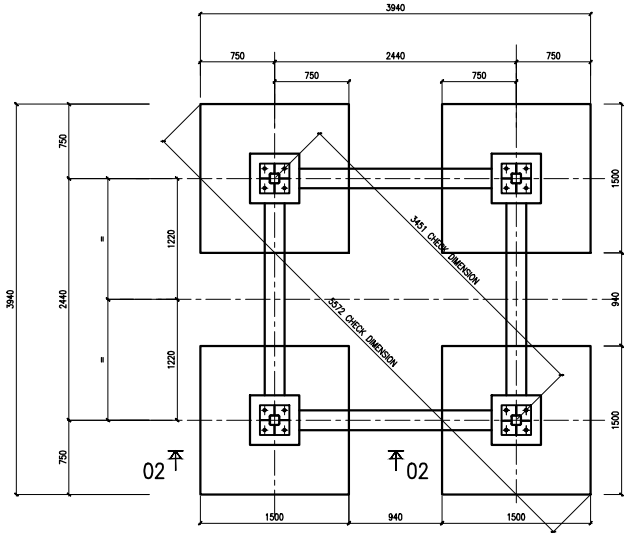
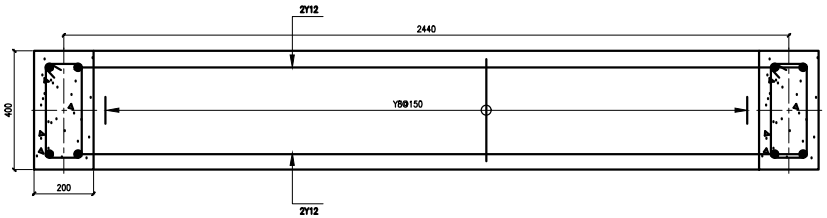
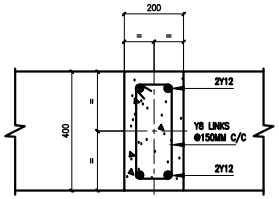


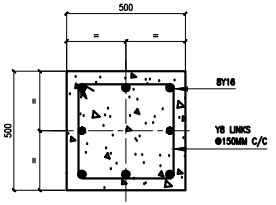
H.D. LAYOUT PLAN



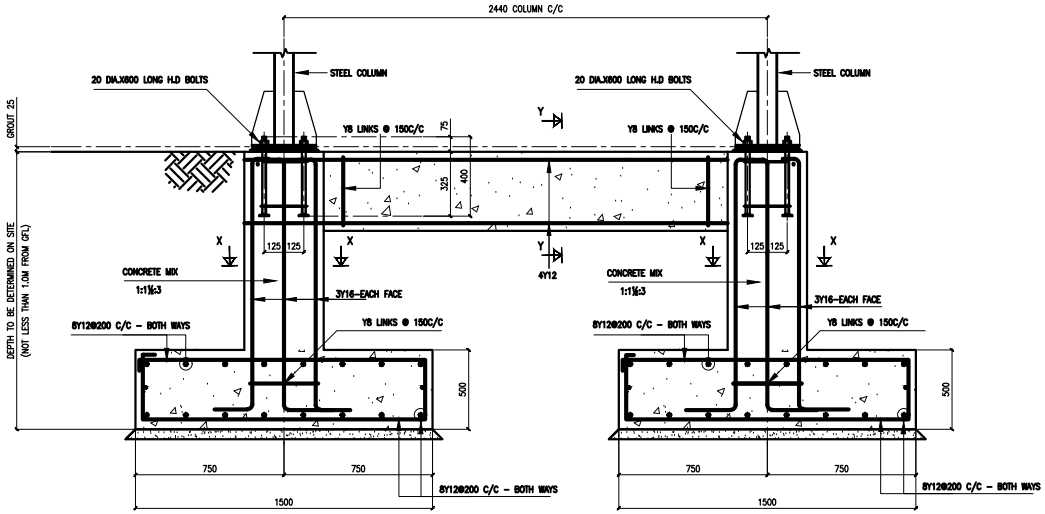
TYPICAL SECTION 01 – 01



TYPICAL SECTION Y – Y
THRU RC BEAMS B1



TYPICAL SECTION X – X
THRU STUB COLUMNS



TYPICAL SECTION 02 – 02

NOTES:

1. MIX OF CONCRETE TO ATTAIN THE STRENGTH OF Fcu 25 N/mm^2
2. CONCRETE MIX 1:1½:3
3. CONCRETE MIX 1:4:8 BLINDING
4. WATER CEMENT RATIO 0.5
5. CUBE STRENGTH 28 DAYS – 25 N/mm^2
6. REINFORCEMENT STEEL STRENGTH – 425/250 N/mm^2
7. COVER TO BASE – 50mm
8. COVER TO COLUMN – 40mm
9. CONTRACTOR TO CONFIRM CHECK DIMENSION USING STEEL TAPE MEASURE.
10. HOLDING DOWN BOLTS TO BE CAST TO ±5mm ACCURACY AND SHOULD BE RECAST IF THIS TOLERANCE IS EXCEEDED.
11. CONTRACTOR TO CONFIRM LEVELS OF FOUNDATIONS.
12. ASSUMED GROUND BEARING PRESSURE – 80 KN/M^2

NOTES

1. READ THE DRAWING IN CONJUCTION WITH RELEVANT R.C.
2. DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
3. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
4. ALL PIPEWORK ARE DUCTILE IRON TO NP 10 WITH NP 16 FLANGES
5. ALL CONCRETE SHALL BE CLASS C30 UNLESS OTHERWISE STATED
6. ALL VALVES TO BE SUPPLIED WITH EXTENSION SPINDLE.
7. MIN CONCRETE COVER OF 40 mm TO THE MAIN STEEL TO BE MAINTAINED.
8. SAFE BEARING CAPACITY TAKEN AS OF 150KN/M2,
9. ALL FOUNDATIONS TO BE TAKEN DOWN TO A SUITABLE ROCK.
10. MAXIMUM AGGREGATE SIZE FOR CONCRETE IS 20mm.
11. ALL REINFORCEMENT TO BE INSPECTED BY THE ENGINEER BEFORE CONCRETING.

PROJECT TITLE:

PROPOSED 24M^3 PRESSED STEEL TANK ON 18M TOWER.

DRAWING TITLE

RC FOUNDATION & H.D. BOLTS LAYOUT DETAILS.

CLIENT

ATHI WATER WORKS

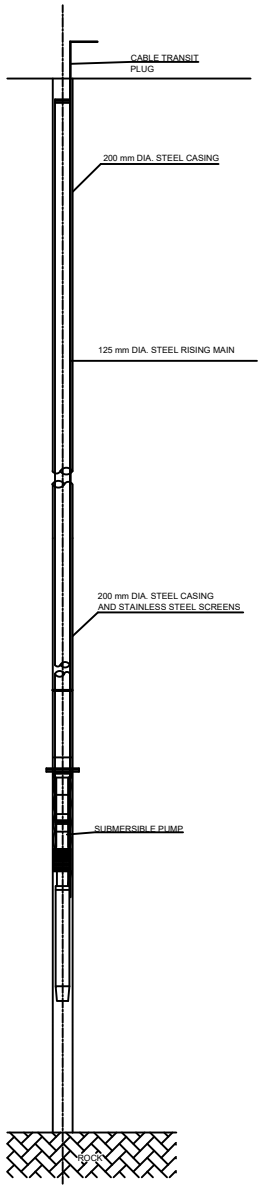
ATHI WATER SERVICES BOARD,
3RD FLOOR AFRICA RE CENTRE,
HOSPITAL RD, UPPER HILL,
P.O. BOX 45283-00100
NAIROBI, KENYA.

SCALE: 1:40

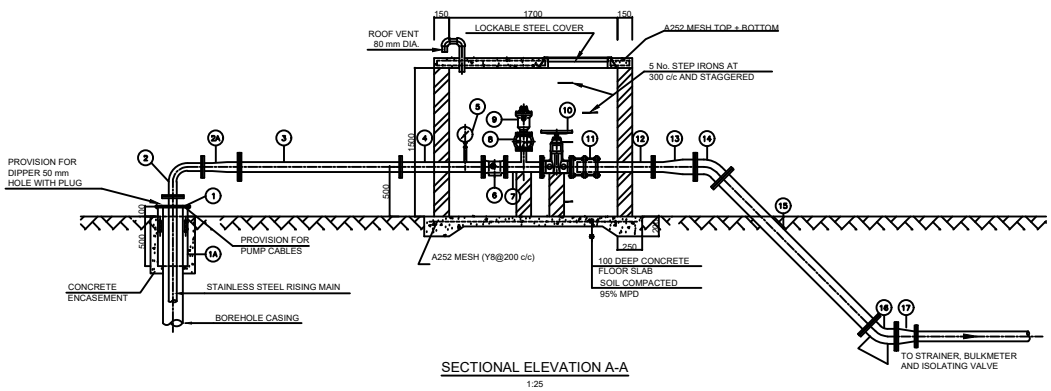
	NAME	SIGNATURE	DATE
Designed			
Drawn			
Checked			

DRG No. 01

Revision Suffix



BOREHOLE SECTION
1:25



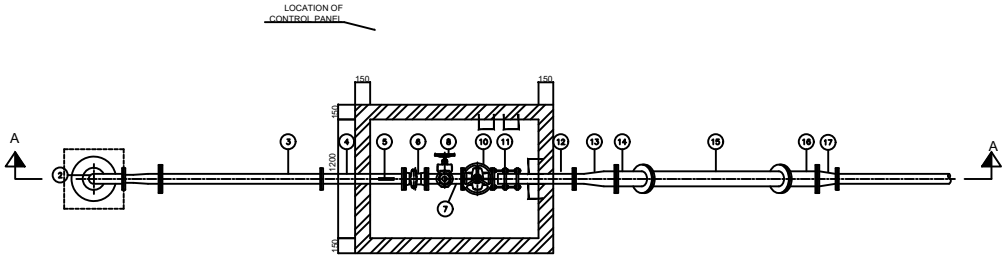
SECTIONAL ELEVATION A-A
1:25

SCHEDULE OF PIPEWORK & FITTINGS PER BOREHOLE

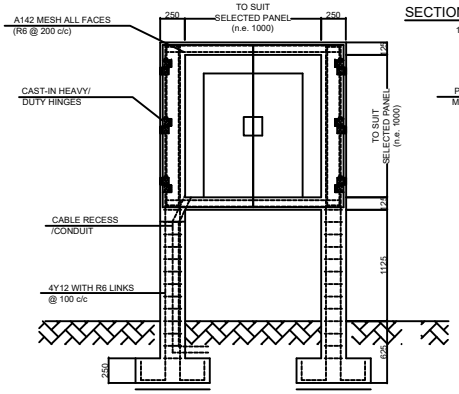
ITEM No.	DESCRIPTION	No.
1	10 mm THICK WELL HEAD PLATE BOLTED TO CASING FLANGE	1
1A	MILD STEEL CASING CAST INTO CONCRETE WITH FLANGE FOR WELLHEAD PLATE	1
2	DOUBLE FLANGED 90° BEND	1
2A	DOUBLE FLANGED REDUCER	1
3	DOUBLE FLANGED PIPE PIECE, 2000 mm LONG	1
4	DOUBLE FLANGED PIPE PIECE, 800 mm LONG WITH PROVISION FOR PRESSURE GAUGE	1
5	PRESSURE GAUGE	1
6	DOUBLE FLANGED NON-RETURN VALVE	1
7	DOUBLE FLANGED TEE (WITH THREADED ADAPTOR FOR DN 50)	1
8	DOUBLE FLANGED (OR THREADED DN 50) SLUICE VALVE	1
9	ANTI SHOCK ANTI SURGE AIR VALVE	1
10	DOUBLE FLANGED SLUICE VALVE	1
11	RESTRAINED DISMANTLING JOINT	1
12	SINGLE FLANGED PIPE PIECE 800 mm LONG	1
13	DOUBLE FLANGED REDUCER	1
14	DOUBLE FLANGED 45° BEND	1
15	DOUBLE FLANGED PIPE PIECE 2100 mm LONG	1
16	DOUBLE FLANGED 45° BEND	1
17	DOUBLE FLANGED REDUCER	1

NOTES

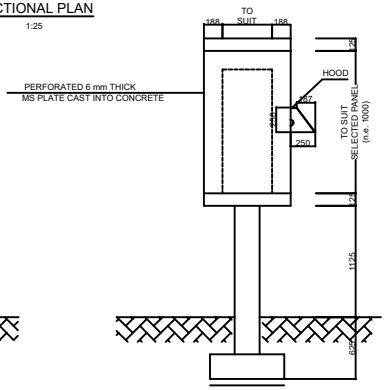
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
2. THE CONTROL PANEL AS APPROVED SHALL DETERMINE THE EXACT DIMENSIONS FOR THE SUPPORT STRUCTURE.
3. THE CONTROL PANEL DOOR SHALL BE PROVIDED WITH A BURGLAR PROOF LOCKABLE HOOD FABRICATED FROM 5 mm THICK MS PLATE CLOSED ON TOP AND SIDES AND OPEN AT BOTTOM
4. THRUST BLOCKS AT BENDS ARE



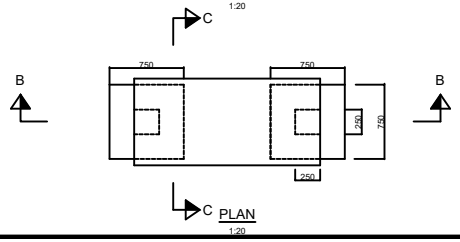
SECTIONAL PLAN
1:25



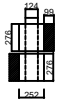
SECTION B-B
1:20



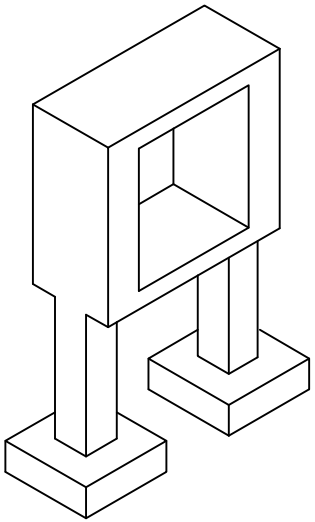
SECTION C-C
1:20



PLAN
1:20



HINGES DETAIL
1:5



ISOMETRIC VIEW OF R.C. BOX STRUCTURE
N.T.S.

CONTROL PANEL STRUCTURE

PROJECT TITLE:
PROPOSED DRILLING AND EQUIPPING OF BOREHOLES

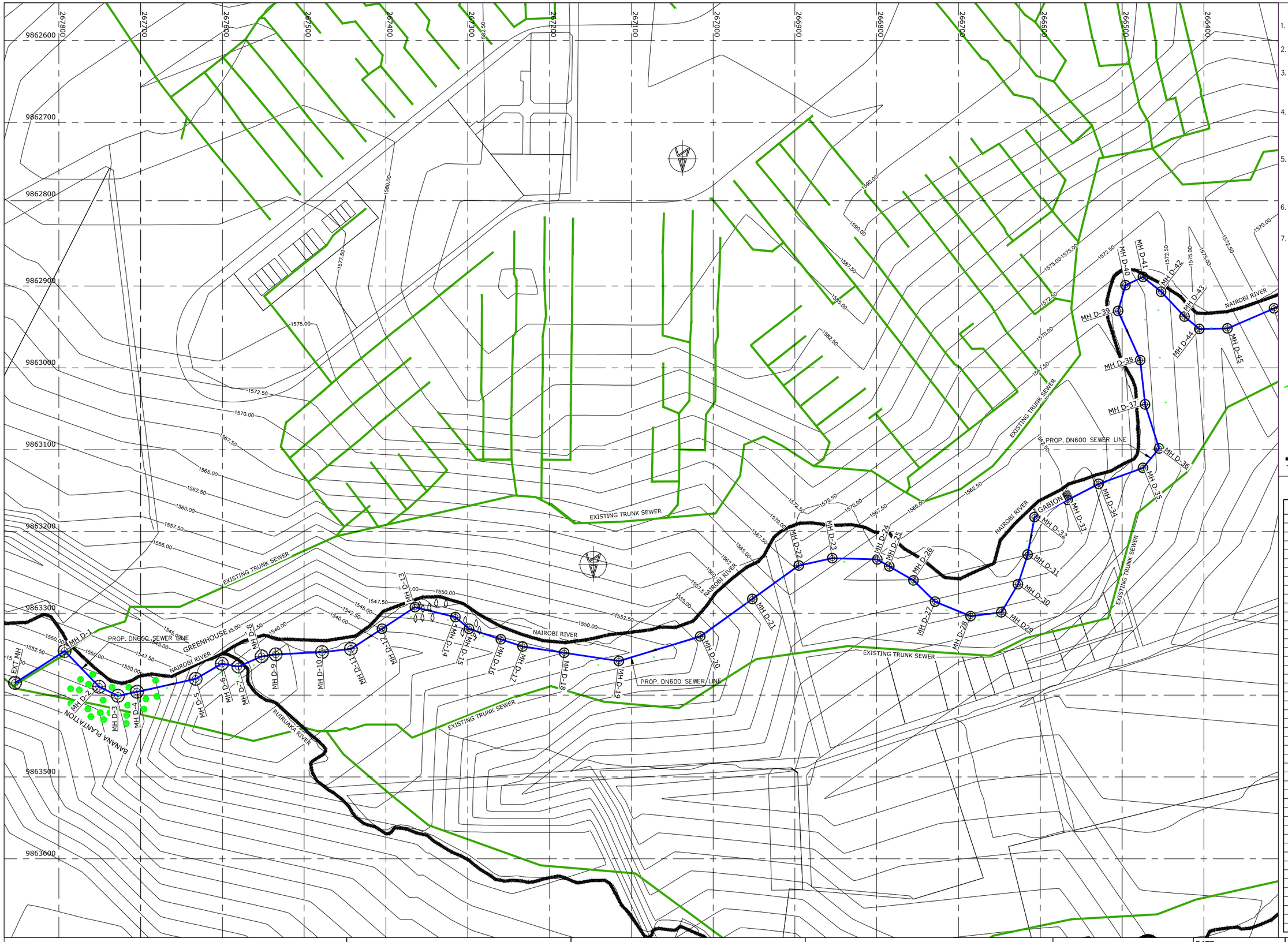
DRAWING TITLE
BOREHOLE DETAILS

CLIENT
ATHI WATER SERVICES BOARD,
3RD FLOOR AFRICA RE CENTRE,
HOSPITAL RD. UPPER HILL,
P.O. BOX 45283-00100
NAIROBI, KENYA.

SCALE: 1:50

	NAME	SIGNATURE	DATE
Designed			
Drawn			
Checked			

DRG No. 01
Revision Suffix



NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METERS AND COORDINATES ARE BASED ON UTM.
3. THE MANHOLE INVERT LEVELS AND PIPE SLOPES ARE AS SHOWN ON DRAWINGS UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
4. MANHOLE TO BE 25MM ABOVE THE GROUND ADJACENT TO ROAD, 150MM ON VERGES, AND 500MM ON OPEN GROUND. THE DEPTHS INDICATED ON THE DRAWING EXCLUDE THESE PROVISIONS.
5. SEWERS ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE TYPE 'D' HAUNCH.
6. FOR BEDDING, HAUNCH AND MANHOLE DETAILS REFER TO THE APPROVED STANDARD DRAWINGS.
7. ACTUAL POSITION OF MANHOLES IS AS SHOWN OR AS DIRECTED BY THE ENGINEER ON SITE.

LEGEND

- EXISTING GROUND LEVEL
- PROPOSED SEWER LINE
- PROPOSED MANHOLE
- TRUE NORTH
- PROP. MANHOLE
- EXT. TRUNK SEWER LINE AND SEWER NETWORK
- EXISTING BANANA PLANTATION
- EXISTING TREE
- CONTOUR AND VALUE
- RIVER
- EXISTING ROAD NETWORK

MANHOLES SETTING OUT CO-ORDINATES

POINT	EASTINGS	NORTHINGS
	LINE D	
EXT.MH-1	267853.39	9863385.04
MH D-1	267792.72	9863346.13
MH D-2	267750.64	9863389.79
MH D-3	267727.67	9863400.86
MH D-4	267704.34	9863396.01
MH D-5	267632.66	9863380.20
MH D-6	267600.63	9863361.62
MH D-7	267580.39	9863365.08
MH D-8	267551.91	9863352.69
MH D-9	267534.72	9863350.22
MH D-10	267478.11	9863347.51
MH D-11	267442.81	9863343.48
MH D-12	267404.78	9863318.97
MH D-13	267364.59	9863292.52
MH D-14	267314.96	9863304.74
MH D-15	267298.29	9863319.06
MH D-16	267259.46	9863331.89
MH D-17	267232.85	9863340.68
MH D-18	267182.08	9863348.28
MH D-19	267115.12	9863358.31
MH D-20	267009.96	9863326.97
MH D-21	266952.00	9863282.58
MH D-22	266895.16	9863241.73
MH D-23	266854.21	9863232.66
MH D-24	266799.05	9863234.18
MH D-25	266784.42	9863242.69
MH D-26	266754.89	9863259.86
MH D-27	266728.67	9863285.76
MH D-28	266685.18	9863303.52
MH D-29	266647.68	9863298.92
MH D-30	266627.20	9863264.58
MH D-31	266615.42	9863228.24
MH D-32	266606.89	9863182.43
MH D-33	266566.39	9863161.47
MH D-34	266528.50	9863141.87
MH D-35	266474.30	9863122.37
MH D-36	266454.66	9863098.56
MH D-37	266471.79	9863044.74
MH D-38	266477.75	9862990.63
MH D-39	266504.74	9862930.49
MH D-40	266495.78	9862899.07
MH D-41	266474.37	9862888.94
MH D-42	266452.16	9862906.97
MH D-43	266423.51	9862937.39
MH D-44	266405.49	9862952.54
MH D-45	266371.07	9862951.88

NAIROBI CITY WATER & SEWERAGE COMPANY LIMITED
P O BOX 30656-00100 NAIROBI

PROJECT

DUMP SITE TRUNK SEWER REHABILITATION PROJECT
(LAYOUT PLAN SHEET 1 OF 2)

SURVEY WORK			DESIGN WORK		
SURVEYED	T. OUMA	SIGN.	DESIGNED	J . M. MUNUVE	SIGN.
DRAWN	C. N. NDUNGU	SIGN.	DRAWN	C. N. NDUNGU	SIGN.
CHECKED	S. KIMANI	SIGN.	CHECKED	Eng. D. MANORE	SIGN.

APPROVED
Eng. Lucy N. Macharia
SIGN. _____
TECHNICAL DIRECTOR

DATE	OCTOBER 2019
SCALE	HOR: 1 : 1000 VERT: 1 : 1000
FIELD BOOK NO.	NCWS/TEC/ENG/004/RTK
DRG No.	NCWS/TEC/ENG/004/S/509

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METERS AND COORDINATES ARE BASED ON UTM.
3. THE MANHOLE INVERT LEVELS AND PIPE SLOPES ARE AS SHOWN ON DRAWINGS UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
4. MANHOLE TO BE 25MM ABOVE THE GROUND ADJACENT TO ROAD, 150MM ON VERGES, AND 500MM ON OPEN GROUND. THE DEPTHS INDICATED ON THE DRAWING EXCLUDE THESE PROVISIONS.
5. SEWERS ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE TYPE 'D' HAUNCH.
6. FOR BEDDING, HAUNCH AND MANHOLE DETAILS REFER TO THE APPROVED STANDARD DRAWINGS.
7. ACTUAL POSITION OF MANHOLES IS AS SHOWN OR AS DIRECTED BY THE ENGINEER ON SITE.

LEGEND

- EXISTING GROUND LEVEL
- PROPOSED SEWER LINE
- PROPOSED MANHOLE
- TRUE NORTH
- PROP. MANHOLE
- EXT. TRUNK SEWER LINE
- EXISTING BANANA PLANTATION
- EXISTING TREE
- CONTOUR AND VALUE
- RIVER

MANHOLES SETTING OUT CO-ORDINATES

POINT	EASTINGS	NORTHINGS
	LINE D	
EXT.MH-1	267853.39	9863385.04
MH D-1	267792.72	9863346.13
MH D-2	267750.64	9863389.79
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MH D-14	267314.96	9863304.74
MH D-15	267298.29	9863319.06
MH D-16	267259.46	9863331.89
MH D-17	267232.85	9863340.68
MH D-18	267182.08	9863348.28
MH D-19	267115.12	9863358.31
MH D-20	267009.96	9863326.97
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MH D-22	266895.16	9863241.73
MH D-23	266854.21	9863232.66
MH D-24	266799.05	9863234.18
MH D-25	266784.42	9863242.69
MH D-26	266754.89	9863259.86
MH D-27	266728.67	9863285.76
MH D-28	266685.18	9863303.52
MH D-29	266647.68	9863298.92
MH D-30	266627.20	9863264.58
MH D-31	266615.42	9863228.24
MH D-32	266606.89	9863182.43
MH D-33	266566.39	9863161.47
MH D-34	266528.50	9863141.87
MH D-35	266474.30	9863122.37
MH D-36	266454.66	9863098.56
MH D-37	266471.79	9863044.74
MH D-38	266477.75	9862990.63
MH D-39	266504.74	9862930.49
MH D-40	266495.78	9862899.07
MH D-41	266474.37	9862888.94
MH D-42	266452.16	9862906.97
MH D-43	266423.51	9862937.39
MH D-44	266405.49	9862952.54
MH D-45	266371.07	9862951.88

NAIROBI CITY WATER & SEWERAGE COMPANY LIMITED
P O BOX 30656-00100 NAIROBI

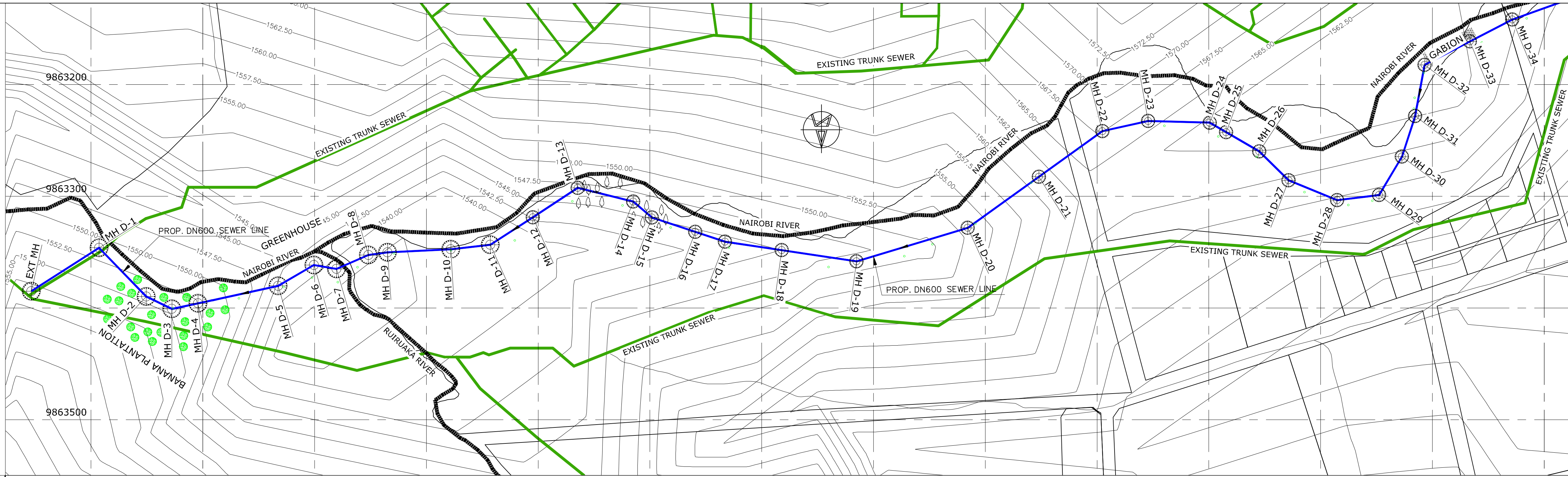
PROJECT

DUMP SITE TRUNK SEWER REHABILITATION PROJECT
(LAYOUT PLAN SHEET 2 OF 2)

SURVEY WORK			DESIGN WORK		
SURVEYED	T. OUMA	SIGN.	DESIGNED	J . M. MUNUVE	SIGN.
DRAWN	C. N. NDUNGU	SIGN.	DRAWN	C. N. NDUNGU	SIGN.
CHECKED	S. KIMANI	SIGN.	CHECKED	Eng. D. MANORE	SIGN.

APPROVED
Eng. Lucy N. Macharia
SIGN. _____
TECHNICAL DIRECTOR

DATE	OCTOBER 2019
SCALE	HOR: 1 : 1000 VERT: 1 : 1000
FIELD BOOK NO.	NCWS/TEC/ENG/004/RTK
DRG No.	NCWS/TEC/ENG/004/S/509



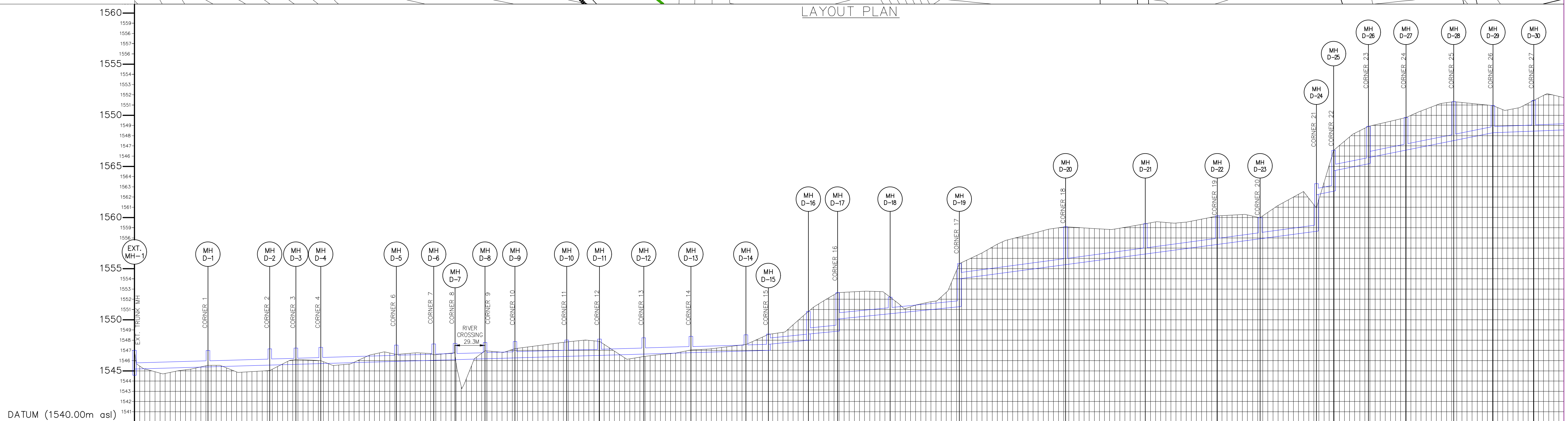
LAYOUT PLAN

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METERS AND COORDINATES ARE BASED ON UTM.
3. THE MANHOLE INVERT LEVELS AND PIPE SLOPES ARE AS SHOWN ON DRAWINGS UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
4. MANHOLE TO BE 25MM ABOVE THE GROUND ADJACENT TO ROAD, 150MM ON VERGES, AND 500MM ON OPEN GROUND. THE DEPTHS INDICATED ON THE DRAWING EXCLUDE THESE PROVISIONS.
5. SEWERS ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE TYPE 'D' HAUNCH.
6. FOR BEDDING, HAUNCH AND MANHOLE DETAILS REFER TO THE APPROVED STANDARD DRAWINGS.
7. ALL ROAD AND RIVER CROSSINGS TYPE 'D' HAUNCH TO BE ADOPTED.
8. ACTUAL POSITION OF MANHOLES IS AS SHOWN OR AS DIRECTED BY THE ENGINEER ON SITE.
9. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE APPROVED SEWER LAYOUT PLAN.

LEGEND

- EXISTING GROUND LEVEL
- PROPOSED SEWER LINE
- PROPOSED MANHOLE
- TRUE NORTH
- PROP. MANHOLE
- EXT. TRUNK SEWER LINE



CHAINAGE (m)	GROUND LEVEL (m)	INVERT LEVEL (m)	MANHOLE DEPTH
0+000	1546.998	1544.574 / 1545.169	2.424
0+020	1544.915		
0+040	1544.952		
0+060	1545.274		
0+072	1545.546	1545.381	1.000
0+080	1545.547		
0+100	1544.897		
0+120	1544.852		
0+132.5	1545.027	1545.559	1.000
0+140	1545.411		
0+158.1	1546.135	1545.634	1.000
0+182.4	1545.992	1545.705	1.000
0+200	1545.573		
0+220	1546.071		
0+240	1546.754		
0+256.3	1546.612	1545.923	1.000
0+280	1546.746		
0+293	1546.575	1546.031	1.000
0+300	1546.641		
0+314	1546.484	1546.093	1.000
0+343.3	1546.971	1546.179	1.000
0+360	1546.827		
0+372.6	1547.173	1546.265	1.600
0+380	1547.268		
0+400	1547.525		
0+423.3	1547.824	1546.414	1.600
0+440	1547.993		
0+455.4	1547.888	1546.508	1.600
0+480	1546.280		
0+498.7	1546.406	1546.636	1.600
0+520	1546.649		
0+545	1547.050	1546.772	1.600
0+560	1547.127		
0+580	1547.758		
0+598.8	1547.578	1546.930	1.600
0+620.7	1548.573	1546.995 / 1547.600	1.578
0+640	1549.066		
0+660	1550.814	1547.993 / 1548.593	2.821 / 2.221
0+680	1552.148		
0+688.6	1552.643 / 1552.720	1548.879 / 1549.479	3.764 / 1.196
0+720	1552.789		
0+740	1552.216	1550.589	1.628
0+760	1551.263		
0+780	1551.764		
0+800	1555.495		
0+807.9	1553.633	1553.995 / 1551.267	4.228 / 2.728
0+820	1556.064		
0+840	1557.105		
0+860	1557.941		
0+880	1558.442		
0+900	1558.920		
0+911.9	1559.088	1555.383	3.705
0+920	1559.037		
0+940	1558.910		
0+960	1558.877		
0+980	1559.209		
0+990	1559.387	1556.424	2.963
1+000	1559.565		
1+020	1559.451		
1+040	1559.739		
1+060.4	1560.151	1557.364	2.787
1+080	1560.259		
1+102.4	1559.969	1557.923	2.046
1+120	1561.164		
1+140	1562.271		
1+157.6	1560.937	1558.660 / 1562.234	4.810 / 3.575
1+174.4	1566.569	1562.570 / 1564.569	3.999 / 1.999
1+200	1568.487		
1+208.5	1568.922	1565.251 / 1565.851	3.671 / 0.600
1+220	1569.183		
1+245.3	1569.778	1566.587	3.192
1+260	1570.420		
1+280	1571.159		
1+292.1	1571.336	1567.523	3.813
1+320	1571.051		
1+330.4	1570.945	1568.290	2.656
1+340	1570.543		
1+360	1570.929		
1+370.5	1571.465	1568.450	3.015
1+380	1571.593		
1+400	1571.705		

PIPE SLOPE: 1:340 (0+000 to 0+620.7); 1:100 (0+620.7 to 0+807.9); 1:75 (0+807.9 to 1+157.6); 1:150 (1+157.6 to 1+330.4); 1:250 (1+330.4 to 1+400)

PIPE SIZE AND TYPE: DN 900 CONCRETE PIPES.

BEDDING/HAUNCH TYPE: 150MM CONCRETE TYPE 'D' SURROUND AND HAUNCH.

PROFILE

SCALES: HOR. 1:2000 & VER. 1:200

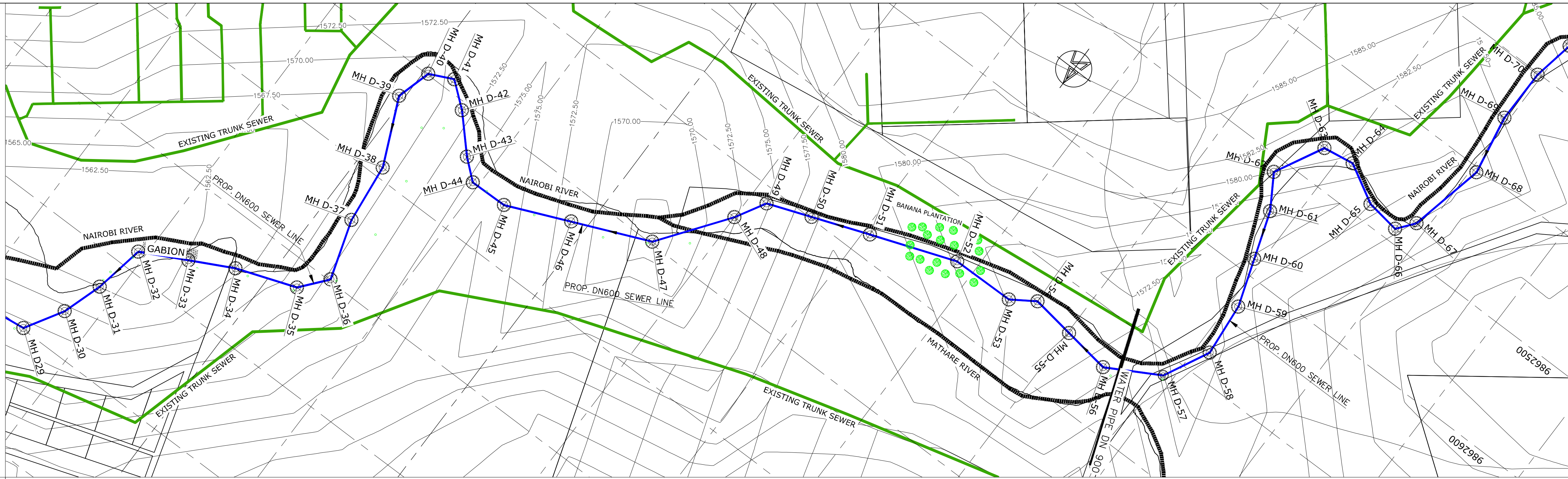
NAIROBI CITY WATER & SEWERAGE COMPANY LIMITED
P O BOX 30656-00100 NAIROBI

PROJECT

DUMP SITE TRUNK SEWER REHABILITATION PROJECT
(PLAN AND PROFILES SHEET 1 OF 3)

SURVEY WORK			DESIGN WORK			APPROVED
SURVEYED	T. OUMA	SIGN.	DESIGNED	J . M. MUNUVE	SIGN.	Eng. Lucy N. Macharia
DRAWN	C. N. NDUNGU	SIGN.	DRAWN	C. N. NDUNGU	SIGN.	SIGN.
CHECKED	S. KIMANI	SIGN.	CHECKED	Eng. D. MANORE	SIGN.	TECHNICAL DIRECTOR

DATE	OCTOBER 2019
SCALE	HOR: 1 : 2000 VERT: 1 : 200
FIELD BOOK NO.	NCWS/TEC/ENG/004/RTK
DRG No.	NCWS/TEC/ENG/004/S/509



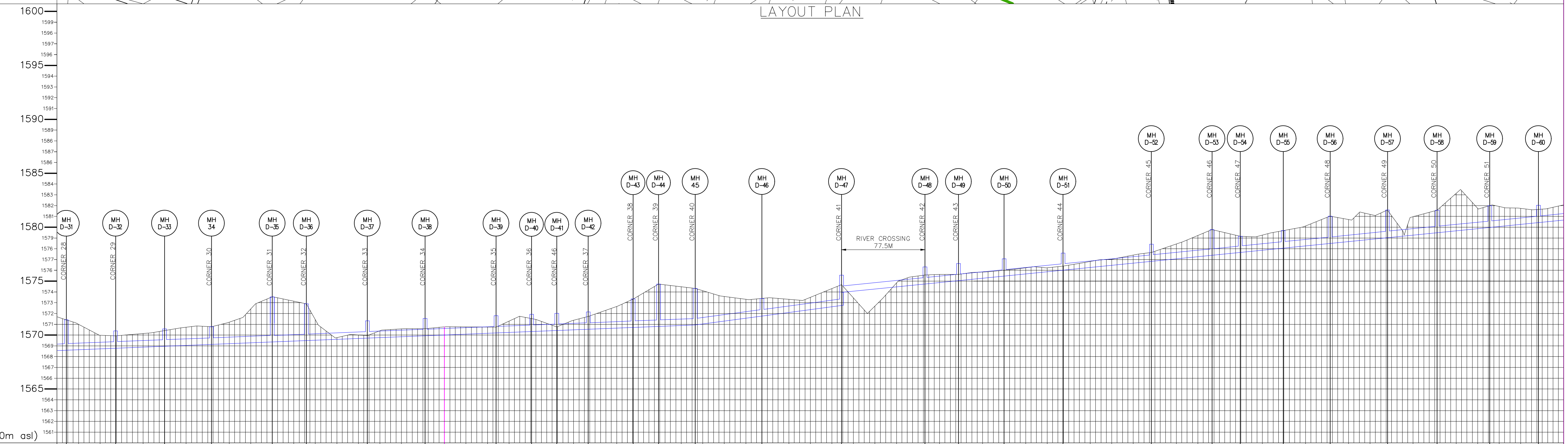
LAYOUT PLAN

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METERS AND COORDINATES ARE BASED ON UTM.
3. THE MANHOLE INVERT LEVELS AND PIPE SLOPES ARE AS SHOWN ON DRAWINGS UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
4. MANHOLE TO BE 25MM ABOVE THE GROUND ADJACENT TO ROAD, 150MM ON VERGES, AND 500MM ON OPEN GROUND. THE DEPTHS INDICATED ON THE DRAWING EXCLUDE THESE PROVISIONS.
5. SEWERS ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE TYPE 'D' HAUNCH.
6. FOR BEDDING, HAUNCH AND MANHOLE DETAILS REFER TO THE APPROVED STANDARD DRAWINGS.
7. ALL ROAD AND RIVER CROSSINGS TYPE 'D' HAUNCH TO BE ADOPTED.
8. ACTUAL POSITION OF MANHOLES IS AS SHOWN OR AS DIRECTED BY THE ENGINEER ON SITE.
9. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE APPROVED SEWER LAYOUT PLAN.

LEGEND

- EXISTING GROUND LEVEL
- PROPOSED SEWER LINE
- MH D-5 – PROPOSED MANHOLE
- TRUE NORTH
- MH-K1 – PROP. MANHOLE
- EXT. TRUNK SEWER LINE



CHAINAGE (m)	GROUND LEVEL (m)	INVERT LEVEL (m)	MANHOLE DEPTH
1+400	1571.705		
1+408.6	1571.406	1568.603	2.804
1+420	1571.005		
1+440	1569.982		
1+454.4	1569.926	1568.786	1.600
1+480	1570.143		
1+500	1570.420	1568.968	1.600
1+520	1570.732		
1+543.6	1570.770	1569.142	1.628
1+560	1571.198		
1+580	1572.419		
1+600	1573.545	1569.368	1.628
1+620	1573.147		
1+631.7	1572.905	1569.495	3.411
1+640	1570.924	1569.540	1.600
1+660	1569.758		
1+680	1570.003		
1+688.4	1569.944	1569.722	1.600
1+700	1570.394		
1+720	1570.570		
1+742	1570.593	1569.936	1.600
1+760	1570.671		
1+780	1570.760		
1+800	1570.738		
1+808	1570.729	1570.200	1.600
1+820	1571.294		
1+841.0	1571.525	1570.332	1.600
1+864.4	1570.759	1570.425	1.600
1+880	1571.373		
1+893.6	1571.725	1570.542	1.600
1+920	1572.640		
1+935.4	1573.350	1570.709	2.641
1+958.9	1574.737	1570.804	3.933
1+980	1574.483		
1+993	1574.326	1570.940	3.386
2+000	1574.114		
2+020	1573.578		
2+040	1573.321		
2+055	1573.400	1571.767	1.634
2+080	1573.318		
2+100	1573.499		
2+120	1574.312		
2+129	1574.676	1572.753	2.800
2+140	1573.445	1573.953	1.200
2+160	1572.692		
2+180	1574.838		
2+206.5	1575.563	1574.728	1.600
2+220	1575.621		
2+237.6	1575.624	1575.039	1.600
2+260	1575.839		
2+280	1576.009	1575.463	1.600
2+300	1576.242		
2+320	1576.237		
2+334.8	1576.395	1576.011	1.600
2+360	1576.824		
2+380	1577.035		
2+400	1577.415		
2+416.8	1577.649	1576.832	1.600
2+440	1578.437		
2+460	1579.232		
2+473.2	1579.787	1577.395	2.392
2+499.4	1579.154	1577.657	1.497
2+520	1579.261		
2+539.3	1579.682	1578.056	1.625
2+560	1580.112		
2+582.9	1581.028	1578.492	2.536
2+600	1580.719		
2+620	1581.194		
2+636.2	1581.590	1579.025	2.565
2+660	1580.979		
2+682.4	1581.581	1579.487	2.095
2+700	1583.123		
2+720	1581.756		
2+731.2	1581.998	1579.975	2.023
2+740	1581.917		
2+760	1581.738		
2+776.5	1581.652	1580.428	1.600
2+800	1582.071		

PIPE SLOPE	1:250 (1+400 – 1+993); 1:75 (1+993 – 2+129); 1:100 (2+129 – 2+800)
PIPE SIZE AND TYPE	DN 900 CONCRETE PIPES.
BEDDING/HAUNCH TYPE	150MM CONCRETE TYPE 'D' SURROUND AND HAUNCH.

PROFILE

SCALES: HOR. 1:2000 & VER. 1:200

NAIROBI CITY WATER & SEWERAGE COMPANY LIMITED
P O BOX 30656-00100 NAIROBI

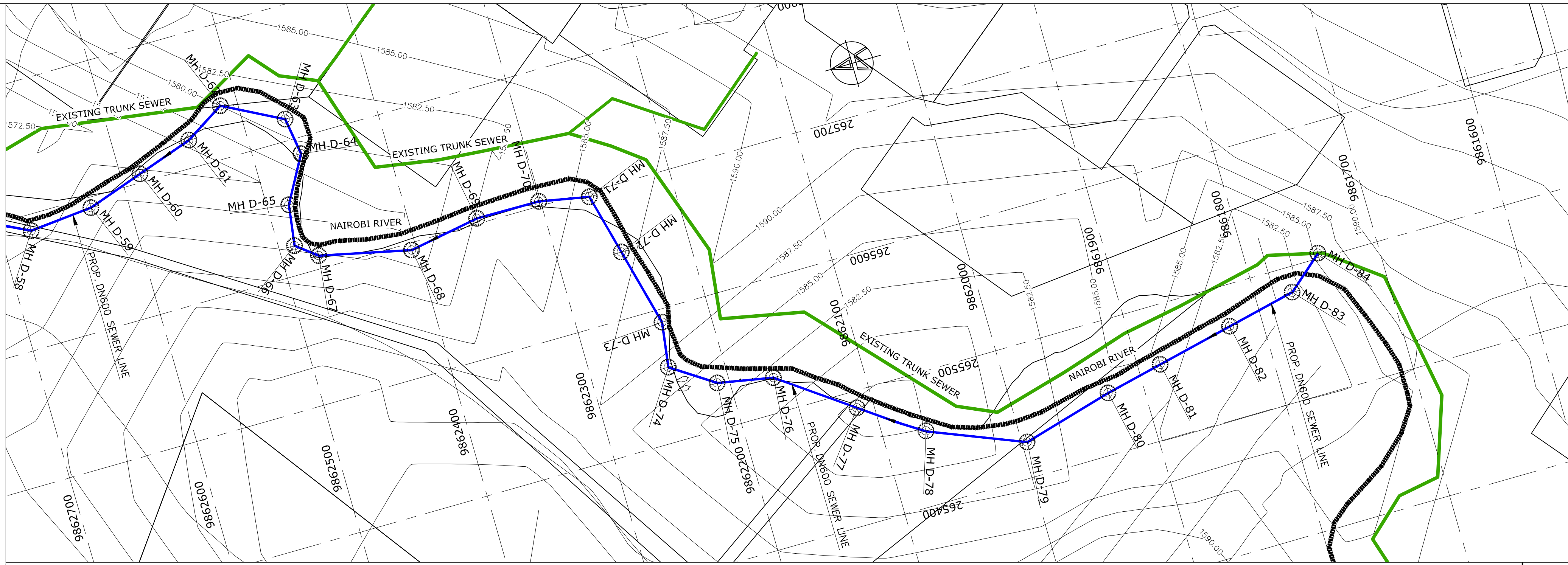
PROJECT

DUMP SITE TRUNK SEWER REHABILITATION PROJECT
(PLAN AND PROFILES SHEET 2 OF 3)

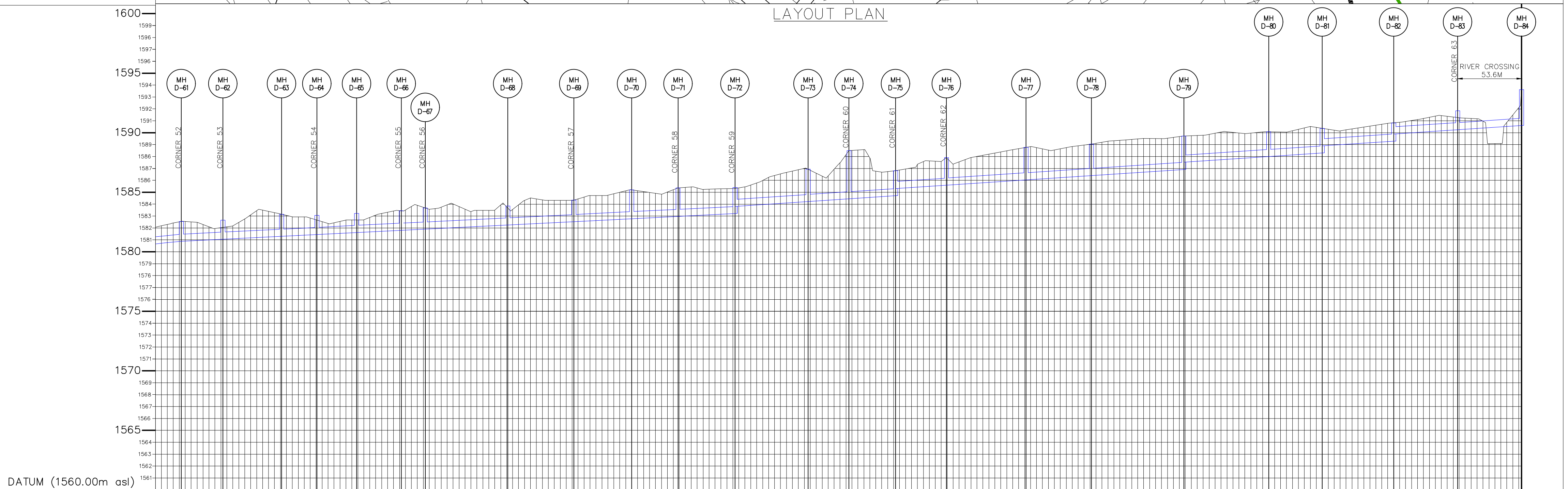
SURVEY WORK			DESIGN WORK		
SURVEYED	T. OUMA	SIGN.	DESIGNED	J . M. MUNUVE	SIGN.
DRAWN	C. N. NDUNGU	SIGN.	DRAWN	C. N. NDUNGU	SIGN.
CHECKED	S. KIMANI	SIGN.	CHECKED	Eng. D. MANORE	SIGN.

APPROVED
Eng. Lucy N. Macharia
SIGN. ____________
TECHNICAL DIRECTOR

DATE	OCTOBER 2019
SCALE	HOR: 1 : 2000 VERT: 1 : 200
FIELD BOOK NO.	NCWS/TEC/ENG/004/RTK
DRG No.	NCWS/TEC/ENG/004/S/509



LAYOUT PLAN



CHAINAGE (m)	GROUND LEVEL (m)	INVERT LEVEL (m)	MANHOLE DEPTH
2+800	1582.071		
2+821.8	1582.541	1580.881	1.660
2+840	1582.298		
2+856.7	1582.053	1581.056	1.600
2+880	1583.099		
2+906	1583.151	1581.302	1.849
2+920	1582.935		
2+935.6	1582.668	1581.450	1.600
2+960	1582.669		
2+975	1582.680		
2+980	1582.879	1581.647	1.600
3+006.5	1583.437	1581.805	1.633
3+026.6	1583.680	1581.905	1.774
3+040	1583.744		
3+060	1583.577		
3+080	1583.482		
3+096	1583.673	1582.252	1.600
3+120	1584.442		
3+140	1584.318		
3+151.5	1584.332	1582.530	1.803
3+180	1584.747		
3+200	1585.200	1582.772	2.424
3+220	1584.913		
3+238.9	1585.357	1582.967	2.390
3+260	1585.232		
3+286.8	1585.301	1583.206 / 1583.806	2.100 / 0.600
3+300	1585.611		
3+320	1586.403		
3+340	1586.896		
3+348.2	1586.937	1584.215	2.722
3+360	1586.365		
3+382.5	1588.497	1584.444	4.053
3+400	1587.895		
3+421.6	1586.817	1584.705 / 1585.305	2.112 / 0.600
3+440	1587.343		
3+464.4	1587.907	1585.590	2.317
3+480	1587.738		
3+500	1588.207		
3+520	1588.575		
3+531.2	1588.765	1586.035	2.730
3+540	1588.753		
3+560	1588.651		
3+586.2	1589.053	1586.402	2.651
3+600	1589.282		
3+620	1589.437		
3+640	1589.512		
3+663.7	1589.717	1586.919 / 1587.519	2.798 / 0.600
3+680	1589.795		
3+700	1590.079		
3+720	1589.965		
3+735	1590.089	1587.994	2.095
3+760	1590.287		
3+780	1590.371	1588.294 / 1588.894	2.077 / 0.600
3+800	1590.246		
3+820	1590.551		
3+840	1590.829	1589.294 / 1589.894	1.535 / 0.600
3+860	1591.101		
3+880	1591.439		
3+911.4	1591.270	1590.252	1.600
3+920	1589.089		
3+940	1591.480		
3+947.4	1593.615	1590.610	3.005

PIPE SLOPE: 1:100 (2+800 – 2+821.8); 1:200 (2+821.8 – 3+286.8); 1:150 (3+286.8 – 3+947.4)

PIPE SIZE AND TYPE: DN 900 CONCRETE PIPES.

BEDDING/HAUNCH TYPE: 150MM CONCRETE TYPE 'D' SURROUND AND HAUNCH.

PROFILE

SCALES: HOR. 1:2000 & VER. 1:200

NOTES

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL LEVELS ARE IN METERS AND COORDINATES ARE BASED ON UTM.
3. THE MANHOLE INVERT LEVELS AND PIPE SLOPES ARE AS SHOWN ON DRAWINGS UNLESS OTHERWISE INDICATED ON SITE BY THE ENGINEER.
4. MANHOLE TO BE 25MM ABOVE THE GROUND ADJACENT TO ROAD, 150MM ON VERGES, AND 500MM ON OPEN GROUND. THE DEPTHS INDICATED ON THE DRAWING EXCLUDE THESE PROVISIONS.
5. SEWERS ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM COVER OF 1.0M. WHERE COVER IS LESS THAN THIS, PIPE TO BE SURROUNDED WITH CONCRETE TYPE 'D' HAUNCH.
6. FOR BEDDING, HAUNCH AND MANHOLE DETAILS REFER TO THE APPROVED STANDARD DRAWINGS.
7. ALL ROAD AND RIVER CROSSINGS TYPE 'D' HAUNCH TO BE ADOPTED.
8. ACTUAL POSITION OF MANHOLES IS AS SHOWN OR AS DIRECTED BY THE ENGINEER ON SITE.
9. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE APPROVED SEWER LAYOUT PLAN.

LEGEND

- EXISTING GROUND LEVEL
- PROPOSED SEWER LINE
- MH D-5 – PROPOSED MANHOLE
- N – TRUE NORTH
- MH-K1 – PROP. MANHOLE
- EXT. TRUNK SEWER LINE

NAIROBI CITY WATER & SEWERAGE COMPANY LIMITED
P O BOX 30656-00100 NAIROBI

PROJECT

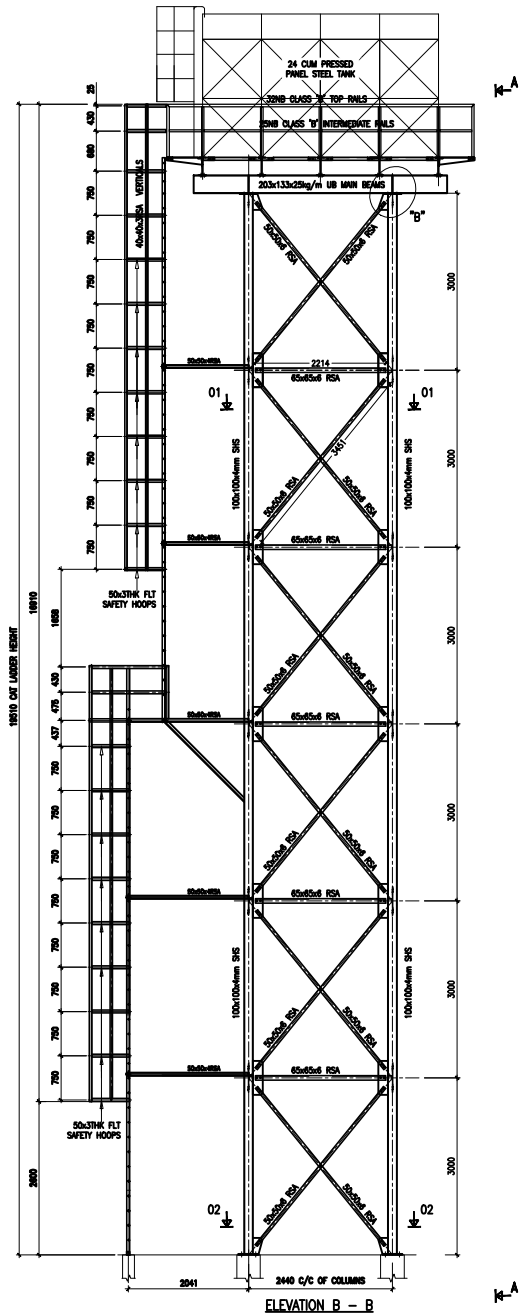
DUMP SITE TRUNK SEWER REHABILITATION PROJECT
(PLAN AND PROFILES SHEET 3 OF 3)

SURVEY WORK		
SURVEYED	T. OUMA	SIGN.
DRAWN	C. N. NDUNGU	SIGN.
CHECKED	S. KIMANI	SIGN.

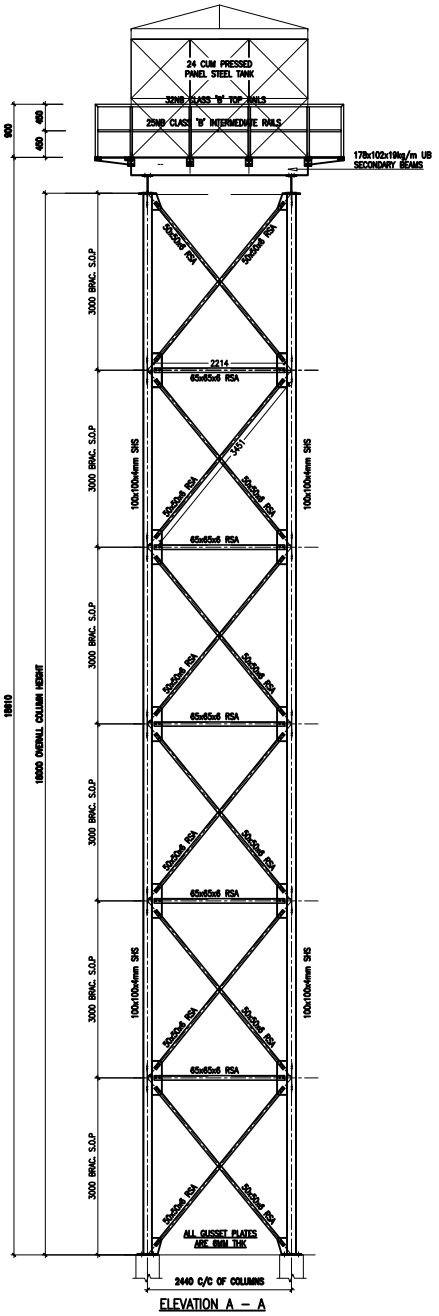
DESIGN WORK		
DESIGNED	J . M. MUNUVE	SIGN.
DRAWN	C. N. NDUNGU	SIGN.
CHECKED	Eng. D. MANORE	SIGN.

APPROVED
Eng. Lucy N. Macharia
SIGN. ____________________
TECHNICAL DIRECTOR

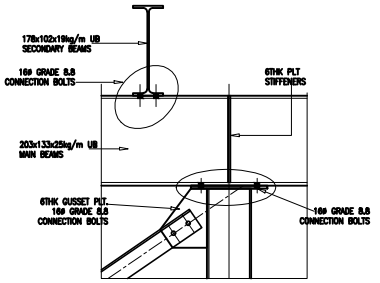
DATE	OCTOBER 2019
SCALE	HOR: 1 : 2000 VERT: 1 : 200
FIELD BOOK NO.	NCWS/TEC/ENG/004/RTK
DRG No.	NCWS/TEC/ENG/004/S/509



ELEVATION B – B



ELEVATION A – A



TYPICAL CONNECTION DETAIL AT "A"

GENERAL NOTES:

1) ALL STRUCTURAL STEELWORK TO BE GRADE 43C.
2) STEELWORK TO BE WIRE BRUSHED PRIOR TO PAINT APPLICATION.
3) APPLY ONE COAT OF GREY OXIDE PRIMER.
4) APPLY ONE COAT OF SILVER ALUMINIUM PAINT.
5) ALL SHOP WELDS TO BE 6MM FILLET WELDS U.O.N.
6) BOLTS ARE GALVANIZED GRADE 4.6. & GRADE 8.8
7) ALL SECTION SIZES TO BE AS SPECIFIED ON DRAWING.
8) THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.

NOTES

1. READ THE DRAWING IN CONJUCTION WITH RELEVANT R.C.
2. DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
3. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
4. ALL PIPEWORK ARE DUCTILE IRON TO NP 10 WITH NP 16 FLANGES
5. ALL CONCRETE SHALL BE CLASS C30 UNLESS OTHERWISE STATED
6. ALL VALVES TO BE SUPPLIED WITH EXTENSION SPINDLE.
7. MIN CONCRETE COVER OF 40 mm TO THE MAIN STEEL TO BE MAINTAINED.
8. SAFE BEARING CAPACITY TAKEN AS OF 150KN/M2,
9. ALL FOUNDATIONS TO BE TAKEN DOWN TO A SUITABLE ROCK.
10. MAXIMUM AGGREGATE SIZE FOR CONCRETE IS 20mm.
11. ALL REINFORCEMENT TO BE INSPECTED BY THE ENGINEER BEFORE CONCRETING.

PROJECT TITLE:

PROPOSED 24M^3 PRESSED STEEL TANK ON 18M TOWER.

DRAWING TITLE

ELEVATION DETAILS

CLIENT

ATHI WATER WORKS

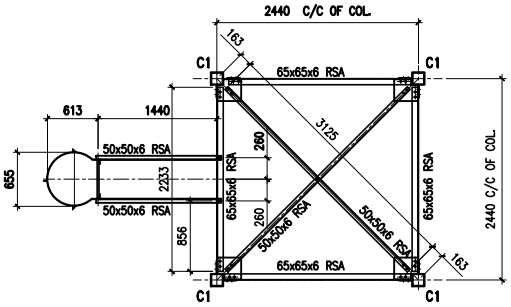
ATHI WATER SERVICES BOARD,
3RD FLOOR AFRICA RE CENTRE,
HOSPITAL RD. UPPER HILL,
P.O. BOX 45283-00100
NAIROBI, KENYA.

SCALE: 1:40

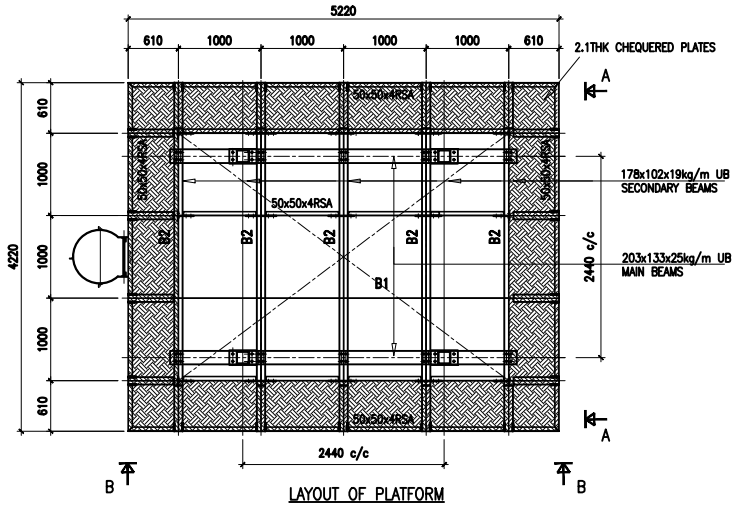
	NAME	SIGNATURE	DATE
Designed			
Drawn			
Checked			

DRG No. 03

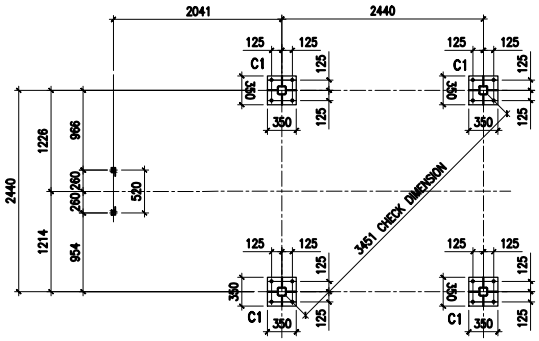
Revision Suffix



SECTION 01 – 01
TYPICAL PLAN ON HORIZONTAL BRACINGS



LAYOUT OF PLATFORM
(PRIMARY & SECONDARY BEAMS)



SECTION 02 – 02
BASE PLATE DETAILS

GENERAL NOTES:

1) ALL STRUCTURAL STEELWORK TO BE GRADE 43C.
2) STEELWORK TO BE WIRE BRUSHED PRIOR TO PAINT APPLICATION.
3) APPLY ONE COAT OF GREY OXIDE PRIMER.
4) APPLY ONE COAT OF SILVER ALUMINIUM PAINT.
5) ALL SHOP WELDS TO BE 6MM FILLET WELDS U.O.N.
6) BOLTS ARE GALVANIZED GRADE 4.6. & GRADE 8.8
7) ALL SECTION SIZES TO BE AS SPECIFIED ON DRAWING.
8) THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.

NOTES

1. READ THE DRAWING IN CONJUCTION WITH RELEVANT R.C. DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
3. ALL PIPEWORK ARE DUCTILE IRON TO NP 10 WITH NP 16 FLANGES
4. ALL CONCRETE SHALL BE CLASS C30 UNLESS OTHERWISE STATED
5. ALL VALVES TO BE SUPPLIED WITH EXTENSION SPINDLE.
6. MIN CONCRETE COVER OF 40 mm TO THE MAIN STEEL TO BE MAINTAINED.
7. SAFE BEARING CAPACITY TAKEN AS OF 150KN/M2.
8. ALL FOUNDATIONS TO BE TAKEN DOWN TO A SUITABLE ROCK.
9. MAXIMUM AGGREGATE SIZE FOR CONCRETE IS 20mm.
10. ALL REINFORCEMENT TO BE INSPECTED BY THE ENGINEER BEFORE CONCRETING.

PROJECT TITLE:

PROPOSED 24M^3 PRESSED STEEL TANK ON 18M TOWER.

DRAWING TITLE

PLATFORM DETAILS

CLIENT

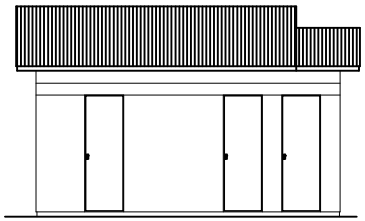
ATHI WATER SERVICES BOARD,
3RD FLOOR AFRICA RE CENTRE,
HOSPITAL RD. UPPER HILL,
P.O. BOX 45283-00100
NAIROBI, KENYA.

SCALE: 1:30

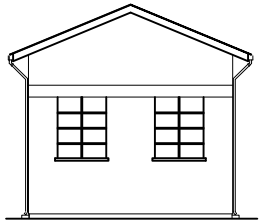
	NAME	SIGNATURE	DATE
Designed			
Drawn			
Checked			

DRG No. 04

Revision Suffix



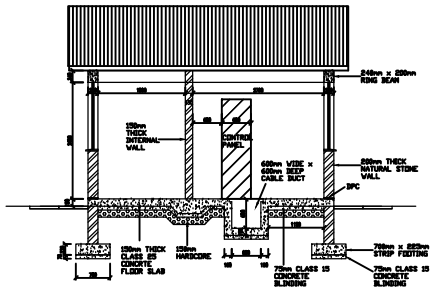
ELEVATION 03
SCALE 1:50



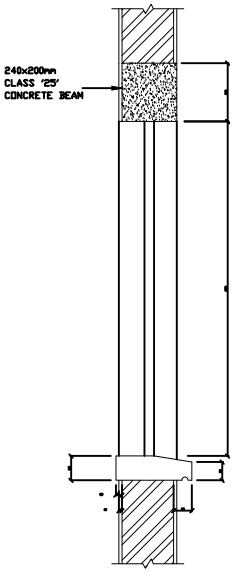
ELEVATION 04
SCALE 1:50

DOOR & WINDOW SCHEDULE

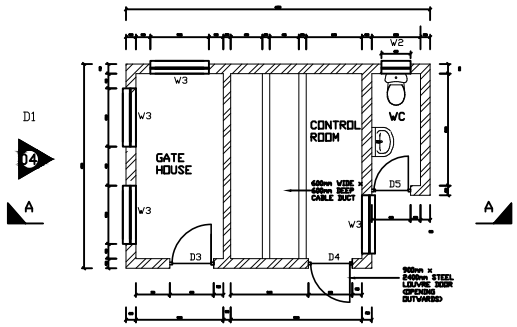
DOOR / WINDOW TYPE	DESCRIPTION
W3	1200 x 1000mm HIGH STANDARD SECTION STEEL WINDOW WITH 1 No. FIXED AND 1 No. SIDE-HUNG OPENING LIGHTS. TOP-HUNG VENTILATOR WITH P.V. HOOD OVER
W2	600 x 600mm HIGH STANDARD SECTION STEEL WINDOW WITH 1 No. TOP-HUNG VENTILATOR WITH P.V. HOOD
D3	900 x 2400mm HIGH TIMBER DOOR
D5	800 x 2400mm HIGH TIMBER DOOR
D4	900 x 2400mm HIGH METAL LOUVRE DOOR



SECTION A-A



TYP. WINDOW DETAIL
SCALE 1:10



03
GATE HOUSE
GROUND FLOOR PLAN
SCALE 1:50

NOTES

PROJECT TITLE:
PROPOSED REINFORCED MASONRY WALL

DRAWING TITLE
GATE HOUSE DETAILS

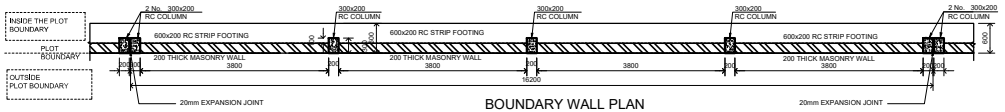
CLIENT
ATHI WATER SERVICES BOARD,
3RD FLOOR AFRICA RE CENTRE,
HOSPITAL RD. UPPER HILL,
P.O. BOX 45283-00100
NAIROBI, KENYA.

SCALE: 1:50

	NAME	SIGNATURE	DATE
Designed			
Drawn			
Checked			

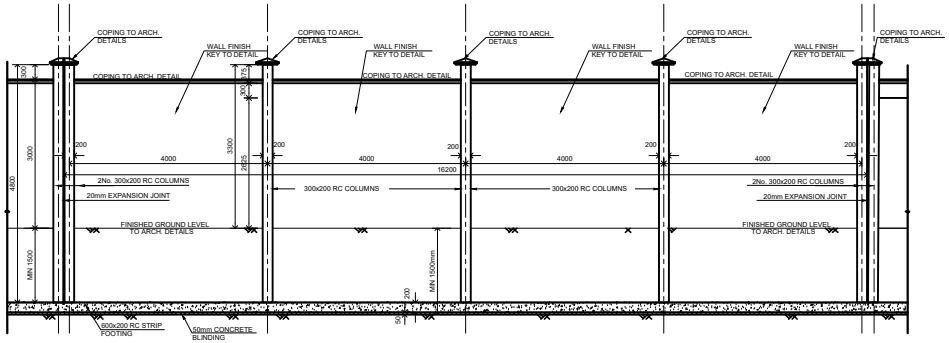
DRG No.
002

Revision Suffix



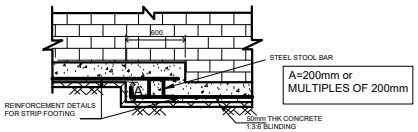
BOUNDARY WALL PLAN
NEIGHBOURING PLOTS SIDE - 2No. SIDES
(4 BAYS BETWEEN EXP JOINTS)

SCALE 1:50



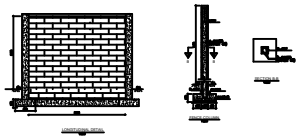
BOUNDARY WALL ELEVATION DETAIL
NEIGHBOURING PLOTS SIDE - 2No. SIDES
(EXPANSION JOINT EVERY 4 BAYS)

SCALE 1:50

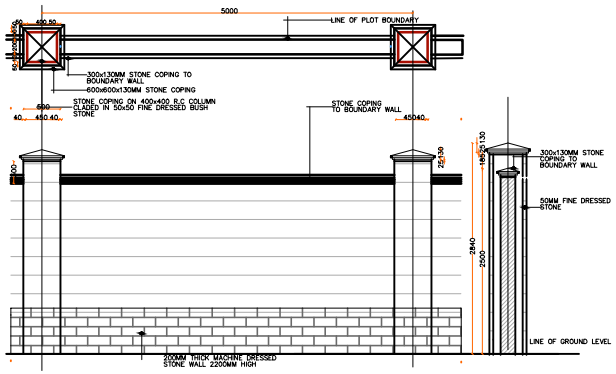


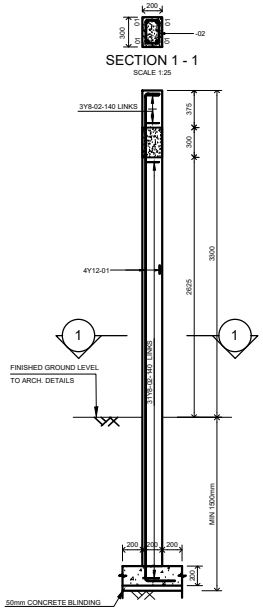
DETAIL AT STEPPED FOUNDATION.

SCALE 1:25



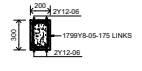
FENCING DETAILS





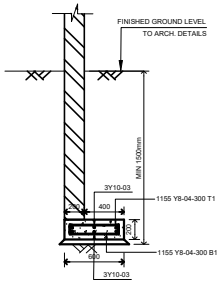
300 x 200 RC COLUMN
100Nos.

SCALE 1: 25



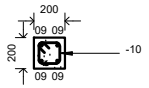
300x200 RC BEAM.
LENGTH = 314.791m

SCALE 1: 25



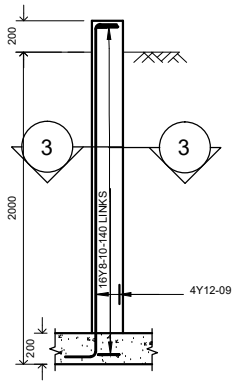
600x200 STRIP FOOTING.
LENGTH = 314.791m

SCALE 1: 25



SECTION 3-3

SCALE 1:25



200SQ. RC COLUMN

SCALE 1:25

NOTES

PROJECT TITLE:

PROPOSED REINFORCED MASONRY WALL

DRAWING TITLE

REINFORCED MASONRY WALL DETAILS

CLIENT

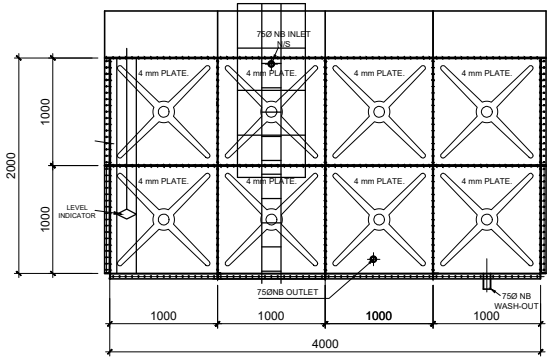
ATHI WATER SERVICES BOARD,
3RD FLOOR AFRICA RE CENTRE,
HOSPITAL RD. UPPER HILL,
P.O. BOX 45283-00100
NAIROBI, KENYA.

SCALE: 1:50

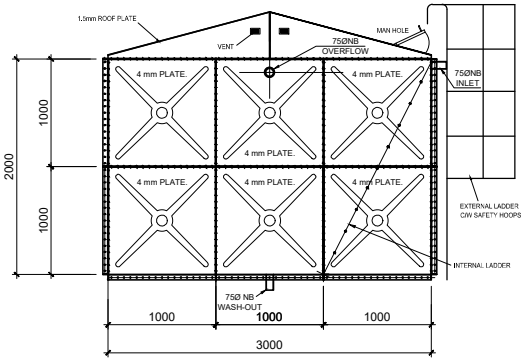
	NAME	SIGNATURE	DATE
Designed			
Drawn			
Checked			

DRG No. 002

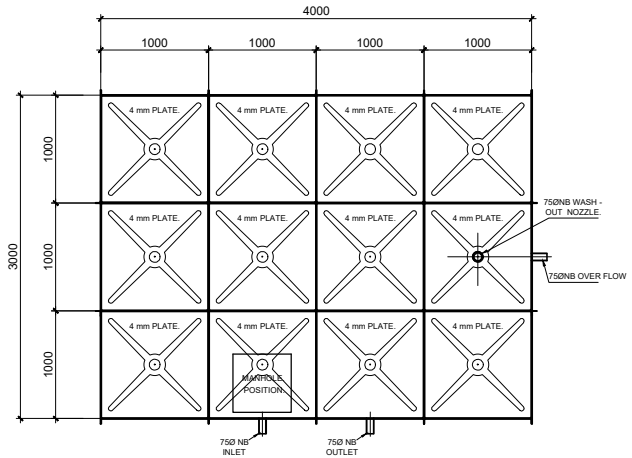
Revision Suffix



SIDE ELIVATION



END ELEVATION



PLAN

DESCRIPTION

OVERFLOW	75MMØ NB
OUTLET	75MMØ NB
WASHOUT	75MMØ NB
INLET	75MMØ NB

GENERAL NOTES:

1) ALL STRUCTURAL STEELWORK TO BE GRADE 43C.

2) STEELWORK TO BE WIRE BRUSHED PRIOR TO FINISHING APPLICATION.

3) INSIDE TANK:ONE COAT OF PRIMER & TWO COATS OF NON TOXIC BITUMINOUS PAINT OUTSIDE TANK:ONE COAT OF PRIMER & ONE COAT OF SILVER ALUMINUM PAINT.

4) ALL SHOP WELDS TO BE 6MM FILLET WELDS UNLESS OTHERWISE NOTED.

5) ALL SECTION SIZES ARE AS SPECIFIED ON DRAWING UNLESS OTHERWISE NOTED.

6) BOLTS ARE GALVANIZED GRADE 8.8.

NOTES

1. READ THE DRAWING IN CONJUCTION WITH RELEVANT R.C.
2. DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE STATED.
3. ALL LEVELS ARE IN METERS ABOVE SEA LEVEL.
4. ALL PIPEWORK ARE DUCTILE IRON TO NP 10 WITH NP 16 FLANGES
5. ALL CONCRETE SHALL BE CLASS C30 UNLESS OTHERWISE STATED
6. ALL VALVES TO BE SUPPLIED WITH EXTENSION SPINDLE.
7. MIN CONCRETE COVER OF 40 mm TO THE MAIN STEEL TO BE MAINTAINED.
8. SAFE BEARING CAPACITY TAKEN AS OF 150KN/M2,
9. ALL FOUNDATIONS TO BE TAKEN DOWN TO A SUITABLE ROCK.
10. MAXIMUM AGGREGATE SIZE FOR CONCRETE IS 20mm.
11. ALL REINFORCEMENT TO BE INSPECTED BY THE ENGINEER BEFORE CONCRETING.

PROJECT TITLE:

PROPOSED 24M^3 PRESSED STEEL TANK ON 18M TOWER.

DRAWING TITLE

PANEL DETAILS

CLIENT

ATHI WATER SERVICES BOARD,
3RD FLOOR AFRICA RE CENTRE,
HOSPITAL RD. UPPER HILL,
P.O. BOX 45283-00100
NAIROBI, KENYA.

SCALE: 1:50

	NAME	SIGNATURE	DATE
Designed			
Drawn			
Checked			

DRG No. 02

Revision Suffix