AFRICAN DEVELOPMENT BANK

MINISTRY OF WATER, SANITATION AND IRRIGATION

ATHI WATER WORKS DEVELOPMENT AGENCY

PROGRAMME: NAIROBI RIVERS BASIN REHABILITATION AND RESTORATION PROGRAM -SEWERAGE IMPROVEMENT PROJECT, PHASE II

PROCUREMENT OF WORKS

LOT 4-CONSTRUCTION OF EAST AND WEST OF NAIROBI RETICULATION SEWERS:

VOL II: BOOK OF DRAWINGS

CONSTRUCTION OF EAST AND WEST OF NAIROBI RETICULATION SEWERS:

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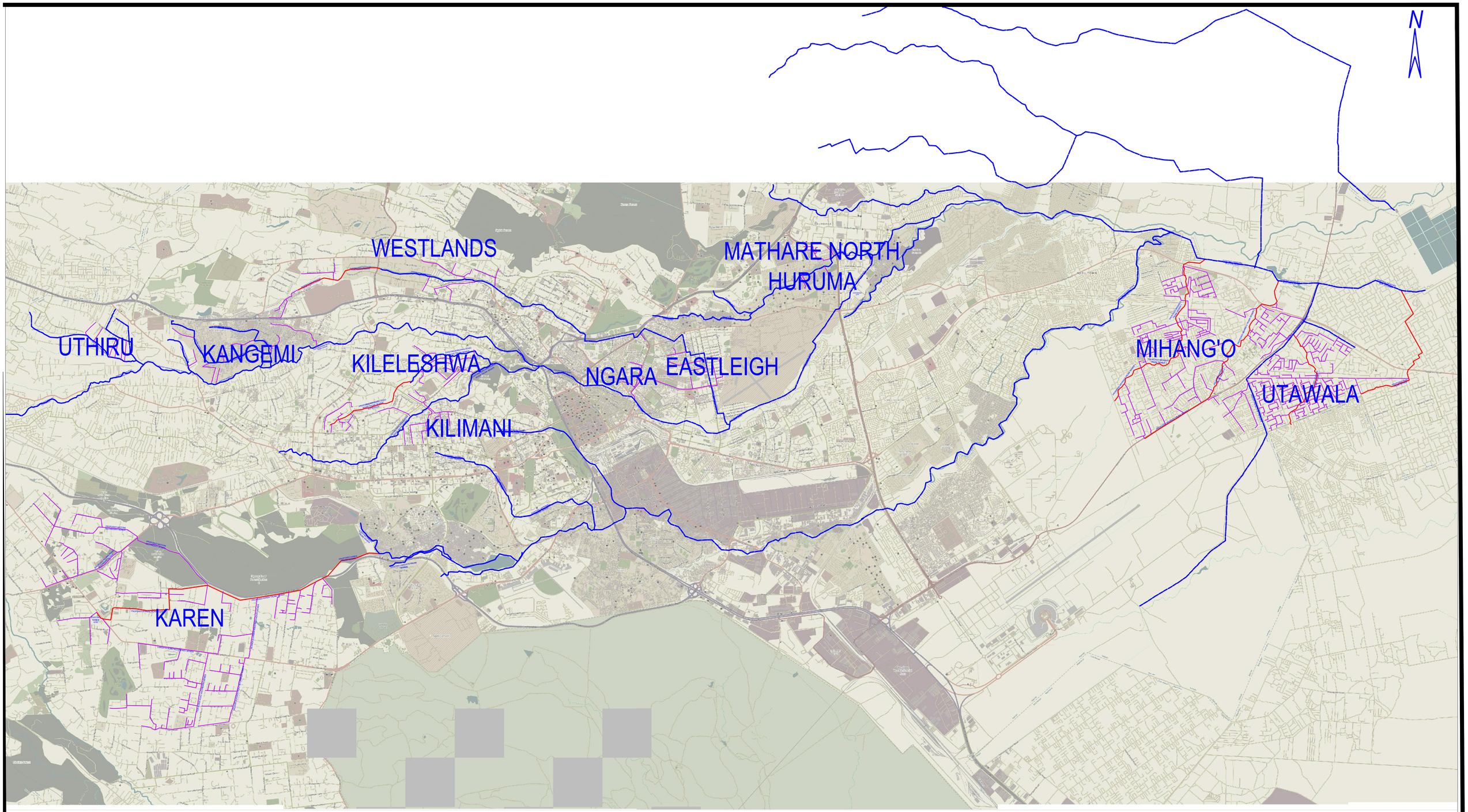

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CONSULTANT:

Hankuk Engineering Consultants

H.E.C

Ecosite Development Consultants Ltd

Consulting Civil and Development Engineers
P.O.BOX 56075-00200 NAIROBI.

CLIENT

ATHI WATER WORKS DEVELOPMENT AGENCY

PROJECT

MWIKI, CLAY WORKS, EASTERN AND WESTERN NAIROBI RETICULATION SEWERS PROJECT

DRG TITLE

EAST AND WEST NAIROBI SEWERS

GENERAL LAYOUT PLAN

SHEET 1 OF 6

Date:	FEB. 2021	JOB No.	CWE20
Designed:	D.K		
Drawn:	D.K	Cad Filename	
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Approved:		DRG. No.	CWE20/E&W/GL/01
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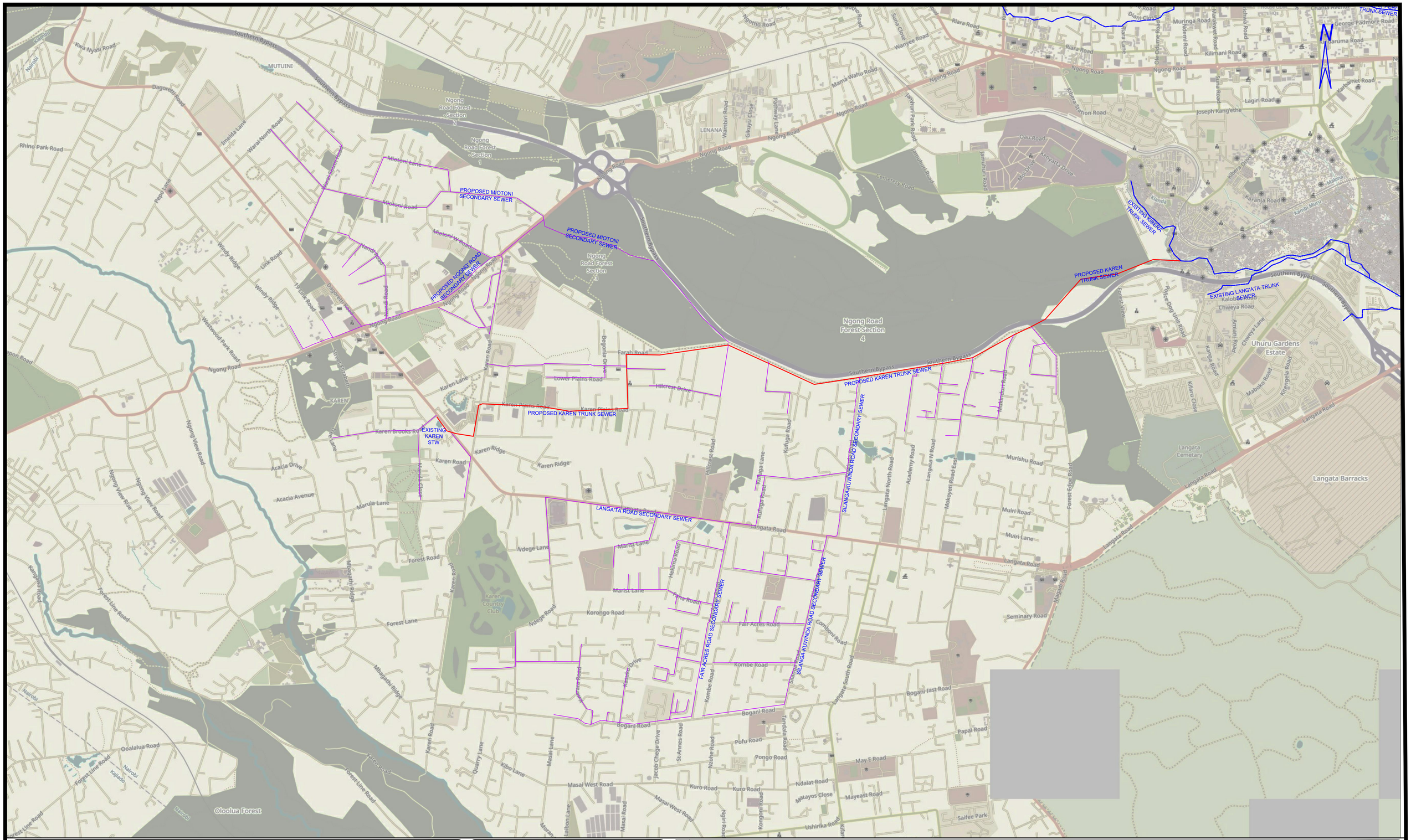

REV. No.	DESCRIPTION	DATE	REV. No.	DESCRIPTION	DATE

CONSULTANT:

Hankuk Engineering Consultants

Ecosite Development Consultants Ltd

Consulting Civil and Development Engineers
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ATHI WATER WORKS DEVELOPMENT AGENCY

PROJECT

MWIKI, CLAY WORKS, EASTERN AND WESTERN NAIROBI RETICULATION SEWERS PROJECT

DRG TITLE

EAST AND WEST NAIROBI SEWERS

GENERAL LAYOUT PLAN
KAREN SEWERAGE PROJECT

SHEET 2 OF 6

Date:	FEB. 2021	JOB No.	CWE20
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Drawn:	D.K	Cad Filename	
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Approved:	W.M.K	DRG. No.	CWE20/E&W/GL/02
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Hankuk Engineering Consultants

H.E.C

Ecosite Development Consultants Ltd

Consulting Civil and Development Engineers
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ATHI WATER WORKS DEVELOPMENT AGENCY

PROJECT

MWIKI, CLAY WORKS, EASTERN AND WESTERN NAIROBI RETICULATION SEWERS PROJECT

DRG TITLE

EAST AND WEST NAIROBI SEWERS

GENERAL LAYOUT PLAN
UTHIRU, MOUNTAIN VIEW AND KANGEMI

SHEET 3 OF 6

Date:	FEB. 2021	JOB No.	CWE20
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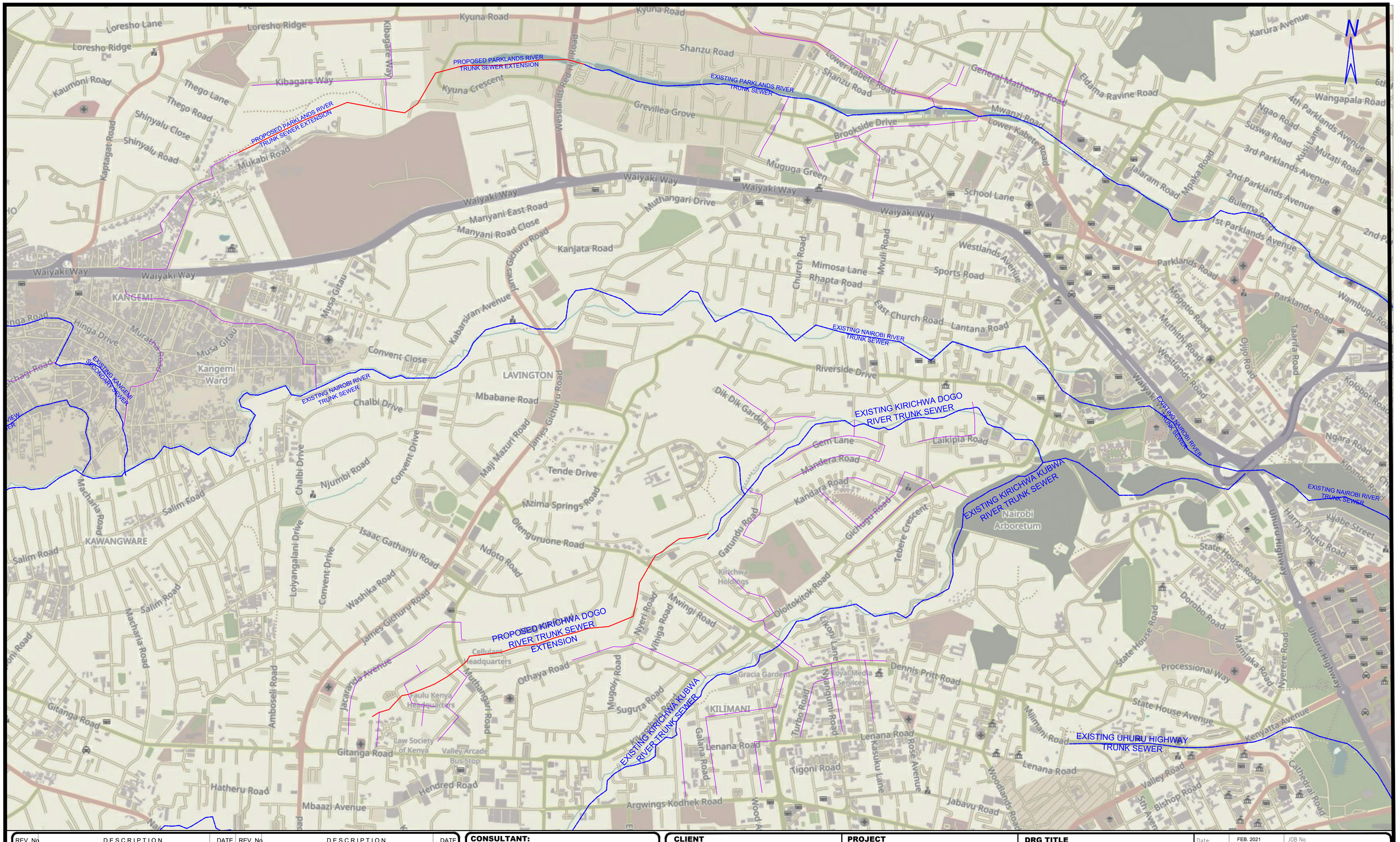

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ATHI WATER WORKS DEVELOPMENT AGENCY

PROJECT

MWIKI, CLAY WORKS, EASTERN AND WESTERN NAIROBI RETICULATION SEWERS PROJECT

DRG TITLE

EAST AND WEST NAIROBI SEWERS

GENERAL LAYOUT PLAN

WESTLANDS, KILIMANI AND KILELESHWA

SHEET 4 OF 6

Date:	FEB. 2021	JOB No.	CWE20
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ATHI WATER WORKS DEVELOPMENT AGENCY

PROJECT

MWIKI, CLAY WORKS, EASTERN AND WESTERN NAIROBI RETICULATION SEWERS PROJECT

DRG TITLE

EAST AND WEST NAIROBI SEWERS

GENERAL LAYOUT PLAN

NGARA, EASTLEIGH, HURUMA AND MATHARE NORTH

SHEET 5 OF 6

Date:	FEB. 2021	JOB No.	CWE20
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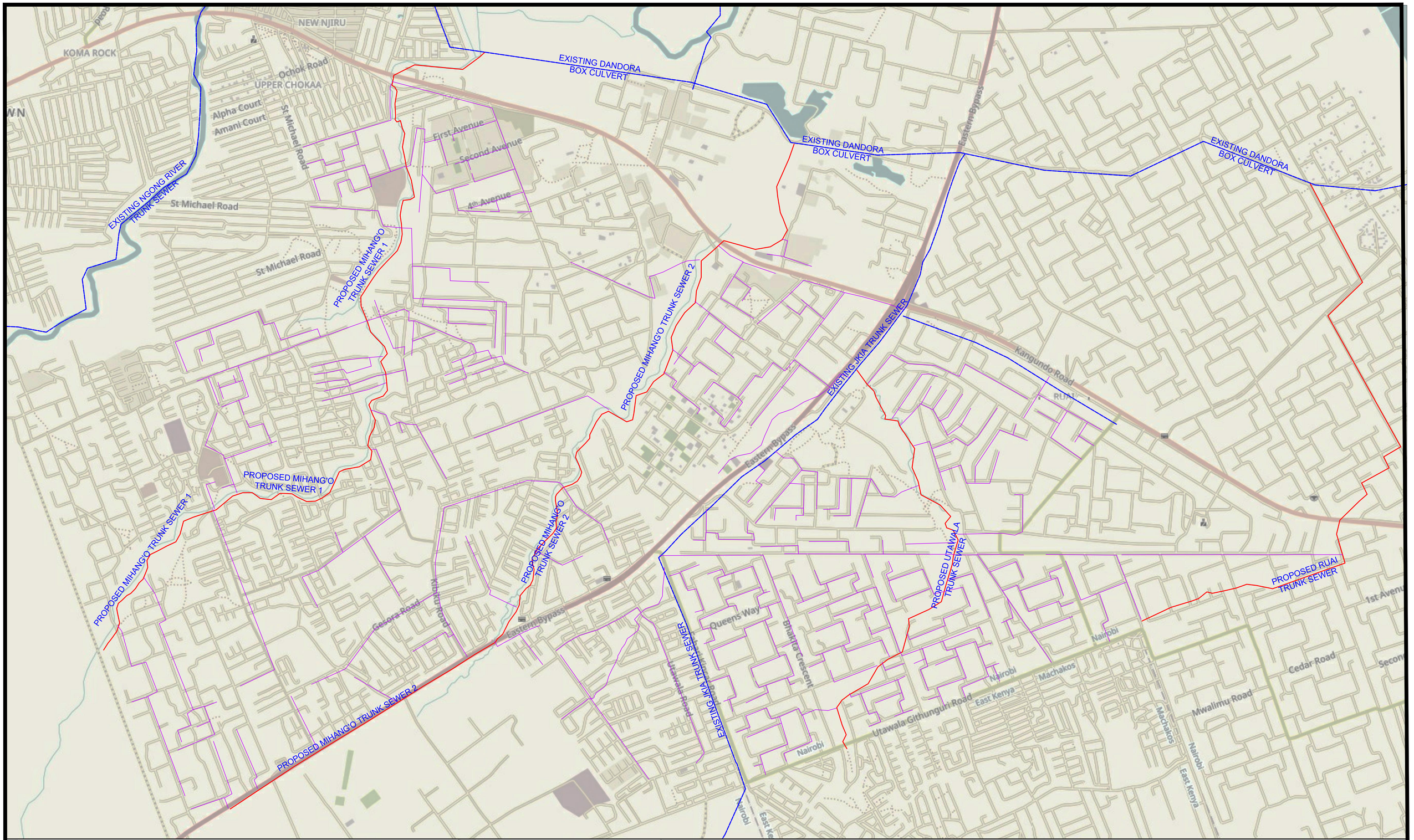

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PROJECT

MWIKI, CLAY WORKS, EASTERN AND WESTERN NAIROBI RETICULATION SEWERS PROJECT

DRG TITLE

EAST AND WEST NAIROBI SEWERS

GENERAL LAYOUT PLAN

UTAWALA AND MIHANG'O

SHEET 6 OF 6

Date:	FEB. 2021
Designed:	D.K
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Cad Filename

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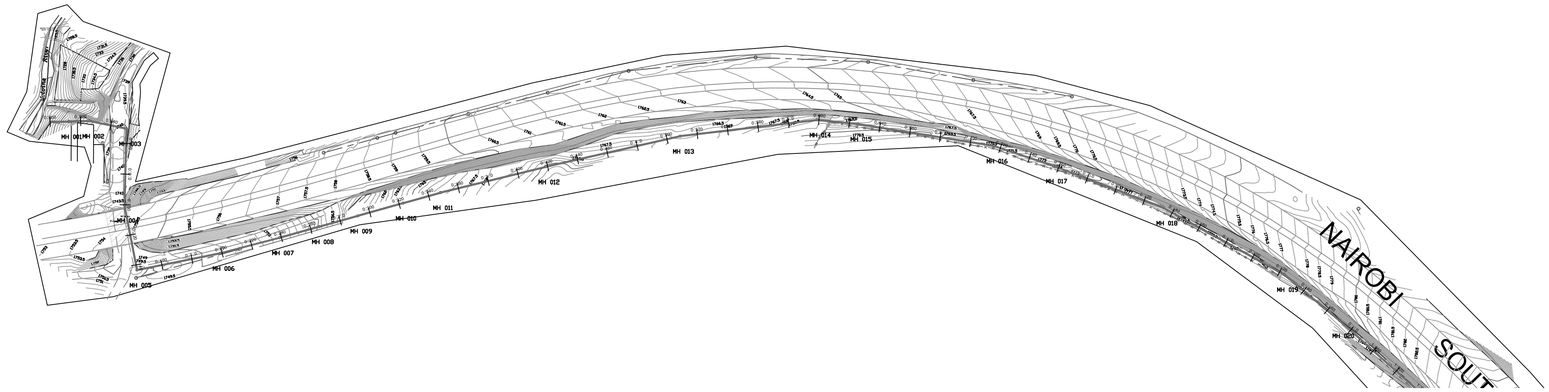
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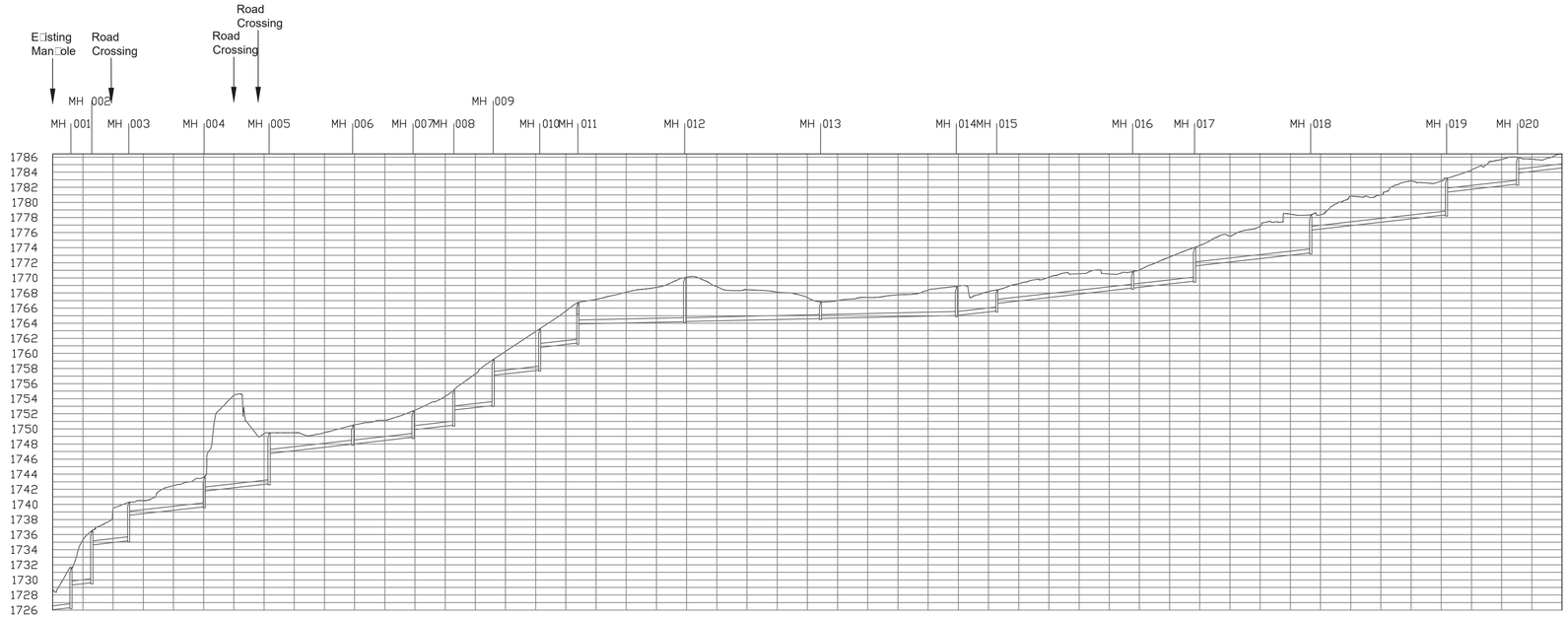
Existing Manhole
Road Crossing
Road Crossing
Road Crossing
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MH 002
MH 003
MH 004
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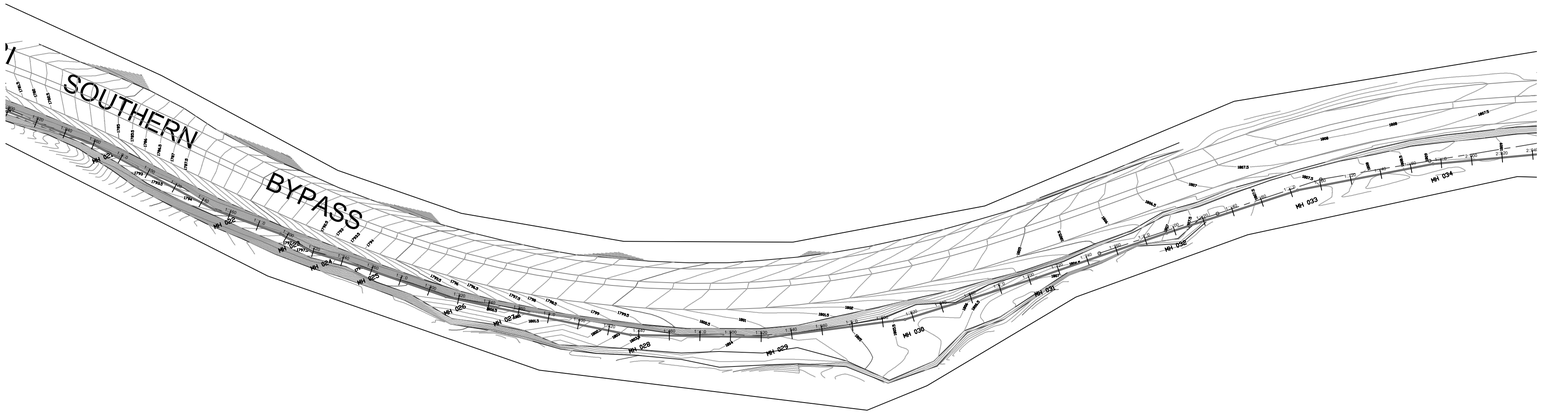

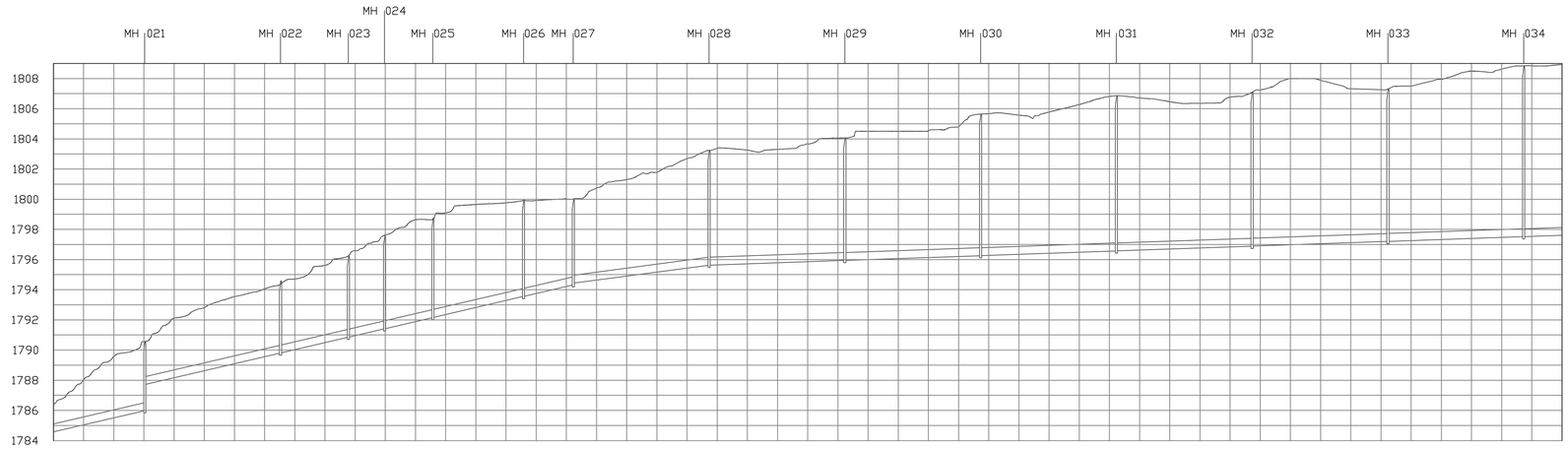

Chainage	1+000.00	1+020.00	1+040.00	1+060.00	1+080.00	1+100.00	1+120.00	1+140.00	1+160.00	1+180.00	1+200.00	1+220.00	1+240.00	1+260.00	1+280.00	1+300.00	1+320.00	1+340.00	1+360.00	1+380.00	1+400.00	1+420.00	1+440.00	1+460.00	1+480.00	1+500.00	1+520.00	1+540.00	1+560.00	1+580.00	1+600.00	1+620.00	1+640.00	1+660.00	1+680.00	1+700.00	1+720.00	1+740.00	1+760.00	1+780.00	1+800.00	1+820.00	1+840.00	1+860.00	1+880.00	1+900.00	1+920.00	1+940.00	1+960.00	1+980.00	2+000.00
Ground Level	1786.44	1788.05	1789.57	1790.55	1792.12	1792.82	1793.54	1794.06	1794.71	1795.62	1796.58	1797.63	1798.64	1799.10	1799.65	1799.76	1799.91	1800.02	1800.74	1801.30	1801.77	1802.68	1803.38	1803.25	1803.31	1803.66	1804.05	1804.50	1804.50	1804.52	1804.80	1805.67	1805.57	1805.78	1806.28	1806.81	1806.72	1806.46	1806.36	1806.77	1807.25	1808.00	1807.88	1807.33	1807.25	1807.50	1807.95	1808.50	1808.63	1808.84	1808.93
Manhole Chainage				1+060.49				1+150.49			1+195.49	1+219.49	1+251.49			1+311.58		1+344.58				1+434.58					1+524.58				1+614.58				1+704.58				1+794.58				1+884.58				1+974.58			
GL at MH Centre				1790.56				1794.59			1796.24	1797.62	1798.72			1799.93		1800.02				1803.24					1804.06				1805.65				1806.87				1807.09				1807.31				1808.85			
Invert Level at MH Centre				1785.98				1789.80			1790.85	1791.41	1792.16			1793.56		1794.33				1795.63					1795.94				1796.26				1796.57				1796.89				1797.20				1797.52			
Depth				4.57				4.78			5.39	6.21	6.56			6.37		5.69				7.61					8.12				9.39				10.29				10.20				10.11				11.33			
Slope		2.33%			2.33%				2.33%			2.33%	2.33%			2.33%		2.33%				1.33%					0.35%				0.35%				0.35%				0.35%				0.35%				0.35%			0.35%
Bed and Surround		150mm Gravel Bedding																																																
Pipe Specifications		DN 600 GRP																																															

Civil Engineer:
FRAME CONSULTANTS LTD
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Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
[illegible]NaRSIP II[illegible]

Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.1[illegible]000 - CH.2[illegible]000

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

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A	BY / CHECKED			

Designed by P.K.M | Drawn by P.K.M
Checked by FMK | Approved by
Scales HOR 1:2,000 VER 1:200 | Date: DECEMBER 2016
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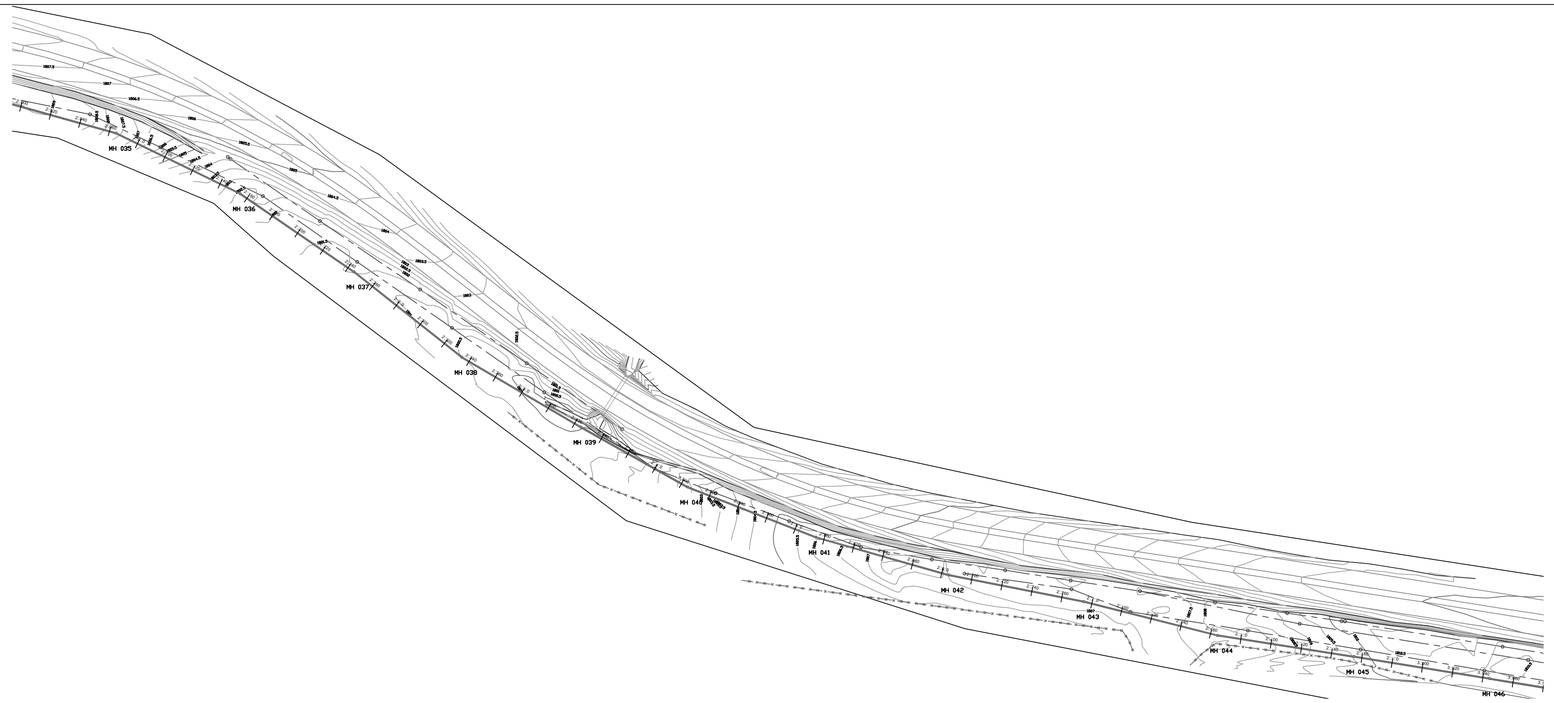
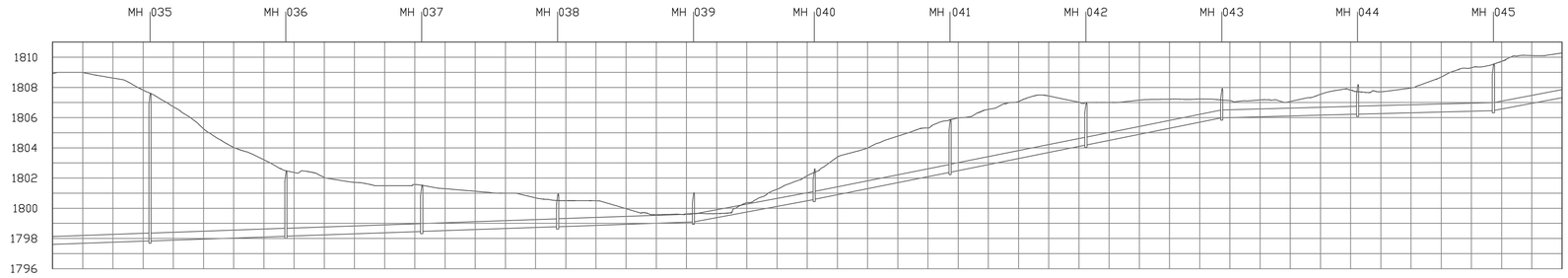
STATUS P | DRG No. FC/CE90/TS/110/02 | REV





Chainage	2+000.00	2+020.00	2+040.00	2+060.00	2+080.00	2+100.00	2+120.00	2+140.00	2+160.00	2+180.00	2+200.00	2+220.00	2+240.00	2+260.00	2+280.00	2+300.00	2+320.00	2+340.00	2+360.00	2+380.00	2+400.00	2+420.00	2+440.00	2+460.00	2+480.00	2+500.00	2+520.00	2+540.00	2+560.00	2+580.00	2+600.00	2+620.00	2+640.00	2+660.00	2+680.00	2+700.00	2+720.00	2+740.00	2+760.00	2+780.00	2+800.00	2+820.00	2+840.00	2+860.00	2+880.00	2+900.00	2+920.00	2+940.00	2+960.00	2+980.00	3+000.00
Ground Level	1808.93	1808.99	1808.62	1807.82	1806.72	1805.27	1804.03	1803.21	1802.37	1802.04	1801.71	1801.50	1801.57	1801.30	1801.13	1801.00	1800.69	1800.50	1800.50	1799.96	1799.57	1799.62	1799.65	1800.38	1801.26	1802.16	1803.39	1804.00	1804.78	1805.31	1805.99	1806.55	1807.07	1807.44	1807.02	1807.00	1807.16	1807.23	1807.23	1807.13	1807.18	1807.07	1807.55	1807.84	1807.71	1807.97	1808.69	1809.32	1809.73	1810.12	1810.28
Manhole Chainage				2+064.58				2+154.58					2+244.58				2+334.58				2+424.58				2+504.58				2+594.58				2+684.58				2+774.58				2+864.58				2+954.58					
GL at MH Centre				1807.62				1802.48					1801.53				1800.95				1801.04				1802.61				1805.87				1807.00				1807.94				1808.18				1809.54					
Invert Level at MH Centre				1797.83				1798.15					1798.46				1798.78				1799.09				1800.59				1802.39				1804.19				1805.98				1806.23				1806.47					
Depth				9.79				4.33					3.06				2.17				1.95				2.02				3.48				2.81				1.95				1.95				3.08					
Slope		0.35%				0.35%				0.35%				0.35%				0.35%				1.87%				2.00%				2.00%				2.00%				0.27%				0.26%				1.90%		
Bed and Surround		150mm Gravel Bedding																																																
Pipe Specifications		DN 600 GRP																																															

Civil Engineer:
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Frame Consultants Ltd

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Email: info@aw board.go.ke

Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
NaRSIP II

Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.2 000 - CH.3 000

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

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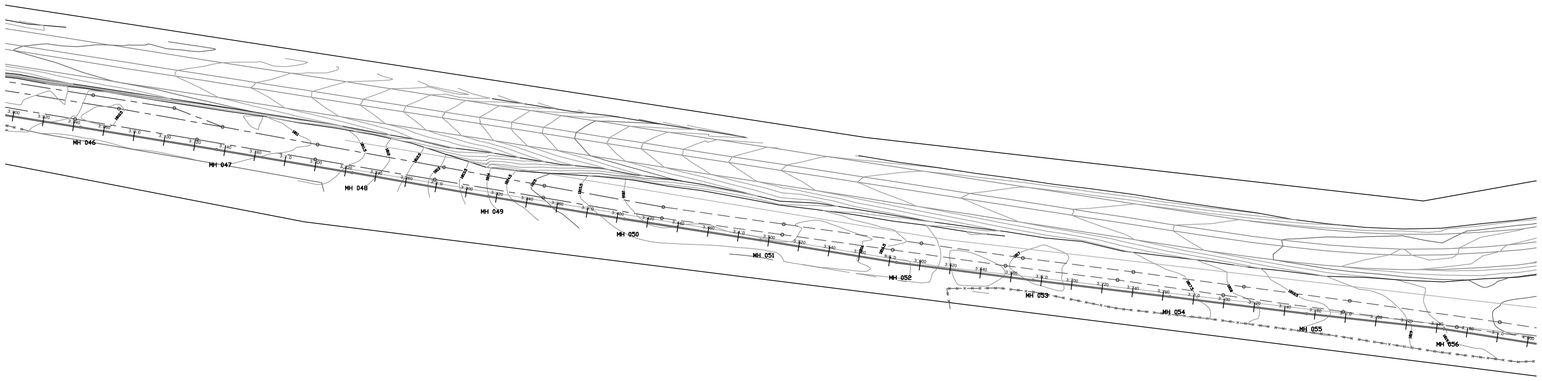
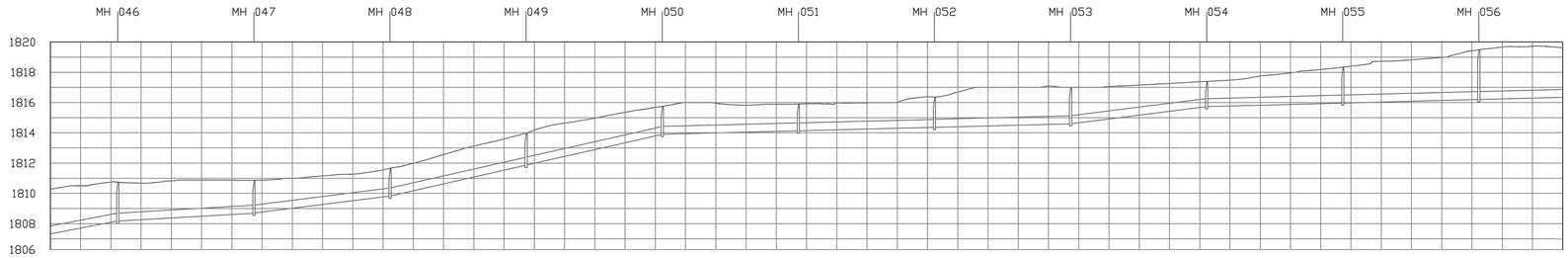
Designed by P.K.M	Drawn by P.K.M		
Checked by FMK	Approved by		
Scales HOR 1:2,000 VER 1:200	Date: DECEMBER 2016		
Job No. FC/CE90	ACAD File: CE90_TS110_03		
P STATUS	DRG No. FC/CE90/TS/110/03	REV	





Chainage	3+000.00	3+020.00	3+040.00	3+060.00	3+080.00	3+100.00	3+120.00	3+140.00	3+160.00	3+180.00	3+200.00	3+220.00	3+240.00	3+260.00	3+280.00	3+300.00	3+320.00	3+340.00	3+360.00	3+380.00	3+400.00	3+420.00	3+440.00	3+460.00	3+480.00	3+500.00	3+520.00	3+540.00	3+560.00	3+580.00	3+600.00	3+620.00	3+640.00	3+660.00	3+680.00	3+700.00	3+720.00	3+740.00	3+760.00	3+780.00	3+800.00	3+820.00	3+840.00	3+860.00	3+880.00	3+900.00	3+920.00	3+940.00	3+960.00	3+980.00	4+000.00
Ground Level	1810.28	1810.50	1810.75	1810.67	1810.83	1810.88	1810.88	1810.87	1811.00	1811.15	1811.27	1811.56	1811.99	1812.57	1813.13	1813.59	1814.18	1814.64	1814.97	1815.36	1815.68	1816.00	1815.96	1815.82	1815.89	1815.92	1815.97	1815.98	1816.02	1816.38	1816.69	1817.00	1817.00	1817.09	1817.00	1817.06	1817.15	1817.26	1817.37	1817.48	1817.76	1817.95	1818.18	1818.40	1818.72	1818.82	1818.97	1819.41	1819.66	1819.71	1819.62
Manhole Chainage			3+044.58					3+134.58				3+224.58				3+314.58					3+404.58				3+494.58				3+584.58				3+674.58				3+764.58				3+854.58				3+944.58					
GL at MH Centre			1810.74					1810.87				1811.66				1813.99					1815.75				1815.90				1816.36				1817.00				1817.40				1818.33				1819.48					
Invert Level at MH Centre			1808.17					1808.69				1809.83				1811.86					1813.90				1814.13				1814.36				1814.60				1815.73				1815.97				1816.20					
Depth			2.56					2.18				1.83				2.12					1.85				1.77				2.00				2.40				1.66				2.37				3.28					
Slope		1.90%		0.58%				1.26%					2.26%				2.26%					0.26%				0.26%				0.26%				0.26%				1.26%				0.26%				0.26%					
Bed and Surround	150mm Gravel Bedding																																																	
Pipe Specifications	DN 600 GRP																																																

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P.O. BOX 58 24 2 DB
22 34 225 5 2 52385
Frame Consultants Ltd

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Email: info@aw oard.go.ke

Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
NaRSIP II

Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.3 000 - CH.4 000

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

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C	BY			
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B	BY			
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A	BY			
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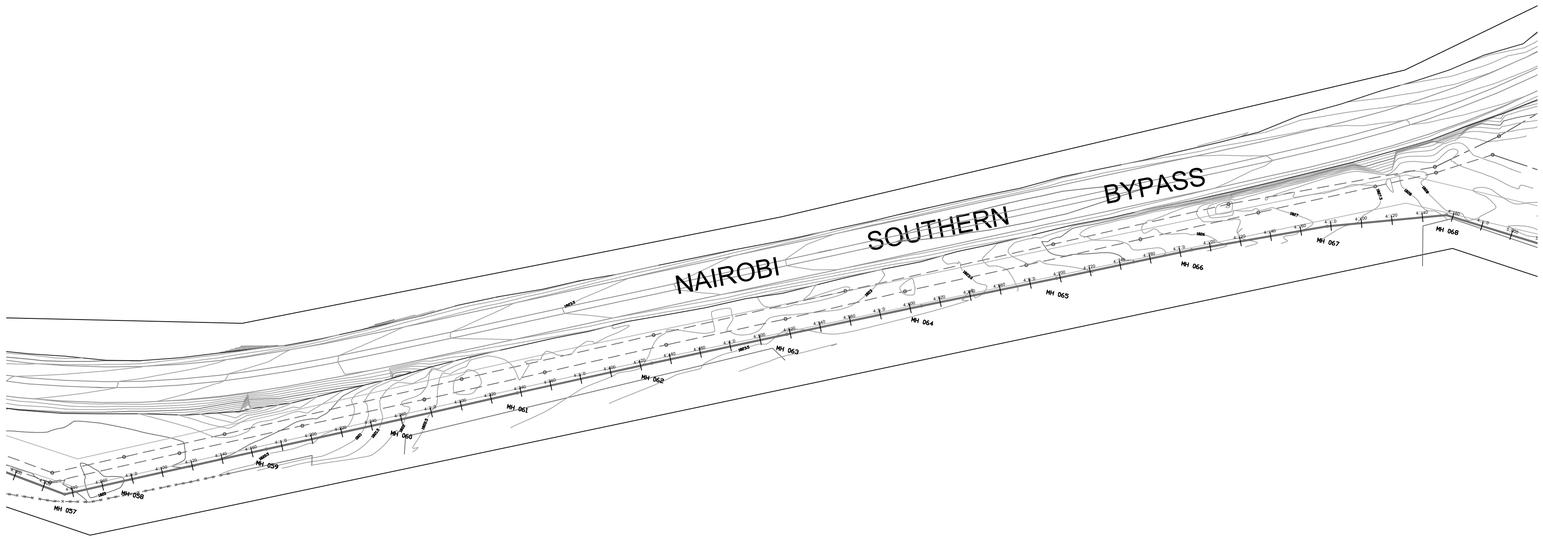
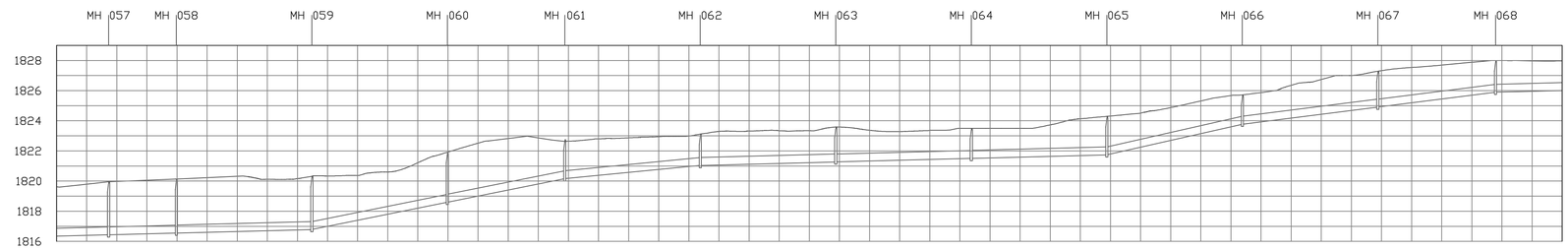
Designed by P.K.M		Drawn by P.K.M	
Checked by FMK		Approved by	
Scales HOR 1:2,000 VER 1:200		Date: DECEMBER 2016	
Job No. FC/CE90		ACAD File: CE90_TS110_04	
P STATUS	DRG No. FC/CE90/TS/110/04		REV





Chainage	4+000.00	4+020.00	4+040.00	4+060.00	4+080.00	4+100.00	4+120.00	4+140.00	4+160.00	4+180.00	4+200.00	4+220.00	4+240.00	4+260.00	4+280.00	4+300.00	4+320.00	4+340.00	4+360.00	4+380.00	4+400.00	4+420.00	4+440.00	4+460.00	4+480.00	4+500.00	4+520.00	4+540.00	4+560.00	4+580.00	4+600.00	4+620.00	4+640.00	4+660.00	4+680.00	4+700.00	4+720.00	4+740.00	4+760.00	4+780.00	4+800.00	4+820.00	4+840.00	4+860.00	4+880.00	4+900.00	4+920.00	4+940.00	4+960.00	4+980.00	5+000.00
Ground Level	1819.62	1819.79	1819.98	1820.06	1820.14	1820.23	1820.31	1820.12	1820.16	1820.34	1820.37	1820.60	1821.22	1821.93	1822.52	1822.82	1822.86	1822.64	1822.80	1822.87	1822.94	1822.98	1823.30	1823.32	1823.34	1823.34	1823.58	1823.37	1823.28	1823.36	1823.50	1823.50	1823.50	1823.73	1824.13	1824.31	1824.50	1824.87	1825.31	1825.67	1825.87	1826.36	1826.74	1827.00	1827.32	1827.53	1827.69	1827.88	1828.00	1827.97	1827.97
Manhole Chainage		4+034.58		4+079.58		4+169.58				4+259.58				4+337.56				4+427.56				4+517.56						4+607.56						4+697.56				4+787.56						4+877.56				4+955.74		
▯GL at MH Centre		1819.96		1820.13		1820.32				1821.91				1822.75				1823.12				1823.59						1823.50						1824.29				1825.72						1827.28				1828.00		
Invert Level at MH Centre		1816.43		1816.55		1816.79				1818.60				1820.16				1821.04				1821.27						1821.50						1821.74				1823.77						1824.91				1825.89		
Depth		3.53		3.58		3.53				3.32				2.59				2.08				2.32						1.99						2.55				1.94						2.38				2.11		
Slope		0.26%		0.26%		0.26%				2.01%				2.00%				0.98%				0.26%						0.26%						0.26%				2.26%						1.26%				1.26%		0.26%
Bed and Surround		150mm Gravel Bedding																																																
Pipe Specifications		DN 600 GRP																																															

Civil Engineer:
▯RAME CONS▯LTANTS LTD
P.O. BOX 58▯24▯▯▯2▯▯▯▯▯▯▯DB▯
▯▯▯▯22▯3▯44▯225▯5▯5▯▯▯2▯52385▯
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Client:
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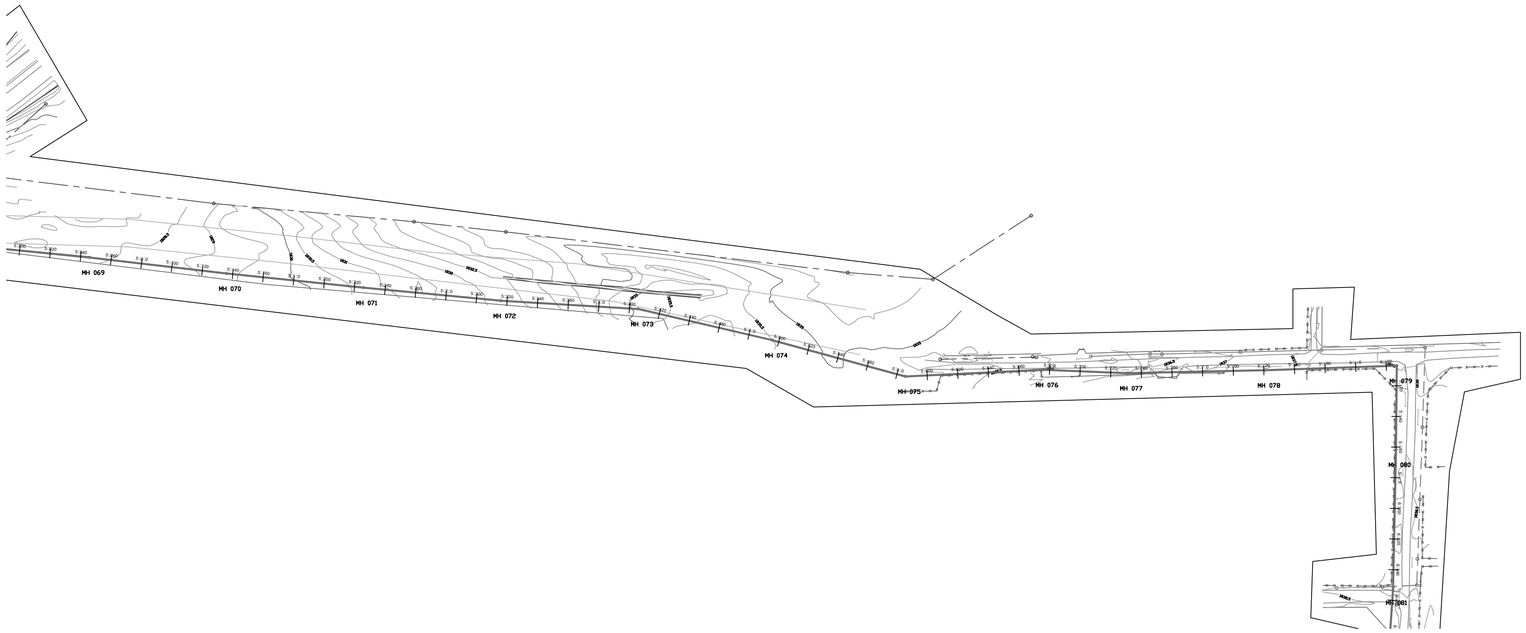
Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
▯NaRSIP II▯

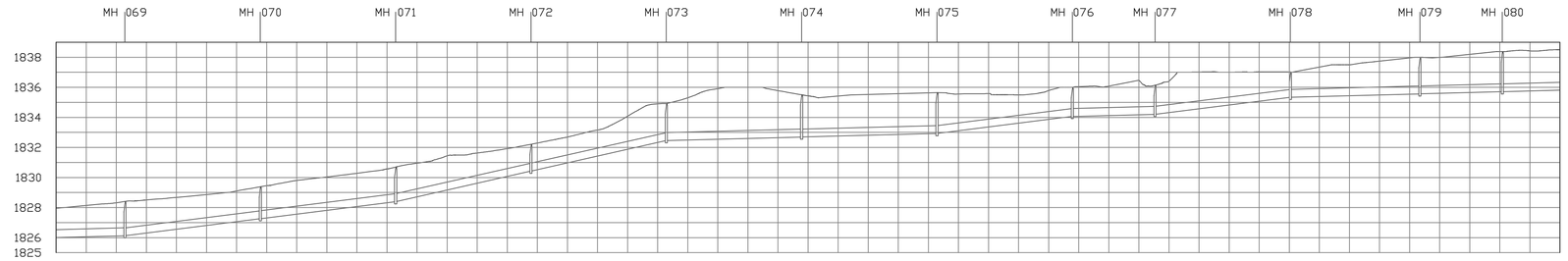
Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.4▯000 - CH.5▯000

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV	REVISIONS	SIGN	DATE	APPROVED
D	BY / CHECKED			
C	BY / CHECKED			
B	BY / CHECKED			
A	BY / CHECKED			

Designed by P.K.M | Drawn by P.K.M
Checked by FMK | Approved by
Scales HOR 1:2,000 VER 1:200 | Date: DECEMBER 2016
Job No. FC/CE90 | ACAD File: CE90_TS110_05
P STATUS | DRG No. FC/CE90/TS/110/05 | REV





Chainage	5+000.00	5+020.00	5+040.00	5+060.00	5+080.00	5+100.00	5+120.00	5+140.00	5+160.00	5+180.00	5+200.00	5+220.00	5+240.00	5+260.00	5+280.00	5+300.00	5+320.00	5+340.00	5+360.00	5+380.00	5+400.00	5+420.00	5+440.00	5+460.00	5+480.00	5+500.00	5+520.00	5+540.00	5+560.00	5+580.00	5+600.00	5+620.00	5+640.00	5+660.00	5+680.00	5+700.00	5+720.00	5+740.00	5+760.00	5+780.00	5+800.00	5+820.00	5+840.00	5+860.00	5+880.00	5+900.00	5+920.00	5+940.00	5+960.00	5+980.00	6+000.00
Ground Level	1827.97	1828.14	1828.32	1828.51	1828.67	1828.86	1829.10	1829.45	1829.80	1830.03	1830.28	1830.57	1830.95	1831.44	1831.63	1831.92	1832.29	1832.69	1833.16	1834.08	1834.90	1835.30	1835.91	1836.00	1835.78	1835.43	1835.43	1835.53	1835.58	1835.63	1835.55	1835.58	1835.50	1835.79	1836.04	1836.08	1836.47	1836.39	1837.02	1837.01	1837.04	1837.02	1837.35	1837.50	1837.74	1837.96	1837.99	1838.19	1838.38	1838.42	1838.50
Manhole Chainage			5+045.74		5+135.74				5+225.74				5+315.74					5+405.74				5+495.74								5+585.74				5+675.74				5+730.74			5+820.74					5+906.84		5+961.66		
GL at MH Centre			1828.40		1829.38				1830.69				1832.21					1834.93				1835.50								1835.65				1836.00				1836.14			1837.02					1838.00		1838.38		
Invert Level at MH Centre			1826.12		1827.26				1828.39				1830.43					1832.46				1832.69								1832.93				1834.06				1834.21			1835.34					1835.56		1835.71		
Depth			2.28		2.13				2.30				1.78					2.47				2.81								2.72				1.94				1.93			1.68					2.44		2.67		
Slope			0.26%		1.26%				1.26%				2.26%					2.26%				0.26%								0.26%				1.26%				0.26%			1.26%					0.26%		0.26%		
Bed and Surround			150mm Gravel Bedding																																															
Pipe Specifications			DN 600 GRP																																	DN 600 GRP														

Civil Engineer:
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Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
NaRSIP II

Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.5 000 - CH.6 000

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

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C	BY / CHECKED			
B	BY / CHECKED			
A	BY / CHECKED			

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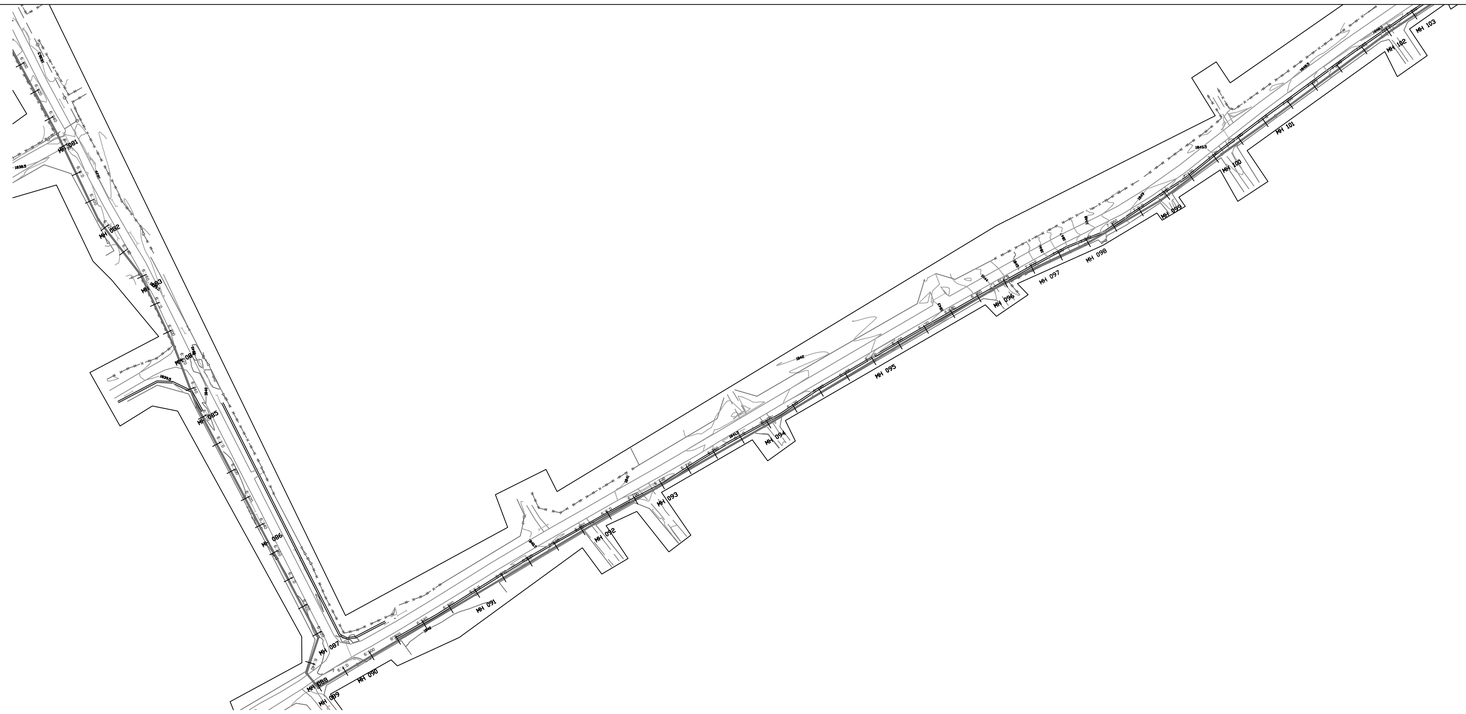
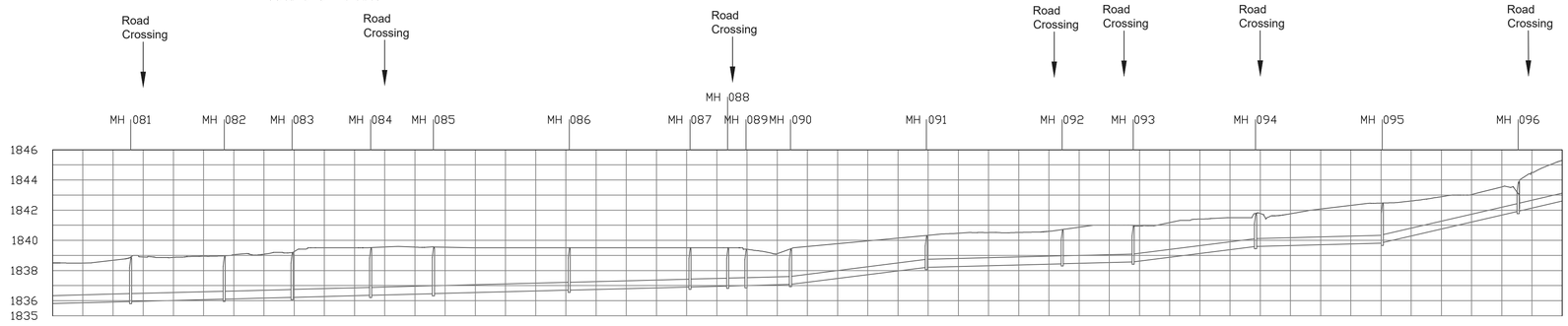
Checked by FMK | Approved by
Scales HOR 1:2,000 VER 1:200 | Date: DECEMBER 2016
Job No. FC/CE90 | ACAD File: CE90_TS110_06
STATUS P | DRG No. FC/CE90/TS/110/06 | REV





Chainage	6+000.00	6+020.00	6+040.00	6+060.00	6+080.00	6+100.00	6+120.00	6+140.00	6+160.00	6+180.00	6+200.00	6+220.00	6+240.00	6+260.00	6+280.00	6+300.00	6+320.00	6+340.00	6+360.00	6+380.00	6+400.00	6+420.00	6+440.00	6+460.00	6+480.00	6+500.00	6+520.00	6+540.00	6+560.00	6+580.00	6+600.00	6+620.00	6+640.00	6+660.00	6+680.00	6+700.00	6+720.00	6+740.00	6+760.00	6+780.00	6+800.00	6+820.00	6+840.00	6+860.00	6+880.00	6+900.00	6+920.00	6+940.00	6+960.00	6+980.00	7+000.00
Ground Level	1838.50	1838.50	1838.68	1838.90	1838.86	1838.95	1839.05	1839.08	1839.25	1839.50	1839.50	1839.56	1839.55	1839.54	1839.50	1839.50	1839.50	1839.50	1839.50	1839.50	1839.50	1839.50	1839.50	1839.41	1839.11	1839.59	1839.77	1839.96	1840.15	1840.33	1840.47	1840.51	1840.52	1840.60	1840.86	1841.00	1840.95	1841.18	1841.41	1841.50	1841.78	1841.76	1842.08	1842.32	1842.47	1842.61	1842.89	1843.04	1843.54	1844.50	1845.31
Manhole Chainage			6+051.66		6+113.66		6+158.66		6+210.66		6+252.22		6+342.22						6+422.22				6+447.22	6+459.37	6+488.81				6+578.81				6+668.81		6+715.81		6+796.88				6+880.88				6+970.88					
GL at MH Centre			1838.89		1838.97		1839.19		1839.52		1839.56		1839.50						1839.50				1839.50	1839.42	1839.43				1840.32				1840.71		1840.98		1841.78				1842.47				1843.87					
Invert Level at MH Centre			1835.94		1836.10		1836.22		1836.35		1836.46		1836.70						1836.90				1836.97	1837.00	1837.08				1838.21				1838.44		1838.57		1839.59				1839.81				1841.92					
Depth			2.95		2.87		2.97		3.17		3.10		2.80						2.60				2.53	2.42	2.35				2.11				2.26		2.42		2.19				2.66				1.95					
Slope		0.26%		0.26%		0.26%		0.26%		0.26%		0.26%		0.26%		0.26%		0.26%		0.26%		0.26%	0.26%	0.26%	0.26%		1.26%			0.26%			0.26%		0.26%		1.26%			0.26%			2.31%		2.33%			
Bed and Surround	150mm Gravel Bedding																																																
Pipe Specifications	DN 600 GRP																																																

Civil Engineer:
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Email: info@aw oard.go.ke

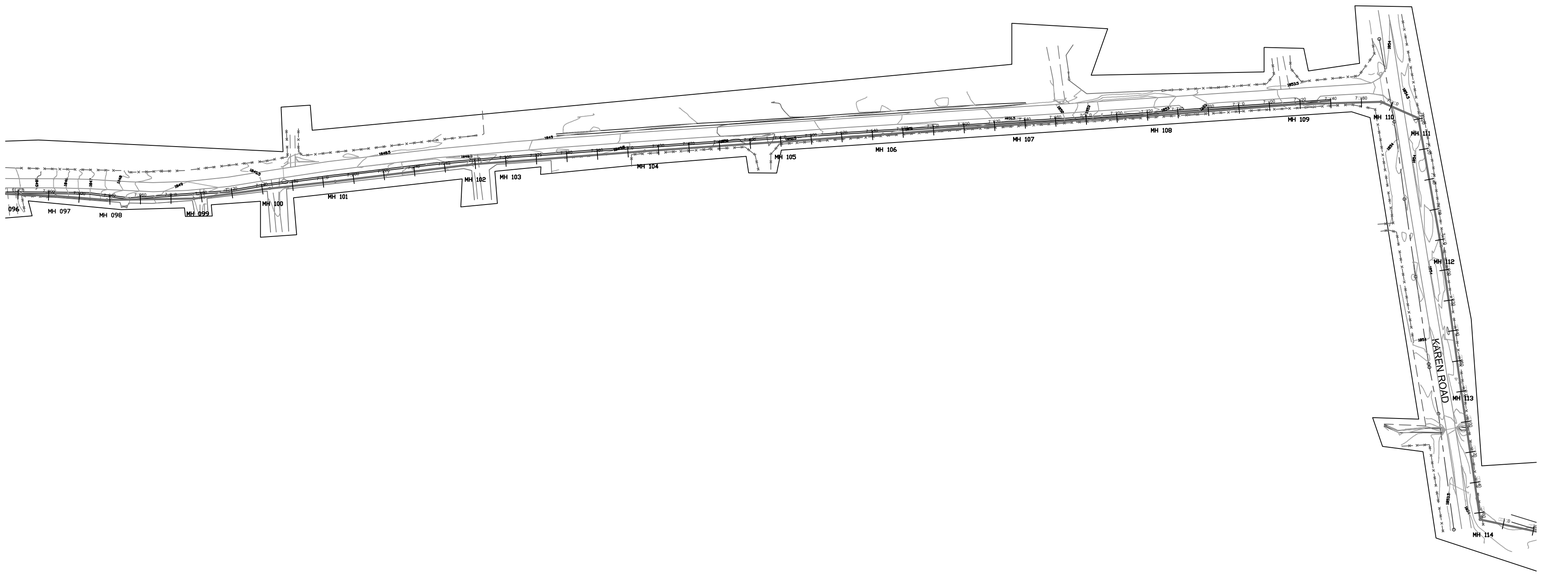
Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
NaRSIP II

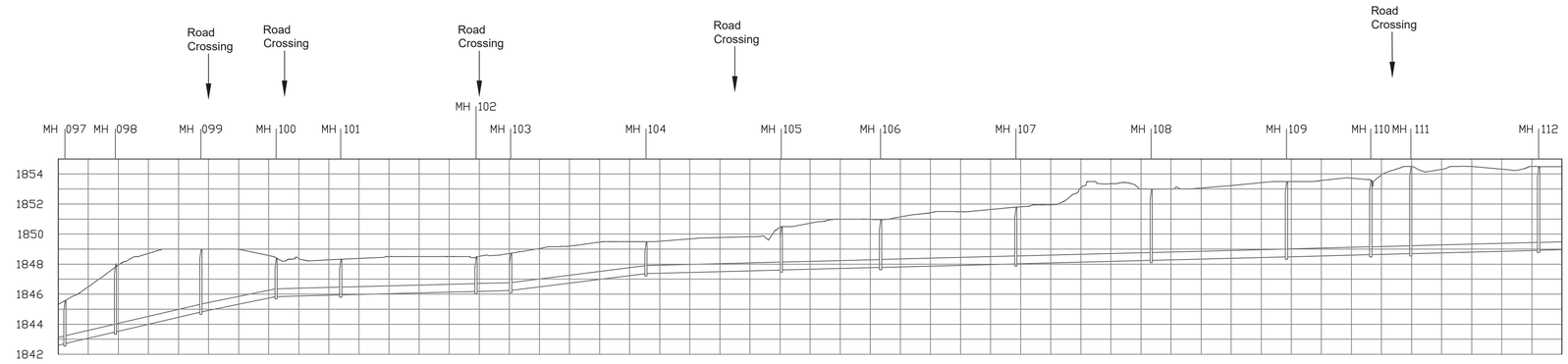
Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.6 000 - CH.7 000

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV	REVISIONS	BY	SIGN	DATE	APPROVED
D		BY CHECKED			
C		BY CHECKED			
B		BY CHECKED			
A		BY CHECKED			

Designed by P.K.M | Drawn by P.K.M
Checked by FMK | Approved by
Scales HOR 1:2,000 VER 1:200 | Date: DECEMBER 2016
Job No. FC/CE90 | ACAD File: CE90_TS110_07
STATUS P | DRG No. FC/CE90/TS/110/07 | REV





Chainage	7+000.00	7+020.00	7+040.00	7+060.00	7+080.00	7+100.00	7+120.00	7+140.00	7+160.00	7+180.00	7+200.00	7+220.00	7+240.00	7+260.00	7+280.00	7+300.00	7+320.00	7+340.00	7+360.00	7+380.00	7+400.00	7+420.00	7+440.00	7+460.00	7+480.00	7+500.00	7+520.00	7+540.00	7+560.00	7+580.00	7+600.00	7+620.00	7+640.00	7+660.00	7+680.00	7+700.00	7+720.00	7+740.00	7+760.00	7+780.00	7+800.00	7+820.00	7+840.00	7+860.00	7+880.00	7+900.00	7+920.00	7+940.00	7+960.00	7+980.00	8+000.00
Ground Level	1845.31	1846.50	1847.93	1848.71	1849.00	1849.00	1848.98	1848.57	1848.37	1848.28	1848.38	1848.50	1848.50	1848.50	1848.52	1848.71	1849.03	1849.20	1849.46	1849.50	1849.52	1849.68	1849.77	1849.82	1850.45	1850.72	1851.00	1850.98	1851.14	1851.42	1851.49	1851.64	1851.81	1851.95	1853.08	1853.35	1853.00	1853.00	1853.06	1853.23	1853.42	1853.50	1853.56	1853.72	1853.95	1854.50	1854.31	1854.50	1854.32	1854.50	1854.49
Manhole Chainage	7+004.42		7+038.03			7+094.84			7+144.84			7+187.84			7+277.84	7+300.84				7+390.84				7+480.84			7+546.84				7+636.84				7+726.84				7+816.84			7+872.84	7+899.46			7+984.46		
⊡GL at MH Centre	1845.57		1848.02			1849.00			1848.41			1848.32			1848.46	1848.72				1849.50				1850.50			1850.97				1851.79				1852.99				1853.50			1853.58	1854.50			1854.49		
Invert Level at MH Centre	1842.70		1843.49			1844.81			1845.84			1845.95			1846.18	1846.24				1847.38				1847.61			1847.78				1848.02				1848.25				1848.48			1848.63	1848.70			1848.92		
Depth	2.86		4.53			4.19			2.58			2.37			2.27	2.48				2.12				2.89			3.18				3.77				4.74				5.02			4.95	5.80			5.57		
Slope	2.33%	2.33%		2.33%			2.04%		0.26%			0.26%				0.26%	1.26%				0.26%				0.26%			0.26%				0.26%				0.26%				0.26%			0.26%	0.26%			0.26%		
Bed and Surround	150mm Gravel Bedding																																																
Pipe Specifications	DN 500 GRP																																																

Civil Engineer:
⊡RAME CONS⊡LTANTS LTD
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⊡⊡⊡22⊡34⊡225⊡5⊡⊡⊡2⊡52385⊡
Frame Consultants Ltd

Client:
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Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
⊡NaRSIP II⊡

Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.7⊡000 - CH.⊡⊡000

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

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A		BY / CHECKED			

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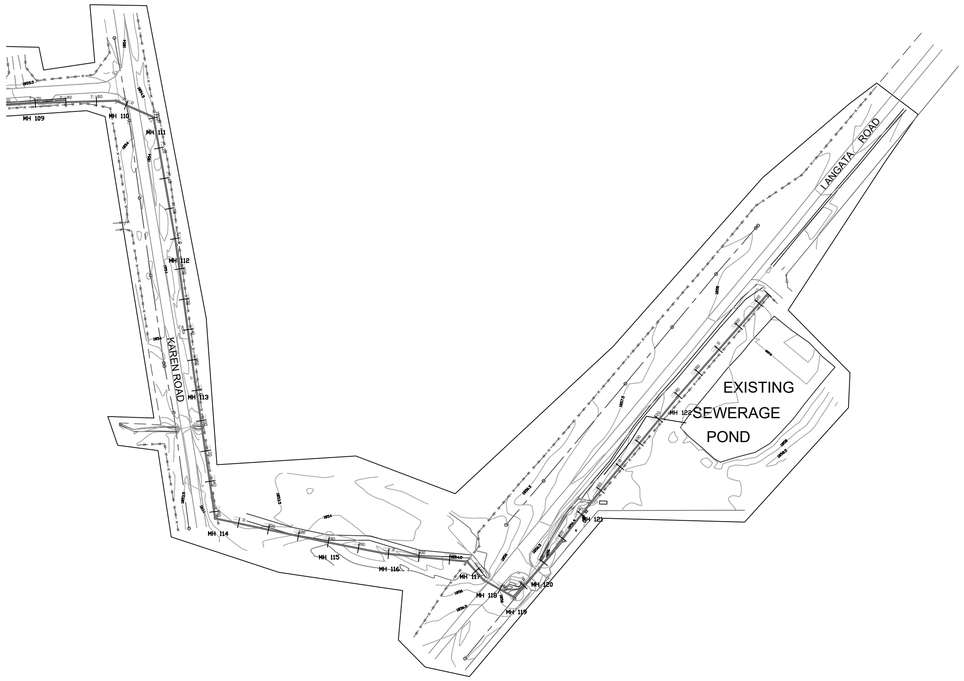
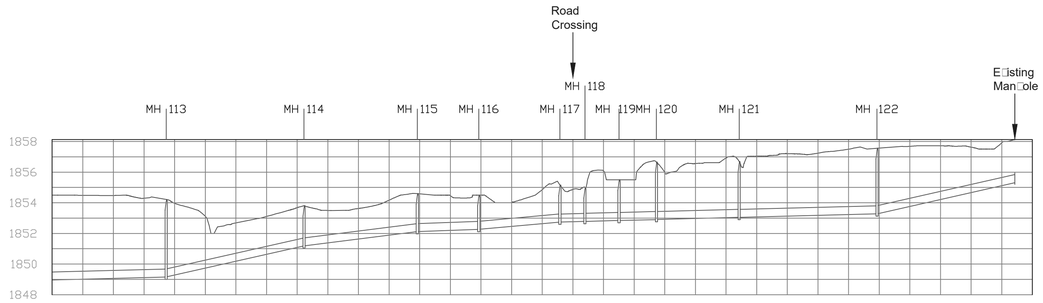
Checked by FMK | Approved by
Scales HOR 1:2,000 VER 1:200 | Date: DECEMBER 2016
Job No. FC/CE90 | ACAD File: CE90_TS110_08
STATUS P | DRG No. FC/CE90/TS/110/08 | REV





Chainage	0+000.00	0+020.00	0+040.00	0+060.00	0+080.00	0+100.00	0+120.00	0+140.00	0+160.00	0+180.00	0+200.00	0+220.00	0+240.00	0+260.00	0+280.00	0+300.00	0+320.00	0+340.00	0+360.00	0+380.00	0+400.00	0+420.00	0+440.00	0+460.00	0+480.00	0+500.00	0+520.00	0+540.00	0+560.00	0+580.00	0+600.00	0+620.00	0+640.00
Ground Level	1854.49	1854.49	1854.47	1854.29	1853.97	1853.31	1852.69	1853.11	1853.68	1853.50	1853.63	1854.17	1854.58	1854.46	1854.50	1854.43	1854.86	1854.87	1856.08	1855.50	1855.98	1856.56	1856.92	1857.04	1857.20	1857.24	1857.49	1857.57	1857.68	1857.73	1857.63	1857.91	
Manhole Chainage					0+074.46		0+164.46				0+238.45			0+278.59			0+331.52	0+347.84	0+370.11	0+394.54		0+448.55				0+538.55							
GL at MH Centre					1854.22		1853.81				1854.60			1854.50			1855.16	1855.01	1855.50	1856.65		1856.69				1857.56							
Invert Level at MH Centre					1849.15		1851.19				1852.12			1852.26			1852.74	1852.78	1852.84	1852.90		1853.05				1853.28							
Depth					5.06		2.62				2.48			2.24			2.42	2.22	2.66	3.75		3.64				4.28							
Slope					0.26%		2.26%				1.26%			0.36%			0.90%	0.24%	0.26%	0.15%		0.26%				0.26%							
Bed and Surround	150mm Gravel Bedding																															
Pipe Specifications	DN 500 GRP																															

Civil Engineer:
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P.O. BOX 58□24□□2 □□□□□□DB□
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Frame Consultants Ltd

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Email: info@aw□oard.go.ke

Project
NAIROBI RIVERS SEWERAGE
IMPROVEMENT PROJECT - PHASE II
□NaRSIP II□

Drawing Title
KAREN TRUNK SEWER
PLAN AND PROFILE
CH.□□000 - CH.□□640

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

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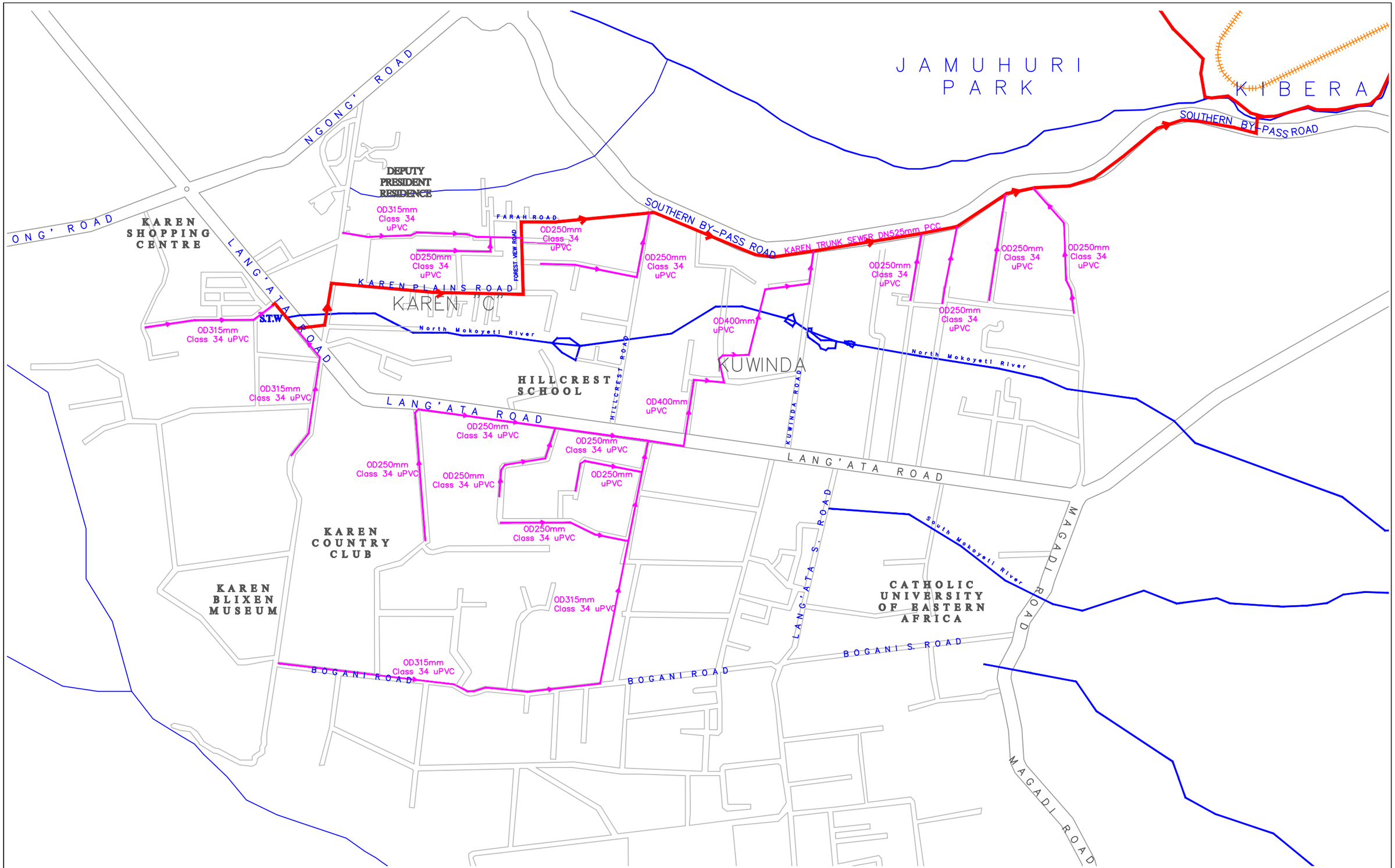
C		BY			
		CHECKED			
B		BY			
		CHECKED			
A		BY			
		CHECKED			

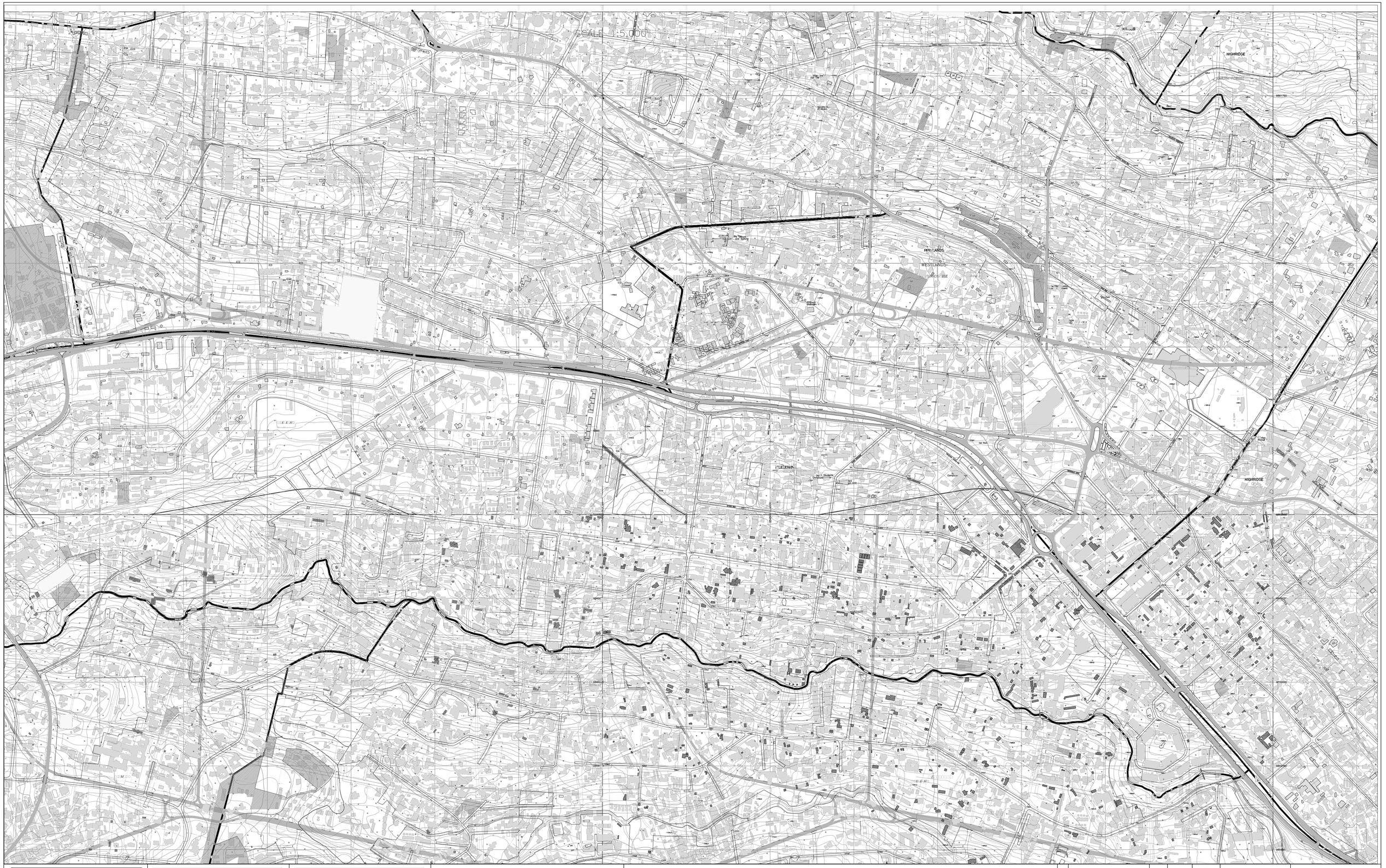
Designed by P.K.M | Drawn by P.K.M
Checked by FMK | Approved by
Scales HOR 1:2,000 VER 1:200 | Date: DECEMBER 2016
Job No. FC/CE90 | ACAD File: CE90_TS110_09
P STATUS | DRG No. FC/CE90/TS/110/09 | REV



	Client: ATHI WATER WORKS DEVELOPMENT AGENCY P.O BOX 45283 - 00100 NAIROBI, Tel: +254 (0) 274292/3 Email: info@awwda.go.ke	**Project** NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II (NaRSIP II)	**Drawing Title** GENERAL LAYOUTS KAREN TRUNK AND RETICULATION SEWER	**NOTES** 1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV.	REVISIONS	BY	CHECKED	SIGN	DATE	APPROVED
D						
C						
B						
A						

Designed by D.K	Drawn by D.K		
Checked by FMK	Approved by		
Scales 1:10,000	Date: DECEMBER 2016		
Job No. FC/CE90	ACAD File: CE90_RS_01		
P STATUS	DRG No. FC/CE90/RS/01	REV	



Civil Engineer:
FRAME CONSULTANTS LTD
P.O. BOX 58[illegible]
[illegible]22[illegible]34[illegible]225[illegible]52385[illegible]
Frame Consultants Ltd

Client:
ATHI WATER SERVICES BOARD
P.O BOX 45283 - 00100
NAIROBI,
Tel: +254 (0) 274292/3
Email: info@awsboard.go.ke

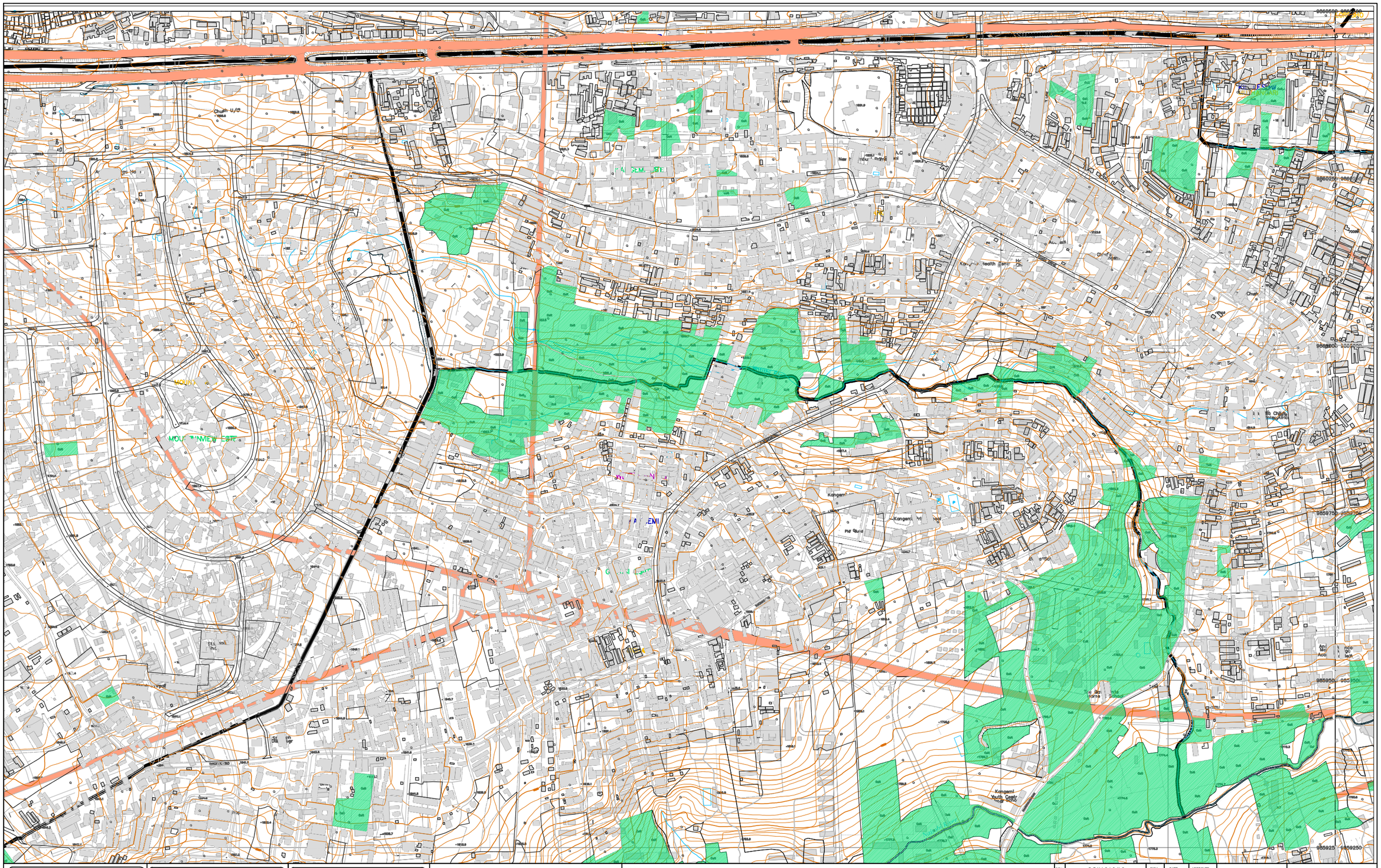
Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
(NaRSIP II)

Drawing Title
GENERAL LAYOUTS
WESTLANDS RETICULATION SEWERS

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV	REVISIONS	BY	SIGN	DATE	APPROVED
D		CHECKED			
C		BY			
		CHECKED			
B		BY			
		CHECKED			
A		BY			
		CHECKED			

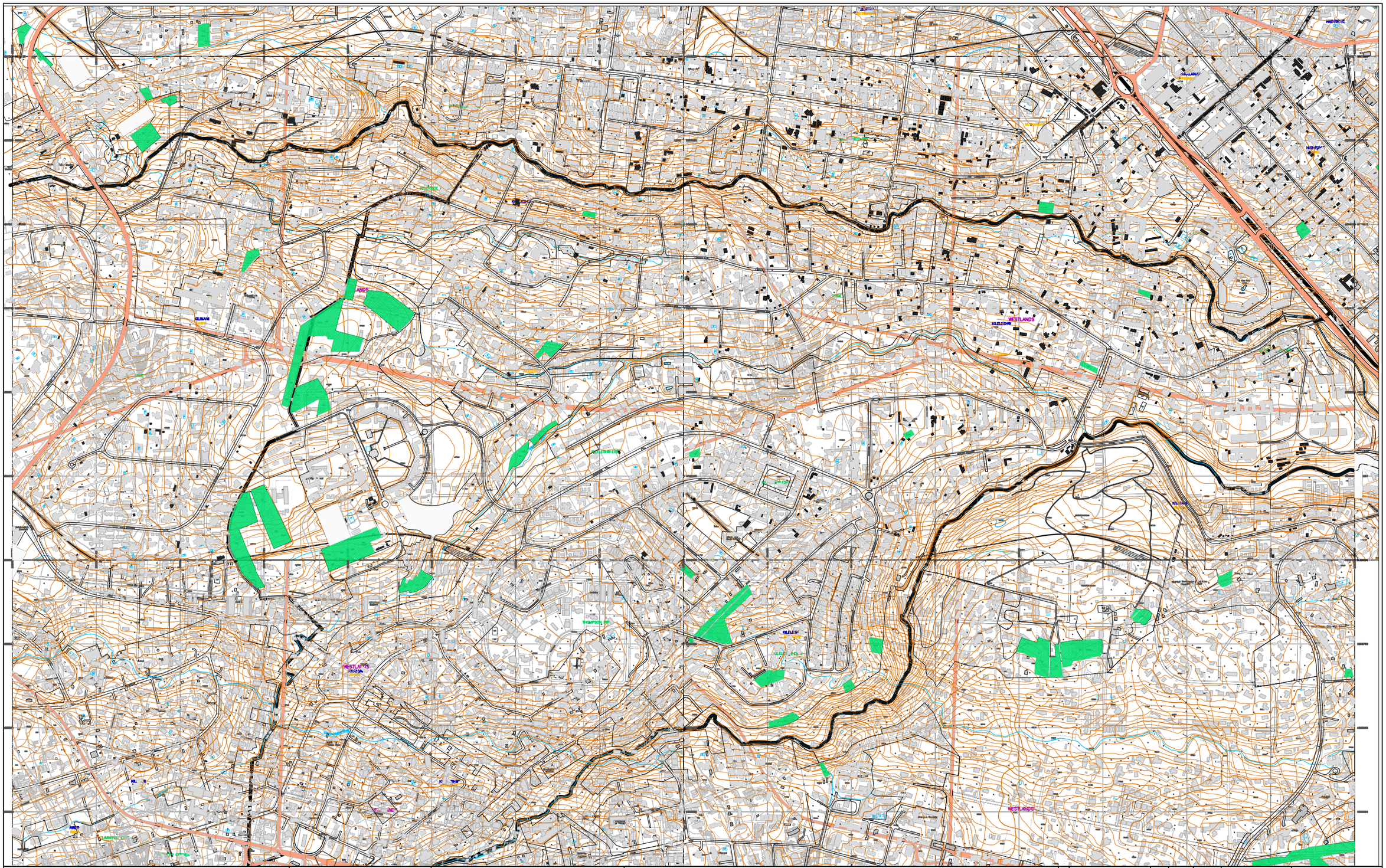
Designed by D.K		Drawn by D.K	
Checked by FMK		Approved by	
Scales 1:2,500		Date: DECEMBER 2016	
Job No. FC/CE90		ACAD File: CE90_RS_06	
P STATUS	DRG No. FC/CE90/RS/06		REV



	Client: **ATHI WATER WORKS DEVELOPMENT AGENCY** P.O BOX 45283 - 00100 NAIROBI, Tel: +254 (0) 274292/3 Email: info@awwda.go.ke	**Project** NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II (NaRSIP II)	**Drawing Title** GENERAL LAYOUTS MOUNTAIN VIEW AND UTHIRU RETICULATION SEWERS	**NOTES** 1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV	REVISIONS	BY	SIGN	DATE	APPROVED
D		BY / CHECKED			
C		BY / CHECKED			
B		BY / CHECKED			
A		BY / CHECKED			

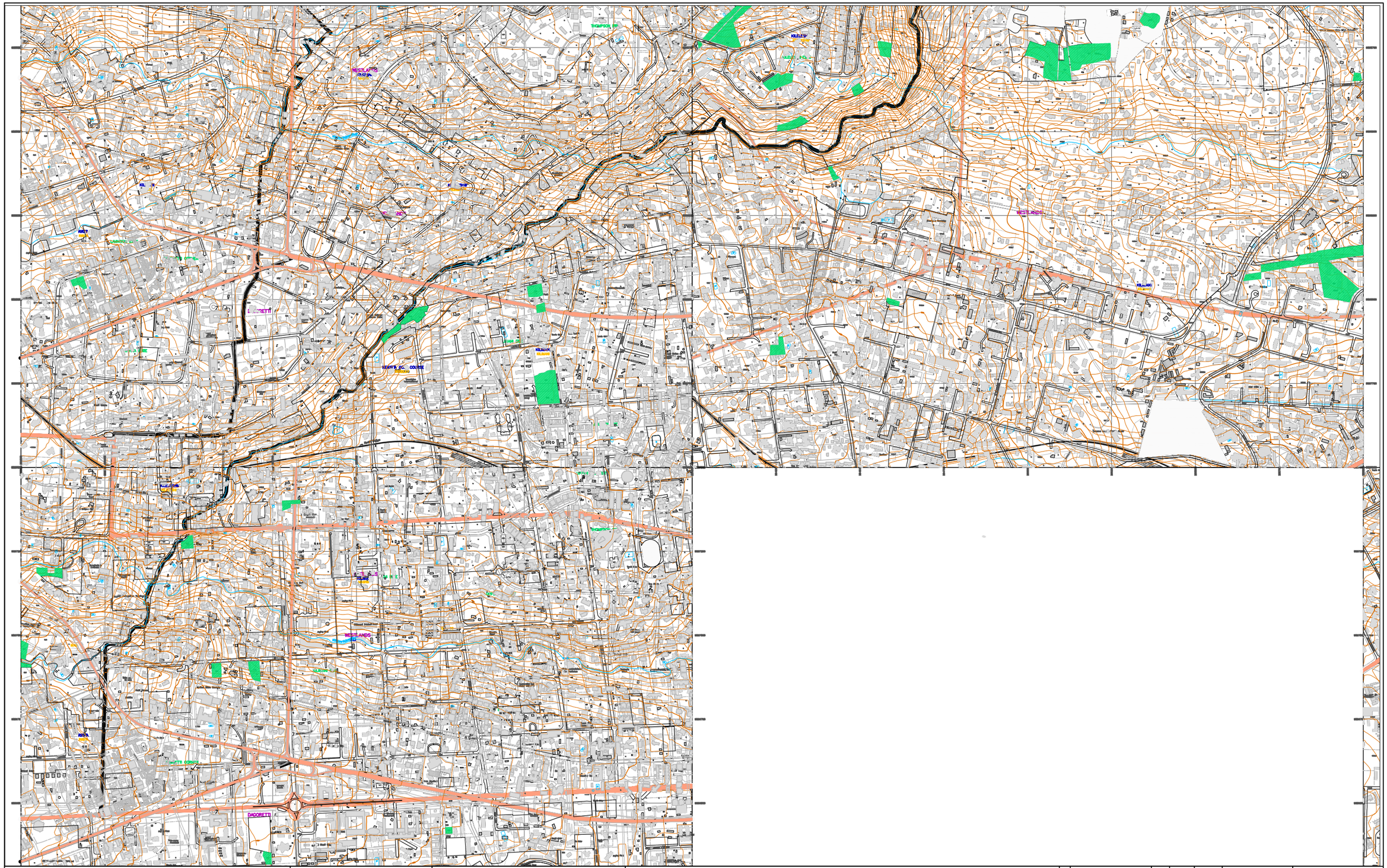
Designed by D.K	Drawn by D.K		
Checked by FMK	Approved by		
Scales 1:2,500	Date: DECEMBER 2016		
Job No. FC/CE90	ACAD File: CE90_RS_04		
P STATUS	DRG No. FC/CE90/RS/04	REV	



Client:	**ATHI WATER WORKS DEVELOPMENT AGENCY** P.O BOX 45283 - 00100 NAIROBI, Tel: +254 (0) 274292/3 Email: info@awwda.go.ke
Project	NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II (NaRSIP II)
Drawing Title	GENERAL LAYOUTS KILELESHWA RETICULATION SEWERS
NOTES	1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV	REVISIONS	BY	CHECKED	SIGN	DATE	APPROVED
D		BY	CHECKED			
C		BY	CHECKED			
B		BY	CHECKED			
A		BY	CHECKED			

Designed by D.K	Drawn by D.K		
Checked by FMK	Approved by		
Scales 1:2,500	Date: DECEMBER 2016		
Job No. FC/CE90	ACAD File: CE90_RS_07		
P STATUS	DRG No. FC/CE90/RS/07	REV	



Client:
ATHI WATER WORKS DEVELOPMENT AGENCY
P.O BOX 45283 - 00100
NAIROBI,
Tel: +254 (0) 274292/3
Email: info@awwda.go.ke

ATHI WATER WORKS

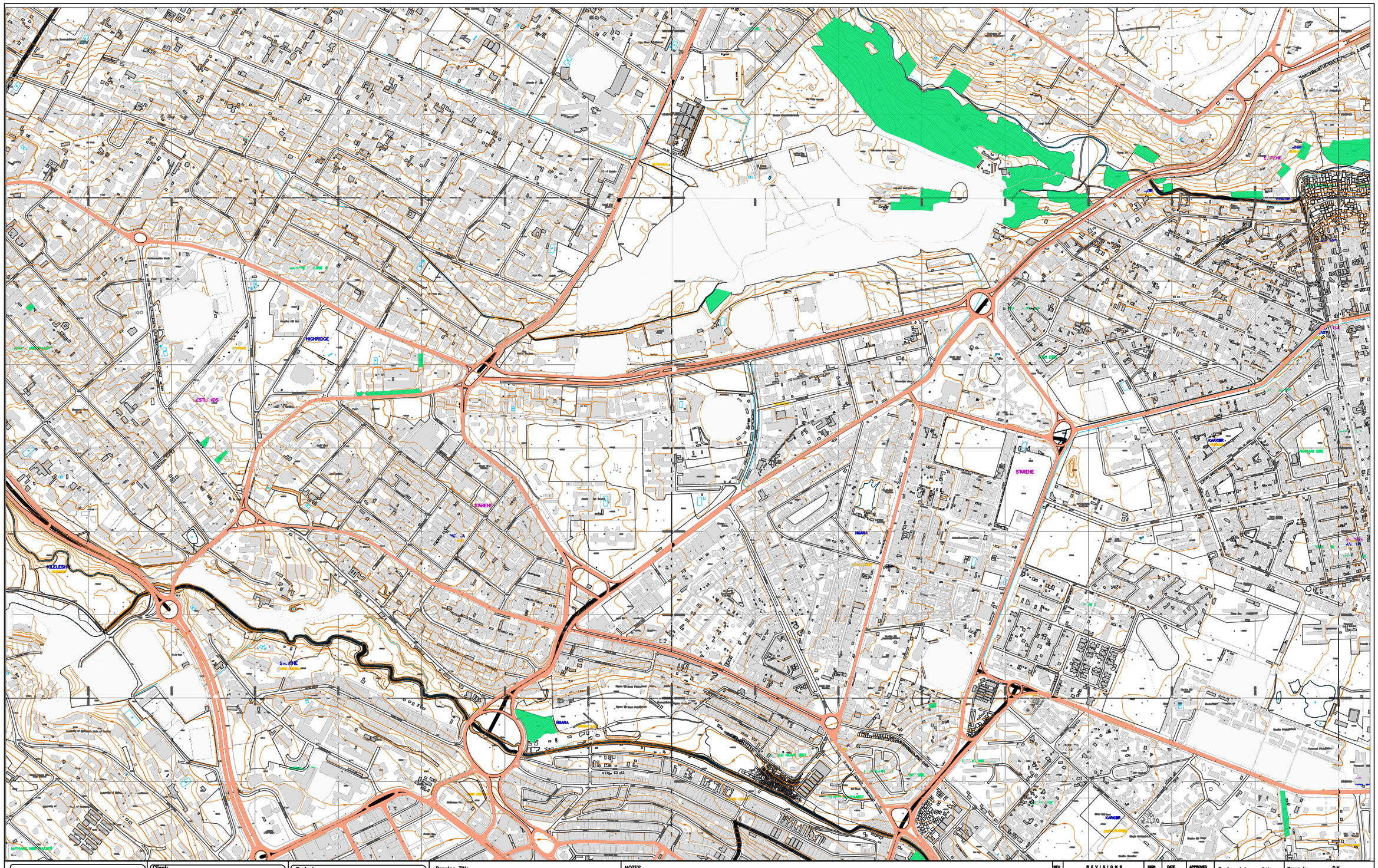
Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
(NaRSIP II)

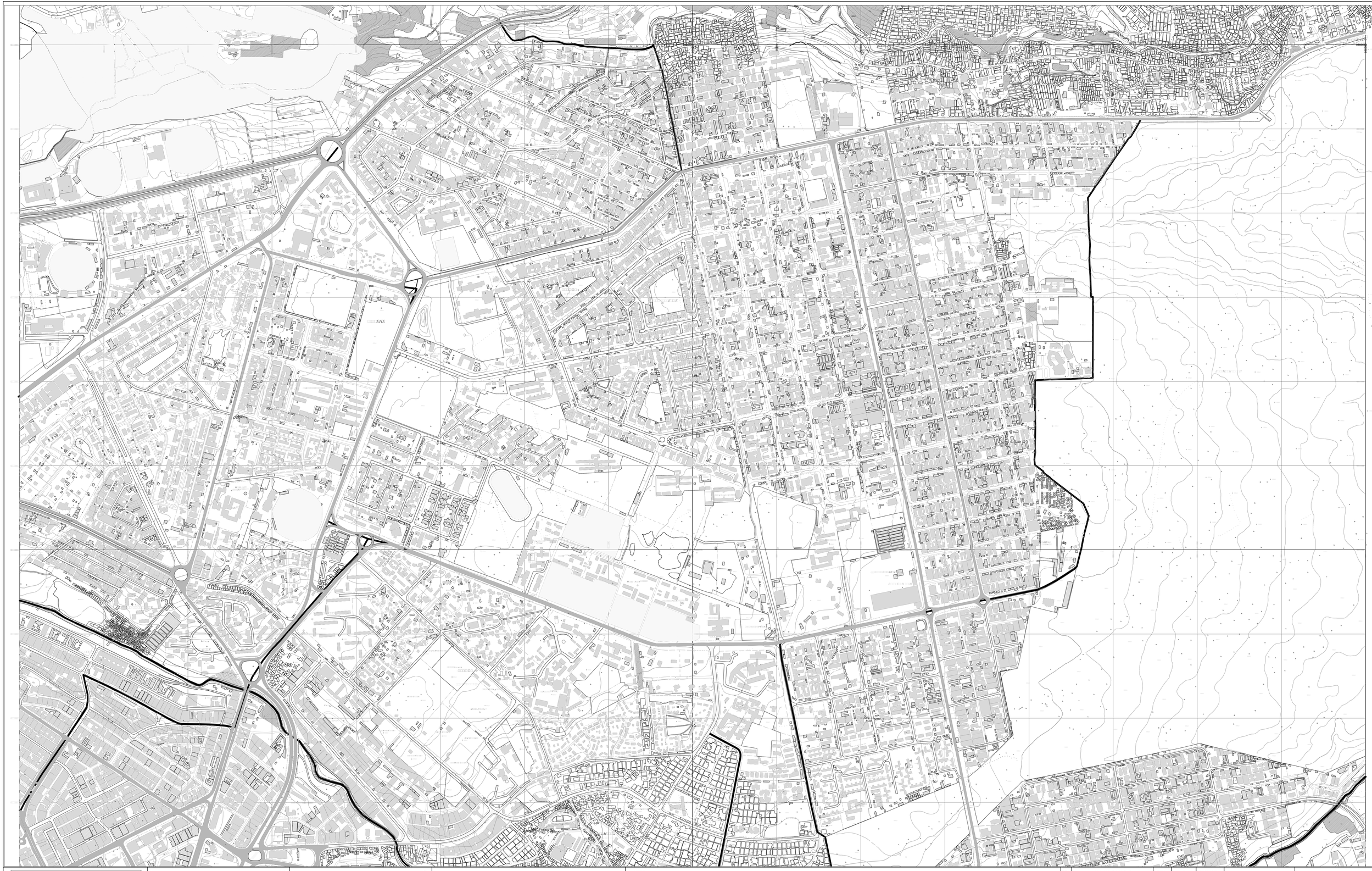
Drawing Title
GENERAL LAYOUTS
KILIMANI RETICULATION SEWERS

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV	REVISIONS	BY	SIGN	DATE	APPROVED
D		CHECKED			
C		BY / CHECKED			
B		BY / CHECKED			
A		BY / CHECKED			

Designed by D.K		Drawn by D.K	
Checked by FMK		Approved by	
Scales 1:5,000		Date: DECEMBER 2016	
Job No. FC/CE90		ACAD File: CE90_RS_08	
P STATUS	DRG No. FC/CE90/RS/08		REV


HIGHRIDGE
STRATHMORE
STRATHMORE
NGARA
KAREN
KAREN
KAREN



Civil Engineer:
□RAME CONS□LTANTS LTD
P.O. BOX 586 ·4·00 ·00, □□□DB□
TEL: ·21 ·□4, ·251 ·0·, 07 ·0 23850
E-mail:info@□ameconsultants□com
Frame Consultants Ltd

Client:
ATHI WATER SERVICES □OARD
P.O BOX 45283 - 00100
NAIROBI,
Tel: +254 (0) 274292/3
Email: info@aw □oard.go.ke

Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
□NaRSIP II□

Drawing Title
GENERAL LAYOUTS
EASTLEIGH RETICULATION SEWER

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV	REVISIONS	BY	SIGN	DATE	APPROVED
D		CHECKED			
C		BY / CHECKED			
B		BY / CHECKED			
A		BY / CHECKED			

Designed by D.K		Drawn by D.K	
Checked by FMK		Approved by	
Scales 1:5,000		Date: DECEMBER 2016	
Job No. FC/CE90		ACAD File: CE90_RS_11	
P STATUS	DRG No. FC/CE90/RS/11		REV

Civil Engineer:
RAME CONS LTANTS LTD
P.O. BOX 58 24 2 DB
22 34 225 5 2 52385
Frame Consultants Ltd

Client:
ATHI WATER SERVICES OARD
P.O BOX 45283 - 00100
NAIROBI,
Tel: +254 (0) 274292/3
Email: info@aw oard.go.ke

Project
NAIROBI RIVERS SEWERAGE IMPROVEMENT PROJECT - PHASE II
NaRSIP II

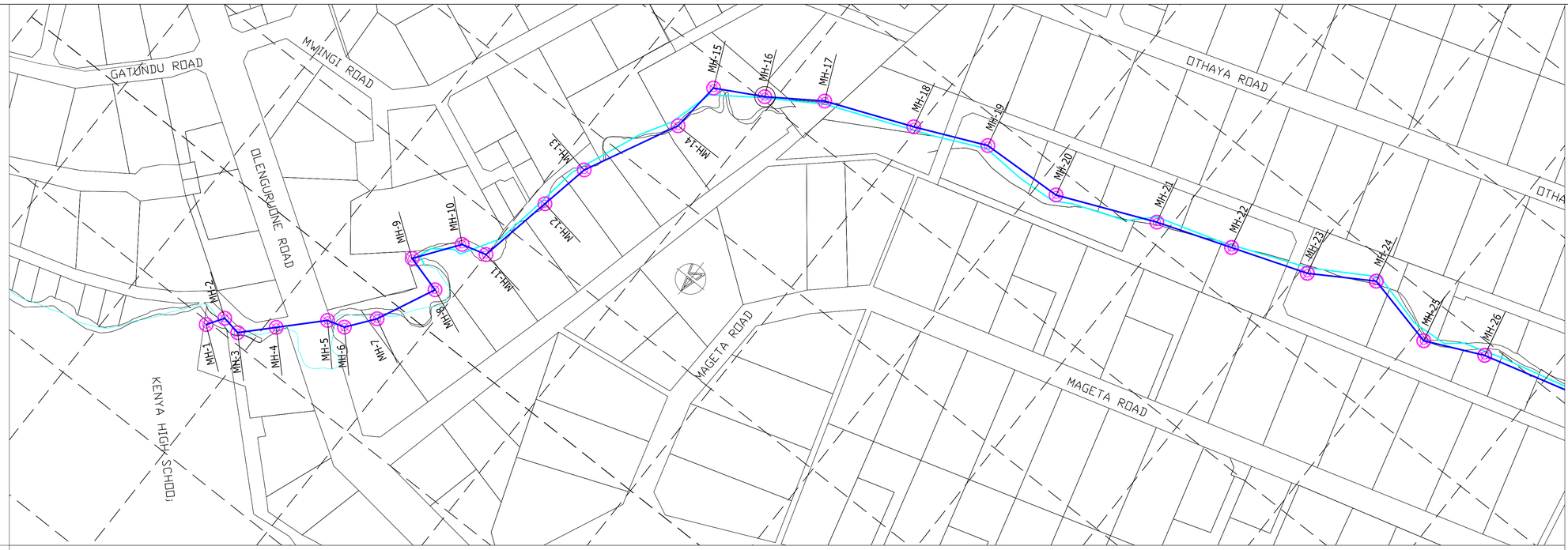
Drawing Title
GENERAL LAYOUTS
HURUMA AND MATHARE NORTH RETICULATION SEWER

NOTES
1. DRAWING TO SCALE ONLY IN A1 SIZE PAPER

REV.	REVISIONS		SIGN	DATE	APPROVED
D		BY			
		CHECKED			
C		BY			
		CHECKED			
B		BY			
		CHECKED			
A		BY			
		CHECKED			

Designed by D.K		Drawn by D.K	
Checked by FMK		Approved by	
Scales 1:5,000		Date: DECEMBER 2016	
Job No. FC/CE90		ACAD File: CE90_RS_15	
P STATUS	DRG No. FC/CE90/RS/15		REV

NAIROBI CITY WATER & SEWERAGE COMPANY P.O BOX 30656-00100 NAIROBI	PROJECT: KIRICHWA DOGO SEWER EXTENSION	DRAWING TITLE: GENERAL LAYOUT PLAN	SURVEY:		DESIGN:		APPROVED BY ENG. L. N. MACHARIA SIGN:_____ TECHNICAL DIRECTOR	DATE	SEPTEMBER 2018
			Surveyed	T. Ouma:	Designed	D. Wanangwe:		SCALE	Scale :HOR. 1:2000
			Drawn	A. Kinyanjui	Drawn	D. Wanangwe:		FIELD BOOK NO.	NCWS/TEC/ENG/NJR/FB31
			Checked	S. Kimani:	Checked	Eng. D. Manore:		DRG No.	NCWS/TEC/ENG/KRCHWA/L01



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 CROSSINGS TYPE 'D' HAUNCH TO BE ADOPTED.

LEGEND

- PROPOSED MANHOLE (MH 28)
- EXISTING GROUND LEVEL
- PROPOSED SEWER LINE
- TRUE NORTH
- PLOT BOUNDARY

MANHOLES SETTING OUT CO-ORDINATES

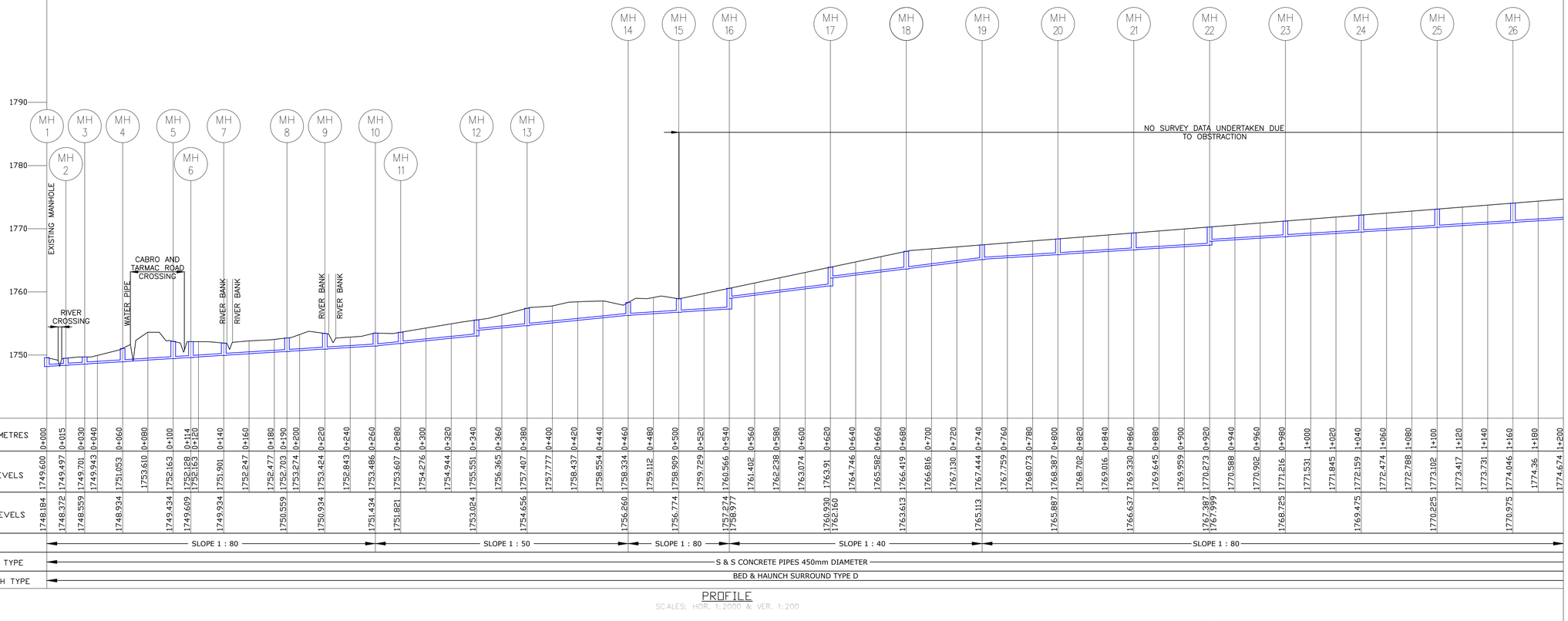
POINT	EASTINGS	NORTHINGS
LINE MD		
MH-1	252935.6057	9858802.2047
MH-2	252927.3430	9858789.5310
MH-3	252912.5977	9858791.9852
MH-4	252891.8462	9858770.4251
MH-5	252864.1072	9858741.6051
MH-6	252850.6860	9858737.6210
MH-7	252834.9547	9858716.9229
MH-8	252813.7338	9858671.6496
MH-9	252842.6285	9858663.5812
MH-11	252819.0964	9858631.2324
MH-12	252799.8116	9858625.9318
MH-13	252788.4532	9858567.0229
MH-14	252780.8658	9858527.7449
MH-15	252745.2508	9858456.1101
MH-16	252706.5866	9858397.0207
MH-17	252668.1908	9858370.9518
MH-18	252601.9745	9858343.8715
MH-19	252548.0383	9858319.8131
MH-20	252483.2097	9858317.0710
MH-21	252409.2124	9858285.2347
MH-22	252352.2519	9858264.8550
MH-23	252294.0477	9858244.1590
MH-24	252248.5905	9858215.9371
MH-25	252191.3255	9858229.2354
MH-26	252147.4033	9858208.9311
MH-27	252070.9256	9858188.1170
MH-28	251997.1764	9858178.7736
MH-29	251944.1986	9858167.0510
MH-30	251904.7877	9858164.8845
MH-31	251842.3012	9858176.3268
MH-32	251782.9337	9858167.6376
MH-33	251743.3484	9858161.8438
MH-34	251698.7013	9858121.7632
MH-35	251699.3096	9858091.7701
MH-36	251656.1890	9858066.4592
MH-37	251616.2296	9858064.6671
MH-38	251569.2284	9858027.3711

PLAN

SCALES: 1:200

PROFILE

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



DATUM 1740.00

CHAINAGES IN METRES	EXT GROUND LEVELS	PROP.INVERT LEVELS
0+000	1749.600	1748.184
0+015	1749.497	1748.372
0+030	1749.701	1748.559
0+040	1749.943	
0+060	1751.053	1748.934
0+080	1753.610	
0+100	1752.163	1749.434
0+114	1752.128	1749.609
0+120	1752.163	
0+140	1751.901	1749.934
0+160	1752.247	
0+180	1752.477	1750.559
0+190	1752.703	
0+200	1753.274	
0+220	1753.424	1750.934
0+240	1752.843	
0+260	1753.486	1751.434
0+280	1753.607	1751.821
0+300	1754.276	
0+320	1754.944	
0+340	1755.551	1753.084
0+360	1756.365	
0+380	1757.407	1754.656
0+400	1757.777	
0+420	1758.437	
0+440	1758.554	
0+460	1758.334	1756.260
0+480	1759.112	
0+500	1758.909	1756.774
0+520	1759.729	
0+540	1760.566	1757.274
0+560	1761.402	1758.977
0+580	1762.238	
0+600	1763.074	
0+620	1763.91	1760.930
0+640	1764.746	1762.160
0+660	1765.582	
0+680	1766.419	1763.613
0+700	1766.816	
0+720	1767.130	
0+740	1767.444	1765.113
0+760	1767.759	
0+780	1768.073	
0+800	1768.387	1765.887
0+820	1768.702	
0+840	1769.016	
0+860	1769.330	1766.637
0+880	1769.645	
0+900	1769.959	
0+920	1770.273	1767.387
0+940	1770.588	1767.999
0+960	1770.902	
1+000	1771.216	1768.725
1+020	1771.531	
1+040	1771.845	1769.475
1+060	1772.159	
1+080	1772.474	
1+100	1772.788	1770.285
1+120	1773.102	
1+140	1773.417	
1+160	1773.731	1770.975
1+180	1774.046	
1+200	1774.36	
	1774.674	

SLOPE	SLOPE 1 : 80 — SLOPE 1 : 50 — SLOPE 1 : 80 — SLOPE 1 : 40 — SLOPE 1 : 80
PIPE SIZE AND TYPE	S & S CONCRETE PIPES 450mm DIAMETER
BEDDING/HAUNCH TYPE	BED & HAUNCH SURROUND TYPE D

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

PROJECT

KIRICHWA NDOGO SEWER EXTENSION PROJECT

DRAWING TITLE

KIRICHWA NDOGO SEWER EXTENSION PLAN AND PROFILE DETAILS (SHEET 1 OF 2)

SURVEY		DESIGN	
Surveyed By	M. Kiarie	Designed By	D. Wanangwe
Drawn By	C. Njoroge	Drawn By	C. Njoroge
Checked By	S. Kimani	Checked By	Eng. D. Manore

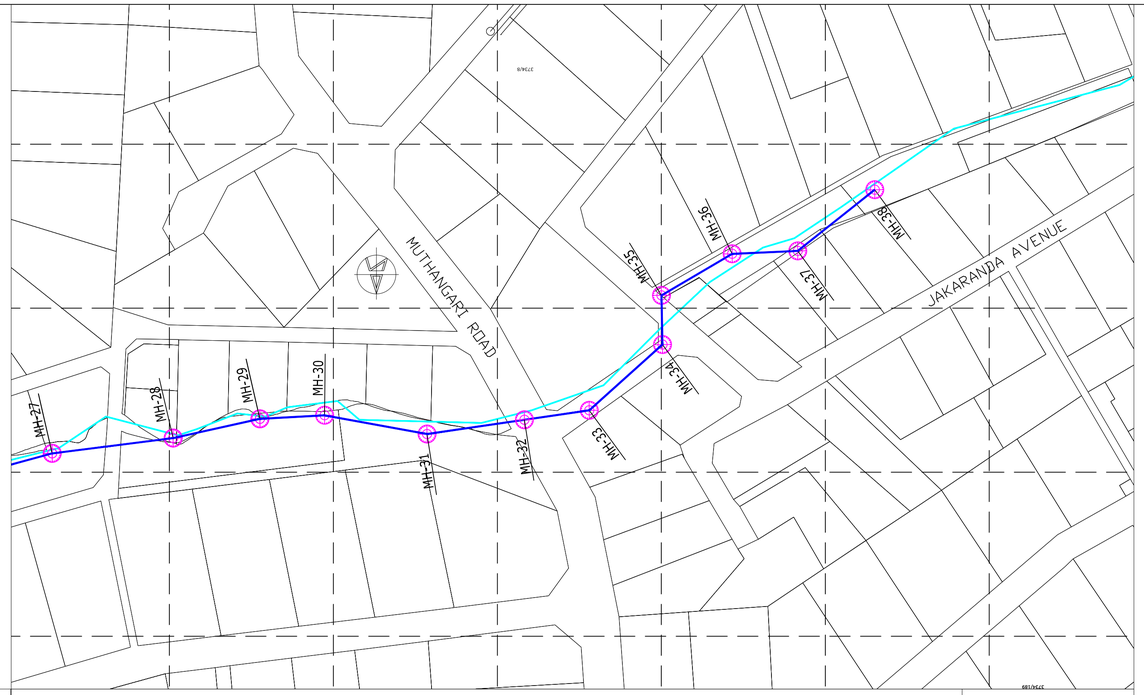
APPROVED BY

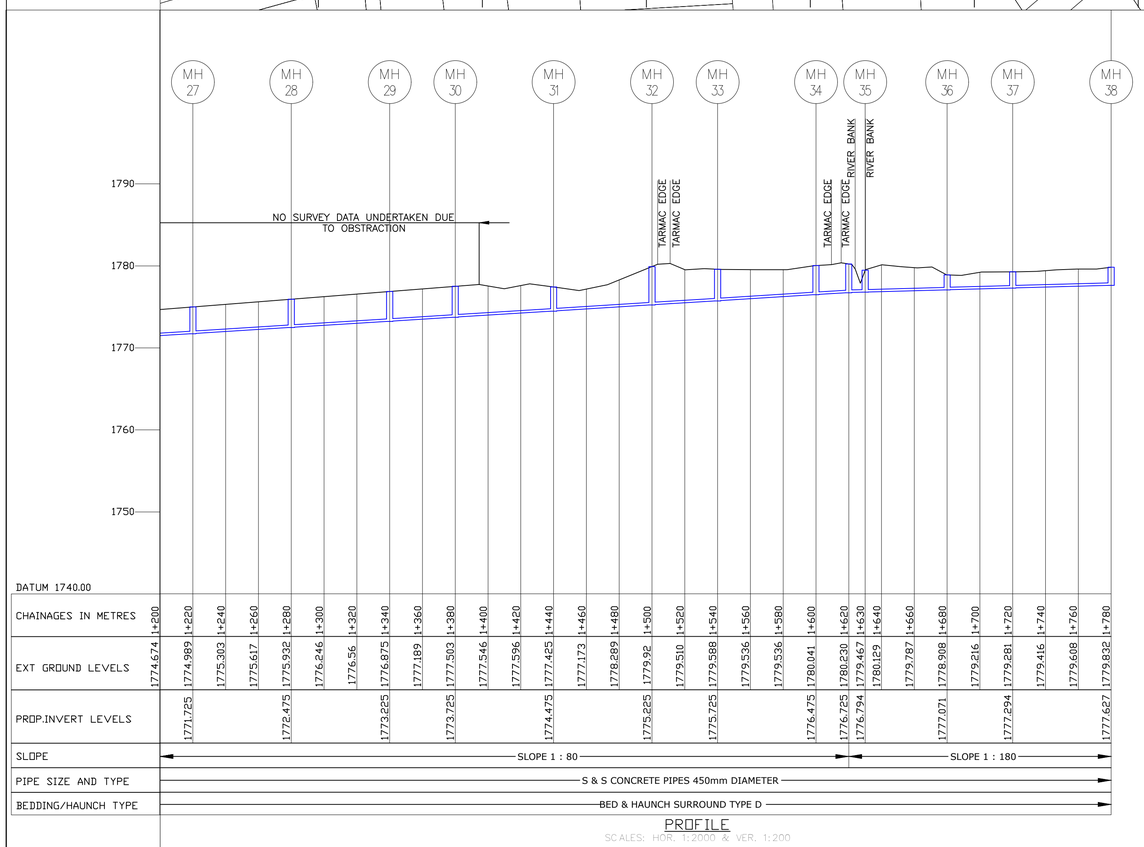
Eng. Lucy N. Macharia

SIGN_____

TECHNICAL DIRECTOR

DATE	MAY 2018
SCALE	Scale :HOR. 1:2000 VERT: 1:200
FIELD BOOK NO.	NCWS/TEC/ENG/004/FB31
DRG No.	NCWS/TEC/ENG/004/S/204





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 CROSSINGS TYPE 'D' HAUNCH TO BE ADOPTED.

LEGEND

- MH 28 — PROPOSED MANHOLE
- EXISTING GROUND LEVEL
- PROPOSED SEWER LINE
- TRUE NORTH
- PLOT BOUNDARY

MANHOLES SETTING OUT CO-ORDINATES

POINT	EASTINGS	NORTHINGS
	LINE MD	
MH-1	252935.6057	9858802.2047
MH-2	252927.3430	9858789.5310
MH-3	252912.5977	9858791.9852
MH-4	252891.8462	9858770.4251
MH-5	252864.1072	9858741.6051
MH-6	252850.6860	9858737.6210
MH-7	252834.9547	9858716.9229
MH-8	252813.7338	9858671.6496
MH-9	252842.6285	9858663.5812
MH-11	252819.0964	9858631.2324
MH-12	252799.8116	9858625.9318
MH-13	252788.4532	9858567.0229
MH-14	252780.8658	9858527.7449
MH-15	252745.2508	9858456.1101
MH-16	252706.5866	9858397.0207
MH-17	252668.1908	9858370.9518
MH-18	252601.9745	9858343.8715
MH-19	252548.0383	9858319.8131
MH-20	252483.2097	9858317.0710
MH-21	252409.2124	9858285.2347
MH-22	252352.2519	9858264.8550
MH-23	252294.0477	9858244.1590
MH-24	252248.5905	9858215.9371
MH-25	252191.3255	9858229.2354
MH-26	252147.4033	9858208.9311
MH-27	252070.9256	9858188.1170
MH-28	251997.1764	9858178.7736
MH-29	251944.1986	9858167.0510
MH-30	251904.7877	9858164.8845
MH-31	251842.3012	9858176.3268
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MH-33	251743.3484	9858161.8438
MH-34	251698.7013	9858121.7632
MH-35	251699.3096	9858091.7701
MH-36	251656.1890	9858066.4592
MH-37	251616.2296	9858064.6671
MH-38	251569.2284	9858027.3711

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

PROJECT

KIRICHWA NDOGO SEWER EXTENSION PROJECT

DRAWING TITLE

KIRICHWA NDOGO SEWER EXTENSION PLAN AND PROFILE DETAILS (SHEET 2 OF 2)

SURVEY		DESIGN	
Surveyed By	M. Kiarie SIGN.	Designed By	D. Wanangwe SIGN.
Drawn By	C. Njoroge SIGN.	Drawn By	C. Njoroge SIGN.
Checked By	S. Kimani SIGN.	Checked By	Eng. D. Manore SIGN.

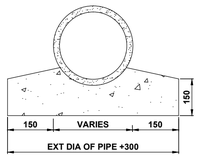
APPROVED BY

Eng. Lucy N. Macharia

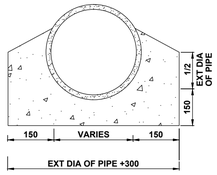
SIGN_____

TECHNICAL DIRECTOR

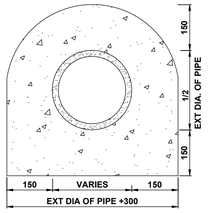
DATE	MAY 2018
SCALE	Scale :HOR. 1:2000 VERT: 1:200
FIELD BOOK NO.	NCWS/TEC/ENG/004/FB31
DRG No.	NCWS/TEC/ENG/004/S/204



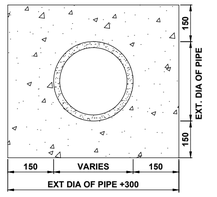
TYPE A



TYPE B



TYPE C



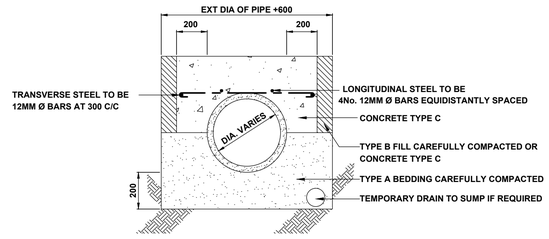
TYPE D

DETAILS OF CONCRETE BED AND SURROUND FOR RIGID JOINTED PIPE LINES

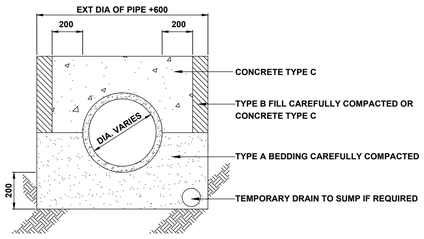
	TYPE A		TYPE B		TYPE C		TYPE D		
	100mm BED	150mm BED	100mm BED	150mm BED	100mm BED	150mm BED	100mm BED	150mm BED	50mm BED
100mm	0.0556	0.0791	0.0800	0.1035	0.1431	0.1667	0.1653	0.1888	0.0235
150mm	0.0643	0.0904	0.0846	0.1108	0.1707	0.1969	0.1981	0.2243	0.0262
225mm	0.0783	0.1078	0.1262	0.1558	0.2155	0.2450	0.2526	0.2821	0.0295
300mm	0.0929	0.1278	0.1558	0.1906	0.2618	0.2966	0.3100	0.3449	0.0348
375mm	0.1080	0.1471	0.1865	0.2256	0.3095	0.3485	0.3703	0.4093	0.0391
450mm	0.1253	0.1689	0.2209	0.2645	0.3623	0.4059	0.4383	0.4818	0.0436
525mm	0.1434	0.1917	0.2564	0.3047	0.4169	0.4652	0.5051	0.5534	0.0483
600mm	0.1620	0.2148	0.2944	0.3472	0.4731	0.5259	0.5844	0.6371	0.0528
675mm	0.1805	0.2375	0.3310	0.3881	0.5270	0.5841	0.6569	0.7139	0.0571
750mm	0.1987	0.2600	0.3683	0.4295	0.5823	0.6437	0.7324	0.7936	0.0613
825mm									
900mm	0.2378	0.3076	0.4463	0.5162	0.6972	0.7670	0.8920	0.9618	0.0699
975mm									
1050mm	0.2810	0.3606	0.4945	0.5741	0.8180	0.8975	1.0636	1.1428	0.0796
1125mm									
1200mm	0.3291	0.4161	0.6231	0.7101	0.9443	1.0315	1.2462	1.3331	0.0870

CONCRETE BED HAUNCHINGS & SURROUNDS TO CONCRETE PIPES
QUANTITIES IN CUBIC METRES PER LINEAR METRE

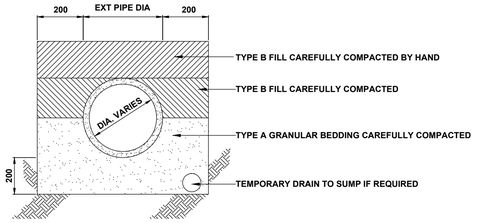
100mm BED TO BE USED WHEN FOUNDING ON ROCK



TYPE 1

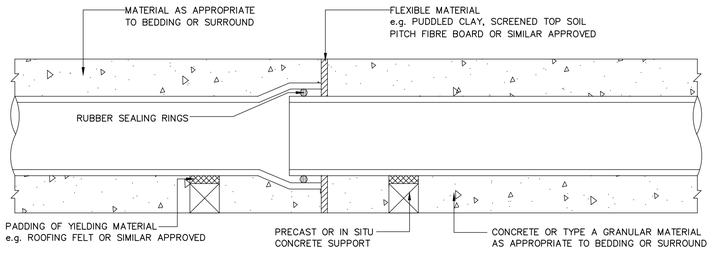


TYPE 2



TYPE 3

DETAILS OF GRANULAR BEDDING TO FLEXIBLY JOINTED PIPES



DETAIL OF FLEXIBLE PIPE JOINT AND SUPPORT PADS

DETAILS OF SUITABLE MATERIALS FOR BEDDING AND HAUNCHING TO PIPES AND FOR FILL OVER THE PIPES AS PER NATIONAL BUILDING STUDIES SPECIAL REPORT 32 (H.M.S.O)

GRANULAR BEDDING TYPE A

USE ROCK OR COARSE GRAINED SOILS (CRUSHED STONE, BRICK OR CONCRETE IS SUITABLE). MATERIAL TO PASS 20mm. SIEVE AND BE RETAINED ON 10mm. SIEVE. TO THIS MATERIAL ADD ONE PART OF FREE DRAINING COARSE SAND FOR EVERY TWO PARTS OF THE MATERIAL AND MIX THOROUGHLY. ALTERNATIVELY USE A FREE DRAINING "ALL IN" MIXTURE OF SIMILAR PARTICLE SIZE. SANDS CONTAINING AN EXCESS OF PARTICLES WHICH WOULD IMPEDE DRAINAGE OR CAUSE BULKING SHOULD NOT BE USED.

SELECTED FILL TYPE B

UNIFORM READILY COMPACTIBLE EXCAVATED OR OTHER MATERIAL FREE FROM CLAY LUMPS RETAINED ON 100mm. SIEVE, STONES RETAINED ON 25mm. SIEVE, TREE ROOTS, VEGETABLE MATTER AND BUILDING RUBBISH.

GENERAL

IN GENERAL THE MOST SUITABLE MATERIAL FOR BEDDING AND SURROUND IS ROUNDED GRAVEL GRADED FROM 10mm. SIZE AS THIS MATERIAL REQURES VERY LITTLE COMPACTION. ALSO SUITABLE ARE SANDS AND GRAVELS OR CLAY/SAND/GRAVEL MIXTURES. THERE SHOULD BE AT LEAST 50% OF SAND AND GRAVEL IN THE MIXTURE, GRAVEL SHOULD BE GRADED FROM 20mm. DOWN. THE MIXTURE SHOULD NOT HAVE EXCESSIVE FINE PARTICLES. ORGANIC OR HIGHLY PLASTIC CLAYS MUST NOT BE USED.

NO.	REFERENCE DRAWING	DRG.NO	NO.	AMENDMENTS	DATE

NAIROBI CITY WATER & SEWERAGE CO. LTD
P.O. BOX 30656 00100 NAIROBI

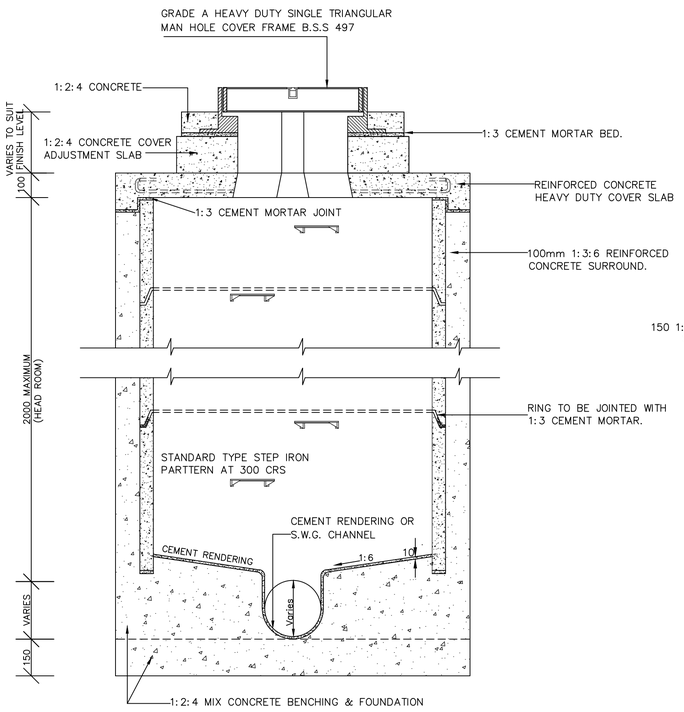
DESIGNED & DRAWN	M. Mokaya
CHECKED	ENG. D. MANORE
APPROVED	ENG. N. MUGUNA

SCALES:

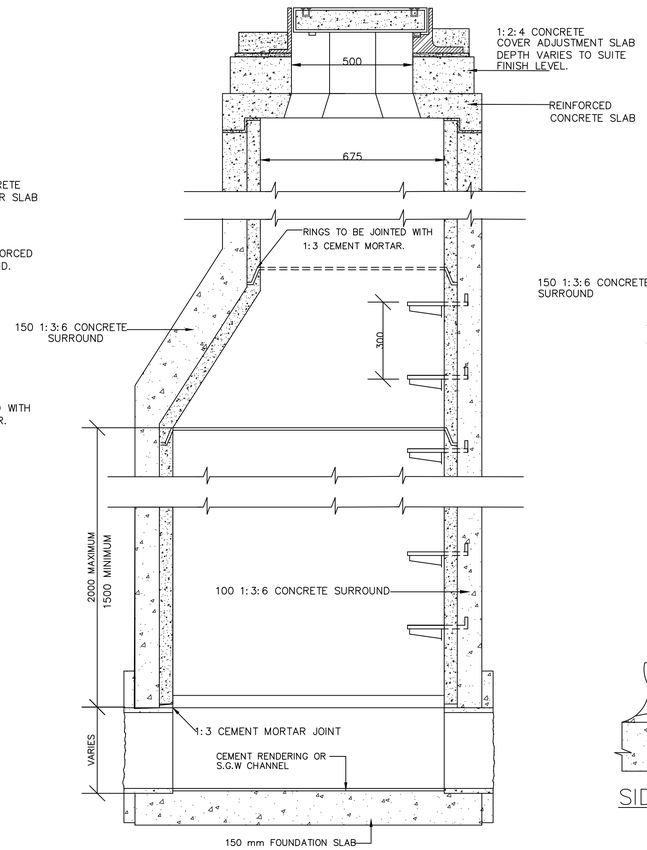
PROJECT TITLE:PROPOSED LUNGALUNGA RD, WUNDANYI RD, SEKONDI RD, PATE ROAD & SACIO ROAD SEWER LINE

DRAWING TITLE: STANDARD SEWER DETAILS

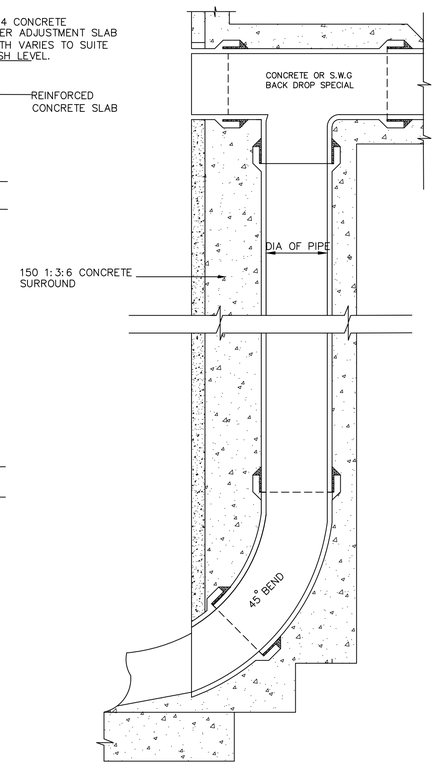
DATE: JULY 2017



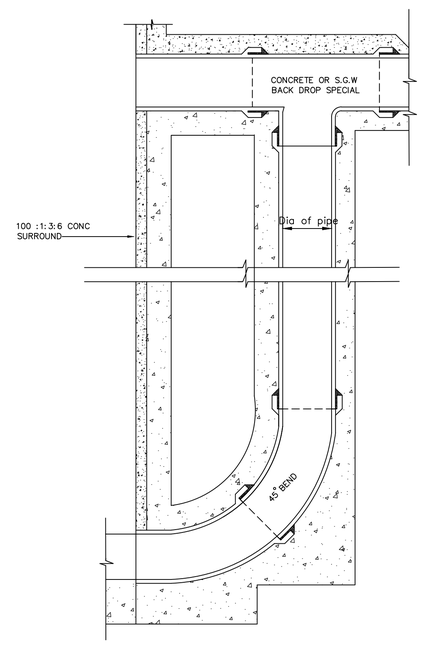
SECTION A–A



SECTION B–B



SIDE ENTRANCE BACKDROP



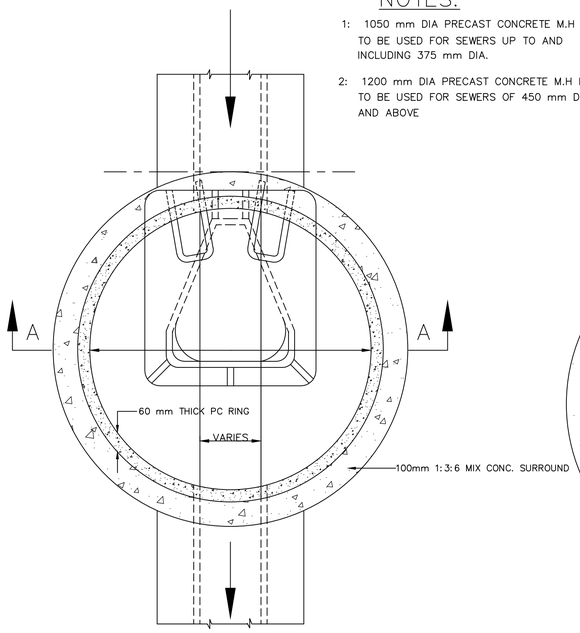
END ENTRANCE BACK DROP

STANDARD MANHOLE DETAILS
WHERE INTERNAL HEADROOM UP TO 2.0 METRES.
TYPE A

NOTES.

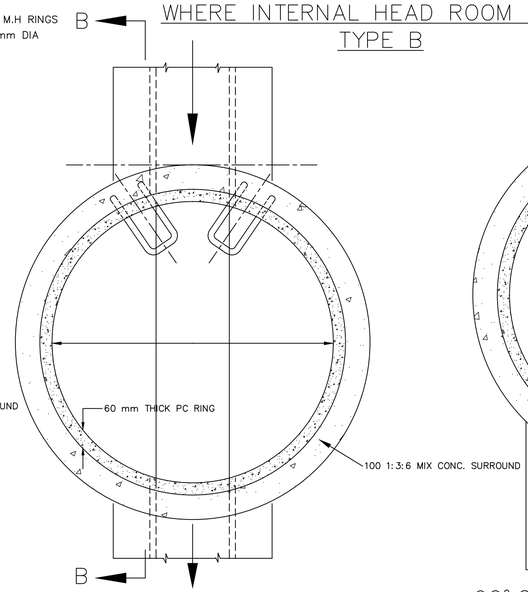
1: 1050 mm DIA PRECAST CONCRETE M.H RINGS TO BE USED FOR SEWERS UP TO AND INCLUDING 375 mm DIA.

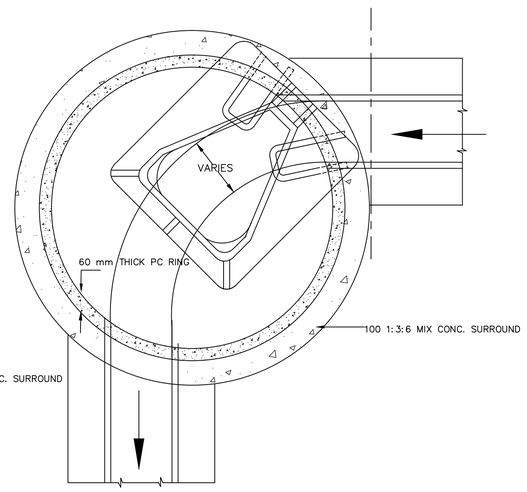
2: 1200 mm DIA PRECAST CONCRETE M.H RINGS TO BE USED FOR SEWERS OF 450 mm DIA AND ABOVE



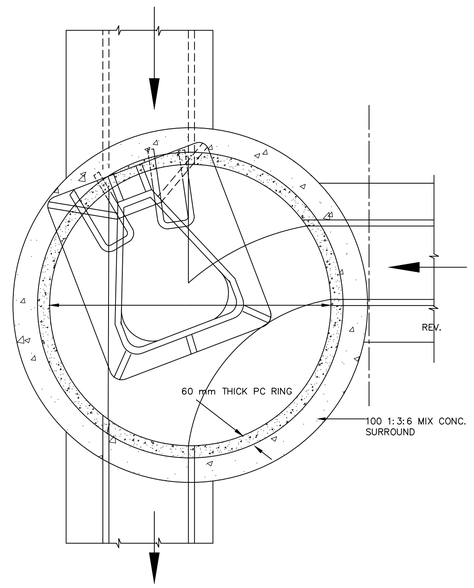
SECTIONAL PLAN

STANDARD TAPERED MANHOLE DETAIL
WHERE INTERNAL HEAD ROOM EXCEED 2.0 METERS
TYPE B





90° CHANGE OF DIRECTION



90° SIDE ENTRANCE

NO.	REFERENCE DRAWING	DRG.NO	NO.	AMENDMENTS	DATE

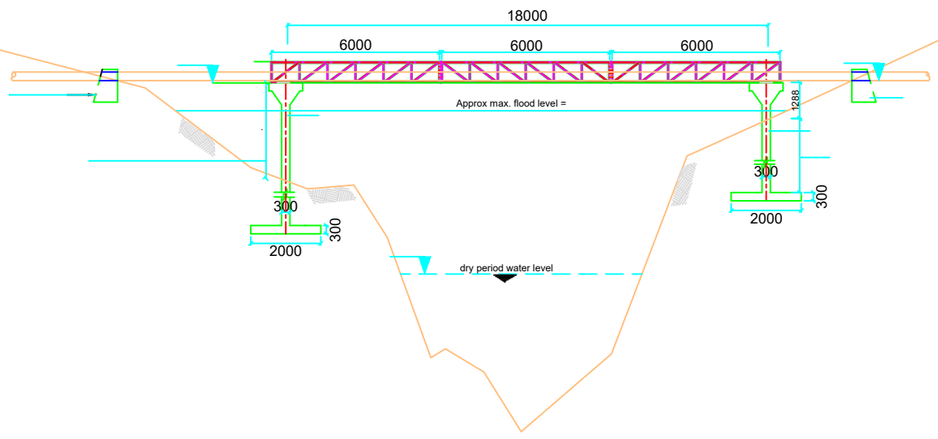
NAIROBI CITY WATER & SEWERAGE CO. LTD
P.O. BOX 30656 00100 NAIROBI

DRAWN & DESIGNED	M. Mokaya
CHECKED	ENG. D. MANORE
APPROVED	ENG. N.MUGUNA

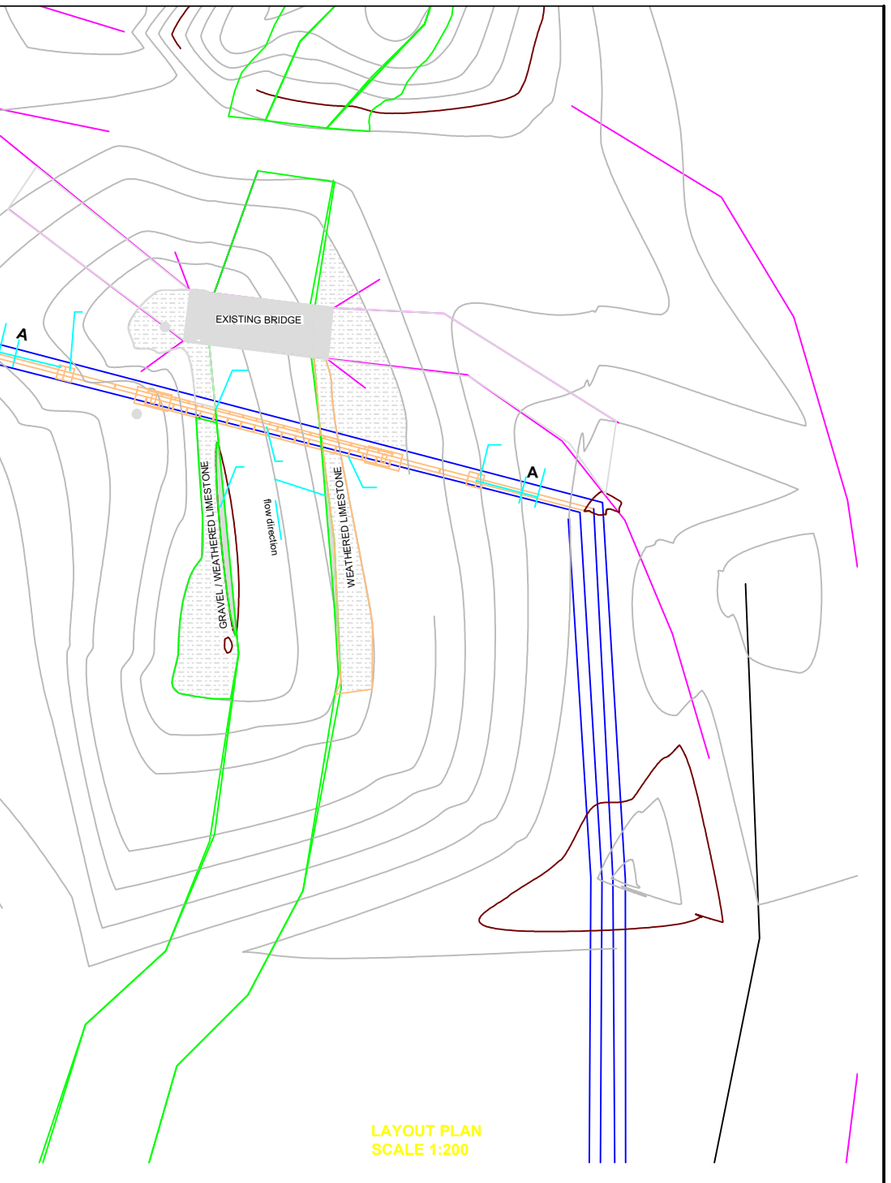
PROJECT TITLE: PROPOSED LUNGALUNGA RD, WUNDANYI RD, SEKONDI RD, PATE ROAD & SACIO ROAD SEWER LINE

DRAWING TITLE: STANDARD MANHOLE DETAILS

DATE: JULY 2017



SECTION A - A
SCALE 1:100



LAYOUT PLAN
SCALE 1:200

Reference Drawings					
B					
A					
REV	REVISIONS		Checked	Date	Appr. WD

DESIGN CONSULTANT

SINCE 1984 **Runji & Partners**
Consulting Engineers and Planners Ltd
3, Kindaruma road ,Off Ngong Road
Telephone (020) 2717213/4
Telefax (020) 2717215
P.O. Box 68053-00200,
Nairobi.

In Joint Venture With

Intercontinental Consultants and Technocrats Pvt. Ltd
A-8, Green Park, New Delhi - 110 016, INDIA

Drawn	Date : MAY. 2017	Designed Date
Name : B.M.O		Name : S.M.W
Checked	Date	Approved Date
Name : N.M		Name : R.N

ATHI WATER WORKS DEVELOPMENT AGENCY
Africa Re-Centre,Hospital Road,Upper Hill
P.O Box 45283-0100
NAIROBI-KENYA

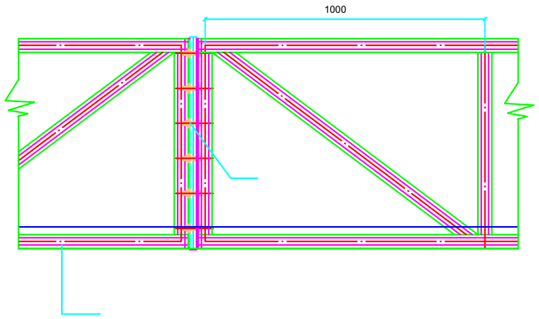
NAIROBI CITY WATER & SEWERAGE COMPANY (NCW&C)
Kampala Road, P.O Box 30656 - 00100,
NAIROBI -KENYA.

ENGINEERING SERVICES FOR DESIGN AND DOCUMENTATION OF PRIMARY AND SECONDARY SEWERLINES-LOT 1

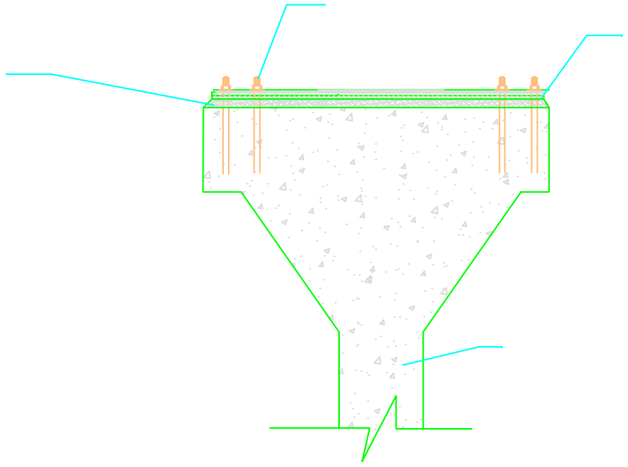
Drawing Title
STANDARD DRAWING-TYPICAL RIVER CROSSING PLAN & SECTION

Scales (A1)
AS SHOWN

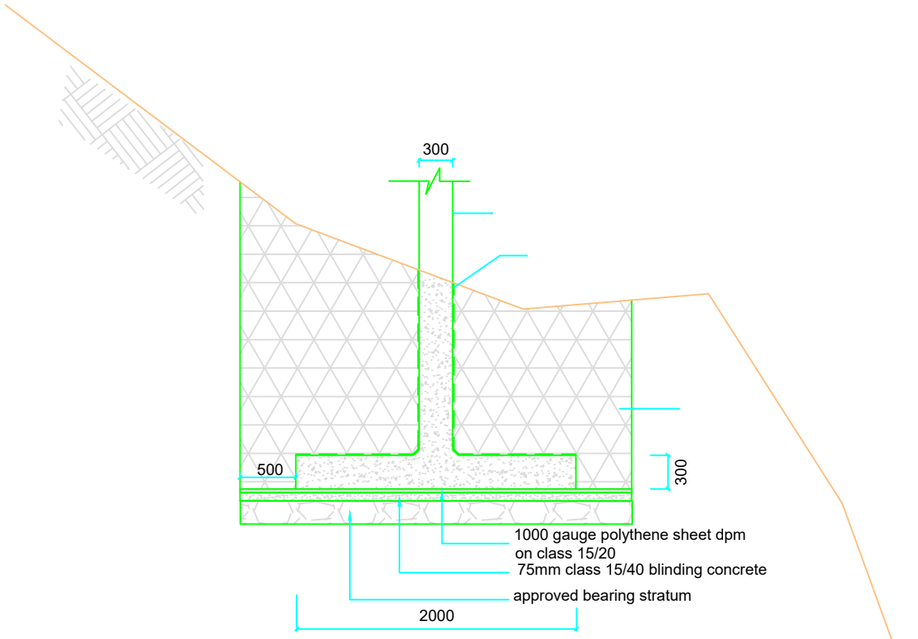
Drg No.
WS621-L4-SD-02



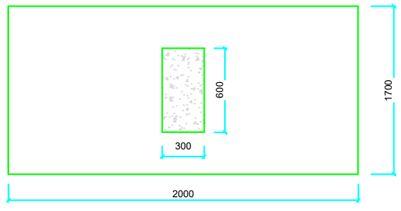
TRUSS CONNECTION DETAIL
SCALE 1:10



COLUMN HEAD-TRUSS
CONNECTION DETAIL
SCALE 1:10



COLUMN FOUNDATION
SCALE 1:25



COLUMN BASE (2 No.)
SCALE 1:20

Reference Drawings		DESIGN CONSULTANT: SINCE 1984 **Runji & Partners** Consulting Engineers and Planners Ltd, 3, Kindaruma road ,Off Ngong Road, Telephone (020) 2717213/4, Telefax (020) 2717215, P.O. Box 68053-00200, Nairobi. In Joint Venture With **Intercontinental Consultants and Technocrats Pvt. Ltd** A-8, Green Park, New Delhi - 110 016, INDIA	Drawn Date : JULY. 2016 Name : M.N.M	Designed Date Name : S.M.W	ATHI WATER WORKS DEVELOPMENT AGENCY, Africa Re-Centre,Hospital Road,Upper Hill, P.O Box 45283-0100, NAIROBI-KENYA	NAIROBI CITY WATER & SEWERAGE COMPANY (NCW&C), Kampala Road, P.O Box 30656 - 00100, NAIROBI -KENYA.	**ENGINEERING SERVICES FOR DESIGN AND DOCUMENTATION OF PRIMARY AND SECONDARY SEWERLINES-LOT 1**
B			Checked Date	Approved Date			Drawing Title: STANDARD DRAWING-TYPICAL RIVER CROSSING FOUNDATION COLUMN & TRUSS DETAILS
A			Name : N.M	Name : R.N			Scales (A1): AS SHOWN — Drg No.: **WS622-L1-STD-03**
REV	REVISIONS	Checked Date Appr. WD					