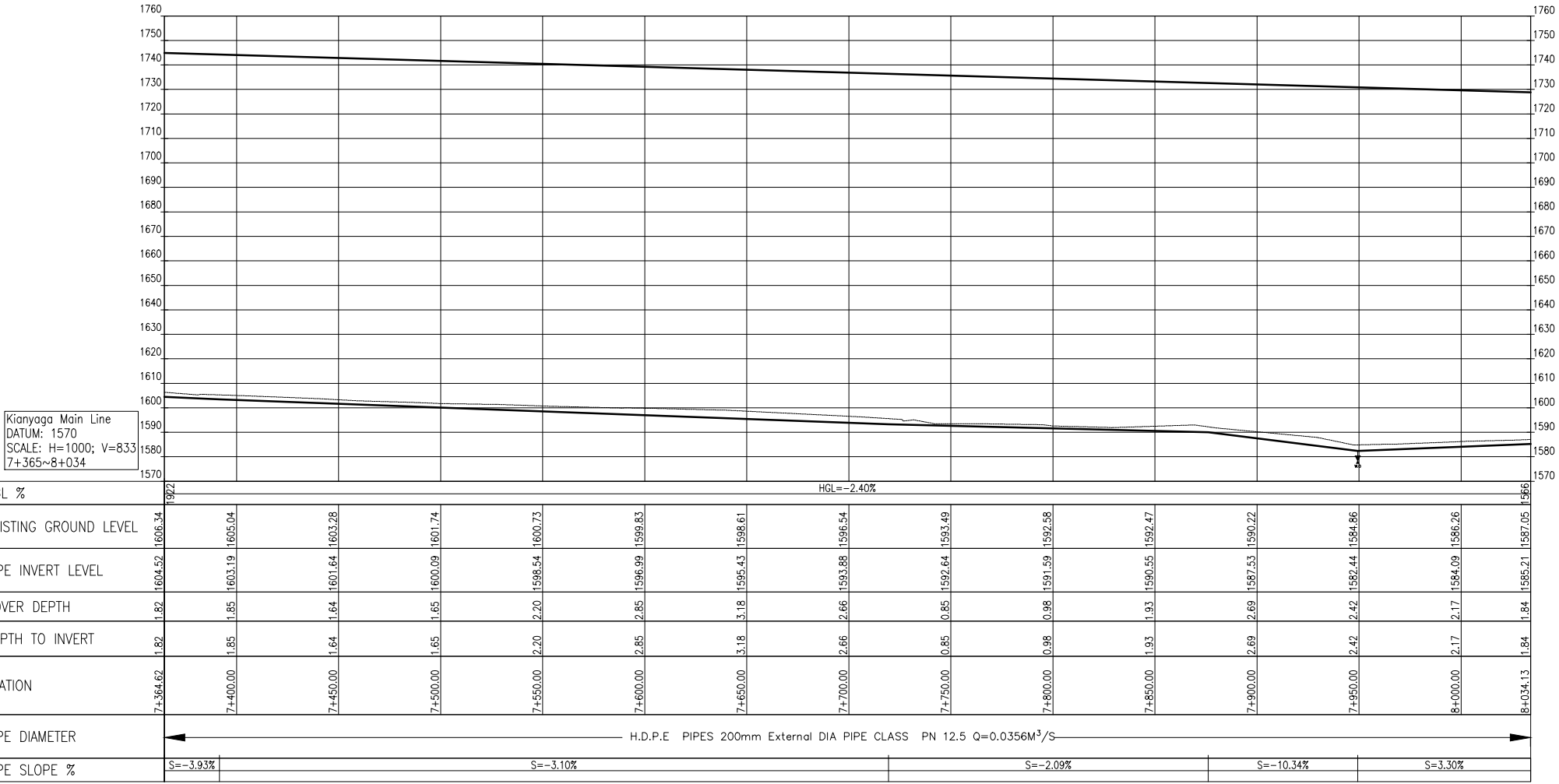


No	Revisions	Checked By	Approved By	Date	Client:	Financed By:	Project:	Designed By:	Drawing Title:	Designed By : M.O.O
1.					 TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No; TWSB/ADB/002/ 2016 - 2017	 CAS CONSULTANTS LIMITED LE MAC BUILDING, 1 ST FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAIROBI, KENYA TEL: 020 4445265 E-MAIL: casconsau@geticaonline.co.ke WEBSITE: www.casconsultants.co.ke	KERUGOYA WATER SUPPLY KIANYAGA MAIN CHAINAGE 6+696-7+365	Drawn By : Z.M.K
2.										Checked By : L.K.N
3.										Approved By : S.M.M
4.										Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/12



NOTES

- ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
- COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
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- CROSSINGS WITH EXISTING PIPELINES ARE NOT SHOWN IN ALL CASES.THE ALIGNMENT HAS TO BE ADJUSTED ON SITE AT CROSSING POINTS WITH EXISTING PIPELINES AS REQUIRED.
- ANY EXISTING STRUCTURES,RETAINING WALLS,TANKS ETC. ALONG THE PIPELINE CORRIDOR HAVE TO BE SECURED AND IF DAMAGED,REINSTALLED AS INSTRUCTED BY THE ENGINEER.
- AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
- HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
- AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.



LEGEND

SYMBOLS



W.O
WASHOUT VALVE






A.V
AIR VALVE

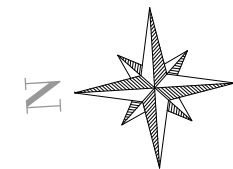





ROAD CROSSING

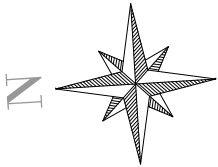


RIVER CROSSING

No	Revisions	Checked By	Approved By	Date	Client:	Financed By:	Project:	Designed By:	Drawing Title:	Designed By : M.O.O
1.					 TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No; TWSB/ADB/002/ 2016 - 2017	 CAS CONSULTANTS LIMITED 1 ST FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAIROBI, KENYA TEL: 020 4445265 E-MAIL: casconsau@caficoonline.co.ke WEBSITE: www.casconsultants.co.ke	KERUGOYA WATER SUPPLY KIANYAGA MAIN CHAINAGE 7+365-8+035	Drawn By : Z.M.K
2.										Checked By : L.K.N
3.										Approved By : S.M.M
4.										Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/13



No	Revisions	Checked By	Approved By	Date	Client:  TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya	Financed By:  AFRICAN DEVELOPMENT BANK	Project: CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No; TWSB/ADB/002/ 2016 - 2017	Designed By:  CAS CONSULTANTS LIMITED 1 st MAC BUILDING, 1 st FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAROBI, KENYA TEL: 020 444265 E-MAIL: casconsult@afriiconline.co.ke WEBSITE: www.casconsultants.co.ke	Drawing Title: KERUGOYA WATER SUPPLY KIANYAGA MAIN CHAINAGE 8+035.8+104	Designed By : M.O.O
1.										Drawn By : Z.M.K
2.										Checked By : L.K.N
3.										Approved By : S.M.M
4.										Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/14



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
3. COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
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9. HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
10. AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



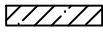
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1580
SCALE: H=1000; V=833
8+704~9+373

HGL %	HGL=-2.40%															1586
EXISTING GROUND LEVEL	1608.43	1607.05	1605.59	1604.58	1603.91	1601.98	1599.96	1598.03	1595.89	1594.44	1593.35	1592.40	1591.21	1590.34	1589.84	1586
PIPE INVERT LEVEL	1607.03	1605.59	1604.03	1602.88	1601.74	1600.16	1598.48	1596.81	1595.16	1593.76	1592.55	1591.33	1590.12	1588.91	1588.35	1586
COVER DEPTH	1.40	1.46	1.56	1.70	2.17	1.82	1.48	1.22	0.74	0.68	0.80	1.07	1.09	1.43	1.50	1.56
DEPTH TO INVERT	1.40	1.46	1.56	1.70	2.17	1.82	1.48	1.22	0.74	0.68	0.80	1.07	1.09	1.43	1.50	1.56
STATION	8+703.64	8+750.00	8+800.00	8+850.00	8+900.00	8+950.00	9+000.00	9+050.00	9+100.00	9+150.00	9+200.00	9+250.00	9+300.00	9+350.00	9+373.15	
PIPE DIAMETER	H.D.P.E PIPES 140mm External DIA PIPE CLASS PN 12.5 Q=0.0264M ³ /S															
PIPE SLOPE %	S=-3.12% S=-2.29% S=-3.35% S=-3.27% S=-2.43%															

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

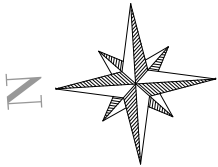


CAS CONSULTANTS LIMITED
LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@geticaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 8+704-9+374

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/15



NOTES

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LEGEND

SYMBOLS



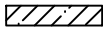
W.O
WASHOUT VALVE



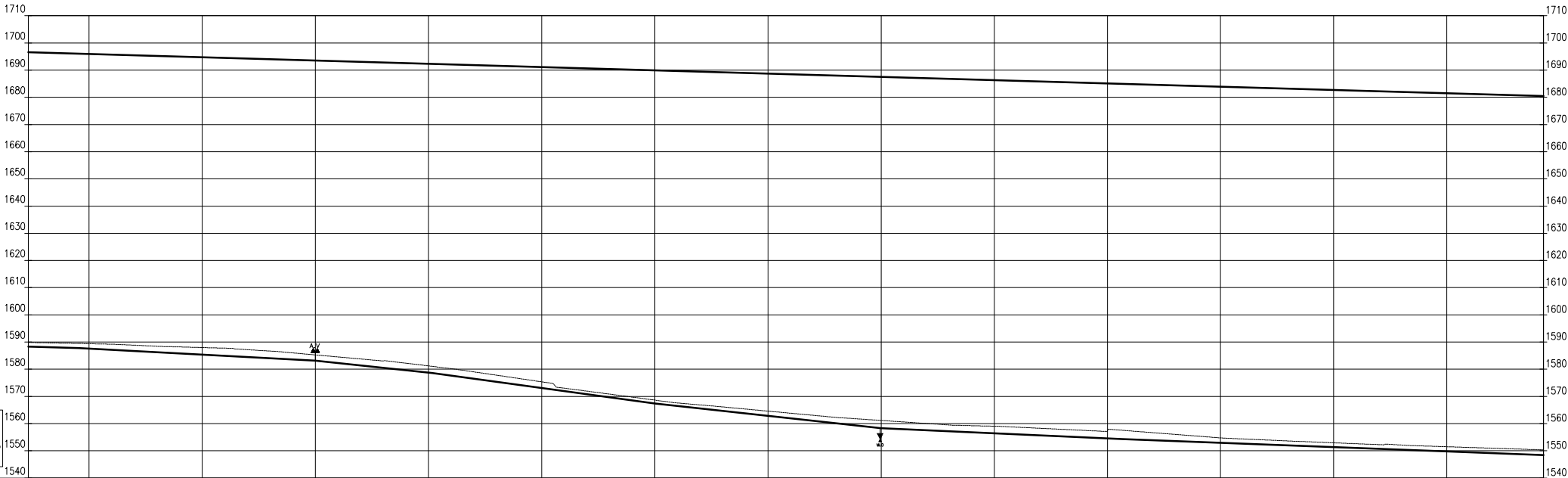
A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING




Kianyaga Main Line
DATUM: 1540
SCALE: H=1000; V=83.3
9+373~10+043

HGL %	HGL=-2.40%													
EXISTING GROUND LEVEL	1589.84	1589.39	1587.97	1585.27	1581.23	1575.38	1568.64	1564.60	1561.17	1559.03	1557.34	1554.74	1552.94	1550.33
PIPE INVERT LEVEL	1588.35	1587.60	1585.37	1583.13	1578.78	1573.13	1567.43	1562.87	1558.32	1556.46	1554.60	1552.96	1551.37	1548.40
COVER DEPTH	1.50	1.78	2.61	2.13	2.45	2.25	1.21	1.72	2.85	2.58	2.75	1.78	1.58	1.93
DEPTH TO INVERT	1.50	1.78	2.61	2.13	2.45	2.25	1.21	1.72	2.85	2.58	2.75	1.78	1.58	1.93
STATION	9+373.15	9+400.00	9+450.00	9+500.00	9+550.00	9+600.00	9+650.00	9+700.00	9+750.00	9+800.00	9+850.00	9+900.00	9+950.00	10+042.66
PIPE DIAMETER	H.D.P.E PIPES 140mm External DIA PIPE CLASS PN 12.5 Q=0.0264M ³ /S													
PIPE SLOPE %	S=-2.43%	S=-4.47%		S=-8.71%		S=-11.39%		S=-9.11%		S=-3.72%		S=-3.20%		

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya



AFRICAN DEVELOPMENT BANK

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

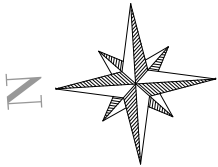


CAS CONSULTANTS LIMITED
LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67663 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@aftriconline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 9+374-10+043

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/16



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
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LEGEND

SYMBOLS



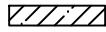
W.O
WASHOUT VALVE



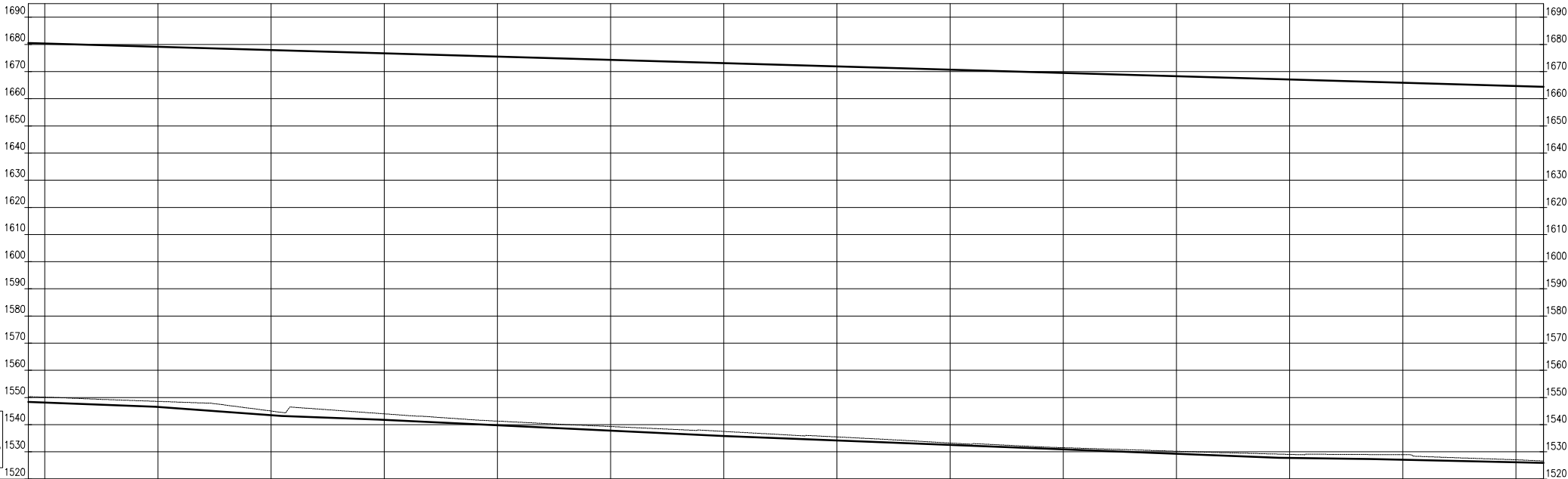
A.V
AIR VALVE



ROAD CROSSING



RIVER CROSSING




Kianyaga Main Line
DATUM: 1520
SCALE: H=1000; V=83.3
10+043~10+712

HGL %	HGL = -2.40%														
EXISTING GROUND LEVEL	1550.33	1548.57	1545.03	1543.99	1541.31	1539.31	1537.52	1535.49	1533.25	1531.52	1530.22	1529.06	1528.93	1527.07	1526.64
PIPE INVERT LEVEL	1548.40	1546.54	1543.50	1541.75	1539.79	1537.82	1535.86	1534.23	1532.59	1530.96	1529.33	1527.79	1527.08	1526.19	1525.97
COVER DEPTH	1.93	2.03	1.53	2.24	1.52	1.49	1.66	1.26	0.65	0.56	0.89	1.27	1.85	0.88	0.67
DEPTH TO INVERT	1.93	2.03	1.53	2.24	1.52	1.49	1.66	1.26	0.65	0.56	0.89	1.27	1.85	0.88	0.67
STATION	10+042.66	10+100.00	10+150.00	10+200.00	10+250.00	10+300.00	10+350.00	10+400.00	10+450.00	10+500.00	10+550.00	10+600.00	10+650.00	10+700.00	10+712.18
PIPE DIAMETER	H.D.P.E PIPES 140mm External DIA PIPE CLASS PN 12.5 Q=0.0264M ³ /S														
PIPE SLOPE %	S=-3.20%	S=-6.07%	S=-3.20%	S=-3.93%	S=-3.27%	S=-1.26%	S=-1.79%								

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:



CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
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TEL: 020 4445265
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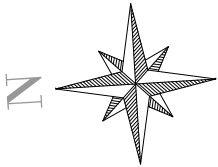
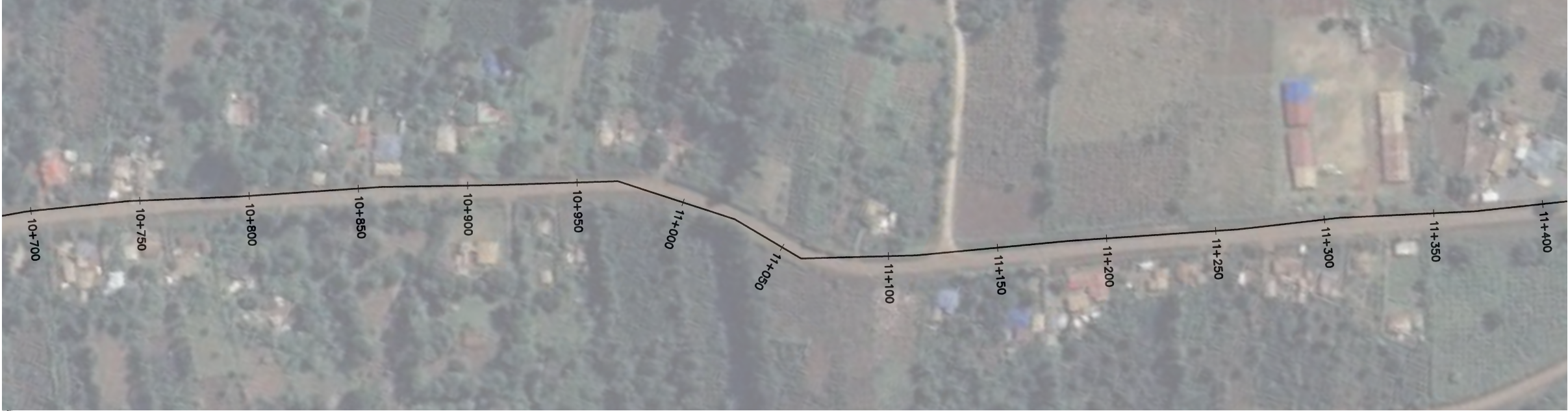
Drawing Title:

KERUGOYA WATER SUPPLY

KIANYAGA MAIN

CHAINAGE 10+043-10+713

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/17



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
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LEGEND

SYMBOLS



W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1500
SCALE: H=1000; V=833
10+712~11+382

HGL %	HGL=-2.40%															1526.64
EXISTING GROUND LEVEL	1526.64	1526.17	1526.09	1526.45	1527.79	1526.97	1524.08	1521.69	1519.28	1517.77	1517.06	1516.00	1515.27	1515.44	1515.28	1515.28
PIPE INVERT LEVEL	1525.97	1525.29	1524.40	1523.51	1522.61	1524.19	1521.66	1519.14	1516.62	1516.02	1515.43	1514.83	1514.24	1513.64	1512.87	1512.87
COVER DEPTH	0.67	0.88	1.69	2.94	5.18	2.78	2.42	2.55	2.66	1.75	1.63	1.16	1.03	1.80	2.41	2.41
DEPTH TO INVERT	0.67	0.88	1.69	2.94	5.18	2.78	2.42	2.55	2.66	1.75	1.63	1.16	1.03	1.80	2.41	2.41
STATION	10+712.18	10+750.00	10+800.00	10+850.00	10+900.00	10+950.00	11+000.00	11+050.00	11+100.00	11+150.00	11+200.00	11+250.00	11+300.00	11+350.00	11+381.69	11+382.00
PIPE DIAMETER	H.D.P.E PIPES 140mm External DIA PIPE CLASS PN 12.5 Q=0.0264M ³ /S															
PIPE SLOPE %	S=-1.79%			S=7.87%			S=-5.05%			S=-1.19%			S=-3.54%			

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

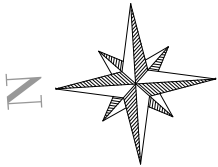


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TEL: 020 445265
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WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 10+713-11+382

Designed By : M.O.O
Drawn By : Z.M.K
Checked By : L.K.N
Approved By : S.M.M
Client Approval :
Date : FEB, 2025
Drawing No : TWWDA/KK/WS-A/18



NOTES

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- THE FINAL LOCATION OF ANY STRUCTURES(VALVE CHAMBERS) ALONG THE PIPELINE SHALL BE AGREED WITH THE ENGINEER.
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- AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
- HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
- AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



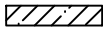
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1485
SCALE: H=1000; V=833
11+382~12+051

HGL %	HGL=-2.40%															1922
EXISTING GROUND LEVEL	1515.28	1514.64	1511.78		1509.69	1507.74	1506.21	1504.66	1504.16	1502.92	1502.90	1503.32	1502.34	1501.48	1500.42	1500.26
PIPE INVERT LEVEL	1512.87	1512.22	1510.45		1508.68	1506.91	1505.14	1503.36	1501.59	1501.33	1501.07	1500.79	1499.94	1499.10	1498.26	1497.43
COVER DEPTH	2.41	2.42	1.33		1.01	0.83	1.07	1.29	2.56	1.58	1.83	2.53	2.40	2.38	2.16	2.84
DEPTH TO INVERT	2.41	2.42	1.33		1.01	0.83	1.07	1.29	2.56	1.58	1.83	2.53	2.40	2.38	2.16	2.84
STATION	11+381.69	11+400.00	11+450.00	11+500.00	11+550.00	11+600.00	11+650.00	11+700.00	11+750.00	11+800.00	11+850.00	11+900.00	11+950.00	12+000.00	12+050.00	12+050.00
PIPE DIAMETER	H.D.P.E PIPES 140mm External DIA PIPE CLASS PN 12.5 Q=0.0201M ³ /S															
PIPE SLOPE %	S=-3.54%					S=-0.52%					S=-1.69%					

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

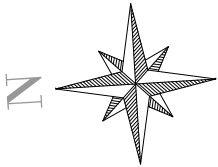


CAS CONSULTANTS LIMITED
LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67663 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@getinfoonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 11+382-12+052

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/19



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
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LEGEND

SYMBOLS



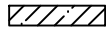
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1475
SCALE: H=1000; V=833
12+051~12+721

HGL %	HGL=-2.40%														
EXISTING GROUND LEVEL	1500.26	1498.36	1496.33	1494.89	1494.36	1493.99	1493.56	1493.86	1493.82	1493.61	1493.79	1491.86	1489.12	1486.66	1485.42
PIPE INVERT LEVEL	1497.39	1496.27	1494.69	1493.11	1493.12	1493.13	1493.14	1493.16	1493.17	1493.35	1493.08	1490.07	1487.07	1484.07	1482.83
COVER DEPTH	2.87	2.10	1.64	1.78	1.24	0.86	1.42	1.70	1.65	1.26	0.72	1.79	2.05	2.59	2.60
DEPTH TO INVERT	2.87	2.10	1.64	1.78	1.24	0.86	1.42	1.70	1.65	1.26	0.72	1.79	2.05	2.59	2.60
STATION	12+051.20	12+100.00	12+150.00	12+200.00	12+250.00	12+300.00	12+350.00	12+400.00	12+450.00	12+500.00	12+550.00	12+600.00	12+650.00	12+700.00	12+720.71
PIPE DIAMETER	H.D.P.E PIPES 140mm External DIA PIPE CLASS PN 12.5 Q=0.0264M ³ /S														
PIPE SLOPE %	S=-1.69%	S=-3.16%			S=0.02%					S=1.06%		S=-6.00%			

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRUSTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:



CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@getitonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 12+052-12+721

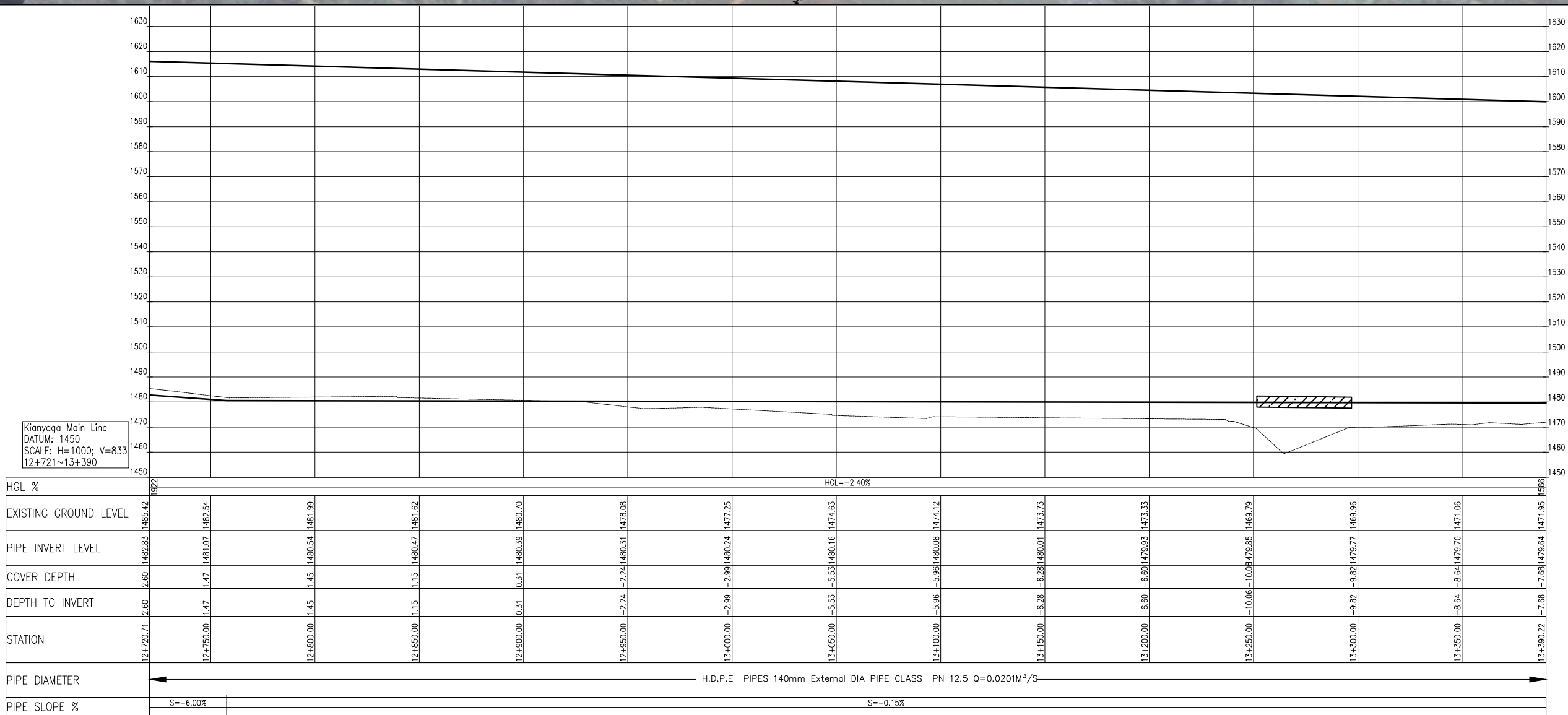
Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/20






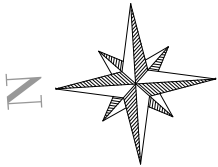
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LEGEND

SYMBOLS

R VALVRIVER CROSSING

No	Revisions	Checked By	Approved By	Date	Client:	Financed By:	Project:	Designed By:	Drawing Title:	Designed By : M.O.O
1.					 TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No; TWSB/ADB/002/ 2016 - 2017	 CAS CONSULTANTS LIMITED 1 st MAC BUILDING, 4 th FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67663 - 00200 - NAROBÍ, KENYA TEL: 020 4440265 E-MAIL: casconsult@africaonline.co.ke WEBSITE: www.casconsultants.co.ke	KERUGOYA WATER SUPPLY KJANYAGA MAIN CHAINAGE 12+721-13+391	Drawn By : Z.M.K
2.				Checked By : L.K.N						
3.				Approved By : S.M.M						
4.				Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/21						



NOTES

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LEGEND

SYMBOLS



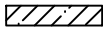
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kianyaga Main Line
DATUM: 1465
SCALE: H=1000; V=833
13+390~14+060

HGL %	HGL=-2.40%														
EXISTING GROUND LEVEL	1471.95	1472.66	1474.87	1474.77	1475.97	1481.40	1480.24	1482.17	1483.69	1484.27	1482.46	1483.63	1485.22	1486.02	1486.33
PIPE INVERT LEVEL	1479.64	1479.62	1479.54	1479.47	1479.39	1479.60	1480.03	1480.46	1480.88	1481.31	1481.69	1482.27	1482.89	1483.50	1483.73
COVER DEPTH	-7.68	-6.96	-4.67	-4.69	-2.42	1.81	0.22	1.72	2.81	2.95	0.77	1.36	2.33	2.52	2.60
DEPTH TO INVERT	-7.68	-6.96	-4.67	-4.69	-2.42	1.81	0.22	1.72	2.81	2.95	0.77	1.36	2.33	2.52	2.60
STATION	13+390.22	13+400.00	13+450.00	13+500.00	13+550.00	13+600.00	13+650.00	13+700.00	13+750.00	13+800.00	13+850.00	13+900.00	13+950.00	14+000.00	14+050.00
PIPE DIAMETER	H.D.P.E PIPES 140mm External DIA PIPE CLASS PN 12.5 Q=0.0201M ³ /S														
PIPE SLOPE %	S=-0.15%			S=0.86%				S=0.75%			S=1.24%			S=-0.70%	

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

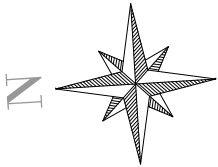


CAS CONSULTANTS LIMITED
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P.O BOX 67663 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@geticaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 13+391-14+060

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/22



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
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LEGEND

SYMBOLS



W.O
WASHOUT VALVE



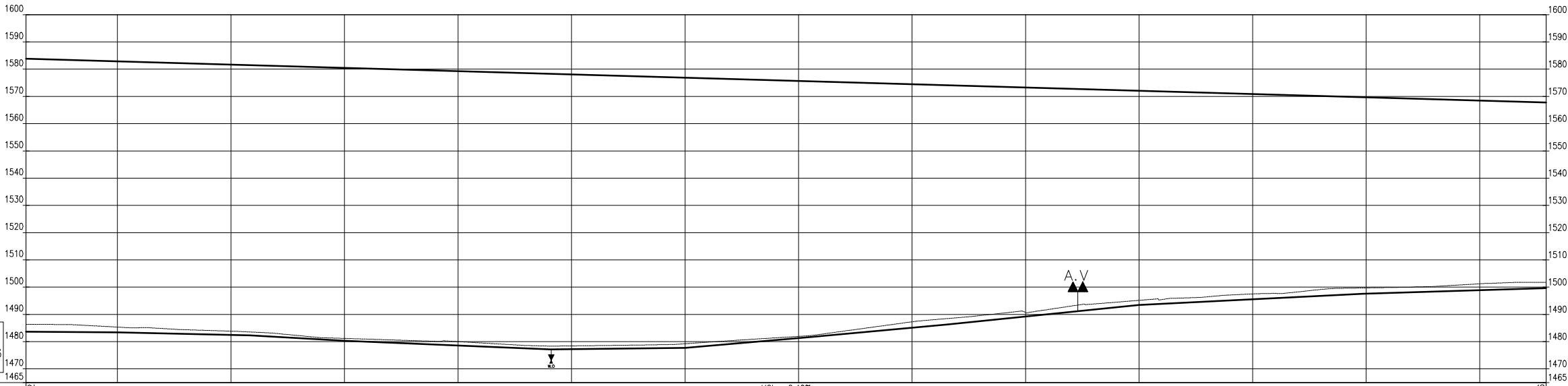
A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING



HGL %	HGL = -2.40%											
EXISTING GROUND LEVEL	1486.31	1485.33	1483.84	1481.18	1480.00	1478.43	1479.22	1481.92	1487.28	1490.71	1495.15	1499.72
PIPE INVERT LEVEL	1483.66	1483.38	1482.45	1480.33	1478.59	1477.27	1477.74	1481.28	1485.10	1489.21	1493.43	1498.90
COVER DEPTH	2.65	1.96	1.39	0.85	1.41	1.17	1.48	0.64	2.18	1.50	1.73	2.33
DEPTH TO INVERT	2.65	1.96	1.39	0.85	1.41	1.17	1.48	0.64	2.18	1.50	1.73	2.33
STATION	14+069.73	14+100.00	14+150.00	14+200.00	14+250.00	14+300.00	14+350.00	14+400.00	14+450.00	14+500.00	14+550.00	14+600.00
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.0201M³/S											
PIPE SLOPE %	S=-0.70%	S=-1.85%	S=-4.73%	S=-3.48%	S=0.95%	S=7.08%	S=7.70%	S=8.43%	S=4.22%	S=2.55%		

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

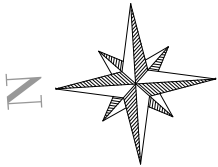
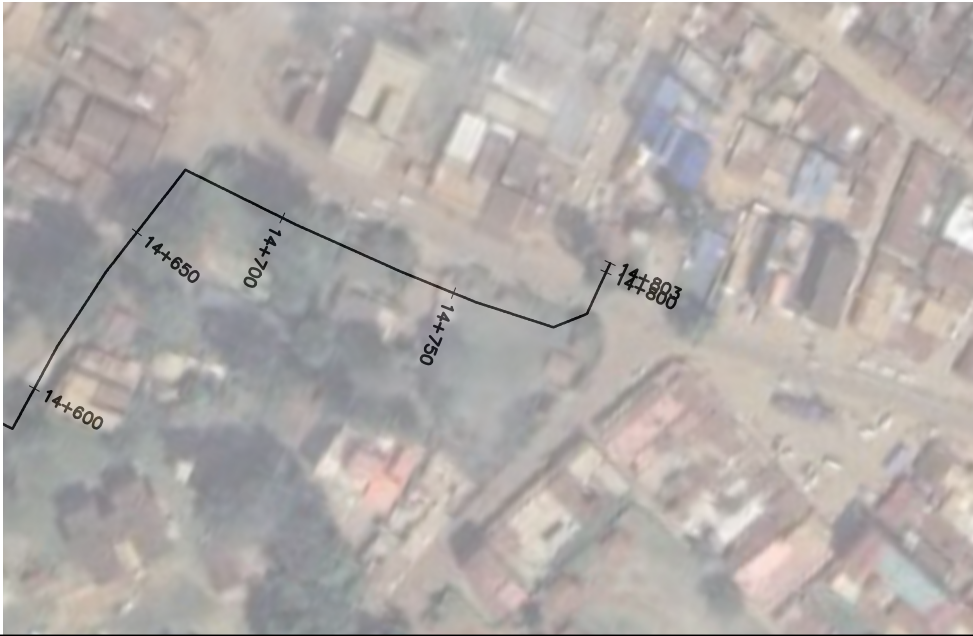


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E-MAIL: casconsau@geticaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIANYAGA MAIN
CHAINAGE 14+060-14+730

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/23



NOTES

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LEGEND

SYMBOLS



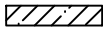
W.O
WASHOUT VALVE



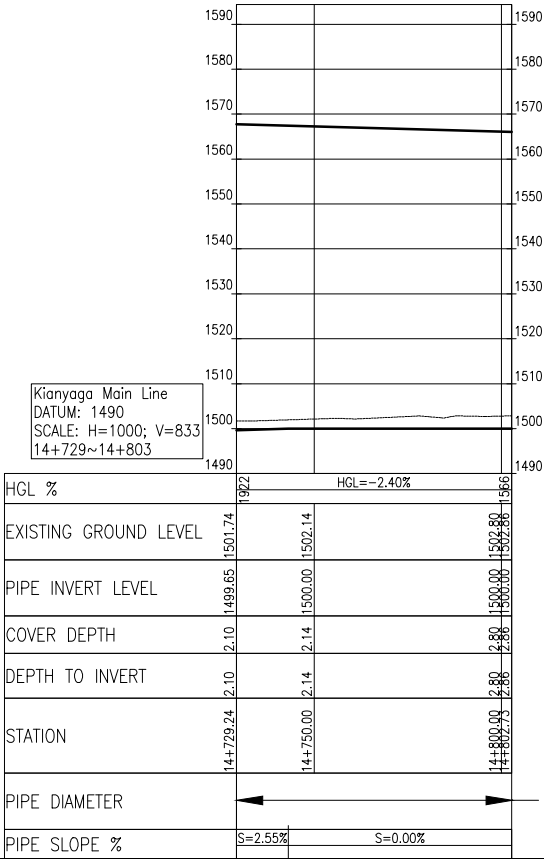
A.V
AIR VALVE

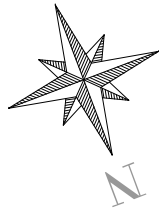
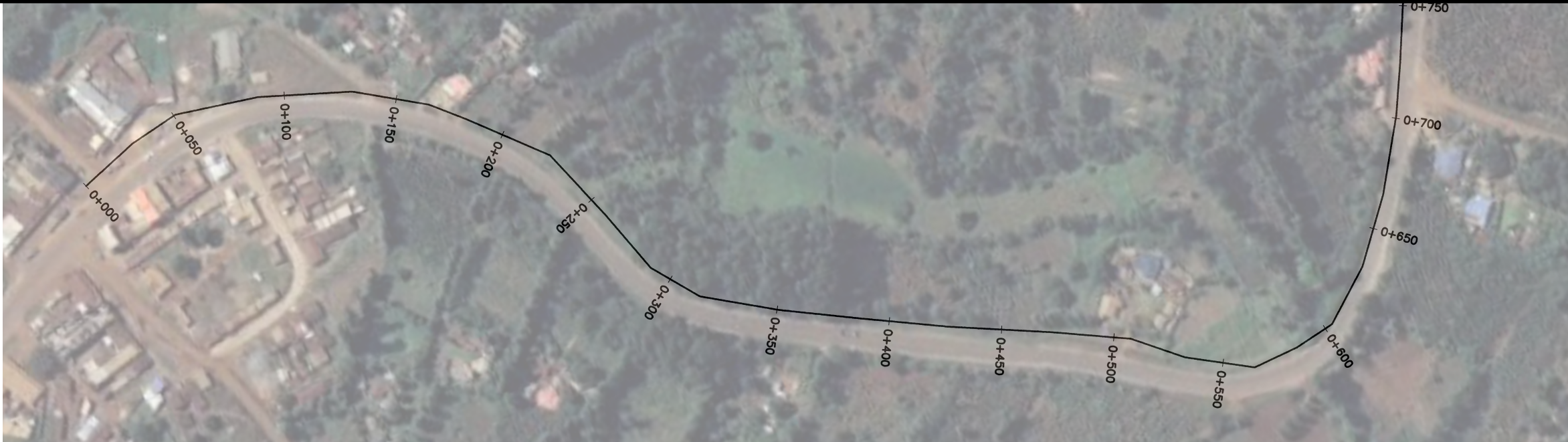


ROAD CROSSING



RIVER CROSSING





NOTES

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LEGEND

SYMBOLS



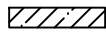
W.O
WASHOUT VALVE



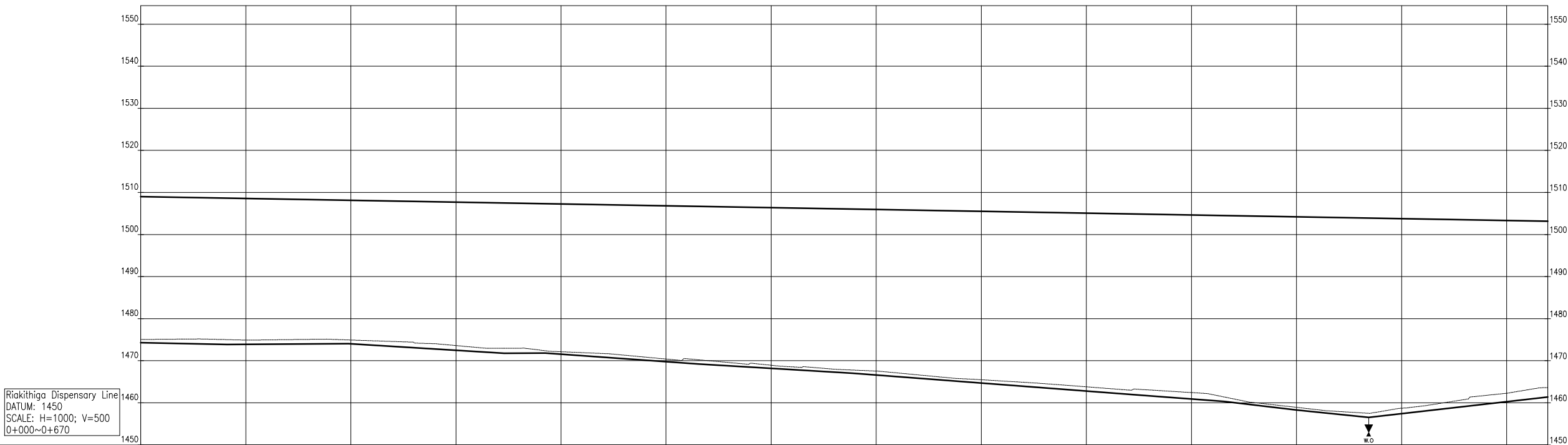
A.V
AIR VALVE



ROAD CROSSING



RIVER CROSSING




Riakithiga Dispensary Line
DATUM: 1450
SCALE: H=1000; V=500
0+000~0+670

HGL %	HGL = -0.87%														
EXISTING GROUND LEVEL	1475.04	1474.90	1474.92	1473.61	1472.14	1470.40	1468.93	1467.55	1465.48	1463.80	1462.43	1458.92	1458.71	1462.28	1463.63
PIPE INVERT LEVEL	1474.28	1473.92	1474.04	1472.48	1471.56	1469.77	1468.20	1466.62	1464.71	1462.80	1460.91	1458.30	1457.43	1460.25	1461.35
COVER DEPTH	0.76	0.99	0.89	1.12	0.58	0.63	0.73	0.92	0.77	1.00	1.53	0.62	1.28	2.02	2.27
DEPTH TO INVERT	0.76	0.99	0.89	1.12	0.58	0.63	0.73	0.92	0.77	1.00	1.53	0.62	1.28	2.02	2.27
STATION	0+000.00	0+050.00	0+100.00	0+150.00	0+200.00	0+250.00	0+300.00	0+350.00	0+400.00	0+450.00	0+500.00	0+550.00	0+600.00	0+650.00	0+669.51
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.006M ³ /S														
PIPE SLOPE %	S=-0.96%	S=0.32%	S=-3.11%	S=0.31%	S=-3.57%	S=-2.96%	S=-3.83%	S=-3.75%	S=-5.86%	S=-5.10%	S=5.64%				

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:



CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67663 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@casconsau.co.ke
WEBSITE: www.casconsultants.co.ke

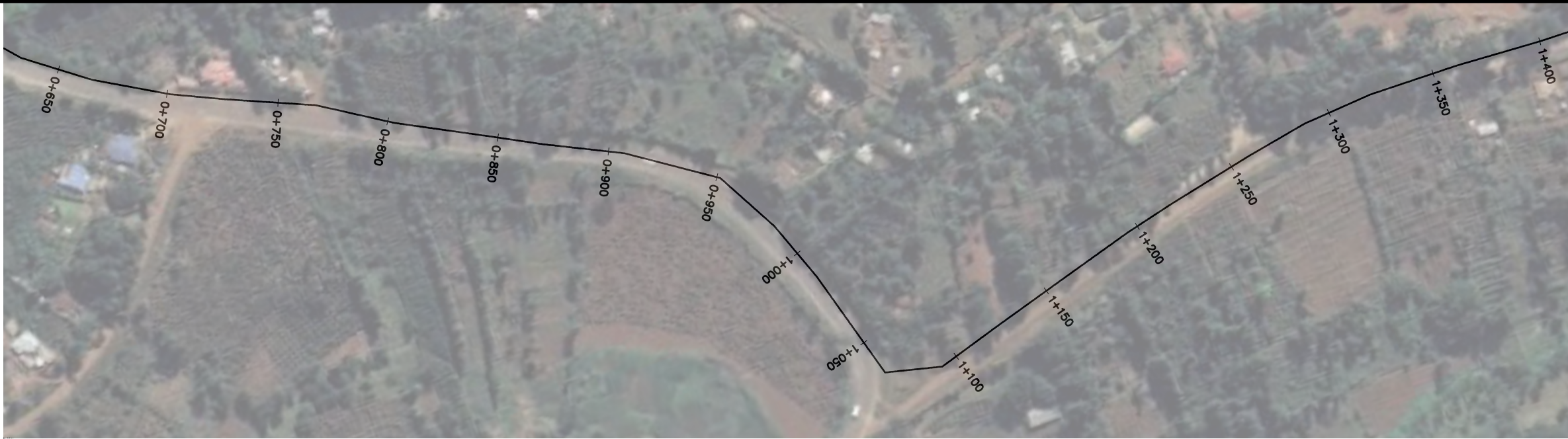
Drawing Title:

KERUGOYA WATER SUPPLY

RIAKITHIGA LINE

CHAINAGE 0+000-0+670

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/25



NOTES

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- AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



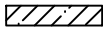
W.O
WASHOUT VALVE



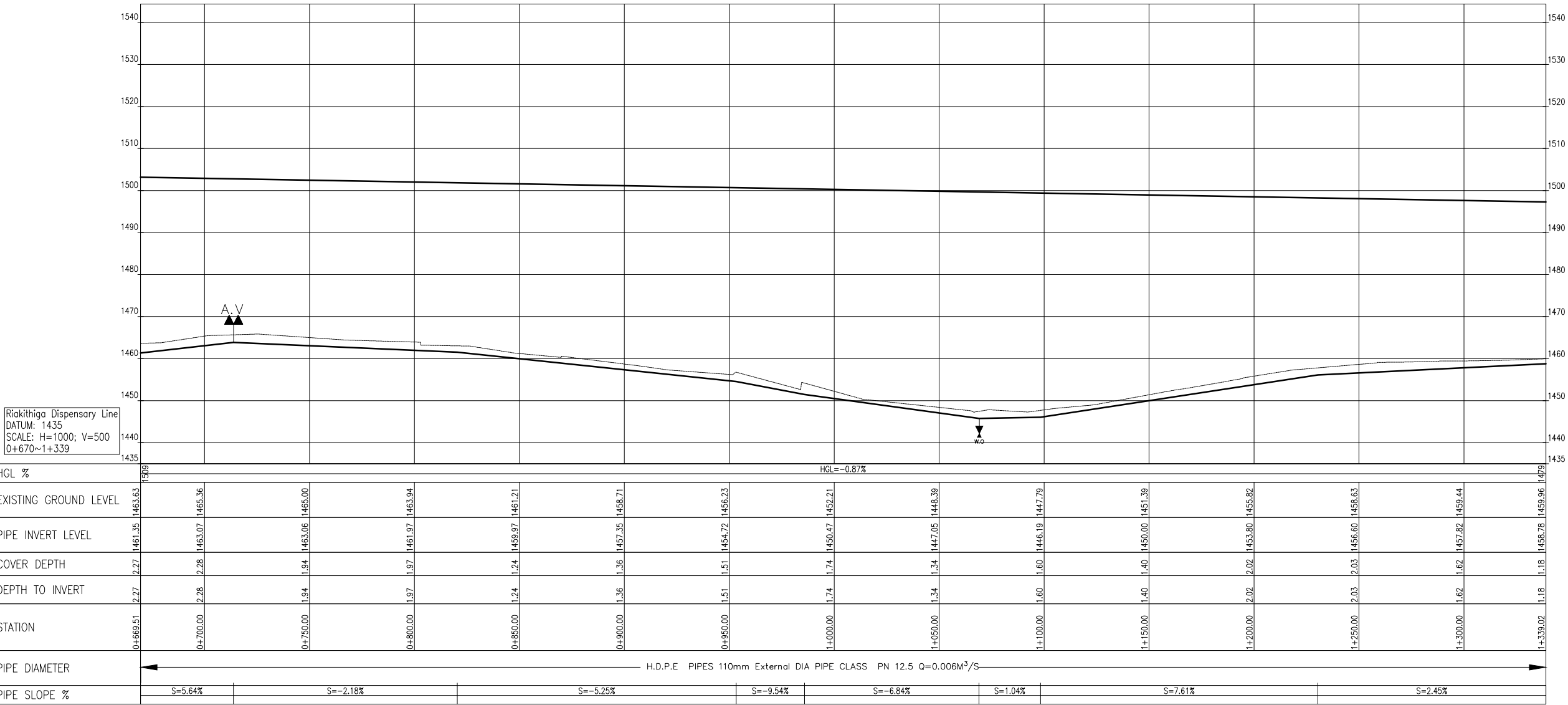
A.V
AIR VALVE






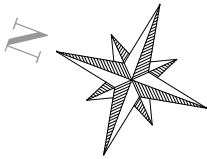
ROAD CROSSING



RIVER CROSSING



No	Revisions	Checked By	Approved By	Date	<div>Client:</div> <div></div> <div>TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya</div>	<div>Financed By:</div> <div></div> <div>AFRICAN DEVELOPMENT BANK</div>	<div>Project:</div> <div>CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS</div> <div>CONTRACT No; TWSB/ADB/002/ 2016 - 2017</div>	<div>Designed By:</div> <div></div> <div>CAS CONSULTANTS LIMITED 1st FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67663 - 00200 - NAIROBI, KENYA TEL: 020 445265 E-MAIL: casconsult@casconsultonline.co.ke WEBSITE: www.casconsultants.co.ke</div>	<div>Drawing Title:</div> <div>KERUGOYA WATER SUPPLY RIAKITHIGA LINE CHAINAGE 0+670-1+340</div>	Designed By	: M.O.O
1.										Drawn By	: Z.M.K
2.										Checked By	: L.K.N
3.										Approved By	: S.M.M
4.										Client Approval :	
										Date	: FEB, 2025
					Drawing No	: TWWDA/KK/WS-A/26					



NOTES

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LEGEND

SYMBOLS



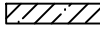
W.O
WASHOUT VALVE



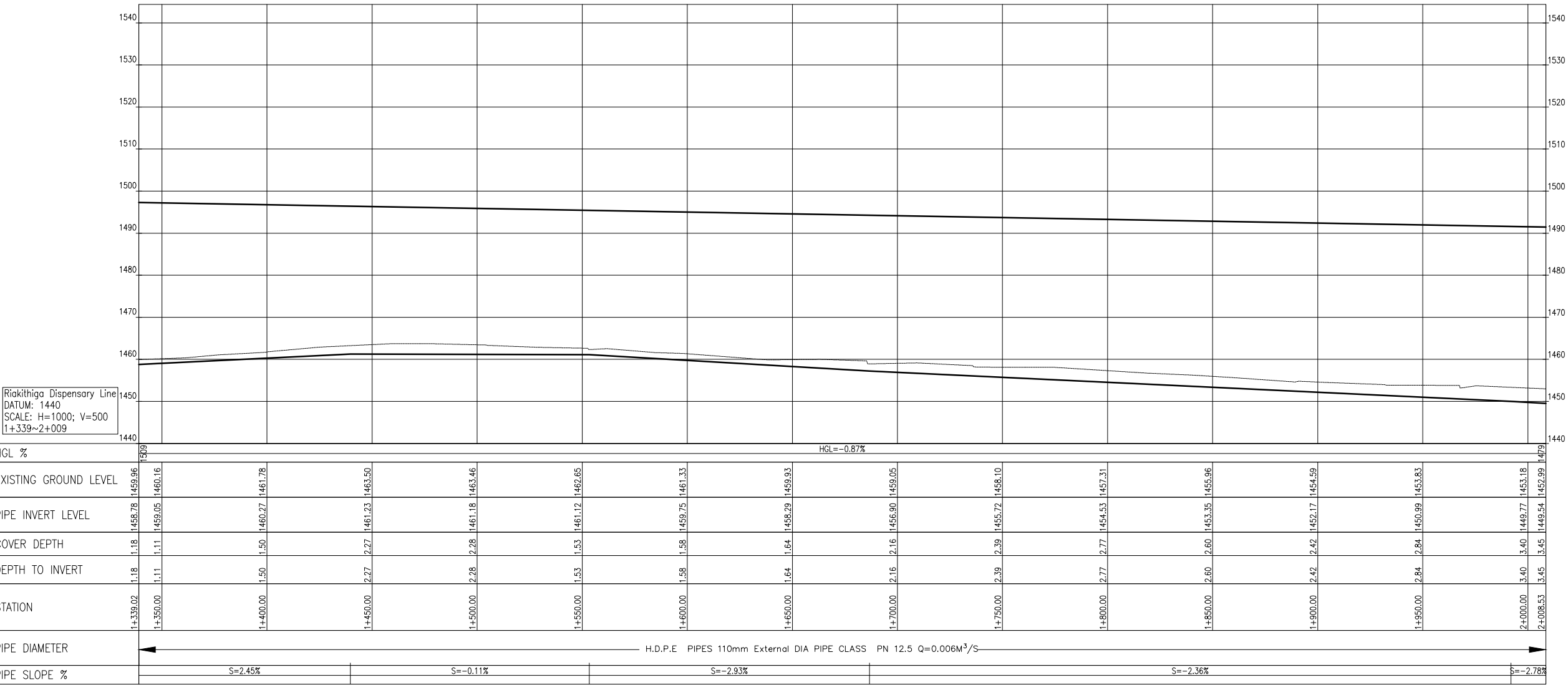
A.V
AIR VALVE



ROAD CROSSING



RIVER CROSSING




Riakithiga Dispensary Line
DATUM: 1440
SCALE: H=1000; V=500
1+339~2+009

HGL %	1509	HGL=-0.87%														1479
EXISTING GROUND LEVEL	1459.96	1460.16	1461.78	1463.50	1465.46	1467.65	1469.33	1471.93	1475.10	1477.31	1479.96	1482.59	1485.83	1489.77	1493.18	1496.54
PIPE INVERT LEVEL	1458.78	1459.05	1460.27	1461.23	1462.18	1463.12	1464.12	1465.29	1466.90	1468.72	1470.53	1472.35	1474.17	1476.54	1478.54	1480.54
COVER DEPTH	1.18	1.11	1.50	2.27	2.28	2.53	2.58	2.64	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39
DEPTH TO INVERT	1.18	1.11	1.50	2.27	2.28	2.53	2.58	2.64	2.39	2.39	2.39	2.39	2.39	2.39	2.39	2.39
STATION	1+350.00	1+400.00	1+450.00	1+500.00	1+550.00	1+600.00	1+650.00	1+700.00	1+750.00	1+800.00	1+850.00	1+900.00	1+950.00	2+000.00	2+050.00	2+100.00
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.006M ³ /S															
PIPE SLOPE %	S=2.45% S=-0.11% S=-2.93% S=-2.36% S=-2.78%															

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

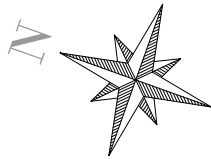


CAS CONSULTANTS LIMITED
LE MAC BUILDING, 4TH FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67663 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@casconsau.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
RIAKITHIGA LINE
CHAINAGE 1+340-2+009

Designed By : M.O.O
Drawn By : Z.M.K
Checked By : L.K.N
Approved By : S.M.M
Client Approval :
Date : FEB, 2025
Drawing No : TWWDA/KK/WS-A/27



NOTES

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LEGEND

SYMBOLS



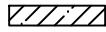
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Riakithiga Dispensary Line
DATUM: 1430
SCALE: H=1000; V=500
2+009~2+678

HGL %	HGL=-0.87%														1430
EXISTING GROUND LEVEL	1452.99	1452.02	1450.23	1448.20	1446.27	1444.55	1443.31	1442.14	1441.03	1439.56	1440.07	1439.78	1439.53	1439.59	1439.48
PIPE INVERT LEVEL	1449.54	1448.38	1446.99	1445.60	1444.21	1442.82	1441.43	1440.20	1439.00	1438.20	1439.01	1437.83	1437.64	1437.42	1437.23
COVER DEPTH	3.45	3.64	3.24	2.60	2.06	1.73	1.88	1.94	2.03	2.37	2.06	1.95	1.88	2.18	2.25
DEPTH TO INVERT	3.45	3.64	3.24	2.60	2.06	1.73	1.88	1.94	2.03	2.37	2.06	1.95	1.88	2.18	2.25
STATION	2+008.53	2+050.00	2+100.00	2+150.00	2+200.00	2+250.00	2+300.00	2+350.00	2+400.00	2+450.00	2+500.00	2+550.00	2+600.00	2+650.00	2+678.04
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.006M ³ /S														
PIPE SLOPE %	S=-2.78%				S=-2.39%				S=-0.37%				S=-0.66%		

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:



CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@casconsaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
RIAKITHIGA LINE
CHAINAGE 2+009-2+679

Designed By : M.O.O

Drawn By : Z.M.K

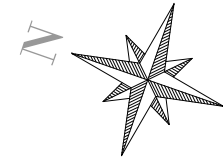
Checked By : L.K.N

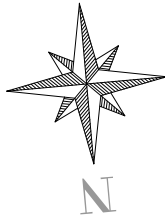
Approved By : S.M.M

Client Approval :

Date : FEB, 2025

Drawing No : TWWDA/KK/WS-A/28

[illegible]



NOTES

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LEGEND

SYMBOLS



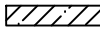
W.O
WASHOUT VALVE



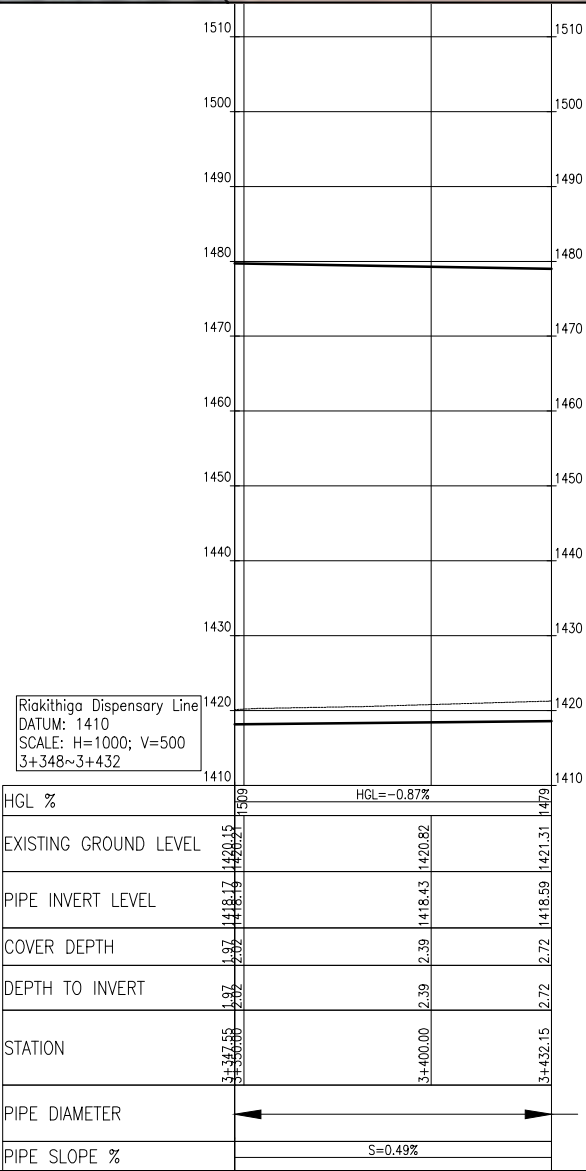
A.V
AIR VALVE






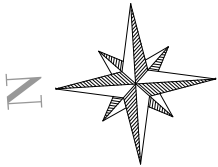
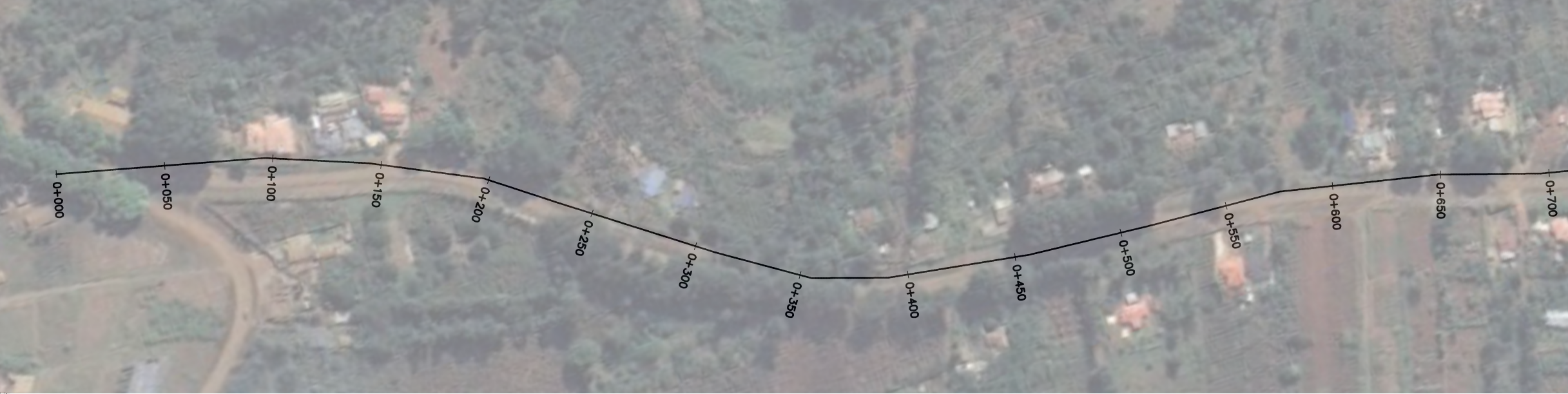
ROAD CROSSING



RIVER CROSSING



No	Revisions	Checked By	Approved By	Date	Client:	Financed By:	Project:	Designed By:	Drawing Title:	Designed By : M.O.O
1.					<div><p>TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya</p></div>	<div><p>AFRICAN DEVELOPMENT BANK</p></div>	<p>CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS</p> <p>CONTRACT No; TWSB/ADB/002/ 2016 - 2017</p>	<div><p>CAS CONSULTANTS LIMITED 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAIROBI, KENYA TEL: 020 4445265 E-MAIL: casconsau@gmail.com WEBSITE: www.casconsultants.co.ke</p></div>	<p>KERUGOYA WATER SUPPLY</p> <p>RIAKITHIGA LINE</p> <p>CHAINAGE 3+348-3+433</p>	Drawn By : Z.M.K
2.										Checked By : L.K.N
3.										Approved By : S.M.M
4.										Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/30



NOTES

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LEGEND

SYMBOLS



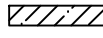
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Governor's Residence Line
DATUM: 1435
SCALE: H=1000; V=667
0+000~0+670

HGL %	HGL = -4.34%														
EXISTING GROUND LEVEL	1480.95	1477.17	1473.68	1475.95	1472.24	1467.36	1458.27	1458.43	1460.63	1461.54	1465.59	1462.61	1461.80	1462.00	1462.04
PIPE INVERT LEVEL	1478.66	1474.94	1471.23	1473.55	1469.98	1464.64	1456.69	1456.45	1459.61	1462.76	1464.56	1461.54	1460.00	1460.00	1460.00
COVER DEPTH	2.29	2.22	2.45	2.40	2.26	2.72	1.58	1.98	1.02	1.78	1.03	1.07	1.80	2.00	2.04
DEPTH TO INVERT	2.29	2.22	2.45	2.40	2.26	2.72	1.58	1.98	1.02	1.78	1.03	1.07	1.80	2.00	2.04
STATION	0+000.00	0+050.00	0+100.00	0+150.00	0+200.00	0+250.00	0+300.00	0+350.00	0+400.00	0+450.00	0+500.00	0+550.00	0+600.00	0+650.00	0+669.51
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.005M ³ /S														
PIPE SLOPE %	S=-7.43% S=8.57% S=-6.75% S=-7.60% S=-19.18% S=-15.90% S=6.30% S=5.49% S=-2.78% S=-6.76% S=0.00%														

No	Revisions	Checked By	Approved By	Date
1.				
2.				
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4.				

Client:



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AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

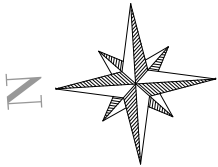


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P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@getinfoonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
GOVERNORS RESIDENCE LINE
CHAINAGE 0+000-0+670

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/31



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
3. COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
4. THE FINAL ALIGNMENT OF THE PIPELINE SHALL BE AGREED ON THE SITE WITH THE ENGINEER.
5. THE FINAL LOCATION OF ANY STRUCTURES(VALVE CHAMBERS) ALONG THE PIPELINE SHALL BE AGREED WITH THE ENGINEER.
6. CROSSINGS WITH EXISTING PIPELINES ARE NOT SHOWN IN ALL CASES.THE ALIGNMENT HAS TO BE ADJUSTED ON SITE AT CROSSING POINTS WITH EXISTING PIPELINES AS REQUIRED.
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8. AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
9. HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
10. AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Governor's Residence Line
DATUM: 1425
SCALE: H=1000; V=667
0+670~1+339

HGL %	HGL=-4.34%															1425
EXISTING GROUND LEVEL	1462.04	1462.54	1461.74	1459.17	1456.28	1452.66	1451.83	1450.74	1450.97	1448.54	1445.60	1442.20	1441.32	1438.20	1434.58	1445
PIPE INVERT LEVEL	1460.00	1460.00	1459.22	1456.59	1453.97	1449.90	1449.30	1448.70	1448.52	1447.13	1443.62	1440.66	1438.25	1435.74	1433.59	1445
COVER DEPTH	2.04	2.54	2.52	2.58	2.31	2.76	2.53	2.03	2.45	1.41	1.98	1.55	3.07	2.46	1.00	1445
DEPTH TO INVERT	2.04	2.54	2.52	2.58	2.31	2.76	2.53	2.03	2.45	1.41	1.98	1.55	3.07	2.46	1.00	1445
STATION	0+669.51	0+700.00	0+750.00	0+800.00	0+850.00	0+900.00	0+950.00	1+000.00	1+050.00	1+100.00	1+150.00	1+200.00	1+250.00	1+300.00	1+339.02	1445
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.005M ³ /S															1445
PIPE SLOPE %	S=0.00% S=-5.25% S=-9.50% S=-1.20% S=0.32% S=-7.03% S=-4.81% S=-5.52%															1445

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

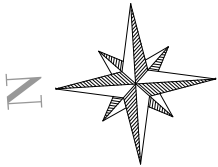


CAS CONSULTANTS LIMITED
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P.O BOX 67663-00200 - NAIROBI, KENYA
TEL: 020 4445365
E-MAIL: casconsau@ethicsonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
GOVERNORS RESIDENCE LINE
CHAINAGE 0+670-1+340

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/32



NOTES

- ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
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LEGEND

SYMBOLS



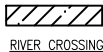
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Governor's Residence Line
DATUM: 1385
SCALE: H=1000; V=667
1+339~2+009

HGL %	1572	HGL=-4.34%															1445
EXISTING GROUND LEVEL	1434.58	1433.58		1431.78													1396.63
PIPE INVERT LEVEL	1433.59	1432.98		1430.22													1394.66
COVER DEPTH	1.00	0.60		1.56													1.97
DEPTH TO INVERT	1.00	0.60		1.49													1.97
STATION	1+339.02	1+350.00		1+400.00													2+008.53
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.005M³/S																
PIPE SLOPE %	S=-5.52% S=-10.80% S=-6.65% S=-6.15% S=-5.27% S=-8.39% S=-2.72% S=-4.57% S=-3.67% S=-1.94%																

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

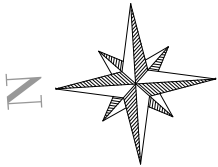


CAS CONSULTANTS LIMITED
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TEL: 020 4445265
E-MAIL: casconsau@casconsaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
GOVERNORS RESIDENCE LINE
CHAINAGE 1+340-2+009

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/33



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LEGEND

SYMBOLS



W.O

WASHOUT VALVE



A.V

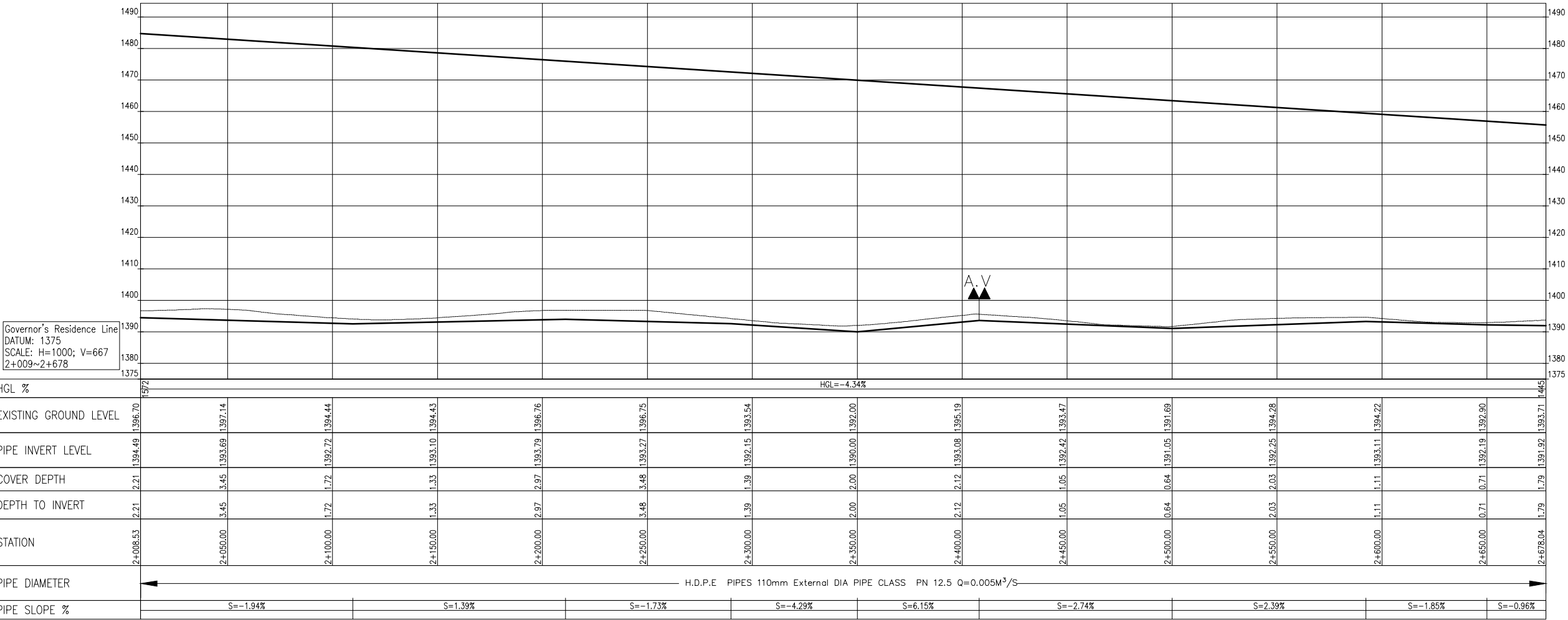
AIR VALVE






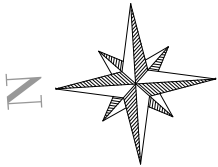
ROAD CROSSING



RIVER CROSSING



No	Revisions	Checked By	Approved By	Date	Client:	Financed By:	Project:	Designed By:	Drawing Title:	Designed By : M.O.O
1.					<div> TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya</div>	<div> AFRICAN DEVELOPMENT BANK</div>	CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No; TWSB/ADB/002/ 2016 - 2017	<div> CAS CONSULTANTS LIMITED LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAIROBI, KENYA TEL: 020 444586 E-MAIL: casconsau@geticaonline.co.ke WEBSITE: www.casconsultants.co.ke</div>	KERUGOYA WATER SUPPLY GOVERNORS RESIDENCE LINE CHAINAGE 2+009-2+678	Drawn By : Z.M.K
2.										Checked By : L.K.N
3.										Approved By : S.M.M
4.										Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/34



NOTES

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LEGEND

SYMBOLS



W.O
WASHOUT VALVE



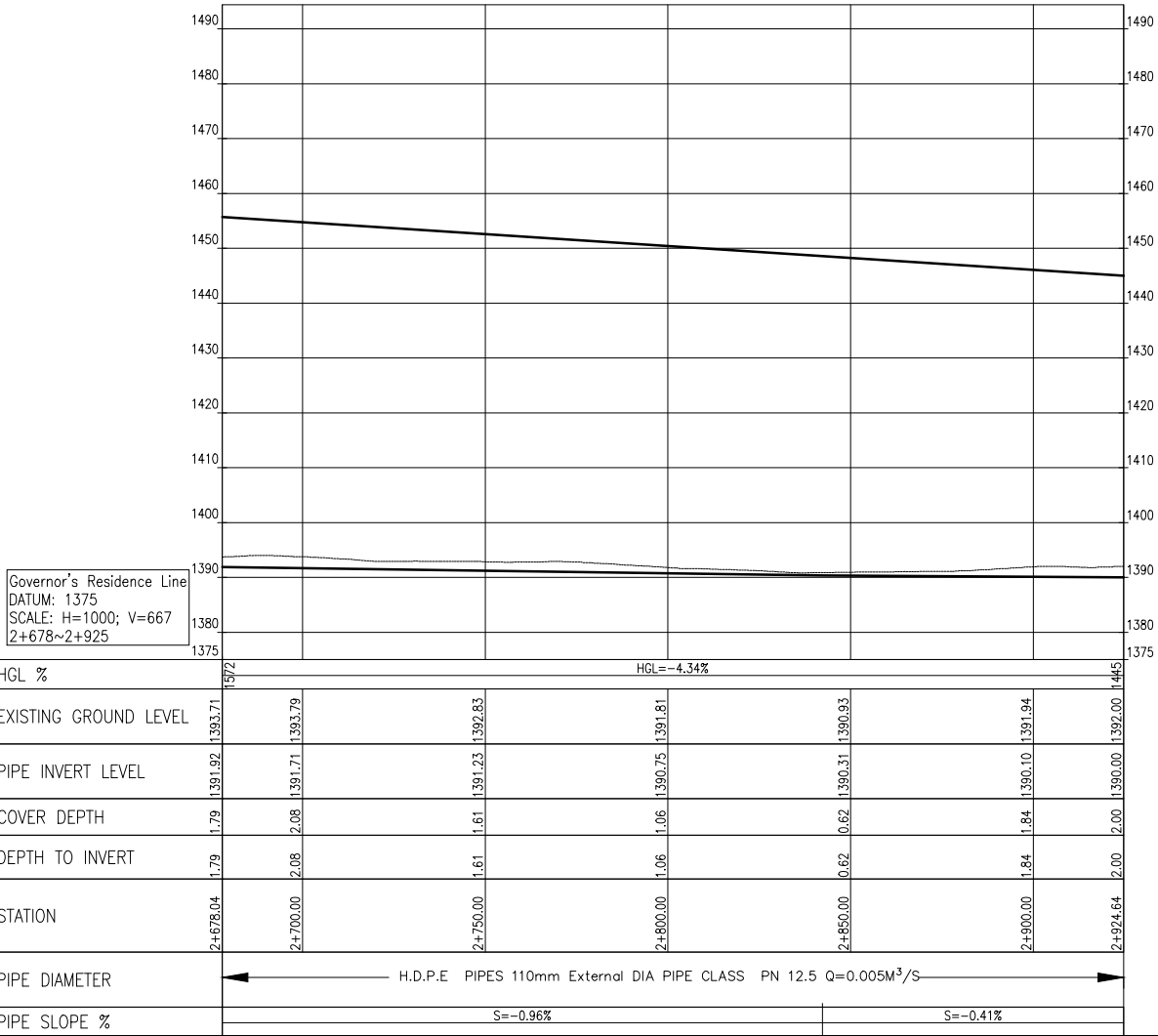
A.V
AIR VALVE




ROAD CROSSING



RIVER CROSSING



No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

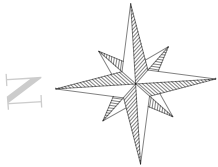
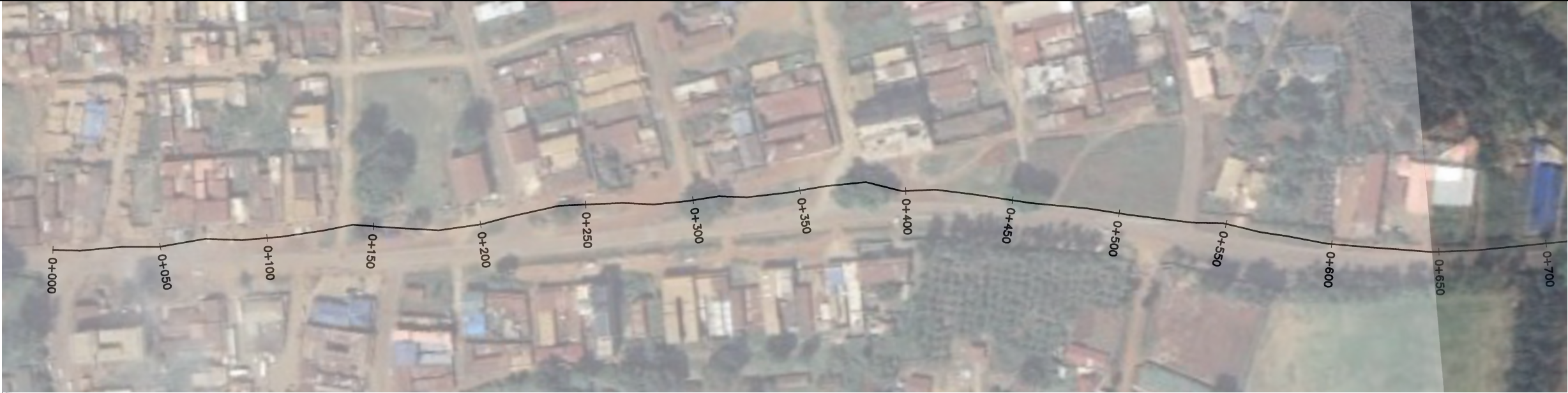


CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@caficoonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
GOVERNORS RESIDENCE LINE
CHAINAGE 2+679-2+925

Designed By : M.O.O
Drawn By : Z.M.K
Checked By : L.K.N
Approved By : S.M.M
Client Approval :
Date : FEB, 2025
Drawing No : TWWDA/KK/WS-A/35



NOTES

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LEGEND

SYMBOLS



W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kariru Offtake
DATUM: 1485
SCALE: H=1000; V=500
0+000~0+670

HGL %	HGL = -0.49%														
EXISTING GROUND LEVEL	1499.85	1500.89	1499.73	1498.47	1498.21	1496.72	1496.11	1496.06	1496.60	1497.35	1497.53	1497.21	1497.34	1498.03	1498.74
PIPE INVERT LEVEL	1499.13	1500.06	1499.12	1497.57	1497.29	1495.67	1495.24	1495.27	1495.52	1495.96	1496.03	1496.10	1496.18	1497.22	1497.84
COVER DEPTH	0.72	0.84	0.60	0.90	0.92	1.05	0.87	0.80	1.08	1.39	1.50	1.10	1.16	0.81	0.90
DEPTH TO INVERT	0.72	0.84	0.60	0.90	0.92	1.05	0.87	0.80	1.08	1.39	1.50	1.10	1.16	0.81	0.90
STATION	0+000.00	0+050.00	0+100.00	0+150.00	0+200.00	0+250.00	0+300.00	0+350.00	0+400.00	0+450.00	0+500.00	0+550.00	0+600.00	0+650.00	0+669.51
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.0044M ³ /S														
PIPE SLOPE %	S=0.54%	S=4.66%	S=-2.37%	S=-5.10%	S=3.71%	S=-3.39%	S=-0.86%	S=0.11%	S=-0.47%	S=1.87%	S=0.14%	S=2.10%	S=6.71%		

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

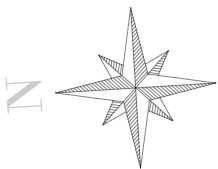





CAS CONSULTANTS LIMITED
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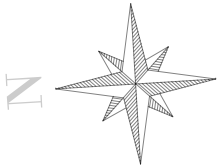
Drawing Title:

KERUGOYA WATER SUPPLY
KARIRU OFFTAKE
CHAINAGE 0+000-0+670

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	:
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/36




No	Revisions	Checked By	Approved By	Date	Client:  TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya	Financed By:  AFRICAN DEVELOPMENT BANK	Project: CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS CONTRACT No: TWSB/ADB/002/ 2016 - 2017	Designed By:  CAS CONSULTANTS LIMITED LE MAC BUILDING, 4 th FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67683 - 00200 - NAIROBI, KENYA TEL: 020 4445265 E-MAIL: casconsult@africasonline.co.ke WEBSITE: www.casconsultants.co.ke	Drawing Title: KERUGOYA WATER SUPPLY KARIRU OFFTAKE CHAINAGE 0+670-1+340	Designed By : M.O.O
1.										Drawn By : Z.M.K
2.										Checked By : L.K.N
3.										Approved By : S.M.M
4.										Client Approval : Date : FEB, 2025 Drawing No : TWWDA/KK/WS-A/37



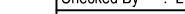
No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:




AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWBSB/ADB/002/ 2016 - 2017

Designed By:



CAS CONSULTANTS LIMITED
 LE MAC BUILDING, 4TH FLOOR, OFF CHURCH ROAD, WESTLANDS
 P.O BOX 67663 – 00200 - NAIROBI, KENYA
 TEL : 020 4445265
 E-MAIL: casconsult@casiconline.co.ke
 WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY

KARIRU OFTAKE

CHAINAGE 1+340-2+009

Designed By : M.O.O

Drawn By : Z.M.K

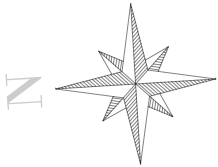
Checked By : L.K.N

Approved By : S.M.M

Client Approval :

Date : FEB, 2025

Drawing No : TWWDA/KK/WS-A/38



NOTES

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LEGEND

SYMBOLS



W.O
WASHOUT VALVE



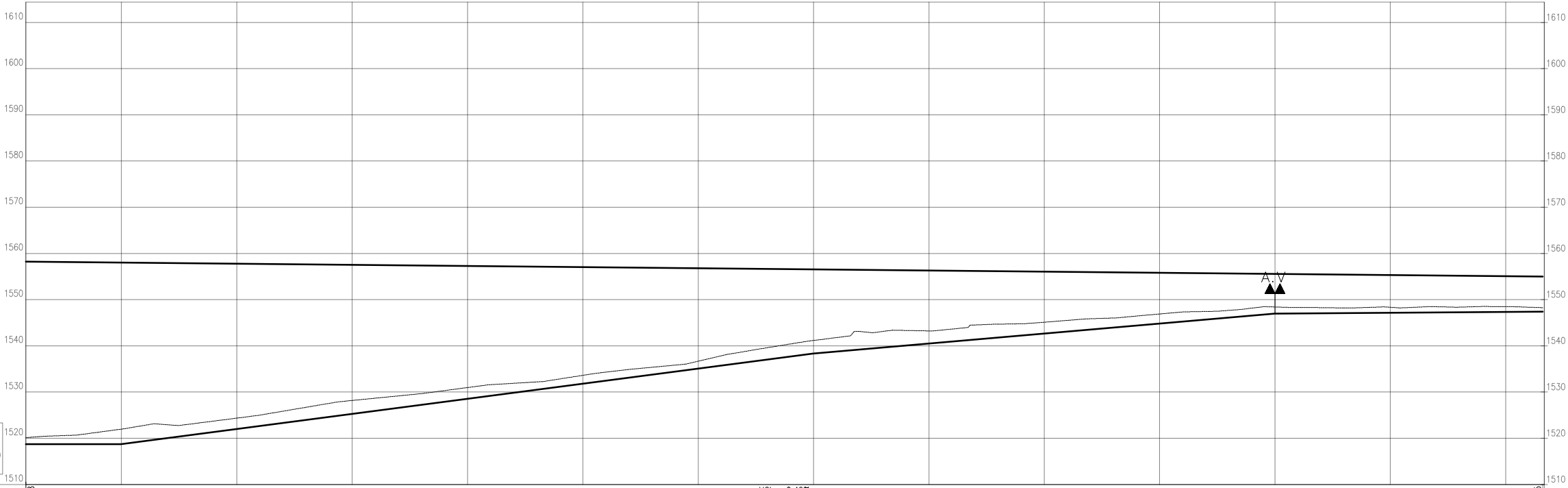
A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING



Kariru Offtake
DATUM: 1510
SCALE: H=1000; V=500
2+009~2+667

HGL %	HGL = -0.49%														1555
EXISTING GROUND LEVEL	1520.13	1521.98	1524.35	1528.17	1530.97	1533.62	1536.67	1541.16	1543.23	1545.11	1546.90	1548.41	1548.34	1548.49	
PIPE INVERT LEVEL	1518.70	1518.74	1522.01	1525.27	1528.54	1531.80	1535.07	1538.33	1540.49	1542.66	1544.83	1546.98	1547.16	1547.33	
COVER DEPTH	1.43	3.24	2.34	2.90	2.43	1.81	1.60	2.83	2.73	2.45	2.07	1.43	1.19	1.15	
DEPTH TO INVERT	1.43	3.24	2.34	2.90	2.43	1.81	1.60	2.83	2.73	2.45	2.07	1.43	1.19	1.15	
STATION	2+008.53	2+050.00	2+100.00	2+150.00	2+200.00	2+250.00	2+300.00	2+350.00	2+400.00	2+450.00	2+500.00	2+550.00	2+600.00	2+650.00	
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.0044M ³ /S														1555
PIPE SLOPE %	S=0.06%		S=6.53%					S=4.33%					S=0.35%		

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

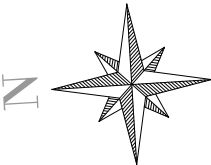


CAS CONSULTANTS LIMITED
1st FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 67693 - 00200 - NAIROBI, KENYA
TEL: 020 4445265
E-MAIL: casconsau@aftriconline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KARIRU OFFTAKE
CHAINAGE 2+009-2+667

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/39



NOTES

- ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
- COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
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- THE FINAL LOCATION OF ANY STRUCTURES(VALVE CHAMBERS) ALONG THE PIPELINE SHALL BE AGREED WITH THE ENGINEER.
- CROSSINGS WITH EXISTING PIPELINES ARE NOT SHOWN IN ALL CASES.THE ALIGNMENT HAS TO BE ADJUSTED ON SITE AT CROSSING POINTS WITH EXISTING PIPELINES AS REQUIRED.
- ANY EXISTING STRUCTURES,RETAINING WALLS,TANKS ETC. ALONG THE PIPELINE CORRIDOR HAVE TO BE SECURED AND IF DAMAGED,REINSTALLED AS INSTRUCTED BY THE ENGINEER.
- AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
- HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
- AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kiamiciri Line
DATUM: 1490
SCALE: H=1000; V=500
0+000~0+670

HGL %	HGL=-1.19%														
EXISTING GROUND LEVEL	1537.33	1536.58	1534.58	1534.73	1533.83	1532.42	1527.20	1523.48	1519.78	1517.54	1516.26	1514.19	1513.64	1514.11	1514.34
PIPE INVERT LEVEL	1536.56	1535.92	1534.11	1533.77	1533.18	1531.29	1526.53	1522.38	1518.95	1516.89	1515.27	1513.51	1512.84	1512.86	1513.01
COVER DEPTH	0.76	0.66	0.47	0.96	0.65	1.13	0.67	1.09	0.83	0.65	1.00	0.68	0.80	1.25	1.33
DEPTH TO INVERT	0.76	0.66	0.47	0.96	0.65	1.13	0.67	1.09	0.83	0.65	1.00	0.68	0.80	1.25	1.33
STATION	0+000.00	0+050.00	0+100.00	0+150.00	0+200.00	0+250.00	0+300.00	0+350.00	0+400.00	0+450.00	0+500.00	0+550.00	0+600.00	0+650.00	0+669.51
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.012M³/S														
PIPE SLOPE %	S=-0.41%	S=-2.16%	S=-3.69%	S=-0.17%	S=-1.36%	S=-9.51%	S=-6.86%	S=-3.25%	S=-3.53%	S=-1.37%	S=-1.08%	S=0.76%			

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

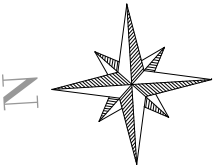


CAS CONSULTANTS LIMITED
LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 87693 - 00200 - NAIROBI, KENYA
TEL: 020 4446386
E-MAIL: casconsult@africaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KIAMICIRI LINE
CHAINAGE 0+000-0+670

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/40



NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
3. COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
4. THE FINAL ALIGNMENT OF THE PIPELINE SHALL BE AGREED ON THE SITE WITH THE ENGINEER.
5. THE FINAL LOCATION OF ANY STRUCTURES(VALVE CHAMBERS) ALONG THE PIPELINE SHALL BE AGREED WITH THE ENGINEER.
6. CROSSINGS WITH EXISTING PIPELINES ARE NOT SHOWN IN ALL CASES.THE ALIGNMENT HAS TO BE ADJUSTED ON SITE AT CROSSING POINTS WITH EXISTING PIPELINES AS REQUIRED.
7. ANY EXISTING STRUCTURES,RETAINING WALLS,TANKS ETC. ALONG THE PIPELINE CORRIDOR HAVE TO BE SECURED AND IF DAMAGED,REINSTALLED AS INSTRUCTED BY THE ENGINEER.
8. AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
9. HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
10. AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



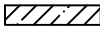
W.O
WASHOUT VALVE



A.V
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kiamiciri Line
DATUM: 1470
SCALE: H=1000; V=500
0+670~1+339

HGL %	HGL=-1.19%														
EXISTING GROUND LEVEL	1514.34	1513.43	1510.32	1507.13	1504.96	1505.05	1503.37	1500.60	1498.16	1496.69	1494.74	1491.39	1488.93	1489.74	1490.33
PIPE INVERT LEVEL	1513.01	1512.28	1509.37	1506.41	1504.04	1502.91	1501.78	1499.98	1497.22	1495.35	1493.52	1490.31	1487.95	1488.04	1488.74
COVER DEPTH	1.33	1.15	0.95	0.72	0.93	2.14	1.60	0.62	0.94	1.34	1.22	1.08	0.98	1.70	1.59
DEPTH TO INVERT	1.33	1.15	0.95	0.72	0.93	2.14	1.60	0.62	0.94	1.34	1.22	1.08	0.98	1.70	1.59
STATION	0+669.51	0+700.00	0+750.00	0+800.00	0+850.00	0+900.00	0+950.00	1+000.00	1+050.00	1+100.00	1+150.00	1+200.00	1+250.00	1+300.00	1+339.02
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.012M ³ /S														
PIPE SLOPE %	S=0.76%	S=-5.53%	S=-7.18%	S=-5.33%		S=-2.26%		S=-5.52%		S=-2.37%		S=-6.41%	S=-0.34%	S=1.81%	

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

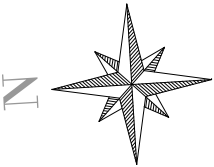


CAS CONSULTANTS LIMITED
LE' MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 87693 - 00200 - NAIROBI, KENYA
TEL: 020 4446386
E-MAIL: casconsult@africaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KAMICIRI LINE
CHAINAGE 0+670-1+340

Designed By	: M.O.O.
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/41



NOTES

- ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
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- HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
- AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



W.O.
WASHOUT VALVE



A.V.
AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kiamiciri Line
DATUM: 1440
SCALE: H=1000; V=500
1+339~2+009

HGL %	HGL=-1.19%															1452
EXISTING GROUND LEVEL	1490.33	1490.39	1491.17	1489.81	1488.81	1484.41	1482.20	1479.57	1476.96	1474.30	1469.97	1464.94	1462.88	1461.88	1459.27	1458.80
PIPE INVERT LEVEL	1488.74	1488.94	1489.85	1489.08	1485.45	1482.85	1480.25	1477.65	1475.05	1472.33	1468.15	1463.97	1461.46	1460.65	1458.47	1458.10
COVER DEPTH	1.59	1.45	1.33	0.73	1.36	1.55	1.94	1.92	1.91	1.98	1.82	0.97	1.42	1.23	0.79	0.70
DEPTH TO INVERT	1.59	1.45	1.33	0.73	1.36	1.55	1.94	1.92	1.91	1.98	1.82	0.97	1.42	1.23	0.79	0.70
STATION	1+339.02	1+350.00	1+400.00	1+450.00	1+500.00	1+550.00	1+600.00	1+650.00	1+700.00	1+750.00	1+800.00	1+850.00	1+900.00	1+950.00	2+000.00	2+008.53
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.012M ³ /S															
PIPE SLOPE %	S=1.81%		S=-1.92%		S=-7.43%		S=-5.20%			S=-8.35%			S=-1.62%		S=-4.36%	

No	Revisions	Checked By	Approved By	Date
1.				
2.				
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4.				

Client:


TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:


AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

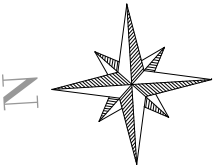
Designed By:


CAS CONSULTANTS LIMITED
LE' MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 87693 - 00200 - NAIROBI, KENYA
TEL: 020 4446386
E-MAIL: casconsul@africonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KAMICIRI LINE
CHAINAGE 1+343.2+009

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/42

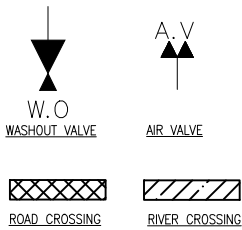


NOTES

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LEGEND

SYMBOLS




Kiamiciri Line
DATUM: 1440
SCALE: H=1000; V=500
2+009~2+678

HGL %	HGL = -1.19%															1452.04
EXISTING GROUND LEVEL	1458.80	1458.22	1458.17	1458.07	1458.44	1453.48	1451.64	1451.51	1449.14	1452.04	1451.68	1450.41	1450.09	1448.43	1448.06	1447.89
PIPE INVERT LEVEL	1458.10	1457.01	1455.79	1454.57	1453.32	1452.06	1450.60	1449.14	1447.63	1447.63	1447.63	1447.63	1447.12	1446.62	1446.11	1445.78
COVER DEPTH	0.70	1.22	2.39	1.50	1.12	1.42	1.03	2.37	3.40	3.54	2.78	2.96	1.82	1.95	2.11	2.11
DEPTH TO INVERT	0.70	1.22	2.39	1.50	1.12	1.42	1.03	2.37	3.40	3.54	2.78	2.96	1.82	1.95	2.11	2.11
STATION	2+008.33	2+050.00	2+100.00	2+150.00	2+200.00	2+250.00	2+300.00	2+350.00	2+400.00	2+450.00	2+500.00	2+550.00	2+600.00	2+650.00	2+678.04	2+678.04
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.006M³/S															
PIPE SLOPE %	S=-4.56%	S=-2.44%	S=-2.50%	S=-2.92%	S=-1.01%	S=-6.71%										

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

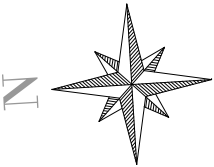


CAS CONSULTANTS LIMITED
LE' MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 87693 - 00200 - NAIROBI, KENYA
TEL: 020 4446386
E-MAIL: casconsult@africaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KAMICIRI LINE
CHAINAGE 2+009-2+678

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/43

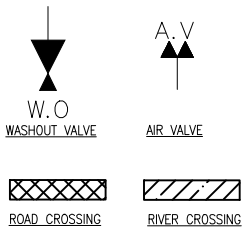


NOTES

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LEGEND

SYMBOLS




Kiamiciri Line
DATUM: 1400
SCALE: H=1000; V=500
2+678~3+348

HGL %	HGL=-1.19%														1400
EXISTING GROUND LEVEL	1447.89	1446.90	1446.29	1439.01	1435.72	1431.30	1429.95	1427.70	1423.57	1421.30	1419.08	1416.12	1418.40	1420.95	1422.29
PIPE INVERT LEVEL	1445.78	1444.31	1440.96	1437.60	1434.25	1430.00	1427.78	1425.55	1422.70	1419.84	1416.98	1415.15	1415.82	1420.00	1420.96
COVER DEPTH	2.11	2.59	1.33	1.40	1.47	1.30	2.18	2.15	0.87	1.46	2.10	0.97	2.58	0.95	1.33
DEPTH TO INVERT	2.11	2.59	1.33	1.40	1.47	1.30	2.18	2.15	0.87	1.46	2.10	0.97	2.58	0.95	1.33
STATION	2+678.04	2+700.00	2+750.00	2+800.00	2+850.00	2+900.00	2+950.00	3+000.00	3+050.00	3+100.00	3+150.00	3+200.00	3+250.00	3+300.00	3+347.55
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.006M ³ /S														
PIPE SLOPE %	S=-6.71%			S=-8.50%			S=-4.45%			S=-5.71%			S=-3.65%		S=2.02%

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

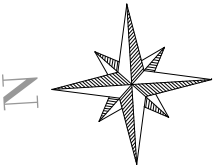


CAS CONSULTANTS LIMITED
LE' MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS
P.O BOX 87693 - 00200 - NAIROBI, KENYA
TEL: 020 4446386
E-MAIL: casconsult@africaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KAMICIRI LINE
CHAINAGE 2+678-3+348

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/44



NOTES

- ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
- THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
- COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
- THE FINAL ALIGNMENT OF THE PIPELINE SHALL BE AGREED ON THE SITE WITH THE ENGINEER.
- THE FINAL LOCATION OF ANY STRUCTURES(VALVE CHAMBERS) ALONG THE PIPELINE SHALL BE AGREED WITH THE ENGINEER.
- CROSSINGS WITH EXISTING PIPELINES ARE NOT SHOWN IN ALL CASES.THE ALIGNMENT HAS TO BE ADJUSTED ON SITE AT CROSSING POINTS WITH EXISTING PIPELINES AS REQUIRED.
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- AT LOCAL LOW POINTS THE CONTRACTOR SHALL FILL THE AREA WITH GRAVEL/COURSE SOIL OR DIRECTED BY THE ENGINEER IN SITE TO ENSURE 0.8m PIPE COVER.
- HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
- AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS



W.O. WASHOUT VALVE



AIR VALVE



ROAD CROSSING




RIVER CROSSING

Kiamiciri Line
DATUM: 1400
SCALE: H=1000; V=500
3+348~4+017

HGL %	HGL=-1.19%														
EXISTING GROUND LEVEL	1422.29	1421.69	1420.28	1421.42	1420.67	1415.34	1412.33	1413.80	1414.19	1414.41	1414.23	1413.37	1412.84	1412.28	1412.05
PIPE INVERT LEVEL	1420.98	1421.00	1420.09	1419.17	1416.59	1413.53	1411.13	1411.47	1411.81	1412.15	1412.49	1412.10	1411.50	1410.94	1410.75
COVER DEPTH	1.33	0.69	0.20	2.25	4.08	1.82	1.20	2.33	2.37	2.26	1.74	1.27	1.32	1.34	1.30
DEPTH TO INVERT	1.33	0.69	0.20	2.25	4.08	1.82	1.20	2.33	2.37	2.26	1.74	1.27	1.32	1.34	1.30
STATION	3+347.55	3+400.00	3+450.00	3+500.00	3+550.00	3+600.00	3+650.00	3+700.00	3+750.00	3+800.00	3+850.00	3+900.00	3+950.00	4+000.00	4+017.07
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.006M ³ /S														
PIPE SLOPE %	S=2.02%	S=-1.82%			S=-6.13%			S=0.68%				S=-1.15%			

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

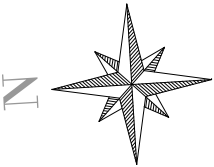


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E-MAIL: casconsult@africaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KAMICIRI LINE
CHAINAGE 3+348~4+018

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/45

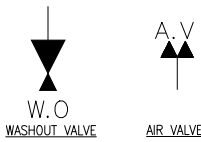


NOTES

1. ALL DIMENSIONS,LEVELS AND STATIONS ARE IN METERS UNLESS OTHERWISE NOTED.
2. THE EASTING AND NORTHING VALUES ARE BASED ON UTM ARC1960 ZONE-37S.
3. COORDINATES SYSTEM IS ESTABLISHED WITH RESPECT TO TRUE NORTH.
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9. HORIZONTAL AND VERTICAL JOINTS WITH AN ANGLE LESS THAN 22.5° SHALL BE LAID BY DEFLECTION UNLESS OTHERWISE NOTED.
10. AT ALL CROSSING POINTS WITH LOCAL(DIRT) ROADS,THE PIPE SHALL BE PROTECTED BY A MASS CONCRETE ENCASEMENT AND AS DIRECTED BY THE ENGINEER.

LEGEND

SYMBOLS




Kiamiciri Line
DATUM: 1390
SCALE: H=1000; V=500
4+017~4+687

HGL %	HGL = -1.19%															
EXISTING GROUND LEVEL	1412.05	1411.77	1411.41	1410.33	1409.53	1408.29	1407.03	1404.61	1403.31	1402.09	1401.07	1400.15	1399.62	1398.74	1398.06	1482
PIPE INVERT LEVEL	1410.75	1410.37	1409.79	1409.21	1408.23	1406.91	1405.59	1403.69	1402.17	1400.66	1399.16	1397.98	1397.35	1396.72	1396.26	1482
COVER DEPTH	1.30	1.41	1.62	1.11	1.29	1.38	1.44	0.92	1.14	1.42	1.91	2.17	2.27	2.02	1.80	1482
DEPTH TO INVERT	1.30	1.41	1.62	1.11	1.29	1.38	1.44	0.92	1.14	1.42	1.91	2.17	2.27	2.02	1.80	1482
STATION	4+017.07	4+050.00	4+100.00	4+150.00	4+200.00	4+250.00	4+300.00	4+350.00	4+400.00	4+450.00	4+500.00	4+550.00	4+600.00	4+650.00	4+686.58	1482
PIPE DIAMETER	H.D.P.E PIPES 110mm External DIA PIPE CLASS PN 12.5 Q=0.006M³/S															
PIPE SLOPE %	S=-1.15%				S=-2.64%			S=-4.07%		S=-3.01%				S=-1.26%		

No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:

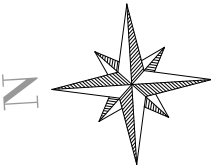


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E-MAIL: casconsul@africaonline.co.ke
WEBSITE: www.casconsultants.co.ke

Drawing Title:

KERUGOYA WATER SUPPLY
KAMICIRI LINE
CHAINAGE 4+018-4+687

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/46

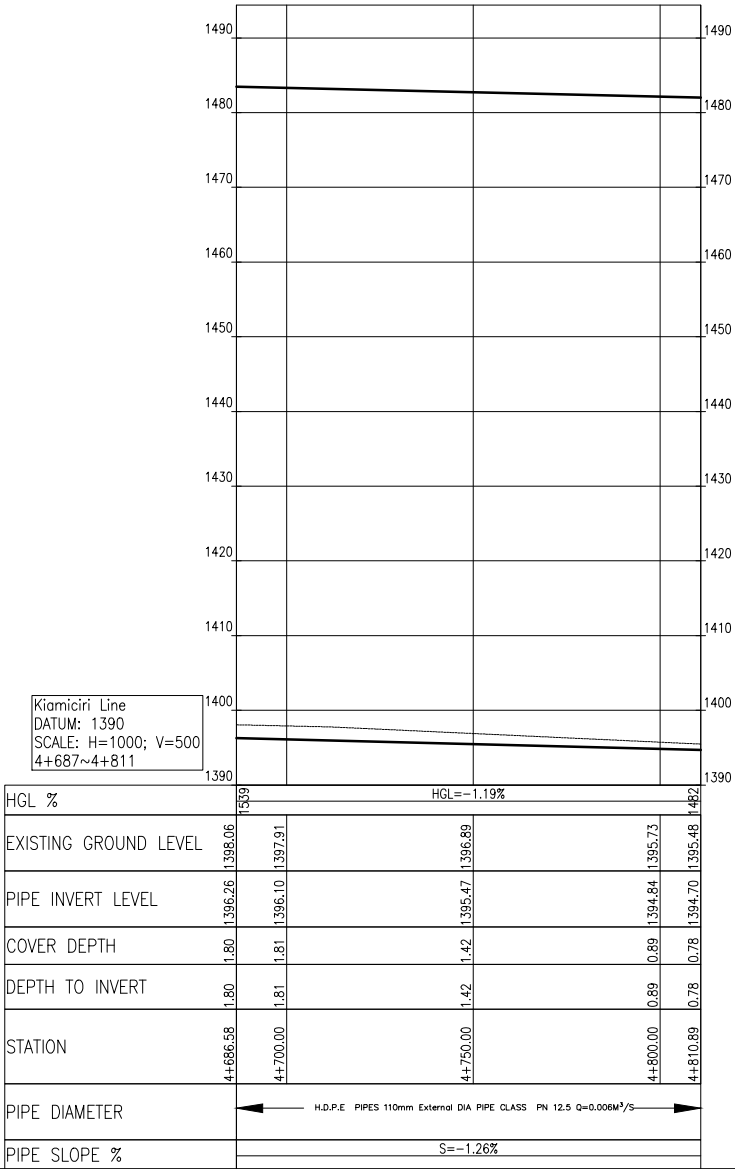


NOTES

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LEGEND

SYMBOLS



No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

Client:



TANA WATER WORKS DEVELOPMENT AGENCY
Maji House, Baden Powell Road P.O Box 1292, Nyeri, Kenya

Financed By:



AFRICAN DEVELOPMENT BANK

Project:

CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT I ADDENDUM WORKS

CONTRACT No; TWSB/ADB/002/ 2016 - 2017

Designed By:



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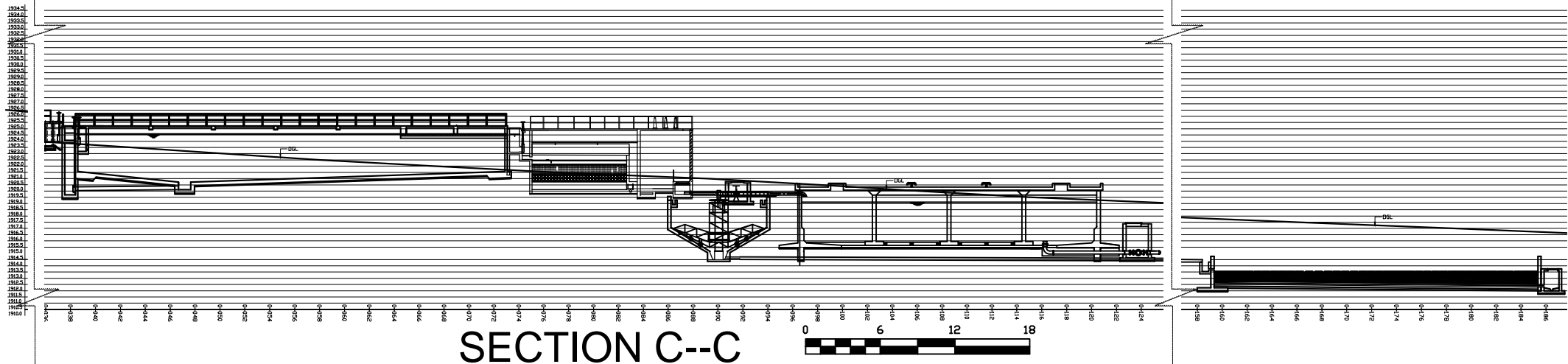
Drawing Title:


KERUGOYA WATER SUPPLY
KAMICIRI LINE
CHAINAGE 4+687-4+811

Designed By	: M.O.O
Drawn By	: Z.M.K
Checked By	: L.K.N
Approved By	: S.M.M
Client Approval :	
Date	: FEB, 2025
Drawing No	: TWWDA/KK/WS-A/47

TREATMENT WORKS DRAWINGS

NEW SCOPE



No	REVISIONS	CHECKED BY	APPROVED BY	DATE	<div>Client</div> <div></div> <div>TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya</div>	<div>Financed By</div> <div></div> <div>AFRICAN DEVELOPMENT BANK</div>	<div>Project</div> <div>ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION</div> <div>CONTRACT No: TWSB/ADB/002/2016 - 2017</div>	<div>Designed By</div> <div></div> <div>Tana Water Works Development Agency TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya</div>	<div>Reviewed By</div> <div></div> <div>CAS CONSULTANTS LIMITED Nleleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke</div>	<div>Drawing Title</div> <div>MURATIRI TREATMENT SECTION C-C</div>	Designed By : LK
1.		W.K	S.M.M	September, 2017							Drawn By : D.G.M
2.											Checked By : W.K
3.											Approved By : S.M.M
4.											Client approval :
										Date : September 2017	
										Drawing No : TWSB/KK/TW/003	

This technical drawing illustrates the layout of a wastewater treatment plant, featuring two main lagoons and several associated chambers and pipes. The overall dimensions are 19150mm by 12750mm.

Lagoons:

- SLUDGE LAGOON:** Dimensions 8000mm x 12000mm. It has a 1:1.5 slope on the sides and a 1:100 slope on the floor. It is separated from the Backwash Water Lagoon by a 200mm thick Class 25/20 R.C. wall.
- BACKWASH WATER LAGOON:** Dimensions 12000mm x 12000mm. It has a 1:1.5 slope on the sides and a 1:100 slope on the floor.

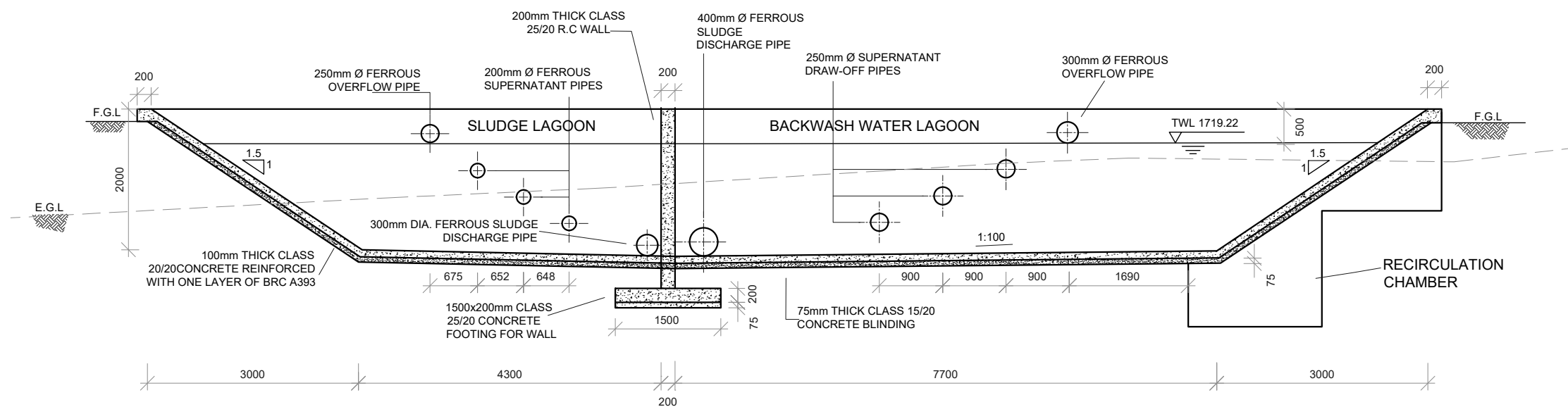
Pipes and Chambers:

- 200mm DIA. uPVC SITE DRAINAGE PIPE:** Located at the top left.
- 450mm DIA. CONCRETE SITE DRAINAGE PIPE:** Located at the top right.
- 800x800x1200mm DEEP R.C. INLET CHAMBER WITH G.M.S OPEN MESH COVER:** Located at the top left.
- 1200x1200x1200mm DEEP R.C. INLET CHAMBER WITH G.M.S OPEN MESH COVER:** Located at the top right.
- 300mm Ø FERROUS SLUDGE DISCHARGE PIPE:** Located at the bottom left.
- 400mm Ø FERROUS SLUDGE DISCHARGE PIPE:** Located at the bottom center.
- 200mm DIA. SUPERNATANT DRAW-OFF PIPES:** Located at the bottom left.
- 250mm DIA. SUPERNATANT DRAW-OFF PIPES:** Located at the bottom right.
- 300mm OVERFLOW PIPE:** Located at the bottom right.
- 250mm OVERFLOW PIPE:** Located at the bottom left.
- 3100x1800mm DEEP R.C. CHAMBER WITH G.M.S OPEN MESH COVER:** Located at the bottom left.
- 2200x1800 x2500mm DEEP R.C. CHAMBER WITH G.M.S OPEN MESH COVER:** Located at the bottom left.
- 4050x2200x2500mm DEEP R.C. CHAMBER WITH G.M.S OPEN MESH COVER:** Located at the bottom center.
- RECIRCULATION PUMP CHAMBER:** Located at the bottom right.
- 1500x1500x3350mm DEEP R.C. SCOUR CHAMBER WITH G.M.S OPEN MESH COVER:** Located at the bottom right.

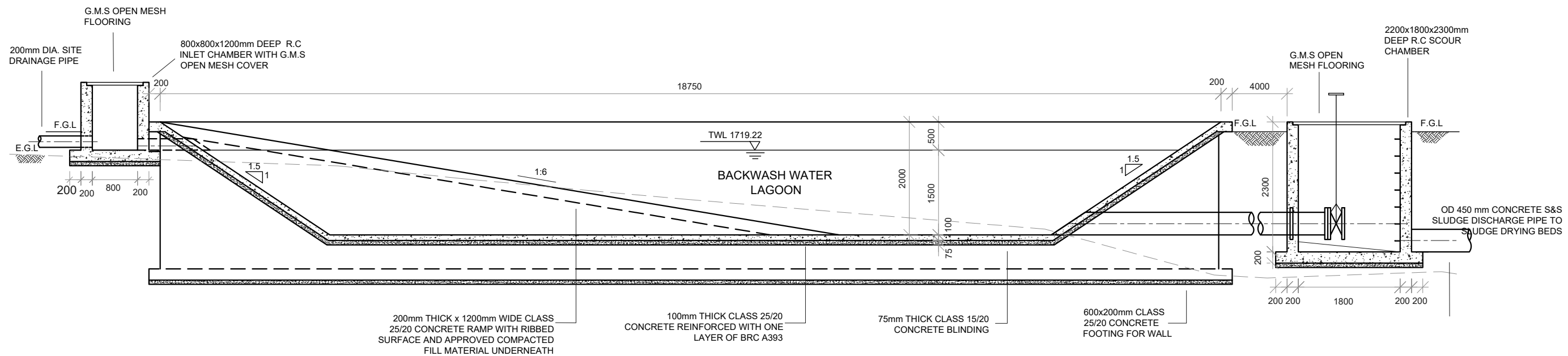
Other Details:

- RAMP 1:5:** Two ramps are shown between the lagoons.
- 200mm THICK CLASS 25/20 R.C. WALL:** Separates the two lagoons.
- ND 150mm FERROUS RECIRCULATION PIPEWORK STILLING:** Located at the bottom right.
- 450mm DIA CONCRETE S&S SLUDGE DISCHARGE PIPE TO SLUDGE DRYING BEDS:** Located at the bottom center.





Drawn By : A.M.	Date : 2	Client :  Tana Water Works Development Agency	Financed By :  AFRICAN DEVELOPMENT BANK	Project : ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GACHUGU WATER PROJECT EXTENSION AS AN CONTRACT No: TWSB/NDM/002/2016 - 2017 Water supply component	Designed By : 	Reviewed By :  CAS CONSULTANTS LIMITED Nileon Place, Rhapsa Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	Drawing Title : Sludge lagoons	Designed By : LK Drawn By : D.G.M Checked By : W.K Approved By : S.M.M Client approval : Date : 7 Drawing No : TWSB/KK/SD/001
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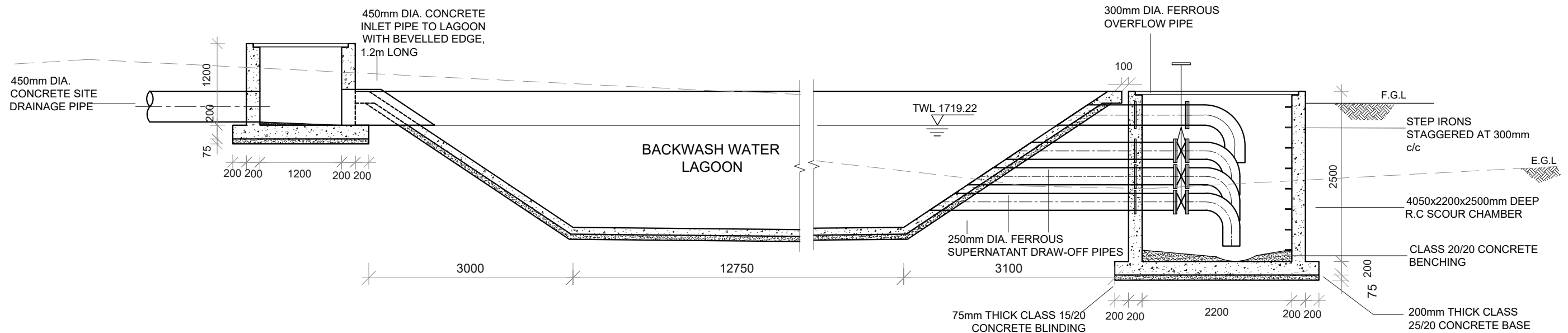


SECTION A-A

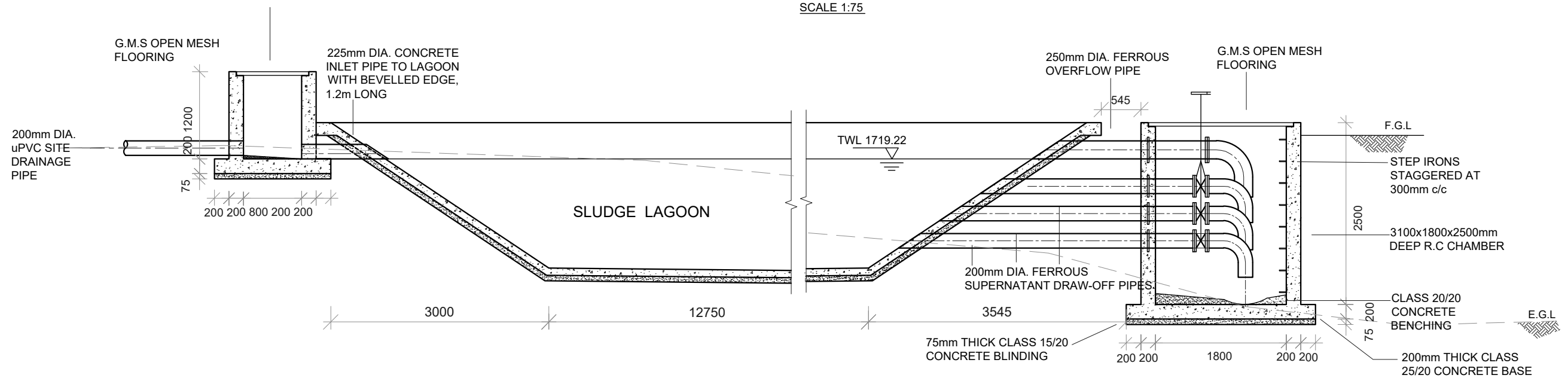


SECTION B - B

No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.M.	S.M.M.	17			ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS AN			Sludge lagoons	U.K.
2.										Sludge lagoons	D.G.M.
3.											W.K.
4.											S.M.M.
											Client approval:
											Date:
											Drawing No : TWSB/KK/SD/001

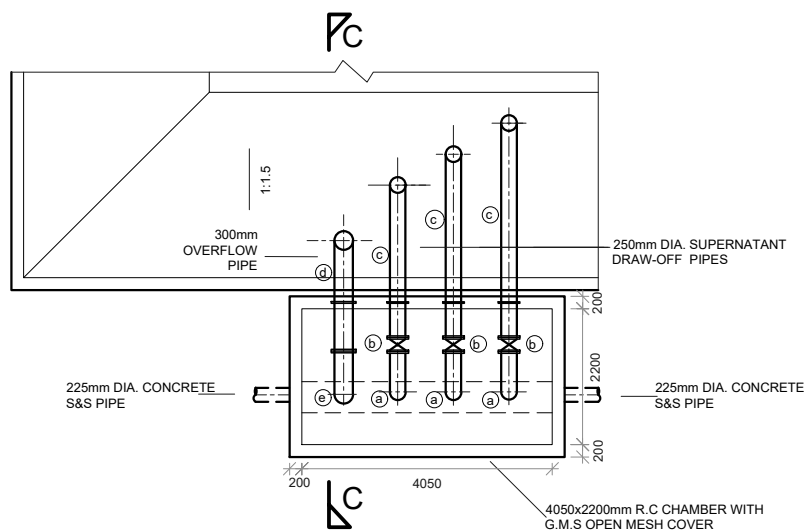


SECTION C-C
BACKWASH WATER LAGOON INLET AND OUTLET PIPEWORK DETAILS
 SCALE 1:75

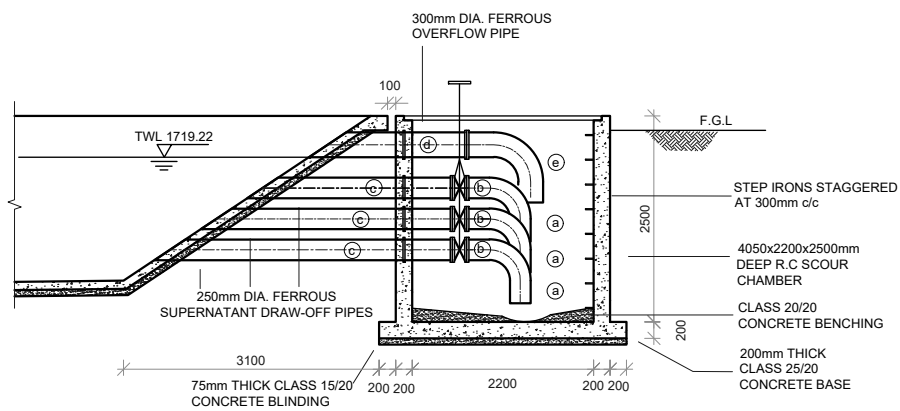


SECTION D-D
SLUDGE LAGOON INLET AND OUTLET PIPEWORK DETAILS
 SCALE 1:75

No.	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K.	S.M.M.		 Tana Water Works Development Agency	 AFRICAN DEVELOPMENT BANK	ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS AN		 CAS CONSULTANTS LIMITED Nileon Place, Rhapsa Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@fratitonline.co.ke	Sludge lagoons	LK
2.							O.G.M.				
3.							W.K.				
4.							S.M.M.				
Client approval:											
Date:											



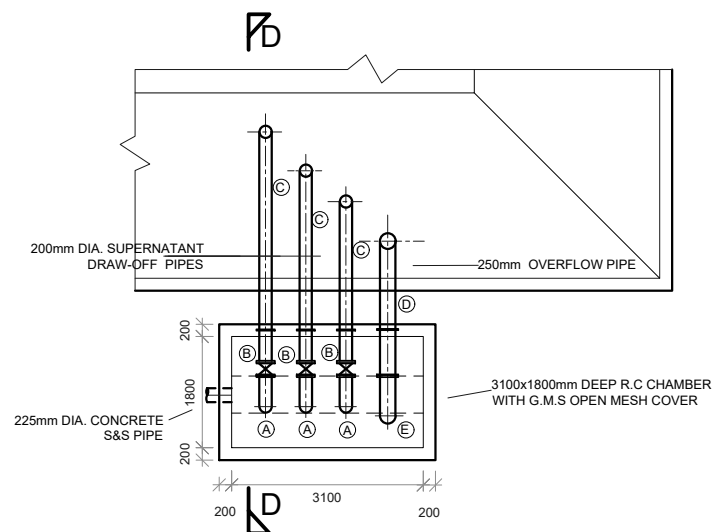
BACKWASH WATER LAGOON
SUPERNATANT DRAW-OFF AND OVERFLOW PIPEWORK - PLAN
SCALE 1:100



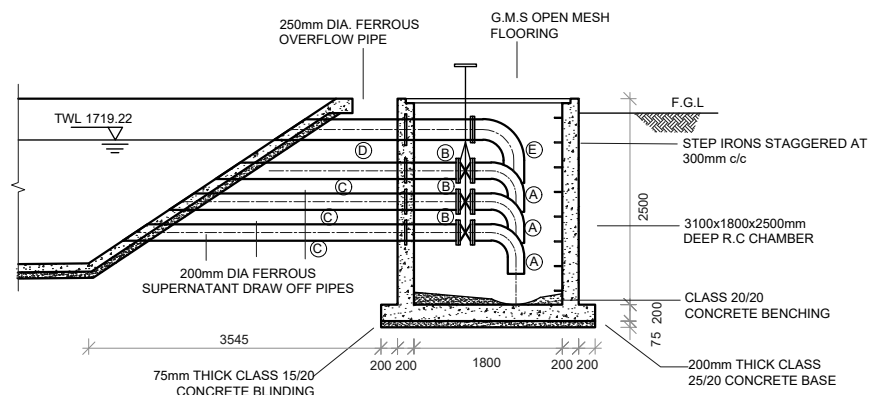
BACKWASH WATER LAGOON
SUPERNATANT DRAW-OFF AND OVERFLOW PIPEWORK - SECTION C-C
SCALE 1:75

BACKWASH WATER LAGOON
SUPERNATANT DRAW-OFF AND OVERFLOW PIPEWORK SCHEDULE
(APPROVED LINED FERROUS PIPES AND FITTINGS)

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
(a)	SINGLE FLANGED 90° BEND	250	650	3
(b)	ALL FLANGED GATE VALVE WITH EXTENDED SPINDLE AND WHEEL	250	250	3
(c)	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 750mm FROM FLANGED END AND WITH SPIGOT END BEVELLED (CUT TO SUIT ON SITE)	250	2400 2950 3550	111
(d)	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 750mm FROM FLANGED END AND WITH SPIGOT END BEVELLED (CUT TO SUIT ON SITE)	300	1750	1
(e)	SINGLE FLANGED 90° BEND	300	700	1



SLUDGE LAGOON
SUPERNATANT DRAW-OFF AND OVERFLOW PIPEWORK - PLAN
SCALE 1:100

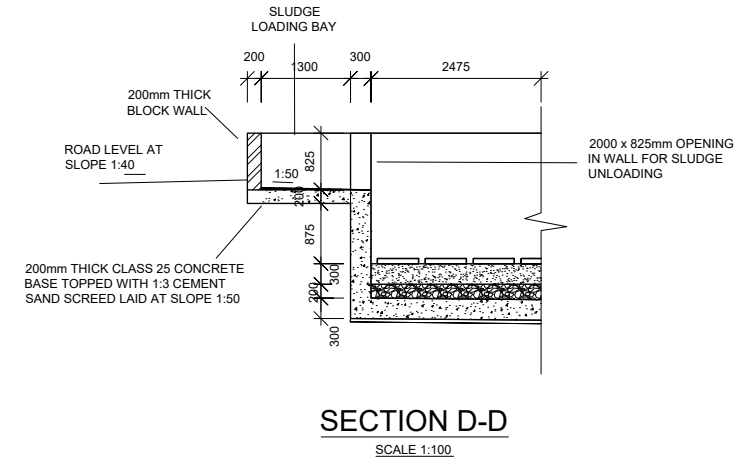


SLUDGE LAGOON
SUPERNATANT DRAW-OFF AND OVERFLOW PIPEWORK - SECTION D-D
SCALE 1:75

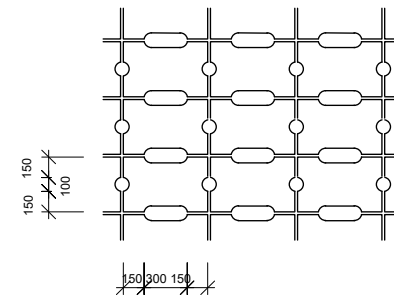
SLUDGE LAGOON
SUPERNATANT DRAW-OFF AND OVERFLOW PIPEWORK SCHEDULE
(APPROVED LINED FERROUS PIPES AND FITTINGS)

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
(A)	SINGLE FLANGED 90° BEND	200	500	3
(B)	ALL FLANGED GATE VALVE WITH EXTENDED SPINDLE AND WHEEL	200	230	3
(C)	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 565mm FROM FLANGED END AND WITH SPIGOT END BEVELLED (CUT TO SUIT ON SITE)	200	2850 3450 4050	111
(D)	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 565mm FROM FLANGED END AND WITH SPIGOT END BEVELLED (CUT TO SUIT ON SITE)	250	2350	1
(E)	SINGLE FLANGED 90° BEND	250	650	1

REVISIONS 1. 2. 3. 4.	CHECKED BY W.K.	APPROVED BY S.M.M.	DATE 17	Client Tana Water Works Development Agency	Financed By AFRICAN DEVELOPMENT BANK	Project ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATERPROJECT EXTENSION AS AN	Designed by Tana Water Works Development Agency	Reviewed By CAS CONSULTANTS LIMITED Nelson Place, Rhapta Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	Drawing Title Sludge lagoons	Designed By : L.K. Drawn By : D.G.M. Checked By : W.K. Approved By : S.M.M. Client approval : Date : Drawing No : TWSB/KK/SD/001
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SECTION D-D
SCALE 1:100

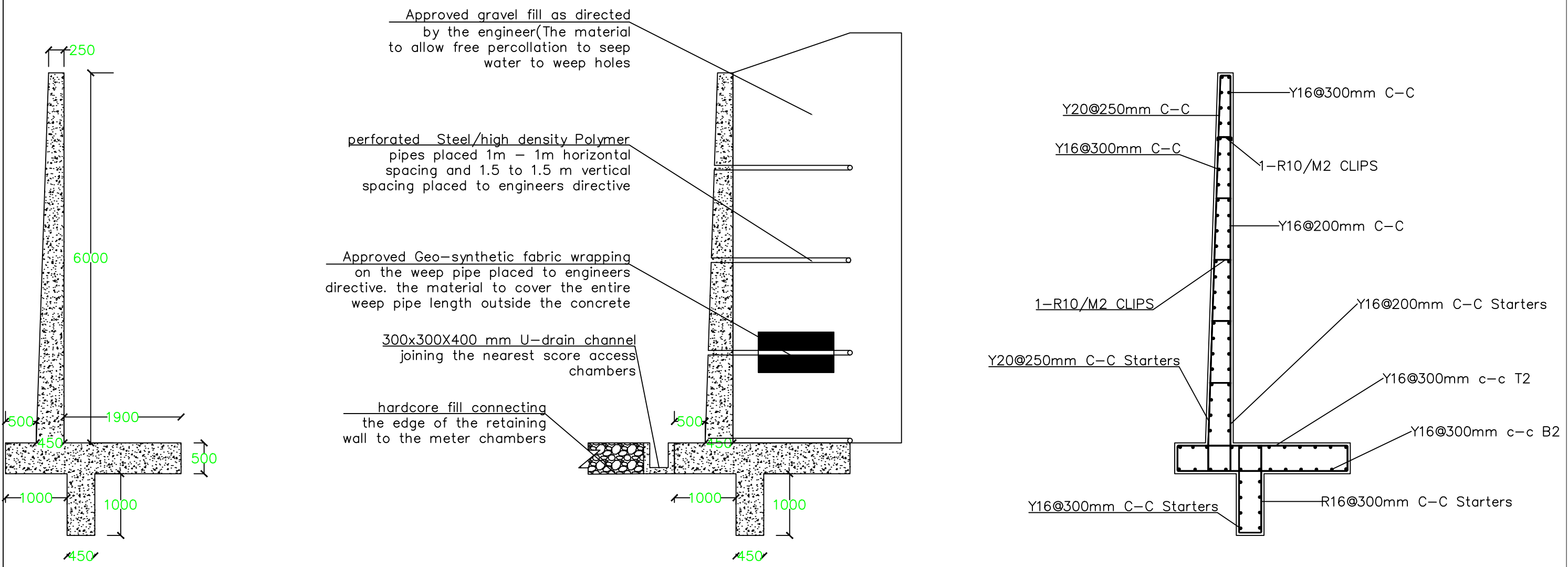


SECTION B-B



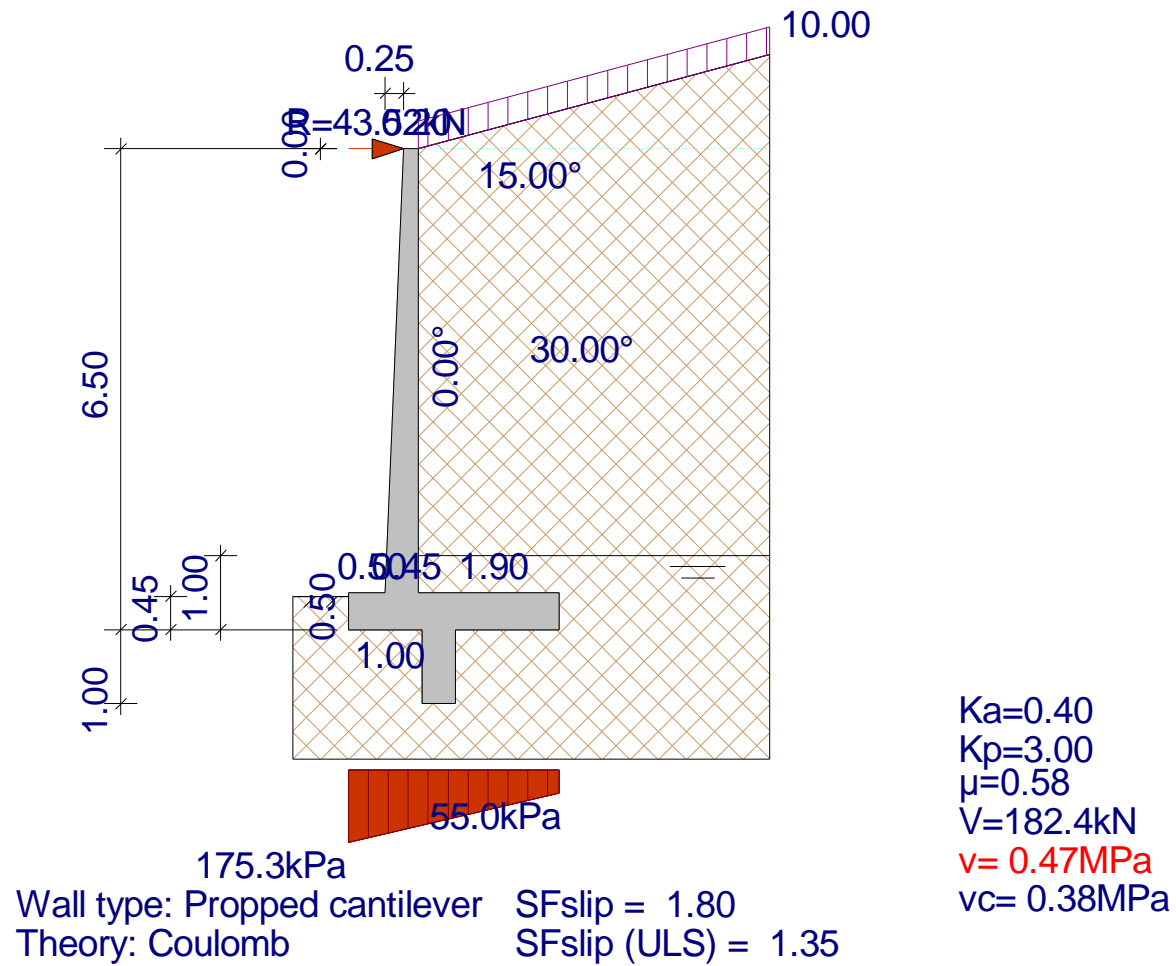
No	REVISIONS	CHECKED BY	APPROVED BY	DATE	 			Drawing Title Sludge Drying bed	Designed By : LK
1.		W.K	S.M.M	August 2017					Drawn By : D.G.M
2.									Checked By : W.K
3.									Approved By : S.M.M
4.									Client approval :
					CONTRACT No: TWSS/MD/002/2016 - 2017 Water supply components	Tana Water Works Development Agency			Date : AUGUST 2017 Drawing No : TWSS/KK/SD/001

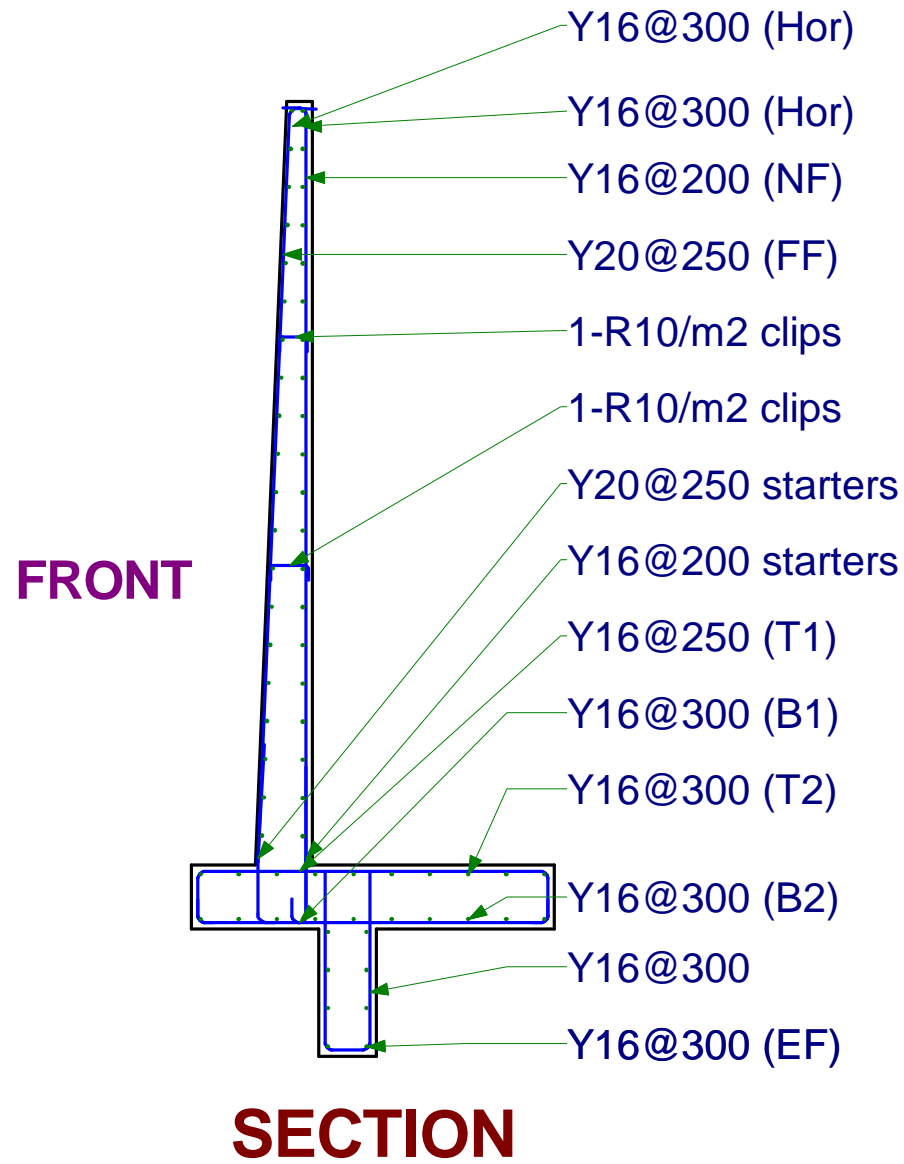
Sectional View Of The Retaining wall








REVISIONS					Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
No	DESCRIPTION	CHECKED BY	APPROVED BY	DATE							
1.		W.K.	S.M.M	August 2017							
2.											
3.											
4.											

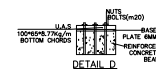
Design code: BS8110 - 1997





NO.	REVISIONS	CHECKED BY	APPROVED BY	DATE
1.				
2.				
3.				
4.				

<p>CLIENT:</p>  <p>TANA WATER DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya</p>	<p>Financed By:</p>   <p>AFRICAN DEVELOPMENT BANK</p>	 <p>REPUBLIC OF KENYA MINISTRY OF WATER AND SANITATION</p>	<p>PROJECT:</p> <p>CONSTRUCTION OF KERUGOYA KUTUS WATER AND SEWERAGE INFRASTRUCTURE PROJECT-LOT 1 WATER INFRASTRUCTURE</p>	<p>DESIGNED BY:</p>  <p>CAS CONSULTANTS LIMITED LE MAC BUILDING, 1ST FLOOR, OFF CHURCH ROAD, WESTLANDS P.O BOX 67693 - 00200 - NAIROBI, KENYA TEL: 020 4445265 E-MAIL: casconsult@africonline.co.ke WEBSITE: www.casconsultants.co.ke</p>	<p>DRAWING TITLE:</p> <p>CONTROL ROOM</p>	<p>Designed By : L.K</p> <p>Drawn By : D.K</p> <p>Checked By : M.O</p> <p>Approved By : S.M.M</p> <p>Client approval:</p> <p>Date : JULY 2024</p> <p>Drawing No :</p>
---	---	---	--	---	---	---



(NOTES)

PROGRAMME , METHOD OF CONSTRUCTION AND
SETTING OUT OF WORK TO BE APPROVED BY ENGINEER
BEFORE COMMENCEMENT OF WORK

DESIGN CRITERIA—

a) DESIGN CODES EN 1993 and 1993-2

STEEL—

a) STEEL GRADE TO BE S275

b) ALL DIMENSIONS IN MM UNLESS STATED OTHERWISE



No	Revisions	Checked By	Approved By	Date
1.				
2.				
3.				
4.				

**TANA WATER WORKS
DEVELOPMENT AGENCY**
Maji House, Baden Powell Road
P.O. Box 1292, Nyeri, Kenya

**TANA WATER WORKS
DEVELOPMENT AGENCY**
Maji House, Baden Powell Road
P.O. Box 1292, Nyeri, Kenya

AFRICAN DEVELOPMENT BANK

Project :

CONSTRUCTION OF KERUGOYA KUTUS
WATER AND SEWERAGE INFRASTRUCTURE
PROJECT-LOT I WATER INFRASTRUCTURE

Contract No: TWSB/ADF/001/ 2017 -
2018-Lot 2

Reviewed By:

CAS CONSULTANTS LIMITED
Nelleon Place, Rhapta Road, Westlands
P.O Box 67693 - 00200 - Nairobi, Kenya
Tel: 020 4445265 Fax: 020 4440049
E-mail: casconsult@africaonline.co.ke

Drawing Title:

MURATIRI TREATMENT

SEDIMENTATION TANK BRIDGE DECK

Designed By : L.K

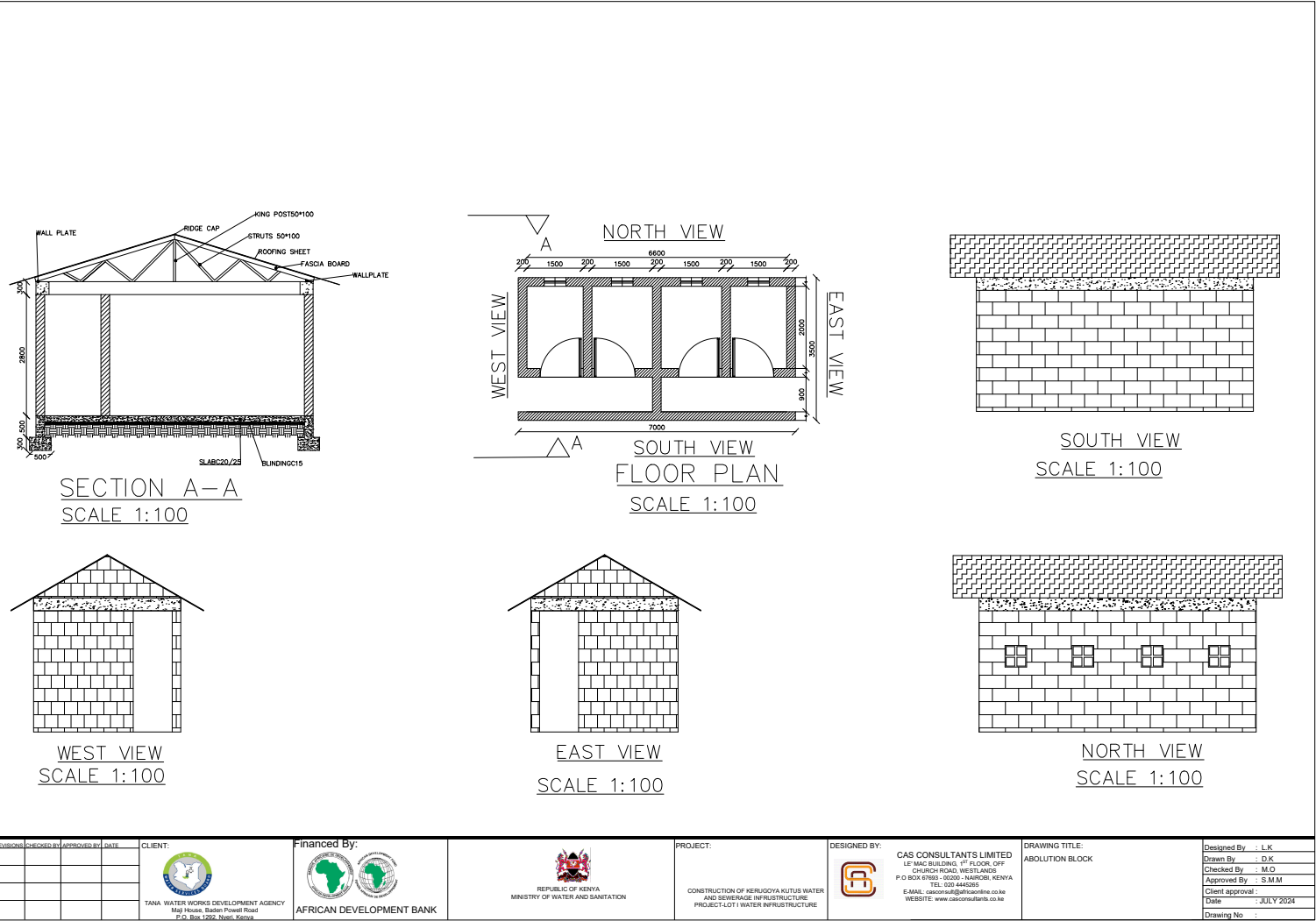
Drawn By : D.K

Checked By : M.O.

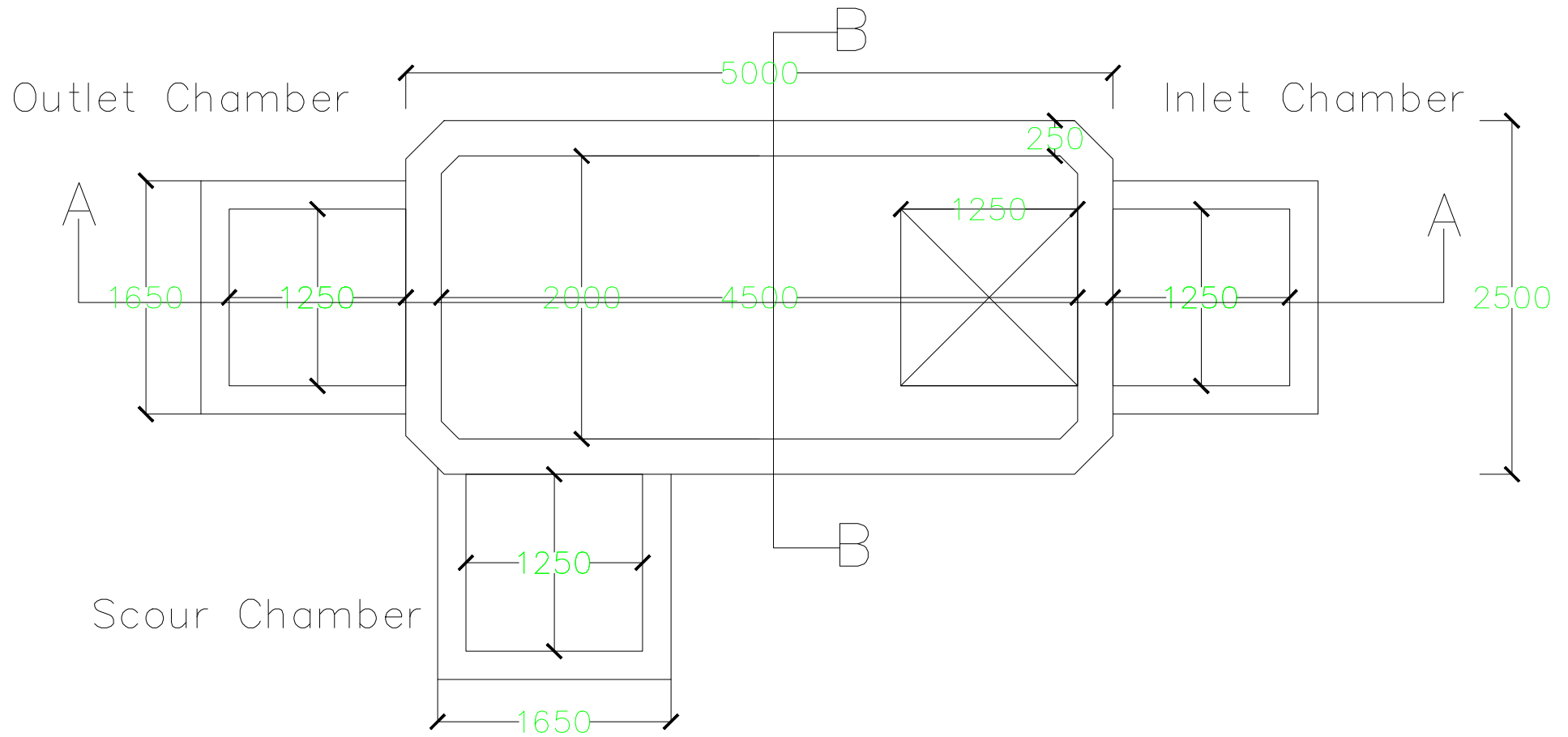
Approved By : S.M

Date : JULY 2024

Drawing No :



18 M3 RCC BPT- GICHUGU PROJECT



No.	Revisions	Checked By	Approved By	Date
1	1	L.K	S.M.M	February
2				
3				
4				

CLIENT



TANA WATER WORKS
DEVELOPMENT AGENCY

FINANCED BY



AFRICAN DEVELOPMENT
BANK

PROJECT

CONSULTING SERVICES TO
DESIGN AND SUPERVISE
CONSTRUCTION OF GICHUGU
WATER EXTENSION PROJECT
AS ADDENDUM TO LOT1

DESIGN BY



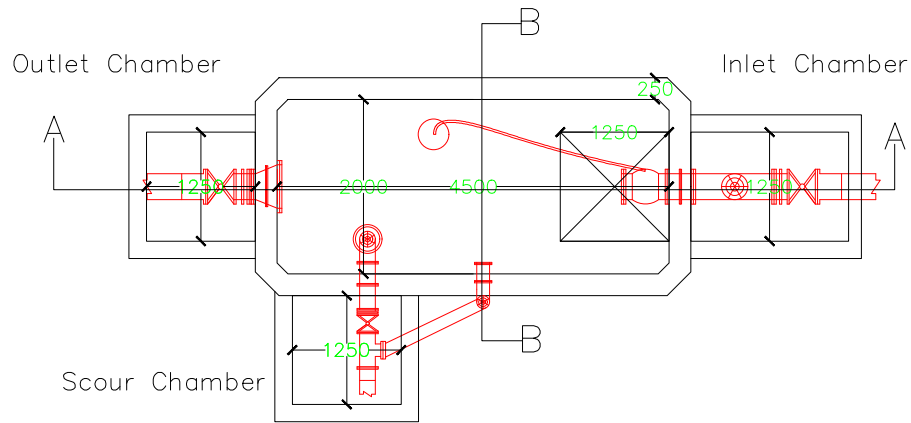
CAS CONSULTANT LIMITED

DRAWING

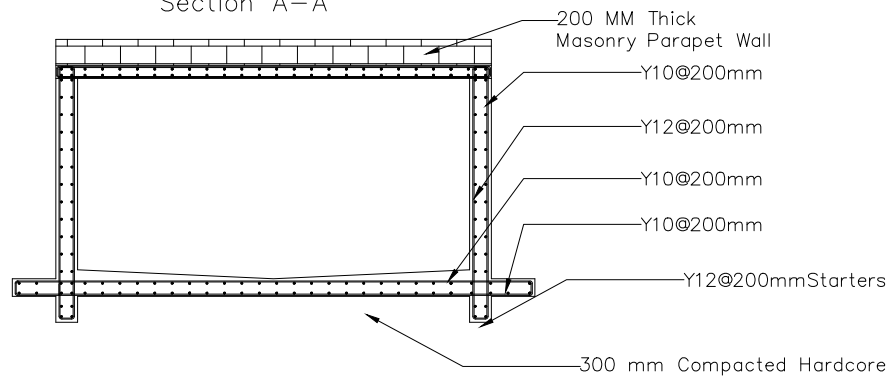
BREAK PRESSURE TANKS

Designed By	J.M.K
Drawn By	J.M.K
Checked By	L.K
Approved By	L.K
Date	February
Drawing No.	C-FEB-01

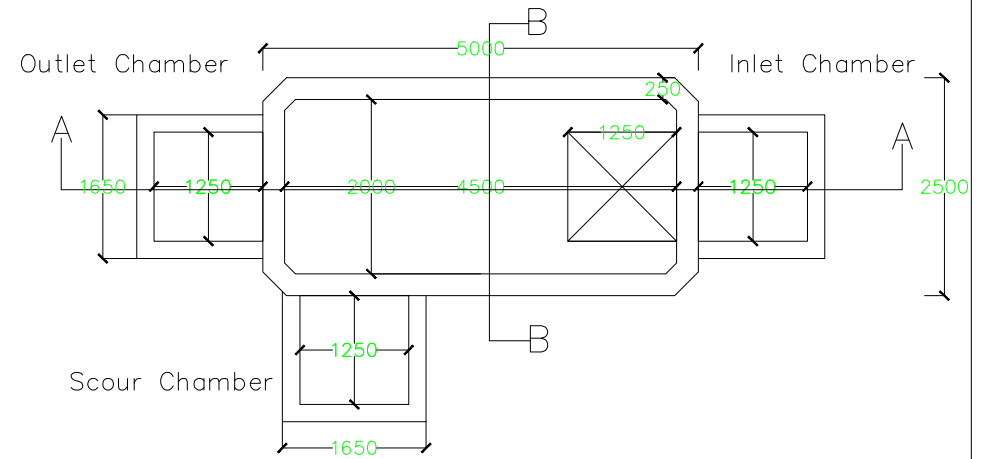
18 M3 RCC BPT- PIPE WORK PLAN VIEW



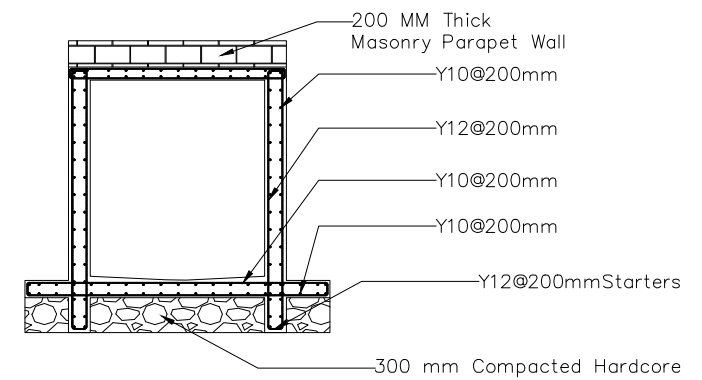
Section A-A






18 M3 RCC BPT- GICHUGU PROJECT



Section B-B

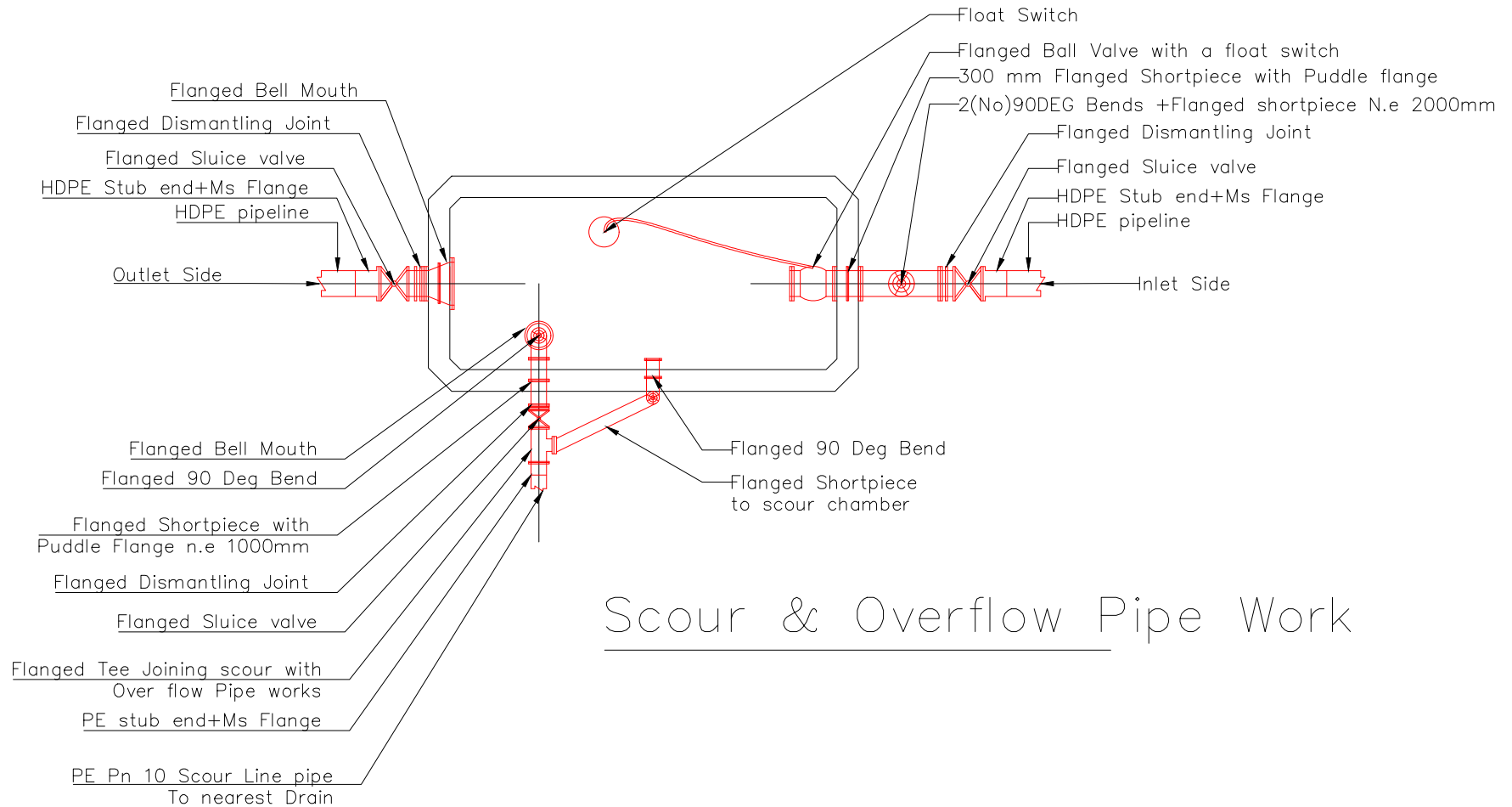





No.	Revisions	Checked By	Approved By	Date	CLIENT 	FINANCED BY  AFRICAN DEVELOPMENT BANK	PROJECT	DESIGN BY  CAS CONSULTANT LIMITED	DRAWING BREAK PRESSURE TANKS	Designed By	J.M.K
1	1	L.K	S.M.M	February						Drawn By	J.M.K
2										Checked By	L.K
3										Approved By	L.K
4										Date	February
										Drawing No.	C-FEB-01

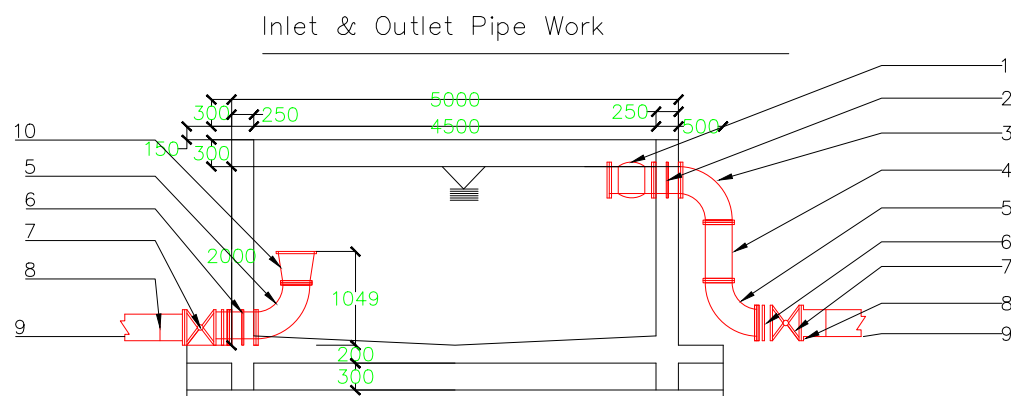
BPT PIPE WORK

Outlet Pipe Work

Inlet Pipe Work

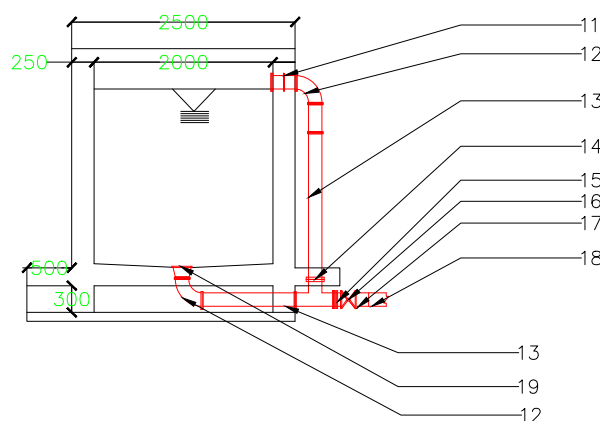


No.	Revisions	Checked By	Approved By	Date	CLIENT  TANA WATER WORKS DEVELOPMENT AGENCY	FINANCED BY 	PROJECT	DESIGN BY  CAS CONSULTANT LIMITED	DRAWING BREAK PRESSURE TANK	Designed By	J.M.K
1	1	L.K	S.M.M	February						Drawn By	J.M.K
2										Checked By	L.K
3										Approved By	L.K
4										Date	February
										Drawing No.	C-FEB-01



- ### INLET AND OUTLET PIPEWORKS
- 1 Ball Valve with a float switch
 - 2 Double Flanged Shortpiece with a puddle Flange
 - 3 90 Degree bend- flanged
 - 4 Double flanged Shortpiece L=N.e 2000 mm
 - 5 90 Degree bend- flanged
 - 6 Double Flanged Dismantling Joint
 - 7 Double Flanged Sluice Valve
 - 8 HDPE stub end with MS flange
 - 9 Incoming/ outgoing pipe
 - 10 Standard flanged bell mouth

Sludge and Overflow Pipe Work



- ### INLET AND OUTLET PIPEWORKS
- 11 Double Flanged Shortpiece with a puddle Flange
 - 12 90 Degree bend- flanged
 - 13 Double flanged Shortpiece L=N.e 2000 mm
 - 14 Double Flanged Standard Tee
 - 15 Double Flanged Dismantling Joint
 - 16 Double Flanged Sluice Valve
 - 17 HDPE stub end with MS flange
 - 18 Scour and Overflow pipe to nearest drain
 - 19 Standard flanged bell mouth

No.	Revisions	Checked By	Approved By	Date
1	1	L.K	S.M.M	February
2				
3				
4				

CLIENT



FINANCED BY



PROJECT

DESIGN BY



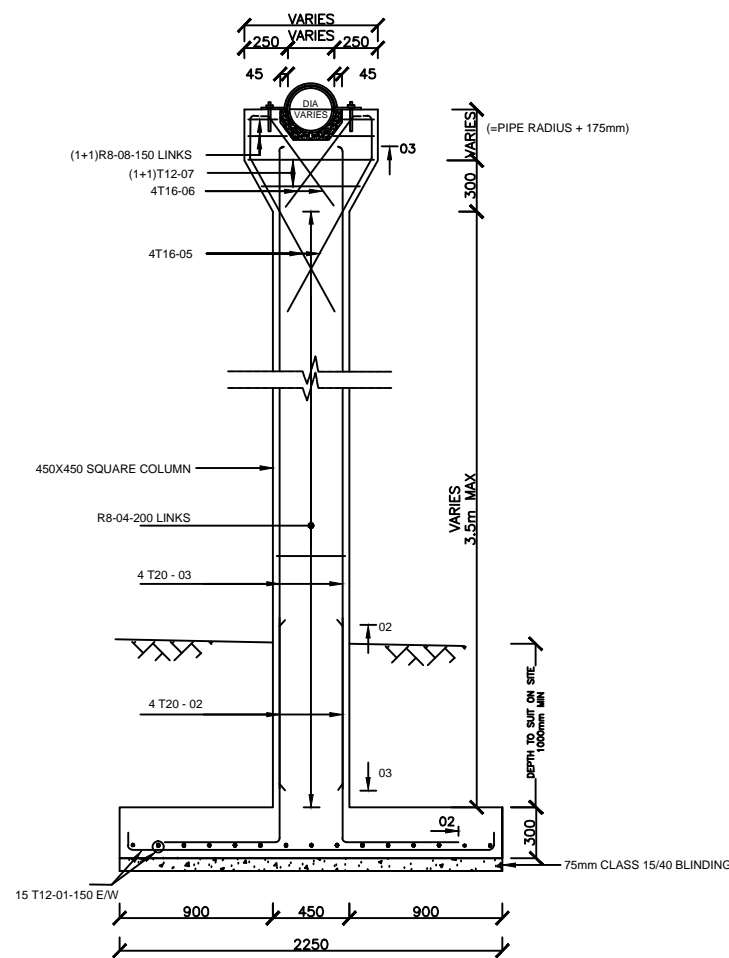
CAS CONSULTANT LIMITED

DRAWING

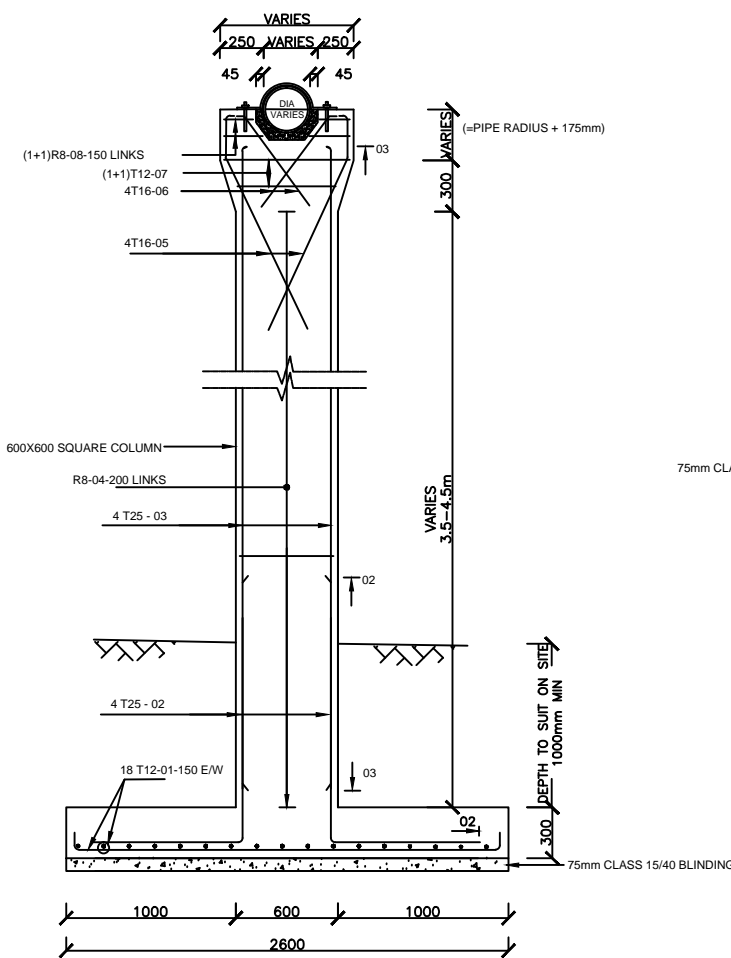
BREAK PRESSURE TANK

Designed By	J.M.K
Drawn By	J.M.K
Checked By	L.K
Approved By	L.K
Date	February
Drawing No.	C-FEB-01

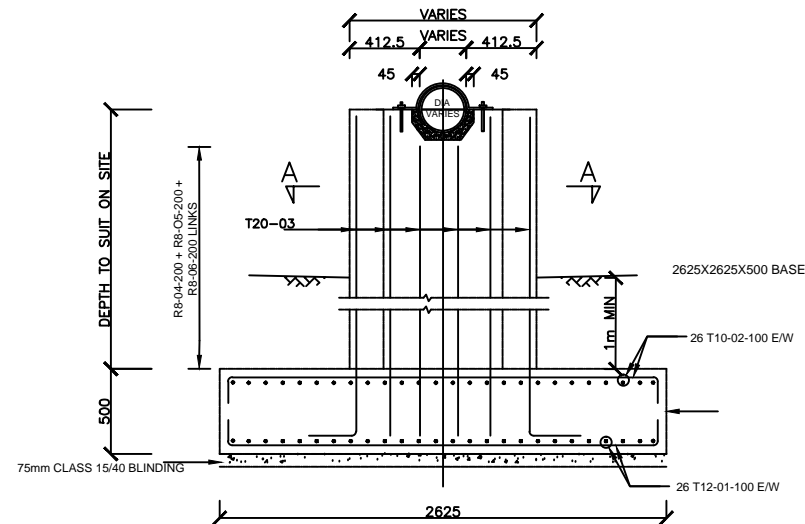
STANDARD DRAWINGS



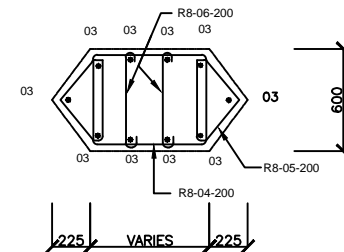
PIER TYPE 'A'
(HEIGHT UPTO 3.5m)
SCALE 1:40



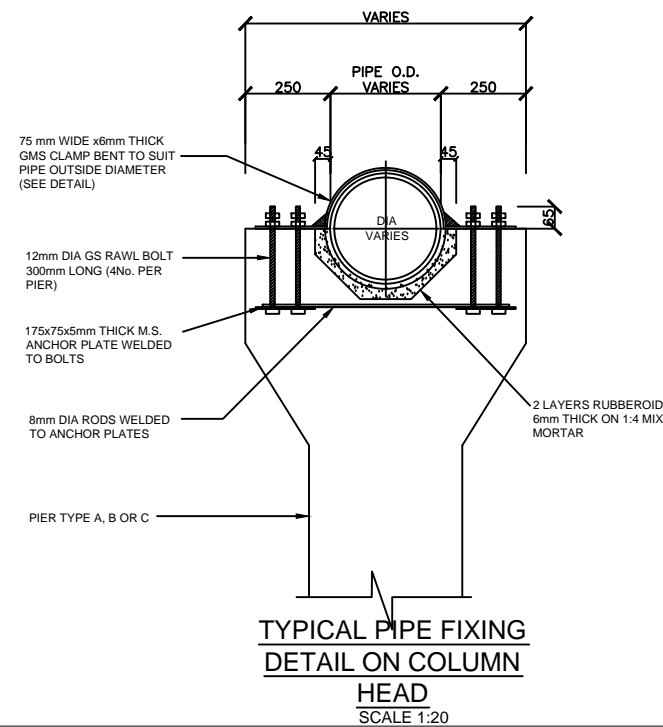
PIER TYPE 'B'
(HEIGHT 3.5-4.5m)
SCALE 1:40



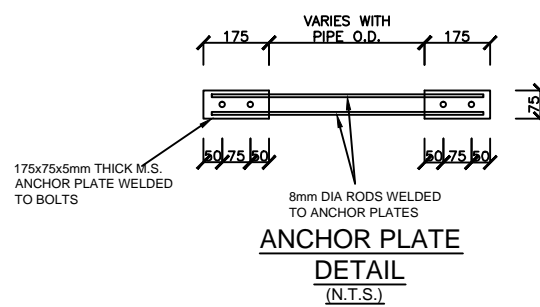
PIER TYPE 'C' (4m HIGH MAX)
(TO BE USED AT RIVER CROSSINGS)
SCALE 1:40



SECTION A-A
PIER TYPE 'C' (4m HIGH MAX)
(TO BE USED AT RIVER CROSSINGS)
SCALE 1:40

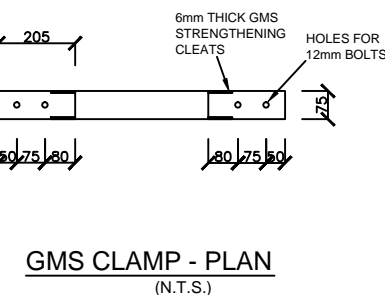
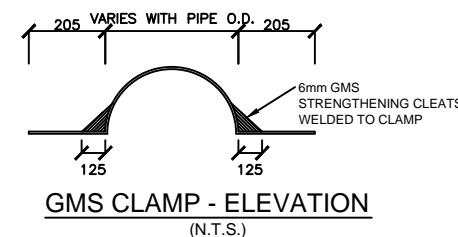


TYPICAL PIPE FIXING
DETAIL ON COLUMN
HEAD
SCALE 1:20



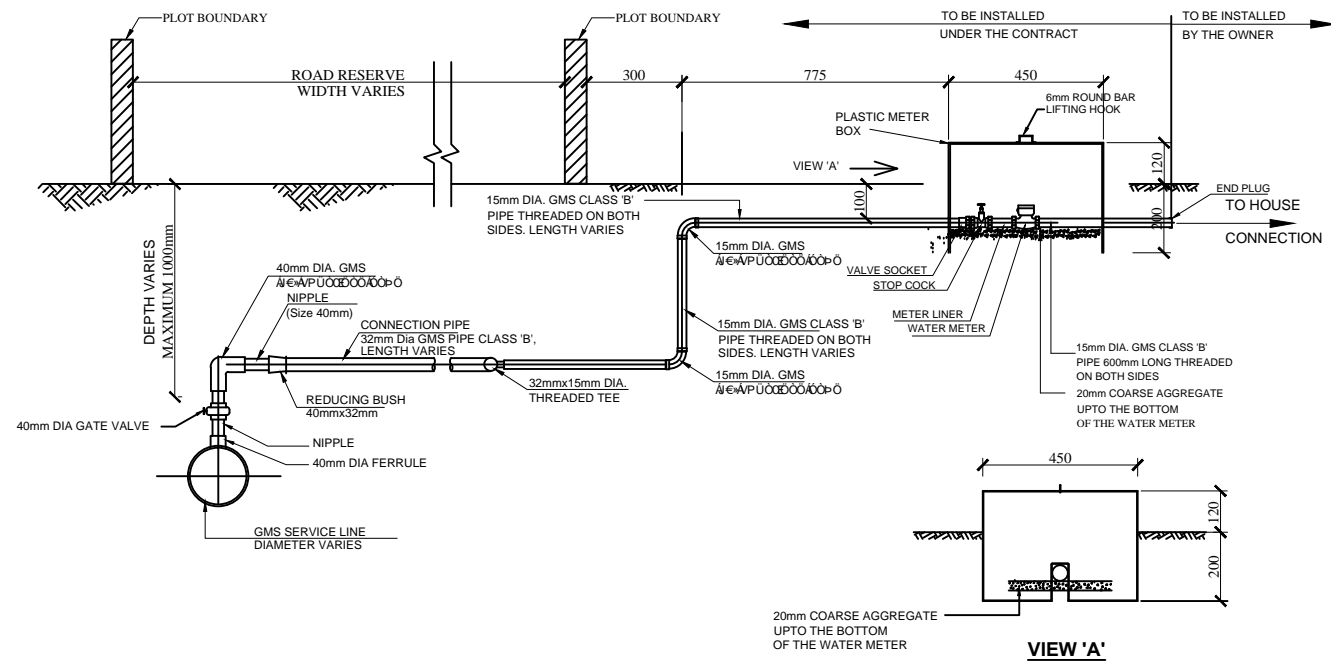
ANCHOR PLATE
DETAIL
(N.T.S.)

ANCHOR PLATES & GMS CLAMP DETAILS

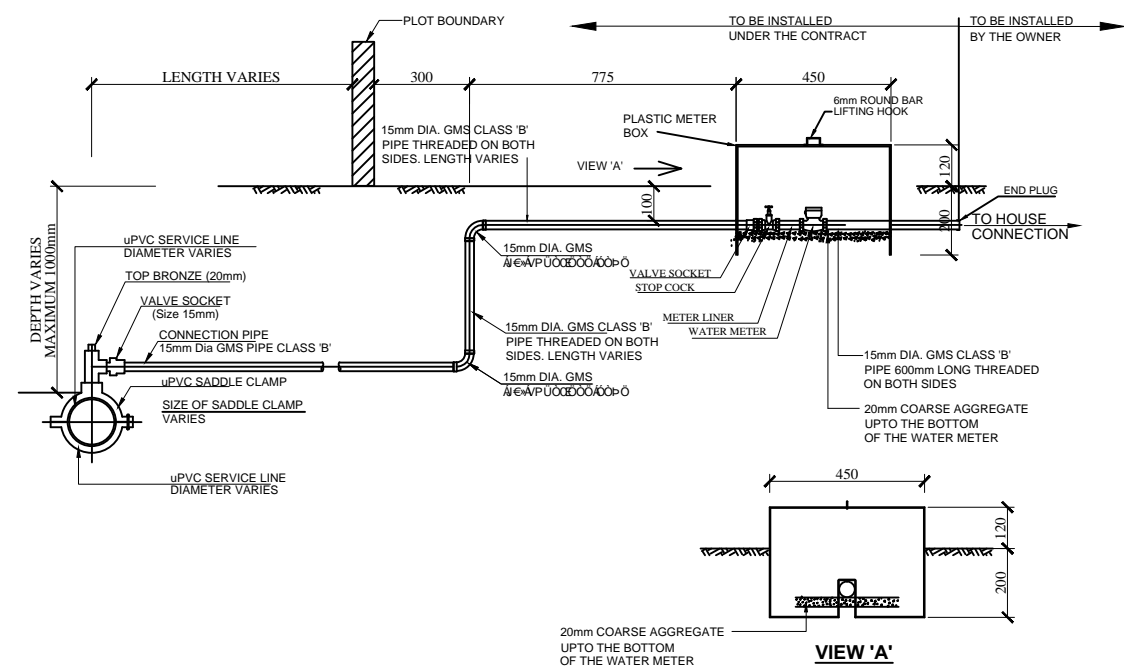


- (NOTES)
- PROGRAMME, METHOD OF CONSTRUCTION AND SETTING OUT OF WORK TO BE APPROVED BY THE ENGINEER BEFORE COMMENCEMENT OF WORK
 - DESIGN CRITERIA:
 - DESIGN CODES B.S. 8007 & B.S. 8110
 - UNIFORM NON-COMPRESSIBLE FOUNDATION WITH BEARING CAPACITY 80kN/m²
 - CONCRETE:
 - CEMENT TO BE ORDINARY PORTLAND CEMENT TO B.S. 12
 - CONCRETE AGGREGATE TO COMPLY WITH B.S. 882
 - WATER IN CONCRETE MIXES TO B.S. 3148
 - CONCRETE CLASSES TO BE AS FOLLOWS:-
MASS CONCRETE FILL AND BLINDING MIX, CLASS 15/40
REINFORCED CONCRETE, CLASS 25/20
 - MINIMUM COVER TO ALL REINFORCEMENT TO BE 40mm UNLESS AS SPECIFIED BELOW FOR BUILDINGS:
MEMBERS OF BUILDINGS:
- SLABS - 20 mm
- BEAMS - 25 mm
- COLUMNS - 40 mm
- FOUNDATIONS & FOOTINGS - 50 mm
 - WALLS/COLUMNS SHOULD BE POURED, IF POSSIBLE, IN A FULL HEIGHT POUR AS SOON AS POSSIBLE AFTER THE BASE HAS BEEN CONCRETED (2 TO 3 DAYS)
 - REINFORCEMENT:
 - REINFORCEMENT TO BE HIGH YIELD SQUARE TWISTED BARS TO B.S. 4461
 - BENDING DIMENSIONS TO B.S. 4466
 - THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL SPACER BLOCKS, CHAIRS AND TYING WIRE
 - EXAMPLE: 16 T12 - 07 - 150
SIGNIFIES 16 No. HIGH TENSILE 12mm DIA. BARS IDENTIFICATION MARK 07 AT 150mm CENTRE TO CENTRE SPACING
 - JOINTS:
 - THE POSITION AND NUMBER OF INTERMEDIATE JOINTS TO BE AS DIRECTED BY THE ENGINEER OR AS SHOWN IN THE DRAWINGS.
BEFORE PLACING FRESH CONCRETE THE OLD SURFACE SHALL BE ROUGHENED AND ALL LAITANCE AND LOOSE MATERIAL REMOVED. THE SURFACE SHALL BE THOROUGHLY WETTED BUT EXCESS WATER SHOULD BE REMOVED SO THAT THE CONSTRUCTION JOINTS ARE IN A SATURATED BUT SURFACE DRY CONDITION
 - ALL WALL/COLUMN BASE CONNECTIONS SHOULD HAVE 100mm KICKER UNLESS OTHERWISE SPECIFIED
 - THE uPVC WATER STOP SHALL BE 200mm WIDE UNLESS OTHERWISE SPECIFIED
 - JOINT FILLER TO B.S. 5292 AND TO BE APPROVED BY THE ENGINEER

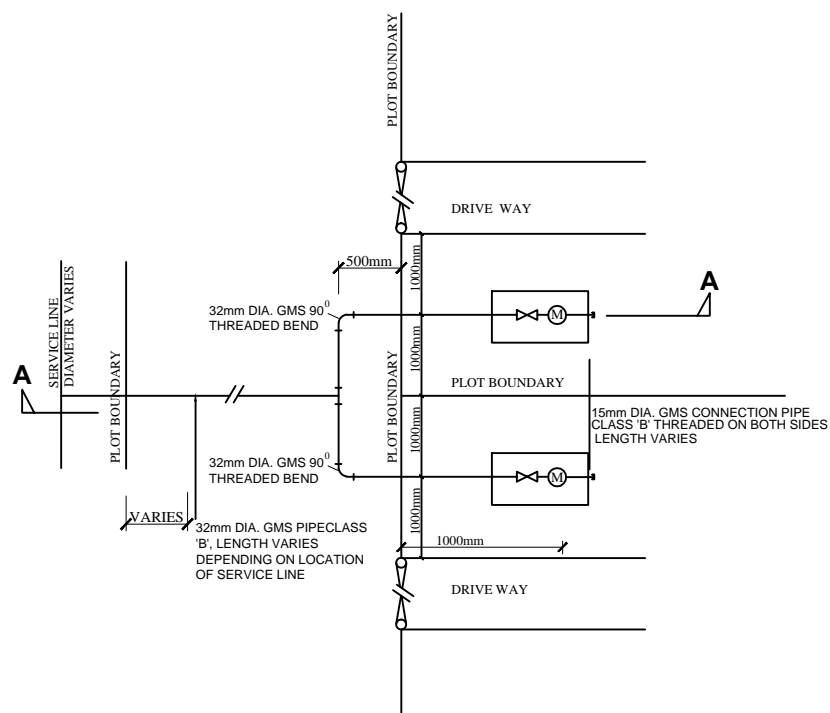
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1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS AN	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	AERIAL CROSSING	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval : _____
											Date : 02-Feb-25
											Drawing No : TWSB/KK/SD/001



SECTION A-A
NTS

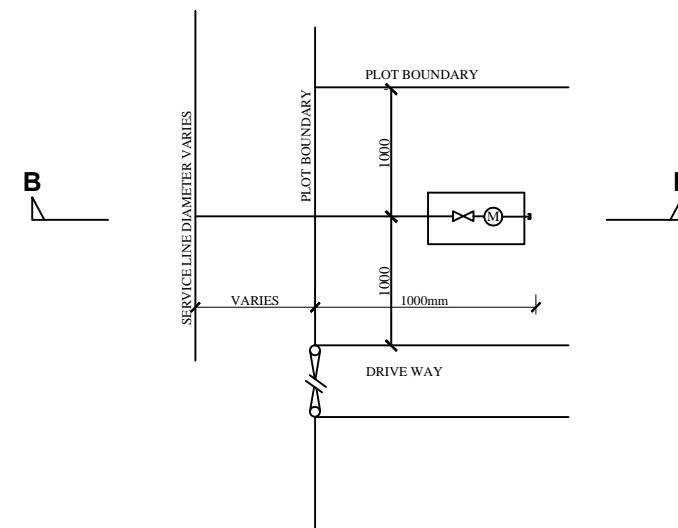


SECTION B-B
NTS



PLAN
TYPICAL CONSUMER CONNECTION
ACROSS CARRIAGE WAY FOR TWO
HOUSEHOLDS ON A GMS SERVICE LINE

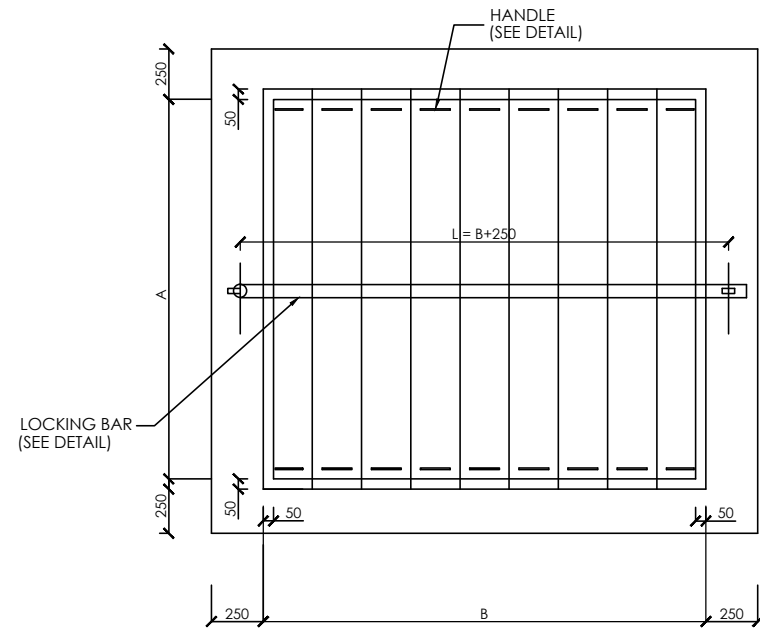
NTS



PLAN
TYPICAL CONSUMER CONNECTION
FOR ONE HOUSEHOLD ON A uPVC
SERVICE LINE

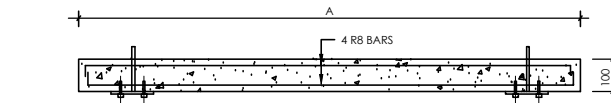
NTS

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Desi ⁿ ed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS AN CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component.	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	CONSUMER CONNECTIONS	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSB/KN/SD/002



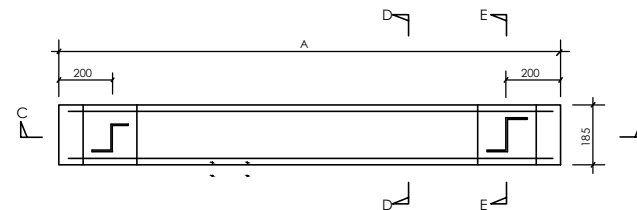
COVER FOR AIR VALVE CHAMBERS

SCALE A1 - 1:10
A3 - 1:20

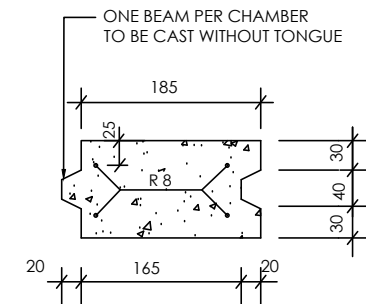


SECTION G-G

SCALE A1 - 1:10
A3 - 1:20

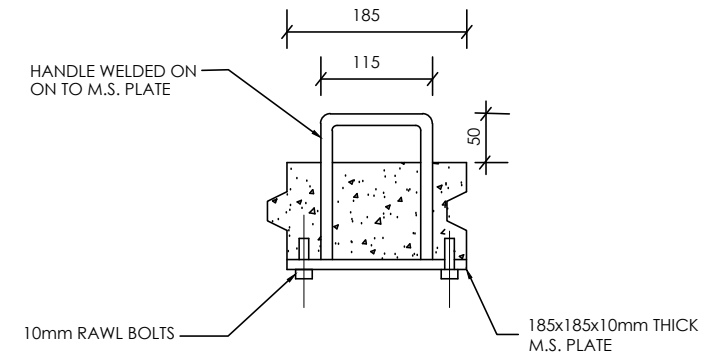


PLAN



SECTION D-D

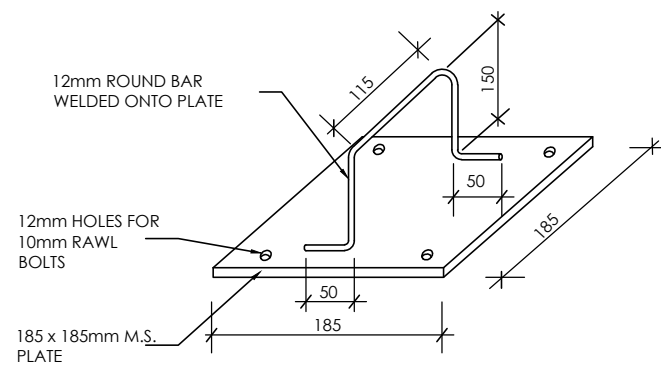
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SECTION E-E

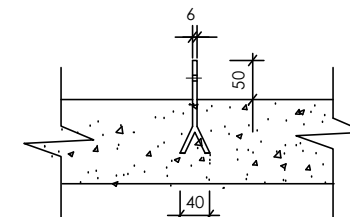
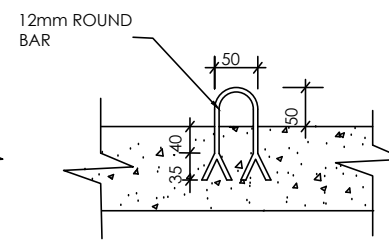
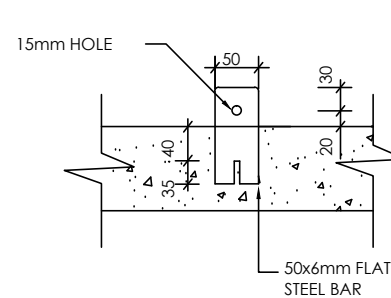
NTS

DETAIL OF PRECAST CONCRETE COVER SLAB

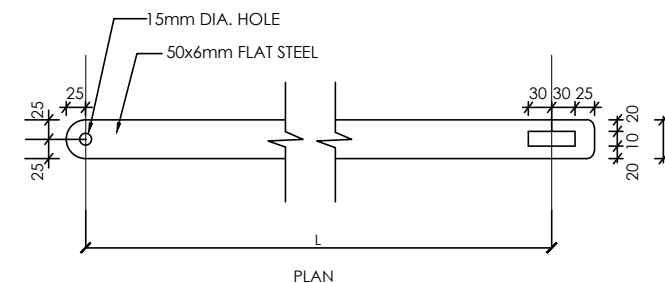


DETAIL OF HANDLE

NTS



SECTIONS



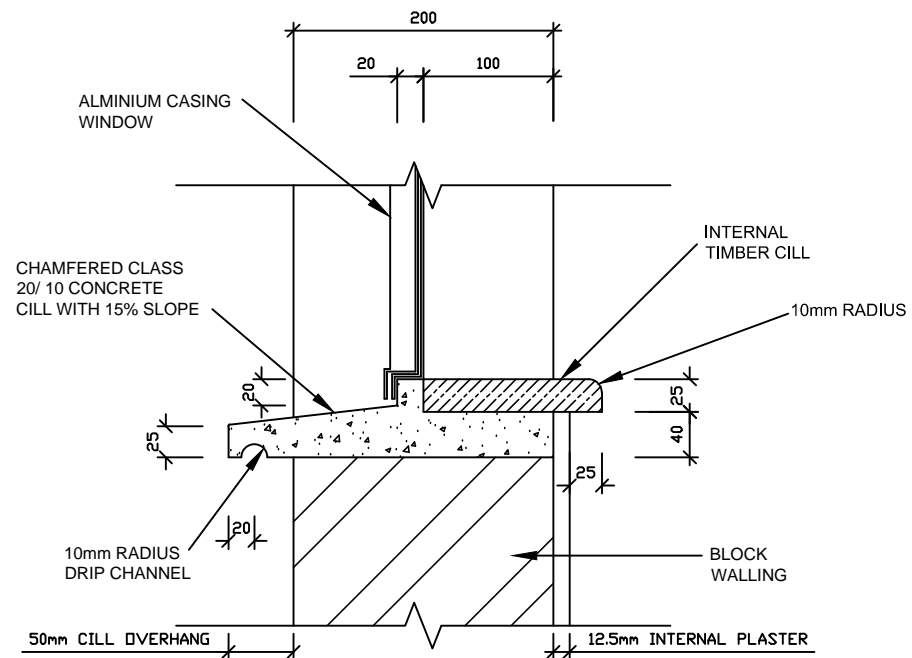
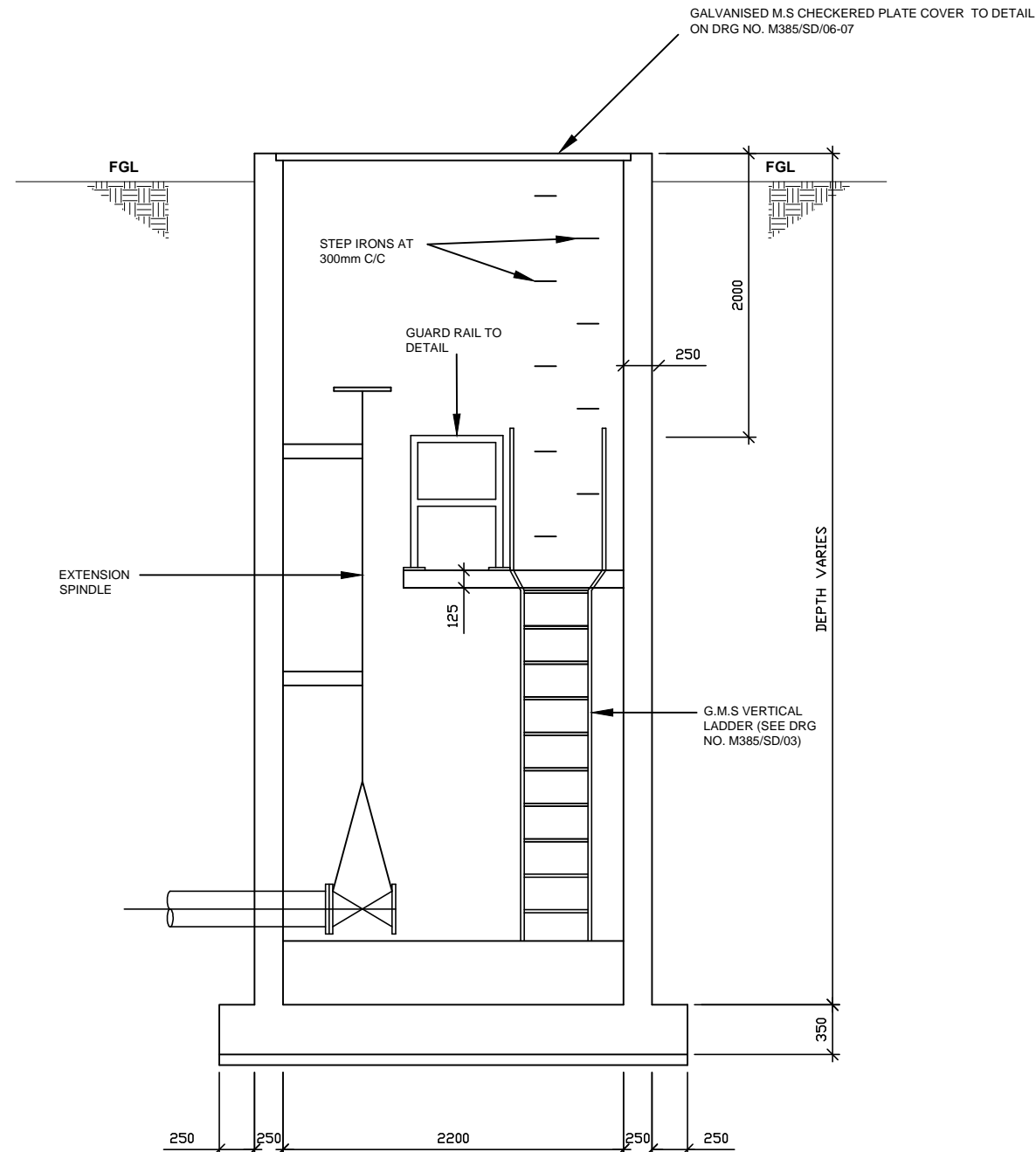
DETAILS OF LOCKING BAR

NTS

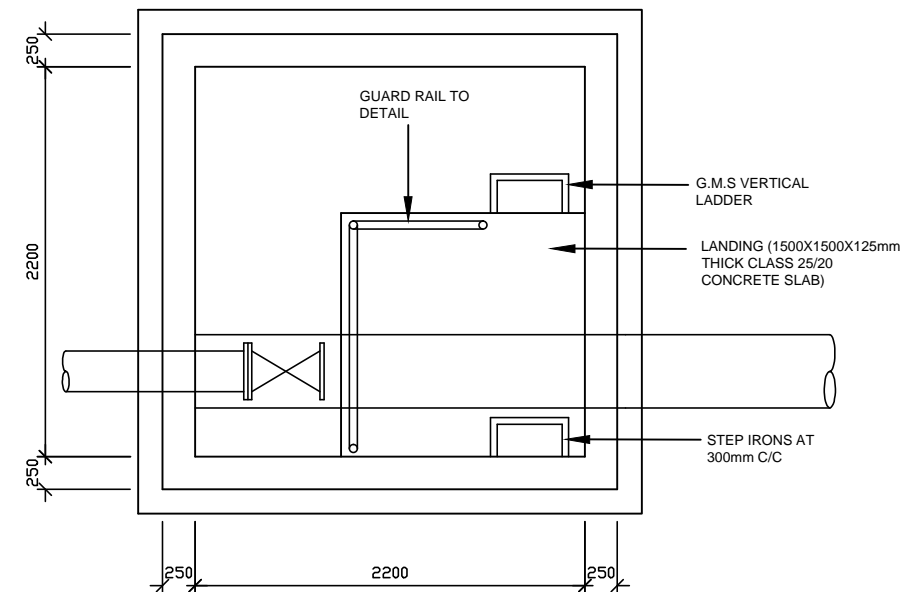
COVER SIZE SCHDULE

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

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Proiect	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS AN	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	COVER DETAILS	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSB/KN/SD/003







WINDOW CILL DETAIL
(ALL DIMENSIONS IN MILLIMETERS)



CHAMBER TYPE 1A
PLAN

NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED

ABBREVIATIONS
mm - MILLIMETER
G.M.S. - GALVANISED MILD STEEL
E.G.L. - EXISTING GROUND LEVEL

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	DEEP VALVE CHAMBER	Drawn By : D.G.M
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval : Date : 02-Feb-25 Drawing No : TWSB/KK/SD/004							



ABBREVIATIONS





SUS - Stainless Steel
thk - thick
Typ - Type
Dia. - Diameter
L - Angle Iron



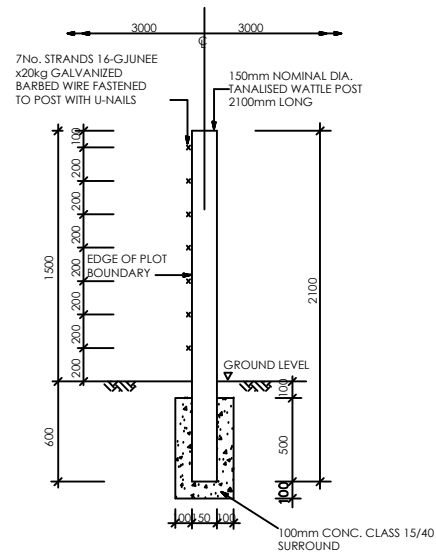
NOTES
ALL DIMENSIONS ARE IN MILLIMETERS
(mm) UNLESS OTHERWISE STATED

ABBREVIATIONS

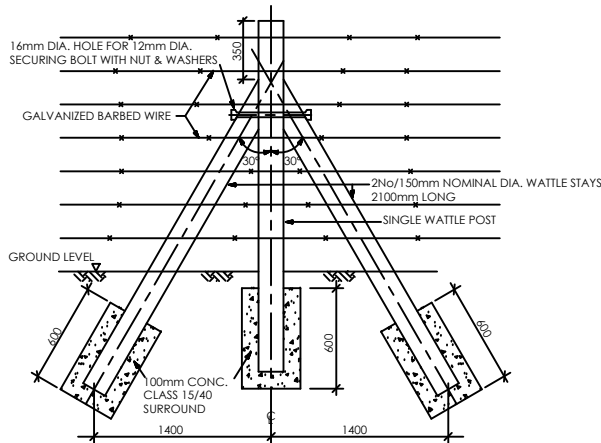
t - Thick
 SUS - STAINLESS STEEL
 thk - Thick
 Typ - Type
 L - Angle Iron
 - Diameter

No		REVISIONS	CHECKED BY	APPROVED BY	DATE	<div>Client</div> <div></div> <div>Tana Water Works Development Agency</div> <div>Maai House, Baden Powell Road</div> <div>P.O. Box 1292, Nyeri, Kenya</div>	<div>Financed By</div> <div></div> <div>AFRICAN DEVELOPMENT BANK</div>	<div>Project</div> <div>ADDEDUM TO LOT 1:</div> <div>CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION</div> <div>CONTRACT No: TWWSB/ADB/002/ 2016 - 2017</div> <div>Water supply component</div>	<div>Designed By</div> <div></div> <div>Tana Water Works Development Agency</div> <div>Maai House, Baden Powell Road</div> <div>P.O. Box 1292, Nyeri, Kenya</div>	<div>Reviewed By</div> <div></div> <div>CAS CONSULTANTS LIMITED</div> <div>Nlelon Place, Rhapsa Road, Westlands</div> <div>P.O Box 67693 - 00200 - Nairobi, Kenya</div> <div>Tel: 020 4445265 Fax: 020 4440049</div> <div>E-mail: casconsult@africaonline.co.ke</div>	<div>Drawing Title</div> <div>CHECKERED PLATE DETAILS</div>	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	Drawn By : D.G.M							
2.					Checked By : W.K							
3.					Approved By : S.M.M							
4.					Client approval : Date : 02-Feb-25							
												Drawing No : TWWSB/KK/SD/005

DETAILS OF WATTLE POSTS FOR BARBED WIRE FENCE



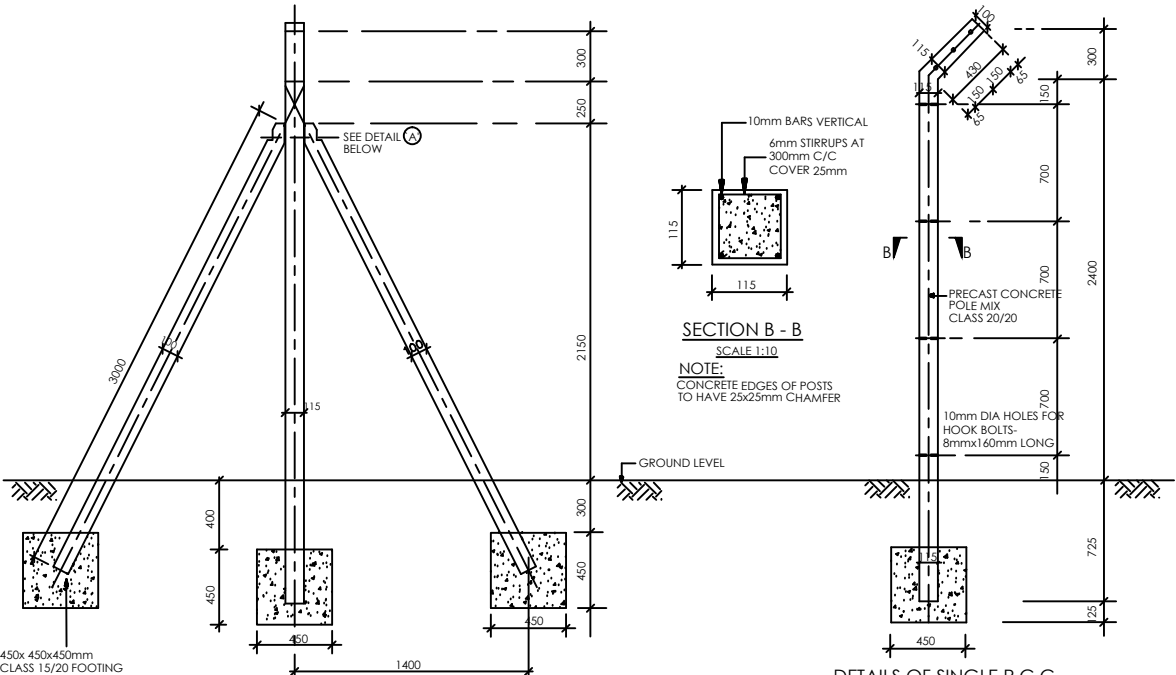
TYPICAL END ELEVATION - SINGLE POST
(TO BE AT 3.0m CENTRES)
(N.T.S.)



TYPICAL FRONT ELEVATION - STAYED POST
(STAYS TO BE PROVIDED AT 30.0m c/c AND AT CORNERS)
(N.T.S.)

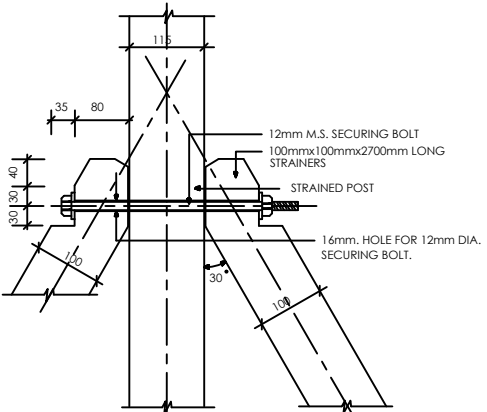
- NOTES
- a) ALL CORNER POSTS AND EVERY 10th SINGLE POST TO HAVE 2No. STAYS
 - b) POSTS TO BE AT 3000mm CENTRES
 - c) TOP OF ALL POSTS TO BE KEPT IN UNIFORM LINE
 - d) EXTENT OF FENCING IS SHOWN ON THE LAYOUT PLAN
 - e) N.T.S. = NOT TO SCALE

DETAILS OF PRECAST CONCRETE POSTS FOR CHAIN LINK FENCE



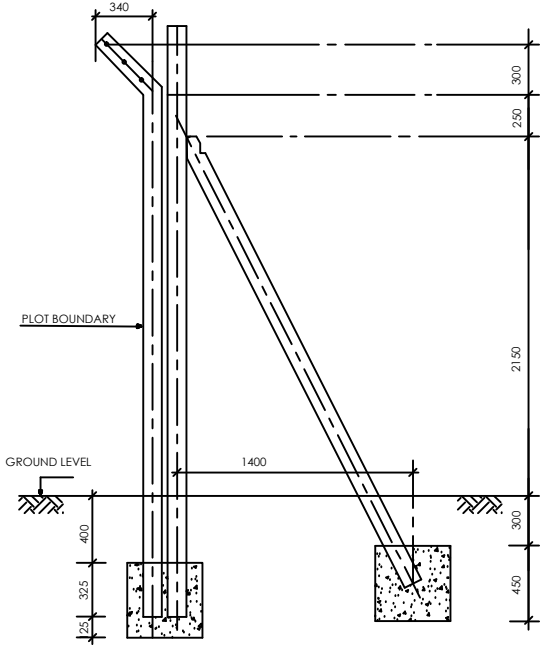
DETAILS OF STRAINING POST FOR
CHAIN LINK FENCE AT 33.3m Cts.
SCALE 1:40

DETAILS OF SINGLE P.C.C.
POST AT 3.30m Cts.
SCALE 1:40



DETAIL 'A'
SCALE 1:10

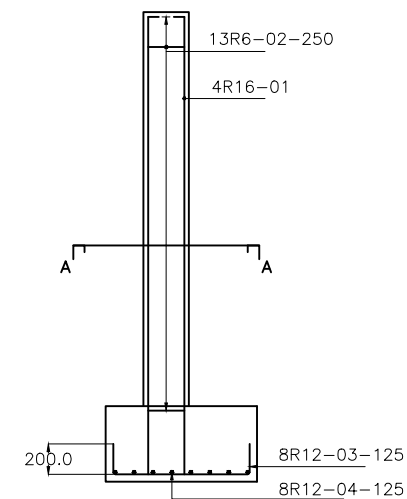
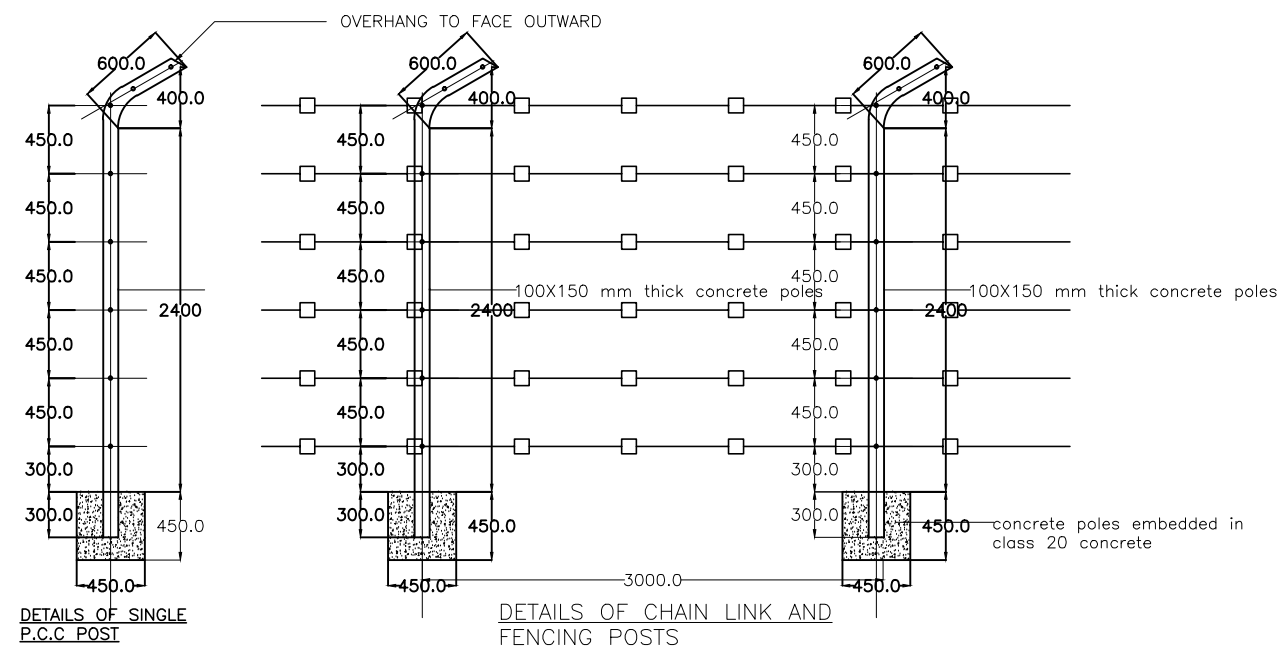
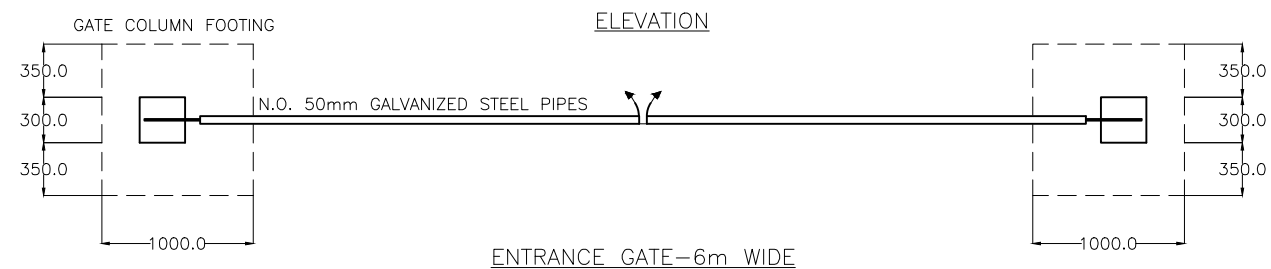
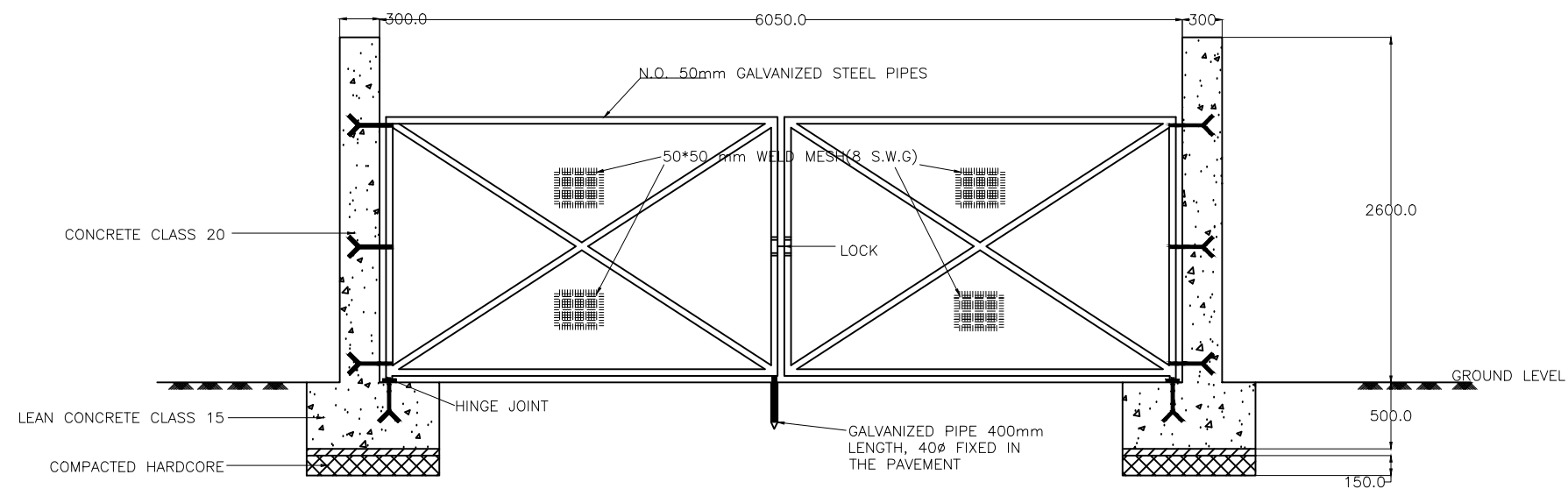
- NOTES
- a) APPROXIMATELY EVERY 10th POST AND ALL CORNER POST TO BE STRAINED
 - b) POST TO BE AT 3300mm CENTRES
 - c) TOP OF ALL POSTS TO BE KEPT IN UNIFORM LINE



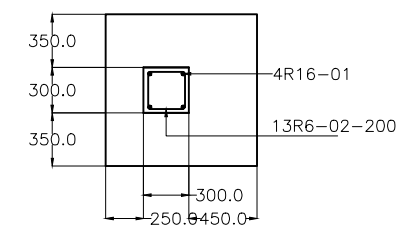
DETAILS OF CORNER POSTS
SCALE 1:40

- (NOTES)
1. PROGRAMME, METHOD OF CONSTRUCTION AND SETTING OUT OF WORK TO BE APPROVED BY THE ENGINEER BEFORE COMMENCEMENT OF WORK
 2. DESIGN CRITERIA:
 - (a) DESIGN CODES B.S. 8007 & B.S. 8110
 - (b) UNIFORM NON-COMPRESSIBLE FOUNDATION WITH BEARING CAPACITY 80kN/m²
 3. CONCRETE:
 - (a) CEMENT TO BE ORDINARY PORTLAND CEMENT TO B.S. 12
 - (b) CONCRETE AGGREGATE TO COMPLY WITH B.S. 882
 - (c) WATER IN CONCRETE MIXES TO B.S. 3148
 - (d) CONCRETE CLASSES TO BE AS FOLLOWS:-
 - MASS CONCRETE FILL AND BLINDING MIX, CLASS 15/40
 - REINFORCED CONCRETE, CLASS 25/20
 - (e) MINIMUM COVER TO ALL REINFORCEMENT TO BE 40mm UNLESS AS SPECIFIED BELOW FOR BUILDINGS:
 - MEMBERS OF BUILDINGS:
 - SLABS - 20 mm
 - BEAMS - 25 mm
 - COLUMNS - 40 mm
 - FOUNDATIONS & FOOTINGS - 50 mm
 - (f) WALLS/COLUMNS SHOULD BE POURED, IF POSSIBLE, IN A FULL HEIGHT POUR AS SOON AS POSSIBLE AFTER THE BASE HAS BEEN CONCRETED (2 TO 3 DAYS)
 4. REINFORCEMENT:
 - (a) REINFORCEMENT TO BE HIGH YIELD SQUARE TWISTED BARS TO B.S. 4461
 - (b) BENDING DIMENSIONS TO B.S. 4466
 - (c) THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL SPACER BLOCKS, CHAIRS AND TYING WIRE
 - (d) EXAMPLE: 16 T12 - 07 - 150 SIGNIFIES 16 No. HIGH TENSILE 12mm DIA. BARS IDENTIFICATION MARK 07 AT 150mm CENTRE TO CENTRE SPACING
 5. JOINTS:
 - (a) THE POSITION AND NUMBER OF INTERMEDIATE JOINTS TO BE AS DIRECTED BY THE ENGINEER OR AS SHOWN IN THE DRAWINGS. BEFORE PLACING FRESH CONCRETE THE OLD SURFACE SHALL BE ROUGHENED AND ALL LAITANCE AND LOOSE MATERIAL REMOVED. THE SURFACE SHALL BE THOROUGHLY WETTED BUT EXCESS WATER SHOULD BE REMOVED SO THAT THE CONSTRUCTION JOINTS ARE IN A SATURATED BUT SURFACE DRY CONDITION
 - (b) ALL WALL/COLUMN BASE CONNECTIONS SHOULD HAVE 100mm KICKER UNLESS OTHERWISE SPECIFIED
 - (c) THE uPVC WATER STOP SHALL BE 200mm WIDE UNLESS OTHERWISE SPECIFIED
 - (d) JOINT FILLER TO B.S. 5292 AND TO BE APPROVED BY THE ENGINEER

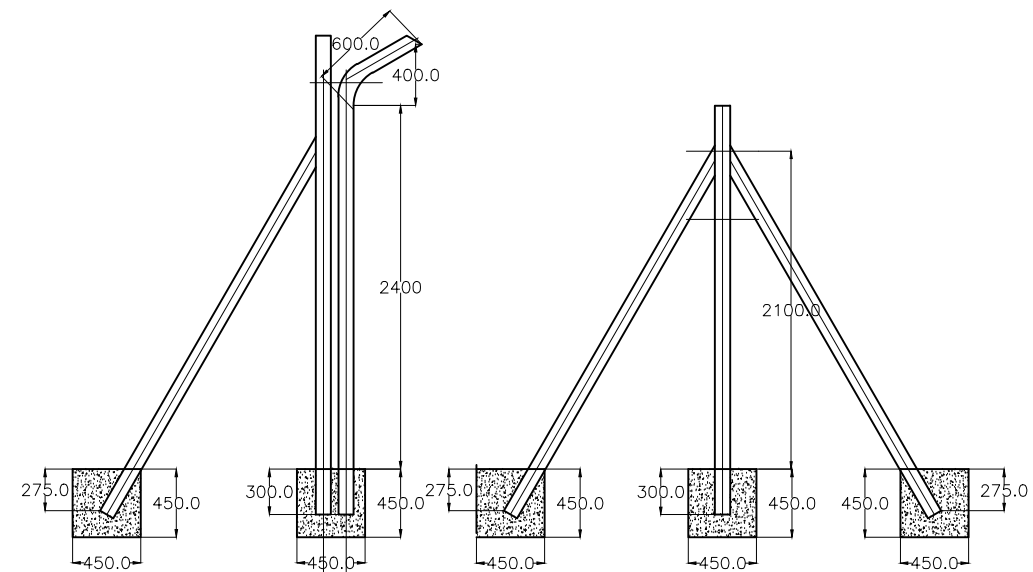
No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency Mail House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component	Tana Water Works Development Agency Mail House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	DETAILS OF FENCING POSTS	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSB/KK/SD/006



GATE POST



SECTION A-A



DETAILS OF CORNER P.C.C POST





DETAILS OF STRAINING FOR CHAIN LINK FENCE

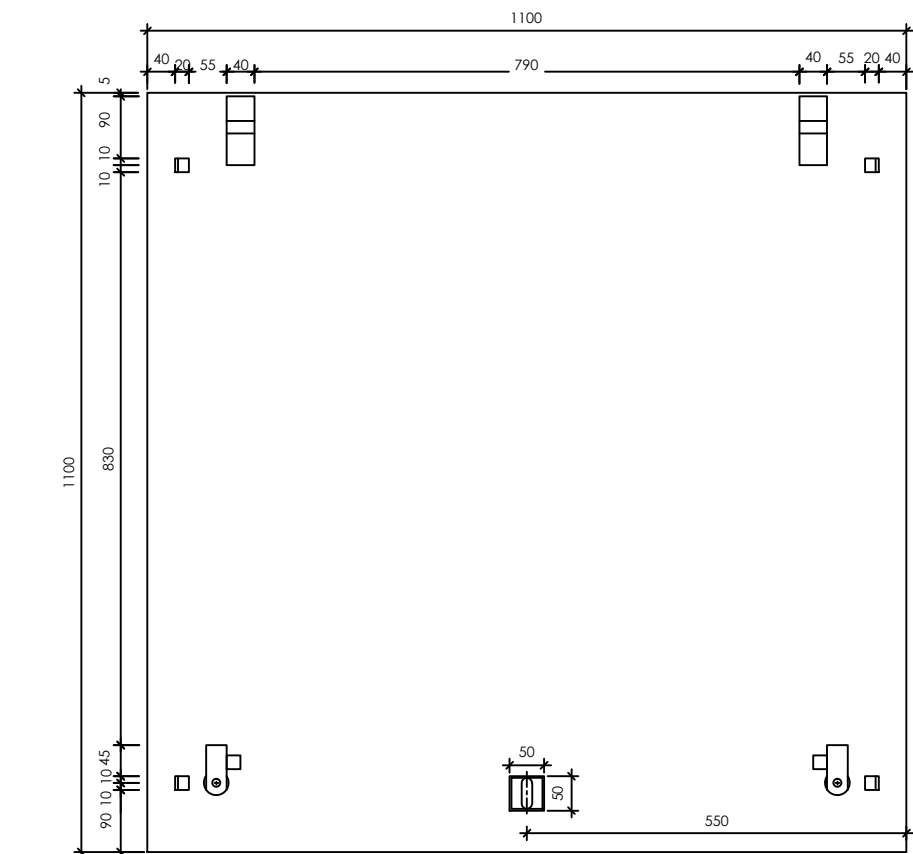
LOCATION	BAR MARK	TYPE AND SIZE	No IN EACH	TOTAL No	CUT LENGTHS METRES	TOTAL LENGTH METRES	SHAPE CODE	A	B	C	WEIGHT KG
ENTRANCE GATE 6m WIDE	01	R16	4	8	3.050	24.400	37	0.050	3.000		38.527
	02	R6	13	26	1.050	27.300	60	0.200	0.200		6.060
	03	R12	8	8	1.400	11.200	38	0.250	0.900		9.945
	04	R12	8	8	1.400	11.200	38	0.250	0.900		9.945
CHAIN LINK FENCING POST	05	R6	32	32	0.450	14.400	60	0.600	0.600	2.580	3.197
	06	R8	4	4	3.160	12.640	62	0.580	0.580		4.993

BAR BENDING SCHEDULE

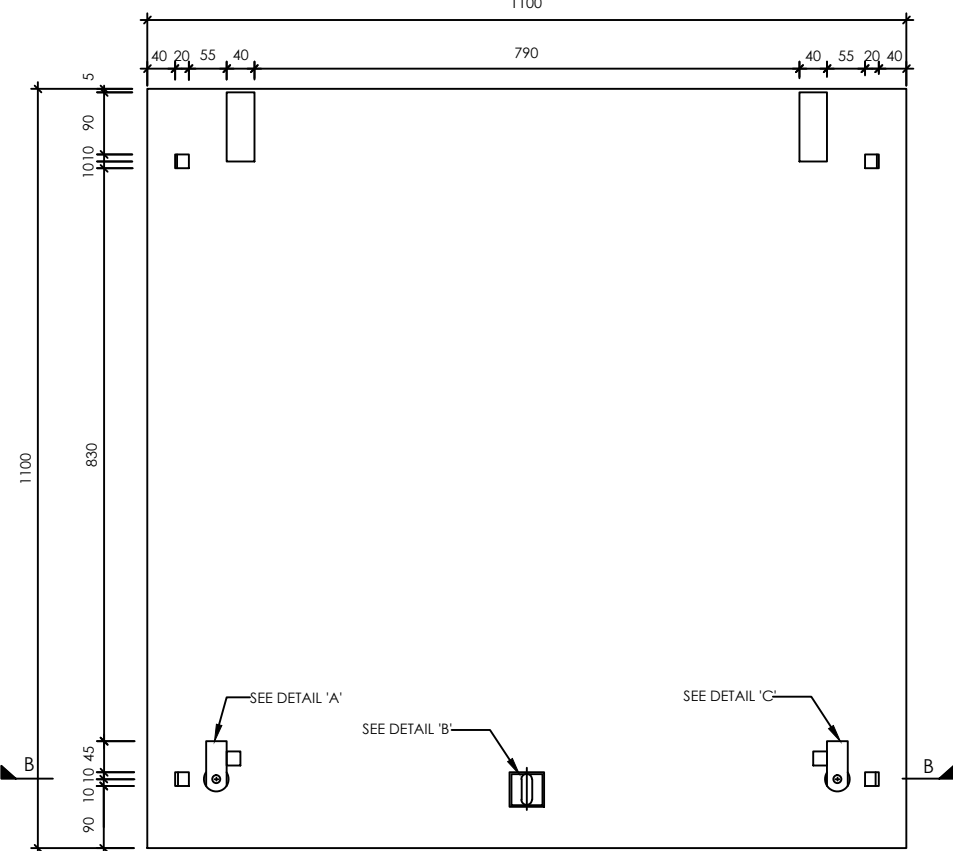
No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	FENCE AND GATE DETAILS	LK
2.							CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component				Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSB/KK/SD/007



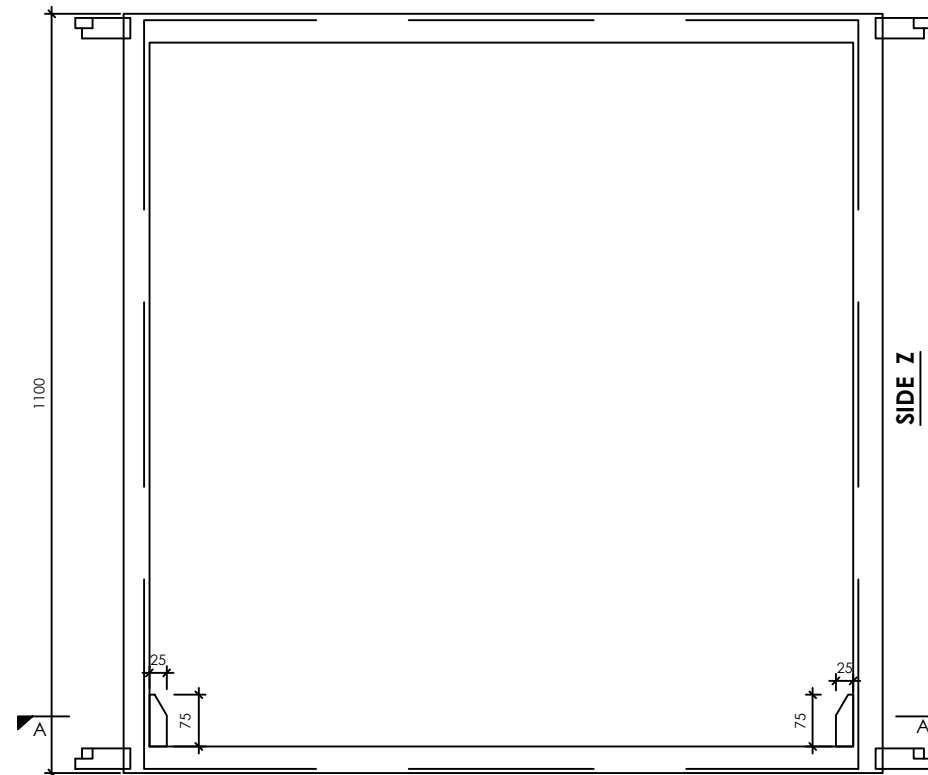
No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	 <div>Tana Water Works Development Agency</div> <div>Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya</div>	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWWSB/ADB/002/ 2016 - 2017 Water supply component	 <div>Tana Water Works Development Agency</div> <div>Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya</div>	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	DETAILS OF METAL COVER CONTRACT No: TWWSB/ADB/002/ 2016 - 2017	Drawn By : LK
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval : Date : 02-Feb-25 Drawing No : TWWSB/ADB/SD/008A							



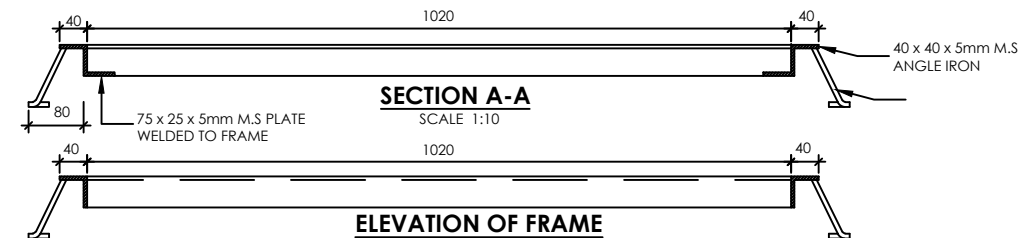
**SIDE X
PLAN - UNDERSIDE OF COVER**
SCALE 1:10



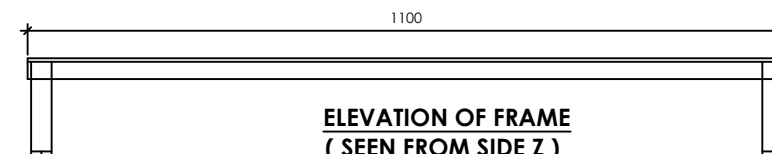
PLAN - OF COVER
SCALE 1:10



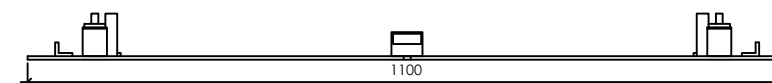
**SIDE Y
PLAN OF FRAME**
SCALE 1:10



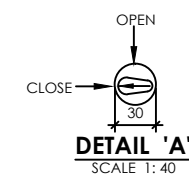
**SECTION A-A
ELEVATION OF FRAME
(SEEN FROM SIDE Y)**
SCALE 1:10



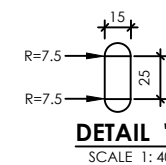
**ELEVATION OF FRAME
(SEEN FROM SIDE Z)**
SCALE 1:10



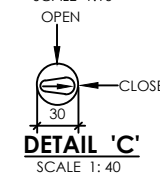
**ELEVATION OF COVER
(SEEN FROM SIDE X)**
SCALE 1:10



DETAIL 'A'
SCALE 1:40

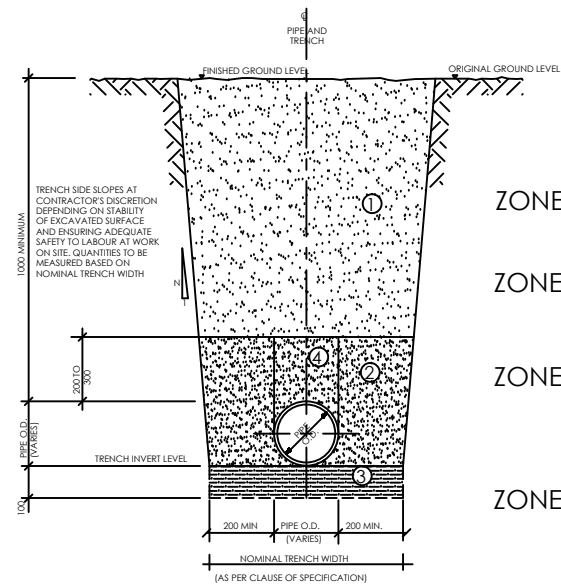


DETAIL 'B'
SCALE 1:40

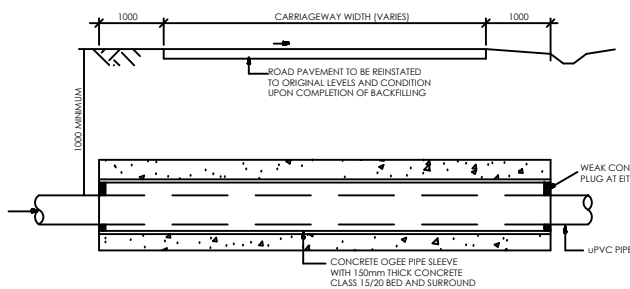


DETAIL 'C'
SCALE 1:40

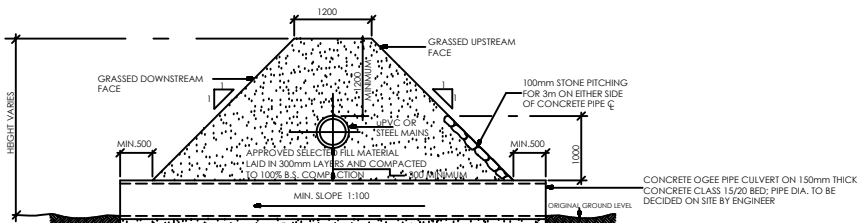
No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	DETAILS OF METAL COVER CONTINUE	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSB/KN/SD/008B



**TYPICAL TRENCH DETAIL FOR RETICULATION PIPES
(uPVC OR C/L FERROUS PIPES)**
SCALE 1:100



TYPICAL ROAD PIPE CROSSING DETAIL FOR uPVC PIPES
SCALE A1-1: 100



**TYPICAL DETAIL OF PIPE CROSSING
SEASONAL STREAM / DRAINAGE DITCH**
SCALE 1: 100

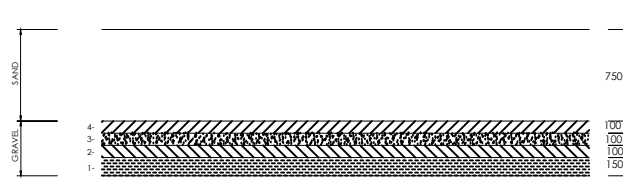
NOTES

SOIL TO BE USED MAY INCLUDE FREE-DRAINING COARSE SAND, GRAVEL, LOAM AND SOIL OF A FRIABLE NATURE. PARTICAL SIZE NOT TO EXCEED 20mm.
BACKFILL IN LAYERS NOT EXCEEDING 300mm UPTO FINISHED GROUND LEVEL, EACH LAYER BEING WELL COMPACTED TO LIMIT VOIDS. MECHANICAL COMPACTION EQUIPMENT MAY BE USED IF APPROVED BY ENGINEER.

BACKFILL WITH SOIL APPROVED BY THE ENGINEER, IN LAYERS NOT EXCEEDING 200mm.
THOROUGHLY COMPACT SOIL, TAMPING EQUALLY ON EITHER SIDE AND ALONG LOWER EDGE OF PIPE.
ONLY HAND TAMPING TO BE USED

IF ROCK SHARP PROJECTIONS, TREE ROOTS OR OTHER UNSUITABLE MATERIAL IS ENCOUNTERED AT TRENCH INVERT LEVEL, A FURTHER 100mm DEPTH OF MATERIAL IS TO BE EXCAVATED.
BACKFILL WITH SOIL APPROVED BY THE ENGINEER UPTO TRENCH INVERT LEVEL.
THOROUGHLY COMPACT SOIL BY HAND TO GIVE A UNIFORM GRADIENT ALONG PIPE TRENCH, LEAVING RECESSES FOR PIPE JOINTS.

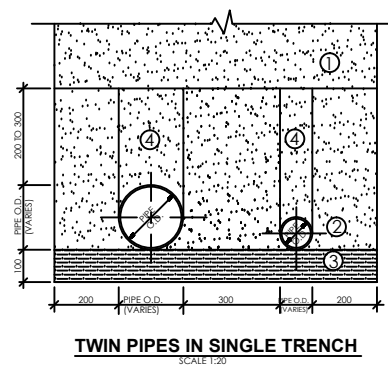
SIMILAR REQUIREMENTS TO ZONE 2 EXCEPT NO EXCESS TAMPING IS PERMITTED OVER PIPE.



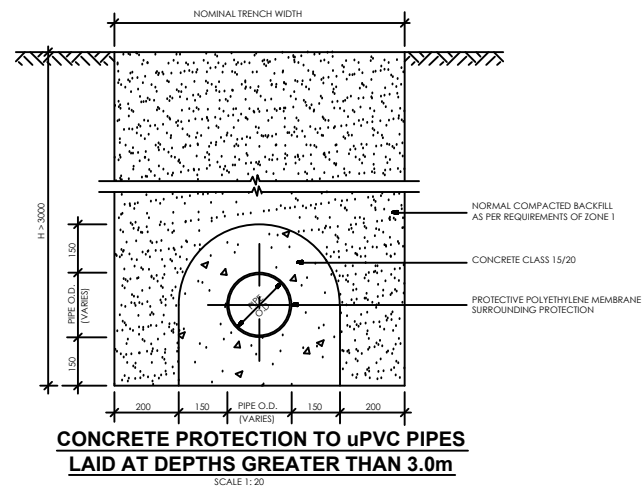
LAYER	1	2	3	4
DEPTH (mm)	150	100	100	100
PASSING SQUARE MESH	38mm (1 1/2")	20mm (3/4")	12mm (1/2")	5mm (3/16")
RETAINED	20mm (3/4")	12mm (1/2")	5mm (3/16")	2mm (3/32")

TOP SAND LAYER 750mm EFFECTIVE SIZE 0.7mm
UNIFORMITY COEFFICIENT 1.5

DETAILS OF FILTER MEDIA IN RAPID SAND FILTERS
NTS



TWIN PIPES IN SINGLE TRENCH
SCALE 1:20



**CONCRETE PROTECTION TO uPVC PIPES
LAID AT DEPTHS GREATER THAN 3.0m**
SCALE 1:20

NOTES

ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

ABBREVIATIONS

O.D. - Outside Diameter
uPVC - Unplasticised Polyvynl Chloride
C or C/L - Centre line
mm - Milimeter
m - Meter
> - Greater Than
KS - Kenya Standard
B.S. - British Standard
SRN - Standard Reference Number
MIN - Minimum

PIPE DIAMETER SCHEDULES

uPVC WATER PRESSURE PIPES TO KS. 06-149: PART 2, 2000			WALL THICKNESS (mm)									
NOMINAL OUTSIDE DIAMETER (mm)	CORRESPONDING OUTSIDE DIAMETER AS PER KS. 06-149: PART 2, 2000 (mm)		PN = 6 BAR		PN = 10 BAR		PN = 12.5 BAR		PN = 16 BAR			
			CLASS 'B'		CLASS 'C'		CLASS 'D'		CLASS 'E'			
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
63	63	63.3	1.70	2.1	2.70	3.2	3.40	3.9	4.30	4.9		
75	75	75.3	2.00	2.4	3.30	3.8	4.00	4.6	5.10	5.8		
90	90	90.3	2.40	2.8	3.90	4.5	4.80	5.5	6.10	6.9		
110	110	110.4	2.90	3.4	4.80	5.5	5.90	6.7	7.50	8.5		
125	125	125.4	3.30	3.8	5.40	6.1	6.70	7.6	8.50	9.6		
140	140	140.4	3.70	4.3	6.00	6.8	7.50	8.5	9.50	10.7		
160	160	160.5	4.20	4.8	7.00	7.9	8.60	9.7	10.80	12.1		
200	200	200.6	4.80	5.5	7.80	8.8	9.70	10.9	12.20	13.6		
225	225	225.7	5.40	6.1	8.80	9.9	10.90	12.2	13.70	15.3		
250	250	250.8	6.00	6.8	9.80	11.0	12.10	13.5	15.30	17.0		
280	280	280.9	6.70	7.6	10.90	12.2	13.50	15.1	17.10	19.0		
315	315	316.0	7.50	8.5	12.30	13.7	15.20	16.9	19.20	21.3		
uPVC PIPE PRESSURE CLASSES												
CLASS 'B'		CLASS 'C'		CLASS 'D'		CLASS 'E'						
6 BAR		10 BAR		12.5 BAR		16 BAR						
40mm HEAD OF WATER		50mm HEAD OF WATER		120mm HEAD OF WATER		150mm HEAD OF WATER						

PN = NOMINAL PRESSURE

PN = NOMINAL PRESSURE

BITUMEN LINED STEEL PIPES TO TO B.S. 534:1981	
NOMINAL INTERNAL DIAMETER (mm)	CORRESPONDING OUTSIDE PIPE DIAMETER AS PER B.S. 534: 1981 (mm)
50	60.3
65	76.1
80	88.9
100	114.3
125	139.7
150	168.3
175	193.7
200	219.1
225	244.5
250	273.0
300	323.9
350	355.6
400	406.4
450	457.0
500	508.0
550	559.0
600	610.0

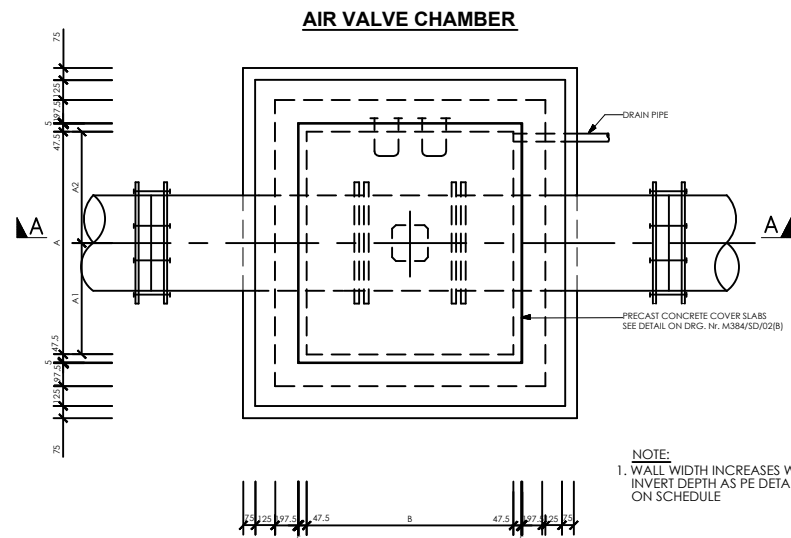
DUCTILE IRON PIPES TO B.S. 4772:1980	
NOMINAL INTERNAL DIAMETER (mm)	CORRESPONDING OUTSIDE DIAMETER AS PER B.S. 4772 1980 (mm)
50 *	66 *
65 *	82 *
80	98
100	118
125 *	144 *
150	170
200	222
250	274
300	326
350	378
400	429
450	480
500	532
600	635

* NOT IN B.S. 4772: DATA FROM HALBERGER HUTTE TABLES

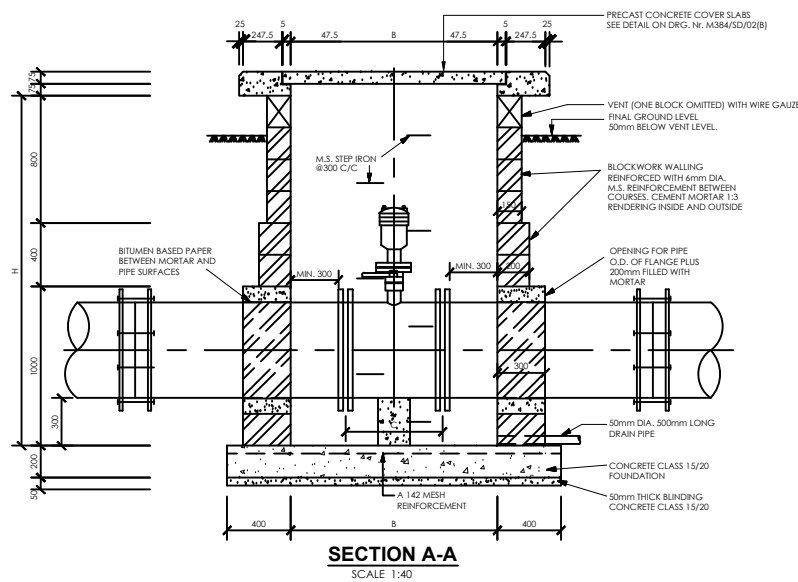
NOTE

ALL DIMENSIONS SHOWN ABOVE ARE BASED ON THE CURRENT RELEVANT KENYAN OR BRITISH STANDARDS AND ARE FOR THE TENDERER'S INFORMATION.
TENDERERS ARE FREE TO QUOTE FOR PIPES TO ANY OTHER APPROVED EQUIVALENT SRN NUMBER. THE TENDERER'S ATTENTION IS ALSO DRAWN TO CLAUSE 36 OF PREAMBLE TO THE BILL OF QUANTITIES, REGARDING ALTERNATIVE PIPE AND JOINTING TYPES.

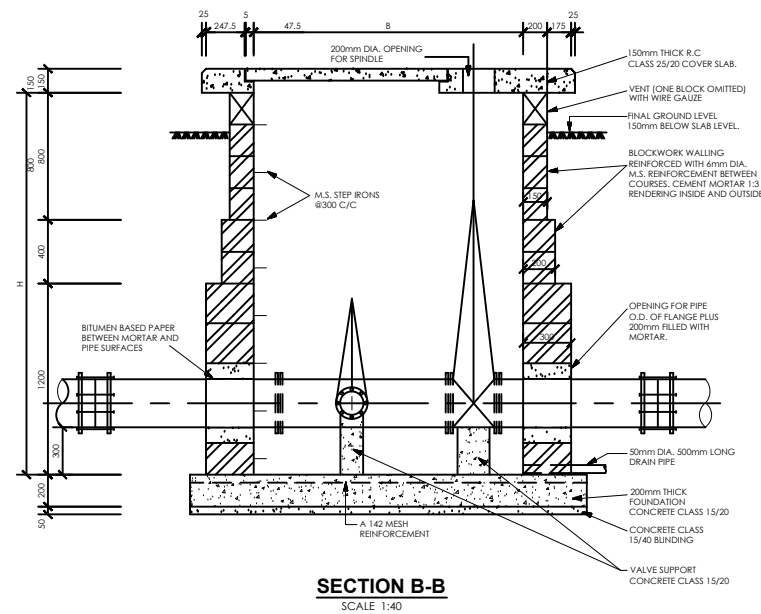
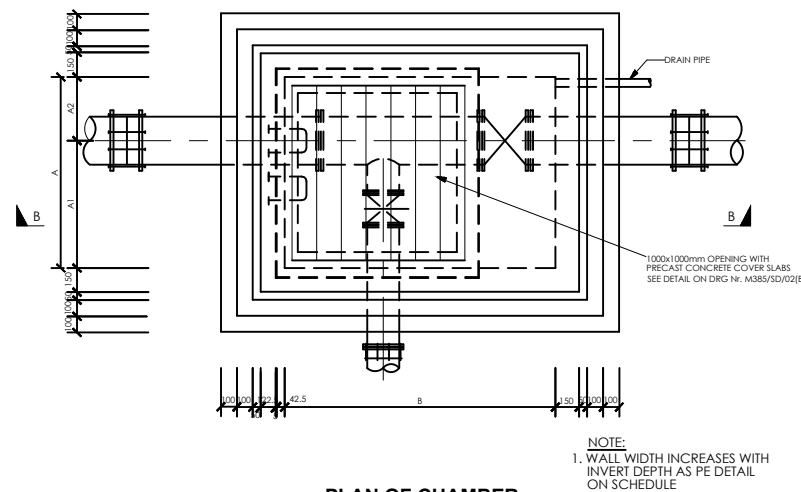
No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	African Development Bank	ADDENDUM TO LOT 1:	Tana Water Works Development Agency	CAS CONSULTANTS LIMITED	PIPE TRENCH DETAILS	LK
2.							CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION	Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	Nelleon Place, Rhapta Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke		Drawn By : D.G.M
3.							CONTRACT No: TWSS/ADB/002/ 2016 - 2017 Water supply component				Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSS/ADB/002/001



PLAN OF CHAMBER
SCALE 1:40



VALVE CHAMBER DETAILS AT JUNCTIONS



CONSTRUCTION DETAILS FOR VALVE CHAMBERS

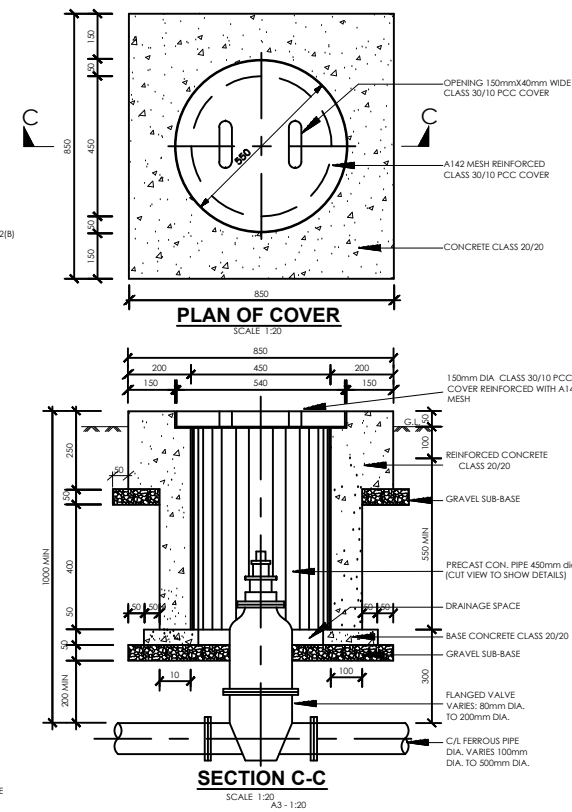
MAINS DIAMETER (mm)	PLAN SIZE OF CHAMBER (INTERNAL DIMENSIONS) A(mm) x B(mm)
100	1200 x 1200
150	1200 x 1200
200	1400 x 1200
250	1500 x 1200
300	1500 x 1200
350	1800 x 1200
400	1800 x 1200
450	1400 x 1400
500	1400 x 1200

CHAMBER SIZE SCHEDULE FOR VARIOUS PIPE SIZES

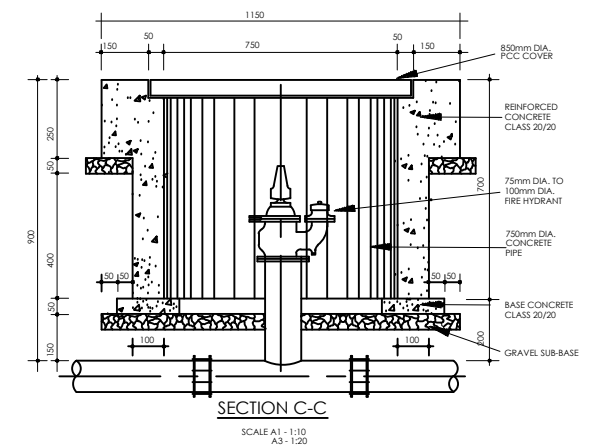
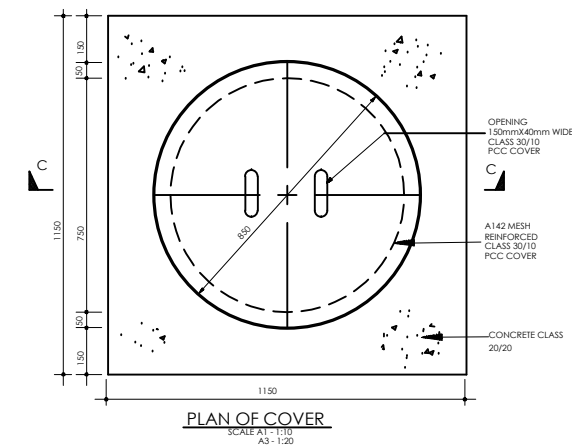
INVERT DEPTHS (mm)	HEIGHT OF WALL (mm)	WALL WIDTH (mm)
0 - 800	800	150 - MASONRY WALL
800 - 1200	400	200 - MASONRY WALL
1200 - 2400	1200	300 - MASONRY WALL
2400 - 3000	600	350 - MASONRY WALL
DEPTH MORE THAN 3000	-	300mm REINFORCED CONCRETE (CLASS 25/20) WALL

CHAMBER DEPTHS & WALL THICKNESS SCHEDULE

VALVE BOX DETAIL FOR WASHOUT/VALVE



VALVE BOX DETAIL FOR FIRE HYDRANT



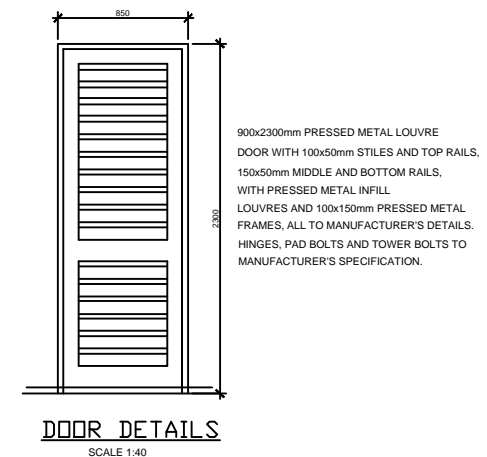
NOTES

1. DIMENSIONS ARE SHOWN IN MILLIMETRES
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

No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	Details of Valve Chamber	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
							CONTRACT No: TWBS/ADB/002/ 2016 - 2017 Water supply component				Client approval :
											Date : 02-Feb-25
											Drawing No : TWBS/KN/SD/010



ABBREVIATIONS

G.C.I. = GALVANISED CORRUGATED IRON

mm = MILIMETRES

Dia. = DIAMETER

MIN. = MINIMUM

No. = NUMBER

G.L. = GROUND LEVEL

G.I. = GALVANISED IRON

Y10 = REINFORCEMENT BAR 10mm DIAMETER

P.C.C. = PRECAST CEMENT CONCRETE

T&G = TONGUE AND GROOVE

G.S. = GALVANISED STEEL

C.I. = CAST IRON

ALT. = ALTERNATIVE

GV = GATE VALVE

DESCRIPTION

- 2No. 100mm DIA. STEPPED COUPLING
- 2No. 100mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG
- 1No. 100x100x80mm ALL FLANGED TEE
- 1No. 80x50mm ALL FLANGED CONCENTRIC TAPER
- 1No. 50mm DIA. ALL FLANGED GATE VALVE
- 1No. 50mm DIA. FLANGED SPIGOT FERROUS PIPE 1200mm LONG WITH THREADED END
- 1No. 50mm DIA. THREADED COUPLING
- 50mm DIA. G.I. THREADED PIPES

1400

200

FOR LINTEL SEE DETAIL

100x50 PODO REBATED 50x20

225

150x25 PODO

4No. 150 TEE HINGES

2No. 150 BARREL BOLTS

150x15 T & G PODO

150x25 PODO

3No. COUNTERSINK SCREWS

840

500

150

200

30

ELEVATION - WINDOW

SCALE 1:20

Architectural drawing showing the plan view of a window detail. The drawing includes dimensions for the window frame, sill, and wall. Key dimensions include a total width of 950, a total height of 300, and a sill depth of 300. The drawing is labeled "DETAIL OF WINDOW - PLAN" and "SCALE 1:20".

SECTION A-A
SCALE 1:40

DETAIL OF LINTEL


DETAIL OF SOAK-PIT AND CATCH PIT
SCALE 1:40

SECTION B-B
SCALE 1:40

SECTION PLAN - WATER KIOSK
SCALE 1:40


No	REVISIONS	CHECKED BY	APPROVED By	DATE
1.		W.K	S.M.M	02-Feb-25
2.				
3.				
4.				

Client



Tana Water Works Development Agency
Meji House, Baden Powell Road
P.O. Box 1292, Nyeri, Kenya

Financed By



AFRICAN DEVELOPMENT BANK


Project

ADDED TO LOT 1:

CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION


CONTRACT No: TWSB/ADB/002/ 2016 - 2017
Water supply component

Designed By



Tana Water Works Development Agency
Meji House, Baden Powell Road
P.O. Box 1292, Nyeri, Kenya

Reviewed By



CAS CONSULTANTS LIMITED
Nelleon Place, Rhapta Road, Westlands
P.O Box 67693 - 00200 - Nairobi, Kenya
Tel: 020 4445265 Fax: 020 4440049
E-mail: casconsult@africaonline.co.ke

Drawing Title

DETAILS OF WATER KIOSK

Designed By : LK

Drawn By : D.G.M

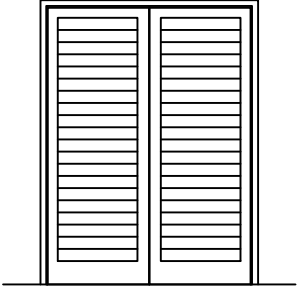
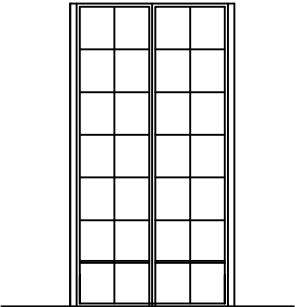
Checked By : W.K

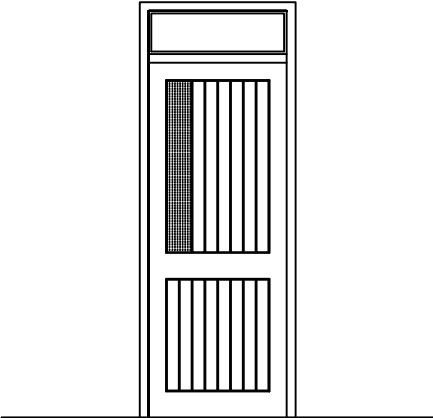
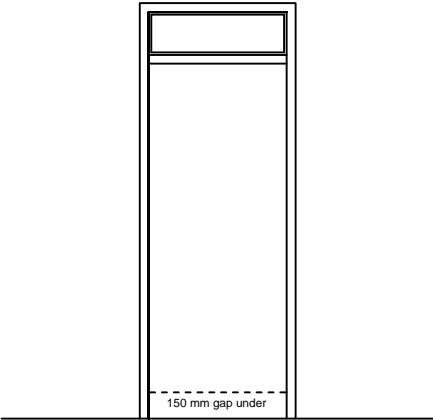
Approved By : S.M.M





Client approval :

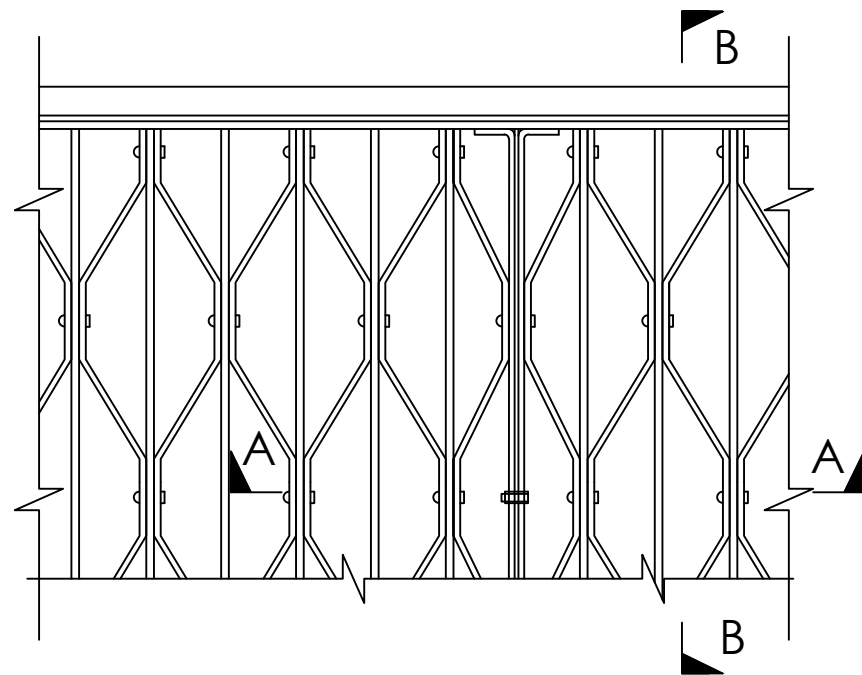
Date : 02-Feb-25

Drawing No : TWSB/KKSD/011

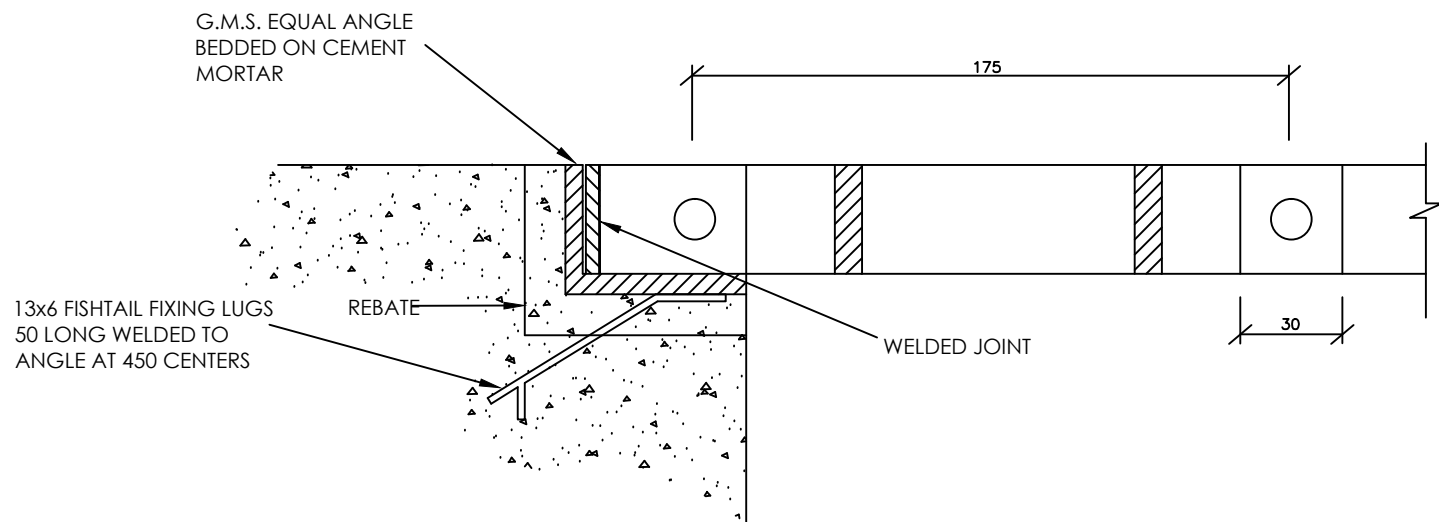
DOOR TYPES	DESCRIPTION	STRUCTURAL OPENING
 <p>D 1</p>	1800 x 2400 mm press metal louvre double door	1800 x 2400 mm
	Door Type D 1a similar, but door size to be 900 x 2400 mm.(Single door)	900 x 2400 mm
	Door Type D 1b similar, but door to be single door size 1200 x 2400 mm .	1200 x 2400 mm
 <p>D 2</p>	1200 x 2397mm side-hung standard section steel casement door in two equal panels	

DOOR TYPES	DESCRIPTION	STRUCTURAL OPENING
 D 4 / D4a	<p>800 x 2030 mm timber door with ex 100 x 50 mm stiles and top rails, ex 150 x 50 mm middle and bottom rails, and infill panels in ex 100 x 50 mm t & g battens, all in prime grade cypress .</p> <p>990 x 140 mm georgian wired clear glass panel in upper half, and glazed fanlight over.</p> <p>D 4a similar, but without georgian wired glass panel & fanlight over.</p>	<p>900 x 2400 mm</p> <p>900 x 2200 mm</p>
 D 5 / D 5a	<p>800 x 2030 mm semi - solid core flush door with hardwood lipping all round, painted.Glazed fanlight over ex 125 x 50 mm prime grade cypress door frame.</p> <p>Door Type D 5a similar, but door size to be 800 x 1880 mm .</p>	<p>900 x 2400 mm</p> <p>800 x 2400 mm</p>

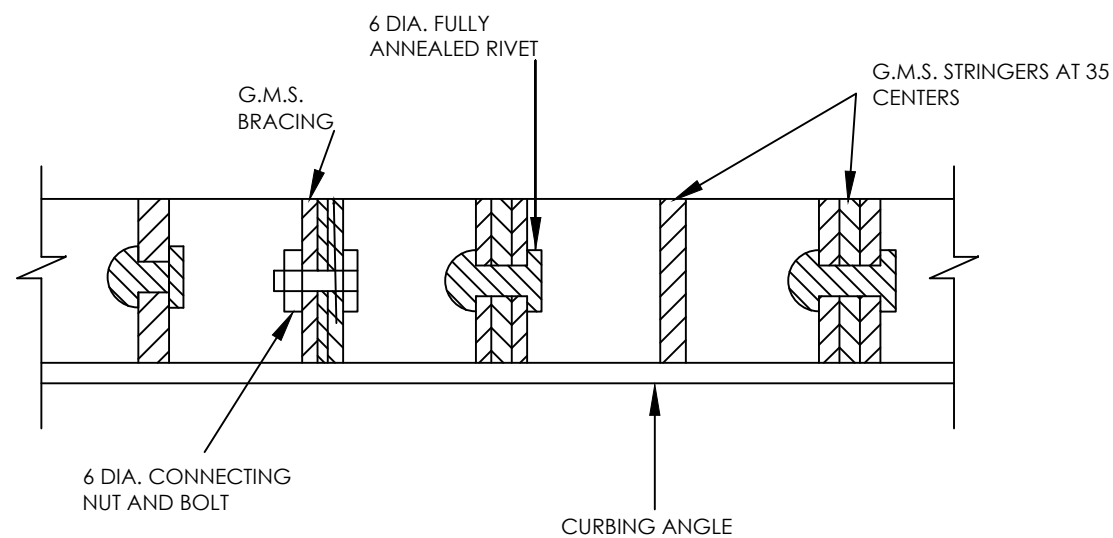
No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	DOOR SCHEDULE 02	Drawn By : D.G.M
2.											Checked By : W.K
3.											Approved By : S.M.M
4.											Client approval : Date : 02-Feb-25 Drawing No : TWSB/KWS/SD/013



GALVANISED MILD STEEL OPEN MESH FLOORING
SCALE 1:2



SECTION B-B
SCALE 1:2



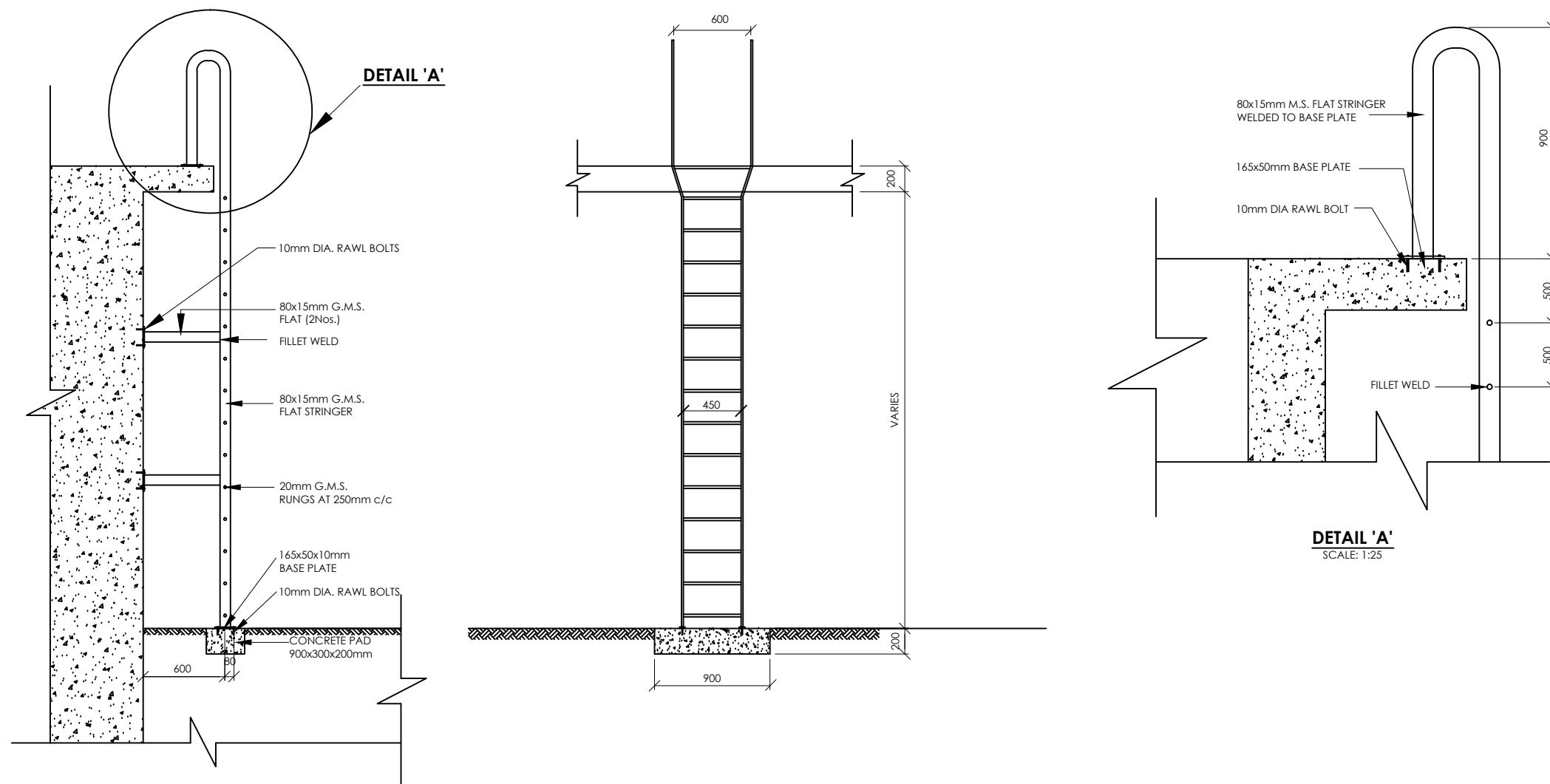
SECTION A-A
SCALE 1:1

TYPE	MAXIMUM SPAN	STRINGERS	BRACING	EDGING	CURBING	MAXIMUM PANEL WIDTH	REBATE DIMENSIONS
A	1100	25x3	25x3	25x5	31x31x6	1800	50x50
B	1600	35x3	35x3	35x5	51x51x6	1000	50x50
C	2000	40x5	40x3	40x5	46x46x6	750	65x65

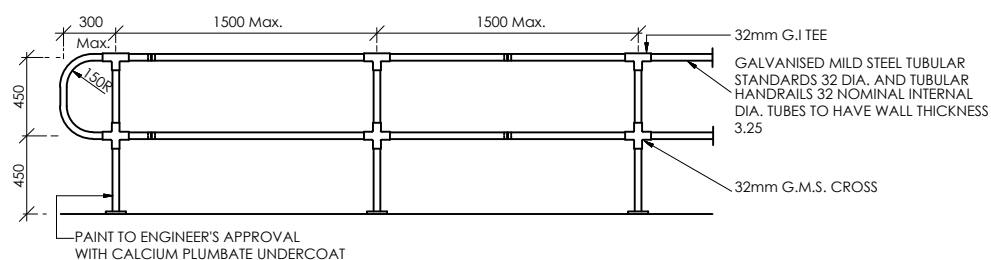
NOTES

1. All mild steel components shall be hot dipped galvanised after fabrication
2. All flooring, curbing, framing etc is to be fabricated from mild steel to B.S 4592 : 1970
3. All flooring panel dimensions are to be checked against as constructed site dimensions before fabrication
4. For all spans in excess of those shown on standard details flooring shall be designed to take distributed load at 50KN/m²
5. Maximum weight of panel 40kg.
6. Dimensions in mm unless otherwise specified
7. G.M.S. = Galvanized Mild Steel

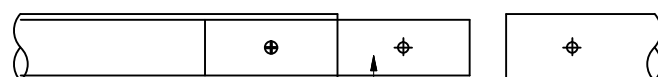
No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency Maji House, Badon Powell Road P.O. Box 1292, Nyeri, Kenya	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component	Tana Water Works Development Agency Maji House, Badon Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	FLOOR MESH	Drawn By : D.G.M
2.											Checked By : W.K
3.											Approved By : S.M.M
4.											Client approval : Date : 02-Feb-25 Drawing No : TWSB/KK/SD/014



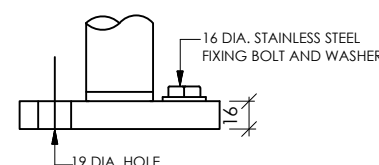
DETAILS OF G.M.S. LADDER
SCALE: 1: 50



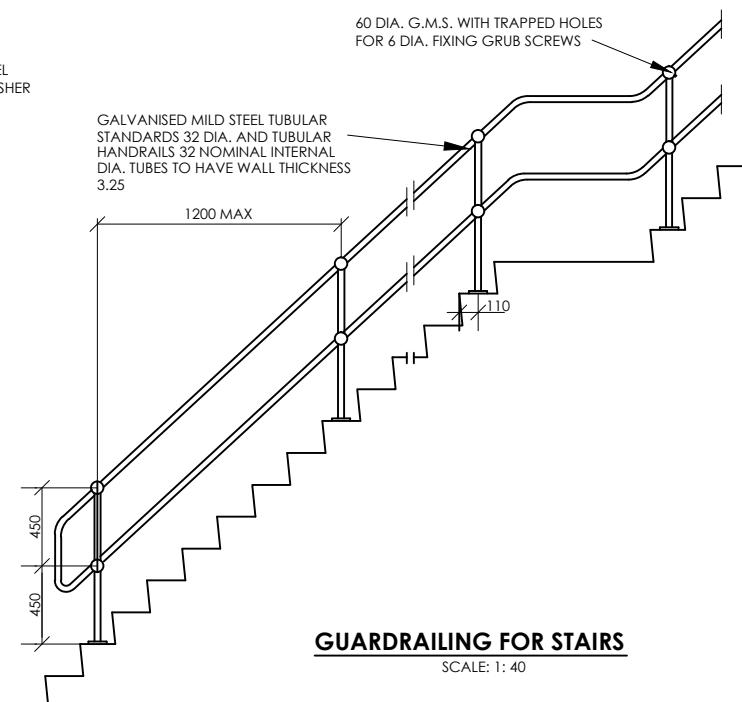
GUARDRAILING
SCALE: 1: 40



TUBULAR GUARDRAILING JOINT
SCALE: 1: 4



ROUND BASE
SCALE: 1: 4



GUARDRAILING FOR STAIRS
SCALE: 1: 40

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	GMS LADDER DETAILS	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval : Date : 02-Feb-25
											Drawing No : TWSB/KRSD/015

CLASS 20/20 VIBRATED CONCRETE

75

1.50 RAD.

50

100

225

75

20

300

300

450

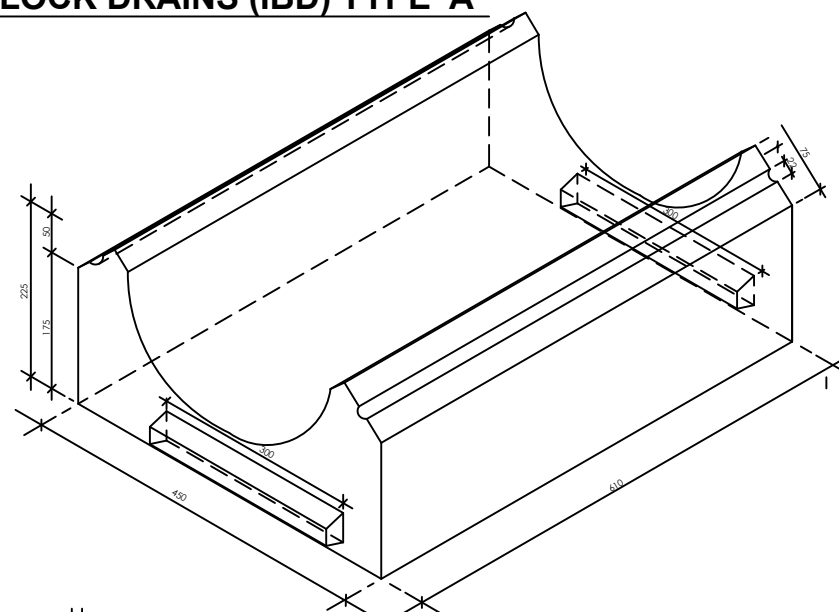
75

38

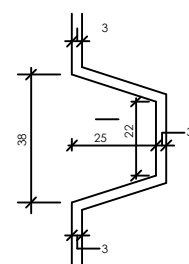
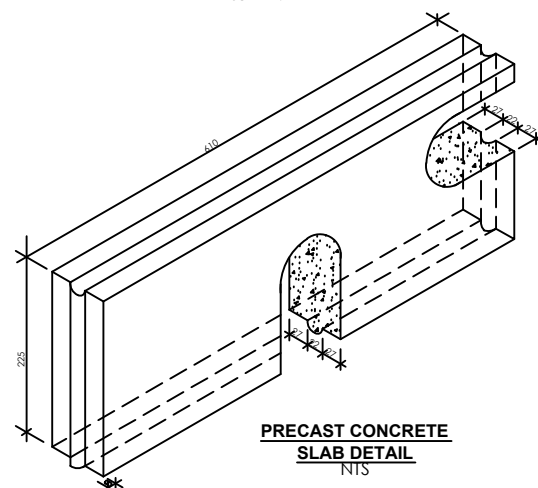
PRECAST CONCRETE INVERT BLOCK DRAIN (IBD)

TYPE 'A'

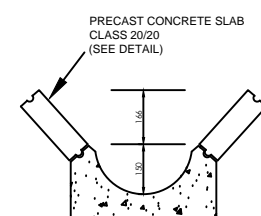
SCALE 1:4



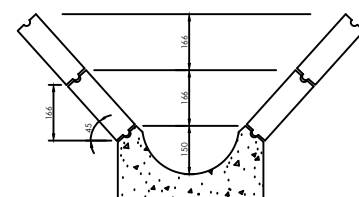
ISOMETRIC VIEW OF INVERT BLOCK TYPE 'A'



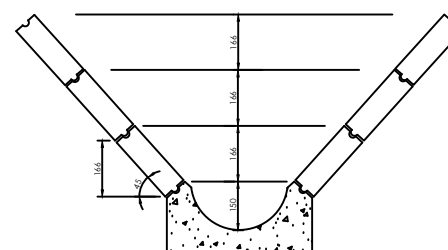
DETAIL OF JOINT
SCALE: 1:1



IBD TYPE 'A' + TWO COURSES
(IBD TYPE 'A' + 2C)
SCALE 1:8



IBD TYPE 'A' + FOUR COURSES
(IBD TYPE 'A' + 4C)
SCALE 1:8

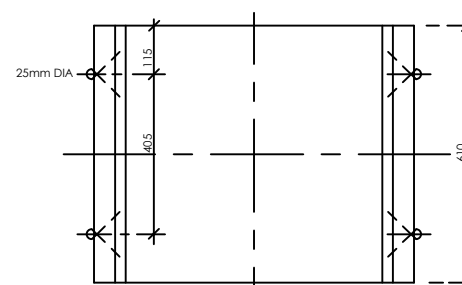


IBD TYPE 'A' + SIX COURSES
(IBD TYPE 'A' + 6C)
SCALE 1:8

Technical drawing of a U-shaped concrete structure, labeled BRC No. 1. The drawing shows a cross-section of the structure with the following dimensions and specifications:

- Overall Width:** 760
- Overall Height:** 355
- Internal Width:** 610
- Internal Height:** 230
- Top Flange Width:** 75 (on each side)
- Bottom Flange Width:** 75 (on each side)
- Top Flange Thickness:** 75
- Bottom Flange Thickness:** 75
- Radius of Curvature:** 12 RADIUS BULL NOSE
- Material Specifications:**
 - PRECAST CONCRETE SLAB CLASS 20/20 CONCRETE (SEE DETAIL)
 - CLASS 20/20 VIBRATED CONCRETE
- Reinforcement:** The structure is reinforced with steel bars, including a top bar in the precast slab and bottom bars in the U-shape.

SECTION - I.B.D. TYPE 'B'
SCALE 1:8



PLAN
INVERT BLOCK DRAIN (IBD) TYPE 'B'
SCALE 1:8

Technical drawings of a rectangular column showing front and side views with dimensions and material specifications.

Front View (Left):

- Overall width: 600mm (150mm + 300mm + 150mm).
- Overall height: VARIES MAX 600mm.
- Material: MIX 1:2:4 CONCRETE.
- Reinforcement: BRC MESH No. A142.




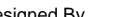
Side View (Right):

- Overall depth: VARIES FOR DEPTH MORE THAN 600mm.
- Overall width: 600mm (200mm + 300mm + 200mm).
- Material: MIX 1:2:4 CONCRETE.
- Reinforcement: METAL GRATING COVER MADE OF 25mm DIA M.S. ROUND BARS AT 100mm C/C WELDED TO 30x30x3mm M.S. ANGLES.
- Vertical spacing: Y10 @ 200 c/c BOTH WAYS.
- Bottom reinforcement: 30mm COVER.

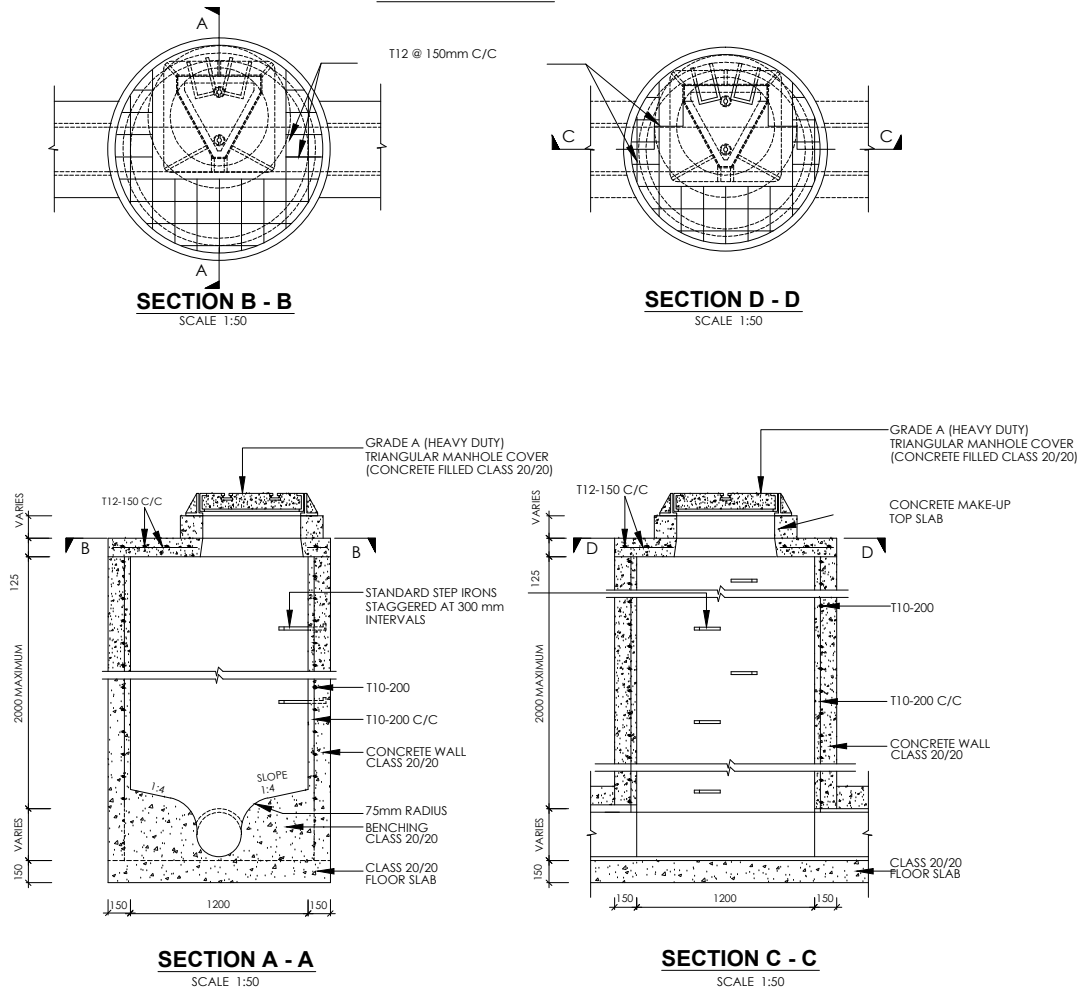
NOTE: BASE OF DRAIN
LAID TO SLOPE 1:100
(STARTING DEPTH OF
DRAIN IS 300mm)

Technical drawing of a 150mm Class 15/2 concrete base for a wall. The drawing shows a 3D perspective view of the base and wall. The base is 450mm wide and 150mm high. The wall is 150mm thick and 1500mm long. The base is made of 150mm Class 15/2 concrete. The wall is made of 150mm Class 15/2 concrete blocks. The base is labeled "150mm CLASS 15/2 CONCRETE BASE". The wall is labeled "DIAMETER VARIES". The base is labeled "HEIGHT VARIES".

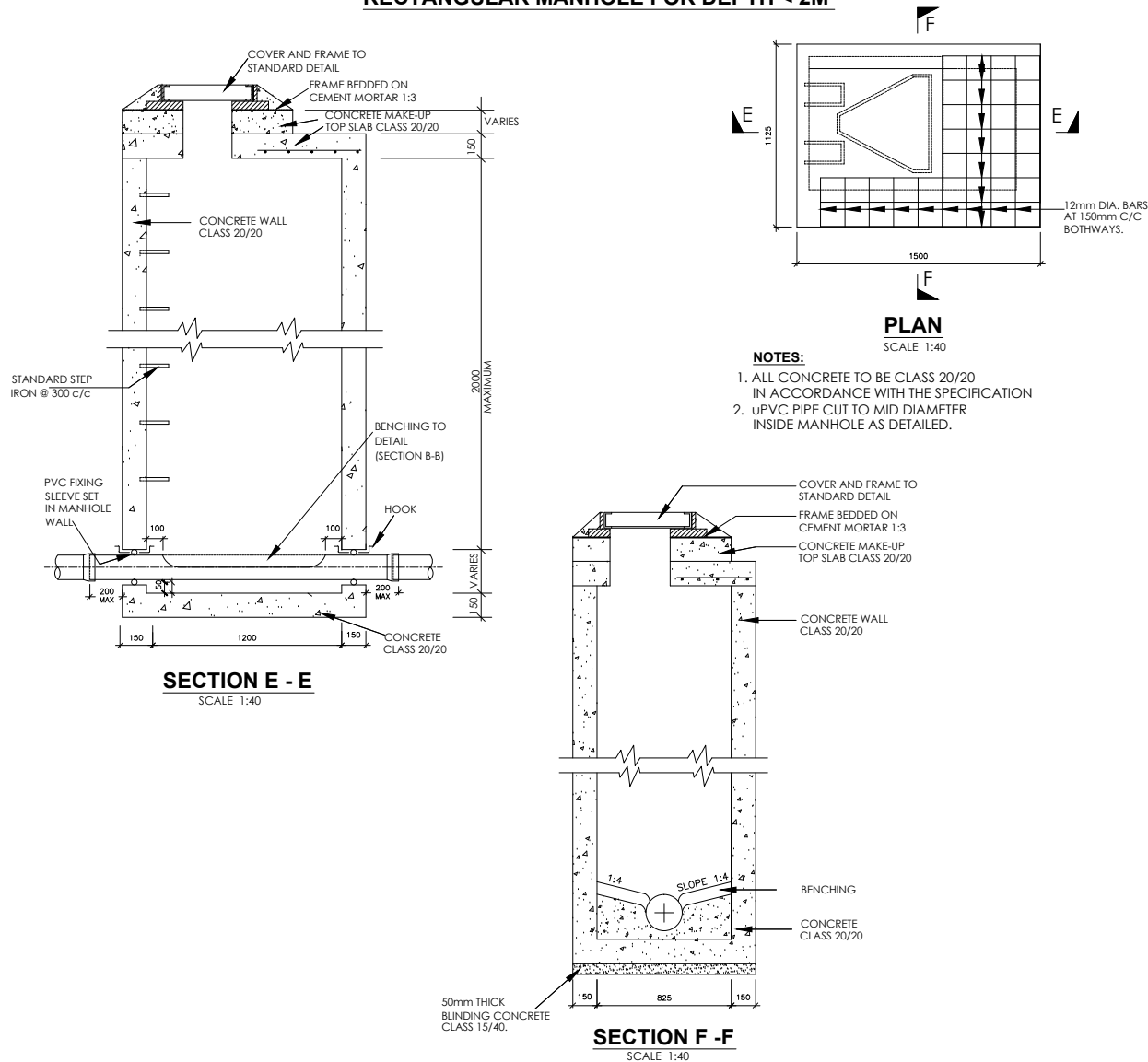
DETAIL OF HEAD WALL
SCALE 1:30

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWBSB/ADB/002/ 2016 - 2017 Water supply component	 1 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nlelon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	IBD AND HEADWALL	Drawn By : D.G.M
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval : Date : 02-Feb-25 Drawing No : TWBSB/KK/SD/016							

REINFORCED CONCRETE CIRCULAR MANHOLE & COVER
DEPTH n.e. 2.0m



RECTANGULAR MANHOLE FOR DEPTH < 2M



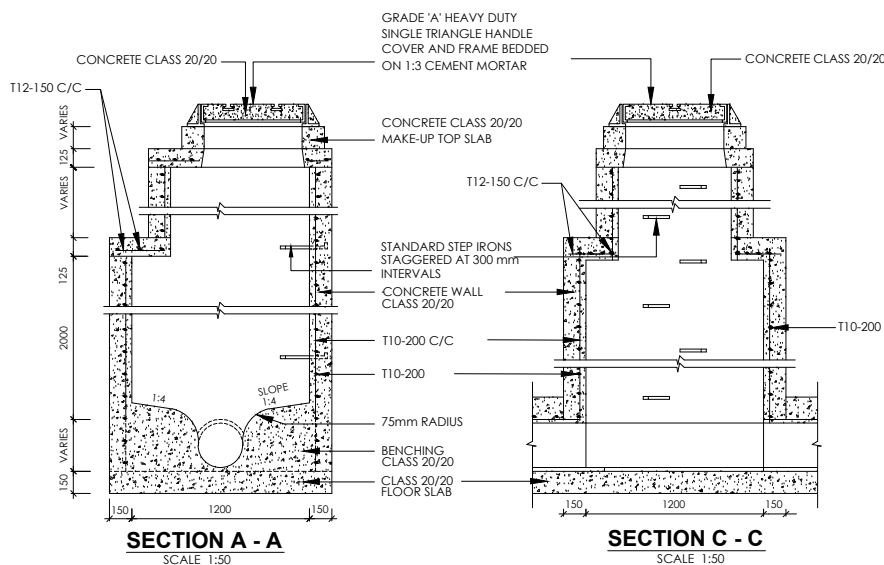
NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
2. ALL CONCRETE TO BE CLASS 20/20
3. ALL PRECAST CONCRETE UNITS TO BS 556
4. CONCRETE FILLING CLASS 25/20 VIBRATED AND CURED IN ACCORDANCE WITH THE APPROPRIATE SPECIFICATION CLAUSES.
5. TOLERANCE ON OVERALL SIZE 3mm
6. ALL HAUNCHES ARE CLASS 15/40 CONCRETE AS INDICATED ON THE SPECIFICATION OVER EXCAVATION TO BE MADE GOOD IN CONCRETE CLASS 15/40.

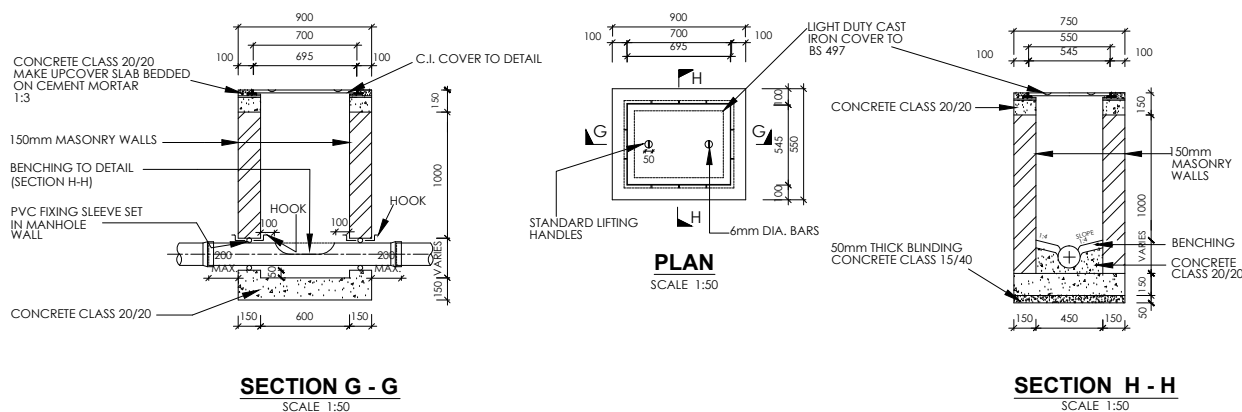
ABBREVIATIONS

- 1.n.e. - NOT EXCEEDING
2. c/c - CENTRE TO CENTRE
3. MIN - MINIMUM
4. G.L. - GROUND LEVEL
5. mm - MILLIMETER
6. m - METRE
7. EXT. DIA. - EXTERNAL DIAMETER
8. OD - OUTSIDE DIAMETER
9. ND - NOMINAL DIAMETER
10. RC - REINFORCED CONCRETE
11. T10 - TWISTED BAR 10mm SIZE
12. NTS - NOT TO SCALE
13. CU.M PER LIN. METER - CUBIC METER PER LINEAR METER
14. CI - CAST IRON

REINFORCED CONCRETE MANHOLE & COVER
DEPTH > 2.0m



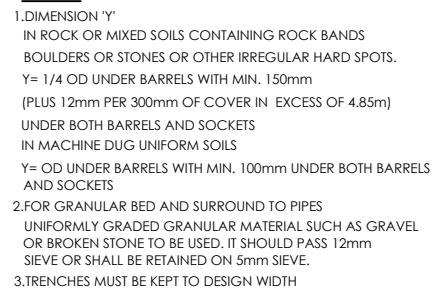
INSPECTION CHAMBER DETAILS



NOTES:

1. INSPECTION CHAMBER SHOULD BE SIZE 600x450mm UPTO DEPTH OF 1000mm
2. FOR INSPECTION CHAMBER EXCEEDING DEPTH 1000mm SIZE SHOULD BE 850x1200mm
3. WALLS OF INSPECTION CHAMBER TO BE OF MASONRY

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1:	Tana Water Works Development Agency			Designed By : LK
2.							CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION	Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya			Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSB/ADB/017A







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

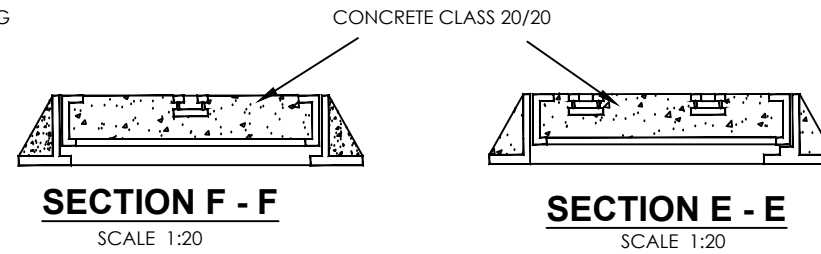
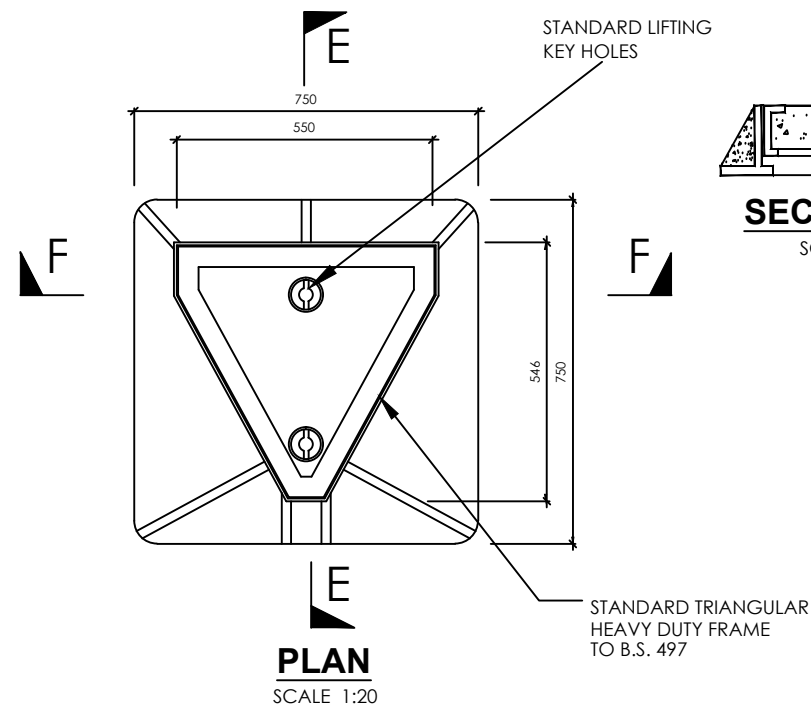
TYPE OF BED AND HAUNCH TO BE USED

NOTES:
L - TO BE DETERMINED ON SITE
D - VARIES BETWEEN 160 - 250mm
D1 - 160mm DIA uPVC SEWER PIPE



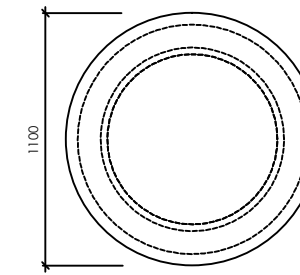
No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client  Tana Development TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	Financed By  AFRICAN DEVELOPMENT BANK	Project ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWSS/ADB/002/ 2016 - 2017 Water supply component	Designed By  TANA WATER SERVICE BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	Reviewed By  CAS CONSULTANTS LIMITED Nelleon Place, Rhapsa Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	Drawing Title MANHOLE DETAILS	Designed By : LK Drawn By : D.G.M Checked By : W.K Approved By : S.M.M Client approval : Date : A Drawing No : TWSS/KSD/017B
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DETAILS OF TRIANGULAR CONCRETE FILLED MANHOLE COVER FOR FOUL SEWER

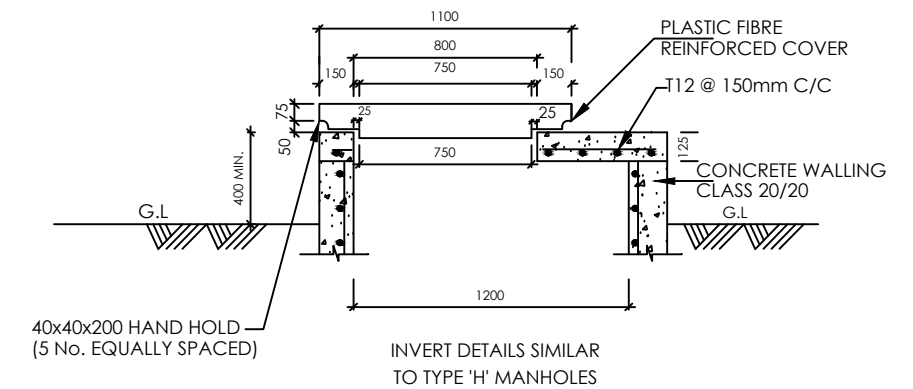


NOTE
COVER FABRICATED FROM 6mm
M.S. PLATE.

PLASTIC FIBRE REINFORCED COVER FOR MANHOLES

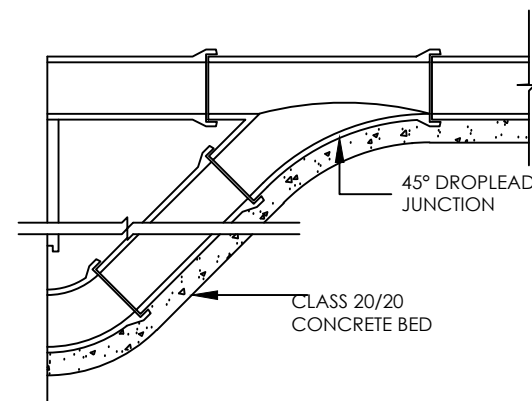


SECTIONAL ELEVATION
SCALE 1:40

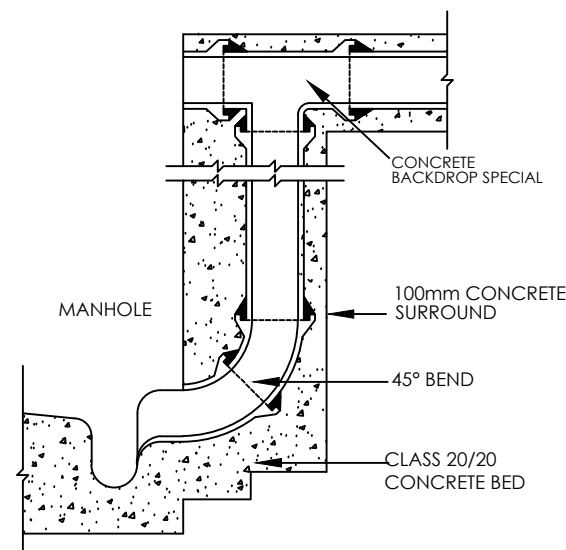


PLASTIC FIBRE REINFORCED
COVER - PLAN
SCALE 1:40

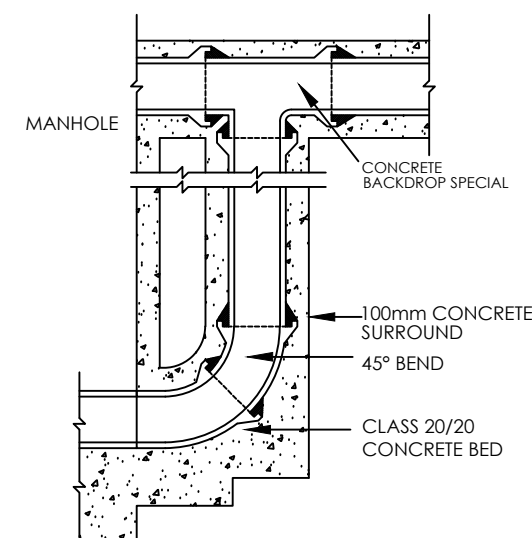
DETAILS OF BACKDROPS FOR MANHOLES







MANHOLE DROPLEAD

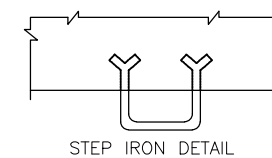
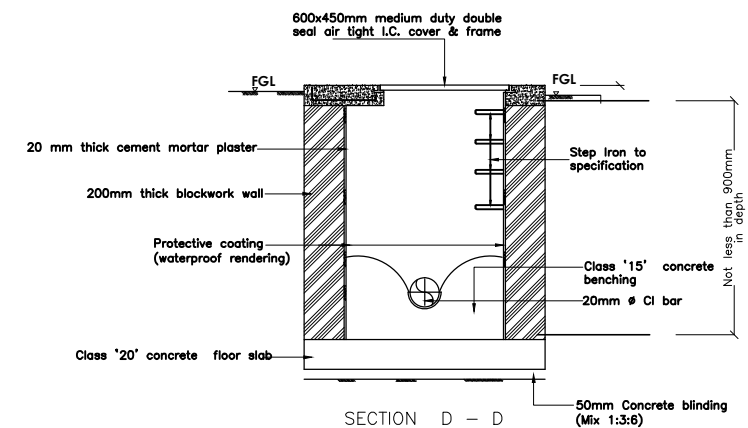
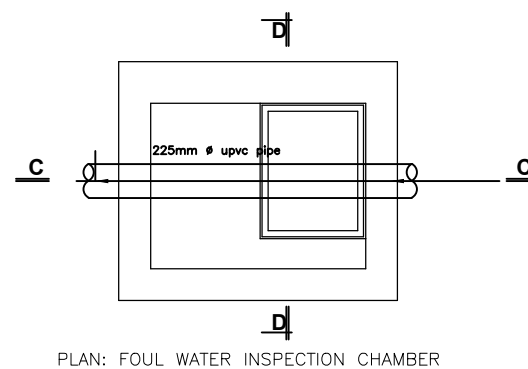
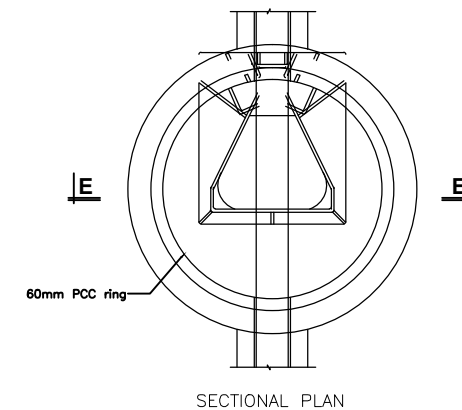
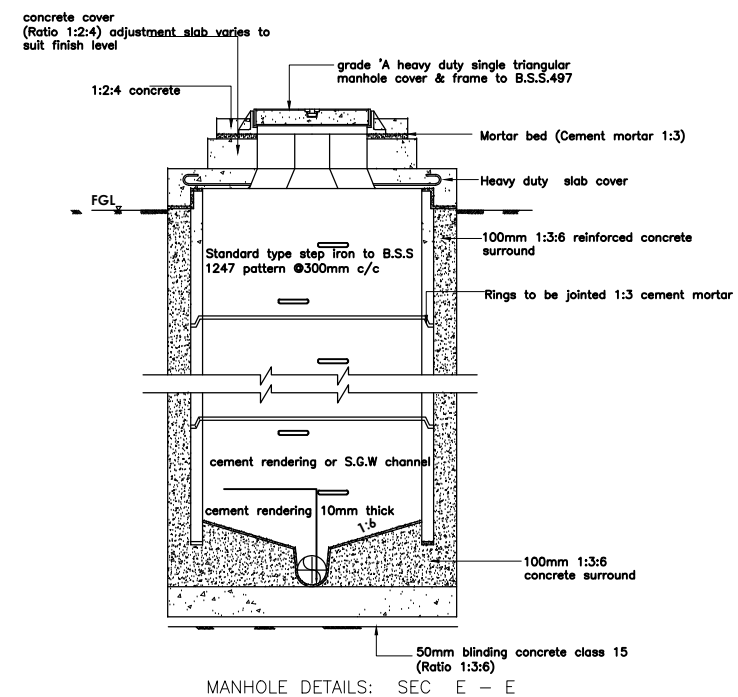


SIDE ENTRANCE BACKDROP



END ENTRANCE BACKDROP

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	 Tana Water Works Development Agency TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWBS/ADB/002/ 2016 - 2017 Water supply component	 TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	MANHOLE DETAILS	Drawn By : D.G.M
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval : Date : AUGUST 2017 02-Feb-25 Drawing No : TWSD/ADB/017C							







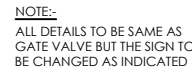
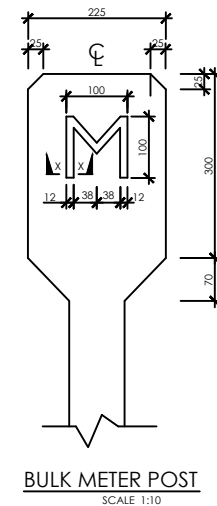
No	REVISED	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	AUGUST 2017 02-10-2017	 Tana Water Works Development Agency Tana Water SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1:	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049	SEPTIC TANK PLAN AND SECTIONS	Drawn By : D.G.M
2.				CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION			Checked By : W.K				
3.				CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component			Approved By : S.M.M				
4.							Client approval : Date : AUGUST 2017 02-10-2017 Drawing No : TWSB/KK/SD/018				



Diagram illustrating the cross-section of a trench installation. The diagram shows a central pipe surrounded by a protective polythylene membrane, which is then covered by a layer of concrete (Class 20/20). The trench is filled with normal compacted backfill. The top trench width is indicated as 300. The normal trench width is also indicated. The protective polythylene membrane depth varies depending upon ground conditions and diameter of pipe. The concrete layer is labeled as CONCRETE CLASS 20/20. A vertical dimension of 200 MIN. is shown on the left side.




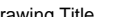
SECTION I-I
SCALE: 1/40

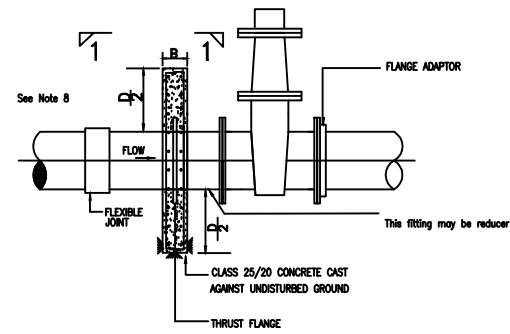


NOTE:- THE ABOVE VALUES APPLY FOR SOCKETTED uPVC AND FLANGED OR COUPLED LINED STEEL PIPES SUBJECT TO A WORKING PRESSURE HEAD OF 12 BAR

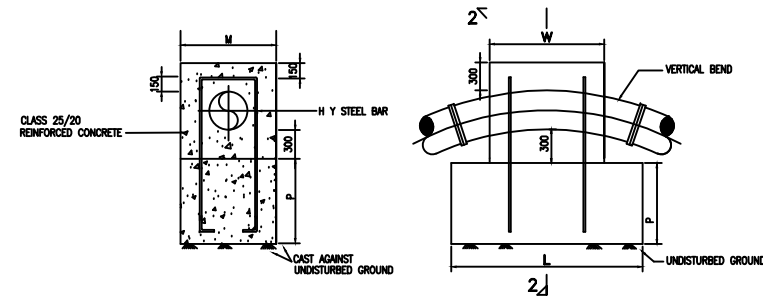


- mm - MILLIMETRES
OD - OUTSIDE DIAMETER
ND - NOMINAL DIAMETER
Dia - DIAMETER
c/c - CENTRE TO CENTRE
No. - NUMBER
uPVC - UNPLASTICISED POLYVINYL CHLORIDE
m - METRE
C - CENTRE LINE
GV - GATE VALVE
AV - AIR VALVE
WO - WASH OUT
WM - WATER MAIN
M - BULK METER
 m^3 - CUBIC METRE

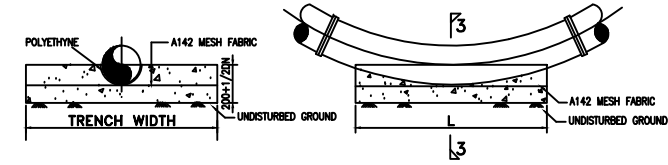
No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	August 2017	 Tana Water Works Development Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION CONTRACT No: TWSP/ADB/002/ 2016 - 2017 Water supply component	 TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	STANDARD WATER DETAILS	Drawn By : D.G.M
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval : Date : August 2017 Drawing No : TWSP/KICSD/019							



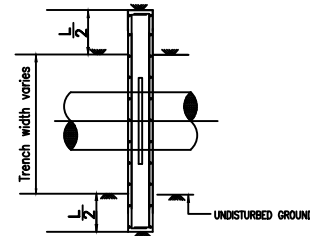
**ELEVATION
ANCHOR BLOCK
FOR GATE VALVES**



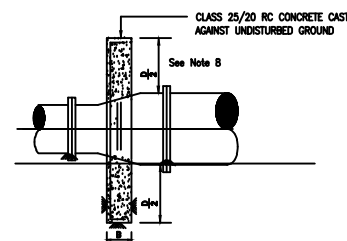
**SECTION 2 - 2
UPTHRUST THRUST
UPVERTICAL BENDS - TYPICAL**



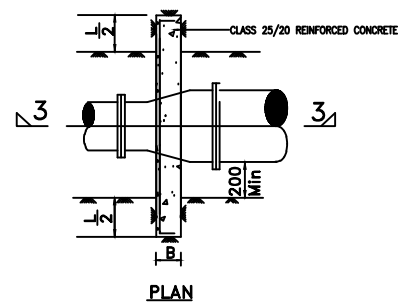
**SECTION 3 - 3
ELEVATION**



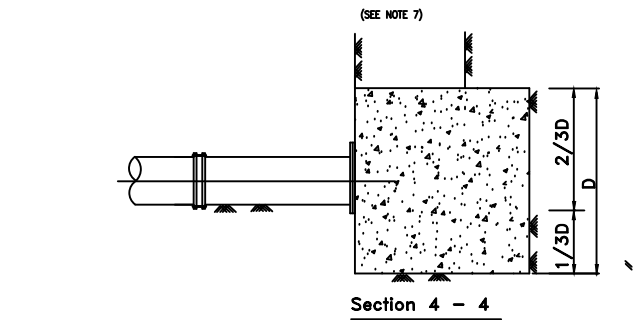
SECTION 1 - 1



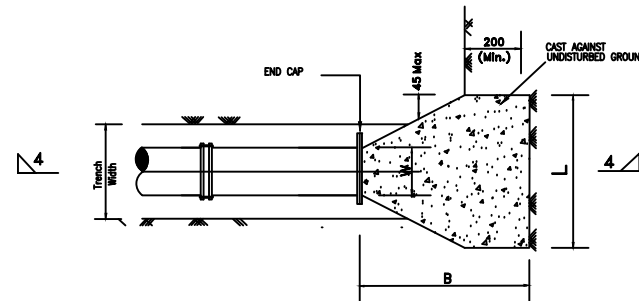
**SECTION 3 - 3
THRUST BLOCKS FOR TAPERS**



PLAN



Section 4 - 4



Plan

Thrust Block for Blank Ends

TABLE 1		
MAIN SIZE (mm)	BLOCK TYPE	
	100m Head	160m Head
800	E	E
600	D	E
450	D	D
400	C	D
350	C	C
300	B	C
250	B	B
200	A	A
150	A	A
100	A	A

**Table of Anchor Blocks
For Gate Valves**

**DOWNTHRUST VERTICAL
BENDS - TYPICAL
(SEE NOTE 7)**

TEST HEAD (m)	PIPE DIA (mm)	D (m)	L (m)	B (m)	CONCRETE VOL (m ³)
100	800	1.8	2.6	1.2	3.1
	500	1.4	2.2	1.1	2.1
	450	1.2	2.0	1.0	1.5
	400	1.2	1.8	0.8	1.0
	350	1.0	1.5	0.8	0.7
	300	1.0	1.2	0.7	0.5
	250	0.8	1.0	0.5	0.3
	200	0.6	0.8	0.5	0.2
	150	0.5	0.6	0.5	0.1
	100	0.5	0.6	0.5	0.1

TABLE OF ANCHOR BLOCKS FOR BLANK ENDS

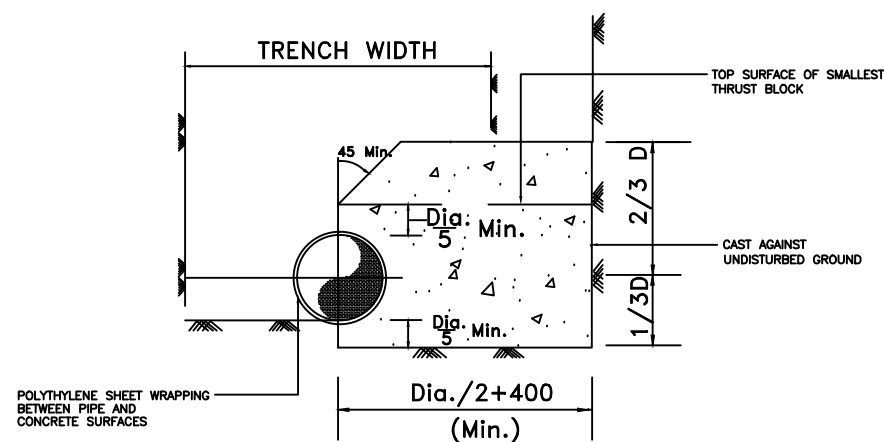
TABLE 4					
BLOCK TYPE	D (m)	L (m)	B (mm)	MAIN STEEL	DISTRIBUTION STEEL
A	0.6	1.4	200	Y10 - 150	Y10 - 150
B	0.8	1.8	300	Y10 - 150	Y10 - 150
C	1.0	1.8	300	Y12 - 150	Y10 - 150
D	1.2	2.0	400	Y12 - 150	Y12 - 150
E	1.4	2.6	500	Y12 - 150	Y12 - 150
F	1.6	3.2	500	Y12 - 150	Y12 - 150

**DETAILS OF ANCHOR BLOCKS FOR GATE VALVES AND TAPERS
(CLASS '25/20' CONCRETE)**

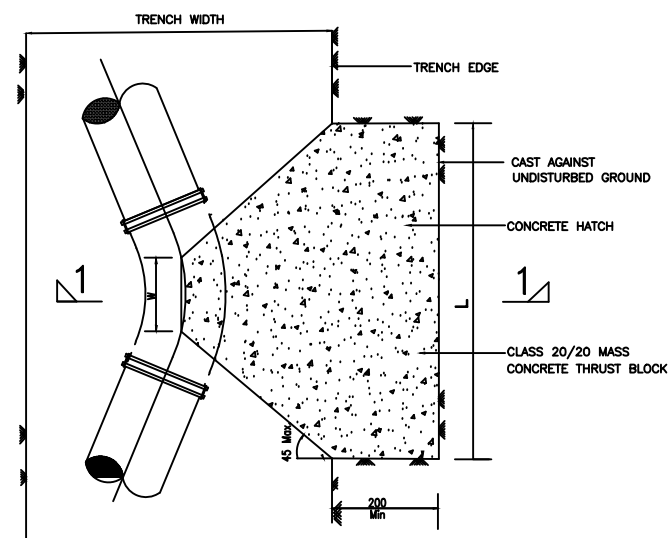
TABLE OF THRUST BLOCKS FOR TAPERS												
MAIN SIZE (mm)	TAPER (SMALLER SIZE) mm											
	100 m HEAD TEST PRESSURE											
	800	700	600	500	450	400	350	300	250	200	150	100
800	—	D	E	F	—	F	—	E	—	—	—	—
700	—	—	D	E	—	F	F	E	—	—	—	—
600	—	D	D	C	D	D	E	E	—	—	—	—
500	—	B	C	—	B	C	C	D	—	—	—	—
450	—	—	B	—	—	B	C	C	D	—	—	—
400	—	—	—	—	—	—	A	B	C	C	—	—
350	—	—	—	—	—	—	—	A	B	B	C	—
300	—	—	—	—	—	—	—	—	A	B	B	—
250	—	—	—	—	—	—	—	—	—	A	A	B
200	—	—	—	—	—	—	—	—	—	—	A	A
150	—	—	—	—	—	—	—	—	—	—	—	A

**TABLE OF ANCHOR BLOCKS FOR GATE VALVES AND TAPERS
(CLASS '25' CONCRETE)
FOR DIMENSIONS (See table 4)**

No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	THRUST BLOCK 1	LK
2.											D.G.M
3.											W.K
4.											S.M.M
											Client approval:
											Date: 02-Feb-25
											Drawing No: TWSB/ADB/020A



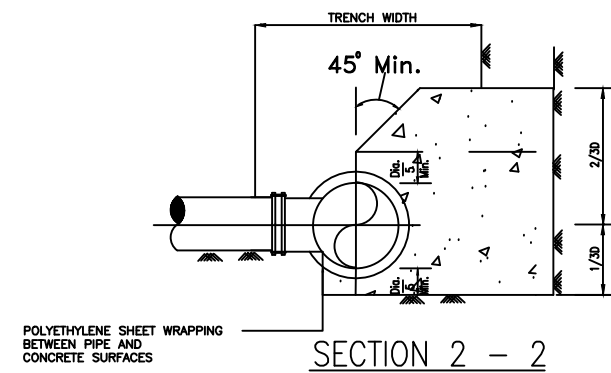
Section 1 - 1



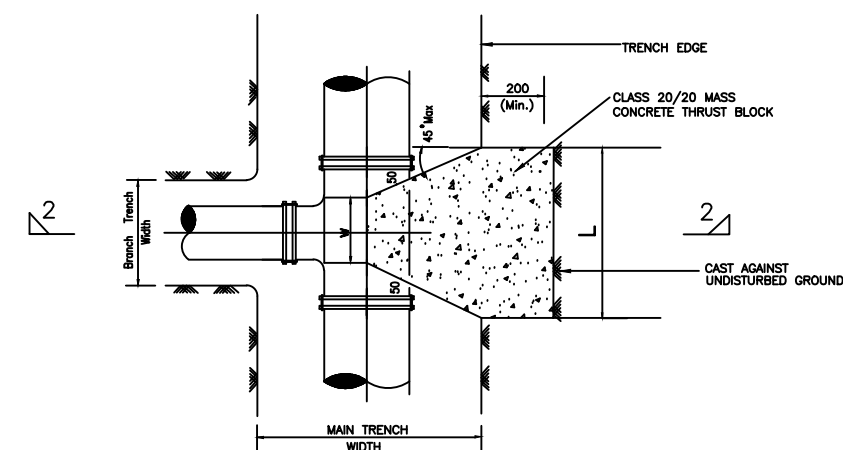
SECTIONAL PLAN
THRUST BLOCK FOR HORIZONTAL BENDS

TABLE OF THRUST BLOCKS FOR HORIZONTAL BENDS												
TEST HEAD (m)	BEND	DIMENSIONS (D)m x (L)m x V(m ³)										
		SIZE OF BEND DN (mm)										
		800	700	600	500	450	400	350	300	250	200	150/100
100 SEE NOTE 8	1 1/4"	1.8X0.8X0.7	1.6X0.8X0.6	1.4X0.7X0.4	1.2X0.6X0.3	1.1X0.5X0.2	1.0X0.5X0.2	0.9X0.4X0.1	0.8X0.4X0.1	0.7X0.3X0.1	0.5X0.3X0.1	0.5X0.3X0.1
	2 1/2"	1.8X1.6X1.4	1.6X1.6X1.2	1.4X1.3X0.8	1.2X1.2X0.6	1.1X1.0X0.5	1.1X0.8X0.4	1.0X0.7X0.3	0.8X0.7X0.2	0.8X0.5X0.1	0.8X0.3X0.1	0.5X0.3X0.1
	30°	1.8X2.1X1.9	1.6X2.0X1.5	1.4X1.8X1.1	1.2X1.5X0.8	1.1X1.3X0.6	1.1X1.1X0.5	1.0X0.9X0.3	0.9X0.8X0.3	0.8X0.7X0.2	0.8X0.4X0.1	0.5X0.4X0.1
	45°	1.8X3.2X2.9	1.6X3.2X2.4	1.6X2.2X1.6	1.4X1.8X1.1	1.1X2.0X0.9	1.2X1.5X0.7	1.0X1.4X0.5	1.0X1.0X0.4	0.8X1.0X0.3	0.8X0.6X0.2	0.6X0.5X0.1
	90°	2.4X4.0X4.8	2.0X3.8X3.6	1.8X3.5X2.8	1.6X2.7X1.8	1.4X2.6X1.5	1.2X2.5X1.2	1.2X2.0X0.9	1.2X1.5X0.7	1.0X1.4X0.5	1.0X0.8X0.3	0.6X0.9X0.2

Table of Thrust Blocks for Horizontal Bends



SECTION 2 - 2



SECTIONAL PLAN
THRUST BLOCK FOR TEES

TABLE OF THRUST BLOCKS FOR TEES												
TEST HEAD (m)	MAIN SIZE (mm)	DIMENSIONS (D)m x (L)m x V (m ³)										
		BRANCH SIZE (mm)										
		800	700	600	500	450	400	350	300	250	200	150/100
100 SEE NOTE No. 8	800	2.0x3.5x3.5	1.8x3.2x2.7	1.6x2.7x1.9	1.6x2.0x1.4	1.6x1.6x1.1	1.6x1.2x0.8	1.6x1.0x0.6	1.6x0.7x0.4	1.6x0.5x0.3	1.6x0.3x0.2	1.6x0.3x0.2
	700		1.6x3.6x2.7	1.6x2.7x1.9	1.5x2.1x1.4	1.5x1.7x1.1	1.5x1.3x0.8	1.5x1.0x0.6	1.5x0.8x0.5	1.4x0.6x0.3	1.4x0.4x0.2	1.4x0.3x0.2
	600			1.5x3.0x2.0	1.5x2.1x1.4	1.5x1.7x1.1	1.2x1.8x0.9	1.2x1.4x0.7	1.2x1.0x0.5	1.2x0.7x0.3	1.2x0.5x0.2	1.2x0.3x0.1
	500				1.4x2.3x1.4	1.3x2.0x1.1	1.2x1.8x0.9	1.2x1.4x0.7	1.2x1.0x0.5	1.1x0.8x0.3	1.1x0.5x0.2	1.1x0.3x0.1
	450					1.2x2.3x1.1	1.2x1.8x0.9	1.1x1.6x0.7	1.1x1.2x0.5	1.1x0.8x0.3	1.0x0.6x0.2	1.0x0.4x0.1
	400						1.0x1.3x0.9	1.0x1.8x0.7	1.0x1.3x0.5	1.0x0.9x0.3	1.0x0.6x0.2	1.0x0.4x0.1
	350							1.0x1.8x0.7	1.0x1.3x0.5	1.0x0.9x0.3	1.0x0.5x0.2	1.0x0.4x0.1
	300								0.8x1.7x0.5	0.8x1.2x0.3	0.8x0.8x0.2	0.8x0.5x0.1
	250									0.8x1.2x0.3	0.8x0.8x0.2	0.8x0.5x0.1
	200										0.6x1.1x0.2	0.6x0.7x0.1
	150											0.5x0.8x0.1

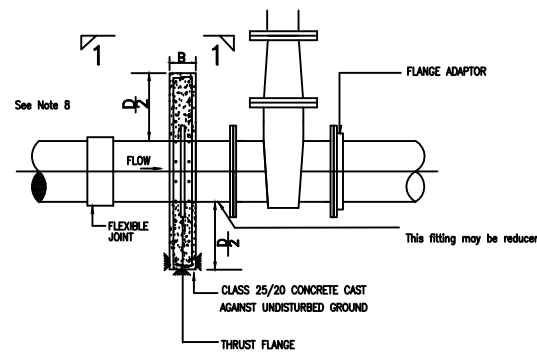
Table of Thrust Blocks for Tees
(CLASS 20/20 CONCRETE)

NOTES

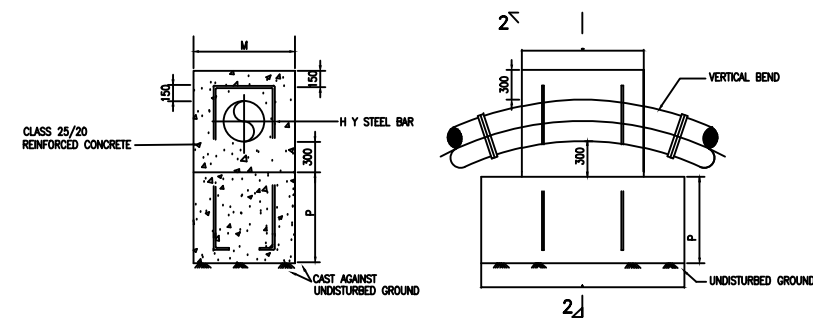
- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
- ANCHOR BLOCKS TO BE INSTALLED FOR PIPES LAID AT SLOPES EXCEEDING 1:6 SLOPE
- THRUST BLOCKS TO BE INSTALLED AT ALL HORIZONTAL AND VERTICAL BENDS, CAPPED ENDS, TEES, TAPERS AND GATE VALVES
- DETAILS FOR ALL INDICATOR POSTS TO BE AS FOR GATE VALVE BUT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

FOR	USE
GATE VALVE	GV
AIR VALVE	AV
WASHOUT	WO
WATER MAIN	WM
BULK METER	M
Y-JUNCTION	Y
- ALL INDICATOR POSTS TO BE PAINTED WITH 2 COATS BLUE OIL BASED PAINT AND WHITE LETTERING TO ENGINEER'S APPROVAL

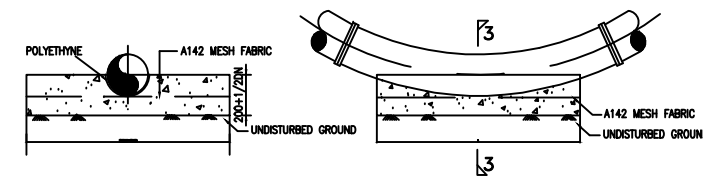
No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K.	S.M.M.	AUGUST 2017 02-Feb-25	Tana Water Works Development Agency Tana Water Works Development Agency Tana Water Works Development Agency Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUWA WATER PROJECT EXTENSION CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component	Tana Water Works Development Agency Maji House, Badert Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@aficaonline.co.ke	THRUST BLOCK 2	LK
2.											D.G.M
3.											W.K
4.											S.M.M
											Client approval :
											Date : AUGUST 2017 02-Feb-25
											Drawing No : TWSB/KWS/020B



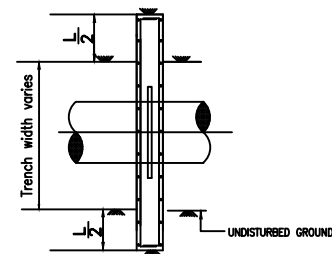
**ELEVATION
ANCHOR BLOCK
FOR GATE VALVES**



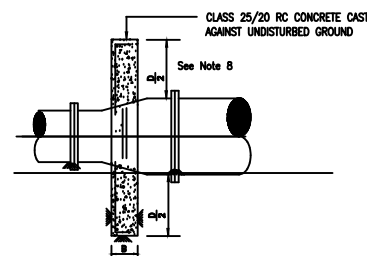
**SECTION 2 - 2
UPRUST THRUST
UPVERTICAL BENDS - TYPICAL**



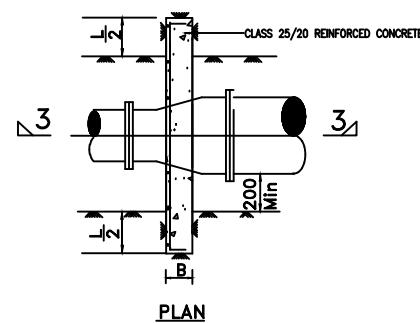
**SECTION 3 - 3
DOWNTHRUST VERTICAL
BENDS - TYPICAL
(SEE NOTE 7)**



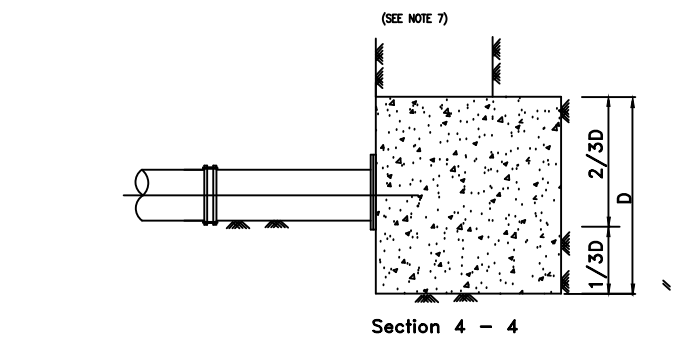
SECTION 1 - 1



**SECTION 3 - 3
THRUST BLOCKS FOR TAPERS**



PLAN



**Section 4 - 4
Thrust Block for Blank Ends**

MAIN SIZE (mm)	BLOCK TYPE	
	100m Head	160m Head
600	E	E
500	D	E
450	D	D
400	C	D
350	C	C
300	B	C
250	B	B
200	A	A
150	A	A
100	A	A

**Table of Anchor Blocks
For Gate Valves**

TEST HEAD (m)	PIPE DIA (mm)	D (m)	L (m)	B (m)	CONCRETE VOL (m3)
100	600	1.6	2.6	1.2	3.1
	500	1.4	2.2	1.1	2.1
	450	1.2	2.0	1.0	1.5
	400	1.2	1.6	0.8	1.0
	350	1.0	1.5	0.8	0.7
	300	1.0	1.2	0.7	0.5
	250	0.8	1.0	0.5	0.3
	200	0.6	0.8	0.5	0.2
	150	0.5	0.6	0.5	0.1
	100	0.5	0.6	0.5	0.1

TABLE OF ANCHOR BLOCKS FOR BLANK ENDS

TABLE 4					
BLOCK TYPE	D (m)	L (m)	B (mm)	MAIN STEEL	DISTRIBUTION STEEL
A	0.6	1.4	200	Y10 - 150	Y10 - 150
B	0.8	1.6	300	Y10 - 150	Y10 - 150
C	1.0	1.8	300	Y12 - 150	Y10 - 150
D	1.2	2.0	400	Y12 - 150	Y12 - 150
E	1.4	2.6	500	Y12 - 150	Y12 - 150
F	1.6	3.2	500	Y12 - 150	Y12 - 150

**DETAILS OF ANCHOR BLOCKS FOR GATE VALVES AND TAPERS
(CLASS '25/20' CONCRETE)**

MAIN SIZE (mm)	TABLE OF THRUST BLOCKS FOR TAPERS										
	TAPER (SMALLER SIZE) mm										
	100 m HEAD TEST PRESSURE										
	800	700	600	500	450	400	350	300	250	200	150
800	—	D	E	F	—	F	—	E	—	—	—
700	—	—	D	E	—	F	F	E	—	—	—
600	—	D	D	C	D	D	E	E	—	—	—
500	—	B	C	—	B	C	C	D	—	—	—
450	—	—	B	—	—	B	C	C	D	—	—
400	—	—	—	—	—	A	B	C	C	—	—
350	—	—	—	—	—	—	A	B	B	C	—
300	—	—	—	—	—	—	—	A	B	B	—
250	—	—	—	—	—	—	—	—	A	A	B
200	—	—	—	—	—	—	—	—	—	A	A
150	—	—	—	—	—	—	—	—	—	—	A

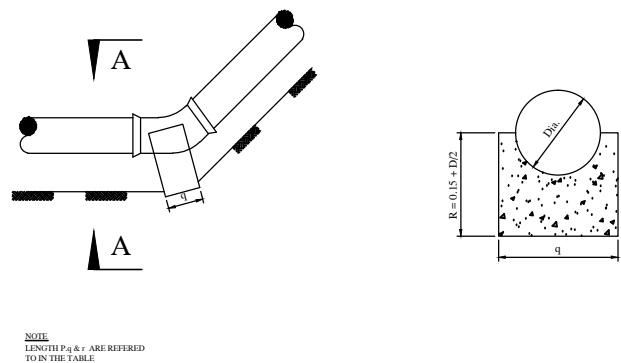
**TABLE OF ANCHOR BLOCKS FOR GATE VALVES AND TAPERS
(CLASS '25' CONCRETE)
FOR DIMENSIONS (See table 4)**

NOTES

- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
- ANCHOR BLOCKS TO BE INSTALLED FOR PIPES LAID AT SLOPES EXCEEDING 1:6 SLOPE
- THRUST BLOCKS TO BE INSTALLED AT ALL HORIZONTAL AND VERTICAL BENDS, CAPPED ENDS, TEES, TAPERS AND GATE VALVES
- DETAILS FOR ALL INDICATOR POSTS TO BE 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
- ALL INDICATOR POSTS TO BE PAINTED WITH 2 COATS BLUE OIL BASED PAINT AND WHITE LETTERING TO ENGINEER'S APPROVAL

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	THRUST BLOCK 3	LK
2.											Drawn By : D.G.M
3.											Checked By : W.K
4.											Approved By : S.M.M
											Client approval :
											Date : 02-Feb-25
											Drawing No : TWSB/KKSD/020C



		; 2ADGP F								67ADGP F								4407ADGP F								3307ADGP F								JUNCTIONS & BLANK ENDS							
		DIA.	80	100	125	150	200	250	300	80	100	125	150	200	250	300	80	100	125	150	200	250	300	80	100	125	150	200	250	300	80	100	125	150	200	250	300				
CLASS 'E'	150m. HEAD	D (m.)	0.60	0.60	0.60	0.60	0.60	0.90	0.90	0.45	0.45	0.60	0.60	0.60	0.60	0.90	0.45	0.45	0.60	0.60	0.60	0.60	0.60	0.45	0.45	0.45	0.45	0.45	0.60	0.60	0.45	0.45	0.45	0.60	0.45	0.60	0.60	0.60	0.90		
	L (m.)	0.75	0.75	0.75	1.00	1.40	1.60	2.30	0.60	0.75	0.75	0.75	1.00	1.40	1.40	0.60	0.60	0.60	0.60	0.75	0.75	0.75	1.00	0.60	0.60	0.60	0.60	0.60	0.75	0.75	0.60	0.75	0.75	0.75	1.00	1.40	1.40	1.60			
	W (m.)	0.35	0.35	0.40	0.40	0.40	0.45	0.45	0.35	0.35	0.40	0.40	0.40	0.45	0.45	0.35	0.35	0.40	0.40	0.40	0.40	0.45	0.45	0.35	0.35	0.40	0.40	0.40	0.45	0.45	0.35	0.35	0.40	0.40	0.40	0.45	0.45				
	VL c.m.	0.18	0.18	0.21	0.24	0.29	0.53	0.67	0.13	0.18	0.21	0.21	0.24	0.32	0.49	0.13	0.13	0.14	0.21	0.21	0.21	0.24	0.27	0.13	0.13	0.14	0.14	0.14	0.24	0.24	0.13	0.18	0.21	0.21	0.24	0.32	0.49				

CLASS 'E'		67ADGP F								447ADGP F								3307ADGP F							
		DIA.	80	100	125	150	200	250	300	80	100	125	150	200	250	300	80	100	125	150	200	250	300		
150m. HEAD	a (m).	0.90	1.60	1.70	2.40	4.25	5.55	8.00	0.45	0.80	0.85	1.20	2.15	2.85	4.15	0.30	0.55	0.65	0.65	1.10	1.45	2.10			
	b (m).	0.60	0.60	0.90	0.90	0.90	0.90	0.90	0.60	0.60	0.90	0.90	0.90	0.90	0.90	0.45	0.45	0.90	0.90	0.90	0.90	0.90			
	c (m).	0.60	0.60	0.60	0.60	0.60	0.60	0.90	0.60	0.60	0.60	0.60	0.60	0.60	0.70	0.70	0.60	0.60	0.60	0.60	0.60	0.70	0.70		
	VL. c.m.	0.32	0.57	0.90	1.30	2.30	3.50	5.10	0.16	0.29	0.45	0.65	1.15	1.80	2.60	0.08	0.15	0.23	0.33	0.60	0.90	1.30			

	CLASS 'D' 120m. HEAD			CLASS 'E' 150m. HEAD		
	440VADGPF			440VADGPF		
DIA.	200	250	300	200	250	300
p (m.)	0.25	0.35	0.45	0.35	0.35	0.60
q (m.)	0.40	0.45	0.50	0.45	0.45	0.60
r (m.)	0.25	0.25	0.30	0.25	0.25	0.30
VL. c. m.	0.03	0.04	0.07	0.04	0.04	0.11

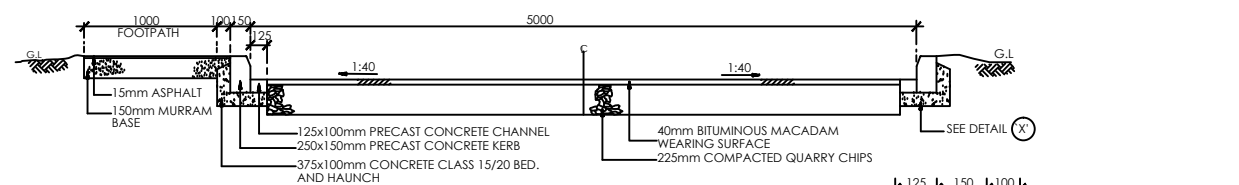
ANCHOR BLOCKS AT SECTIONAL VALVES

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

<u>FOR</u>	<u>USE</u>
GATE VALVE	GV
AIR VALVE	AV
WASHOUT	VO
WATER MAIN	WM
BULK METER	M
'Y'- JUNCTION	Y
5. ALL INDICATOR POSTS TO BE PAINTED WITH 2 COATS BLUE OIL BASED PAINT AND WHITE LETTERING TO ENGINEER'S APPROVAL

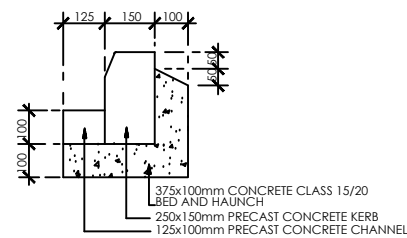
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1.		W.K	S.M.M	02-Feb-25	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS... CONTRACT No: TWSS.ADB/002/2016 - 2017 Water supply component	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nlelon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	THRUST BLOCK DETAILS	Drawn By : D.G.M
2.				Checked By : W.K							
3.				Approved By : S.M.M							
4.				Client approval:							
				Date							02-Feb-25 7
				Drawing No							TWSS/KKSD/021

TYPICAL BITUMINOUS ROAD DETAILS



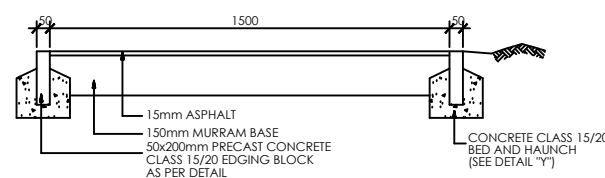
TYPICAL SECTION OF BITUMINOUS ROAD

SCALE 1:50



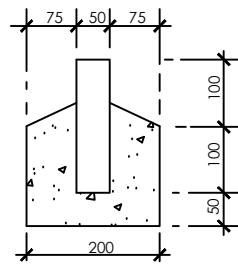
DETAIL 'X'

SCALE 1:20



TYPICAL SECTION OF FOOTPATH

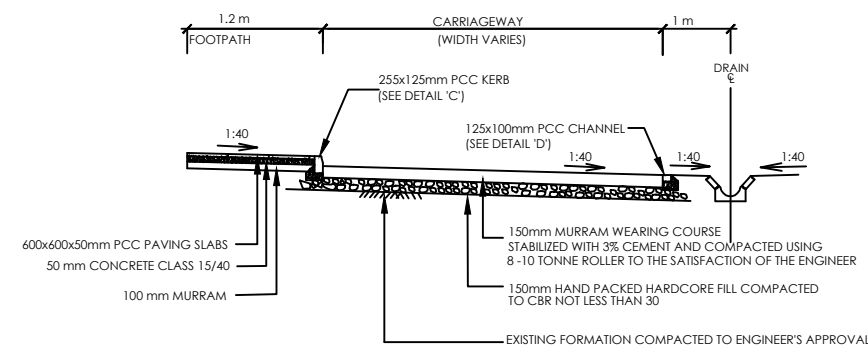
SCALE 1:25



DETAIL 'Y'

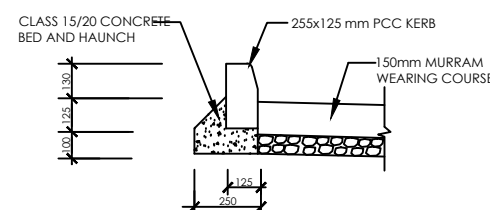
SCALE 1:10

TYPICAL MURRAM ROAD DETAILS



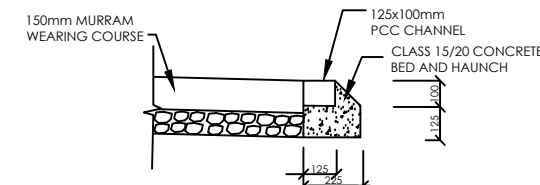
TYPICAL SECTION OF MURRAM ROAD

SCALE 1:50



DETAIL 'C'
TYPICAL DETAIL OF KERB

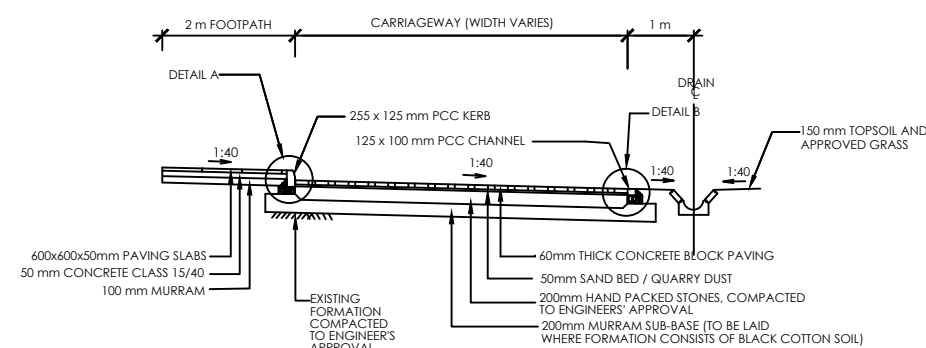
SCALE 1:25



DETAIL 'D'
TYPICAL DETAIL OF CHANNEL

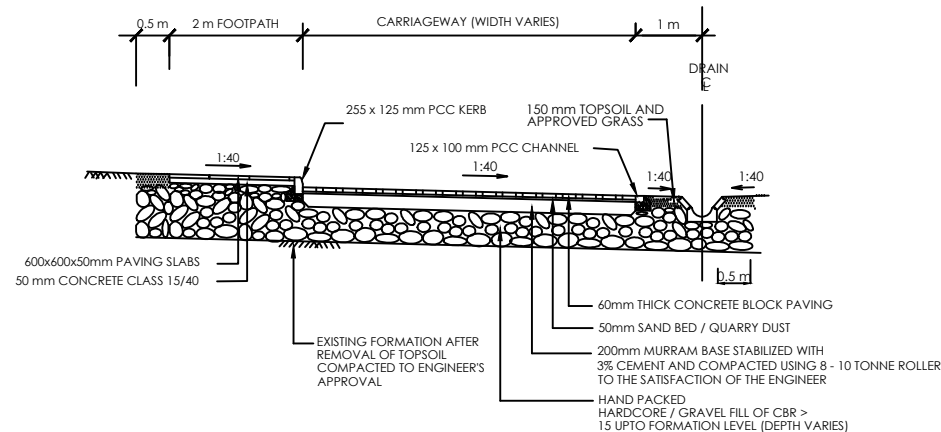
SCALE 1:25

TYPICAL CONCRETE BLOCK SURFACE ROAD DETAILS



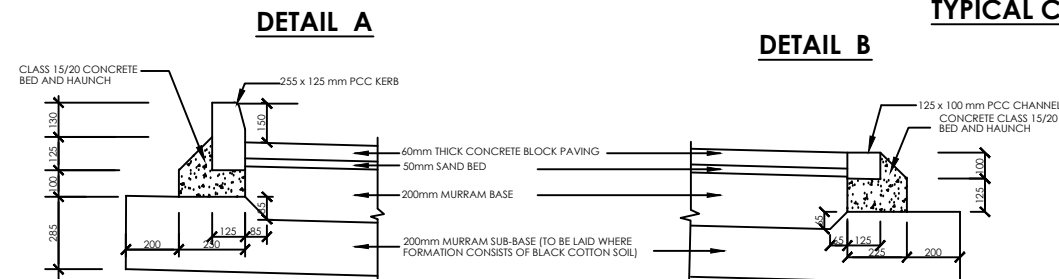
TYPICAL CROSS SECTION FOR CARRIAGEWAY IN CUT

SCALE 1:100



TYPICAL CROSS SECTION FOR CARRIAGEWAY IN FILL

SCALE 1:100



DETAIL OF KERB

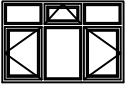
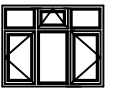






SCALE 1:25

DETAIL B

DETAIL OF CHANNEL

SCALE 1:25

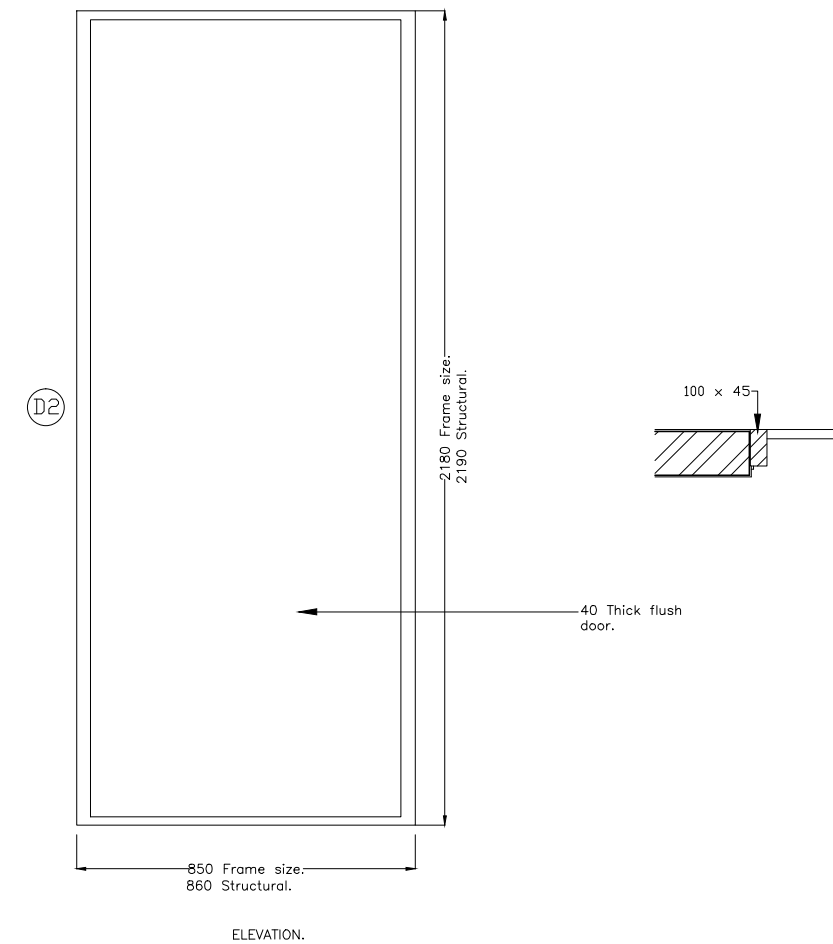
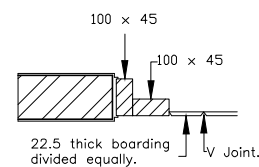
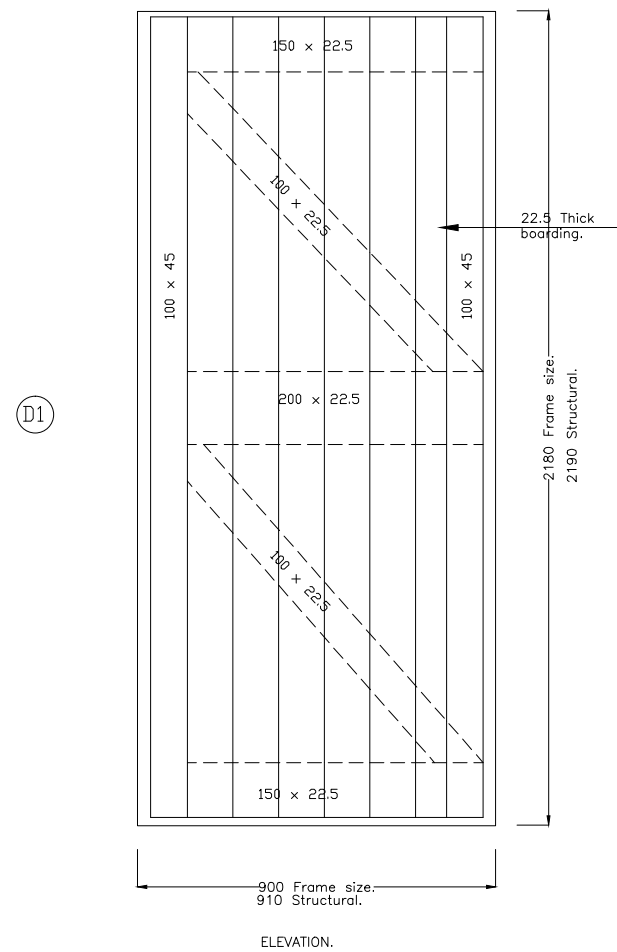
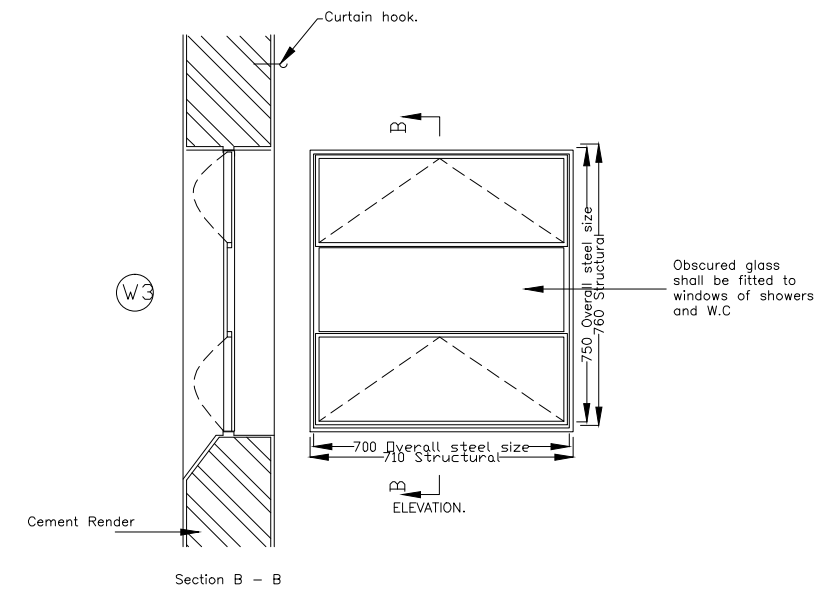
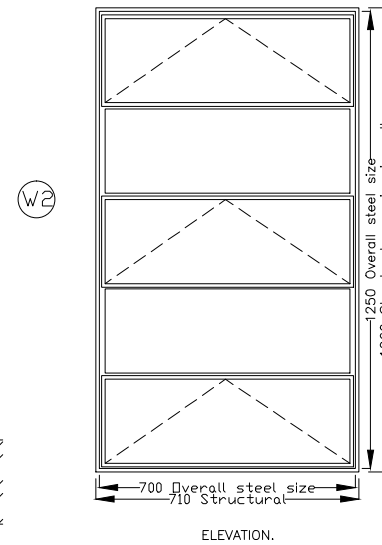
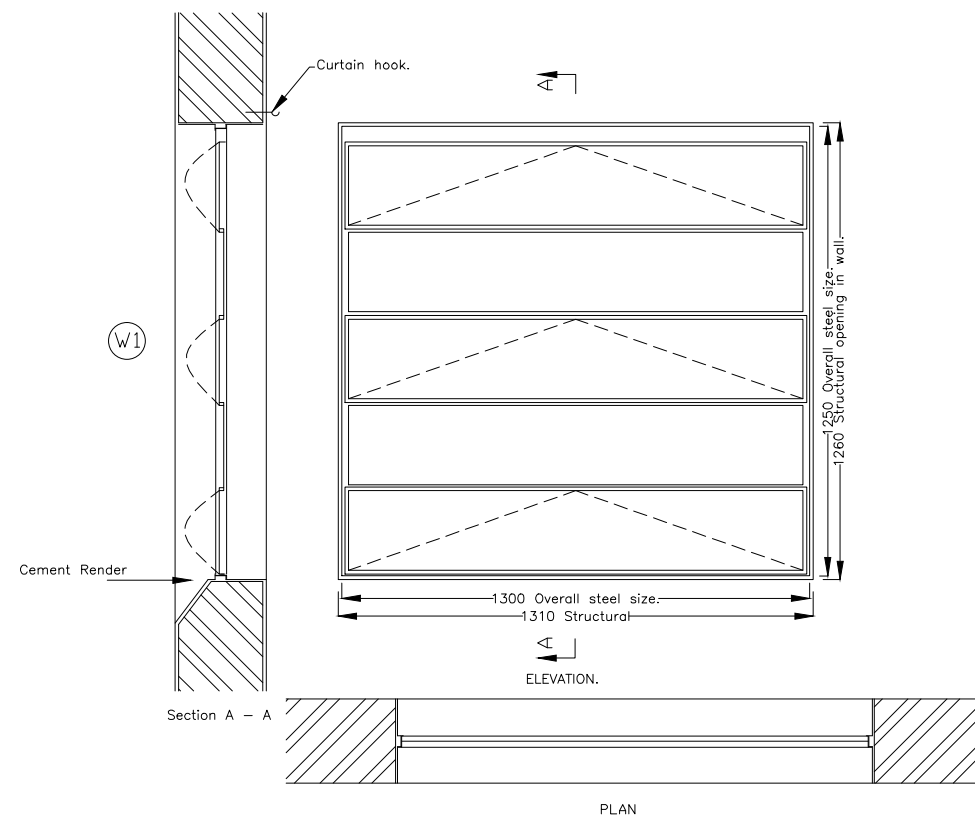
No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By
1.		W.K.	S.M.M.	02-Feb-25	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	AFRICAN DEVELOPMENT BANK	ADDENDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHINGU WATER PROJECT EXTENSION AS SUPPL... CONTRACT No: TWSE.ADB/002/2016 - 2017 Water supply component	Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nellean Place, Rhapsa Road, Westlands P.O. Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	TYPICAL ROAD CROSSING DETAILS	L.K.
2.											D.G.M.
3.											W.K.
4.											S.M.M.
											Client approval:
											Date: 02-Feb-25
											Drawing No: TWSE/KES/SD/022

WINDOW TYPES	DESCRIPTION	STRUCTURAL OPENING
 W 1 / W 1a	<p>1797 X 1197 mm steel casement window in 3 equal panels, with upper part having 2 no. fixed and 1 no. top - hung ventilator, and lower half having 2 no.side-hung panels opening outwards, and 1 no. fixed panel.</p> <p>W1a similar but window size to be 1497 x 1197</p>	<p>1800 x 1200 mm</p> <p>1500 x 1200 mm</p>
 W 2 / W 2a	<p>1797 X 1197 mm PVC window in 3 equal panels, with upper part having 2 no. fixed and 1 no. top - hung ventilator, and lower half having 2 no.side-hung panels opening outwards, and 1 no. fixed panel.</p> <p>W2a similar but window size to be 1497 x 1197</p>	<p>1800 x 1200 mm</p> <p>1500 x 1200 mm</p>
 W 3 / W 3a	<p>1197 X 1397 mm steel casement window in 2 equal panels, with upper part having 1 no. fixed and 1 no. top - hung ventilator, and lower half having 1 no.side-hung casement opening outwards, and 1 no. fixed panel with coupling mullions.</p> <p>Window W3a similar but size 1197x1197mm</p>	<p>1200 x 1400 mm</p> <p>1200 x 1200 mm</p>
 W 4/ W 4a	<p>597 X 1197 mm steel casement window, with upper part having 1 no. top - hung ventilator, and lower half having 1 no.side-hung panel opening outwards.</p> <p>W 4a similar but uPVC window</p>	<p>600 x 1200 mm</p> <p>600 x 1200 mm</p>
 W 5 / W 5a / W5b	<p>1797 x 597 mm PVC window in 3 equal panels with 1 no. fixed and 2 no. top-hung panels opening outwards.</p> <p>Window W5a similar but steel casement window Window W5b similar but pvc window size 1497 x 597mm</p>	<p>1800 x 600 mm</p> <p>1800 x 600 mm 1500 x 600 mm</p>
 W 6	<p>597 X 597 mm steel casement window, with top - hung ventilator.</p>	<p>600 x 600 mm</p>
 W 7 / W7a	<p>1197 X 597 mm steel casement window in 2 equal panels, with 1 no. fixed and 1 no. top - hung ventilator.</p> <p>Window W7a similar but pvc window size 997 x 597mm</p>	<p>1200 x 600 mm</p> <p>1000 x 600 mm</p>
 W 8	<p>1197 X 597 mm PVC window in 2 equal panels, with 2 no. top - hung ventilators.</p>	<p>1200 x 600 mm</p>

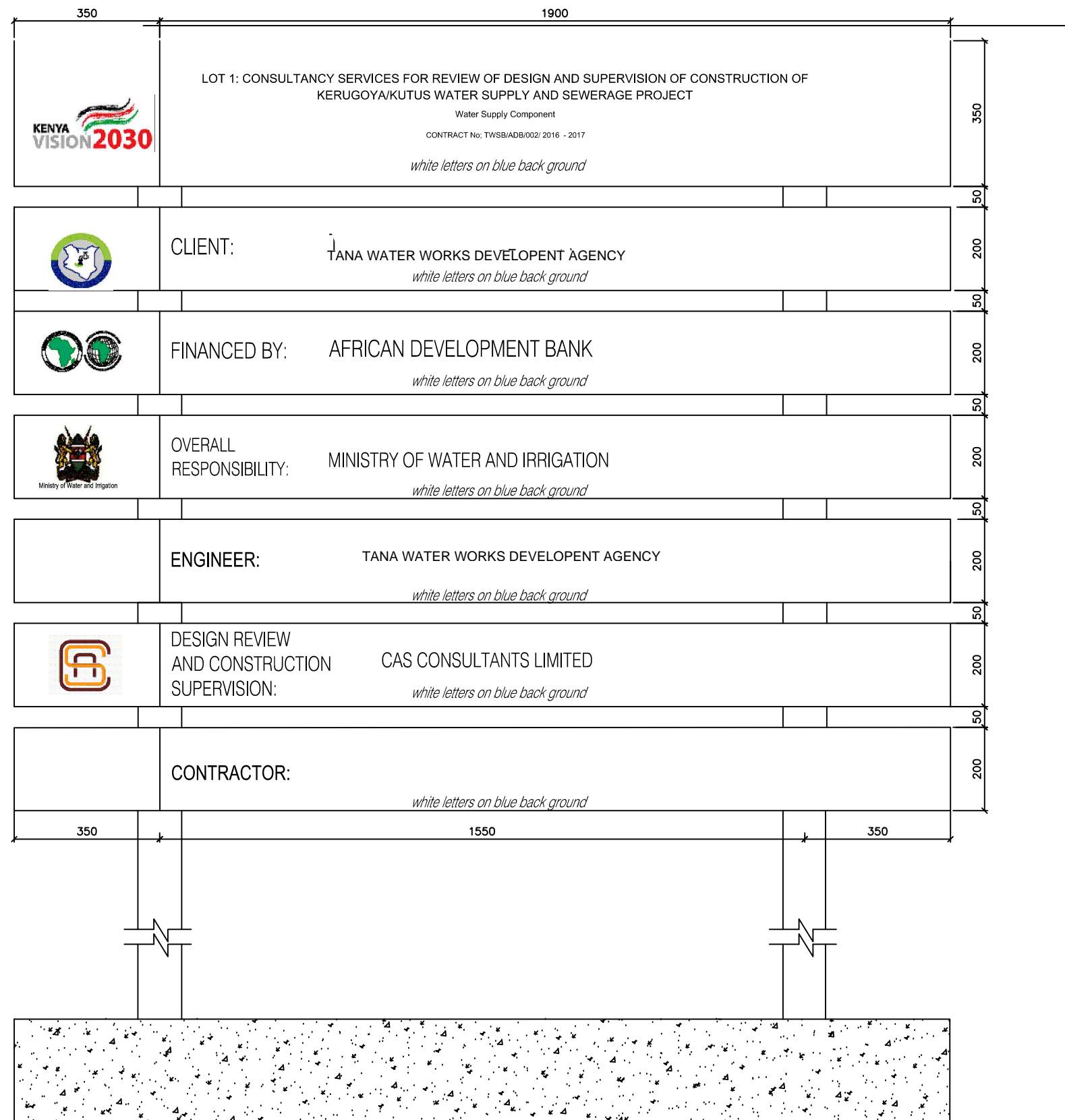
NOTES:

- All windows to be fitted with burglar proofing grille fabricated from 12x12mm m.s. square bars at 150mm c/c vertically and 200mm c/c horizontally , and fixed internally to surrounding wall with 12mm m.s. fish tail lugs at centres not exceeding 600mm.

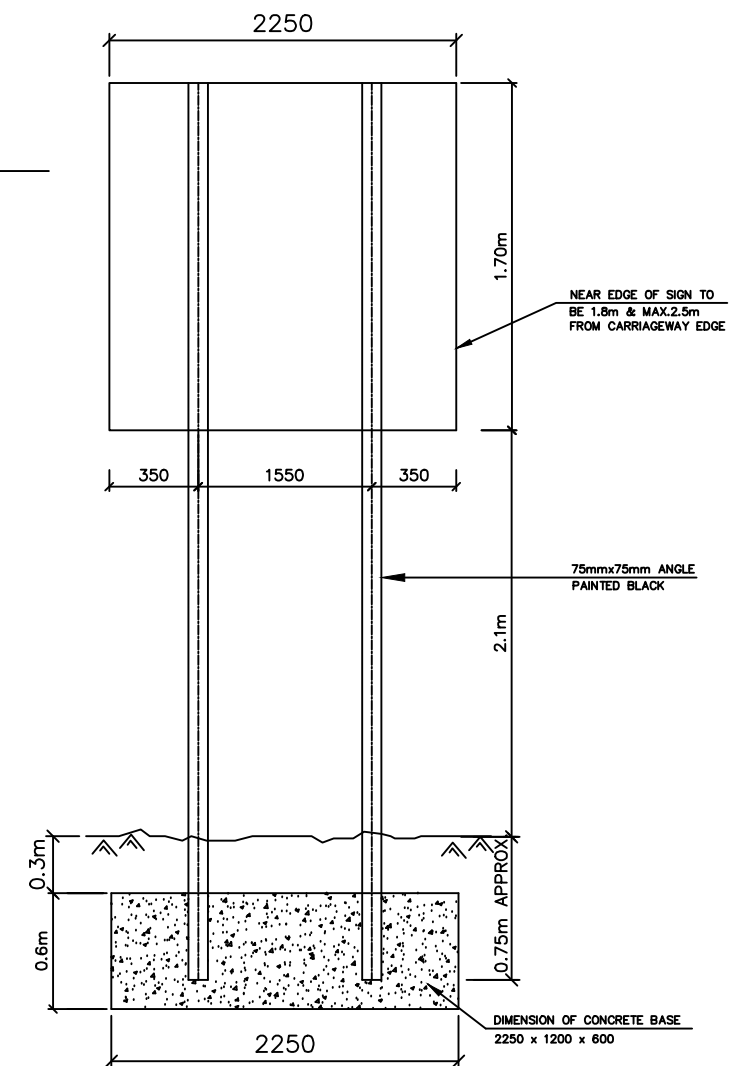
No	REVISIONS	CHECKED BY	APPROVED BY	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	10/2/2015	Tana Water Works Development Agency TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS	Tana Water Works Development Agency TANA WATER SERVICES BOARD Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	WINDOW SCHEDULE	Drawn By : D.G.M
2.											Checked By : W.K
3.											Approved By : S.M.M
4.											Client approval : Date : 02/2/2017 Drawing No : TWSB/KK/SD/023



No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	Tana Water Works Development Agency	AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS	Tana Water Works Development Agency Maji House, Badeni Powell Road P.O. Box 1292, Nyeri, Kenya	CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	DOORS AND WINDOW DETAILS	Drawn By : D.G.M
2.											Checked By : W.K
3.											Approved By : S.M.M
4.											Client approval :
											Date : 02-Feb-25
											Drawing No : TVSB/KK/SD/024



PROJECT SIGN BOARD

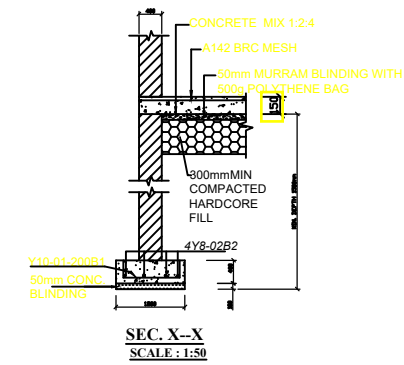
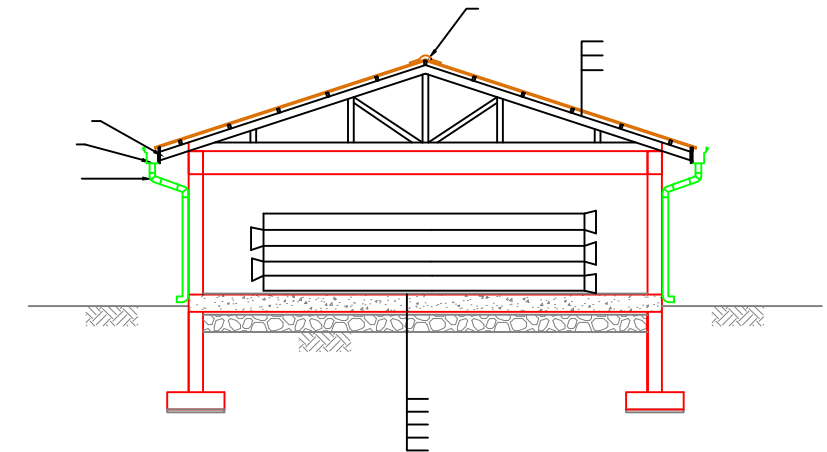
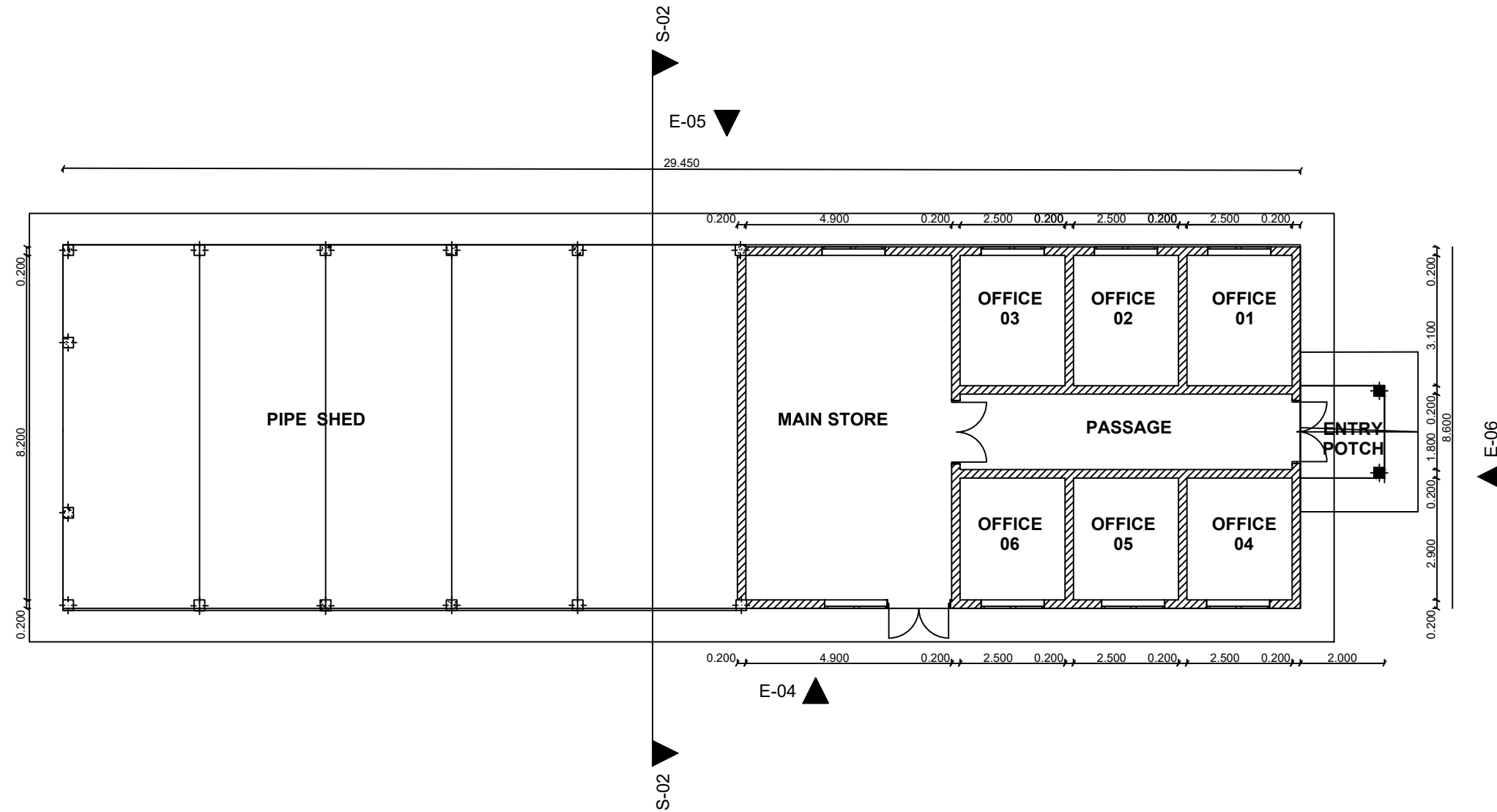
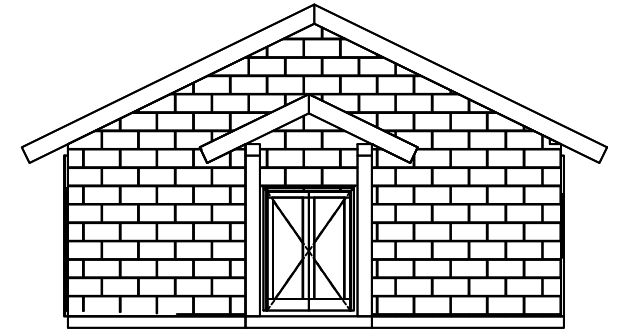
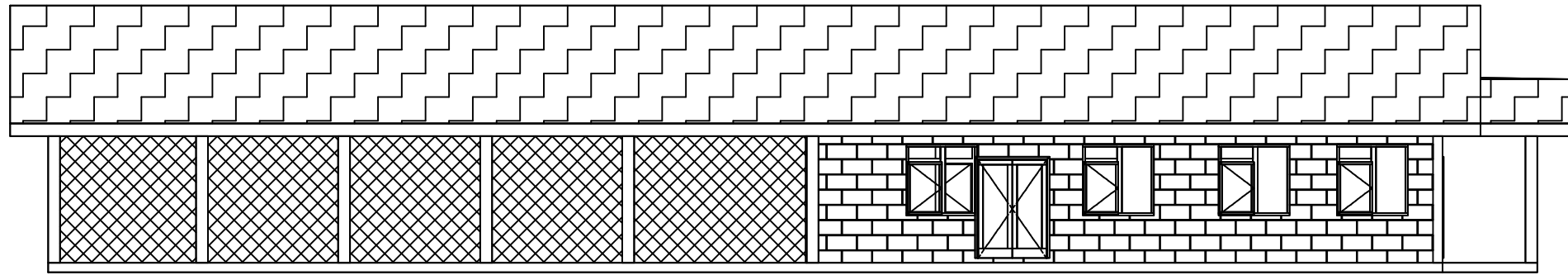


SIGN BOARD INSTALLATION DETAILS
NOT TO SCALE

NOTES:

1. ALL DIMENSIONS IN MILLIMETER
2. HEIGHTS OF LETTERS 70mm, 50mm AND 35mm
3. SIGNBOARD PANELS ARE TIMBER HARDWOOD PANELS
4. BACKGROUND COLOUR TO BE BLUE UNLESS INSTRUCTED OTHER WISE BY THE ENGINEER

No	REVISIONS	CHECKED BY	APPROVED By	DATE	Client	Financed By	Project	Designed By	Reviewed By	Drawing Title	Designed By : LK
1.		W.K	S.M.M	02-Feb-25	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 AFRICAN DEVELOPMENT BANK	ADDEDUM TO LOT 1: CONSULTING SERVICES TO DESIGN AND SUPERVISE CONSTRUCTION OF GICHUGU WATER PROJECT EXTENSION AS CONTRACT No: TWSB/ADB/002/ 2016 - 2017 Water supply component	 Tana Water Works Development Agency Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	 CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	PROJECT SIGN BOARD	Drawn By : D.G.M
2.											Checked By : W.K
3.											Approved By : S.M.M
4.											Client approval : Date : 02-Feb-25 7 Drawing No : TWSB/KK/SD/025



No	REVISIONS	CHECKED BY	APPROVED By	DATE
1.		W.K	S.M.M	September, 2017
2.				
3.				
4.				

Client  TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	Financed By  AFRICAN DEVELOPMENT BANK	Project LOT II: CONSULTANCY SERVICES FOR REVIEW OF DESIGN AND SUPERVISION OF CONSTRUCTION OF KERUGOYA/KUTUS WATER SUPPLY AND SEWERAGE PROJECT CONTRACT No; TWSB/ADB/002/ 2016 - 2017	Designed By  TANA WATER WORKS DEVELOPMENT AGENCY Maji House, Baden Powell Road P.O. Box 1292, Nyeri, Kenya	Reviewed By  CAS CONSULTANTS LIMITED Nelleon Place, Rhapta Road, Westlands P.O Box 67693 - 00200 - Nairobi, Kenya Tel: 020 4445265 Fax: 020 4440049 E-mail: casconsult@africaonline.co.ke	Drawing title: PIPE SHED FOUNDATION LAYOUT SECTIONS AND ELEVATION	Designed By : LK
						Drawn By : D.G.M
						Checked By : W.K
						Approved By : S.M.M
						Client approval : Date : FEB 2025
						Drawing No : TWWDA/KK/PS/001