

**Bill No. 3.0: Main Line**

ITEM	DESCRIPTION	UNIT	QNTY	RATE	AMOUNT
<b>3.1</b>	<b>DEMOLITION AND SITE CLEARANCE</b>				
3.1.1	Light bush clearing and removal of rubbish from pipeline area (1m*1,000m) = 1,000 m2	m <sup>2</sup>	1,000		
3.1.2	Cutting down trees (Girth not exceeding 600 mm)	No.	10		
<b>3.2</b>	<b>EXCAVATION AND BACKFILLING</b>				
3.2.1	PIPEWORK - PIPES				
	Supply and Install - HDPE Pipes PE PN 6 (Rate to include transport to site and storage, jointing materials/couplings, fusion, complete set of galvanized bolts washers, nuts and appropriate gaskets, etc., as applicable. All diameters are outside)				
3.2.2	90 mm dia PN6 HDPE pipes	m	1,000		
3.2.3	Excavate, lay, joint and backfill for pipelines as stated below.				
	Trench excavation in normal soil for depth n. e 0.6m for 90 mm dia HDPE pipe.	m <sup>3</sup>	360.0		
<b>3.3</b>	<b>FITTINGS AND ACCESSORIES</b>				
3.3.1	Supply and install concrete pipeline marker posts as directed by the Engineer at spacing of 50 m	No	20		
	Note: The following have been used on the drawings to specify pipe diameters/types/classes. Pipe dimensions/working pressures shall conform to KS-06-149 Part 2:2000.				
	<b>Class</b> <b>Working Pressure (m)</b>				
	PN6                                      60				
	PN8                                      100				
	PN10                                    125				
3.3.2	<b>Vertical Bends</b>				
	90 mm dia 90° bend	No.	2		
3.3.3	<b>Horizontal Bends</b>				
	90 mm dia 90° bend	No.	2		
<b>3.4</b>	<b>ROAD CROSSINGS</b>				
	Provide all materials for the construction of the Concrete Encasement for the Road Crossings. The Rates include all Excavation and Backfilling works.				

	<b>2No. Road Crossing at chainages 00+060 m to 00+070 m and 00+240 m to 00+250 m</b>				
3.4.1	Provide for Main Road crossings as per Drawing No and in accordance with specifications. Rates to include for excavation and backfilling, culvert rings, concrete surround and all jointing materials and other fittings as per specifications	m	20		
	<b>Reinstatement</b>				
3.4.2	Breaking up, temporary and permanent reinstatement of gravel/murram road with 80mm thick murram base compacted using a 8-10 tonne roller to the satisfaction of the Engineer.	m	20		
	<b>TOTAL FOR BILL NO. 3 CARRIED TO GRAND SUMMARY</b>				

**Bill No. 5.0: Main line**

ITEM	DESCRIPTION	UNIT	QNTY	RATE	AMOUNT
<b>5.1</b>	<b>DEMOLITION AND SITE CLEARANCE</b>				
5.1.1	Light bush clearing and removal of rubbish from pipeline area (1m*1470m) = 1470 m2	m <sup>2</sup>	1,470		
5.1.2	Cutting down trees (Girth not exceeding 600 mm)	No.	10		
<b>5.2</b>	<b>EXCAVATION AND BACKFILLING</b>				
5.2.1	PIPEWORK - PIPES				
	Supply and Install - HDPE Pipes PE PN 8 (Rate to include transport to site and storage, jointing materials/couplings, fusion, complete set of galvanized bolts washers, nuts and appropriate gaskets, etc., as applicable. All diameters are outside)				
5.2.2	40 mm dia PN 8 HDPE pipes	m	1,470		
5.2.3	Excavate, lay, joint and backfill for pipelines as stated below.				
	Trench excavation in normal soil for depth n. e 0.6m for 40 mm dia HDPE pipe.	m <sup>3</sup>	529.2		
<b>5.3</b>	<b>FITTINGS AND ACCESSORIES</b>				
5.3.1	Supply and install concrete pipeline marker posts as directed by the Engineer at spacing of 50 m	No	30		
	Note: The following have been used on the drawings to specify pipe diameters/types/classes. Pipe dimensions/working pressures shall conform to KS-06-149 Part 2:2000.				

	<b>Class</b>	<b>Working Pressure (m)</b>			
	PN6	60			
	PN8	100			
	PN10	125			
<b>5.3.2</b>	<b>Vertical Bends</b>				
	40 mm dia 90° bend		No.	3	
<b>5.3.3</b>	<b>Horizontal Bends</b>				
	40 mm dia 90° bend		No.	6	
<b>5.4</b>	<b>ROAD CROSSINGS</b>				
	Provide all materials for the construction of the Concrete Encasement for the Road Crossings. The Rates include all Excavation and Backfilling works.				
	<b>2No. Road Crossing at chainages 00+760 m to 00+770 m and 01+210 m to 01+220 m</b>				
<b>5.4.1</b>	Provide for Main Road crossings as per Drawing No and in accordance with specifications. Rates to include for excavation and backfilling, culvert rings, concrete surround and all jointing materials and other fittings as per specifications		m	20	
<b>5.4.2</b>	<b>Reinstatement</b> Breaking up, temporary and permanent reinstatement of gravel/murram road with 80mm thick murram base compacted using a 8-10 tonne roller to the satisfaction of the Engineer.		m	20	
<b>TOTAL FOR BILL NO. 5 CARRIED TO GRAND SUMMARY</b>					<b>-</b>

**Bill No. 6.0: Main Line**

<b>ITEM</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QNTY</b>	<b>RATE</b>	<b>AMOUNT</b>
<b>6.1</b>	<b>DEMOLITION AND SITE CLEARANCE</b>				
6.1.1	Light bush clearing and removal of rubbish from pipeline area (1m*1,800m) = 1,800 m2	m <sup>2</sup>	1,800		
6.1.2	Cutting down trees (Girth not exceeding 600 mm)	No.	10		
<b>6.2</b>	<b>EXCAVATION AND BACKFILLING</b>				
6.2.1	PIPEWORK - PIPES				

	Supply and Install - HDPE Pipes PE PN 8 (Rate to include transport to site and storage, jointing materials/couplings, fusion, complete set of galvanized bolts washers, nuts and appropriate gaskets, etc., as applicable. All diameters are outside)				
6.2.2	50 mm dia PN8 HDPE pipes	m	1,800		
6.2.3	Excavate, lay, joint and backfill for pipelines as stated below.				
	Trench excavation in normal soil for depth n. e 0.6m for 50 mm dia HDPE pipe.	m <sup>3</sup>	648.0		
<b>6.3</b>	<b>FITTINGS AND ACCESSORIES</b>				
6.3.1	Supply and install concrete pipeline marker posts as directed by the Engineer at spacing of 50 m	No	36		
	Note: The following have been used on the drawings to specify pipe diameters/types/classes. Pipe dimensions/working pressures shall conform to KS-06-149 Part 2:2000.				
	<b>Class</b>	<b>Working Pressure (m)</b>			
	PN6	60			
	PN8	100			
	PN10	125			
6.3.2	<b>Vertical Bends</b>				
	50 mm dia 90° bend	No.	3		
6.3.3	<b>Horizontal Bends</b>				
	50 mm dia 90° bend	No.	6		
<b>6.4</b>	<b>ROAD CROSSINGS</b>				
	Provide all materials for the construction of the Concrete Encasement for the Road Crossings. The Rates include all Excavation and Backfilling works.				
	<b>2No. Road Crossing at chainages 00+310 m to 00+320 m and 00+750 m to 00+760 m</b>				
6.4.1	Provide for Main Road crossings as per Drawing No and in accordance with specifications. Rates to include for excavation and backfilling, culvert rings, concrete surround and all jointing materials and other fittings as per specifications	m	20		
	<b>Reinstatement</b>				
6.4.2	Breaking up, temporary and permanent reinstatement of gravel/murram road with 80mm thick murram base compacted using a 8-10 tonne roller to the satisfaction of the Engineer.	m	20		

	<b>TOTAL FOR BILL NO. 6 CARRIED TO GRAND SUMMARY</b>	-
--	--	---

**Bill No. 7.0: Main Line**

ITEM	DESCRIPTION	UNIT	QNTY	RATE	AMOUNT
<b>7.1</b>	<b>DEMOLITION AND SITE CLEARANCE</b>				
7.1.1	Light bush clearing and removal of rubbish from pipeline area (1m*300m) = 300 m2	m <sup>2</sup>	300		
7.1.2	Cutting down trees (Girth not exceeding 600 mm)	No.	10		
<b>7.2</b>	<b>EXCAVATION AND BACKFILLING</b>				
7.2.1	PIPEWORK - PIPES				
	Supply and Install - HDPE Pipes PE PN 6 (Rate to include transport to site and storage, jointing materials/couplings, fusion, complete set of galvanized bolts washers, nuts and appropriate gaskets, etc., as applicable. All diameters are outside)				
7.2.2	90 mm dia PN6 HDPE pipes	m	300		
7.2.3	Excavate, lay, joint and backfill for pipelines as stated below.				
	Trench excavation in normal soil for depth n. e 0.6m for 90 mm dia HDPE pipe.	m <sup>3</sup>	108.0		
<b>7.3</b>	<b>FITTINGS AND ACCESSORIES</b>				
7.3.1	Supply and install concrete pipeline marker posts as directed by the Engineer at spacing of 50 m	No	6		
	Note: The following have been used on the drawings to specify pipe diameters/types/classes. Pipe dimensions/working pressures shall conform to KS-06-149 Part 2:2000.				
	<b>Class                      Working Pressure (m)</b>				
	PN6                                      60				
	PN8                                      100				
	PN10                                      125				
7.3.2	<b>Vertical Bends</b>				
	90 mm dia 90° bend	No.	2		
7.3.3	<b>Horizontal Bends</b>				
	90 mm dia 90° bend	No.	4		
<b>7.4</b>	<b>ROAD CROSSINGS</b>				

	Provide all materials for the construction of the Concrete Encasement for the Road Crossings. The Rates include all Excavation and Backfilling works.				
	<b>2No. Road Crossing at chainages 00+060 m to 00+070 m and 00+160 m to 00+170 m</b>				
7.4.1	Provide for Main Road crossings as per Drawing No and in accordance with specifications. Rates to include for excavation and backfilling, culvert rings, concrete surround and all jointing materials and other fittings as per specifications	m	20		
	<b>Reinstatement</b>				
7.4.2	Breaking up, temporary and permanent reinstatement of gravel/murram road with 80mm thick murram base compacted using a 8-10 tonne roller to the satisfaction of the Engineer.	m	20		
<b>TOTAL FOR BILL NO. 7 CARRIED TO GRAND SUMMARY</b>					-

ITEM	DESCRIPTION	QTY	UNIT	RATE (Ksh)	AMOUNT (Ksh)
	CONSTRUCTION OF 35 KN RETICULATION PIPELINE <b>SUMMARY OF BUILDERS WORK</b>  1 VILLAGE 3 2 VILLAGE 5 3 VILLAGE 6 4 VILLAGE 7				
	<b>TOTAL COST FOR ALL VILLAGES</b>				

## **CONSTRUCTION OF 35K WATER RETICULATION PIPELINE**

### **EVALUATION CRITERIA**

The tenders submitted by tenderers shall be evaluated in the following three (3) stages:

- 1) Mandatory Requirements Check;
- 2) Technical Evaluation; and
- 3) Financial Evaluation.

#### **1) Mandatory Requirements Check**

These are mandatory documents to be attached to the tender document. Absence of any of these documents will lead to bidder being disqualified and will not be considered proceed to the next stage of evaluation.

##### **Schedule-1: Mandatory Requirements**

<b>Item</b>	<b>Requirement</b>	<b>Yes / No</b>
1.	Certificate of Registration/Incorporation.	
2.	Updated copy of certified CR12 Form	
3.	Current Single Business Permit	
4.	Valid KRA Tax Compliance Certificate	
5.	Valid Registration Certificate from National Construction Authority (NCA 4 or higher ) as water works Contractor	
6.	Priced Bill of Quantities in the Format Provided in the Bid Documents.	
7.	Certified Company's Audited Financial Statements for the last three years (2022 and 2023)	



## 2) Technical Evaluation Criteria

The technical evaluation is weighted out of 100 points with a pass mark of 70 points. Any bidder scoring 70 points and above in the technical evaluation will be considered for Financial evaluation stage. Any bidder scoring below 70 Points in the Technical Evaluation will be disqualified from further evaluation.

### Schedule-2: Technical Evaluation Summary

Scoring Criteria			Bidder's Score
Item	Requirements	Maximum Possible Points	
1.	Contractors Experience (Value of Works and Works of Similar Nature )	30	
2.	Contractor Equipment for the works	20	
3.	Contractor's Staff (Technical Competence)	20	
4.	Works Plan and Method Statement	20	
5.	Evidence of financial capacity for the works	10	
<b>Total</b>		<b>100</b>	

#### **2.1 Contractor's Experience - Value of Works and Works of Similar Nature (Max-30)**

The bidder to attach reference letters/contracts for past and ongoing works / purchase orders/completion certificates for past and ongoing works as evidences.

### Schedule-3: Value of Works handled in the last three Years (Max -15)

Scoring Criteria			Bidder's Score
Item	Requirements	Maximum Possible Points	
1	Annual volume of construction works during the past three years of above Kshs 50,000,000.00	15	
2	Annual volume of construction work during the past three years of above Kshs 25,000,000.00 and not exceeding 50,000,000.00	9	
3	Annual volume of construction work during the past three years of below Kshs 25,000,000.00	6	
	No submission of project record	0	

**NOTE:** *Score for value of works will be awarded based on submitted contracts for past and ongoing works / purchase orders/completion certificates for past and ongoing works.*

**Schedule-4: Works of Similar Nature and Complexity (Max-15)**

<b>Scoring Criteria</b>			<b>Bidder's Score</b>
<b>Item</b>	<b>Requirements</b>	<b>Maximum Possible Points</b>	
1	Experience as prime contractor in the construction of at least <b>Three</b> Projects of similar nature and complexity in the last <b>Three Years</b> . (Construction of concrete weirs, intake structures, Water Pipelines, Water Points Construction or installation of water tanks). Evidence of completed works must be attached and Ongoing works cited should be at least 80 percent complete.	15	
2	Experience as prime contractor in the construction of at least <b>Three</b> Water Works Related Projects in the last Five <b>Years</b> . (e.g. Irrigation Works, Sewerage works, Dams/water pans, Canals, Borehole and Pressed Steel Tanks). Evidence of completed works must be attached and Ongoing works cited should be at least 80 percent complete	9	
3	Any other three unrelated Engineering Works (Buildings, Roads, Bridges etc) in the last five years	6	
4	No submission of project record	0	

**NOTE: Score for value of works will be awarded and prorated based on submitted contracts for past and ongoing works / purchase orders/completion certificates for past and ongoing works.**

## 2.2 Contractors Equipment for Works (Max-20)

### Schedule-5: Contractors Equipment (Max-20)

Item	Scoring Criteria			Proof of Ownership (Logbook or Lease Agreement)	Bidder's Score
	Requirements	Maximum Possible Points	Listing		
1.	Transport Trucks – one (1) unit	4	0.5	3.5	
2.	Pick up – one (1) unit;	4	0.5	3.5	
3.	Concrete mixer- one (1) unit	4	0.5	3.5	
4.	Concrete poker vibrator- one (1) unit	2	0.5	3.5	
5.	HDPE pipes Butt fusion machine- one (1) unit	4	0.5	3.5	
6.	Dewatering Pump (1 unit)	2	0.5	1.5	
	<b>Total</b>	<b>20</b>			

**NOTE:** Score for Equipment will be awarded based on submitted Logbooks (in the name of the Bidder or Owner in the CR12 provided) or Lease agreement between the Bidder and Leaser.

### 2.3 Contractor's Staff (Technical Competence) (Max-20)

Bidder must attach detailed Curriculum Vitae (CVs) and other testimonials including Academic Certificates (Degree, Diploma etc), Registration Certificates from professional Bodies and Recommendations from past assignments as necessary for each staff.

#### Schedule-6.1: Contractors Key Staff – Education (Max-10)

Scoring Criteria							Bidder's Score
Item	Requirements	Maximum Possible Points	Degree in Civil Eng. or Equivalent	Diploma in Civil Eng. or Equivalent	Certificate in Civil Eng. or Equivalent	Registration with relevant bodies (Engineering body/ NCA)	
1	Site Agent	5	4	2	0	1	
2	One (1) Site Foremen (Earthworks/concrete Works)	2.5	1.5	2	1	0.5	
3	One (1) Site Foremen (Pipe works foreman)	2.5	1.5	2	1	0.5	
<b>Total</b>		<b>10</b>					

#### Schedule-6.2: Contractors Key Staff – Experience (Max-10)

Scoring Criteria									Bidder's Score
Item	Requirements	Maximum Possible Points	Over 5 Years		3 – 5 Years		1 – 3 Years		
			Relevant Experience	General Experience	Relevant Experience	General Experience	Relevant Experience	General Experience	
1	Site Agent	4	4	2	3	2	2	1	
2	One (1) Site Foremen (Earthworks/concrete Works)	3	3	1	2	1	1	0.5	
3	One (1) Site Foremen (Pipe)	3	3	1	2	1	1	0.5	

	works foreman)								
	<b>Total</b>	<b>10</b>							

**NOTES on Relevant Experience**

- Relevant experience refers the proposed key staff having worked in at least 2 projects of a similar nature in similar position in the last 5 years.
- The minimum registration requirement for the site agent must be either EBK, EIK or KTRB
- The minimum registration requirement for foremen will be NCA technician registration.

**2.4 Work Plan and Method Statement (Max-20)**

***Schedule-7: Work Plan and Method Statement (Max-20)***

	<b>Scoring Criteria</b>		<b>Bidder's Score</b>
<b>Item</b>	<b>Description</b>	<b>Maximum Possible Points</b>	
1	Detailed Schedule of works (work plan) as described in section 12 of this bid document covering all items in the scope of works including Defects Liability Period (DLP) and within the performance period as specified in the bid documents.	5	
2	Detailed Method Statement covering all items in the scope of works including but not limited to Mobilization, works execution methodology (setting out, earthworks, concerted works, Pipe Works, testing, etc.) for each items of works including DLP. As described in section 11 of this bid documents.	7	
3	Detailed Project Site management as described in section 11 of this bid documents.	2	
4	Health and Safety management as described in section 11 of this bid documents	2	
	Environmental Management as described in section 11 of this bid documents	2	
	Quality Management as described described in section 11 of this bid documents	2	
	<b>Total</b>	<b>20</b>	








**NOTES on Works Plan and Method Statement**

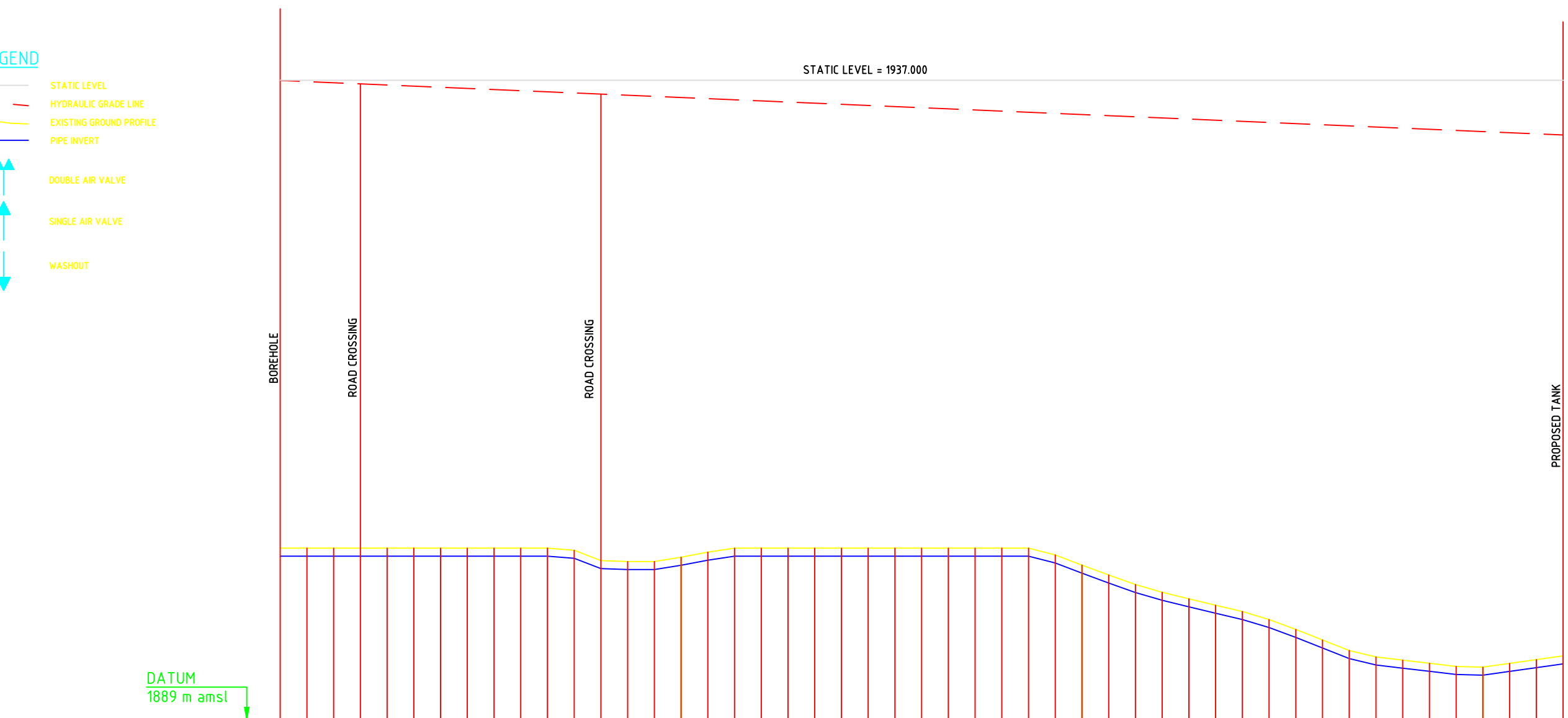
- Scores will be awarded based on the adequacy of the submitted documents in reference to the scope and works requirements.

**2.5 Evidence of financial capacity to undertake the works (Max-10)**





	Scoring Criteria						
Item	Requirements	Maximum Possible Points	Equal or over	50% and above	25% and above	Less than 25%	Bidder's Score
1	Value of average Turn Over in the last three years equal to three times to the value of tendered works	5	5	3	2	1	
2	Value of average Net Assets in the last three years equal to value of Tendered Works.	5	5	3	2	1	
	<b>Total</b>	<b>10</b>					

**LEGEND**

-  STATIC LEVEL
-  HYDRAULIC GRADE LINE
-  EXISTING GROUND PROFILE
-  PIPE INVERT
-  DOUBLE AIR VALVE
-  SINGLE AIR VALVE
-  WASHOUT



HYDRAULIC GRADE (m)	1937.000																																																
CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	480.00	500.00	520.00	540.00	560.00	580.00	600.00	620.00	640.00	660.00	680.00	700.00	720.00	740.00	760.00	780.00	800.00	820.00	840.00	860.00	880.00	900.00	920.00	940.00	960.00
GROUND LEVEL (m amsl)	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1901.840	1901.070	1901.000	1901.000	1901.320	1901.700	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1902.000	1901.490	1900.730	1899.990	1899.280	1898.700	1898.210	1897.730	1897.260	1896.660	1895.920	1895.130	1894.340	1893.860	1893.620	1893.390	1892.550	1891.150	1893.100	1893.380	1893.660	1893.940		
INVERT LEVEL (m amsl)	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.240	1900.470	1900.400	1900.400	1900.720	1901.100	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1901.400	1900.890	1900.130	1899.390	1898.680	1898.100	1897.610	1897.130	1896.660	1895.320	1894.530	1893.740	1893.260	1893.020	1892.790	1892.550	1892.500	1892.780	1893.060	1893.340				
TRENCH DEPTH (m)	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715	0.715		
STEADY-STATE HEAD (m)																																																	
DESIGN FLOW (l/s)	2.80																																																
OFFTAKE (l/s)																																																	
PIPE DETAILS	90mm Ø HDPE PN6																																																
BEDDING DETAILS	GRADED GRANULAR MATERIAL (BS EN 12620)																																																
SOIL TYPE	NORMAL SOILS																																																

<b>REV. No.</b>	<b>DESCRIPTION</b>	<b>DATE</b>	<b>CLIENT</b>	<b>PROJECT EXECUTING AGENCY</b>	<b>PROJECT IMPLEMENTATION AGENCY</b>	<b>CONSULTANTS</b>	<b>PROJECT</b>	<b>DRG TITLE</b>	<b>Date:</b>	<b>NOV 2024</b>	<b>JOB No.</b>	
			 Habitat for Humanity Kenya, P.O. Box 38948, Nairobi, Kenya.	 Habitat for Humanity Kenya, P.O. Box 38948, Nairobi, Kenya.	 Habitat for Humanity Kenya, P.O. Box 38948, Nairobi, Kenya.	 BONGOTIPS LTD. CONSULTANCY   CONSTRUCTIONS   SUPPLIES Bongotips Limited P.O. Box 1508-00100 Park road AHP Block E Suite 2 Kinshasha Road bongotips@yahoo.com	DRILLING AND REHABILITATION WORK IN SOLIO SETTLEMENT SCHEME - LAIKIPIA COUNTY	<b>SOLIO VILLAGE No.3 WATER SUPPLY</b>  <b>MAINLINE</b> <b>CH. 0.00 - CH. 960.00</b> <b>SHEET 1 OF 1</b>	<b>Designed:</b>	Moses Ngala (GE)	Project stage TENDER DRAWING	
									<b>Drawn:</b>	Moses Ngala (GE)		<b>Checked:</b>
									<b>Approved:</b>		<b>Scale:</b>	H: 1:2000 V: 1:200 (A1)

RAISING MAIN

EL static = {pump head (150 m) - pump setting level (115 m)} + G. Elev (1902.00 m) =

1937.00 m

Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	BOREHOLE	0	0	140	0.0028	0.082	0.005	0.535	0.000	0.015	1902.00	1937.000	1936.985	35.59	35.60	PN 6	1937.00	0.6	1901.40		
	2	20	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.915	1936.900	35.50	35.60	PN 6	1937.00	0.6	1901.40		
	3	40	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.830	1936.816	35.42	35.60	PN 6	1937.00	0.6	1901.40		
	Road Crossing	60	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.745	1936.731	35.33	35.60	PN 6	1937.00	0.6	1901.40		
	5	80	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.660	1936.646	35.25	35.60	PN 6	1937.00	0.6	1901.40		
	6	100	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.575	1936.561	35.16	35.60	PN 6	1937.00	0.6	1901.40		
	7	120	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.490	1936.476	35.08	35.60	PN 6	1937.00	0.6	1901.40		
	8	140	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.405	1936.391	34.99	35.60	PN 6	1937.00	0.6	1901.40		
	9	160	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.320	1936.306	34.91	35.60	PN 6	1937.00	0.6	1901.40		
	10	180	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.236	1936.221	34.82	35.60	PN 6	1937.00	0.6	1901.40		
	11	200	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1936.151	1936.136	34.74	35.60	PN 6	1937.00	0.6	1901.40		
	12	220	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1901.84	1936.066	1936.051	34.81	35.76	PN 6	1937.00	0.6	1901.24		
	Road Crossing	240	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1901.07	1935.981	1935.966	35.50	36.53	PN 6	1937.00	0.6	1900.47		
	14	260	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1901.00	1935.896	1935.881	35.48	36.60	PN 6	1937.00	0.6	1900.40		
	15	280	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1901.00	1935.811	1935.796	35.40	36.60	PN 6	1937.00	0.6	1900.40		
	16	300	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1901.32	1935.726	1935.711	34.99	36.28	PN 6	1937.00	0.6	1900.72		
	17	320	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1901.70	1935.641	1935.626	34.53	35.90	PN 6	1937.00	0.6	1901.10		
	18	340	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1935.556	1935.541	34.14	35.60	PN 6	1937.00	0.6	1901.40		
	19	360	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1935.471	1935.456	34.06	35.60	PN 6	1937.00	0.6	1901.40		
	20	380	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1935.386	1935.371	33.97	35.60	PN 6	1937.00	0.6	1901.40		
	21	400	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1935.301	1935.287	33.89	35.60	PN 6	1937.00	0.6	1901.40		
	22	420	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1935.216	1935.202	33.80	35.60	PN 6	1937.00	0.6	1901.40		
	23	440	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1935.131	1935.117	33.72	35.60	PN 6	1937.00	0.6	1901.40		
	24	460	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1935.046	1935.032	33.63	35.60	PN 6	1937.00	0.6	1901.40		
	25	480	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1934.961	1934.947	33.55	35.60	PN 6	1937.00	0.6	1901.40		
	26	500	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1934.876	1934.862	33.46	35.60	PN 6	1937.00	0.6	1901.40		
	27	520	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1934.791	1934.777	33.38	35.60	PN 6	1937.00	0.6	1901.40		
	28	540	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1934.707	1934.692	33.29	35.60	PN 6	1937.00	0.6	1901.40		
	29	560	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1902.00	1934.622	1934.607	33.21	35.60	PN 6	1937.00	0.6	1901.40		
	30	580	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1901.49	1934.537	1934.522	33.63	36.11	PN 6	1937.00	0.6	1900.89		
	31	600	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1900.73	1934.452	1934.437	34.31	36.87	PN 6	1937.00	0.6	1900.13		
	32	620	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1899.99	1934.367	1934.352	34.96	37.61	PN 6	1937.00	0.6	1899.39		
	33	640	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1899.28	1934.282	1934.267	35.59	38.32	PN 6	1937.00	0.6	1898.68		
	34	660	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1898.70	1934.197	1934.182	36.08	38.90	PN 6	1937.00	0.6	1898.10		
	35	680	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1898.21	1934.112	1934.097	36.49	39.39	PN 6	1937.00	0.6	1897.61		
	36	700	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1897.73	1934.027	1934.012	36.88	39.87	PN 6	1937.00	0.6	1897.13		
	37	720	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1897.26	1933.942	1933.927	37.27	40.34	PN 6	1937.00	0.6	1896.66		
	38	740	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1896.66	1933.857	1933.842	37.78	40.94	PN 6	1937.00	0.6	1896.06		
	39	760	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1895.92	1933.772	1933.758	38.44	41.68	PN 6	1937.00	0.6	1895.32		
	40	780	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1895.13	1933.687	1933.673	39.14	42.47	PN 6	1937.00	0.6	1894.53		
	41	800	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1894.34	1933.602	1933.588	39.85	43.26	PN 6	1937.00	0.6	1893.74		
	42	820	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.86	1933.517	1933.503	40.24	43.74	PN 6	1937.00	0.6	1893.26		

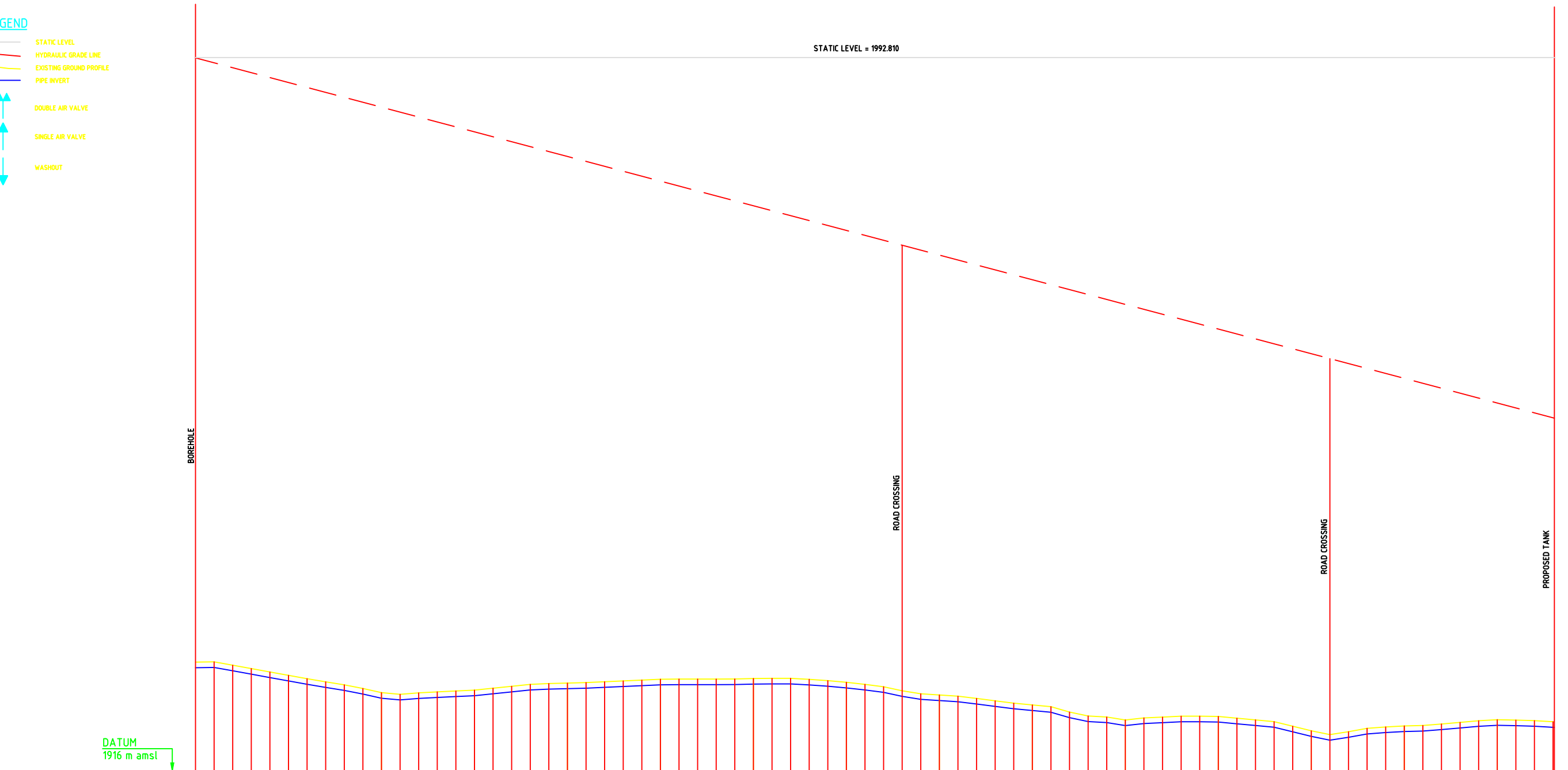


Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	43	840	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.62	1933.432	1933.418	40.40	43.98	PN 6	1937.00	0.6	1893.02		
	44	860	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.39	1933.347	1933.333	40.54	44.21	PN 6	1937.00	0.6	1892.79		
	45	880	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.15	1933.262	1933.248	40.70	44.45	PN 6	1937.00	0.6	1892.55		
	46	900	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.10	1933.178	1933.163	40.66	44.50	PN 6	1937.00	0.6	1892.50		
	47	920	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.38	1933.093	1933.078	40.30	44.22	PN 6	1937.00	0.6	1892.78		
	48	940	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.66	1933.008	1932.993	39.93	43.94	PN 6	1937.00	0.6	1893.06		
	<b>Proposed Tank</b>	960	20	140	0.0028	0.082	0.005	0.535	0.085	0.015	1893.94	1932.923	1932.908	39.57	43.66	PN 6	1937.00	0.6	1893.34	<b>0.0028</b>	<b>2.80</b>

**LEGEND**

-  STATIC LEVEL
-  HYDRAULIC GRADE LINE
-  EXISTING GROUND PROFILE
-  PIPE INVERT
-  DOUBLE AIR VALVE
-  SINGLE AIR VALVE
-  WASHOUT

STATIC LEVEL = 1992.810



DATUM  
1916 m amsl

HYDRAULIC GRADE (m)	0.715	1927.210	1927.810	0.000.00
CHAINAGE (m)	0.715	1927.210	1927.840	020.00
GROUND LEVEL (m amsl)	0.715	1926.880	1927.480	040.00
INVERT LEVEL (m amsl)	0.715	1926.520	1927.120	060.00
TRENCH DEPTH (m)	0.715	1926.150	1926.750	080.00
STEADY-STATE HEAD (m)	0.715	1925.790	1926.390	100.00
DESIGN FLOW (l/s)	0.715	1925.430	1926.030	120.00
OFFTAKE (l/s)	0.715	1925.090	1925.690	140.00
PIPE DETAILS	0.715	1924.770	1925.370	160.00
BEDDING DETAILS	0.715	1924.380	1924.980	180.00
SOIL TYPE	0.715	1923.930	1924.530	200.00
	0.715	1923.750	1924.350	220.00
	0.715	1923.910	1924.510	240.00
	0.715	1924.010	1924.610	260.00
	0.715	1924.110	1924.710	280.00
	0.715	1924.200	1924.800	300.00
	0.715	1924.410	1925.010	320.00
	0.715	1924.610	1925.210	340.00
	0.715	1924.820	1925.420	360.00
	0.715	1924.910	1925.510	380.00
	0.715	1924.960	1925.560	400.00
	0.715	1925.010	1925.610	420.00
	0.715	1925.100	1925.700	440.00
	0.715	1925.190	1925.790	460.00
	0.715	1925.280	1925.880	480.00
	0.715	1925.370	1925.970	500.00
	0.715	1925.390	1925.990	520.00
	0.715	1925.390	1925.990	540.00
	0.715	1925.390	1925.990	560.00
	0.715	1925.400	1926.000	580.00
	0.715	1925.450	1926.050	600.00
	0.715	1925.470	1926.070	620.00
	0.715	1925.470	1926.070	640.00
	0.715	1925.360	1925.960	660.00
	0.715	1925.220	1925.820	680.00
	0.715	1925.040	1925.640	700.00
	0.715	1924.820	1925.420	720.00
	0.715	1924.560	1925.160	740.00
	0.715	1924.130	1924.730	760.00
	0.715	1923.910	1924.410	780.00
	0.715	1923.680	1924.280	800.00
	0.715	1923.550	1924.150	820.00
	0.715	1923.310	1923.910	840.00
	0.715	1923.050	1923.650	860.00
	0.715	1922.800	1923.400	880.00
	0.715	1922.610	1923.210	900.00
	0.715	1922.420	1923.020	920.00
	0.715	1921.840	1922.440	940.00
	0.715	1921.420	1922.020	960.00
	0.715	1921.310	1921.910	980.00
	0.715	1920.990	1921.590	1000.00
	0.715	1921.210	1921.810	1020.00
	0.715	1921.300	1921.900	1040.00
	0.715	1921.400	1922.000	1060.00
	0.715	1921.400	1922.000	1080.00
	0.715	1921.370	1921.970	1100.00
	0.715	1921.180	1921.780	1120.00
	0.715	1921.000	1921.600	1140.00
	0.715	1920.810	1921.410	1160.00
	0.715	1920.320	1920.920	1180.00
	0.715	1919.830	1920.430	1200.00
	0.715	1919.420	1920.020	1220.00
	0.715	1919.730	1920.330	1240.00
	0.715	1920.090	1920.690	1260.00
	0.715	1920.240	1920.840	1280.00
	0.715	1920.350	1920.950	1300.00
	0.715	1920.400	1921.000	1320.00
	0.715	1920.560	1921.160	1340.00
	0.715	1920.730	1921.330	1360.00
	0.715	1920.910	1921.510	1380.00
	0.715	1921.020	1921.620	1400.00
	0.715	1920.980	1921.580	1420.00
	0.715	1920.920	1921.520	1440.00
	0.715	1920.800	1921.400	1460.00
	0.715	1920.790	1921.390	1464.44

<b>REV. No.</b>	<b>DESCRIPTION</b>	<b>DATE</b>	<b>CLIENT</b>	<b>PROJECT EXECUTING AGENCY</b>	<b>PROJECT IMPLEMENTATION AGENCY</b>	<b>CONSULTANTS</b>	<b>PROJECT</b>	<b>DRG TITLE</b>	<b>Date:</b>	<b>JOB No.</b>						
			 Habitat for Humanity Kenya, P.O. Box 38948, Nairobi, Kenya.	 Habitat for Humanity Kenya, P.O. Box 38948, Nairobi, Kenya.	 Habitat for Humanity Kenya, P.O. Box 38948, Nairobi, Kenya.	 Bongotips Limited P.O. Box 1500-06060 Park road AIP Block E Suite 2 Kisumu Road bongotips@yahoo.com	DRILLING AND REHABILITATION WORK IN SOLIO SETTLEMENT SCHEME - LAIKIPIA COUNTY	SOLIO VILLAGE 5 WATER SUPPLY  <b>MAINLINE</b> CH. 0.00 - CH. 1461.44 SHEET 1 OF 1	NOV 2024							
									Designed: Moses Ngala (GE) Drawn: Moses Ngala (GE) Checked: Approved: Scale: H: 1:2000 V: 1:200 (A1)	Project stage TENDER DRAWING  DRG. No. REV <b>O</b>						

RAISING MAIN

EL static = {pump head (180 m) - pump setting level (115 m)} + G. Elev (1927.81 m) = 1992.81 m

Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	<b>BOREHOLE</b>	0	0	140	0.0008	0.035	0.001	0.841	0.000	0.036	1927.81	1992.810	1992.774	65.56	65.60	PN 8	1992.81	0.6	1927.21		
	2	20	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1927.84	1992.280	1992.244	65.00	65.57	PN 8	1992.81	0.6	1927.24		
	3	40	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1927.48	1991.750	1991.714	64.83	65.93	PN 8	1992.81	0.6	1926.88		
	4	60	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1927.12	1991.220	1991.184	64.66	66.29	PN 8	1992.81	0.6	1926.52		
	5	80	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1926.75	1990.690	1990.654	64.50	66.66	PN 8	1992.81	0.6	1926.15		
	6	100	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1926.39	1990.160	1990.124	64.33	67.02	PN 8	1992.81	0.6	1925.79		
	7	120	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1926.03	1989.630	1989.594	64.16	67.38	PN 8	1992.81	0.6	1925.43		
	8	140	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.69	1989.100	1989.064	63.97	67.72	PN 8	1992.81	0.6	1925.09		
	9	160	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.37	1988.570	1988.533	63.76	68.04	PN 8	1992.81	0.6	1924.77		
	10	180	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.98	1988.039	1988.003	63.62	68.43	PN 8	1992.81	0.6	1924.38		
	11	200	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.53	1987.509	1987.473	63.54	68.88	PN 8	1992.81	0.6	1923.93		
	12	220	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.35	1986.979	1986.943	63.19	69.06	PN 8	1992.81	0.6	1923.75		
	13	240	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.51	1986.449	1986.413	62.50	68.90	PN 8	1992.81	0.6	1923.91		
	14	260	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.61	1985.919	1985.883	61.87	68.80	PN 8	1992.81	0.6	1924.01		
	15	280	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.71	1985.389	1985.353	61.24	68.70	PN 8	1992.81	0.6	1924.11		
	16	300	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.80	1984.859	1984.823	60.62	68.61	PN 8	1992.81	0.6	1924.20		
	17	320	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.01	1984.329	1984.293	59.88	68.40	PN 8	1992.81	0.6	1924.41		
	18	340	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.21	1983.799	1983.763	59.15	68.20	PN 8	1992.81	0.6	1924.61		
	19	360	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.42	1983.269	1983.233	58.41	67.99	PN 8	1992.81	0.6	1924.82		
	20	380	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.51	1982.739	1982.703	57.79	67.90	PN 8	1992.81	0.6	1924.91		
	21	400	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.56	1982.209	1982.173	57.21	67.85	PN 8	1992.81	0.6	1924.96		
	22	420	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.61	1981.679	1981.643	56.63	67.80	PN 8	1992.81	0.6	1925.01		
	23	440	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.70	1981.149	1981.113	56.01	67.71	PN 8	1992.81	0.6	1925.10		
	24	460	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.79	1980.619	1980.583	55.39	67.62	PN 8	1992.81	0.6	1925.19		
	25	480	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.88	1980.089	1980.052	54.77	67.53	PN 8	1992.81	0.6	1925.28		
	26	500	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.97	1979.558	1979.522	54.15	67.44	PN 8	1992.81	0.6	1925.37		
	27	520	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.99	1979.028	1978.992	53.60	67.42	PN 8	1992.81	0.6	1925.39		
	28	540	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.99	1978.498	1978.462	53.07	67.42	PN 8	1992.81	0.6	1925.39		
	29	560	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.99	1977.968	1977.932	52.54	67.42	PN 8	1992.81	0.6	1925.39		
	30	580	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1926.00	1977.438	1977.402	52.00	67.41	PN 8	1992.81	0.6	1925.40		
	31	600	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1926.05	1976.908	1976.872	51.42	67.36	PN 8	1992.81	0.6	1925.45		
	32	620	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1926.07	1976.378	1976.342	50.87	67.34	PN 8	1992.81	0.6	1925.47		
	33	640	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1926.07	1975.848	1975.812	50.34	67.34	PN 8	1992.81	0.6	1925.47		
	34	660	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.96	1975.318	1975.282	49.92	67.45	PN 8	1992.81	0.6	1925.36		
	35	680	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.82	1974.788	1974.752	49.53	67.59	PN 8	1992.81	0.6	1925.22		
	36	700	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.64	1974.258	1974.222	49.18	67.77	PN 8	1992.81	0.6	1925.04		
	37	720	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.42	1973.728	1973.692	48.87	67.99	PN 8	1992.81	0.6	1924.82		
	38	740	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1925.16	1973.198	1973.162	48.60	68.25	PN 8	1992.81	0.6	1924.56		
	<b>Road Crossing</b>	760	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.73	1972.668	1972.632	48.50	68.68	PN 8	1992.81	0.6	1924.13		
	40	780	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.41	1972.138	1972.102	48.29	69.00	PN 8	1992.81	0.6	1923.81		
	41	800	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.28	1971.608	1971.571	47.89	69.13	PN 8	1992.81	0.6	1923.68		
	42	820	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1924.15	1971.077	1971.041	47.49	69.26	PN 8	1992.81	0.6	1923.55		

Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	43	840	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1923.91	1970.547	1970.511	47.20	69.50	PN 8	1992.81	0.6	1923.31		
	44	860	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1923.65	1970.017	1969.981	46.93	69.76	PN 8	1992.81	0.6	1923.05		
	45	880	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1923.40	1969.487	1969.451	46.65	70.01	PN 8	1992.81	0.6	1922.80		
	46	900	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1923.21	1968.957	1968.921	46.31	70.20	PN 8	1992.81	0.6	1922.61		
	47	920	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1923.02	1968.427	1968.391	45.97	70.39	PN 8	1992.81	0.6	1922.42		
	48	940	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1922.44	1967.897	1967.861	46.02	70.97	PN 8	1992.81	0.6	1921.84		
	49	960	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1922.02	1967.367	1967.331	45.91	71.39	PN 8	1992.81	0.6	1921.42		
	50	980	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.91	1966.837	1966.801	45.49	71.50	PN 8	1992.81	0.6	1921.31		
	51	1000	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.59	1966.307	1966.271	45.28	71.82	PN 8	1992.81	0.6	1920.99		
	52	1020	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.81	1965.777	1965.741	44.53	71.60	PN 8	1992.81	0.6	1921.21		
	53	1040	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.90	1965.247	1965.211	43.91	71.51	PN 8	1992.81	0.6	1921.30		
	54	1060	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1922.00	1964.717	1964.681	43.28	71.41	PN 8	1992.81	0.6	1921.40		
	55	1080	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1922.00	1964.187	1964.151	42.75	71.41	PN 8	1992.81	0.6	1921.40		
	56	1100	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.97	1963.657	1963.621	42.25	71.44	PN 8	1992.81	0.6	1921.37		
	57	1120	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.78	1963.127	1963.090	41.91	71.63	PN 8	1992.81	0.6	1921.18		
	58	1140	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.60	1962.596	1962.560	41.56	71.81	PN 8	1992.81	0.6	1921.00		
	59	1160	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.41	1962.066	1962.030	41.22	72.00	PN 8	1992.81	0.6	1920.81		
	60	1180	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1920.92	1961.536	1961.500	41.18	72.49	PN 8	1992.81	0.6	1920.32		
	61	1200	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1920.43	1961.006	1960.970	41.14	72.98	PN 8	1992.81	0.6	1919.83		
	Road Crossing	1220	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1920.02	1960.476	1960.440	41.02	73.39	PN 8	1992.81	0.6	1919.42		
	63	1240	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1920.33	1959.946	1959.910	40.18	73.08	PN 8	1992.81	0.6	1919.73		
	64	1260	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1920.69	1959.416	1959.380	39.29	72.72	PN 8	1992.81	0.6	1920.09		
	65	1280	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1920.84	1958.886	1958.850	38.61	72.57	PN 8	1992.81	0.6	1920.24		
	66	1300	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1920.95	1958.356	1958.320	37.97	72.46	PN 8	1992.81	0.6	1920.35		
	67	1320	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.00	1957.826	1957.790	37.39	72.41	PN 8	1992.81	0.6	1920.40		
	68	1340	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.16	1957.296	1957.260	36.70	72.25	PN 8	1992.81	0.6	1920.56		
	69	1360	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.33	1956.766	1956.730	36.00	72.08	PN 8	1992.81	0.6	1920.73		
	70	1380	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.51	1956.236	1956.200	35.29	71.90	PN 8	1992.81	0.6	1920.91		
	71	1400	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.62	1955.706	1955.670	34.65	71.79	PN 8	1992.81	0.6	1921.02		
	72	1420	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.58	1955.176	1955.140	34.16	71.83	PN 8	1992.81	0.6	1920.98		
	73	1440	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.52	1954.646	1954.609	33.69	71.89	PN 8	1992.81	0.6	1920.92		
	74	1460	20	140	0.0008	0.035	0.001	0.841	0.530	0.036	1921.40	1954.115	1954.079	33.28	72.01	PN 8	1992.81	0.6	1920.80		
	Proposed Tank	1461.44	1.44	140	0.0008	0.035	0.001	0.841	0.038	0.036	1921.39	1954.077	1954.041	33.25	72.02	PN 8	1992.81	0.6	1920.79	0.0008	0.80



RAISING MAIN

EL static = {pump head (180 m) - pump setting level (96 m)} + G. Elev (1874.91 m) = 1958.91 m

Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	<b>BOREHOLE</b>	0	0	140	0.002	0.044	0.002	1.327	0.000	0.090	1874.91	1958.910	1958.820	84.51	84.60	PN 8	1958.91	0.6	1874.31		
	2	20	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1875.13	1957.967	1957.877	83.35	84.38	PN 8	1958.91	0.6	1874.53		
	3	40	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1875.44	1957.023	1956.933	82.09	84.07	PN 8	1958.91	0.6	1874.84		
	4	60	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1875.73	1956.080	1955.990	80.86	83.78	PN 8	1958.91	0.6	1875.13		
	5	80	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1875.88	1955.136	1955.046	79.77	83.63	PN 8	1958.91	0.6	1875.28		
	6	100	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1876.05	1954.193	1954.103	78.65	83.46	PN 8	1958.91	0.6	1875.45		
	7	120	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1876.24	1953.249	1953.159	77.52	83.27	PN 8	1958.91	0.6	1875.64		
	8	140	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1876.41	1952.306	1952.216	76.41	83.10	PN 8	1958.91	0.6	1875.81		
	9	160	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1876.56	1951.362	1951.273	75.31	82.95	PN 8	1958.91	0.6	1875.96		
	10	180	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1876.71	1950.419	1950.329	74.22	82.80	PN 8	1958.91	0.6	1876.11		
	11	200	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1876.87	1949.475	1949.386	73.12	82.64	PN 8	1958.91	0.6	1876.27		
	12	220	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1877.03	1948.532	1948.442	72.01	82.48	PN 8	1958.91	0.6	1876.43		
	13	240	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1877.09	1947.588	1947.499	71.01	82.42	PN 8	1958.91	0.6	1876.49		
	14	260	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1877.14	1946.645	1946.555	70.02	82.37	PN 8	1958.91	0.6	1876.54		
	15	280	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1877.27	1945.702	1945.612	68.94	82.24	PN 8	1958.91	0.6	1876.67		
	16	300	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1877.29	1944.758	1944.668	67.98	82.22	PN 8	1958.91	0.6	1876.69		
	<b>Road Crossing</b>	320	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1878.10	1943.815	1943.725	66.22	81.41	PN 8	1958.91	0.6	1877.50		
	18	340	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1879.38	1942.871	1942.781	64.00	80.13	PN 8	1958.91	0.6	1878.78		
	19	360	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1880.47	1941.928	1941.838	61.97	79.04	PN 8	1958.91	0.6	1879.87		
	20	380	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1881.56	1940.984	1940.894	59.93	77.95	PN 8	1958.91	0.6	1880.96		
	21	400	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1882.66	1940.041	1939.951	57.89	76.85	PN 8	1958.91	0.6	1882.06		
	22	420	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1883.75	1939.097	1939.008	55.86	75.76	PN 8	1958.91	0.6	1883.15		
	23	440	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1884.76	1938.154	1938.064	53.90	74.75	PN 8	1958.91	0.6	1884.16		
	24	460	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1885.33	1937.210	1937.121	52.39	74.18	PN 8	1958.91	0.6	1884.73		
	25	480	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1885.90	1936.267	1936.177	50.88	73.61	PN 8	1958.91	0.6	1885.30		
	26	500	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1885.58	1935.323	1935.234	50.25	73.93	PN 8	1958.91	0.6	1884.98		
	27	520	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1885.13	1934.380	1934.290	49.76	74.38	PN 8	1958.91	0.6	1884.53		
	28	540	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1884.57	1933.437	1933.347	49.38	74.94	PN 8	1958.91	0.6	1883.97		
	29	560	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1883.86	1932.493	1932.403	49.14	75.65	PN 8	1958.91	0.6	1883.26		
	30	580	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1883.15	1931.550	1931.460	48.91	76.36	PN 8	1958.91	0.6	1882.55		
	31	600	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1882.46	1930.606	1930.516	48.66	77.05	PN 8	1958.91	0.6	1881.86		
	32	620	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1881.78	1929.663	1929.573	48.39	77.73	PN 8	1958.91	0.6	1881.18		
	33	640	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1881.10	1928.719	1928.629	48.13	78.41	PN 8	1958.91	0.6	1880.50		
	34	660	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1880.48	1927.776	1927.686	47.81	79.03	PN 8	1958.91	0.6	1879.88		
	35	680	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1879.86	1926.832	1926.743	47.48	79.65	PN 8	1958.91	0.6	1879.26		
	36	700	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1879.18	1925.889	1925.799	47.22	80.33	PN 8	1958.91	0.6	1878.58		
	37	720	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1878.48	1924.945	1924.856	46.98	81.03	PN 8	1958.91	0.6	1877.88		
	38	740	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1877.83	1924.002	1923.912	46.68	81.68	PN 8	1958.91	0.6	1877.23		
	<b>Road Crossing</b>	760	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1877.15	1923.058	1922.969	46.42	82.36	PN 8	1958.91	0.6	1876.55		
	40	780	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1876.50	1922.115	1922.025	46.13	83.01	PN 8	1958.91	0.6	1875.90		
	41	800	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1875.83	1921.172	1921.082	45.85	83.68	PN 8	1958.91	0.6	1875.23		
	42	820	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1875.14	1920.228	1920.138	45.60	84.37	PN 8	1958.91	0.6	1874.54		

Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	43	840	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1874.44	1919.285	1919.195	45.35	85.07	PN 8	1958.91	0.6	1873.84		
	44	860	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1873.55	1918.341	1918.251	45.30	85.96	PN 8	1958.91	0.6	1872.95		
	45	880	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1872.59	1917.398	1917.308	45.32	86.92	PN 8	1958.91	0.6	1871.99		
	46	900	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1871.90	1916.454	1916.364	45.06	87.61	PN 8	1958.91	0.6	1871.30		
	47	920	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1871.28	1915.511	1915.421	44.74	88.23	PN 8	1958.91	0.6	1870.68		
	48	940	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1870.73	1914.567	1914.478	44.35	88.78	PN 8	1958.91	0.6	1870.13		
	49	960	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1870.26	1913.624	1913.534	43.87	89.25	PN 8	1958.91	0.6	1869.66		
	50	980	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1869.81	1912.680	1912.591	43.38	89.70	PN 8	1958.91	0.6	1869.21		
	51	1000	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1869.35	1911.737	1911.647	42.90	90.16	PN 8	1958.91	0.6	1868.75		
	52	1020	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1868.89	1910.794	1910.704	42.41	90.62	PN 8	1958.91	0.6	1868.29		
	53	1040	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1868.41	1909.850	1909.760	41.95	91.10	PN 8	1958.91	0.6	1867.81		
	54	1060	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1867.94	1908.907	1908.817	41.48	91.57	PN 8	1958.91	0.6	1867.34		
	55	1080	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1867.47	1907.963	1907.873	41.00	92.04	PN 8	1958.91	0.6	1866.87		
	56	1100	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1867.14	1907.020	1906.930	40.39	92.37	PN 8	1958.91	0.6	1866.54		
	57	1120	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1866.88	1906.076	1905.986	39.71	92.63	PN 8	1958.91	0.6	1866.28		
	58	1140	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1866.61	1905.133	1905.043	39.03	92.90	PN 8	1958.91	0.6	1866.01		
	59	1160	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1866.34	1904.189	1904.099	38.36	93.17	PN 8	1958.91	0.6	1865.74		
	60	1180	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1866.03	1903.246	1903.156	37.73	93.48	PN 8	1958.91	0.6	1865.43		
	61	1200	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.72	1902.302	1902.213	37.09	93.79	PN 8	1958.91	0.6	1865.12		
	62	1220	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.41	1901.359	1901.269	36.46	94.10	PN 8	1958.91	0.6	1864.81		
	63	1240	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.11	1900.415	1900.326	35.82	94.40	PN 8	1958.91	0.6	1864.51		
	64	1260	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.84	1899.472	1899.382	35.14	94.67	PN 8	1958.91	0.6	1864.24		
	65	1280	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.57	1898.529	1898.439	34.47	94.94	PN 8	1958.91	0.6	1863.97		
	66	1300	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.54	1897.585	1897.495	33.56	94.97	PN 8	1958.91	0.6	1863.94		
	67	1320	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.51	1896.642	1896.552	32.64	95.00	PN 8	1958.91	0.6	1863.91		
	68	1340	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.39	1895.698	1895.608	31.82	95.12	PN 8	1958.91	0.6	1863.79		
	69	1360	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.26	1894.755	1894.665	31.00	95.25	PN 8	1958.91	0.6	1863.66		
	70	1380	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.13	1893.811	1893.721	30.19	95.38	PN 8	1958.91	0.6	1863.53		
	71	1400	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.02	1892.868	1892.778	29.36	95.49	PN 8	1958.91	0.6	1863.42		
	72	1420	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1863.75	1891.924	1891.835	28.68	95.76	PN 8	1958.91	0.6	1863.15		
	73	1440	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1863.62	1890.981	1890.891	27.87	95.89	PN 8	1958.91	0.6	1863.02		
	74	1460	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1863.60	1890.037	1889.948	26.95	95.91	PN 8	1958.91	0.6	1863.00		
	75	1480	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1863.58	1889.094	1889.004	26.02	95.93	PN 8	1958.91	0.6	1862.98		
	76	1500	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1863.96	1888.150	1888.061	24.70	95.55	PN 8	1958.91	0.6	1863.36		
	77	1520	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.37	1887.207	1887.117	23.35	95.14	PN 8	1958.91	0.6	1863.77		
	78	1540	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.78	1886.264	1886.174	21.99	94.73	PN 8	1958.91	0.6	1864.18		
	79	1560	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.12	1885.320	1885.230	20.71	94.39	PN 8	1958.91	0.6	1864.52		
	80	1580	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.61	1884.377	1884.287	19.28	93.90	PN 8	1958.91	0.6	1865.01		
	81	1600	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.76	1883.433	1883.343	18.18	93.75	PN 8	1958.91	0.6	1865.16		
	82	1620	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.42	1882.490	1882.400	17.58	94.09	PN 8	1958.91	0.6	1864.82		
	83	1640	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1865.15	1881.546	1881.456	16.91	94.36	PN 8	1958.91	0.6	1864.55		
	84	1660	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.84	1880.603	1880.513	16.27	94.67	PN 8	1958.91	0.6	1864.24		
	85	1680	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.28	1879.659	1879.570	15.89	95.23	PN 8	1958.91	0.6	1863.68		

Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	86	1700	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.18	1878.716	1878.626	15.05	95.33	PN 8	1958.91	0.6	1863.58		
	87	1720	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.40	1877.772	1877.683	13.88	95.11	PN 8	1958.91	0.6	1863.80		
	88	1740	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.62	1876.829	1876.739	12.72	94.89	PN 8	1958.91	0.6	1864.02		
	89	1760	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.85	1875.885	1875.796	11.55	94.66	PN 8	1958.91	0.6	1864.25		
	90	1780	20	140	0.002	0.044	0.002	1.327	0.943	0.090	1864.82	1874.942	1874.852	10.63	94.69	PN 8	1958.91	0.6	1864.22		
	<b>Proposed Tank</b>	1797.58	17.58	140	0.002	0.044	0.002	1.327	0.829	0.090	1864.68	1874.113	1874.023	9.94	94.83	PN 8	1958.91	0.6	1864.08	<b>0.002</b>	<b>2.00</b>



**LEGEND**

- STATIC LEVEL
- HYDRAULIC GRADE LINE
- EXISTING GROUND PROFILE
- PIPE INVERT
- DOUBLE AIR VALVE
- SINGLE AIR VALVE
- WASHOUT



DATUM 1940 m amsl	
HYDRAULIC GRADE (m)	
CHAINAGE (m)	000.00 010.00 020.00 030.00 040.00 050.00 060.00 070.00 080.00 090.00 100.00 110.00 120.00 130.00 140.00 150.00 160.00 170.00 180.00 190.00 200.00 210.00 220.00 230.00 240.00 250.00 260.00
GROUND LEVEL (m amsl)	1943.400 1943.490 1944.090 1944.280 1944.480 1944.690 1944.890 1944.980 1944.980 1944.980 1944.980 1944.980 1944.980 1944.980 1944.980 1945.200 1945.480 1945.760 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000
INVERT LEVEL (m amsl)	1943.400 1943.490 1944.090 1944.280 1944.480 1944.690 1944.890 1944.980 1944.980 1944.980 1944.980 1944.980 1944.980 1944.980 1944.980 1945.200 1945.480 1945.760 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000 1946.000
TRENCH DEPTH (m)	0.715 0.715
STEADY-STATE HEAD (m)	
DESIGN FLOW (l/s)	2.80
OFFTAKE (l/s)	
PIPE DETAILS	90mm Ø HDPE PN6
BEDDING DETAILS	GRADED GRANULAR MATERIAL (BS EN 12620)
SOIL TYPE	NORMAL SOILS

REV. No.	DESCRIPTION	DATE

**CLIENT**

Habitat for Humanity Kenya,  
P.O. Box 38948,  
Nairobi, Kenya.

**PROJECT EXECUTING AGENCY**

Habitat for Humanity Kenya,  
P.O. Box 38948,  
Nairobi, Kenya.

**PROJECT IMPLEMENTATION AGENCY**

Habitat for Humanity Kenya,  
P.O. Box 38948,  
Nairobi, Kenya.

**CONSULTANTS**

**BONGOTIPS LTD.**  
CONSULTANCY | CONSTRUCTIONS | SUPPLIES

Bongotips Limited  
P.O. Box 1508-00100  
Park road AHP Block E Suite 2  
Kisumu Road  
bongotips@yahoo.com

**PROJECT**

**DRILLING AND REHABILITATION WORK IN SOLIO SETTLEMENT SCHEME - LAIKIPIA COUNTY**

**DRG TITLE**

**SOLIO VILLAGE No.7 WATER SUPPLY**

**MAINLINE**  
**CH. 0.00 - CH. 260.00**  
**SHEET 1 OF 1**

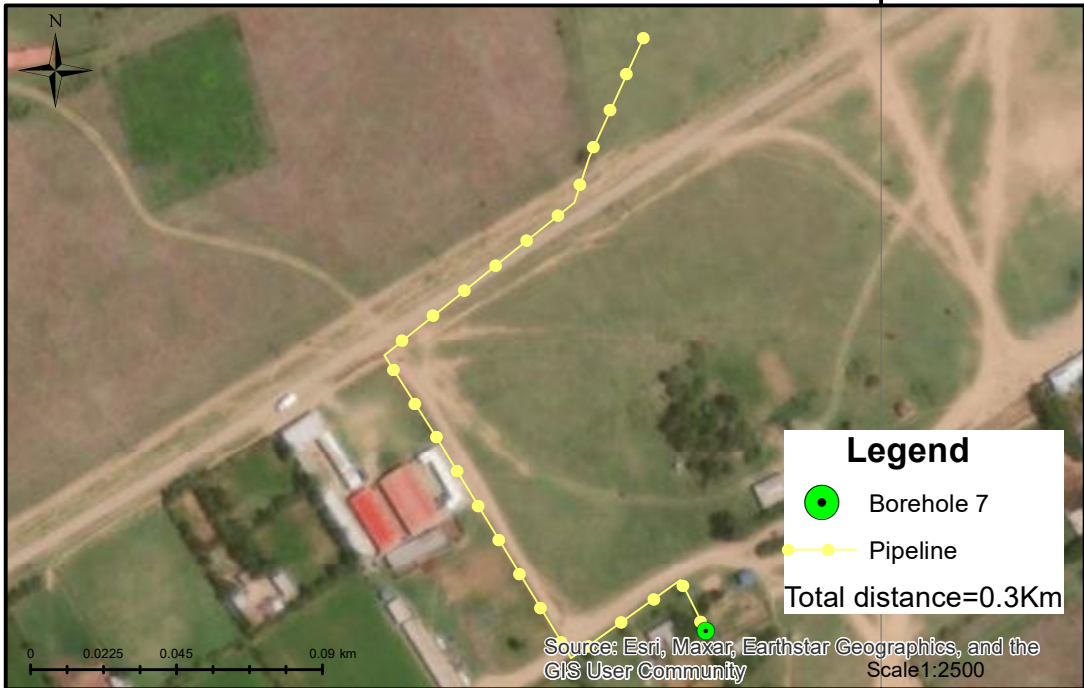
Date:	NOV 2024	JOB No.	
Designed:	Moses Ngala (GE)	Project stage	TENDER DRAWING
Drawn:	Moses Ngala (GE)	DRG. No.	
Checked:		REV	<b>O</b>
Approved:			
Scale:	H: 1:2000 V: 1:200 (A1)		

RAISING MAIN

EL static = {pump head (150 m) - pump setting level (110 m)} + G. Elev (1944.00 m) = 1984.00 m

Soil condition	Node	CH	L	C	Q	D	A	V	HL	Vf	G. Elev	EL	HGL	Hp	Hs	Pipe Class	EL static	Dexcav	Pipe invert	Q out (m3/sec)	Q out (l/sec)
	BOREHOLE	0	0	140	0.0028	0.082	0.005	0.535	0.000	0.015	1944.00	1984.000	1983.985	40.59	40.60	PN 6	1984.00	0.6	1943.40		
	2	10	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.09	1983.958	1983.943	40.45	40.51	PN 6	1984.00	0.6	1943.49		
	3	20	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.28	1983.915	1983.900	40.22	40.32	PN 6	1984.00	0.6	1943.68		
	4	30	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.48	1983.873	1983.858	39.98	40.12	PN 6	1984.00	0.6	1943.88		
	5	40	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.69	1983.830	1983.816	39.73	39.91	PN 6	1984.00	0.6	1944.09		
	6	50	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.89	1983.788	1983.773	39.48	39.71	PN 6	1984.00	0.6	1944.29		
	Road Crossing	60	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.745	1983.731	39.35	39.62	PN 6	1984.00	0.6	1944.38		
	8	70	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.703	1983.688	39.31	39.62	PN 6	1984.00	0.6	1944.38		
	9	80	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.660	1983.646	39.27	39.62	PN 6	1984.00	0.6	1944.38		
	10	90	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.618	1983.603	39.22	39.62	PN 6	1984.00	0.6	1944.38		
	11	100	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.575	1983.561	39.18	39.62	PN 6	1984.00	0.6	1944.38		
	12	110	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.533	1983.518	39.14	39.62	PN 6	1984.00	0.6	1944.38		
	13	120	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.490	1983.476	39.10	39.62	PN 6	1984.00	0.6	1944.38		
	14	130	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1944.98	1983.448	1983.433	39.05	39.62	PN 6	1984.00	0.6	1944.38		
	15	140	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1945.20	1983.405	1983.391	38.79	39.40	PN 6	1984.00	0.6	1944.60		
	16	150	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1945.48	1983.363	1983.348	38.47	39.12	PN 6	1984.00	0.6	1944.88		
	Road Crossing	160	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1945.76	1983.320	1983.306	38.15	38.84	PN 6	1984.00	0.6	1945.16		
	18	170	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1983.278	1983.263	37.86	38.60	PN 6	1984.00	0.6	1945.40		
	19	180	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1983.236	1983.221	37.82	38.60	PN 6	1984.00	0.6	1945.40		
	20	190	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1983.193	1983.178	37.78	38.60	PN 6	1984.00	0.6	1945.40		
	21	200	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1983.151	1983.136	37.74	38.60	PN 6	1984.00	0.6	1945.40		
	22	210	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1983.108	1983.093	37.69	38.60	PN 6	1984.00	0.6	1945.40		
	23	220	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1983.066	1983.051	37.65	38.60	PN 6	1984.00	0.6	1945.40		
	24	230	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1983.023	1983.009	37.61	38.60	PN 6	1984.00	0.6	1945.40		
	25	240	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1982.981	1982.966	37.57	38.60	PN 6	1984.00	0.6	1945.40		
	26	250	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1982.938	1982.924	37.52	38.60	PN 6	1984.00	0.6	1945.40		
	Proposed Tank	260	10	140	0.0028	0.082	0.005	0.535	0.042	0.015	1946.00	1982.896	1982.881	37.48	38.60	PN 6	1984.00	0.6	1945.40	0.0028	2.80

# WATER PIPELINE FOR SOLIO VILLAGE 7.



36°59'30"E

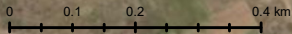
# WATER PIPELINE FOR SOLIO VILLAGE 5.




S.0°19'10.0"

S.0°19'10.0"

36°55'30"E



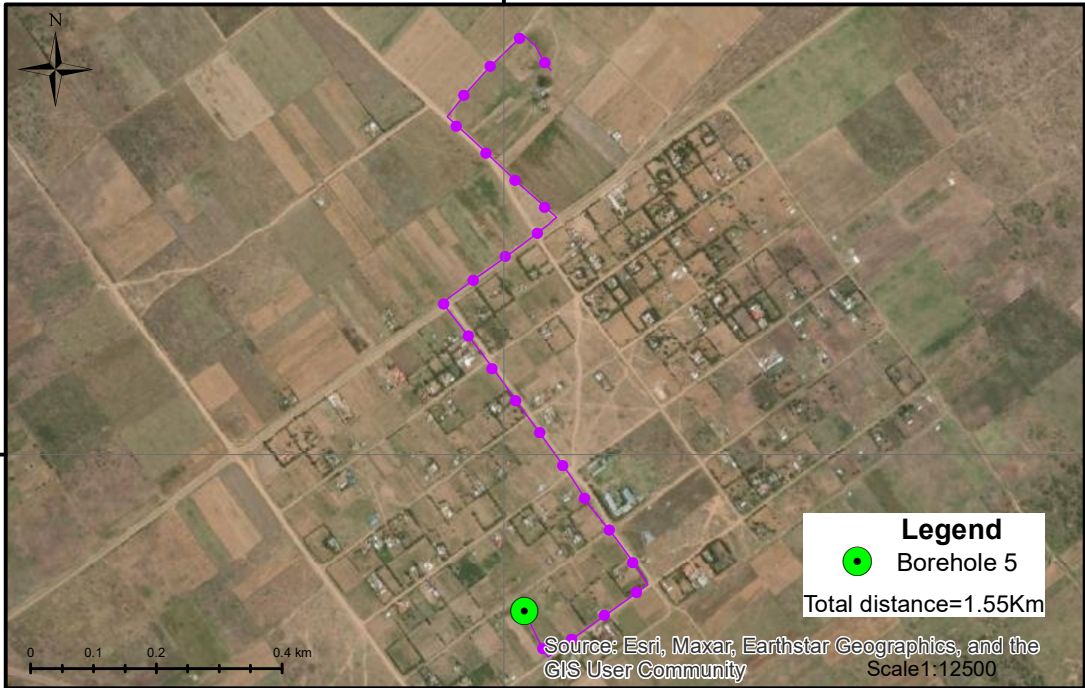
**Legend**

-  Borehole 5

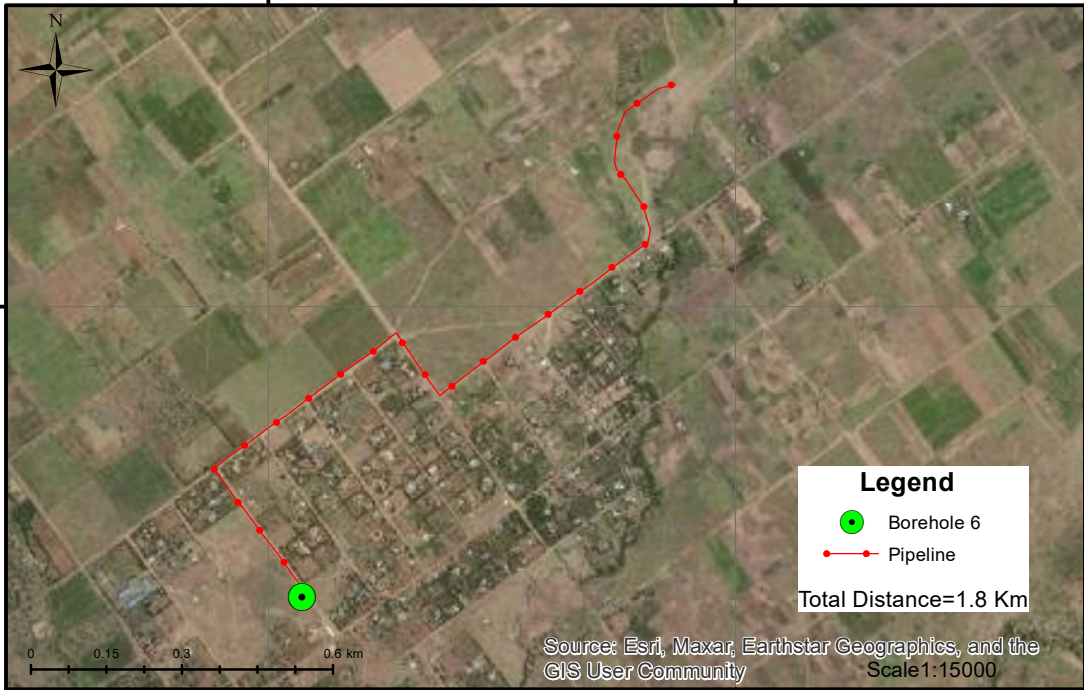
Total distance=1.55Km

Source: Esri, Maxar, Earthstar Geographics, and the  
GIS User Community

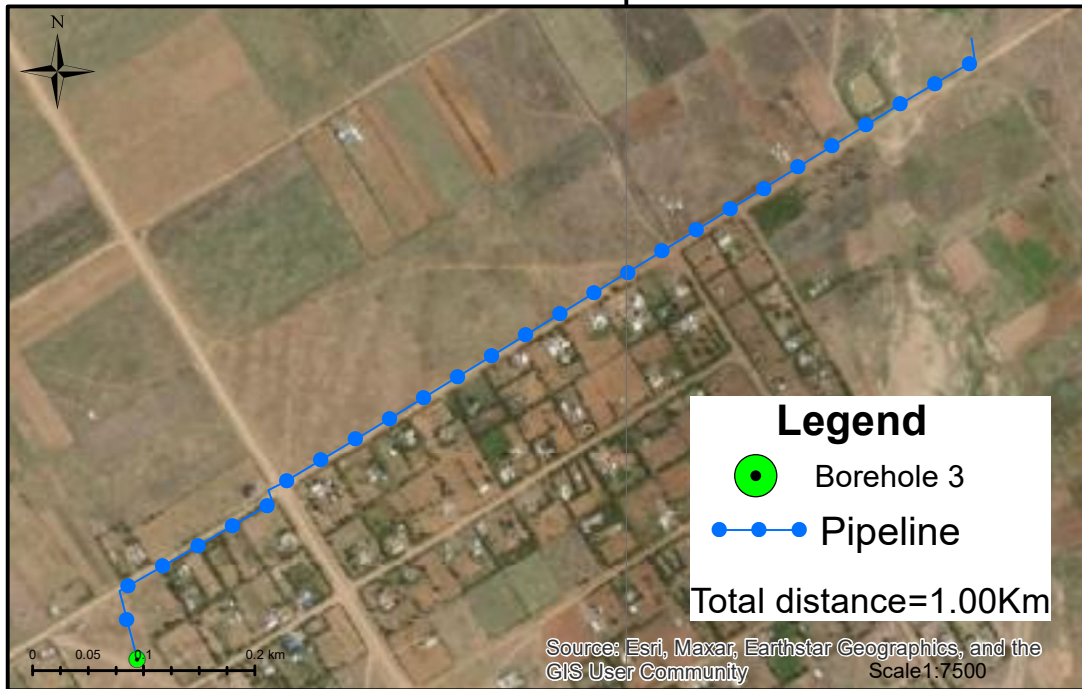
Scale 1:12500



# WATER PIPELINE FOR SOLIO VILLAGE 6.



# WATER PIPELINE FOR SOLIḶ VILLAGE 3.



36°58'30"E