Client:	Consultant:
Ministry of Water and Sanitation **Maji House, 6th Floor** **Ngong Road, Nairobi.** **Republic of Kenya**	**The Priory, 5th Floor** **Argwings Kodhek Road** **P.O. Box 76672-00508** **Nairobi, Kenya**

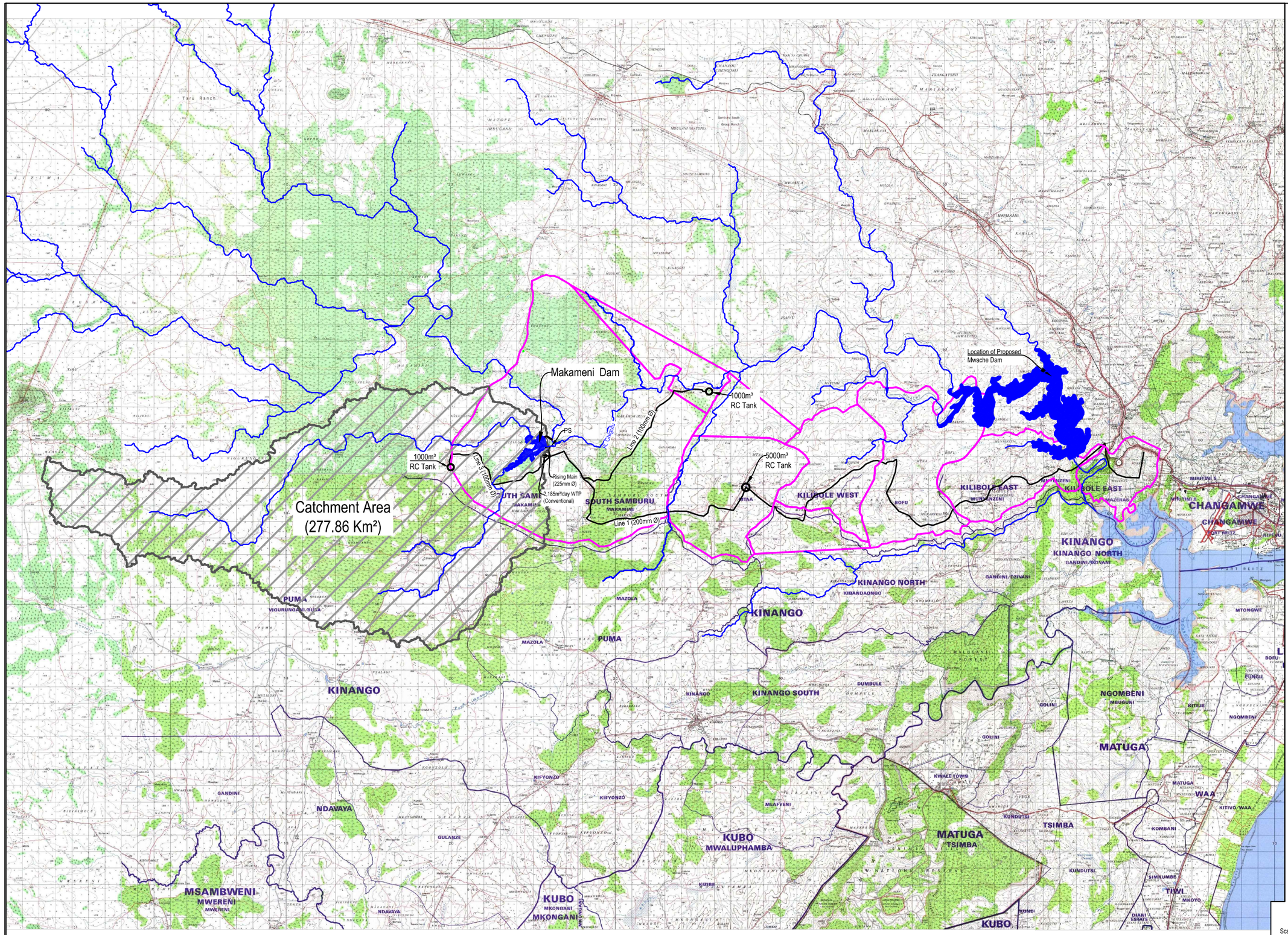
Project Name:

MAKAMINI DAM PRELIMINARY DESIGN

LIST OF DRAWINGS

1) DAM-RESERVOIR, CATCHMENT AREA & TRANSMISSION PIPELINES LOCATION MAP
2) RESERVOIR, EMBANKMENT AND SPILLWAY LAYOUT PLAN
3) EMBANKMENT DAM TYPICAL SECTION
4) DEPTH-AREA CAPACITY CURVES
5) TYPICAL CONVENTIONAL WATER TREATMENT PLANT-UNIT PROCESSES
6) WATER SUPPLY SERVICE AREA & TRANSMISSION PIPELINES LAYOUT MAP
7. WATER SUPPLY TRANMISSION PIPELINES LONGITUDUNAL PROFILES

   i. LINE 1 (**0+000 TO 10+800**)
   ii. LINE 1 (**10+800 TO 21+600**)
   iii. LINE 1 (**21+600 TO 32+400**)
   iv. LINE 1 (**32+400 TO 43+200**)
   v. LINE 1 (**43+200 TO 53+042**)
   vi. LINE 2 (**0+000 TO 10+636**)
   vii. LINE 3 (**0+000 TO 8+799**)



NOTES/LEGEND

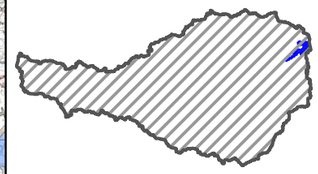
All elevations are in metres above sea level
All dimensions are in mm unless otherwise stated

CI Contour Interval
masl Metres Above Sea Level
NWL Normal Water Level

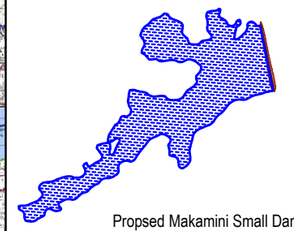
Water Supply Transmission Pipeline

Service Area Boundary

River Flow



Catchment Area (277.86 Km²)



Propsed Makamini Small Dam

N

Scale 0 2.5 5 7.5 10 km

Client:	Project Name:	Consultant:
Ministry of Water and Sanitation **Maji House, 6th Floor** **Ngong Road, Nairobi.** **Republic of Kenya**	**Kenya Water Security and Climate Resilience Project.** **Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)**	egis eau The Priory, 5th Floor Argwings Kodhek Road P.O. Box 76672-00508 Nairobi, Kenya

Revision

No.	Date	Description	Author	Checked	Approved

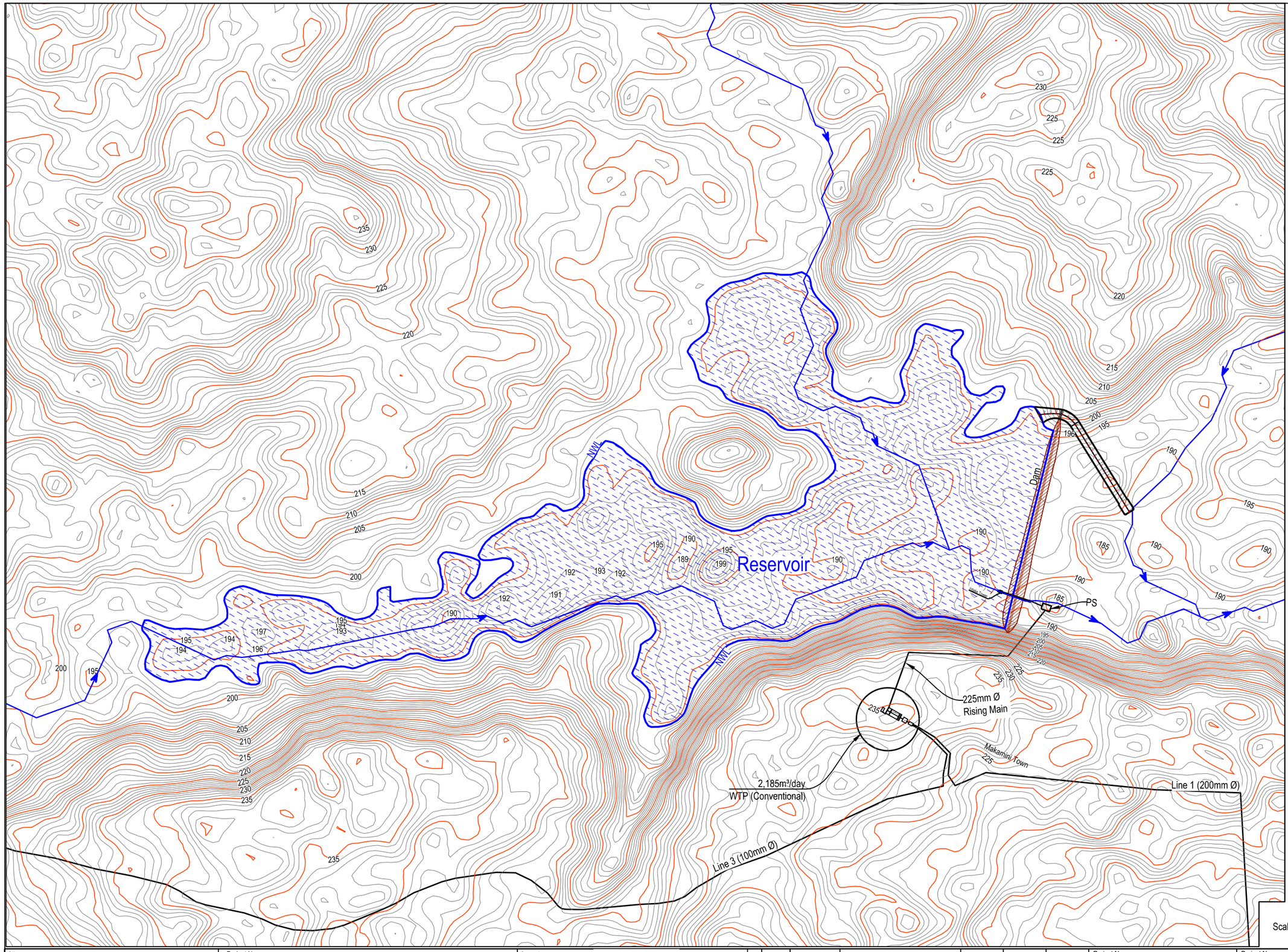
Project Name:

MAKAMINI DAM PRELIMINARY DESIGN

Project Name:

DAM - RESERVOIR, CATCHMENT AREA & TRANSMISSION PIPELINES LOCATION MAP

Date :	October, 2018
Designed :	D.K.N
Drawn :	D.K.N
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No. KWSDMP/PD/MD-LY001	REV. 0



NOTES/LEGEND

All elevations are in metres above sea level

All dimensions are in mm unless otherwise stated

CI	Contour Interval
masl	Metres Above Sea Level
NWL	Normal Water Level
VI	Vertical Interval
WTP	Water Treatment Plant
Ø	Diameter
PS	Pump Station

Water Supply Transmission Pipeline

Service Area Boundary

River Flow

Major Contours (5m VI)

Minor Contours (1m VI)

Client:

Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:

Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

Consultant:

egis eau

The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672-00508
Nairobi, Kenya

Revision

No.	Date	Description	Author	Checked	Approved

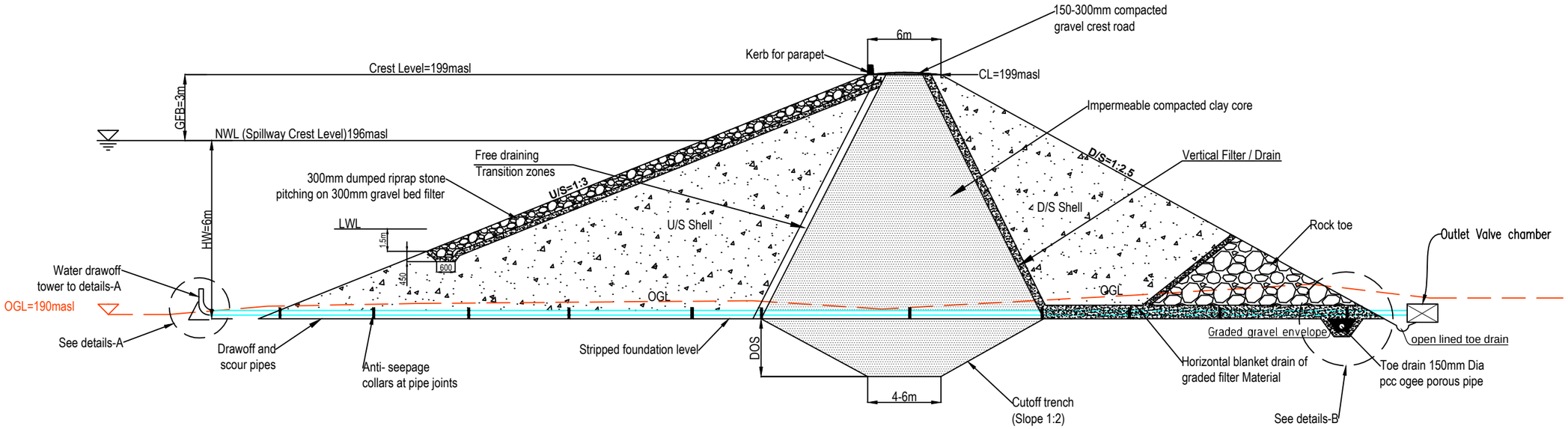
Project Name:

MAKAMINI DAM PRELIMINARY DESIGN

Project Name:

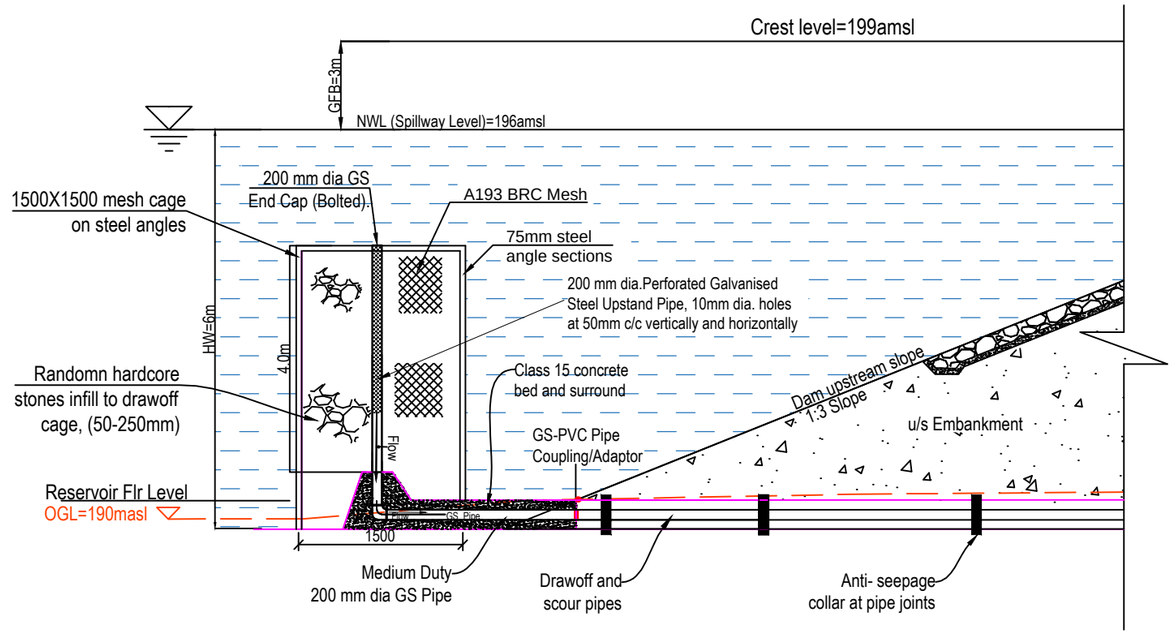
RESERVOIR, EMBANKMENT AND SPILLWAY LAYOUT PLAN

Date :	October, 2018
Designed :	D.K.N
Drawn :	D.K.N
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No. KWSDMP/PD/KMD-LY001	REV. 0

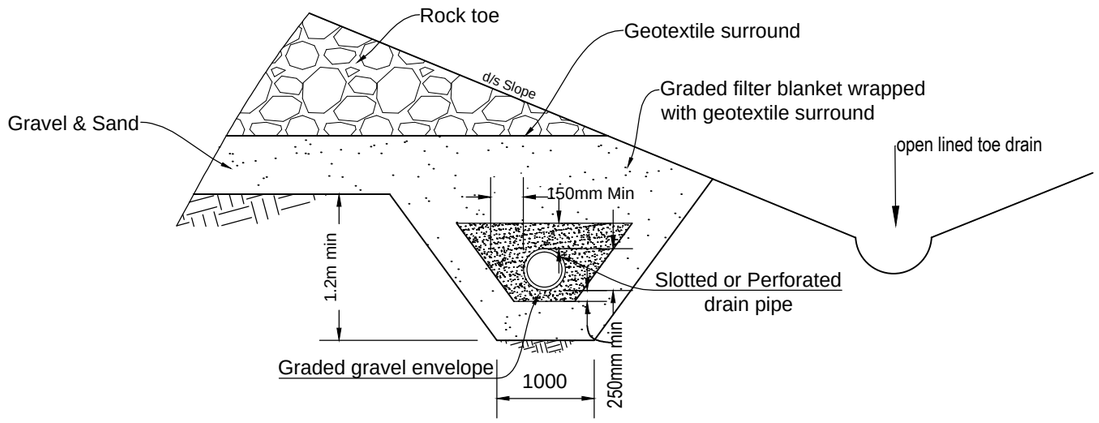


MAKAMINI EARTHFILL EMBANKMENT DAM
TYPICAL SECTION - NTS

NOTES/ LEGENDS
1. All dimensions are in mm unless otherwise stated
2. Abbreviations
   - NTS - not to scale
   - D/S - Downstream
   - U/S - Upstream
   - Spec- Specifications
   - masl - Metres Above Sea Level
   - CW - Crest Width
   - DOS - Determine on site
   - PCC - Precast Cement Concrete
   - CT - Cutoff Trench
   - OGL - Original Ground Level
   - HW - Height of Water(Rerservoir)
   - GFB - Gross Free Board
   - EL - Elevation Level
   - 1:n - slope, 1 unit vertical to n units horizontal



Reservoir Draw off Tower System Detail A
Scale : NTS



TOE DRAIN DETAILS
Detail B (NTS)

Client:	Project Name:	Consultant:
Ministry of Water and Sanitation **Maji House, 6th Floor** **Ngong Road, Nairobi.** **Republic of Kenya**	**Kenya Water Security and Climate Resilience Project.** **Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)**	egis eau The Priory, 5th Floor Argwings Kodhek Road P.O. Box 76672-00508 Nairobi, Kenya

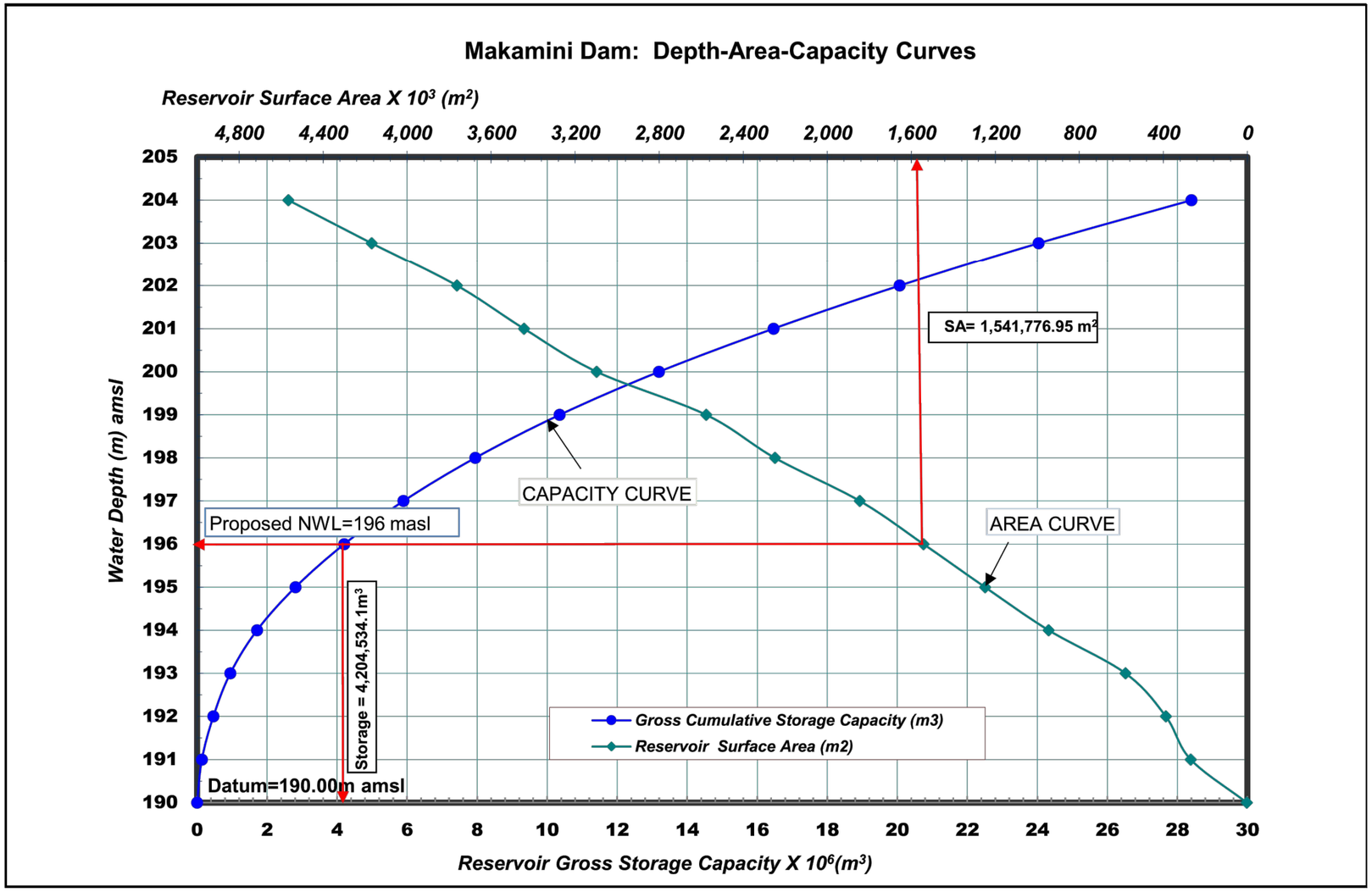
Revision

No.	Date	Description	Author	Checked	Approved

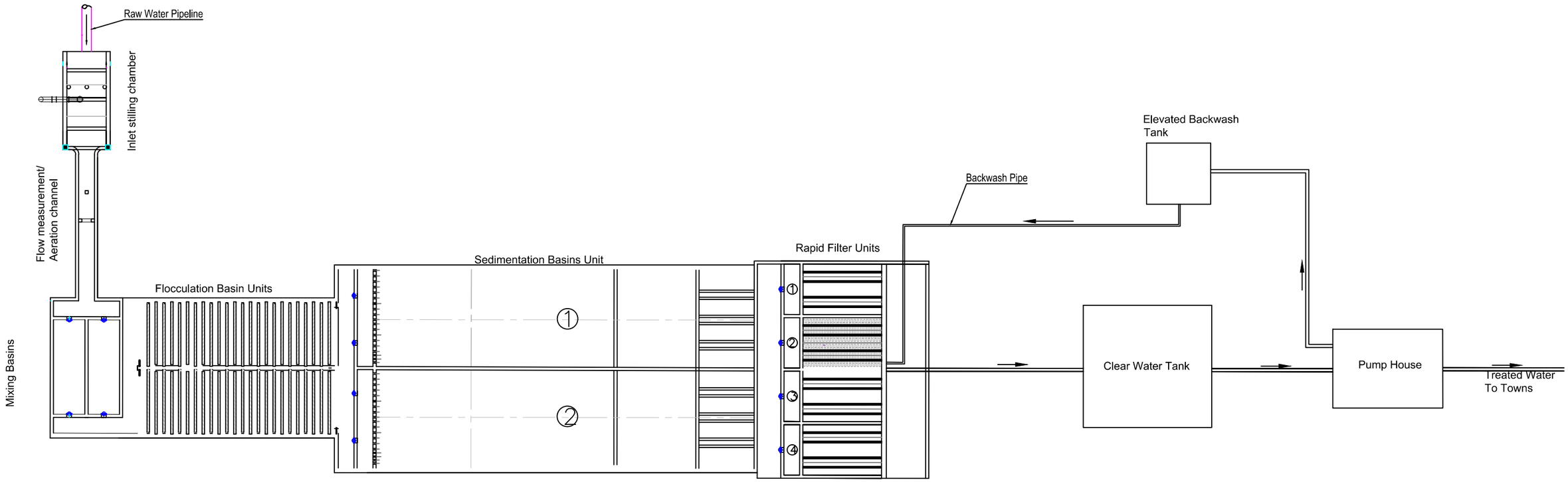
Project Name: **MAKAMINI DAM PRELIMINARY DESIGN**

Project Name: EMBANKMENT DAM TYPICAL SECTION DETAILS

Date :	October, 2018
Designed :	D.K.N
Drawn :	D.K.N
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No.	KWSDMP/PD/KMD-LY001
REV.	0

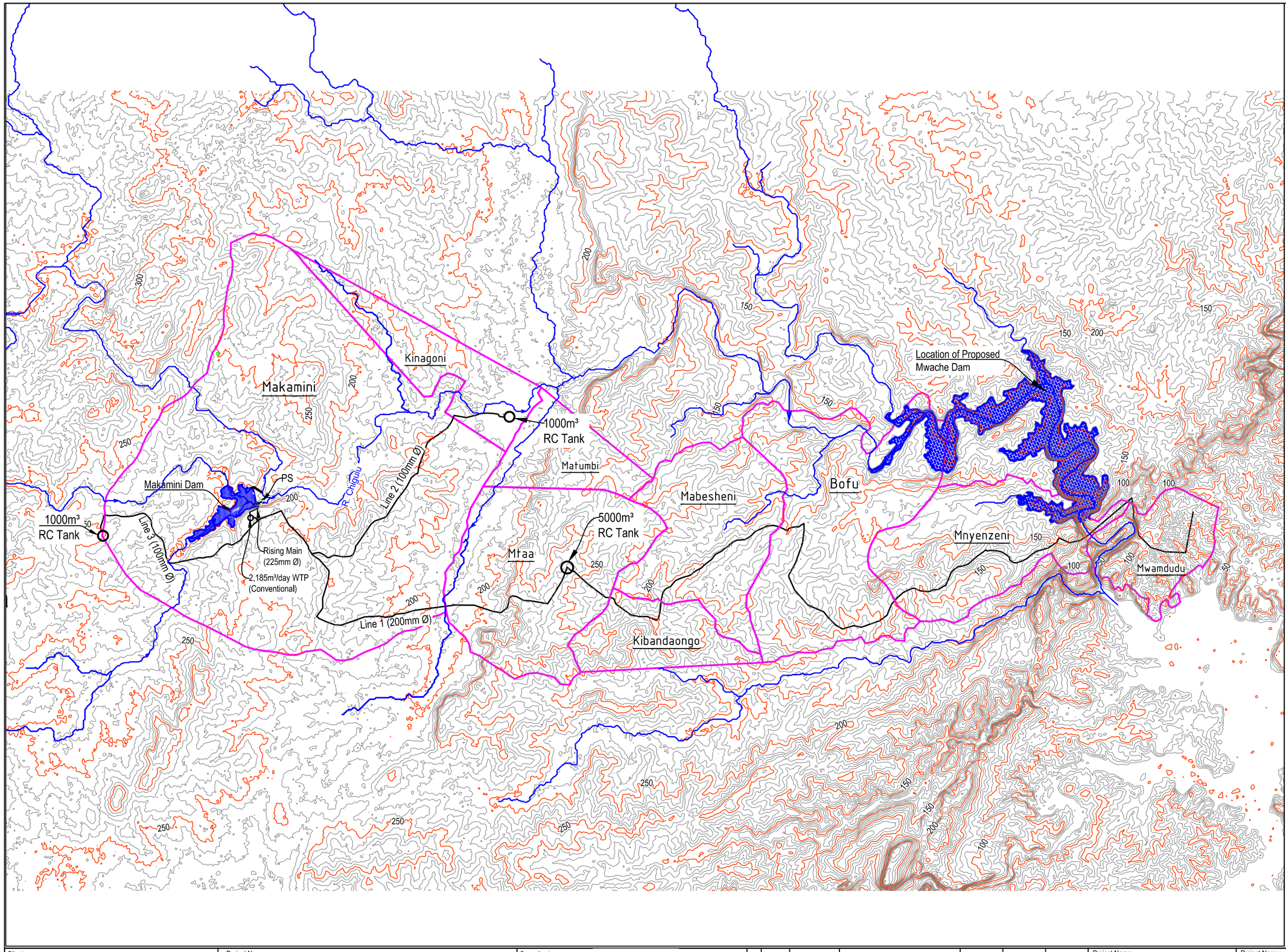


Client:	Project Name:	Consultant:	Revision						Project Name:	Project Name:		
Ministry of Water and Sanitation Maji House, 6th Floor Ngong Road, Nairobi. Republic of Kenya	Kenya Water Security and Climate Resilience Project. Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)	egis eau The Priory, 5th Floor Argwings Kodhek Road P.O. Box 76672-00508 Nairobi, Kenya	No.	Date	Description	Author	Checked	Approved	MAKAMINI DAM PRELIMINARY DESIGN	DEPTH - AREA - CAPACITY CURVES	Date : October, 2018 Designed : D.K.N Drawn : D.K.N Checked : Eng. J.K.R Approved : Eng. J.K.R Scale : As Shown. DRG. No. KWSDMP/PD/MD-LY00	REV. 0



TYPICAL WATER TREATMENT PLANT - UNIT PROCESSES LAYOUT PLAN

Client:	Project Name:	Consultant:	Revision						Project Name:	Project Name:		
Ministry of Water and Sanitation **Maji House, 6th Floor** **Ngong Road, Nairobi.** **Republic of Kenya**	**Kenya Water Security and Climate Resilience Project.** **Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)**	egis eau The Priory, 5th Floor Argwings Kodhek Road P.O. Box 76672-00508 Nairobi, Kenya		No.	Date	Description	Author	Checked	Approved	**MAKAMINI DAM PRELIMINARY DESIGN**	TYPICAL CONVENTIONAL WATER TREATMENT PLANT - UNIT PROCESS.	Date : October, 2018 Designed : D.K.N Drawn : D.K.N Checked : Eng. J.K.R Approved : Eng. J.K.R Scale : As Shown. DRG. No. **KWSDMP/PD/MD-LY00** REV. **0**	



NOTES/LEGEND

All elevations are in metres above sea level
All dimensions are in mm unless otherwise stated

CI	Contour Interval
masl	Metres Above Sea Level
WTP	Water Treatment Plant
RC	Reinforced Concrete
Ø	Diameter
PS	Pump Station

Water Supply Transmission Pipeline

Service Area Boundary

River Flow

Major Contours (50m VI)

Minor Contours (10m VI)

N

Scale 0 1.5 3 4.5 6 km

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672-00508
Nairobi, Kenya

Revision

No.	Date	Description	Author	Checked	Approved

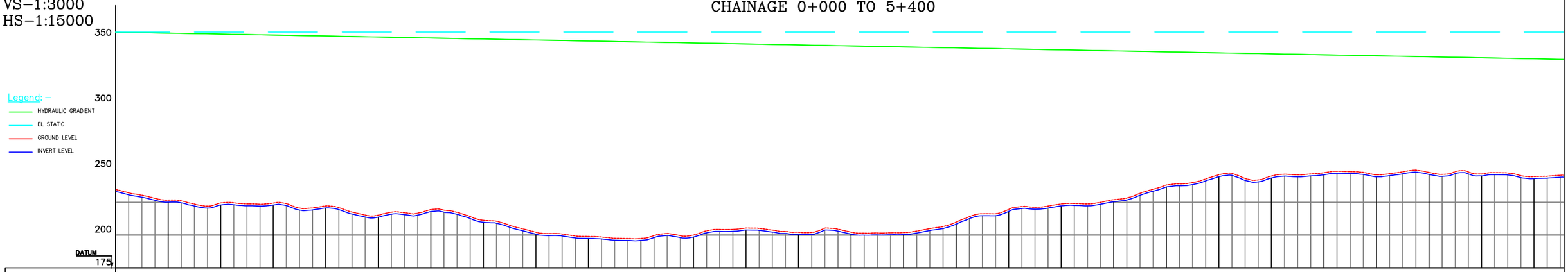
Project Name:
MAKAMINI DAM PRELIMINARY DESIGN

Project Name:
WATER SUPPLY SERVICE AREA & TRANSMISSION PIPELINES LAYOUT MAP

Date :	October, 2018
Designed :	D.K.N
Drawn :	D.K.N
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No.	KWSDMP/PD/KMD-LY00
REV.	0

VS–1:3000
HS–1:15000

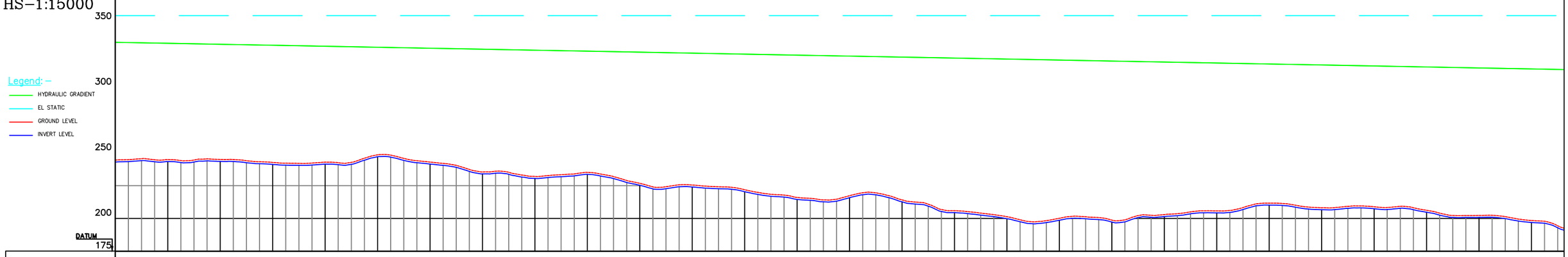
CHAINAGE 0+000 TO 5+400



Station	0+000	0+200	0+400	0+600	0+800	1+000	1+200	1+400	1+600	1+800	2+000	2+200	2+400	2+600	2+800	3+000	3+200	3+400	3+600	3+800	4+000	4+200	4+400	4+600	4+800	5+000	5+200	5+400
Hydraulic Gradient		353.94	353.19	352.43	351.68	350.93	350.18	349.42	348.67	347.92	347.17	346.41	345.66	344.91	344.16	343.40	342.65	341.90	341.15	340.39	339.64	338.89	338.14	337.38	336.63	335.88	335.13	334.37
EL Static (m)		353.98	353.23	352.48	351.73	350.97	350.22	349.47	348.72	347.96	347.21	346.46	345.71	344.95	344.20	343.45	342.70	341.94	341.19	340.44	339.69	338.93	338.18	337.43	336.68	335.92	335.17	334.42
Existing Ground Levels		226.59	224.43	224.35	222.14	215.12	219.39	211.23	202.14	198.89	197.42	199.98	205.35	202.10	202.21	201.84	209.84	219.54	223.71	226.98	236.13	245.98	244.93	247.44	245.94	247.72	245.00	244.55
Invert Levels		225.09	222.93	222.85	220.64	213.62	217.89	209.73	200.64	197.39	195.92	198.48	203.85	200.60	200.71	200.34	208.34	218.04	222.21	225.48	236.63	244.48	243.43	245.94	244.44	246.22	245.00	243.05
Pipe Details	Steel Pipe/200mm Diameter																											

VS–1:3000
HS–1:15000

CHAINAGE 5+400 TO 10+800



Station	0+400	5+600	5+800	6+000	6+200	6+400	6+600	6+800	7+000	7+200	7+400	7+600	7+800	8+000	8+200	8+400	8+600	8+800	9+000	9+200	9+400	9+600	9+800	10+000	10+200	10+400	10+600	10+800
Hydraulic Gradient		333.62	332.87	332.12	331.36	330.61	329.86	329.11	328.35	327.60	326.85	326.10	325.34	324.59	323.84	323.09	322.33	321.58	320.83	320.08	319.32	318.57	317.82	317.07	316.31	315.56	314.81	314.06
EL Static (m)		333.67	332.91	332.16	331.41	330.66	329.90	329.15	328.40	327.65	326.89	326.14	325.39	324.64	323.88	323.13	322.38	321.63	320.87	320.12	319.37	318.62	317.86	317.11	316.36	315.61	314.85	314.10
Existing Ground Levels		244.87	245.03	242.71	242.95	248.54	242.99	235.49	232.01	235.13	226.77	225.49	221.90	216.01	217.35	214.18	205.91	201.30	200.12	198.72	202.93	205.75	211.66	208.14	208.93	206.22	202.29	198.40
Invert Levels		243.37	243.53	241.21	241.45	247.04	241.49	233.99	230.51	233.63	225.27	223.99	220.40	214.51	215.85	212.68	204.41	199.80	198.62	197.22	201.43	204.25	210.16	206.64	207.43	204.72	200.79	196.90
Pipe Details	Steel Pipe/200mm Diameter																											

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672–00508
Nairobi, Kenya

Revision	No.	Date	Description	Author	Checked	Approved

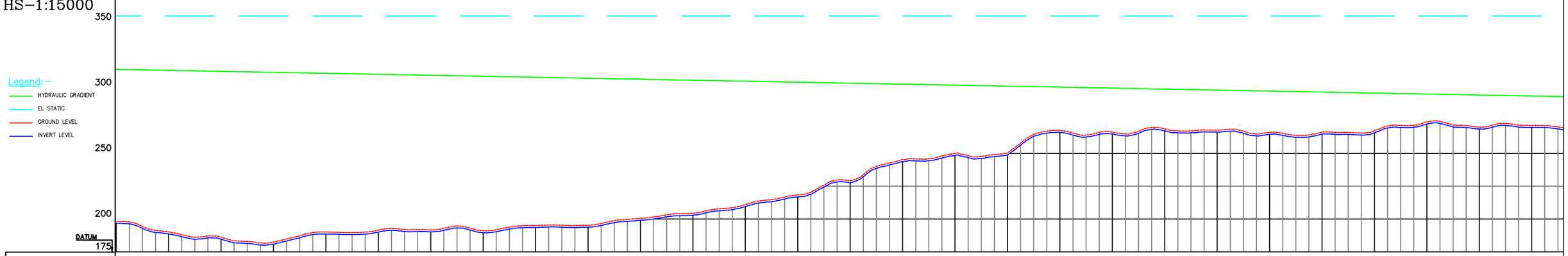
Project Name:
MAKAMINI DAM PRELIMINARY DESIGN

Project Name:
WATER SUPPLY TRANSMISSION PIPELINES LONGITUDINAL PROFILE LINE 1(0+000 TO 10+800)

Date :	October, 2018
Designed :	O.K
Drawn :	O.K
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No. KWSDMP/PD/KMD-LY001	REV. 0

CHAINAGE 10+800 TO 16+200

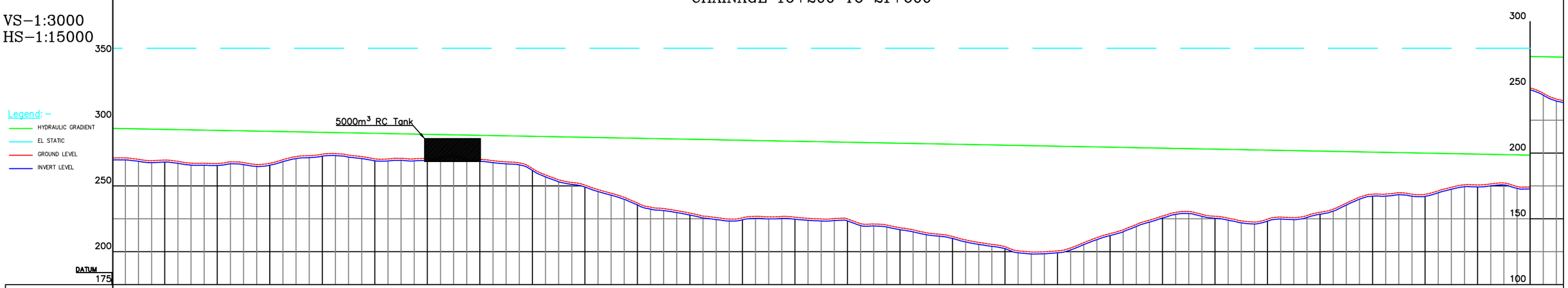
VS–1:3000
HS–1:15000



Station	10+800	11+000	11+200	11+400	11+600	11+800	12+000	12+200	12+400	12+600	12+800	13+000	13+200	13+400	13+600	13+800	14+000	14+200	14+400	14+600	14+800	15+000	15+200	15+400	15+600	15+800	16+000	16+200
Hydraulic Gradient		313.30	312.55	311.80	311.05	310.29	309.54	308.79	308.04	307.28	306.53	305.78	305.03	304.28	303.52	302.77	302.02	301.27	300.51	299.76	299.01	298.26	297.50	296.75	296.00	295.25	294.49	293.74
EL Static (m)		313.35	312.60	311.84	311.09	310.34	309.59	308.83	308.08	307.33	306.58	305.82	305.07	304.32	303.57	302.81	302.06	301.31	300.56	299.81	299.05	298.30	297.55	296.80	296.04	295.29	294.54	293.79
Existing Ground Levels		190.20	186.12	182.39	190.07	191.57	191.72	191.11	195.03	195.32	200.55	204.45	211.00	218.37	229.22	245.20	249.98	250.36	267.53	266.31	268.76	267.75	265.99	266.27	267.23	273.91	268.60	271.30
Invert Levels		188.70	184.62	180.89	188.57	190.07	190.22	189.61	193.53	193.82	199.05	202.95	209.50	216.87	227.72	243.70	248.48	248.86	266.03	264.81	267.26	266.25	264.49	264.77	265.73	272.41	268.60	269.80
Pipe Details	Steel Pipe/200mm Diameter																											

CHAINAGE 16+200 TO 21+600

VS–1:3000
HS–1:15000



Station	16+200	16+400	16+600	16+800	17+000	17+200	17+400	17+600	17+800	18+000	18+200	18+400	18+600	18+800	19+000	19+200	19+400	19+600	19+800	20+000	20+200	20+400	20+600	20+800	21+000	21+200	21+400	21+600
Hydraulic Gradient		293.03	292.24	291.48	290.73	289.98	289.23	288.47	287.72	286.97	286.22	285.46	284.71	283.96	283.21	282.45	281.70	280.95	280.20	279.44	278.69	277.94	277.19	276.43	275.68	274.93	274.18	273.42
EL Static (m)		293.03	292.28	291.53	290.78	290.02	289.27	288.52	287.77	287.01	286.26	285.51	284.76	284.00	283.25	282.50	281.75	280.99	280.24	279.49	278.74	277.98	277.23	276.48	275.73	274.97	274.22	273.47
Existing Ground Levels		269.63	267.08	267.27	274.12	270.62	270.72	270.22	263.26	250.63	237.07	229.33	225.72	226.18	224.91	218.20	211.59	203.80	200.63	213.72	227.12	226.89	224.76	229.94	243.66	243.60	250.74	249.27
Invert Levels		268.13	265.58	265.77	272.62	269.12	269.22	268.72	261.76	249.13	235.57	227.83	224.22	224.68	223.41	216.70	210.09	202.30	199.13	212.22	225.62	225.39	223.26	228.44	242.16	242.10	249.24	247.77
Pipe Details	Steel Pipe/200mm Diameter																											

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672–00508
Nairobi, Kenya

Revision					
No.	Date	Description	Author	Checked	Approved

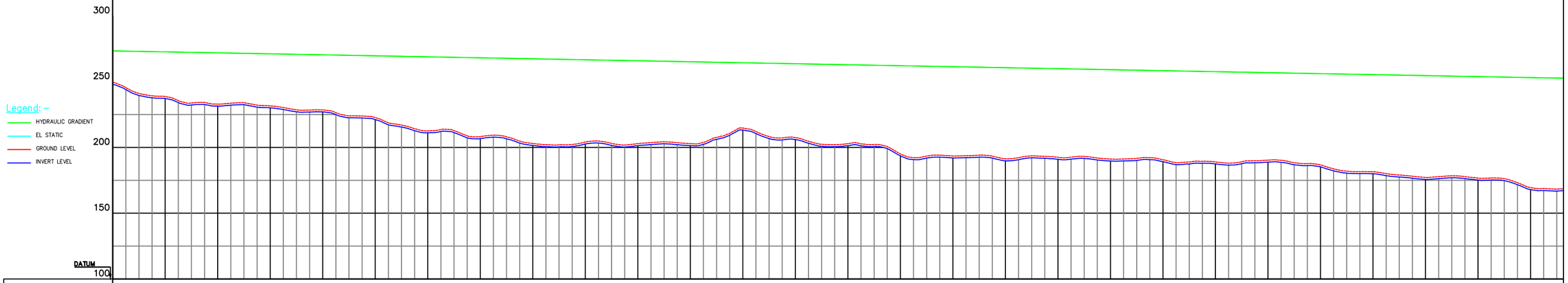
Project Name:
MAKAMINI DAM
PRELIMINARY DESIGN

Project Name:
WATER SUPPLY
TRANSMISSION PIPELINES
LONGITUDINAL PROFILE
LINE 1(10+800 TO 21+600)

Date :	October, 2018
Designed :	O.K
Drawn :	O.K
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No. KWSDMP/PD/KMD-LY001	REV. 0

VS–1:3000
HS–1:15000

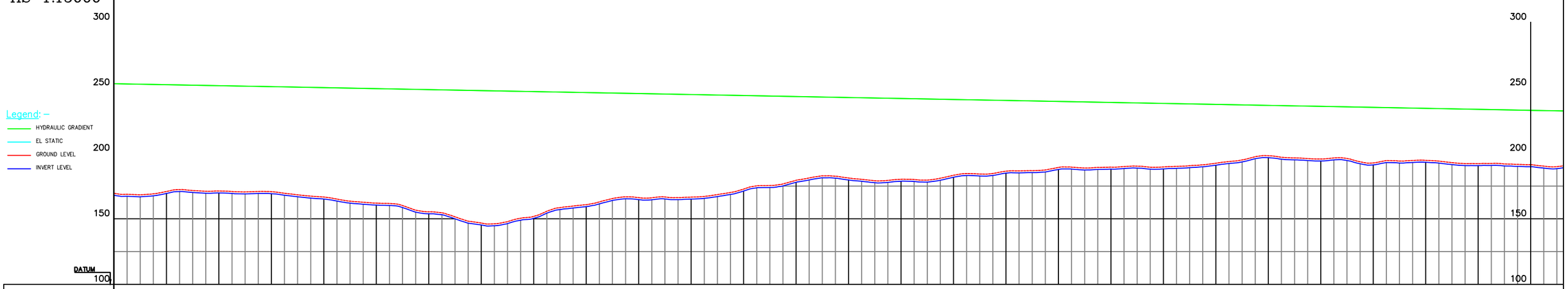
CHAINAGE 21+600 TO 27+000



Station	+600	21+800	22+000	22+200	22+400	22+600	22+800	23+000	23+200	23+400	23+600	23+800	24+000	24+200	24+400	24+600	24+800	25+000	25+200	25+400	25+600	25+800	26+000	26+200	26+400	26+600	26+800	27+000
Hydraulic Gradient		272.67	271.92	271.17	270.41	269.66	268.91	268.16	267.40	266.65	265.90	265.15	264.39	263.64	262.89	262.14	261.38	260.63	259.88	259.13	258.37	257.62	256.87	256.12	255.36	254.61	253.86	253.11
EL Static (m)		272.71	271.96	271.21	270.46	269.71	268.95	268.20	267.45	266.70	265.94	265.19	264.44	263.69	262.93	262.18	261.43	260.68	259.92	259.17	258.42	257.67	256.91	256.16	255.41	254.66	253.90	253.15
Existing Ground Levels		238.71	232.96	231.60	228.55	222.71	212.63	208.26	203.01	204.14	202.90	202.91	214.76	207.50	202.89	195.13	193.53	191.39	192.53	191.19	190.68	189.02	190.33	186.78	181.53	177.20	176.70	169.52
Invert Levels		237.21	231.46	230.10	227.05	221.21	211.13	206.76	201.51	202.64	201.40	201.41	213.26	206.00	201.39	193.63	192.03	189.89	191.03	189.69	189.18	187.52	188.83	185.28	180.03	175.70	175.20	168.02
Pipe Details	Steel Pipe/200mm Diameter																											

VS–1:3000
HS–1:15000

CHAINAGE 27+000 TO 32+400



Station	7+000	27+200	27+400	27+600	27+800	28+000	28+200	28+400	28+600	28+800	29+000	29+200	29+400	29+600	29+800	30+000	30+200	30+400	30+600	30+800	31+000	31+200	31+400	31+600	31+800	32+000	32+200	32+400
Hydraulic Gradient		252.35	251.60	250.85	250.10	249.35	248.59	247.84	247.09	246.34	245.58	244.83	244.08	243.33	242.57	241.82	241.07	240.32	239.56	238.81	238.06	237.31	236.55	235.80	235.05	234.30	233.54	232.79
EL Static (m)		252.40	251.65	250.89	250.14	249.39	248.64	247.88	247.13	246.38	245.63	244.88	244.12	243.37	242.62	241.87	241.11	240.36	239.61	238.86	238.10	237.35	236.60	235.85	235.09	234.34	233.59	232.84
Existing Ground Levels		170.87	171.23	170.70	166.64	161.98	155.37	146.79	151.88	160.81	166.17	166.58	172.69	179.37	181.13	180.18	183.23	186.34	189.18	189.45	189.58	192.43	198.18	195.66	192.64	194.62	192.13	191.29
Invert Levels		169.37	169.73	169.20	165.14	160.48	153.87	145.29	150.38	159.31	164.67	165.08	171.19	177.87	179.63	178.68	181.73	184.84	187.68	187.95	188.08	190.93	196.68	194.16	191.14	193.12	190.63	189.79
Pipe Details	Steel Pipe/200mm Diameter																											

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672–00508
Nairobi, Kenya

Revision					
No.	Date	Description	Author	Checked	Approved

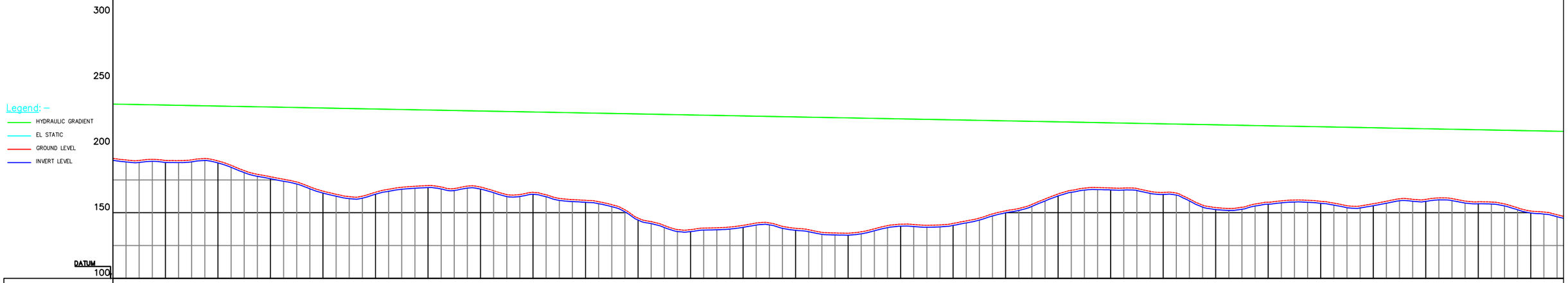
Project Name:
MAKAMINI DAM
PRELIMINARY DESIGN

Project Name:
WATER SUPPLY
TRANSMISSION PIPELINES
LONGITUDINAL PROFILE
LINE 1(21+600 TO 32+400)

Date :	October, 2018
Designed :	O.K
Drawn :	O.K
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No. KWSDMP/PD/KMD-LY001	REV. 0

VS–1:3000
HS–1:15000

CHAINAGE 32+400 TO 37+800

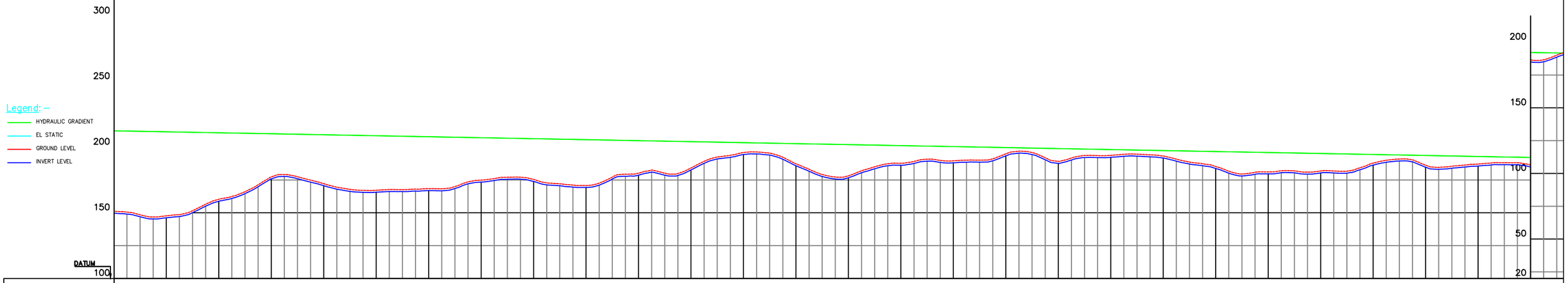


Station	32+400	32+600	32+800	33+000	33+200	33+400	33+600	33+800	34+000	34+200	34+400	34+600	34+800	35+000	35+200	35+400	35+600	35+800	36+000	36+200	36+400	36+600	36+800	37+000	37+200	37+400	37+600	37+800
Hydraulic Gradient	232.08	232.04	231.33	231.29	230.58	230.53	229.83	229.78	229.07	229.03	228.32	228.28	227.57	227.52	226.82	226.77	226.06	226.02	225.31	225.27	224.56	224.51	223.81	223.76	223.05	223.01	222.30	222.26
EL Static (m)	232.08	232.08	231.33	231.33	230.58	230.58	229.83	229.83	229.07	229.07	228.32	228.32	227.57	227.57	226.82	226.82	226.06	226.06	225.31	225.31	224.56	224.56	223.81	223.81	223.05	223.05	222.30	222.30
Existing Ground Levels	189.81	189.81	189.47	189.47	177.41	177.41	166.49	166.49	165.61	165.61	170.69	170.69	169.56	169.56	165.54	165.54	159.46	159.46	145.94	145.94	137.12	137.12	140.36	140.36	138.15	138.15	134.38	134.38
Invert Levels	188.31	188.31	187.97	187.97	175.91	175.91	164.99	164.99	164.11	164.11	169.19	169.19	168.06	168.06	164.04	164.04	157.96	157.96	144.44	144.44	135.62	135.62	138.86	138.86	136.65	136.65	132.88	132.88
Pipe Details	Steel Pipe/200mm Diameter																											

Station	35+200	35+400	35+600	35+800	36+000	36+200	36+400	36+600	36+800	37+000	37+200	37+400	37+600	37+800
Hydraulic Gradient	221.50	221.50	220.75	220.00	219.25	218.49	217.74	216.99	216.24	215.48	214.73	213.98	213.23	212.47
EL Static (m)	221.55	221.25	220.80	220.04	219.29	218.54	217.79	217.03	216.28	215.53	214.78	214.02	213.27	212.52
Existing Ground Levels	141.25	141.25	141.86	151.47	164.36	168.88	165.46	153.92	158.00	158.67	156.87	160.17	158.31	151.31
Invert Levels	139.75	139.75	140.36	149.97	162.86	167.38	163.96	152.42	156.50	157.17	155.37	158.67	156.81	149.81
Pipe Details	Steel Pipe/200mm Diameter													

VS–1:3000
HS–1:15000

CHAINAGE 37+800 TO 43+200



Station	37+800	38+000	38+200	38+400	38+600	38+800	39+000	39+200	39+400	39+600	39+800	40+000	40+200	40+400	40+600	40+800	41+000	41+200	41+400	41+600	41+800	42+000	42+200	42+400	42+600	42+800	43+000	43+200
Hydraulic Gradient	211.72	211.72	210.97	210.22	209.46	208.71	207.96	207.21	206.45	205.70	204.95	204.20	203.44	202.69	201.94	201.19	200.43	199.68	198.93	198.18	197.42	196.67	195.92	195.17	194.42	193.66	192.91	192.16
EL Static (m)	211.77	211.77	211.01	210.26	209.51	208.76	208.00	207.25	206.50	205.75	204.99	204.24	203.49	202.74	201.98	201.23	200.48	199.73	198.97	198.22	197.47	196.72	195.96	195.21	194.46	193.71	192.95	192.20
Existing Ground Levels	147.69	147.69	160.28	177.36	172.21	167.20	168.43	174.90	175.44	170.81	180.13	184.15	195.91	187.34	178.16	187.77	189.61	194.92	189.21	193.79	193.25	185.26	181.17	181.87	187.87	186.27	187.09	186.53
Invert Levels	146.19	146.19	158.78	175.86	170.71	165.70	166.93	173.40	173.94	169.31	178.63	182.65	194.41	185.84	176.66	186.27	188.11	193.42	187.71	192.29	191.75	183.76	179.67	180.37	186.37	184.77	185.59	185.03
Pipe Details	Steel Pipe/200mm Diameter																											

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672–00508
Nairobi, Kenya

Revision					
No.	Date	Description	Author	Checked	Approved

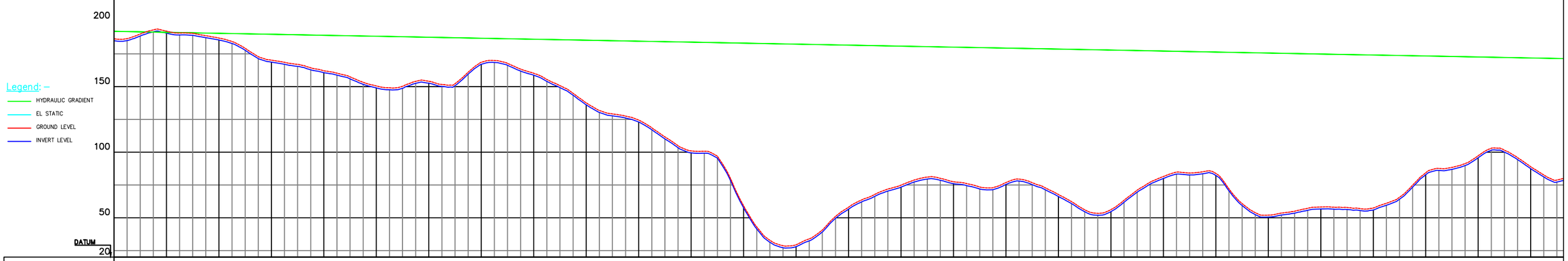
Project Name:
MAKAMINI DAM
PRELIMINARY DESIGN

Project Name:
WATER SUPPLY
TRANSMISSION PIPELINES
LONGITUDINAL PROFILE
LINE 1(32+400 TO 43+200)

Date :	October, 2018
Designed :	O.K
Drawn :	O.K
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No.	KWSDMP/PD/KMD-LY001
REV.	0

VS–1:3000
HS–1:15000

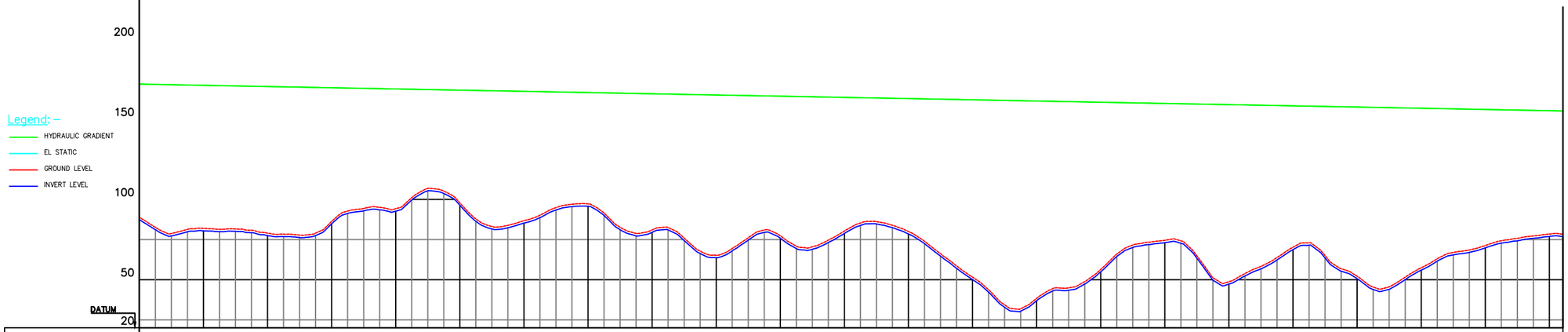
CHAINAGE 43+200 TO 48+600



Station	43+200	43+400	43+600	43+800	44+000	44+200	44+400	44+600	44+800	45+000	45+200	45+400	45+600	45+800	46+000	46+200	46+400	46+600	46+800	47+000	47+200	47+400	47+600	47+800	48+000	48+200	48+400	48+600
Hydraulic Gradient	191.41	191.45	190.65	189.90	189.15	188.40	187.64	186.89	186.14	185.39	184.63	183.88	183.13	182.38	181.62	180.87	180.12	179.37	178.61	177.86	177.11	176.36	175.60	174.85	174.10	173.35	172.59	171.84
EL Static (m)	191.45	191.34	190.70	189.95	189.19	188.44	187.69	186.94	186.18	185.43	184.68	183.93	183.17	182.42	181.67	180.92	180.16	179.41	178.66	177.91	177.15	176.40	175.65	174.90	174.14	173.39	172.64	171.89
Existing Ground Levels	192.34	187.06	170.19	162.13	150.53	154.11	168.55	160.21	137.64	124.52	101.02	59.14	29.46	58.07	74.90	77.52	76.90	67.72	56.20	81.47	83.80	52.03	58.21	57.43	84.35	97.28	88.97	171.84
Invert Levels	190.84	185.56	168.69	160.63	149.03	152.61	167.05	158.71	136.14	123.02	99.52	57.64	27.96	56.57	73.40	76.02	75.40	66.22	54.70	79.97	82.30	50.53	56.71	55.93	82.85	95.78	87.47	
Pipe Details	Steel Pile/200mm Diameter																											

VS–1:3000
HS–1:15000

CHAINAGE 48+600 TO 53+042



Station	48+600	48+800	49+000	49+200	49+400	49+600	49+800	50+000	50+200	50+400	50+600	50+800	51+000	51+200	51+400	51+600	51+800	52+000	52+200	52+400	52+600	52+800	53+000	53+042
Hydraulic Gradient	171.09	170.34	169.58	168.83	168.08	167.33	166.57	165.82	165.07	164.32	163.56	162.81	162.06	161.31	160.55	159.80	159.05	158.30	157.54	156.79	156.04	155.29		
EL Static (m)	171.13	170.38	169.63	168.88	168.12	167.37	166.62	165.87	165.11	164.36	163.61	162.86	162.10	161.35	160.60	159.85	159.09	158.34	157.59	156.84	156.08	155.33		
Existing Ground Levels	81.94	78.96	86.32	94.22	97.85	86.75	97.23	81.00	65.22	77.34	80.31	80.00	51.55	38.39	56.41	74.56	48.76	70.23	52.15	57.42	71.29	78.44		
Invert Levels	80.44	77.46	84.82	92.72	96.35	85.25	95.73	79.50	63.72	75.84	78.81	78.50	50.05	36.89	54.91	73.06	47.26	68.73	50.65	55.92	69.79	76.94		
Pipe Details	Steel Pipe/200mm Diameter																							

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

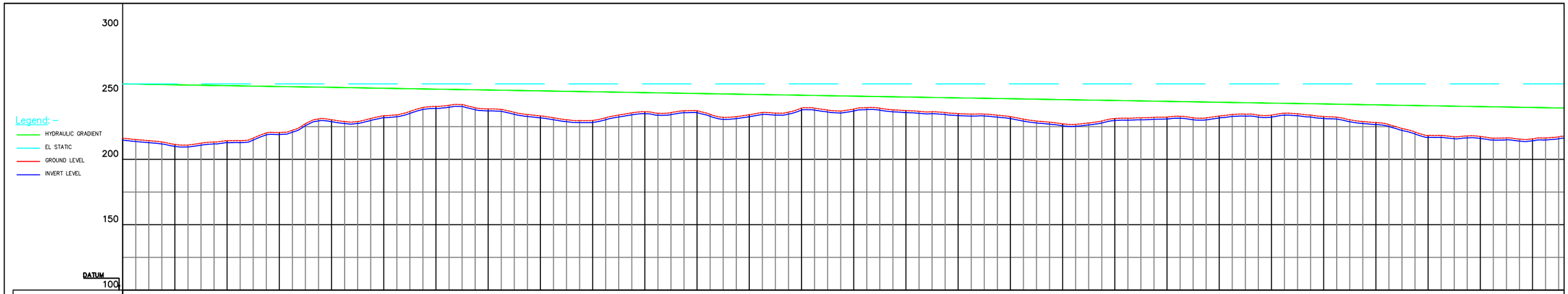
Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672–00508
Nairobi, Kenya

Revision	No.	Date	Description	Author	Checked	Approved

Project Name:
MAKAMINI DAM
PRELIMINARY DESIGN

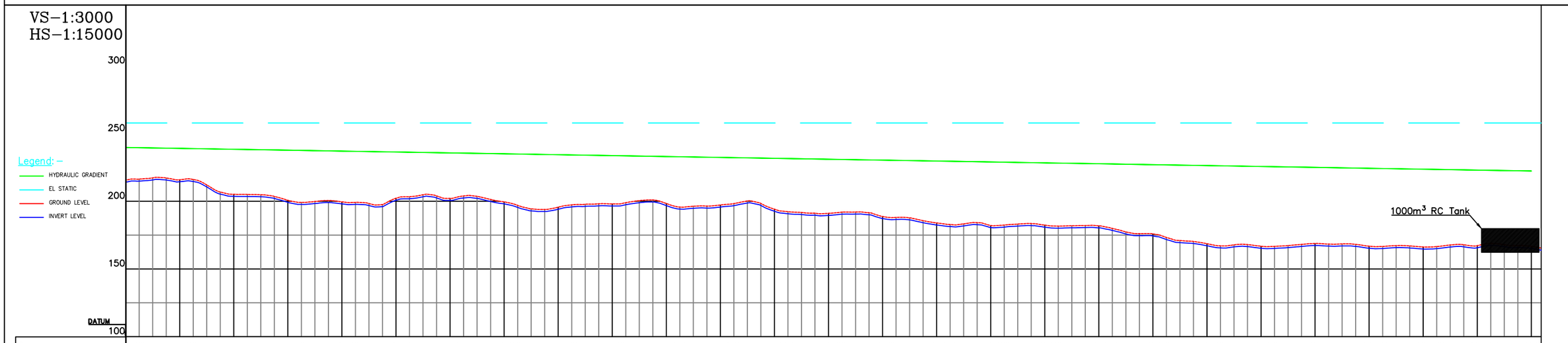
Project Name:
WATER SUPPLY
TRANSMISSION PIPELINES
LONGITUDINAL PROFILE
LINE 1(43+200 TO 53+042)

Date :	October, 2018
Designed :	O.K
Drawn :	O.K
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No.	KWSDMP/PD/KMD-LY001
REV.	0



Station	0+000	0+200	0+400	0+600	0+800	1+000	1+200	1+400	1+600	1+800	2+000	2+200	2+400	2+600	2+800	3+000	3+200	3+400	3+600	3+800	4+000	4+200	4+400	4+600	4+800	5+000	5+200	5+400
Hydraulic Gradient	257.08	257.10	256.41	256.43	255.74	255.76	255.08	255.09	254.41	254.42	253.74	253.76	253.07	253.09	252.40	252.42	251.73	251.75	251.07	251.08	250.40	250.41	249.73	249.75	249.06	249.08	248.39	248.41
EL Static (m)	257.10	257.47	256.43	256.24	255.76	255.55	255.09	254.42	254.41	253.76	253.74	253.09	253.07	252.42	252.40	251.75	251.73	251.08	251.07	250.41	250.40	249.75	249.73	249.08	249.06	248.41	248.39	247.74
Existing Ground Levels	211.47	211.74	214.24	220.55	230.35	233.36	254.42	255.09	255.08	253.76	253.74	253.09	253.07	252.42	252.40	251.75	251.73	251.08	251.07	250.41	250.40	249.75	249.73	249.08	249.06	248.41	248.39	247.74
Invert Levels	209.97	212.74	214.24	219.05	228.85	231.86	239.00	237.11	231.76	228.24	234.95	235.73	232.66	237.71	236.97	235.83	233.51	231.16	225.66	229.73	230.87	231.68	232.36	231.28	226.68	216.80	216.00	214.21
Pipe Details	Steel Pipe/100mm Diameter																											

VS–1:3000
HS–1:15000



Station	+400	5+600	5+800	6+000	6+200	6+400	6+600	6+800	7+000	7+200	7+400	7+600	7+800	8+000	8+200	8+400	8+600	8+800	9+000	9+200	9+400	9+600	9+800	10+000	10+200	10+400	10+636
Hydraulic Gradient	239.05	239.04	238.38	238.37	237.72	237.70	237.05	237.03	236.38	236.36	235.71	235.69	235.04	235.03	234.37	234.36	233.71	233.69	233.04	233.02	232.37	232.35	231.70	231.68	231.03	231.02	230.36
EL Static (m)	239.05	239.91	238.38	205.14	237.72	200.69	237.05	199.55	236.38	202.19	235.71	202.09	235.04	199.58	234.37	195.60	233.71	198.03	233.04	198.33	232.37	197.23	231.70	194.14	231.03	191.06	230.36
Existing Ground Levels	215.91	215.91	205.14	203.64	200.69	199.19	199.55	198.05	202.19	200.69	202.09	200.59	199.58	198.08	195.60	194.10	198.03	196.53	198.33	196.83	197.23	195.73	194.14	192.64	191.06	189.56	188.72
Invert Levels	214.41	214.41	203.64	199.19	198.05	198.05	200.69	200.59	198.08	194.10	196.53	196.83	195.73	192.64	189.56	187.22	182.48	180.60	180.88	180.34	174.39	167.13	165.27	167.29	165.29	164.73	165.71	165.20
Pipe Details	Steel Pipe/100mm Diameter																										

8+400	8+600	8+800	9+000	9+200	9+400	9+600	9+800	10+000	10+200	10+400	10+636
229.68	229.01	228.34	227.67	227.01	226.34	225.67	225.00	224.33	223.66	223.00	222.33
229.70	229.03	228.36	227.69	227.02	226.35	225.68	225.02	224.35	223.68	223.01	222.34
182.48	182.10	182.38	181.84	175.89	168.63	166.77	168.79	166.79	166.23	167.21	166.70
183.98	180.60	180.88	180.34	174.39	167.13	165.27	167.29	165.29	164.73	165.71	165.20
Steel Pipe/100mm Diameter											

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

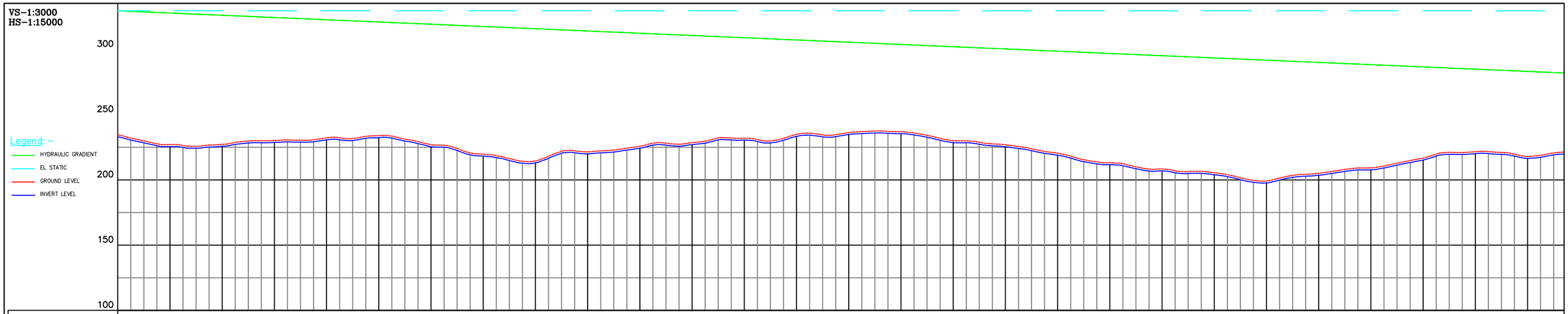
Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672–00508
Nairobi, Kenya

Revision					
No.	Date	Description	Author	Checked	Approved

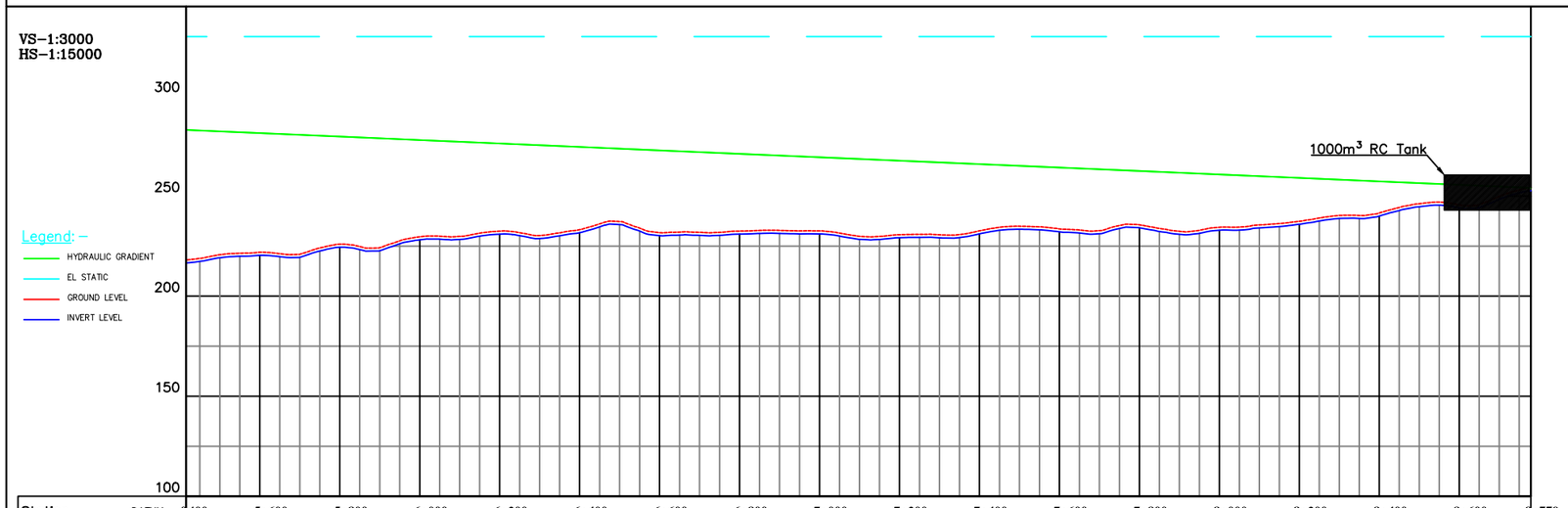
Project Name:
MAKAMINI DAM PRELIMINARY DESIGN

Project Name:
WATER SUPPLY TRANSMISSION PIPELINES LONGITUDINAL PROFILE
Line 2(0+000 To 10+636)

Date :	October, 2018
Designed :	O.K
Drawn :	O.K
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No. KWSDMP/PD/KMD-LY001	REV. 0



Station	DATUM 0+000	0+200	0+400	0+600	0+800	1+000	1+200	1+400	1+600	1+800	2+000	2+200	2+400	2+600	2+800	3+000	3+200	3+400	3+600	3+800	4+000	4+200	4+400	4+600	4+800	5+000	5+200	5+400
Hydraulic Gradient		327.90	326.18	324.45	322.73	321.01	319.29	317.57	315.85	314.13	312.40	310.68	308.96	307.24	305.52	303.80	302.08	300.36	298.63	296.91	295.19	293.47	291.75	290.03	288.31	286.58	284.86	283.14
EL Static (m)		327.06	326.22	324.50	322.78	321.06	319.34	317.61	315.89	314.17	312.45	310.73	309.01	307.29	305.56	303.84	302.12	300.40	298.68	296.96	295.24	293.52	291.79	290.07	288.35	286.63	284.91	283.19
Existing Ground Levels		227.06	227.28	230.24	232.23	233.96	227.00	219.77	214.54	221.48	225.78	228.56	232.02	234.82	236.33	236.99	230.12	226.93	220.49	213.15	208.42	205.39	199.22	205.06	209.24	216.67	221.67	218.06
Invert Levels		225.56	225.78	228.74	230.73	232.46	225.50	218.27	213.04	219.98	224.28	227.06	230.52	233.32	234.83	235.49	228.62	225.43	218.99	211.65	206.92	203.89	197.72	203.56	207.74	215.17	220.17	216.56
Pipe Details	Steel Pipe/100mm Diameter																											



Station	DATUM 5+400	5+600	5+800	6+000	6+200	6+400	6+600	6+800	7+000	7+200	7+400	7+600	7+800	8+000	8+200	8+400	8+600	8+779
Hydraulic Gradient		281.42	279.70	277.98	276.26	274.53	272.81	271.09	269.37	267.65	265.93	264.21	262.49	260.76	259.04	257.32	255.60	
EL Static (m)		281.47	279.74	278.02	276.30	274.58	272.86	271.14	269.42	267.69	265.97	264.25	262.53	260.81	259.09	257.37	255.65	
Existing Ground Levels		221.91	225.97	229.64	232.46	233.20	231.72	232.50	232.60	230.69	232.63	233.60	235.62	234.40	237.39	241.52	245.63	254.16
Invert Levels		220.41	224.47	228.14	230.96	231.70	230.22	231.00	231.10	229.19	231.13	232.10	234.12	232.90	235.89	240.02	244.13	252.66
Pipe Details	Steel Pipe/100mm Diameter																	

Client:
Ministry of Water and Sanitation
Maji House, 6th Floor
Ngong Road, Nairobi.
Republic of Kenya

Project Name:
Kenya Water Security and Climate Resilience Project.

Consultancy Services For Preparation of Kwale County Water Supply Development Master Plan. (KCWSDMP)

Consultant:
egis eau
The Priory, 5th Floor
Argwings Kodhek Road
P.O. Box 76672–00508
Nairobi, Kenya

Revision	No.	Date	Description	Author	Checked	Approved

Project Name:
MAKAMINI DAM PRELIMINARY DESIGN

Project Name:
WATER SUPPLY TRANSMISSION PIPELINES LONGITUDINAL PROFILE
Line 3 (0+000 To 8+779)

Date :	October, 2018
Designed :	O.K
Drawn :	O.K
Checked :	Eng. J.K.R
Approved :	Eng. J.K.R
Scale :	As Shown.
DRG. No. KWSDMP/PD/KMD-LY001	REV. 0