

CHAINAGE	0+000	0+100	0+200	0+300	0+400	0+500	0+534
ORIGINAL GROUND LEVEL	1605.38	1605.38	1605.38	1605.38	1605.38	1605.38	1605.38
PIPE INVERT LEVEL	1603.88	1602.94	1600.52	1595.74	1589.05	1583.40	1579.02
HYDRAULIC GRADE LEVEL	1605.34	1600.52	1594.24	1589.05	1584.90	1583.62	1582.29
FLOW PARAMETERS							0.015607m <sup>3</sup> /s
PIPE INFO							160MM DIA HDPE
SURVEY REMARKS	Overflow weir at the intake						

General Notes

- PLAN AND PROFILE  
 a) all measurements should be read not measured  
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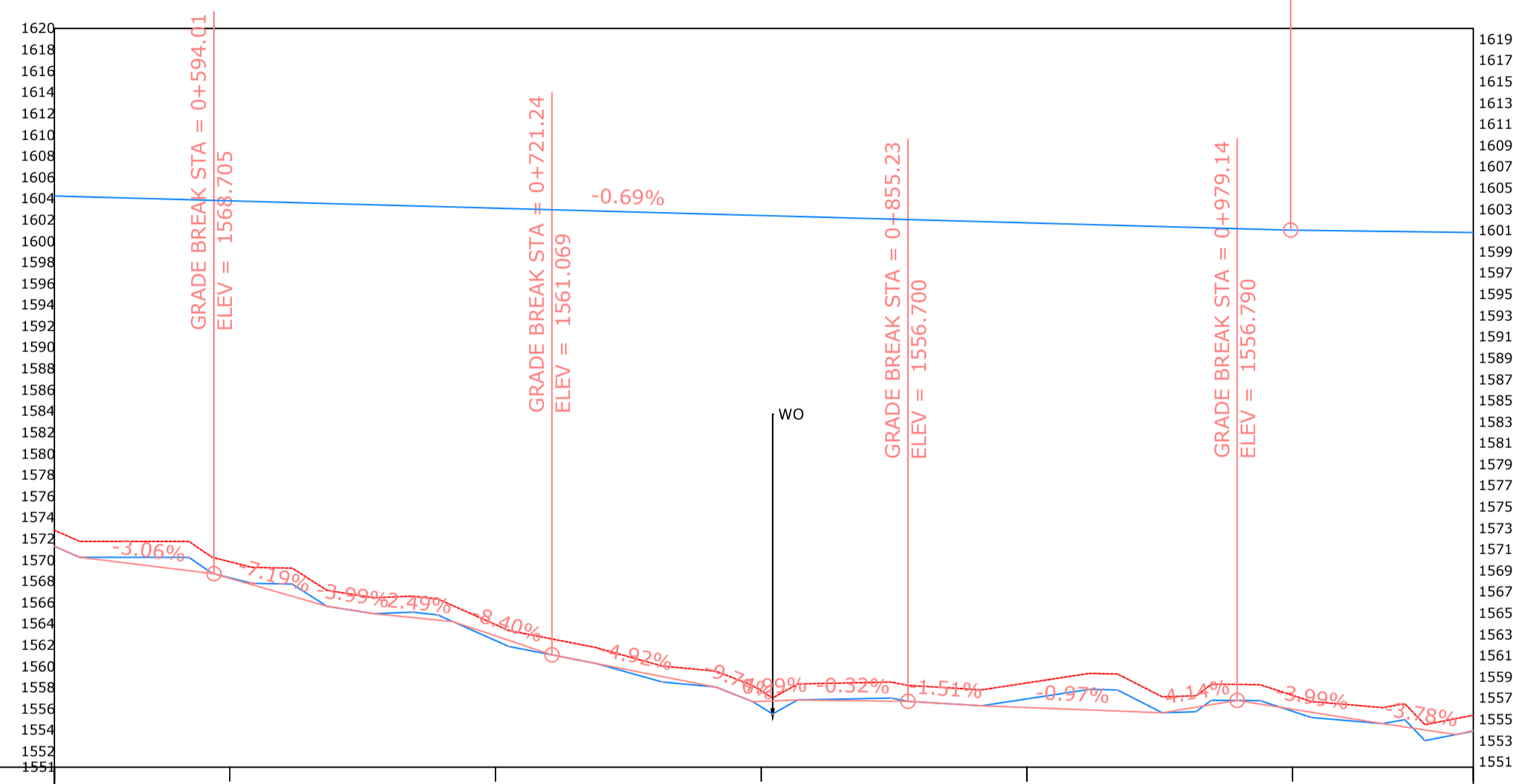
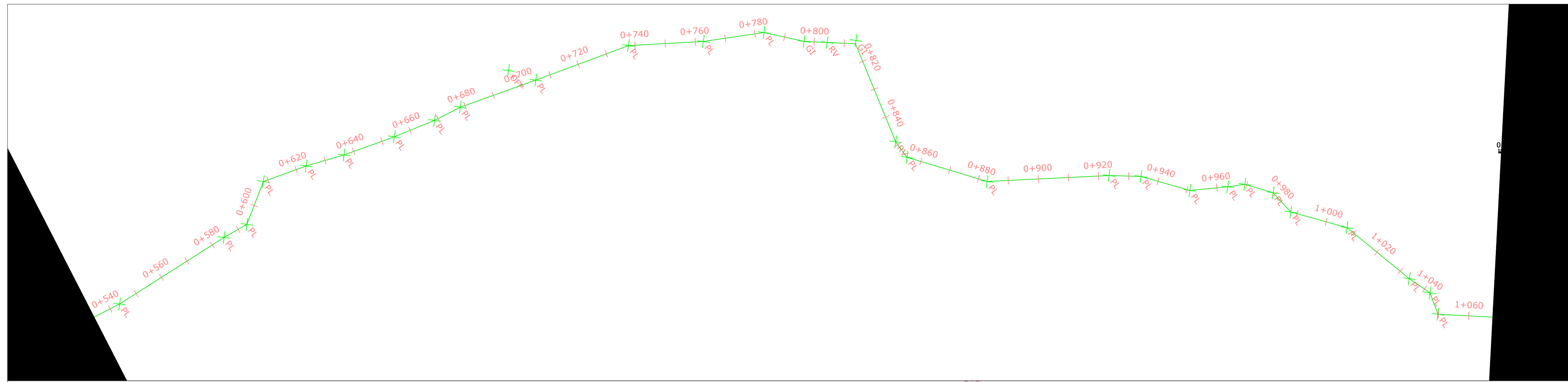
1	Surveyed by:	GISO Maina
2	Drawn By	GISO Maina
3	checked By:	BONFACE WAWERU
4	Approved By	Eng Erastus Waweru

No.	Revision/Issue	Date

Firm Name and Address  
 MAJI HOUSE, ALONG BADEN POWELL ROAD  
 P.O. BOX, 1292 - 10100.  
 Nyeri, Kenya  
 +254 724 259 891,+254 61 2034118  
 +254 61-2032282  
 Email: info@tanawwda.go.ke  
 Website: www.tanawwda.go.ke

Project Name and Address  
 KIBIGA WATER SUPPLY  
 RAW WATER SUPPLY  
 CHUKA CONSTITUENCY  
 THARAKA NITHI COUNTY

Project	WATER PROJECT	Sheet	1
Date	13.04.2022	Scale	1:1000



CHAINAGE	ORIGINAL GROUND LEVEL	PIPE INVERT LEVEL	HYDRAULIC GRADE LEVEL	FLOW PARAMETERS	PIPE INFO	SURVEY REMARKS
0+534	1572.78	1571.75	1604.23			
0+600	1569.83	1568.33	1603.95			
0+700	1563.92	1562.42	1603.09			
0+800	1557.68	1556.18	1602.40			
0+900	1558.43	1556.93	1601.70			
1+000	1557.26	1555.76	1601.02	0.015607m <sup>3</sup> /s	160MM DIA HDPE	
1+060	1555.39	1553.89	1600.80			

General Notes

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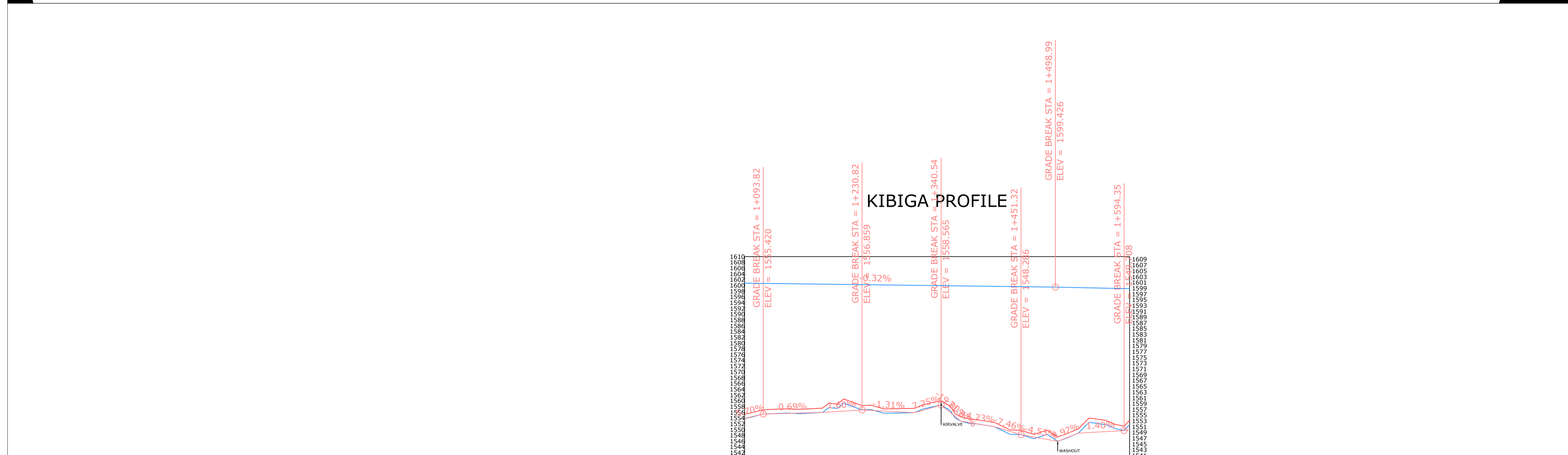
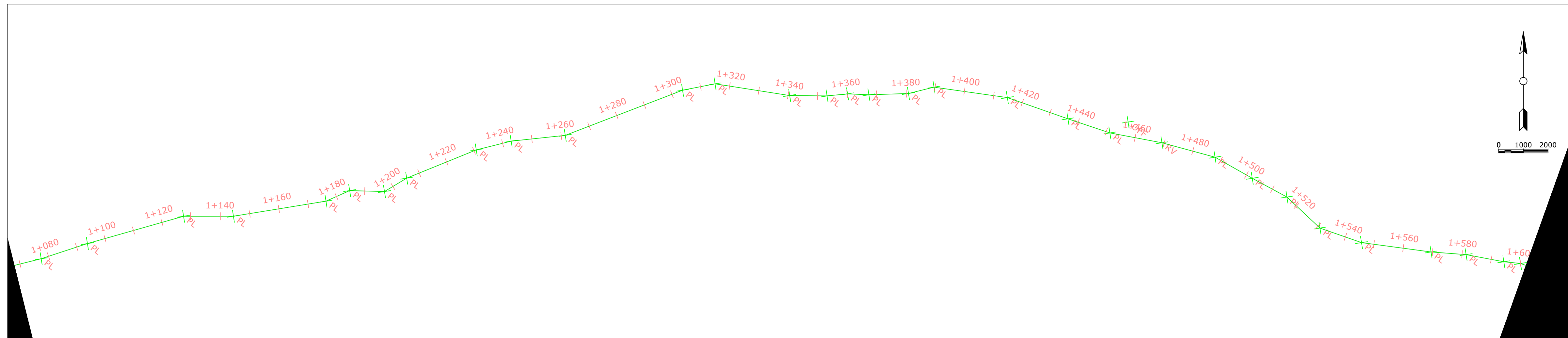
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 THARAKA NITHI COUNTY

Project	WATER PROJECT	Sheet	2
Date	13.04.2022	Scale	1:1000



CHAINAGE	ORIGINAL GROUND LEVEL	PIPE INVERT LEVEL	HYDRAULIC GRADE LEVEL	FLOW PARAMETERS	PIPE INFO	SURVEY REMARKS
1+068	1600.70	1552.89	1552.89			
1+100	1600.62	1555.49	1556.99			
1+120	1600.54	1555.63	1557.13			
1+140	1600.46	1555.97	1557.47			
1+160	1600.38	1558.04	1559.54			
1+180	1600.30	1557.38	1558.88			
1+200	1600.22	1556.50	1558.00			
1+220	1600.14	1555.76	1557.26			
1+230.82	1600.06	1555.88	1557.38			
1+240	1599.98	1557.72	1559.22			
1+260	1599.90	1557.14	1558.64			
1+280	1599.82	1552.49	1553.99			
1+300	1599.74	1551.62	1553.12			
1+320	1599.66	1549.77	1551.27			
1+340.54	1599.58	1548.30	1549.80			
1+360	1599.50	1547.34	1548.84			
1+380	1599.42	1546.35	1547.85			
1+400	1599.29	1548.19	1549.69			
1+420	1599.16	1552.41	1553.91			
1+440	1599.02	1551.11	1552.61			
1+460	1598.89	1551.07	1552.77			
1+480	1598.80	1551.07	1552.77			
1+500	1598.80	1551.07	1552.77			
1+520	1598.80	1551.07	1552.77			
1+540	1598.80	1551.07	1552.77			
1+560	1598.80	1551.07	1552.77			
1+580	1598.80	1551.07	1552.77			
1+600	1598.80	1551.07	1552.77			
1+602	1598.80	1551.07	1552.77			

General Notes

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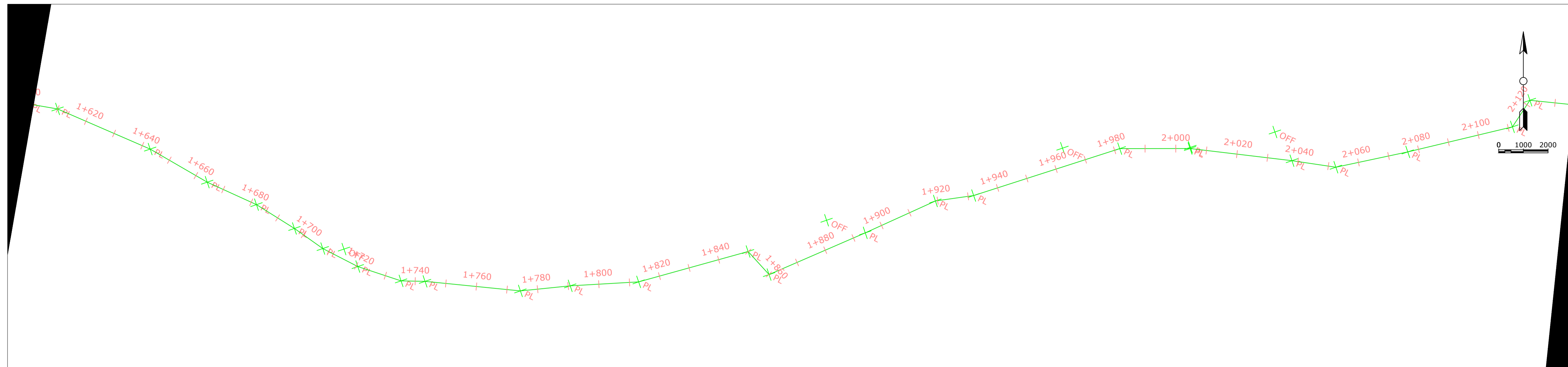
1	Surveyed by:	GISO Maina
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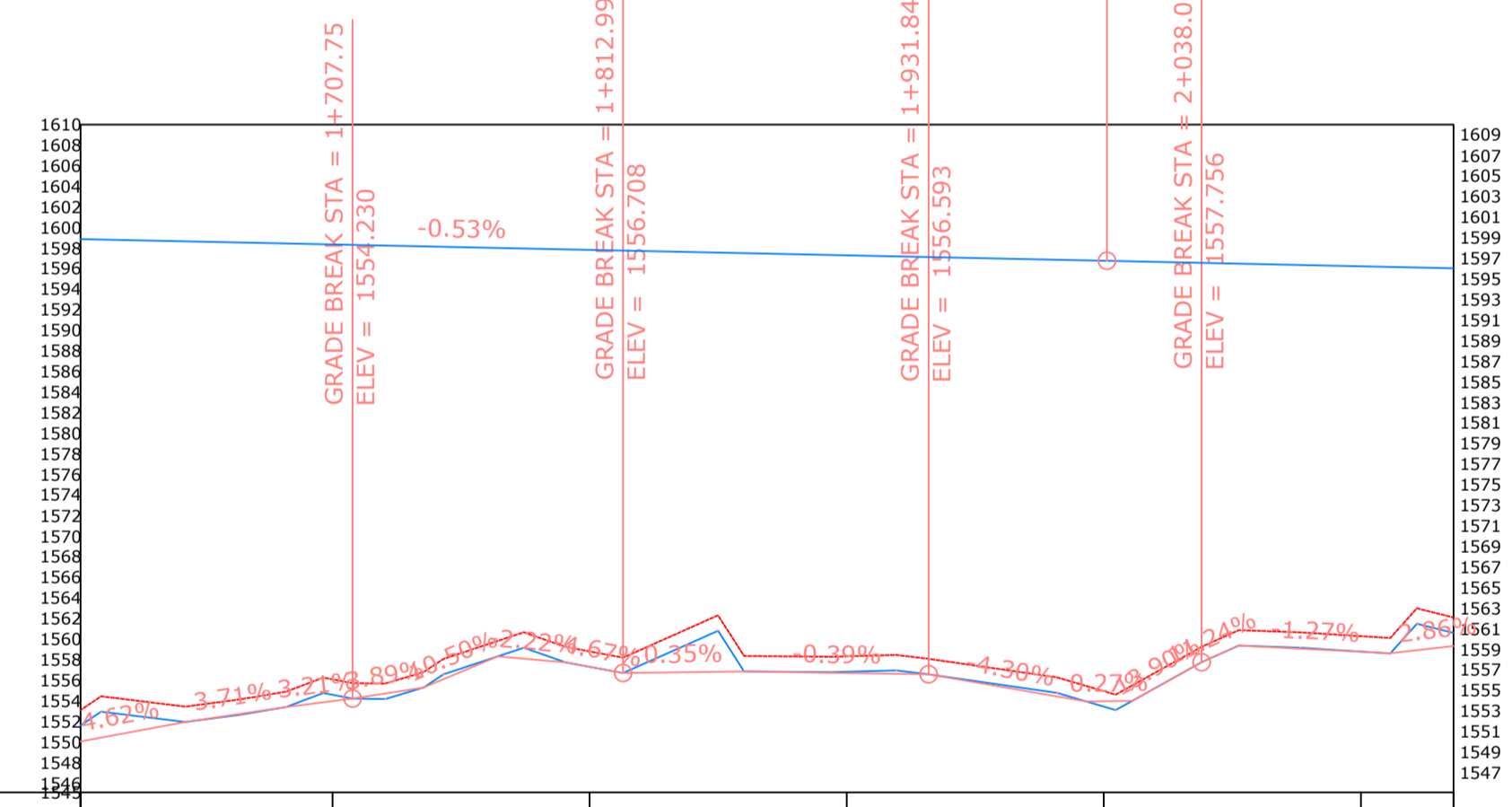
Firm Name and Address  
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Project Name and Address  
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 RAW WATER SUPPLY  
 CHUKA CONSTITUENCY  
 THARAKA NITHI COUNTY

Project	WATER PROJECT	Sheet	3
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**KIBIGA PROFILE**



CHAINAGE	1+602	1+620	1+640	1+660	1+680	1+700	1+720	1+740	1+760	1+780	1+800	1+820	1+840	1+860	1+880	1+900	1+920	1+940	1+960	1+980	2+000	2+020	2+040	2+060	2+080	2+100	2+110	2+120	2+136	
ORIGINAL GROUND LEVEL	1553.11	1553.99	1553.69	1554.61	1556.10	1556.03	1558.65	1560.62	1558.81	1559.55	1562.30	1558.34	1558.33	1558.30	1557.44	1556.54	1554.96	1557.45	1560.60	1560.68	1554.46	1553.46	1559.18	1560.68	1558.80	1560.30	1561.30	1562.80	1562.11	
PIPE INVERT LEVEL	1551.61	1552.49	1552.19	1553.11	1554.61	1554.53	1557.15	1559.12	1557.31	1558.05	1560.80	1556.84	1556.83	1556.80	1555.94	1555.04	1553.46	1555.95	1559.10	1559.18	1553.46	1553.46	1559.18	1560.68	1558.80	1560.30	1561.30	1562.80	1562.11	
HYDRAULIC GRADE LEVEL	1598.88	1598.76	1598.63	1598.50	1598.36	1598.23	1598.10	1597.97	1597.84	1597.70	1597.57	1597.44	1597.31	1597.17	1597.04	1596.91	1596.78	1596.64	1596.51	1596.37	1596.24	1596.10	1595.96	1595.82	1595.68	1595.54	1595.40	1595.26	1595.12	1594.98
FLOW PARAMETERS																						0.015607M <sup>3</sup> /S								
PIPE INFO																														
SURVEY REMARKS																														

General Notes

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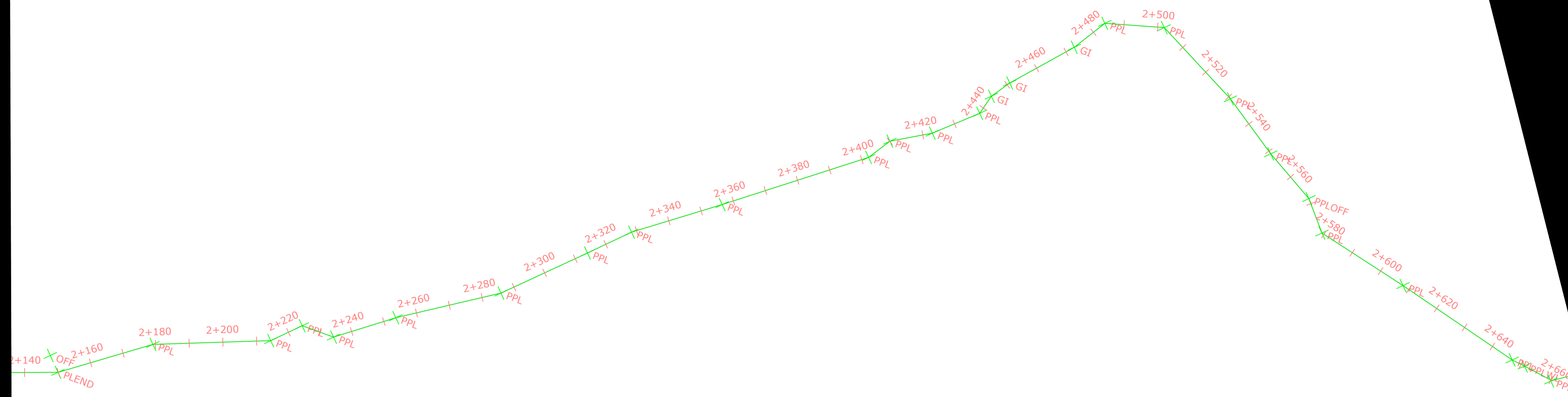
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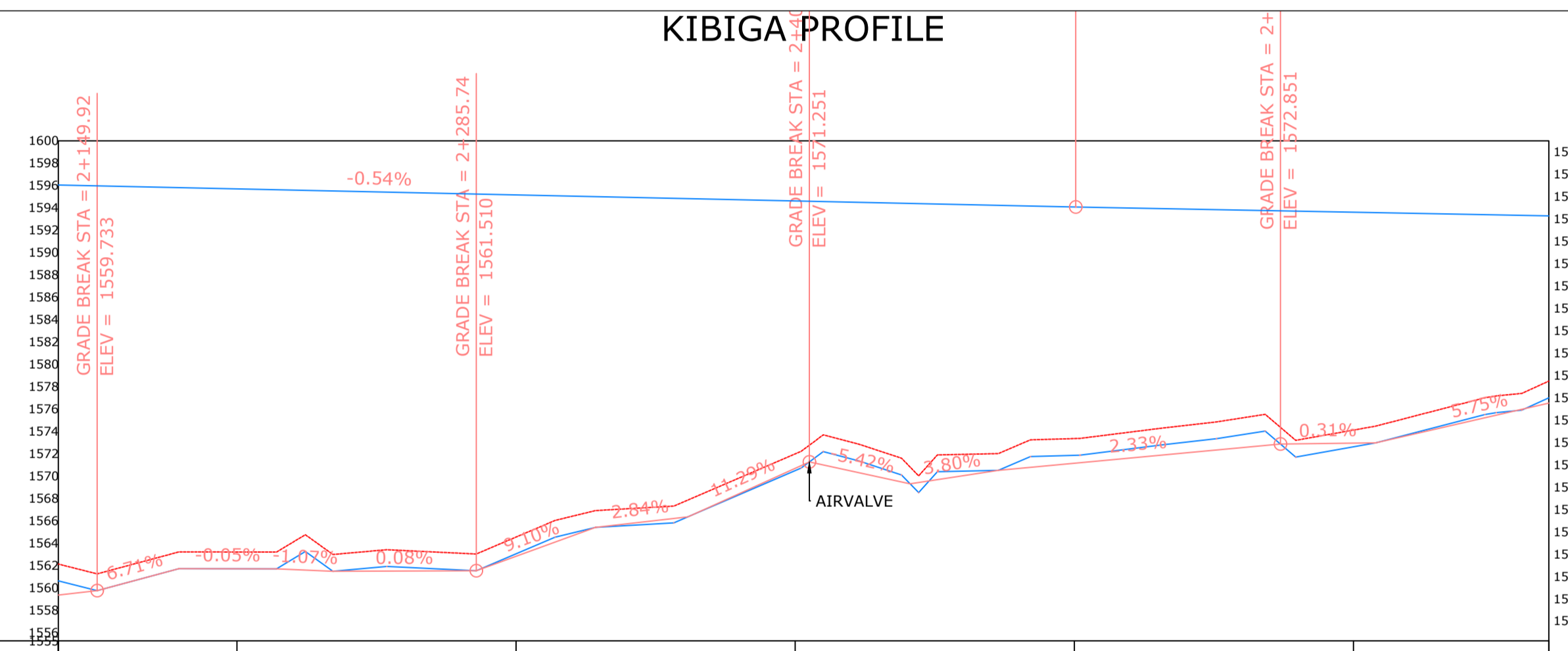
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Project Name and Address  
 KIBIGA WATER SUPPLY  
 RAW WATER SUPPLY  
 CHUKA CONSTITUENCY  
 THARAKA NITHI COUNTY

Project	WATER PROJECT	Sheet	4
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**KIBIGA PROFILE**



CHAINAGE	2+136	2+200	2+300	2+400	2+500	2+600	2+670
ORIGINAL GROUND LEVEL	1562.11	1563.19	1564.53	1571.97	1573.34	1574.10	1578.49
PIPE INVERT LEVEL	1560.61	1561.69	1563.03	1570.47	1571.84	1572.60	1575.61
HYDRAULIC GRADE LEVEL	1596.04	1595.70	1595.16	1594.62	1594.08	1593.61	1593.28
FLOW PARAMETERS							0.015607m <sup>3</sup> /s
PIPE INFO							160MM DIA HDPE
SURVEY REMARKS							

General Notes

- PLAN AND PROFILE**
- a) all measurements should be read not measured
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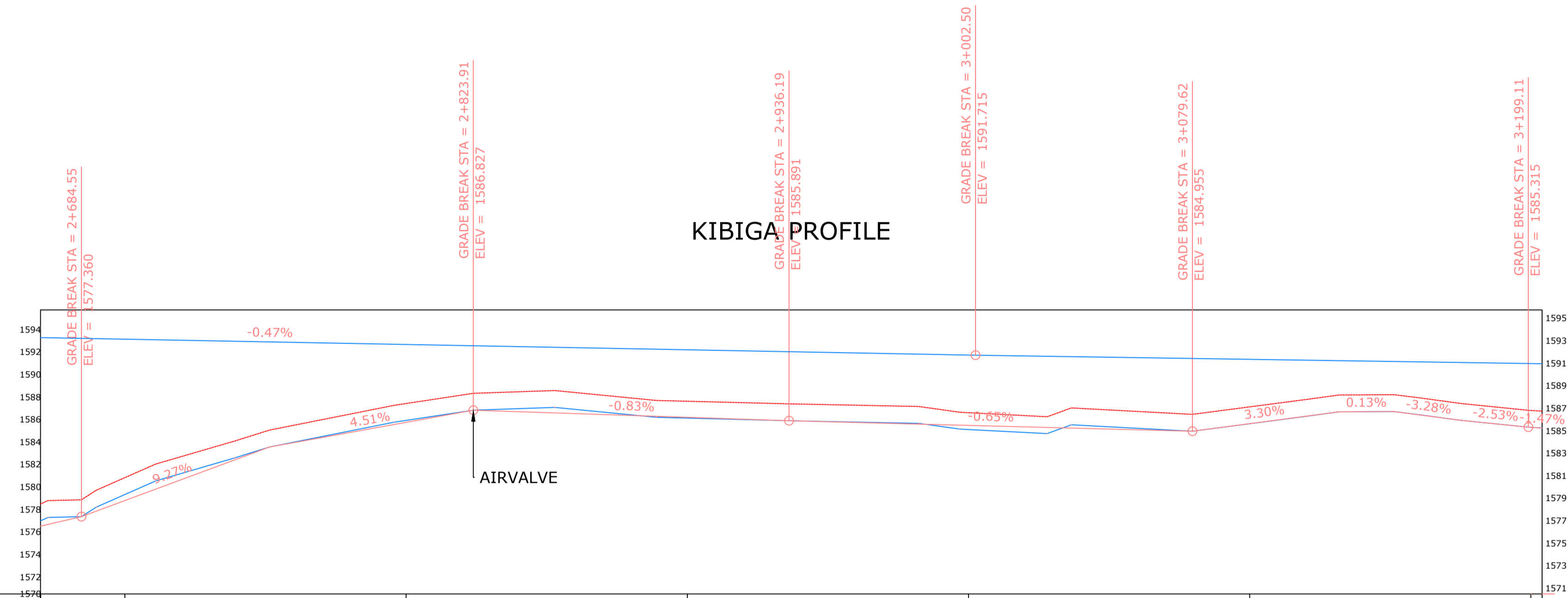
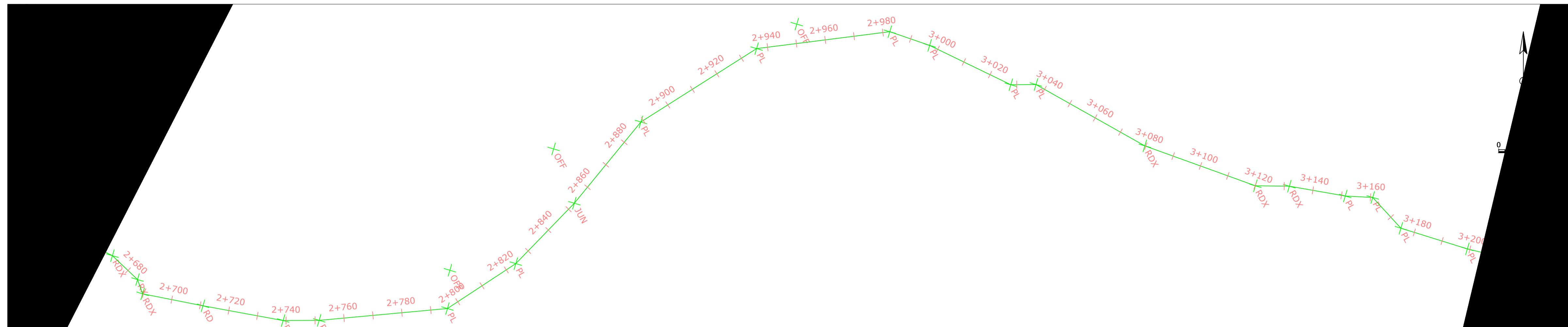
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**KIBIGA WATER SUPPLY**  
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 CHUKA CONSTITUENCY  
 THARAKA NITHI COUNTY

Project	WATER PROJECT	Sheet	<b>5</b>
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KIBIGA PROFILE

CHAINAGE	ORIGINAL GROUND LEVEL	PIPE INVERT LEVEL	HYDRAULIC GRADE LEVEL	FLOW PARAMETERS	PIPE INFO	SURVEY REMARKS
2+670	1578.49	1576.99	1593.28			
2+700	1580.83	1579.33	1593.26			
	1583.06	1581.56	1593.02			
	1584.94	1583.44	1592.90			
	1586.23	1584.73	1592.79			
2+800	1587.42	1585.92	1592.67			
	1588.34	1586.84	1592.55			
	1588.55	1587.05	1592.43			
	1588.03	1586.53	1592.31			
2+900	1587.62	1586.12	1592.20			
	1587.46	1585.96	1592.08			
	1587.32	1585.82	1591.96			
	1587.19	1585.69	1591.84			
3+000	1586.60	1585.10	1591.73			
	1586.28	1584.78	1591.63			
	1586.85	1585.35	1591.54			
	1586.52	1585.02	1591.44			
3+100	1587.12	1585.62	1591.35	0.015607M <sup>3</sup> /S		
	1587.95	1586.45	1591.25			
	1588.20	1586.70	1591.16			
	1587.43	1585.93	1591.06			
3+200	1586.80	1585.30	1590.97			
3+204	1586.74	1585.24	1590.91		160MM DIA HDPE	

General Notes

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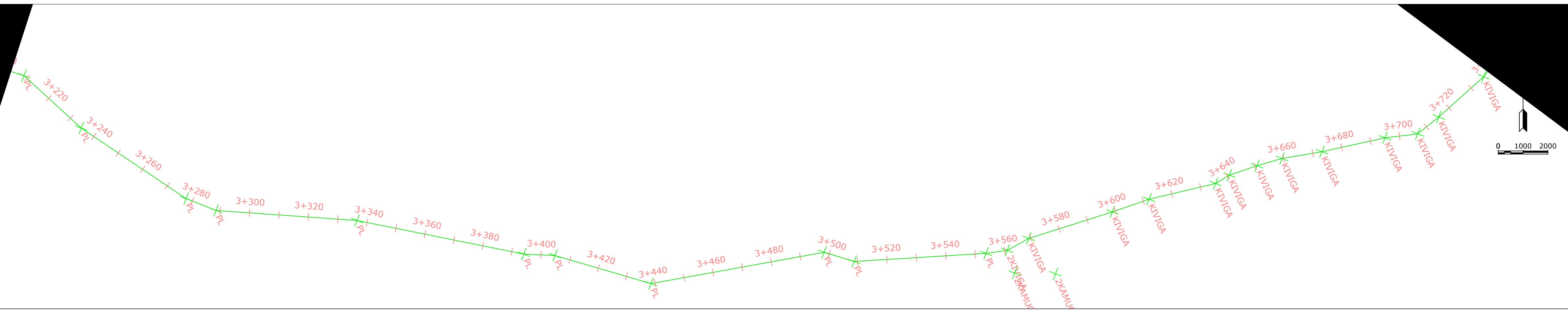
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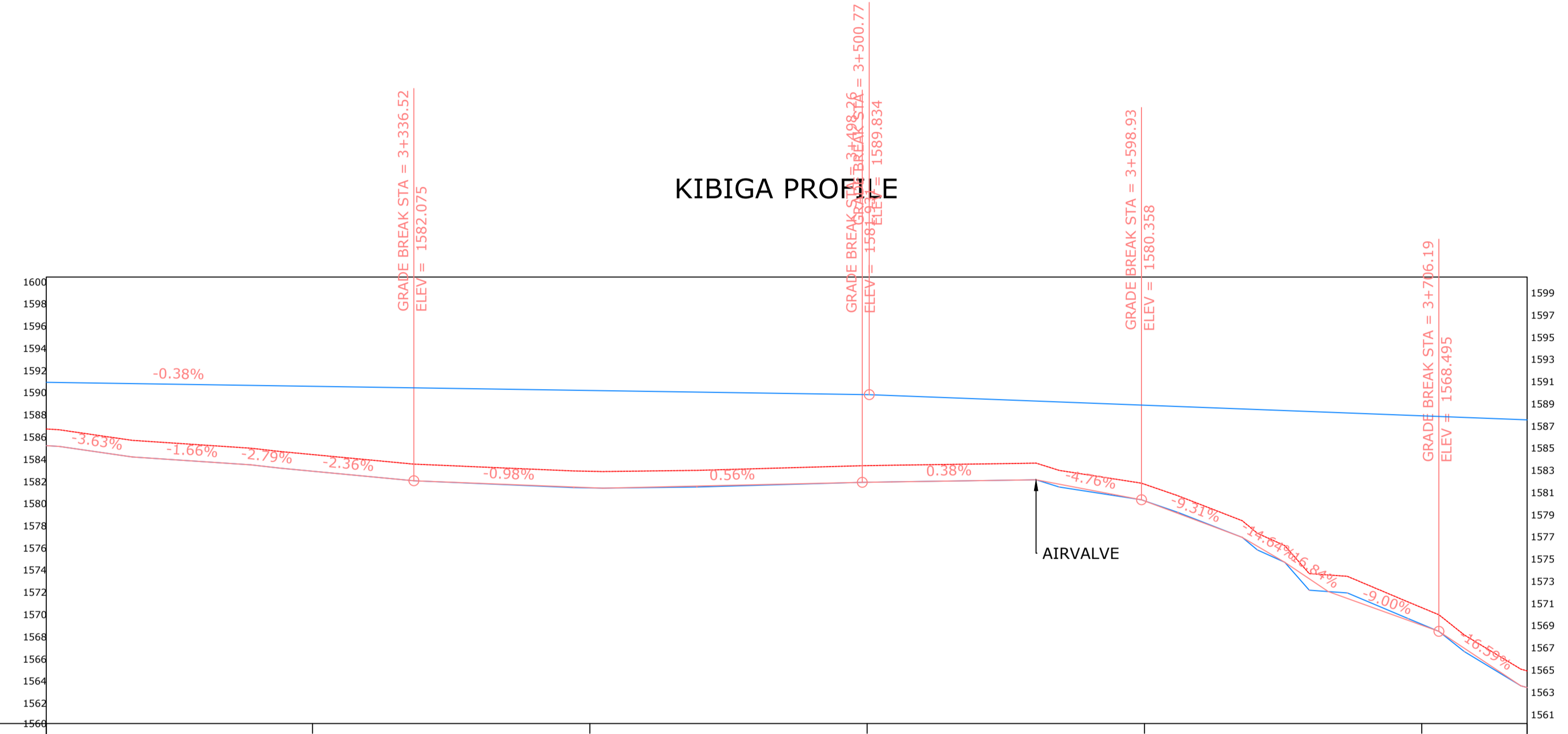
Firm Name and Address  
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Project Name and Address  
 KIBIGA WATER SUPPLY  
 RAW WATER SUPPLY  
 CHUKA CONSTITUENCY  
 THARAKA NITHI COUNTY

Project	Sheet
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### KIBIGA PROFILE



CHAINAGE	ORIGINAL GROUND LEVEL	PIPE INVERT LEVEL	HYDRAULIC GRADE LEVEL	FLOW PARAMETERS	PIPE INFO	SURVEY REMARKS
3+204	1586.74	1585.24	1590.95			
	1586.08	1584.58	1590.88			
	1585.47	1583.97	1590.78			
	1585.06	1583.56	1590.69			
3+300	1584.44	1582.94	1590.59			
	1583.85	1582.35	1590.50			
	1583.43	1581.93	1590.40			
	1583.16	1581.66	1590.31			
3+400	1582.93	1581.43	1590.21			
	1582.97	1581.47	1590.12			
	1583.09	1581.59	1590.03			
	1583.27	1581.77	1589.93			
3+500	1583.44	1581.94	1589.84			
	1583.53	1582.03	1589.60			
	1583.62	1582.12	1589.36			
	1582.79	1581.29	1589.13			
3+600	1581.77	1580.27	1588.89	0.015607M <sup>3</sup> /S	160MM DIA HDPE	
	1579.47	1577.97	1588.65			
	1576.30	1574.80	1588.41			
	1573.27	1571.77	1588.17			
3+700	1570.64	1569.14	1587.93			
	1566.72	1565.22	1587.69			
3+738	1564.94	1563.44	1587.57			

General Notes

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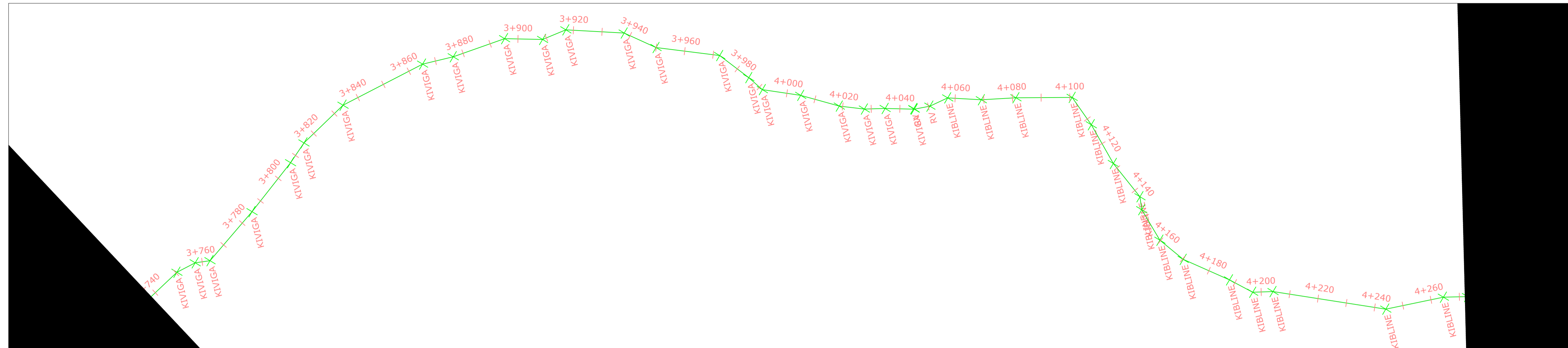
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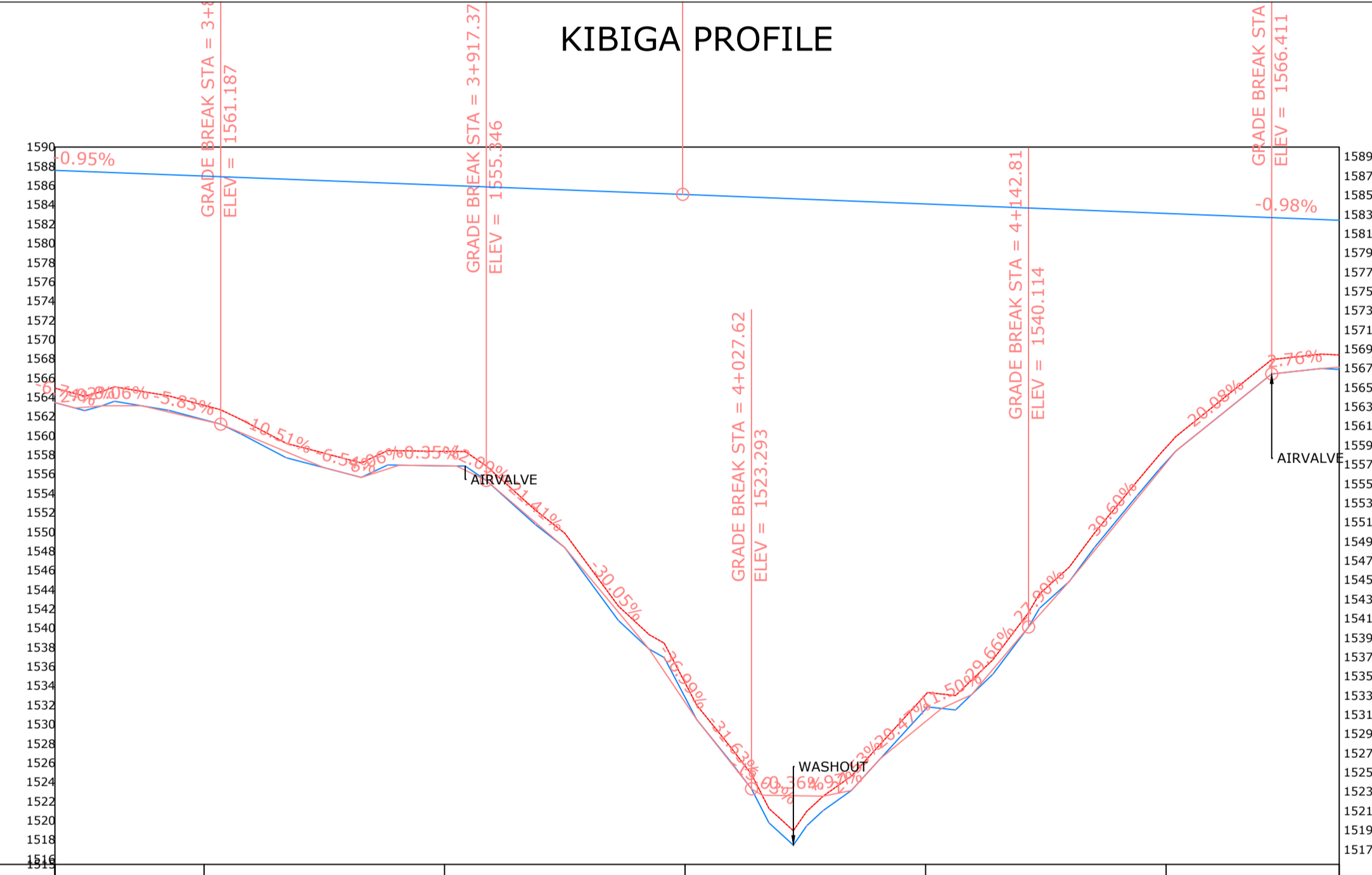
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**Project Name and Address**  
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 RAW WATER SUPPLY  
 CHUKA CONSTITUENCY  
 THARAKA NITHI COUNTY

Project	Sheet
WATER PROJECT	7
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13.04.2022	
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KIBIGA PROFILE



CHAINAGE	3+738	3+800	3+900	4+000	4+100	4+200	4+272
ORIGINAL GROUND LEVEL	1564.94 1564.13	1563.15 1560.41	1558.36 1555.13	1534.30 1525.65	1533.08 1526.23	1558.78 1564.11	1568.39 1568.08
PIPE INVERT LEVEL	1563.44 1562.63	1561.65 1558.91	1556.86 1553.63	1532.80 1524.15	1531.58 1524.73	1557.28 1562.61	1566.89 1566.58
HYDRAULIC GRADE LEVEL	1587.57 1587.45	1587.22 1586.98	1586.74 1586.50	1586.02 1585.78	1584.82 1584.58	1583.10 1582.85	1582.39 1582.14
FLOW PARAMETERS	0.015607M <sup>3</sup> /S						
PIPE INFO	160MM DIA HDPE						
SURVEY REMARKS							

General Notes

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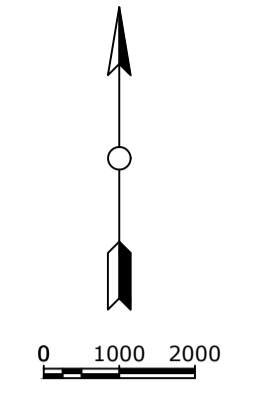
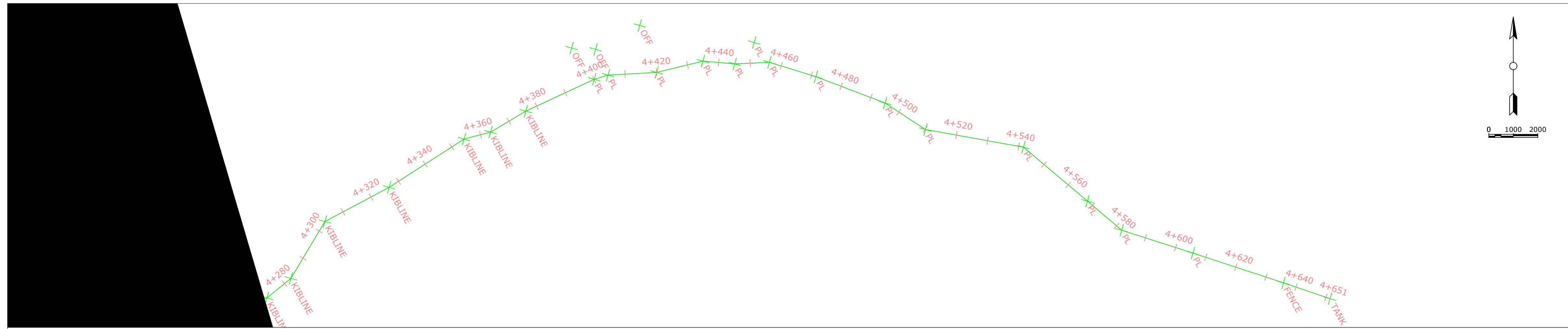
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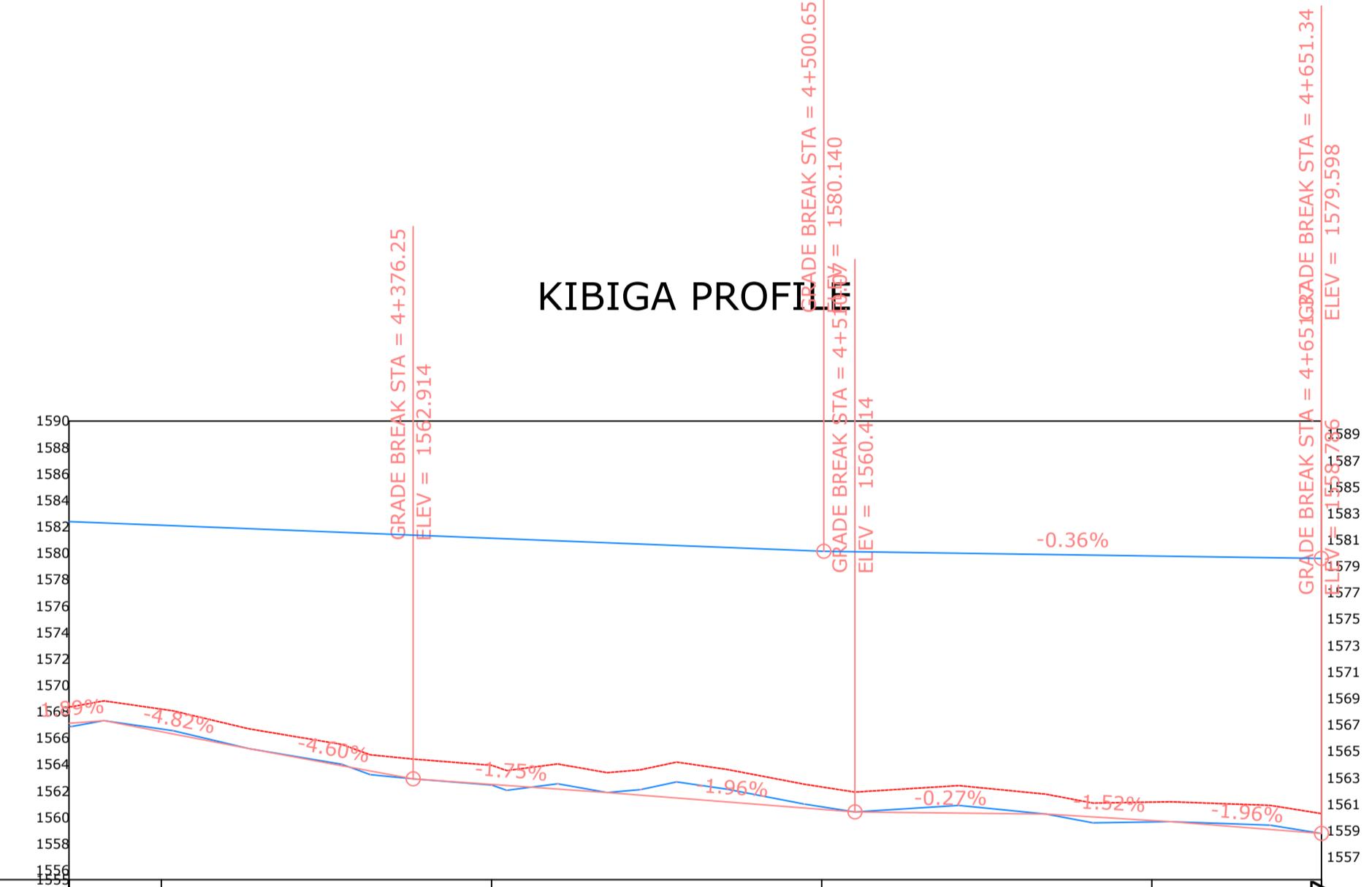
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 RAW WATER SUPPLY  
 CHUKA CONSTITUENCY  
 THARAKA NITHI COUNTY

Project	WATER PROJECT	Sheet	8
Date	13.04.2022		
Scale	1:1000		





### KIBIGA PROFILE



CHAINAGE	4+272	4+300	4+320	4+340	4+360	4+380	4+400	4+420	4+440	4+460	4+480	4+500	4+520	4+540	4+560	4+580	4+600	4+620	4+640	4+651
ORIGINAL GROUND LEVEL	1582.39	1566.89	1568.48	1566.79	1565.72	1564.45	1563.94	1563.82	1563.86	1563.45	1562.15	1562.20	1561.42	1559.66	1559.51	1559.01	1558.79	1558.29	1557.99	1557.37
PIPE INVERT LEVEL	1566.89	1566.69	1565.29	1564.22	1562.95	1562.44	1562.32	1562.36	1561.95	1560.81	1560.65	1560.70	1559.92	1559.66	1559.51	1559.01	1558.79	1558.29	1557.99	1557.37
HYDRAULIC GRADE LEVEL	1582.39	1582.11	1581.87	1581.62	1581.38	1581.13	1580.88	1580.64	1580.39	1580.15	1580.05	1579.96	1579.87	1579.78	1579.69	1579.60	1579.51	1579.42	1579.33	1579.24
FLOW PARAMETERS	0.00462963M <sup>3</sup> /S																			
PIPE INFO	90MM DIA HDPE																			
SURVEY REMARKS	MUKINDURI PLANTATTION FENCE LINE tank site																			

General Notes

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 THARAKA NITHI COUNTY

Project	WATER PROJECT	Sheet	9
Date	13.04.2022		
Scale	1:1000		

General Notes

- NOTES:**
1. CONTOUR LEVELS ARE IN METERS AT TWO METER INTERVALS
  2. GRID VALUES ARE IN METERS AT 200 METER INTERVALS
  3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
  4. FOR FITTING DETAILS SEE DRG. NO. BRT/GM005

**LEGEND:**

- ROAD (TARMAC)
- ROAD / TRACK (EARTH / MURRAM)
- FENCE / HEDGE
- CONTOURS
- ELECTRIC POST
- CULVERT
- GATE
- TEMPORARY STRUCTURES
- BUILDINGS
- K&NHA / K&RRA ROAD BEACON
- PROPOSED TREATED WATER GRAVITY MAIN
- TP10 TRAVERSE POINT & No.
- ⊗ TRIAL HOLE
- 30° HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- RIVER/STREAM
- V.J. VIKING JOHNSON
- GV GATE VALVE
- SV-01 SECTIONAL VALVE & No.
- WO-01 WASHOUT VALVE & No.
- LAV-01 AIR VALVE & No.
- WM WATER METER
- PROPOSED MASONRY CHAMBER
- ▲ DIRECTION (SLOPE MIN. OR 1 IN n)

**ISSUED FOR CONSTRUCTION**

REVISIONS		SIGN	DATE	APPROVED
D	INVERTS AT ROAD CROSSING	BY VJK	15/01	
		CHECKED BY		
		CHECKED BY		
		CHECKED BY		
		CHECKED BY		
		CHECKED BY		

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

ENGINEERS: **MANAGING DIRECTOR  
NYERI WATER AND SANITATION COMPANY**  
P.O BOX 1520 - 10100,  
NYERI, KENYA

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

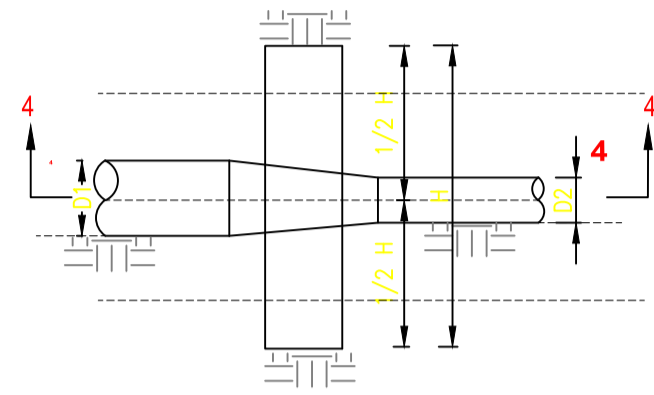
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No.	Revision/Issue	Date
	CONTRACT No.	

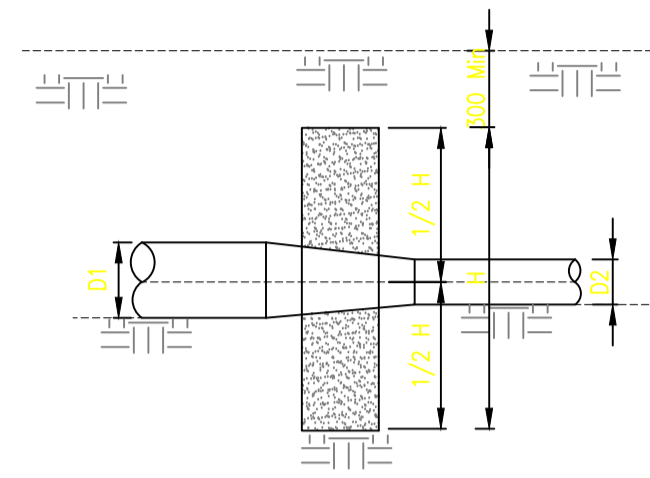
Firm Name and Address  
**MAJI HOUSE, ALONG BADEN POWELL  
ROAD**  
P.O. BOX, 1292 – 10100,  
Nyeri, Kenya  
+254 724 259 891, +254 61 2034118  
+254 61-2032282  
Email: info@tanawwda.go.ke  
Website: www.tanawwda.go.ke

Project Name and Address  
**DETAILS  
OF  
ANCHOR AND THRUST  
BLOCKS**

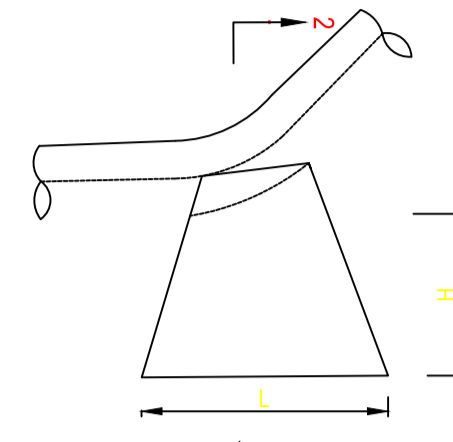
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Date **14.04.2022**  
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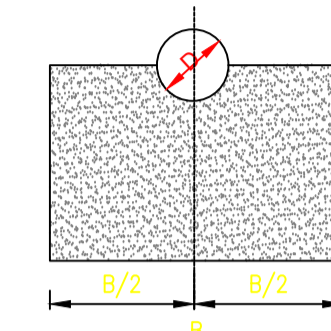
PLAN  
REDUCER – TYPE RD



SECTION 4 – 4



ELEVATION



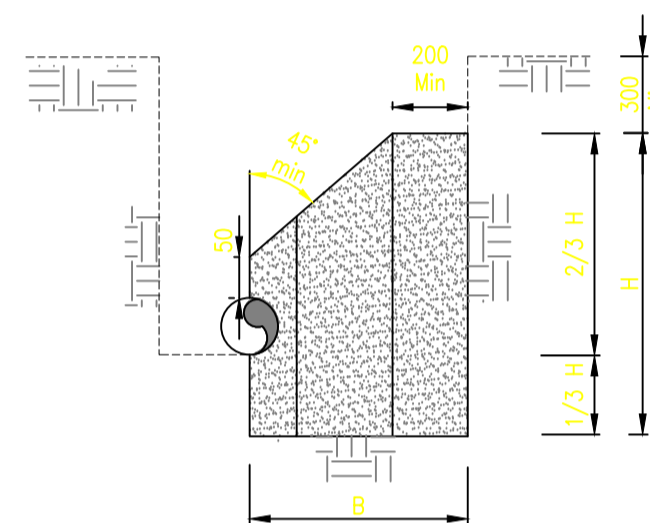
SECTION 5 – 5

VERTICAL ANCHOR BLOCKS AT DEPRESSION (TYPE DV)

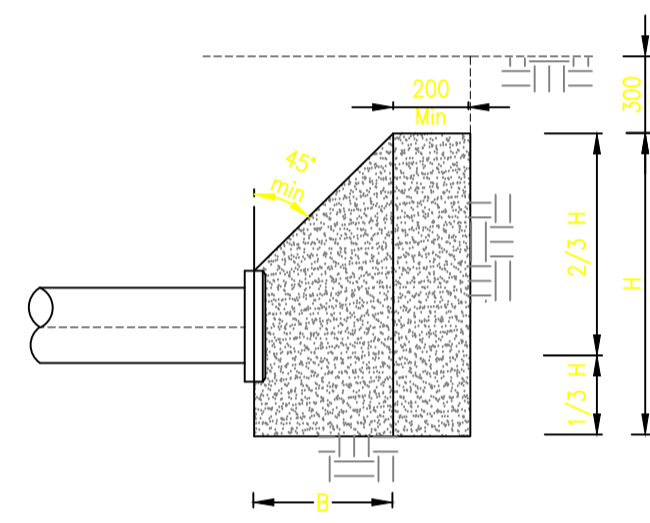
4 1 No. 140mm DIA. HDPE PIPE (LENGTH TO SUIT ON SITE)

Pipe Diameter (mm)	Pipe Pressure (kg)	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
80.00	10.00																				
100.00	15.00																				
150.00	22.50																				
200.00	30.00																				
250.00	37.50																				
300.00	45.00																				

Pipe Diameter (mm)	Pipe Pressure (kg)	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
80.00	10.00																				
100.00	15.00																				
150.00	22.50																				
200.00	30.00																				
250.00	37.50																				
300.00	45.00																				



SECTION 1 - 1



SECTION 3 – 3

END CAPS

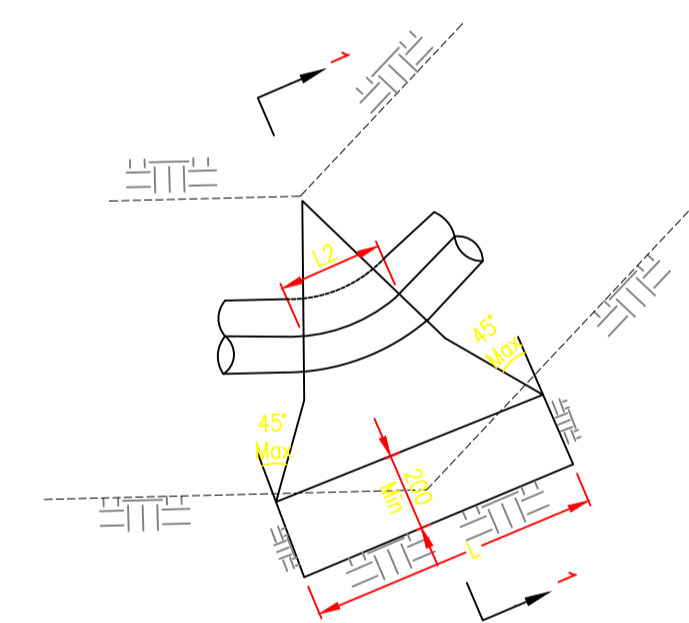
Pipe Diameter (mm)	Pipe Pressure (kg)	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
80.00	10.00																				
100.00	15.00																				
150.00	22.50																				
200.00	30.00																				
250.00	37.50																				
300.00	45.00																				

Pipe Diameter (mm)	Pipe Pressure (kg)	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
80.00	10.00																				
100.00	15.00																				
150.00	22.50																				
200.00	30.00																				
250.00	37.50																				
300.00	45.00																				

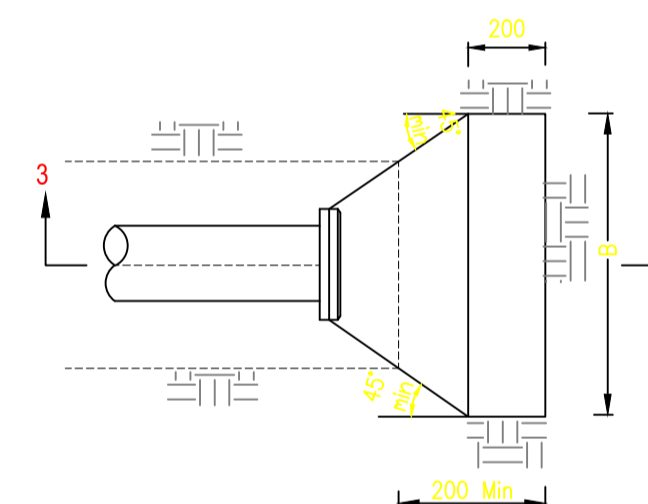
Pipe Diameter (mm)	Pipe Pressure (kg)	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	
80.00	10.00																				
100.00	15.00																				
150.00	22.50																				
200.00	30.00																				
250.00	37.50																				
300.00	45.00																				

**NOTES**

1. ANCHOR BLOCKS CONSTRUCTED FROM UNREINFORCED CONCRETE CLASS 15
2. CONCRETE CAST AGAINST UNDISTURBED GROUND. WHERE DISTURBED, THE SOIL AROUND ANCHOR BLOCK TO BE REMOVED AND FILLED WITH CONCRETE BEFORE THE PIPE IS PRESSURE TESTED OR COMPACTED TO NOT LESS THAN 95% MAX.
3. BENDS LESS THAN 5° TAKEN UP BY THE FLEXIBLE PIPE JOINTS WHERE PRACTICABLE.
4. 11.25° BENDS TO BE USED FOR BENDS GREATER THAN OR EQUAL TO 6° AND LESS THAN OR EQUAL TO 16°.
5. ALL ANCHOR BLOCKS CAST LEAVING ALL PIPE JOINTS FREE.
6. DIAMETERS GIVEN ON THE TABLES ARE PIPE NOMINAL BORE SIZES.
7. ALL DIMENSIONS SHOWN ARE IN MILLIMETERS UNLESS STATED OTHERWISE.
8. ALL BENDS/TAPERS TEES WRAPPED WITH POLYTHENE SHEET GAUGE 500.

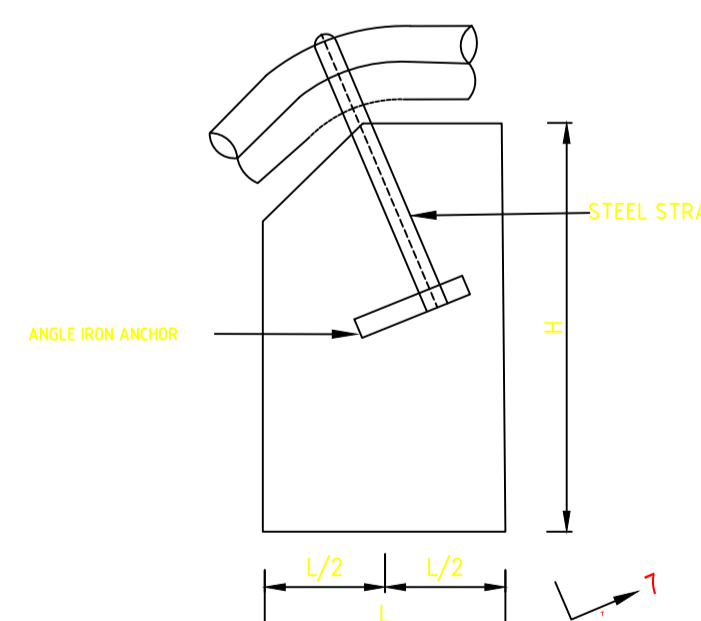


PLAN PLAN  
HORIZONTAL BEND –TYPE HB  
HORIZONTAL BEND –TYPE HB



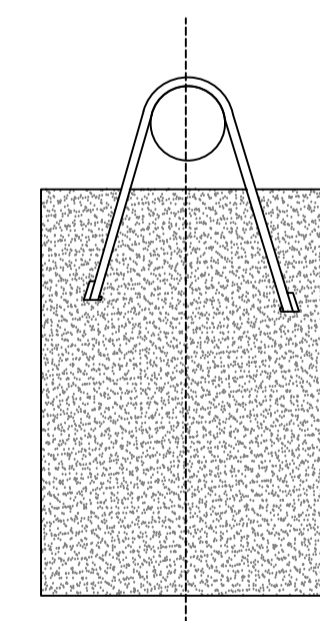
SECTION 2 – 2

TEES – TYPE TV

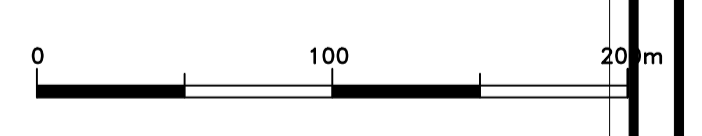
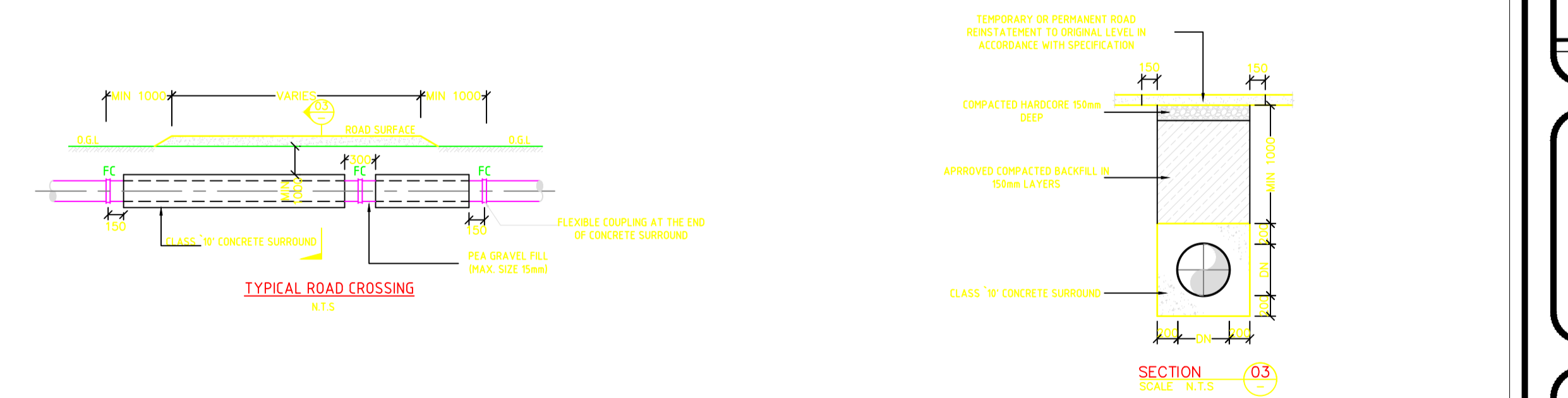
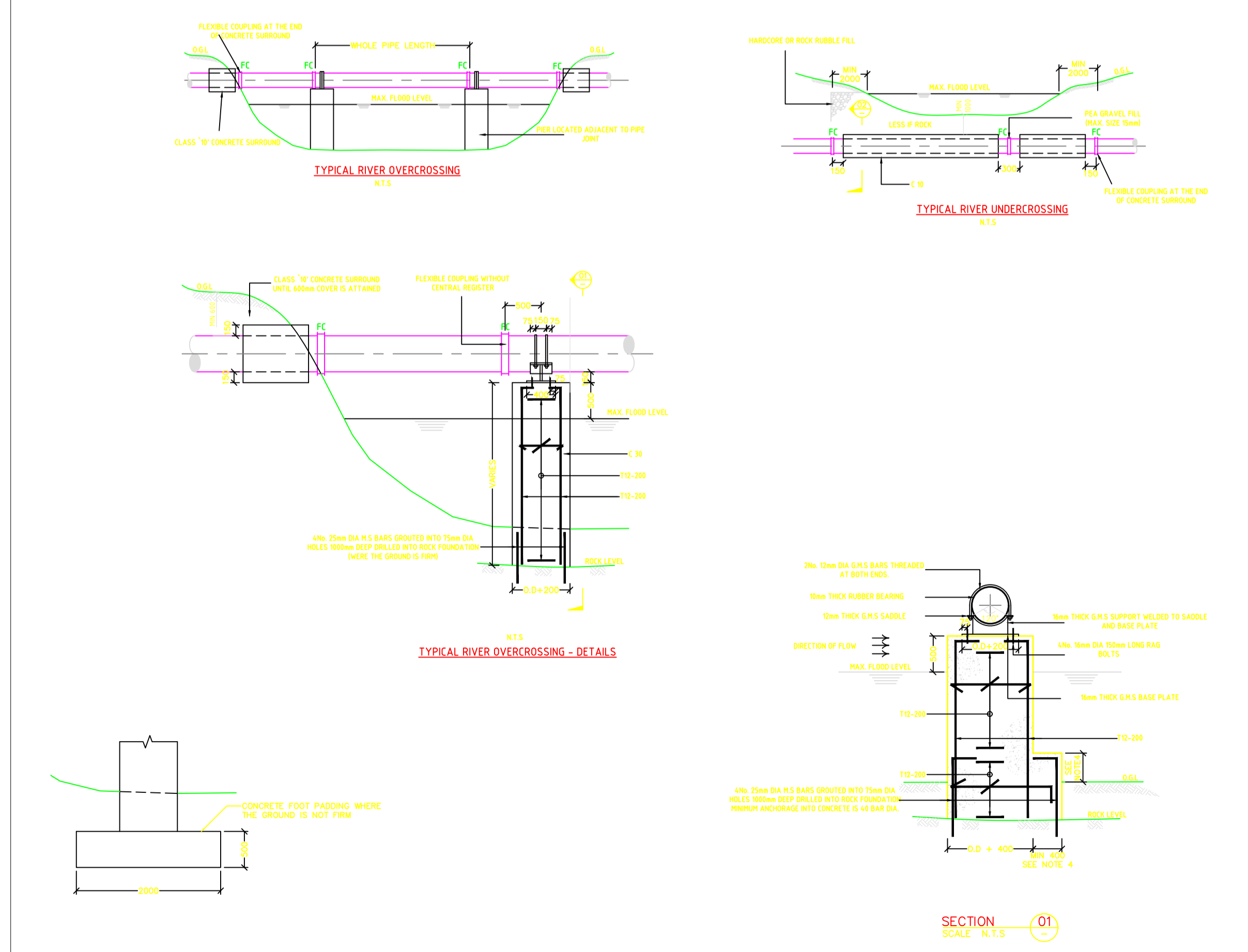
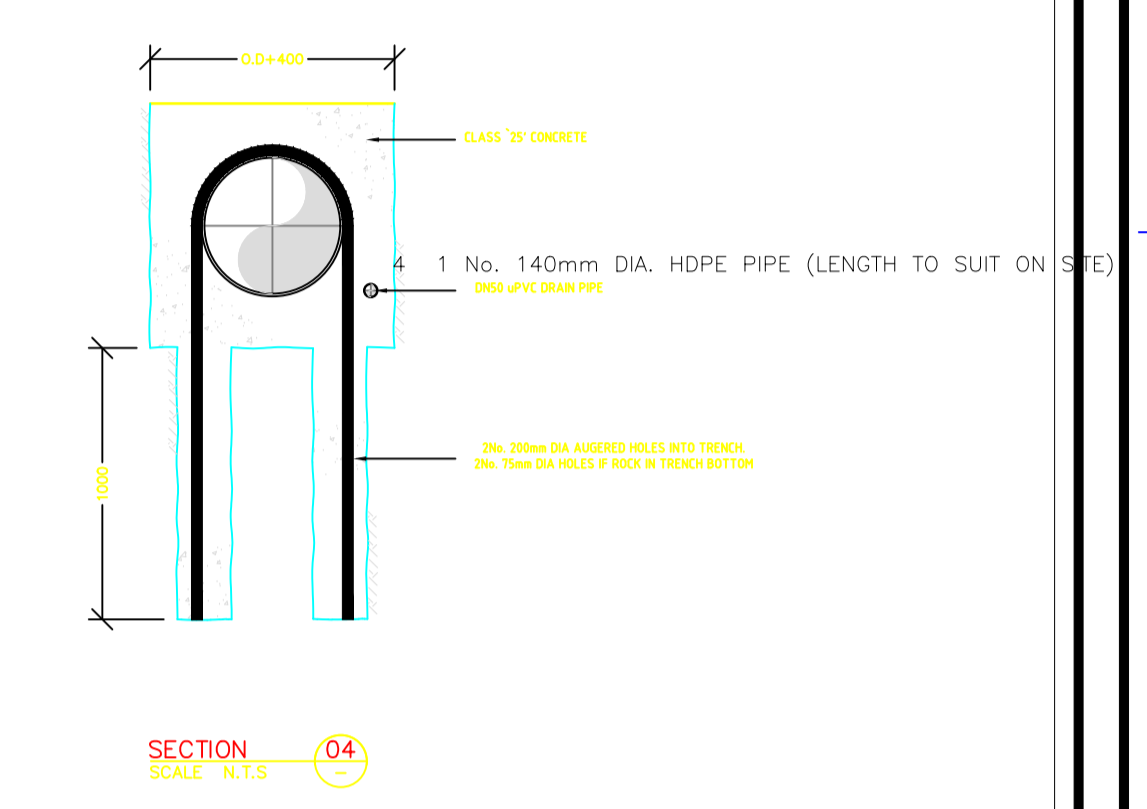
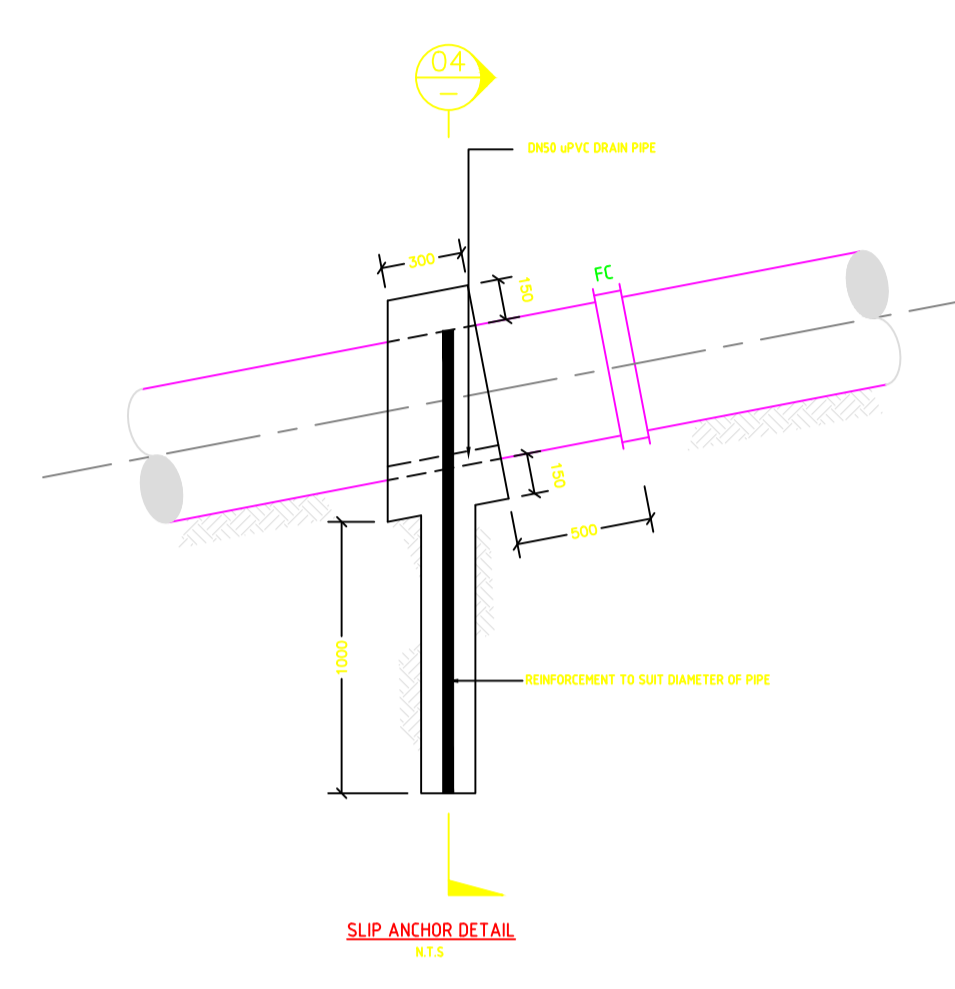
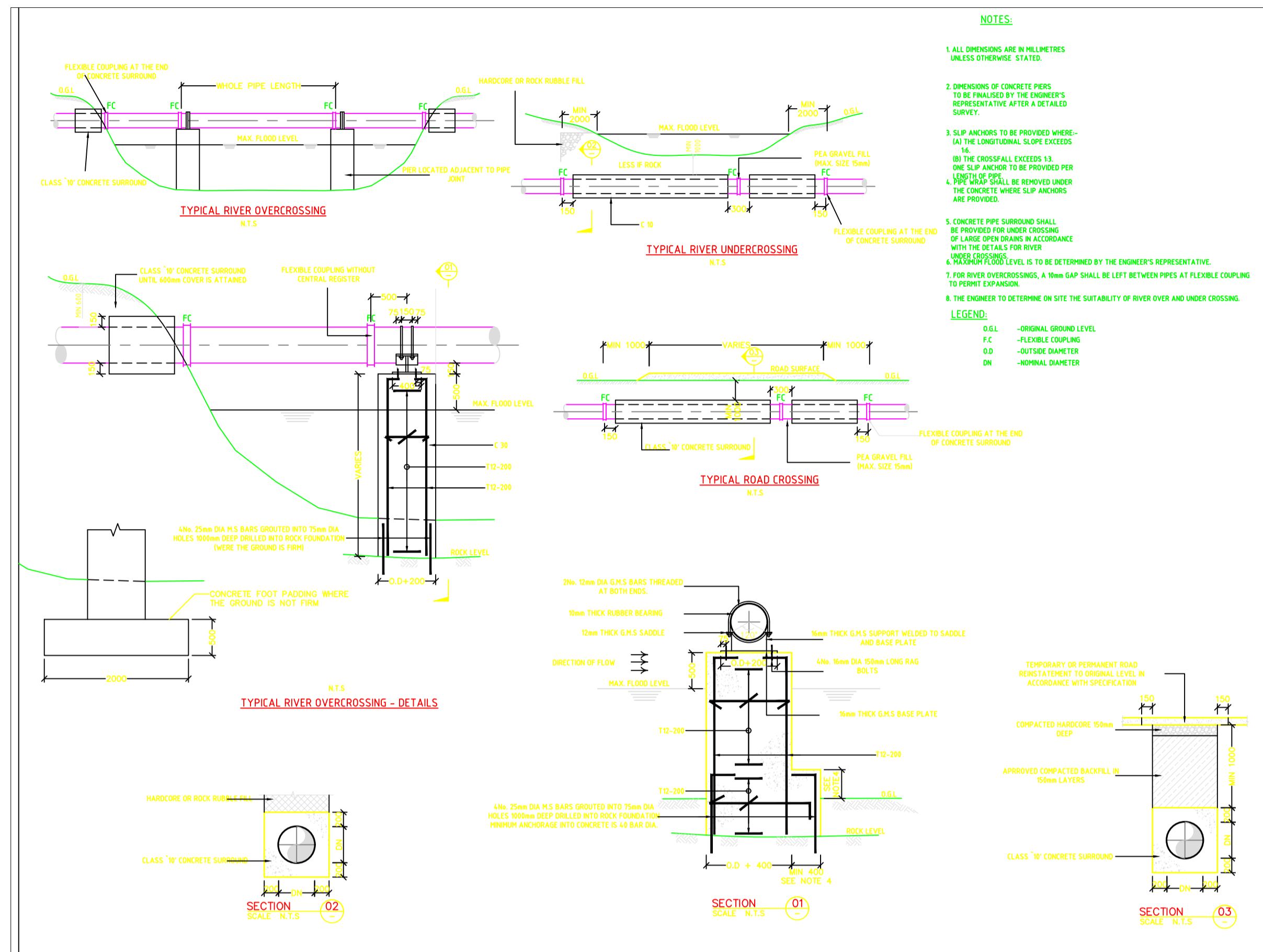


ELEVATION

VERTICAL ANCHOR BLOCKS AT CRESTS (TYPE CV)



SECTION 7 – 7



General Notes

**NOTES:**

1. CONTOUR LEVELS ARE IN METERS AT TWO METER INTERVALS
2. GRID VALUES ARE IN METERS AT 200 METER INTERVALS
3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
4. FOR FITTING DETAILS SEE DRG. NO. BRT/GM005

**LEGEND:**

- ROAD (TARMAC)
- ROAD / TRACK (EARTH / MURRAM)
- FENCE / HEDGE
- CONTOURS
- ELECTRIC POST
- CULVERT
- GATE
- TEMPORARY STRUCTURES
- BUILDINGS
- KaNHHA / KeRRA ROAD BEACON
- PROPOSED TREATED WATER GRAVITY MAIN
- TP10 TRAVERSE POINT & No.
- TRIAL HOLE
- 30° HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- RIVER/STREAM
- V.J. VIKING JOHNSON
- GV GATE VALVE
- SV-01 SECTIONAL VALVE & No.
- WO-01 WASHOUT VALVE & No.
- LAV-01 AIR VALVE & No.
- WM WATER METER
- PROPOSED MASONRY CHAMBER

DIRECTION (SLOPE MIN. OR 1 IN n)

**ISSUED FOR CONSTRUCTION**

R E V I S I O N S		SIGN	DATE	APPROVED
D	INVERTS AT ROAD CROSSING	BY	VJK	15/01
		CHECKED		
		BY		
		CHECKED		
		BY		
		CHECKED		
		BY		
		CHECKED		

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

**ENGINEERS:** MANAGING DIRECTOR  
NYERI WATER AND SANITATION COMPANY  
P.O BOX 1520 - 10100, NYERI, KENYA

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

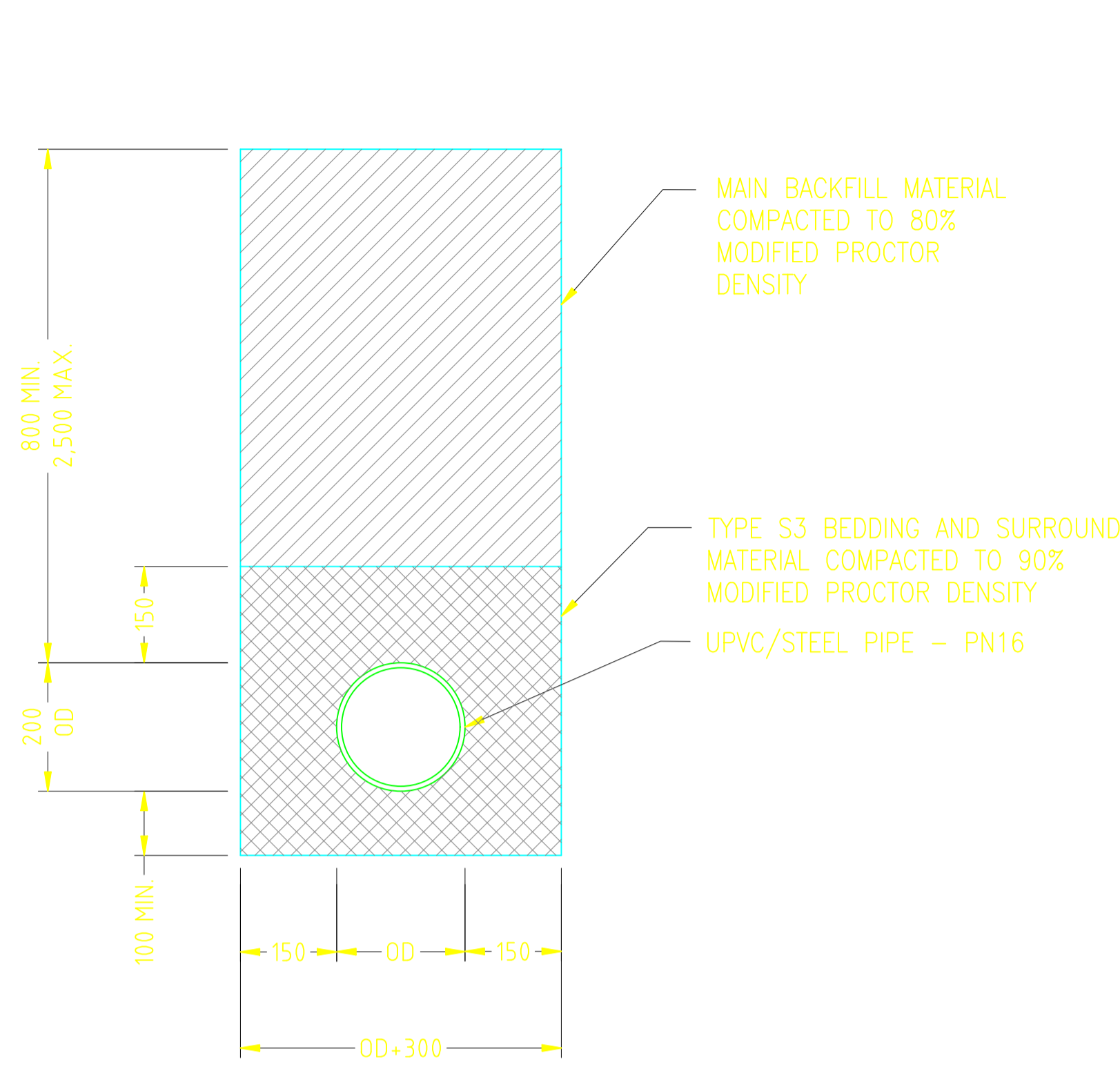
**PROJECT TITLE:**

No.	Revision/Issue	Date
	CONTRACT No.	

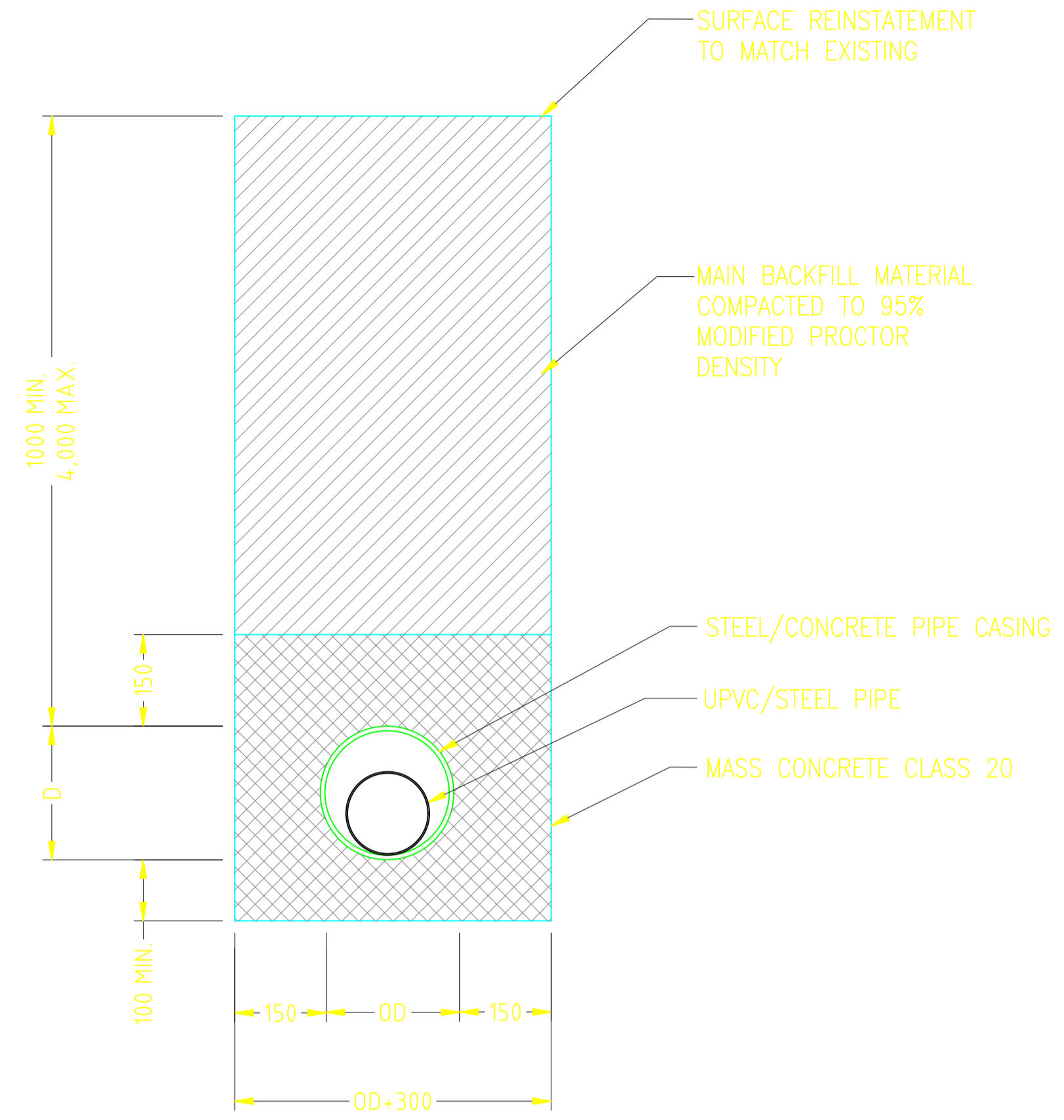
**Firm Name and Address:**  
MAJI HOUSE, ALONG BADEN POWELL ROAD  
P.O. BOX, 1292 - 10100.  
Nyeri, Kenya  
+254 724 259 891, +254 61 2034118  
+254 61-2032282  
Email: info@fanawwda.go.ke  
Website: www.fanawwda.go.ke

**Project Name and Address:**  
TYPE OF RIVER CROSSING

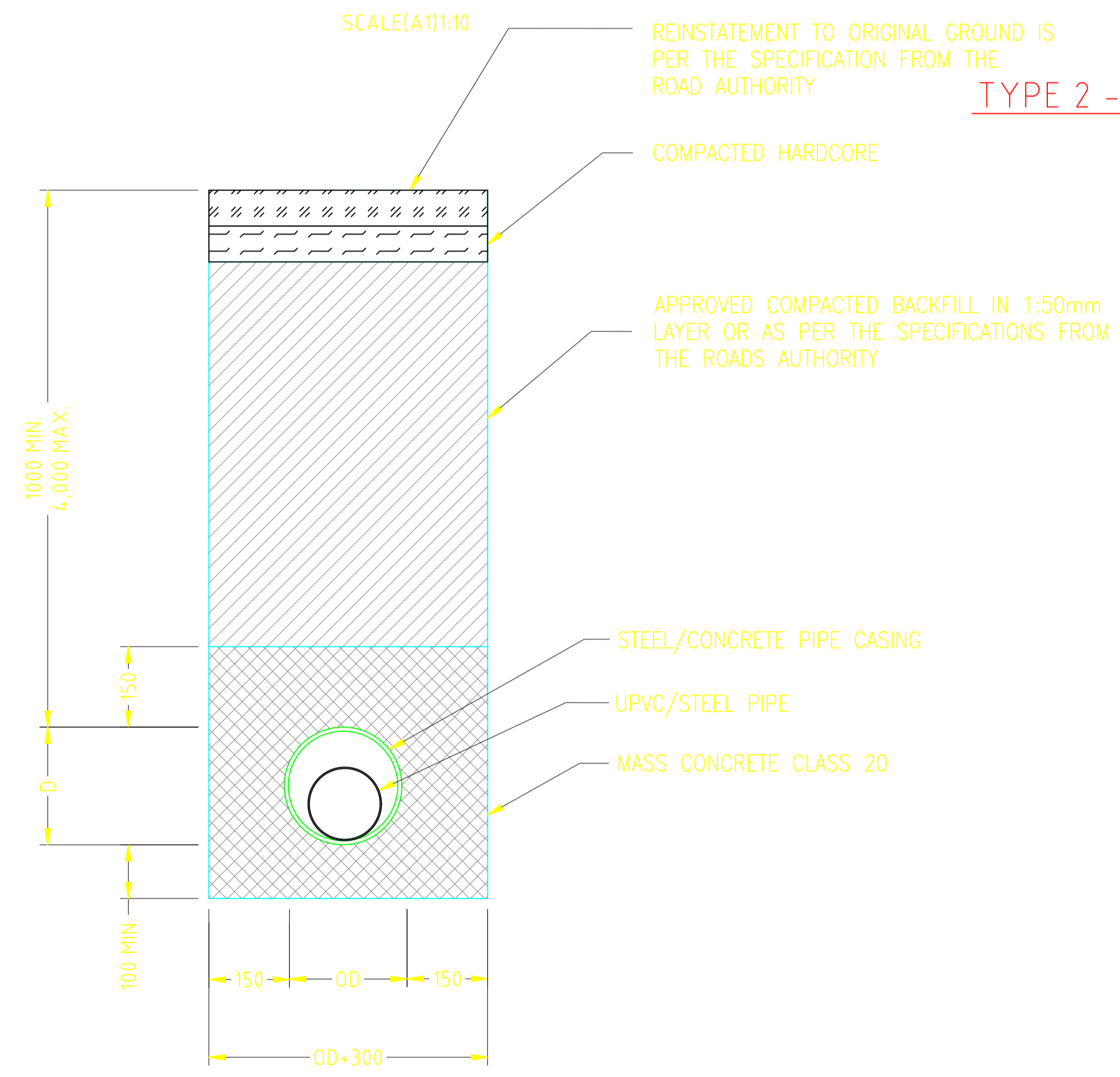
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<b>Date</b> 14.04.2022	
<b>Scale</b> 1:1000	



**TYPE 1 - PIPE ACROSS OPEN GROUND**



**TYPE 2 - PIPE ACROSS EARTH AND GRAVEL ROADS**



**TYPE 3 - PIPE ACROSS TARMAc ROAD**

**NOTES**

1. TYPE S1 BEDDING AND SURROUND TO BE SINGLE SIZED GRANULAR MATERIAL.
2. TYPE S2 BEDDING AND SURROUND TO BE GRADED GRANULAR MATERIAL.
3. TYPE S3 BEDDING AND SURROUND TO BE SAND AND COARSE GRAINED SOIL WITH LESS THAN 12% FINES.
4. THE MINIMUM WIDTH OF PIPE TRENCH SHALL BE AS INDICATED ON THE DRAWING. THIS DIMENSION WILL BE USED FOR MEASUREMENT OF THE WORK AND NO SEPARATE MEASUREMENT WILL BE TAKEN OR ALLOWED FOR OVERBREAK.
5. THE CONTRACTOR SHALL ADVISE THE ENGINEER WHENEVER TRENCH INVERTS HAVE BEEN EXCAVATED AND TRIMMED AND ARE READY FOR INSPECTION. NO TRENCH INVERT SHALL BE COVERED WITH BEDDING MATERIAL OR PIPES LAID UNTIL THE INSPECTION HAS BEEN CARRIED OUT AND THE TRENCH INVERT APPROVED.
6. FOR EARTH ROADS CROSSINGS THE ENGINEER SHALL DETERMINE WHETHER TO CLASSIFY IT AS TYPE 1 OR TYPE 2 DEPENDING ON THE TRAFFIC SIZE.

General Notes

**NOTES:**

1. CONTOUR LEVELS ARE IN METERS AT TWO METER INTERVALS
2. GRID VALUES ARE IN METERS AT 200 METER INTERVALS
3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
4. FOR FITTING DETAILS SEE DRG. NO. BRT/GM005

**LEGEND:**

- ROAD (TARMAC)
- ROAD / TRACK (EARTH / MURRAM)
- FENCE / HEDGE
- CONTOURS
- ELECTRIC POST
- CULVERT
- GATE
- TEMPORARY STRUCTURES
- BUILDINGS
- KeNHA / KeRRA ROAD BEACON
- PROPOSED TREATED WATER GRAVITY MAIN
- TP10 TRAVERSE POINT & No.
- TRIAL HOLE
- 30° HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- RIVER/STREAM
- V.J. VIKING JOHNSON
- GV GATE VALVE
- SV-01 SECTIONAL VALVE & No.
- WO-01 WASHOUT VALVE & No.
- LAV-01 AIR VALVE & No.
- WM WATER METER
- PROPOSED MASONRY CHAMBER
- DIRECTION (SLOPE MIN. OR 1 IN n)

**ISSUED FOR CONSTRUCTION**

REV	BY	CHECKED	DATE	APPROVED
D			15/01	

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

ENGINEERS: **MANAGING DIRECTOR  
NYERI WATER AND SANITATION COMPANY**  
P.O BOX 1520 - 10100,  
NYERI, KENYA

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

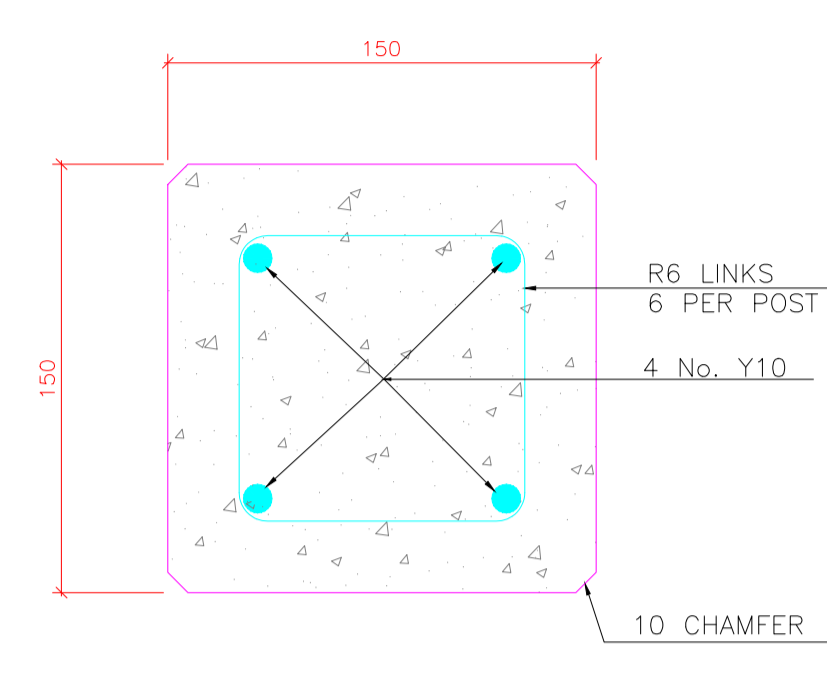
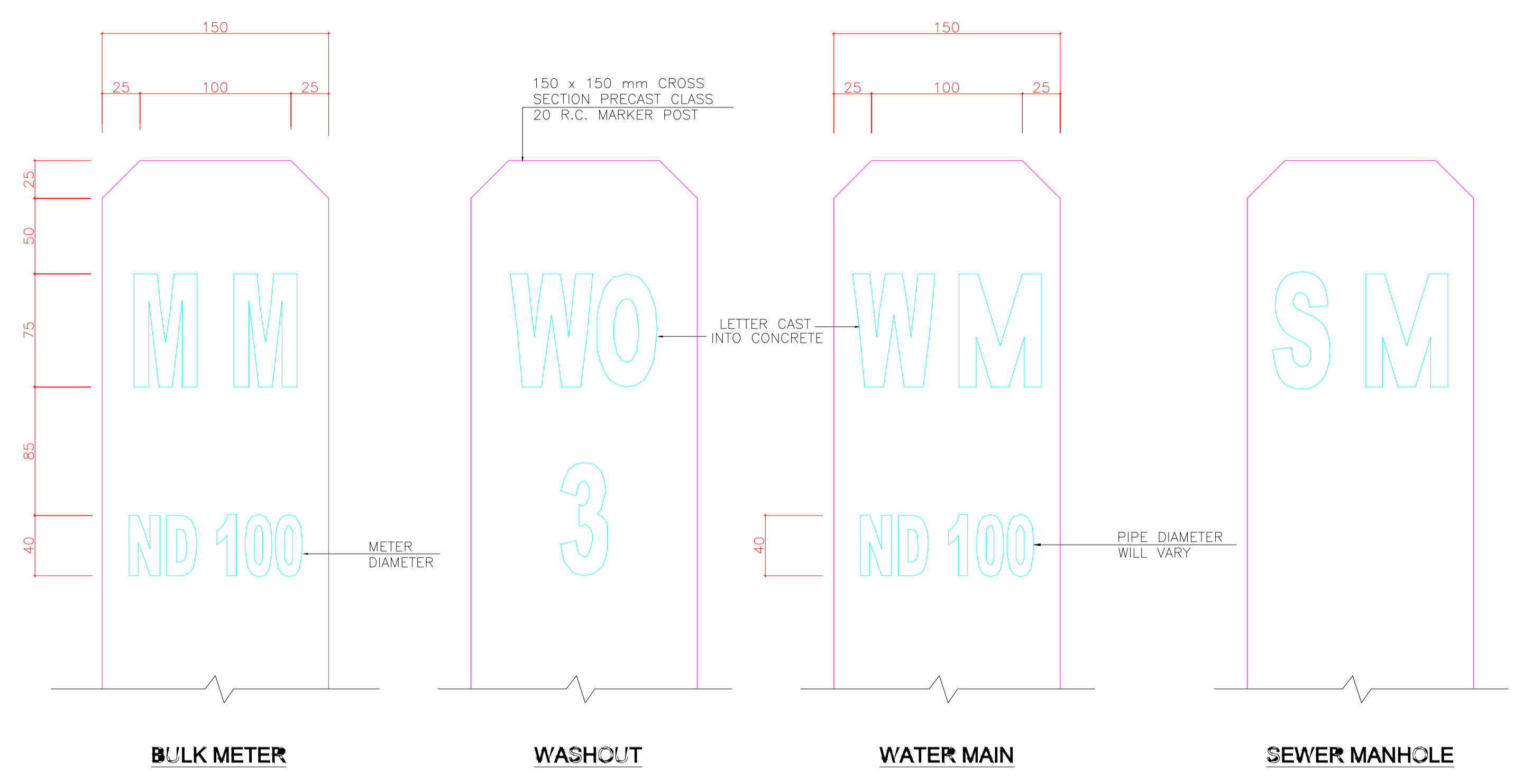
PROJECT TITLE:

No.	Revision/Issue	Date

Firm Name and Address  
**MAJI HOUSE, ALONG BADEN  
POWELL ROAD  
P.O. BOX, 1292 -10100,  
Nyeri, Kenya  
+254 724 259 891,+254 61  
2034118  
+254 61-2032282  
Email: info@tanawwda.go.ke  
Website: www.tanawwda.go.ke**

Project Name and Address  
**TYPE  
OF  
ROAD  
CROSSING**

Project <b>WATER PROJECT</b>	Sheet
Date 14.04.2022	
Scale 1:1000	

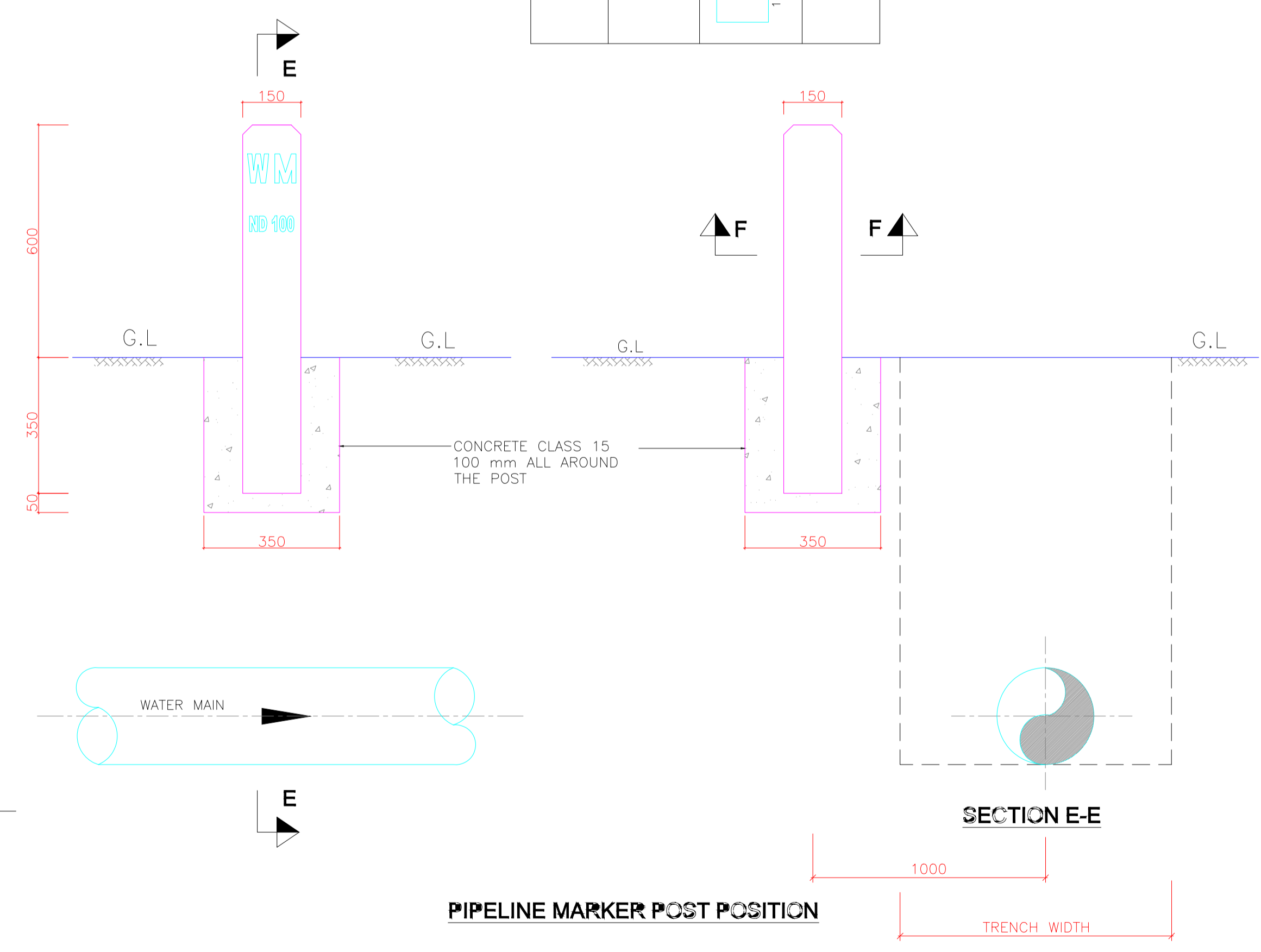
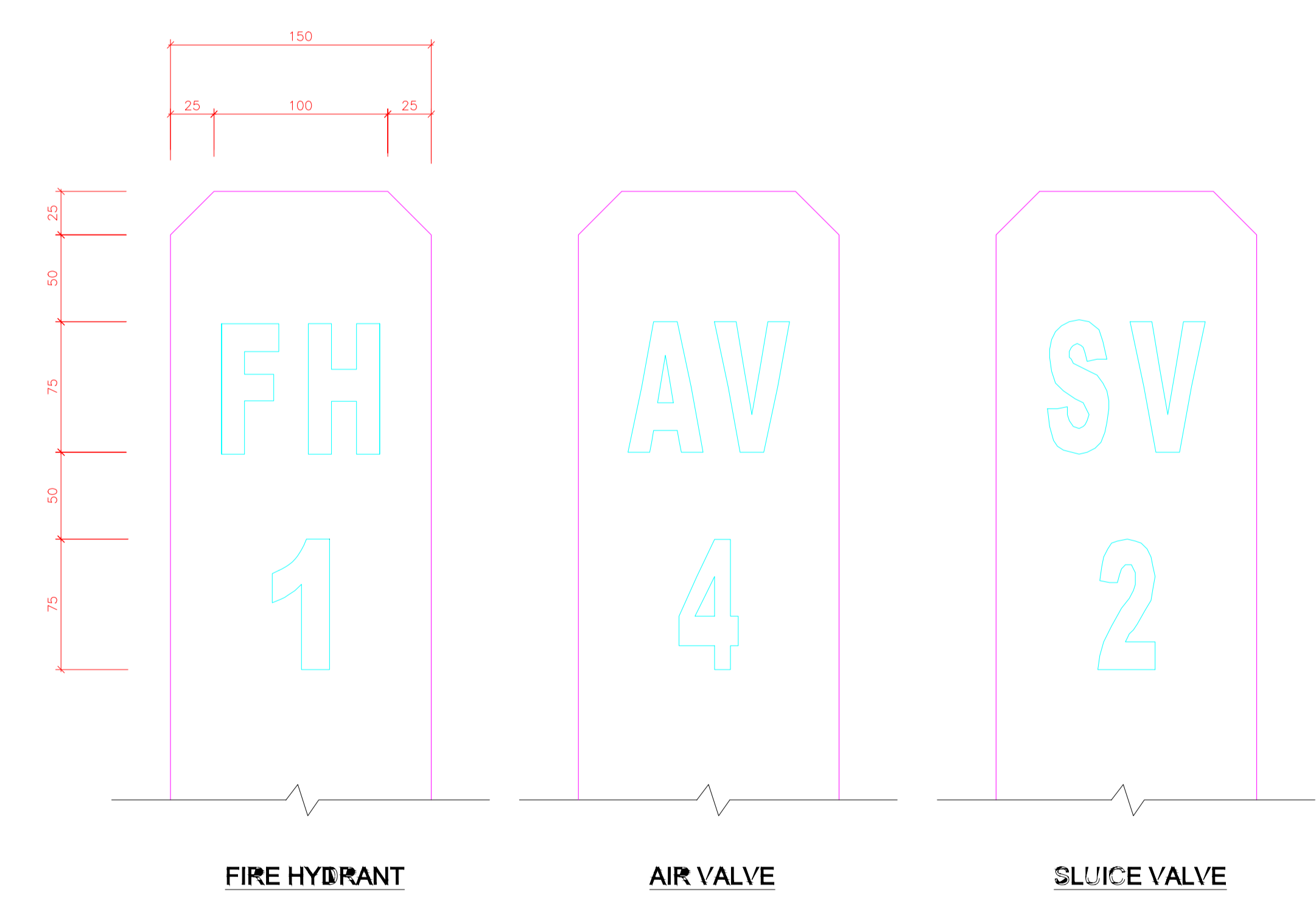


SECTION F-F  
1:2.5

**BAR BENDING SCHEDULE**

BAR	Nb. OFF	TYPE	LENGTH
Y10	4	STRAIGHT	1000
R6	6		500

1. THE RESPECTIVE INSCRIPTION TO BE MADE ONLY ON ONE FACE OF INDICATOR POST FACING THE ACCESS ROAD.
2. ALL STRUCTURAL CONCRETE TO BE CLASS 20 ALL OTHER CONCRETE TO BE CLASS 15.
3. INDICATOR POST TO BE PLACED AT ALL APPURTENANCE LOCATIONS, AND AT INTERVALS OF 250mm Ø ALONG PIPE (LENGTH TO SUIT ON SITE) WATER MAINS.
4. LETTERS TO BE INSCRIBED ON INDICATOR POLES SHOULD FACE ACCESS ROAD AND READ AS FOLLOWS:  
 AV FOR AIR VALVE  
 SV FOR SECTION VALVE  
 WO FOR WASHOUT  
 FH FOR FIRE HYDRANT  
 MM FOR MASTER METER  
 WM FOR WATER MAIN  
 SM FOR SEWER MANHOLE



**MARKER POST DETAILS**  
1:2.5

**PIPELINE MARKER POST POSITION**

General Notes

**NOTES:**

1. CONTOUR LEVELS ARE IN METERS AT TWO METER INTERVALS
2. GRID VALUES ARE IN METERS AT 200 METER INTERVALS
3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
4. FOR FITTING DETAILS SEE DRG. NO. BRT/GM005

**LEGEND:**

- ROAD (TARMAC)
- ROAD / TRACK (EARTH / MURRAM)
- FENCE / HEDGE
- 1480 --- CONTOURS
- ELECTRIC POST
- CULVERT
- GATE
- TEMPORARY STRUCTURES
- BUILDINGS
- KENYA / KERRA ROAD BEACON
- PROPOSED TREATED WATER GRAVITY MAIN
- TP10 --- TRAVERSE POINT & No.
- TRIAL HOLE
- 30° --- HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- RIVER/STREAM
- V.J. --- VIKING JOHNSON
- GV --- GATE VALVE
- SV-01 --- SECTIONAL VALVE & No.
- WO-01 --- WASHOUT VALVE & No.
- LAV-01 --- AIR VALVE & No.
- WM --- WATER METER
- PROPOSED MASONRY CHAMBER
- DIRECTION (SLOPE MIN. OR 1 IN n)

**ISSUED FOR CONSTRUCTION**

REVISIONS		SIGN	DATE	APPROVED
D	INVERTS AT ROAD CROSSING	BY VJK	15/01	
		CHECKED BY		
		CHECKED BY		
		CHECKED BY		
		CHECKED BY		
		CHECKED BY		

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

ENGINEERS: **MANAGING DIRECTOR NYERI WATER AND SANITATION COMPANY**  
P.O BOX 1520 - 10100, NYERI, KENYA

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

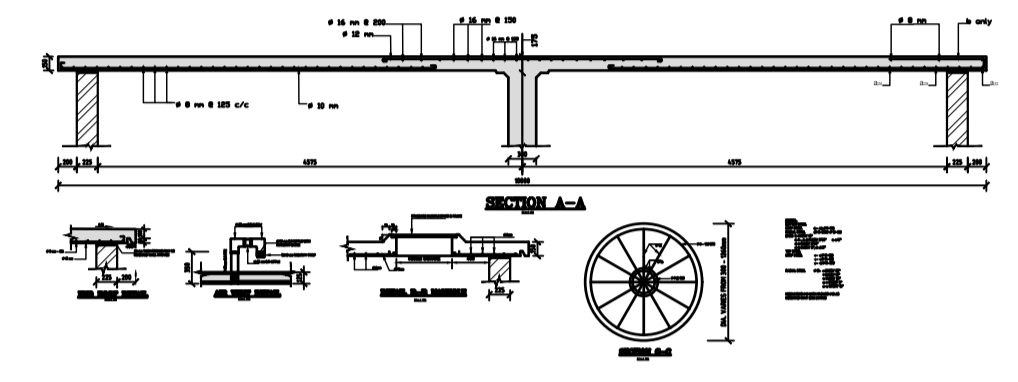
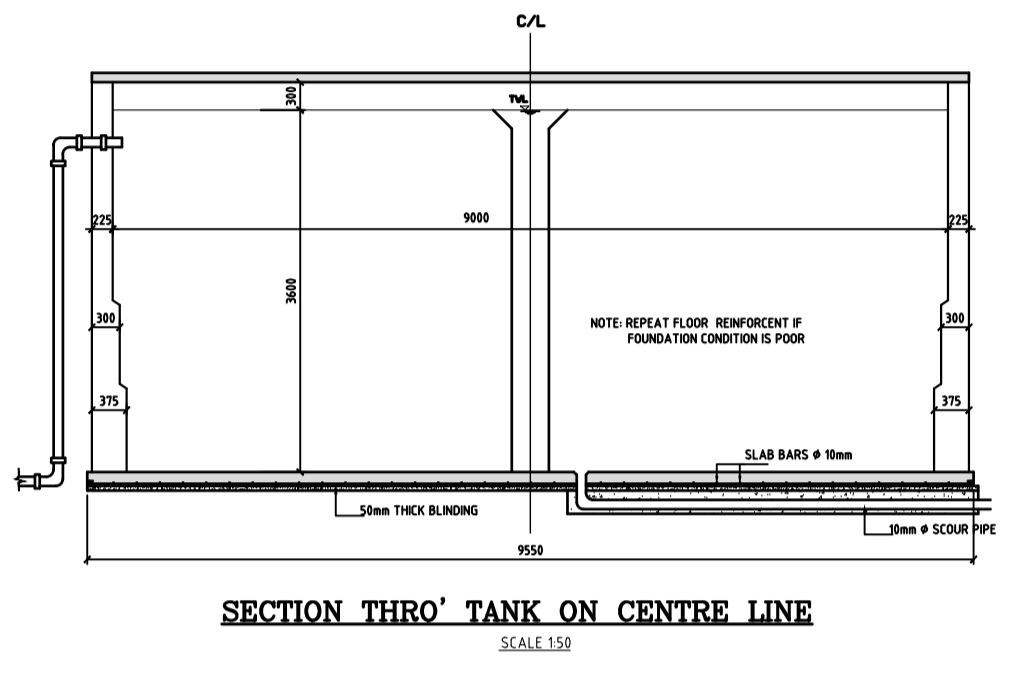
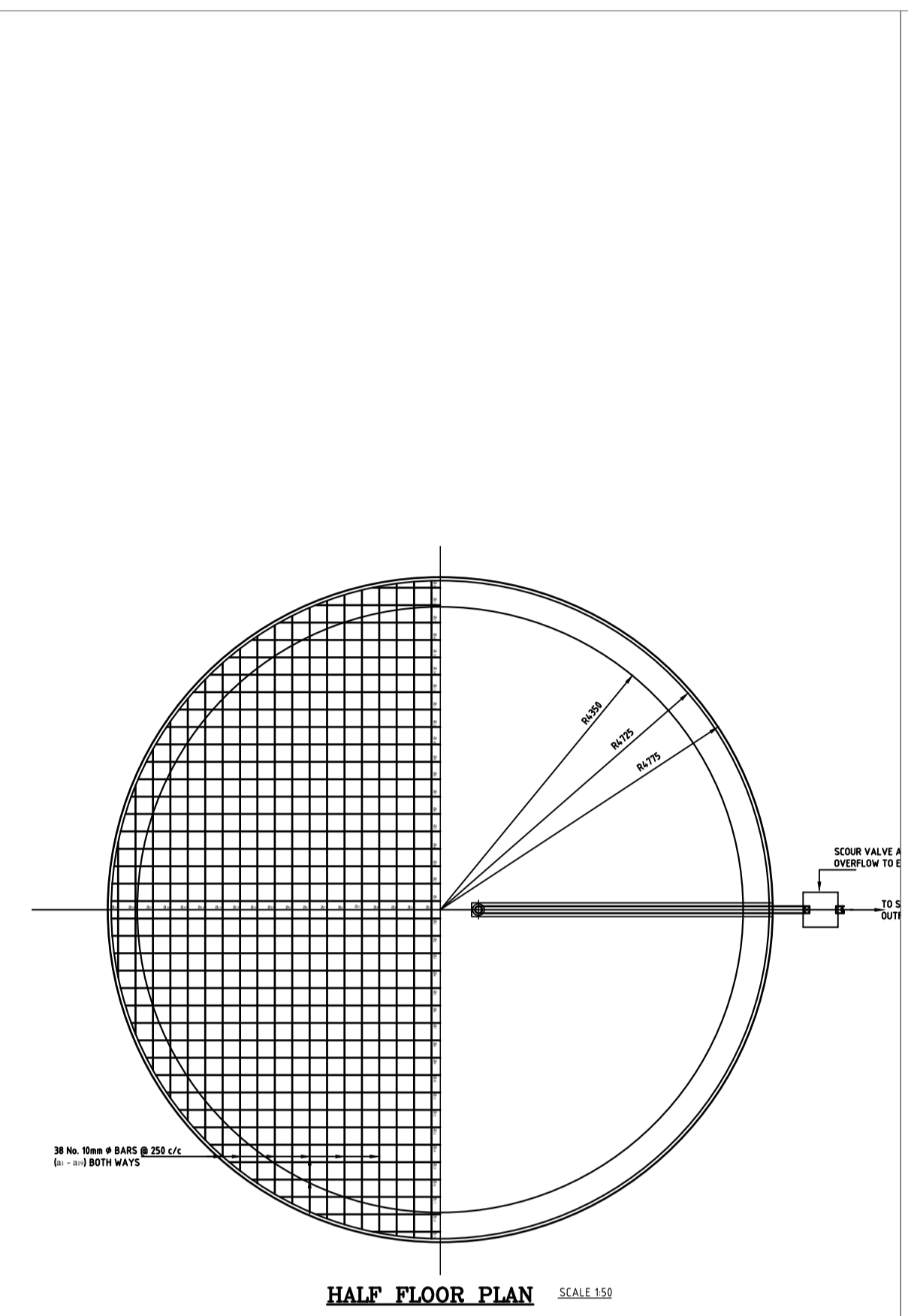
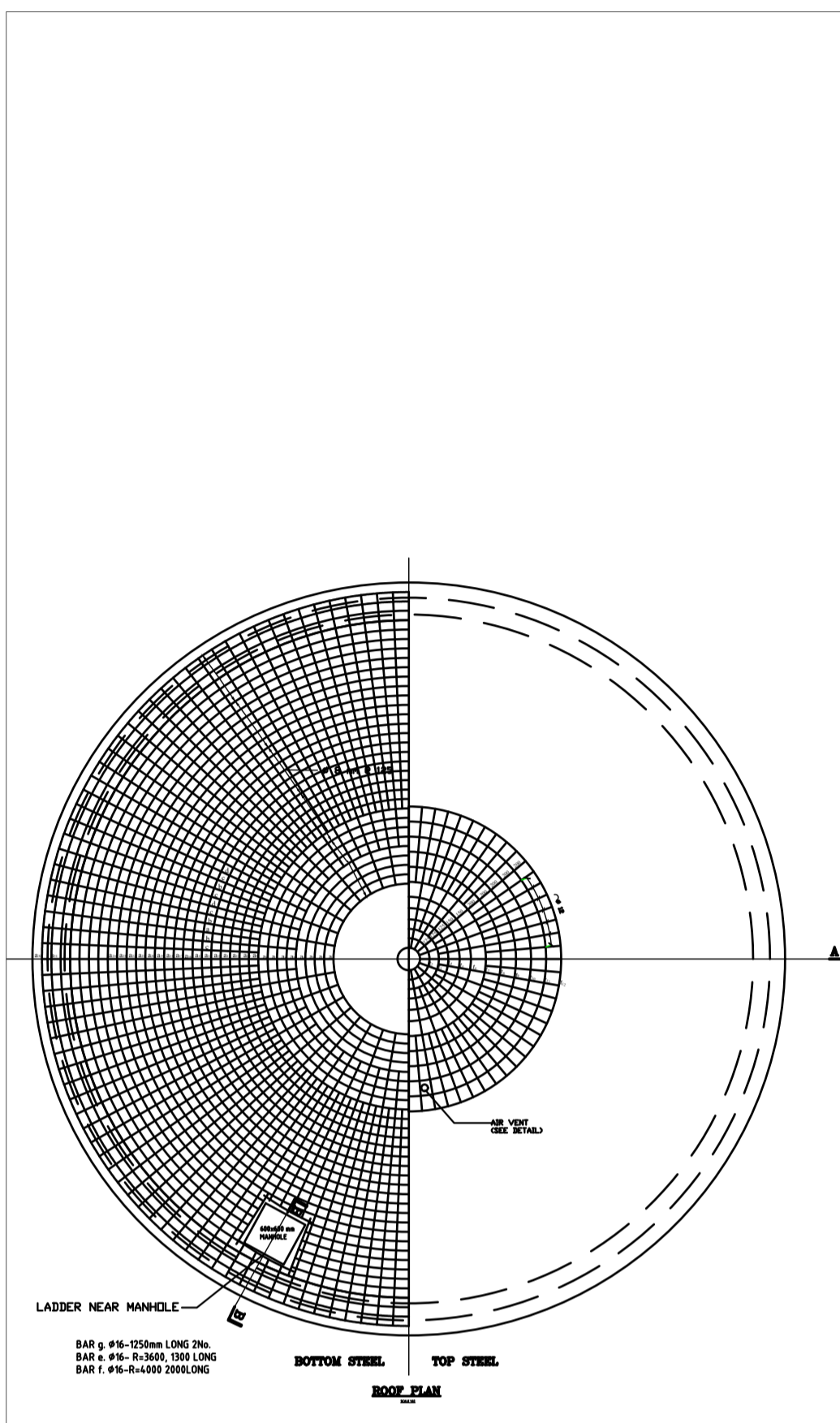
PROJECT TITLE: \_\_\_\_\_

No.	Revision/Issue	Date
	CONTRACT No.	

Client Name and Address:  
MAJI HOUSE, ALONG BADEN POWELL ROAD  
P.O. BOX, 1292 - 10100, Nyeri, Kenya  
+254 724 259 891, +254 41 2034118  
+254 61-2032282  
Email: info@tanawwda.go.ke  
Website: www.tanawwda.go.ke

Project Name and Address:  
**TYPE OF MARKER POST**

Project: **WATER PROJECT** Sheet: \_\_\_\_\_  
Date: 14.04.2022  
Scale: 1:1000



- General Notes**
- CONTOUR LEVELS ARE IN METERS AT TWO METER INTERVALS
  - GRID VALUES ARE IN METERS AT 200 METER INTERVALS
  - GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY
  - FOR FITTING DETAILS SEE DRG. NO. BRT/GM005
- LEGEND:**
- ROAD (TARMAC)
  - ROAD / TRACK (EARTH / MURRAM)
  - FENCE / HEDGE
  - CONTOURS
  - ELECTRIC POST
  - CULVERT
  - GATE
  - TEMPORARY STRUCTURES
  - BUILDINGS
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  - WM WATER METER
  - PROPOSED MASONRY CHAMBER
  - DIRECTION (SLOPE MIN. OR 1 IN n)

**ISSUED FOR CONSTRUCTION**

REV	DESCRIPTION	BY	CHK	DATE	APPROVED
D	INVERTS AT ROAD CROSSING	BY	VJK	15/01	
		BY			
		BY			
		BY			
		BY			
		BY			
		BY			

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

**ENGINEERS:** MANAGING DIRECTOR  
NYERI WATER AND SANITATION COMPANY  
P.O BOX 1520 - 10100,  
NYERI, KENYA

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

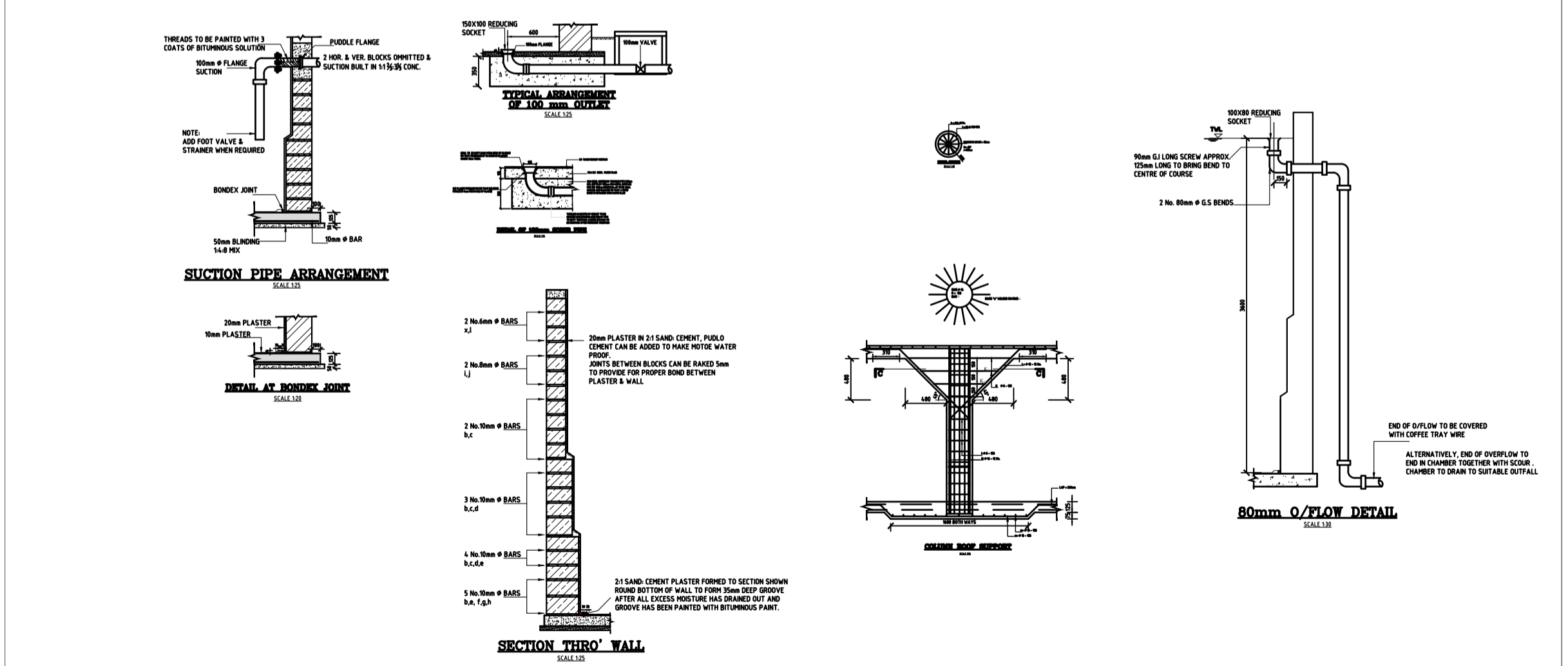
**PROJECT TITLE:**

No.	Revision/Issue	Date
	CONTRACT No.	

Firm Name and Address  
**MAJI HOUSE, ALONG BADEN  
POWELL ROAD  
P.D. BOX, 1292 -10100.  
Nyeri, Kenya  
+254 724 259 891,+254 61  
2034118  
+254 61-2032282  
Email: info@tanawwda.go.ke  
Website: www.tanawwda.go.ke**

Project Name and Address  
**225M<sup>3</sup>  
OF  
MASONRY  
TANK**

Project <b>WATER PROJECT</b>	Sheet
Date <b>14.04.2022</b>	
Scale <b>1:1000</b>	



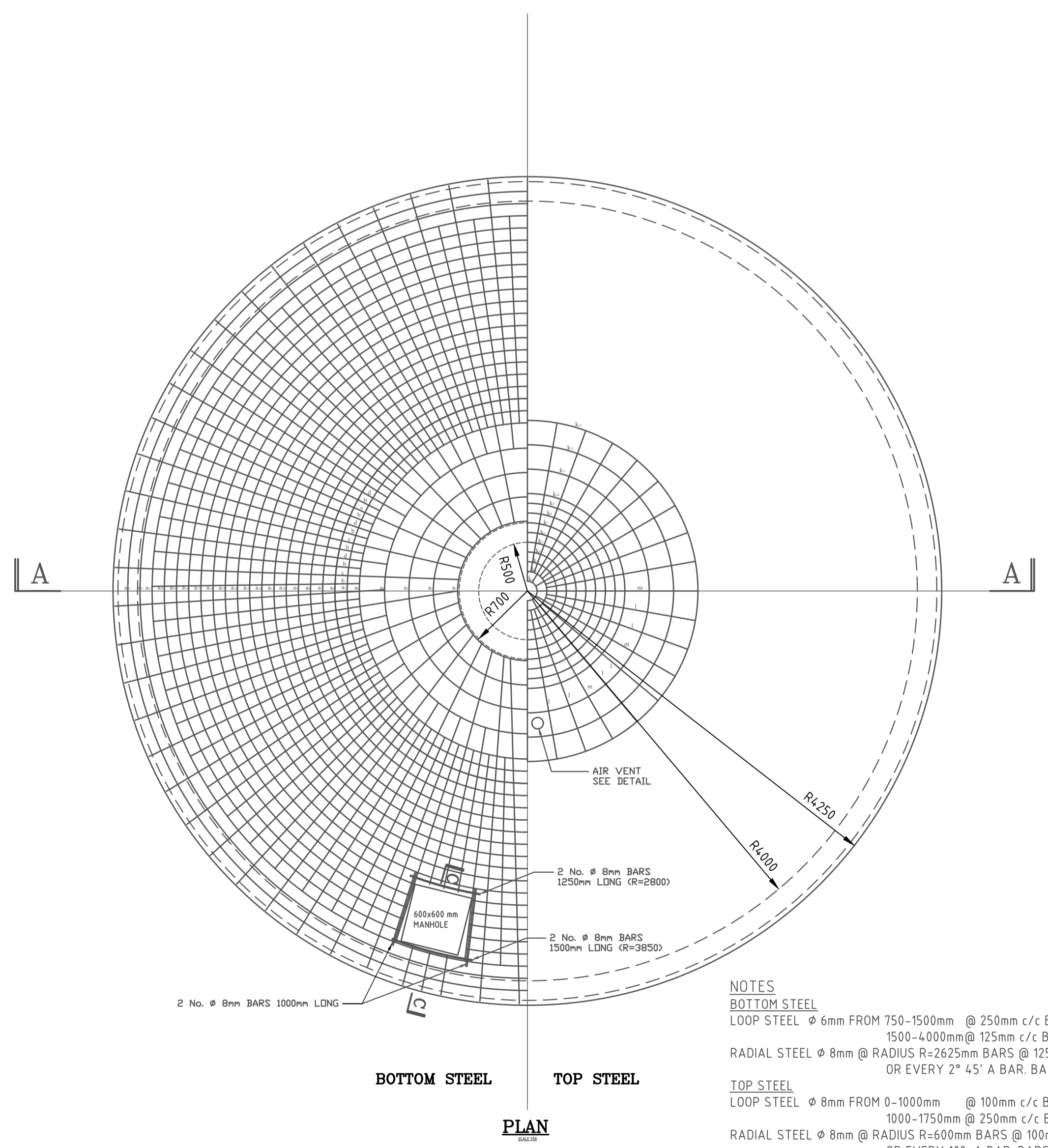
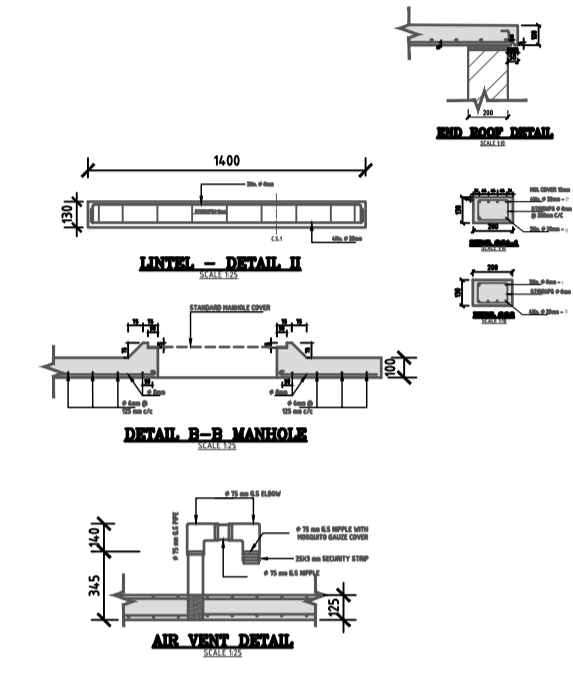
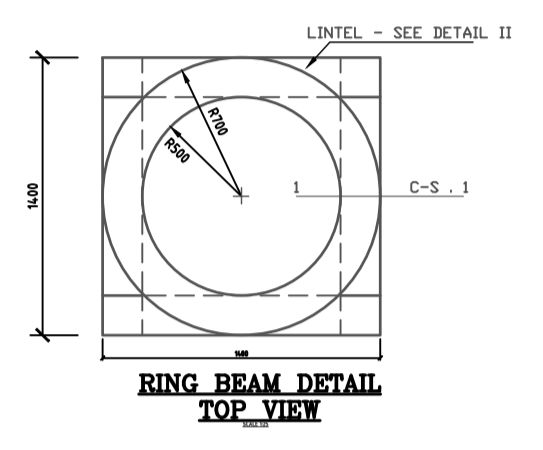
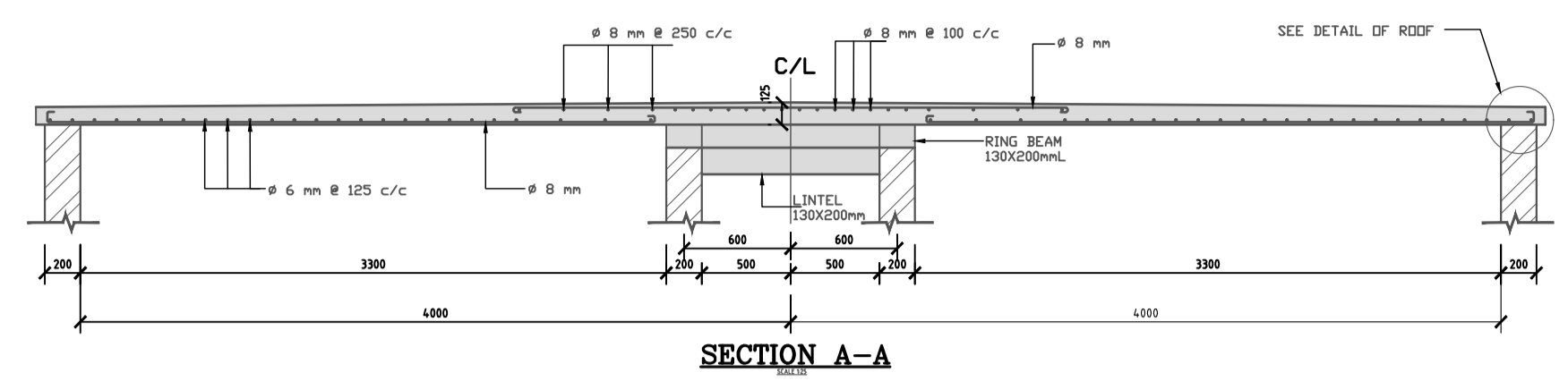
**BAR BENDING SCHEDULE**

DESTINATION	BAR MARK	TOTAL No.	DIAM. (mm)	BAR LENGTH PER BAR MARK (mm)	REINFORCING PER BAR MARK (mm)	BENDING
BOTTOM RADIAL	b	57	12	5000	57000	90°
	c	60	10	3400	20400	90°
	d	72	10	2000	14000	90°
	e	12	10	1900	22800	90°
TOP RADIAL	v	18	10	1900	34200	90°
	w	36	10	1900	68400	90°
	x	18	10	1700	30600	90°
BOTTOM LOOP	aa	32	8	6,283	201056	90°
	ab	4	8	30,830	123320	90°
TOP LOOP	ac	12	10	785	9420	90°
	ad	18	10	12,547	225846	90°
AT MANHOLE	e	1	8	1700	1360	90°
	f	1	8	2000	1600	90°
	g	2	10	2000	4000	90°
COLUMN	b	12	16	4,450	53400	90°
	i	12	12	4,450	53400	90°
COLUMN TOP	k	3	6	2000	12000	90°
	l	12	12	1750	21000	90°
COLUMN BOTTOM	m	26	16	2350	61060	90°
	n	12	12	2350	28200	90°
<b>TOTAL LENGTH</b>				<b>229985.85</b>	<b>251.40</b>	<b>186.45</b>
<b>TOTAL WEIGHT</b>				<b>1842.27kg</b>	<b>339kg</b>	<b>299kg</b>

COMPONENT	No.	BAR MARK	BAR DIA.	LENGTH	BENDING	REMARKS
FLOOR SLAB	1	a	12	2500		
		2	10	3750		
		3	10	4775		
		4	10	5475		
		5	10	4750		
		6	10	4750		
		7	10	1125		
		8	10	2500		
		9	10	8475		
		10	10	8175		
		11	10	8175		
		12	10	8175		
WALL	1	b	16	1300		
		2	16	2850		
		3	16	2995		
		4	10	36475		
		5	10	36275		
		6	10	29800		
		7	10	36250		
		8	10	36250		
		9	10	36250		
		10	10	36250		
		11	10	36250		
		12	10	36250		

**GENERAL NOTES:**

- THE TANK THICK WALLS SHALL BE REINFORCED WITH A STEEL STRAIGHT EDGE UNIT, A DENSE SURFACE REINFORCEMENT IS OBTAINED GROOVE FOR REINFORCEMENT JOINTS TO BE REINFORCED AT THE SAME TIME.
- THE TANK WALL MUST NOT BE BORED TO THE FLOOR SLAB TO ENSURE THIS, BEFORE COMMENCING TO BUILD THE TANK WALL THE SURFACE TO THE FLOOR SLAB IS TO BE WELL COATED WITH BITUMEN UNDERLAYER WALL ONLY.
- ALL BALLAST FOR CONCRETE TO BE BROKEN FROM SOURCE INTO A MAXIMUM SIZE OF 20mm. IT MUST PASS THROUGH A 20mm MESH SCREEN AND SHOULD BE EVENLY GRADED TO MINIMUM SIZE OF THIS APPROX. SIZE IS RETAINED ON A 10mm MESH AND NOT LESS THAN 20% PASSED A 5mm MESH.
- ALL SAND USED MUST BE CLEAN, SHARP AND FREE FROM ALL CLAY, VEGETATION AND OTHER DELETERIOUS MATTER.
- WALL STRENGTH IS TO BE GUARANTEED THROUGH WATER RESISTANT LAYERS.
- PARTICULAR CARE SHOULD BE TAKEN TO ENSURE THAT ALL JOINTS BETWEEN STONES IN THE WALL ARE FILLED WITH MORTAR. ALL JOINTS BETWEEN STONES TO BE 25mm.
- 30mm MIN COVER TO ALL REINFORCEMENT TO BE PROVIDED.



**NOTES**  
**BOTTOM STEEL**  
 LOOP STEEL  $\phi$  6mm FROM 750-1500mm @ 250mm c/c BARS a1-a4  
 1500-4000mm @ 125mm c/c BARS a1-a24  
 RADIAL STEEL  $\phi$  8mm @ RADIUS R=2625mm BARS @ 125mm c/c  
 OR EVERY 2° 45' A BAR. BARS b,c,d

**TOP STEEL**  
 LOOP STEEL  $\phi$  8mm FROM 0-1000mm @ 100mm c/c BARS k1-k10  
 1000-1750mm @ 250mm c/c BARS k10-k24  
 RADIAL STEEL  $\phi$  8mm @ RADIUS R=600mm BARS @ 100mm c/c  
 OR EVERY 10° A BAR. BARS l,m

POSITION	BAR MARK	TOTAL No.	BAR DIA. mm	LENGTH PER BAR (m)	TOTAL LENGTH PER $\phi$ (m)			BENDING	REMARKS
					$\phi$ 6	$\phi$ 8	$\phi$ 20		
TOP RADIAL	l	24	8	1.17		28.08			
	m	24	8	1.87		44.88			
BOTTOM RADIAL	b	64	8	2.22		142.08			
	c	32	8	2.92		93.44			
	d	32	8	3.42		105.44			
TOP LOOP	k1	1	8	0.63		62.80 (LAPS)			NOT INCLUDING LAPS 1 LAP $\phi$ 8mm. STEEL 460mm LONG
	k10	1	8	10.99		6.04			
BOTTOM LOOP	a1	1	6	4.71	381.00 (LAPS)	7.50			1 LAP $\phi$ 6mm. STEEL 340mm LONG
	a24	1	6	25.12	14.62				
RING BEAM	p	4	20	3.35 - 4.2		15.10			R= 531mm = 577mm = 623mm = 669mm
	q	2	20	3.35 - 4.2	7.55	7.55			
	r	19	8	0.60	14.40	14.40			
LINTEL	s	8	20	1.50		12.00			
	t	4	8	1.35		5.40			
	u	22	6	0.62	13.64				
TOTAL LENGTH					409.26	510.06	34.65		
TOTAL WEIGHT					94	196	60	350	

General Notes

**NOTES:**  
 1. CONTOUR LEVELS ARE IN METERS AT TWO METER INTERVALS  
 2. GRID VALUES ARE IN METERS AT 200 METER INTERVALS  
 3. GEOLOGICAL CONDITIONS INDICATED ON DRAWING ARE FOR GENERAL GUIDANCE ONLY  
 4. FOR FITTING DETAILS SEE DRG. NO. BRT/GM005

**LEGEND:**

- ROAD (TARMAC)
- ROAD / TRACK (EARTH / MURRAM)
- FENCE / HEDGE
- CONTOURS
- ELECTRIC POST
- CULVERT
- GATE
- TEMPORARY STRUCTURES
- BUILDINGS
- K&NHA / KeRRA ROAD BEACON
- PROPOSED TREATED WATER GRAVITY MAIN
- TP10 TRAVERSE POINT & No.
- TRIAL HOLE
- 30° HORIZONTAL BEND (H) OR VERTICAL BEND (V) WITH ANGLE INDICATED
- RIVER/STREAM
- V.J. VIKING JOHNSON
- GV GATE VALVE
- SV-01 SECTIONAL VALVE & No.
- WO-01 WASHOUT VALVE & No.
- LAV-01 AIR VALVE & No.
- WM WATER METER
- PROPOSED MASONRY CHAMBER
- DIRECTION (SLOPE MIN. OR 1 IN n)

**ISSUED FOR CONSTRUCTION**

REVISIONS		SIGN	DATE	APPROVED
D	INVERTS AT ROAD CROSSING	BY VJK	15/01	
	CHECKED BY			
	CHECKED BY			
	CHECKED BY			
	CHECKED BY			

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

**ENGINEERS:** MANAGING DIRECTOR  
 NYERI WATER AND SANITATION COMPANY  
 P.O BOX 1520 - 10100,  
 NYERI, KENYA

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

**PROJECT TITLE:**

No.	Revision/Issue	Date
	CONTRACT No.	

**Client Name and Address:**  
 MAJI HOUSE, ALONG BADEN  
 POWELL ROAD  
 P.D. BOX, 1292 -10100.  
 Nyeri, Kenya  
 +254 724 259 891,+254 61  
 2034118  
 +254 61-2032282  
 Email: info@tanawwda.go.ke  
 Website: www.tanawwda.go.ke

**Project Name and Address:**  
 150M<sup>3</sup>  
 OF  
 MASONRY  
 TANK

Project	Sheet
WATER PROJECT	
Date	
14.04.2022	
Scale	
1:1000	