



ATHI WATER WORKS  
DEVELOPMENT AGENCY(AWWDA)  
MINISTRY OF WATER, SANITATION  
AND IRRIGATION (MWSI)



In partnership with



FRENCH DEVELOPMENT AGENCY

**BIDDING DOCUMENTS**

for

Procurement of

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**CONSTRUCTION WORKS FOR GIGIRI-KARURA-OUTERING ROAD TRANSMISSION PIPELINE PROJECT**

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## **VOLUME III: BOOK OF DRAWINGS**

**IPC No :** AWWDA/AFD/NWSP/W-02B/2023

**Project :** CKE1135-NAIROBI WATER AND SANITATION PROJECT

**Employer:** ATHI WATER WORKS DEVELOPMENT AGENCY

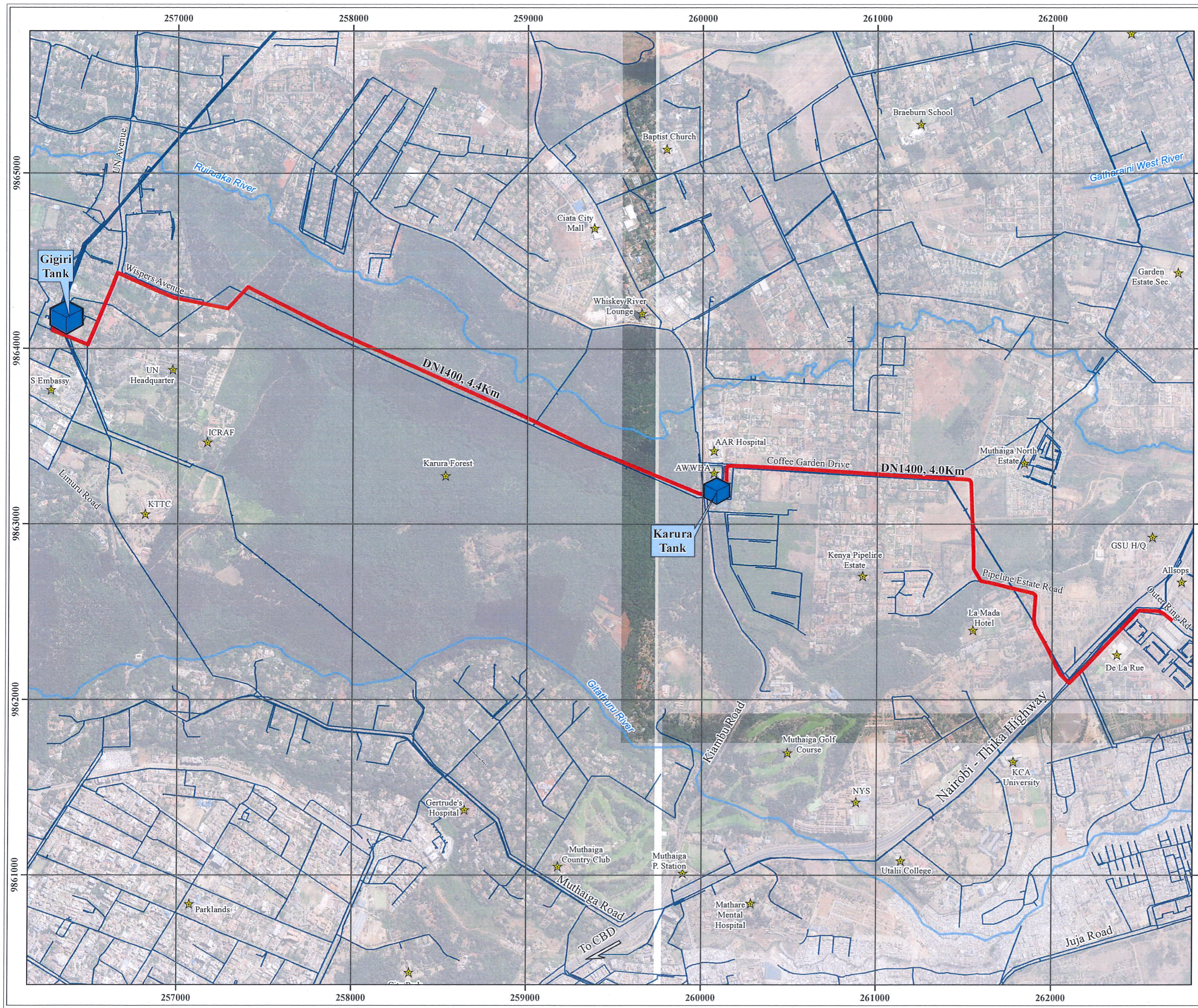
**Country:** KENYA

**Issued on:** 27<sup>th</sup> February 2024



**CKE1135- NAIROBI WATER AND SANITATION PROJECT**  
**CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE PROJECT**  
**BID No. AWWDA/AFD/NWSP/W-02B/2023**  
**SCHEDULE OF ENGINEERING DRAWINGS**

DRG NO.	DESCRIPTION
<b>GIGIRI - KARURA PIPELINE SECTION (LINE GK)</b>	
M455/W-02B/W/GKO/LP/01	LAYOUT PLAN
M455/W-02B/W/GKO/G/LP/01	GIGIRI - KARURA - OUTER - RING TRUNK MAIN - KEY PLAN AND HYDRAULIC PROFILE
M455/W-02B/W/GK/01	GIGIRI - KARURA - PIPELINE SECTION (LINE GK) - PLAN AND LONGITUDINAL SECTION - SHEET 1 OF 5 - CH 0+000 - CH 1+200
M455/W-02B/W/GK/02	GIGIRI - KARURA - PIPELINE SECTION (LINE GK) - PLAN AND LONGITUDINAL SECTION - SHEET 2 OF 5 - CH 1+200 - CH 2+400
M455/W-02B/W/GK/03	GIGIRI - KARURA - PIPELINE SECTION (LINE GK) - PLAN AND LONGITUDINAL SECTION - SHEET 3 OF 6 - CH 2+400 - CH 3+600
M455/W-02B/W/GK/04	GIGIRI - KARURA - PIPELINE SECTION (LINE GK) - PLAN AND LONGITUDINAL SECTION - SHEET 4 OF 6 - CH 3+600 - CH 4+420
M455/W-02B/W/GK/05	GIGIRI - KARURA - PIPELINE SECTION (LINE GK) - PLAN AND LONGITUDINAL SECTION - SHEET 5 OF 6 - FITTINGS DETAILS
M455/W-02B/W/GK/06	GIGIRI - KARURA - PIPELINE SECTION (LINE GK) - PLAN AND LONGITUDINAL SECTION - SHEET 6 OF 6 - INTAKE VALVE CHAMBER FITTINGS DETAILS
<b>KARURA - OUTER RING ROAD PIPELINE SECTION (LINE KO)</b>	
M455/W-02B/W/KO/01	KARURA - OUTER RING ROAD PIPELINE SECTION (LINE KO) PLAN AND LONGITUDINAL SECTION - SHEET 1 OF 4 - CH 0+000 - CH 1+200
M455/W-02B/W/KO/02	KARURA - OUTER RING ROAD PIPELINE SECTION (LINE KO) PLAN AND LONGITUDINAL SECTION - SHEET 2 OF 4 - CH 1+200 - CH 2+400
M455/W-02B/W/KO/03	KARURA - OUTER RING ROAD PIPELINE SECTION (LINE KO) PLAN AND LONGITUDINAL SECTION - SHEET 3 OF 4 - CH 2+400 - CH 3+600
M455/W-02B/W/KO/04	KARURA - OUTER RING ROAD PIPELINE SECTION (LINE KO) PLAN AND LONGITUDINAL SECTION - SHEET 4 OF 4 - CH 3+600 - CH 3+950
<b>STANDARD DRAWINGS</b>	
M455/W-02B/SD/01	STANDARD DETAILS - PROJECT SIGN BOARD DETAIL
M455/W-02B/SD/02	STANDARD DETAILS - AIR VALVE CHAMBERS AND FITTINGS
M455/W-02B/SD/03	STANDARD DETAILS - WASHOUT OUTFALL STRUCTURE AND FIRE HYDRANT DETAILS (SHEET 1 OF 2)
M455/W-02B/SD/04	STANDARD DETAILS - WASHOUT OUTFALL STRUCTURE AND FIRE HYDRANT DETAILS (SHEET 2 OF 2)
M455/W-02B/SD/05	STANDARD DETAILS - INLINE/OFFTAKE VALVE CHAMBER, FITTINGS AND ACCESS LADDER SHEET 1 OF 2
M455/W-02B/SD/06	STANDARD DETAILS - INLINE/OFFTAKE VALVE CHAMBER, FITTINGS AND ACCESS LADDER SHEET 2 OF 2
M455/W-02B/SD/07	STANDARD DETAILS - METER CHAMBER FITTINGS AND DETAILS
M455/W-02B/SD/08	STANDARD DETAILS - CHAMBER COVERS
M455/W-02B/SD/09	STANDARD DETAILS - THRUST BLOCKS SHEET
M455/W-02B/SD/10	STANDARD DETAILS - ANCHOR BLOCKS AND INDICATOR POSTS
M455/W-02B/SD/11	STANDARD DETAILS - PIPE TRENCH AND CONCRETE SURROUND
M455/W-02B/SD/12	STANDARD DETAILS - TRENCHLESS ROAD CROSSING
M455/W-02B/SD/13	STANDARD DETAILS - PERMANENT REINSTATEMENT OF PAVEMENTS
M455/W-02B/SD/14	STANDARD DETAILS - PIERS AND PIER SUPPORTS
M455/W-02B/SD/15	STANDARD DETAILS - DETAILS OF CHECKERED PLATE COVERS FOR CHAMBERS SHEET 1 OF 2
M455/W-02B/SD/16	STANDARD DETAILS - DETAILS OF CHECKERED PLATE COVERS FOR CHAMBERS SHEET 2 OF 2
M455/W-02B/SD/17	STANDARD DETAILS - DETAILS OF STORMWATER CATCH PIT AND EARTH DRAINS
M455/W-02B/SD/19	STANDARD DETAILS - TYPICAL ROAD CROSS SECTION DETAILS
M455/W-02B/SD/19	STANDARD DETAILS - INVERT BLOCK DRAINS AND HEADWALL DETAILS



**Proposed Gigiri - Karura -  
Outer Ring Road Transmission  
Main Pipeline**

**(REVISED PACKAGING)**



**Legend**

- Landmark
- River
- Proposed Works**
- Gigiri-Karura-Outer Ring Road Pipeline
- Existing Works**
- Reservoirs
- Distribution Network

REVISIONS	BY	SIGN	DATE	APPROVED
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

**CLIENT:**  
**ATHI WATER WORKS DEVELOPMENT AGENCY**  
 P.O BOX 45283 - 00100, NAIROBI  
 TEL: 020 - 2727438, FAX: 2724295

**CONSULTING ENGINEERS:**  
**ARTELIA**  
 6 RUE DE LORRAINE  
 38130 ECHIROLLES, FRANCE  
 E-MAIL: artelia@artelagroup.com  
 TEL: +33 (0)4 76 33 40 00

**MANGAT I.B PATEL(MIBP) LIMITED**  
**MIBP**  
 CONSULTING ENGINEERS  
 P.O BOX 48674, 00100-GPO  
 NAIROBI, KENYA  
 E-MAIL: mibp.nairob@mibp.co.ke  
 TEL: +254-20-2710500

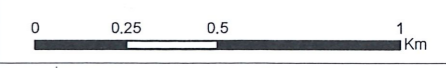
**PROJECT NAME:**  
**CKE1135- NAIROBI WATER AND SANITATION PROJECT**

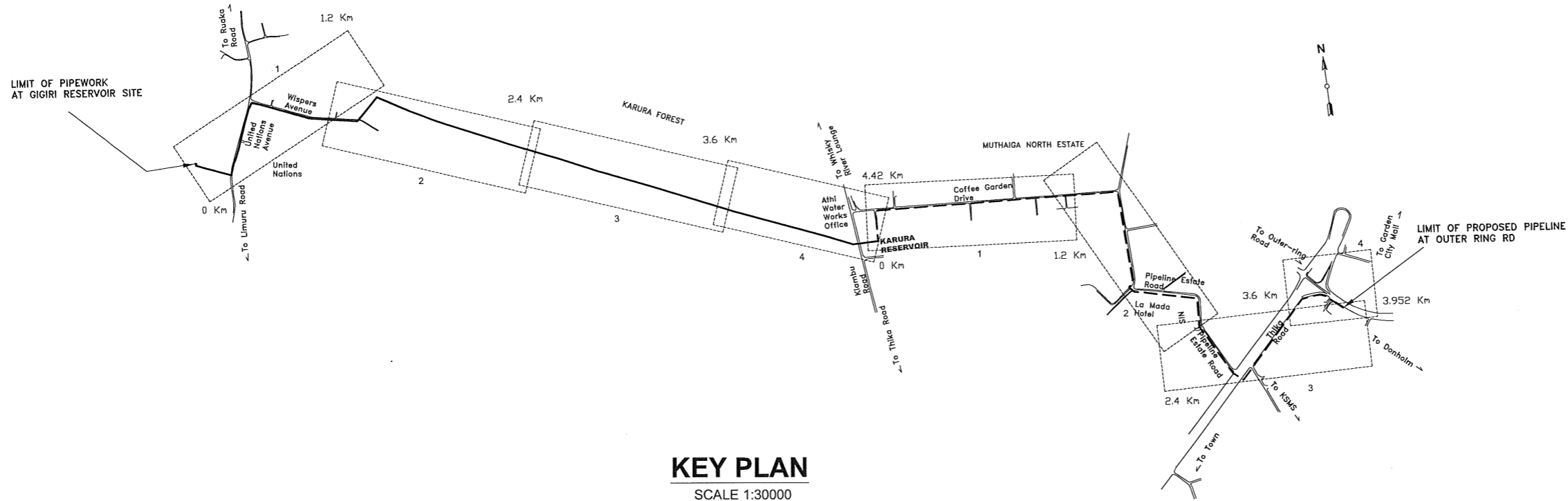
**CONTRACT TITLE:**  
**CONSTRUCTION WORKS FOR  
 GIGIRI-KARURA-OUTER RING ROAD  
 TRANSMISSION PIPELINE PROJECT  
 BID No. AWWDA/AFD/NWSP/W-02B/2023**

**GIGIRI - KARURA - OUTER RING ROAD  
 TRUNK MAIN**

**DRAWING TITLE:**  
**GIGIRI - KARURA - OUTER RING TRUNK MAIN  
 GENERAL LAYOUT PLAN**

Designed by:	V.K	Drawn by:	G.O.N
Checked by:	J.M.K	Approved by:	C.R
Scale:	AS SHOWN	Date:	JUNE, 2023
DRG No.	DRG No. M455/W-02B/W/GKO/LP/01	REV	





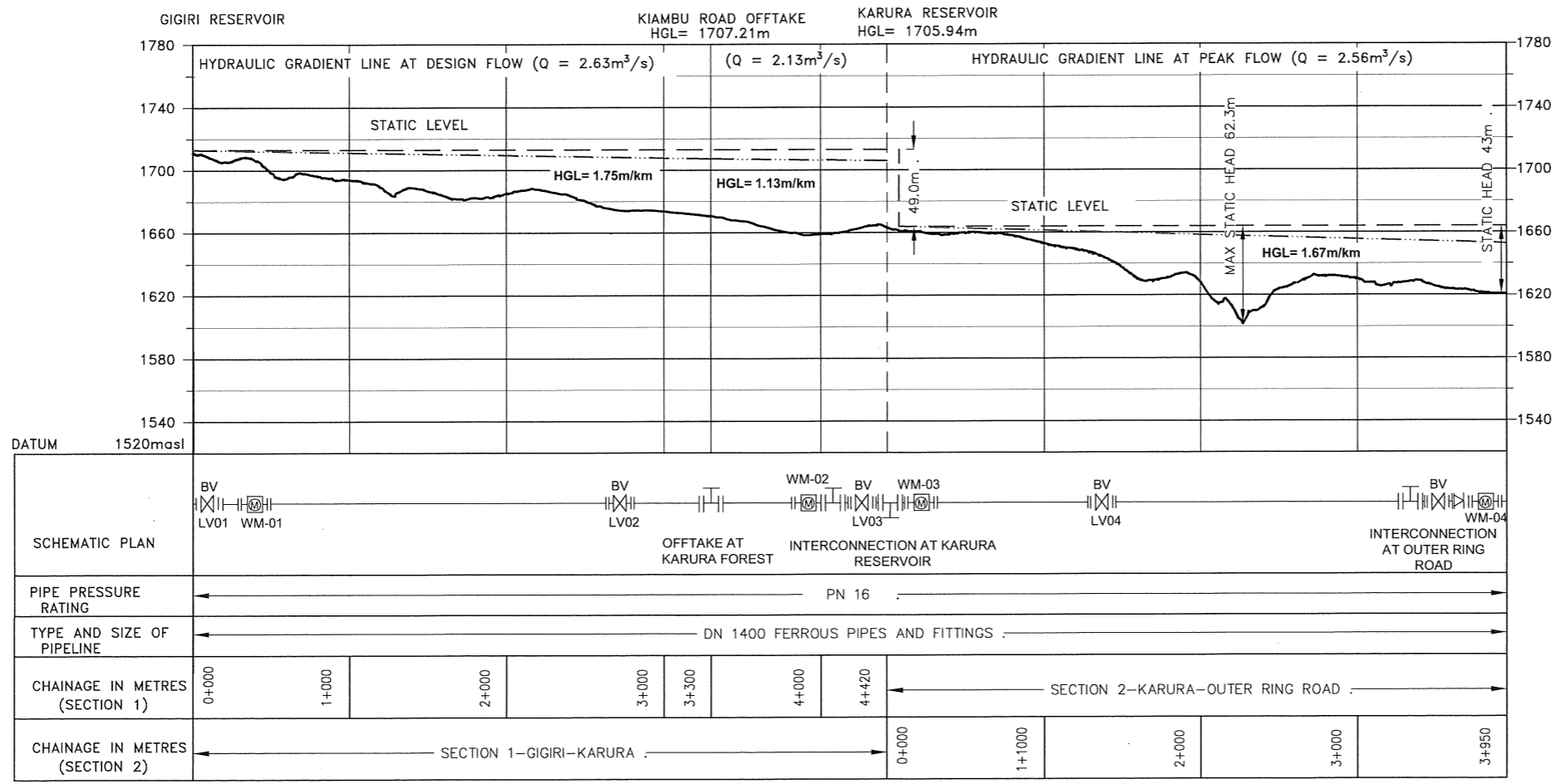
**KEY PLAN**  
SCALE 1:30000

**NOTES:**

1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRG. No. M455/W-02B/WGK01-05 & M455/W-02B/WK01-04

**LEGEND:**

- PROPOSED WATER MAIN (SECTION 1)
- PROPOSED WATER MAIN (SECTION 2)
- STATIC PRESSURE LINE
- HYDRAULIC GRADIENT LINE
- SHEET & SHEET NUMBER
- BUTTERFLY VALVE  
LINE VALVE (with Ref. No.)
- WATER METER (with Ref. No.)
- CHECK VALVE (NON RETURN VALVE)
- METRES ABOVE SEA LEVEL



**HYDRAULIC PROFILE**  
H- 1:40000, V- 1:4000

REVISIONS	SIGN	DATE	APPROVED
	BY		
	CHECKED		
	BY		
	CHECKED		
	BY		
	CHECKED		

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP MANGAT I.B PATEL (MIBP) LIMITED**  
P.O BOX 48674,00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

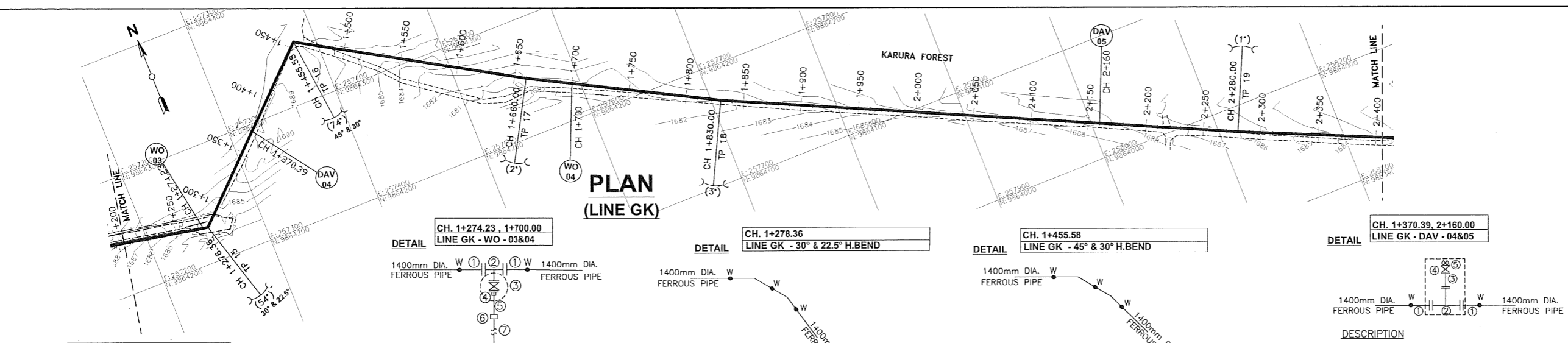
**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI-KARURA-OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT BID No. AWWDA/AFD/NWSP/W-02B/2023

**DRAWING TITLE:**  
GIGIRI KARURA OUTER RING TRUNK MAIN  
  
KEY PLAN AND HYDRAULIC PROFILE

Designed by: S.W.R	Drawn by: F.M.M
Checked by: J.M.K	Approved by: C.R
Scale: AS SHOWN	Date: JUNE 2023
Drg No. M455/W-02B/WGK01-05	REV. 0

**GIGIRI - KARURA PIPELINE SECTION  
(LINE GK)**





- DETAIL CH. 1+274.23, 1+370.39  
LINE GK - 11.25° V.BEND**
- DESCRIPTION**  
2Nos. REQUIRED
- ① 1 No. 1400mm DIA. PLAIN ENDED FERROUS 11.25° BEND
- NOTE**  
—PROVIDE ANCHOR BLOCKS FOR GRADIENTS UPTO 1:10
- DETAIL CH. 1+274.23, 1+700.00  
LINE GK - WO - 03&04**
- DESCRIPTION**  
2Nos. REQUIRED
- ① 2 Nos. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG
  - ② 1 No. 1400x250mm DIA. ALL FLANGED LEVEL INVERT TEE
  - ③ 1 No. 250mm DIA. ALL FLANGED GATE VALVE
  - ④ 1 No. 250mm DIA. FLANGE ADAPTOR
  - ⑤ 1 No. 250mm DIA. PLAIN ENDED PIPE 1.2m LONG
  - ⑥ 1 No. 250mm DIA. RANGER COUPLING
  - ⑦ 1 No. 250mm DIA. PN 16 HDPE PIPE WITH BUTT FUSION WELDED JOINTS, LENGTH TO BE DETERMINED ON SITE, TO AN OUTFALL STRUCTURE
- DETAIL CH. 1+278.36  
LINE GK - 30° & 22.5° H.BEND**
- DESCRIPTION**  
1No. REQUIRED
- ① 1 No. 1400mm DIA. PLAIN ENDED FERROUS 30° BEND
  - ② 1 No. 1400mm DIA. PLAIN ENDED FERROUS 22.5° BEND
- DETAIL CH. 1+455.58  
LINE GK - 45° & 30° H.BEND**
- DESCRIPTION**  
1No. REQUIRED
- ① 1 No. 1400mm DIA. PLAIN ENDED FERROUS 45° BEND
  - ② 1 No. 1400mm DIA. PLAIN ENDED FERROUS 30° BEND
- DETAIL CH. 1+370.39, 2+160.00  
LINE GK - DAV - 04&05**
- DESCRIPTION**  
2Nos. REQUIRED
- ① 2 Nos. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 625mm FROM FLANGED END
  - ② 1 No. 1400x800mm DIA. ALL FLANGED SPECIAL TEE
  - ③ 1 No. 200mm DIA. SPECIAL PIPE 325mm LONG WITH FLANGE TO SUIT 800mm DIA. TEE ON ONE END AND NORMAL FLANGE ON THE OTHER END
  - ④ 1 No. 200mm DIA. ALL FLANGED GATE VALVE (ISOLATING VALVE)
  - ⑤ 1 No. 200mm DIA. DOUBLE ORIFICE AIR VALVE

**NOTES:**

- CONTOUR LEVELS ARE IN METERS AT 1m INTERVALS
- GRID VALUES ARE IN METERS AT 100 METER INTERVALS
- ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

**LEGEND:**

- PAVED ROAD
- CONCRETE PAVED ROAD
- MURRAM/EARTH ROAD
- FENCE / HEDGE
- CONTOURS, 1m INTERVAL
- RIVER/STREAM
- BUILDINGS
- TEMPORARY STRUCTURE
- MANHOLE/CHAMBER
- GATE
- DRAIN
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- HORIZONTAL BEND (H) OR VERTICAL BEND (V) ANGLE INDICATED
- TH1 TRIAL HOLE
- CONCRETE SURROUND
- PROPOSED CHAMBER
- PROPOSED SURFACE BOX
- TP10 TRAVERSE POINT & No.
- GV GATE VALVE
- WO WASH OUT
- FH FIRE HYDRANT
- WM WATER METER
- DAV DOUBLE ORIFICE AIR VALVE
- masl METRES ABOVE SEA LEVEL
- 91.96 MD18 BENCHMARK WITH ELEVATION

REVISIONS			
NO.	BY	DATE	APPROVED
	CHECKED		
	BY		
	CHECKED		
	BY		
	CHECKED		

**CLIENT:**

**THE CHIEF EXECUTIVE OFFICER**  
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**PROJECT NAME:**  
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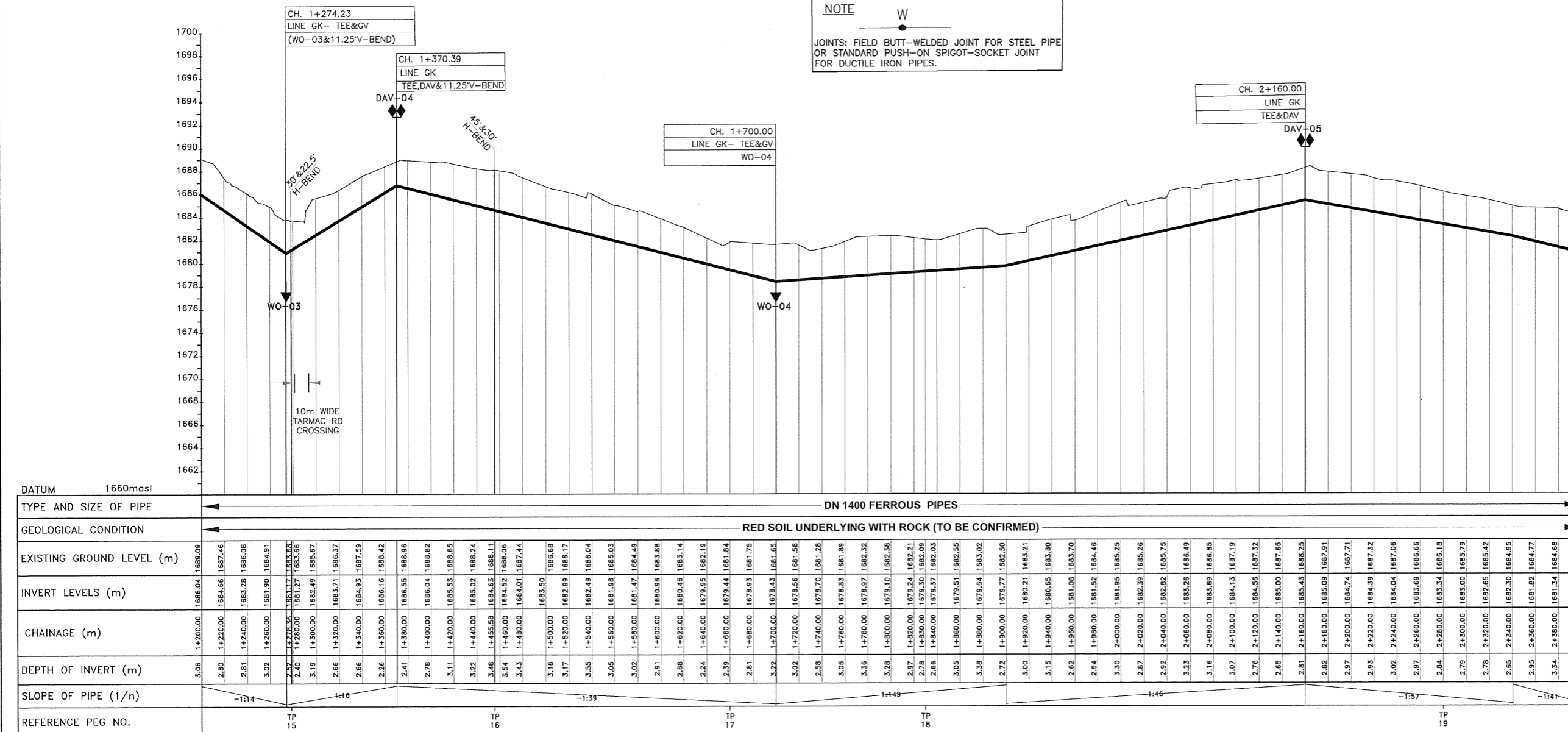
**CONTRACT TITLE:**  
**CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT**  
**BID No. AWWDA/AFD/NWSP/W-02B/2023**

**DRAWING TITLE:**  
**GIGIRI-KARURA PIPELINE SECTION (LINE GK)**  
**PLAN & LONGITUDINAL SECTION**  
**(CH 1+200.00 - 2+400.00)**  
**SHEET 2 OF 6**

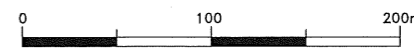
Designed by: SWR  
Checked by: J.M.K  
Scale: H- 1:4000, V- 1:400 (A3)  
Date: JUNE 2023

Drawn by: SWR  
Approved by: C.R  
Date: JUNE 2023

DRG No. M455/W-02B/WGK/02  
REV. 0

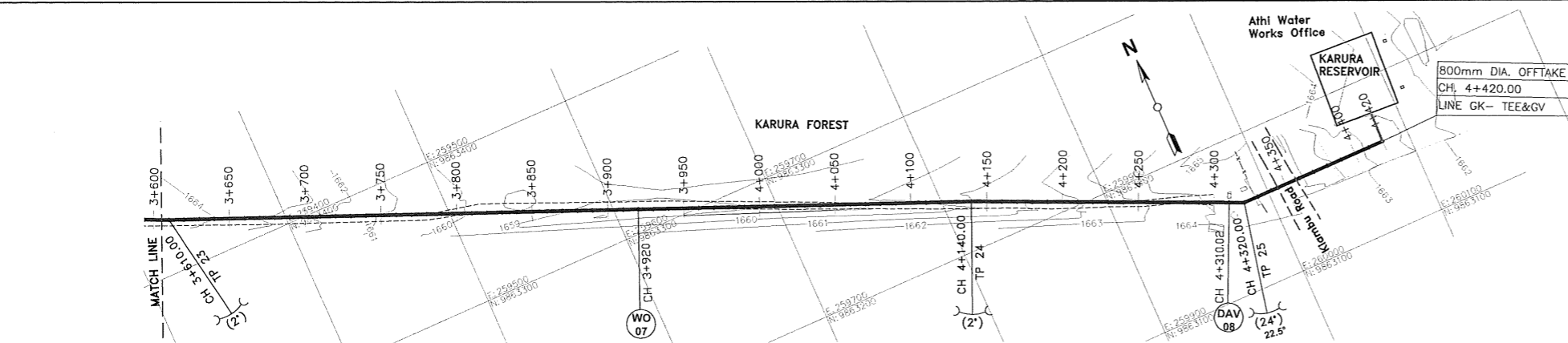


**LONGITUDINAL SECTION**

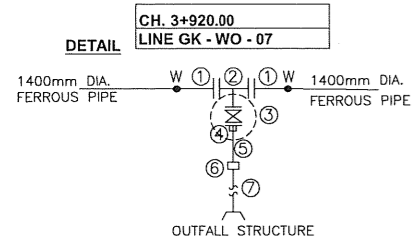
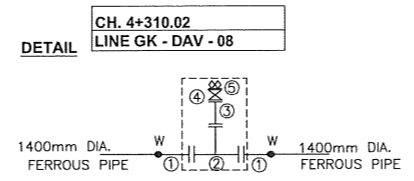
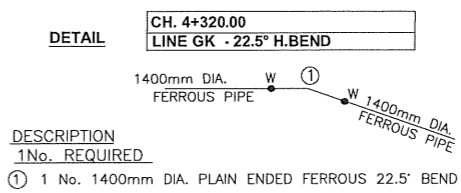








**PLAN  
(LINE GK)**

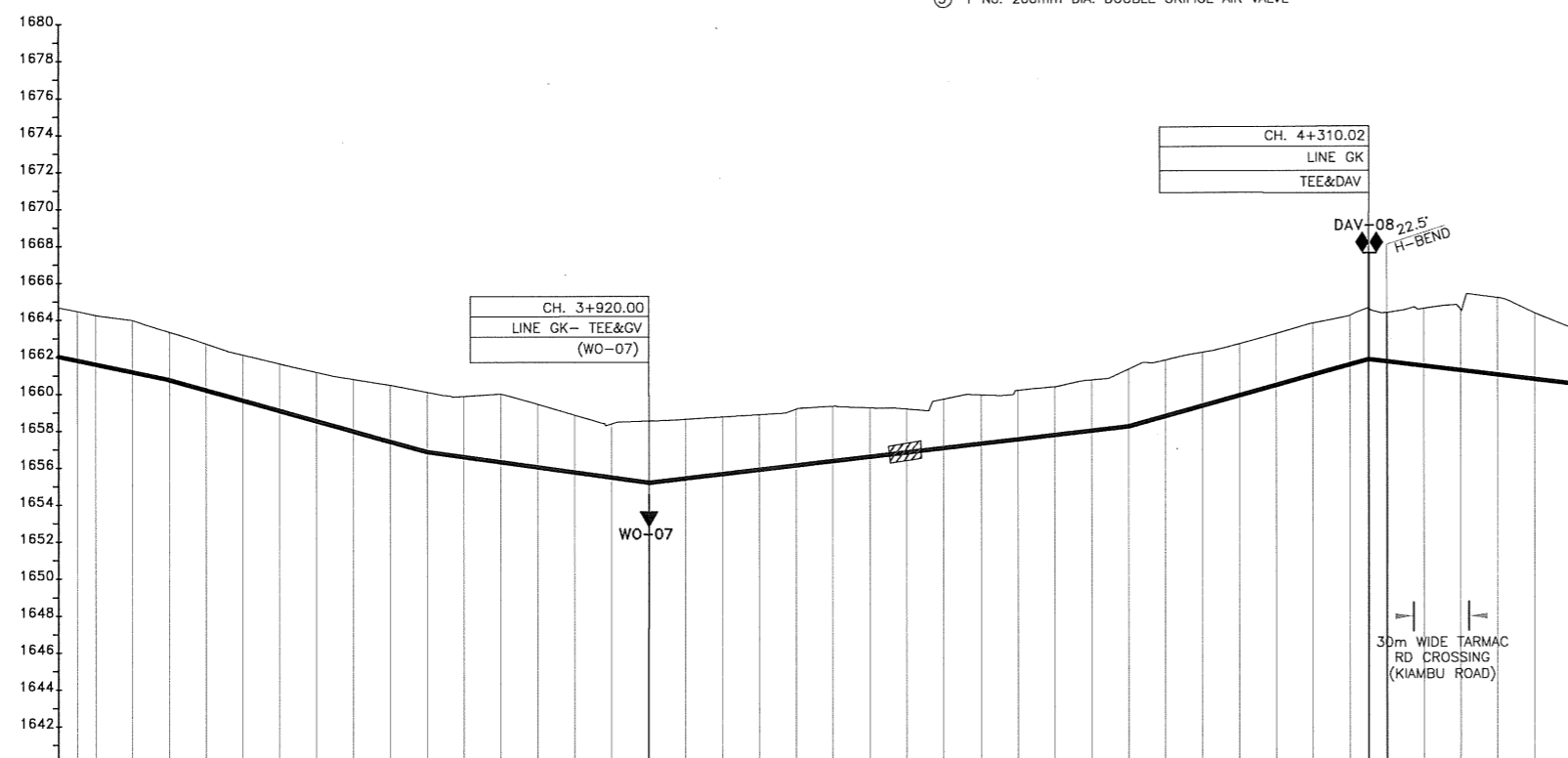


- DESCRIPTION**  
1 No. REQUIRED
- ① 2 Nos. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG
  - ② 1 No. 1400x250mm DIA. ALL FLANGED LEVEL INVERT TEE
  - ③ 1 No. 250mm DIA. ALL FLANGED GATE VALVE
  - ④ 1 No. 250mm DIA. FLANGE ADAPTOR
  - ⑤ 1 No. 250mm DIA. PLAIN ENDED PIPE 1.2m LONG
  - ⑥ 1 No. 250mm DIA. RANGER COUPLING
  - ⑦ 1 No. 250mm DIA. PN 16 HDPE PIPE WITH BUTT FUSION WELDED JOINTS, LENGTH TO BE DETERMINED ON SITE, TO AN OUTFALL STRUCTURE

- DESCRIPTION**  
1 No. REQUIRED
- ① 2 Nos. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 625mm FROM FLANGED END
  - ② 1 No. 1400x800mm DIA. ALL FLANGED SPECIAL TEE
  - ③ 1 No. 200mm DIA. SPECIAL PIPE 325mm LONG WITH FLANGE TO SUIT 800mm DIA. TEE ON ONE END AND NORMAL FLANGE ON THE OTHER END
  - ④ 1 No. 200mm DIA. ALL FLANGED GATE VALVE (ISOLATING VALVE)
  - ⑤ 1 No. 200mm DIA. DOUBLE ORIFICE AIR VALVE

**NOTE**  
W  
JOINTS: FIELD BUTT-WELDED JOINT FOR STEEL PIPE OR STANDARD PUSH-ON SPIGOT-SOCKET JOINT FOR DUCTILE IRON PIPES.

- NOTES:**
- CONTOUR LEVELS ARE IN METERS AT 1m INTERVALS
  - GRID VALUES ARE IN METERS AT 100 METER INTERVALS
  - ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT
- LEGEND:**
- PAVED ROAD
  - CONCRETE PAVED ROAD
  - MURRAM/EARTH ROAD
  - FENCE / HEDGE
  - CONTOURS, 1m INTERVAL
  - RIVER/STREAM
  - BUILDINGS
  - TEMPORARY STRUCTURE
  - MANHOLE/CHAMBER
  - GATE
  - DRAIN
  - EXISTING WATER MAIN
  - PROPOSED WATER MAIN
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) ANGLE INDICATED
  - TH1 TRIAL HOLE
  - CONCRETE SURROUND
  - PROPOSED CHAMBER
  - PROPOSED SURFACE BOX
  - TP10 TRAVERSE POINT & No.
  - GV GATE VALVE
  - WO WASH OUT
  - FH FIRE HYDRANT
  - WM WATER METER
  - DAV DOUBLE ORIFICE AIR VALVE
  - masl METRES ABOVE SEA LEVEL
  - 91.96 BENCHMARK WITH ELEVATION

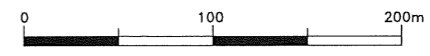


LIMIT OF PIPEWORK FOR LINE GK  
CH. 4+420.00  
LINE GK-WM, TEE&BV  
800mm DIA. OFFTAKE

**NOTE**  
- PROVIDE ANCHOR BLOCKS FOR GRADIENTS UPTO 1:10  
- FOR DETAILS AT CH. 4+420.00  
SEE DRG.No.M455/W-02B/W/GK/05 & DRG.No.M455/W-02B/W/GK/06

DATUM 1640masl	
TYPE AND SIZE OF PIPE	DN 1400 FERROUS PIPES
GEOLOGICAL CONDITION	RED SOIL UNDERLYING WITH ROCK (TO BE CONFIRMED)
EXISTING GROUND LEVEL (m)	1662.03, 1664.89, 1661.82, 1664.48, 1661.61, 1664.27, 1661.13, 1663.99, 1660.75, 1663.36, 1660.20, 1662.72, 1659.65, 1662.12, 1659.09, 1661.64, 1656.53, 1661.17, 1657.97, 1660.78, 1657.41, 1660.46, 1655.73, 1658.83, 1656.85, 1660.08, 1656.57, 1659.85, 1656.29, 1659.98, 1656.01, 1659.42, 1655.73, 1658.83, 1655.45, 1658.36, 1655.17, 1658.51, 1655.40, 1658.99, 1655.63, 1658.72, 1656.78, 1659.13, 1657.02, 1659.66, 1657.25, 1659.89, 1657.48, 1660.12, 1657.71, 1660.32, 1660.32, 1660.32, 1657.94, 1660.68, 1656.17, 1661.27, 1656.72, 1661.76, 1655.28, 1662.17, 1659.83, 1662.63, 1660.39, 1663.17, 1660.94, 1663.73, 1661.50, 1664.16, 1661.65, 1664.50, 1664.30, 1661.41, 1664.52, 1661.17, 1664.44, 1660.92, 1665.09, 1660.68, 1664.26, 1660.44, 1663.44
INVERT LEVELS (m)	1662.03, 1664.89, 1661.82, 1664.48, 1661.61, 1664.27, 1661.13, 1663.99, 1660.75, 1663.36, 1660.20, 1662.72, 1659.65, 1662.12, 1659.09, 1661.64, 1656.53, 1661.17, 1657.97, 1660.78, 1657.41, 1660.46, 1655.73, 1658.83, 1656.85, 1660.08, 1656.57, 1659.85, 1656.29, 1659.98, 1656.01, 1659.42, 1655.73, 1658.83, 1655.45, 1658.36, 1655.17, 1658.51, 1655.40, 1658.99, 1655.63, 1658.72, 1656.78, 1659.13, 1657.02, 1659.66, 1657.25, 1659.89, 1657.48, 1660.12, 1657.71, 1660.32, 1660.32, 1660.32, 1657.94, 1660.68, 1656.17, 1661.27, 1656.72, 1661.76, 1655.28, 1662.17, 1659.83, 1662.63, 1660.39, 1663.17, 1660.94, 1663.73, 1661.50, 1664.16, 1661.65, 1664.50, 1664.30, 1661.41, 1664.52, 1661.17, 1664.44, 1660.92, 1665.09, 1660.68, 1664.26, 1660.44, 1663.44
CHAINAGE (m)	3+600.00, 3+610.00, 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, 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
DEPTH OF INVERT (m)	2.65, 2.65, 2.65, 2.80, 2.59, 2.51, 2.47, 2.55, 2.64, 2.81, 3.05, 3.23, 3.29, 3.69, 3.41, 3.10, 2.91, 3.34, 3.19, 3.09, 2.88, 3.05, 2.97, 2.64, 2.34, 2.64, 2.64, 2.64, 2.61, 2.61, 2.74, 3.10, 3.04, 2.89, 2.79, 2.79, 2.79, 2.66, 2.64, 2.64, 3.11, 3.27, 4.17, 3.59, 3.00
SLOPE OF PIPE (1/n)	-1:47, -1:36, -1:72, 1:87, 1:36, -1:82
REFERENCE PEG NO.	TP 23, TP 24, TP 25

**LONGITUDINAL SECTION**



REVISIONS			
NO.	BY	DATE	APPROVED
	CHECKED		
	CHECKED		
	CHECKED		

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP MANGAT I.B. PATEL (MIBP) LIMITED**  
P.O BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

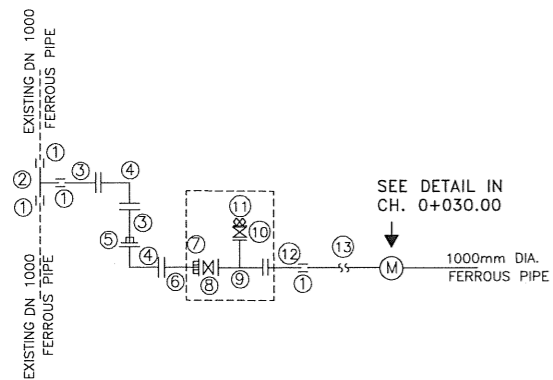
**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

**DRAWING TITLE:**  
GIGIRI-KARURA OUTER-RING TRUNK MAIN (LINE GK)  
PLAN & LONGITUDINAL SECTION  
(CH 3+600.00 - 4+420.00)  
SHEET 4 OF 6

Designed by: SWR Drawn by: SWR  
Checked by: J.M.K Approved by: C.R  
Scale: H- 1:4000, V- 1:400 (A3) Date: JUNE 2023  
DRG No. M455/W-02B/W/GK/04 REV. 0.

CH. 0+000  
LINE GK - TEE, LV-01& DAV-01

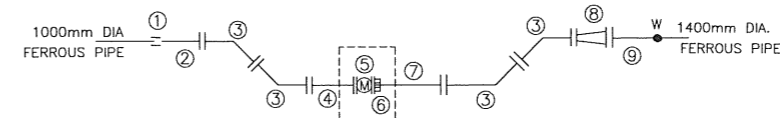


**DESCRIPTION**

**1No. REQUIRED**

- ① 4 Nos. 1000mm DIA STRAIGHT COUPLING
- ② 1 No. 1000x1000mm DIA. PLAIN ENDED TEE
- ③ 2 Nos. 1000mm DIA. FLANGED SPIGOT PIPE 6m LONG (CUT TO SUIT ON SITE)
- ④ 2 Nos. 1000mm DIA. ALL FLANGED 90° BEND
- ⑤ 1 No. 1000mm DIA. FLANGE ADAPTOR
- ⑥ 1 No. 1000mm DIA. ALL FLANGED PIPE 1.5m LONG WITH PUDDLE FLANGE 655mm FROM ONE END
- ⑦ 1 No. 1000mm DIA. DISMANTLING PIECE
- ⑧ 1 No. 1000mm DIA. ALL FLANGED BUTTERFLY VALVE
- ⑨ 1 No. 1000x200mm DIA. ALL FLANGED SPECIAL TEE
- ⑩ 1 No. 200mm DIA. ALL FLANGED GATE VALVE WITH OPERATION WHEEL
- ⑪ 1 No. 200mm DIA. DOUBLE ORIFICE AIR VALVE
- ⑫ 1 No. 1000mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 655mm FROM FLANGED END
- ⑬ 1 No. 1000mm PLAIN ENDED PIPE 15m LONG WITH COUPLINGS (CUT TO SUIT ON SITE)

CH. 0+030.00  
LINE GK - WM-01



**DESCRIPTION**

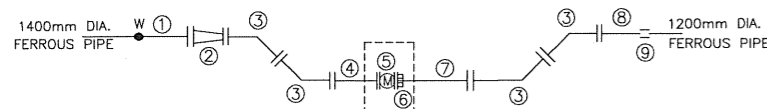
**1No. REQUIRED**

- ① 1 No. 1000mm DIA STRAIGHT COUPLING
- ② 1 No. 1000mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)
- ③ 4 Nos. 1000mm DIA. ALL FLANGED 45° BEND
- ④ 1 No. 1000mm DIA. ALL FLANGED PIPE 10m LONG WITH PUDDLE FLANGE AT 655mm FROM ONE END
- ⑤ 1 No. 1000mm DIA. ALL FLANGED ELECTROMAGNETIC WATER METER
- ⑥ 1 No. 1000mm DIA. DISMANTLING PIECE
- ⑦ 1 No. 1000mm DIA. ALL FLANGED PIPE 5m LONG WITH PUDDLE FLANGE AT 655mm FROM ONE END
- ⑧ 1 No. 1400x1000mm DIA. ALL FLANGED CONCENTRIC TAPER
- ⑨ 1 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)

**PART FITTING DETAILS FOR DRG No. M455/W-03/W/GK/01**

**NOTE**  
W  
JOINTS: FIELD BUTT-WELDED JOINT FOR STEEL PIPE OR STANDARD PUSH-ON SPIGOT-SOCKET JOINT FOR DUCTILE IRON PIPES.

CH. 4+420.00  
LINE GK - TEE, BV&WM  
OFF TAKE

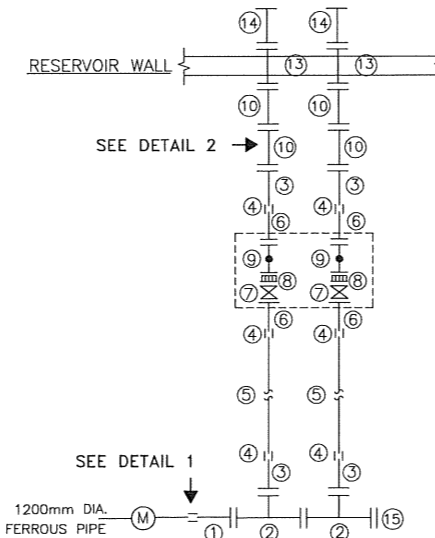


**DETAIL 1**

**DESCRIPTION**

**1No. REQUIRED**

- ① 1 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)
- ② 1 No. 1400x1200mm DIA. ALL FLANGED CONCENTRIC TAPER
- ③ 4 Nos. 1200mm DIA. ALL FLANGED 45° BEND
- ④ 1 No. 1200mm DIA. ALL FLANGED PIPE 12m LONG WITH PUDDLE FLANGE AT 645mm FROM ONE END
- ⑤ 1 No. 1200mm DIA. ALL FLANGED ELECTROMAGNETIC WATER METER
- ⑥ 1 No. 1200mm DIA. DISMANTLING PIECE
- ⑦ 1 No. 1200mm DIA. ALL FLANGED PIPE 6m LONG WITH PUDDLE FLANGE AT 645mm FROM ONE END
- ⑧ 1 No. 1200mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)
- ⑨ 1 No. 1200mm DIA STRAIGHT COUPLING



**PART FITTING DETAILS FOR DRG No. M455/W-02B/W/GK/04**

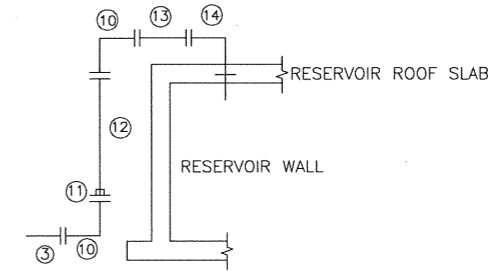
**DESCRIPTION**

**1 No. REQUIRED**

- ① 1 No. 1200mm DIA. FLANGED SPIGOT PIPE 1.5m LONG
- ② 2 Nos. 1200x800mm DIA. ALL FLANGED TEE
- ③ 4 Nos. 800mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)
- ④ 6 Nos. 800mm DIA STRAIGHT COUPLING (CUT TO SUIT ON SITE)
- ⑤ 2 Nos. 800mm PLAIN ENDED PIPE 15m LONG WITH COUPLINGS (CUT TO SUIT ON SITE)
- ⑥ 4 Nos. 800mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 880mm FROM FLANGED END
- ⑦ 2 Nos. 800mm DIA. ALL FLANGED BUTTERFLY VALVE
- ⑧ 2 Nos. 800mm DIA. DISMANTLING PIECE
- ⑨ 2 Nos. 800mm DIA. ALL FLANGED FLOW CONTROL VALVE WITH INBUILT ALTITUDE VALVE FUNCTION
- ⑩ 4 Nos. 800mm DIA. ALL FLANGED 90° BEND
- ⑪ 2 Nos. 800mm DIA. FLANGE ADAPTOR
- ⑫ 2 Nos. 800mm DIA. FLANGED SPIGOT PIPE 6m LONG (CUT TO SUIT ON SITE)
- ⑬ 2 Nos. 800mm DIA. ALL FLANGED PIPE 2m LONG
- ⑭ 2 Nos. 800mm DIA. FLANGED SPIGOT 90° BEND WITH PUDDLE FLANGE 450mm FROM PLAIN END
- ⑮ 1 No. 1200mm DIA. BLANK FLANGE

**NOTE**

-FOR INTAKE VALVE CHAMBER AND FITTINGS DETAILS AT CH. 4+420.00  
SEE DRG.No.M455/W-02B/W/GK/06



**DETAIL 2**

**NOTES:**

- 1. CONTOUR LEVELS ARE IN METERS AT 1m INTERVALS
- 2. GRID VALUES ARE IN METERS AT 100 METER INTERVALS
- 3. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

**LEGEND:**

- PAVED ROAD
- CONCRETE PAVED ROAD
- MURRAM/EARTH ROAD
- FENCE / HEDGE
- CONTOURS, 1m INTERVAL
- RIVER/STREAM
- BUILDINGS
- TEMPORARY STRUCTURE
- MANHOLE/CHAMBER
- GATE
- DRAIN
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- HORIZONTAL BEND (H) OR VERTICAL BEND (V) ANGLE INDICATED
- TRIAL HOLE
- CONCRETE SURROUND
- PROPOSED CHAMBER
- PROPOSED SURFACE BOX
- TP10 TRAVERSE POINT & No.
- GV GATE VALVE
- WO WASH OUT
- FH FIRE HYDRANT
- WM WATER METER
- DAV DOUBLE ORIFICE AIR VALVE
- masl METRES ABOVE SEA LEVEL
- 91.96 BENCHMARK WITH ELEVATION
- MD18

REVISIONS	SIGN	DATE	APPROVED
CHECKED			
CHECKED			
CHECKED			
CHECKED			

**CLIENT:**  
**THE CHIEF EXECUTIVE OFFICER**  
**ATHI WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
**JOINT VENTURE**  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artella@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

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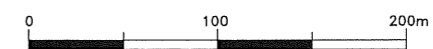
**PROJECT NAME:**  
**CKE1135- NAIROBI WATER AND SANITATION PROJECT**

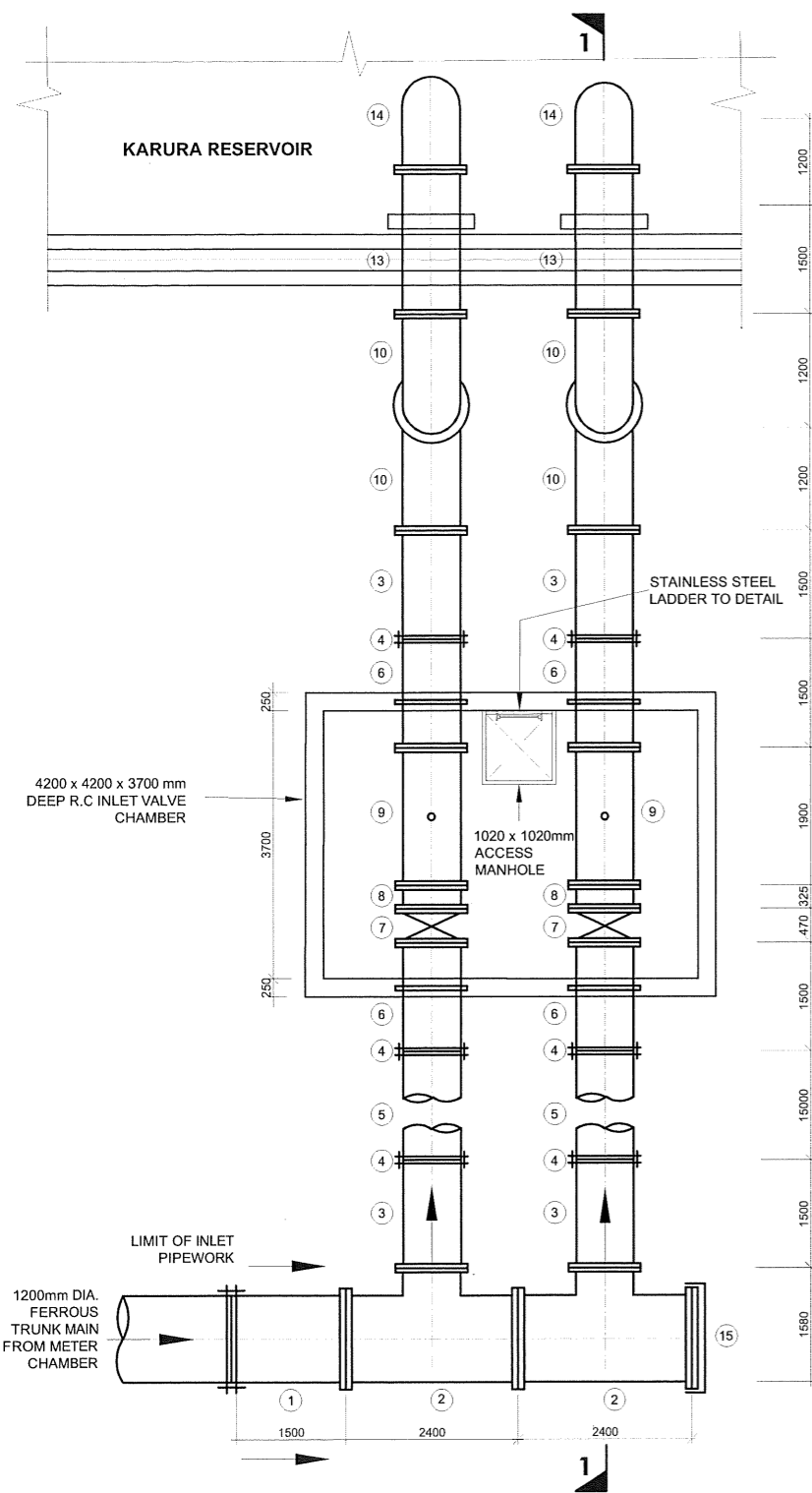
**CONTRACT TITLE:**  
**CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT**  
**BID No. AWWDA/AFD/NWSP/W-02B/2023**

**TRUNK MAIN GIGIRI KARURA PIPELINE**

**DRAWING TITLE:**  
**GIGIRI-KARURA OUTER-RING TRUNK MAIN (LINE GK)**  
**PLAN & LONGITUDINAL SECTION**  
**FITTINGS DETAILS**  
**SHEET 5 OF 6**

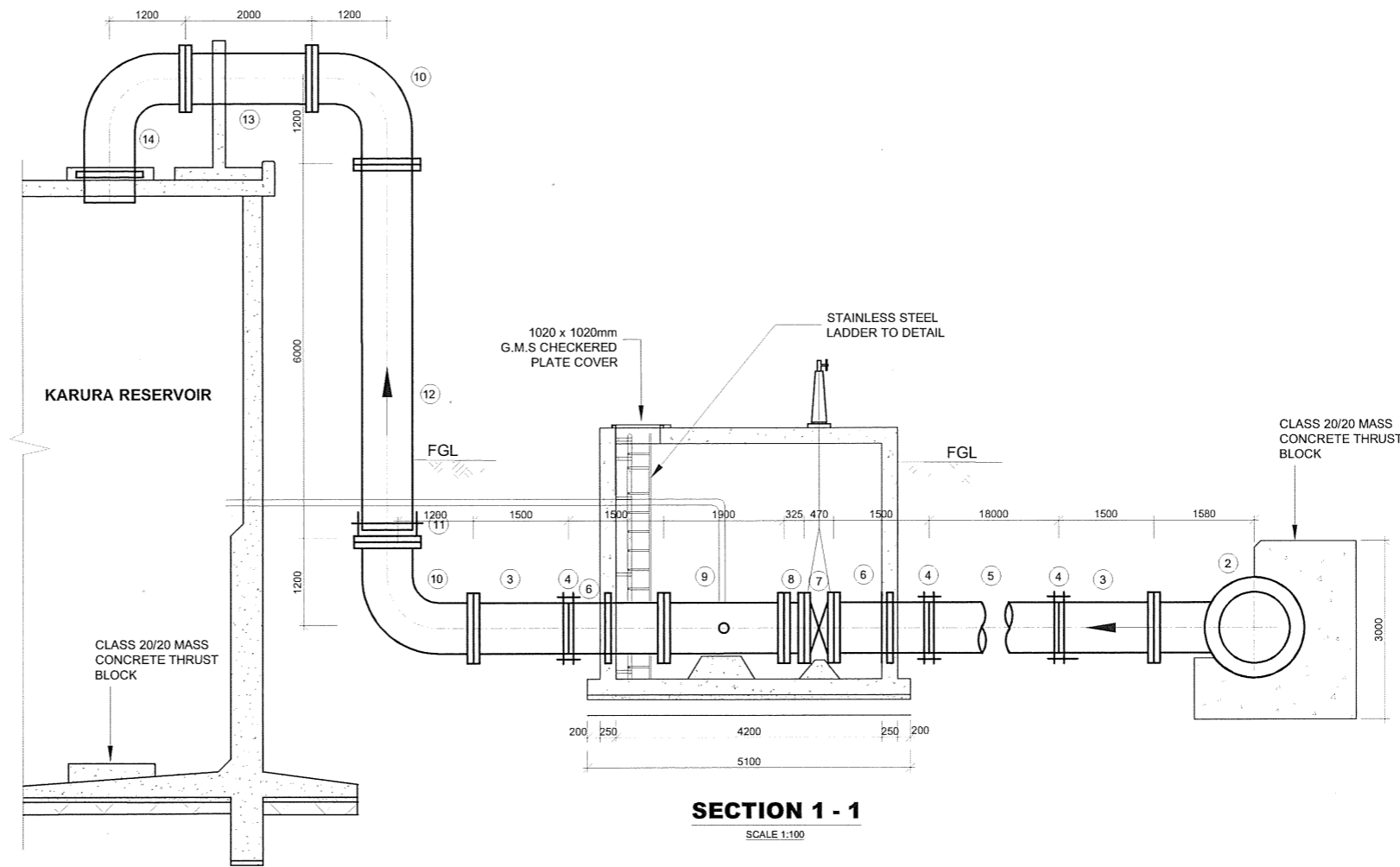
Designed by: SWR	Drawn by: SWR
Checked by: J.M.K	Approved by: C.R
Scale: H- 1:4000, V- 1:400 (A3)	Date: JUNE 2023
DRG No. M455/W-02B/W/GK/05	REV. 0





**INLET PIPEWORK DETAIL**  
SCALE 1:100

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
12	FLANGED SPIGOT PIPE (CUT TO SUIT ON SITE)	800	6000	2
13	ALL FLANGED PIPE	800	2000	2
14	FLANGED SPIGOT 90° SPECIAL BEND WITH PUDDLE FLANGE 450mm FROM PLAIN END	800	1200	2
15	BLANK FLANGE	1200	-	1



**SECTION 1 - 1**  
SCALE 1:100

**INLET PIPEWORK SCHEDULE  
(APPROVED LINED FERROUS PIPES AND FITTINGS)**

ITEM No.	DESCRIPTION	DIA. (mm)	LENGTH (mm)	QUANTITY (No.)
1	FLANGED SPIGOT PIPE (CUT TO SUIT ON SITE)	1200	1500	1
2	ALL FLANGED TEE	1200	800	2
3	FLANGED SPIGOT PIPE	800	1500	4
4	COUPLING	800	-	6
5	PLAIN ENDED PIPE WITH COUPLINGS (CUT TO SUIT ON SITE)	800	15000	2
6	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE AT 880mm FROM FLANGED END	800	1500	4
7	ALL FLANGED BUTTERFLY VALVE	800	470	2
8	ALL FLANGED DISMANTLING JOINT	800	325	2
9	ALL FLANGED FLOW CONTROL VALVE WITH INTEGRATED ALTITUDE VALVE FUNCTION	800	1900	2
10	ALL FLANGED 90° BEND	800	1200	4
11	FLANGE ADAPTOR	800	-	2

- NOTES:**
- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
  - FOR LADDER DETAILS, SEE DRG. No. M455/W-02B/SD/06
  - FOR COVER DETAILS, SEE DRG. No. M455/W-02B/SD/08
  - ALL REINFORCED CONCRETE IN CLASS 25/20 UNLESS OTHERWISE STATED
  - ALL EXPOSED CONCRETE EDGES HAVE A 25mmX25mm CHAMFER
  - ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)
  - PRESSURE RATING FOR ALL WASHOUT PIPEWORK AND FITTINGS CORRESPOND TO THE PRESSURE RATING OF THE MAIN PIPELINE
  - GATE VALVES HAVE IN-BUILT SOLATING VALVES

REVISIONS				SIGN	DATE	APPROVED

CLIENT:  
**THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT  
AGENCY**  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

CONSULTING ENGINEERS:  
JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP MANGAT I.B. PATEL (MIBP) LIMITED**  
P.O. BOX 48874, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710800

PROJECT NAME:  
**CKE1135- NAIROBI WATER AND SANITATION  
PROJECT**

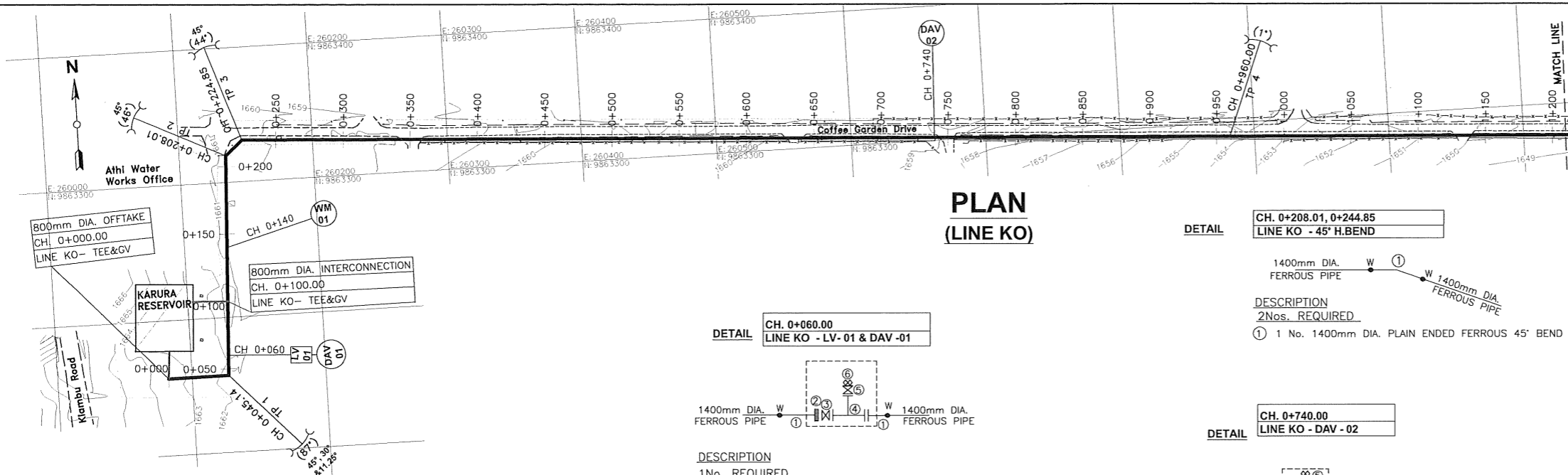
CONTRACT TITLE:  
**CONSTRUCTION WORKS FOR  
GIGIRI - KARURA - OUTER RING ROAD  
TRANSMISSION PIPELINE AND NORTH NAIROBI  
WATER AND SEWERAGE PROJECT**  
BID No. AWWDA/AFD/NWSP/W-02B/2023

**TRUNK MAIN  
GIGIRI KARURA OUTER-RING**

DRAWING TITLE:  
**INTAKE VALVE CHAMBER &  
FITTINGS DETAILS**  
**SHEET 6 OF 6**

Designed by: J.M.K      Drawn by: S.W.R  
Checked by: J.M.K      Approved by: C.R  
Scale: AS SHOWN      Date: JUNE 2023

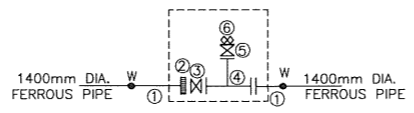
**KARURA - OUTERING ROAD PIPELINE  
SECTION (LINE KO)**



**PLAN  
(LINE KO)**

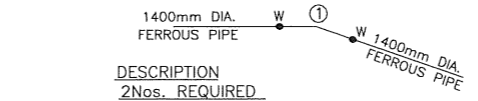
- NOTES:**
- CONTOUR LEVELS ARE IN METERS AT 1m INTERVALS
  - GRID VALUES ARE IN METERS AT 100 METER INTERVALS
  - ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT
- LEGEND:**
- PAVED ROAD
  - CONCRETE PAVED ROAD
  - MURRAM/EARTH ROAD
  - FENCE / HEDGE
  - CONTOURS, 1m INTERVAL
  - RIVER/STREAM
  - BUILDINGS
  - TEMPORARY STRUCTURE
  - MANHOLE/CHAMBER
  - GATE
  - DRAIN
  - EXISTING WATER MAIN
  - PROPOSED WATER MAIN
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) ANGLE INDICATED
  - TH1 TRIAL HOLE
  - CONCRETE SURROUND
  - PROPOSED CHAMBER
  - PROPOSED SURFACE BOX
  - TP10 TRAVERSE POINT & No.
  - GV GATE VALVE
  - WO WASH OUT
  - FH FIRE HYDRANT
  - WM WATER METER
  - DAV DOUBLE ORIFICE AIR VALVE
  - masl METRES ABOVE SEA LEVEL
  - 91.96 MD18 BENCHMARK WITH ELEVATION

**DETAIL**  
CH. 0+060.00  
LINE KO - LV-01 & DAV-01



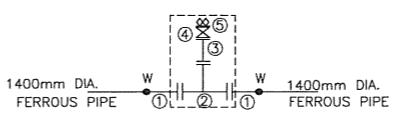
- DESCRIPTION**  
1No. REQUIRED
- 2 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 655mm FROM THE FLANGED END
  - 1 No. 1400mm DIA DISMANTLING PIECE
  - 1 No. 1400mm DIA. ALL FLANGED BUTTERFLY VALVE WITH IN-BUILT BYPASS AND GEAR MECHANISM
  - 1 No. 1400x200mm DIA. ALL FLANGED TEE
  - 1 No. 200mm DIA. ALL FLANGED GATE VALVE WITH OPERATION WHEEL
  - 1 No. 200mm DIA. DOUBLE ORIFICE AIR VALVE

**DETAIL**  
CH. 0+208.01, 0+244.85  
LINE KO - 45° H.BEND



- DESCRIPTION**  
2Nos. REQUIRED
- 1 No. 1400mm DIA. PLAIN ENDED FERROUS 45° BEND

**DETAIL**  
CH. 0+740.00  
LINE KO - DAV - 02

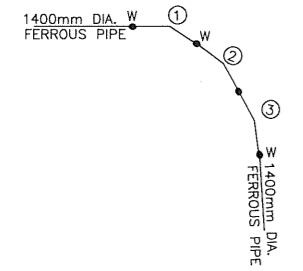


- DESCRIPTION**  
1No. REQUIRED
- 2 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 625mm FROM FLANGED END
  - 1 No. 1400x800mm DIA. ALL FLANGED SPECIAL TEE
  - 1 No. 200mm DIA. SPECIAL PIPE 325mm LONG WITH FLANGE TO SUIT 800mm DIA. TEE ON ONE END AND NORMAL FLANGE ON THE OTHER END
  - 1 No. 200mm DIA. ALL FLANGED GATE VALVE (ISOLATING VALVE)
  - 1 No. 200mm DIA. DOUBLE ORIFICE AIR VALVE

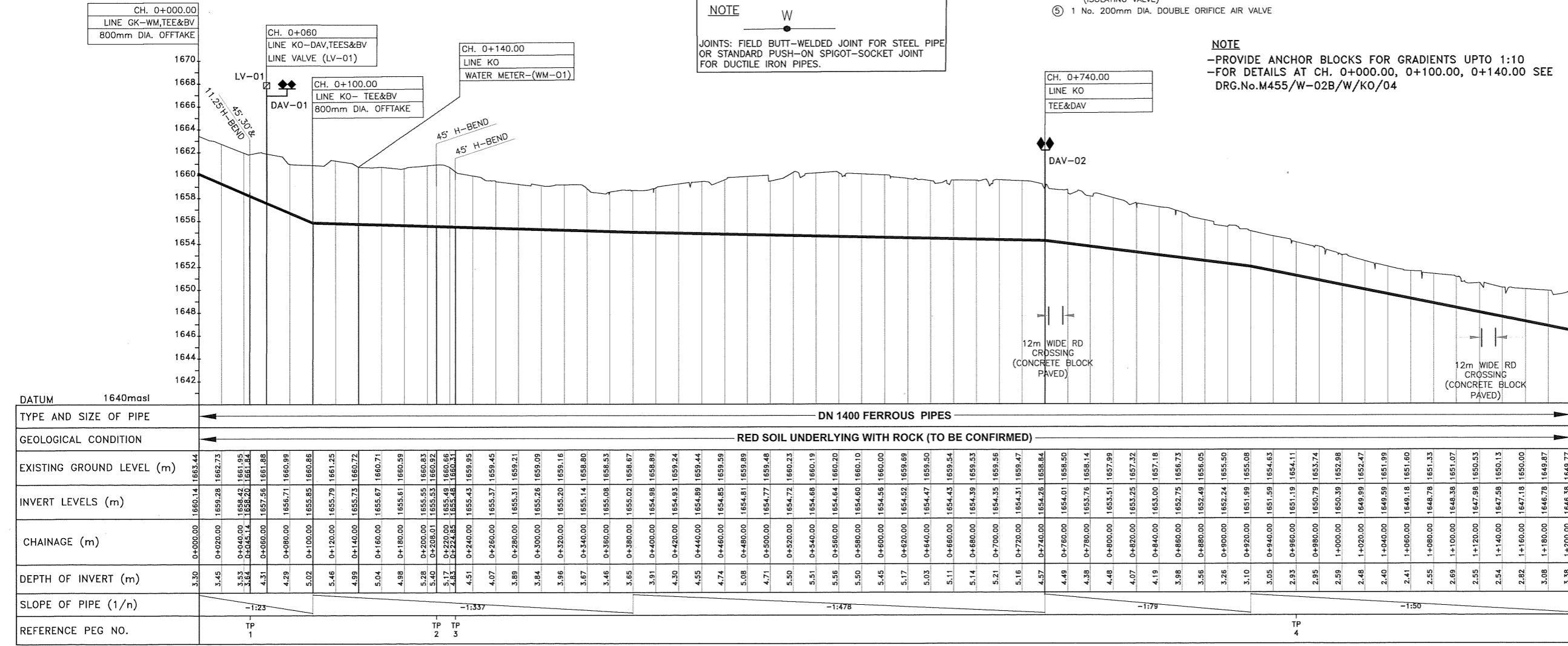
**NOTE**  
JOINTS: FIELD BUTT-WELDED JOINT FOR STEEL PIPE OR STANDARD PUSH-ON SPIGOT-SOCKET JOINT FOR DUCTILE IRON PIPES.

**NOTE**  
-PROVIDE ANCHOR BLOCKS FOR GRADIENTS UPTO 1:10  
-FOR DETAILS AT CH. 0+000.00, 0+100.00, 0+140.00 SEE DRG.No.M455/W-02B/W/KO/04

**DETAIL**  
CH. 0+045.14  
LINE KO - 45°, 30° & 11.25° H.BEND



- DESCRIPTION**  
1No. REQUIRED
- 1 No. 1400mm DIA. PLAIN ENDED FERROUS 45° BEND
  - 1 No. 1400mm DIA. PLAIN ENDED FERROUS 30° BEND
  - 1 No. 1400mm DIA. PLAIN ENDED FERROUS 11.25° BEND



**LONGITUDINAL SECTION**

REVISIONS	SIGN	DATE	APPROVED

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

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TEL: +254-2-2710500

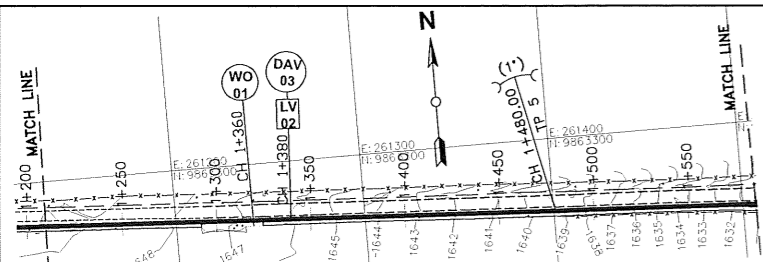
**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

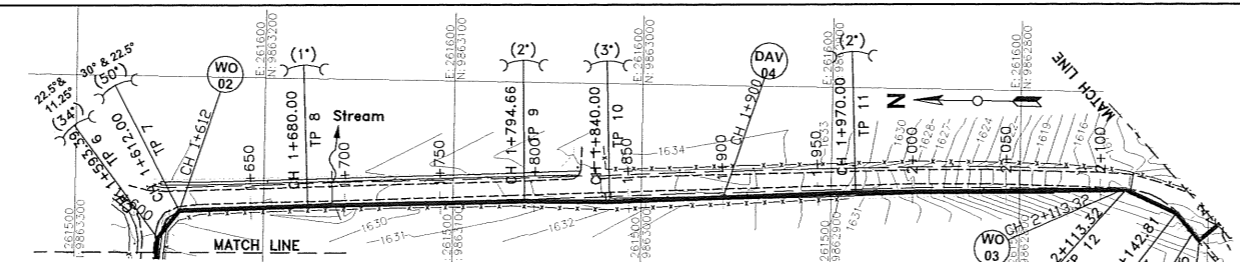
**DRAWING TITLE:**  
TRUNK MAIN  
GIGIRI KARURA OUTER-RING  
KARURA-OUTER-RING ROAD PIPELINE SECTION (LINE KO)  
PLAN & LONGITUDINAL SECTION  
(CH 0+000.00 - 1+200.00)  
SHEET 1 OF 4

Designed by: SWR Drawn by: SWR  
Checked by: J.M.K Approved by: C.R

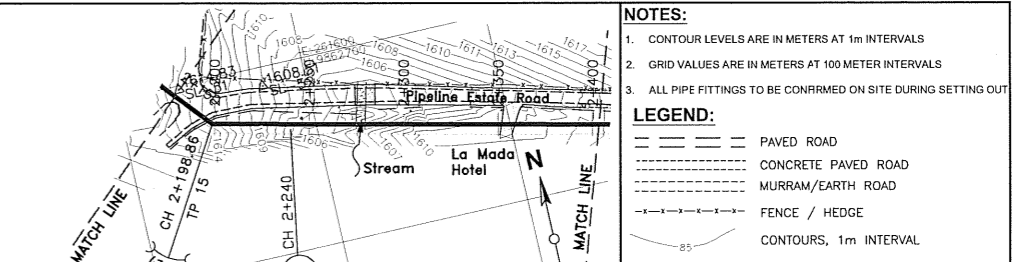
Scale: H- 1:4000, V- 1:400 (A3) Date: JUNE 2023  
DRG No. M455/W-02B/W/KO/01 REV. 0



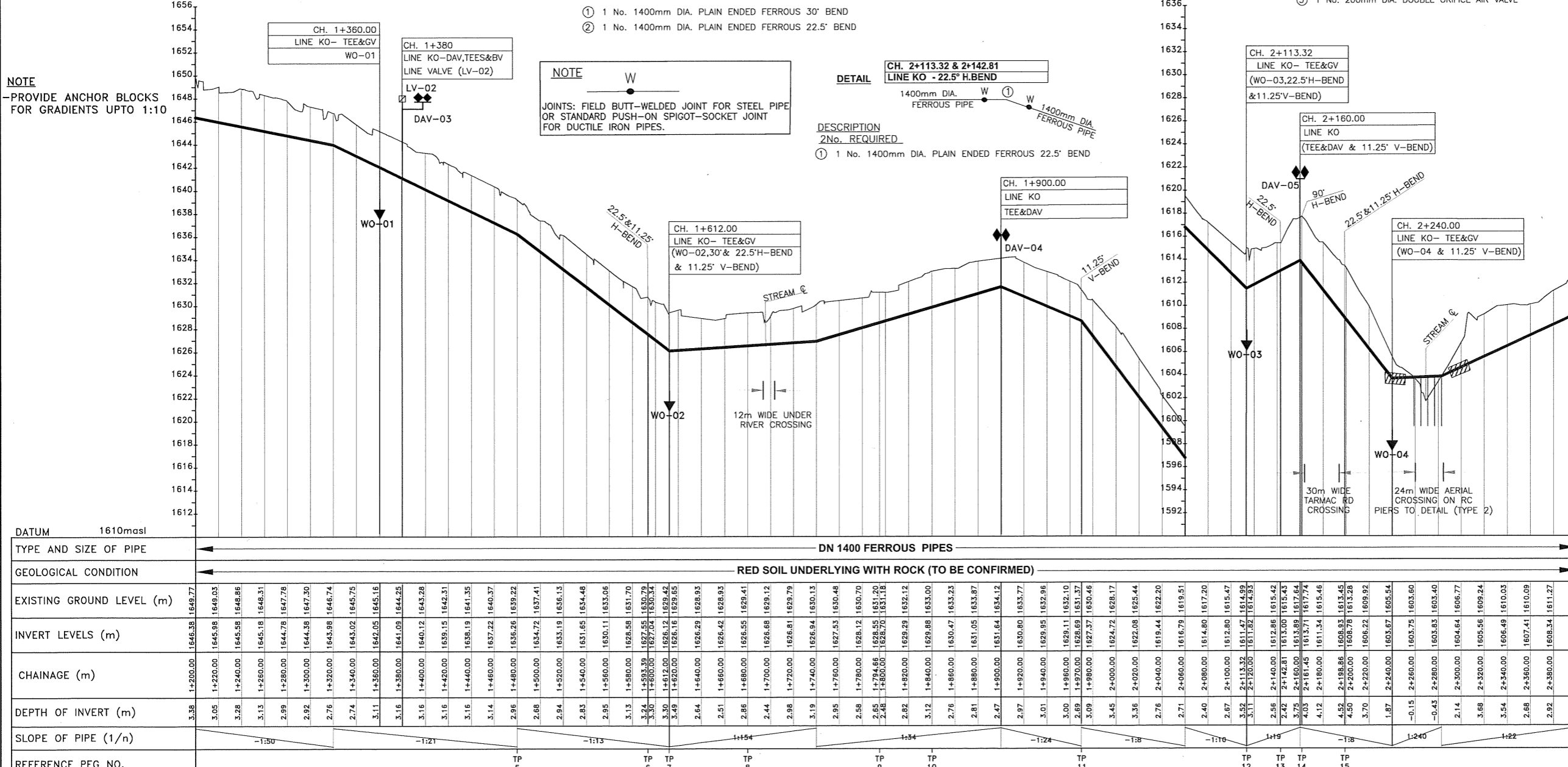
- DETAIL** CH. 1+360.00, 1+612.00, 2+113.32 & 2+240.00  
LINE KO - WO - 01, 02, 03 & 04
- DESCRIPTION**  
1No. REQUIRED
- ① 2 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG
  - ② 1 No. 1400x250mm DIA. ALL FLANGED LEVEL INVERT TEE
  - ③ 1 No. 250mm DIA. ALL FLANGED GATE VALVE
  - ④ 1 No. 250mm DIA. FLANGE ADAPTOR
  - ⑤ 1 No. 250mm DIA. PLAIN ENDED PIPE 1.2m LONG
  - ⑥ 1 No. 250mm DIA. RANGER COUPLING
  - ⑦ 1 No. 250mm DIA. PN16 HDPE PIPE WITH BUTT FUSION WELDED JOINTS, LENGTH TO BE DETERMINED ON SITE, TO AN OUTFALL STRUCTURE



- PLAN (LINE KO)**
- DETAIL** CH. 1+593.39, 2+198.86  
LINE KO - 22.5° & 11.25° H.BEND
- DESCRIPTION**  
2Nos. REQUIRED
- ① 1 No. 1400mm DIA. PLAIN ENDED FERROUS 22.5° BEND
  - ② 1 No. 1400mm DIA. PLAIN ENDED FERROUS 11.25° BEND
- DETAIL** CH. 2+161.45  
LINE KO - 90° H.BEND
- DESCRIPTION**  
1No. REQUIRED
- ① 1 No. 1400mm DIA. PLAIN ENDED FERROUS 90° BEND



- DETAIL** CH. 1+900.00 & 2+160.00  
LINE KO - DAV - 04 & 05
- DESCRIPTION**  
2No. REQUIRED
- ① 2 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 625mm FROM FLANGED END
  - ② 1 No. 1400x800mm DIA. ALL FLANGED SPECIAL TEE
  - ③ 1 No. 200mm DIA. SPECIAL PIPE 325mm LONG WITH FLANGE TO SUIT 800mm DIA. TEE ON ONE END AND NORMAL FLANGE ON THE OTHER END
  - ④ 1 No. 200mm DIA. ALL FLANGED GATE VALVE (ISOLATING VALVE)
  - ⑤ 1 No. 200mm DIA. DOUBLE ORIFICE AIR VALVE



**NOTE**  
-PROVIDE ANCHOR BLOCKS FOR GRADIENTS UPTO 1:10

**NOTE**  
W  
JOINTS: FIELD BUTT-WELDED JOINT FOR STEEL PIPE OR STANDARD PUSH-ON SPIGOT-SOCKET JOINT FOR DUCTILE IRON PIPES.

- NOTES:**
- 1. CONTOUR LEVELS ARE IN METERS AT 1m INTERVALS
  - 2. GRID VALUES ARE IN METERS AT 100 METER INTERVALS
  - 3. ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

- LEGEND:**
- PAVED ROAD
  - CONCRETE PAVED ROAD
  - MURRAM/EARTH ROAD
  - FENCE / HEDGE
  - CONTOURS, 1m INTERVAL
  - RIVER/STREAM
  - BUILDINGS
  - TEMPORARY STRUCTURE
  - MANHOLE/CHAMBER
  - GATE
  - DRAIN
  - EXISTING WATER MAIN
  - PROPOSED WATER MAIN
  - HORIZONTAL BEND (H) OR VERTICAL BEND (V) ANGLE INDICATED
  - TH1 TRIAL HOLE
  - CONCRETE SURROUND
  - PROPOSED CHAMBER
  - PROPOSED SURFACE BOX
  - TP10 TRAVERSE POINT & No.
  - GV GATE VALVE
  - WO WASH OUT
  - FH FIRE HYDRANT
  - WM WATER METER
  - DAV DOUBLE ORIFICE AIR VALVE
  - masl METRES ABOVE SEA LEVEL
  - 91.96 BENCHMARK WITH ELEVATION
  - MD18

REVISIONS			
NO.	BY	DATE	APPROVED
	CHECKED		
	BY		
	CHECKED		
	BY		
	CHECKED		

**CLIENT:**

**THE CHIEF EXECUTIVE OFFICER**  
**ATHI WATER WORKS DEVELOPMENT AGENCY**

P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE

**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP MANGAT I.B.PATEL (MIBP) LIMITED**  
P.O BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

**PROJECT NAME:**  
**CKE1135- NAIROBI WATER AND SANITATION PROJECT**

**CONTRACT TITLE:**  
**CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT**  
**BID No. AWWDA/AFD/NWSP/W-02B/2023**

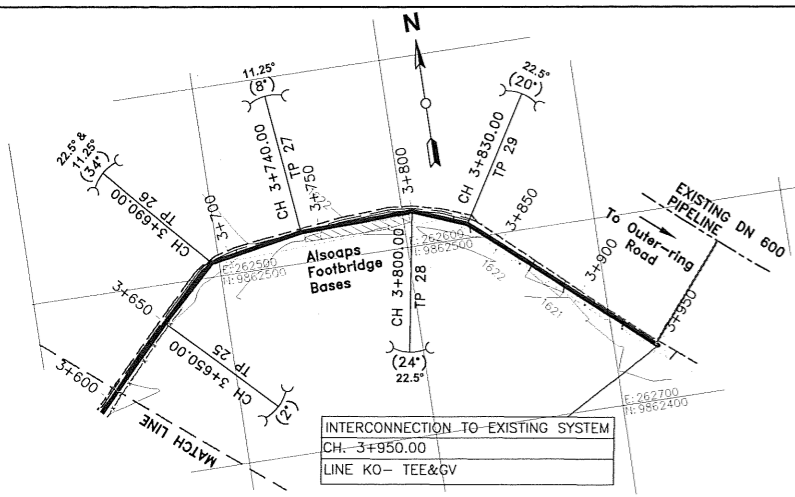
**DRAWING TITLE:**  
**KARURA-OUTER-RING ROAD PIPELINE SECTION (LINE KO) PLAN & LONGITUDINAL SECTION (CH 1+200.00 - 2+400.00) SHEET 2 OF 4**

Designed by: SWR Drawn by: SWR  
Checked by: J.M.K Approved by: C.R  
Scale: H: 1:4000, V: 1:400 (A3) Date: JUNE 2023

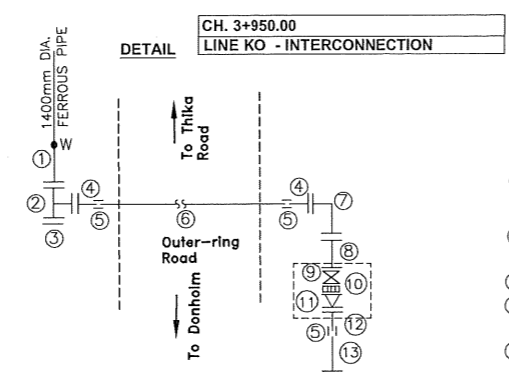
DRG No. M455/W-02B/W/KO/02 REV. 0

**LONGITUDINAL SECTION**



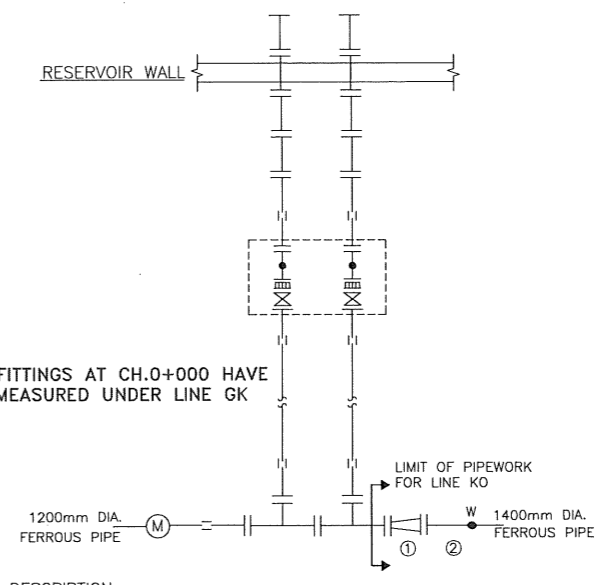


**PLAN  
(LINE KO)**



- DESCRIPTION**  
1No. REQUIRED
- 1 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG
  - 1 No. 1400x600mm DIA. ALL FLANGED TEE
  - 1 No. 1400mm DIA. BLANK FLANGE
  - 3 No. 600mm DIA. FLANGED SPIGOT PIPE 5m LONG (CUT TO SUIT ON SITE)
  - 5 No. 600mm DIA. STRAIGHT COUPLING
  - 1 No. 600mm PLAIN ENDED PIPE 60m LONG WITH COUPLINGS (CUT TO SUIT ON SITE)
  - 1 No. 600mm DIA. ALL FLANGED 90° BEND
  - 1 No. 600mm DIA. ALL FLANGED PIPE 1.5m LONG WITH PUDDLE FLANGE 640mm FROM ONE END
  - 1 No. 600mm DIA. ALL FLANGED BUTTERFLY VALVE
  - 2 No. 600mm DIA. DISMANTLING PIECE
  - 1 No. 600mm DIA. ALL FLANGED CHECK VALVE (NON RETURN VALVE)
  - 1 No. 600mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 640mm FROM SPIGOT END
  - 3 No. 600mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)
  - 4 No. 600mm DIA. ALL FLANGED 45° BEND
  - 1 No. 600mm DIA. ALL FLANGED PIPE 6m LONG WITH PUDDLE FLANGE 610mm FROM ONE END
  - 1 No. 600mm DIA. ALL FLANGED ELECTROMAGNETIC WATER METER
  - 1 No. 600mm DIA. ALL FLANGED PIPE 3m LONG WITH PUDDLE FLANGE 610mm FROM ONE END
  - 1 No. 600mm DIA. ALL FLANGED PIPE 1.5m LONG
  - 2 No. 600x600mm DIA. ALL FLANGED TEE
  - 1 No. 600mm DIA. BLANK FLANGE
  - 1 No. 600mm DIA. FLANGE ADAPTOR

**CH. 0+000.00  
LINE KO - OFFTAKE**

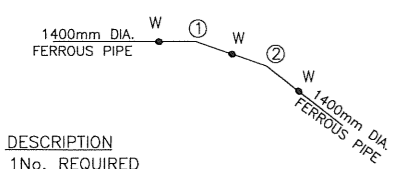


**NOTE**  
-THE FITTINGS AT CH.0+000 HAVE BEEN MEASURED UNDER LINE GK

- DESCRIPTION**  
1No. REQUIRED
- 1 No. 1400x1200mm DIA. ALL FLANGED CONCENTRIC TAPER
  - 1 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)

**PART FITTING DETAILS FOR DRG No. M455/W-02B/W/KO/01**

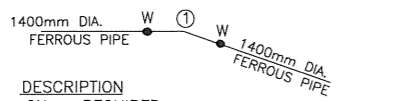
**CH. 3+690.00  
LINE KO - 22.5° & 11.25° H.BEND**



- DESCRIPTION**  
1No. REQUIRED
- 1 No. 1400mm DIA. PLAIN ENDED FERROUS 22.5° BEND
  - 1 No. 1400mm DIA. PLAIN ENDED FERROUS 11.25° BEND

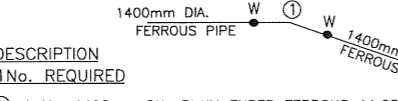
**NOTE**  
JOINTS: FIELD BUTT-WELDED JOINT FOR STEEL PIPE OR STANDARD PUSH-ON SPIGOT-SOCKET JOINT FOR DUCTILE IRON PIPES.

**CH. 3+800.00, 3+830.00  
LINE KO - 22.5° H.BEND**



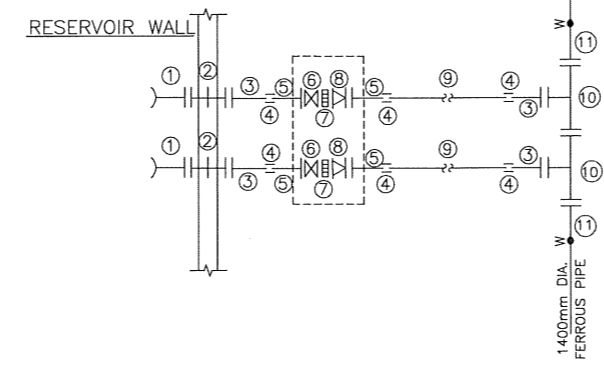
- DESCRIPTION**  
2Nos. REQUIRED
- 1 No. 1400mm DIA. PLAIN ENDED FERROUS 22.5° BEND

**CH. 3+740.00  
LINE KO - 11.25° H.BEND**



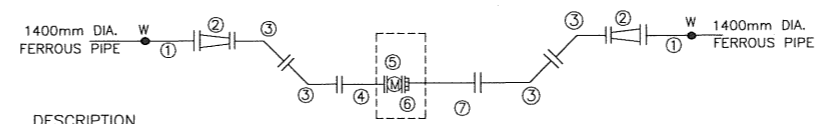
- DESCRIPTION**  
1No. REQUIRED
- 1 No. 1400mm DIA. PLAIN ENDED FERROUS 11.25° BEND

**CH. 0+100.00  
LINE KO - INTERCONNECTION**

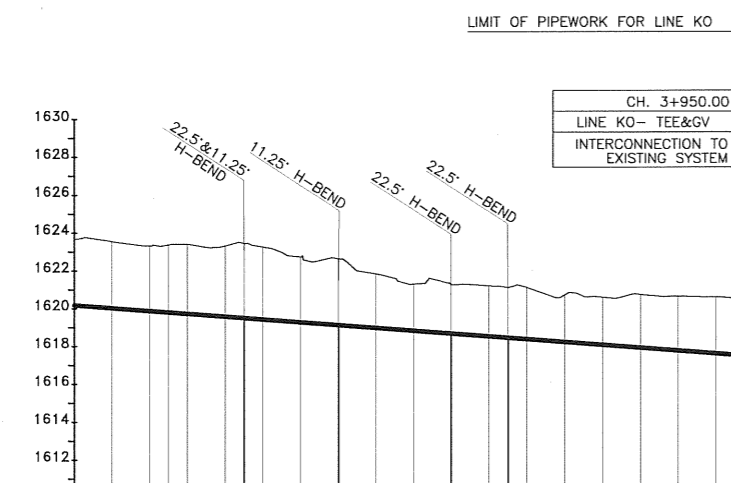


- DESCRIPTION**  
1No. REQUIRED
- 2 No. 800mm DIA. SPECIAL FLANGED BELLMOUTH
  - 2 No. 800mm DIA. ALL FLANGED PIPE 1.5m LONG WITH PUDDLE FLANGE 750mm FROM ONE END
  - 4 No. 800mm DIA. FLANGED SPIGOT PIPE 6m LONG (CUT TO SUIT ON SITE)
  - 6 No. 800mm DIA STRAIGHT COUPLING
  - 4 No. 800mm DIA. FLANGED SPIGOT PIPE 1.5m LONG WITH PUDDLE FLANGE 640mm FROM FLANGED END
  - 2 No. 800mm DIA. ALL FLANGED BUTTERFLY VALVE
  - 2 No. 800mm DIA. DISMANTLING PIECE
  - 2 No. 800mm DIA. ALL FLANGED CHECK VALVE (NON RETURN VALVE)
  - 2 No. 800mm PLAIN ENDED PIPE 15m LONG WITH COUPLINGS (CUT TO SUIT ON SITE)
  - 2 No. 1400x800mm DIA. ALL FLANGED TEE
  - 2 No. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG

**CH. 0+140.00  
LINE KO - WM-01**



- DESCRIPTION**  
1No. REQUIRED
- 2 Nos. 1400mm DIA. FLANGED SPIGOT PIPE 1.5m LONG (CUT TO SUIT ON SITE)
  - 2 No. 1400x1200mm DIA. ALL FLANGED CONCENTRIC TAPER
  - 4 Nos. 1200mm DIA. ALL FLANGED 45° BEND
  - 1 No. 1200mm DIA. ALL FLANGED PIPE 12m LONG WITH PUDDLE FLANGE AT 645mm FROM ONE END
  - 1 No. 1200mm DIA. ALL FLANGED ELECTROMAGNETIC WATER METER
  - 1 No. 1200mm DIA. DISMANTLING PIECE
  - 1 No. 1200mm DIA. ALL FLANGED PIPE 6m LONG WITH PUDDLE FLANGE AT 645mm FROM ONE END



DATUM	1610masl																					
TYPE AND SIZE OF PIPE	DN 1400 FERROUS PIPES																					
GEOLOGICAL CONDITION	RED SOIL UNDERLYING WITH ROCK (TO BE CONFIRMED)																					
EXISTING GROUND LEVEL (m)	1623.68	1623.56	1623.32	1623.38	1623.41	1623.31	1623.43	1623.26	1622.73	1622.62	1621.82	1621.30	1621.25	1621.19	1621.10	1620.71	1620.58	1620.72	1620.62	1620.60	1620.54	
INVERT LEVELS (m)	1620.19	1620.04	1619.89	1619.81	1619.74	1619.56	1619.51	1619.43	1619.28	1619.13	1618.98	1618.83	1618.67	1618.52	1618.45	1618.37	1618.22	1618.07	1617.91	1617.76	1617.61	1617.55
CHAINAGE (m)	3+600.00	3+620.00	3+640.00	3+650.00	3+660.00	3+680.00	3+690.00	3+700.00	3+720.00	3+740.00	3+760.00	3+780.00	3+800.00	3+820.00	3+830.00	3+840.00	3+860.00	3+880.00	3+900.00	3+920.00	3+940.00	3+950.00
DEPTH OF INVERT (m)	3.49	3.51	3.43	3.56	3.67	3.73	3.82	3.82	3.45	3.50	2.84	2.47	2.58	2.66	2.65	2.73	2.49	2.51	2.81	2.86	2.99	3.01
SLOPE OF PIPE (1/n)	-1:132																					
REFERENCE PEG NO.						TP 25	TP 26		TP 27					TP 28	TP 29							

**LONGITUDINAL SECTION**

**NOTES:**

- CONTOUR LEVELS ARE IN METERS AT 1m INTERVALS
- GRID VALUES ARE IN METERS AT 100 METER INTERVALS
- ALL PIPE FITTINGS TO BE CONFIRMED ON SITE DURING SETTING OUT

**LEGEND:**

- PAVED ROAD
- CONCRETE PAVED ROAD
- MURRAM/EARTH ROAD
- FENCE / HEDGE
- CONTOURS, 1m INTERVAL
- RIVER/STREAM
- BUILDINGS
- TEMPORARY STRUCTURE
- MANHOLE/CHAMBER
- GATE
- DRAIN
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- HORIZONTAL BEND (H) OR VERTICAL BEND (V) ANGLE INDICATED
- TRIAL HOLE
- CONCRETE SURROUND
- PROPOSED CHAMBER
- PROPOSED SURFACE BOX
- TP10 TRAVERSE POINT & No.
- GV GATE VALVE
- WO WASH OUT
- FH FIRE HYDRANT
- WM WATER METER
- DAV DOUBLE ORIFICE AIR VALVE
- masl METRES ABOVE SEA LEVEL
- 91.96 BENCHMARK WITH ELEVATION
- MD18

REVISIONS	SIGN	DATE	APPROVED

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

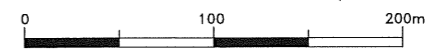
**MIBP MANGAT I.B. PATEL (MIBP) LIMITED**  
P.O. BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

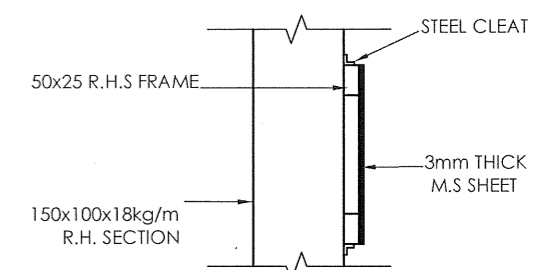
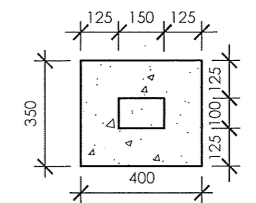
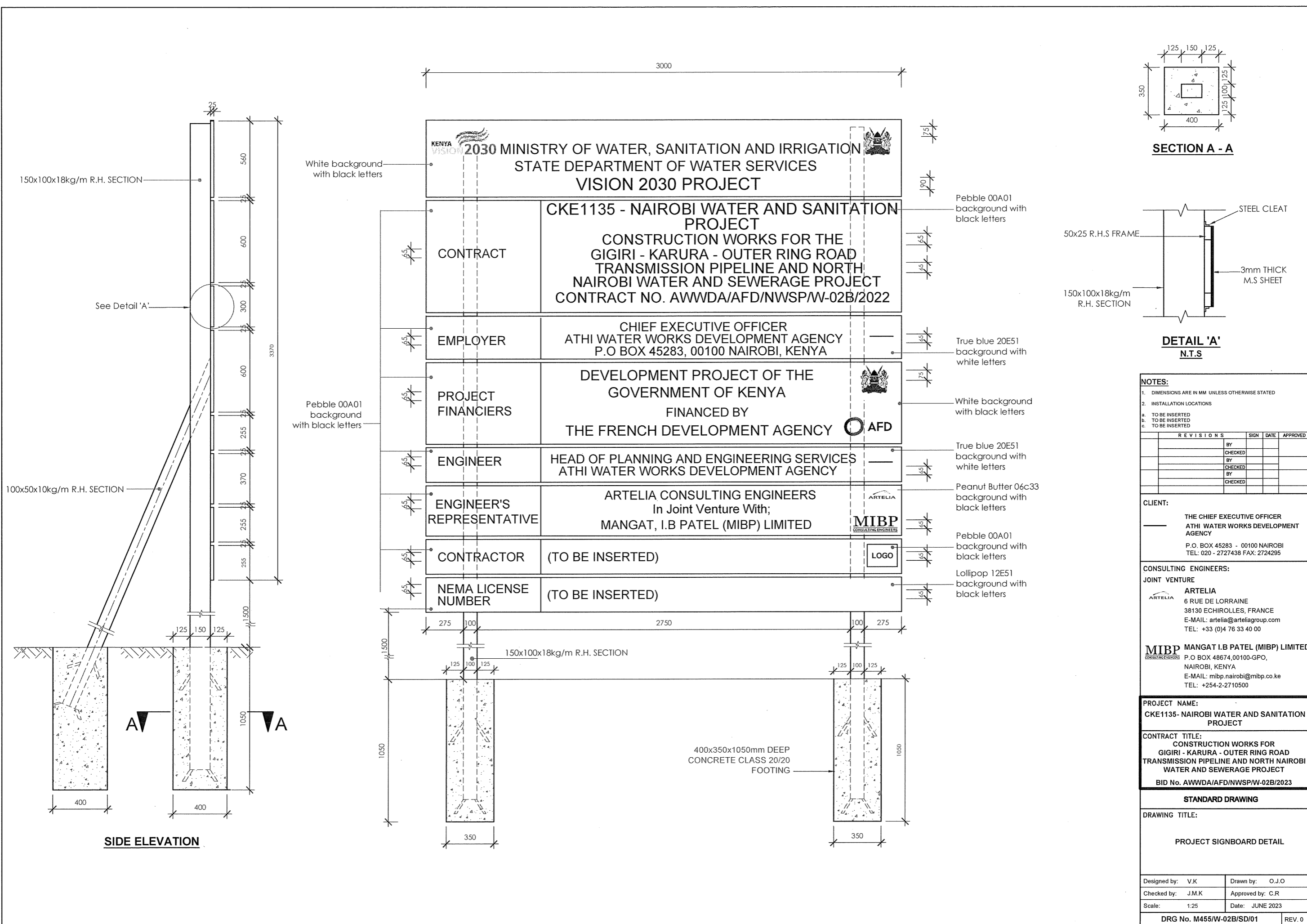
**DRAWING TITLE:**  
KARURA-OUTER-RING ROAD PIPELINE SECTION (LINE KO)  
PLAN & LONGITUDINAL SECTION  
(CH 3+600.00 - 3+950.00)  
SHEET 4 OF 4

Designed by: SWR      Drawn by: SWR  
Checked by: J.M.K      Approved by: C.R  
Scale: H- 1:4000, V- 1:400 (A3)      Date: JUNE 2023  
DRG No. M455/W-02B/W/KO/04      REV. 0





# **STANDARD DRAWINGS**



**NOTES:**  
 1. DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED  
 2. INSTALLATION LOCATIONS  
 a. TO BE INSERTED  
 b. TO BE INSERTED  
 c. TO BE INSERTED

R E V I S I O N S				SIGN	DATE	APPROVED
	BY	CHECKED				
	BY	CHECKED				
	BY	CHECKED				
	BY	CHECKED				

**CLIENT:**  
 THE CHIEF EXECUTIVE OFFICER  
 ATHI WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 45283 - 00100 NAIROBI  
 TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
**JOINT VENTURE**  
**ARTELIA**  
 6 RUE DE LORRAINE  
 38130 ECHIROLLES, FRANCE  
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 P.O BOX 48674,00100-GPO,  
 NAIROBI, KENYA  
 E-MAIL: mibp.nairobi@mibp.co.ke  
 TEL: +254-2-2710500

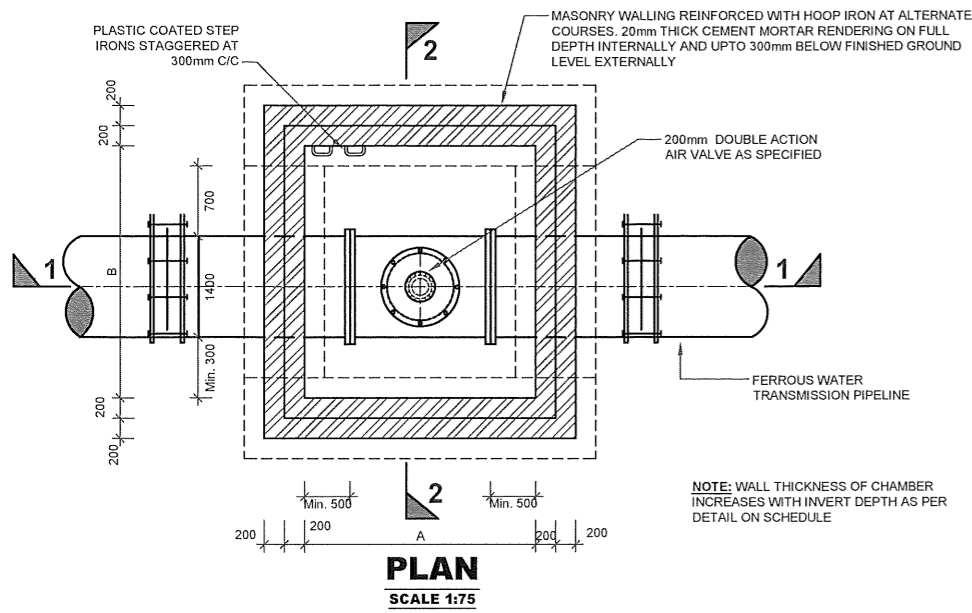
**PROJECT NAME:**  
 CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
 CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
 BID No. AWWDA/AFD/NWSP/W-02B/2023

**STANDARD DRAWING**

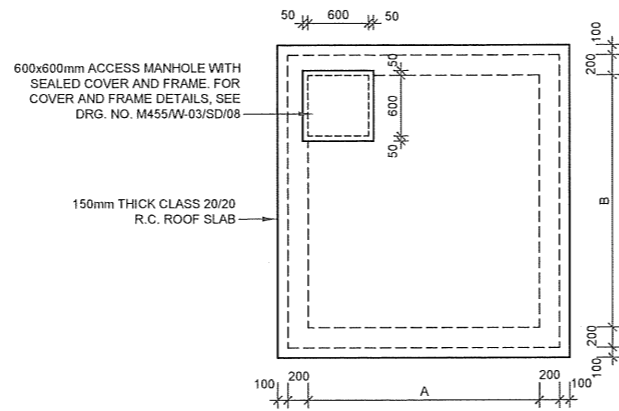
**DRAWING TITLE:**  
 PROJECT SIGNBOARD DETAIL

Designed by: V.K	Drawn by: O.J.O
Checked by: J.M.K	Approved by: C.R
Scale: 1:25	Date: JUNE 2023
DRG No. M455/W-02B/SD/01	
REV. 0	

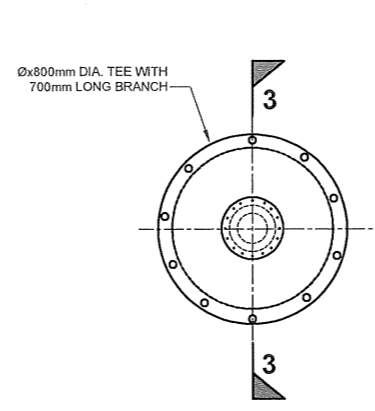


**SECTION 1-1**  
SCALE 1:75

NOTE: WALL THICKNESS OF CHAMBER INCREASES WITH INVERT DEPTH AS PER DETAIL ON SCHEDULE

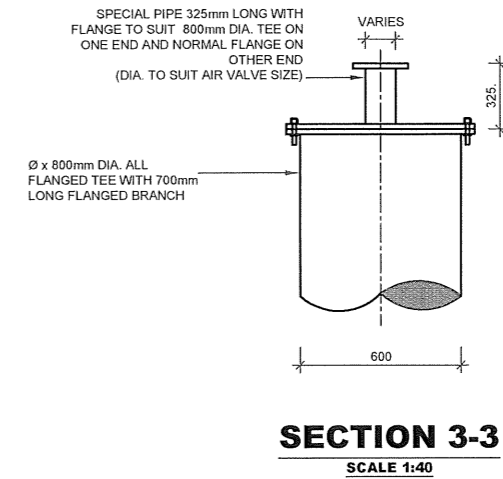


**AIR VALVE CHAMBER ROOF DETAIL**  
SCALE 1:75



**PLAN**  
SCALE 1:40

**DETAIL '1'**



**SECTION 3-3**  
SCALE 1:40

- NOTES:**
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
  2. FOR COVER DETAILS, SEE DRG. No. M455W-02B/SD08
  3. ALL REINFORCED CONCRETE IN CLASS 25/20 UNLESS OTHERWISE STATED
  4. ALL EXPOSED CONCRETE EDGES HAVE A 25mmX25mm CHAMFER
  5. ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)

**ABBREVIATIONS**

mm	-	MILLIMETRES
FGL	-	FINISHED GROUND LEVEL
PIL	-	PIPE INVERT LEVEL
DIA	-	DIAMETER
Ø	-	DIAMETER
R.C.	-	REINFORCED CONCRETE
G.M.S.	-	GALVANIZED MILD STEEL
M.S.	-	MILD STEEL
c/c	-	CENTRE TO CENTRE
No.	-	NUMBER
L	-	LENGTH

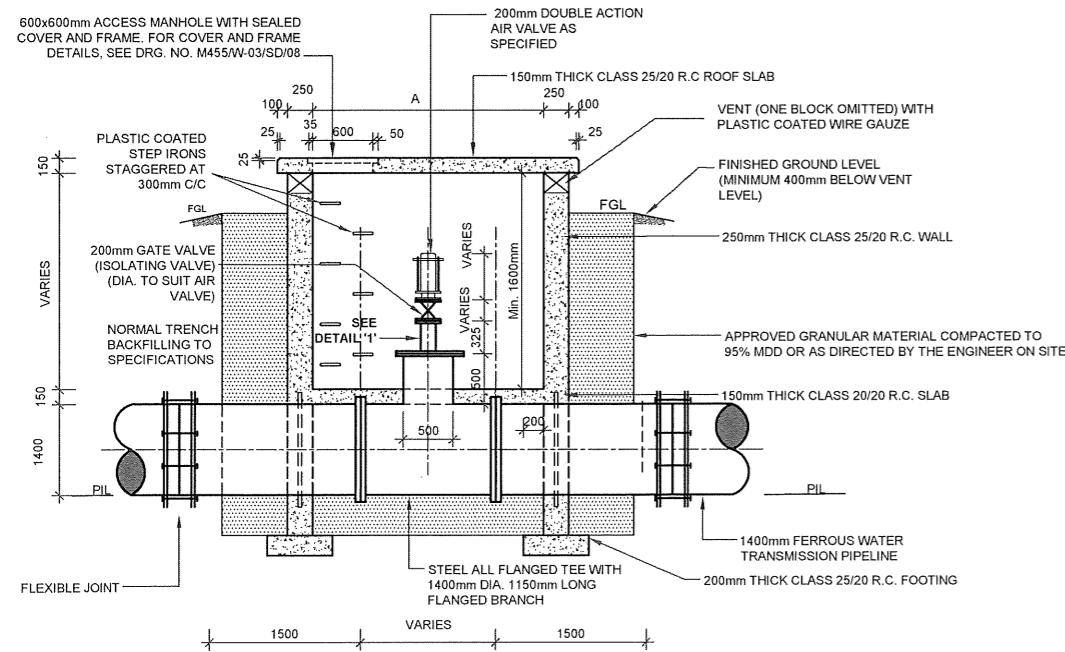
REVISIONS				SIGN	DATE	APPROVED

**NOTE:**

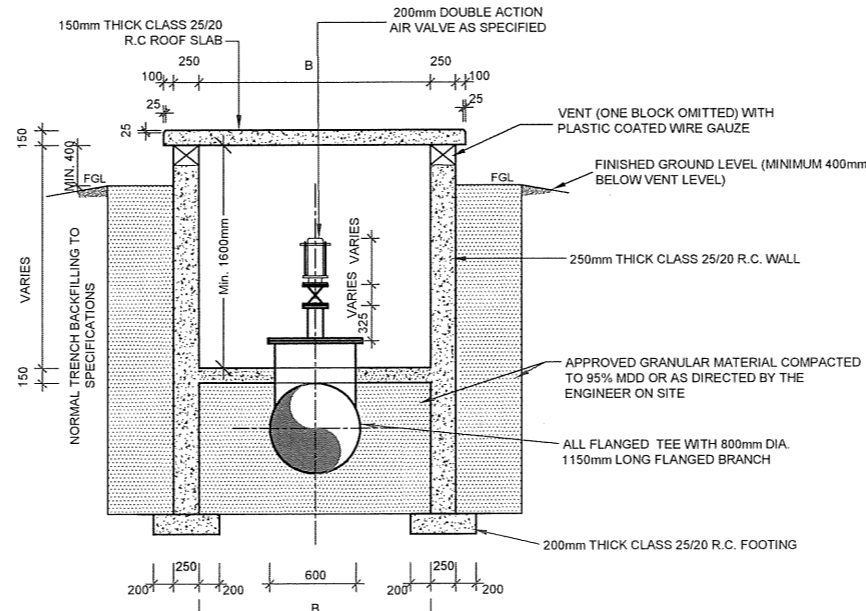
FOR CHAMBER DEPTHS >3000mm, R.C. 1500mm x 1500mm CHAMBER TO BE ADOPTED

**GENERAL NOTES:**

1. PRESSURE RATING FOR ALL AIR VALVE PIPEWORK AND FITTINGS TO PN 16
2. THE PIPEWORK MATERIAL PIPELINE IS FERROUS TYPE TO DESIGN PRESSURE RATING, AS SPECIFIED
3. RIGID JOINT REFERS TO BUTT WELDED JOINT WHILE FLEXIBLE JOINT REFERS TO COUPLING, FLANGED OR SOCKET AND SPIGOT JOINT
4. FOR FITTINGS SCHEDULES, SEE RESPECTIVE PLAN AND PROFILE DRAWINGS AT LOCATION OF AIR VALVES



**SECTION 1-1**  
SCALE 1:75



**SECTION 2-2**  
SCALE 1:75

**STANDARD AIR VALVE CHAMBER DIMENSIONS SCHEDULE**

MAIN PIPE DIA Ø (mm)	PLAN SIZE (INTERNAL DIMENSIONS) A(mm) x B(mm)
1400	2400 x 2200

**CLIENT:**

THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**

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TEL: +254-2-2710500

**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT

BID No. AWWDA/AFD/NWSP/W-02B/2023

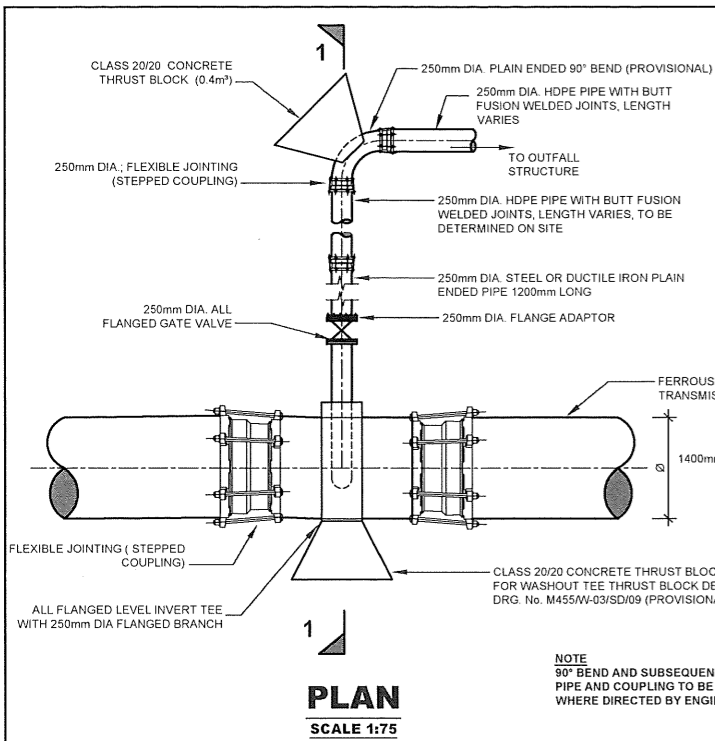
STANDARD DRAWING

**DRAWING TITLE:**

AIR VALVE CHAMBERS AND FITTINGS

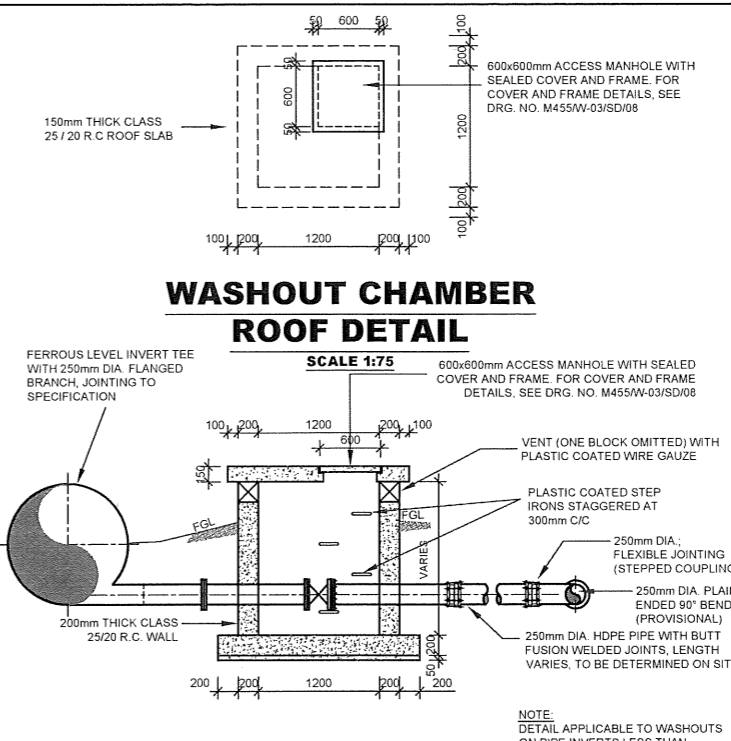
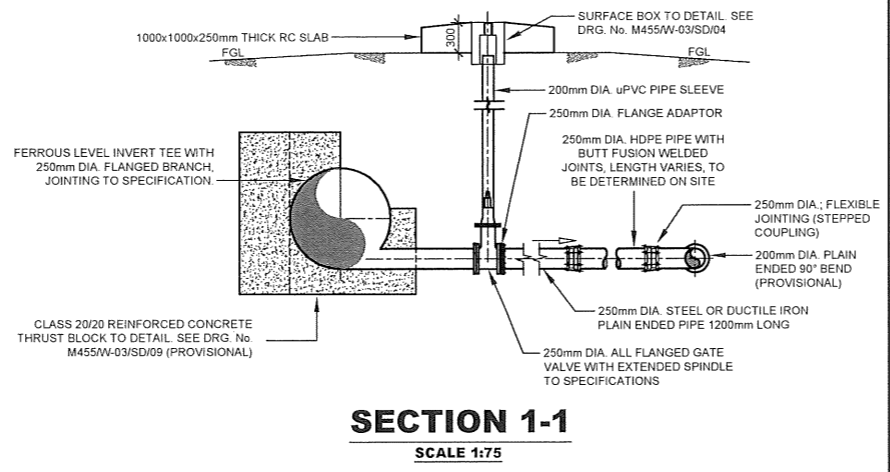
Designed by: J.M.K	Drawn by: O.J.O
Checked by: J.M.K	Approved by: C.R
Scale: AS SHOWN	Date: JUNE 2023

DRG No. M455/W-02B/SD/02 REV. 0



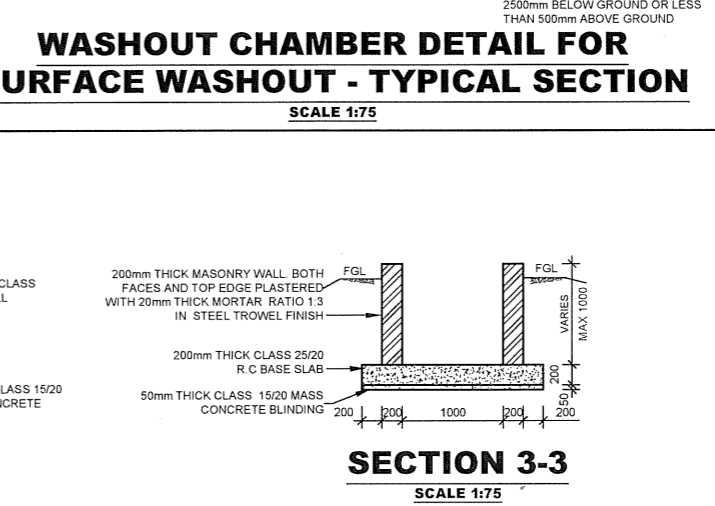
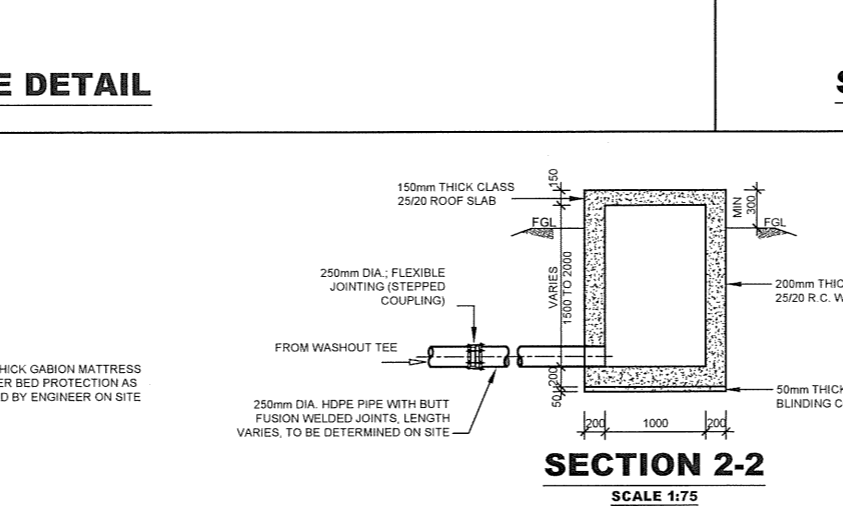
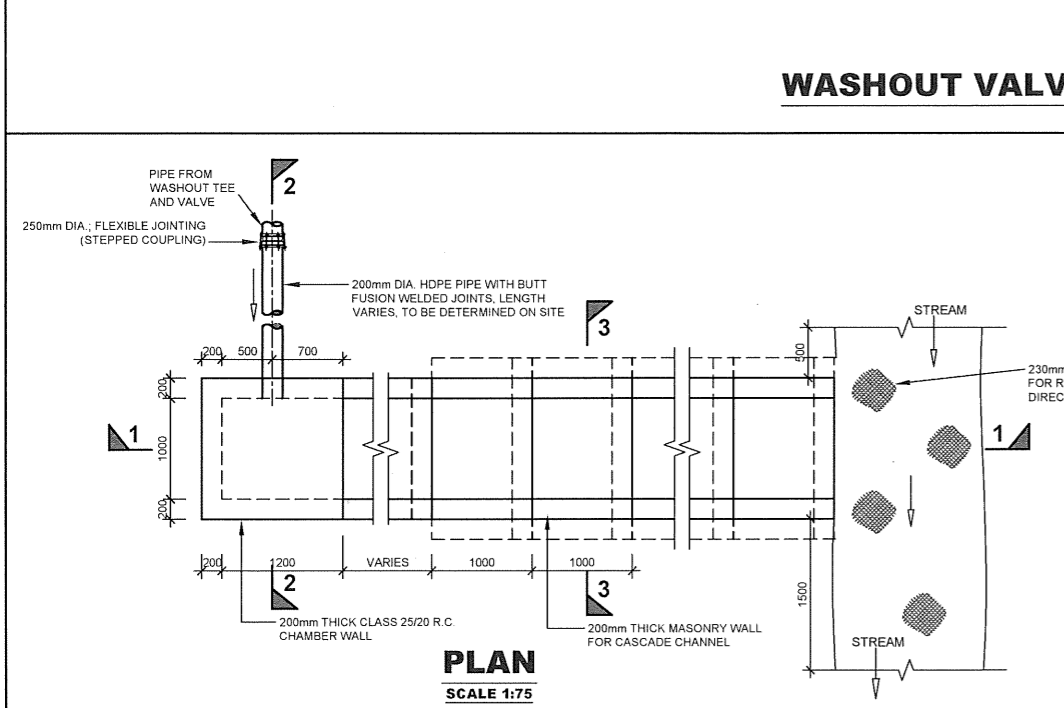
MAIN PIPE DIA Ø (mm)	WASHOUT LEVEL INVERT TEE BRANCH	FITTINGS ON WASHOUT
1400	250mm	250mm

**NOTE:**  
STANDARD WASHOUT DETAILS INDICATED ARE FOR THE 1400mm DIA. PIPE SECTION. SIMILAR DETAILS TO BE ADOPTED FOR THE OTHER PIPE SIZES ARE AS SHOWN ON THE SCHEDULE



- NOTES:**
- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
  - FOR THRUST BLOCK DETAILS, REFER TO DRG. No. M455W-02B/SD/08
  - ALL REINFORCED CONCRETE IN CLASS 25/20 UNLESS OTHERWISE STATED
  - ALL EXPOSED CONCRETE EDGES HAVE A 25mmx25mm CHAMFER
  - ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)
  - PRESSURE RATING FOR ALL WASHOUT PIPEWORK AND FITTINGS CORRESPOND TO THE PRESSURE RATING OF THE MAIN PIPELINE

- ABBREVIATIONS**
- mm - MILLIMETRES
  - FGL - FINISHED GROUND LEVEL
  - PIL - PIPE INVERT LEVEL
  - DIA - DIAMETER
  - Ø - DIAMETER
  - R.C. - REINFORCED CONCRETE
  - G.M.S. - GALVANIZED MILD STEEL
  - M.S. - MILD STEEL
  - c/c - CENTRE TO CENTRE
  - No. - NUMBER
  - L - LENGTH



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

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

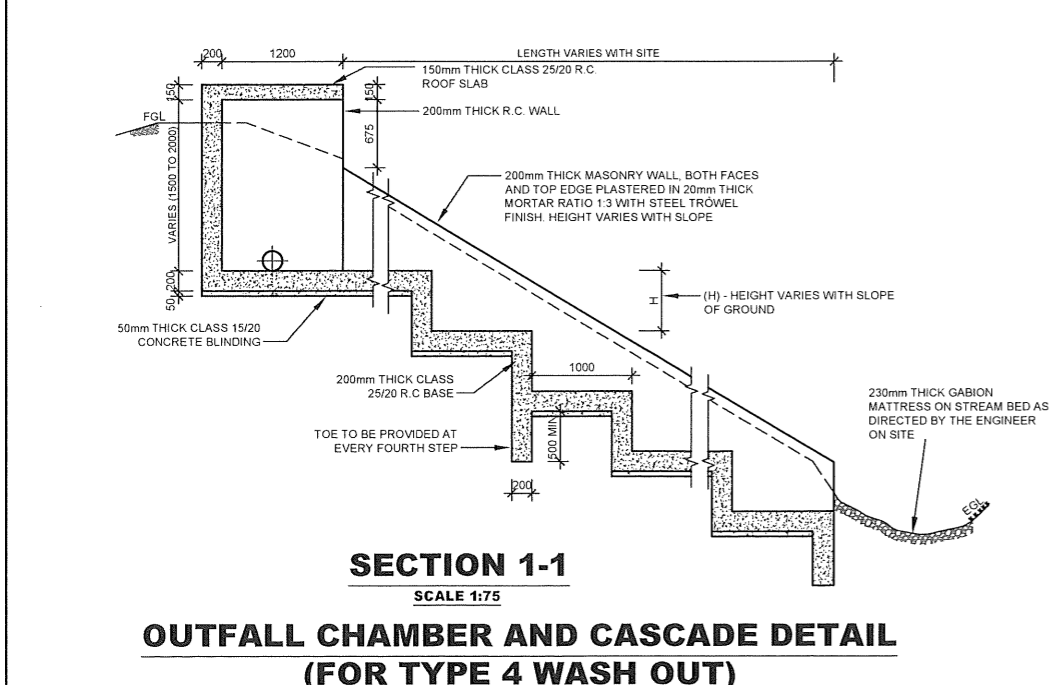
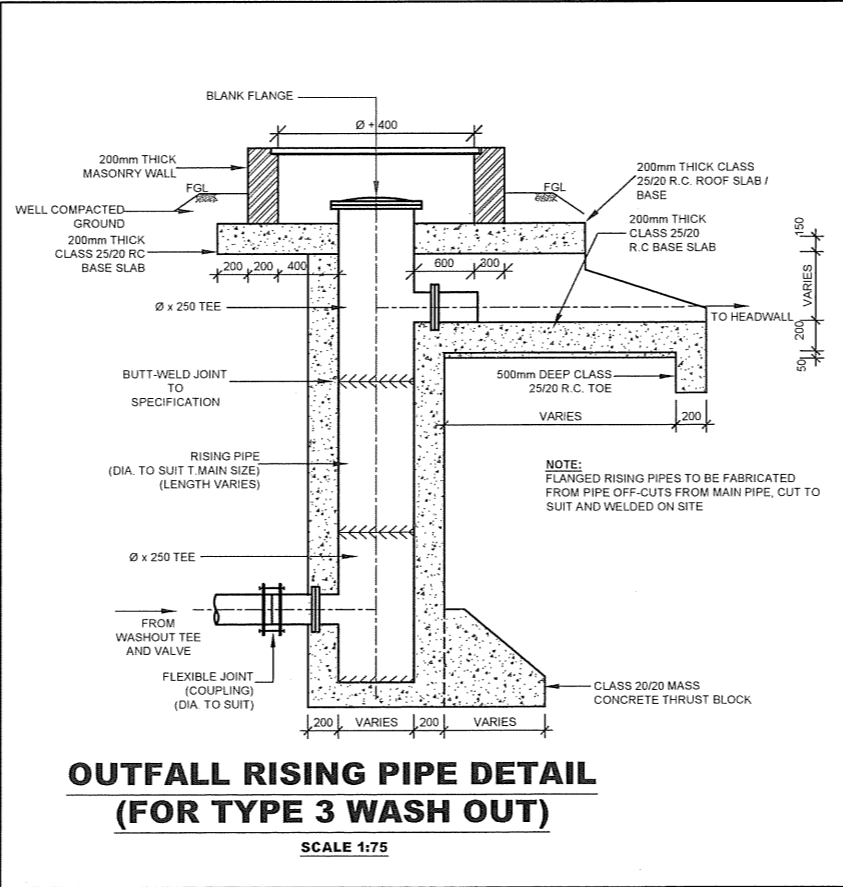
**CONSULTING ENGINEERS:**  
**JOINT VENTURE**  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00  
**MIBP**  
MANGAT I.B. PATEL (MIBP) LIMITED  
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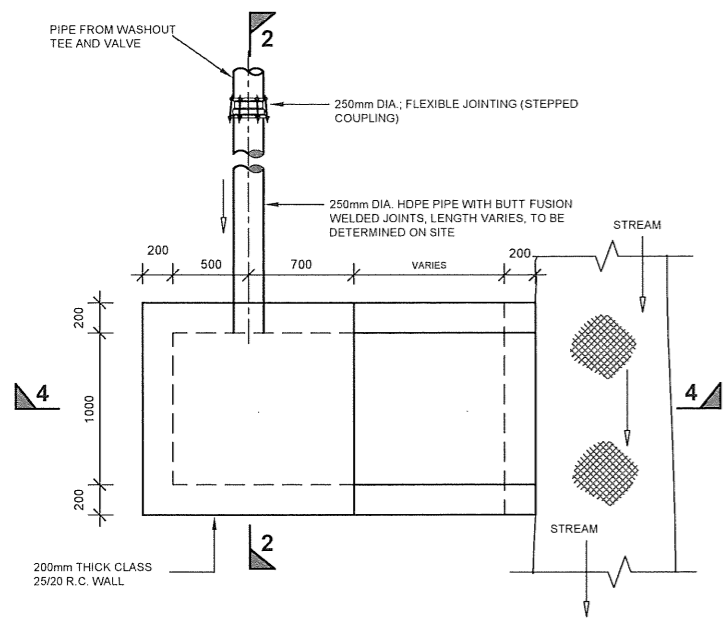
**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT  
**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
**BID No. AWWDA/AFD/NWSP/W-02B/2023**

**STANDARD DRAWING**  
**DRAWING TITLE:**  
WASHOUT OUTFALL STRUCTURE AND FIRE HYDRANT DETAILS  
**SHEET 1 OF 2**  
Designed by: J.M.K. Drawn by: O.J.O.  
Checked by: J.M.K. Approved by: C.R.  
Scale: AS SHOWN Date: JUNE 2023  
DRG No. M455W-02B/SD/03 REV. 0

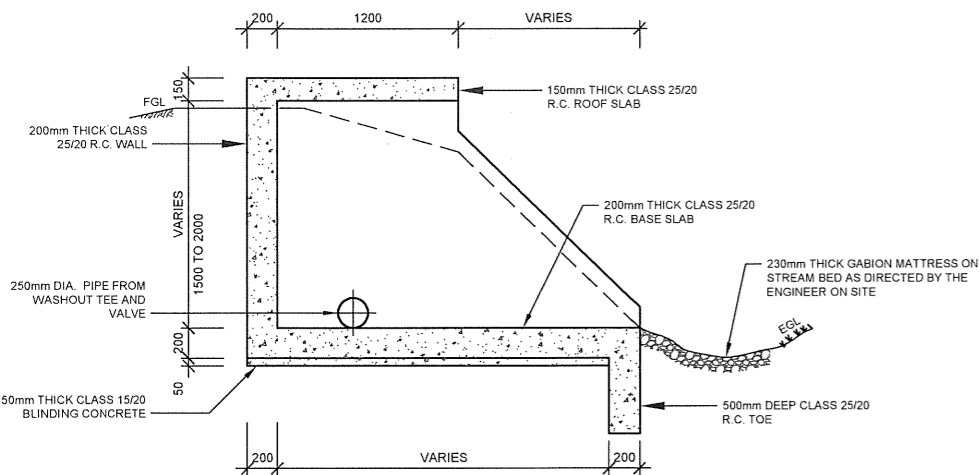
**WASHOUT ARRANGEMENT SCHEDULE**

WASHOUT TYPE	USE	SCHEMATIC ARRANGEMENT
1	WASHOUT PIPE ABOVE WATERCOURSE LEVEL WITH HEADWALL DISCHARGE	HEADWALL WATER MAIN WATER COURSE
2	WASHOUT PIPE BELOW WATER LEVEL - RISING CHAMBER	RISING CHAMBER WATER MAIN WATER COURSE
3	WASHOUT BELOW WATER LEVEL - RISING PIPE	RISING PIPE WATER MAIN WATER COURSE
4	SPECIAL WASHOUT PIPE ARRANGEMENT TO BE USED AT AERIAL CROSSINGS	TYPICAL AERIAL CROSSING WATER MAIN CASCADE



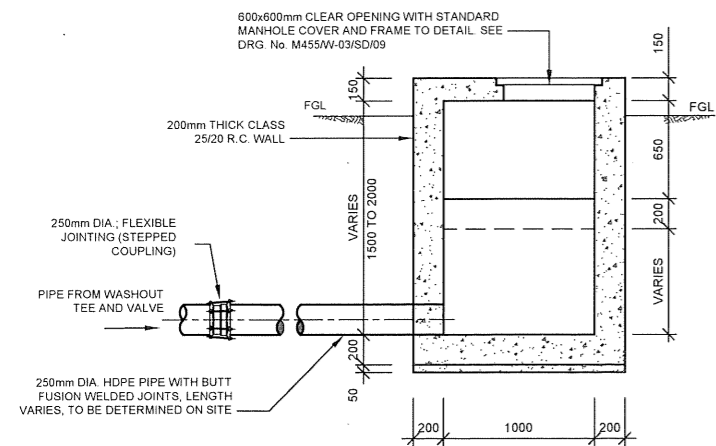


**PLAN**  
SCALE 1:50

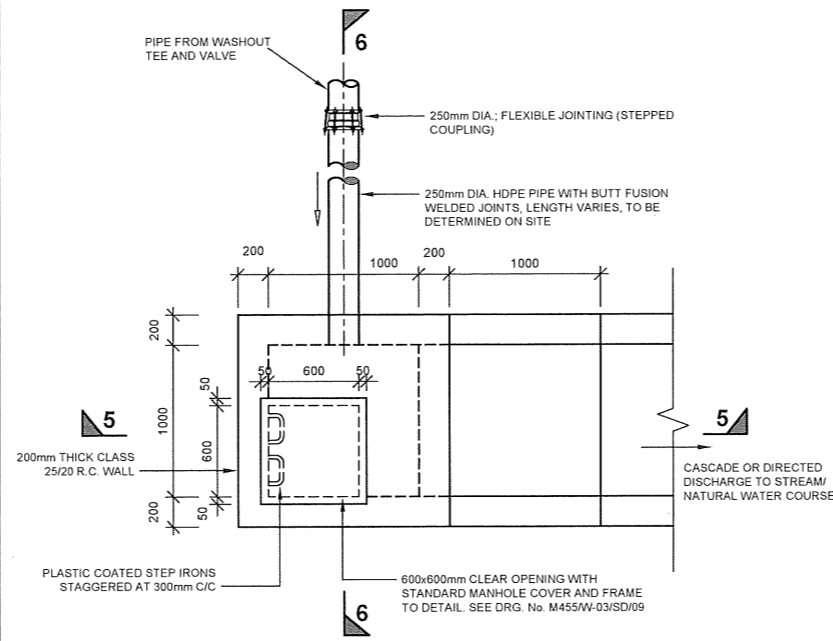


**SECTION 4-4**  
SCALE 1:50

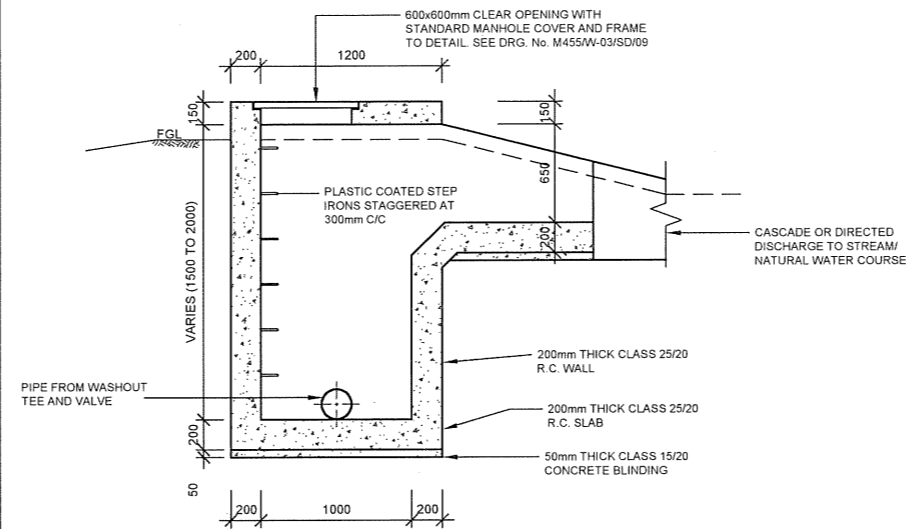
**HEADWALL DETAIL  
(FOR TYPE 1 WASH OUT)**



**SECTION 6-6**  
SCALE 1:50



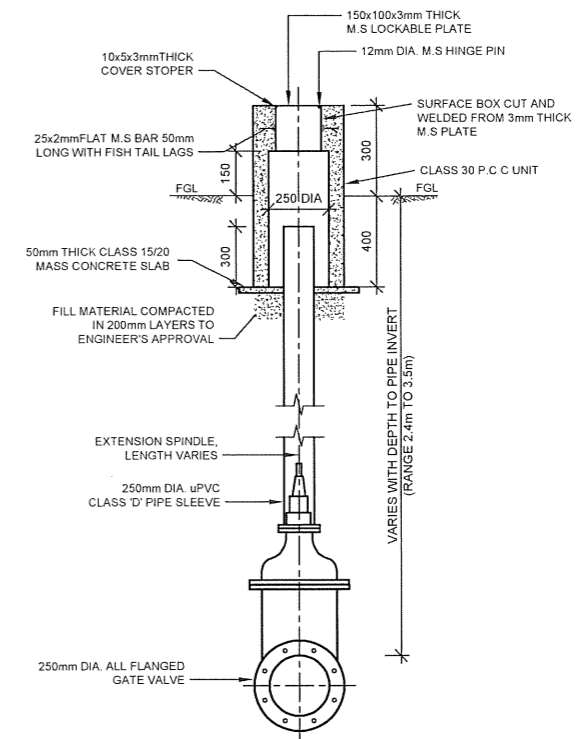
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SCALE 1:50



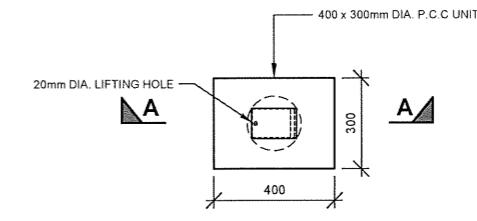
**SECTION 5-5**  
SCALE 1:50

**RISING OUTLET CHAMBER DETAIL  
(FOR TYPE 2 WASH OUT)**

**NOTE:-**  
APPLICABLE WHERE WASHOUT OUTLET IS BELOW WATER COURSE LEVEL



**SECTION A-A**  
SCALE 1:25



**PLAN**  
SCALE 1:25

**DETAIL 1 - SURFACE BOX DETAIL**

MAIN PIPE DIA Ø (mm)	WASHOUT LEVEL INVERT TEE BRANCH	FITTINGS ON WASHOUT
1400	250mm	250mm

**NOTE:**

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**ABBREVIATIONS**

mm	-	MILLIMETRES
FGL	-	FINISHED GROUND LEVEL
PIL	-	PIPE INVERT LEVEL
DIA	-	DIAMETER
Ø	-	DIAMETER
R.C.	-	REINFORCED CONCRETE
G.M.S.	-	GALVANIZED MILD STEEL
M.S.	-	MILD STEEL
c/c	-	CENTRE TO CENTRE
No.	-	NUMBER
L	-	LENGTH

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

**CLIENT:**

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**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION  
PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI -  
KARURA - OUTER RING ROAD  
TRANSMISSION PIPELINE AND NORTH  
NAIROBI WATER AND SEWERAGE PROJECT

BID No. AWWDA/AFD/NWSP/W-02B/2023

STANDARD DRAWING

**DRAWING TITLE:**  
WASHOUT OUTFALL STRUCTURE AND FIRE  
HYDRANT DETAILS

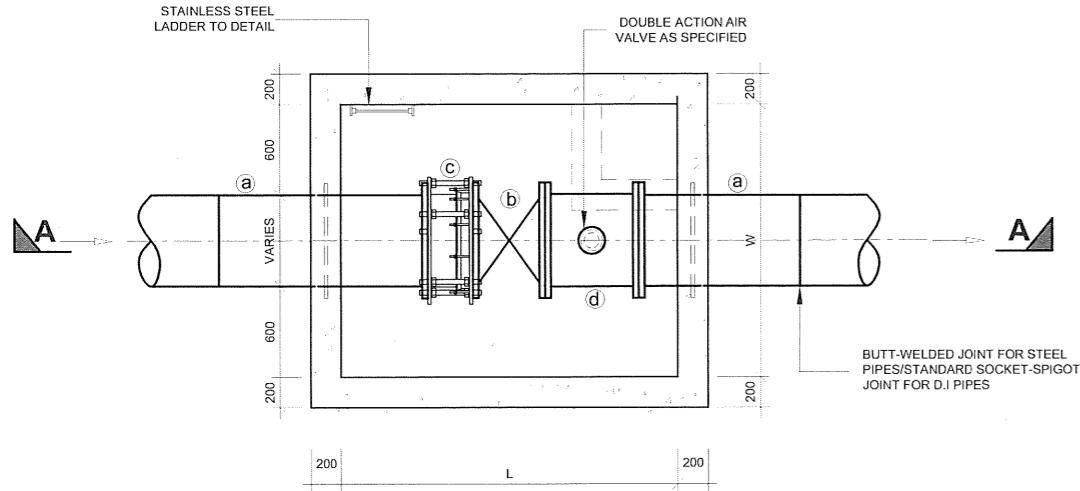
SHEET 2 OF 2

Designed by: J.M.K Drawn by: O.J.O

Checked by: J.M.K Approved by: C.R

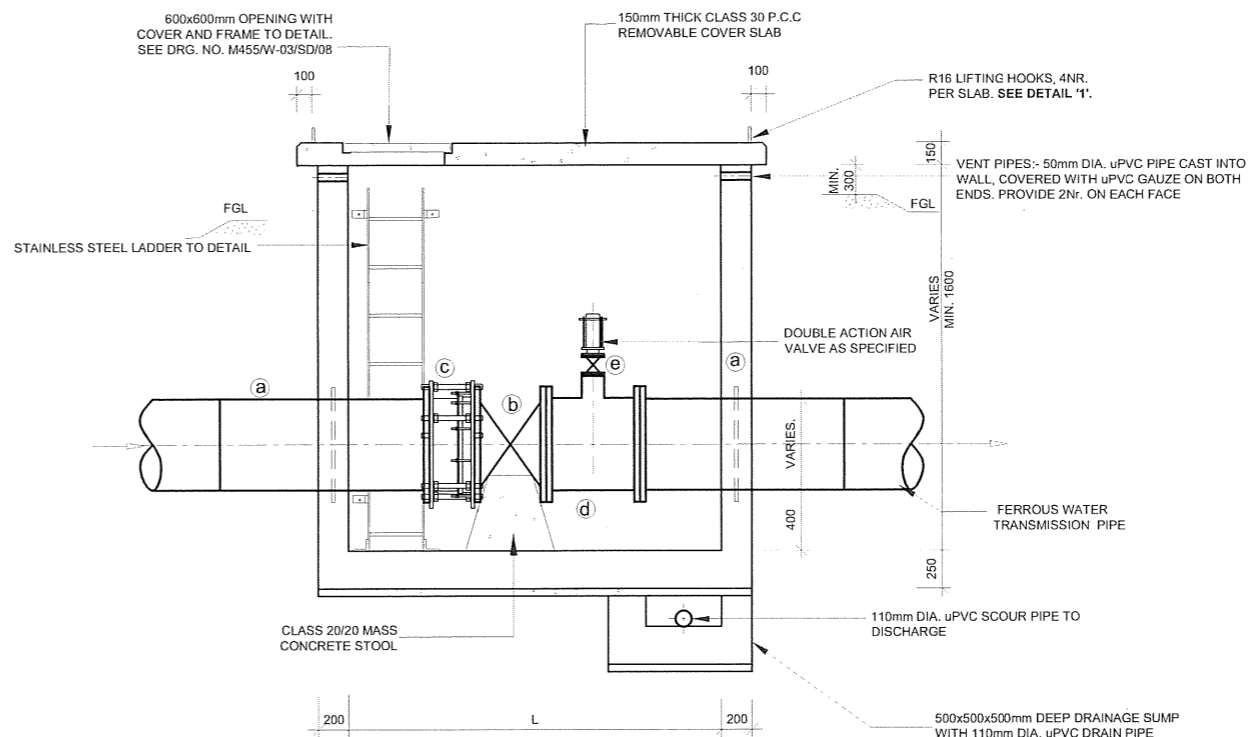
Scale: AS SHOWN Date: JUNE 2023

DRG No. M455/W-02B/SD/04 REV. 0



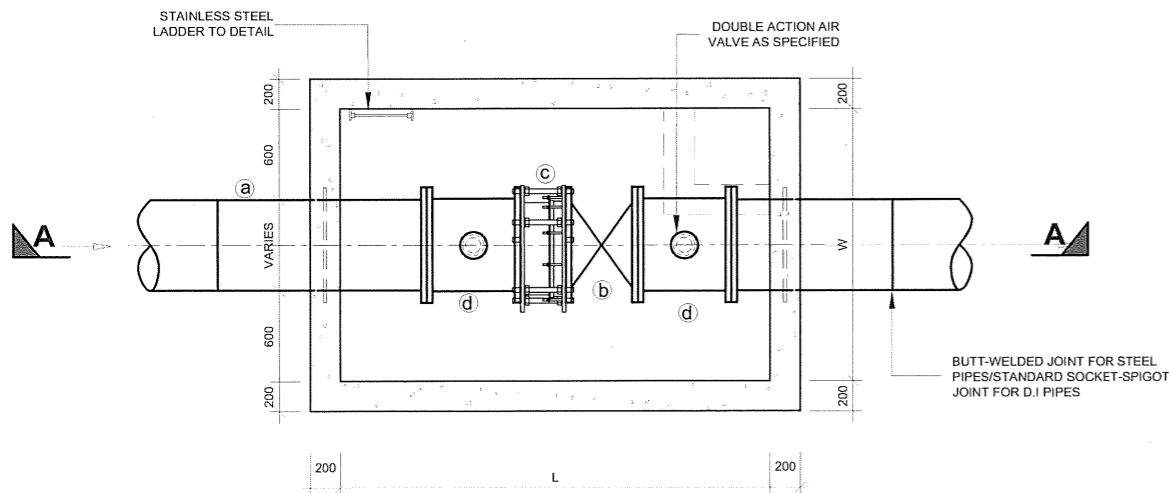
**TYPE 1 INLINE VALVE CHAMBER PLAN**

SCALE 1:50



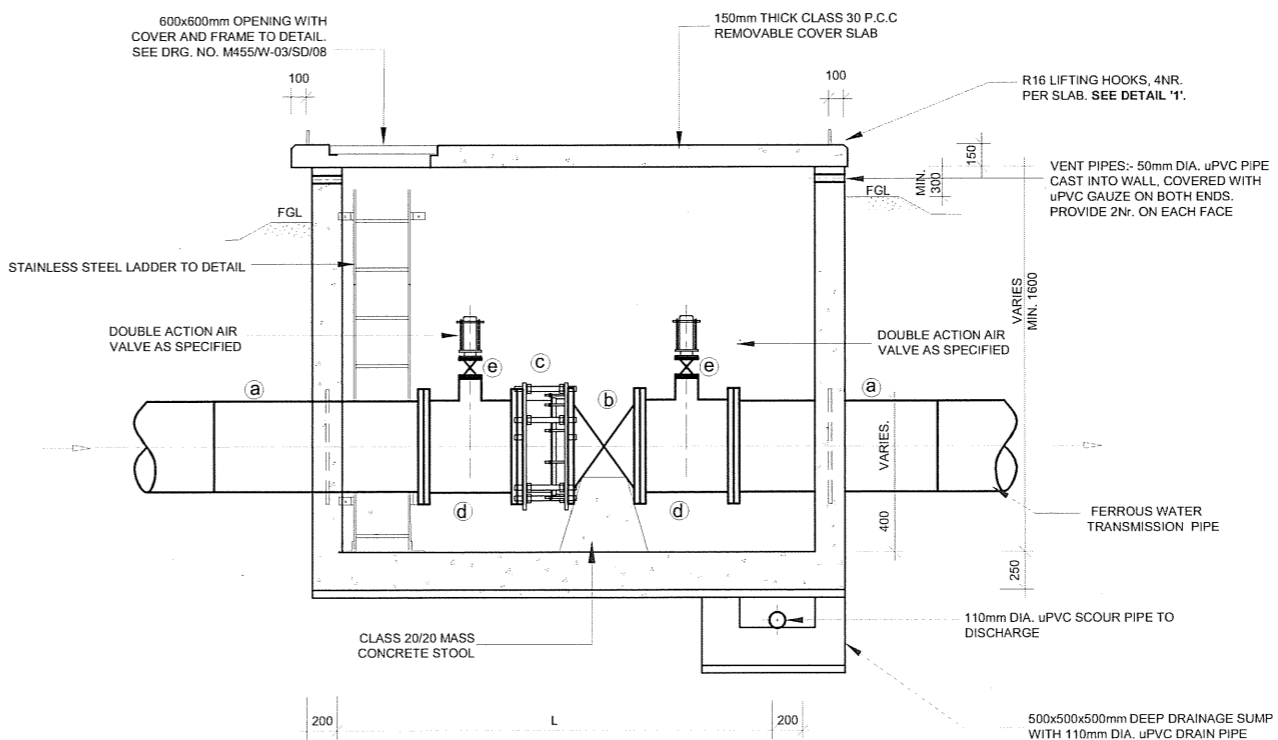
**SECTION A-A**

SCALE 1:50



**TYPE 2 INLINE VALVE CHAMBER PLAN**

SCALE 1:50



**SECTION A-A**

SCALE 1:50

**CHAMBER INTERNAL PLAN DIMENSIONS**

PIPE DIA. (mm)	OFF TAKE GATE VALVE CHAMBER L(mm) x W(mm)	LINE VALVE CHAMBER (TYPE1) L(mm) x W(mm)	LINE VALVE CHAMBER (TYPE 2) L(mm) x W(mm)	LINE VALVE CHAMBER (TYPE 3) L(mm) x W(mm)
1400	-	2800 x 2600	-	-
1000	-	2400 x 2200	-	-
800	1800 x 1800	-	-	-
600	1600 x 2400	-	-	-

**SCHEDULE OF FITTINGS FOR INLINE VALVE CHAMBER (TYPE 1, 2 AND 3)**

S/Nr.	DESCRIPTION	Nr.
a	FLANGED SPIGOT 1500/1200mm LONG WITH PUDDLE FLANGE (LOCATION OF PUDDLE FLANGE VARIES)	2
b	ALL FLANGED BUTTERFLY VALVE	1
c	DISMANTLING PIECE	1
d	ALL FLANGED TEE (DIA TO SUIT T. PIPELINE)	1
e	ALL FLANGED GATE VALVE (DIA. TO SUIT AIR VALVE)	1

**NOTES:**

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- FOR COVER DETAILS, SEE DRG. NO. M455W-02B/SD/08
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- ALL EXPOSED CONCRETE EDGES HAVE A 25mmX25mm CHAMFER
- ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)
- PRESSURE RATING FOR ALL WASHOUT PIPEWORK AND FITTINGS CORRESPOND TO THE PRESSURE RATING OF THE MAIN PIPELINE
- GATE VALVES HAVE IN-BUILT ISOLATING VALVES

REVISIONS				SIGN	DATE	APPROVED
	BY	CHECKED				
	BY	CHECKED				
	BY	CHECKED				

**CLIENT:**

**THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 45283 - 00100 NAIROBI  
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TEL: +254-2-2710500

**PROJECT NAME:**

**CKE1135- NAIROBI WATER AND SANITATION PROJECT**

**CONTRACT TITLE:**

**CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT**

**BID No. AWWDA/AFD/NWSPW-02B/2023**

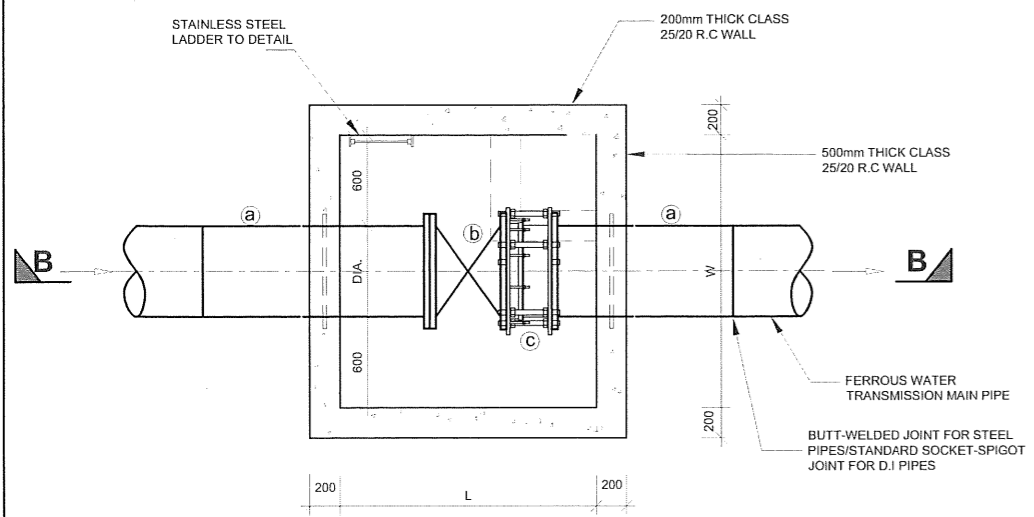
**STANDARD DRAWING**

**DRAWING TITLE:**

**INLINE/OFFTAKE VALVE CHAMBER, FITTINGS AND ACCESS LADDER**

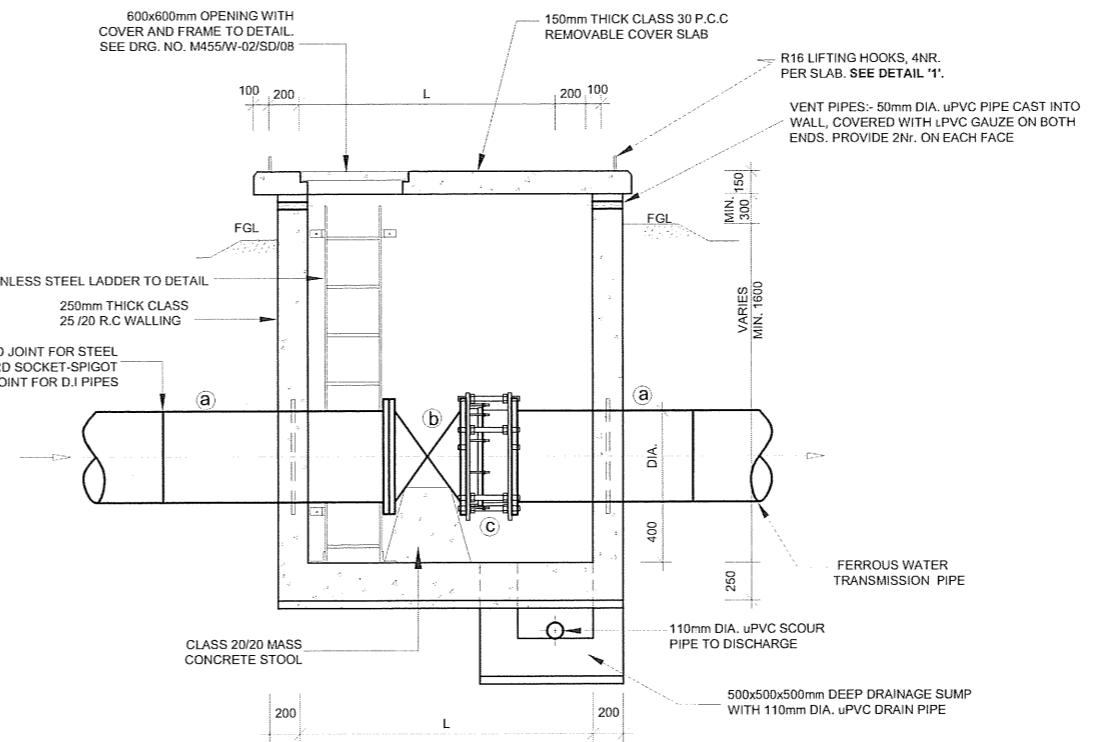
**SHEET 1 OF 2**

Designed by: J.M.K	Drawn by: O.J.O
Checked by: J.M.K	Approved by: C.R
Scale: AS SHOWN	Date: JUNE 2023



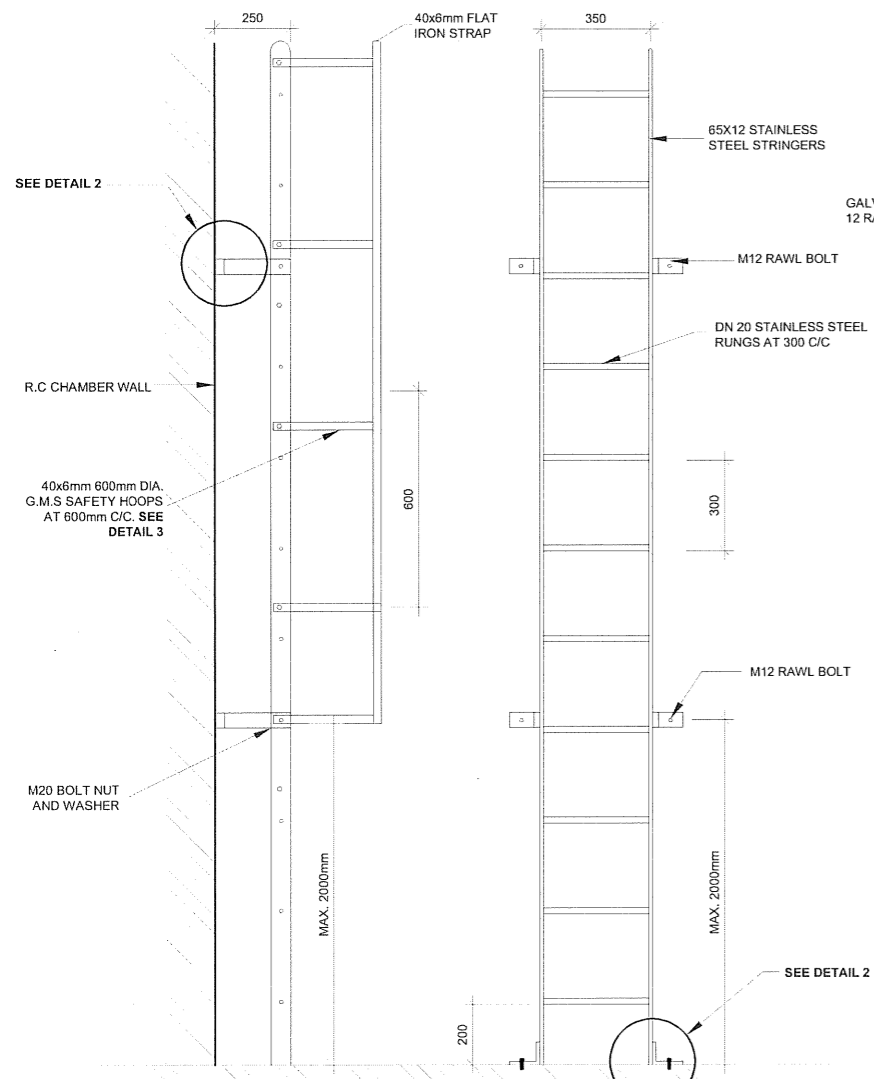
**TYPE 3 INLINE VALVE CHAMBER PLAN**

SCALE 1:50



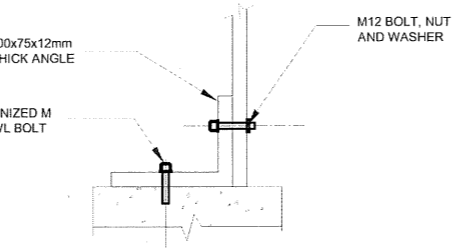
**SECTION B-B**

SCALE 1:50



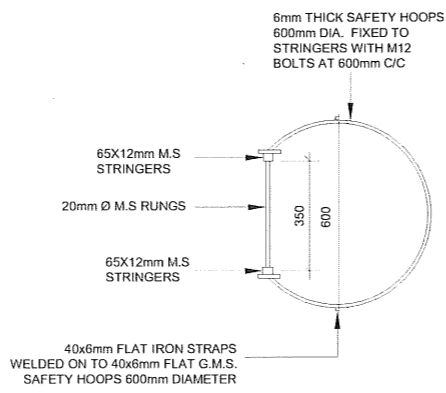
**LADDER DETAIL**

SCALE 1:25



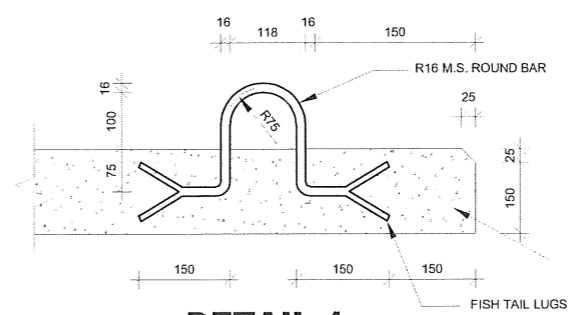
**DETAIL 2 - AT WALL & BASE**

SCALE 1:5



**DETAIL 3 - SAFETY HOOPS**

SCALE 1:25



**DETAIL 1 LIFTING EYE DETAIL**

SCALE 1:20

- NOTES:**
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
  2. FOR COVER DETAILS, SEE DRG. No. M455W-02B/SD/08
  3. ALL REINFORCED CONCRETE IN CLASS 25/20 UNLESS OTHERWISE STATED
  4. ALL EXPOSED CONCRETE EDGES HAVE A 25mmX25mm CHAMFER
  5. ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)
  6. PRESSURE RATING FOR ALL WASHOUT PIPEWORK AND FITTINGS CORRESPOND TO THE PRESSURE RATING OF THE MAIN PIPELINE
  7. GATE VALVES HAVE IN-BUILT ISOLATING VALVES

REVISIONS				SIGN	DATE	APPROVED

CLIENT:  
**THE CHIEF EXECUTIVE OFFICER**  
**ATHI WATER WORKS DEVELOPMENT AGENCY**  
 P.O. BOX 45283 - 00100 NAIROBI  
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PROJECT NAME:  
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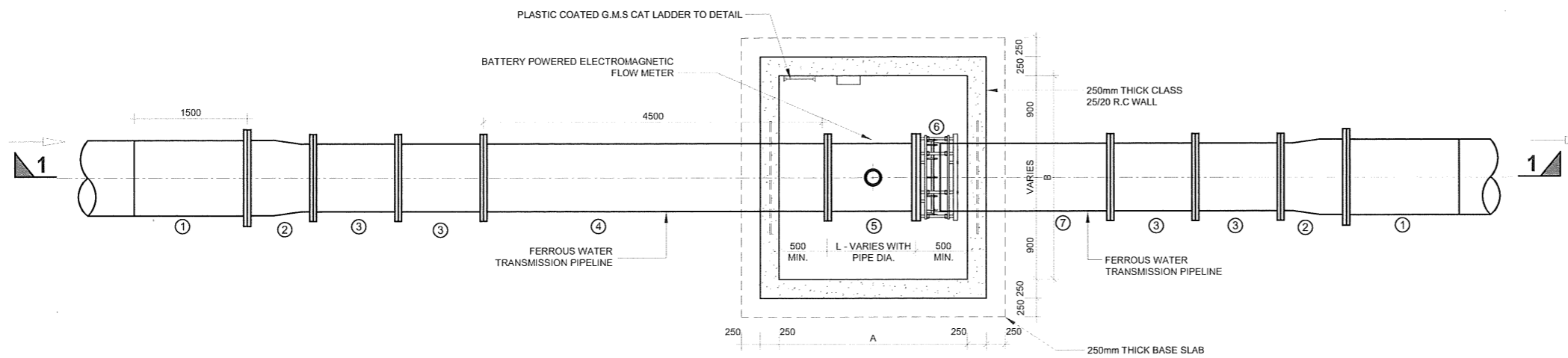
CONTRACT TITLE:  
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 BID No. AWWDA/AFD/NWSP/W-02B/2023

STANDARD DRAWING

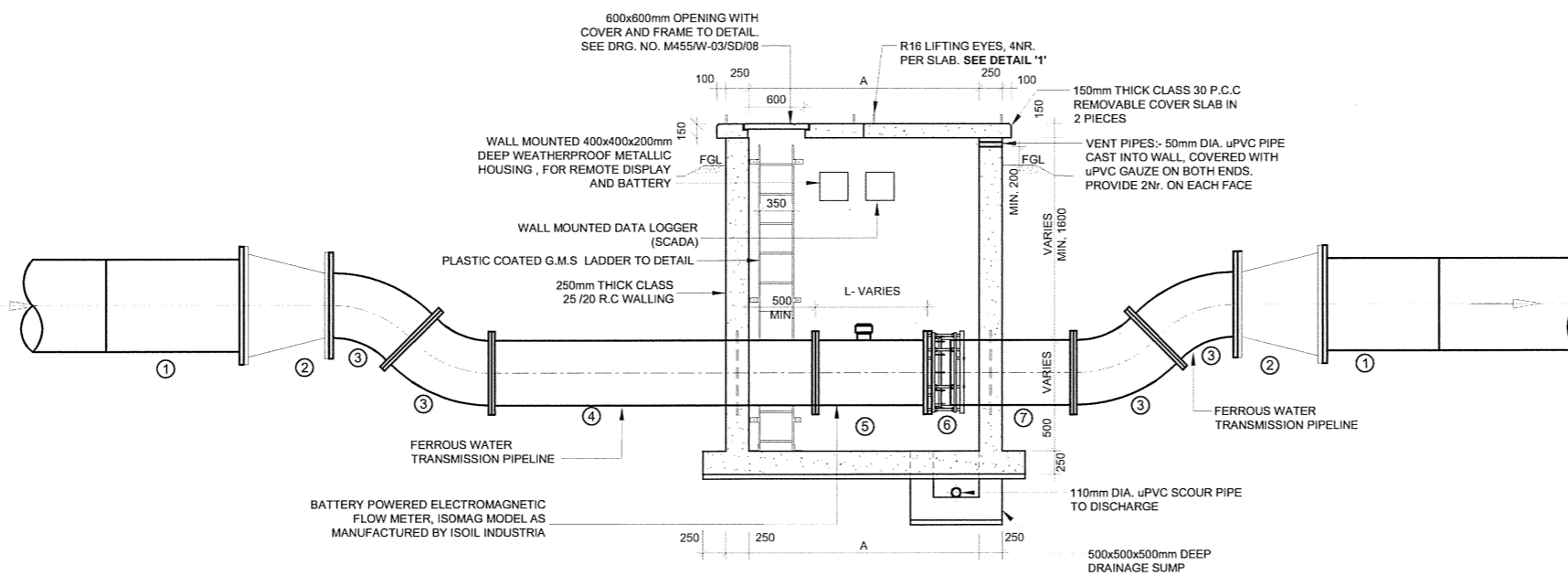
DRAWING TITLE:  
**INLINE/OFFTAKE VALVE CHAMBER, FITTINGS AND ACCESS LADDER**  
 SHEET 2 OF 2

Designed by: J.M.K  
 Drawn by: O.J.O  
 Checked by: J.M.K  
 Approved by: C.R  
 Scale: AS SHOWN  
 Date: JUNE 2023

DRG No. M455W-02B/SD/06 REV. 0



**PLAN**  
SCALE 1:75



**SECTION 1-1**  
SCALE 1:75

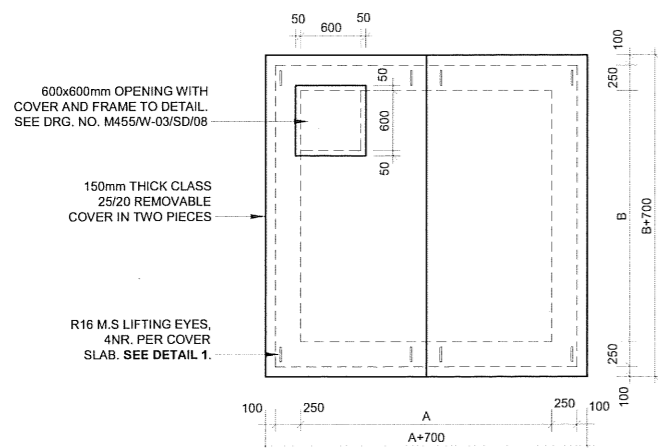
**ELECTROMAGNETIC METER CHAMBER**

**TYPICAL ELECTROMAGNETIC METER CHAMBER SCHEDULE OF FITTINGS**

S/Nr.	DESCRIPTION	Nr.
1	FLANGED SPIGOT PIPE 1500/1200mm LONG	2
2	1400 x 1200 mm ALL FLANGED CONCENTRIC TAPER	2
3	ALL FLANGED 45° BEND	4
4	DOUBLE FLANGED PIPE WITH PUDDLE FLANGE (MIN. LENGTH 5 x DIA.). LOCATION OF PUDDLE FLANGE VARIES	2
5	ALL FLANGED BATTERY POWERED ELECTROMAGNETIC WATER METER, COMPLETE WITH REMOTE LED DISPLAY AND REQUISITE FITTINGS	1
6	DISMANTLING PIECE	1
7	FLANGED SPIGOT PIPE WITH PUDDLE FLANGE (MIN. LENGTH 2.5 x DIA.). LOCATION OF PUDDLE FLANGE VARIES	1

**STANDARD ELECTROMAGNETIC METER CHAMBER DIMENSIONS SCHEDULE**

MAIN PIPE DIA Ø (mm)	PLAN SIZE (INTERNAL DIMENSIONS) A(mm) x B(mm)
1400	2600 x 3000
1000	2400 x 2800
800	2200 x 2600
600	2200 x 2400



**METER CHAMBER ROOF DETAIL**  
SCALE 1:75

- NOTES:**
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  - ALL FITTINGS ARE FERROUS TYPE RIGID JOINED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)
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  - G.M.S. - GALVANIZED MILD STEEL
  - M.S. - MILD STEEL
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REVISIONS				SGI	DATE	APPROVED

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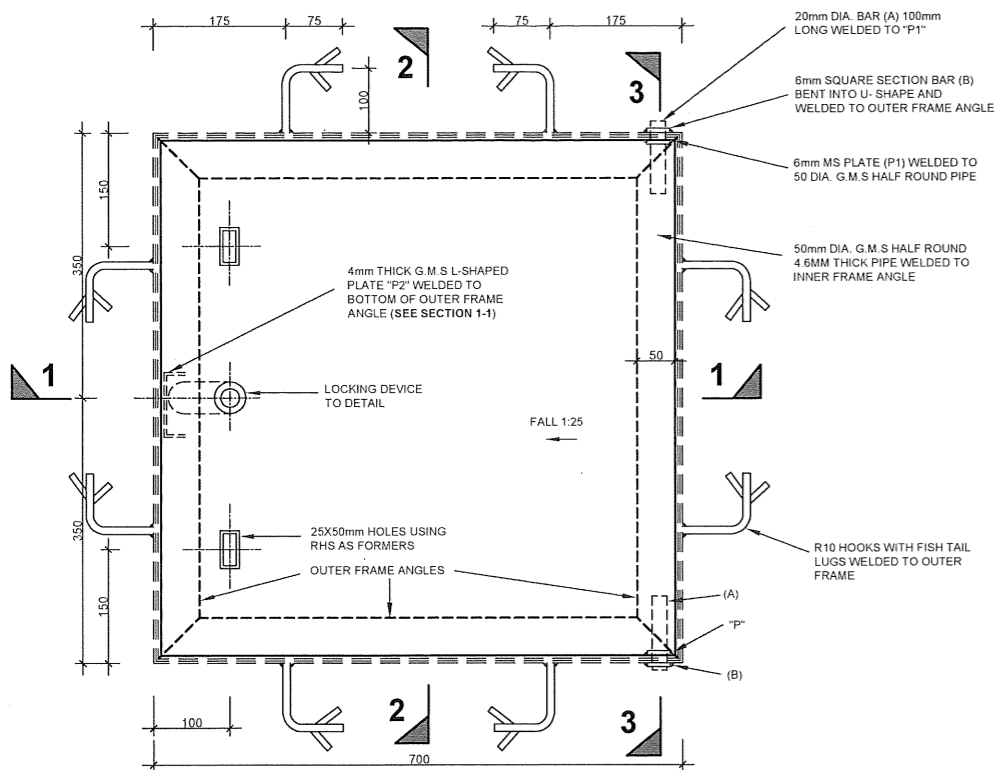
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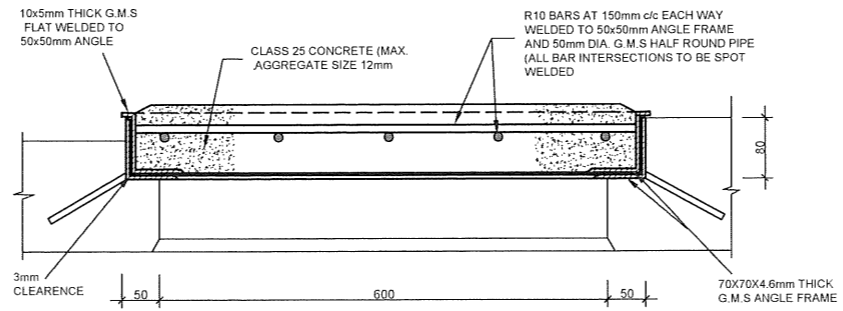
**STANDARD DRAWING**  
DRAWING TITLE:  
METER CHAMBER FITTINGS AND DETAILS

Designed by: V.K      Drawn by: O.J.O  
Checked by: J.M.K      Approved by: C.R  
Scale: AS SHOWN      Date: JUNE 2023

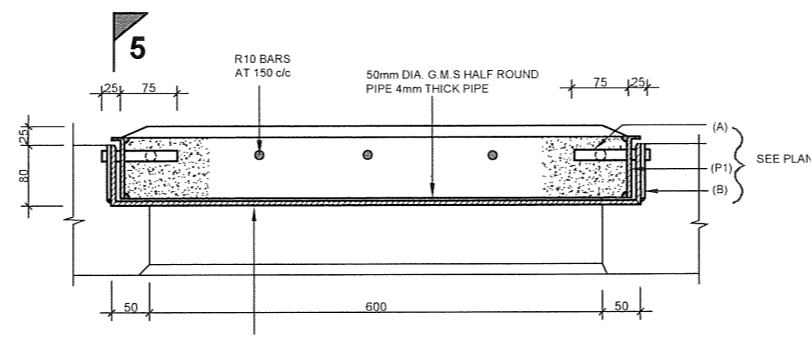




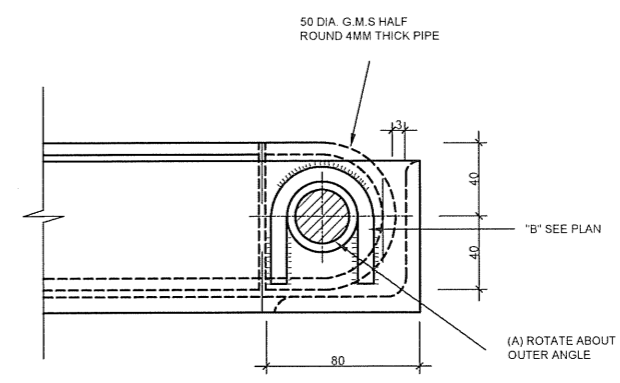
**PLAN**  
SCALE 1:10



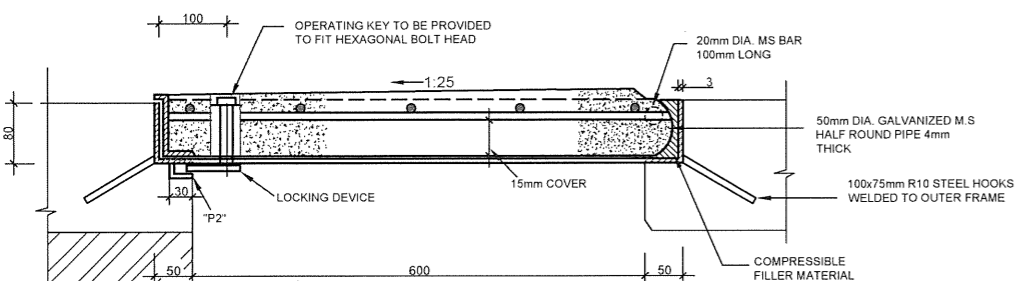
**SECTION 2-2**  
SCALE 1:10



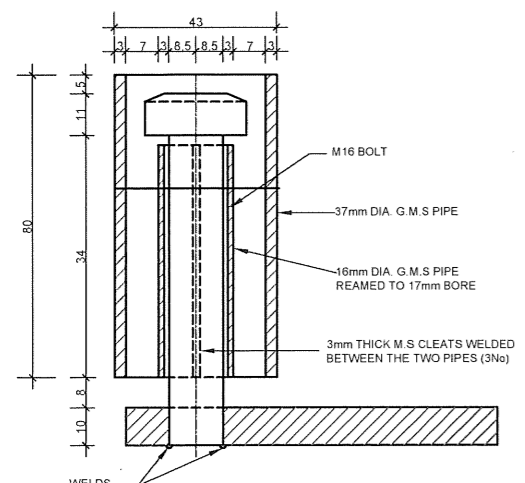
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SCALE 1:10



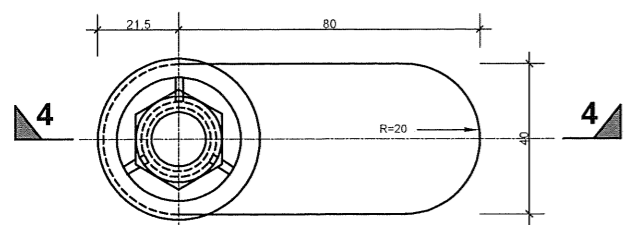
**SECTION 5-5**  
SCALE 1:4



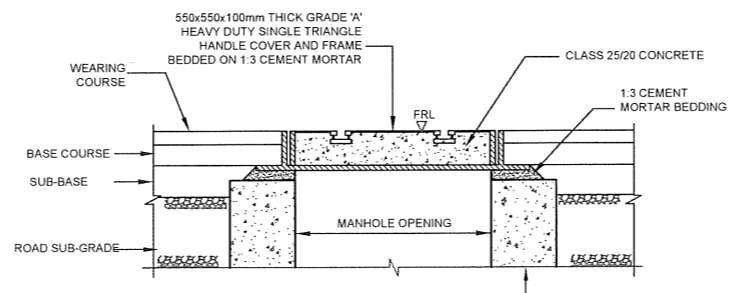
**SECTION 1-1**  
SCALE 1:10



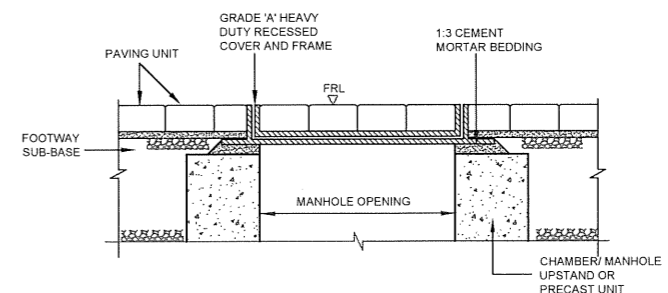
**SECTION 4-4**  
N.T.S



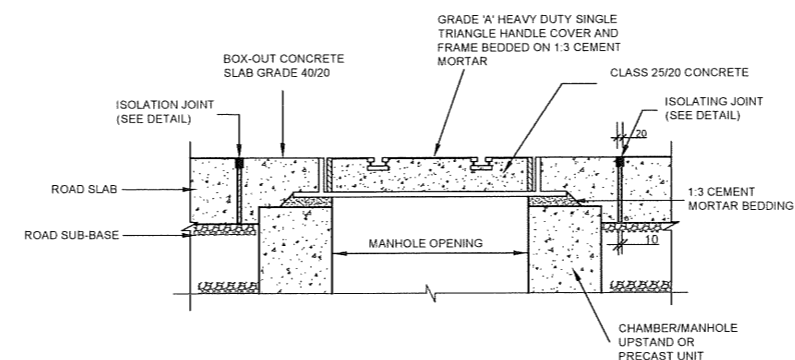
**LOCKING DEVICE DETAIL PLAN**  
N.T.S



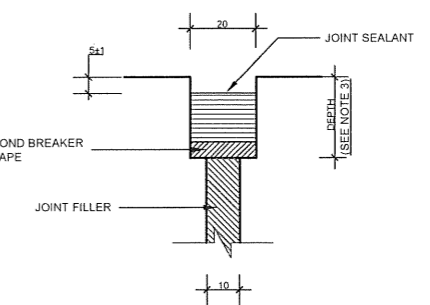
**DETAIL OF COVER APPLIED TO FLEXIBLE ROAD SURFACE**  
N.T.S



**TOP TREATMENT APPLIED TO PAVING UNIT FOOTWAY SURFACE**  
N.T.S



**TOP TREATMENT APPLIED TO CONCRETE ROAD SURFACE**  
N.T.S



**ISOLATION JOINT**  
SCALE 1:2.5

**NOTES:**  
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

**ABBREVIATIONS**

mm	-	MILLIMETRES
FGL	-	FINISHED GROUND LEVEL
PIL	-	PIPE INVERT LEVEL
DIA	-	DIAMETER
Ø	-	DIAMETER
R.C.	-	REINFORCED CONCRETE
G.M.S.	-	GALVANIZED MILD STEEL
M.S.	-	MILD STEEL
c/c	-	CENTRE TO CENTRE
No.	-	NUMBER
L	-	LENGTH

**REVISIONS**

NO.	DESCRIPTION	BY	DATE	APPROVED
		CHECKED		
		BY		
		CHECKED		
		BY		
		CHECKED		

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

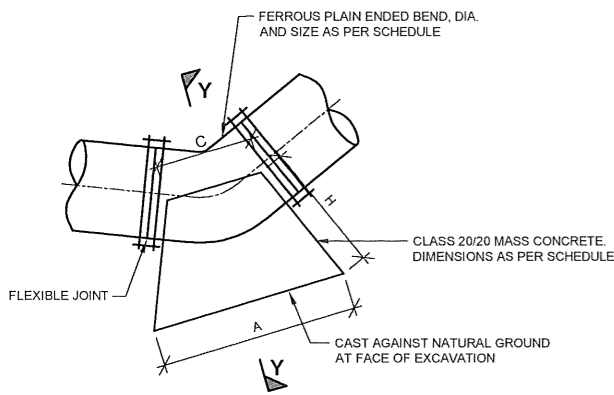
**MIBP** MANGAT I.B. PATEL (MIBP) LIMITED  
P.O. BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

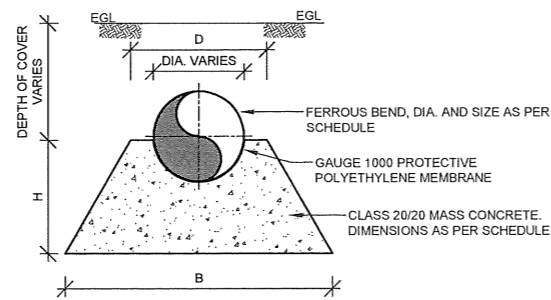
**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/02B/2023

**STANDARD DETAILS**  
DRAWING TITLE:  
CHAMBER COVERS

Designed by: V.K	Drawn by: O.J.O
Checked by: J.M.K	Approved by: C.R
Scale: AS SHOWN	Date: JUNE 2023
DRG No. M455/W-02B/SD/08	
REV. 0	

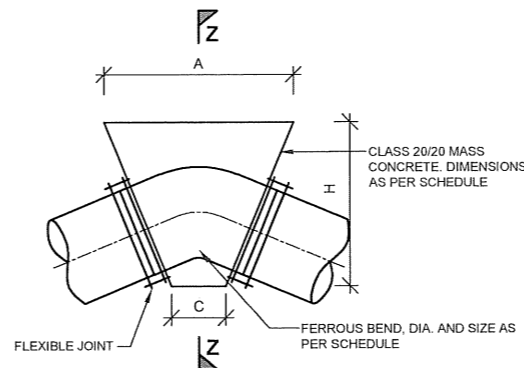


**ELEVATION**

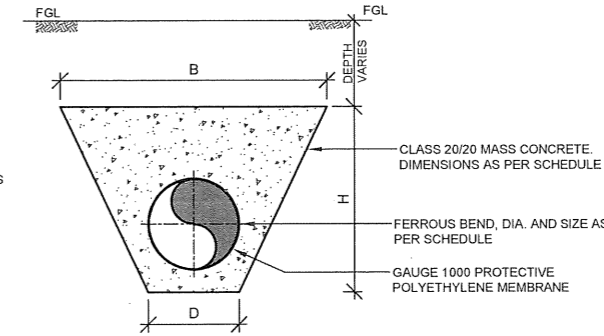


**SECTION Y-Y**

**THRUST BLOCK ON VERTICAL BENDS  
(DOWN THRUST)**

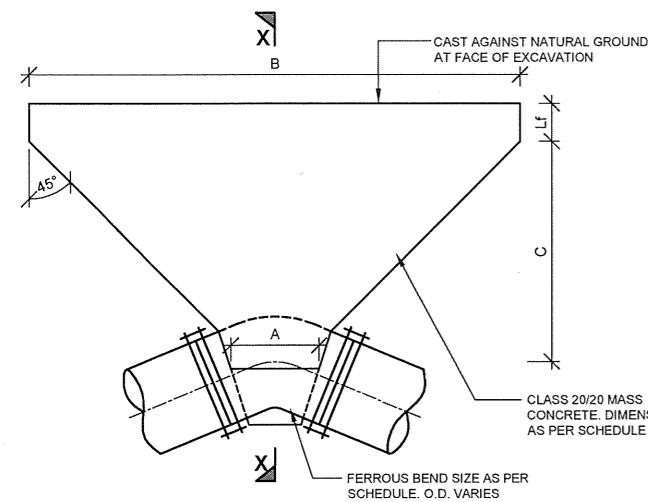


**ELEVATION**

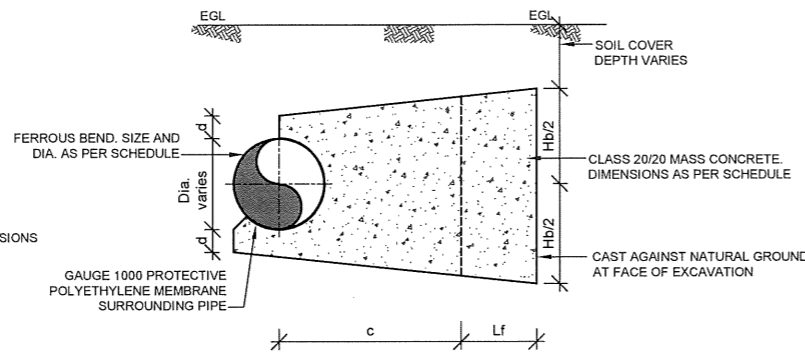


**SECTION Z-Z**

**THRUST BLOCK ON VERTICAL BENDS  
(UP THRUST)**

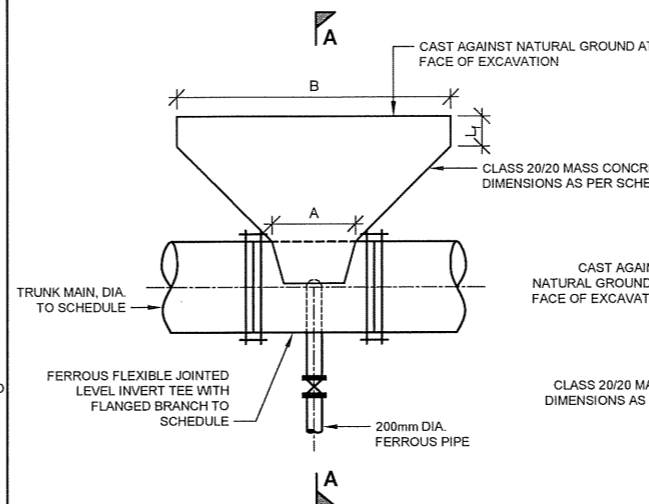


**PLAN**

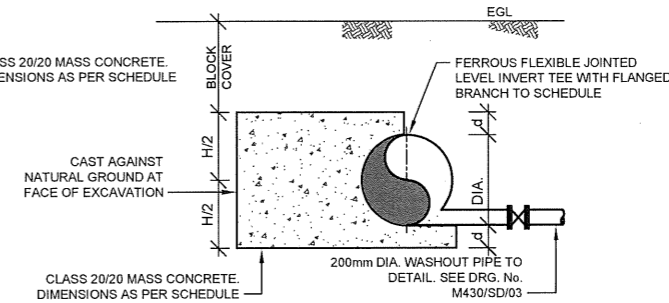


**SECTION X-X**

**THRUST BLOCK ON  
HORIZONTAL BENDS**



**PLAN**



**SECTION A-A**

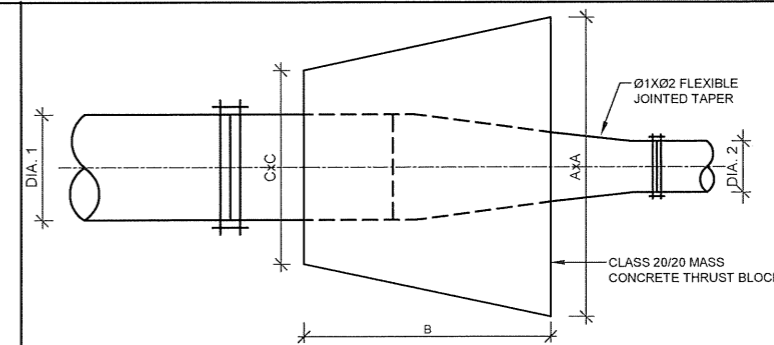
**THRUST BLOCK ON  
WASH-OUT TEE**

**THRUST BLOCK DIMENSIONS**

PIPE DIA Ø(mm)	PRESSURE RATING (Bar)	ANGLE OF BEND (Deg)	HORIZONTAL BENDS							VERTICAL BENDS - DOWN THRUST					
			DIMENSIONS (mm)							DIMENSIONS (mm)					MIN. VOLUME (m <sup>3</sup> )
			A	B	C	d	L <sub>f</sub>	H <sub>b</sub>	VOLUME (m <sup>3</sup> )	A	B	C	D	H <sub>b</sub>	VOLUME (m <sup>3</sup> )
1400	16	11.25	800	2000	2000	400	500	1400	3.67	2000	2000	800	1600	1000	2.12
		22.5	800	2200	2500	400	500	1800	7.24	2000	2000	800	1600	2000	4.63
		30	900	3000	3000	600	600	2600	15.36	2400	2400	800	1800	3000	9.67
		45	1100	3500	3500	800	800	3800	31.24	3000	3000	800	1800	3800	19.3
		90	1100	4300	4500	800	1000	4000	47.98	3200	3200	800	2500	4100	37.6

**THRUST BLOCK ON TEES**

MAIN PIPE DIA Ø(mm)	BRANCHING PIPE DIA (mm)	PRESSURE RATING (Bar)	DIMENSIONS (mm)					
			A	B	H <sub>b</sub>	L	L <sub>f</sub>	VOLUME (m <sup>3</sup> )
1400	1000	16	1200	8700	3000	3500	400	51.98
1400	800	16	1200	7000	3500	3500	400	50.23
1400	600	16	1100	6550	2400	2000	400	35.5



**THRUST BLOCK AT REDUCER**

**THRUST BLOCKS ON TAPERS**

Ø <sub>1</sub> (mm)	Ø <sub>2</sub> (mm)	TEST PRESSURE (Bar)	DIMENSIONS (mm)			
			A	B	C	VOLUME (m <sup>3</sup> )
1400	1200	16	2200	2000	1600	7.75

**NOTES:**

- ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED
- ANCHOR BLOCKS TO BE INSTALLED FOR PIPES LAID AT SLOPES EXCEEDING 1:6 SLOPE
- THRUST BLOCKS INSTALLED AT ALL FLEXIBLE JOINTED HORIZONTAL AND VERTICAL BENDS, CAPPED ENDS, TEES, TAPERS AND GATE VALVES
- ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)
- ALL PIPE SURFACES IN CONTACT WITH CONCRETE WRAPPED WITH GAUGE 1000 POLYTHENE MEMBRANE PROTECTIVE LAYER

**ABBREVIATIONS**

- mm - MILLIMETRES
- FGL - FINISHED GROUND LEVEL
- PIL - PIPE INVERT LEVEL
- DIA - DIAMETER
- Ø - DIAMETER
- R.C. - REINFORCED CONCRETE
- G.M.S. - GALVANIZED MILD STEEL
- M.S. - MILD STEEL
- c/c - CENTRE TO CENTRE
- No. - NUMBER
- L - LENGTH
- m<sup>3</sup> - CUBIC METER

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

**CLIENT:**

THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

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JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

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P.O BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

STANDARD DRAWING

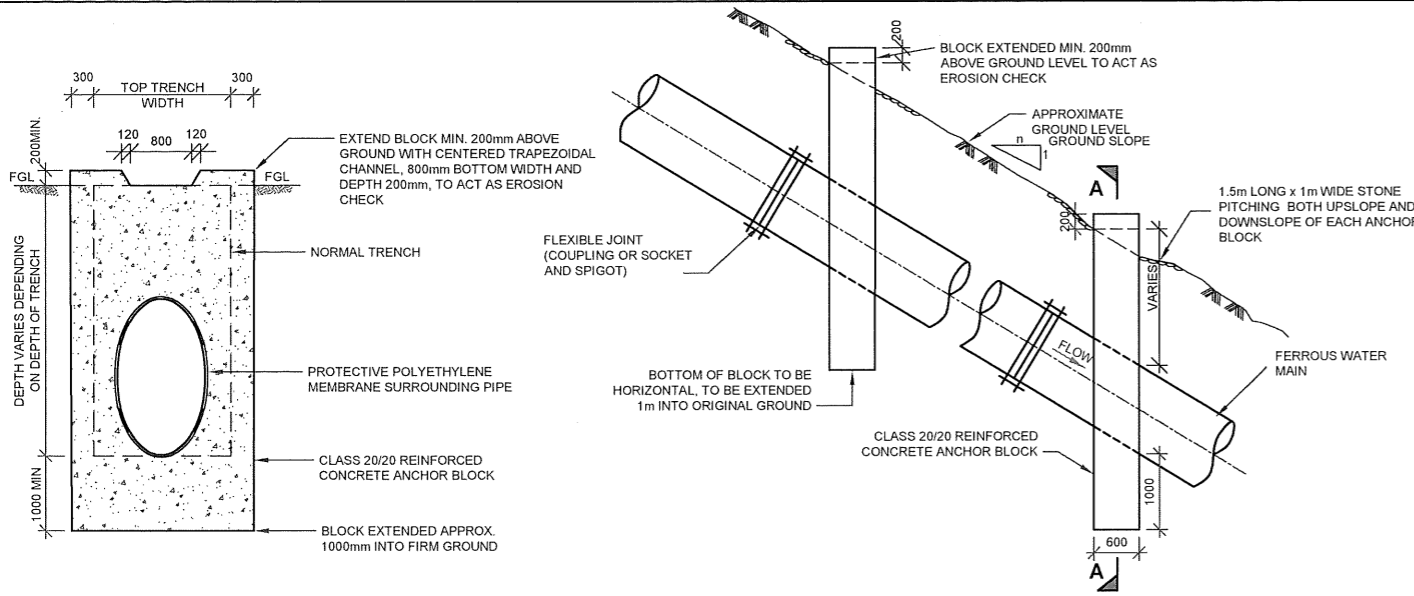
DRAWING TITLE:  
**THRUST BLOCKS**

Designed by: J.M.K Drawn by: O.J.O

Checked by: J.M.K Approved by: C.R

Scale: AS SHOWN Date: JUNE 2023

DRG No. M455/W-02B/SD/09 REV. 0



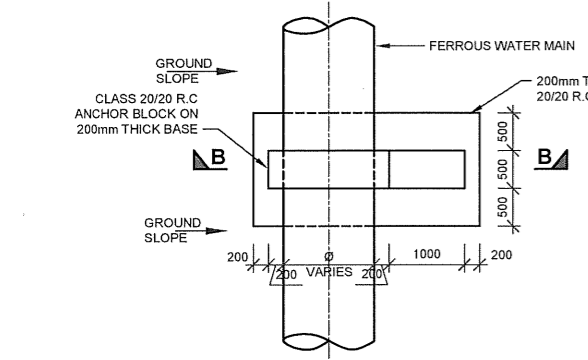
**SECTION A-A**  
SCALE 1:100

**SIDE ELEVATION**  
SCALE 1:100

- NOTES**
- SAME ARRANGEMENT CAN BE USED AS SUPPORTS FOR PIPES LAID IN VERY SOFT GROUND BUT BLOCKS TO BE CAST ON SOUND ROCK OR HARD STRATUM
  - ANCHOR BLOCKS TO BE CONSTRUCTED ON LOWER SIDE OF JOINT
  - UNLESS OTHERWISE INSTRUCTED, BUTT WELD JOINTED PIPES FOR STEEL AND SELF ANCHORING JOINTED PIPES FOR DUCTILE IRON WILL NOT REQUIRE ANCHOR BLOCKS

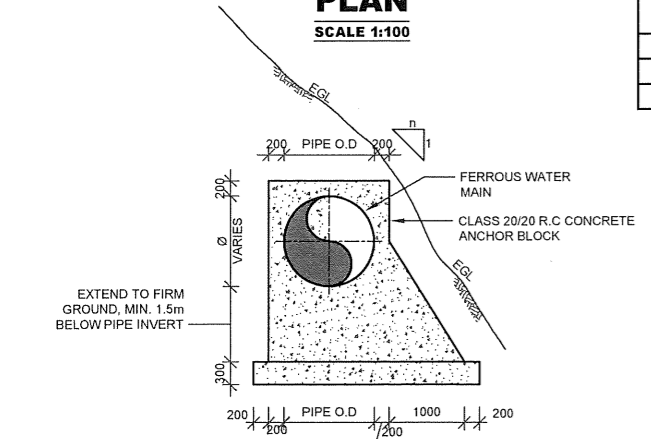
**ANCHOR BLOCK TYPE 1**  
PIPE LAID ALONG SLOPE (GRADIENT > 1:8)

RANGE OF GROUND SLOPE 1:n	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS TYPE 1 (ALONG SLOPE) (m)
<1:8	-
1:10 - 1:6	36
1:6 - 1:5	24
1:5 - 1:4	18
1:4 - 1:2	12
>1:2	EVERY PIPE LENGTH TO BE ANCHORED (BASED ON PIPE LENGTH OF 6m)



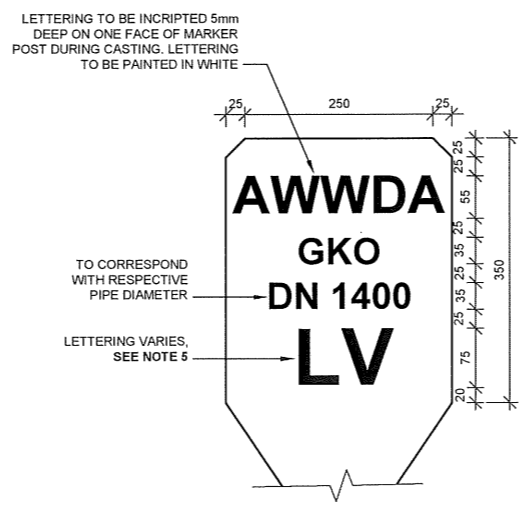
**PLAN**  
SCALE 1:100

RANGE OF GROUND SLOPE 1:n	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS TYPE 2 (ACROSS SLOPE) (m)
<1:4	-
1:4 - 1:2	12
>1:2	6



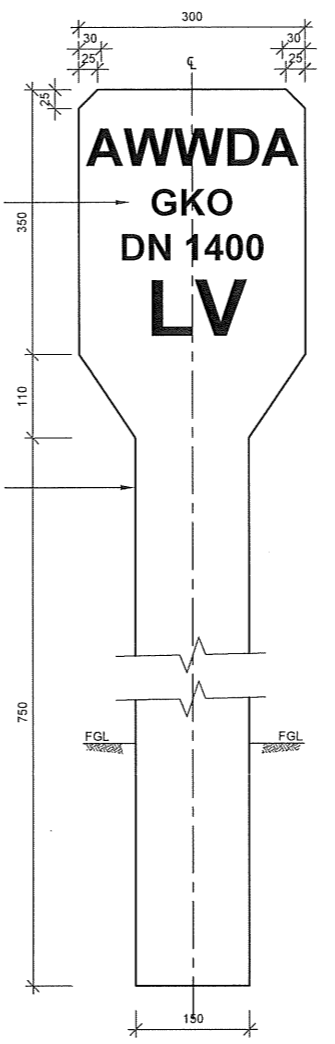
**SECTION B-B**  
SCALE 1:100

**ANCHOR BLOCK TYPE 2**  
PIPE LAID ACROSS SLOPE (GRADIENT > 1:4)

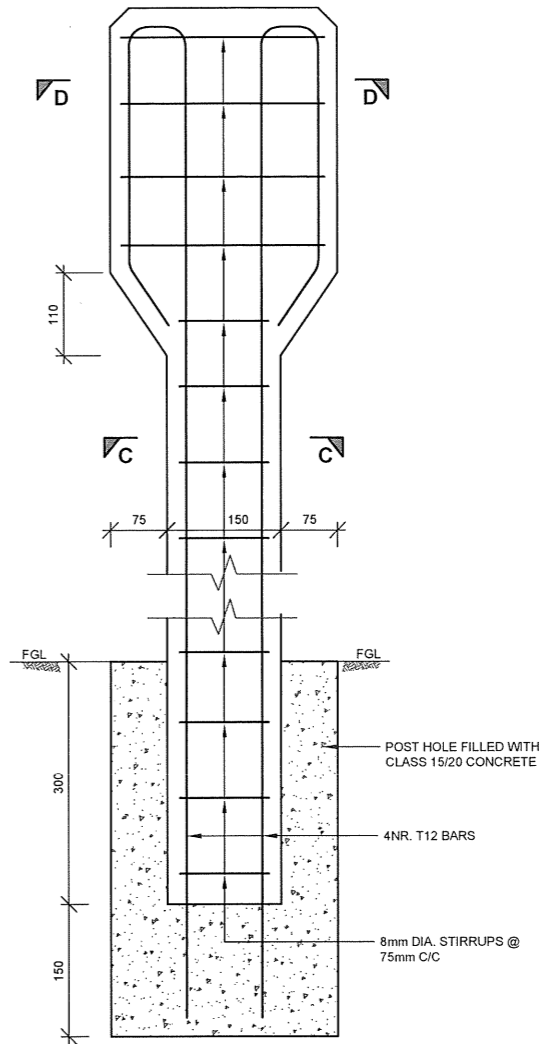


**DETAIL 1**  
**LETTERING DETAIL**  
SCALE 1:10

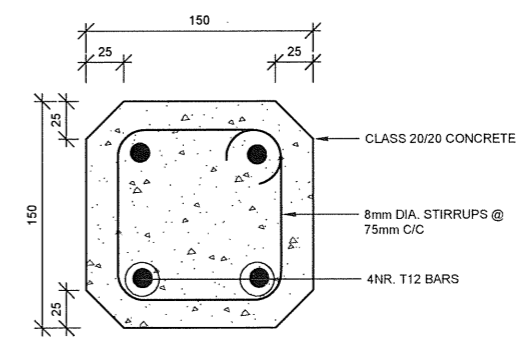
- NOTES:**
- ALL INDICATOR POSTS TO BE PAINTED WITH TWO COATS OF BLUE OIL BASED PAINT AND WHITE LETTERING TO ENGINEER'S APPROVAL
  - INDICATOR POSTS TO BE PLACED AT ALL APPURTENANCE LOCATIONS, AND AT INTERVALS OF 250m, WITH THE UNSCRIPED LETTERING FACING THE ACCESS ROAD



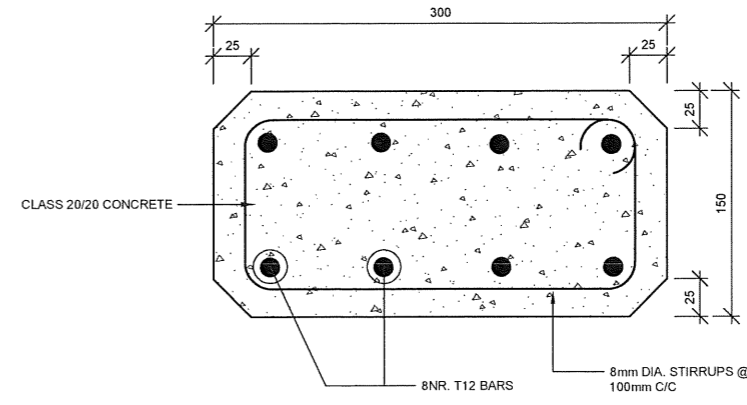
**LINE VALVE INDICATOR POST**  
SCALE 1:10



**INDICATOR POST REINFORCEMENT DETAILS**  
SCALE 1:10



**SECTION C-C**  
SCALE 1:5



**SECTION D-D**  
SCALE 1:5

- NOTES**
- ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED
  - ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)
  - ANCHOR BLOCKS INSTALLED FOR PIPES LAID AT SLOPES EXCEEDING 1:8 FOR TYPE 1 BLOCKS AND SLOPES EXCEEDING 1:4 FOR TYPE 2 BLOCKS
  - DETAILS OF ALL INDICATOR POSTS ARE AS FOR LINE VALVE BUT LETTERING TO BE AS FOLLOWS-
- | FOR        | USE |
|------------|-----|
| LINE VALVE | LV  |
| AIR VALVE  | AV  |
| WASHOUT    | WO  |
| WATER MAIN | WM  |
| BULK METER | M   |
- ABBREVIATIONS**
- mm - MILLIMETRES  
FGL - FINISHED GROUND LEVEL  
EGL - EXISTING GROUND LEVEL  
PIL - PIPE INVERT LEVEL  
DIA - DIAMETER  
O.D - OUTER DIAMETER  
R.C. - REINFORCED CONCRETE  
M.S. - MILD STEEL  
c/c - CENTER TO CENTRE  
No. - NUMBER  
m<sup>3</sup> - CUBIC METER  
AWWDA - ATHI WATER WORKS DEVELOPMENT AGENCY

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

**CLIENT:**

THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE

**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP**  
MANGAT I.B PATEL (MIBP) LIMITED  
P.O BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

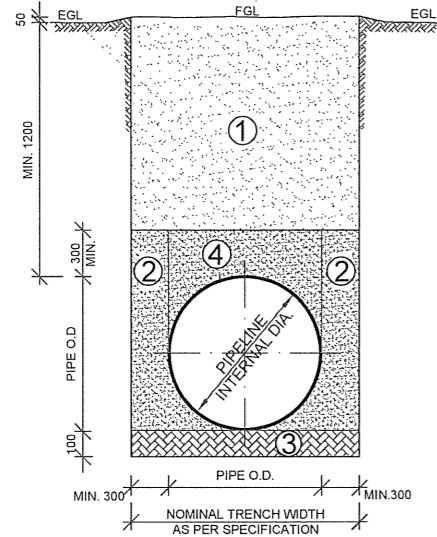
**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

**STANDARD DRAWING**

**DRAWING TITLE:**  
ANCHOR BLOCKS AND INDICATOR POSTS

Designed by: J.M.K	Drawn by: O.J.O
Checked by: J.M.K	Approved by: C.R
Scale: AS SHOWN	Date: JUNE 2023
DRG No. M455/W-02B/SD/10	REV. 0

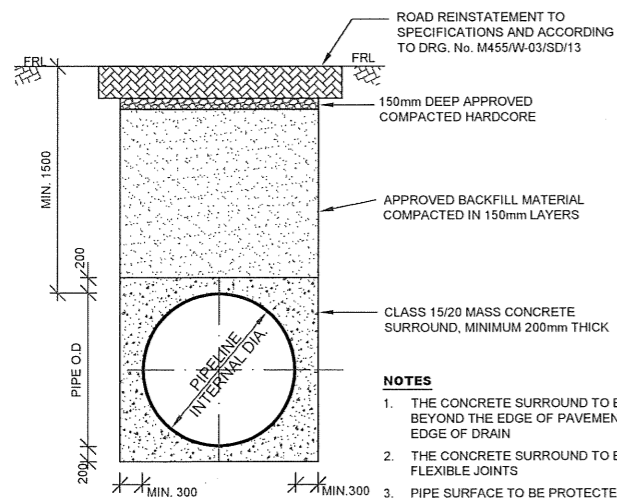


**TYPICAL NORMAL TRENCH DETAILS FOR WATER MAINS (FERROUS PIPES)**  
SCALE 1:100

- ZONE 1** SOIL TO BE USED MAY INCLUDE FREE-DRAINING COARSE SAND, GRAVEL, LOAM AND SOIL OF A FRIABLE NATURE. PARTICULAR SIZE NOT TO EXCEED 20mm. BACKFILL IN LAYERS NOT EXCEEDING 300mm UPTO FINISHED GROUND LEVEL, EACH LAYER BEING WELL COMPACTED TO LIMIT VOIDS. MECHANICAL COMPACTION EQUIPMENT MAY BE USED IF APPROVED BY ENGINEER.
- ZONE 2** BACKFILL WITH SOIL APPROVED BY THE ENGINEER, IN LAYERS NOT EXCEEDING 200mm. THOROUGHLY COMPACT SOIL, TAMPING EQUALLY ON EITHER SIDE AND ALONG LOWER EDGE OF PIPE. ONLY HAND TAMPING TO BE USED.
- ZONE 3** IF SHARP ROCK PROJECTIONS, TREE ROOTS OR OTHER UNSUITABLE MATERIAL IS ENCOUNTERED AT TRENCH INVERT LEVEL, A FURTHER 100mm DEPTH OF MATERIAL IS TO BE EXCAVATED. BACKFILL WITH SOIL APPROVED BY ENGINEER UPTO TRENCH INVERT LEVEL. THOROUGHLY COMPACT SOIL BY HAND TO GIVE A UNIFORM GRADIENT ALONG PIPE TRENCH, LEAVING RECESSES FOR PIPE JOINTS.
- ZONE 4** SIMILAR REQUIREMENTS TO ZONE 2 EXCEPT NO EXCESS TAMPING IS PERMITTED OVER PIPE

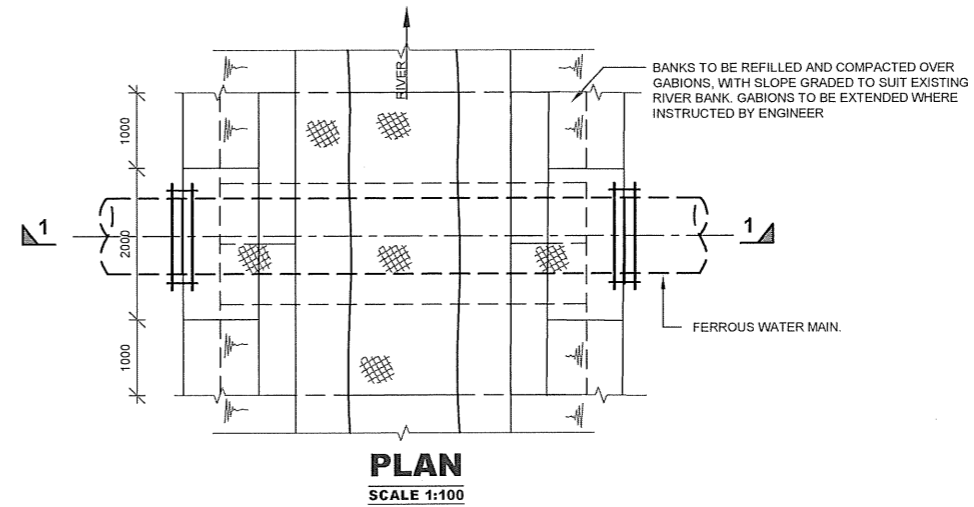
**NOTE:**  
TRENCH SIDE SLOPES AND EXTENDED WIDTH AT CONTRACTOR'S DISCRETION DEPENDING ON STABILITY OF EXCAVATED SURFACE TO ENSURE ADEQUATE SAFETY TO LABOUR AT WORK ON SITE. QUANTITIES TO BE MEASURED BASED ON NOMINAL TRENCH WIDTH

PIPE DIA (mm)	TRENCH WIDTH (mm)
1400	2000

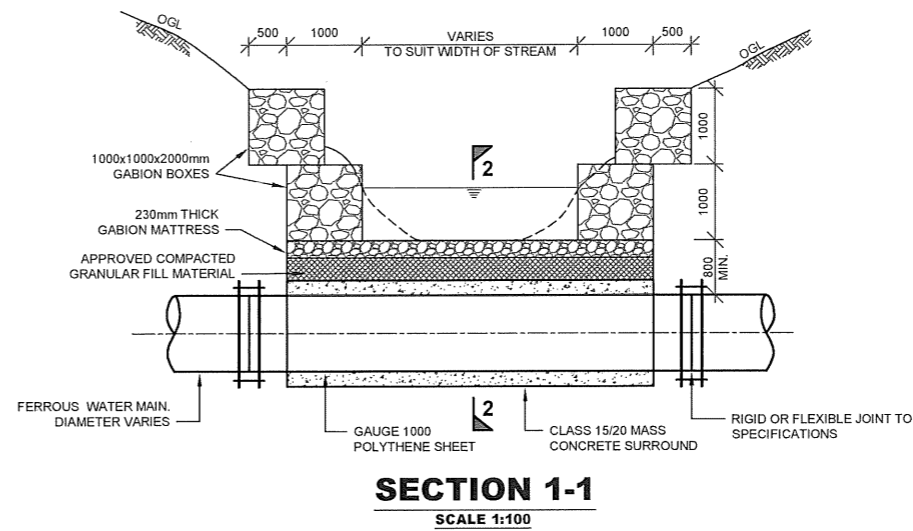


**TYPICAL TRENCH REINSTATEMENT DETAIL AT ROAD CROSSINGS**  
SCALE 1:100

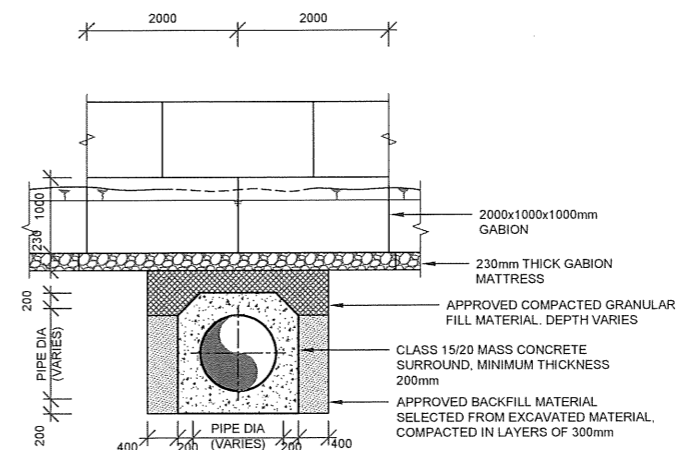
- NOTES**
1. THE CONCRETE SURROUND TO BE EXTENDED 1m BEYOND THE EDGE OF PAVEMENT OR IF APPLICABLE EDGE OF DRAIN
  2. THE CONCRETE SURROUND TO BE BROKEN AT FLEXIBLE JOINTS
  3. PIPE SURFACE TO BE PROTECTED WITH GAUGE 1000 POLYTHENE SHEET



**PLAN**  
SCALE 1:100



**SECTION 1-1**  
SCALE 1:100



**SECTION 2-2**  
SCALE 1:100

**TYPICAL UNDER-RIVER CROSSING**

- NOTES:**
1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED
  2. ALL PIPE SURFACES IN CONTACT WITH CONCRETE ARE WRAPPED IN GAUGE 1000 POLYTHENE SHEET
  3. MASS CONCRETE SURROUND IN CLASS 15/20 UNLESS OTHERWISE STATED
  4. ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED, COUPLING OR SOCKET AND SPIGOT JOINT)

**ABBREVIATIONS**

mm	-	MILLIMETRES
FGL	-	FINISHED GROUND LEVEL
EGL	-	EXISTING GROUND LEVEL
O.G.L	-	ORIGINAL GROUND LEVEL
DIA	-	DIAMETER
FRL	-	FINISHED ROAD LEVEL
CL	-	CENTER LINE

REVISIONS	SIGN	DATE	APPROVED
	BY		
	CHECKED		
	BY		
	CHECKED		
	BY		
	CHECKED		

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

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JOINT VENTURE  
**ARTELIA**  
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38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
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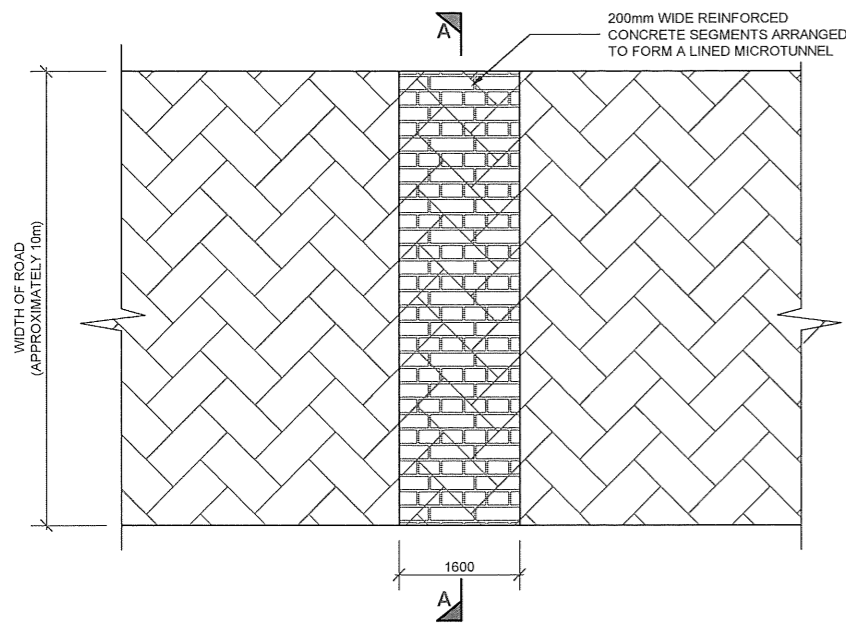
**MIBP MANGAT I.B. PATEL (MIBP) LIMITED**  
CONSULTING ENGINEERS  
P.O. BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

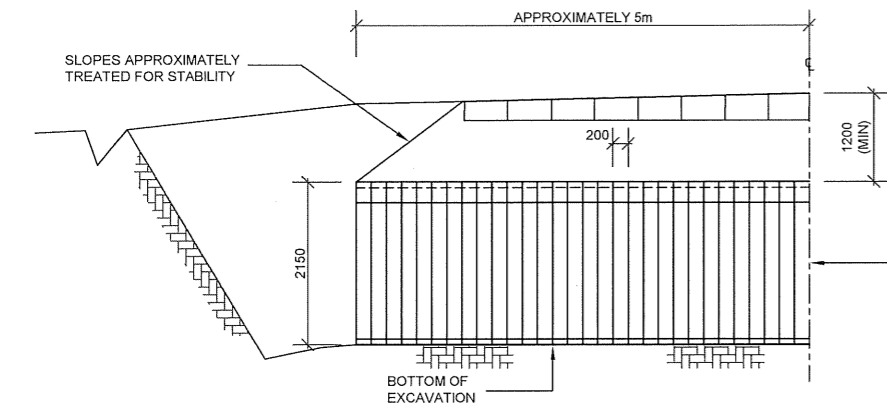
**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

**STANDARD DRAWING**  
**DRAWING TITLE:**  
PIPE TRENCH AND CONCRETE SURROUND

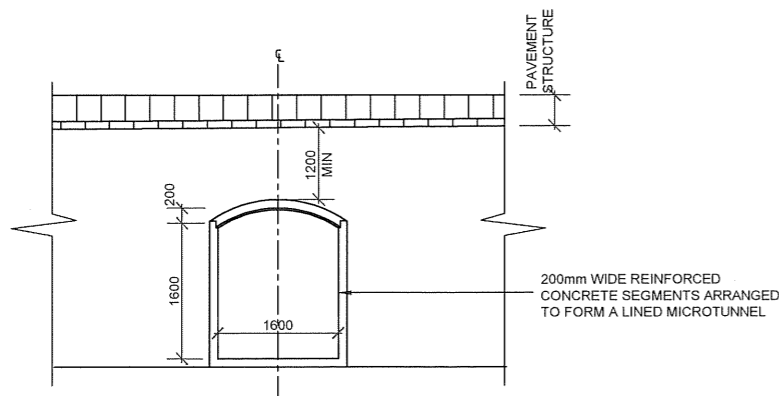
Designed by: J.M.K	Drawn by: O.J.O
Checked by: J.M.K	Approved by: C.R
Scale: AS SHOWN	Date: JUNE 2023
DRG No. M455/W-02B/SD/11	REV. 0



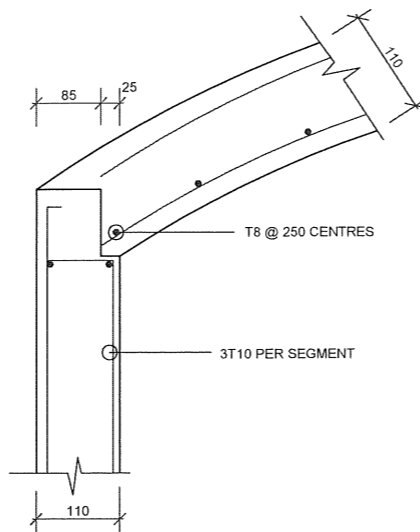
**PLAN VIEW ON ROAD**  
SCALE 1:100



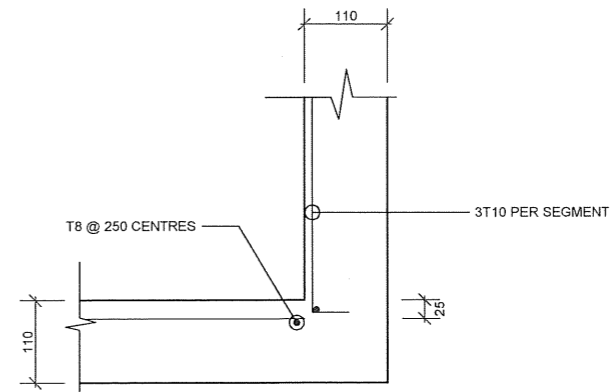
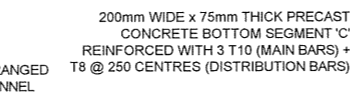
**SECTION A-A**  
SCALE 1:100



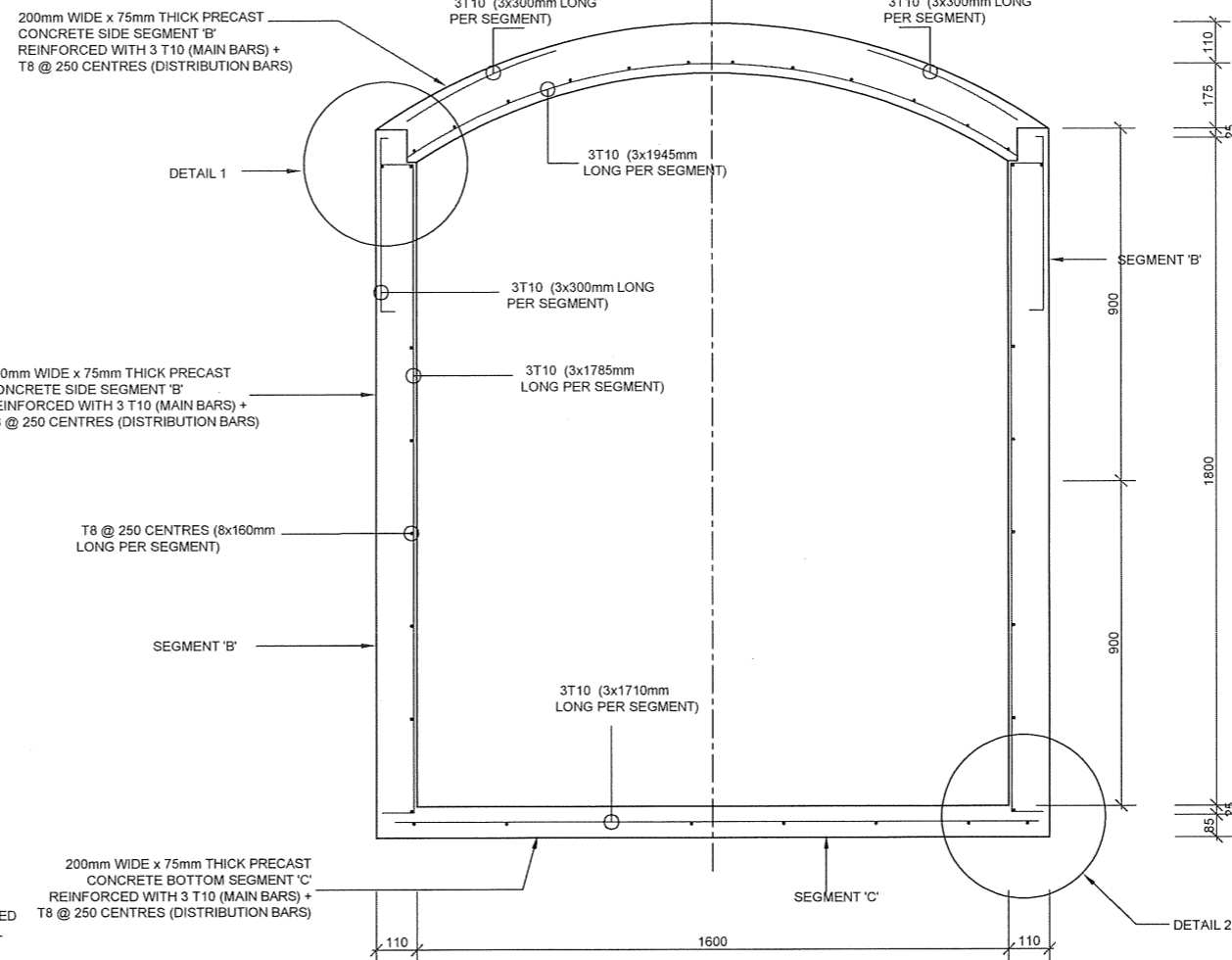
**SECTION B-B**  
SCALE 1:100



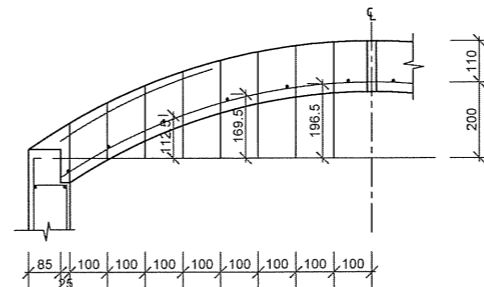
**DETAIL 1**  
SCALE 1:10



**DETAIL 2**  
SCALE 1:10



**TUNNEL LINING DETAILS**  
SCALE 1:20



**CROWN SEGMENT 'A' DETAIL**  
SCALE 1:20

**ABBREVIATIONS**

- mm - MILLIMETRES
- FGL - FINISHED GROUND LEVEL
- EGL - EXISTING GROUND LEVEL
- PIL - PIPE INVERT LEVEL
- DIA - DIAMETER
- R.C. - REINFORCED CONCRETE
- M.S. - MILD STEEL
- c/c - CENTER TO CENTRE
- No. - NUMBER

**NOTES:**

1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED
2. ALL REINFORCED CONCRETE IN CLASS 25/20 UNLESS OTHERWISE STATED
3. ALL HIGH TENSILE (T) BARS IN ACCORDANCE WITH BS 4449
4. MINIMUM COVER TO ALL REINFORCEMENTS FROM INSIDE FACES IS 20mm

**SPECIFICATIONS**

1. TYPICAL DETAILS ARE SUITABLE FOR SOFT MATERIAL SUCH AS RED COFFEE SOIL, CLAY SOILS AND GRAVELLY SOILS.
2. PRECAST SEGMENTS DESIGNED FOR THE FOLLOWING LOADING ASSUMPTIONS:
  - TRAFFIC WHEEL LOAD OF 100KN DIRECTLY ABOVE TUNNEL AND APPLIED ON THE PAVEMENT SURFACE WITH A CONTACT AREA OF 300mm x 300mm
  - UNIFORM SURCHARGE LOAD OF 20KN/m<sup>2</sup> APPLIED ON PAVEMENT SURFACE
  - MINIMUM OVERBURDEN OF 1200mm FROM THE ROAD PAVEMENT SURFACE TO CROWN OF THE SEGMENTS
  - SPACES BEHIND PRECAST CONCRETE LINING AND EXCAVATION GROUTED (BY CONTACT GROUTING) ON COMPLETION OF PLACING THE SEGMENTS.
  - MAXIMUM LENGTH OF THE TUNNEL EXCAVATED EACH TIME BEFORE INSTALLING THE PRECAST SEGMENTS IS 500mm.
  - CROWN SEGMENT OF THE TUNNEL LINING IS OF ARCH PROFILE AS PER THE SETTING OUT DIMENSIONS TABULATED.
3. TYPICAL WEIGHTS OF THE SEGMENTS:
  - SEGMENT A: 136.8Kgs
  - CROWN SEGMENT B: 129.6Kgs
  - BOTTOM SEGMENT C: 115.2Kgs

REVISIONS				SIGN	DATE	APPROVED
	BY	CHECKED				
	BY	CHECKED				
	BY	CHECKED				

**CLIENT:**

THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**

**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP MANGAT I.B PATEL (MIBP) LIMITED**  
P.O BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
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**PROJECT NAME:**  
CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

**STANDARD DRAWING**

**DRAWING TITLE:**  
TRENCHLESS ROAD CROSSING

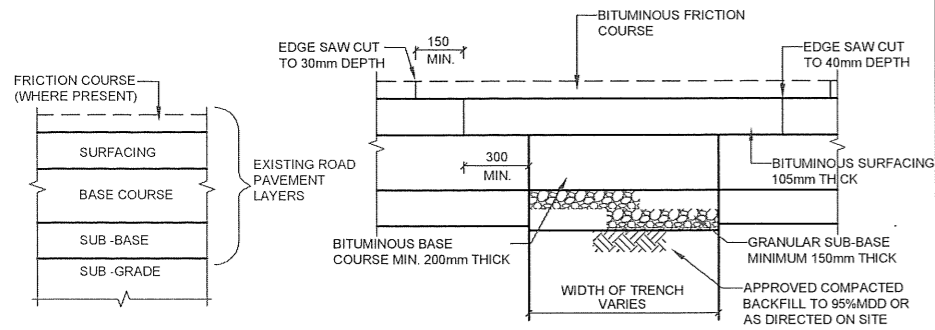
Designed by: J.M.K Drawn by: O.J.O

Checked by: J.M.K Approved by: C.R

Scale: AS SHOWN Date: JUNE 2023

DRG No. M455W-02B/SD/12 REV. 0

### 1. BITUMINOUS CARRIAGEWAY



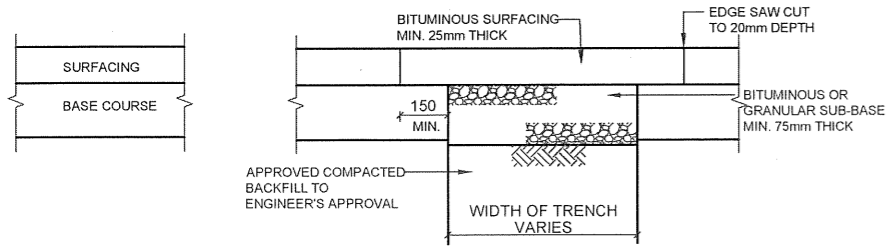
**EXISTING CONSTRUCTION**  
(MAY VARY ON SITE)

**PERMANENT REINSTATEMENT**

**NOTES:**

- THE REINSTATEMENT SUB-BASE MATERIAL TO BE PUT BACK SHALL BE OF THE SAME THICKNESS AS THE ORIGINAL ADJOINING PAVEMENT SUBJECT TO A MINIMUM OF 150mm.
- THE REINSTATEMENT ROAD-BASE TO BE PUT BACK SHALL BE OF APPROVED BITUMINOUS MATERIAL AND OF THE SAME THICKNESS AS THE ADJOINING PAVEMENT SUBJECT TO A MINIMUM OF 200mm.
- THE APPROVED BITUMINOUS SURFACING LAYER TO BE PUT BACK SHALL BE 105mm THICK AND SHALL CONSIST OF A 65mm THICK BASE COURSE AND A 40mm THICK WEARING COURSE.
- FRICITION COURSE MAY BE ABSENT IN MOST URBAN ROADS, BUT WHERE A FRICITION COURSE IS PRESENT IN THE ORIGINAL ROAD PAVEMENT, A FRICITION COURSE LAYER OF THE SAME THICKNESS SHALL BE PUT BACK.
- MATERIAL SPECIFICATION SHALL BE IN ACCORDANCE WITH GENERAL SPECIFICATIONS. A TYPICAL PAVEMENT SECTION CONSTRUCTION MAY CONSIST OF  
 FRICITION COURSE - 10mm NOMINAL SIZE FRICITION COURSE MATERIAL  
 WEARING COURSE - 10 OR 20mm NOMINAL SIZE WEARING COURSE MATERIAL  
 BASE COURSE - 28 OR 37.5mm NOMINAL SIZE BASE COURSE MATERIAL  
 ROAD-BASE - 37.5mm NOMINAL SIZE ROAD-BASE COURSE MATERIAL  
 SUB-BASE - GRANULAR SUB-BASE
- FOR LIMITS OF REINSTATEMENT REFER TO THE RULES IN MIDDLE COLUMN OF THIS DRAWING

### 2. BITUMINOUS FOOTWAY AND CYCLETRACK



**EXISTING CONSTRUCTION**  
(MAY VARY ON SITE)

**PERMANENT REINSTATEMENT**

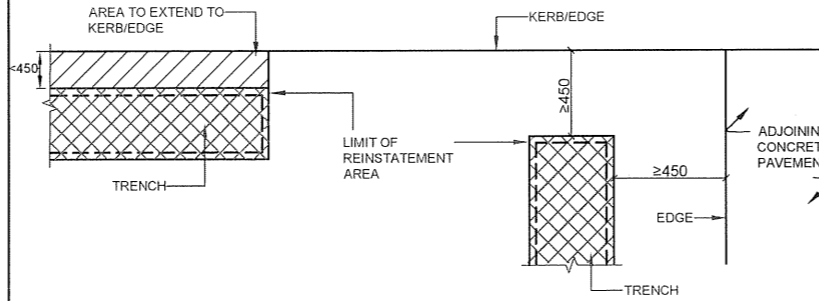
**NOTES:**

- THE SUB-BASE TO BE PUT BACK SHALL BE OF EITHER APPROVED GRANULAR MATERIAL SPECIFICATIONS OR BITUMINOUS MATERIAL AND SHALL BE OF THE SAME THICKNESS AS THE ADJOINING ORIGINAL FOOTWAY OR CYCLETRACK SUBJECT TO A MINIMUM THICKNESS OF 75mm.
- THE SURFACING TO BE PUT BACK SHALL BE 10mm NOMINAL SIZE WEARING COURSE MATERIAL AND SHALL BE OF THE SAME THICKNESS AS THE ADJOINING ORIGINAL FOOTWAY OR CYCLETRACK SUBJECT TO A MINIMUM OF 25mm.
- FOR LIMITS OF REINSTATEMENT REFER TO THE RULES IN MIDDLE COLUMN OF THIS DRAWING

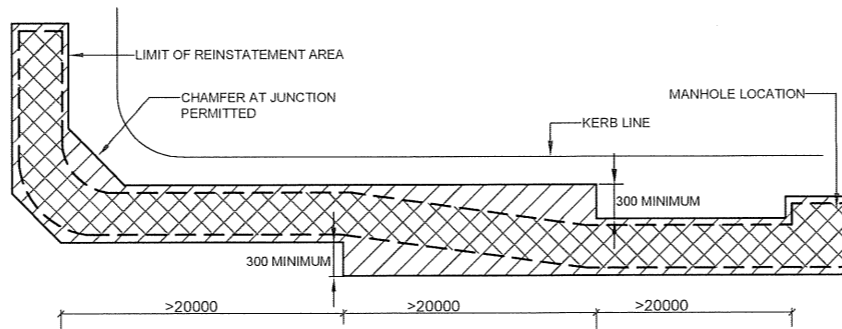
### RULES TO DETERMINE THE LIMIT OF REINSTATEMENT IN BITUMINOUS CARRIAGEWAY, FOOTWAY AND CYCLETRACK

**A. CARRIAGEWAY CONSTRUCTED MORE THAN 5 YEARS AGO, CARRIAGEWAY RE-SURFACED MORE THAN 1 YEAR AGO AND FOOTWAY OR CYCLETRACK CONSTRUCTED MORE THAN 1 YEAR AGO**

- THE REINSTATEMENT AREA (TRENCH WIDTH SHALL BE OF SUFFICIENT WIDTH TO ALLOW THE USE OF PROPER COMPACTING EQUIPMENT).
- THE REINSTATEMENT AREA SHALL EITHER  
 (a) BE AT AN EDGE (THE KERB LINE, THE BUILDING LINE OR ADJOINING CONCRETE PAVEMENT) OF THE BITUMINOUS PAVEMENT; OR  
 (b) BE AT A MINIMUM DISTANCE (MEASURED FROM ANY PART OF THE REINSTATEMENT AREA AT RIGHT ANGLE TO THE EDGE) OF 450mm FROM AN EDGE

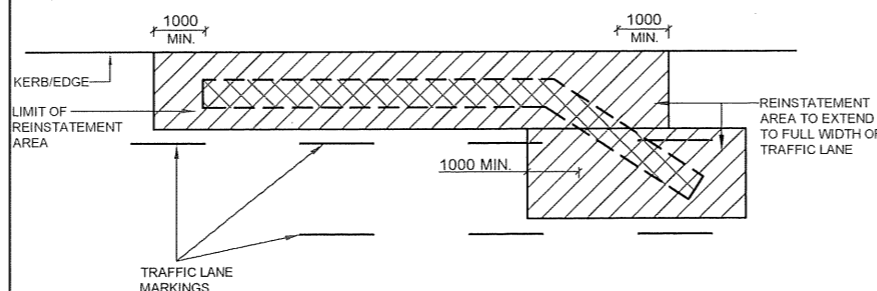


- THE REINSTATEMENT AREA SHALL BE RECTANGULAR IN PLAN WITH THE SIDES EITHER PARALLEL OR PERPENDICULAR TO THE NEAREST EDGE OF THE BITUMINOUS PAVEMENT. STEPPED OR L-SHAPED REINSTATEMENT AREA IS PERMITTED ONLY IF:-  
 (a) THE REINSTATEMENT AREA RUNS ALONG THE LENGTH OF THE CARRIAGEWAY, FOOTWAY OR CYCLETRACK, IN SUCH CASES  
 - THE LENGTH OF EACH STEP ALONG THE LENGTH OF THE CARRIAGEWAY, FOOTWAY OR CYCLETRACK IS NOT LESS THAN 20m EXCEPT AT LOCATION OF MANHOLES OR JUNCTION BOXES;  
 - THE LENGTH OF EACH STEP PERPENDICULAR TO THE LENGTH OF THE CARRIAGEWAY, FOOTWAY OR CYCLETRACK IS NOT LESS 300mm; OR  
 (b) THE TRENCH GOES ROUND A ROAD JUNCTION, IN SUCH CASES A CHAMFER AT THE CORNER IS PERMITTED.

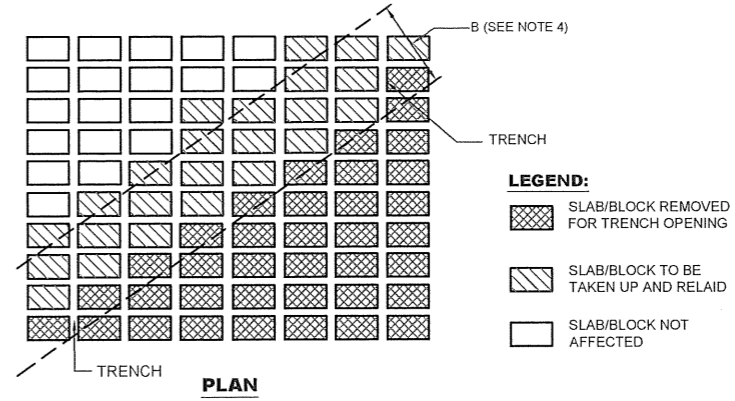


**B. CARRIAGEWAY CONSTRUCTED WITHIN THE LAST 5 YEARS, CARRIAGEWAY RE-SURFACED WITHIN THE LAST 1 YEAR AND FOOTWAY OR CYCLETRACK CONSTRUCTED WITHIN THE LAST 1 YEAR**

- IN ADDITION TO THE RULES MENTIONED IN A ABOVE, THE REINSTATEMENT AREA SHALL EXTEND TO THE FULL WIDTH OF THE TRAFFIC LANE(S) IN WHICH THE TRENCH IS SITUATED. ANY EXTENSION OF THE REINSTATEMENT AREA BEYOND THE MINIMUM LIMIT CAN BE DONE BY COLD MILLING AND RESURFACING THE WEARING COURSE WITHIN THE EXTENDED AREA.

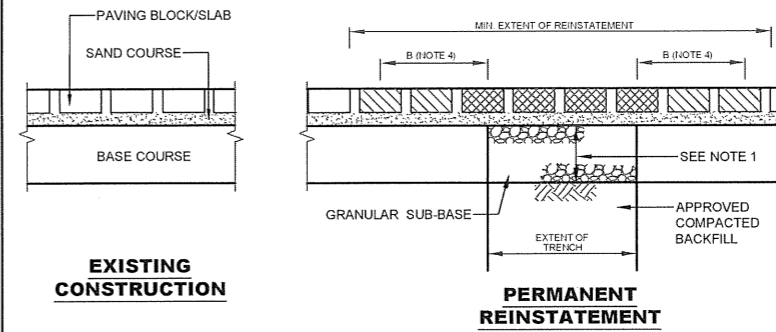


### 3. PAVING SLAB/BLOCK CONSTRUCTION



**LEGEND:**

- SLAB/BLOCK REMOVED FOR TRENCH OPENING
- SLAB/BLOCK TO BE TAKEN UP AND RELAI
- SLAB/BLOCK NOT AFFECTED



**NOTES:**

- THE SUB-BASE TO BE PUT BACK SHALL BE OF GRANULAR MATERIAL TO GENERAL SPECIFICATIONS AND SHALL BE OF THE SAME THICKNESS AS THE ADJOINING PAVEMENT SUBJECT TO A MINIMUM OF 75mm IN FOOTWAY AND 150mm IN RUN-IN AND CARRIAGEWAY.
- THE SAND COURSE TO BE PUT BACK SHALL EXCEED 20mm AND NOT EXCEED 30mm THICKNESS
- THE PAVING SLABS/BLOCKS SHALL BE OF THE SAME THICKNESS AS THE ADJOINING PAVEMENT SUBJECT TO A MINIMUM OF 60mm IN FOOTWAY AND 80mm IN CARRIAGEWAY OR RUN-IN.
- ALL PAVING SLABS/BLOCKS WITHIN A DISTANCE OF B MILLIMETERS FROM THE SIDE OF A TRENCH OR DISTURBED AS A RESULT OF THE TRENCH WORKS SHALL BE TAKEN UP AND RELAI TOGETHER WITH THE OTHER SLABS/BLOCKS REMOVED FOR THE TRENCHING WORK. B SHALL BE AT LEAST 300mm OR TWICE THE LARGEST LATERAL DIMENSION OF THE PAVING SLABS/BLOCKS USED IN THE PAVING PATTERN (THE PATTERN MAY INVOLVE SLABS/BLOCKS OF A FEW DIFFERENT SIZES), WHICHEVER IS THE GREATER. IF NECESSARY, FURTHER SLABS/BLOCKS SHOULD BE LIFTED AND REINSTATE.
- THE PAVING SLABS/BLOCKS SHALL BE RELAI ACCORDING TO THE ORIGINAL PATTERN. ANY SLABS/BLOCKS DAMAGED OR LOST SHALL BE REPLACED.

**NOTES:**

1. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED

**ABBREVIATIONS:**

- mm - MILLIMETRES
- FGL - FINISHED GROUND LEVEL
- EGL - EXISTING GROUND LEVEL
- DIA - DIAMETER
- CL - CENTER LINE

REVISIONS		SIGN	DATE	APPROVED
BY	CHECKED			
BY	CHECKED			
BY	CHECKED			

**CLIENT:**

THE CHIEF EXECUTIVE OFFICER  
 ATHI WATER WORKS DEVELOPMENT AGENCY  
 P.O. BOX 45283 - 00100 NAIROBI  
 TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**

**JOINT VENTURE**  
 ARTELIA  
 6 RUE DE LORRAINE  
 38130 ECHIROLLES, FRANCE  
 E-MAIL: artelia@arteliagroup.com  
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 NAIROBI, KENYA  
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**PROJECT NAME:**  
 CKE1135- NAIROBI WATER AND SANITATION PROJECT

**CONTRACT TITLE:**  
 CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT

BID No. AWWDA/AFD/NWSP/W-02B/2023

STANDARD DRAWING

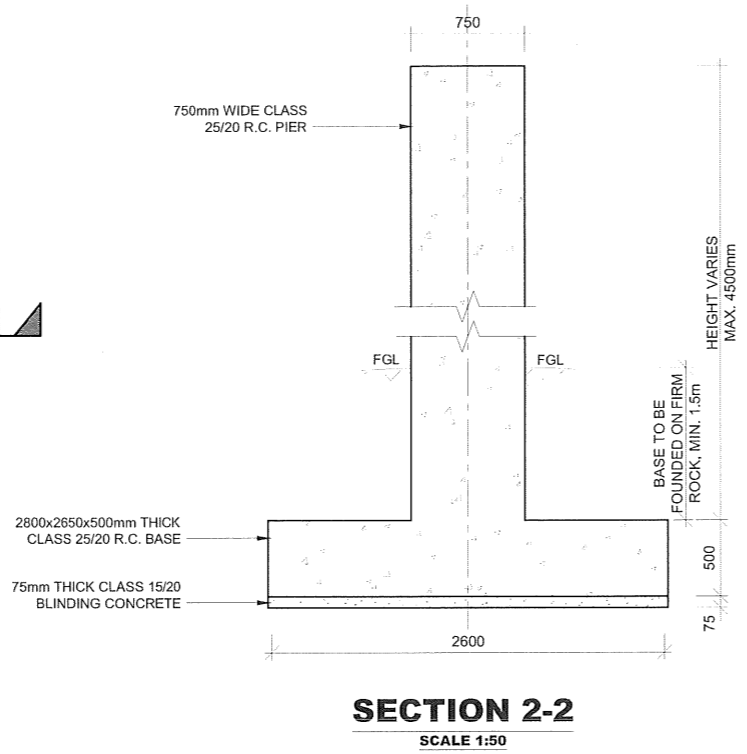
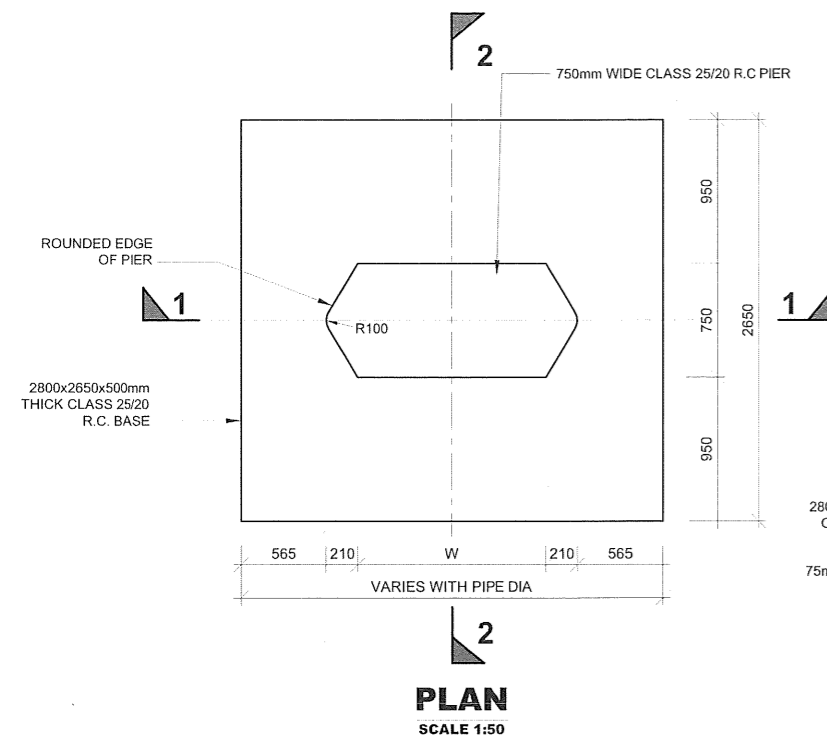
DRAWING TITLE:  
 PERMANENT REINSTATEMENT OF PAVEMENTS

Designed by: J.M.K Drawn by: O.J.O

Checked by: J.M.K Approved by: C.R

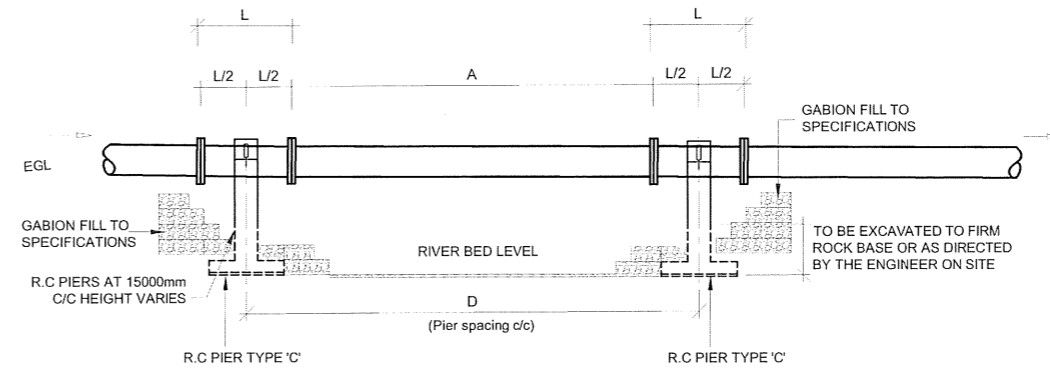
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DRG No. M455/W-02B/SD/13 REV. 0



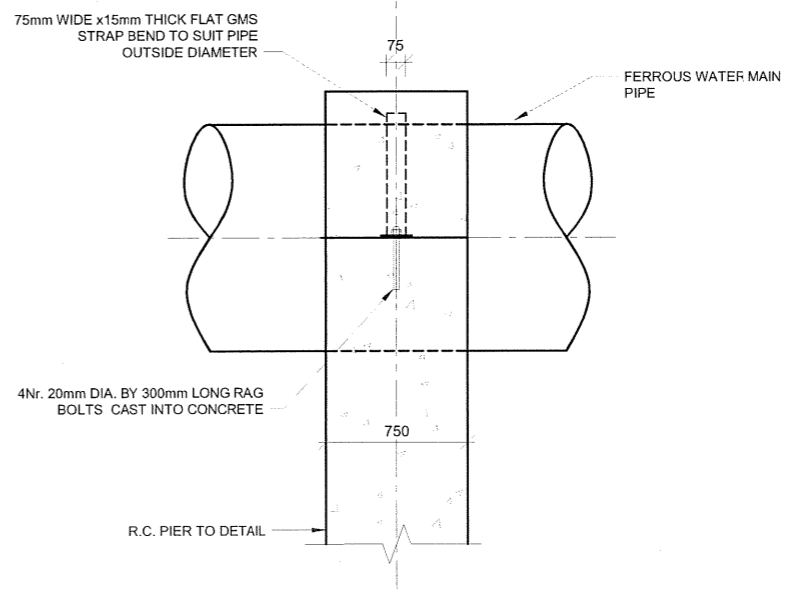
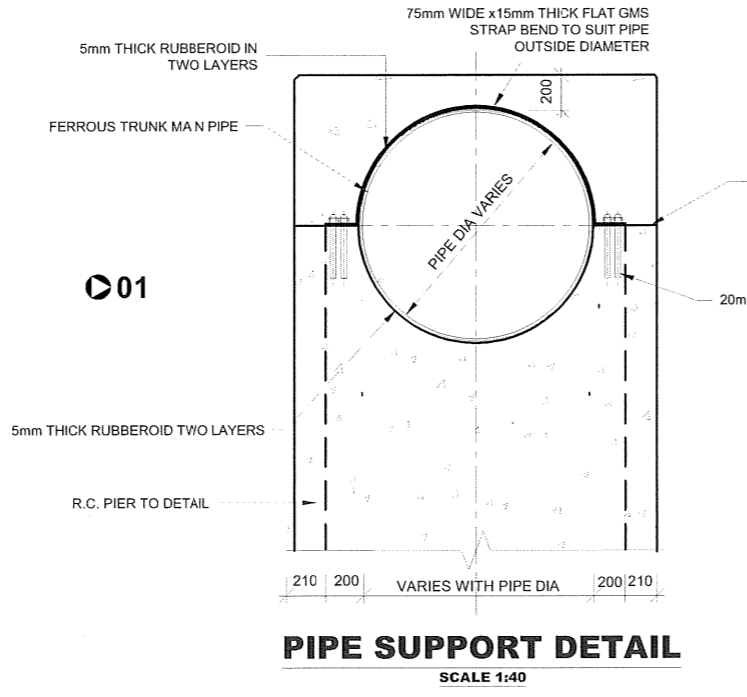
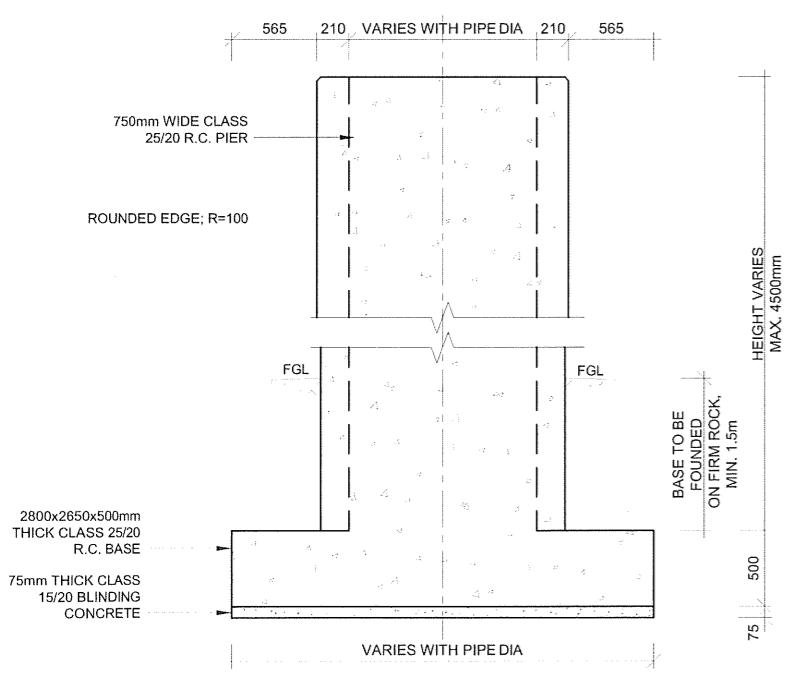
**TYPICAL DIMENSIONS**

TYPE	D (mm)	L (mm)	A (mm)	Nr.
1	15000	5000	10000	
2	12000	4000	8000	
3	9000	3000	6000	

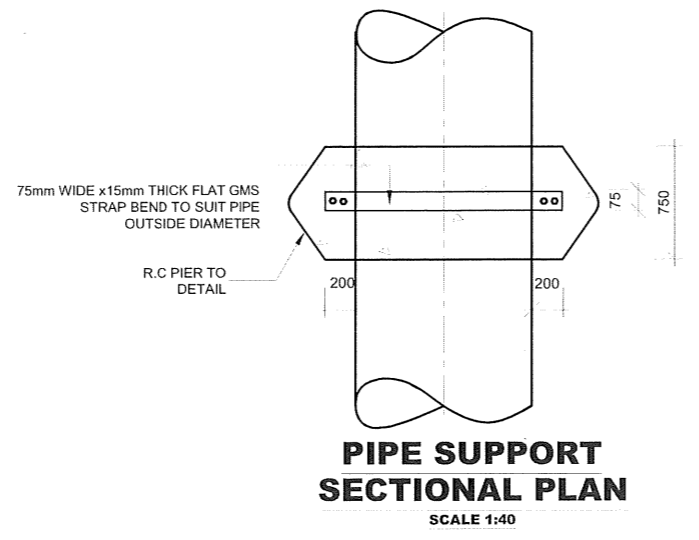


- NOTES:**
- ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED
  - ALL REINFORCED CONCRETE IN CLASS 25/20 UNLESS OTHERWISE STATED
  - ALL EXPOSED CONCRETE EDGES HAVE A 25x25mm CHAMFER
  - BOLTS AND NUTS ARE GALVANIZED
  - BOLTS AND NUTS ON PIPE SUPPORTS ARE SPOT WELDED AFTER INSTALLATION
  - ALL FITTINGS ARE FERROUS TYPE RIGID JOINTED BY BUTT-WELDING AND/OR MECHANICAL/FLEXIBLE JOINTED (FLANGED COUPLING OR SOCKET AND SPIGOT JOINT)

- ABBREVIATIONS**
- mm - MILLIMETRES
  - FGL - FINISHED GROUND LEVEL
  - EGL - EXISTING GROUND LEVEL
  - PIL - PIPE INVERT LEVEL
  - DIA - DIAMETER
  - R.C. - REINFORCED CONCRETE
  - M.S. - MILD STEEL
  - c/c - CENTER TO CENTRE
  - No. - NUMBER
  - Nr. - NUMBER
  - W - PIPE DIAMETER



**TYPICAL PIER DETAIL ON AERIAL CROSSINGS**  
SEE SCHEDULE FOR VARYING DIMENSIONS



REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

**CLIENT:**

**THE CHIEF EXECUTIVE OFFICER**  
**ATHI WATER WORKS DEVELOPMENT AGENCY**  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

**CONSULTING ENGINEERS:**  
JOINT VENTURE

**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP CONSULTING ENGINEERS**  
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P.O BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
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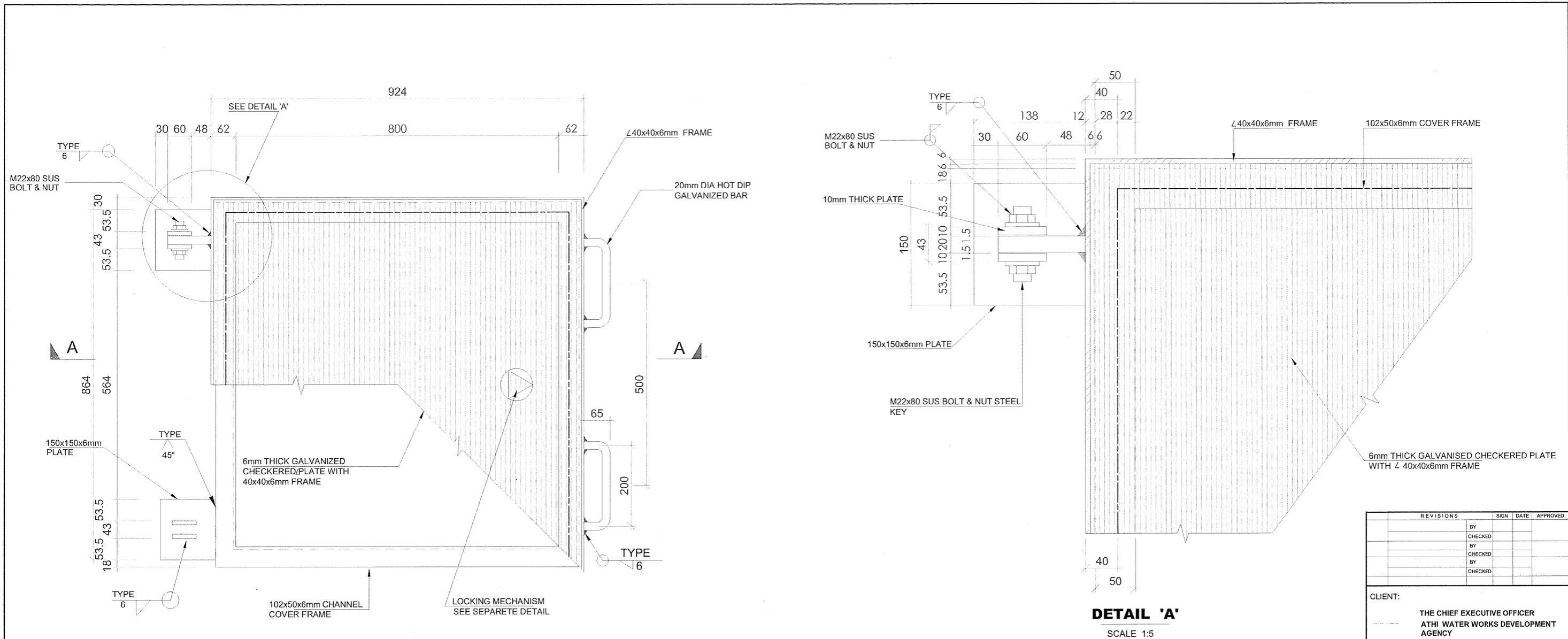
**PROJECT NAME:**  
**CKE1135- NAIROBI WATER AND SANITATION PROJECT**

**CONTRACT TITLE:**  
**CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT**  
BID No. AWWDA/AFD/NWSP/W-02B/2023

**STANDARD DRAWING**

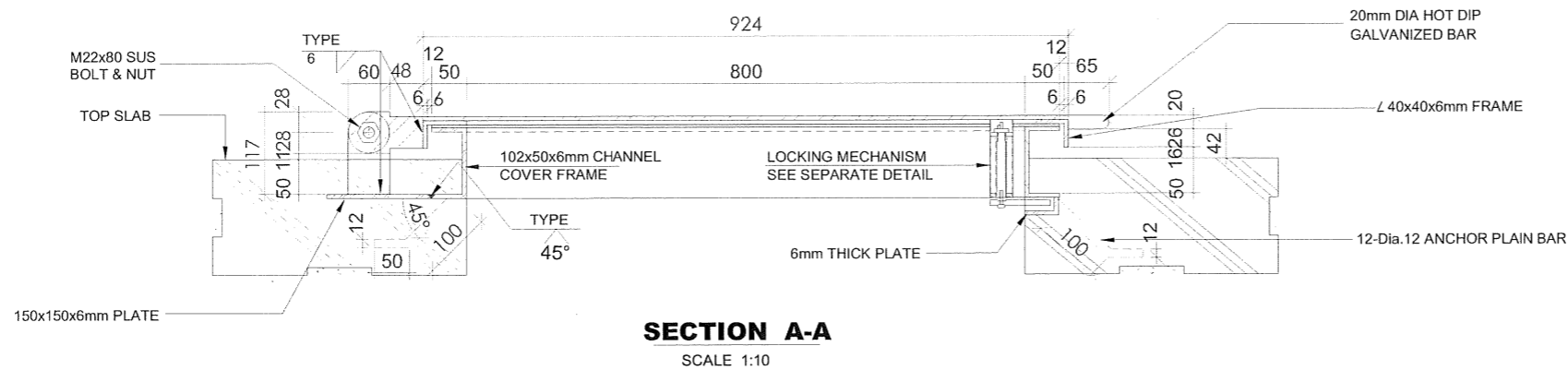
**DRAWING TITLE:**  
**PIERS AND PIPE SUPPORTS**

Designed by: J.M.K | Drawn by: O.J.O  
Checked by: J.M.K | Approved by: C.R  
Scale: AS SHOWN | Date: JUNE 2023  
DRG No. M455/W-02B/SD/14 | REV. 0



**PLAN OF CHECKERED PLATE COVER FOR CHAMBERS**  
SCALE 1:10

**DETAIL 'A'**  
SCALE 1:5



**SECTION A-A**  
SCALE 1:10

REVISIONS	SIGN	DATE	APPROVED
BY			
CHECKED			
BY			
CHECKED			
BY			
CHECKED			

CLIENT:  
**THE CHIEF EXECUTIVE OFFICER**  
**ATHI WATER WORKS DEVELOPMENT AGENCY**  
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BID No. AWWDA/AFD/NWSP/W-02B/2023

STANDARD DRAWING

DRAWING TITLE:  
**DETAILS OF CHECKERED PLATE COVERS FOR CHAMBERS**

SHEET 1 OF 2

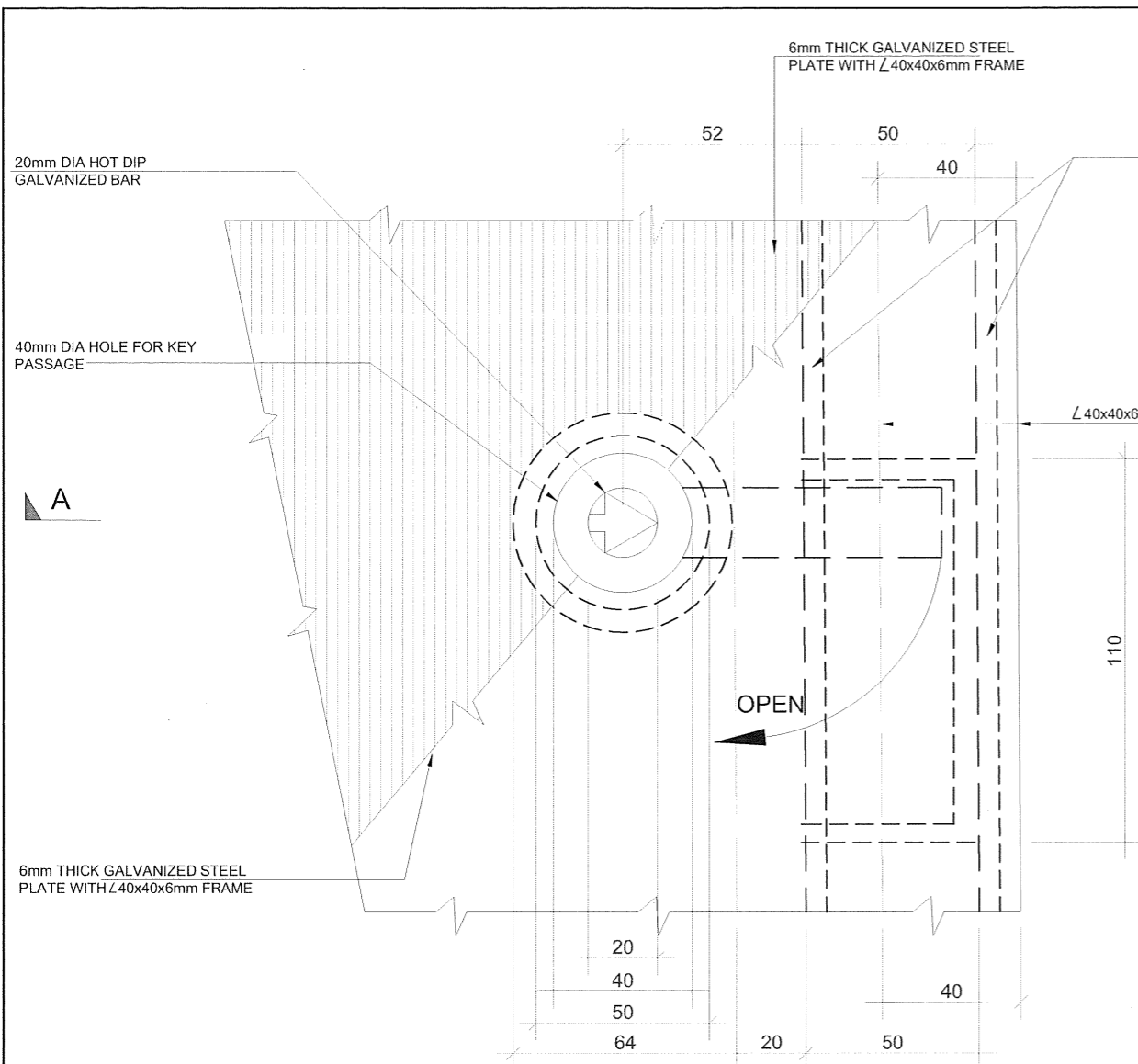
Designed by: J.M.K Drawn by: O.J.O

Checked by: J.M.K Approved by: C.R

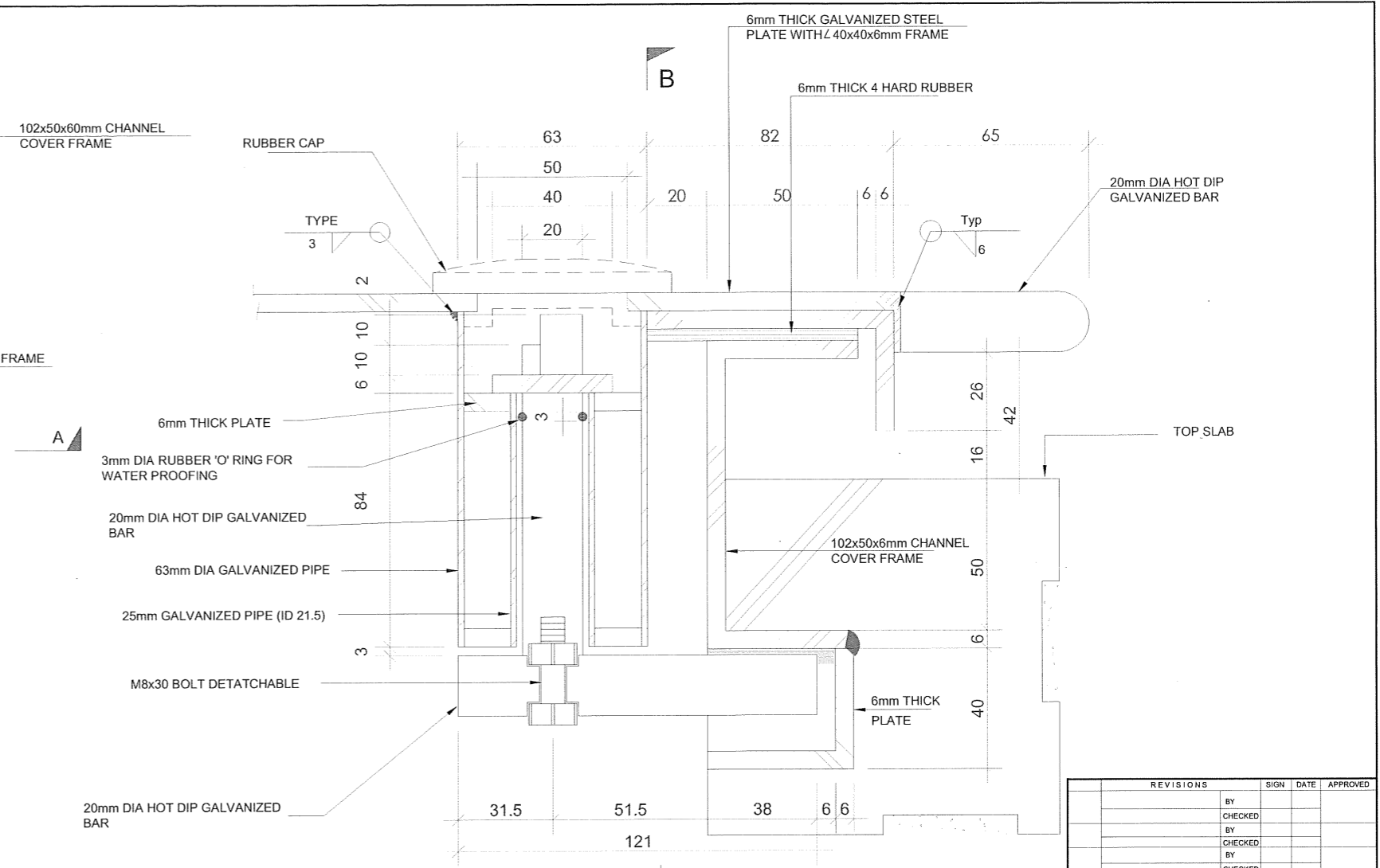
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DRG No. M455/W-02B/SD/15 REV. 0

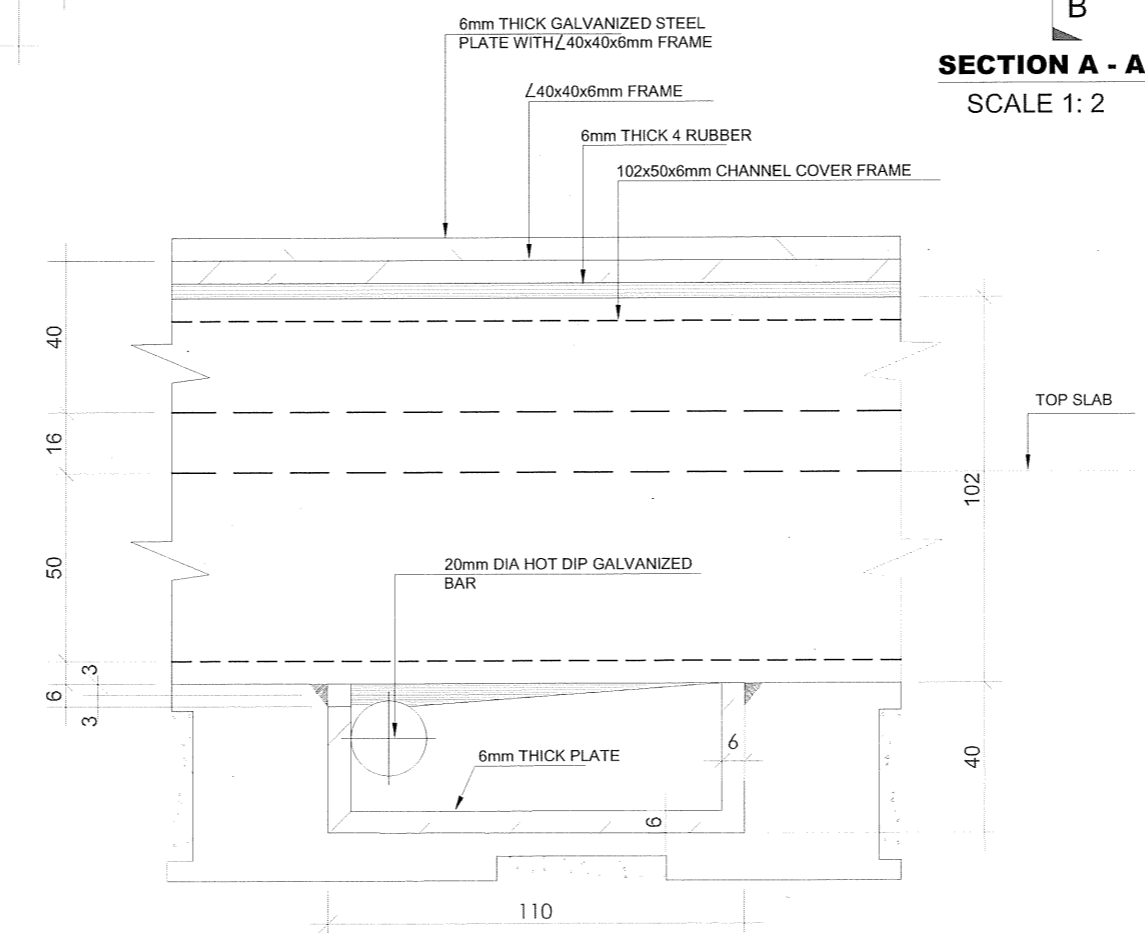
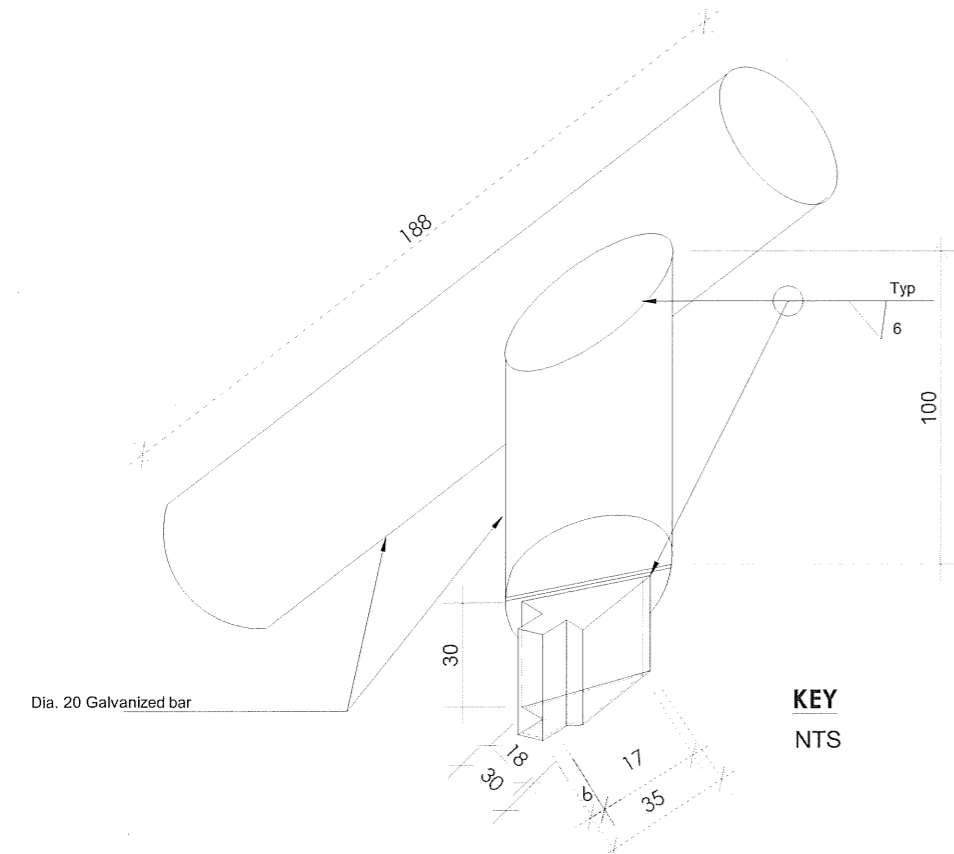




**PLAN OF LOCKING MECHANISM**  
SCALE 1:2



**SECTION A - A**  
SCALE 1:2



**SECTION B - B**  
SCALE 1:2

**NOTES:**  
1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

**ABBREVIATIONS**  
SUS - STAINLESS STEEL  
THK - THICK  
TYP - TYPE  
DIA - DIAMETER  
L - ANGLE IRON

REVISIONS	SIGN	DATE	APPROVED
BY CHECKED			
BY CHECKED			
BY CHECKED			

**CLIENT:**  
THE CHIEF EXECUTIVE OFFICER  
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CONSTRUCTION WORKS FOR GIGIRI - KARURA - OUTER RING ROAD TRANSMISSION PIPELINE AND NORTH NAIROBI WATER AND SEWERAGE PROJECT  
BID No. AWWDA/AFD/NWSP/W-02B/2023

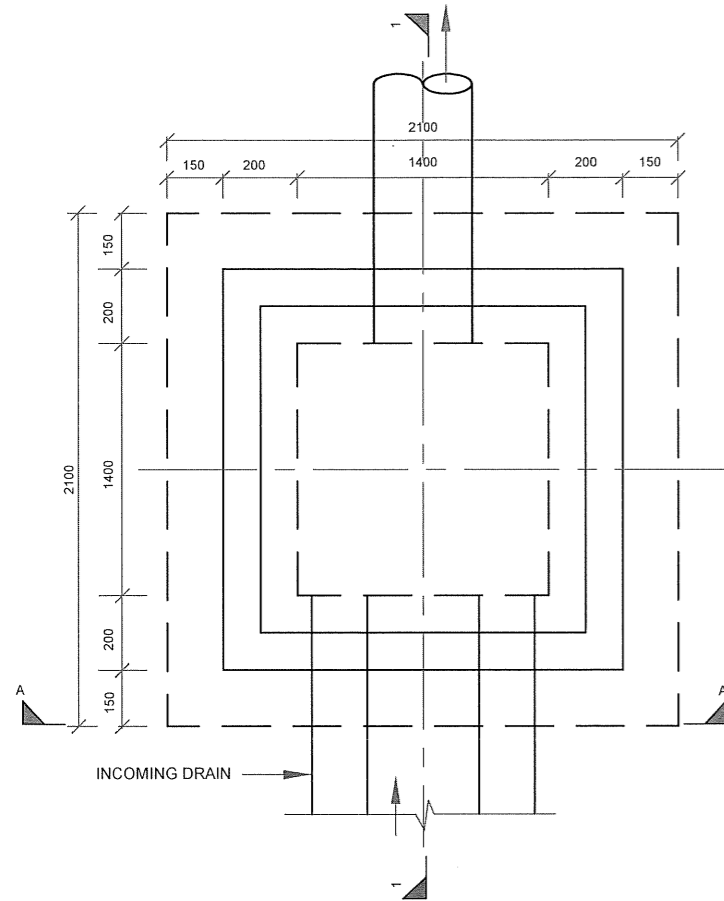
**STANDARD DRAWING**

**DRAWING TITLE:**  
DETAILS OF CHECKERED PLATE COVERS FOR CHAMBERS  
SHEET 2 OF 2

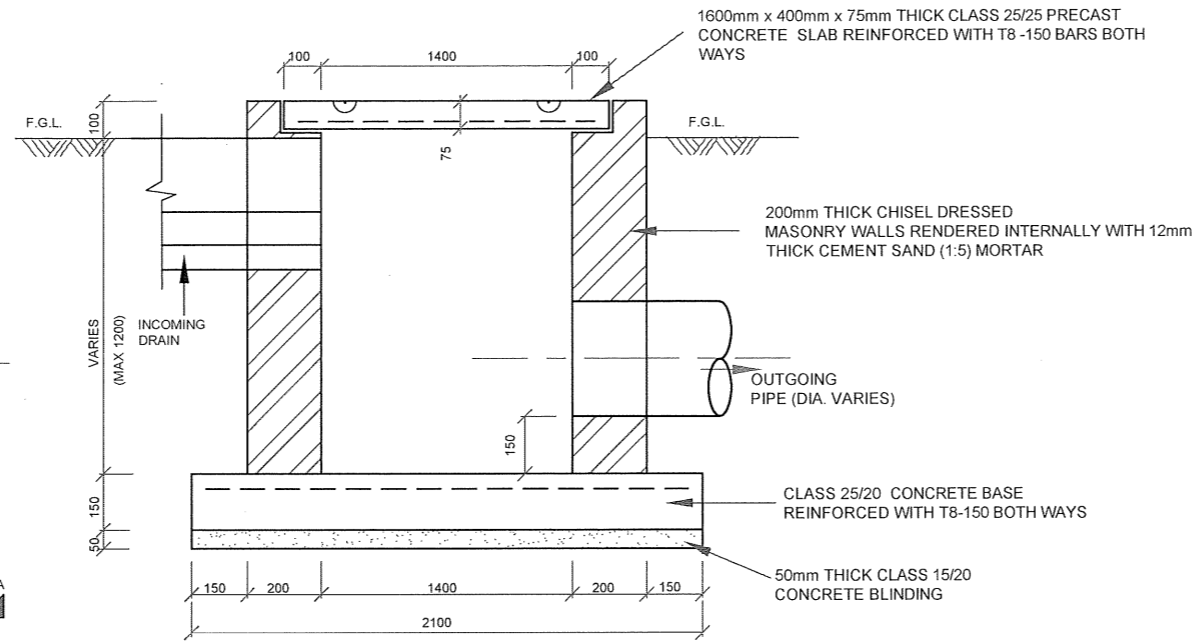
Designed by: J.M.K Drawn by: O.J.O  
Checked by: J.M.K Approved by: C.R  
Scale: AS SHOWN Date: JUNE 2023

DRG No. M455/W-02B/SD/16 REV. 0

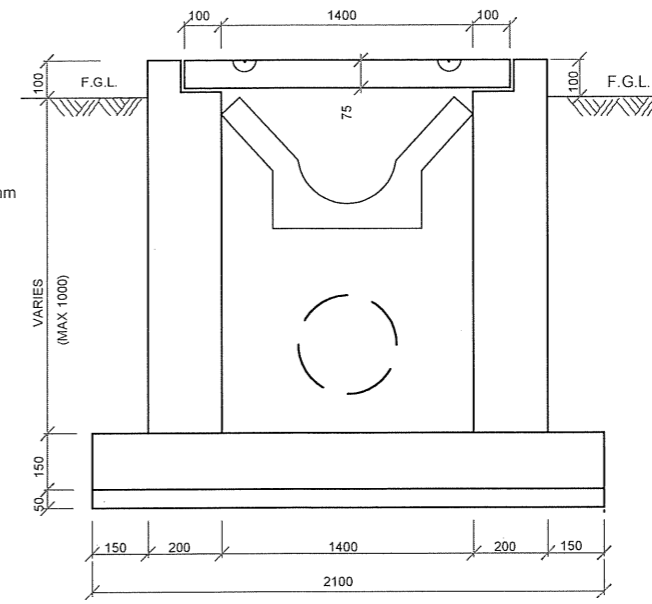
## DETAILS OF STORM WATER CATCHPIT



**PLAN**  
**TYPICAL STORM WATER CATCHPIT**  
SCALE 1:20



**SECTION 1-1**  
SCALE 1:20



**ELEVATION A-A**  
SCALE 1:20

### NOTES:

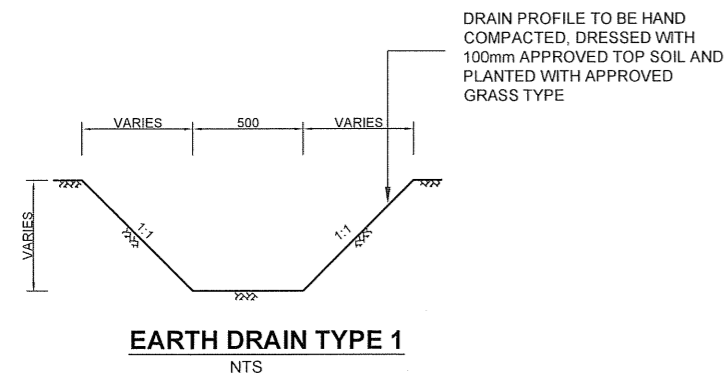
- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED
- LENGTH OF EACH CASCADE IS 1000mm

### ABBREVIATIONS

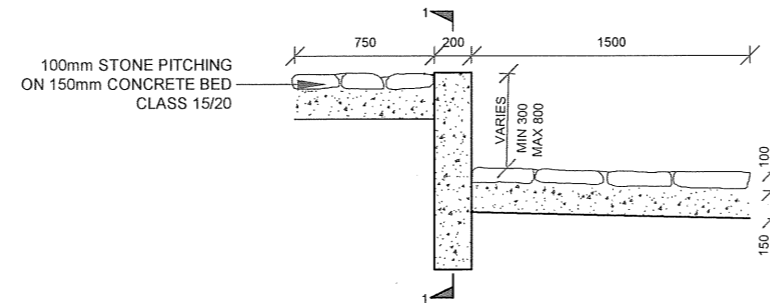
- I.B - INVERT BLOCK
- I.B.D - INVERT BLOCK DRAIN
- DIA - DIAMETER
- mm - MILLIMETER
- F.G.L - FINISHED GROUND LEVEL

REVISIONS		SIGN	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

## DETAILS OF EARTH DRAIN TYPE '1'

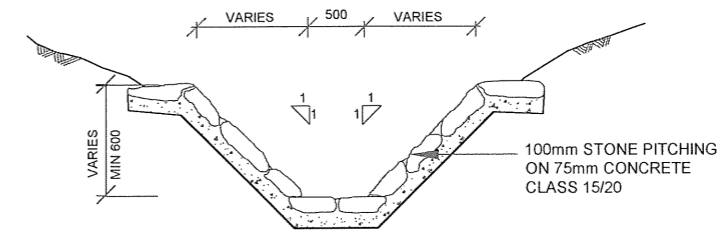


**EARTH DRAIN TYPE 1**  
NTS

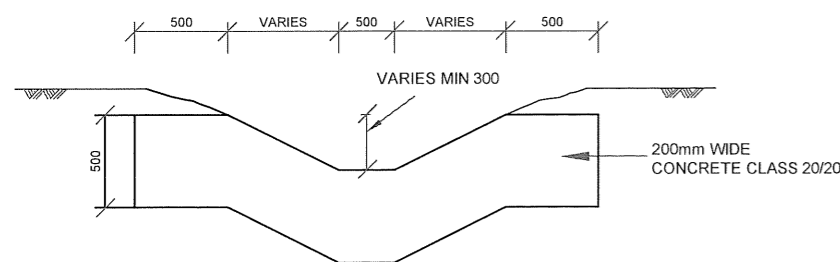


**SECTION SILL FOR DRAIN TYPE 1**  
SCALE 1:40

## DETAILS OF DRAIN TYPE '2' (STONE PITCHED DRAIN)



**DRAIN TYPE 2 (STONE PITCHED DRAIN)**  
SCALE 1:40



**ELEVATION 1-1**  
SCALE 1:40

### CLIENT:

THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT  
AGENCY  
P.O. BOX 45283 - 00100 NAIROBI  
TEL: 020 - 2727438 FAX: 2724295

### CONSULTING ENGINEERS:

JOINT VENTURE  
**ARTELIA**  
6 RUE DE LORRAINE  
38130 ECHIROLLES, FRANCE  
E-MAIL: artelia@arteliagroup.com  
TEL: +33 (0)4 76 33 40 00

**MIBP** MANGAT I.B PATEL (MIBP) LIMITED  
P.O BOX 48674, 00100-GPO,  
NAIROBI, KENYA  
E-MAIL: mibp.nairobi@mibp.co.ke  
TEL: +254-2-2710500

### PROJECT NAME:

CKE1135- NAIROBI WATER AND SANITATION  
PROJECT

### CONTRACT TITLE:

CONSTRUCTION WORKS FOR GIGIRI -  
KARURA - OUTER RING ROAD  
TRANSMISSION PIPELINE AND NORTH  
NAIROBI WATER AND SEWERAGE PROJECT

BID No. AWWDA/AFD/NWSP/W-02B/2023

### STANDARD DRAWING

### DRAWING TITLE:

DETAILS OF STORMWATER CATCH  
PIT AND EARTH DRAINS

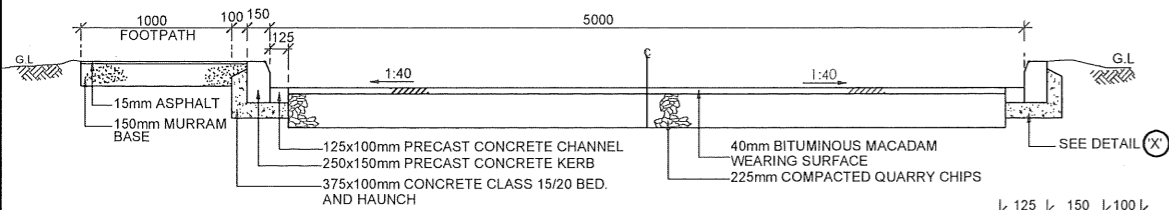
Designed by: J.M.K Drawn by: O.J.O

Checked by: J.M.K Approved by: C.R

Scale: AS SHOWN Date: JUNE 2023

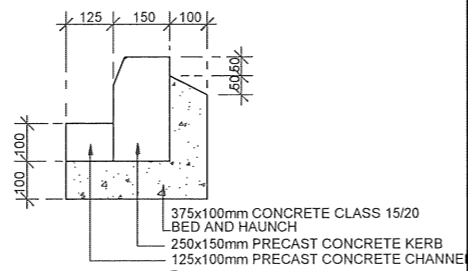
DRG No. M455/W-02B/SD/17 REV. 0

### TYPICAL BITUMINOUS ROAD DETAILS



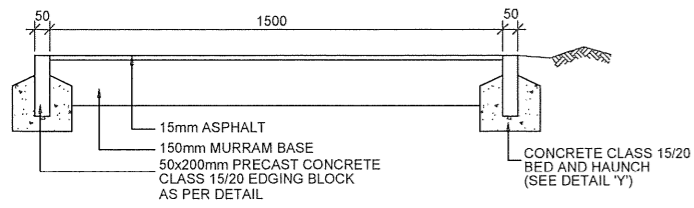
#### TYPICAL SECTION OF BITUMINOUS ROAD

SCALE 1:50



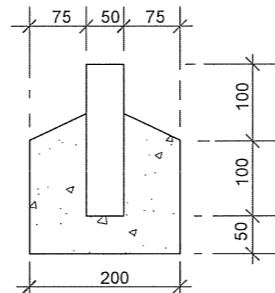
#### DETAIL (X)

SCALE 1:20



#### TYPICAL SECTION OF FOOTPATH

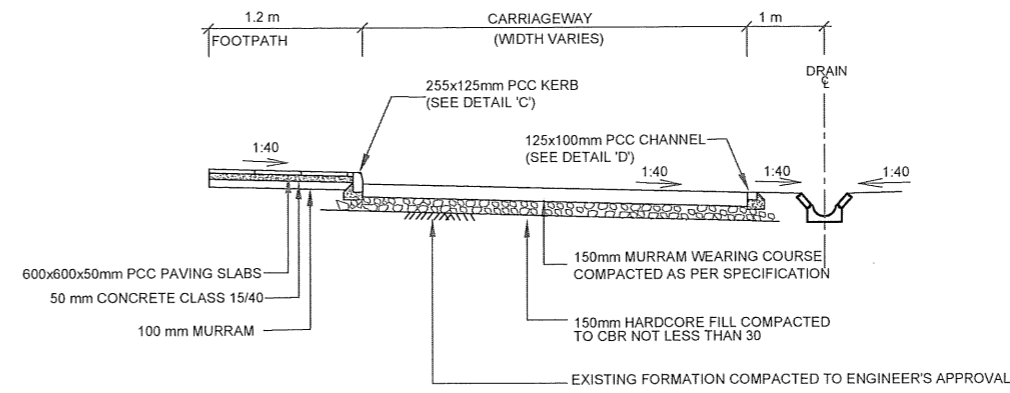
SCALE 1:25



#### DETAIL (Y)

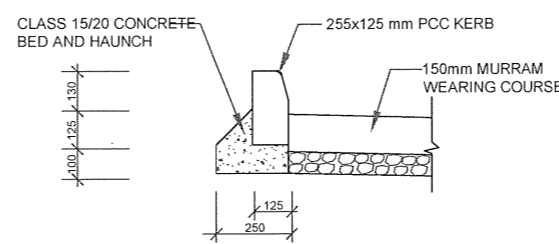
SCALE 1:10

### TYPICAL MURRAM ROAD DETAILS



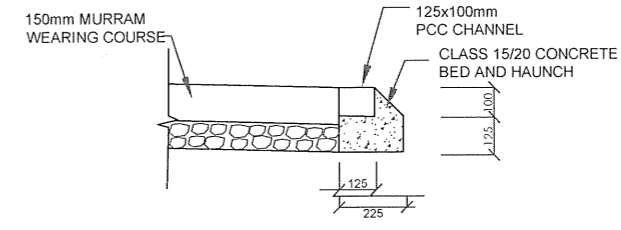
#### TYPICAL SECTION OF MURRAM ROAD

SCALE 1: 50



#### DETAIL 'C' TYPICAL DETAIL OF KERB

SCALE 1:25



#### DETAIL 'D' TYPICAL DETAIL OF CHANNEL

SCALE 1:25

#### NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

#### ABBREVIATIONS

mm	-	MILLIMETRES
FGL	-	FINISHED GROUND LEVEL
PIL	-	PIPE INVERT LEVEL
DIA	-	DIAMETER
Ø	-	DIAMETER
R.C.	-	REINFORCED CONCRETE
G.M.S	-	GALVANIZED MILD STEEL
M.S.	-	MILD STEEL
c/c	-	CENTRE TO CENTRE
No.	-	NUMBER
L	-	LENGTH
C	-	CENTRE LINE
G.L	-	GROUND LEVEL
PCC	-	PRECAST CEMENT

REVISIONS				SIGN	DATE	APPROVED
		BY	CHECKED			
		BY	CHECKED			
		BY	CHECKED			
		BY	CHECKED			

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P.O. BOX 45283 - 00100 NAIROBI  
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ARTELIA  
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38130 ECHIROLLES, FRANCE  
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TEL: +33 (0)4 76 33 40 00

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NAIROBI, KENYA  
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#### PROJECT NAME:

CKE1135- NAIROBI WATER AND SANITATION  
PROJECT

#### CONTRACT TITLE:

CONSTRUCTION WORKS FOR GIGIRI -  
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TRANSMISSION PIPELINE AND NORTH  
NAIROBI WATER AND SEWERAGE PROJECT

BID No. AWWDA/AFD/NWSP/W-02B/2023

#### STANDARD DRAWING

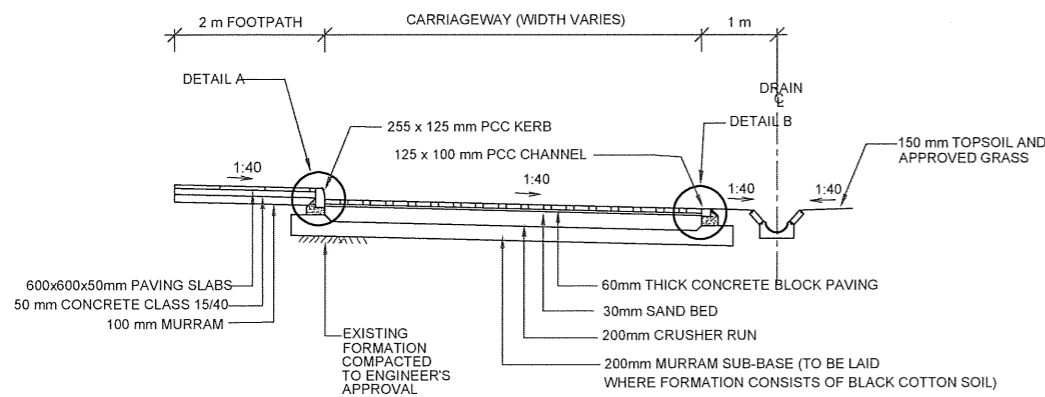
#### DRAWING TITLE:

TYPICAL ROAD CROSS  
SECTION DETAILS

Designed by:	J.M.K	Drawn by:	O.J.O
Checked by:	J.M.K	Approved by:	C.R
Scale:	AS SHOWN	Date:	JUNE 2023

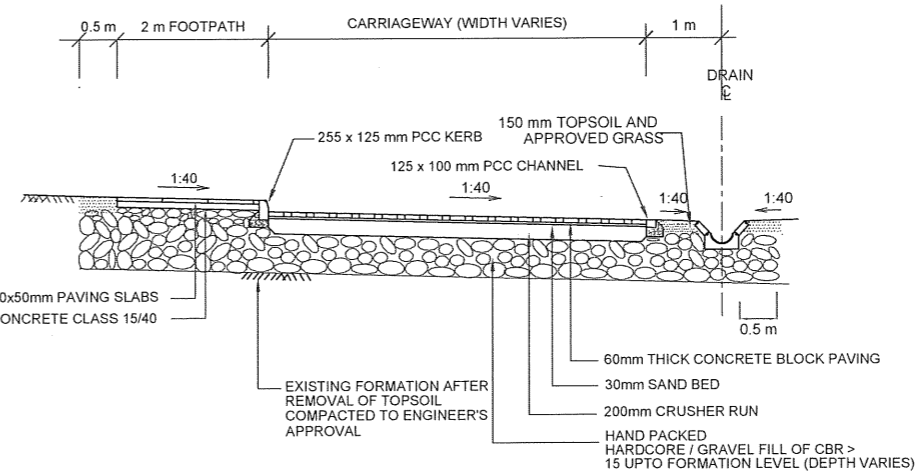
DRG No. M455/W-02B/SD/18 REV. 0

### TYPICAL CONCRETE BLOCKS SURFACE ROAD DETAILS



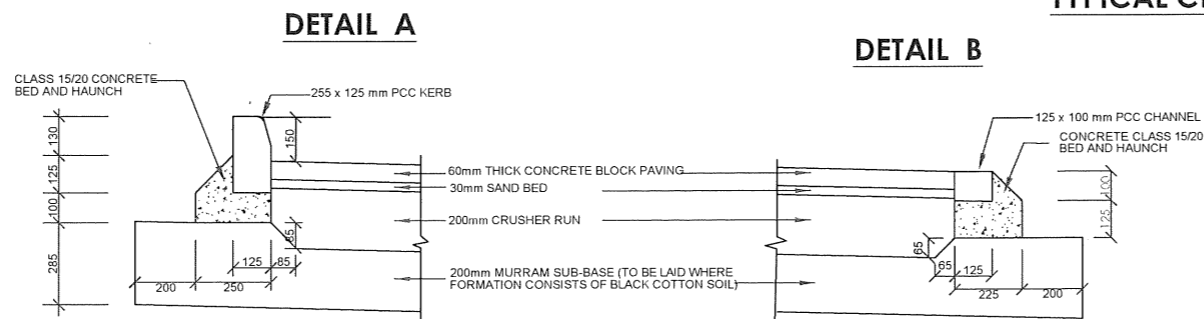
#### TYPICAL CROSS SECTION FOR CARRIAGEWAY IN CUT

SCALE 1:100



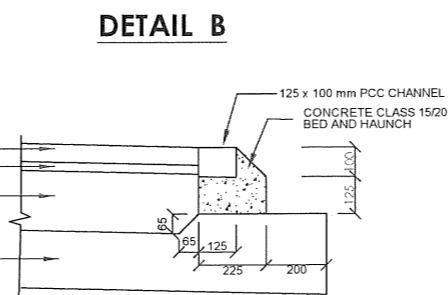
#### TYPICAL CROSS SECTION FOR CARRIAGEWAY IN FILL

SCALE 1:100



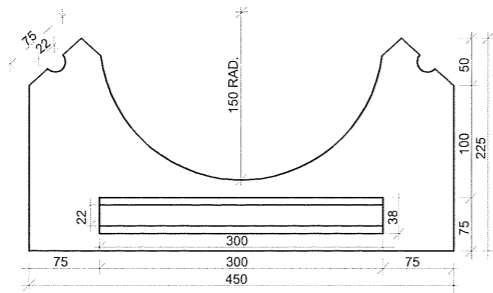
#### DETAIL OF KERB

SCALE 1:25

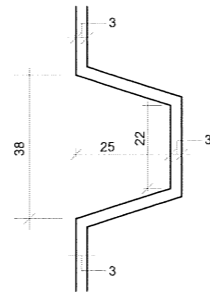


#### DETAIL OF CHANNEL

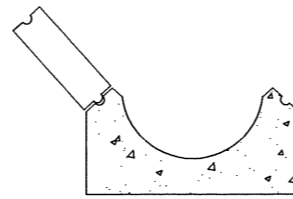
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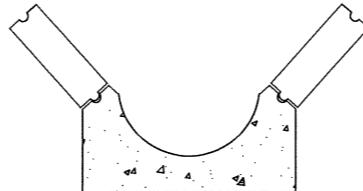
**PRECAST CONCRETE  
TYPE 'A' INVERT BLOCK**  
SCALE 1:4



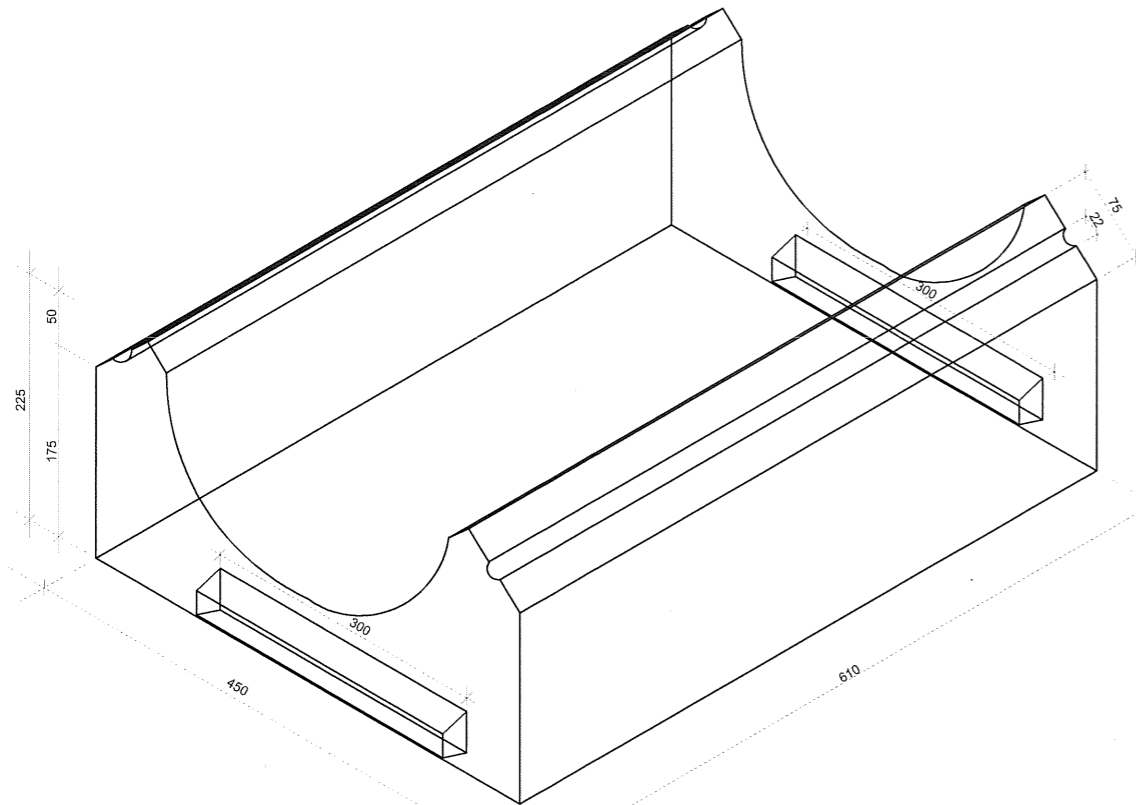
**DETAIL OF JOINT**  
SCALE: 1:1



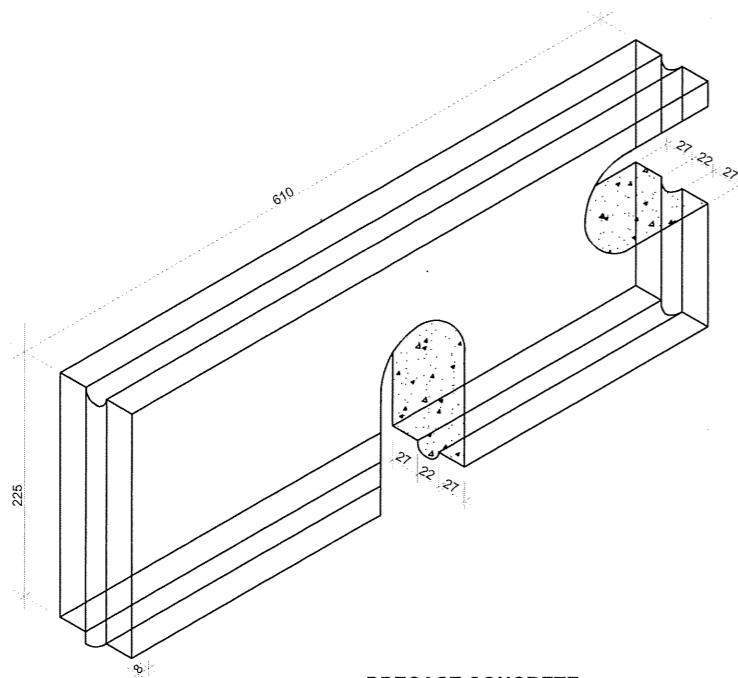
**TYPE 'A' INVERT BLOCK  
AND ONE COURSE**  
SCALE 1:8



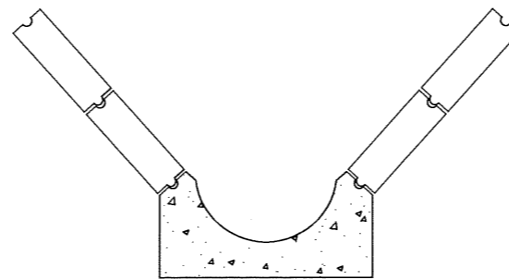
**INVERT BLOCK TYPE 'A'  
AND TWO COURSES**  
SCALE 1:8



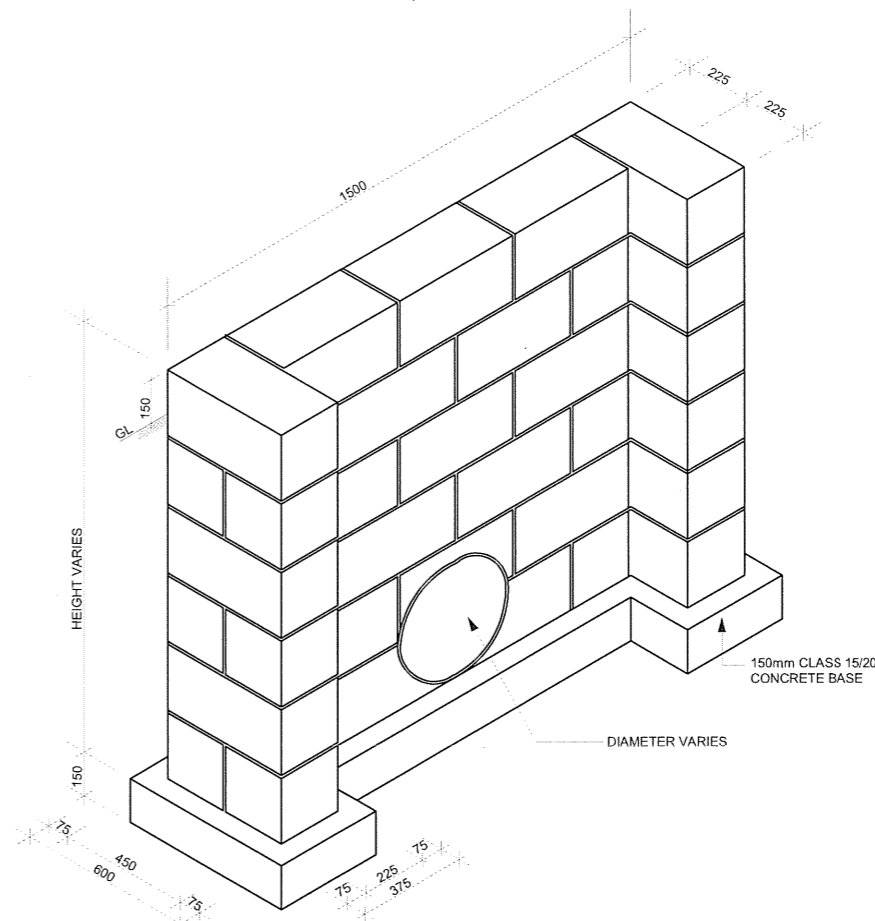
**ISOMETRIC VIEW OF INVERT BLOCK TYPE 'A'**  
NTS



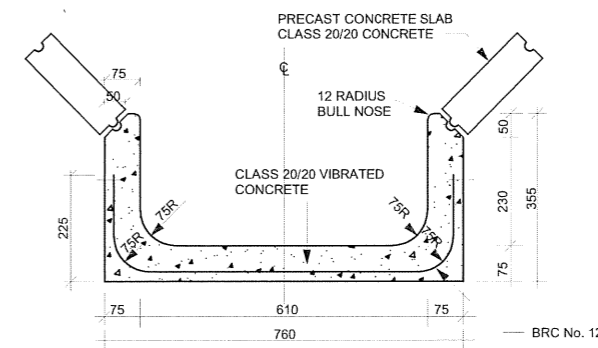
**PRECAST CONCRETE  
SLAB DETAIL**  
NTS



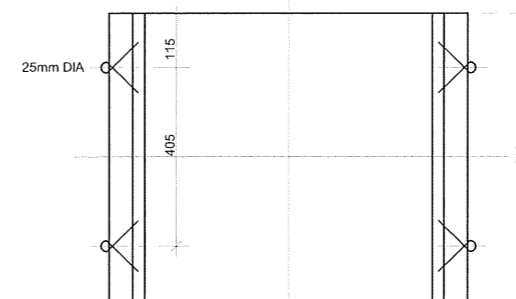
**INVERT BLOCK TYPE 'A'  
AND FOUR COURSES**  
SCALE 1:16



**DETAIL OF HEAD WALL**  
SCALE 1:30



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



**PLAN  
DETAILS OF INVERT BLOCK TYPE 'B'**  
SCALE 1:8

**NOTES:**

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED

**ABBREVIATIONS**

mm - MILLIMETRES  
G.L - GROUND LEVEL  
RAD - RADIUS  
R - RADIUS

R E V I S I O N S		SKD	DATE	APPROVED
	BY			
	CHECKED			
	BY			
	CHECKED			
	BY			
	CHECKED			

**CLIENT:**

**THE CHIEF EXECUTIVE OFFICER  
ATHI WATER WORKS DEVELOPMENT  
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**PROJECT NAME:**

**CKE1135- NAIROBI WATER AND SANITATION  
PROJECT**

**CONTRACT TITLE:**

**CONSTRUCTION WORKS FOR GIGIRI -  
KARURA - OUTER RING ROAD  
TRANSMISSION PIPELINE AND NORTH  
NAIROBI WATER AND SEWERAGE PROJECT**

**BID No. AWWDA/AFD/NWSP/W-02B/2023**

**STANDARD DRAWING**

**DRAWING TITLE:**

**INVERT BLOCK DRAINS AND  
HEADWALL DETAILS**

Designed by: J.M.K Drawn by: O.J.O

Checked by: J.M.K Approved by: C.R

Scale: AS SHOWN Date: JUNE 2023

**DRG No. M455/W-02B/SD/19**

REV. 0