WaterFund
Financing the Water Sector
WATER SECTOR TRUST FUND

THE WORLD BANK

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL AND SOCIAL IMPACTS ASSESSMENT(ESIA)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHABILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR;

CONTRACT NO. KE-WSTF-332741-CS-QCBS

WAJIR COUNTY

FINAL DETAILED DESIGN

VOLUME III: BOOK OF DRAWINGS LOT 1

JUNE 2025

aarvee associates
architects engineers & consultants pvt. ltd.

ADVANCED
ENGINEERING CONSULTANTS

DRAWINGS SCHEDULE

DRAWING No.	TITLE
	GENERAL
GW4R-WJR-LOT1-PP-00-01.	LIST OF DRAWINGS - SHEET 1
GW4R-WJR-LOT1-PP-00-02.	LIST OF DRAWINGS - SHEET 2
	1 - ADAMASEJIDA RWSS
GW4R-WJR-LOT1-PP-01-01.	GENERAL LAYOUT - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-01-02.01	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 1 OF 4
GW4R-WJR-LOT1-PP-01-02.02	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 2 OF 4
GW4R-WJR-LOT1-PP-01-02.03	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 3 OF 4
GW4R-WJR-LOT1-PP-01-02.04	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 4 OF 4
GW4R-WJR-LOT1-PP-01-03.	RISING MAIN (RM-02) - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-01-04.01	RISING MAIN (RM-03) - PLAN AND PROFILE - SHEET 1 OF 4
GW4R-WJR-LOT1-PP-01-04.02	RISING MAIN (RM-03) - PLAN AND PROFILE - SHEET 2 OF 4
GW4R-WJR-LOT1-PP-01-04.03	RISING MAIN (RM-03) - PLAN AND PROFILE - SHEET 3 OF 4
GW4R-WJR-LOT1-PP-01-04.04	RISING MAIN (RM-03) - PLAN AND PROFILE - SHEET 4 OF 4
GW4R-WJR-LOT1-PP-01-05.01	RISING MAIN (RM-04) - PLAN AND PROFILE - SHEET 1 OF 4
GW4R-WJR-LOT1-PP-01-05.02	RISING MAIN (RM-04) - PLAN AND PROFILE - SHEET 2 OF 4
GW4R-WJR-LOT1-PP-01-05.03	RISING MAIN (RM-04) - PLAN AND PROFILE - SHEET 3 OF 4
GW4R-WJR-LOT1-PP-01-05.04	RISING MAIN (RM-04) - PLAN AND PROFILE - SHEET 4 OF 4
GW4R-WJR-LOT1-PP-01-06.01	RISING MAIN (RM-05) - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-01-06.02	RISING MAIN (RM-05) - PLAN AND PROFILE - SHEET 2 OF 2
	2 - ATHIBOHOL RWSS
GW4R-WJR-LOT1-PP-02-01.	GENERAL LAYOUT - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-02-02.01	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-02-02.02	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-02-03.01	DL-02 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-02-03.02	DL-02 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-02-04.	DL-03 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-02-05.	DL-05 - PLAN AND PROFILE - SHEET 1 OF 1
	3 - BARMISH RWSS
GW4R-WJR-LOT1-PP-03-01.	GENERAL LAYOUT - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-03-04.01	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 1 OF 4
GW4R-WJR-LOT1-PP-03-04.02	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 2 OF 4
GW4R-WJR-LOT1-PP-03-04.03	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 3 OF 4
GW4R-WJR-LOT1-PP-03-04.04	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 4 OF 4
GW4R-WJR-LOT1-PP-03-03.	DL-01 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-03-04.01	DL-02 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-03-04.02	DL-02 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-03-05.	DL-03 - PLAN AND PROFILE - SHEET 1 OF 1
	4 - GTRSEY QOFTU RWSS
GW4R-WJR-LOT1-PP-04-01.	GENERAL LAYOUT - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-02.01	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 1 OF 3
GW4R-WJR-LOT1-PP-04-02.02	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 2 OF 3
GW4R-WJR-LOT1-PP-04-03.	RISING MAIN (RM-02) - PLAN AND PROFILE - SHEET 3 OF 3

DRAWING No.	TITLE
GW4R-WJR-LOT1-PP-04-04.	DL-03 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-05.	DL-05 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-06.	DL-06 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-07.	DL-09 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-09.	DL-15 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-10.	DL-16 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-11.01	DL-17 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-04-11.02	DL-17 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-04-12.	DL-19 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-13.	DL-20 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-04-14.	DL-22 - PLAN AND PROFILE - SHEET 1 OF 1
	5 - HADADO RWSS
GW4R-WJR-LOT1-PP-05-01.	GENERAL LAYOUT - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-02.01	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 1 OF 3
GW4R-WJR-LOT1-PP-05-02.02	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 2 OF 3
GW4R-WJR-LOT1-PP-05-02.03	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 3 OF 3
GW4R-WJR-LOT1-PP-05-03.01	RISING MAIN (RM-02) - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-03.02	RISING MAIN (RM-02) - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-04.	DL-01 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-05.	DL-02 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-06.	DL-04 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-07.01	DL-06 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-07.02	DL-06 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-08.01	DL-07 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-08.02	DL-07 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-09.01	DL-09 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-09.02	DL-09 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-10.01	DL-11 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-10.02	DL-11 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-11.	DL-12 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-12.	DL-13 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-13.	DL-16 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-14.01	DL-17 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-14.02	DL-17 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-15.01	DL-18 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-15.02	DL-18 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-16.01	DL-22 - PLAN AND PROFILE - SHEET 1 OF 3
GW4R-WJR-LOT1-PP-05-16.02	DL-22 - PLAN AND PROFILE - SHEET 2 OF 3
GW4R-WJR-LOT1-PP-05-16.03	DL-22 - PLAN AND PROFILE - SHEET 3 OF 3
GW4R-WJR-LOT1-PP-05-17.	DL-23 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-18.	DL-24 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-18.	DL-24 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-19.01	DL-25 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP-05-19.02	DL-25 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP-05-20.	DL-26 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-21.	DL-27 - PLAN AND PROFILE - SHEET 1 OF 1

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE. 2025
Drawn by:	J.K	JUNE. 2025
Checked by:	W.O	JUNE. 2025
Approved by:	D.L	JUNE. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

WAJIR COUNTY

DRAWINGS SCHEDULE
PLANS AND PROFILES
SHEET 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-00.01

Jul 19, 2025 - 9:51am

DRAWINGS SCHEDULE

DRAWING No.	TITLE
GW4R-WJR-LOT1-PP-05-22.	DL-28 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-23.	DL-29 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-05-25.	DL-34 - PLAN AND PROFILE - SHEET 1 OF 1
	6 - NOORGOWS RWSS
GW4R-WJR-LOT1-PP 06-01.	GENERAL LAYOUT - SHEET 1 OF 1
GW4R-WJR-LOT1-PP 06-02.	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP 06-03.01	DL-01 - PLAN AND PROFILE - SHEET 1 OF 2
GW4R-WJR-LOT1-PP 06-03.02	DL-01 - PLAN AND PROFILE - SHEET 2 OF 2
GW4R-WJR-LOT1-PP 06-04.	DL-02 - PLAN AND PROFILE - SHEET 1 OF 1
	7 - ABDIGAMEY RWSS
GW4R-WJR-LOT1-PP-07-01.	GENERAL LAYOUT - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-07-02.	RISING MAIN (RM-01) - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-07-03.	RISING MAIN (RM-02) - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-07-04.	DL-01 - PLAN AND PROFILE - SHEET 1 OF 1
GW4R-WJR-LOT1-PP-07-05.	DL-03 - PLAN AND PROFILE - SHEET 1 OF 1
	STANDARD DRAWINGS
GW4R-WJR-STD-01	TYPICAL SITE LAYOUT PLAN - SHEET 1 OF 1
GW4R-WJR-STD-02.01	ABLUTION BLOCK-FLOOR PLAN,ELEVATION & FOUNDATION DETAILS - SHEET 1 OF 2
GW4R-WJR-STD-02.01	ABLUTION BLOCK-SECTION VIEWS - SHEET 2 OF 2
GW4R-WJR-STD-03.01	OPERATOR'S HOUSE- FLOOR PLAN,ELEVATION & SECTION VIEWS - SHEET 1 OF 2
GW4R-WJR-STD-03.02	OPERATOR'S HOUSE- ROOF PLAN & FOUNDATION DETAILS - SHEET 2 OF 2
GW4R-WJR-STD-05.01	POWER HOUSE-FLOOR PLAN & ELEVATION VIEWS - SHEET 1 OF 2
GW4R-WJR-STD-05.02	POWER HOUSE-FOUNDATION,ROOF PLAN &SECTION VIEWS - SHEET 2 OF 2
GW4R-WJR-STD-06	CHLORINATION HOUSE-PLAN, ELEVATION AND SECTION VIEWS - SHEET 1 OF 1
GW4R-WJR-STD-07.01	GATES DETAILS-ELEVATION AND PLAN - SHEET 1 OF 2
GW4R-WJR-STD-07.02	GATES DETAILS-COLUMN AND HINGE DETAILS - SHEET 2 OF 2
GW4R-WJR-STD-08	CHAIN-LINK FENCE DETAILS-ELEVATION VIEWS&SECTIONS - SHEET 1 OF 1
GW4R-WJR-STD-09.01	WATER KIOSK TYPE 1-FOUNDATION,PLAN & SECTION VIEWS - SHEET 1 OF 2
GW4R-WJR-STD-09.02	WATER KIOSK TYPE 1-ROOF SLAB, REINFORCEMENT DETAILS & ELEVATION - SHEET 2 OF 2
GW4R-WJR-STD-10	WATER KIOSK TYPE 2-PLAN,ELEVATION & SECTION - SHEET 1 OF 1
GW4R-WJR-STD-11.01	THRUST BLOCKS AND ANCHOR BLOCKS-SECTION & ELEVATION - SHEET 1 OF 2
GW4R-WJR-STD-11.02	THRUST BLOCKS AND ANCHOR BLOCKS-PLAN & SECTIONS - SHEET 2 OF 2
GW4R-WJR-STD-12	GATE VALVES,AIR VALVES & WASHOUT VALVES DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-13	METRE CHAMBER DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-14.01	PLANT ROOM-PLAN & SECTIONS - SHEET 1 OF 2
GW4R-WJR-STD-14.02	PLANT ROOM - ELEVATIONS - SHEET 2 OF 2
GW4R-WJR-STD-15	MARKER POST DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-16	ELEVATED STEEL TANK-PLAN,SECTION & VIEWS - SHEET 1 OF 1
GW4R-WJR-STD-17.01	ELEVATED PLASTIC TANK-FRONT & SIDE VIEW - SHEET 1 OF 3
GW4R-WJR-STD-17.02	ELEVATED PLASTIC TANK-FOUNDATION LAYOUT & SECTION VIEWS - SHEET 2 OF 3
GW4R-WJR-STD-17.03	ELEVATED PLASTIC TANK-COLUMN BASE DETAILS - SHEET 3 OF 3
GW4R-WJR-STD-18	50M3 GROUND MASONRY TANK DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-19.01	CAMEL AND CATTLE WATER TROUGHS-PLAN - SHEET 1 OF 4
GW4R-WJR-STD-19.02	CAMEL AND CATTLE WATER TROUGHS-CROSS SECTIONAL ELEVATIONS - SHEET 2 OF 4

DRAWING No.	TITLE
GW4R-WJR-STD-19.03	SHOATS WATER TROUGHS-PLAN - SHEET 3 OF 4
GW4R-WJR-STD-19.04	SHOATS WATER TROUGHS-CROSS SECTIONAL ELEATIONS - SHEET 4 OF 4
GW4R-WJR-STD-20	BOREHOLE HEAD, CHAMBER AND FITTING DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-22	PIPE TRENCHES DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-23	RIVER AND LAGHA CROSSINGS DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-24	SOLAR SUPPORT STRUCTURE - SHEET 1 OF 1
GW4R-WJR-STD-25	PROJECT SIGNBOARD - SHEET 1 OF 1
GW4R-WJR-STD-26	PUMP HOUSE-PLAN, SECTION, ELEVATION VIEWS & FOUNDATION DETAILS - SHEET 1 OF 1
GW4R-WJR-STD-27	DRAINAGE CHANNEL - SHEET 1 OF 1
GW4R-WJR-STD-28	RO SCHEMATIC DRAWING - SHEET 1 OF 1

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE. 2025
Drawn by:	J.K	JUNE. 2025
Checked by:	W.O	JUNE. 2025
Approved by:	D.L	JUNE. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

WAJIR COUNTY

DRAWINGS SCHEDULE
PLANS AND PROFILES
SHEET 2

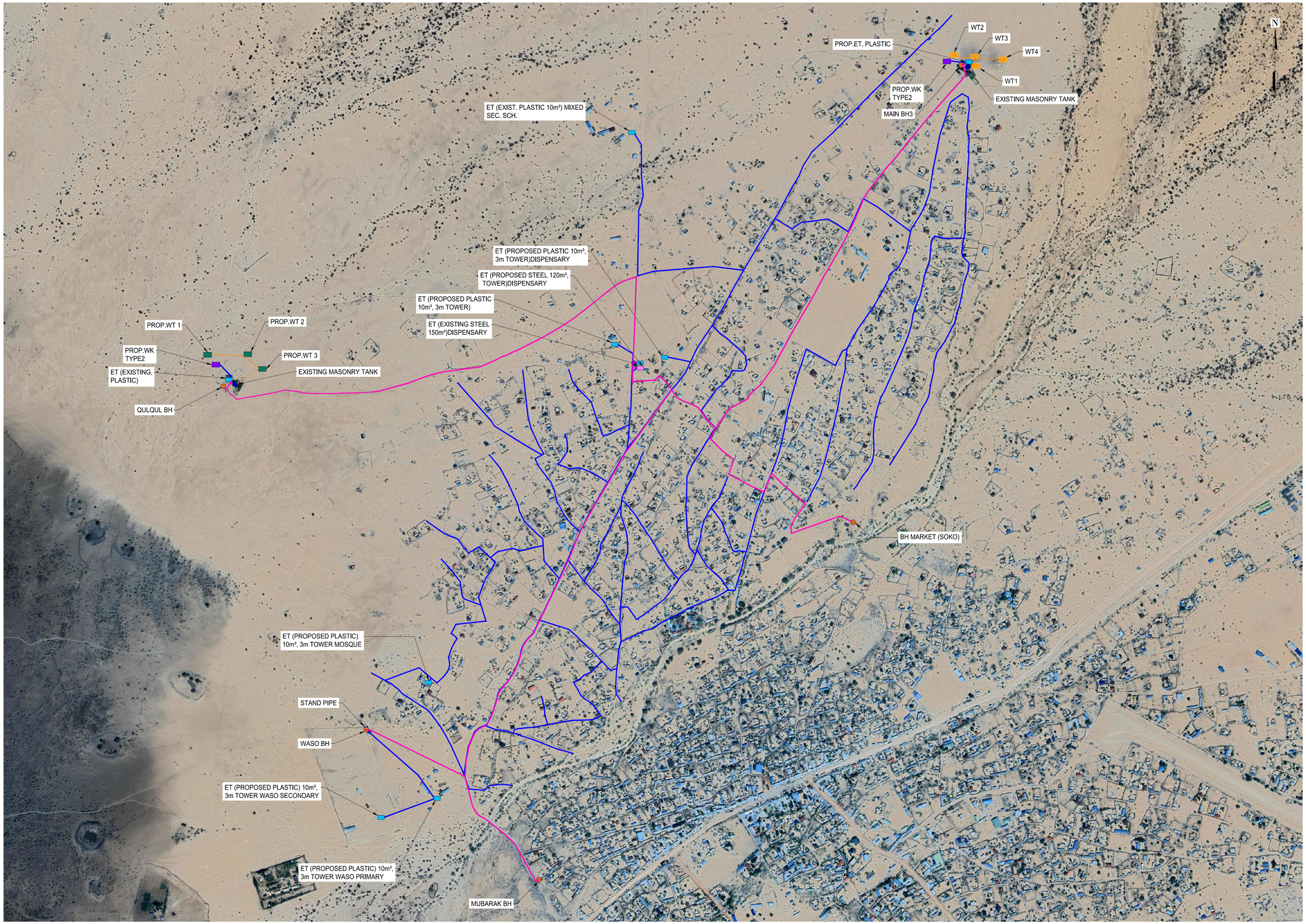
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-00.02

Jul 19, 2025 - 9:51am

PLANS AND PROFILES

ADAMASEJIDA RWSS - WAJIR



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

ADAMASEJIDA RWSS - WAJIR

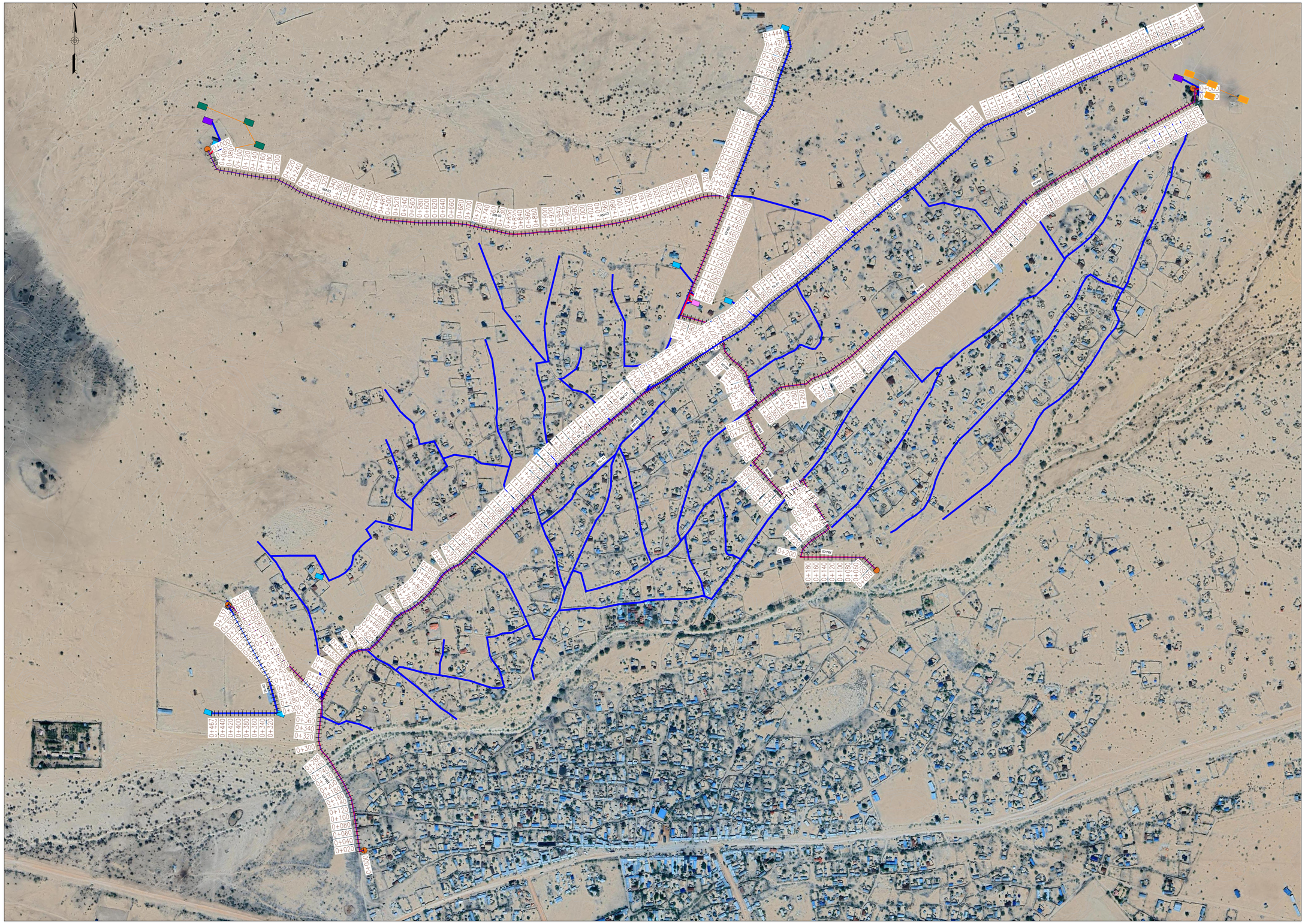
GENERAL LAYOUT PLAN - PROPOSED

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-01

Jul 19, 2025 - 10:04am



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP		SOLAR PANEL
GH		GENERATOR HOUSE
BH		BOREHOLE
UT		UNDERGROUND TANK
GT		GROUND TANK
ET		ELEVATED TANK, PLASTIC
SET		STEEL ELEVATED TANK(SET)
WK-PROP.		WATER KIOSK (PROPOSED)
WK-EXIST.		WATER KIOSK (EXISTING)
CH		CHAMBER
WT-PROP.		WATER TROUGH-PROPOSED
WT-EXIST.		WATER TROUGH-EXISTING
		EXISTING PIPELINE
		RISING MAIN
		DISTRIBUTION LINE
		DISTRIBUTION LINE TO WATER TROUGH
		ORIGINAL GROUND LEVEL
		PIPE INVERT LEVEL
		PIPE
212.50		MAJOR CONTOURS WITH ELEVATION
212.30		MINOR CONTOURS WITH ELEVATION
OD		OUTSIDE DIAMETER
S.A.V.		SINGLE AIR VALVE
D.A.V.		DOUBLE AIR VALVE
W.O.		WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd. | ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

ADAMASEJIDA RWSS - WAJIR

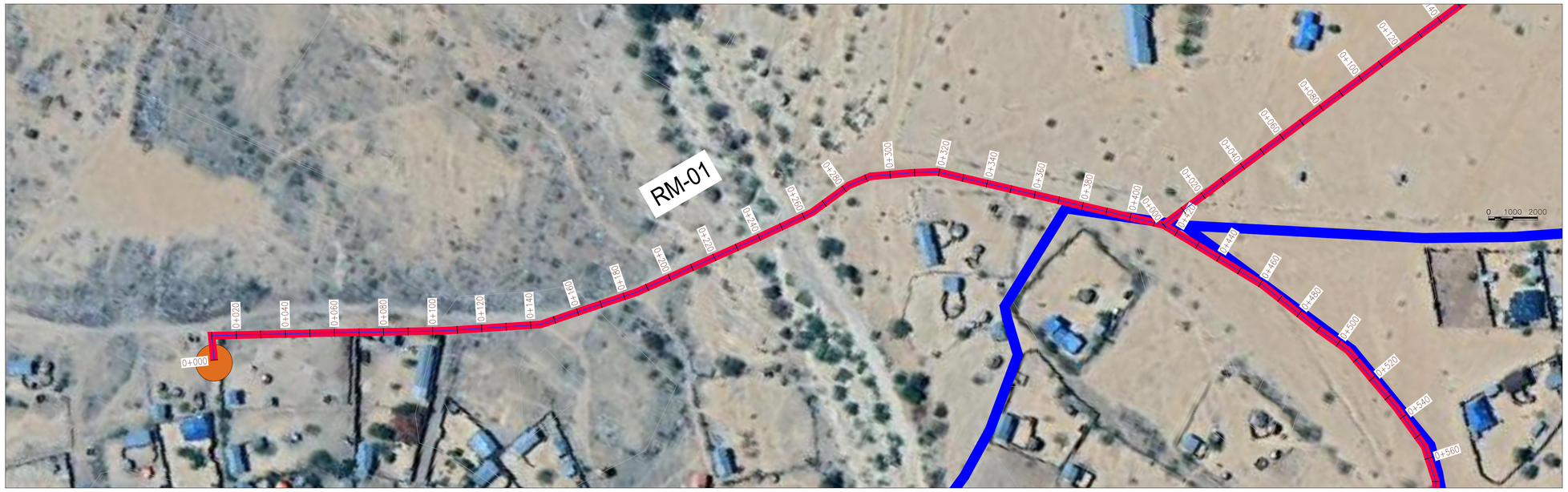
GENERAL LAYOUT

SHEET 1 OF 1

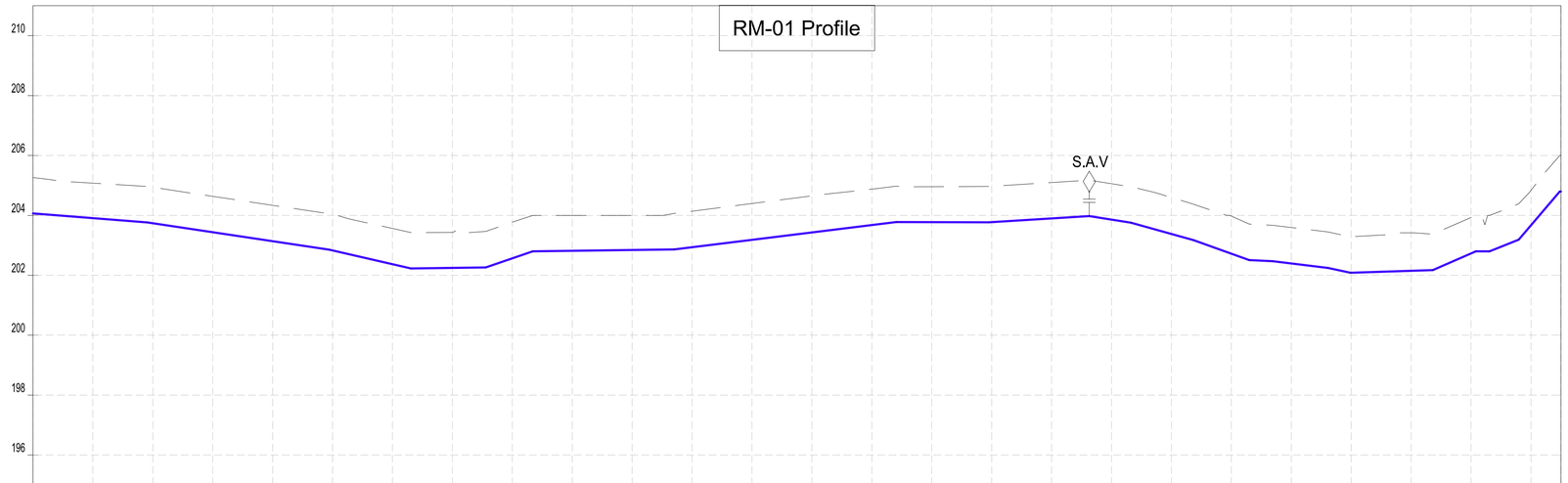
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-01

Jul 19, 2025 - 10:04am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	204.07	204.066	1.20
0+020	203.91	203.908	1.17
0+040	203.74	203.737	1.20
0+060	203.44	203.437	1.20
0+080	203.14	203.138	1.20
0+100	202.83	202.829	1.20
0+120	202.37	202.369	1.19
0+140	202.25	202.248	1.18
0+160	202.57	202.567	1.21
0+180	202.82	202.818	1.18
0+200	202.85	202.845	1.15
0+220	202.94	202.938	1.20
0+240	203.18	203.184	1.21
0+260	203.43	203.431	1.22
0+280	203.68	203.677	1.20
0+300	203.77	203.775	1.18
0+320	203.78	203.775	1.20
0+340	203.90	203.898	1.20
0+360	203.86	203.859	1.20
0+380	203.38	203.380	1.22
0+400	202.72	202.722	1.26
0+420	202.39	202.395	1.20
0+440	202.09	202.087	1.20
0+460	202.15	202.151	1.27
0+480	202.73	202.730	1.20
0+500	203.67	203.669	1.16
0+510	204.80	204.800	1.20

SIZE AND TYPE OF PIPE: OD75 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.79% | -1.50% | -2.30% | 0.14% | 3.43% | 0.14% | 1.23% | -0.03% | 0.62% | -1.53% | -2.79% | -3.58% | -0.51% | -1.21% | -2.13% | 0.32% | 4.36% | 0.00% | 3.09% | 11.75% | 0.00%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-01)
PLAN AND PROFILE

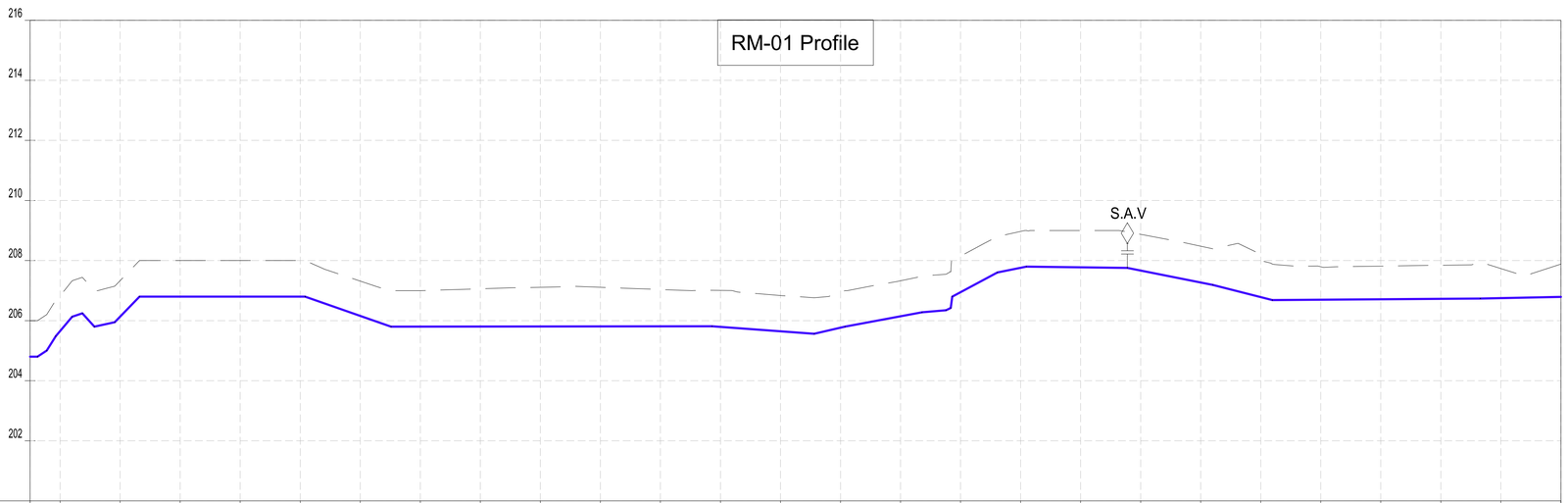
SHEET 1 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-02.01

Jul 19, 2025 - 10:05am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	206.00	204.800	1.20
0+520	205.84	205.653	1.19
0+540	207.33	206.132	1.20
0+560	208.00	206.800	1.20
0+580	208.00	206.800	1.20
0+600	208.00	206.800	1.20
0+620	207.32	206.158	1.16
0+640	207.00	205.801	1.20
0+660	207.06	205.803	1.26
0+680	207.11	205.805	1.30
0+700	207.11	205.807	1.30
0+720	207.03	205.809	1.23
0+740	207.01	205.791	1.22
0+760	206.84	205.645	1.19
0+780	206.95	205.766	1.19
0+800	207.33	206.144	1.18
0+820	208.15	206.947	1.20
0+840	208.97	207.760	1.21
0+860	209.00	207.776	1.22
0+880	208.87	207.689	1.20
0+900	208.48	207.272	1.21
0+920	208.00	206.783	1.22
0+940	207.80	206.696	1.10
0+960	207.82	206.711	1.11
0+980	207.84	206.727	1.12
1+000	207.73	206.751	0.98
1+020	207.88	206.791	1.09

SIZE AND TYPE OF PIPE: OD75 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.00% | 0.34% | 0.26% | 0.67% | 1.40% | 0.11% | 0.17% | 10.31% | −0.00% | −3.49% | 0.01% | −0.73% | 2.31% | 1.86% | 0.65% | 0.03% | 0.34% | 2.04% | −0.12% | −1.99% | −2.56% | 0.08% | 0.20%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-01)
PLAN AND PROFILE

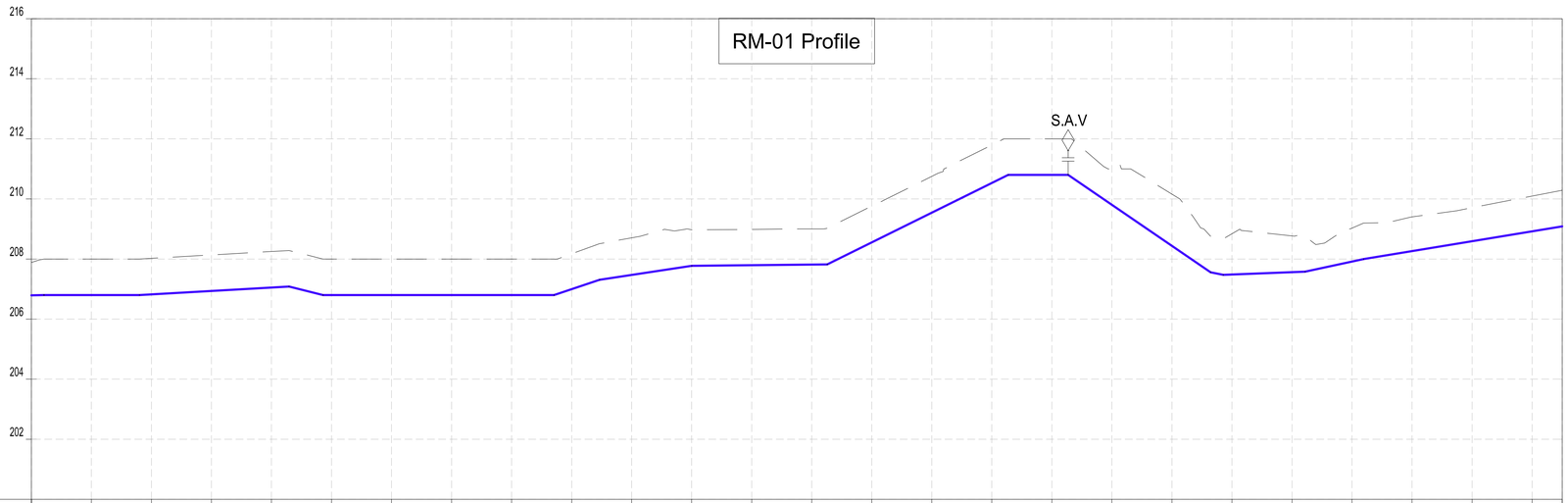
SHEET 2 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-02.02

Jul 19, 2025 – 10:05am

PLAN
SCALE 1:1250



CHAINAGES (M)	1+020	1+040	1+060	1+080	1+100	1+120	1+140	1+160	1+180	1+200	1+220	1+240	1+260	1+280	1+300	1+320	1+340	1+360	1+380	1+400	1+420	1+440	1+460	1+480	1+500	1+520	1+530
GROUND LEVEL (M)	207.88	208.00	208.02	208.14	208.25	208.00	208.00	208.00	208.00	208.17	208.71	208.97	208.98	209.00	209.76	210.75	211.80	212.00	211.05	210.16	208.84	208.77	209.03	209.40	209.71	210.10	210.29
INVERT LEVELS (M)	206.791	206.800	206.823	206.936	207.050	206.800	206.800	206.799	206.799	206.996	207.470	207.771	207.794	207.816	208.556	209.543	210.531	210.800	209.804	208.437	207.483	207.561	207.914	208.262	208.592	208.922	209.087
TRENCH DEPTH (M)	1.09	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.18	1.23	1.20	1.19	1.18	1.21	1.21	1.27	1.20	1.25	1.73	1.36	1.21	1.11	1.14	1.12	1.18	1.20
SIZE AND TYPE OF PIPE	OD75 PN10 HDPE PIPE																										
PIPE FITTINGS																											
SLOPE (%)	-0.20%	0.00%	0.57%	-2.80%	-0.00%	3.37%	1.50%	0.11%	4.94%	0.00%	-6.83%	-2.81%	0.39%	2.15%	1.65%												

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-01)
PLAN AND PROFILE

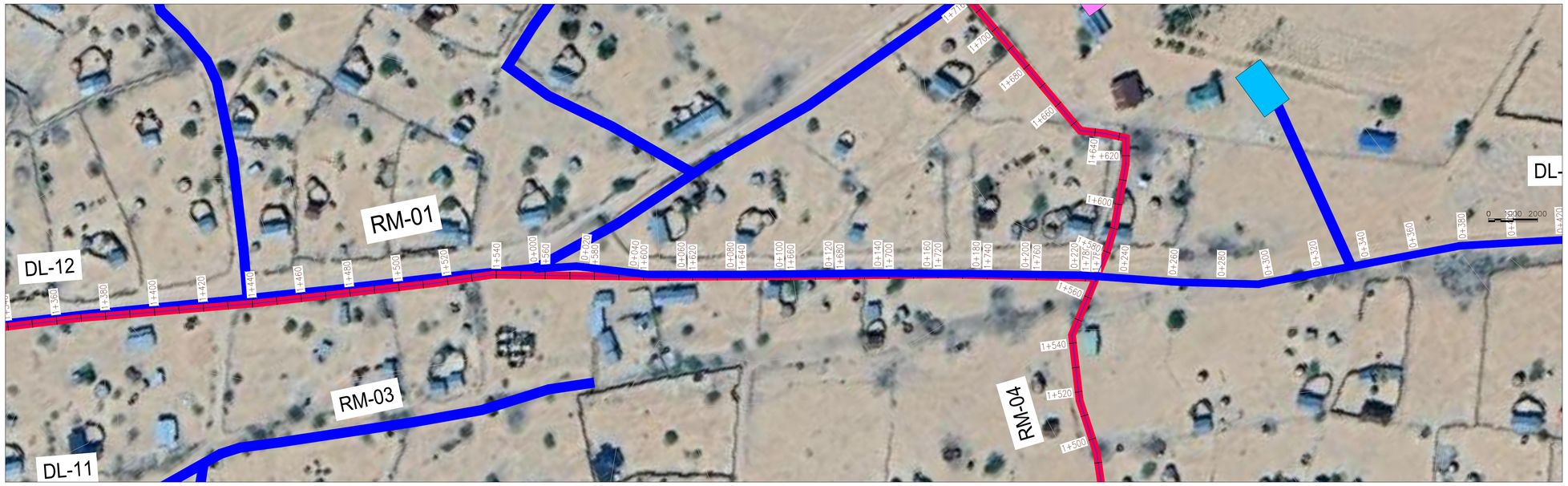
SHEET 3 OF 4

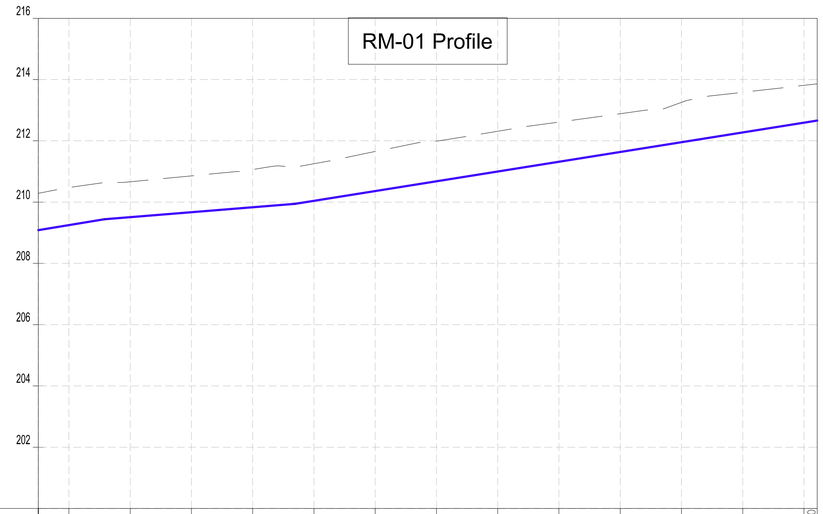
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-02.03

Jul 19, 2025 - 10:05am

PLAN
SCALE 1:1250





CHAINAGES (M)	1+530	1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	1+700	1+720	1+740	1+760	1+780	1+784.30
GROUND LEVEL (M)	210.29	210.48	210.66	210.86	211.06	211.25	211.65	211.99	212.31	212.61	212.89	213.26	213.59	213.81	213.86
INVERT LEVELS (M)	209.087	209.252	209.510	209.671	209.831	210.041	210.359	210.678	210.997	211.316	211.635	211.954	212.273	212.592	212.661
TRENCH DEPTH (M)	1.20	1.22	1.15	1.19	1.23	1.21	1.29	1.31	1.32	1.30	1.25	1.30	1.31	1.22	1.20
SIZE AND TYPE OF PIPE	OD75 PN10 HDPE PIPE														
PIPE FITTINGS															
SLOPE (%)	1.63%		0.80%							1.59%					

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

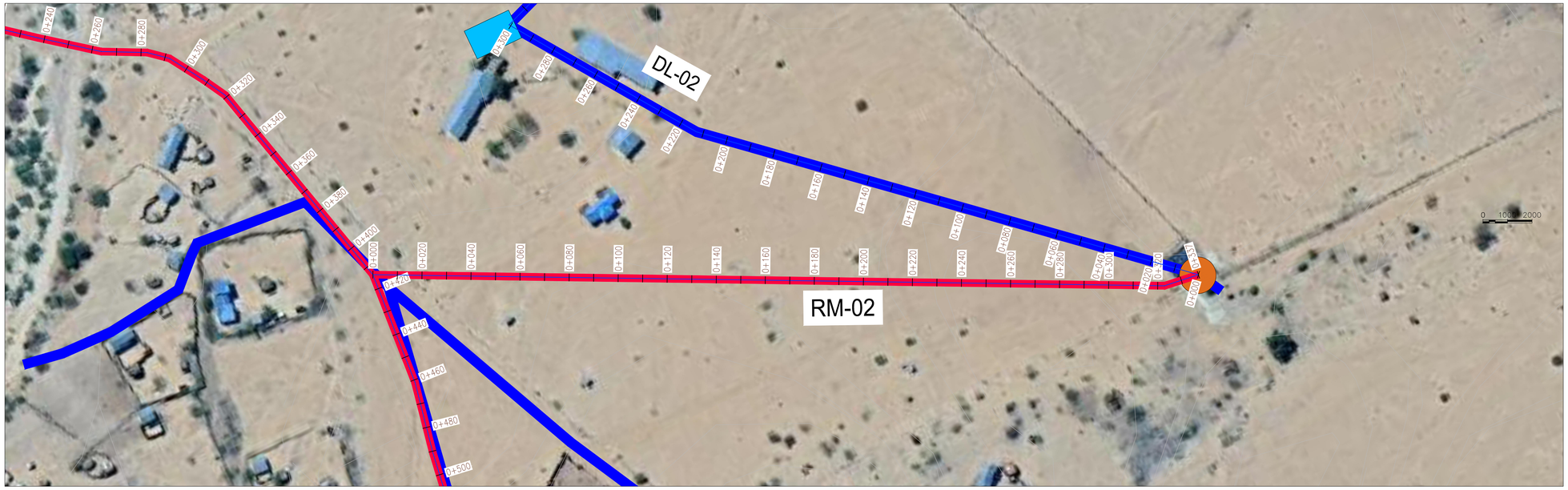
DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-01)
PLAN AND PROFILE

SHEET 4 OF 4

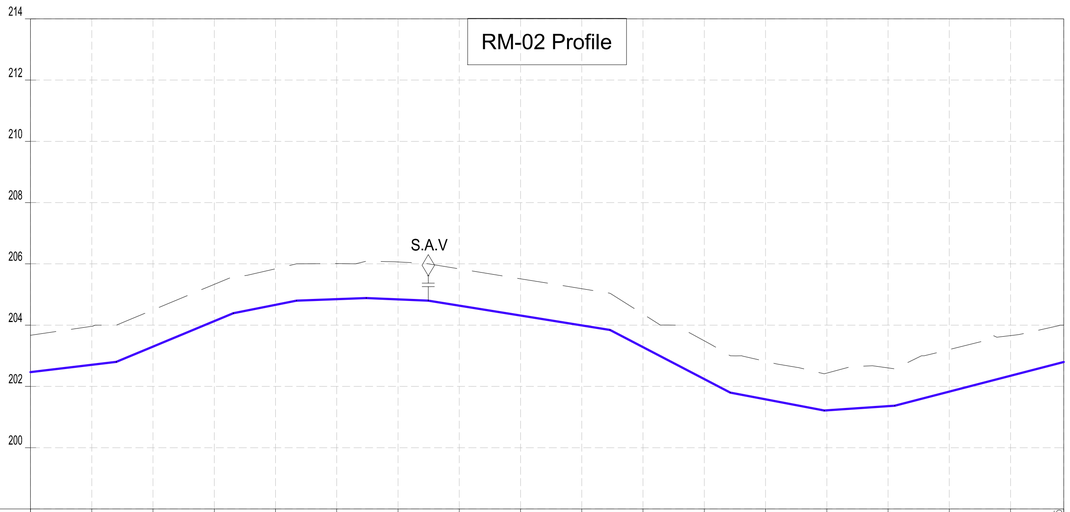
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-02.04

Jul 19, 2025 - 10:05am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	203.67	202.469	1.20
0+020	203.96	202.705	1.25
0+040	204.50	203.299	1.20
0+060	205.33	204.132	1.20
0+080	205.84	204.664	1.18
0+100	206.01	204.850	1.16
0+120	206.06	204.842	1.22
0+140	205.84	204.637	1.20
0+160	205.51	204.314	1.20
0+180	205.19	203.991	1.20
0+200	204.36	203.281	1.08
0+220	203.49	202.241	1.25
0+240	202.82	201.579	1.24
0+260	202.43	201.218	1.22
0+280	202.60	201.357	1.25
0+300	203.20	201.833	1.37
0+320	203.66	202.350	1.31
0+337.35	204.00	202.798	1.20

SIZE AND TYPE OF PIPE: OD75 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.78% | 4.17% | 1.08% | 0.38% | -0.43% | -1.61% | -5.20% | -1.92% | 0.70% | 2.58%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-02)
PLAN AND PROFILE

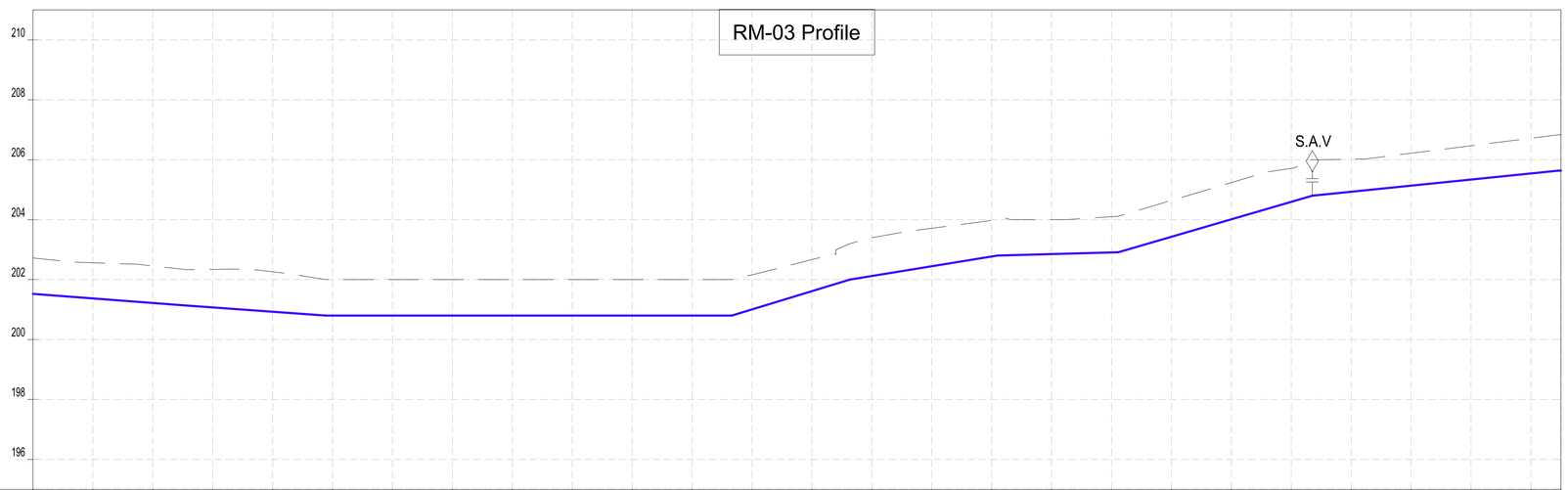
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-03

Jul 19, 2025 - 10:05am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	202.72	201.522	1.20
0+020	202.56	201.370	1.19
0+040	202.45	201.218	1.24
0+060	202.34	201.070	1.27
0+080	202.26	200.927	1.33
0+100	202.00	200.800	1.20
0+120	202.00	200.800	1.20
0+140	202.00	200.800	1.20
0+160	202.00	200.800	1.20
0+180	202.00	200.800	1.20
0+200	202.00	200.800	1.20
0+220	202.00	200.800	1.20
0+240	202.16	201.005	1.15
0+260	202.67	201.614	1.05
0+280	203.40	202.120	1.28
0+300	203.71	202.444	1.27
0+320	203.97	202.769	1.21
0+340	204.00	202.851	1.15
0+360	204.10	202.907	1.19
0+380	204.64	203.430	1.21
0+400	205.24	204.012	1.23
0+420	205.71	204.595	1.12
0+440	206.02	204.932	1.09
0+460	206.22	205.135	1.08
0+480	206.47	205.339	1.13
0+500	206.72	205.542	1.18
0+510	206.84	205.638	1.20

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.76% | -0.72% | 0.00% | 3.04% | 1.62% | 0.28% | 2.91% | 1.02% | 0.39%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

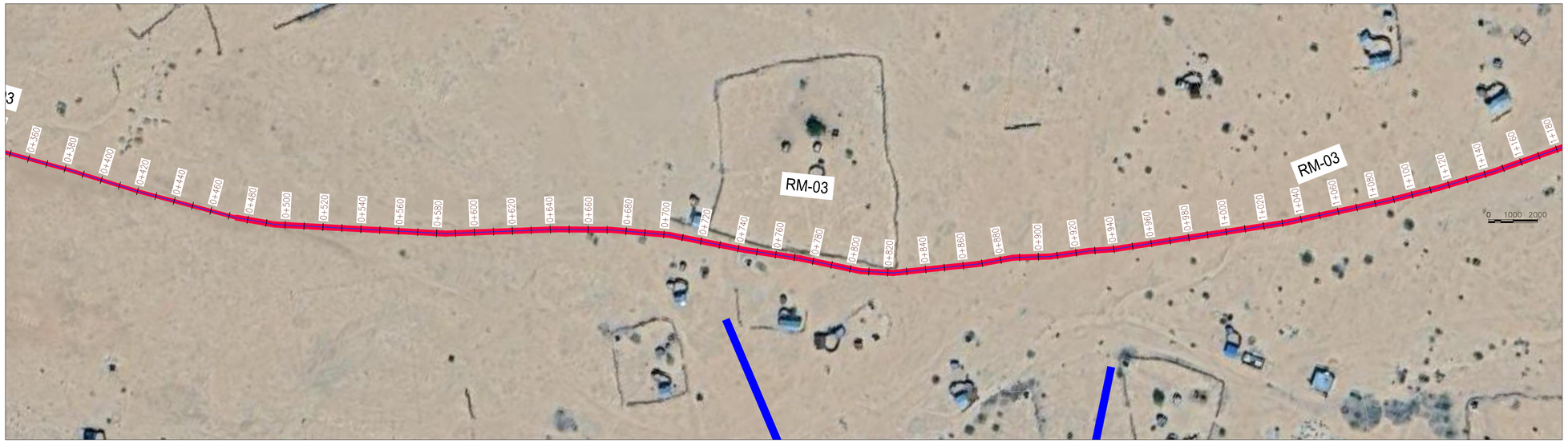
DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-03)
PLAN AND PROFILE

SHEET 1 OF 4

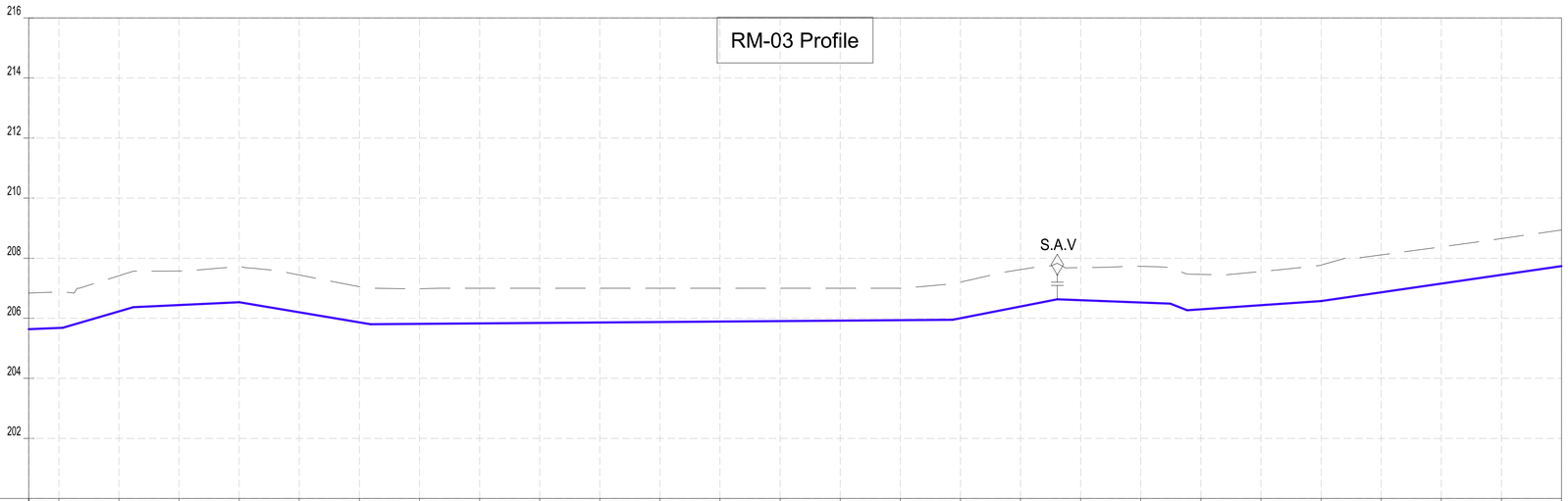
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-04.01

Jul 19, 2025 - 10:05am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	206.84	205.638	1.20
0+520	206.88	205.676	1.20
0+540	207.42	206.228	1.19
0+560	207.58	206.439	1.14
0+580	207.73	206.533	1.20
0+600	207.44	206.198	1.24
0+620	207.05	205.862	1.19
0+640	206.98	205.812	1.17
0+660	207.00	205.828	1.17
0+680	207.00	205.843	1.16
0+700	207.00	205.858	1.14
0+720	207.00	205.874	1.13
0+740	207.00	205.889	1.11
0+760	207.00	205.904	1.10
0+780	207.00	205.919	1.08
0+800	207.00	205.935	1.07
0+820	207.20	205.999	1.20
0+840	207.62	206.392	1.23
0+860	207.68	206.602	1.08
0+880	207.73	206.524	1.21
0+900	207.46	206.208	1.16
0+920	207.56	206.435	1.12
0+940	207.77	206.571	1.20
0+960	208.11	206.863	1.25
0+980	208.38	207.154	1.22
1+000	208.65	207.446	1.21
1+020	208.94	207.737	1.20

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.38% | 2.92% | 0.47% | -1.68% | 0.08% | 1.96% | -0.39% | 3.39% | 0.68% | 1.46%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-03)
PLAN AND PROFILE

SHEET 2 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-04.02

Jul 19, 2025 - 10:06am

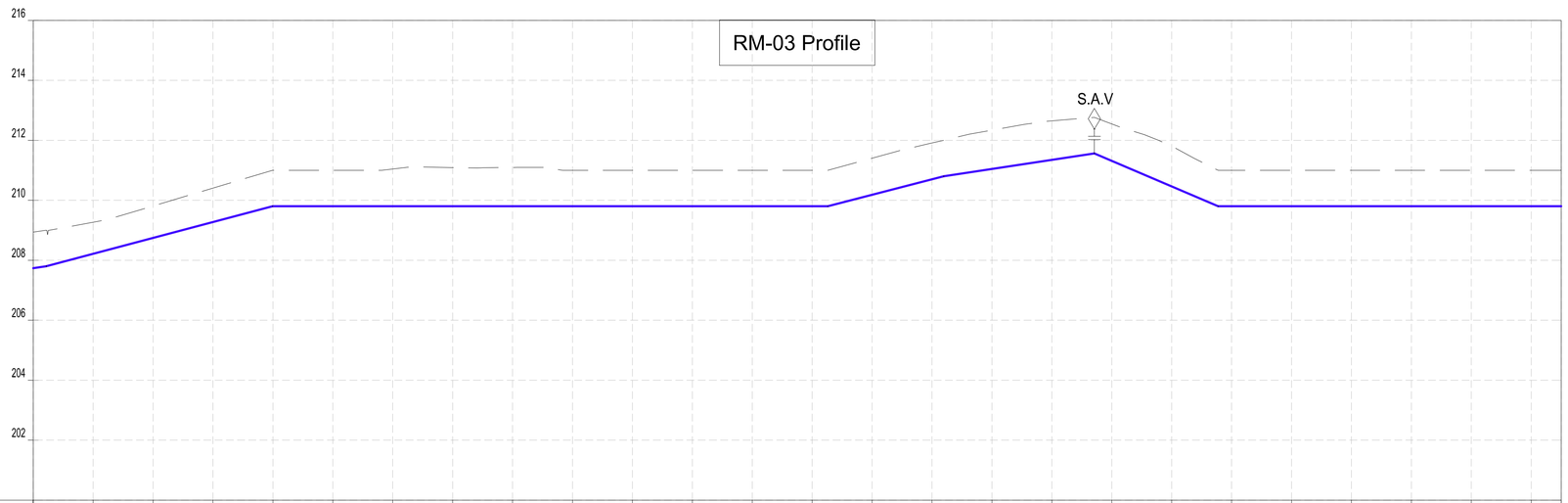
PLAN
SCALE 1:1250

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
1+020	208.94	207.737	1.20
1+040	209.27	208.215	1.05
1+060	209.81	208.744	1.07
1+080	210.41	209.274	1.13
1+100	211.00	209.800	1.20
1+120	211.00	209.800	1.20
1+140	211.04	209.800	1.24
1+160	211.09	209.800	1.29
1+180	211.09	209.800	1.29
1+200	211.00	209.800	1.20
1+220	211.00	209.800	1.20
1+240	211.00	209.800	1.20
1+260	211.00	209.800	1.20
1+280	211.00	209.800	1.20
1+300	211.40	210.182	1.22
1+320	211.91	210.699	1.21
1+340	212.34	211.045	1.30
1+360	212.65	211.348	1.30
1+380	212.55	211.316	1.23
1+400	211.81	210.462	1.34
1+420	211.00	209.800	1.20
1+440	211.00	209.800	1.20
1+460	211.00	209.800	1.20
1+480	211.00	209.800	1.20
1+500	211.00	209.800	1.20
1+520	211.00	209.800	1.20
1+530	211.00	209.800	1.20

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.46% | 2.65% | −0.00% | 2.59% | 1.52% | −4.27% | 0.00%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-03)
PLAN AND PROFILE

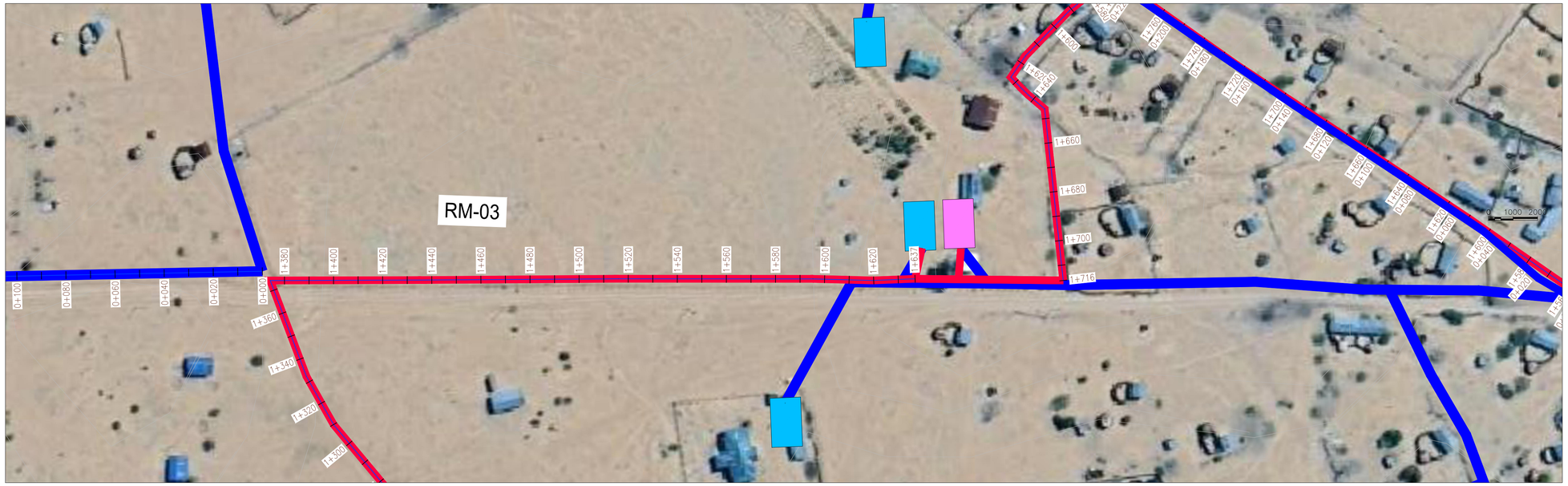
SHEET 3 OF 4

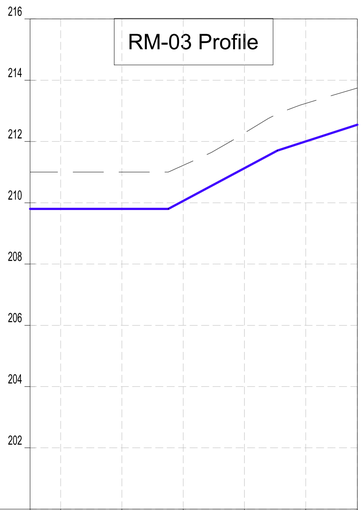
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-04.03

Jul 19, 2025 - 10:06am

PLAN
SCALE 1:1250





CHAINAGES (M)	1+530	1+540	1+560	1+580	1+600	1+620	1+636.85
GROUND LEVEL (M)	211.00	211.00	211.00	211.22	212.28	213.24	213.75
INVERT LEVELS (M)	209.800	209.800	209.800	210.059	211.129	212.002	212.547
TRENCH DEPTH (M)	1.20	1.20	1.20	1.16	1.15	1.24	1.20
SIZE AND TYPE OF PIPE	OD63 PN10 HDPE PIPE						
PIPE FITTINGS							
SLOPE (%)	0.00%		5.35%		3.23%		

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

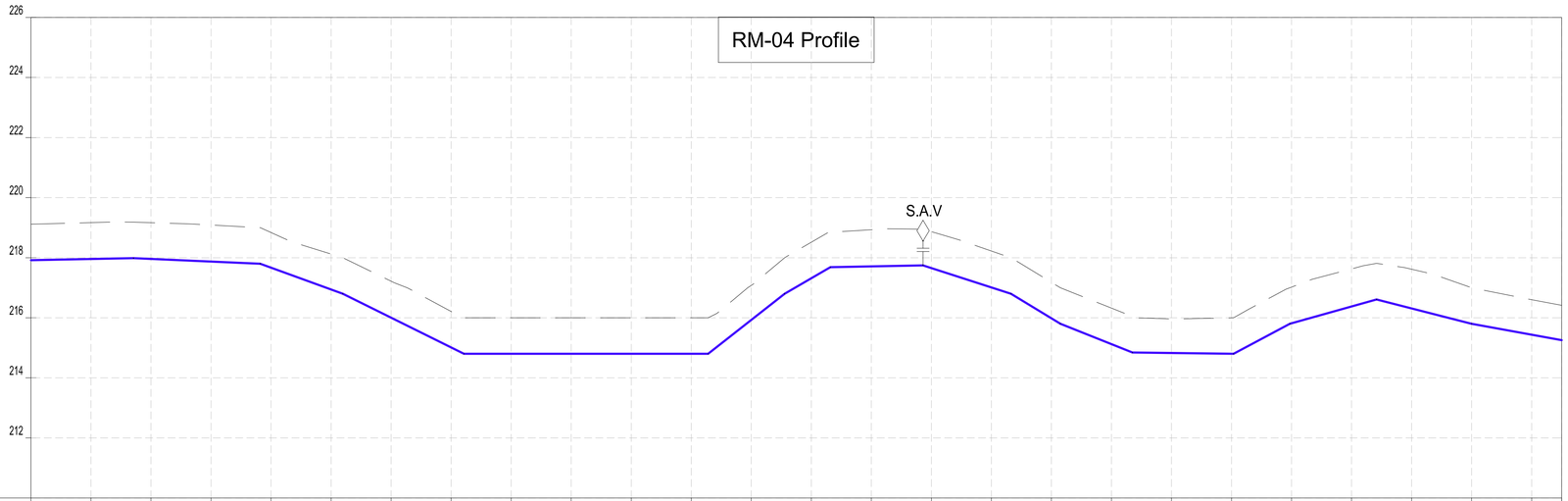
DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-03)
PLAN AND PROFILE
SHEET 4 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-04.04

Jul 19, 2025 - 10:06am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	219.12	217.916	1.20
0+020	219.17	217.957	1.21
0+040	219.17	217.960	1.21
0+060	219.09	217.872	1.21
0+080	218.84	217.668	1.17
0+100	218.12	216.942	1.18
0+120	217.22	216.003	1.21
0+140	216.21	215.012	1.20
0+160	216.00	214.800	1.20
0+180	216.00	214.800	1.20
0+200	216.00	214.800	1.20
0+220	216.00	214.800	1.20
0+240	217.08	215.928	1.15
0+260	218.52	217.315	1.20
0+280	218.93	217.711	1.22
0+300	218.87	217.656	1.21
0+320	218.23	217.011	1.21
0+340	217.18	215.981	1.20
0+360	216.32	215.122	1.20
0+380	215.96	214.826	1.14
0+400	216.00	214.801	1.20
0+420	217.02	215.815	1.21
0+440	217.63	216.378	1.25
0+460	217.62	216.312	1.31
0+480	217.00	215.799	1.20
0+500	216.60	215.437	1.16
0+510	216.41	215.255	1.16

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.20% | -0.44% | -3.63% | -4.95% | 0.00% | 7.85% | 5.79% | 0.20% | -3.23% | -6.08% | -3.99% | -0.13% | 5.34% | 2.81% | -2.57% | -1.81%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

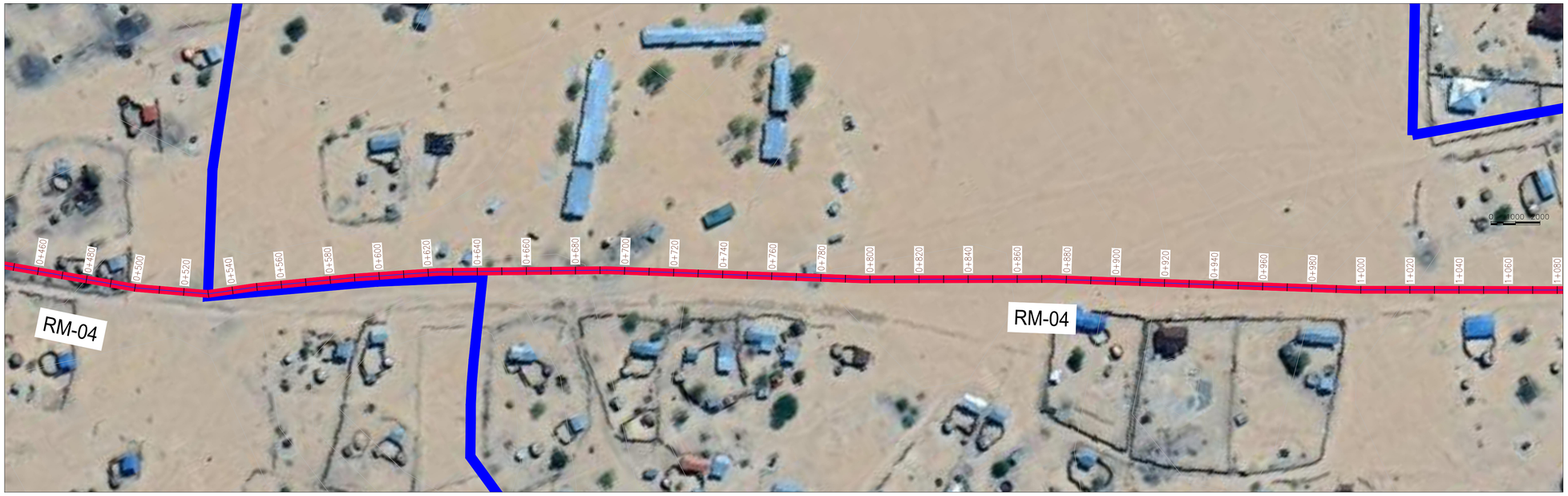
DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-04)
PLAN AND PROFILE

SHEET 1 OF 4

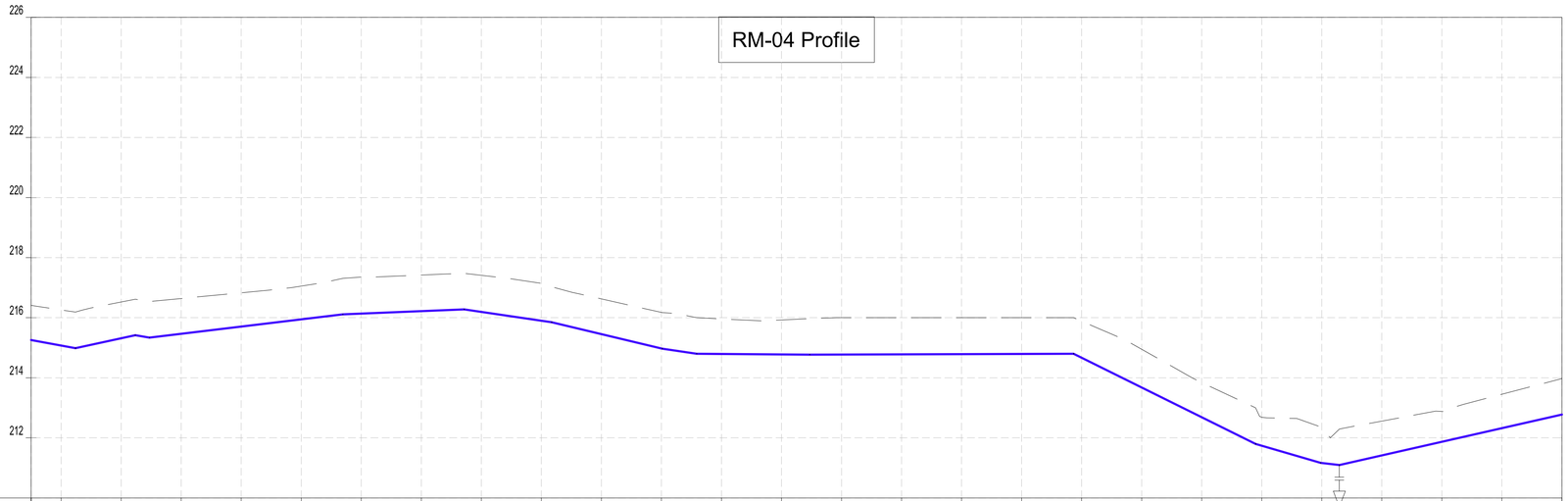
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-05.01

Jul 19, 2025 - 10:06am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	216.41	215.255	1.16
0+520	216.26	215.074	1.18
0+540	216.52	215.314	1.21
0+560	216.64	215.464	1.17
0+580	216.83	215.704	1.13
0+600	217.05	215.944	1.11
0+620	217.35	216.136	1.22
0+640	217.42	216.219	1.20
0+660	217.41	216.195	1.22
0+680	217.15	215.901	1.24
0+700	216.63	215.454	1.17
0+720	216.18	214.976	1.20
0+740	215.96	214.794	1.17
0+760	215.93	214.778	1.15
0+780	216.00	214.774	1.23
0+800	216.00	214.781	1.22
0+820	216.00	214.788	1.21
0+840	216.00	214.794	1.21
0+860	215.88	214.666	1.22
0+880	214.95	213.677	1.27
0+900	213.84	212.687	1.16
0+920	212.69	211.739	0.95
0+940	212.32	211.161	1.16
0+960	212.56	211.416	1.14
0+980	212.88	211.870	1.01
1+000	213.45	212.323	1.13
1+020	213.97	212.776	1.20

SIZE AND TYPE OF PIPE: OD32 PN63 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -1.81% | 2.15% | -1.65% | 1.20% | 0.42% | -1.47% | -2.39% | -1.48% | -0.08% | 0.03% | -4.95% | -2.92% | -1.17% | 2.27%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-04)
PLAN AND PROFILE

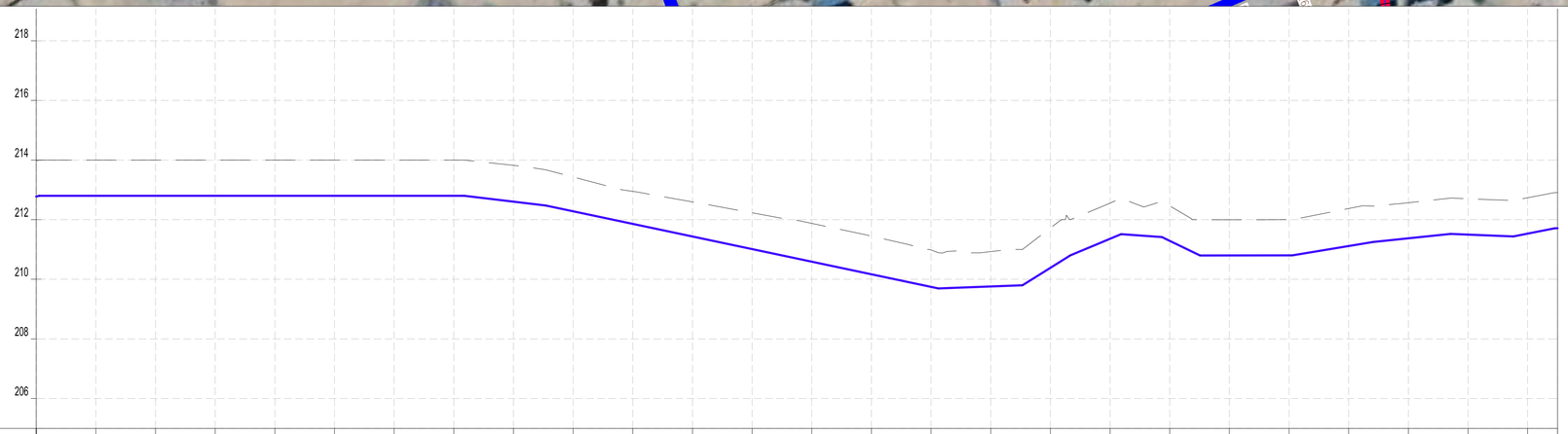
SHEET 2 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-05.02

Jul 19, 2025 - 10:06am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
1+020	213.97	212.776	1.20
1+040	214.00	212.800	1.20
1+060	214.00	212.800	1.20
1+080	214.00	212.800	1.20
1+100	214.00	212.800	1.20
1+120	214.00	212.800	1.20
1+140	214.00	212.800	1.20
1+160	214.00	212.800	1.20
1+180	213.82	212.603	1.22
1+200	213.43	212.279	1.15
1+220	212.95	211.857	1.09
1+240	212.59	211.435	1.16
1+260	212.23	211.012	1.22
1+280	211.88	210.590	1.29
1+300	211.45	210.167	1.28
1+320	210.98	209.745	1.24
1+340	210.93	209.760	1.17
1+360	211.72	210.383	1.34
1+380	212.56	211.358	1.20
1+400	212.46	211.289	1.17
1+420	212.00	210.799	1.20
1+440	212.00	210.800	1.20
1+460	212.37	211.116	1.26
1+480	212.57	211.376	1.19
1+500	212.70	211.500	1.20
1+520	212.73	211.532	1.20
1+530	212.91	211.712	1.19

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 2.27% | ~0.00% | ~1.20% | ~2.11% | 0.38% | 6.23% | 4.20% | ~0.21% | ~4.84% | 0.01% | 1.67% | 1.04% | ~0.40% | 1.95% | 0.48%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

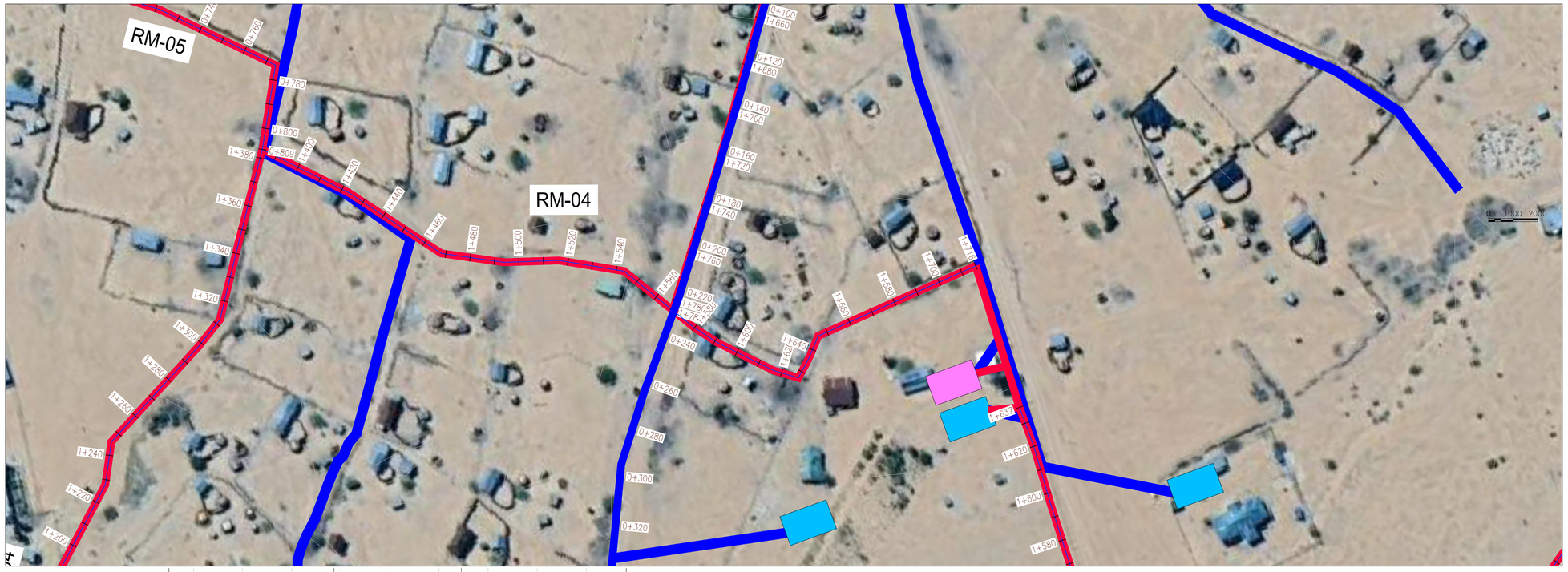
DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-04)
PLAN AND PROFILE

SHEET 3 OF 4

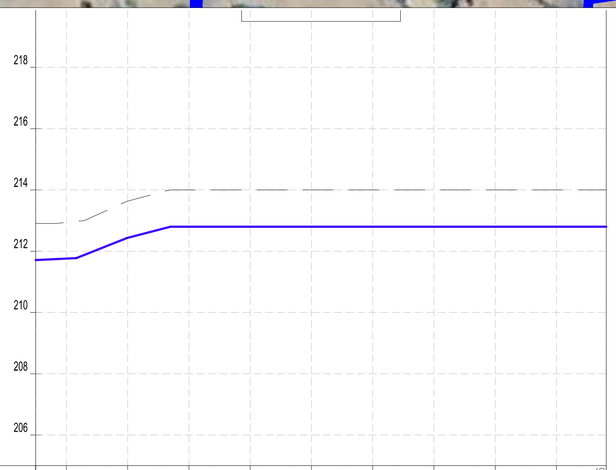
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-05.03

Jul 19, 2025 - 10:07am



PLAN
SCALE 1:1250



CHAINAGES (M)	1+530	1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680	1+700	1+716.26
GROUND LEVEL (M)	212.91	212.94	213.64	214.00	214.00	214.00	214.00	214.00	214.00	214.00	214.00
INVERT LEVELS (M)	211.712	211.760	212.435	212.800	212.800	212.800	212.800	212.800	212.800	212.800	212.800
TRENCH DEPTH (M)	1.19	1.18	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20	1.20
SIZE AND TYPE OF PIPE	OD63 PN10 HDPE PIPE										
PIPE FITTINGS											
SLOPE (%)	0.46%	3.96%	2.61%	0.00%							

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-04)
PLAN AND PROFILE

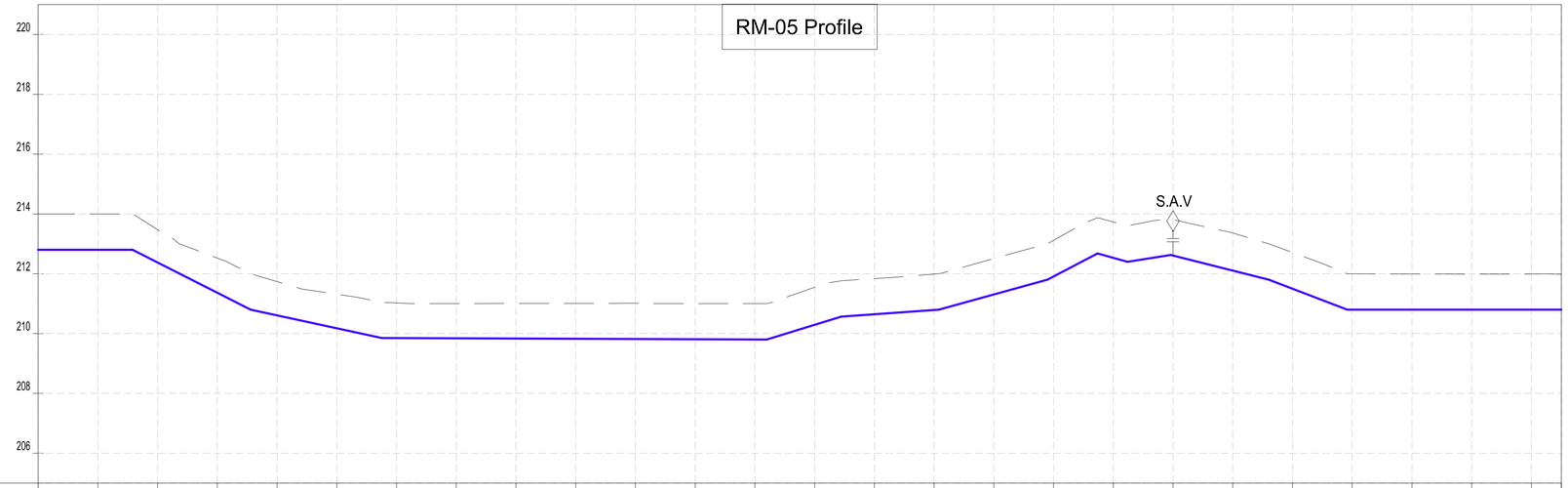
SHEET 4 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-05.04

Jul 19, 2025 - 10:07am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	214.00	212.800	1.20
0+020	214.00	212.800	1.20
0+040	213.47	212.376	1.10
0+060	212.52	211.365	1.16
0+080	211.74	210.609	1.13
0+100	211.31	210.175	1.14
0+120	211.02	209.847	1.18
0+140	211.00	209.840	1.16
0+160	211.00	209.832	1.17
0+180	211.00	209.825	1.18
0+200	211.01	209.817	1.19
0+220	211.00	209.810	1.19
0+240	211.00	209.803	1.20
0+260	211.55	210.292	1.26
0+280	211.84	210.645	1.19
0+300	211.99	210.789	1.20
0+320	212.51	211.306	1.20
0+340	213.12	211.907	1.21
0+360	213.73	212.530	1.20
0+380	213.81	212.607	1.20
0+400	213.36	212.103	1.26
0+420	212.71	211.497	1.21
0+440	212.00	210.800	1.20
0+460	211.99	210.800	1.19
0+480	211.99	210.800	1.19
0+500	211.99	210.800	1.19
0+510	211.98	210.800	1.18

SIZE AND TYPE OF PIPE: OD75 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.00% | -5.05% | -2.17% | -0.04% | 3.07% | 0.72% | 2.75% | 5.23% | -2.78% | 1.53% | -2.52% | -3.80% | 0.00%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-05)
PLAN AND PROFILE

SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-06.01

Jul 19, 2025 - 10:07am

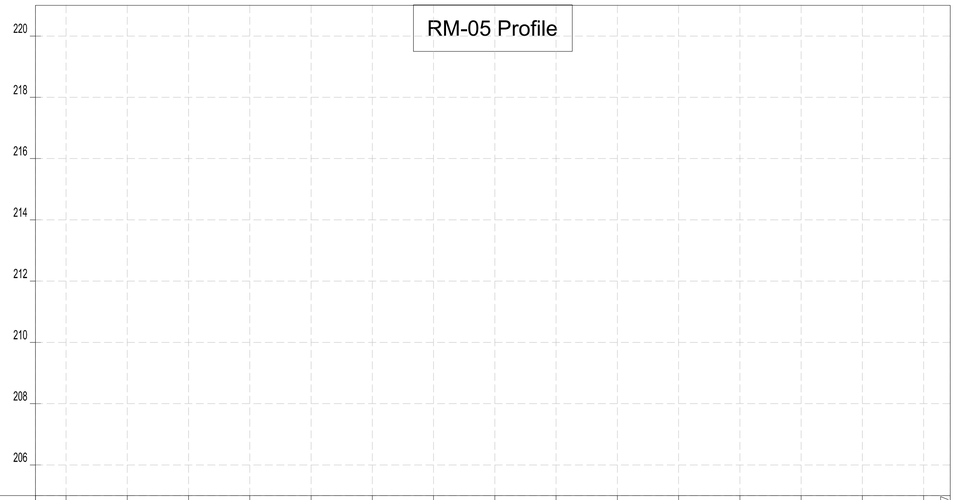
PLAN
SCALE 1:1250

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	211.98	210.800	1.18
0+520	211.97	210.800	1.17
0+540	211.94	210.800	1.14
0+560	211.94	210.800	1.14
0+580	211.97	210.800	1.17
0+600	212.00	210.800	1.20
0+620	212.59	211.446	1.15
0+640	213.22	212.148	1.07
0+660	214.00	212.800	1.20
0+680	214.00	212.800	1.20
0+700	214.00	212.800	1.20
0+720	214.00	212.800	1.20
0+740	214.00	212.800	1.20
0+760	214.00	212.800	1.20
0+780	213.82	212.626	1.19
0+800	213.12	211.938	1.18
0+808.67	212.71	211.512	1.20

SIZE AND TYPE OF PIPE: OD75 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.00% | 3.51% | 0.00% | -2.61% | -4.91%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

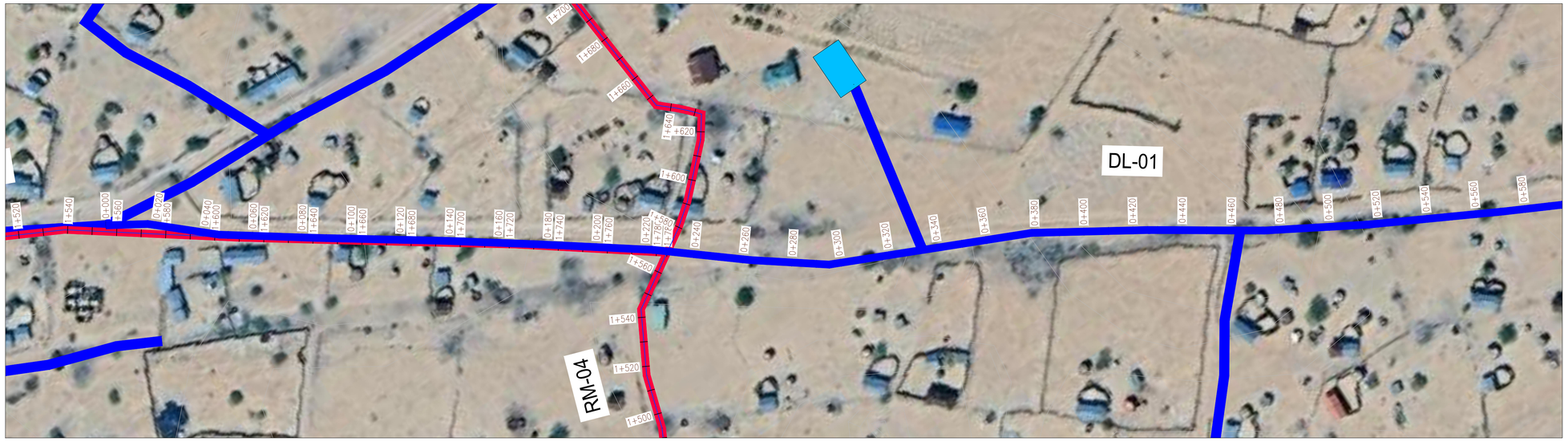
DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
RISING MAIN (RM-05)
PLAN AND PROFILE

SHEET 2 OF 2

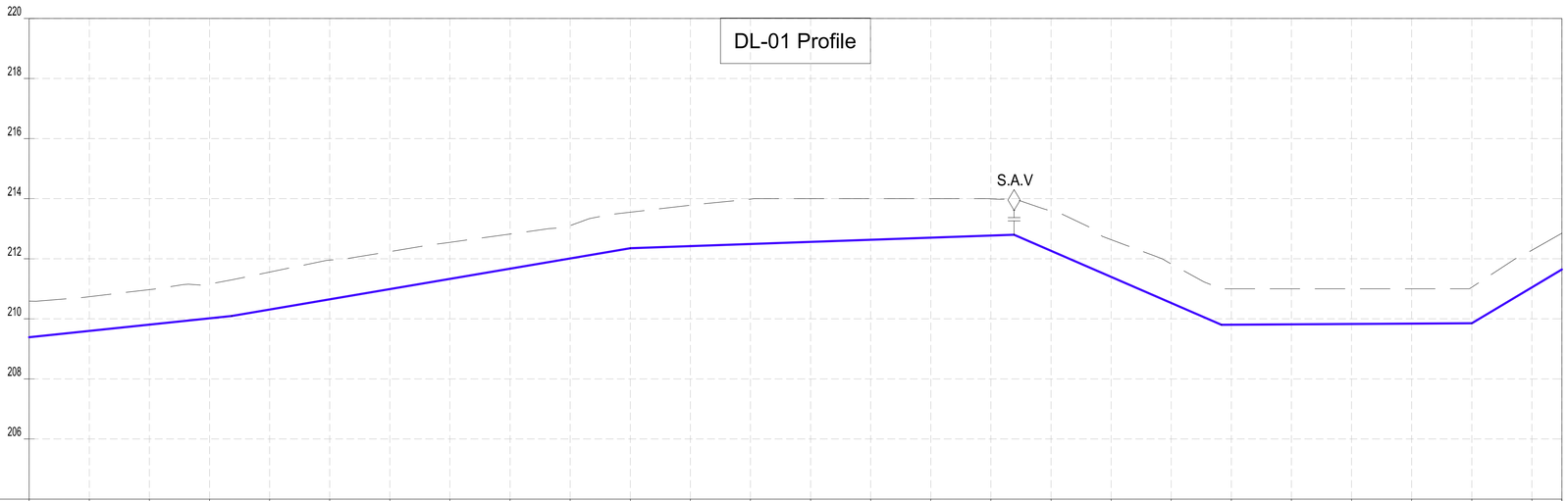
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-06.02

Jul 19, 2025 - 10:07am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	210.59	209.389	1.20
0+020	210.74	209.599	1.14
0+040	210.97	209.809	1.16
0+060	211.16	210.019	1.14
0+080	211.56	210.311	1.24
0+100	211.95	210.651	1.30
0+120	212.24	210.990	1.25
0+140	212.55	211.330	1.22
0+160	212.82	211.670	1.15
0+180	213.10	212.010	1.09
0+200	213.55	212.350	1.20
0+220	213.78	212.420	1.36
0+240	213.99	212.491	1.50
0+260	214.00	212.561	1.44
0+280	214.00	212.632	1.37
0+300	214.00	212.702	1.30
0+320	213.99	212.773	1.22
0+340	213.59	212.266	1.32
0+360	212.63	211.396	1.24
0+380	211.83	210.526	1.30
0+400	211.00	209.802	1.20
0+420	211.00	209.814	1.19
0+440	211.00	209.826	1.17
0+460	211.00	209.838	1.16
0+480	211.05	209.851	1.20
0+500	212.28	211.046	1.24
0+510	212.85	211.643	1.21

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.05% | 1.70% | 0.35% | -4.35% | 0.06% | 5.98%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
DL-01

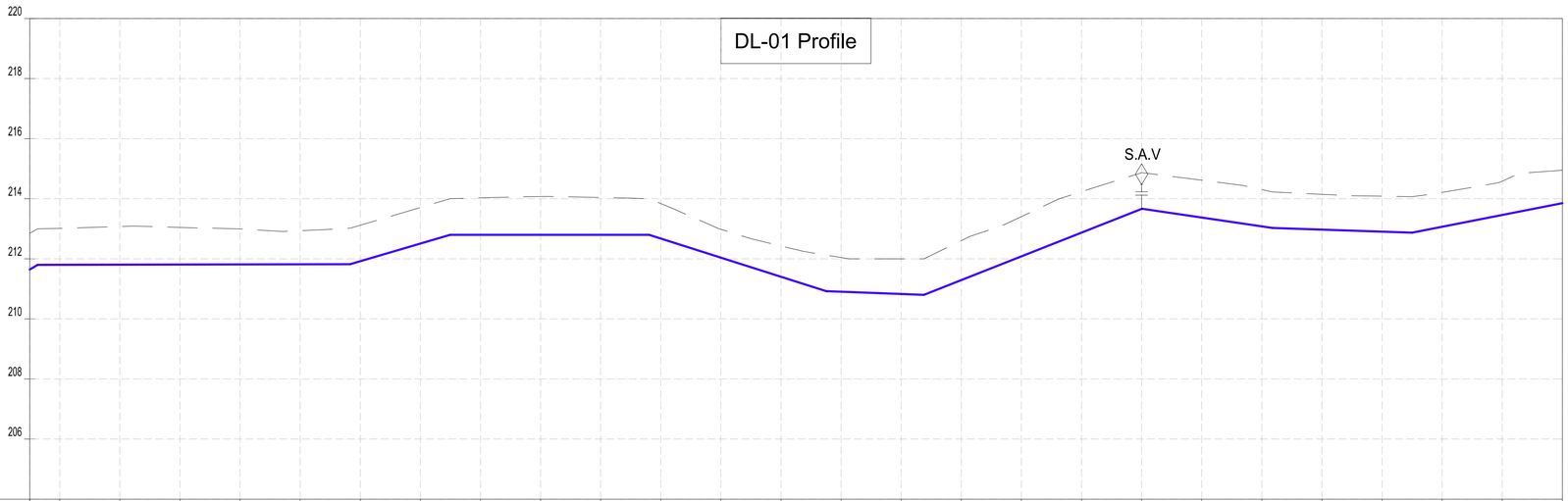
PLAN AND PROFILE
SHEET 1 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-07.01

Jul 19, 2025 - 10:07am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	212.85	211.643	1.21
0+520	213.01	211.801	1.21
0+540	213.08	211.805	1.27
0+560	213.04	211.809	1.24
0+580	213.00	211.813	1.18
0+600	212.94	211.817	1.12
0+620	213.12	211.920	1.20
0+640	213.71	212.509	1.20
0+660	214.03	212.800	1.23
0+680	214.08	212.800	1.28
0+700	214.04	212.800	1.24
0+720	213.84	212.676	1.16
0+740	212.98	212.040	0.94
0+760	212.43	211.403	1.03
0+780	212.04	210.905	1.14
0+800	212.00	210.829	1.17
0+820	212.61	211.292	1.31
0+840	213.41	212.082	1.32
0+860	214.24	212.873	1.36
0+880	214.86	213.664	1.20
0+900	214.62	213.375	1.24
0+920	214.31	213.080	1.23
0+940	214.15	212.972	1.18
0+960	214.09	212.905	1.18
0+980	214.21	213.068	1.14
1+000	214.59	213.462	1.12
1+020	214.96	213.855	1.11

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 5.98% | 0.02% | 2.95% | 0.00% | -3.18% | -0.38% | 3.95% | -1.47% | -0.34% | 1.97%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

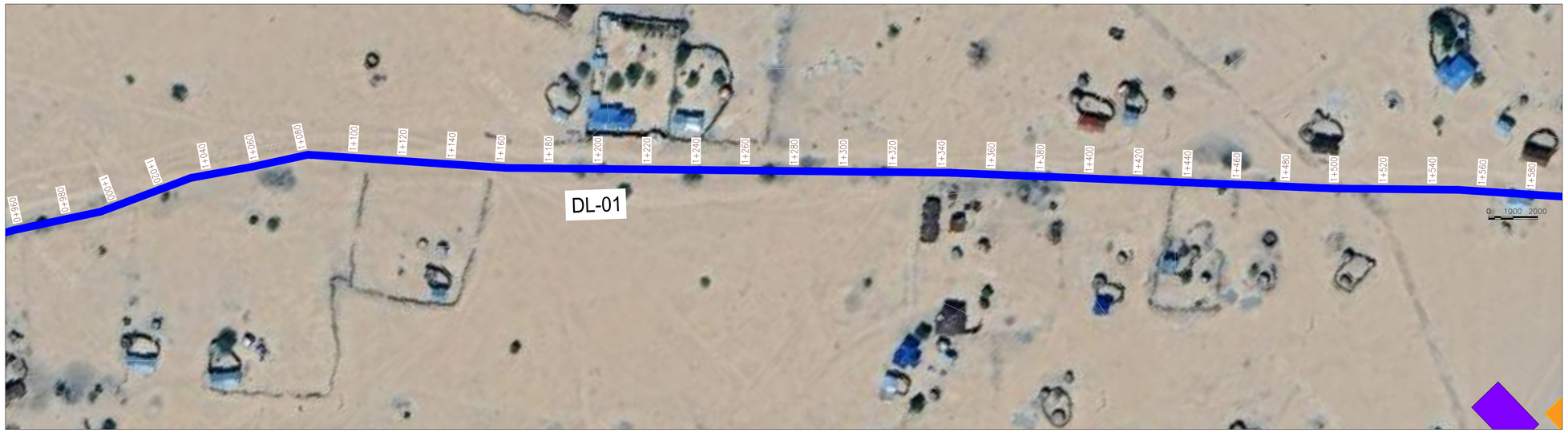
DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
DL-01

PLAN AND PROFILE
SHEET 2 OF 4

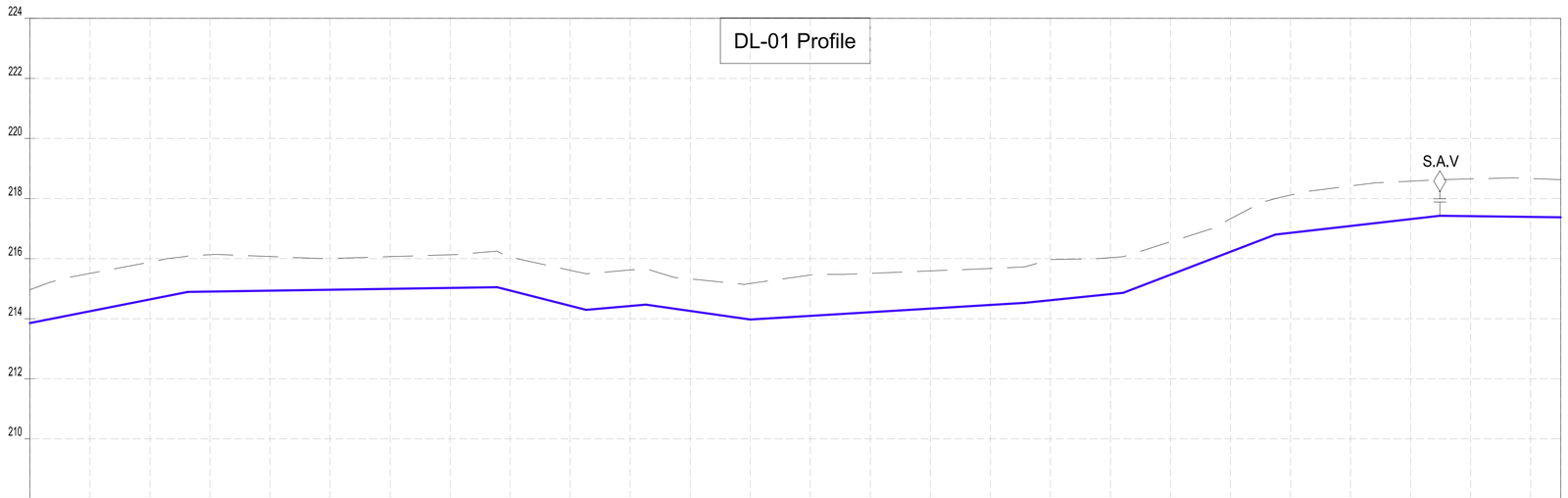
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-07.02

Jul 19, 2025 - 10:08am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
1+020	214.96	213.855	1.11
1+040	215.51	214.249	1.26
1+060	215.88	214.643	1.24
1+080	216.13	214.903	1.23
1+100	216.07	214.933	1.14
1+120	216.01	214.964	1.04
1+140	216.07	214.995	1.07
1+160	216.13	215.026	1.10
1+180	216.05	214.940	1.11
1+200	215.61	214.431	1.18
1+220	215.62	214.423	1.20
1+240	215.32	214.257	1.07
1+260	215.17	213.972	1.20
1+280	215.45	214.094	1.36
1+300	215.51	214.215	1.30
1+320	215.59	214.336	1.26
1+340	215.67	214.457	1.22
1+360	215.97	214.614	1.35
1+380	216.03	214.820	1.21
1+400	216.56	215.465	1.10
1+420	217.32	216.229	1.10
1+440	218.12	216.858	1.26
1+460	218.42	217.086	1.33
1+480	218.58	217.315	1.26
1+500	218.66	217.414	1.24
1+520	218.67	217.390	1.28
1+530	218.63	217.377	1.25

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.97% | 0.15% | -2.54% | 0.86% | -1.42% | 0.61% | 1.03% | 3.82% | 1.14% | -0.12%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
DL-01

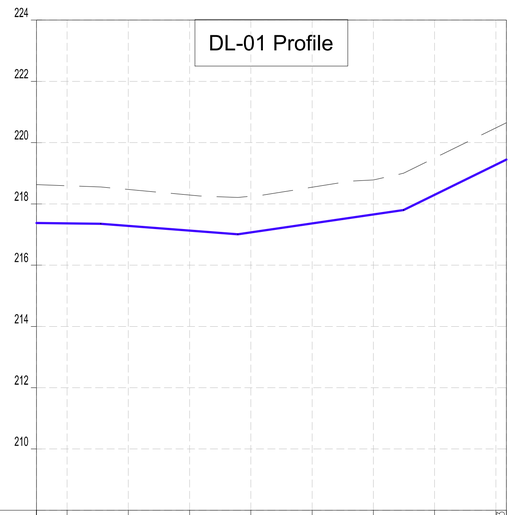
PLAN AND PROFILE
SHEET 3 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-07.03

Jul 19, 2025 - 10:08am

PLAN
SCALE 1:1250



CHAINAGES (M)	1+530	1+540	1+560	1+580	1+600	1+620	1+640	1+660	1+680 / 1+683.43
GROUND LEVEL (M)	218.63	218.59	218.47	218.29	218.25	218.54	218.78	219.50	220.48 / 220.65
INVERT LEVELS (M)	217.377	217.365	217.283	217.129	217.070	217.363	217.656	218.298	219.279 / 219.448
TRENCH DEPTH (M)	1.25	1.23	1.19	1.16	1.18	1.18	1.13	1.20	1.20 / 1.20
SIZE AND TYPE OF PIPE	OD40 PN10 HDPE PIPE								
PIPE FITTINGS									
SLOPE (%)	-0.12%	-0.77%	1.46%	4.91%					

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
DL-01

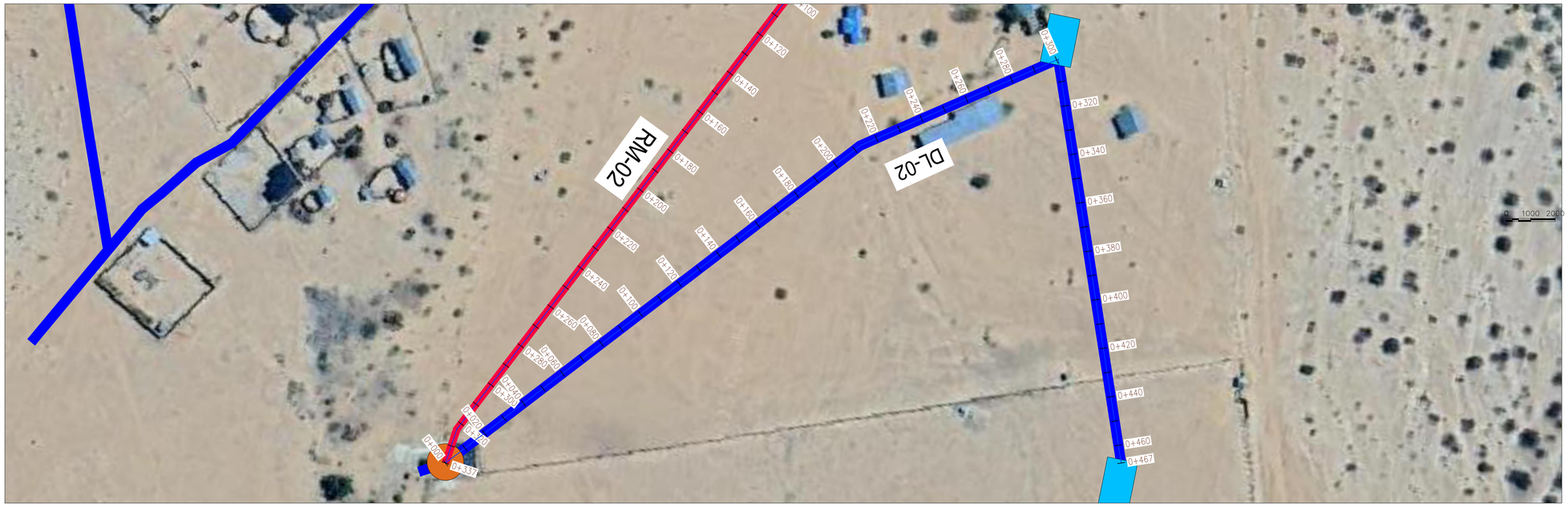
PLAN AND PROFILE
SHEET 4 OF 4

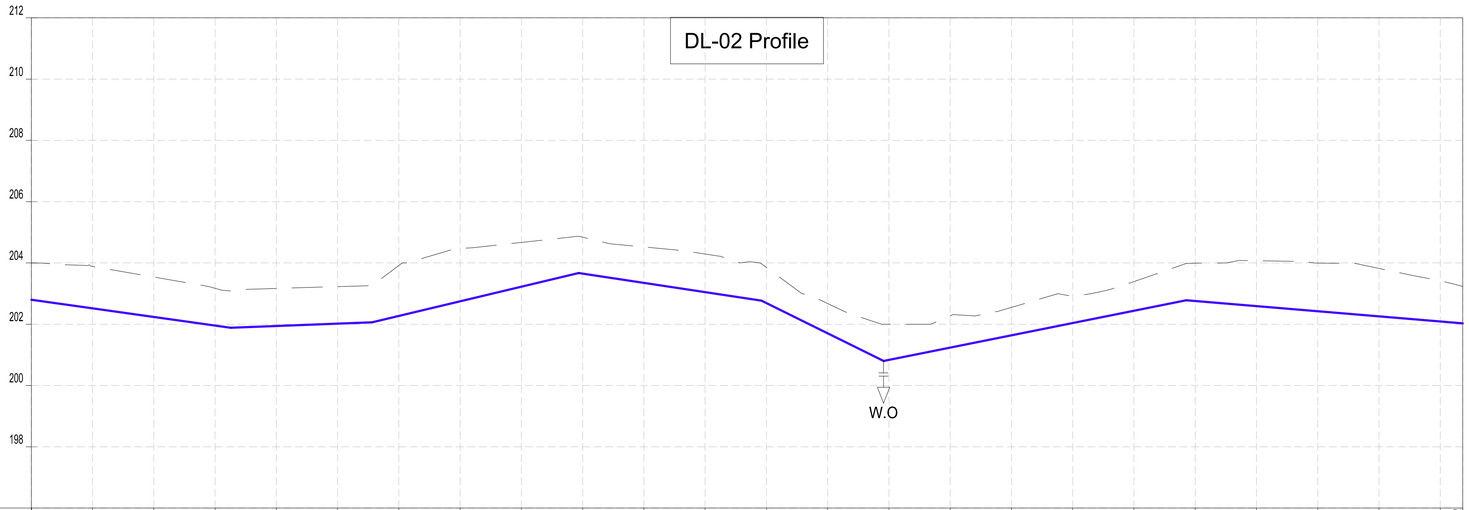
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-07.04

Jul 19, 2025 - 10:08am

PLAN
SCALE 1:1250





CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	204.00	202.798	1.20
0+020	203.89	202.518	1.37
0+040	203.54	202.238	1.30
0+060	203.17	201.958	1.22
0+080	203.17	201.943	1.22
0+100	203.23	202.019	1.21
0+120	203.92	202.270	1.65
0+140	204.47	202.748	1.72
0+160	204.67	203.226	1.44
0+180	204.84	203.653	1.19
0+200	204.52	203.351	1.17
0+220	204.29	203.049	1.24
0+240	203.85	202.692	1.16
0+260	202.68	201.704	0.97
0+280	202.00	200.835	1.17
0+300	202.28	201.236	1.04
0+320	202.55	201.637	0.91
0+340	202.92	202.039	0.88
0+360	203.39	202.440	0.95
0+380	203.99	202.759	1.23
0+400	204.07	202.592	1.48
0+420	204.00	202.425	1.57
0+440	203.82	202.259	1.56
0+460	203.42	202.092	1.32
0+467.32	203.23	202.031	1.20

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -1.40% | 0.38% | 2.39% | -1.51% | -4.94% | 2.01% | -0.83%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
DL-02

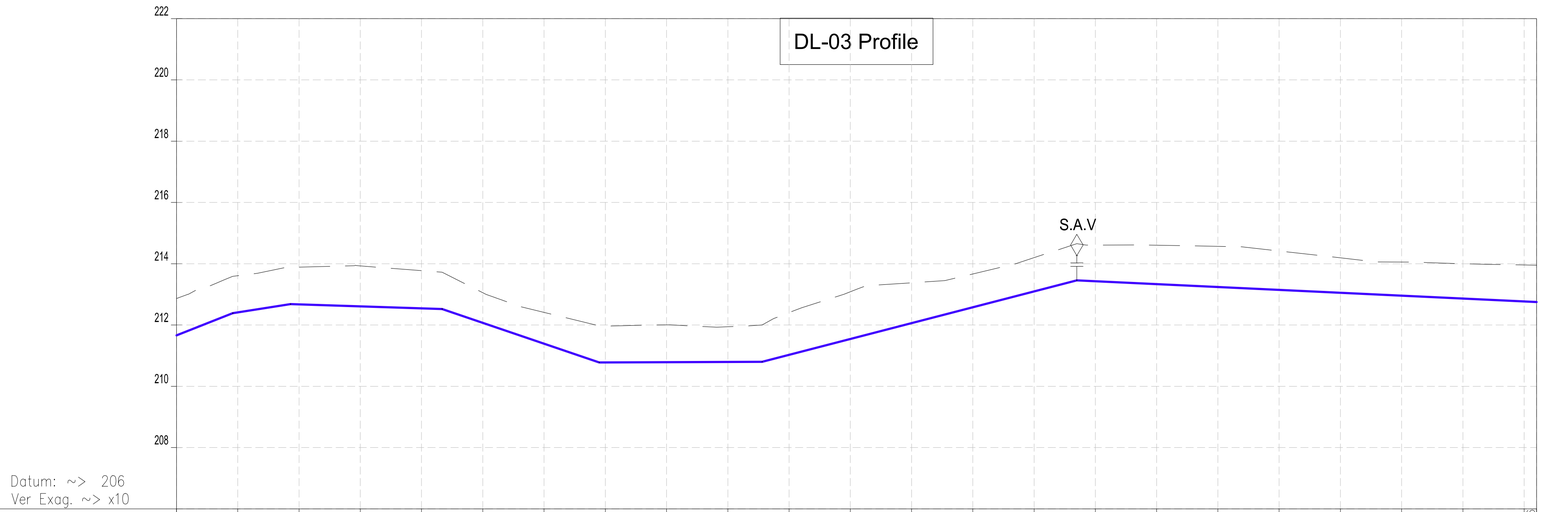
PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-08.01

Jul 19, 2025 - 10:08am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	212.86	211.663	1.20
0+020	213.61	212.414	1.19
0+040	213.89	212.672	1.22
0+060	213.93	212.608	1.32
0+080	213.77	212.544	1.23
0+100	213.05	212.071	0.98
0+120	212.41	211.392	1.02
0+140	211.96	210.781	1.18
0+160	212.00	210.788	1.22
0+180	211.94	210.796	1.15
0+200	212.40	211.027	1.38
0+220	213.09	211.544	1.54
0+240	213.38	212.061	1.32
0+260	213.67	212.578	1.09
0+280	214.20	213.096	1.10
0+300	214.61	213.428	1.18
0+320	214.61	213.334	1.27
0+340	214.57	213.240	1.33
0+360	214.42	213.146	1.27
0+380	214.19	213.052	1.14
0+400	214.05	212.958	1.10
0+420	214.00	212.864	1.13
0+440	213.96	212.770	1.19
0+444.06	213.95	212.751	1.20

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 3.96% | 1.55% | -0.32% | -3.40% | 0.04% | 2.59% | -0.47%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ADAMASEJIDA RWSS - WAJIR
DL-03

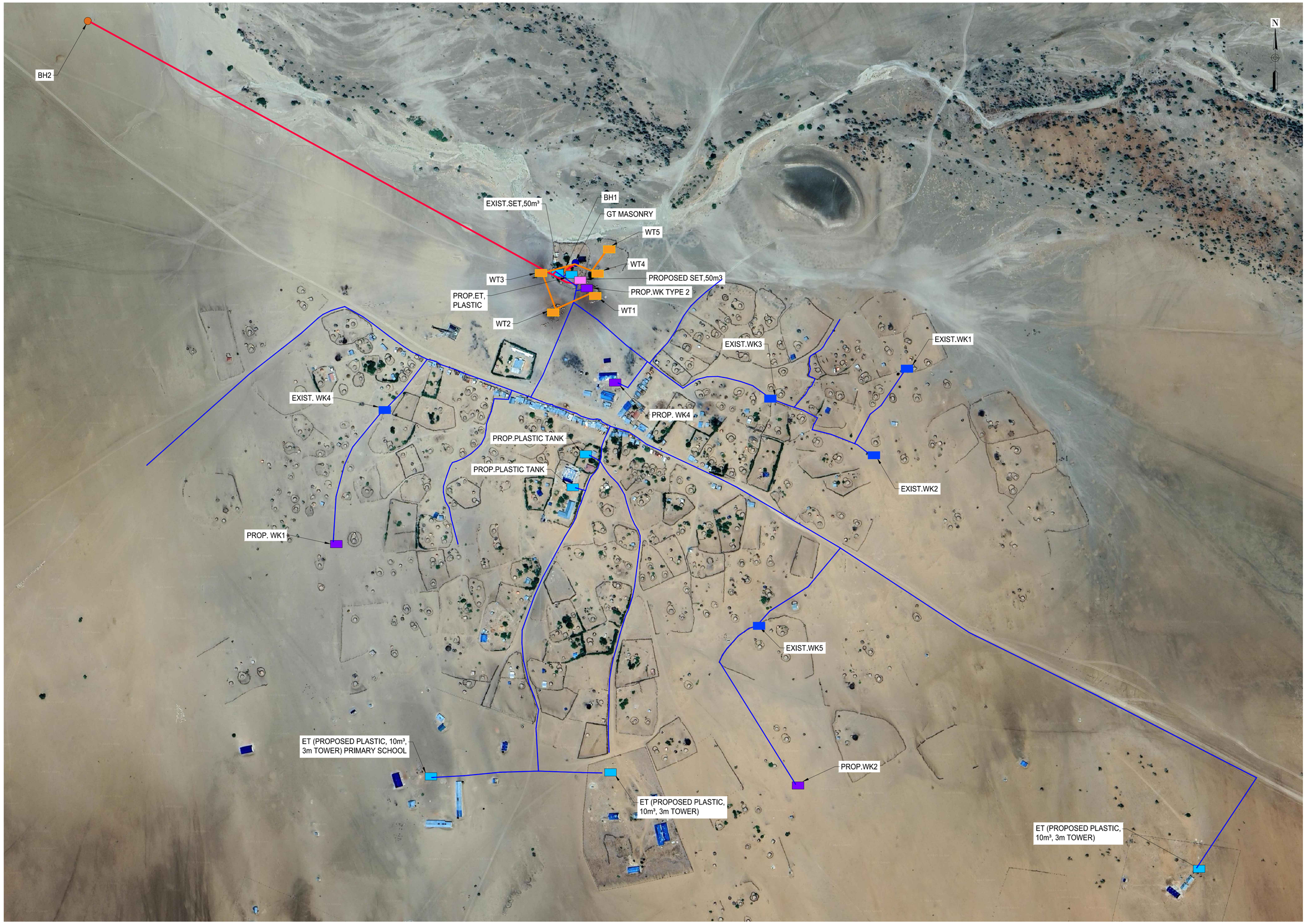
PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-01-09.01

Jul 19, 2025 - 10:08am

ATHIBOHOL RWSS - WAJIR



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

ATHIBOHOL RWSS - WAJIR

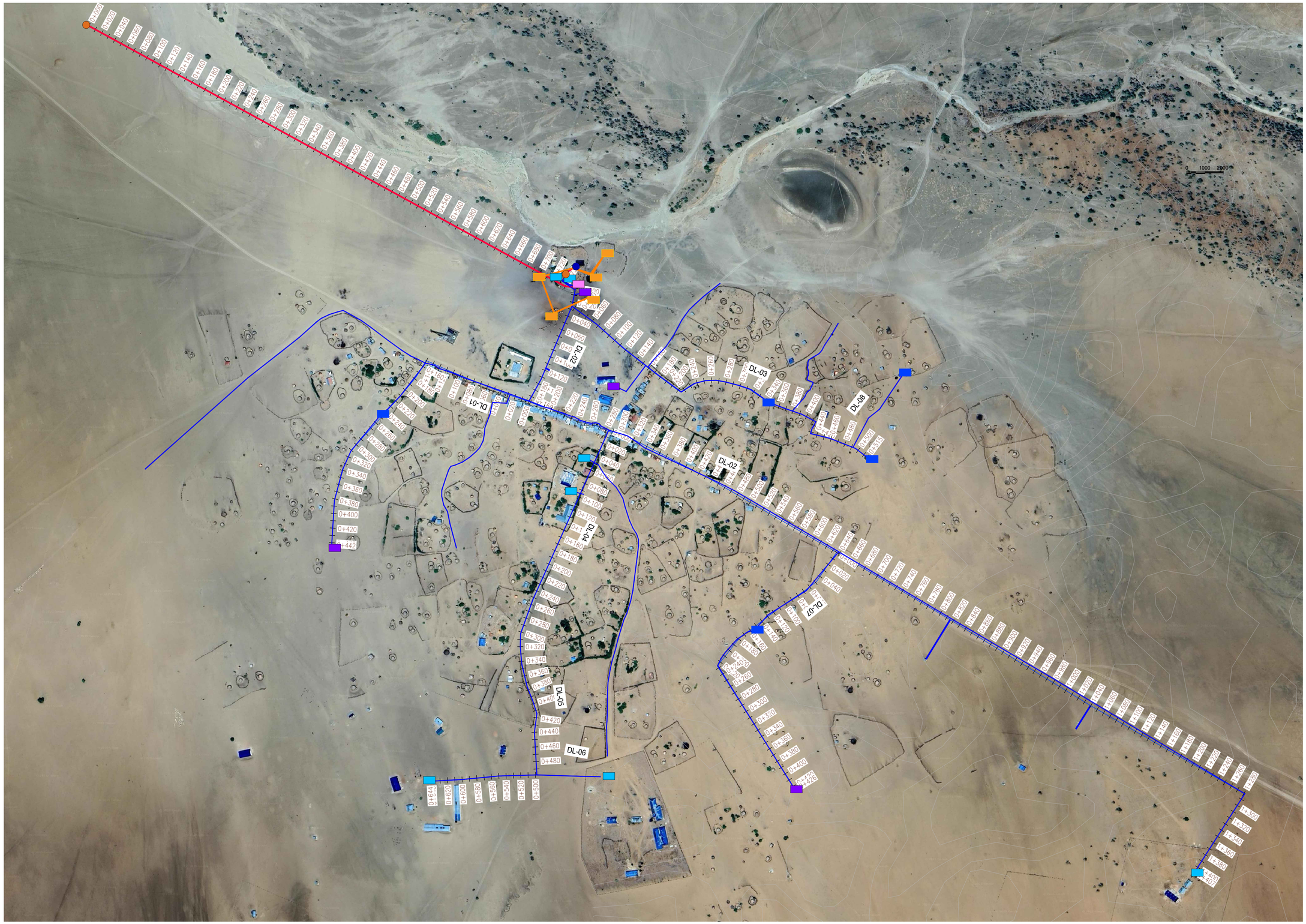
GENERAL LAYOUT

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-01

Jul 19, 2025 - 10:15am



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

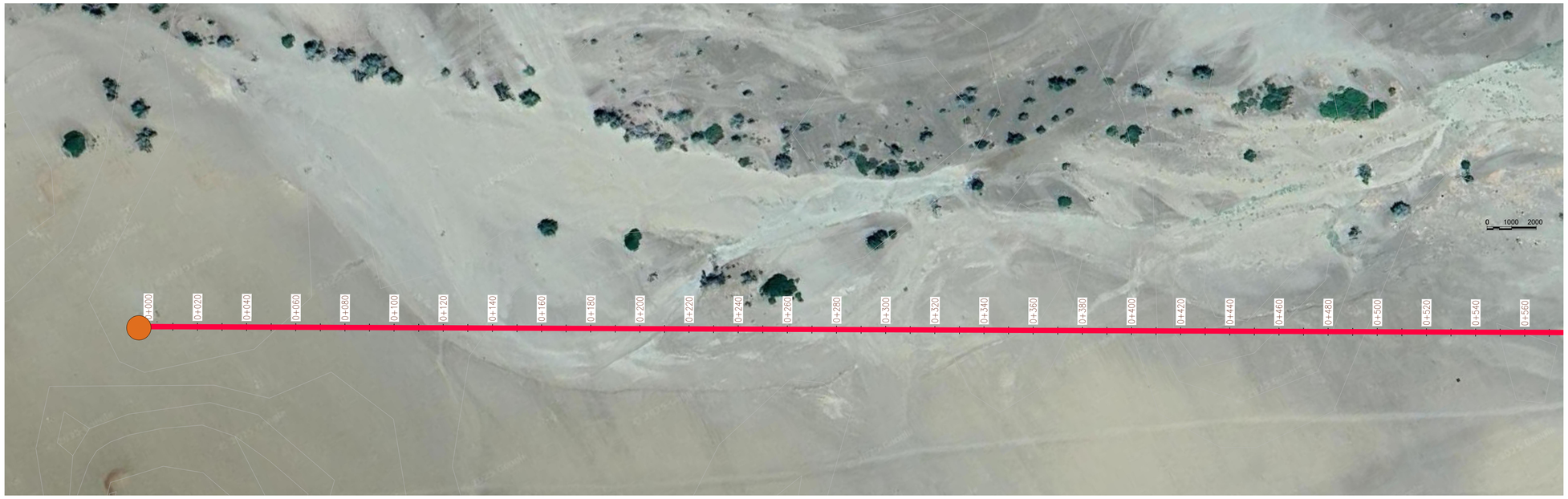
ATHIBOHOL RWSS - WAJIR

GENERAL LAYOUT

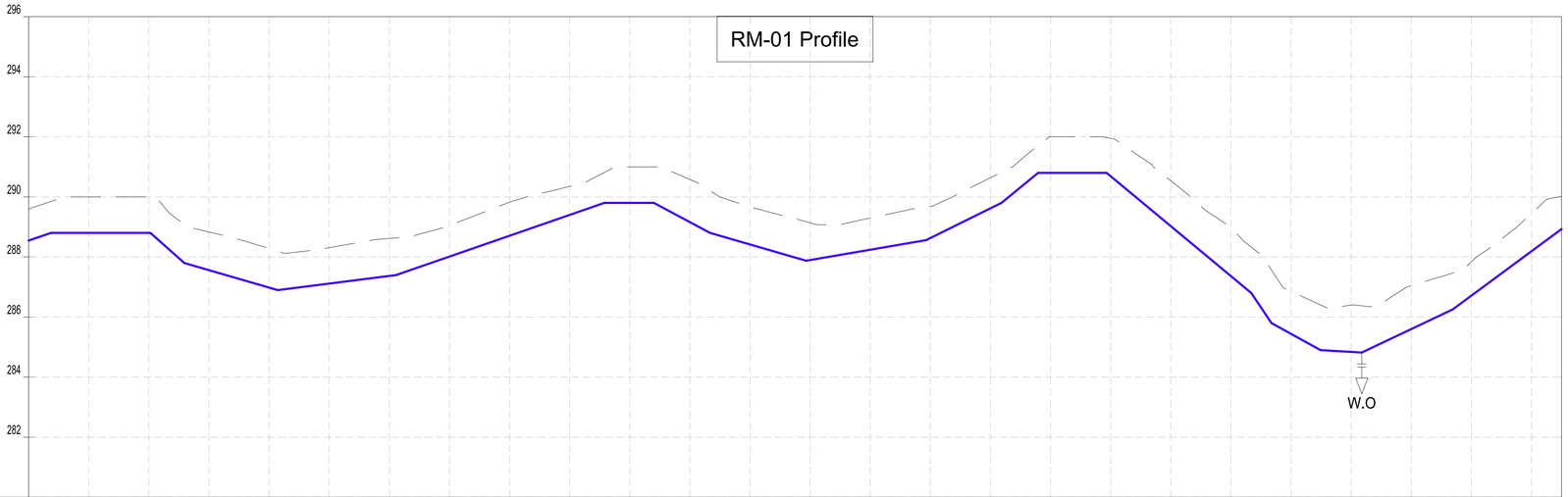
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-02

Jul 19, 2025 – 10:15am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	289.60	288.548	1.05
0+020	290.00	288.800	1.20
0+040	290.00	288.800	1.20
0+060	288.83	287.562	1.27
0+080	288.28	286.981	1.30
0+100	288.31	287.114	1.20
0+120	288.62	287.366	1.25
0+140	289.05	288.011	1.04
0+160	289.82	288.705	1.12
0+180	290.35	289.399	0.95
0+200	291.00	289.800	1.20
0+220	290.58	289.159	1.42
0+240	289.66	288.415	1.25
0+260	289.14	287.898	1.24
0+280	289.30	288.241	1.06
0+300	289.68	288.630	1.05
0+320	290.64	289.619	1.02
0+340	292.00	290.800	1.20
0+360	291.95	290.689	1.26
0+380	290.54	289.027	1.51
0+400	288.99	287.366	1.62
0+420	286.85	285.442	1.41
0+440	286.40	284.839	1.56
0+460	287.05	285.598	1.45
0+480	287.84	286.710	1.13
0+500	289.44	288.188	1.26
0+510	290.02	288.927	1.09

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 3.59% | 0.00% | -8.67% | -2.90% | 1.76% | 3.47% | 0.00% | -5.75% | -2.89% | 1.72% | 4.95% | 8.20% | 0.00% | -8.31% | -14.06% | -5.51% | -0.59% | 4.75% | 7.39% | 2.42%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

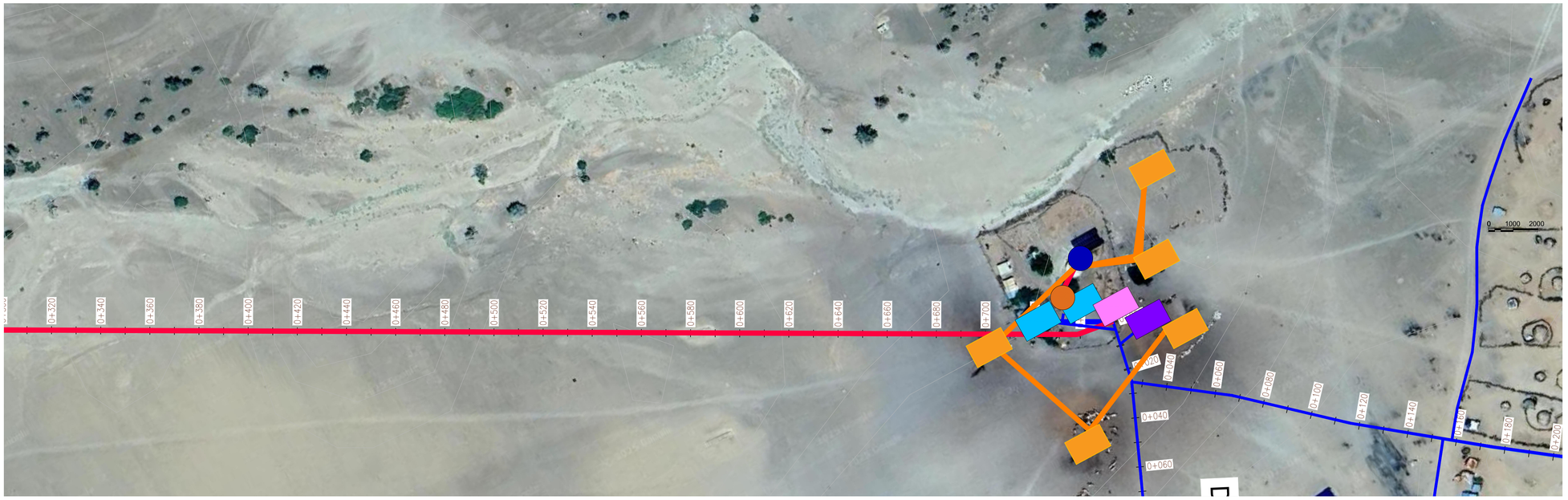
DRAWING TITLE:
ATHIBOHOL RWSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
CHAINAGE 0+000 - 0+510
SHEET 1 OF 2

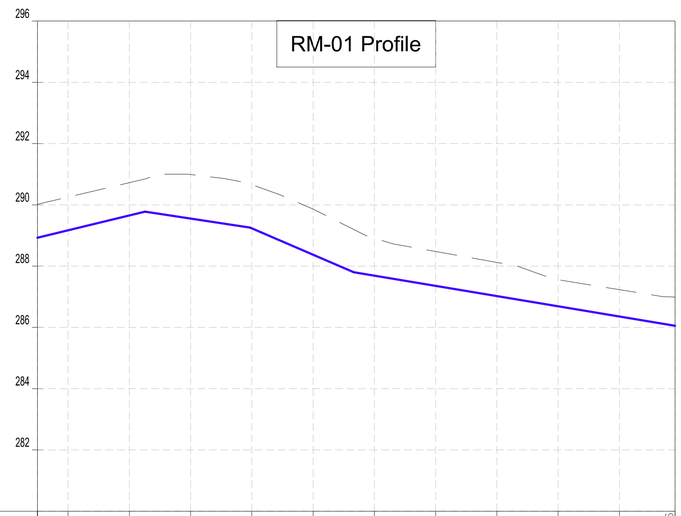
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-02.01

Jul 19, 2025 - 10:15am



PLAN
SCALE 1:1250



CHAINAGES (M)	0+510	0+520	0+540	0+560	0+580	0+600	0+620	0+640	0+660	0+680	0+700	0+718.16
GROUND LEVEL (M)	290.02	290.25	290.72	290.99	290.66	289.86	288.91	288.48	288.12	287.56	287.23	286.98
INVERT LEVELS (M)	288.927	289.169	289.654	289.552	289.235	288.372	287.688	287.354	287.021	286.688	286.355	286.053
TRENCH DEPTH (M)	1.09	1.09	1.07	1.44	1.42	1.49	1.23	1.12	1.10	0.87	0.88	0.93
SIZE AND TYPE OF PIPE	OD75 PN10 HDPE PIPE											
PIPE FITTINGS												
SLOPE (%)	7.39%	2.42%	-1.51%		-4.31%			-1.67%				

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

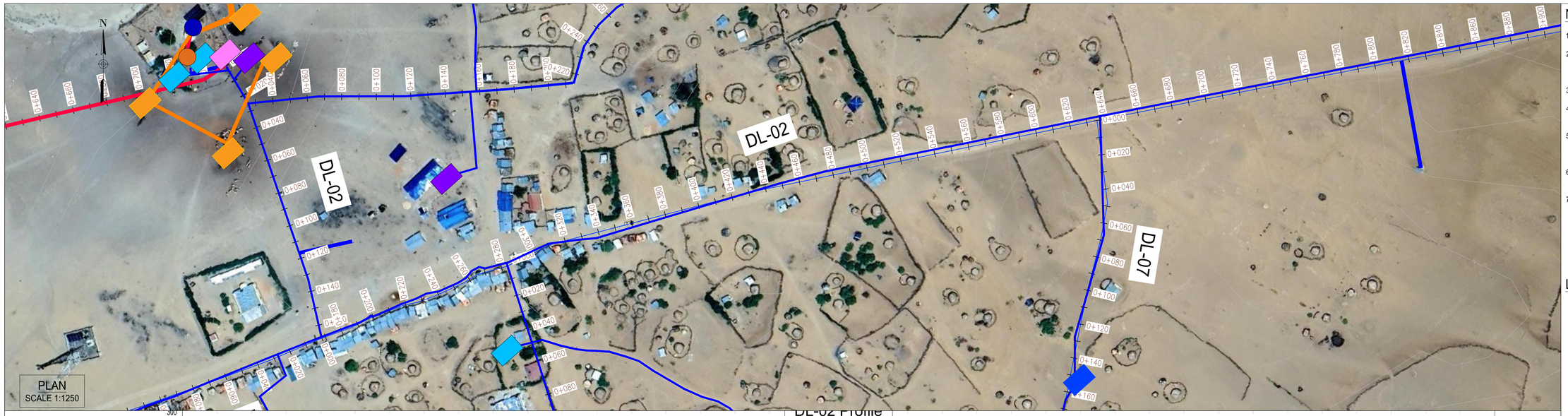
DRAWING TITLE:
ATHIBOHOL RWSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
CHAINAGE 0+510 - 0+718
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-02.02

Jul 19, 2025 - 10:15am

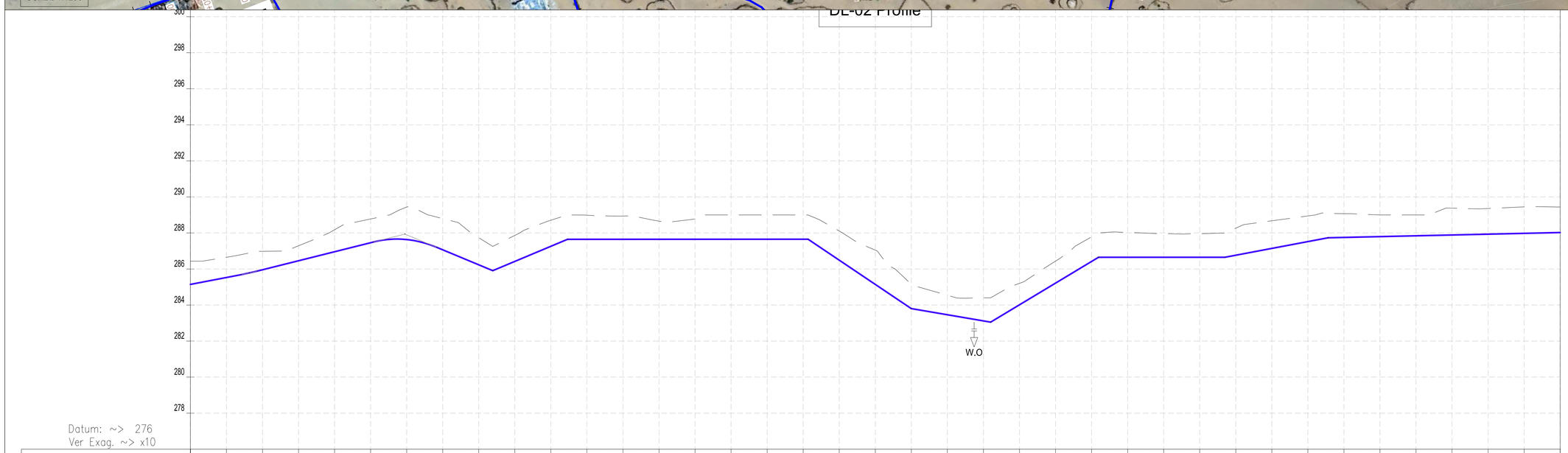


NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	286.44	285.147	1.29
0+020	286.65	285.530	1.12
0+040	286.98	285.957	1.02
0+060	287.29	286.458	0.83
0+080	288.18	286.959	1.22
0+100	288.77	287.460	1.31
0+120	289.44	287.634	1.80
0+140	288.80	287.064	1.73
0+160	287.74	286.231	1.50
0+180	287.86	286.421	1.44
0+200	288.71	287.260	1.45
0+220	288.99	287.648	1.34
0+240	288.94	287.649	1.29
0+260	288.66	287.649	1.01
0+280	288.77	287.649	1.12
0+300	289.00	287.649	1.35
0+320	289.00	287.650	1.35
0+340	289.00	287.650	1.35
0+360	288.11	286.489	1.62
0+380	287.05	285.145	1.90
0+400	285.15	283.803	1.35
0+420	284.54	283.461	1.08
0+440	284.40	283.119	1.28
0+460	285.21	284.011	1.19
0+480	286.44	285.214	1.22
0+500	287.78	286.417	1.36
0+520	288.03	286.650	1.38
0+540	287.96	286.650	1.31
0+560	287.96	286.650	1.31
0+580	288.27	286.764	1.50
0+600	288.67	287.142	1.53
0+620	288.94	287.519	1.42
0+640	289.07	287.750	1.32
0+660	289.00	287.796	1.20
0+680	289.00	287.842	1.16
0+700	289.38	287.887	1.49
0+720	289.36	287.933	1.42
0+740	289.45	287.979	1.47
0+760	289.44	288.024	1.42

SIZE AND TYPE OF PIPE: OD110 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.92% | 2.50% | -4.17% | 4.20% | 0.00% | -6.72% | -1.71% | 6.01% | 0.00% | 1.89% | 0.23%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ATHIBOHOL RWSS - WAJIR

DL-02
CHAINAGE 0+000 - 0+510
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-03.01

Jul 19, 2025 - 10:15am

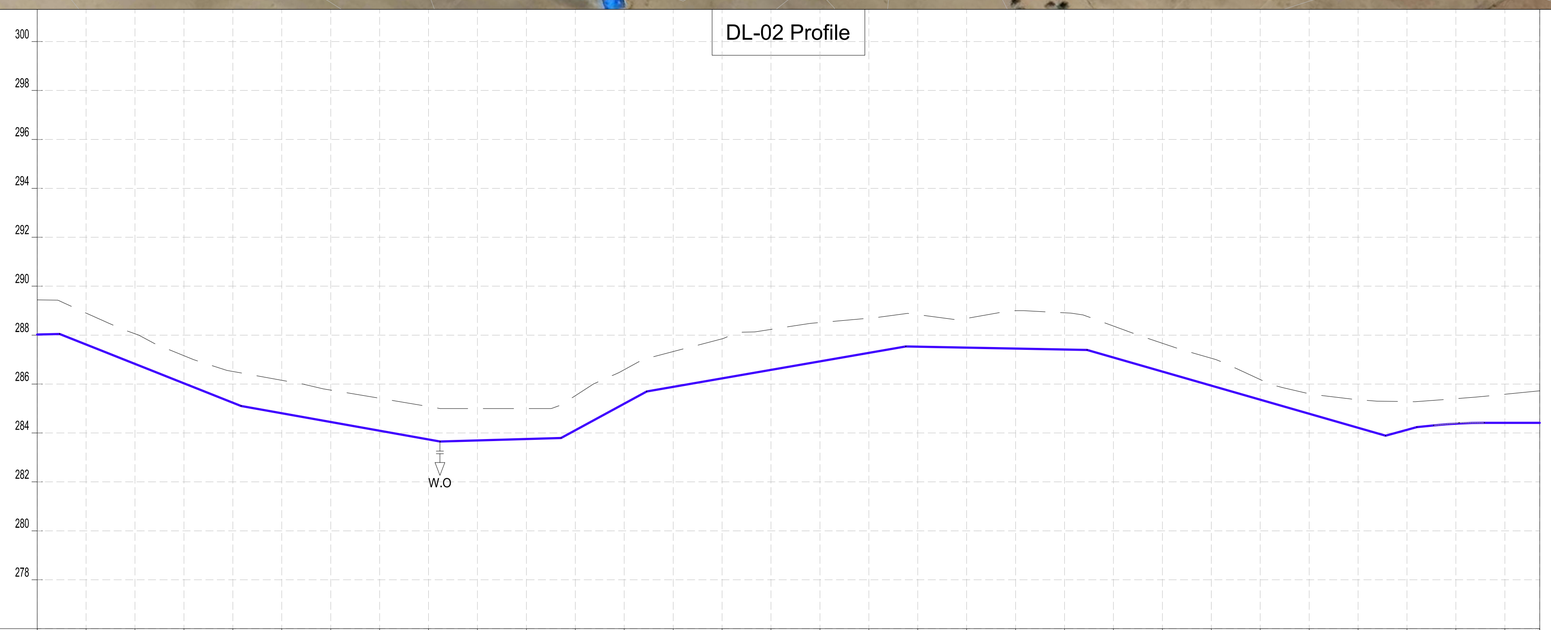
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

DL-02 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+760	289.44	288.024	1.42
0+780	288.90	287.617	1.28
0+800	288.06	286.824	1.23
0+820	287.16	286.031	1.13
0+840	286.52	285.238	1.28
0+860	286.16	284.807	1.35
0+880	285.75	284.450	1.30
0+900	285.42	284.092	1.32
0+920	285.08	283.735	1.35
0+940	285.00	283.694	1.31
0+960	285.00	283.752	1.25
0+980	285.52	284.110	1.41
1+000	286.59	285.196	1.39
1+020	287.33	285.883	1.44
1+040	287.85	286.230	1.62
1+060	288.23	286.577	1.65
1+080	288.52	286.925	1.59
1+100	288.69	287.272	1.42
1+120	288.84	287.526	1.31
1+140	288.69	287.468	1.20
1+160	289.00	287.450	1.55
1+180	288.91	287.413	1.50
1+200	288.37	287.085	1.29
1+220	287.67	286.510	1.16
1+240	287.05	285.936	1.12
1+260	286.18	285.361	0.82
1+280	285.60	284.786	0.82
1+300	285.36	284.211	1.15
1+320	285.28	284.129	1.15
1+340	285.40	284.381	1.02
1+360	285.58	284.414	1.17
1+374.26	285.72	284.414	1.31

SIZE AND TYPE OF PIPE: OD110 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): 0.16% | -3.97% | -1.79% | 0.29% | 5.43% | 1.74% | -0.19% | -2.87% | -2.75% | -1.07% | -0.00%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

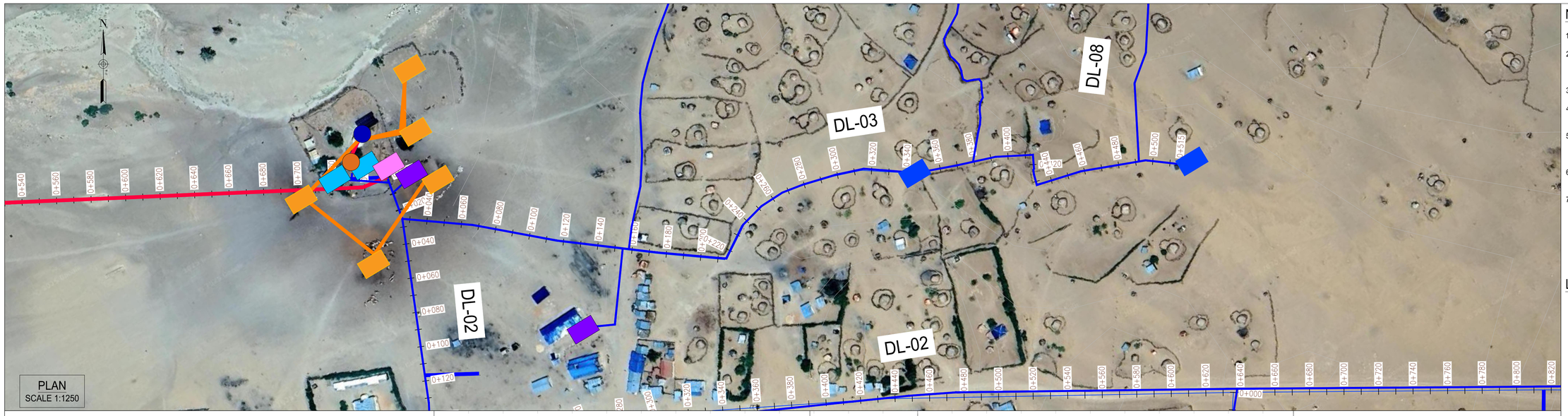
DRAWING TITLE:
ATHIBOHOL RWSS - WAJIR

DL-02
CHAINAGE 0+000 - 1+374
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-03.02

Jul 19, 2025 - 10:15am



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

DL-03 Profile

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	286.44	285.089	1.35
0+020	286.64	285.436	1.21
0+040	286.86	285.783	1.07
0+060	287.42	286.402	1.01
0+080	288.35	287.027	1.32
0+100	288.96	287.652	1.31
0+120	289.59	288.228	1.36
0+140	289.08	287.645	1.43
0+160	288.56	287.063	1.50
0+180	287.98	286.650	1.33
0+200	287.95	286.650	1.30
0+220	287.90	286.650	1.25
0+240	287.99	286.650	1.34
0+260	288.83	287.375	1.45
0+280	289.57	288.197	1.37
0+300	290.37	289.019	1.35
0+320	290.78	289.384	1.39
0+340	291.01	289.608	1.40
0+360	291.10	289.832	1.27
0+380	291.47	290.056	1.41
0+400	291.73	290.279	1.46
0+420	291.42	290.503	0.91
0+440	291.27	290.052	1.22
0+460	290.52	289.263	1.25
0+480	289.92	288.875	1.05
0+497.62	289.58	288.647	0.93

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.73% | 3.13% | -2.91% | 0.00% | 4.11% | 1.12% | -3.94% | -1.30%

PROFILE

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. / ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS

Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

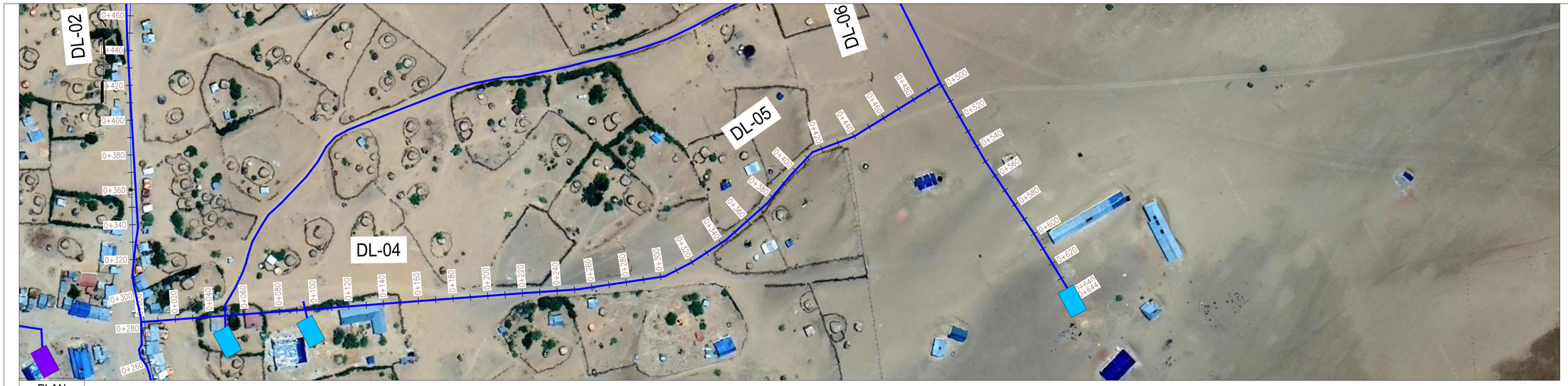
DRAWING TITLE: ATHIBOHOL RWSS - WAJIR

DL-03
CHAINAGE 0+000 - 0+510
SHEET 1 OF 1

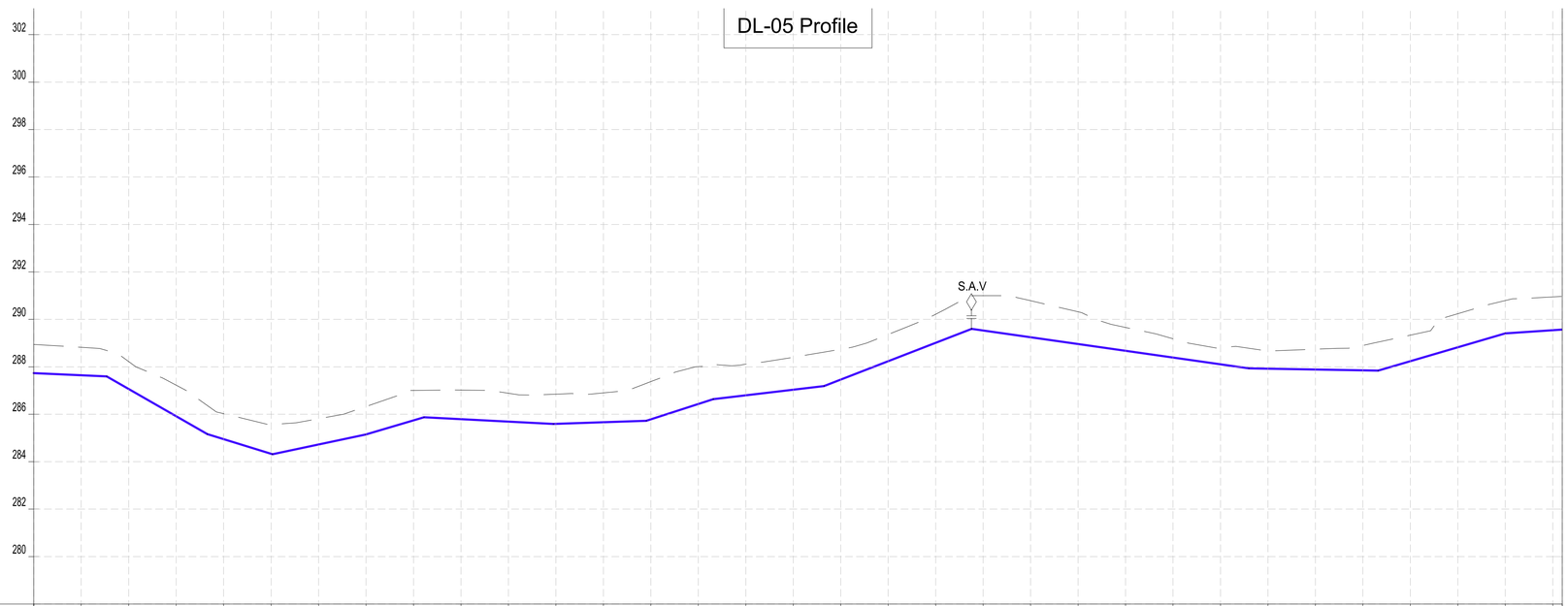
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-04

Jul 19, 2025 - 10:16am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	288.94	287.732	1.21
0+020	288.82	287.644	1.18
0+040	288.22	287.065	1.16
0+060	287.22	285.916	1.31
0+080	286.03	284.950	1.08
0+100	285.56	284.334	1.23
0+120	285.81	284.725	1.08
0+140	286.33	285.148	1.18
0+160	287.00	285.739	1.26
0+180	287.02	285.789	1.23
0+200	286.89	285.687	1.20
0+220	286.85	285.594	1.25
0+240	286.90	285.663	1.24
0+260	287.38	285.786	1.59
0+280	288.01	286.431	1.58
0+300	288.11	286.797	1.31
0+320	288.40	287.034	1.36
0+340	288.74	287.461	1.28
0+360	289.36	288.236	1.13
0+380	290.22	289.012	1.20
0+400	291.00	289.531	1.47
0+420	290.79	289.246	1.54
0+440	290.32	288.961	1.36
0+460	289.66	288.676	0.98
0+480	289.18	288.391	0.79
0+500	288.81	288.106	0.70
0+520	288.66	287.922	0.74
0+540	288.74	287.866	0.86
0+560	288.89	287.850	1.04
0+580	289.33	288.236	1.10
0+600	290.24	288.822	1.42
0+620	290.79	289.407	1.39
0+640	290.94	289.539	1.41
0+644			

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.44% | -5.75% | -3.08% | 2.11% | 2.96% | -0.51% | 0.34% | 3.22% | 1.19% | 3.86% | -1.42% | -0.18% | 2.93% | 0.66%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ATHIBOHOL RWSS - WAJIR

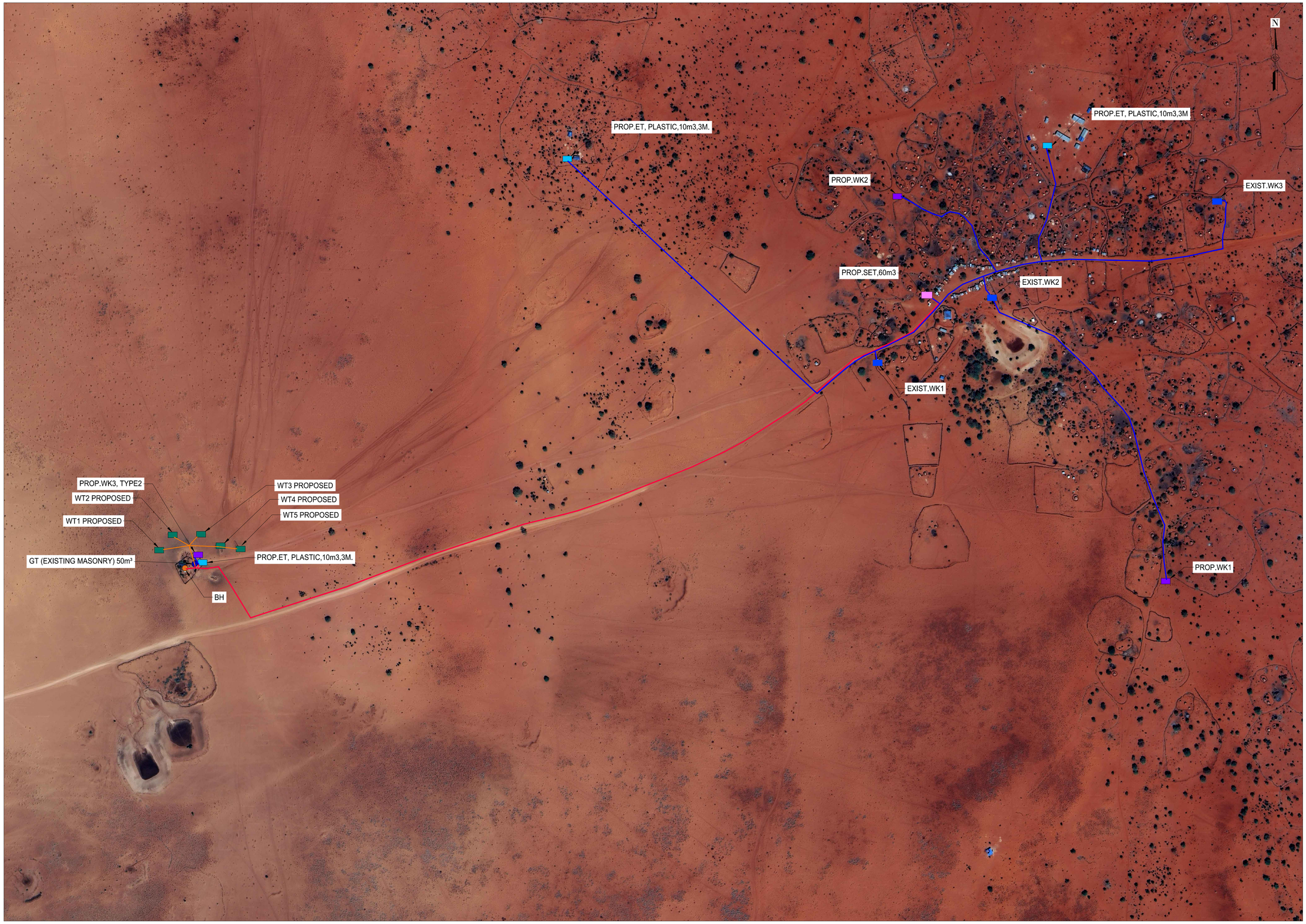
DL-05
CHAINAGE 0+000 - 0+410
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-02-05

Jul 19, 2025 - 10:16am

BARMISH RWSS - WAJIR



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

BARMISH RWSS - WAJIR

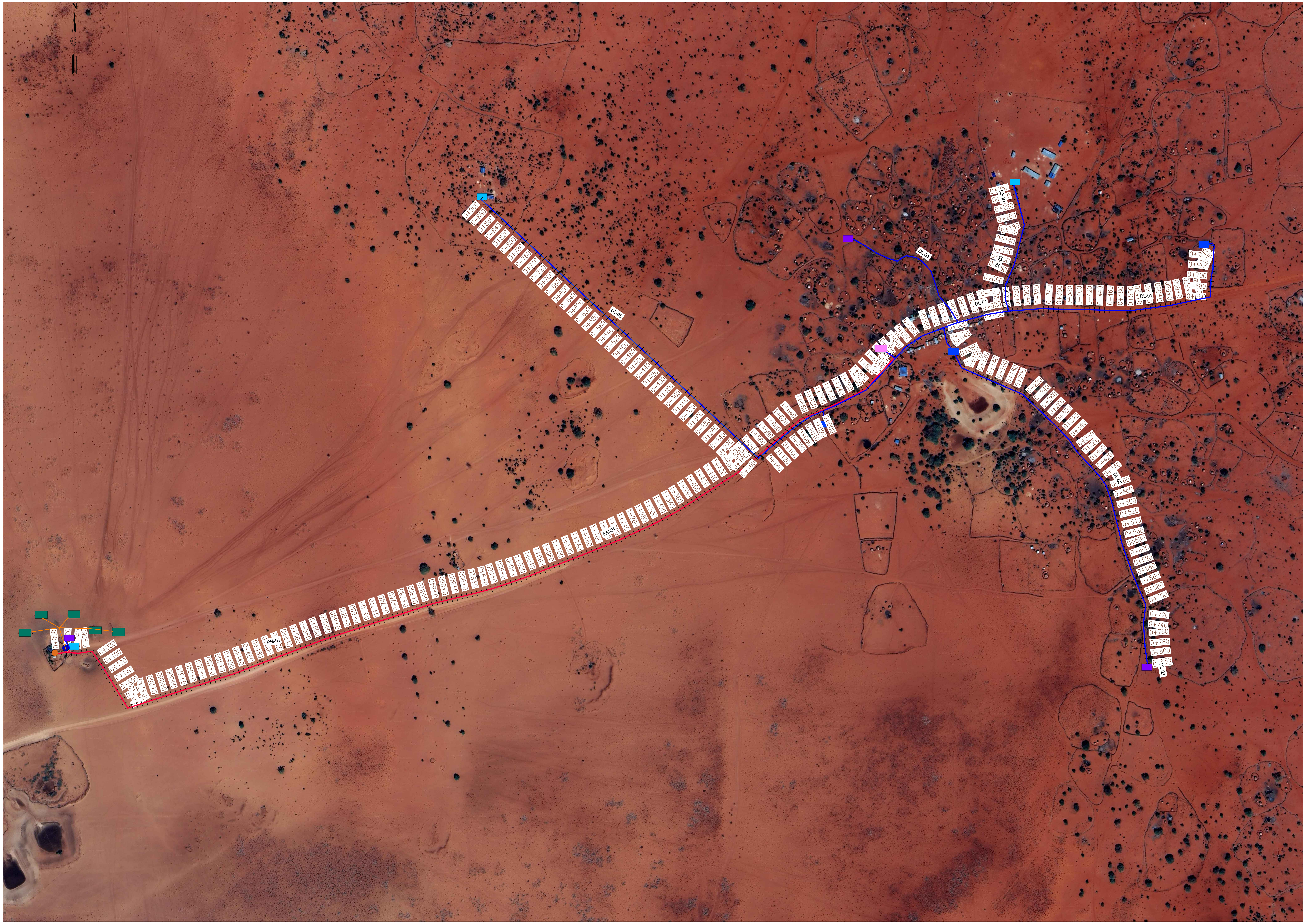
GENERAL LAYOUT PLAN - PROPOSED

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-03-01

Jul 19, 2025 - 10:21am



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund — Financing the Water Sector

WATER SECTOR TRUST FUND

1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHABILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates — architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd
in Association with
Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS

Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

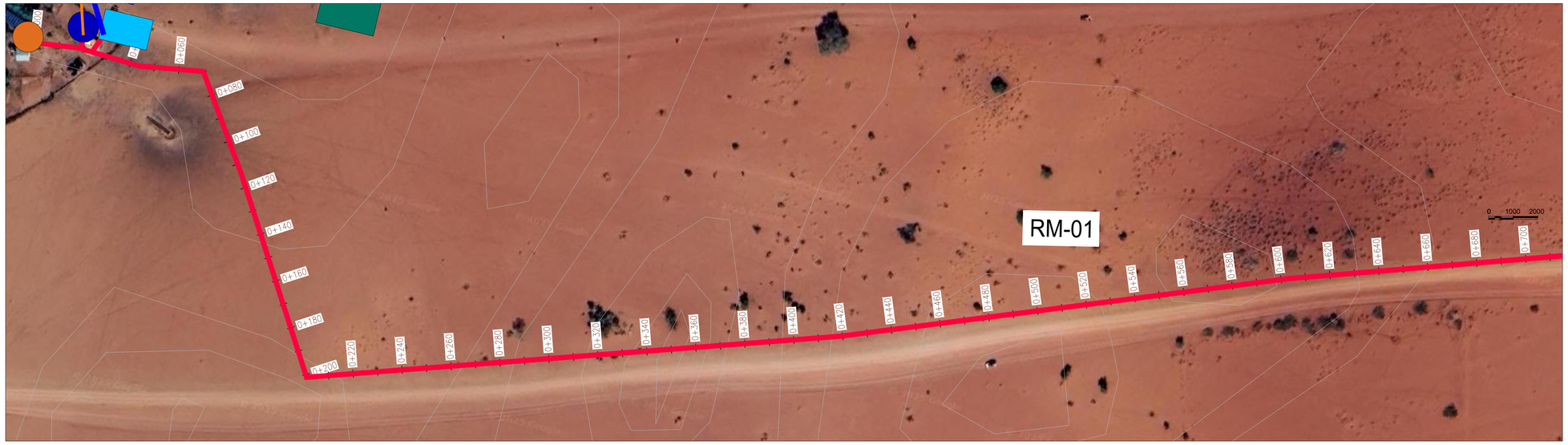
BARMISH WRSS - WAJIR

GENERAL LAYOUT

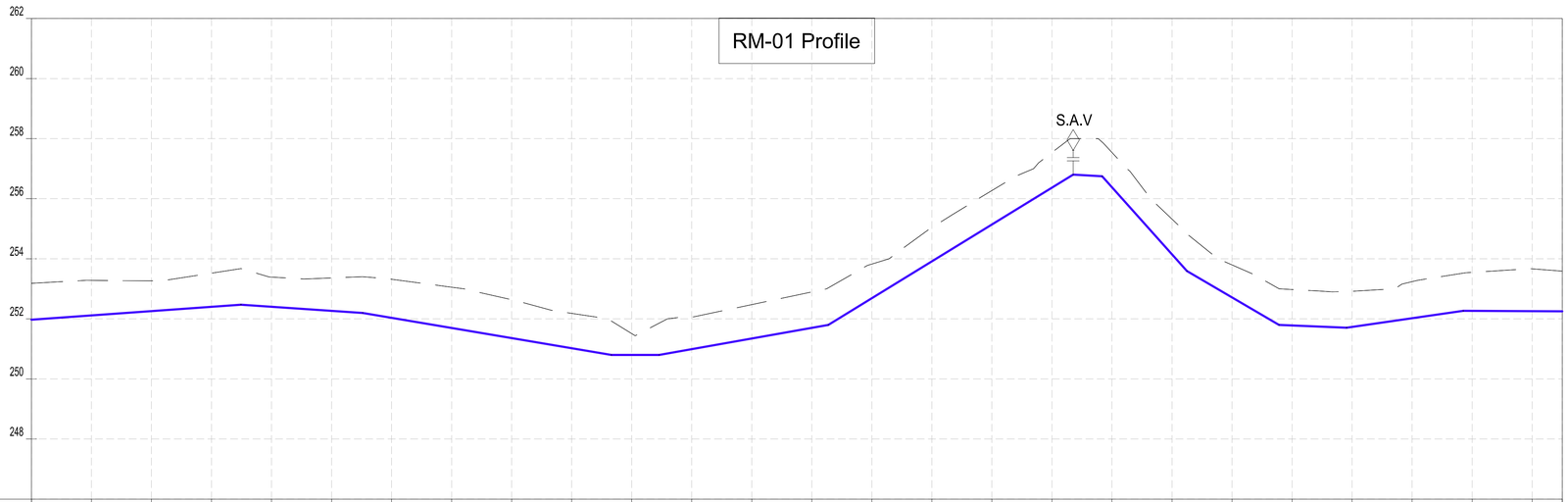
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-01

Jul 19, 2025 - 10:21am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	253.18	251.970	1.21
0+020	253.28	252.114	1.17
0+040	253.27	252.258	1.01
0+060	253.52	252.402	1.12
0+080	253.39	252.404	0.99
0+100	253.36	252.268	1.09
0+120	253.32	252.035	1.28
0+140	253.05	251.698	1.36
0+160	252.64	251.361	1.28
0+180	252.18	251.023	1.16
0+200	251.51	250.800	0.71
0+220	252.06	250.993	1.07
0+240	252.48	251.348	1.13
0+260	252.90	251.703	1.19
0+280	253.82	252.689	1.13
0+300	255.04	253.915	1.13
0+320	256.27	255.140	1.13
0+340	257.54	256.366	1.17
0+360	257.54	256.381	1.16
0+380	255.32	254.148	1.17
0+400	253.80	252.715	1.08
0+420	252.98	251.782	1.19
0+440	252.92	251.732	1.19
0+460	253.24	252.021	1.22
0+480	253.55	252.265	1.28
0+500	253.67	252.257	1.41
0+510	253.59	252.253	1.34

SIZE AND TYPE OF PIPE: OD75 PN16 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): 0.72% | -0.68% | -1.69% | 0.00% | 1.77% | 6.13% | -0.57% | -11.17% | -5.84% | -0.47% | 1.44% | -0.04%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
BARMISH WRSS - WAJIR

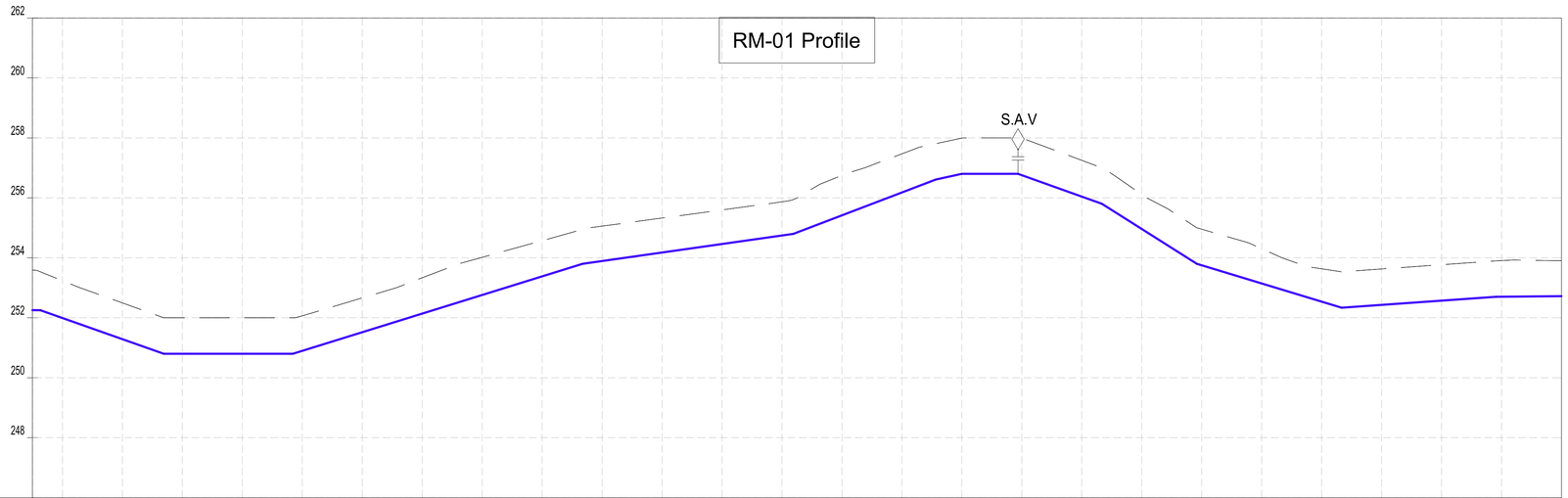
RISING MAIN (RM-01) - PLAN AND PROFILE
CHAINAGE 0+000 - 0+510
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-02.01

Jul 19, 2025 - 10:22am

PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	253.59	252.253	1.34
0+520	253.24	251.992	1.24
0+540	252.49	251.287	1.21
0+560	252.00	250.800	1.20
0+580	252.00	250.800	1.20
0+600	252.07	250.898	1.17
0+620	252.66	251.519	1.14
0+640	253.33	252.139	1.19
0+660	254.02	252.760	1.26
0+680	254.57	253.381	1.19
0+700	255.06	253.892	1.16
0+720	255.33	254.177	1.15
0+740	255.60	254.461	1.14
0+760	255.87	254.746	1.12
0+780	256.75	255.417	1.33
0+800	257.47	256.179	1.29
0+820	257.99	256.800	1.19
0+840	257.97	256.755	1.21
0+860	257.25	256.040	1.21
0+880	256.12	254.961	1.16
0+900	254.95	253.751	1.20
0+920	254.30	253.143	1.16
0+940	253.63	252.536	1.10
0+960	253.63	252.428	1.20
0+980	253.77	252.569	1.20
1+000	253.91	252.700	1.21
1+020	253.90	252.720	1.18

SIZE AND TYPE OF PIPE: OD75 PN16 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.04% | -3.53% | 0.00% | 3.10% | 1.42% | 3.81% | 2.18% | -0.00% | -3.57% | -6.31% | -3.04% | 0.71% | 0.10%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

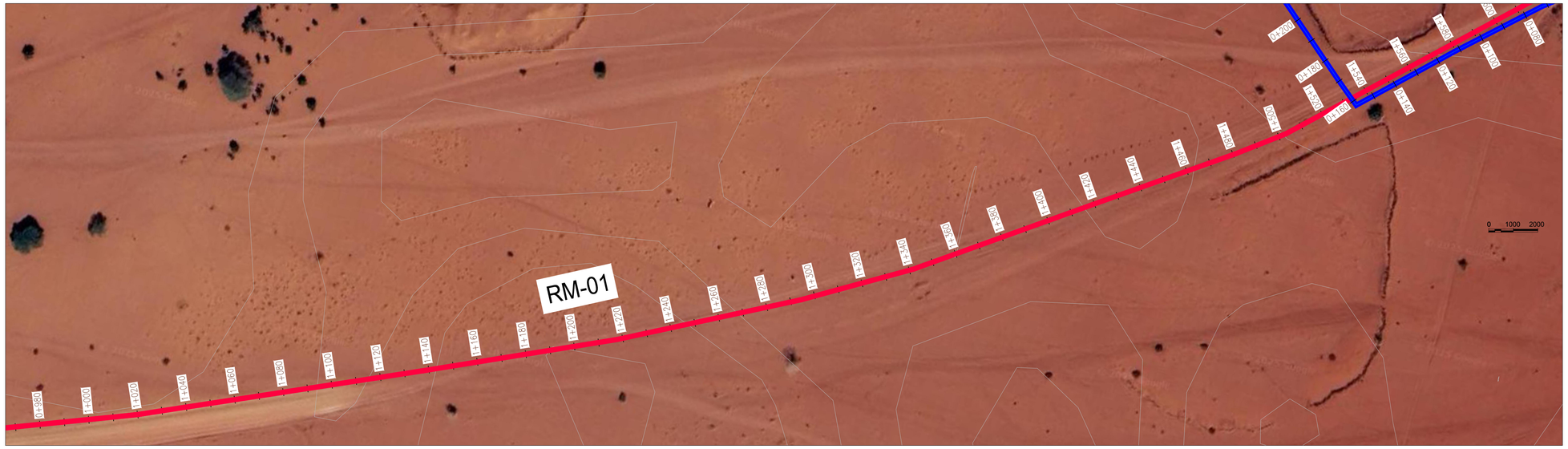
DRAWING TITLE:
BARMISH WRSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
CHAINAGE 0+510 - 1+020
SHEET 2 OF 4

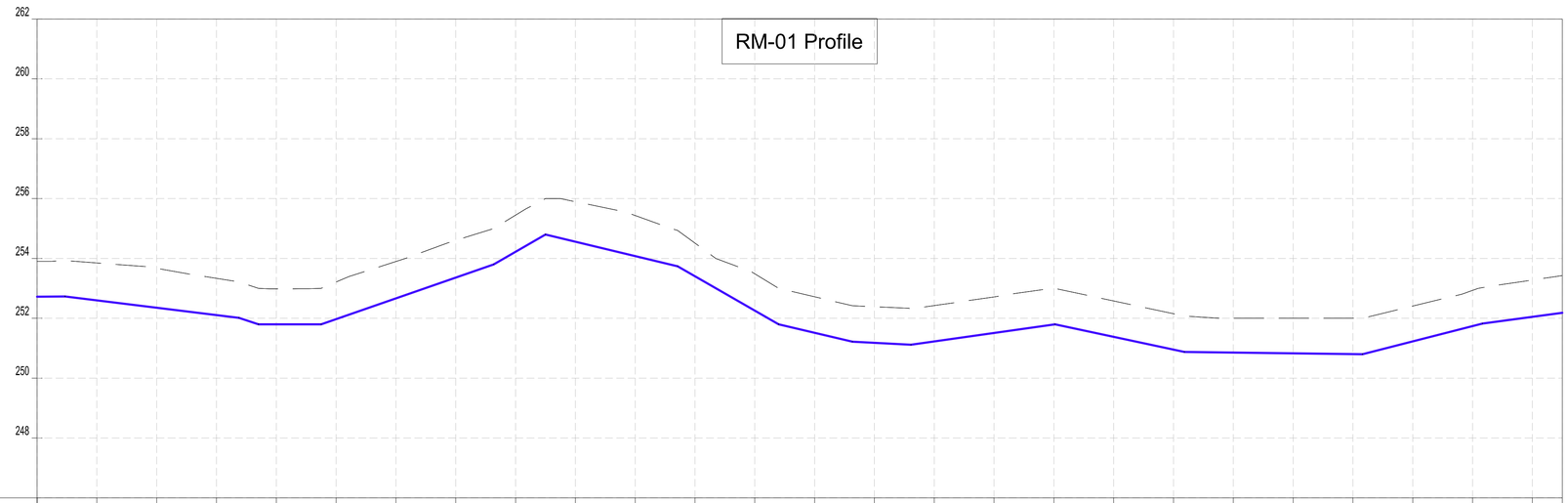
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-02.02

Jul 19, 2025 - 10:22am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
1+020	253.90	252.720	1.18
1+040	253.85	252.599	1.25
1+060	253.67	252.353	1.32
1+080	253.33	252.107	1.23
1+100	252.98	251.800	1.18
1+120	253.21	251.973	1.24
1+140	253.90	252.667	1.23
1+160	254.60	253.360	1.24
1+180	255.45	254.223	1.22
1+200	255.90	254.559	1.34
1+220	255.43	254.078	1.36
1+240	254.51	253.404	1.11
1+260	253.48	252.257	1.23
1+280	252.72	251.516	1.20
1+300	252.39	251.180	1.21
1+320	252.42	251.226	1.20
1+340	252.71	251.510	1.20
1+360	253.00	251.794	1.21
1+380	252.58	251.381	1.20
1+400	252.15	250.954	1.20
1+420	252.00	250.855	1.14
1+440	252.00	250.830	1.17
1+460	252.00	250.804	1.20
1+480	252.41	251.229	1.18
1+500	252.93	251.740	1.19
1+520	253.28	252.050	1.23
1+530	253.43	252.185	1.24

SIZE AND TYPE OF PIPE: OD75 PN16 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.10% | -1.23% | -3.45% | -0.00% | 3.47% | 5.78% | -2.41% | -5.74% | -2.36% | -0.53% | 1.42% | -2.14% | -0.13% | 2.55% | 1.35%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

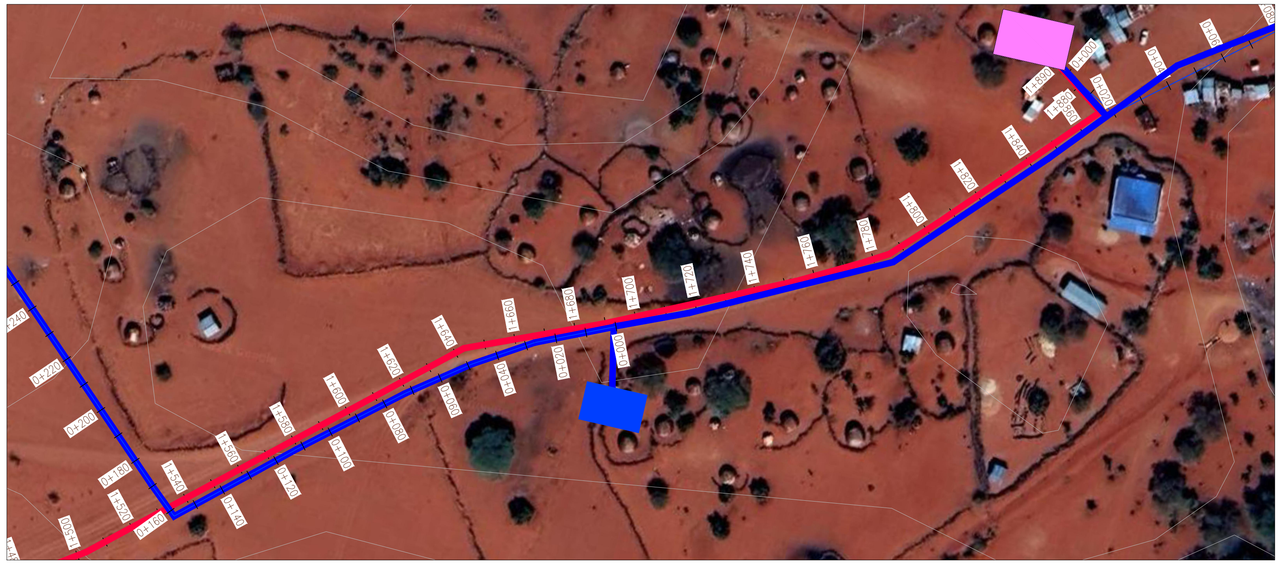
DRAWING TITLE:
BARMISH WRSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
CHAINAGE 1+020 - 1+530
SHEET 3 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-02.03

Jul 19, 2025 - 10:22am



PLAN
SCALE 1:1250

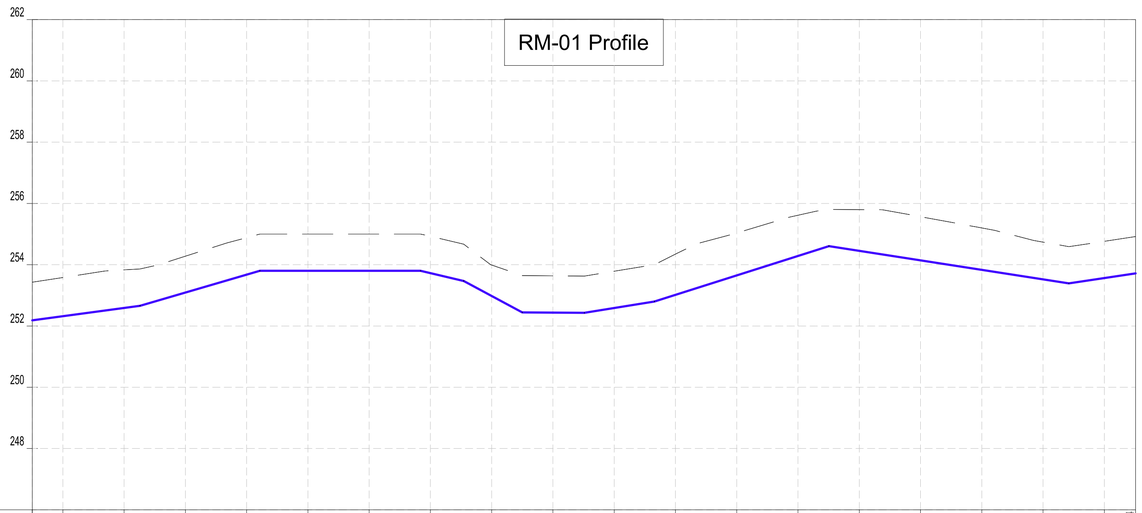
0 1000 2000

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
1+530	253.43	252.185	1.24
1+540	253.58	252.320	1.26
1+560	253.83	252.590	1.24
1+580	254.28	253.091	1.19
1+600	254.88	253.674	1.21
1+620	255.00	253.800	1.20
1+640	255.00	253.800	1.20
1+660	254.92	253.724	1.20
1+680	253.99	252.980	1.01
1+700	253.64	252.436	1.20
1+720	253.79	252.586	1.20
1+740	254.35	253.018	1.33
1+760	255.03	253.652	1.38
1+780	255.61	254.286	1.33
1+800	255.80	254.452	1.35
1+820	255.57	254.141	1.43
1+840	255.20	253.831	1.37
1+860	254.74	253.520	1.22
1+880	254.76	253.563	1.20
1+890.24	254.92	253.717	1.20

SIZE AND TYPE OF PIPE: OD75 PN16 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.35% | 2.91% | 0.00% | -2.36% | -5.36% | -10.08% | 1.63% | 3.17% | -1.55% | 1.50%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
BARMISH WRSS - WAJIR
RISING MAIN (RM-01) - PLAN AND PROFILE
CHAINAGE 1+530 - 1+891
SHEET 4 OF 4

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-02.04

Jul 19, 2025 - 10:22am

PLAN
SCALE 1:1250

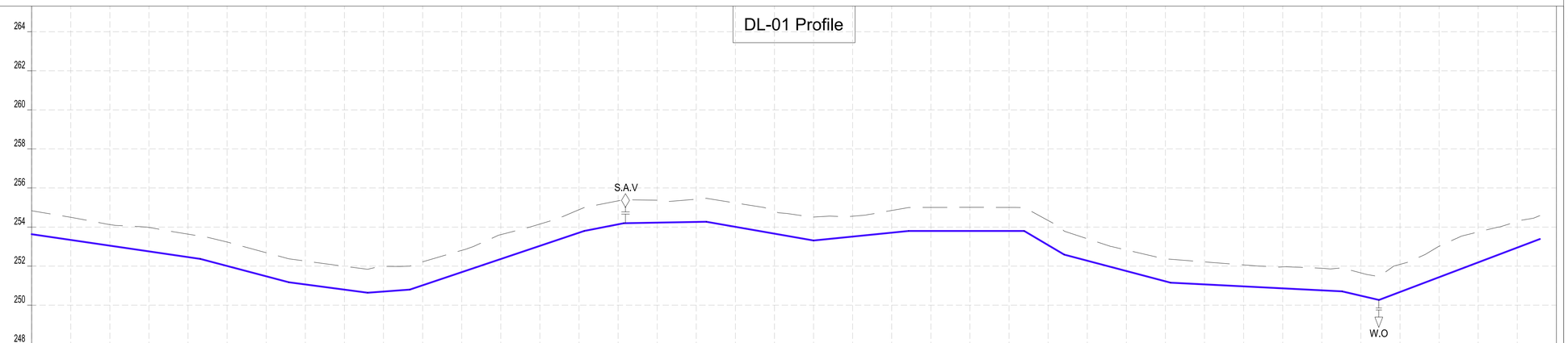
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0,9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP		SOLAR PANEL
GH		GENERATOR HOUSE
BH		BOREHOLE
UT		UNDERGROUND TANK
GT		GROUND TANK
ET		ELEVATED TANK, PLASTIC
SET		STEEL ELEVATED TANK(SET)
WK-PROP.		WATER KIOSK (PROPOSED)
WK-EXIST.		WATER KIOSK (EXISTING)
CH		CHAMBER
WT-PROP.		WATER TROUGH-PROPOSED
WT-EXIST.		WATER TROUGH-EXISTING
		EXISTING PIPELINE
		RISING MAIN
		DISTRIBUTION LINE
		DISTRIBUTION LINE TO WATER TROUGH
		ORIGINAL GROUND LEVEL
		PIPE INVERT LEVEL
		PIPE
212.50		MAJOR CONTOURS WITH ELEVATION
212.30		MINOR CONTOURS WITH ELEVATION
OD		OUTSIDE DIAMETER
S.A.V.		SINGLE AIR VALVE
D.A.V.		DOUBLE AIR VALVE
W.O.		WASH OUT

DL-01 Profile



Datum: ~> 240
Ver Exag. ~> x10

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	254.83	253.633	1.20
0+020	254.50	253.339	1.16
0+040	254.13	253.046	1.08
0+060	253.98	252.753	1.23
0+080	253.64	252.459	1.18
0+100	253.23	252.006	1.22
0+120	252.69	251.479	1.21
0+140	252.26	251.063	1.20
0+160	251.99	250.797	1.19
0+180	251.99	250.700	1.29
0+200	252.22	251.019	1.20
0+220	252.81	251.692	1.11
0+240	253.61	252.365	1.25
0+260	254.15	253.038	1.12
0+280	254.89	253.711	1.18
0+300	255.34	254.141	1.20
0+320	255.37	254.227	1.15
0+340	255.43	254.261	1.17
0+360	255.23	254.010	1.22
0+380	254.81	253.661	1.15
0+400	254.51	253.312	1.20
0+420	254.56	253.512	1.04
0+440	254.85	253.713	1.13
0+460	255.01	253.800	1.21
0+480	255.01	253.800	1.21
0+500	255.01	253.800	1.21
0+520	254.34	253.075	1.26
0+540	253.40	252.278	1.12
0+560	252.83	251.750	1.08
0+580	252.36	251.222	1.14
0+600	252.22	251.065	1.15
0+620	252.06	250.964	1.10
0+640	251.96	250.863	1.10
0+660	251.89	250.762	1.13
0+680	251.65	250.484	1.17
0+700	252.09	250.674	1.42
0+720	253.02	251.432	1.58
0+740	253.75	252.191	1.56
0+760	254.30	252.949	1.35
0+780			

SIZE AND TYPE OF PIPE: OD90 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): −1.47% | −2.63% | −1.33% | 0.74% | 3.36% | 1.98% | 0.17% | −1.75% | 1.00% | 0.00% | −5.92% | −2.64% | −0.50% | −2.36% | 3.79%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
BARMISH WRSS - WAJIR

DL-01
CHAINAGE 0+000 - 0+760
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-03

Jul 19, 2025 - 10:22am

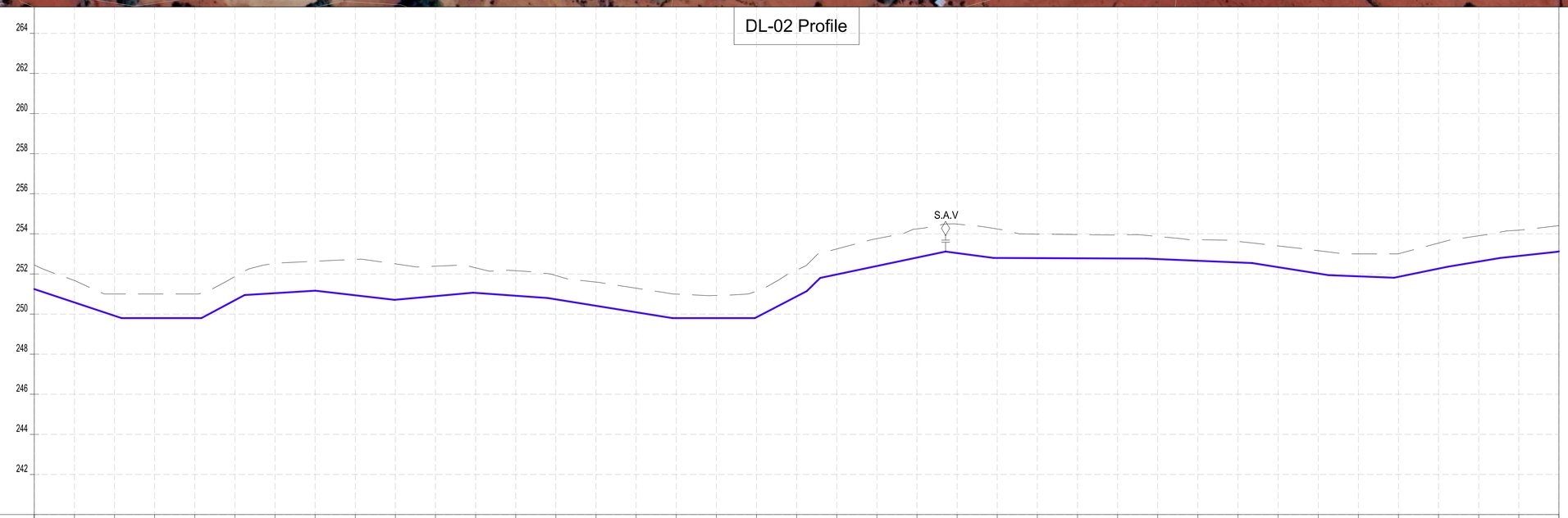
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

DL-02 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	252.45	251.247	1.20
0+020	251.67	250.582	1.09
0+040	251.00	249.916	1.08
0+060	251.00	249.800	1.20
0+080	251.00	249.800	1.20
0+100	251.87	250.691	1.18
0+120	252.52	251.041	1.48
0+140	252.63	251.164	1.47
0+160	252.73	250.936	1.79
0+180	252.50	250.714	1.79
0+200	252.39	250.895	1.49
0+220	252.30	251.054	1.25
0+240	252.16	250.913	1.25
0+260	251.92	250.734	1.19
0+280	251.59	250.413	1.18
0+300	251.29	250.092	1.20
0+320	250.99	249.800	1.19
0+340	250.93	249.800	1.13
0+360	251.14	249.840	1.30
0+380	252.19	250.880	1.31
0+400	253.25	251.975	1.27
0+420	253.76	252.397	1.36
0+440	254.25	252.819	1.43
0+460	254.49	253.043	1.45
0+480	254.24	252.799	1.45
0+500	253.99	252.791	1.20
0+520	253.96	252.782	1.18
0+540	253.95	252.774	1.17
0+560	253.87	252.744	1.13
0+580	253.71	252.660	1.05
0+600	253.63	252.575	1.05
0+620	253.40	252.341	1.06
0+640	253.16	252.024	1.14
0+660	253.00	251.883	1.12
0+680	253.01	251.858	1.15
0+700	253.54	252.268	1.27
0+720	253.91	252.619	1.29
0+740	254.18	252.900	1.28
0+760	254.41	253.122	1.29

SIZE AND TYPE OF PIPE: OD50 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): −3.33% | 0.00% | 5.34% | 0.61% | −1.15% | 0.90% | −0.71% | −1.61% | 0.00% | 5.20% | 9.55% | 2.11% | −1.33% | −0.04% | −0.42% | −1.58% | −0.40% | 2.05% | 1.67% | 1.09% | 1.37%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

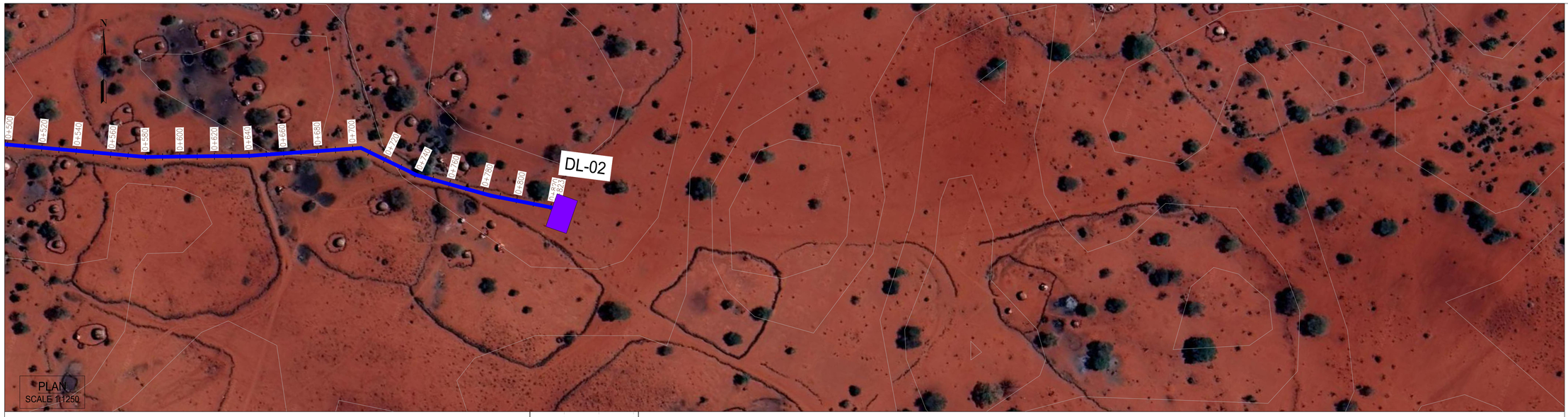
DRAWING TITLE:
BARMISH WRSS - WAJIR

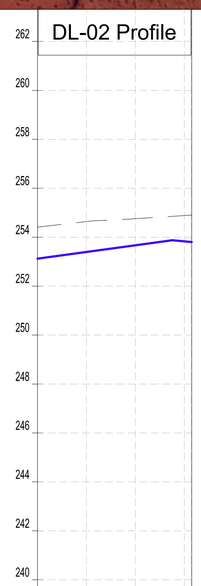
DL-02
CHAINAGE 0+000 - 0+760
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-04.01

Jul 19, 2025 - 10:22am





Datum: ~> 238
Ver Exag. ~> x10

CHAINAGES (M)	0+760	0+780	0+800	0+820 0+823
GROUND LEVEL (M)	254.41	254.64	254.76	254.88 254.80
INVERT LEVELS (M)	253.122	253.396	253.671	253.831 253.802
TRENCH DEPTH (M)	1.29	1.24	1.09	1.05 1.00
SIZE AND TYPE OF PIPE	OD50 PN10 HDPE PIPE			
PIPE FITTINGS				
SLOPE (%)	1.37%			0.38%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

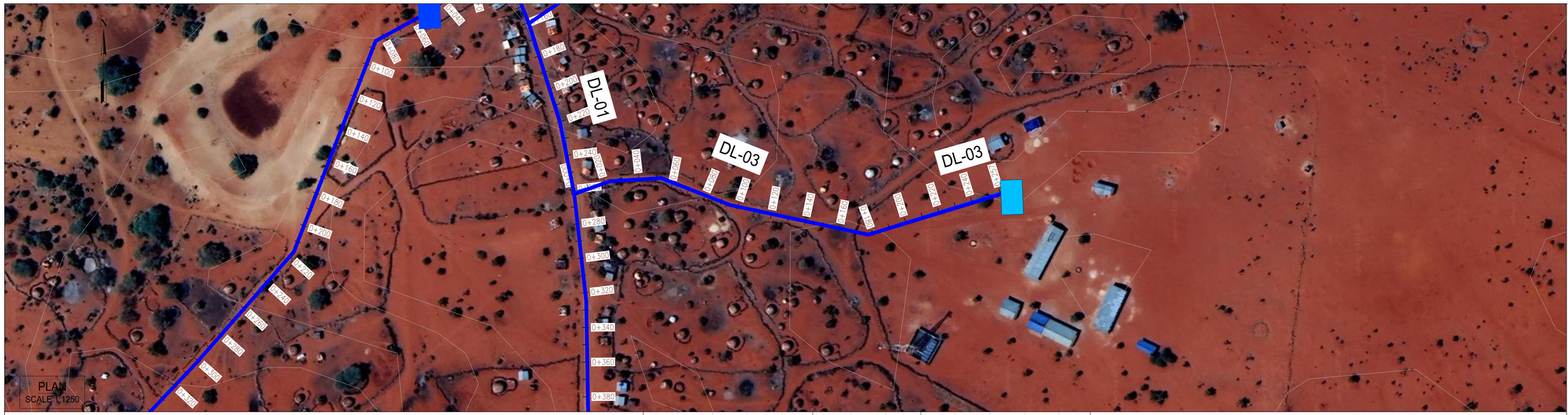
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
BARMISH WRSS - WAJIR
DL-02
CHAINAGE 0+000 - 1+148
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-04.02

Jul 19, 2025 - 10:23am

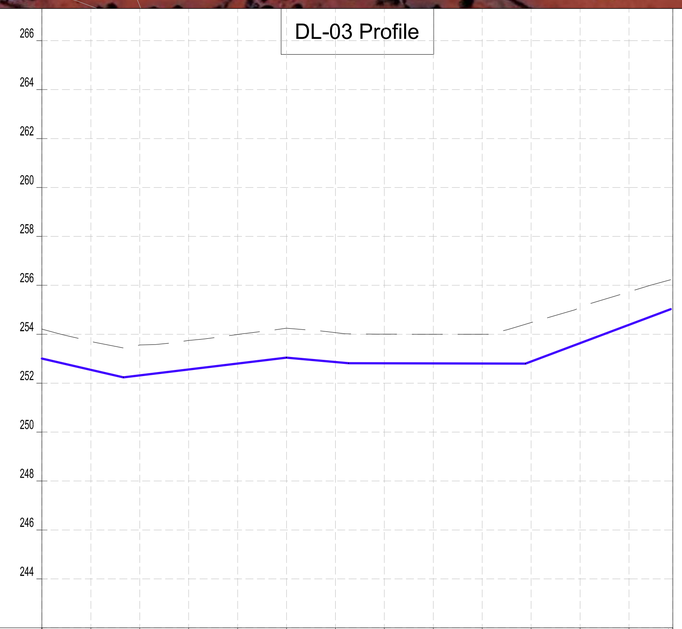


NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT



CHAINAGES (M)	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+257.94
GROUND LEVEL (M)	254.21	253.71	253.56	253.75	253.99	254.24	254.07	254.00	254.00	254.00	254.48	255.09	255.73	
INVERT LEVELS (M)	253.009	252.546	252.319	252.561	252.803	253.045	252.864	252.812	252.808	252.804	252.887	253.638	254.389	
TRENCH DEPTH (M)	1.20	1.16	1.24	1.19	1.19	1.20	1.20	1.19	1.19	1.20	1.59	1.46	1.35	

SIZE AND TYPE OF PIPE: OD50 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): -2.31% | 1.21% | -0.90% | -0.02% | 3.75%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
BARMISH WRSS - WAJIR

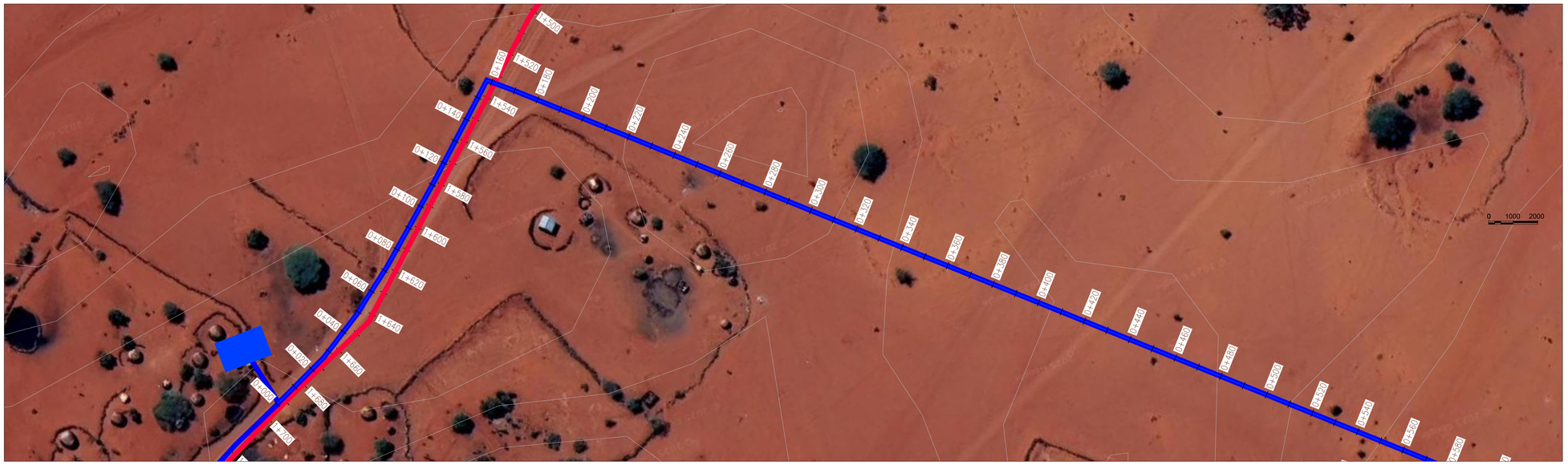
DL-03
CHAINAGE 0+000 - 0+258
SHEET 1 OF 1

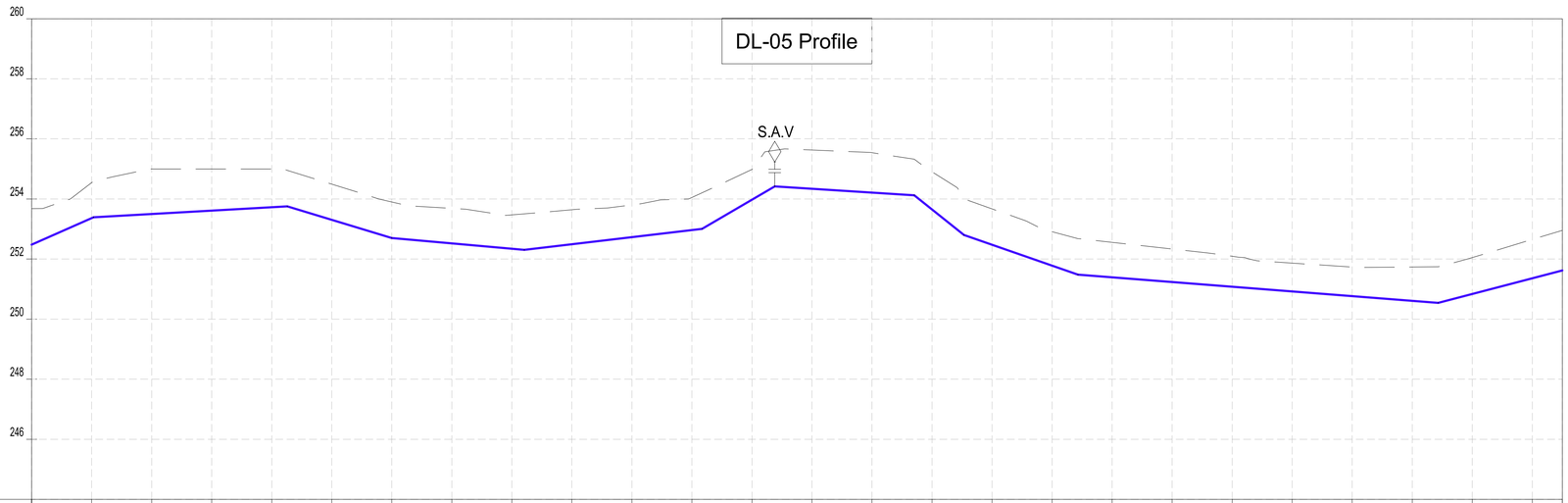
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-05

Jul 19, 2025 - 10:23am

PLAN
SCALE 1:1250





CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	253.68	252.480	1.20
0+020	254.54	253.361	1.18
0+040	255.00	253.498	1.50
0+060	255.00	253.610	1.39
0+080	255.00	253.723	1.28
0+100	254.49	253.305	1.19
0+120	253.90	252.700	1.20
0+140	253.69	252.521	1.17
0+160	253.47	252.341	1.13
0+180	253.64	252.492	1.15
0+200	253.80	252.729	1.07
0+220	254.05	252.965	1.08
0+240	254.99	253.976	1.01
0+260	255.63	254.340	1.29
0+280	255.54	254.213	1.33
0+300	254.90	253.651	1.25
0+320	253.67	252.474	1.19
0+340	252.91	251.780	1.13
0+360	252.55	251.391	1.16
0+380	252.34	251.235	1.10
0+400	252.09	251.078	1.01
0+420	251.86	250.922	0.94
0+440	251.73	250.766	0.97
0+460	251.73	250.609	1.13
0+480	252.05	250.837	1.21
0+500	252.65	251.358	1.30
0+510	252.96	251.619	1.34

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 4.41% | 0.56% | -3.02% | -0.90% | 1.18% | -5.84% | -0.64% | -8.00% | -3.47% | -0.78% | 2.60%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

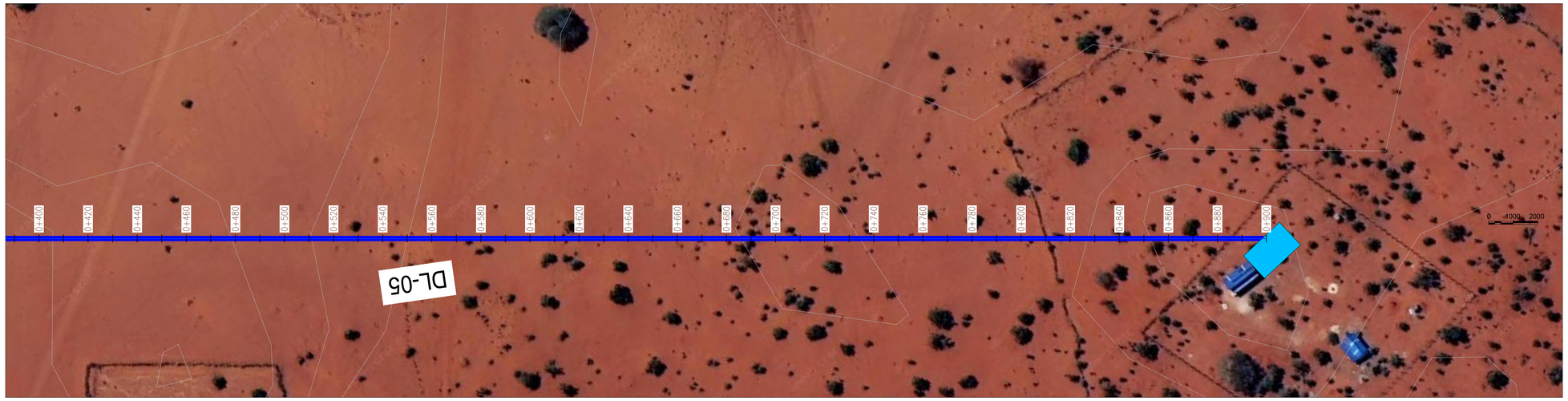
DRAWING TITLE:
BARMISH WRSS - WAJIR

DL-05
CHAINAGE 0+000 - 0+510
SHEET 1 OF 2

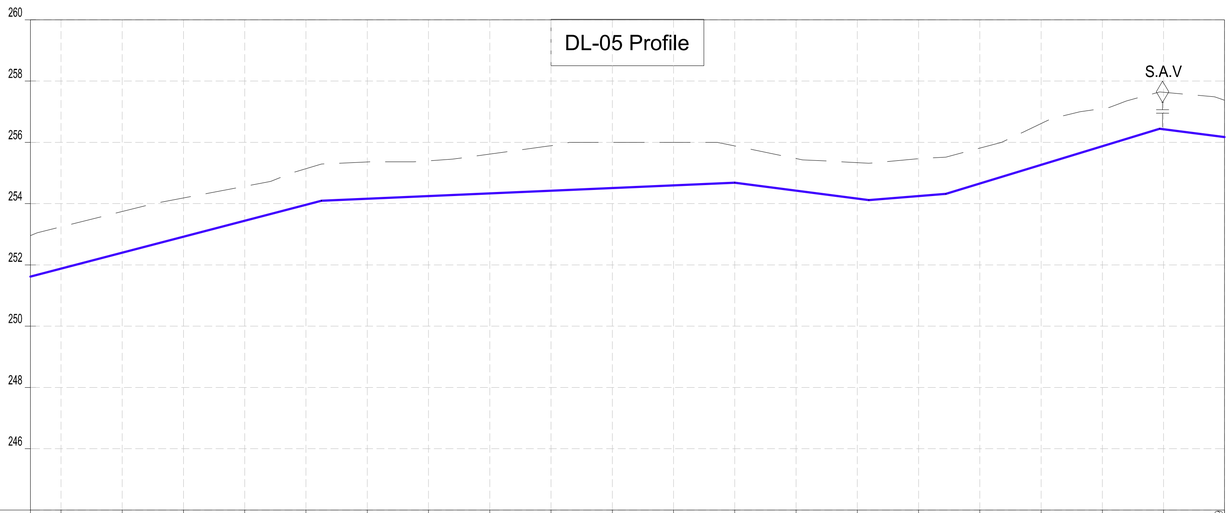
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-06.01

Jul 19, 2025 - 10:23am



PLAN
SCALE 1:1250



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	252.96	251.619	1.34
0+520	253.24	251.879	1.36
0+540	253.74	252.400	1.34
0+560	254.18	252.921	1.26
0+580	254.56	253.442	1.12
0+600	255.14	253.963	1.18
0+620	255.36	254.159	1.20
0+640	255.40	254.246	1.15
0+660	255.62	254.333	1.28
0+680	255.89	254.420	1.47
0+700	256.00	254.508	1.49
0+720	256.00	254.595	1.41
0+740	255.88	254.682	1.20
0+760	255.47	254.423	1.05
0+780	255.34	254.164	1.17
0+800	255.46	254.246	1.22
0+820	255.81	254.656	1.16
0+840	256.61	255.265	1.35
0+860	257.10	255.874	1.23
0+880	257.63	256.428	1.21
0+899.89	257.37	256.174	1.20

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 2.60% | 0.44% | -1.29% | 0.80% | 3.05% | -1.26%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
BARMISH WRSS - WAJIR

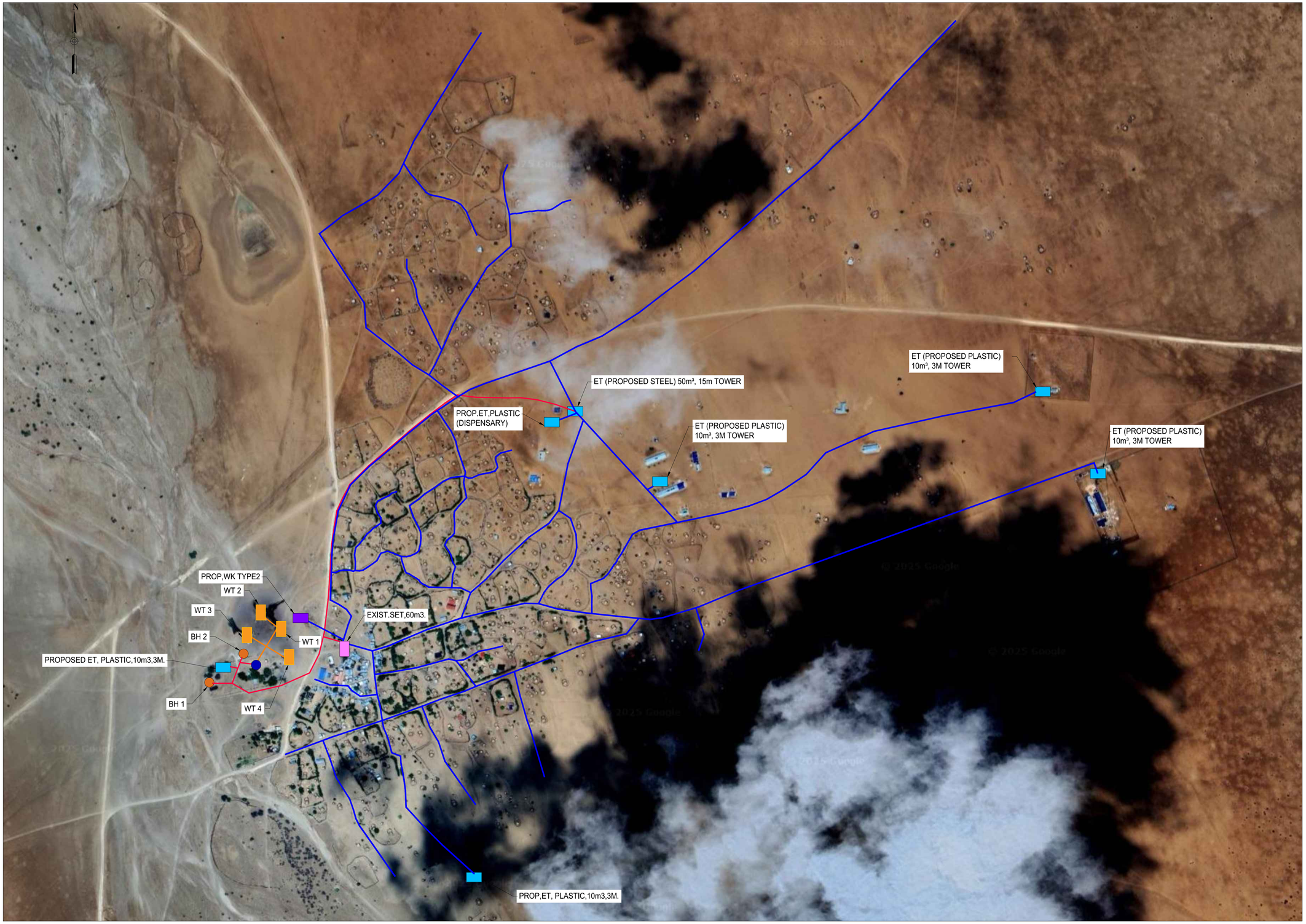
DL-05
CHAINAGE 0+510 - 0+900
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-06.02

Jul 19, 2025 - 10:23am

GARSE QOFTU RWSS - WAJIR



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

GIRSEY GOFTU RWSS - WAJIR

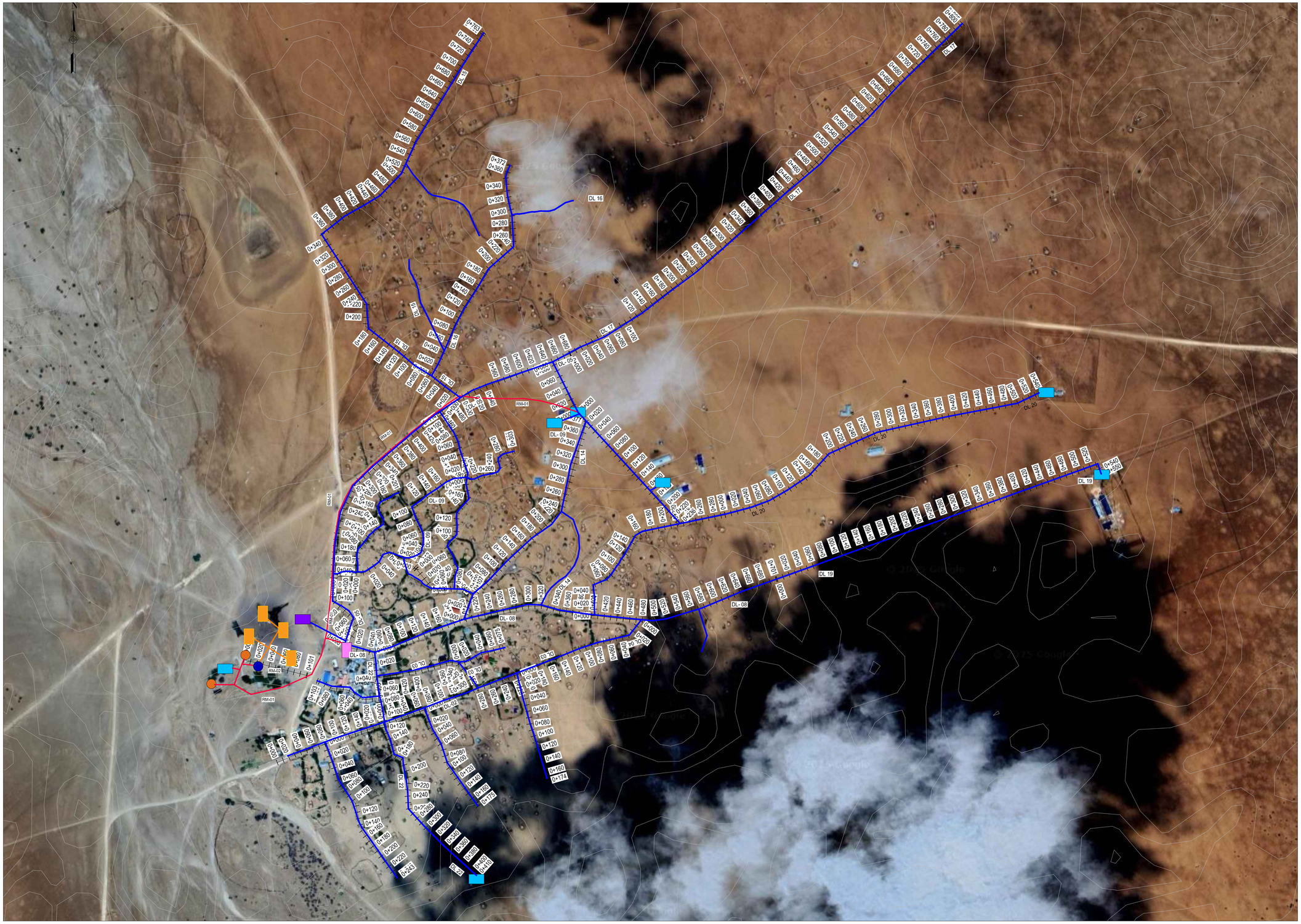
GENERAL LAYOUT

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-01

Jul 19, 2025 - 10:27am



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:

aarvee associates
architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

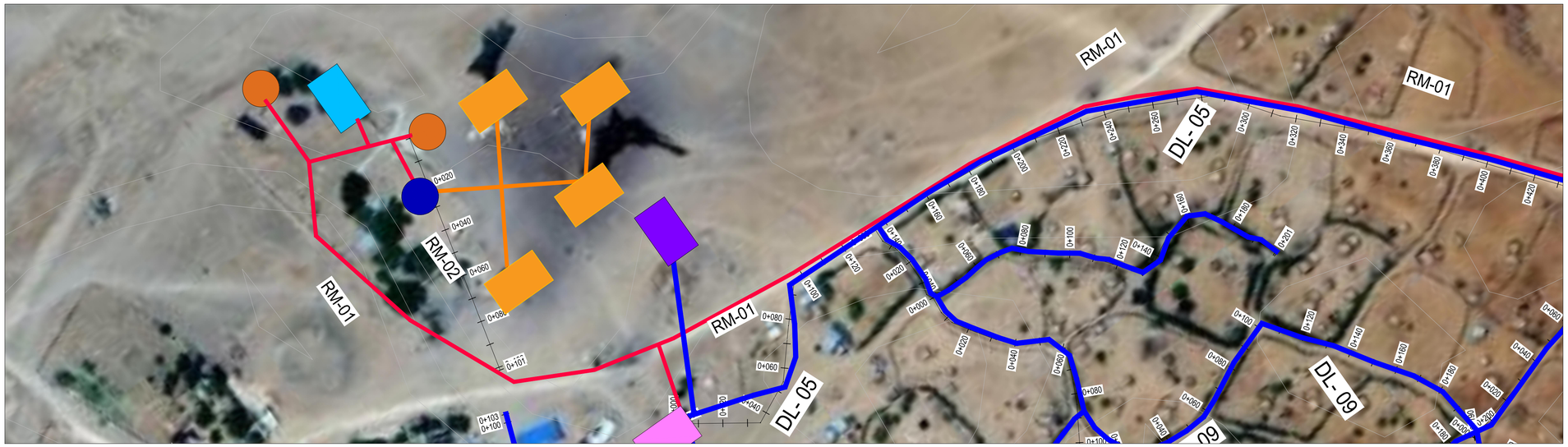
GARSE QOFTU RWSS - WAJIR

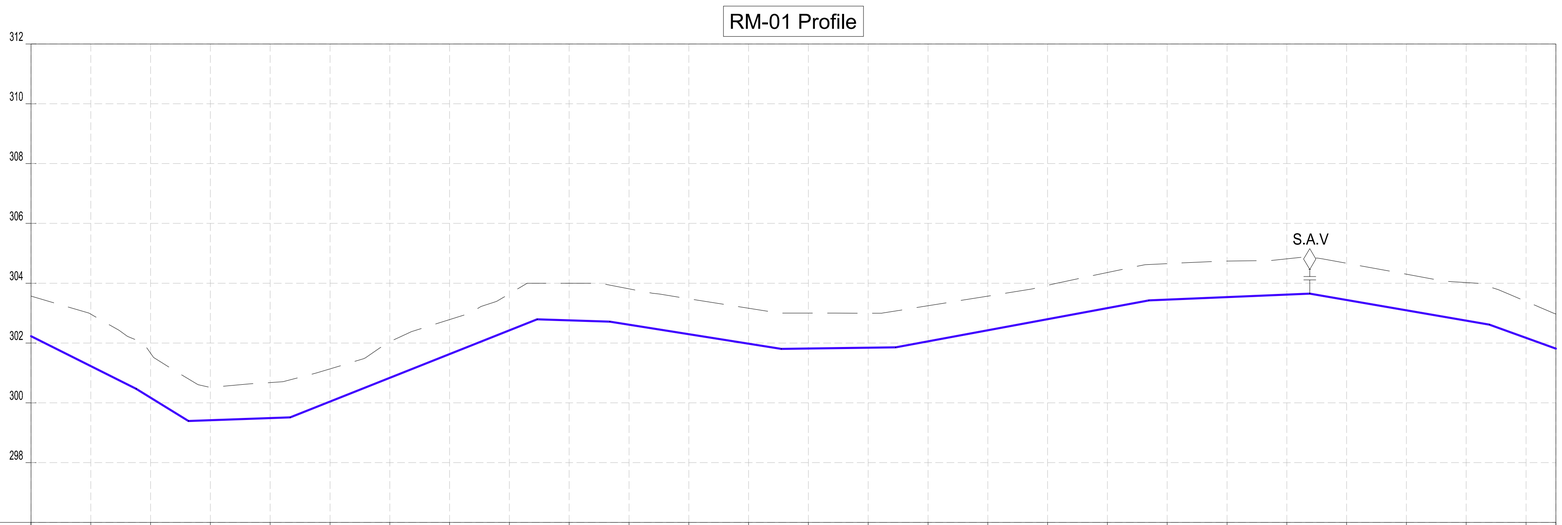
RISING MAIN (RM-01) - PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-01

Jul 19, 2025 - 10:27am





CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	303.57	302.227	1.34
0+020	302.97	301.226	1.74
0+040	301.66	300.170	1.49
0+060	300.52	299.419	1.10
0+080	300.68	299.489	1.19
0+100	301.13	300.040	1.09
0+120	302.05	300.835	1.21
0+140	302.78	301.629	1.15
0+160	303.64	302.424	1.22
0+180	304.00	302.759	1.24
0+200	303.81	302.614	1.20
0+220	303.48	302.295	1.19
0+240	303.16	301.976	1.19
0+260	303.00	301.815	1.19
0+280	303.00	301.843	1.15
0+300	303.25	302.056	1.19
0+320	303.57	302.426	1.14
0+340	303.93	302.797	1.13
0+360	304.36	303.167	1.19
0+380	304.65	303.451	1.20
0+400	304.74	303.536	1.21
0+420	304.81	303.621	1.19
0+440	304.67	303.441	1.23
0+460	304.30	303.096	1.21
0+480	304.02	302.750	1.27
0+500	303.39	302.174	1.22
0+510	302.97	301.812	1.16

SIZE AND TYPE OF PIPE: OD90 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -5.01% | -0.14% | 0.35% | 3.97% | -0.31% | -1.59% | 0.14% | 1.85% | 0.43% | -1.73% | -1.62%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

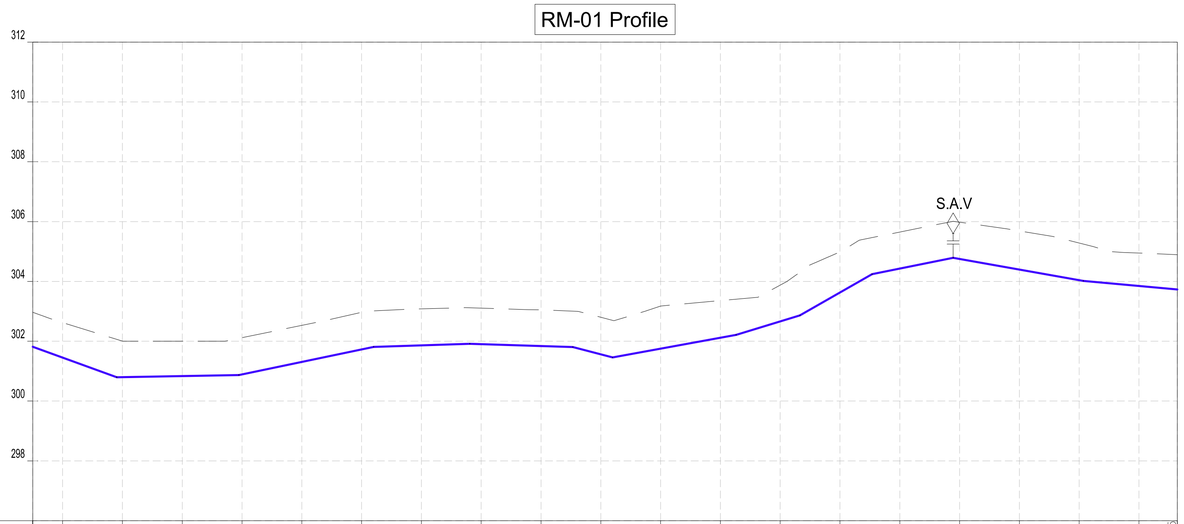
RISING MAIN (RM-01) - PLAN AND PROFILE
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-02.01

Jul 19, 2025 - 10:28am

RM-01 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+510	302.97	301.812	1.16
0+520	302.62	301.451	1.17
0+540	302.00	300.800	1.20
0+560	302.00	300.836	1.16
0+580	302.12	300.893	1.23
0+600	302.53	301.309	1.22
0+620	302.97	301.726	1.24
0+640	303.08	301.862	1.22
0+660	303.10	301.903	1.20
0+680	303.05	301.839	1.21
0+700	302.80	301.561	1.24
0+720	303.18	301.751	1.43
0+740	303.36	302.116	1.24
0+760	303.87	302.663	1.21
0+780	304.99	303.629	1.36
0+800	305.65	304.428	1.22
0+820	305.98	304.750	1.23
0+840	305.69	304.396	1.29
0+860	305.28	304.042	1.24
0+880	304.95	303.848	1.10
0+892.65	304.89	303.731	1.16

SIZE AND TYPE OF PIPE: OD90 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -3.62% | 0.18% | 2.08% | 0.33% | -0.32% | -2.62% | 1.83% | 3.08% | 5.71% | 2.01% | -1.77% | -0.91%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

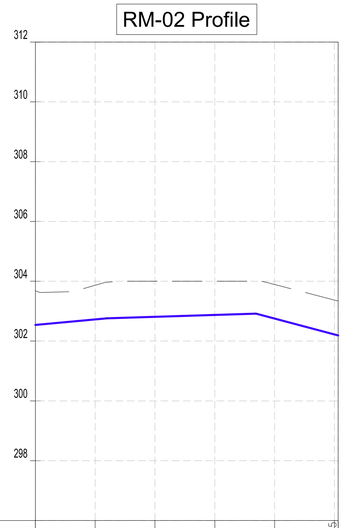
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-02.02

Jul 19, 2025 - 10:28am



CHAINAGES (M)	0+000	0+020	0+040	0+060	0+080	0+101.25
GROUND LEVEL (M)	303.68	303.87	304.00	304.00	303.89	303.37
INVERT LEVELS (M)	302.541	302.723	302.810	302.873	302.752	302.123
TRENCH DEPTH (M)	1.14	1.14	1.19	1.13	1.14	1.15
SIZE AND TYPE OF PIPE	OD40 PN10 HDPE PIPE					
PIPE FITTINGS						
SLOPE (%)	0.91%	0.32%			-2.65%	

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

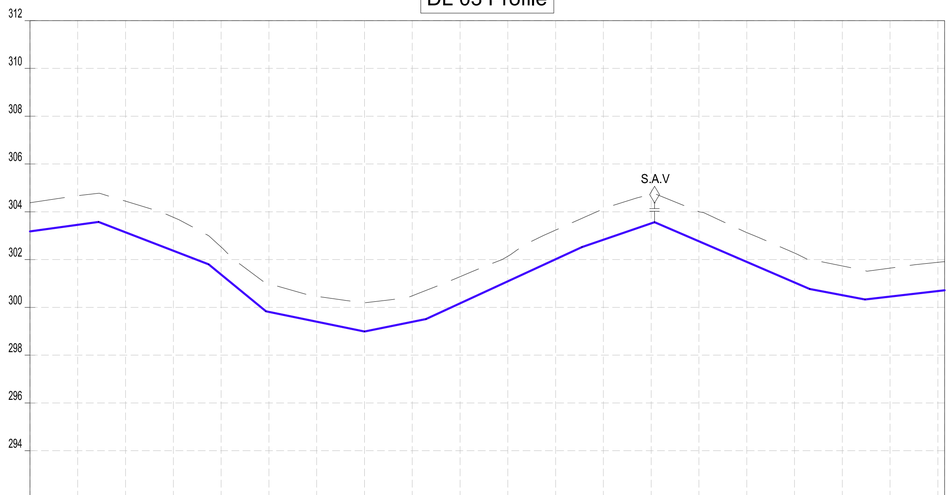
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

RISING MAIN (RM-02) - PLAN AND PROFILE
CH.0+000.00 - CH.0+101.25
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-03

Jul 19, 2025 - 10:28am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	304.38	303.181	1.20
0+020	304.67	303.456	1.22
0+040	304.44	303.142	1.30
0+060	303.77	302.370	1.40
0+080	302.52	301.372	1.15
0+100	300.99	299.810	1.18
0+120	300.46	299.401	1.06
0+140	300.19	298.992	1.20
0+160	300.49	299.393	1.09
0+180	301.28	300.167	1.12
0+200	302.14	301.091	1.05
0+220	303.23	302.015	1.22
0+240	304.11	302.831	1.28
0+260	304.73	303.516	1.21
0+280	304.00	302.764	1.24
0+300	303.13	301.903	1.22
0+320	302.28	301.042	1.23
0+340	301.73	300.511	1.22
0+360	301.64	300.452	1.19
0+380 / 0+382.85	301.88 / 301.91	300.681 / 300.717	1.20 / 1.20

SIZE AND TYPE OF PIPE: OD50 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.39% | -3.86% | -8.19% | -2.05% | 2.01% | 4.62% | 3.42% | -4.31% | -1.88% | 1.15%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

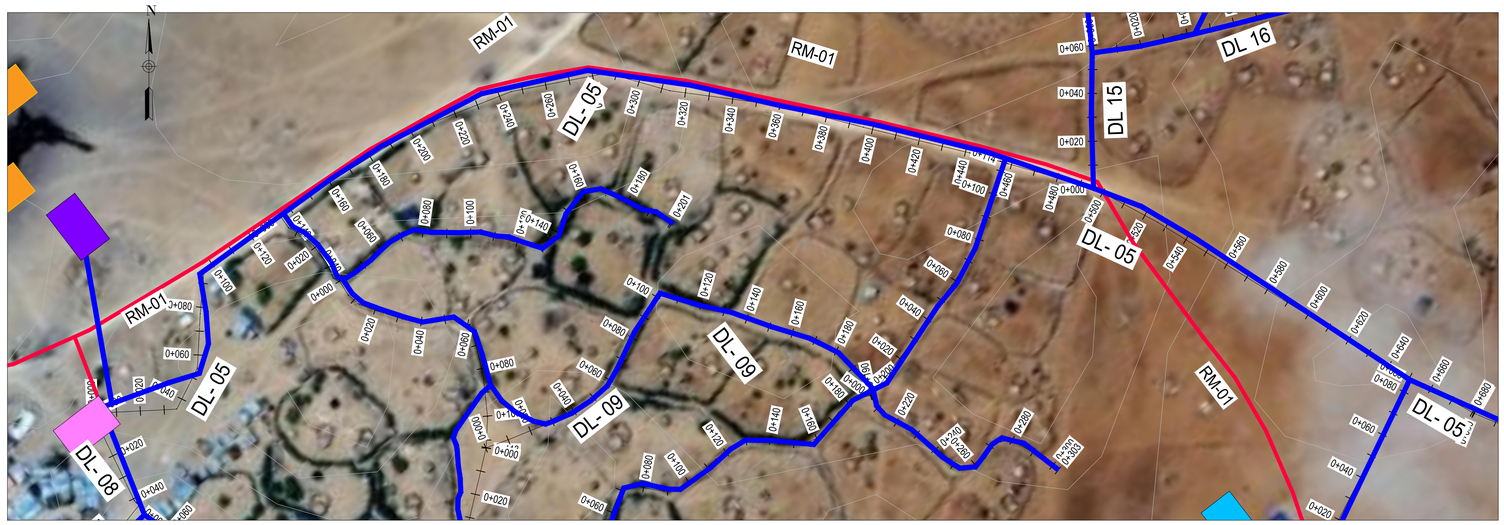
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 03 - PLAN AND PROFILE
CH.0+000.00 - CH.0+382.85
SHEET 1 OF 1

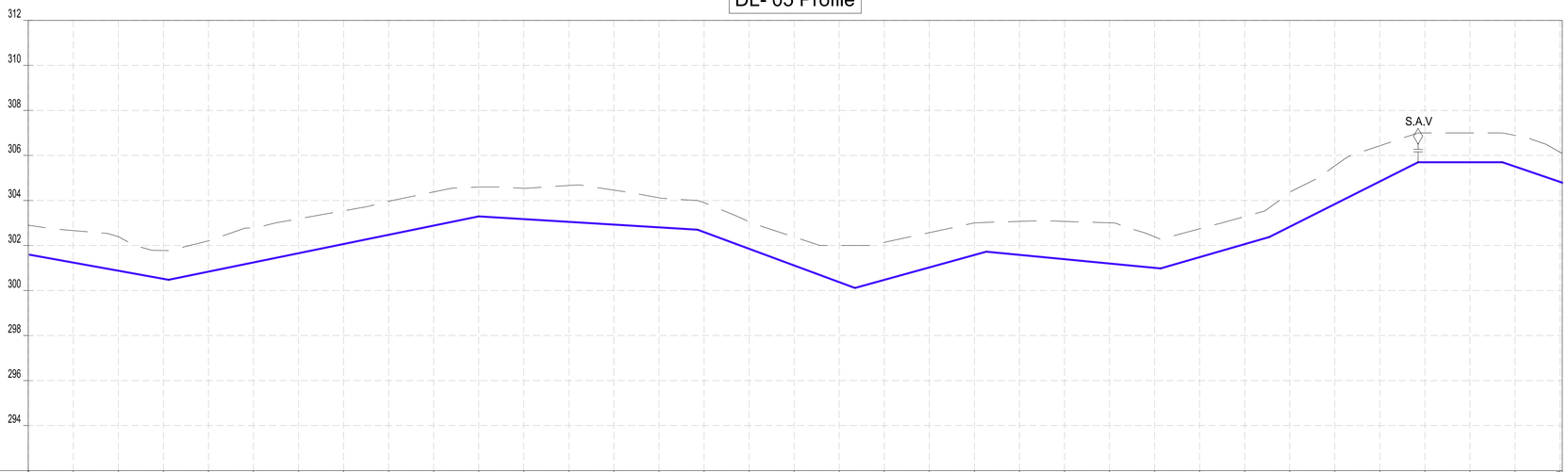
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-04

Jul 19, 2025 - 10:28am



DL- 05 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	302.90	301.240	1.42
0+020	302.66	300.878	1.51
0+040	302.39	300.516	1.26
0+060	301.78	300.838	1.37
0+080	302.21	301.247	1.55
0+100	302.80	301.657	1.53
0+120	303.19	302.067	1.47
0+140	303.54	302.476	1.49
0+160	303.96	302.886	1.49
0+180	304.38	303.296	1.30
0+200	304.60	303.173	1.37
0+220	304.54	303.050	1.61
0+240	304.67	302.928	1.53
0+260	304.46	302.805	1.31
0+280	304.12	302.593	1.31
0+300	303.90	301.853	1.20
0+320	303.06	301.113	1.26
0+340	302.38	300.372	1.63
0+360	302.00	300.474	1.66
0+380	302.14	301.028	1.54
0+400	302.57	301.581	1.42
0+420	303.00	301.585	1.48
0+440	303.07	301.392	1.68
0+460	303.07	301.198	1.81
0+480	303.01	301.005	1.38
0+500	302.39	301.480	1.26
0+520	302.74	302.060	1.22
0+540	303.28	302.833	1.54
0+560	304.37	303.839	1.69
0+580	305.53	304.846	1.59
0+600	306.43	305.700	1.30
0+620	307.00	305.700	1.30
0+640	307.00	305.509	1.39
0+660	306.89	304.989	1.38
0+679.5	306.74	304.989	

SIZE AND TYPE OF PIPE: OD50 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -1.81% | 2.05% | -0.61% | -3.70% | 2.77% | -0.97% | 2.90% | 5.03% | 0.00% | -3.43%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

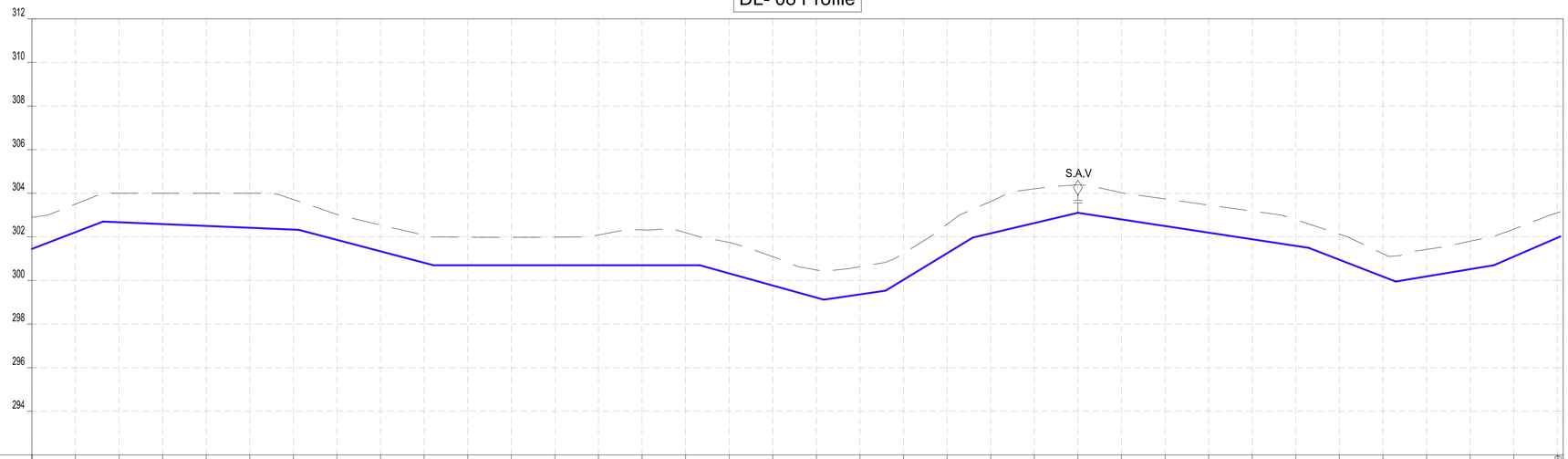
DL 05 - PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-05

Jul 19, 2025 - 10:28am

DL- 08 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	302.90	301.450	1.45
0+020	303.50	302.215	1.29
0+040	304.00	302.669	1.33
0+060	304.00	302.586	1.41
0+080	304.00	302.502	1.50
0+100	304.00	302.418	1.58
0+120	303.71	302.334	1.38
0+140	303.03	301.863	1.16
0+160	302.54	301.337	1.21
0+180	302.06	300.810	1.25
0+200	301.99	300.698	1.29
0+220	301.98	300.699	1.28
0+240	301.98	300.699	1.28
0+260	302.09	300.699	1.39
0+280	302.32	300.700	1.62
0+300	302.19	300.700	1.49
0+320	301.75	300.325	1.42
0+340	301.09	299.768	1.32
0+360	300.48	299.212	1.27
0+380	300.63	299.361	1.27
0+400	301.24	300.034	1.21
0+420	302.58	301.251	1.33
0+440	303.62	302.162	1.46
0+460	304.20	302.634	1.57
0+480	304.38	303.105	1.28
0+500	304.02	302.802	1.22
0+520	303.74	302.498	1.24
0+540	303.46	302.194	1.26
0+560	303.18	301.890	1.29
0+580	302.78	301.586	1.20
0+600	302.12	300.950	1.17
0+620	301.22	300.175	1.05
0+640	301.43	300.189	1.24
0+660	301.81	300.520	1.29
0+680	302.35	301.094	1.26
0+700 (0+702.69)	303.11	301.958	1.15

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 3.92% | -0.42% | -2.63% | 0.00% | -2.78% | 1.46% | 6.08% | 2.36% | -1.52% | -3.88% | 1.66% | 4.32%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

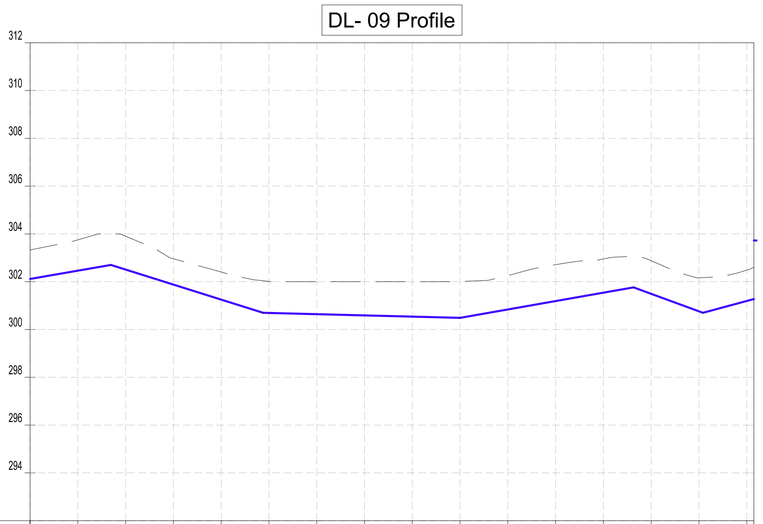
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 08 - PLAN AND PROFILE
CH.0+000.00 - CH.0+702.69
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-06

Jul 19, 2025 - 10:28am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	303.33	302.116	1.21
0+020	303.75	302.461	1.29
0+040	303.90	302.506	1.40
0+060	302.96	301.879	1.08
0+080	302.40	301.251	1.15
0+100	302.01	300.694	1.32
0+120	302.00	300.641	1.36
0+140	302.00	300.589	1.41
0+160	302.00	300.537	1.46
0+180	302.01	300.485	1.52
0+200	302.25	300.836	1.42
0+220	302.71	301.188	1.52
0+240	302.95	301.540	1.41
0+260	302.88	301.493	1.38
0+280	302.16	300.762	1.40
0+300 / 0+303	302.48	301.191	1.29

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): 1.73% | -3.14% | -0.26% | 1.76% | -3.66% | -2.68%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

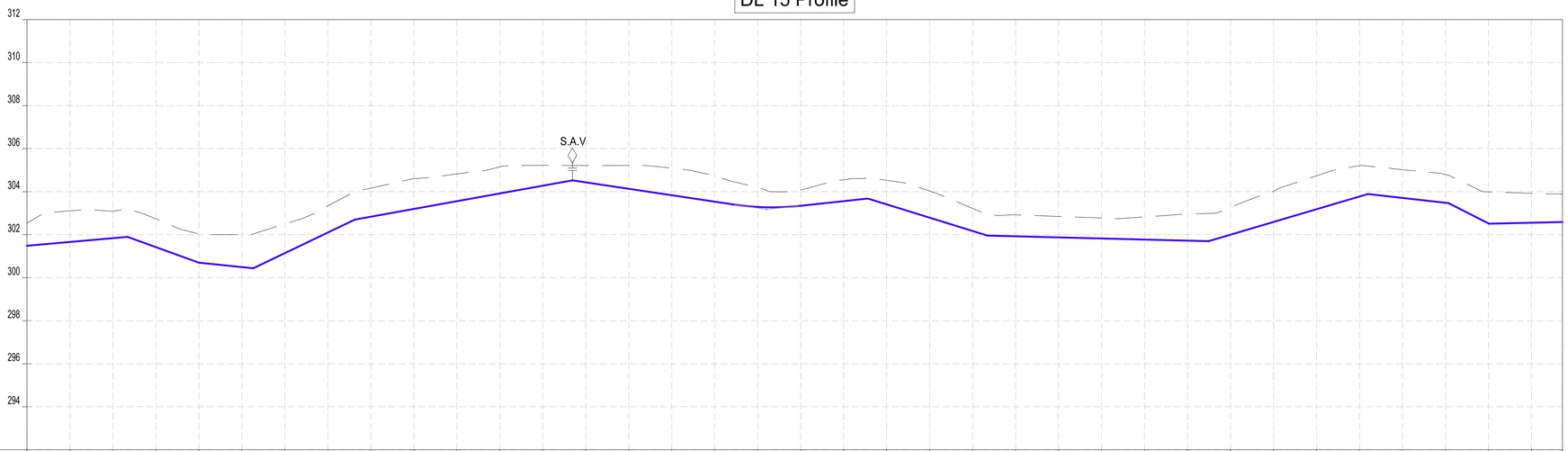
DL 09 - PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-07

Jul 19, 2025 - 10:29am

DL 15 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	302.53	301.484	1.05
0+020	303.11	301.662	1.45
0+040	303.09	301.839	1.25
0+060	302.73	301.422	1.31
0+080	302.03	300.700	1.33
0+100	302.00	300.492	1.51
0+120	302.50	301.141	1.36
0+140	303.34	302.099	1.24
0+160	304.17	302.835	1.33
0+180	304.61	303.195	1.41
0+200	304.82	303.556	1.27
0+220	305.15	303.917	1.23
0+240	305.22	304.277	0.95
0+260	305.22	304.433	0.78
0+280	305.22	304.134	1.09
0+300	305.10	303.834	1.26
0+320	304.73	303.535	1.19
0+340	304.19	303.287	0.91
0+360	304.07	303.345	0.73
0+380	304.55	303.560	0.99
0+400	304.53	303.408	1.12
0+420	304.03	302.790	1.24
0+440	303.22	302.171	1.05
0+460	302.92	301.925	1.00
0+480	302.85	301.875	0.97
0+500	302.78	301.825	0.95
0+520	302.83	301.775	1.05
0+540	302.96	301.725	1.24
0+560	303.27	302.002	1.27
0+580	304.02	302.594	1.42
0+600	304.74	303.185	1.55
0+620	305.21	303.776	1.43
0+640	305.02	303.707	1.31
0+660	304.80	303.482	1.32
0+680	303.99	302.522	1.47
0+700	303.92	302.555	1.37
0+714.43	303.89	302.588	1.30

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.89% | -3.61% | -1.04% | 4.79% | 1.80% | -1.50% | 1.08% | -3.09% | -0.25% | 2.96% | -1.13% | -5.06% | 0.23%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

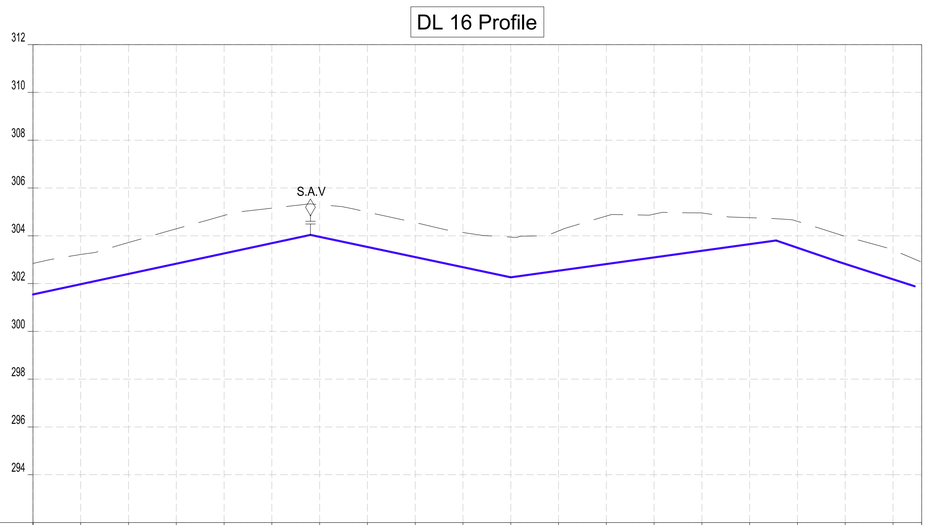
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 15 - PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-09

Jul 19, 2025 - 10:29am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	302.84	301.544	1.30
0+020	303.22	301.973	1.25
0+040	303.72	302.403	1.31
0+060	304.29	302.832	1.46
0+080	304.85	303.261	1.59
0+100	305.16	303.690	1.47
0+120	305.30	303.955	1.35
0+140	304.99	303.532	1.46
0+160	304.55	303.108	1.44
0+180	304.14	302.684	1.45
0+200	303.94	302.261	1.68
0+220	304.20	302.538	1.67
0+240	304.82	302.816	2.01
0+260	304.91	303.094	1.81
0+280	304.96	303.372	1.58
0+300	304.76	303.650	1.11
0+320	304.60	303.498	1.10
0+340	303.98	302.821	1.16
0+360	303.40	302.178	1.23
0+372			

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 2.15% | -2.12% | 1.39% | -3.42% | -3.21%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

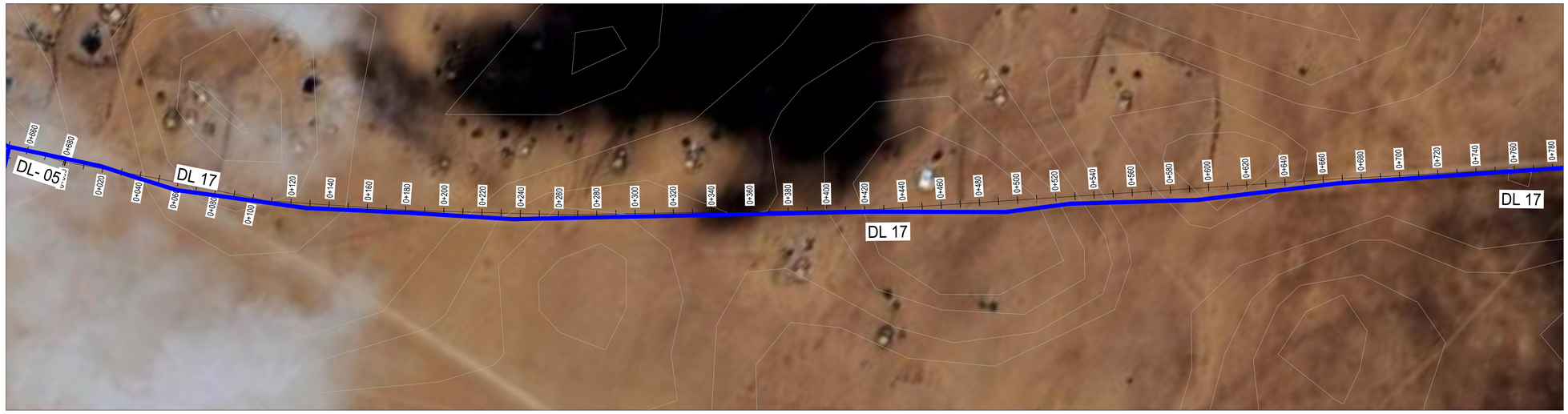
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 16 - PLAN AND PROFILE
CH.0+000.00 - CH.0+418.61
SHEET 1 OF 1

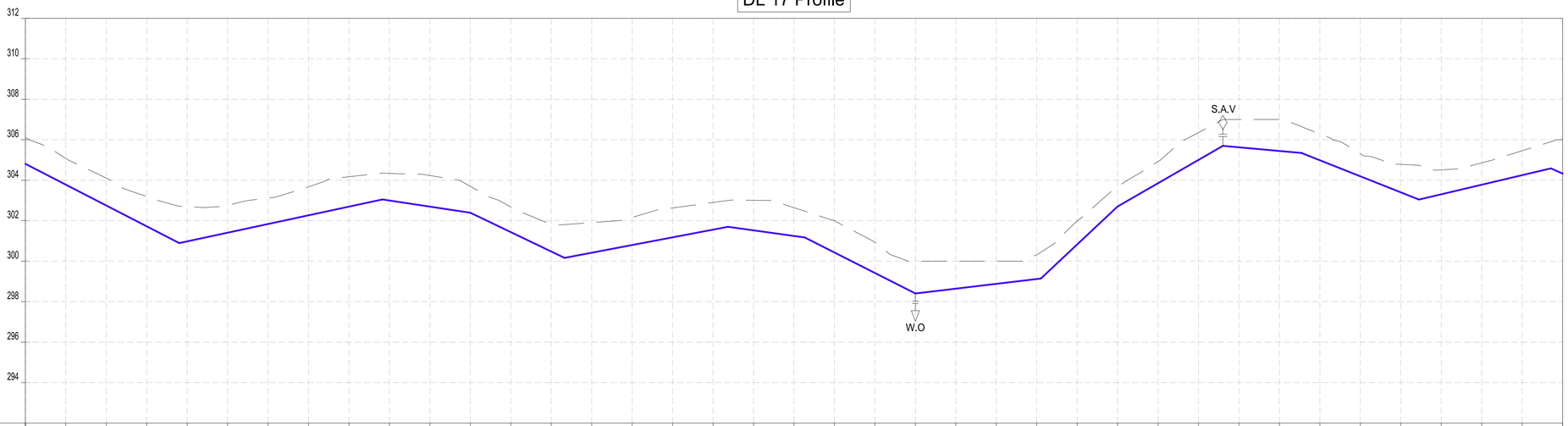
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-10

Jul 19, 2025 - 10:29am



DL 17 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	306.11	304.809	1.30
0+020	305.08	303.780	1.30
0+040	304.11	302.752	1.36
0+060	303.19	301.723	1.47
0+080	302.69	300.980	1.71
0+100	302.76	301.409	1.35
0+120	303.12	301.838	1.28
0+140	303.67	302.267	1.41
0+160	304.17	302.696	1.48
0+180	304.34	302.998	1.34
0+200	304.23	302.697	1.53
0+220	303.70	302.395	1.30
0+240	302.68	301.435	1.24
0+260	301.85	300.474	1.37
0+280	301.90	300.417	1.49
0+300	302.16	300.798	1.37
0+320	302.63	301.179	1.45
0+340	302.90	301.560	1.34
0+360	303.01	301.523	1.48
0+380	302.64	301.243	1.40
0+400	302.00	300.425	1.58
0+420	300.92	299.414	1.51
0+440	300.00	298.404	1.60
0+460	300.00	298.642	1.36
0+480	300.00	298.880	1.12
0+500	300.32	299.119	1.20
0+520	301.99	300.827	1.16
0+540	303.68	302.700	0.98
0+560	304.92	303.853	1.07
0+580	306.35	305.007	1.35
0+600	307.00	305.627	1.37
0+620	307.00	305.443	1.56
0+640	306.29	304.987	1.30
0+660	305.31	304.194	1.11
0+680	304.78	303.400	1.38
0+700	304.51	303.305	1.21
0+720	304.86	303.777	1.08
0+740	305.46	304.249	1.21
0+760	306.00	304.325	1.67

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -5.14% | 2.15% | -1.51% | -4.80% | 1.90% | -1.40% | -5.05% | 1.19% | 9.57% | 5.77% | -0.92% | -3.97% | 2.36% | -4.45%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

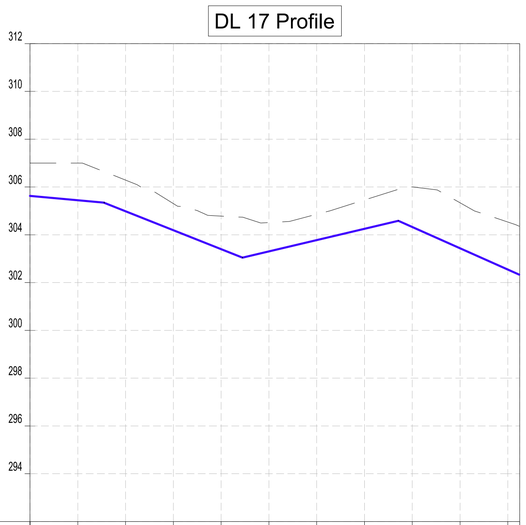
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 17 - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-11.01

Jul 19, 2025 - 10:29am



CHAINAGES (M)	0+600	0+620	0+640	0+660	0+680	0+700	0+720	0+740	0+760	0+780	0+800	0+805
GROUND LEVEL (M)	307.00	307.00	306.29	305.31	304.78	304.51	304.86	305.46	306.00	305.34	304.53	
INVERT LEVELS (M)	305.627	305.443	304.987	304.194	303.400	303.305	303.777	304.249	304.325	303.434	302.542	
TRENCH DEPTH (M)	1.37	1.56	1.30	1.11	1.38	1.21	1.08	1.21	1.67	1.91	1.99	
SIZE AND TYPE OF PIPE	OD32 PN10 HDPE PIPE											
PIPE FITTINGS												
SLOPE (%)	-0.97%		-3.97%				2.36%			-4.46%		

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

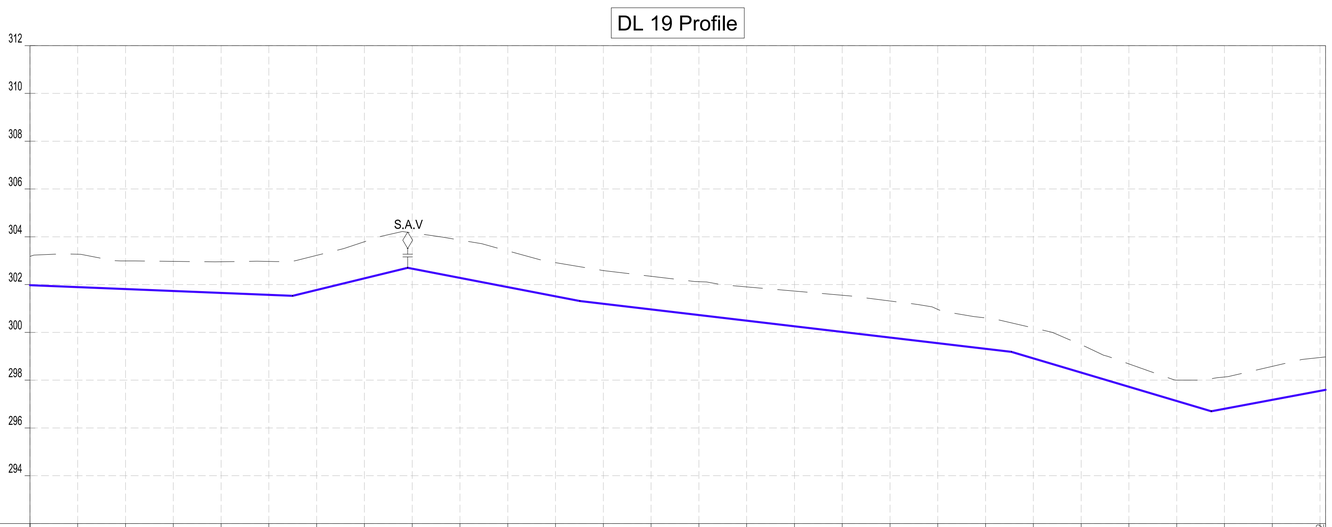
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 17 - PLAN AND PROFILE
CH.0+000.00 - CH.0+833.26
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-11.02

Jul 19, 2025 - 10:29am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	303.18	301.975	1.20
0+020	303.27	301.894	1.38
0+040	302.99	301.813	1.17
0+060	302.97	301.732	1.24
0+080	302.96	301.651	1.30
0+100	302.97	301.570	1.40
0+120	303.22	301.774	1.45
0+140	303.79	302.260	1.53
0+160	304.16	302.664	1.50
0+180	303.86	302.279	1.58
0+200	303.41	301.894	1.52
0+220	302.92	301.510	1.41
0+240	302.59	301.198	1.39
0+260	302.35	300.962	1.39
0+280	302.12	300.727	1.40
0+300	301.90	300.491	1.41
0+320	301.73	300.255	1.47
0+340	301.55	300.019	1.53
0+360	301.31	299.783	1.53
0+380	300.96	299.547	1.42
0+400	300.61	299.311	1.29
0+420	300.18	298.911	1.27
0+440	299.48	298.317	1.17
0+460	298.68	297.724	0.96
0+480	298.00	297.130	0.87
0+500	298.13	296.803	1.33
0+520	298.58	297.176	1.40
0+540	298.97	297.549	1.42

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.40% | 2.43% | -1.92% | -1.18% | -2.97% | 1.87%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

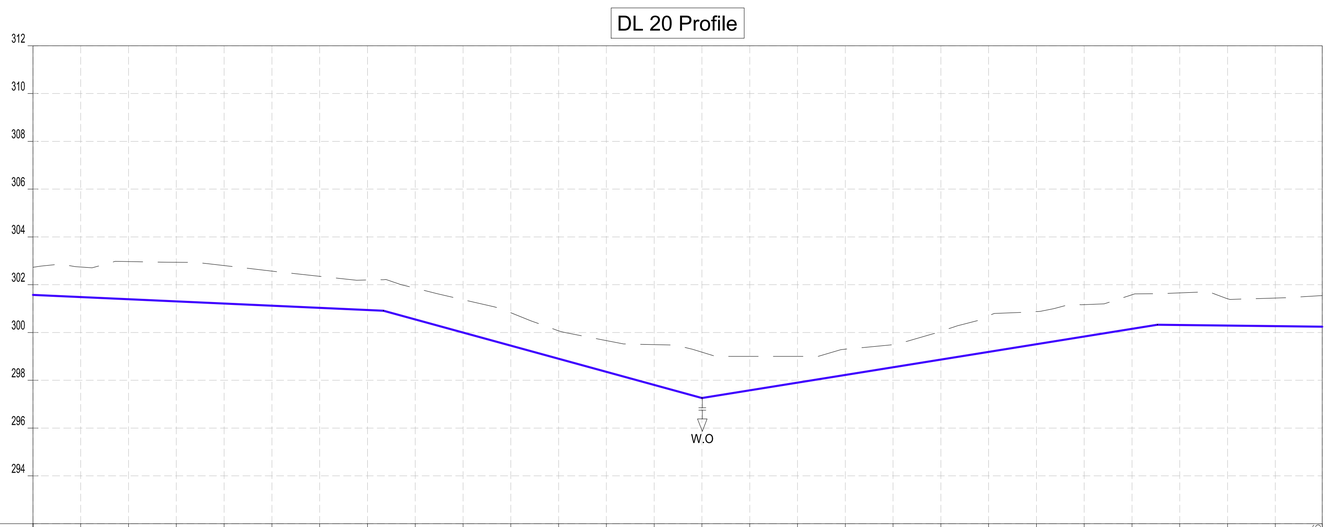
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 19 - PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-12

Jul 19, 2025 - 10:29am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	302.73	301.572	1.16
0+020	302.74	301.482	1.26
0+040	302.97	301.392	1.58
0+060	302.94	301.301	1.64
0+080	302.80	301.211	1.59
0+100	302.57	301.120	1.45
0+120	302.35	301.030	1.32
0+140	302.20	300.940	1.26
0+160	301.85	300.545	1.31
0+180	301.38	299.997	1.38
0+200	300.83	299.450	1.38
0+220	300.07	298.902	1.17
0+240	299.66	298.354	1.31
0+260	299.49	297.807	1.69
0+280	299.18	297.259	1.92
0+300	299.00	297.581	1.42
0+320	299.00	297.902	1.10
0+340	299.30	298.223	1.08
0+360	299.49	298.544	0.94
0+380	300.05	298.866	1.18
0+400	300.70	299.187	1.51
0+420	300.87	299.508	1.36
0+440	301.17	299.830	1.34
0+460	301.58	300.151	1.43
0+480	301.66	300.312	1.35
0+500	301.41	300.289	1.12
0+520	301.44	300.266	1.17
0+539.66	301.54	300.243	1.30

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.45% | -2.74% | 1.61% | -0.11%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

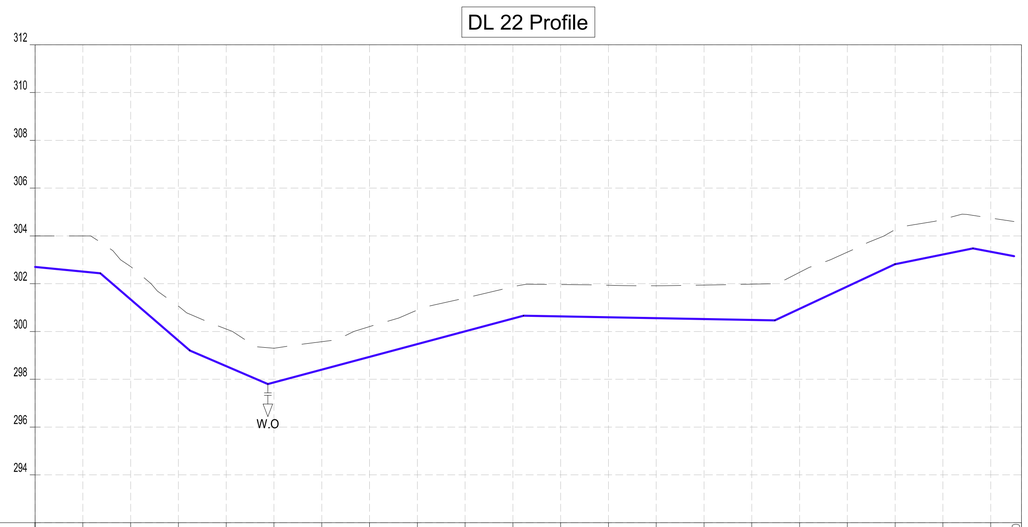
DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

DL 20 - PLAN AND PROFILE
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-13

Jul 19, 2025 - 10:30am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	304.00	302.700	1.30
0+020	304.00	302.505	1.49
0+040	302.72	301.339	1.38
0+060	301.06	299.614	1.44
0+080	300.10	298.550	1.55
0+100	299.30	297.868	1.43
0+120	299.57	298.403	1.17
0+140	300.20	298.937	1.27
0+160	300.90	299.471	1.43
0+180	301.40	300.006	1.39
0+200	301.87	300.540	1.33
0+220	301.97	300.630	1.33
0+240	301.94	300.593	1.34
0+260	301.91	300.557	1.36
0+280	301.94	300.520	1.42
0+300	301.98	300.483	1.50
0+320	302.47	300.947	1.53
0+340	303.32	301.882	1.44
0+360	304.27	302.815	1.45
0+380	304.70	303.221	1.48
0+400	304.75	303.338	1.41
0+412.90			

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.97% | -8.63% | -4.31% | 2.67% | -0.18% | 4.67% | 2.03% | -1.67%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
GARSE QOFTU RWSS - WAJIR

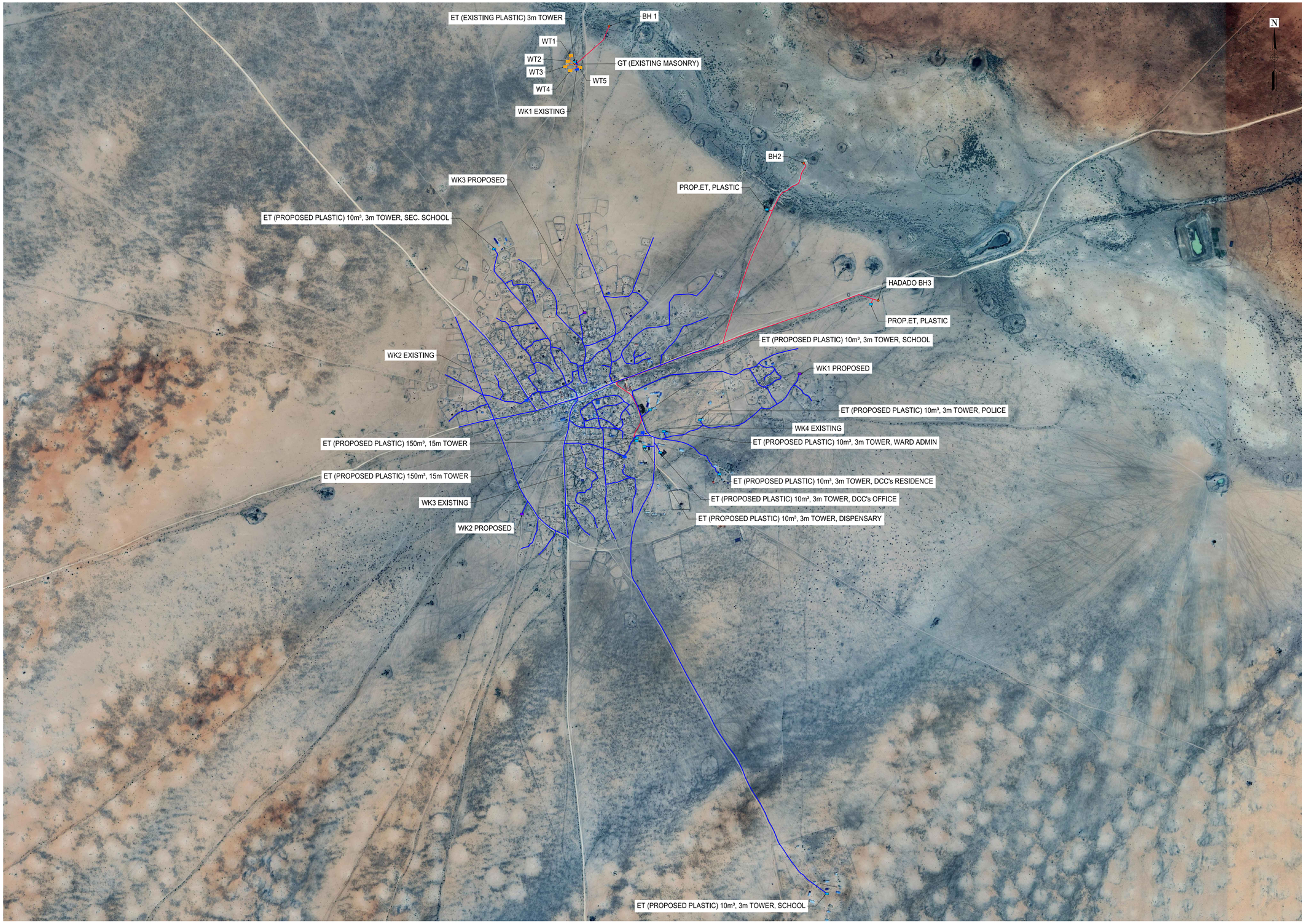
DL 22 - PLAN AND PROFILE
CH.0+000.00 - CH.0+412.90
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-04-14

Jul 19, 2025 - 10:30am

HADADO RWSS - WAJIR



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

HADADO RWSS - WAJIR

GENERAL LAYOUT PLAN - PROPOSED

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-01

Jul 19, 2025 - 10:32am

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

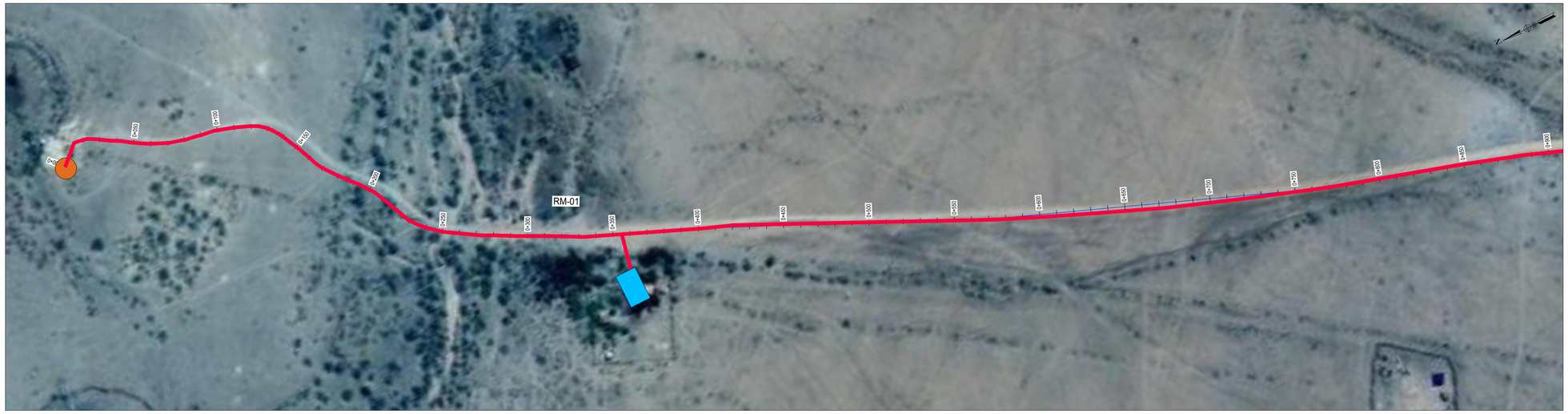
HADADO RWSS - WAJIR

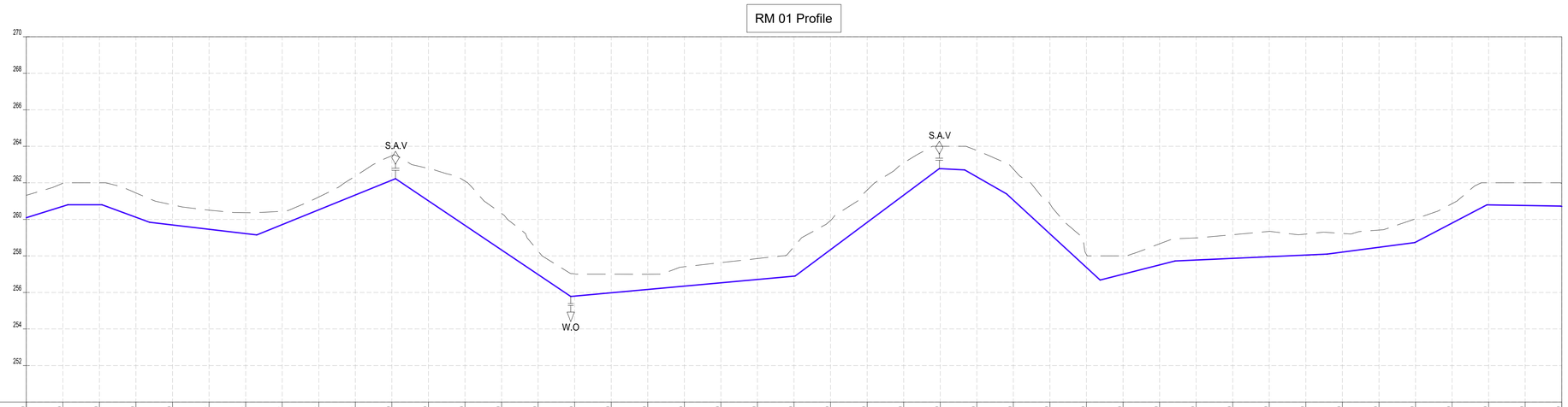
GENERAL LAYOUT PLAN
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-01

Jul 19, 2025 - 10:32am





CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	261.32	260.088	1.23
0+020	261.98	260.714	1.26
0+040	262.00	260.798	1.20
0+060	261.45	260.116	1.33
0+080	260.79	259.693	1.10
0+100	260.50	259.457	1.05
0+120	260.37	259.220	1.15
0+140	260.45	259.712	0.74
0+160	261.23	260.523	0.70
0+180	262.37	261.334	1.03
0+200	263.48	262.145	1.34
0+220	262.79	261.014	1.78
0+240	262.09	259.669	2.42
0+260	260.32	258.323	2.00
0+280	258.26	256.978	1.29
0+300	257.01	255.797	1.21
0+320	257.00	255.980	1.02
0+340	257.00	256.162	0.83
0+360	257.41	256.344	1.06
0+380	257.63	256.526	1.11
0+400	257.86	256.708	1.15
0+420	258.51	256.890	1.62
0+440	259.94	258.342	1.60
0+460	261.60	259.835	1.76
0+480	263.10	261.328	1.77
0+500	264.00	262.777	1.22
0+520	263.77	262.331	1.44
0+540	262.76	261.054	1.70
0+560	260.85	259.210	1.64
0+580	258.07	257.366	0.71
0+600	258.00	256.996	1.00
0+620	258.66	257.507	1.16
0+640	258.99	257.775	1.21
0+660	259.16	257.865	1.30
0+680	259.34	257.956	1.39
0+700	259.20	258.047	1.15
0+720	259.23	258.210	1.02
0+740	259.42	258.472	0.94
0+760	260.03	258.749	1.28
0+780	260.86	259.797	1.07
0+800	262.00	260.793	1.21
0+820	262.00	260.759	1.24
0+840	261.97	260.708	1.27

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 3.13% | -10.01% | -3.68% | -1.18% | 4.06% | -6.73% | 0.91% | 7.46% | -13.67% | -3.73% | -9.27% | 2.56% | 0.45% | 1.31% | 5.24% | -0.17% | -5.73%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
CH.0+000.00 - CH.0+840.00
SHEET 1 OF 3

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-02.01

Jul 19, 2025 - 10:33am

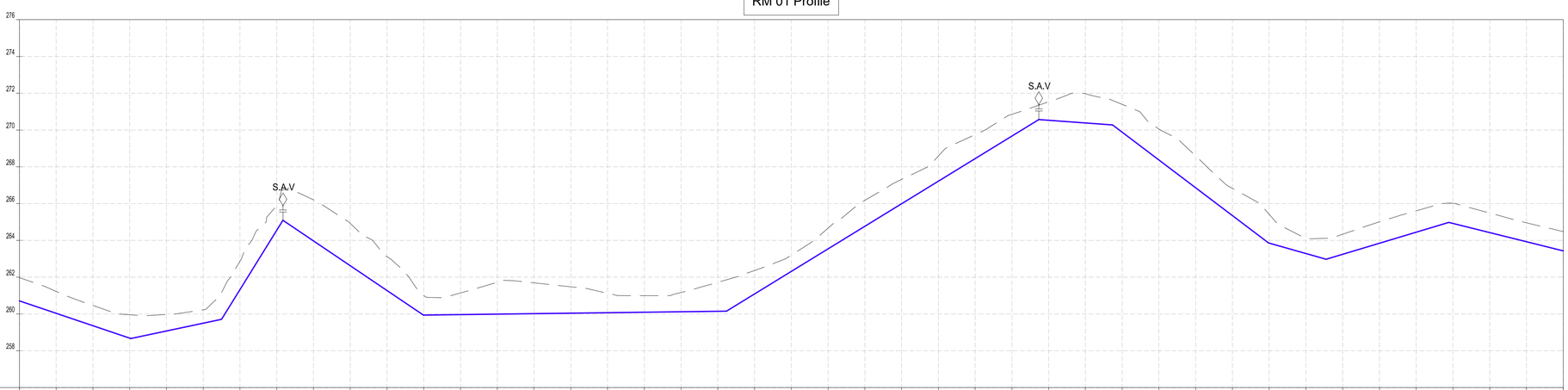
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

RM 01 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+840	261.97	260.708	1.27
0+860	261.22	260.033	1.19
0+880	260.46	259.359	1.10
0+900	259.95	258.685	1.27
0+920	259.97	259.073	0.90
0+940	260.22	259.495	0.73
0+960	262.87	261.326	1.54
0+980	265.89	264.554	1.34
1+000	266.20	263.971	2.23
1+020	264.92	262.623	2.30
1+040	263.12	261.274	1.84
1+060	261.00	259.939	1.06
1+080	261.14	259.965	1.18
1+100	261.73	259.991	1.74
1+120	261.69	260.017	1.67
1+140	261.48	260.043	1.43
1+160	261.12	260.068	1.05
1+180	260.99	260.094	0.90
1+200	261.16	260.120	1.04
1+220	261.72	260.146	1.58
1+240	262.36	261.090	1.27
1+260	263.20	262.316	0.88
1+280	264.67	263.542	1.13
1+300	266.18	264.767	1.41
1+320	267.31	265.993	1.32
1+340	268.58	267.219	1.36
1+360	269.75	268.445	1.31
1+380	270.85	269.670	1.18
1+400	271.53	270.529	1.00
1+420	271.97	270.384	1.59
1+440	271.39	269.884	1.51
1+460	270.05	268.371	1.68
1+480	268.59	266.858	1.73
1+500	266.83	265.345	1.48
1+520	265.42	263.847	1.57
1+540	264.10	263.265	0.81
1+560	264.33	263.244	1.09
1+580	265.01	263.843	1.16
1+600	265.61	264.442	1.17
1+620	266.01	264.918	1.09
1+640	265.49	264.422	1.06
1+660	264.95	263.925	1.03
1+680	264.48	263.428	1.05

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -3.37% | 2.11% | 16.14% | -6.74% | 0.13% | 6.13% | -0.73% | -7.57% | -2.81% | 1.00% | -2.48%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
CH.0+840.00 - CH.1+680.00
SHEET 2 OF 3

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-02.02

Jul 19, 2025 - 10:33am

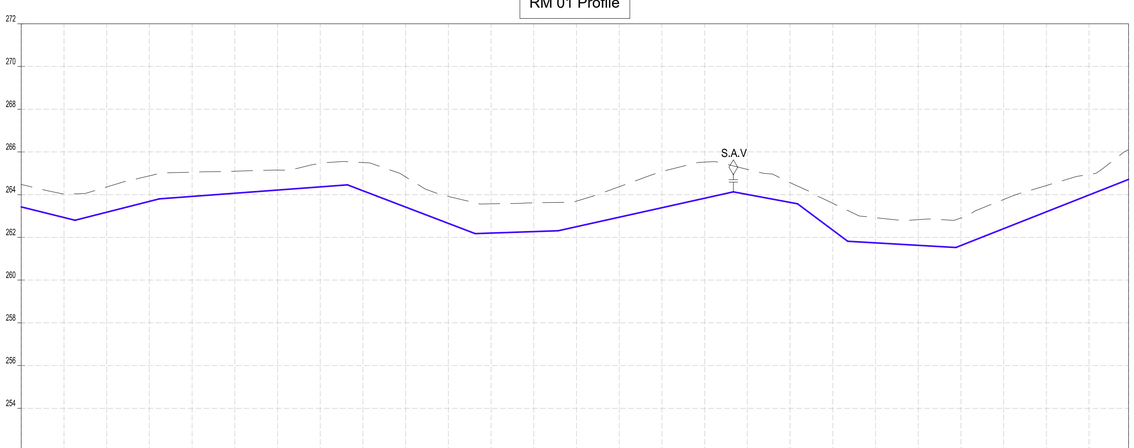
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

RM 01 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
1+680	264.48	263.428	1.05
1+700	264.03	262.932	1.10
1+720	264.36	263.178	1.18
1+740	264.88	263.685	1.19
1+760	265.05	263.918	1.14
1+780	265.10	264.066	1.03
1+800	265.15	264.215	0.94
1+820	265.46	264.364	1.09
1+840	265.50	264.182	1.32
1+860	264.83	263.418	1.41
1+880	263.91	262.655	1.26
1+900	263.57	262.202	1.37
1+920	263.62	262.272	1.35
1+940	263.70	262.502	1.19
1+960	264.37	262.945	1.43
1+980	265.09	263.387	1.70
2+000	265.52	263.830	1.69
2+020	265.18	264.007	1.18
2+040	264.56	263.635	0.93
2+060	263.59	262.338	1.26
2+080	262.92	261.742	1.18
2+100	262.83	261.627	1.20
2+120	262.90	261.619	1.29
2+140	263.77	262.407	1.37
2+160	264.43	263.194	1.33
2+180	264.94	263.992	0.96
2+198.50	266.11	264.711	1.40

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -2.48% | 2.57% | 0.74% | -3.82% | 0.35% | 2.21% | -1.86% | -7.47% | -0.57% | 3.94%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

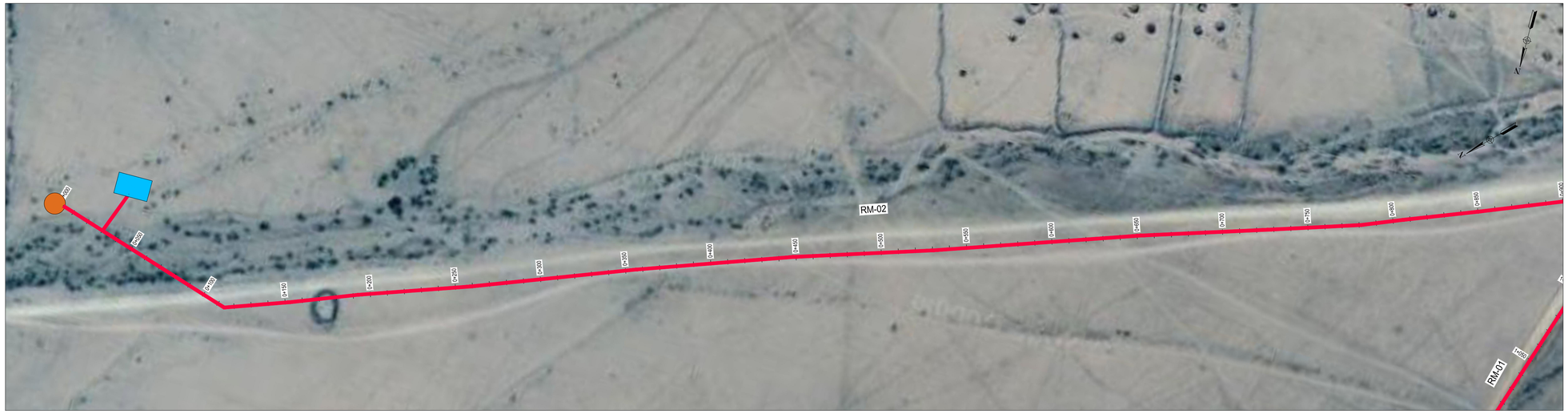
DRAWING TITLE:
HADADO RWSS - WAJIR

RISING MAIN (RM-01) - PLAN AND PROFILE
CH.1+680.00 - CH.2+198.50
SHEET 3 OF 3

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-02-03

Jul 19, 2025 - 10:33am



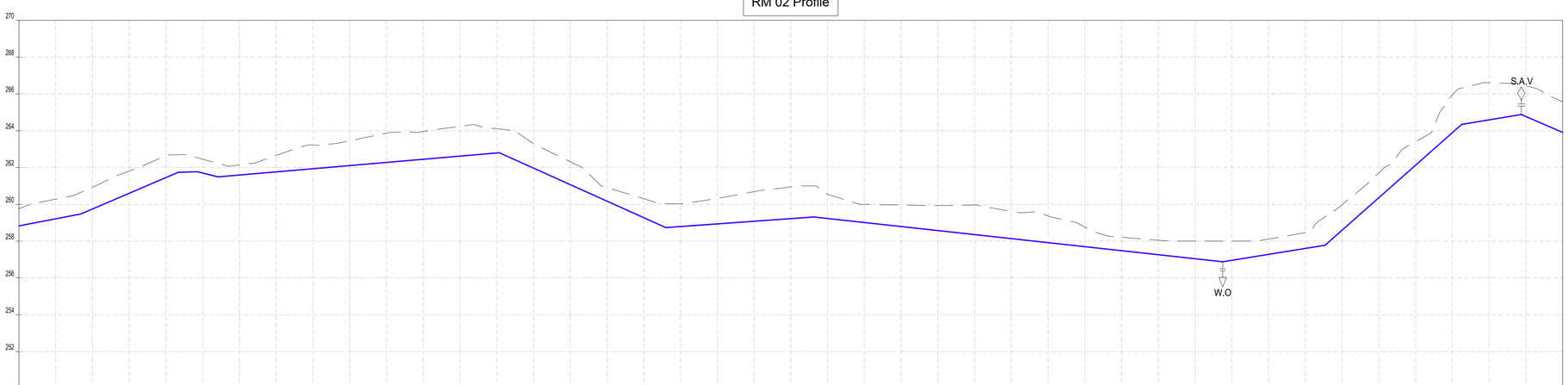
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

RM 02 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	259.76	259.826	0.93
0+020	260.28	259.212	1.07
0+040	260.93	259.746	1.18
0+060	261.81	260.600	1.21
0+080	262.64	261.453	1.19
0+100	262.45	261.701	0.75
0+120	262.14	261.588	0.55
0+140	262.66	261.760	0.90
0+160	263.22	261.932	1.29
0+180	263.45	262.103	1.35
0+200	263.87	262.275	1.59
0+220	263.96	262.447	1.51
0+240	264.24	262.619	1.62
0+260	264.12	262.790	1.32
0+280	263.31	261.967	1.35
0+300	262.32	261.068	1.25
0+320	260.91	260.169	0.74
0+340	260.31	259.270	1.04
0+360	260.03	258.790	1.24
0+380	260.32	258.934	1.39
0+400	260.69	259.078	1.61
0+420	260.95	259.222	1.73
0+440	260.54	259.230	1.31
0+460	260.00	259.011	0.98
0+480	259.96	258.793	1.17
0+500	259.93	258.574	1.36
0+520	259.96	258.356	1.61
0+540	259.62	258.137	1.48
0+560	259.37	257.919	1.45
0+580	258.76	257.700	1.05
0+600	258.21	257.482	0.73
0+620	258.05	257.263	0.79
0+640	258.00	257.044	0.96
0+660	258.00	256.960	1.04
0+680	258.11	257.282	0.83
0+700	258.46	257.605	0.86
0+720	259.88	258.597	1.38
0+740	261.71	260.362	1.35
0+760	263.41	262.128	1.28
0+780	265.94	263.893	2.05
0+800	266.61	264.588	2.02
0+820	266.45	264.768	1.68
0+840	265.58	263.908	1.67

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.93% | 4.27% | 0.10% | -2.55% | 0.86% | -4.50% | 0.72% | -1.09% | 1.61% | 8.83% | 1.62% | -4.10%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund
Financing the Water Sector

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:

aarvee associates
architects engineers & consultants pvt. ltd.

ADVANCED
ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

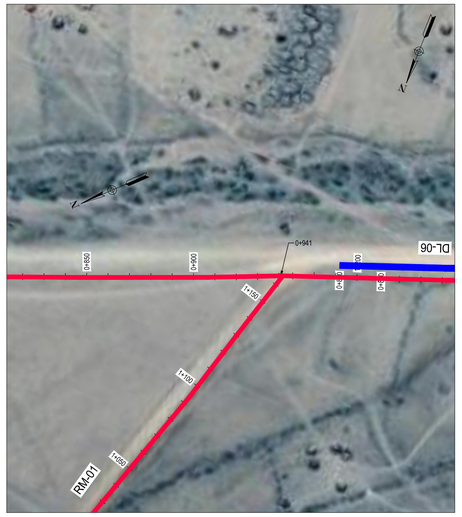
HADADO RWSS - WAJIR

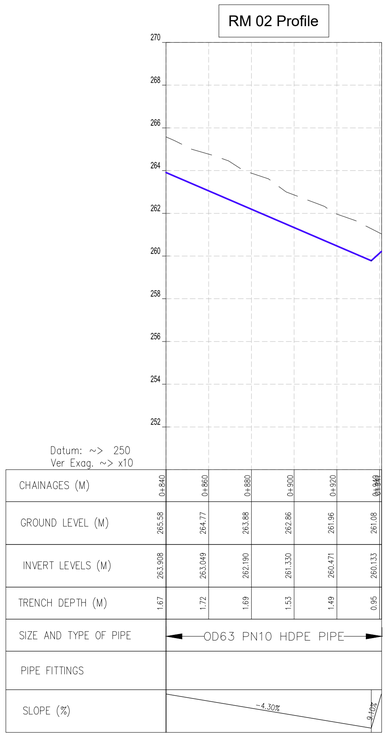
RISING MAIN (RM-02) - PLAN AND PROFILE
CH.0+000.00 - CH.0+840.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-03.01

Jul 19, 2025 - 10:34am





CHAINAGES (M)	0+840	0+860	0+880	0+900	0+920	0+940
GROUND LEVEL (M)	265.58	264.77	263.88	262.86	261.96	261.08
INVERT LEVELS (M)	263.908	263.049	262.190	261.330	260.471	260.133
TRENCH DEPTH (M)	1.67	1.72	1.69	1.53	1.49	0.95
SIZE AND TYPE OF PIPE	OD63 PN10 HDPE PIPE					
PIPE FITTINGS						
SLOPE (%)	-4.30%					-0.42%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund
Financing the Water Sector

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:

aarvee associates
architects engineers & consultants pvt. ltd.

ADVANCED
ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd
in Association with
Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

HADADO RWSS - WAJIR

RISING MAIN (RM-02) - PLAN AND PROFILE
CH.0+840.00 - CH.0+981.81
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-03.02

Jul 19, 2025 - 10:34am

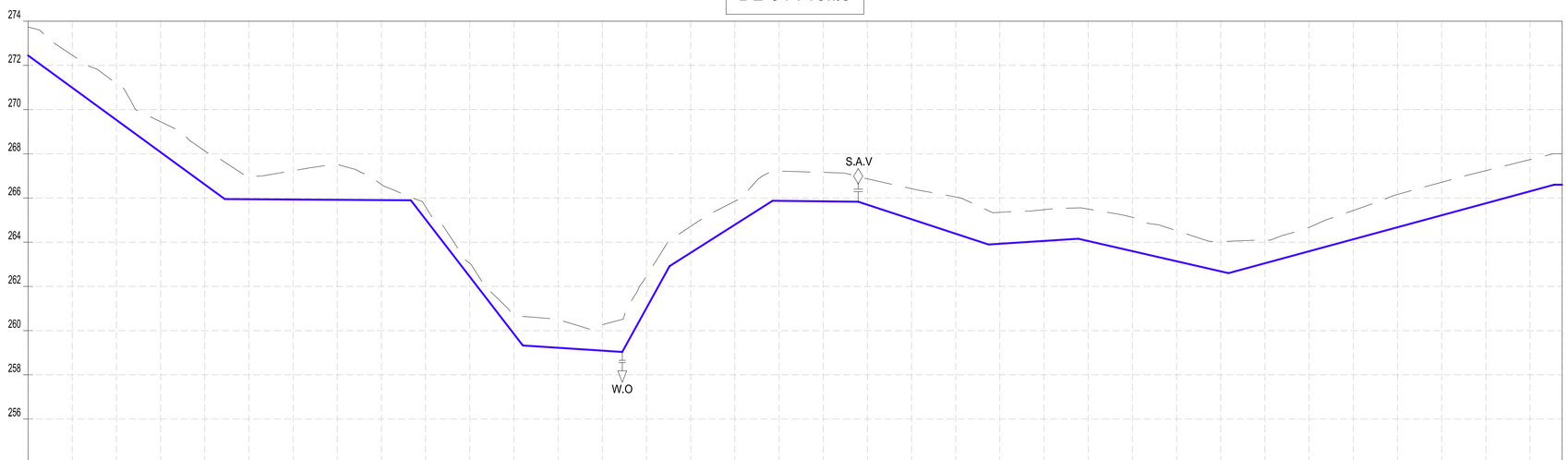
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

DL-01 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	273.74	272.450	1.29
0+020	272.46	270.991	1.47
0+040	271.18	269.531	1.65
0+060	269.45	268.072	1.38
0+080	268.13	266.613	1.52
0+100	266.95	265.944	1.01
0+120	267.23	265.931	1.30
0+140	267.51	265.918	1.60
0+160	266.61	265.905	0.70
0+180	265.61	265.030	0.58
0+200	263.04	262.437	0.61
0+220	260.72	259.845	0.87
0+240	260.50	259.224	1.27
0+260	260.26	259.096	1.16
0+280	262.46	261.023	1.44
0+300	264.72	263.525	1.19
0+320	265.85	264.791	1.06
0+340	267.20	265.871	1.33
0+360	267.16	265.848	1.31
0+380	266.87	265.695	1.17
0+400	266.42	265.039	1.38
0+420	266.05	264.382	1.66
0+440	265.35	263.929	1.42
0+460	265.47	264.056	1.42
0+480	265.50	264.052	1.45
0+500	265.13	263.594	1.53
0+520	264.52	263.137	1.38
0+540	264.03	262.680	1.35
0+560	264.09	263.048	1.05
0+580	264.67	263.590	1.08
0+600	265.44	264.132	1.30
0+620	266.16	264.675	1.48
0+640	266.71	265.217	1.49
0+660	267.24	265.760	1.48
0+680	267.74	266.302	1.44
0+694.53	268.00	266.600	1.40

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): -7.30% | -0.06% | -12.96% | -0.64% | 18.11% | 6.33% | -0.11% | -3.28% | 0.64% | -2.29% | 2.71% | 0.00%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

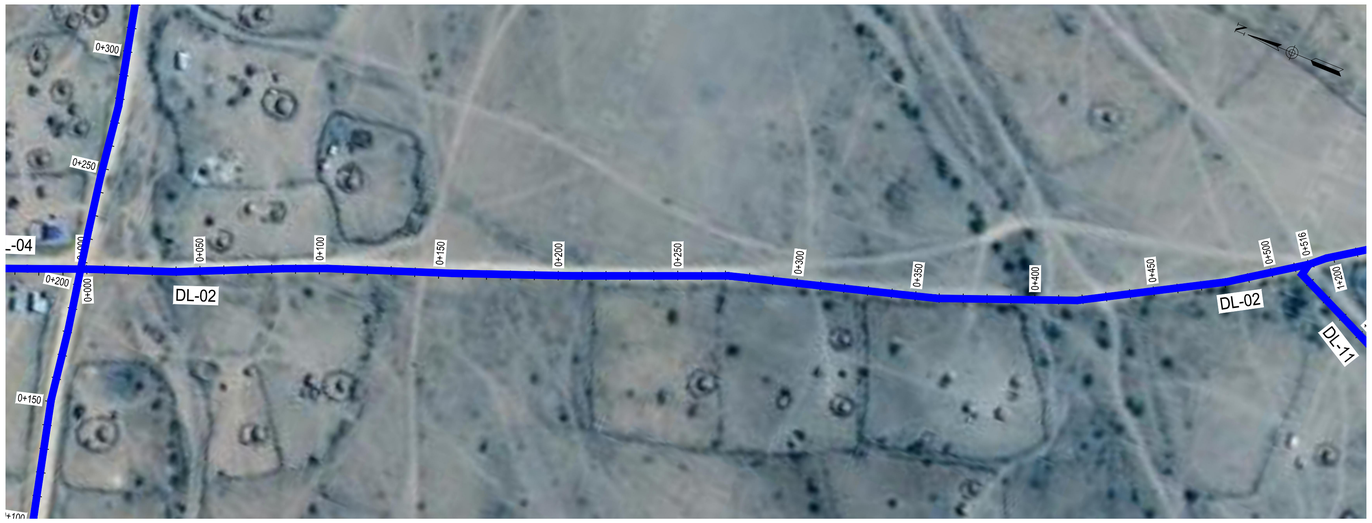
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-01) - PLAN AND PROFILE
CH.0+000.00 - CH.0+694.53
SHEET 1 OF 1

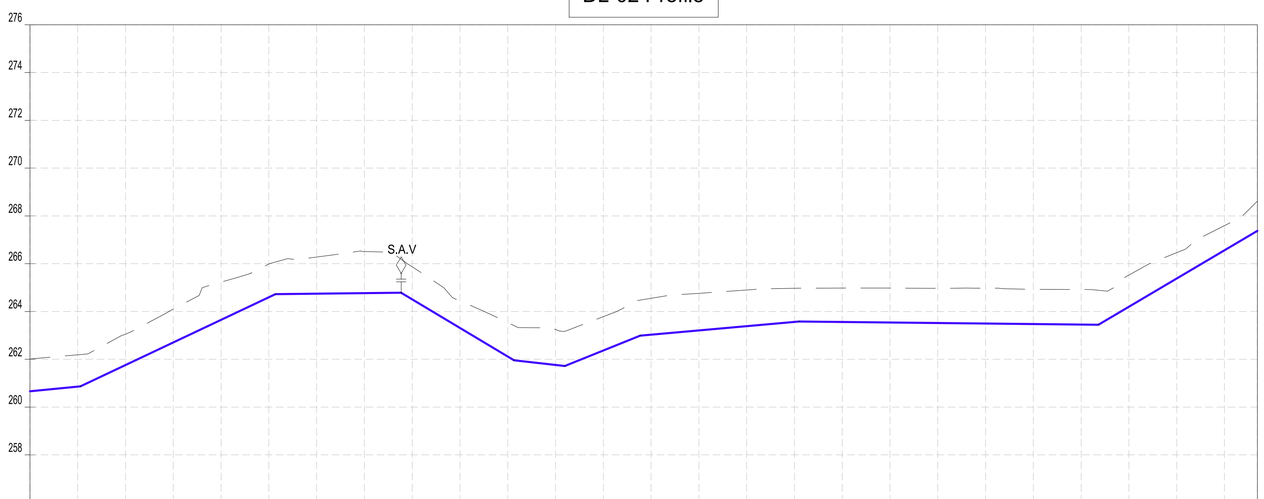
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-04.01

Jul 19, 2025 - 10:34am



DL-02 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	262.01	260.662	1.35
0+020	262.19	260.856	1.33
0+040	263.05	261.761	1.29
0+060	264.10	262.707	1.39
0+080	265.23	263.653	1.58
0+100	265.99	264.599	1.39
0+120	266.28	264.748	1.53
0+140	266.51	264.770	1.74
0+160	265.87	264.509	1.36
0+180	264.44	263.312	1.13
0+200	263.54	262.115	1.42
0+220	263.25	261.762	1.49
0+240	263.79	262.367	1.42
0+260	264.55	263.030	1.52
0+280	264.76	263.209	1.55
0+300	264.90	263.387	1.51
0+320	264.97	263.566	1.40
0+340	264.98	263.564	1.42
0+360	264.98	263.542	1.44
0+380	264.97	263.520	1.45
0+400	264.98	263.498	1.48
0+420	264.93	263.476	1.45
0+440	264.92	263.455	1.47
0+460	265.52	264.200	1.32
0+480	266.46	265.381	1.08
0+500	267.60	266.562	1.03
0+513.76	268.62	267.375	1.24

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.07% | 4.73% | 0.11% | -5.99% | -1.13% | 4.03% | 0.89% | -0.11% | 5.91%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

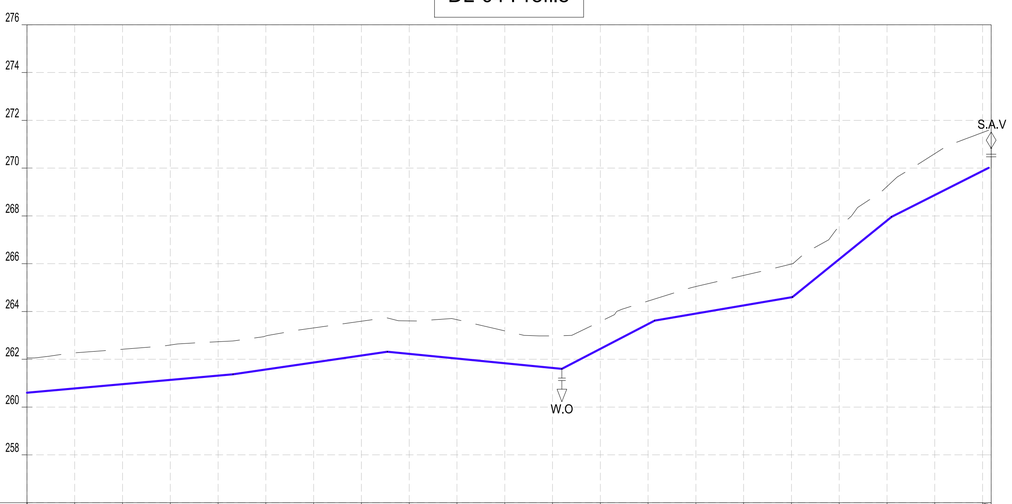
DISTRIBUTION LINE (DL-02) - PLAN AND PROFILE
CH.0+000.00 - CH.0+513.76
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-05.01

Jul 19, 2025 - 10:34am

DL-04 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	262.06	260.600	1.46
0+020	262.27	260.778	1.49
0+040	262.42	260.957	1.47
0+060	262.60	261.135	1.46
0+080	262.74	261.314	1.42
0+100	262.98	261.570	1.41
0+120	263.31	261.863	1.45
0+140	263.59	262.155	1.44
0+160	263.61	262.225	1.38
0+180	263.66	262.029	1.63
0+200	263.19	261.834	1.36
0+220	262.98	261.638	1.34
0+240	263.58	262.437	1.14
0+260	264.44	263.477	0.96
0+280	265.04	263.914	1.13
0+300	265.51	264.254	1.26
0+320	265.99	264.594	1.39
0+340	267.54	266.190	1.35
0+360	269.23	267.809	1.42
0+380	270.61	268.876	1.73
0+400 / 0+403.59	271.49	269.884	1.60

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.89% | 1.46% | -0.98% | 5.70% | 1.70% | 8.10% | 5.04%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-04) - PLAN AND PROFILE
CH.0+000.00 - CH.0+403.59
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-06.01

Jul 19, 2025 - 10:35am

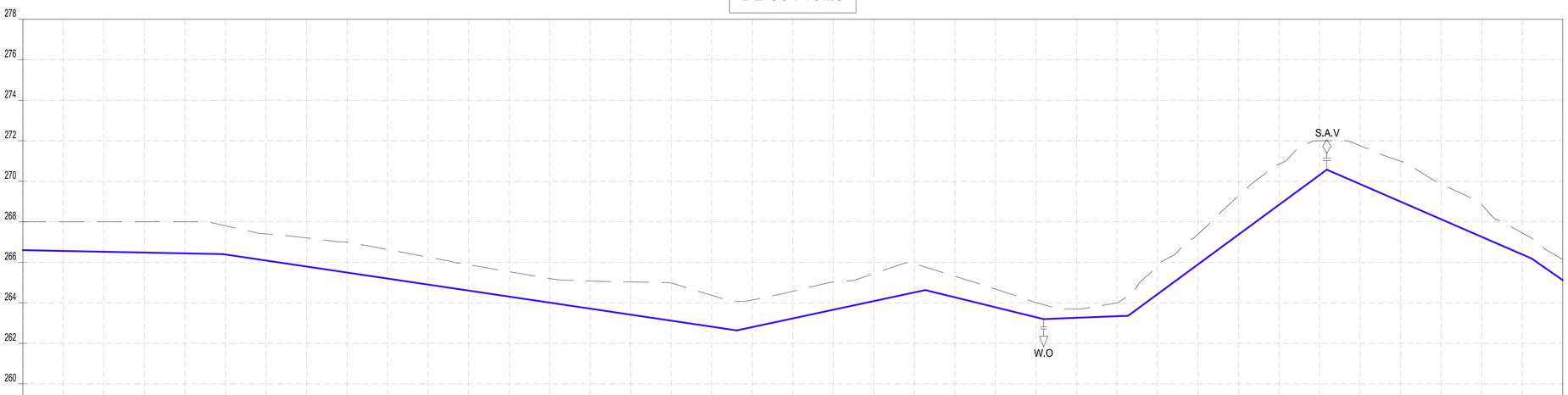
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

DL-06 Profile



Datum: ~> 258
Ver Exag. ~> x10

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	268.00	266.600	1.40
0+020	268.00	266.560	1.44
0+040	268.00	266.521	1.48
0+060	268.00	266.481	1.52
0+080	268.00	266.442	1.56
0+100	267.80	266.386	1.42
0+120	267.40	266.089	1.31
0+140	267.21	265.792	1.41
0+160	267.00	265.495	1.51
0+180	266.63	265.198	1.44
0+200	266.26	264.901	1.36
0+220	265.88	264.604	1.28
0+240	265.54	264.307	1.23
0+260	265.20	264.010	1.19
0+280	265.08	263.713	1.37
0+300	265.03	263.416	1.62
0+320	264.98	263.119	1.86
0+340	264.37	262.822	1.55
0+360	264.14	262.803	1.34
0+380	264.57	263.232	1.34
0+400	265.02	263.660	1.36
0+420	265.44	264.089	1.36
0+440	265.94	264.518	1.42
0+460	265.32	264.276	1.04
0+480	264.68	263.784	0.90
0+500	264.01	263.293	0.72
0+520	263.69	263.264	0.43
0+540	263.99	263.342	0.65
0+560	265.86	264.430	1.43
0+580	267.39	265.900	1.49
0+600	269.28	267.370	1.91
0+620	270.85	268.840	2.01
0+640	272.00	270.310	1.69
0+660	271.76	269.861	1.90
0+680	270.99	268.994	2.00
0+700	269.87	268.126	1.74
0+720	268.85	267.259	1.59
0+740	267.45	266.391	1.06
0+760	266.14	265.119	1.02

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.20% | -1.48% | 2.14% | -2.46% | 0.39% | 7.35% | -4.34% | -6.97%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

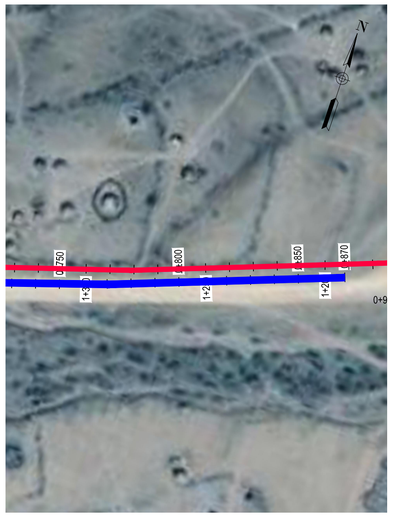
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-06) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

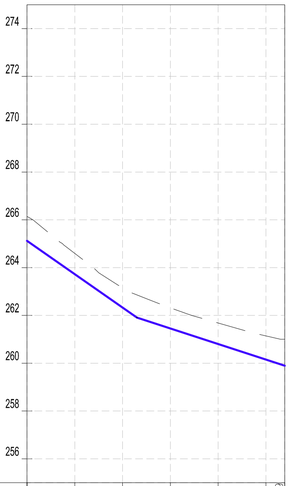
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-07.01

Jul 19, 2025 - 10:35am



DL-06 Profile



CHAINAGES (M)	0+760	0+780	0+800	0+820	0+840	0+860	0+867.89
GROUND LEVEL (M)	266.14	264.60	263.14	262.31	261.68	261.14	261.00
INVERT LEVELS (M)	265.119	263.725	262.330	261.454	260.802	260.150	259.893
TRENCH DEPTH (M)	1.02	0.87	0.81	0.86	0.88	0.99	1.11
SIZE AND TYPE OF PIPE	OD32 PN10 HDPE PIPE						
PIPE FITTINGS							
SLOPE (%)	-6.97%		-3.26%				

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

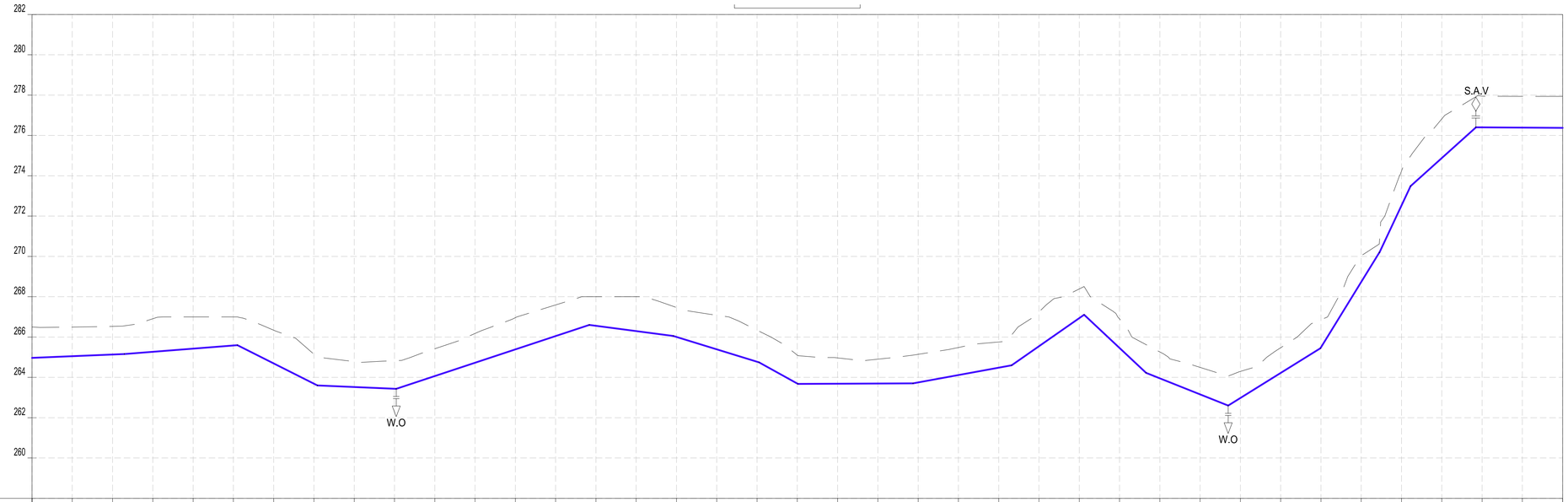
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-06) - PLAN AND PROFILE
CH.0+760.00 - CH.0+867.89
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-07.02

Jul 19, 2025 - 10:35am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	266.50	264.966	1.53
0+020	266.49	265.049	1.44
0+040	266.53	265.133	1.40
0+060	266.91	265.269	1.64
0+080	267.00	265.427	1.57
0+100	267.00	265.584	1.42
0+120	266.34	264.693	1.65
0+140	265.15	263.685	1.46
0+160	264.78	263.521	1.26
0+180	264.83	263.436	1.39
0+200	265.42	264.066	1.35
0+220	266.18	264.726	1.45
0+240	266.96	265.387	1.58
0+260	267.59	266.048	1.55
0+280	268.00	266.557	1.44
0+300	268.00	266.296	1.70
0+320	267.46	266.007	1.46
0+340	267.08	265.392	1.69
0+360	266.34	264.777	1.56
0+380	265.10	263.692	1.41
0+400	264.96	263.684	1.28
0+420	264.90	263.693	1.21
0+440	265.14	263.748	1.39
0+460	265.48	264.115	1.37
0+480	265.75	264.482	1.27
0+500	267.25	265.546	1.70
0+520	268.39	266.939	1.45
0+540	266.90	265.458	1.44
0+560	265.26	263.953	1.31
0+580	264.50	263.156	1.34
0+600	264.30	262.977	1.32
0+620	265.47	264.220	1.25
0+640	266.86	265.491	1.37
0+660	270.04	268.734	1.31
0+680	274.23	272.533	1.70
0+700	276.82	274.879	1.94
0+720	277.95	276.398	1.55
0+740	277.94	276.387	1.55
0+760	277.94	276.375	1.57

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): 0.47% | 0.79% | -5.04% | -0.47% | 3.30% | -1.31% | -3.07% | -5.55% | 0.04% | 1.83% | 6.97% | -9.37% | -3.99% | 6.22% | 16.22% | 21.27% | 9.00% | -0.06%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

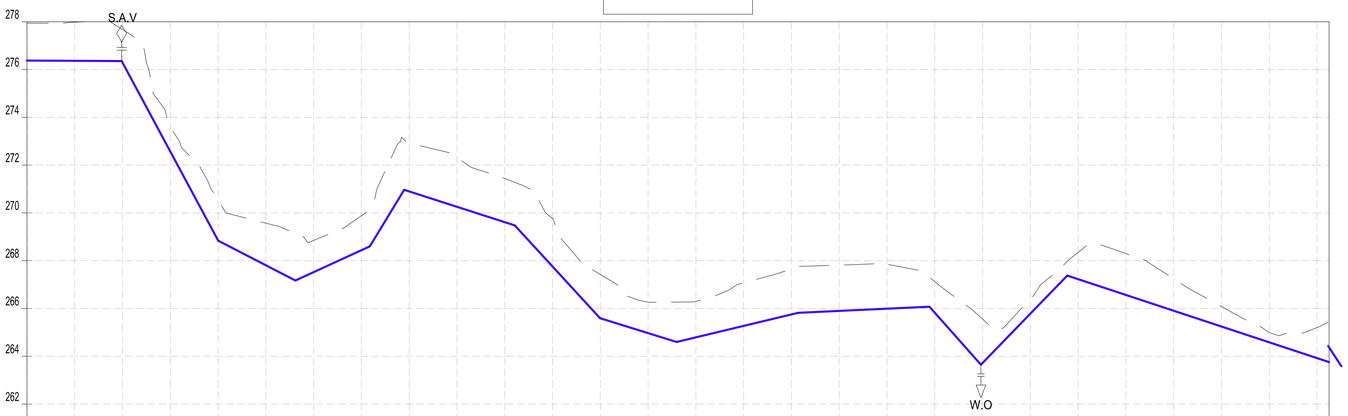
DISTRIBUTION LINE (DL-07) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-08.01

Jul 19, 2025 - 10:35am

DL-07 Profile



Datum: ~> 258
Ver Exag. ~> x10

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+760	277.94	276.375	1.57
0+780	277.98	276.363	1.62
0+800	277.67	276.287	1.39
0+820	273.59	272.567	1.02
0+840	270.56	268.847	1.71
0+860	269.57	267.807	1.76
0+880	268.85	267.522	1.33
0+900	269.89	268.440	1.45
0+920	272.94	270.899	2.04
0+940	272.33	270.255	2.08
0+960	271.44	269.612	1.83
0+980	269.77	267.756	2.02
1+000	267.42	265.594	1.83
1+020	266.26	264.971	1.29
1+040	266.30	264.794	1.50
1+060	267.08	265.274	1.80
1+080	267.65	265.754	1.90
1+100	267.81	265.901	1.91
1+120	267.85	265.993	1.86
1+140	267.12	265.822	1.30
1+160	265.56	263.718	1.84
1+180	266.35	265.783	0.56
1+200	268.35	267.225	1.13
1+220	268.30	266.564	1.73
1+240	267.24	265.904	1.34
1+260	266.08	265.243	0.84
1+280	264.99	264.582	0.41
1+300	265.21	263.921	1.29
1+305			

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.06% | -18.60% | -5.16% | 4.59% | 15.60% | -3.22% | -10.89% | -3.11% | 2.40% | 0.46% | -11.27% | 10.33% | -3.30% | -15.40%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

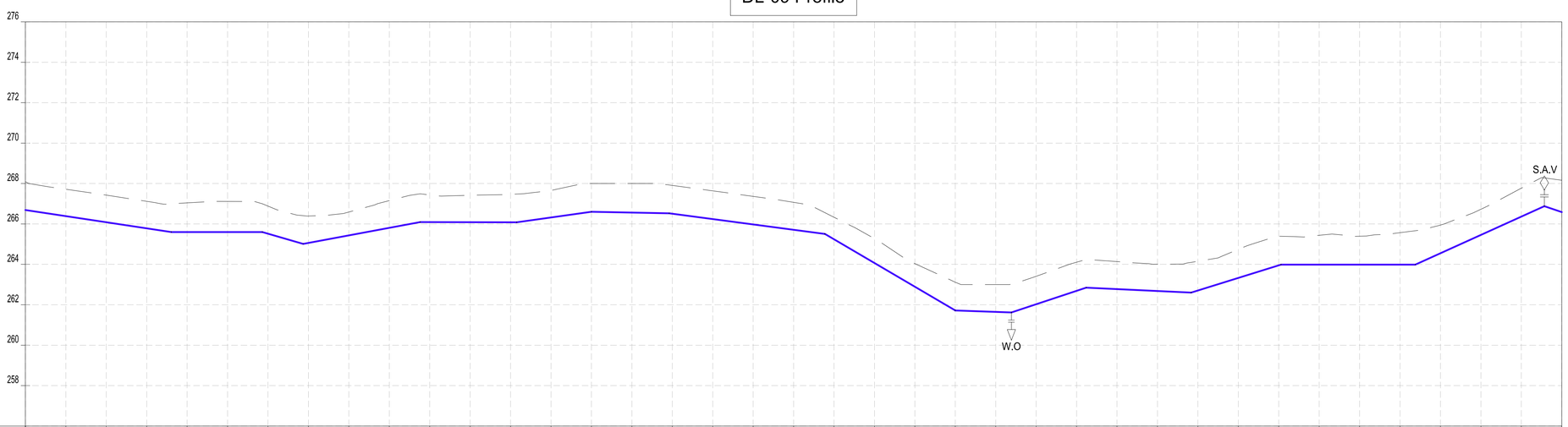
DISTRIBUTION LINE (DL-07) - PLAN AND PROFILE
CH.0+760.00 - CH.1+323.32
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-08.02

Jul 19, 2025 - 10:36am

DL-09 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	268.09	266.686	1.40
0+020	267.72	266.385	1.33
0+040	267.43	266.084	1.34
0+060	267.12	265.783	1.33
0+080	267.04	265.600	1.44
0+100	267.11	265.600	1.51
0+120	266.88	265.519	1.36
0+140	266.39	265.060	1.33
0+160	266.59	265.433	1.16
0+180	267.15	265.806	1.35
0+200	267.43	266.089	1.34
0+220	267.42	266.085	1.33
0+240	267.47	266.081	1.39
0+260	267.65	266.318	1.34
0+280	268.00	266.600	1.40
0+300	268.00	266.562	1.44
0+320	267.91	266.506	1.40
0+340	267.64	266.241	1.39
0+360	267.36	265.976	1.39
0+380	267.07	265.711	1.36
0+400	266.33	265.240	1.09
0+420	265.27	264.065	1.21
0+440	264.04	262.891	1.15
0+460	263.12	261.720	1.40
0+480	263.00	261.650	1.35
0+500	263.41	262.028	1.38
0+520	264.11	262.689	1.42
0+540	264.14	262.773	1.36
0+560	264.01	262.679	1.33
0+580	264.15	262.704	1.45
0+600	264.74	263.328	1.41
0+620	265.39	263.953	1.44
0+640	265.44	263.988	1.45
0+660	265.39	263.988	1.40
0+680	265.57	263.988	1.58
0+700	265.94	264.553	1.39
0+720	266.73	265.458	1.27
0+740	267.77	266.363	1.41
0+760	268.16	266.587	1.57

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -1.51% | 0.00% | -2.91% | 1.86% | -0.02% | 1.41% | -0.19% | -1.33% | -5.87% | -0.35% | 3.31% | -0.47% | 3.12% | 0.00% | 4.52% | -3.37%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

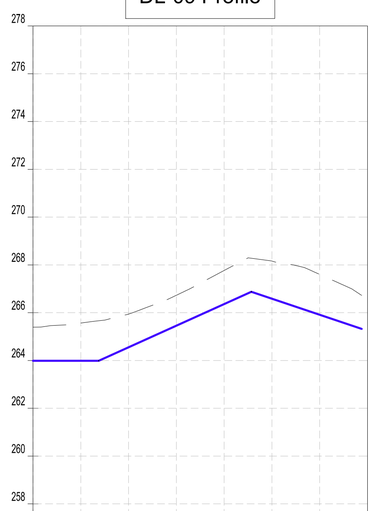
DISTRIBUTION LINE (DL-09) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-09.01

Jul 19, 2025 - 10:36am

DL-09 Profile



Datum: ~> 256
Ver Exag. ~> x10

CHAINAGES (M)	0+660	0+680	0+700	0+720	0+740	0+760	0+780	0+800
GROUND LEVEL (M)	265.39	265.57	265.94	266.73	267.77	268.16	267.60	
INVERT LEVELS (M)	263.988	263.988	264.553	265.458	266.363	266.587	265.913	
TRENCH DEPTH (M)	1.40	1.58	1.39	1.27	1.41	1.57	1.69	
SIZE AND TYPE OF PIPE	OD32 PN10 HDPE PIPE							
PIPE FITTINGS								
SLOPE (%)	0.00%	4.52%					-3.37%	

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

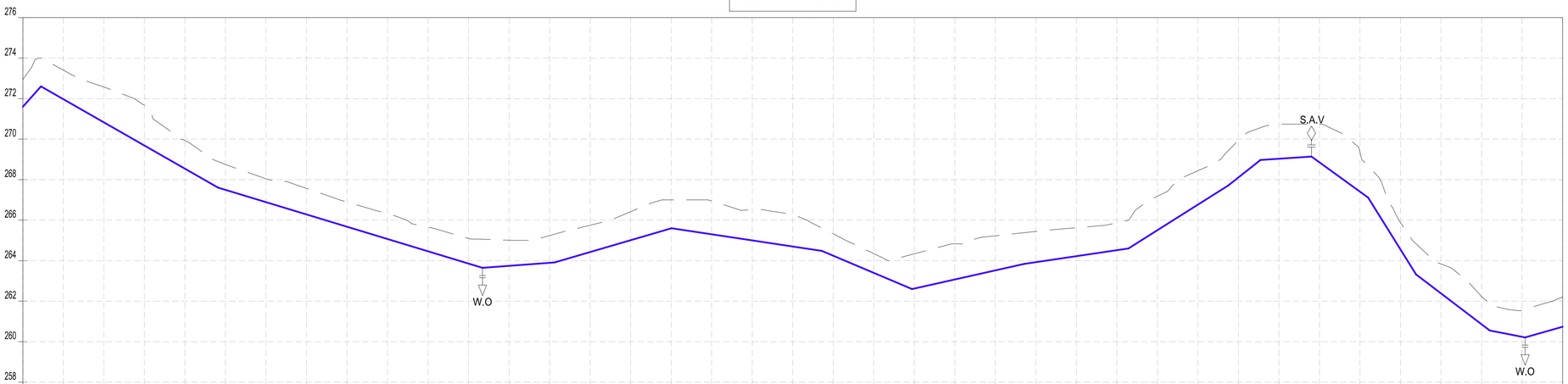
DISTRIBUTION LINE (DL-09) - PLAN AND PROFILE
CH.0+660.00 - CH.0+806.19
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-09.02

Jul 19, 2025 - 10:36am

DL-11 Profile



Datum: ~> 256
Ver Exag. ~> x10

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	272.95	271.596	1.35
0+020	273.41	271.967	1.44
0+040	272.57	270.824	1.75
0+060	271.67	269.681	1.99
0+080	269.93	268.539	1.39
0+100	268.75	267.492	1.26
0+120	268.04	266.885	1.16
0+140	267.57	266.279	1.29
0+160	266.89	265.673	1.22
0+180	266.33	265.067	1.26
0+200	265.65	264.460	1.19
0+220	265.09	263.854	1.24
0+240	265.01	263.745	1.27
0+260	265.24	263.896	1.34
0+280	265.75	264.428	1.32
0+300	266.42	265.012	1.41
0+320	267.00	265.596	1.40
0+340	266.94	265.302	1.64
0+360	266.52	265.001	1.52
0+380	266.28	264.701	1.58
0+400	265.32	264.246	1.08
0+420	264.35	263.400	0.95
0+440	264.34	262.625	1.72
0+460	264.83	263.072	1.76
0+480	265.23	263.519	1.71
0+500	265.44	263.924	1.52
0+520	265.63	264.220	1.41
0+540	265.87	264.516	1.35
0+560	267.18	265.503	1.68
0+580	268.44	266.766	1.67
0+600	269.95	268.111	1.84
0+620	270.74	269.031	1.71
0+640	270.74	268.854	1.88
0+660	269.35	267.406	1.94
0+680	265.87	264.547	1.33
0+700	263.84	262.378	1.46
0+720	262.23	260.856	1.37
0+740	261.55	260.241	1.31
0+760	262.21	260.737	1.47

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -11.25% | -5.71% | -3.03% | 0.76% | 2.92% | -1.50% | -4.23% | 2.24% | 1.48% | 6.31% | 7.85% | 0.69% | -7.24% | -16.06% | -7.61% | -1.94% | 2.83%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

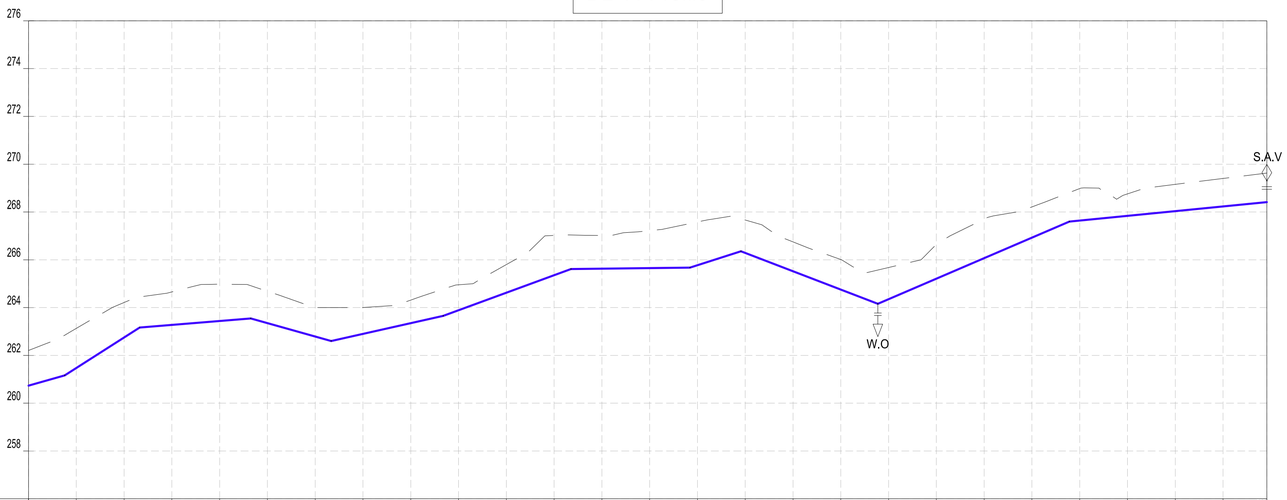
DISTRIBUTION LINE (DL-11) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-10.01

Jul 19, 2025 - 10:36am

DL-11 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+760	262.21	260.737	1.47
0+780	263.13	261.476	1.65
0+800	264.22	262.749	1.47
0+820	264.66	263.275	1.38
0+840	264.98	263.439	1.54
0+860	264.68	263.349	1.33
0+880	264.00	262.787	1.21
0+900	264.00	262.899	1.11
0+920	264.31	263.348	0.96
0+940	264.96	263.888	1.07
0+960	265.80	264.621	1.18
0+980	267.02	265.354	1.67
1+000	267.02	265.629	1.39
1+020	267.22	265.654	1.56
1+040	267.58	265.775	1.81
1+060	267.67	266.289	1.38
1+080	266.75	265.521	1.23
1+100	266.01	264.753	1.26
1+120	265.68	264.352	1.33
1+140	266.64	265.210	1.43
1+160	267.70	266.069	1.63
1+180	268.21	266.927	1.29
1+200	268.96	267.642	1.34
1+220	268.76	267.839	0.92
1+240	269.16	268.035	1.12
1+260	269.40	268.231	1.17
1+278.33	269.63	268.411	1.22

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): 2.63% | 6.37% | 0.82% | -2.81% | 2.24% | 3.67% | 0.13% | 3.21% | -3.84% | 4.29% | 0.98%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-11) - PLAN AND PROFILE
CH.0+760.00 - CH.1+278.33
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-10.02

Jul 19, 2025 - 10:36am

DL-12 Profile

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	265.14	263.742	1.40
0+020	263.97	262.771	1.20
0+040	263.22	261.826	1.39
0+060	263.41	262.309	1.10
0+080	264.18	262.913	1.27
0+100	265.23	263.862	1.37
0+120	266.01	264.810	1.20
0+140	267.92	266.257	1.66
0+160	271.37	269.598	1.77
0+180	273.66	272.077	1.58
0+200	275.52	273.847	1.68
0+220	276.95	275.618	1.33
0+240	277.13	275.645	1.48
0+260	275.57	274.806	0.77
0+280	274.49	273.881	0.61
0+300	273.98	272.955	1.03
0+320	273.22	272.030	1.19
0+340	272.37	271.104	1.27
0+360	271.42	270.179	1.24
0+380	271.59	270.091	1.49
0+400	271.77	270.339	1.43
0+420	269.73	268.088	1.65
0+440	266.97	265.837	1.14
0+460	265.12	263.786	1.34
0+480	264.98	263.822	1.16
0+500	265.43	263.857	1.57
0+520	265.29	263.893	1.40
0+540	264.15	262.459	1.69
0+560	262.72	261.024	1.69
0+580	261.45	259.589	1.86
0+600	259.68	258.154	1.52
0+620	258.45	257.074	1.38
0+640	260.17	258.595	1.57
0+656.12	261.22	259.820	1.40

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): −4.86% | 2.41% | 4.74% | 16.71% | 8.85% | −1.59% | −4.63% | 1.93% | −11.26% | 0.18% | −7.17% | 7.60%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

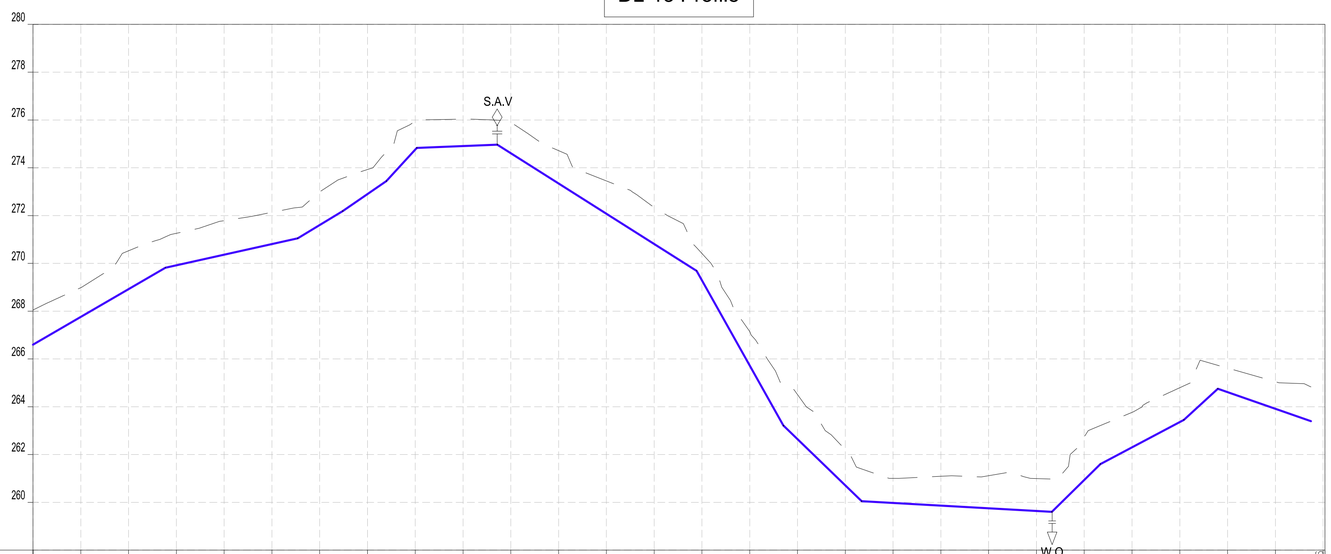
DISTRIBUTION LINE (DL-12) - PLAN AND PROFILE
CH.0+000.00 - CH.0+656.12
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-11.01

Jul 19, 2025 - 10:37am

DL-13 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	268.05	266.600	1.45
0+020	268.98	267.761	1.22
0+040	270.53	268.923	1.60
0+060	271.26	269.919	1.34
0+080	271.79	270.364	1.42
0+100	272.14	270.809	1.33
0+120	272.99	271.604	1.39
0+140	273.93	272.900	1.03
0+160	275.97	274.759	1.22
0+180	276.04	274.907	1.13
0+200	275.90	274.605	1.30
0+220	274.72	273.339	1.38
0+240	273.45	272.073	1.38
0+260	272.34	270.808	1.53
0+280	270.41	269.284	1.13
0+300	267.15	265.723	1.42
0+320	264.51	262.639	1.87
0+340	262.21	260.706	1.50
0+360	261.00	259.973	1.03
0+380	261.09	259.861	1.23
0+400	261.11	259.748	1.37
0+420	260.99	259.636	1.36
0+440	262.74	260.936	1.80
0+460	263.76	262.303	1.46
0+480	264.80	263.363	1.44
0+500	265.62	264.612	1.01
0+520	265.05	263.914	1.13
0+540.76			

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 5.81% | 2.23% | 6.04% | 6.89% | 10.95% | 0.40% | −6.33% | −17.80% | −9.66% | −0.56% | 9.85% | 5.30% | 9.14% | −3.49%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates — architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

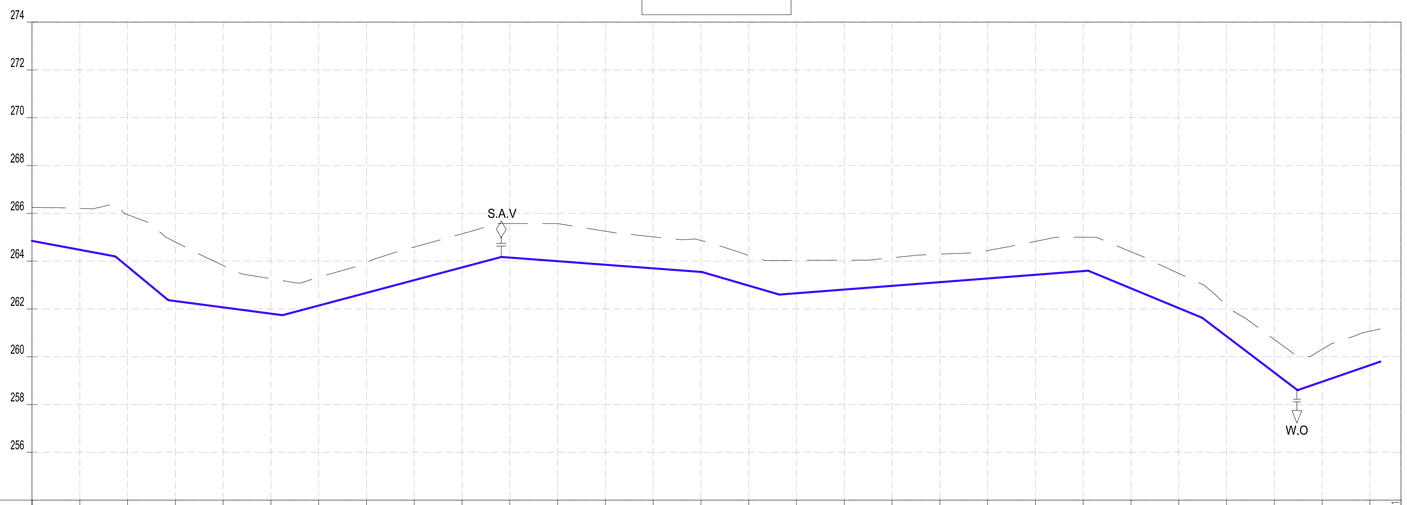
DISTRIBUTION LINE (DL-13) - PLAN AND PROFILE
CH.0+000.00 - CH.0+540.71
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-12.02

Jul 19, 2025 - 10:37am

DL-16 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	266.25	264.849	1.40
0+020	266.21	264.475	1.73
0+040	265.94	263.776	2.17
0+060	264.80	262.330	2.47
0+080	263.82	262.066	1.75
0+100	263.26	261.801	1.46
0+120	263.33	262.140	1.19
0+140	263.95	262.672	1.28
0+160	264.59	263.204	1.39
0+180	265.14	263.736	1.41
0+200	265.57	264.148	1.43
0+220	265.57	263.998	1.57
0+240	265.25	263.847	1.40
0+260	265.02	263.697	1.32
0+280	264.86	263.547	1.32
0+300	264.24	262.973	1.26
0+320	264.03	262.655	1.37
0+340	264.04	262.810	1.23
0+360	264.14	262.965	1.18
0+380	264.29	263.120	1.17
0+400	264.44	263.275	1.17
0+420	264.83	263.429	1.40
0+440	265.00	263.584	1.42
0+460	264.39	262.860	1.53
0+480	263.48	262.034	1.45
0+500	262.14	260.855	1.28
0+520	260.72	259.337	1.38
0+540	260.31	258.954	1.36
0+560	261.07	259.642	1.43
0+573.01			

SIZE AND TYPE OF PIPE: OD50 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): -1.87% | -8.25% | -1.37% | 2.66% | -0.75% | -2.91% | 0.77% | -4.13% | -7.59% | 3.44%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-16) - PLAN AND PROFILE
CH.0+000.00 - CH.0+573.01
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-13.01

Jul 19, 2025 - 10:37am

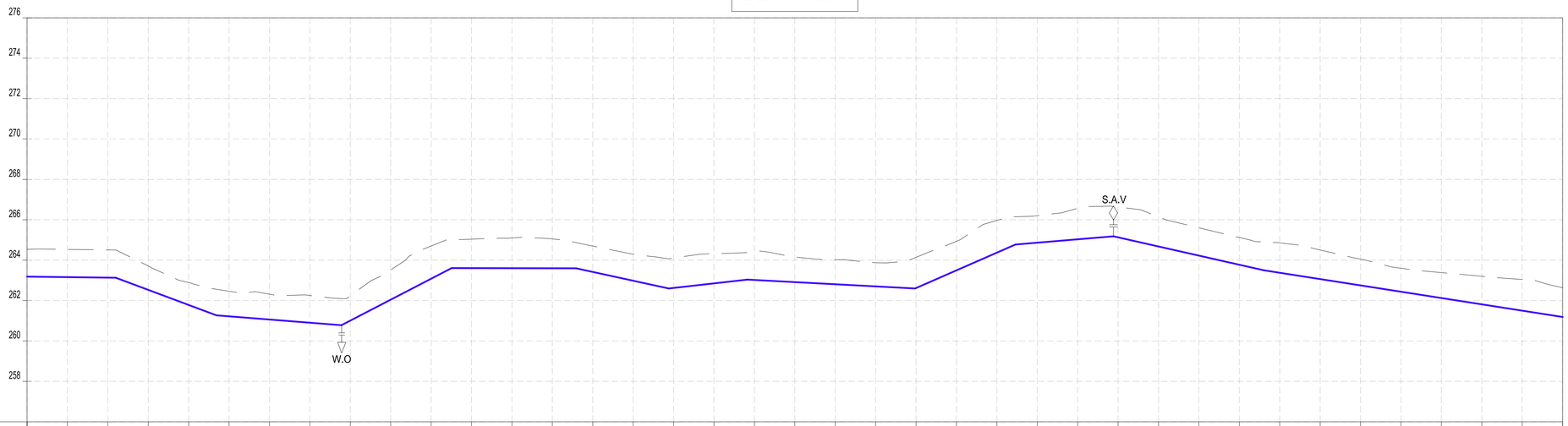
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP		SOLAR PANEL
GH		GENERATOR HOUSE
BH		BOREHOLE
UT		UNDERGROUND TANK
GT		GROUND TANK
ET		ELEVATED TANK, PLASTIC
SET		STEEL ELEVATED TANK(SET)
WK-PROP.		WATER KIOSK (PROPOSED)
WK-EXIST.		WATER KIOSK (EXISTING)
CH		CHAMBER
WT-PROP.		WATER TROUGH-PROPOSED
WT-EXIST.		WATER TROUGH-EXISTING
		EXISTING PIPELINE
		RISING MAIN
		DISTRIBUTION LINE
		DISTRIBUTION LINE TO WATER TROUGH
		ORIGINAL GROUND LEVEL
		PIPE INVERT LEVEL
		PIPE
212.50		MAJOR CONTOURS WITH ELEVATION
212.30		MINOR CONTOURS WITH ELEVATION
OD		OUTSIDE DIAMETER
S.A.V.		SINGLE AIR VALVE
D.A.V.		DOUBLE AIR VALVE
W.O.		WASH OUT

DL-17 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	264.54	263.184	1.35
0+020	264.53	263.160	1.37
0+040	264.51	263.137	1.37
0+060	263.71	262.530	1.18
0+080	262.89	261.782	1.11
0+100	262.46	261.219	1.24
0+120	262.32	261.062	1.25
0+140	262.25	260.905	1.35
0+160	262.23	261.009	1.22
0+180	263.52	262.045	1.48
0+200	264.70	263.081	1.62
0+220	265.04	263.606	1.44
0+240	265.10	263.604	1.49
0+260	265.05	263.601	1.45
0+280	264.70	263.420	1.28
0+300	264.30	262.984	1.31
0+320	264.09	262.627	1.46
0+340	264.32	262.852	1.47
0+360	264.43	263.019	1.41
0+380	264.15	262.914	1.24
0+400	264.02	262.808	1.21
0+420	263.87	262.703	1.17
0+440	264.14	262.620	1.52
0+460	264.94	263.498	1.44
0+480	265.97	264.375	1.59
0+500	266.20	264.867	1.34
0+520	266.57	265.035	1.53
0+540	266.63	265.133	1.50
0+560	266.15	264.680	1.47
0+580	265.60	264.228	1.37
0+600	265.12	263.776	1.35
0+620	264.86	263.378	1.48
0+640	264.50	263.065	1.44
0+660	264.05	262.753	1.30
0+680	263.60	262.440	1.16
0+700	263.38	262.127	1.26
0+720	263.20	261.815	1.39
0+740	263.05	261.502	1.54
0+760	262.63	261.189	1.45

SIZE AND TYPE OF PIPE: OD40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.12% | -3.74% | -0.78% | 5.18% | -0.01% | -2.18% | 1.13% | -0.53% | 4.39% | 0.84% | -2.26% | -1.56%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

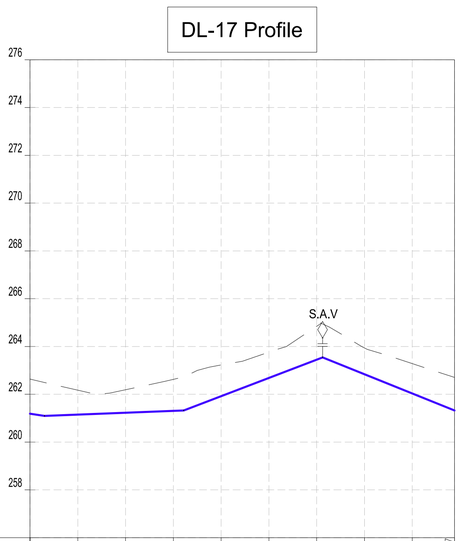
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-17) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-14.01

Jul 19, 2025 - 10:37am



CHAINAGES (M)	0+760	0+780	0+800	0+820	0+840	0+860	0+880	0+900	0+920	0+937.67
GROUND LEVEL (M)	262.63	262.17	262.19	262.62	263.23	263.77	264.85	263.94	263.28	262.71
INVERT LEVELS (M)	261.189	261.149	261.228	261.307	261.922	262.687	263.451	262.841	262.036	261.324
TRENCH DEPTH (M)	1.45	1.02	0.96	1.32	1.30	1.08	1.40	1.10	1.25	1.38
SIZE AND TYPE OF PIPE	OD32 PN10 HDPE PIPE									
PIPE FITTINGS										
SLOPE (%)	-1.95%	0.40%			3.82%			-4.03%		

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

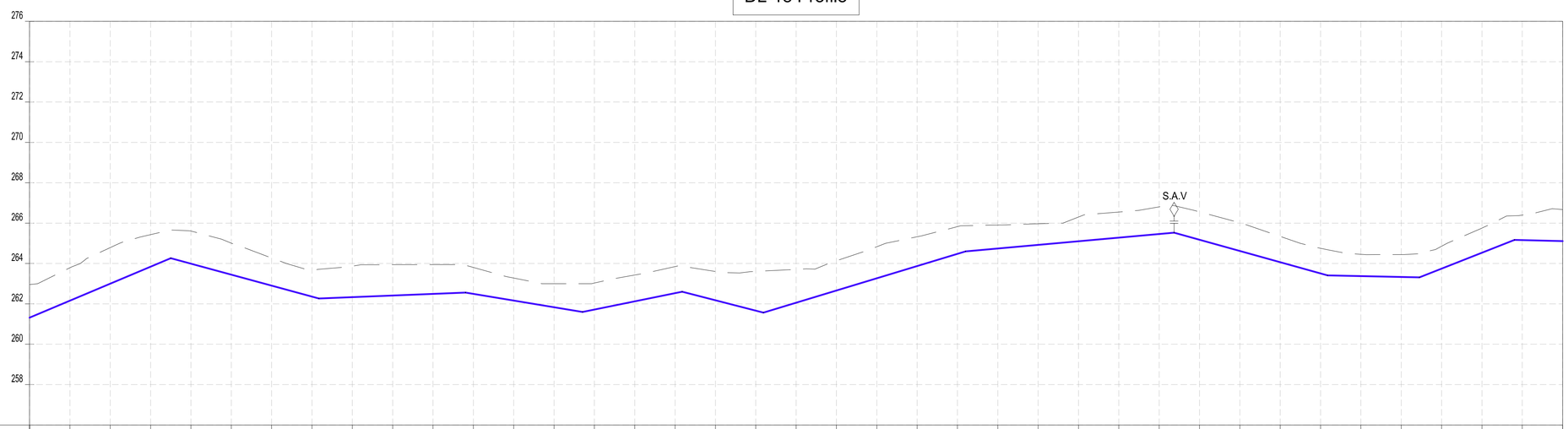
DISTRIBUTION LINE (DL-17) - PLAN AND PROFILE
CH.0+760.00 - CH.0+937.67
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-14.02

Jul 19, 2025 - 10:38am

DL-18 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	262.96	261.317	1.64
0+020	263.79	262.159	1.63
0+040	264.79	263.000	1.79
0+060	265.43	263.842	1.59
0+080	265.61	263.990	1.62
0+100	265.01	263.446	1.56
0+120	264.27	262.901	1.37
0+140	263.68	262.357	1.32
0+160	263.87	262.330	1.54
0+180	263.94	262.410	1.53
0+200	263.95	262.491	1.46
0+220	263.81	262.493	1.32
0+240	263.28	262.163	1.12
0+260	263.00	261.833	1.17
0+280	263.03	261.719	1.31
0+300	263.43	262.124	1.30
0+320	263.85	262.529	1.32
0+340	263.60	262.176	1.43
0+360	263.61	261.661	1.95
0+380	263.71	262.055	1.65
0+400	264.13	262.661	1.47
0+420	264.83	263.267	1.56
0+440	265.32	263.873	1.45
0+460	265.83	264.480	1.35
0+480	265.91	264.743	1.16
0+500	265.97	264.922	1.04
0+520	266.30	265.101	1.20
0+540	266.55	265.280	1.27
0+560	266.81	265.458	1.35
0+580	266.56	265.173	1.39
0+600	266.02	264.618	1.40
0+620	265.34	264.062	1.28
0+640	264.75	263.507	1.25
0+660	264.45	263.375	1.08
0+680	264.44	263.332	1.11
0+700	264.86	263.746	1.11
0+720	265.76	264.534	1.22
0+740	266.40	265.158	1.24
0+760	266.67	265.109	1.56

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 4.21% | -2.72% | 0.40% | -1.65% | 2.03% | -2.57% | 3.03% | 0.89% | -2.78% | -0.22% | 3.94% | -0.26%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

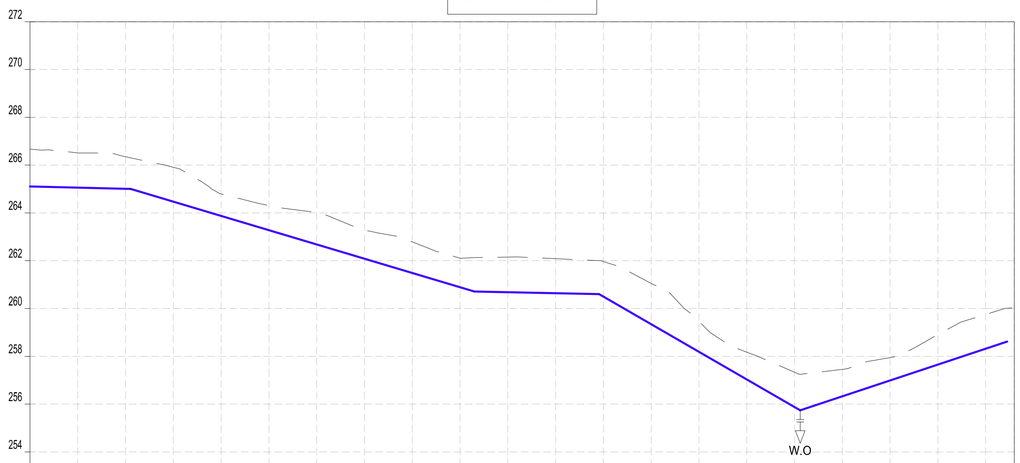
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-18) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-15.01

Jul 19, 2025 - 10:38am



Datum: ~> 252
Ver Exag. ~> x10

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+760	266.67	265.109	1.56
0+780	266.51	265.059	1.45
0+800	266.35	265.010	1.34
0+820	265.91	264.472	1.44
0+840	264.80	263.875	0.92
0+860	264.31	263.277	1.03
0+880	264.02	262.680	1.34
0+900	263.28	262.082	1.20
0+920	262.79	261.485	1.30
0+940	262.11	260.888	1.22
0+960	262.15	260.680	1.47
0+980	262.09	260.638	1.45
1+000	261.96	260.495	1.47
1+020	261.05	259.340	1.71
1+040	259.46	258.185	1.28
1+060	258.17	257.030	1.14
1+080	257.34	255.875	1.46
1+100	257.45	256.325	1.13
1+120	257.95	256.990	0.96
1+140	258.91	257.655	1.26
1+160	259.75	258.320	1.43
1+172			

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -0.25% | -2.99% | -0.21% | -5.78% | 3.33%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

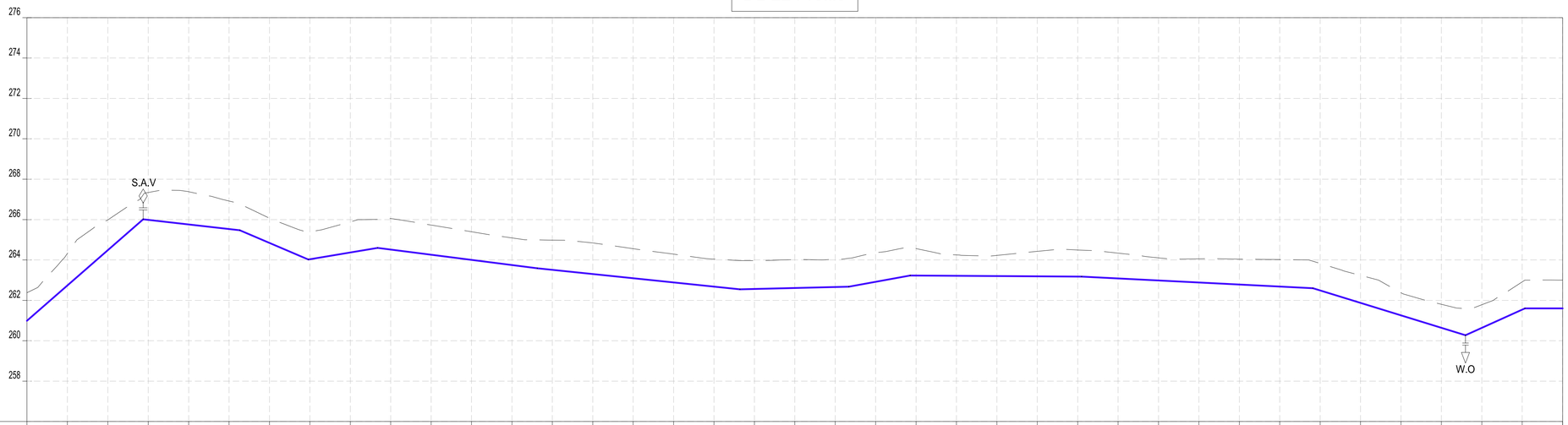
DISTRIBUTION LINE (DL-18) - PLAN AND PROFILE
CH.0+760.00 - CH.1+191.55
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-15.02

Jul 19, 2025 - 10:38am

DL-22 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	262.38	260.991	1.39
0+020	264.32	262.739	1.58
0+040	265.99	264.487	1.50
0+060	267.34	265.987	1.35
0+080	267.38	265.760	1.62
0+100	266.92	265.533	1.38
0+120	266.07	264.843	1.23
0+140	265.40	264.033	1.36
0+160	265.89	264.370	1.52
0+180	266.05	264.516	1.54
0+200	265.73	264.260	1.47
0+220	265.40	264.004	1.39
0+240	265.09	263.747	1.35
0+260	264.98	263.510	1.47
0+280	264.84	263.302	1.54
0+300	264.56	263.095	1.46
0+320	264.29	262.887	1.40
0+340	264.04	262.680	1.36
0+360	263.97	262.564	1.40
0+380	264.02	262.611	1.41
0+400	264.03	262.658	1.37
0+420	264.36	262.916	1.45
0+440	264.56	263.226	1.34
0+460	264.25	263.214	1.04
0+480	264.23	263.201	1.03
0+500	264.43	263.188	1.24
0+520	264.49	263.175	1.32
0+540	264.34	263.084	1.25
0+560	264.10	262.983	1.12
0+580	264.06	262.883	1.17
0+600	264.04	262.783	1.26
0+620	264.02	262.682	1.34
0+640	263.83	262.489	1.34
0+660	263.24	261.872	1.36
0+680	262.38	261.255	1.12
0+700	261.81	260.638	1.17
0+720	261.79	260.636	1.15
0+740	262.91	261.540	1.37
0+760	263.00	261.602	1.40

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): 8.74% | -1.14% | -4.28% | 1.60% | -1.28% | -1.04% | 0.24% | 1.83% | -0.06% | -0.50% | -3.09% | 4.52% | 0.01%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

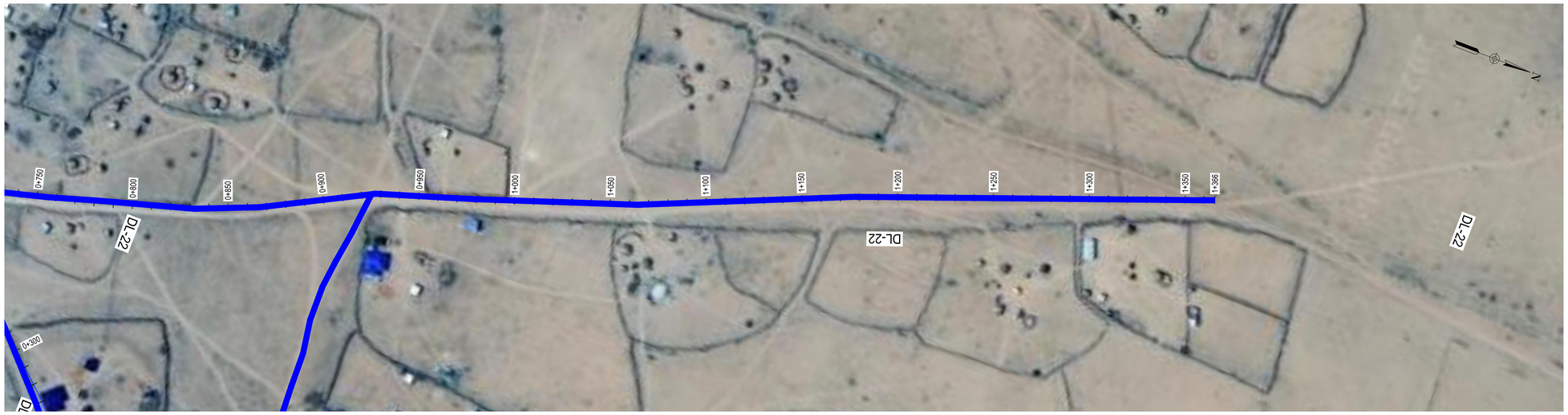
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-22) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-16.01

Jul 19, 2025 - 10:39am



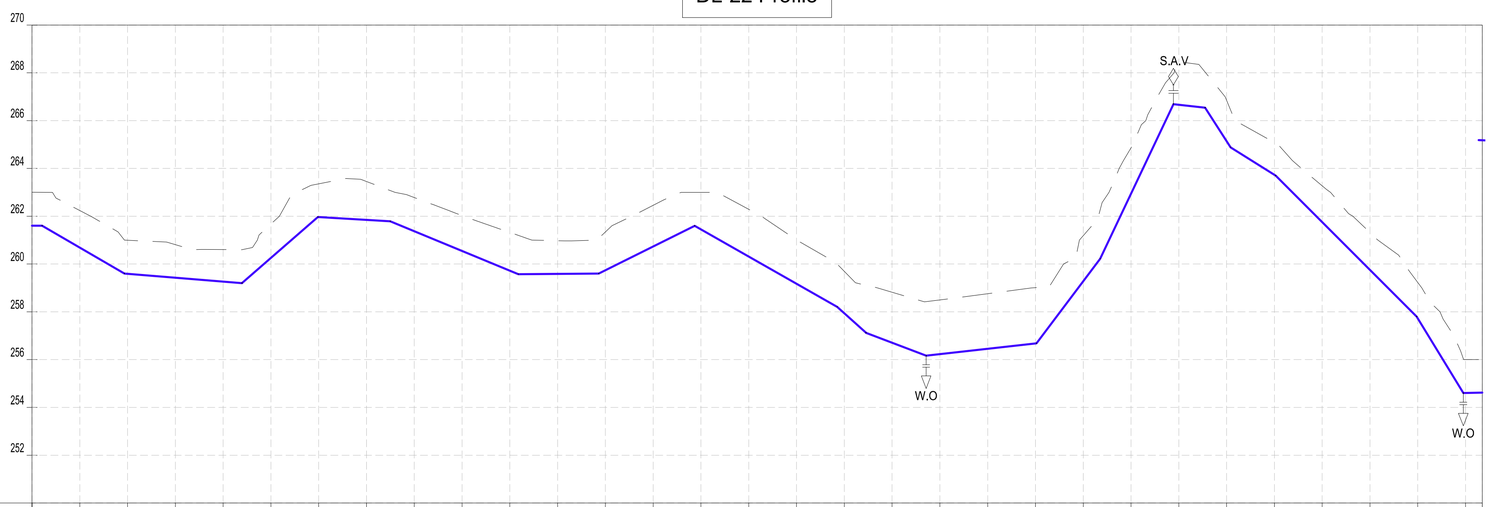
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

DL-22 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+760	263.00	261.602	1.40
0+780	262.24	260.685	1.55
0+800	260.99	259.589	1.40
0+820	260.81	259.428	1.38
0+840	260.60	259.266	1.34
0+860	261.67	260.253	1.42
0+880	263.35	261.964	1.39
0+900	263.45	261.848	1.60
0+920	262.78	261.374	1.41
0+940	262.02	260.547	1.47
0+960	261.32	259.720	1.60
0+980	260.98	259.586	1.39
1+000	261.34	259.738	1.60
1+020	262.46	260.734	1.72
1+040	263.00	261.451	1.55
1+060	262.29	260.313	1.98
1+080	261.00	259.175	1.83
1+100	259.69	257.938	1.75
1+120	258.82	256.708	2.11
1+140	258.50	256.232	2.26
1+160	258.76	256.454	2.30
1+180	259.01	256.677	2.33
1+200	261.19	259.278	1.91
1+220	264.86	262.943	1.92
1+240	268.46	266.661	1.80
1+260	266.85	265.143	1.71
1+280	265.09	263.730	1.36
1+300	263.27	261.752	1.52
1+320	261.32	259.754	1.57
1+340	259.23	257.728	1.50
1+360	256.00	254.602	1.40
1+367			

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS:

SLOPE (%): 0.01% | -5.60% | -0.81% | 8.70% | -0.55% | -4.13% | 0.08% | 4.96% | -5.69% | -9.00% | -3.70% | 1.11% | 13.27% | 21.09% | -1.11% | -15.54% | -6.28% | -9.93% | -16.40% | 2.27%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-22) - PLAN AND PROFILE
CH.0+760.00 - CH.1+520.00
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-16.02

Jul 19, 2025 - 10:39am

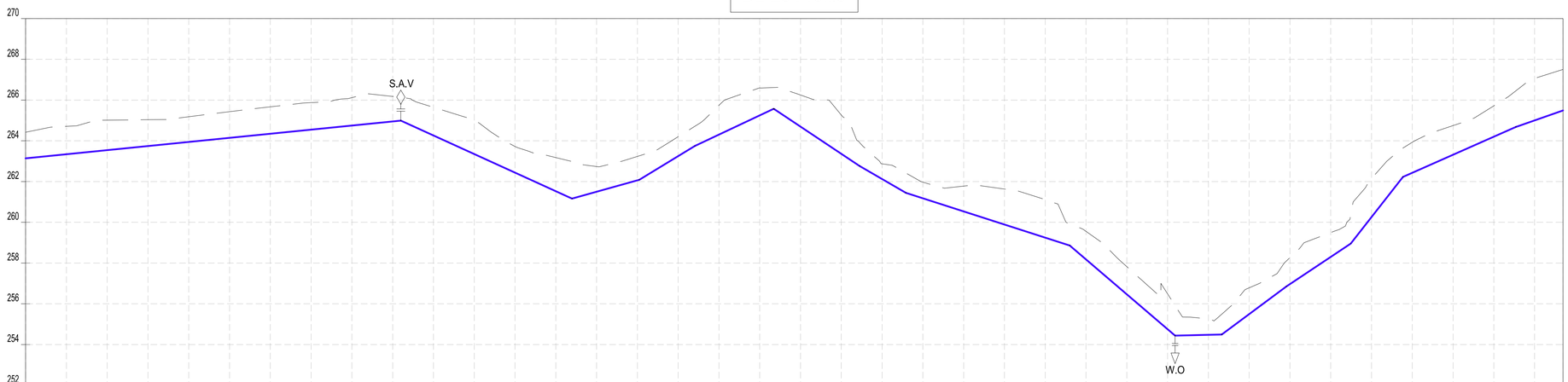
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

DL-23 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	264.42	263.137	1.28
0+020	264.71	263.339	1.37
0+040	265.01	263.540	1.47
0+060	265.04	263.742	1.30
0+080	265.18	263.943	1.24
0+100	265.43	264.145	1.29
0+120	265.67	264.346	1.32
0+140	265.87	264.548	1.32
0+160	266.12	264.750	1.37
0+180	266.18	264.951	1.23
0+200	265.65	264.263	1.38
0+220	265.02	263.351	1.67
0+240	263.72	262.440	1.28
0+260	263.18	261.528	1.65
0+280	262.74	261.500	1.24
0+300	263.23	262.057	1.18
0+320	264.20	263.246	0.95
0+340	265.74	264.302	1.44
0+360	266.59	265.246	1.35
0+380	266.25	264.698	1.55
0+400	265.27	263.365	1.90
0+420	262.87	262.124	0.75
0+440	261.97	261.176	0.80
0+460	261.78	260.533	1.24
0+480	261.63	259.891	1.74
0+500	261.12	259.249	1.87
0+520	259.56	258.178	1.38
0+540	257.83	256.467	1.36
0+560	256.49	254.755	1.74
0+580	255.27	254.479	0.79
0+600	256.78	255.491	1.29
0+620	258.27	256.968	1.30
0+640	259.50	258.300	1.20
0+660	262.14	260.255	1.89
0+680	263.93	262.428	1.50
0+700	264.75	263.314	1.43
0+720	265.72	264.200	1.52
0+740	267.07	265.001	2.07
0+753.91	267.50	265.487	2.01

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS: 0+000, 0+184, 0+268, 0+301, 0+328, 0+367, 0+409, 0+432, 0+512, 0+564, 0+587, 0+618, 0+650, 0+675, 0+731, 0+754

SLOPE (%): 1.01%, −4.56%, 2.72%, 6.10%, 4.72%, −6.67%, −5.83%, −3.21%, −8.56%, 0.25%, 7.45%, 6.66%, 12.78%, 4.43%, 3.50%

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

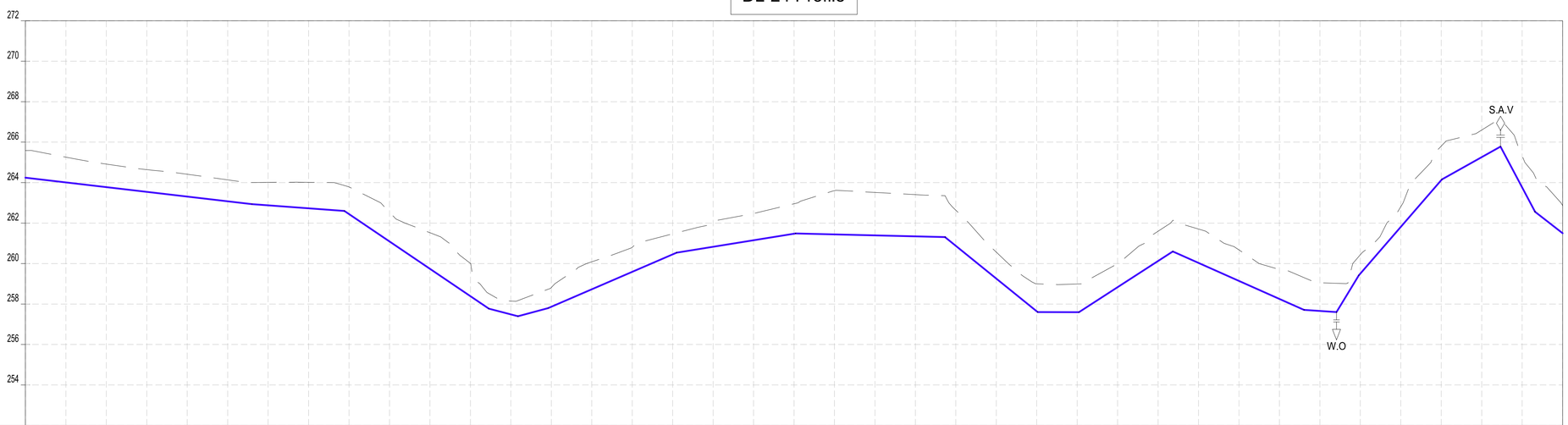
DISTRIBUTION LINE (DL-23) - PLAN AND PROFILE
CH.0+000.00 - CH.0+753.91
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-17.01

Jul 19, 2025 - 10:39am

DL-24 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	265.59	264.243	1.34
0+020	265.26	264.009	1.25
0+040	264.91	263.776	1.14
0+060	264.64	263.543	1.10
0+080	264.41	263.309	1.10
0+100	264.14	263.076	1.06
0+120	264.01	262.877	1.13
0+140	264.01	262.730	1.28
0+160	263.79	262.444	1.35
0+180	262.54	261.092	1.45
0+200	261.52	259.740	1.79
0+220	260.01	258.387	1.62
0+240	258.15	257.490	0.66
0+260	258.81	257.865	0.95
0+280	260.08	258.727	1.36
0+300	260.80	259.588	1.21
0+320	261.47	260.450	1.02
0+340	262.07	260.827	1.24
0+360	262.47	261.150	1.32
0+380	262.95	261.474	1.48
0+400	263.60	261.440	2.16
0+420	263.52	261.391	2.12
0+440	263.41	261.342	2.07
0+460	262.64	260.879	1.76
0+480	260.57	259.258	1.31
0+500	259.00	257.636	1.36
0+520	258.99	257.598	1.39
0+540	259.99	258.834	1.16
0+560	261.60	260.128	1.47
0+580	261.70	260.034	1.67
0+600	260.67	259.143	1.53
0+620	259.72	258.252	1.47
0+640	259.05	257.656	1.39
0+660	260.44	259.510	0.93
0+680	262.81	261.817	0.99
0+700	265.80	264.123	1.68
0+720	266.60	265.262	1.34
0+740	265.32	263.759	1.56
0+760	262.87	261.497	1.37

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): −1.17% | −0.74% | −6.76% | −2.88% | −2.67% | 4.31% | 1.62% | −0.24% | −8.11% | −0.01% | 6.47% | −4.46% | −10.60% | 16.51% | 11.53% | 5.60% | −18.91% | −2.60%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

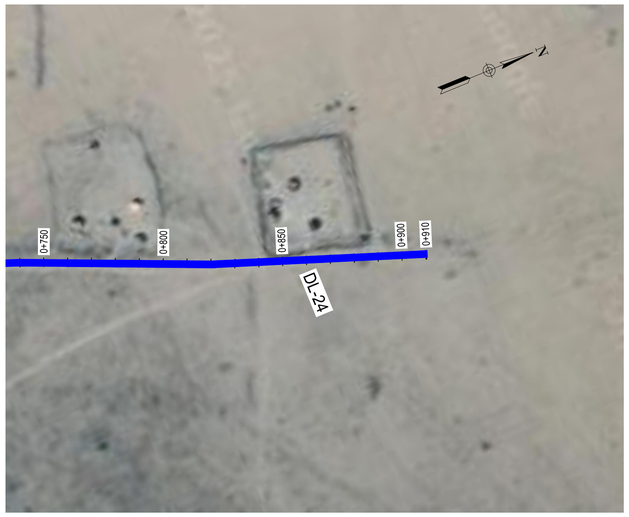
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-24) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

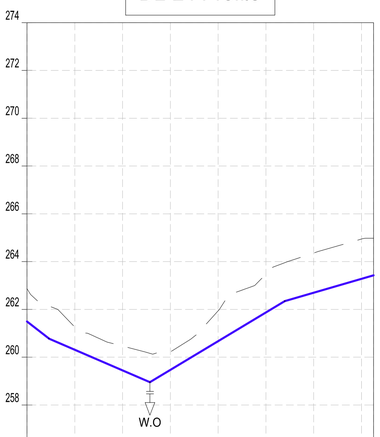
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-18.01

Jul 19, 2025 - 10:40am



DL-24 Profile



Datum: ~> 254
Ver Exag. ~> x10

CHAINAGES (M)	0+760	0+780	0+800	0+820	0+840	0+860	0+880	0+900	0+905.05
GROUND LEVEL (M)	262.87	261.26	260.47	260.25	261.94	263.48	264.36	264.94	264.98
INVERT LEVELS (M)	261.497	260.313	259.449	259.467	260.668	261.870	262.697	263.280	263.427
TRENCH DEPTH (M)	1.37	0.95	1.02	0.78	1.27	1.61	1.66	1.66	1.55
SIZE AND TYPE OF PIPE	OD32 PN10 HDPE PIPE								
PIPE FITTINGS									
SLOPE (%)	-7.80%	-4.37%		6.01%				2.91%	

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

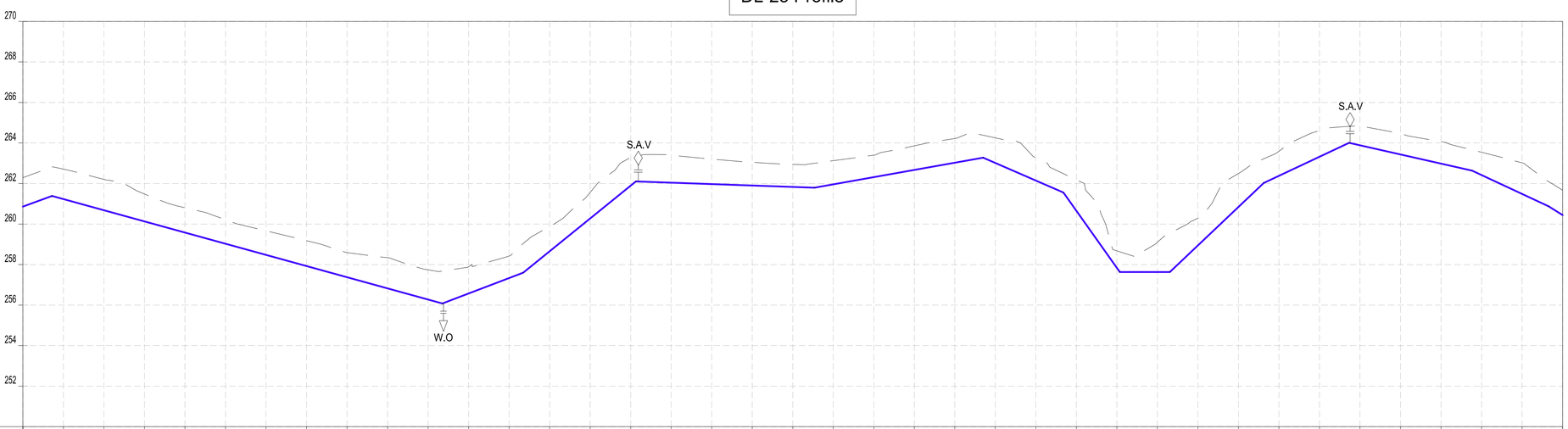
DRAWING TITLE:
HADADO RWSS - WAJIR
DISTRIBUTION LINE (DL-24) - PLAN AND PROFILE
CH.0+760.00 - CH.0+905.05
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-18.02

Jul 19, 2025 - 10:40am

DL-25 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	262.29	260.861	1.43
0+020	262.71	261.231	1.48
0+040	262.20	260.681	1.52
0+060	261.48	260.130	1.35
0+080	260.81	259.580	1.23
0+100	260.21	259.029	1.18
0+120	259.66	258.478	1.19
0+140	259.18	257.928	1.25
0+160	258.59	257.377	1.21
0+180	258.34	256.826	1.52
0+200	257.74	256.276	1.46
0+220	257.89	256.575	1.32
0+240	258.42	257.336	1.08
0+260	259.88	258.656	1.22
0+280	261.56	260.274	1.28
0+300	263.29	261.893	1.40
0+320	263.40	262.041	1.36
0+340	263.21	261.972	1.23
0+360	263.05	261.903	1.14
0+380	262.94	261.833	1.11
0+400	263.12	261.961	1.16
0+420	263.40	262.316	1.08
0+440	263.86	262.671	1.19
0+460	264.22	263.027	1.20
0+480	264.25	263.013	1.24
0+500	263.27	262.144	1.12
0+520	262.18	260.650	1.53
0+540	258.68	257.838	0.84
0+560	259.11	257.632	1.47
0+580	260.29	258.947	1.34
0+600	262.50	260.843	1.65
0+620	263.59	262.380	1.21
0+640	264.61	263.322	1.29
0+660	264.86	263.887	0.97
0+680	264.46	263.434	1.03
0+700	264.07	262.981	1.09
0+720	263.54	262.416	1.12
0+740	263.02	261.485	1.54
0+760	261.67	260.445	1.23

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 3.65% | −2.75% | 3.80% | 8.09% | −0.35% | 1.78% | −4.35% | −14.06% | 0.00% | 9.46% | 4.71% | −2.27% | −4.65% | −0.27%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

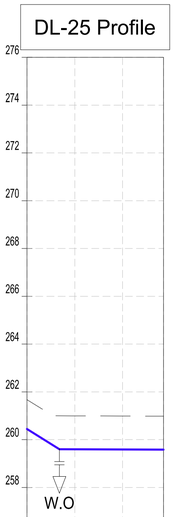
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-25) - PLAN AND PROFILE
CH.0+000.00 - CH.0+760.00
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-19.01

Jul 19, 2025 - 10:40am



CHAINAGES (M)	0+760	0+780	0+800	0+817.13
GROUND LEVEL (M)	261.67	261.00	260.99	260.98
INVERT LEVELS (M)	260.445	259.598	259.591	259.586
TRENCH DEPTH (M)	1.23	1.40	1.40	1.40
SIZE AND TYPE OF PIPE	OD32 PN10 HDPE PIPE			
PIPE FITTINGS				
SLOPE (%)	-0.375	-0.075		

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND

1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,

Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

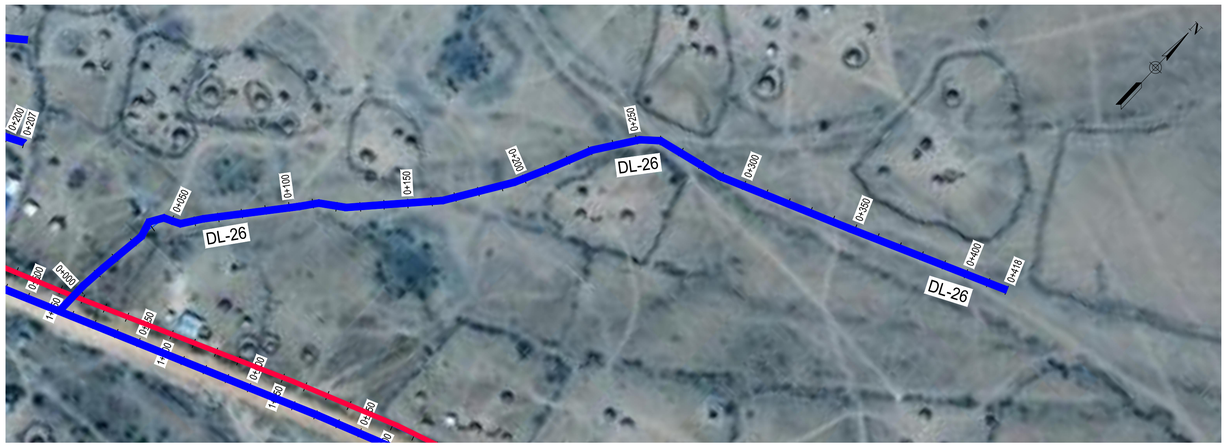
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-25) - PLAN AND PROFILE
CH.0+760.00 - CH.0+817.13
SHEET 2 OF 2

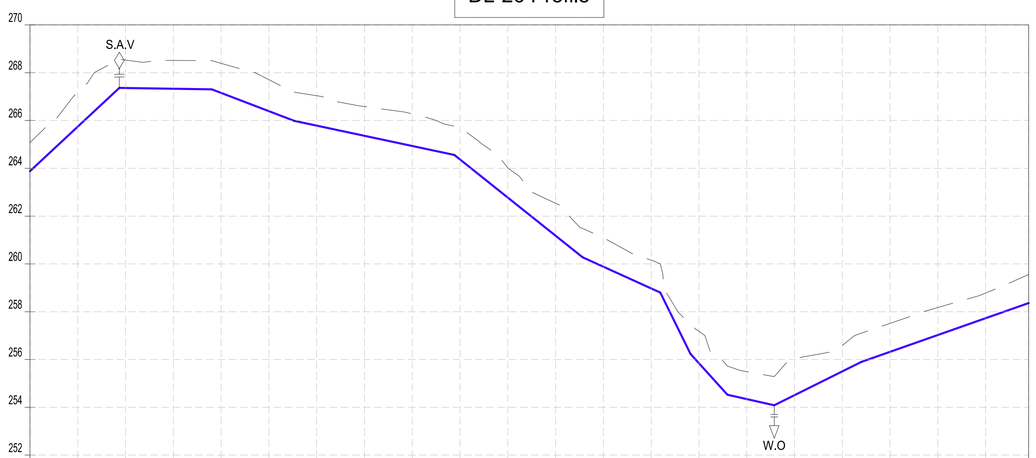
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-19.02

Jul 19, 2025 - 10:41am



DL-26 Profile



Datum: ~> 250
Ver Exag. ~> x10

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	265.08	263.881	1.20
0+020	267.18	265.743	1.44
0+040	268.53	267.358	1.17
0+060	268.51	267.327	1.19
0+080	268.39	267.153	1.24
0+100	267.71	266.389	1.32
0+120	267.04	265.783	1.25
0+140	266.58	265.357	1.23
0+160	266.27	264.931	1.34
0+180	265.71	264.366	1.34
0+200	264.02	262.774	1.25
0+220	262.54	261.181	1.36
0+240	261.08	259.884	1.20
0+260	260.16	258.974	1.18
0+280	257.18	255.845	1.33
0+300	255.49	254.344	1.15
0+320	256.04	254.506	1.53
0+340	256.59	255.503	1.08
0+360	257.51	256.323	1.19
0+380	258.17	257.026	1.15
0+400	258.78	257.728	1.05
0+418	259.56	258.361	1.20

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 9.31% | -0.15% | -3.82% | -2.13% | -7.96% | -4.55% | -20.26% | -11.08% | -2.26% | 4.99% | 3.51%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

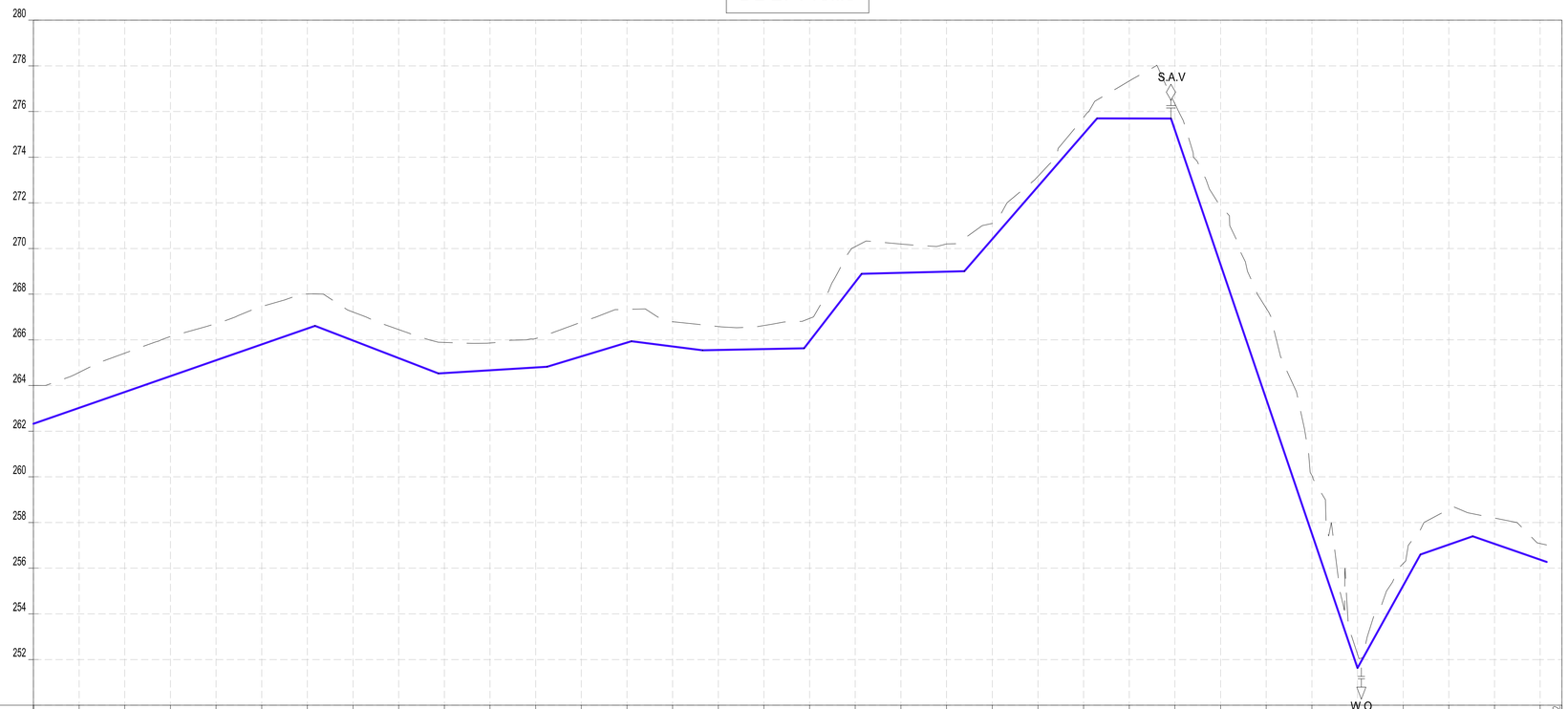
DISTRIBUTION LINE (DL-26) - PLAN AND PROFILE
CH.0+000.00 - CH.0+446.72
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-20.01

Jul 19, 2025 - 10:41am

DL-27 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	264.00	262.327	1.67
0+020	264.58	263.022	1.55
0+040	265.42	263.717	1.70
0+060	266.15	264.412	1.73
0+080	266.71	265.106	1.61
0+100	267.46	265.801	1.66
0+120	268.01	266.496	1.51
0+140	267.22	265.970	1.25
0+160	266.45	265.199	1.25
0+180	265.89	264.544	1.34
0+200	265.86	264.667	1.20
0+220	266.06	264.791	1.27
0+240	266.77	265.276	1.50
0+260	267.33	265.883	1.45
0+280	266.79	265.710	1.08
0+300	266.58	265.555	1.03
0+320	266.63	265.594	1.03
0+340	266.93	265.941	0.99
0+360	270.08	268.530	1.55
0+380	270.19	268.933	1.26
0+400	270.20	268.983	1.22
0+420	271.10	270.410	0.69
0+440	273.16	272.712	0.45
0+460	275.74	275.014	0.72
0+480	277.34	275.694	1.64
0+500	276.34	275.191	1.15
0+520	271.88	269.300	2.58
0+540	267.39	263.410	3.98
0+560	260.06	257.519	2.54
0+580	252.23	251.630	0.61
0+600	256.20	255.237	0.97
0+620	258.58	257.033	1.55
0+640	258.19	257.066	1.13
0+660	257.08	256.370	0.71
0+669.52			

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 3.47% | -3.85% | 0.62% | 3.03% | -1.28% | 0.19% | 12.94% | 0.25% | 11.51% | -0.01% | -29.45% | 18.04% | 3.48% | -3.48%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

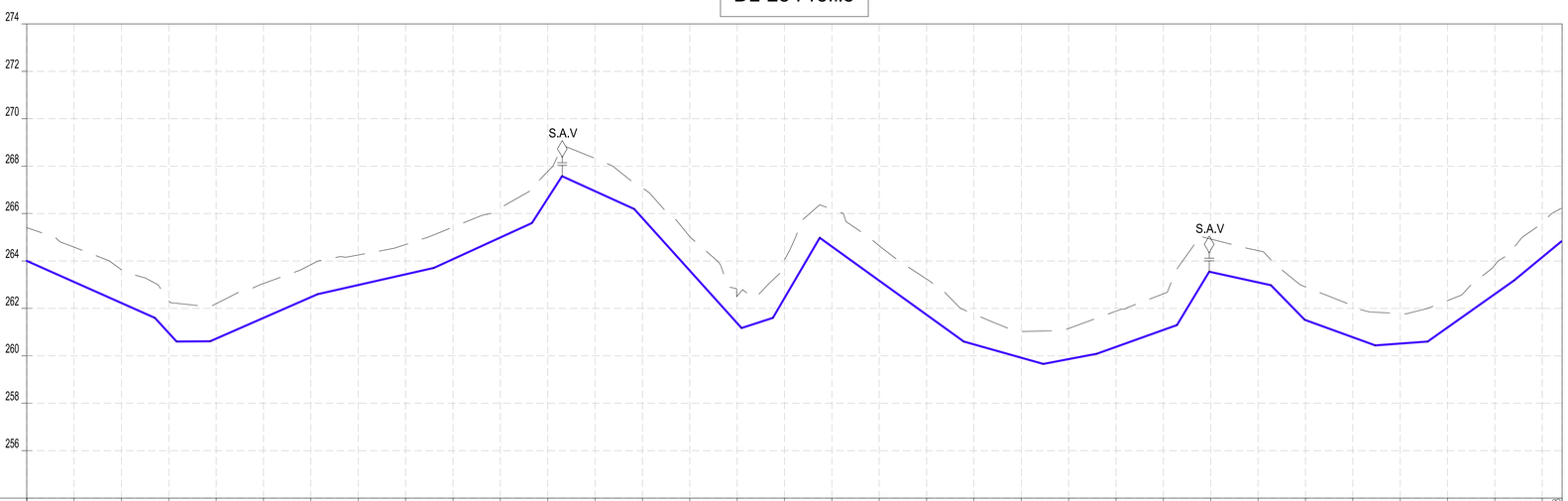
DISTRIBUTION LINE (DL-27) - PLAN AND PROFILE
CH.0+000.00 - CH.0+669.52
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-21.01

Jul 19, 2025 - 10:41am

DL-28 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	265.41	264.008	1.40
0+020	264.59	263.117	1.47
0+040	263.63	262.227	1.40
0+060	262.33	260.957	1.37
0+080	262.20	260.725	1.48
0+100	263.05	261.601	1.45
0+120	263.85	262.477	1.37
0+140	264.25	262.988	1.26
0+160	264.70	263.438	1.26
0+180	265.43	264.077	1.35
0+200	266.24	264.990	1.25
0+220	267.77	266.634	1.14
0+240	268.33	266.944	1.39
0+260	267.07	265.808	1.26
0+280	265.02	263.593	1.43
0+300	262.52	261.377	1.14
0+320	264.05	262.437	1.61
0+340	266.18	264.611	1.57
0+360	264.64	263.171	1.47
0+380	263.24	261.731	1.51
0+400	261.76	260.479	1.28
0+420	261.03	259.917	1.11
0+440	261.15	259.860	1.29
0+460	261.88	260.378	1.51
0+480	262.61	261.090	1.52
0+500	264.93	263.536	1.39
0+520	264.44	263.097	1.34
0+540	262.91	261.511	1.40
0+560	262.07	260.784	1.28
0+580	261.79	260.516	1.27
0+600	262.33	261.190	1.14
0+620	263.84	262.605	1.23
0+640	265.63	264.157	1.48
0+648.38			

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -4.45% | -10.94% | -10.19% | 4.38% | 2.25% | 4.57% | 15.56% | -4.55% | -11.08% | 3.25% | 17.07% | -7.20% | -2.81% | 1.92% | 3.56% | 16.53% | -2.20% | -10.21% | -3.64% | 0.72% | 7.07% | 8.23%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

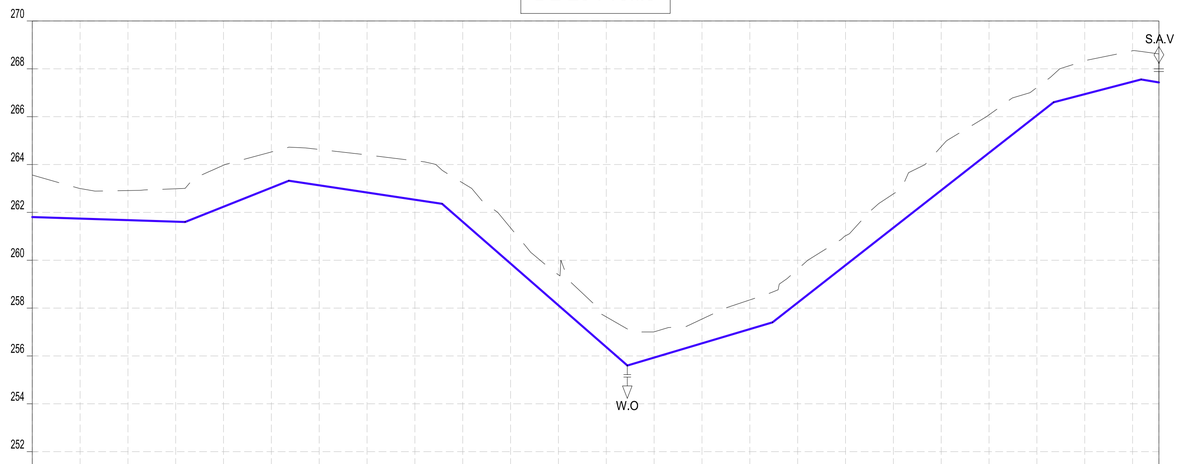
DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-28) - PLAN AND PROFILE
CH.0+000.00 - CH.0+648.38
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-22.01

Jul 19, 2025 - 10:41am



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	263.56	261.803	1.76
0+020	262.99	261.740	1.26
0+040	262.91	261.676	1.24
0+060	262.98	261.612	1.37
0+080	263.97	262.238	1.73
0+100	264.52	263.032	1.49
0+120	264.63	263.131	1.50
0+140	264.40	262.830	1.57
0+160	264.15	262.528	1.62
0+180	263.23	261.604	1.62
0+200	261.35	259.858	1.49
0+220	259.39	258.112	1.28
0+240	257.63	256.367	1.26
0+260	257.01	255.933	1.07
0+280	257.54	256.528	1.01
0+300	258.34	257.122	1.22
0+320	259.62	258.227	1.40
0+340	261.02	259.791	1.23
0+360	262.77	261.356	1.42
0+380	264.75	262.921	1.82
0+400	266.08	264.486	1.59
0+420	267.22	266.050	1.17
0+440	268.34	266.938	1.40
0+460	268.75	267.460	1.29
0+471	268.62	267.429	1.19

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): ~0.32% | 3.97% | ~1.51% | ~8.73% | 2.97% | 7.82% | 2.67% | ~1.63%

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

DISTRIBUTION LINE (DL-29) - PLAN AND PROFILE
CH.0+000.00 - CH.0+599.68
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-23.01

Jul 19, 2025 - 10:42am

NOTES:

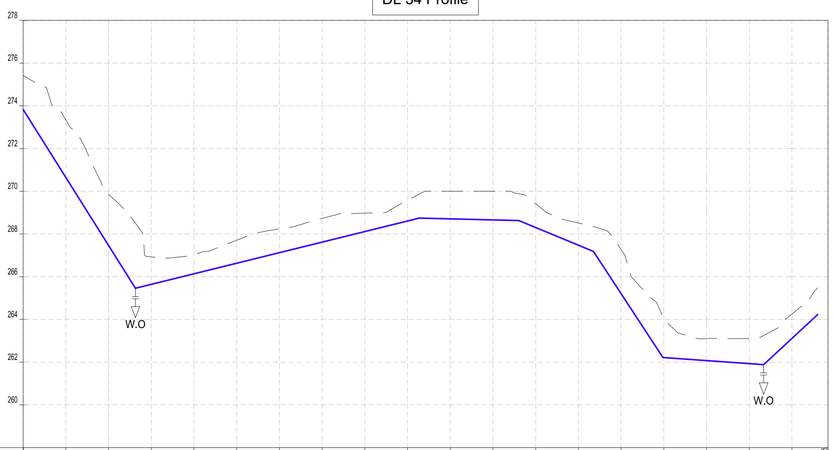
1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

DL 34 Profile



Datum: ~> 258
Ver Exag. ~> x10

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	275.43	273.823	1.60
0+020	273.33	270.642	2.69
0+040	269.85	267.460	2.39
0+060	266.93	265.640	1.29
0+080	267.00	266.135	0.86
0+100	267.71	266.630	1.08
0+120	268.24	267.125	1.12
0+140	268.73	267.620	1.11
0+160	268.98	268.115	0.86
0+180	269.61	268.609	1.00
0+200	270.00	268.710	1.29
0+220	270.00	268.660	1.34
0+240	269.42	268.305	1.11
0+260	268.51	267.475	1.04
0+280	267.27	265.205	2.06
0+300	264.02	262.212	1.81
0+320	263.10	262.071	1.03
0+340	263.10	261.930	1.17
0+360	264.25	263.115	1.14
0+576.88			

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -15.91% | 2.47% | -0.25% | -4.15% | -15.29% | -0.70% | 9.28%

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
HADADO RWSS - WAJIR

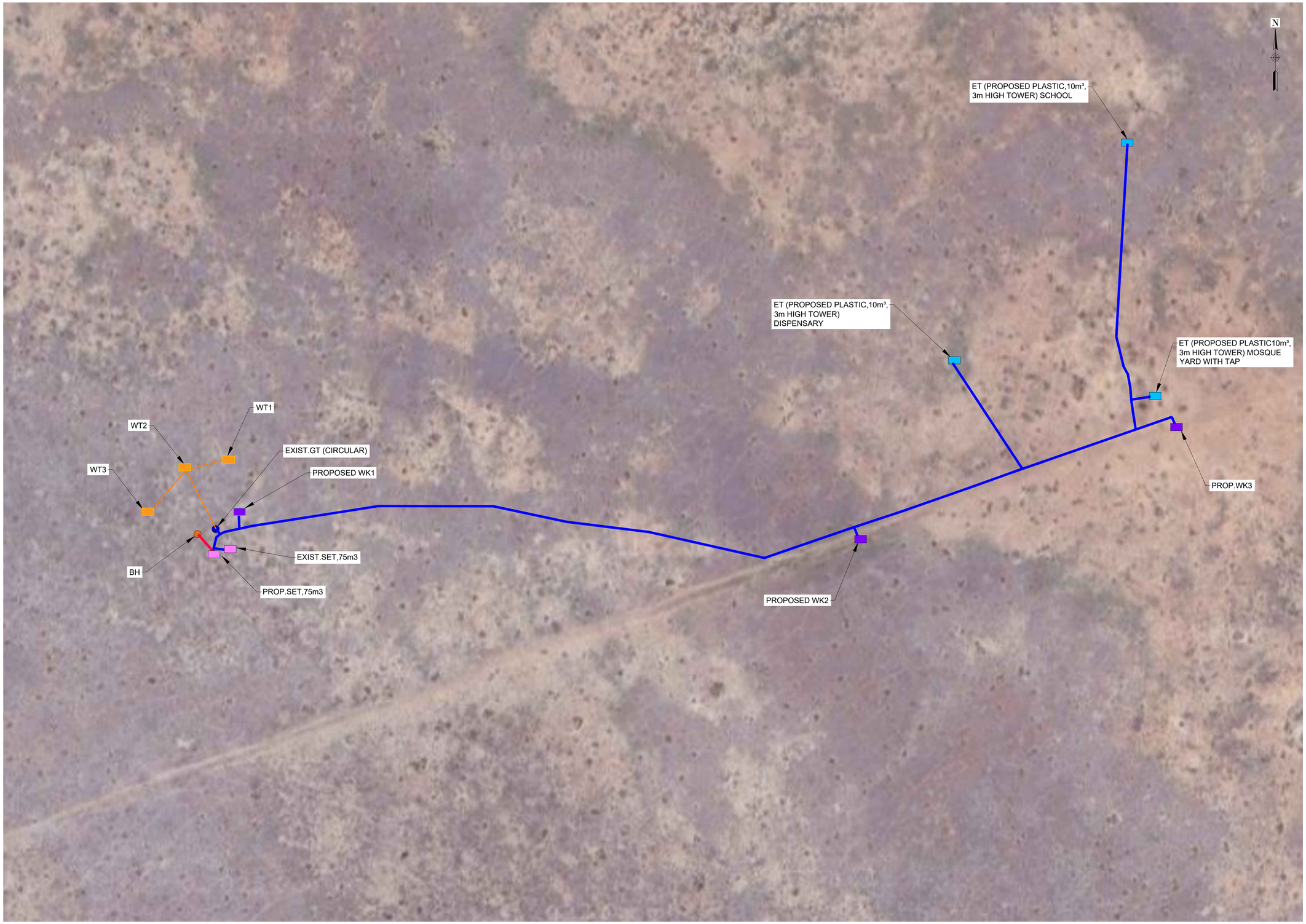
DISTRIBUTION LINE (DL-34) - PLAN AND PROFILE
CH.0+000.00 - CH.0+599.68
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-05-24

Jul 19, 2025 - 10:42am

NOORGOWS RWSS - WAJIR



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

NOORGOWS - WAJIR

GENERAL LAYOUT PLAN - PROPOSED

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-01

Jul 19, 2025 - 10:43am

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

NOORGOWS RWSS - WAJIR

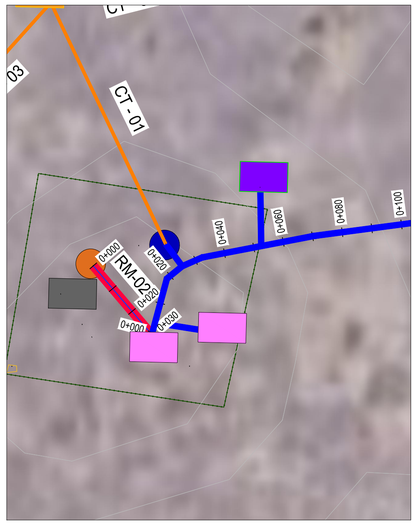
GENERAL LAYOUT

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

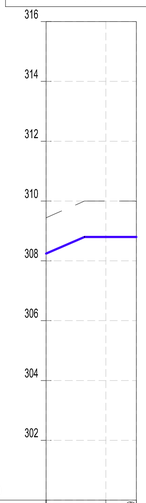
DRAWING No.: GW4R-WJR-LOT1-PP-06-01

Jul 19, 2025 - 10:43am



PLAN
SCALE 1:1250

RM-01 (1) Profile



Datum: ~> 300
Ver Exag. ~> x10

CHAINAGES (M)	0+000	0+020	0+030.19
GROUND LEVEL (M)	309.44	310.00	309.99
INVERT LEVELS (M)	308.242	308.800	308.800
TRENCH DEPTH (M)	1.20	1.20	1.19
SIZE AND TYPE OF PIPE	OD50 PN10 HDPE PIPE		
PIPE FITTINGS			
SLOPE (%)	2.74%	0.00%	

PROFILE

N

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
NOORGOWS RWSS - WAJIR
RM-01
PLAN AND PROFILE
CHAINAGE 0+000 - 0+030
SHEET 1 OF 1

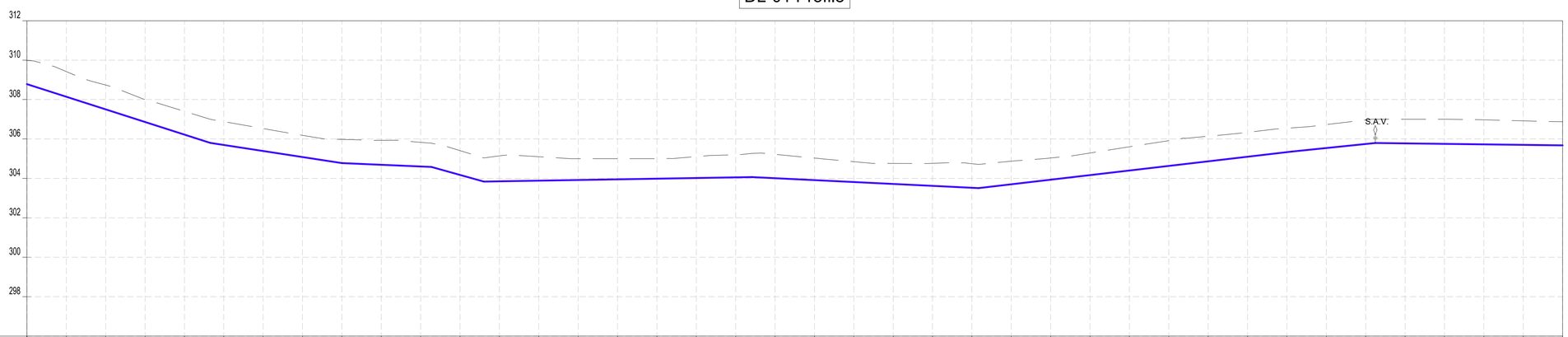
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-02

Jul 19, 2025 - 10:44am

PLAN
SCALE 1:1250

DL-01 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	309.98	308.783	1.20
0+020	309.42	308.142	1.28
0+040	308.74	307.501	1.24
0+060	307.99	306.861	1.13
0+080	307.41	306.220	1.19
0+100	306.88	305.695	1.19
0+120	306.53	305.389	1.14
0+140	306.18	305.084	1.10
0+160	305.98	304.778	1.20
0+180	305.93	304.692	1.24
0+200	305.83	304.607	1.22
0+220	305.41	304.177	1.23
0+240	305.15	303.852	1.29
0+260	305.10	303.886	1.22
0+280	305.00	303.920	1.08
0+300	305.00	303.954	1.05
0+320	305.00	303.988	1.01
0+340	305.11	304.022	1.08
0+360	305.20	304.056	1.15
0+380	305.22	304.013	1.21
0+400	305.03	303.916	1.11
0+420	304.85	303.819	1.03
0+440	304.76	303.722	1.04
0+460	304.76	303.625	1.14
0+480	304.74	303.528	1.22
0+500	304.87	303.704	1.17
0+520	305.04	303.937	1.10
0+540	305.29	304.170	1.12
0+560	305.60	304.403	1.20
0+580	305.92	304.636	1.28
0+600	306.14	304.868	1.27
0+620	306.34	305.101	1.24
0+640	306.55	305.334	1.21
0+660	306.73	305.543	1.19
0+680	306.97	305.748	1.22
0+700	307.00	305.779	1.22
0+720	307.00	305.754	1.25
0+740	306.97	305.728	1.25
0+760	306.92	305.702	1.22
0+780	306.88	305.676	1.20

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -3.20% | -1.53% | -0.43% | -2.80% | 0.17% | -0.49% | 1.16% | 1.03% | -0.13%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
NOORGOWS RWSS - WAJIR
DL-01
PLAN AND PROFILE
CHAINAGE 0+000 - 0+780
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-03.01

Jul 19, 2025 - 10:44am

PLAN
SCALE 1:1250

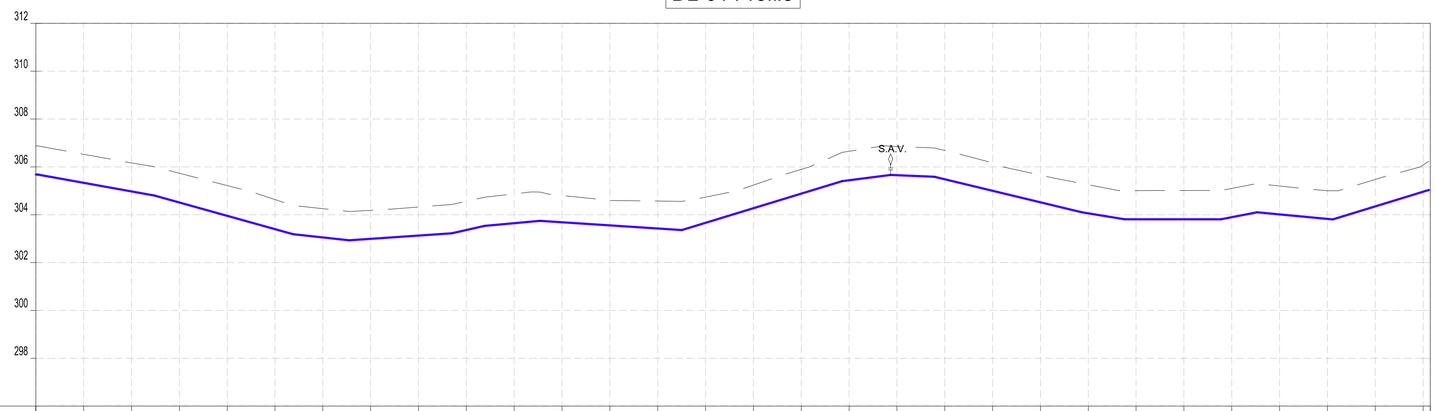
NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP		SOLAR PANEL
GH		GENERATOR HOUSE
BH		BOREHOLE
UT		UNDERGROUND TANK
GT		GROUND TANK
ET		ELEVATED TANK, PLASTIC
SET		STEEL ELEVATED TANK(SET)
WK-PROP.		WATER KIOSK (PROPOSED)
WK-EXIST.		WATER KIOSK (EXISTING)
CH		CHAMBER
WT-PROP.		WATER TROUGH-PROPOSED
WT-EXIST.		WATER TROUGH-EXISTING
		EXISTING PIPELINE
		RISING MAIN
		DISTRIBUTION LINE
		DISTRIBUTION LINE TO WATER TROUGH
		ORIGINAL GROUND LEVEL
		PIPE INVERT LEVEL
		PIPE
	212.50	MAJOR CONTOURS WITH ELEVATION
	212.30	MINOR CONTOURS WITH ELEVATION
OD		OUTSIDE DIAMETER
	S.A.V.	SINGLE AIR VALVE
	D.A.V.	DOUBLE AIR VALVE
	W.O.	WASH OUT

DL-01 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+780	306.88	306.876	0.00
0+800	306.53	306.526	0.00
0+820	306.16	306.164	0.00
0+840	305.73	305.733	0.00
0+860	305.22	305.218	0.00
0+880	304.63	304.634	0.00
0+900	304.25	304.251	0.00
0+920	304.18	304.184	0.00
0+940	304.32	304.320	0.00
0+960	304.56	304.561	0.00
0+980	304.87	304.871	0.00
1+000	304.80	304.802	0.00
1+020	304.60	304.596	0.00
1+040	304.57	304.569	0.00
1+060	304.74	304.737	0.00
1+080	305.24	305.237	0.00
1+100	305.89	305.894	0.00
1+120	306.65	306.650	0.00
1+140	306.84	306.844	0.00
1+160	306.68	306.685	0.00
1+180	306.17	306.167	0.00
1+200	305.65	305.653	0.00
1+220	305.25	305.251	0.00
1+240	305.01	305.008	0.00
1+260	305.01	305.010	0.00
1+280	305.09	305.095	0.00
1+300	305.20	305.200	0.00
1+320	305.00	305.000	0.00
1+340	305.47	305.471	0.00
1+360 / 1+363	306.08	306.075	0.00

SIZE AND TYPE OF PIPE: OD63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 0.00% | -1.82% | -1.10% | 0.87% | -2.55% | -3.27% | -1.45% | -1.07% | 0.57% | 0.76% | 2.24% | 1.15% | 1.12% | 0.12% | -0.07% | -0.00% | -1.04% | -0.12% | 1.52% | 2.09% | 2.01% | 3.45% | 3.05% | 4.44% | 1.59% | 0.04% | -0.36% | -2.30% | -2.45% | -2.52% | -2.21% | -1.94% | -0.12% | -0.01% | 0.01% | 0.12% | 0.34% | -1.03% | -1.07% | -0.36% | 3.03% | 2.13% | 6.62%

PROFILE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
NOORGOWS RWSS - WAJIR
DL-01
PLAN AND PROFILE
CHAINAGE 0+780 - 1+363
SHEET 1 OF 1

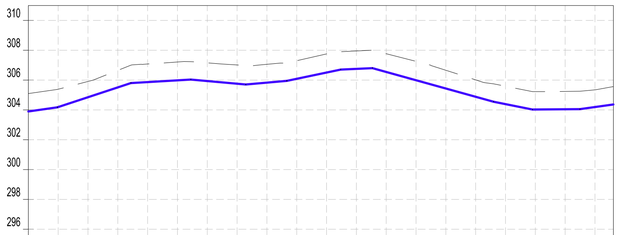
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-03.02

Jul 19, 2025 - 10:44am

PLAN
SCALE 1:1250

DL-02 Profile



CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	305.09	303.893	1.20
0+020	305.39	304.190	1.20
0+040	305.91	304.850	1.06
0+060	306.65	305.510	1.14
0+080	307.08	305.866	1.21
0+100	307.21	305.985	1.23
0+120	307.15	305.938	1.22
0+140	307.01	305.757	1.25
0+160	307.06	305.830	1.23
0+180	307.30	306.088	1.21
0+200	307.76	306.506	1.25
0+220	307.95	306.751	1.20
0+240	307.76	306.545	1.22
0+260	307.25	305.990	1.26
0+280	306.66	305.436	1.22
0+300	306.01	304.881	1.13
0+320	305.59	304.388	1.20
0+340	305.23	304.027	1.20
0+360	305.24	304.041	1.20
0+380	305.34	304.191	1.15
0+392.33	305.56	304.365	1.20

SIZE AND TYPE OF PIPE: OD32 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): 1.43% | 3.10% | 0.59% | -0.91% | 0.90% | 2.09% | 0.46% | -2.77% | -2.00% | 0.07% | 1.41%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
NOORGOWS RWSS - WAJIR
DL-02
PLAN AND PROFILE
CHAINAGE 0+000 - 0+392
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-06-03

Jul 19, 2025 - 10:44am

ABDIGAMEY RWSS - WAJIR

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd
in Association with
Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE 2025
Drawn by:	R.K	JUNE 2025
Checked by:	W.O	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

ABDIGAMEY RWSS - WAJIR

GENERAL LAYOUT PLAN - PROPOSED

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-07-01

Jul 19, 2025 - 10:45am

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates
architects engineers & consultants pvt. ltd.

ADVANCED
ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE. 2025
Drawn by:	J.K	JUNE. 2025
Checked by:	W.O	JUNE. 2025
Approved by:	D.L	JUNE. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

ABDIGAMEY RWSS - WAJIR

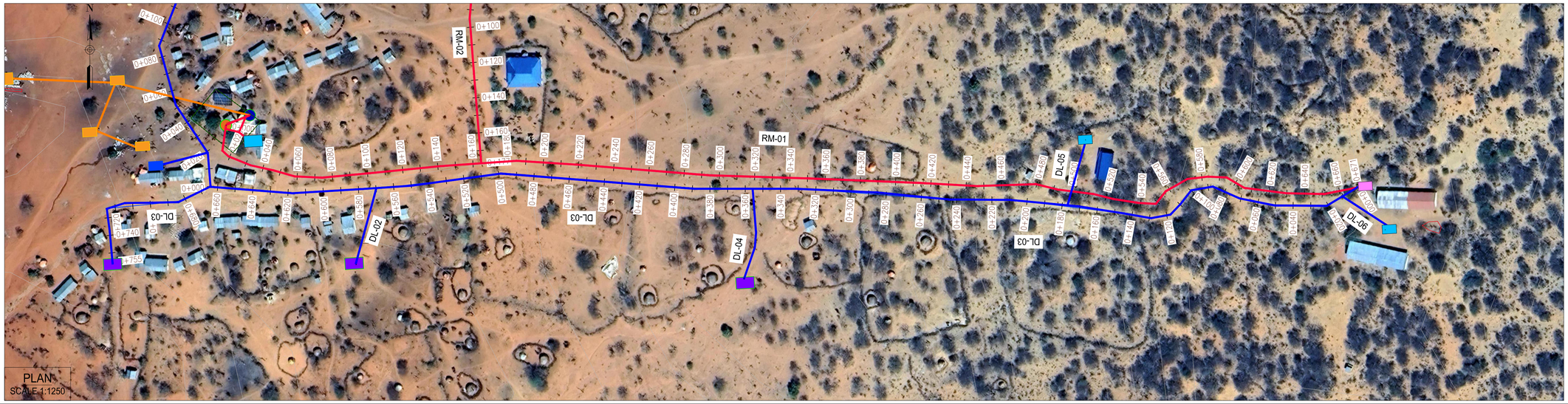
GENERAL LAYOUT

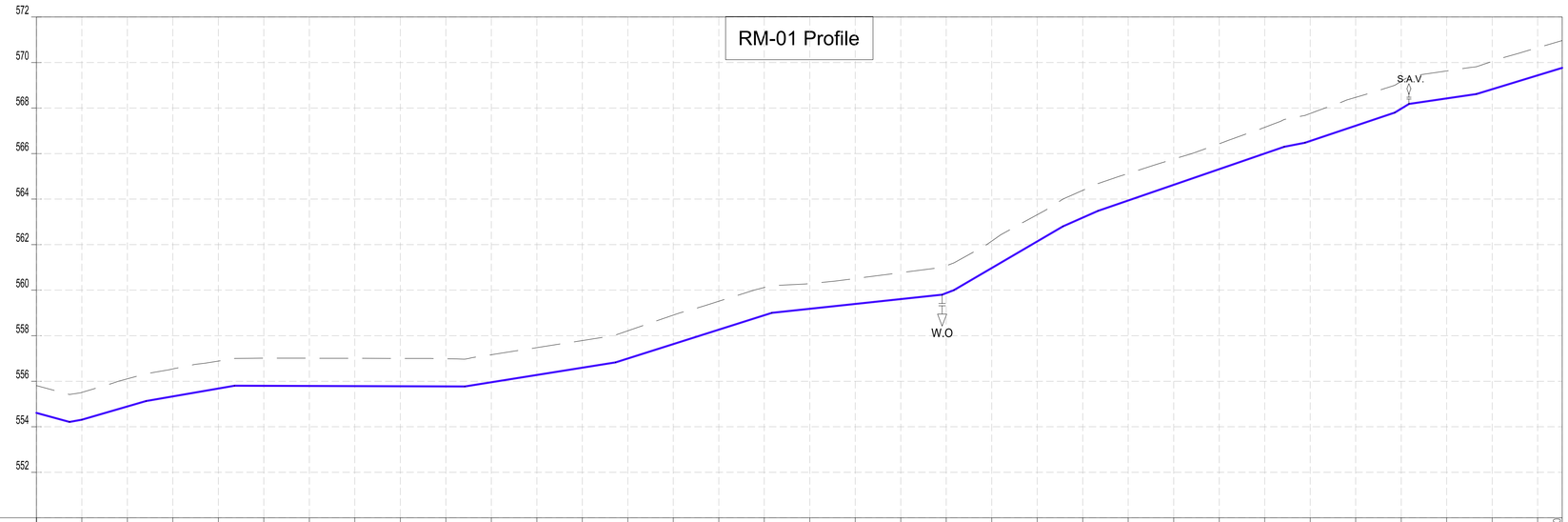
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-07-01

Jul 19, 2025 - 10:45am





CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	555.81	554.608	1.20
0+020	555.51	554.308	1.20
0+040	556.11	554.889	1.22
0+060	556.54	555.331	1.21
0+080	556.89	555.677	1.21
0+100	557.01	555.796	1.22
0+120	557.01	555.790	1.22
0+140	557.01	555.784	1.22
0+160	557.00	555.779	1.22
0+180	556.99	555.773	1.22
0+200	557.17	555.956	1.21
0+220	557.48	556.276	1.20
0+240	557.79	556.595	1.19
0+260	558.21	556.999	1.21
0+280	558.90	557.631	1.27
0+300	559.51	558.264	1.25
0+320	560.12	558.897	1.22
0+340	560.29	559.180	1.11
0+360	560.51	559.393	1.12
0+380	560.77	559.606	1.16
0+400	561.07	559.869	1.20
0+420	562.15	560.970	1.18
0+440	563.31	562.138	1.18
0+460	564.38	563.184	1.20
0+480	565.12	563.939	1.18
0+500	565.76	564.627	1.14
0+520	566.43	565.316	1.12
0+540	567.15	566.004	1.15
0+560	567.76	566.554	1.21
0+580	568.47	567.225	1.24
0+600	569.17	567.973	1.20
0+620	569.63	568.424	1.21
0+640	570.06	568.826	1.24
0+660	570.65	569.434	1.21
0+670.80	570.96	569.762	1.20

SIZE AND TYPE OF PIPE: OD 40 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -2.77% -1.29% 2.90% 1.73% -0.03% 1.60% 3.16% 1.07% -1.86% 5.84% 4.43% 3.44% -1.46% 3.35% 6.10% 1.46% 3.04%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE. 2025
Drawn by:	J.K	JUNE. 2025
Checked by:	W.O	JUNE. 2025
Approved by:	D.L	JUNE. 2025

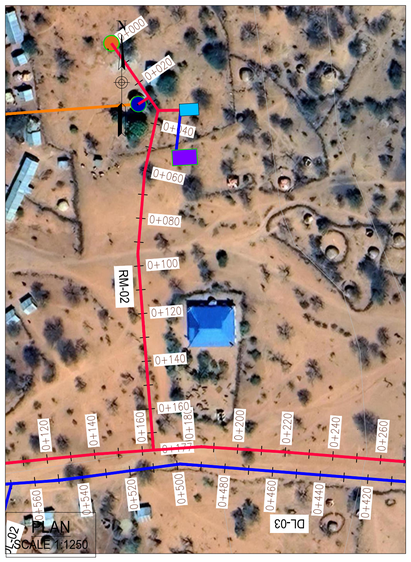
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

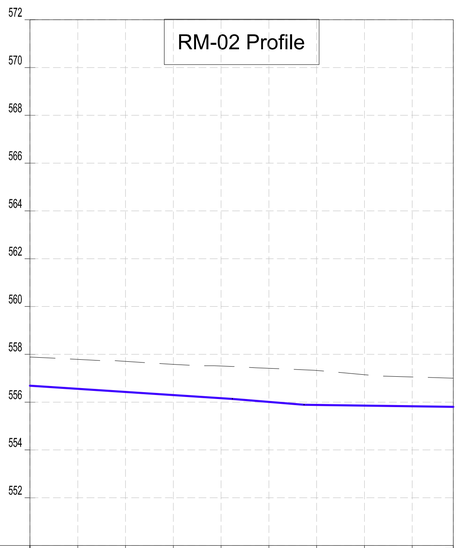
DRAWING TITLE:
ABDIGAMEY RWSS - WAJIR
RM-01
PLAN AND PROFILE
CHAINAGE 0+000 - 0+671
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-07-02

Jul 19, 2025 - 10:45am





CHAINAGES (M)	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+177.21
GROUND LEVEL (M)	557.89	557.79	557.70	557.58	557.51	557.42	557.33	557.15	557.05	557.00
INVERT LEVELS (M)	556.687	556.557	556.426	556.296	556.165	556.011	555.884	555.855	555.827	555.802
TRENCH DEPTH (M)	1.20	1.23	1.28	1.28	1.35	1.40	1.44	1.29	1.22	1.20
SIZE AND TYPE OF PIPE	OD 32 PN10 HDPE PIPE									
PIPE FITTINGS										
SLOPE (%)	~0.65%					~0.81%	~0.14%			

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE. 2025
Drawn by:	J.K	JUNE. 2025
Checked by:	W.O	JUNE. 2025
Approved by:	D.L	JUNE. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

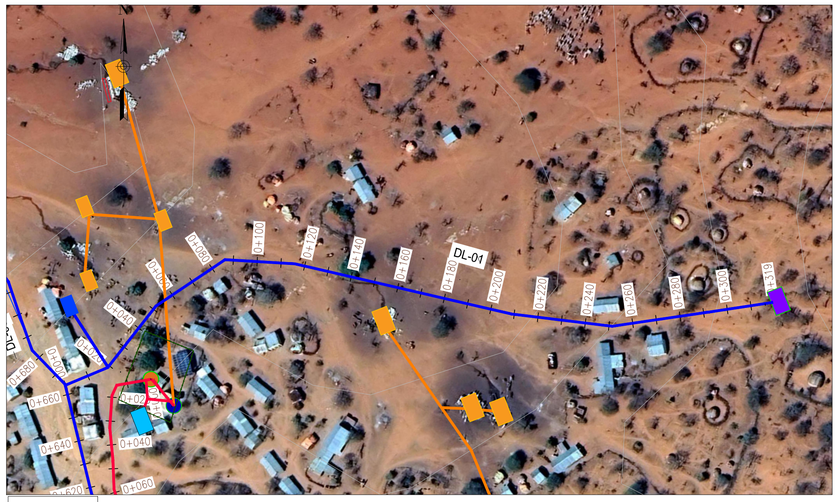
DRAWING TITLE:

ABDIGAMEY RWSS - WAJIR
RM-02
PLAN AND PROFILE
CHAINAGE 0+000 - 0+177
SHEET 1 OF 1

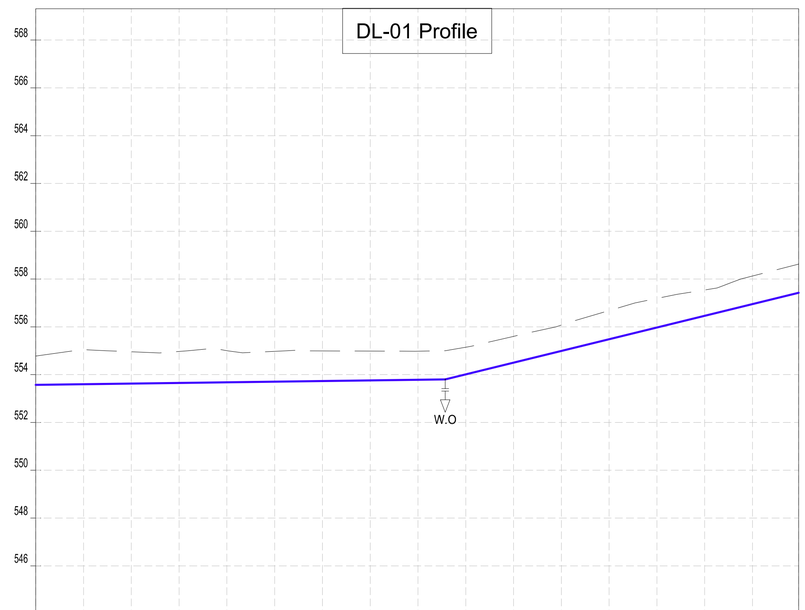
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-07-03

Jul 19, 2025 - 10:46am



PLAN
SCALE 1:1250



CHAINAGES (M)	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200	0+220	0+240	0+260	0+280	0+300	0+319.35
GROUND LEVEL (M)	554.78	555.05	554.96	554.97	555.00	554.98	554.99	554.99	554.98	555.15	555.60	556.07	556.68	557.19	557.54	558.13	558.63
INVERT LEVELS (M)	553.575	553.602	553.628	553.654	553.680	553.706	553.733	553.759	553.785	554.011	554.501	554.991	555.481	555.971	556.462	556.952	557.426
TRENCH DEPTH (M)	1.20	1.45	1.33	1.32	1.32	1.27	1.26	1.23	1.20	1.14	1.10	1.08	1.20	1.22	1.08	1.18	1.20
SIZE AND TYPE OF PIPE	OD 32 PN10 HDPE PIPE																
PIPE FITTINGS																	
SLOPE (%)	0.13%											2.45%					

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE. 2025
Drawn by:	J.K	JUNE. 2025
Checked by:	W.O	JUNE. 2025
Approved by:	D.L	JUNE. 2025

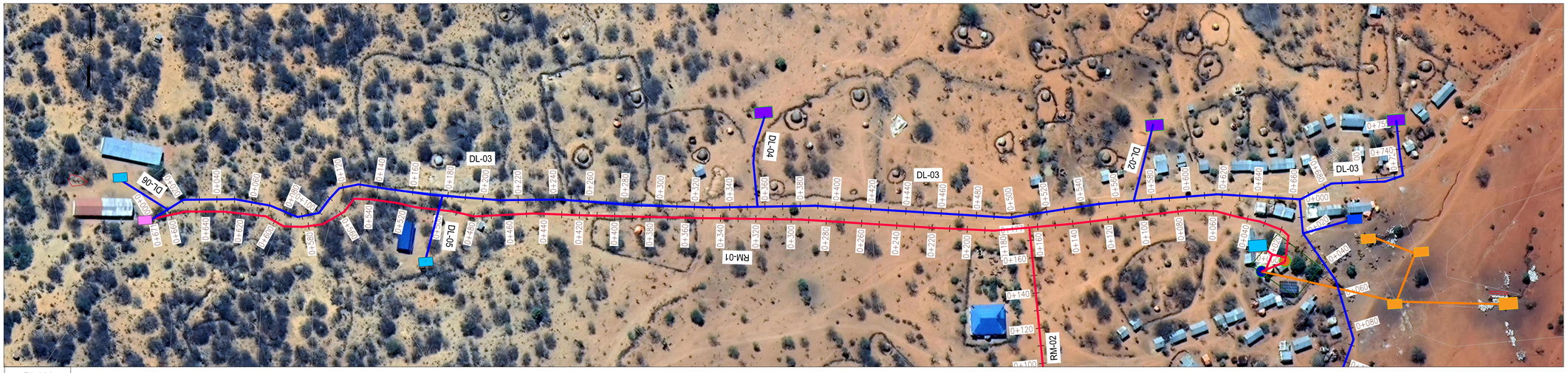
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
ABDIGAMEY RWSS - WAJIR
DL-01
PLAN AND PROFILE
CHAINAGE 0+000 - 0+319
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-07-04

Jul 19, 2025 - 10:46am



PLAN
SCALE 1:1250

CHAINAGES (M)	GROUND LEVEL (M)	INVERT LEVELS (M)	TRENCH DEPTH (M)
0+000	570.97		
0+020	570.42	569.213	1.21
0+040	569.93	568.724	1.21
0+060	569.65	568.440	1.21
0+080	568.96	567.962	1.00
0+100	568.35	567.258	1.09
0+120	567.91	566.554	1.36
0+140	567.07	565.850	1.22
0+160	566.35	565.146	1.20
0+180	565.68	564.442	1.24
0+200	565.04	563.738	1.30
0+220	564.22	563.034	1.18
0+240	563.14	561.931	1.21
0+260	561.90	560.828	1.07
0+280	560.98	559.783	1.20
0+300	560.72	559.529	1.20
0+320	560.47	559.274	1.19
0+340	560.21	559.020	1.19
0+360	559.92	558.718	1.20
0+380	559.37	558.107	1.26
0+400	558.77	557.496	1.28
0+420	558.09	556.885	1.21
0+440	557.73	556.518	1.21
0+460	557.42	556.191	1.23
0+480	557.07	555.863	1.21
0+500	556.85	555.636	1.22
0+520	556.86	555.656	1.21
0+540	556.88	555.676	1.20
0+560	556.89	555.695	1.20
0+580	556.88	555.657	1.22
0+600	556.61	555.326	1.28
0+620	556.23	554.996	1.23
0+640	555.64	554.452	1.19
0+660	554.90	553.720	1.18
0+664.50	554.76	553.556	1.20

SIZE AND TYPE OF PIPE: OD 63 PN10 HDPE PIPE

PIPE FITTINGS

SLOPE (%): -2.77% | -1.42% | -3.52% | -5.52% | -1.27% | -3.06% | -1.64% | 0.10% | -1.65% | -3.66%

PROFILE

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PIPES ARE TO BE LAID TO EVEN GRADIENTS WITH A MINIMUM OF 0.9m AND 1.0m FOR TRAFFICKED AREAS, WHERE COVER IS LESS THAN 0.9m, THE PIPE IS TO BE SURROUNDED WITH CONCRETE.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH OTHER RELATED DRAWINGS.
4. DRAWINGS ARE TO BE READ AND NOT SCALED, ANY DISCREPANCIES TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON SITE IMMEDIATELY.
5. SURVEY OF THE PIPELINE ROUTES SHALL BE CARRIED OUT TO CONFIRM CONSTRUCTION DETAILS ISSUED AND SUBMITTED TO THE RESIDENT ENGINEER FOR APPROVAL PRIOR TO COMMENCEMENT OF CONSTRUCTION.
6. SECTIONS HAVING A SLOPE HIGHER THAN 16% WILL REQUIRE CONCRETE SUPPORT AS DIRECTED BY THE ENGINEER ON SITE.
7. THE TYPE OF WASHOUT WILL BE AS DIRECTED BY THE ENGINEER ONSITE AS PER THE DETAILS PROVIDED IN THE STANDARD DRAWING No. GW4R-STD-11.

LEGEND:

SP	SOLAR PANEL
GH	GENERATOR HOUSE
BH	BOREHOLE
UT	UNDERGROUND TANK
GT	GROUND TANK
ET	ELEVATED TANK, PLASTIC
SET	STEEL ELEVATED TANK(SET)
WK-PROP.	WATER KIOSK (PROPOSED)
WK-EXIST.	WATER KIOSK (EXISTING)
CH	CHAMBER
WT-PROP.	WATER TROUGH-PROPOSED
WT-EXIST.	WATER TROUGH-EXISTING
	EXISTING PIPELINE
	RISING MAIN
	DISTRIBUTION LINE
	DISTRIBUTION LINE TO WATER TROUGH
	ORIGINAL GROUND LEVEL
	PIPE INVERT LEVEL
	PIPE
212.50	MAJOR CONTOURS WITH ELEVATION
212.30	MINOR CONTOURS WITH ELEVATION
OD	OUTSIDE DIAMETER
S.A.V.	SINGLE AIR VALVE
D.A.V.	DOUBLE AIR VALVE
W.O.	WASH OUT

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUNE. 2025
Drawn by:	J.K	JUNE. 2025
Checked by:	W.O	JUNE. 2025
Approved by:	D.L	JUNE. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

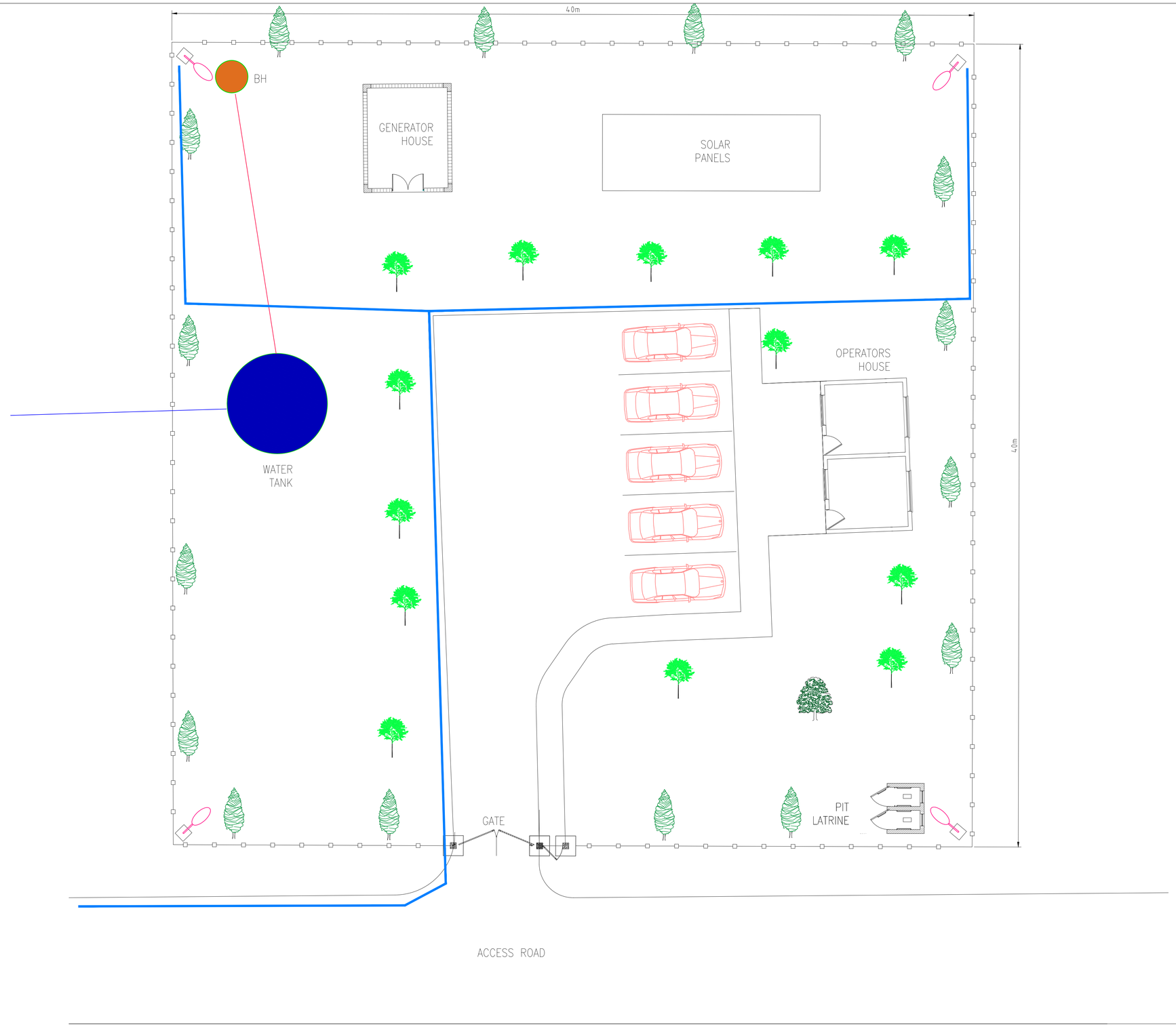
DRAWING TITLE:
ABDIGAMEY RWSS - WAJIR
DL-03
PLAN AND PROFILE
CHAINAGE 0+000 - 0+664
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-LOT1-PP-07-05

Jul 19, 2025 - 10:46am

STANDARD DRAWINGS



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.

LEGEND:

- RISING MAIN
- DISTRIBUTION LINE
- FENCE
- FLOOD LIGHT
- STORM WATER DRAINAGE

COORDINATES SYSTEM
ARC 1960
UTM ZONE 37 NORTH.
KENYA

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	M.J	JUN. 2025
Drawn by:	J.K	JUN. 2025
Checked by:	W.O	JUN. 2025
Approved by:	D.L	JUN. 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

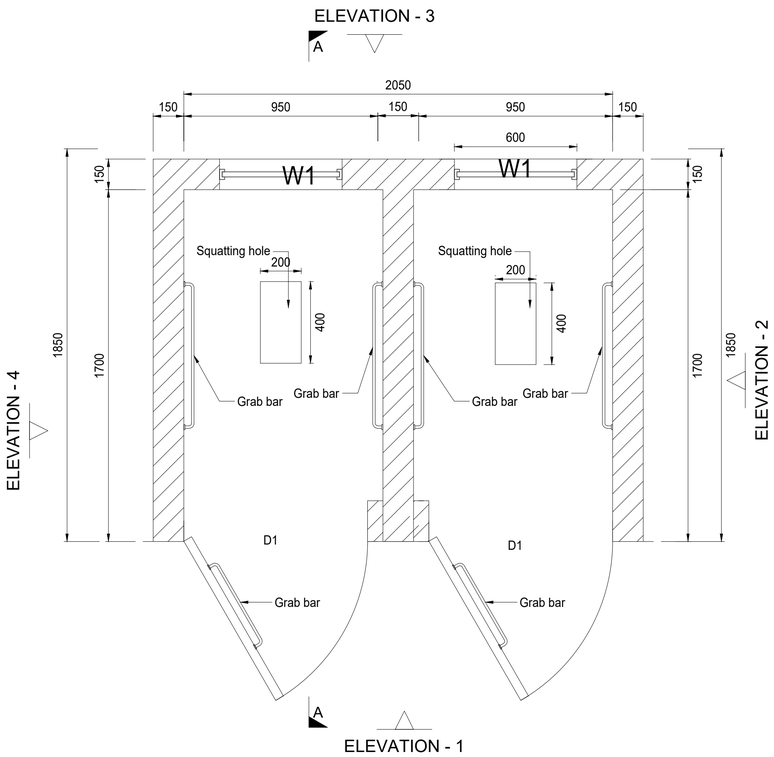
TYPICAL SITE PLAN

SHEET 1 OF 1

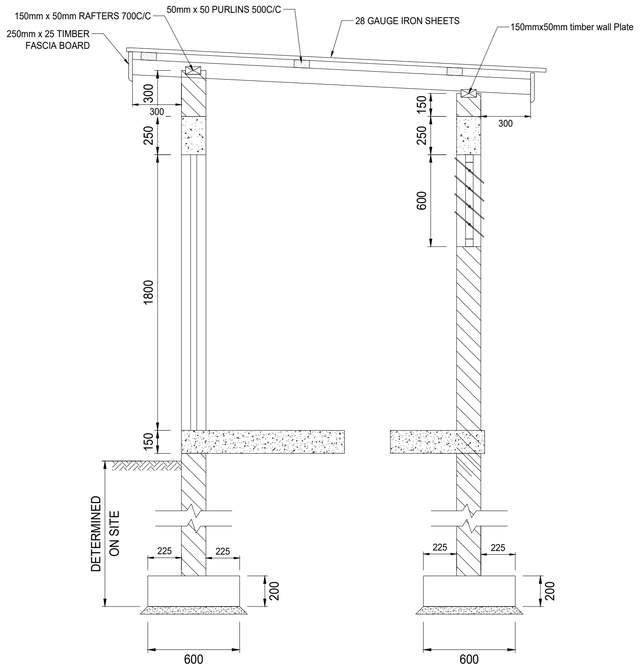
DRAWING SCALE: 1:100

DRAWING No.: GW4R-WJR-STD-01

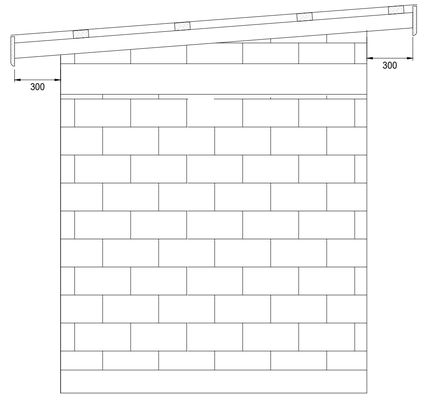
Jul 20, 2025 - 10:50pm



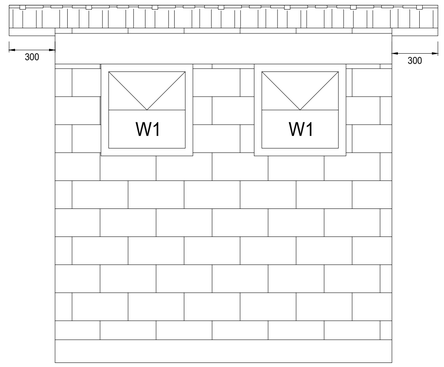
ABLUTION BLOCK PLAN
SCALE 1:20



ABLUTION BLOCK CROSS SECTION A-A
SCALE 1:20



ELEVATION - 2
SCALE 1:30

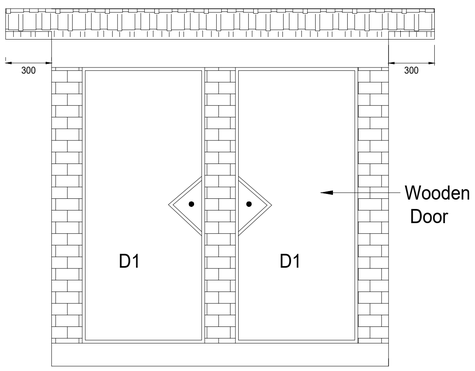


ELEVATION - 3
SCALE 1:30

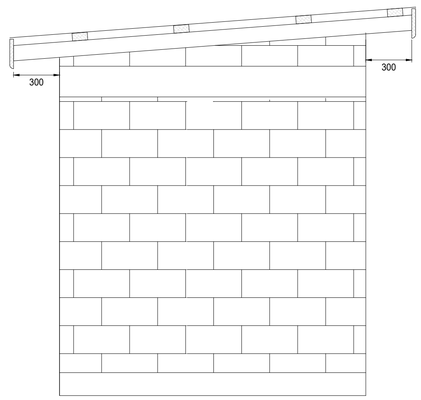
WINDOWS AND DOOR SCHEDULE

WINDOW	SIZE (HxW) mm		NO
W1	600	600	2

DOOR	SIZE (HxW) mm		NO
D1	1800	900	2



ELEVATION - 1
SCALE 1:30



ELEVATION - 4
SCALE 1:30

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

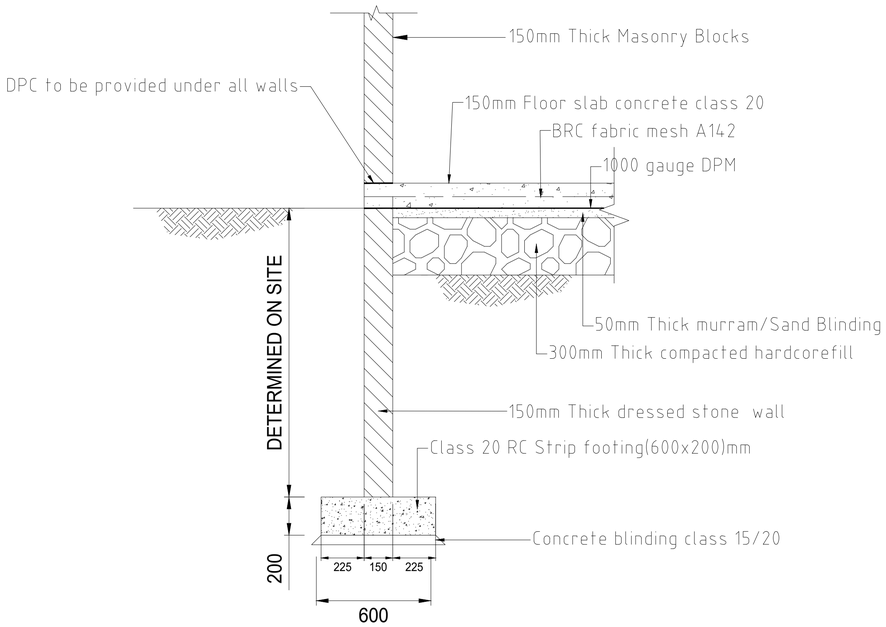
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
2.ABLUTION BLOCK
PLAN, SECTION, ELEVATION VIEWS
AND FOUNDATION DETAILS
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

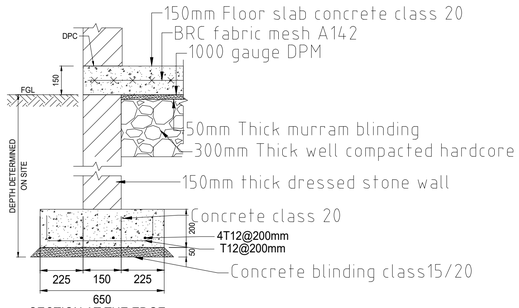
DRAWING No.: GW4R-WJR-STD-02.01

Jun 18, 2025 - 8:40am



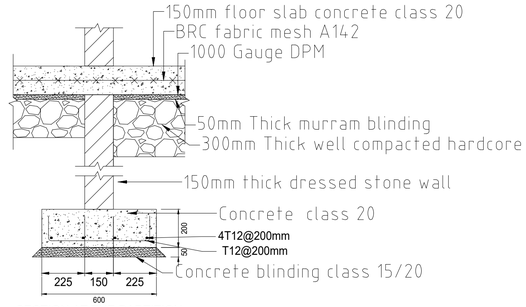
TYPICAL FLOOR AND FOUNDATION DETAIL

SCALE (A1) 1:25



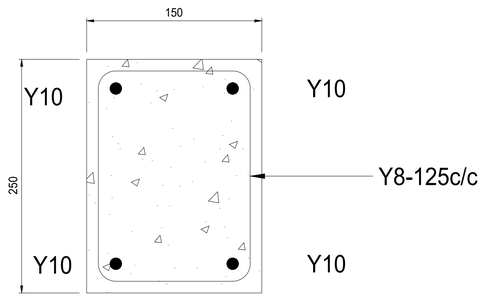
SECTION AT THE EDGE

SCALE 1:10



SECTION AT THE PARTITION

SCALE 1:10



TYPICAL CROSS SECTION THROUGH RING BEAM

SCALE 1:5

CLIENT:

WaterFund

WATER SECTOR TRUST FUND

1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,

Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

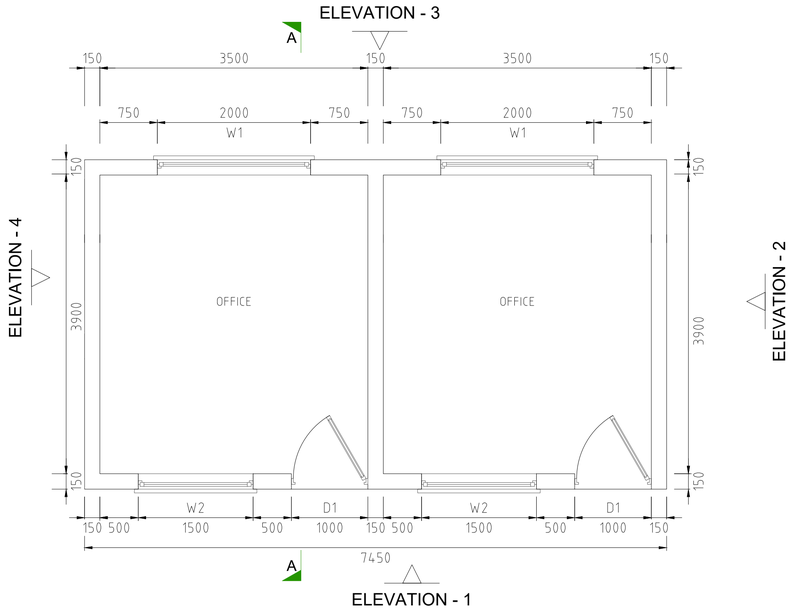
STANDARD DRAWINGS

2.ABLUTION BLOCK
PLAN, SECTION, ELEVATION VIEWS
AND FOUNDATION DETAILS
SHEET 2 OF 2

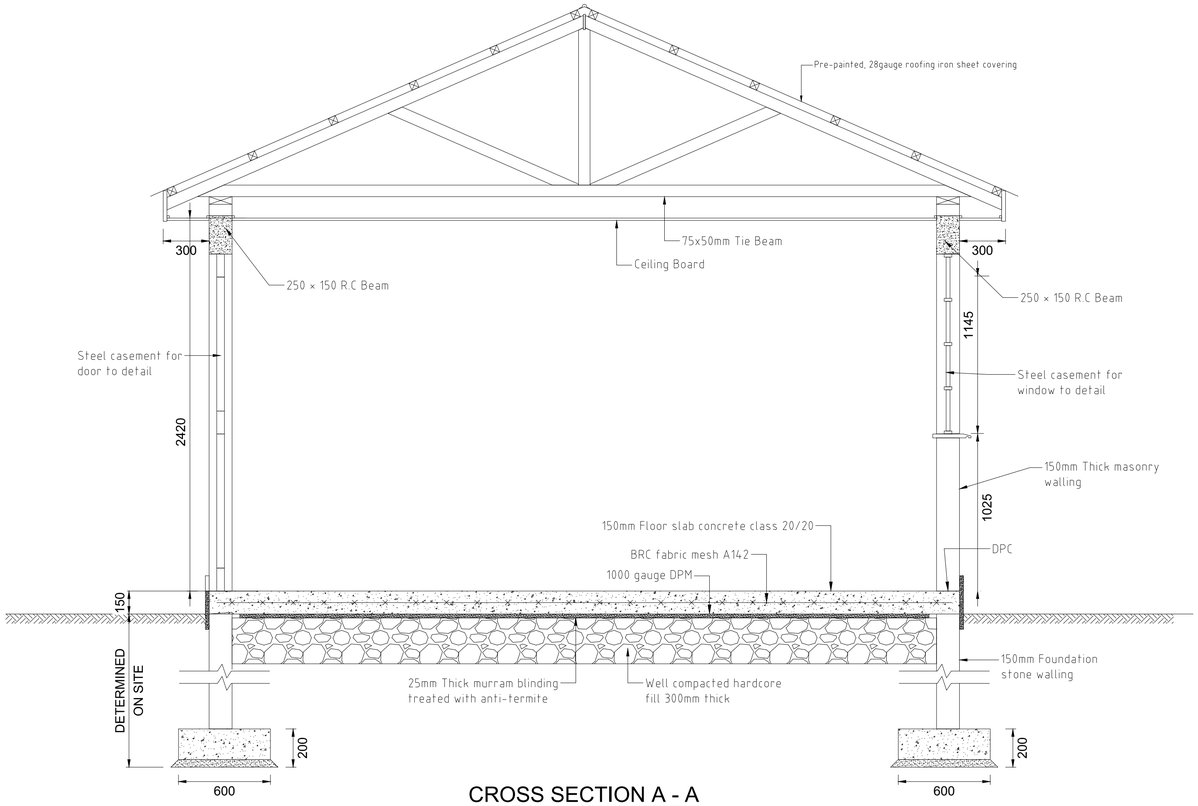
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-02.02

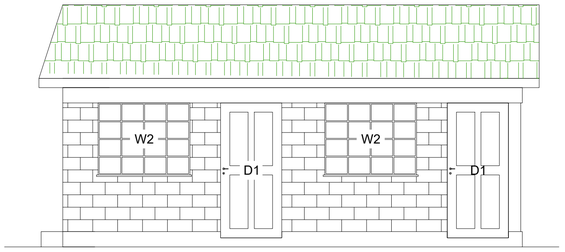
Jun 18, 2025 - 8:40am



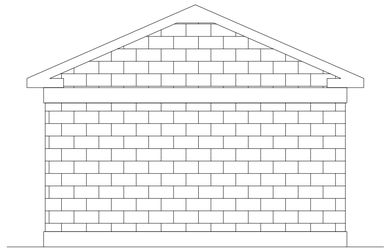
OPERATIONS BUILDING FLOOR PLAN
SCALE 1:40



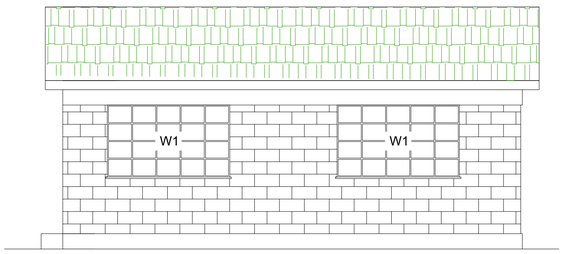
CROSS SECTION A - A
SCALE 1:20



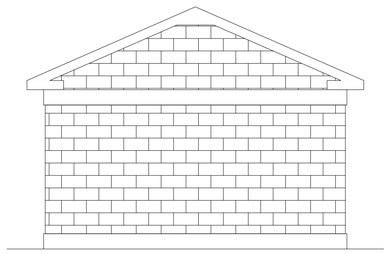
ELEVATION - 1
SCALE 1:50



ELEVATION - 2
SCALE 1:50



ELEVATION - 3
SCALE 1:50



ELEVATION - 4
SCALE 1:50

WINDOWS AND DOOR SCHEDULE

WINDOW	SIZE(mm)		
	Height	Width	NO.
W1	1175	2000	2
W2	1175	1500	2

DOOR	SIZE(mm)		
	Height	Width	NO.
D1	2200	1000	2

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

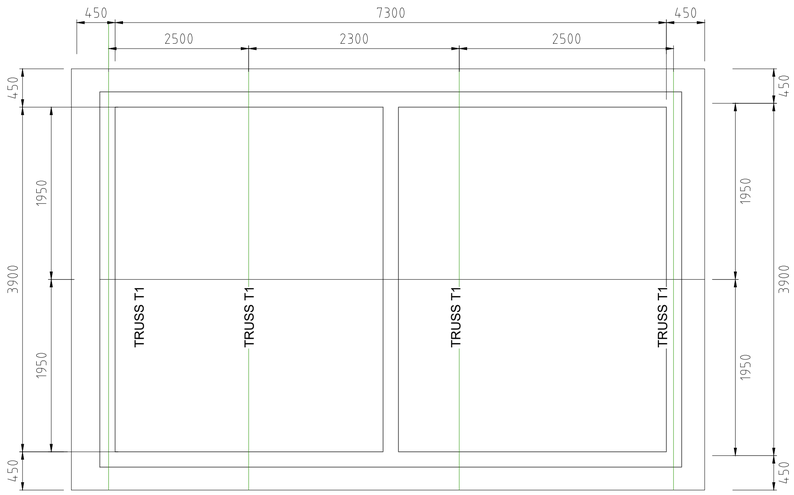
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
3.OPERATOR'S HOUSE
PLAN AND ELEVATION VIEWS
SHEET 1 OF 2

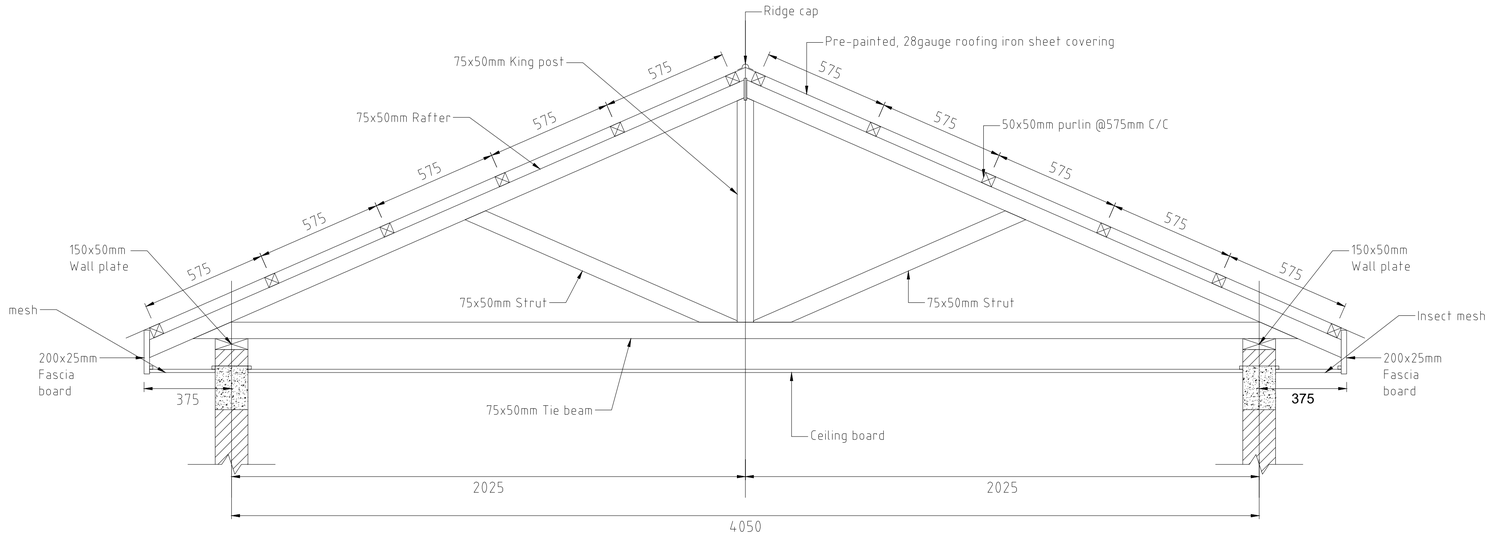
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-03.01

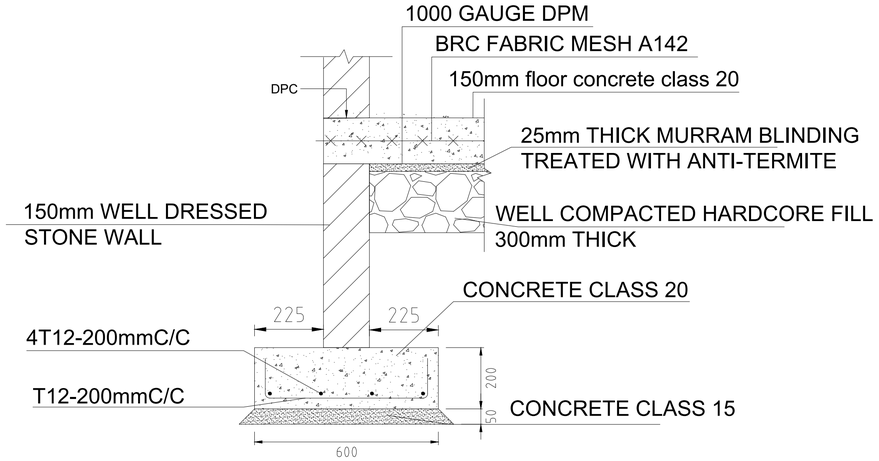
Jun 22, 2025 - 11:34pm



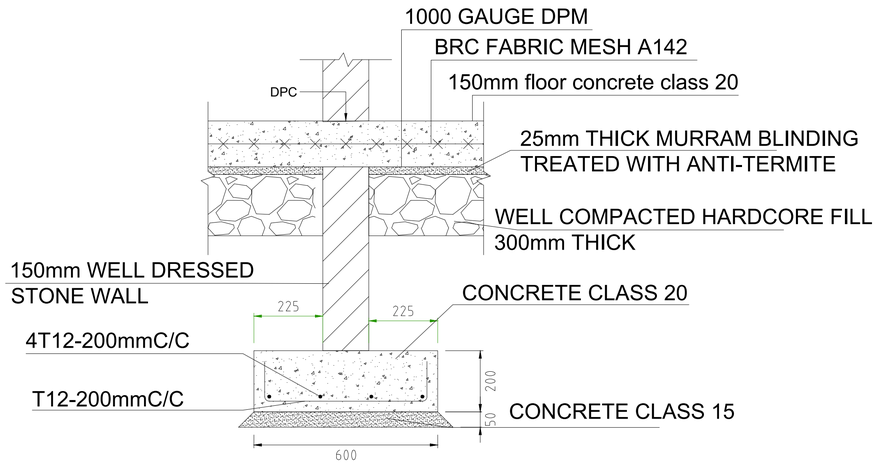
ROOF PLAN
SCALE 1:40



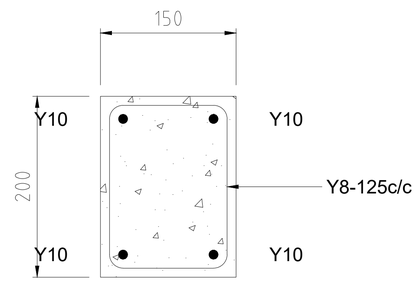
CROSS SECTION A - A
SCALE 1:15



SECTION AT THE EDGE
SCALE 1:10



SECTION AT THE PARTITION
SCALE 1:10



TYPICAL CROSS SECTION THROUGH RING BEAM
SCALE 1:5

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

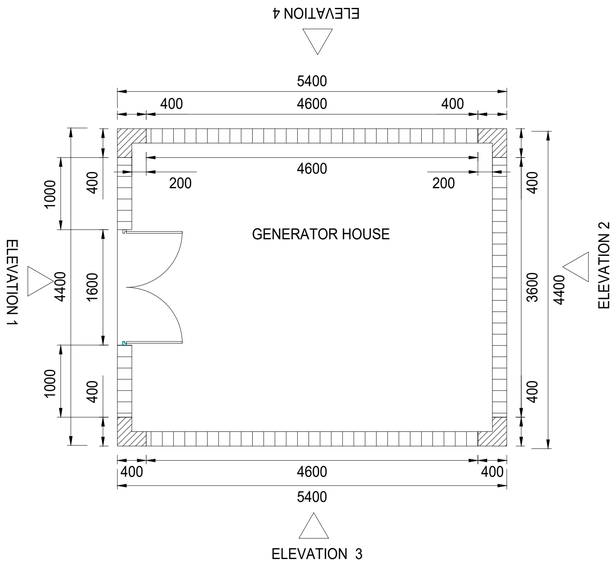
STANDARD DRAWINGS

3.OPERATOR'S HOUSE
ROOF PLAN, TRUSS DETAILS AND FOUNDATION DETAILS
SHEET 2 OF 2

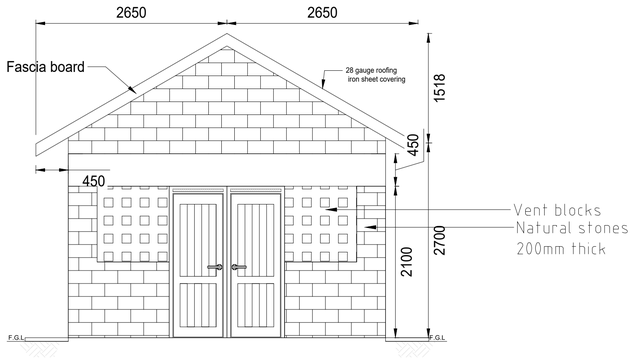
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-03.02

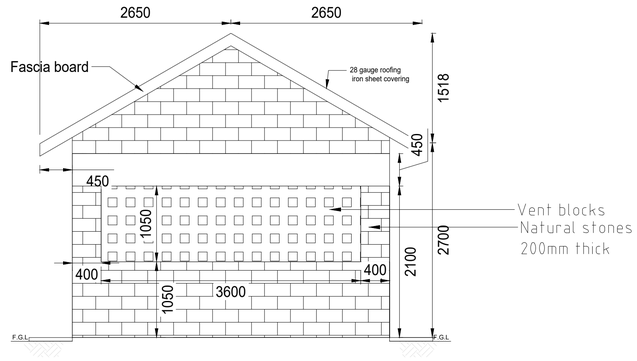
Jun 17, 2025 - 3:58pm



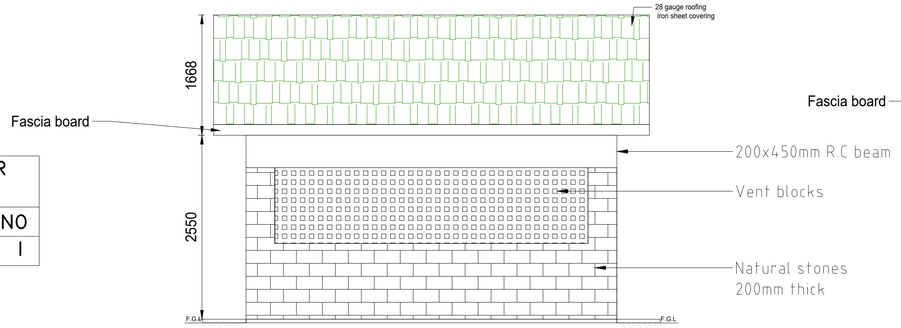
PLAN
SCALE 1:25



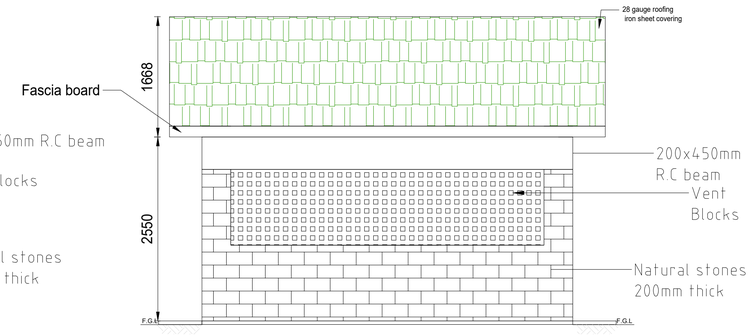
ELEVATION 1
SCALE 1:25



ELEVATION 2
SCALE 1:25



ELEVATION 3
SCALE 1:25



ELEVATION 4
SCALE 1:25

SPECIFIC NOTES:
1. The work top to be100mm thick concrete slab.
2. The slab to be reinforced with Y8-200 c/c.
3. The work top to be carried by 200mm thick wall at the edges and as may be directed by the Engineer.

WINDOW AND DOOR SCHEDULE		
ITEM	SIZE(MM)	NO
D	1600X2100	1

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

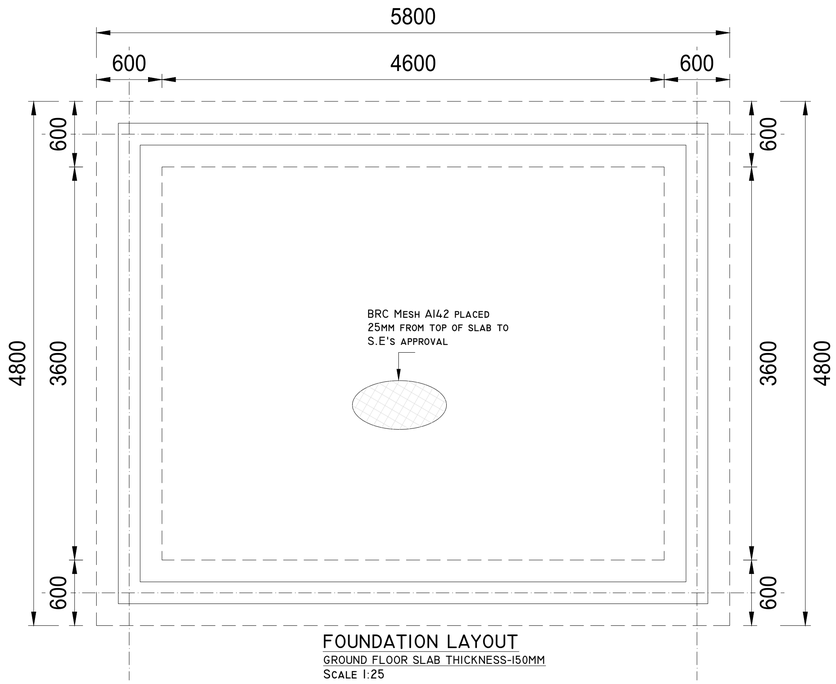
DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

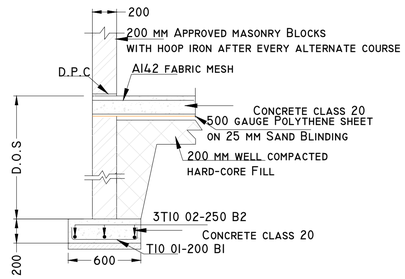
DRAWING TITLE:
STANDARD DRAWINGS
5.GENERATOR HOUSE
ROOF, RING BEAM,FOUNDATION LAYOUT PLANS AND DETAILS
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN
DRAWING No.: GW4R-WJR-STD-05.01

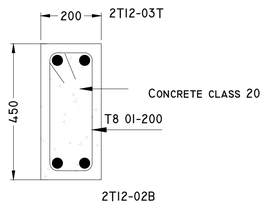
Jun 18, 2025 - 8:51am



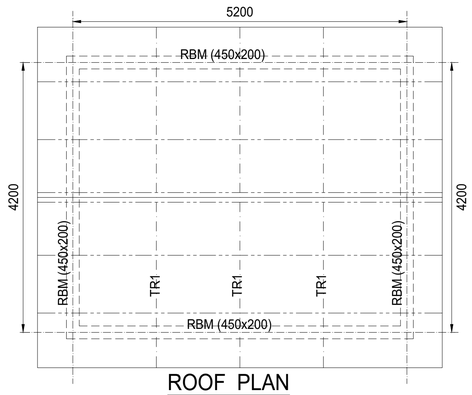
FOUNDATION LAYOUT
GROUND FLOOR SLAB THICKNESS-150MM
SCALE 1:25



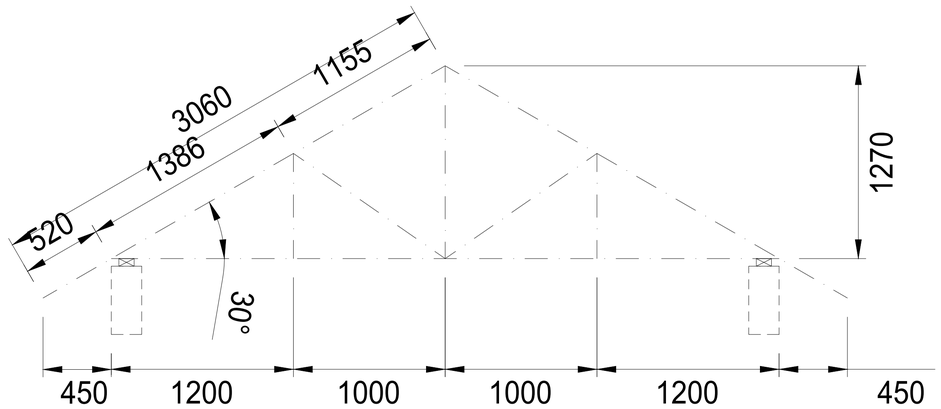
TYPICAL SECTION 1-1 THROUGH
EXTERNAL STRIP FOOTING
SCALE 1:25



TYPICAL RING BEAM
SECTION (RBM)
SCALE 1:10



ROOF PLAN
SCALE 1:25



TRUSS TRI
ALL EXTERNAL MEMBERS-100X50
ALL INTERNAL MEMBERS-75X50

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

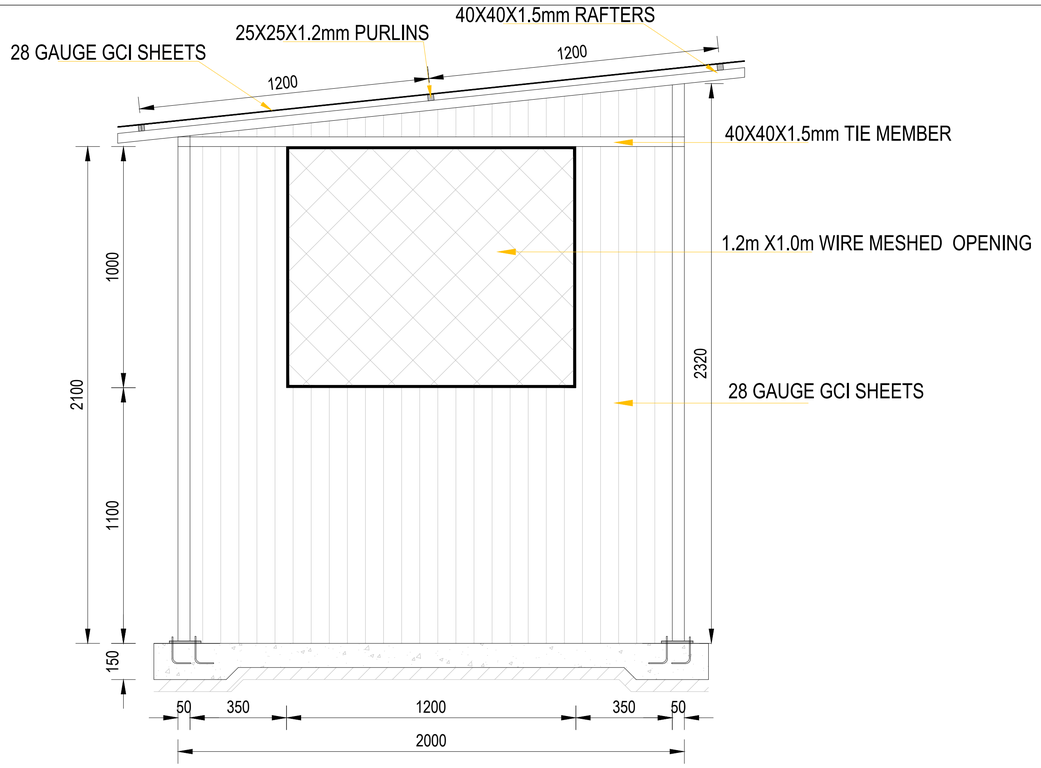
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS

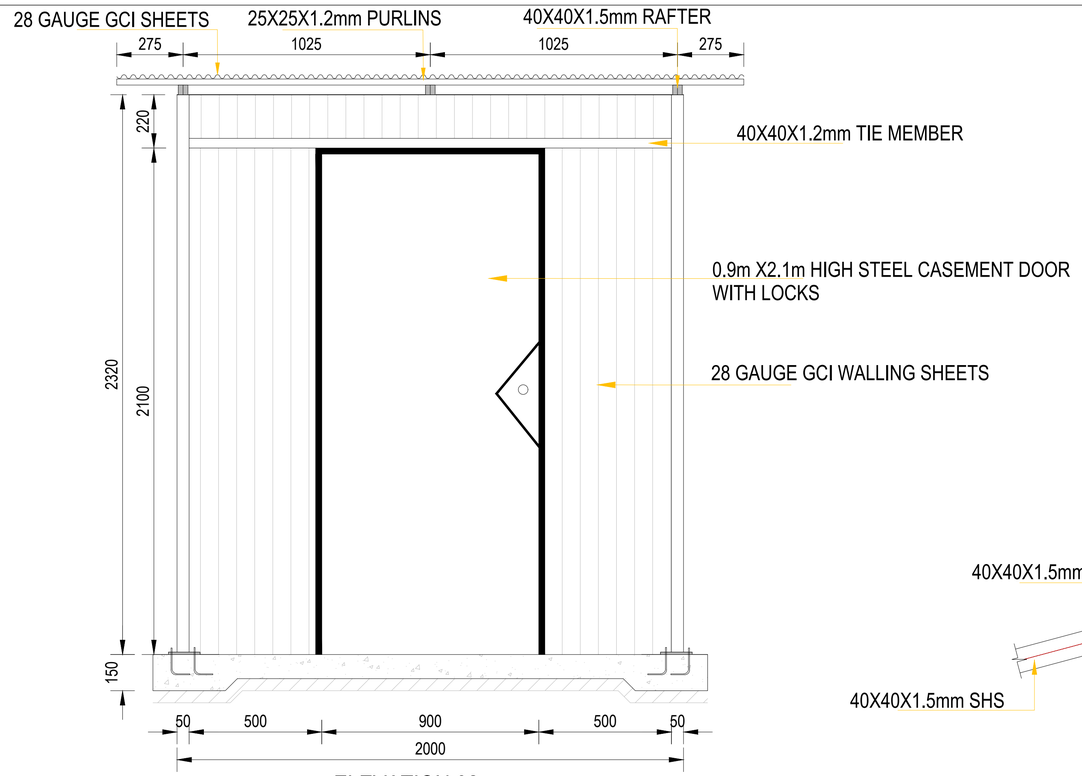
5.GENERATOR HOUSE
ROOF, RING BEAM,FOUNDATION LAYOUT PLANS AND DETAILS
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN
DRAWING No.: GW4R-WJR-STD-05.02

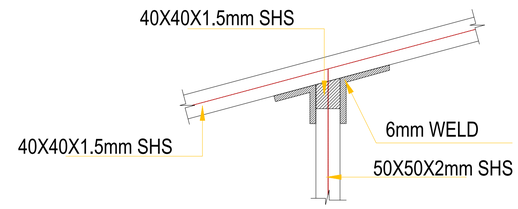
Jun 18, 2025 - 8:51am



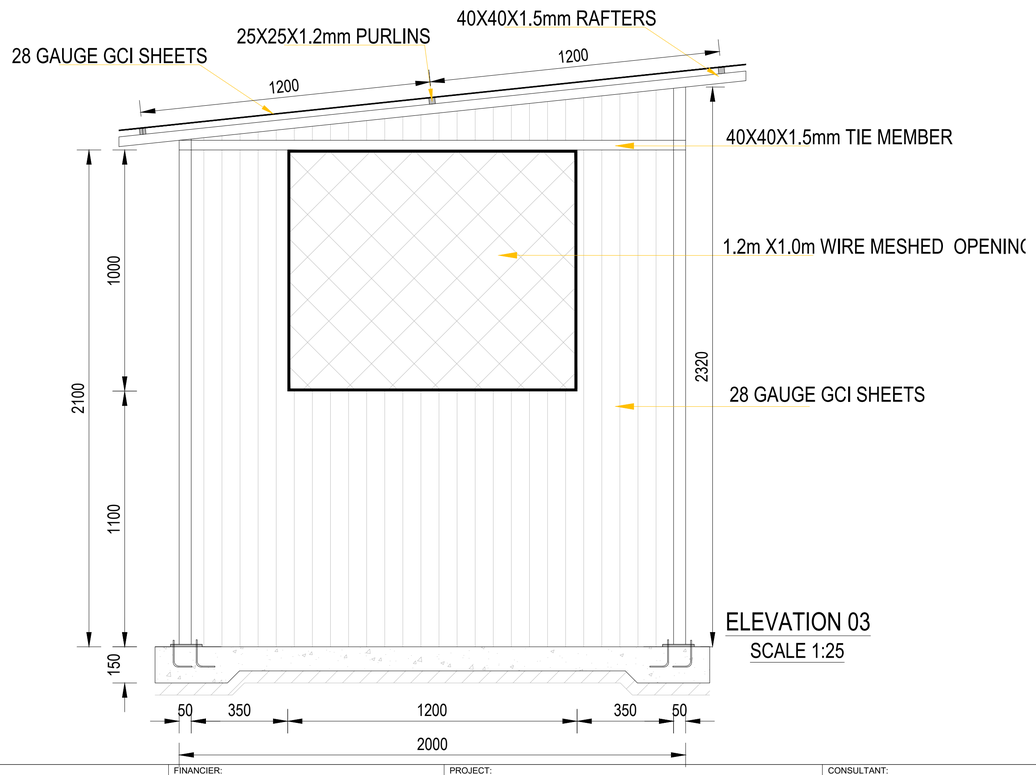
ELEVATION 01 SCALE 1:25



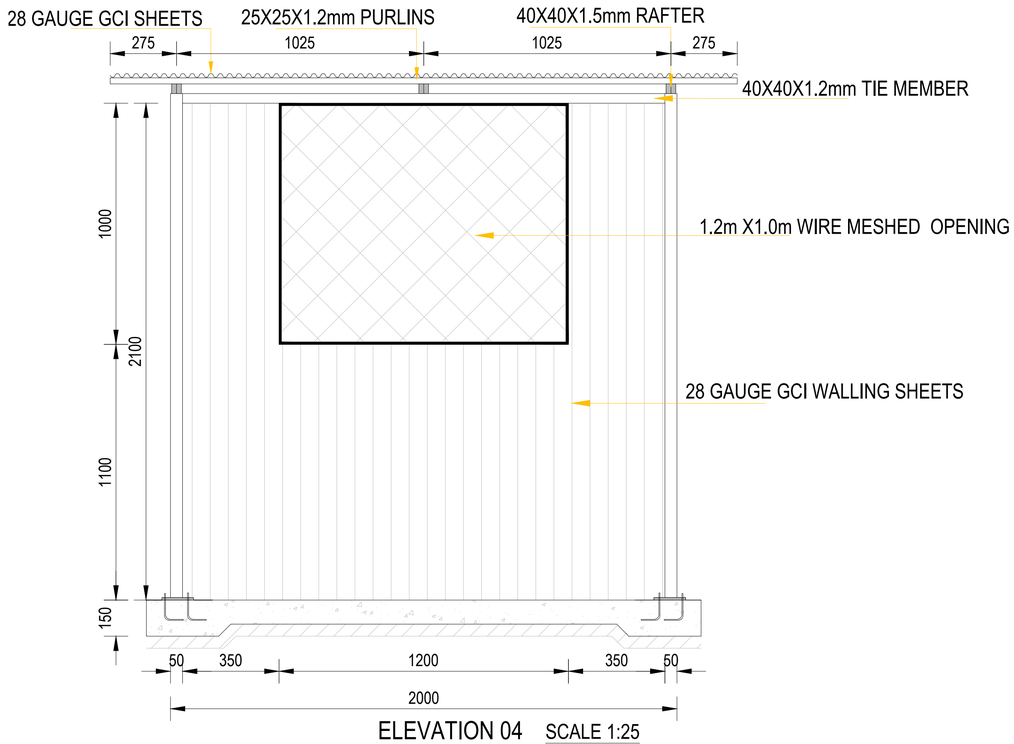
ELEVATION 02 SCALE 1:25



COLUMN TO RAFTER CONNECTION
SCALE 1:25



ELEVATION 03
SCALE 1:25



ELEVATION 04 SCALE 1:25

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WATER SECTOR TRUST FUND 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	**THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	**Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd**, Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

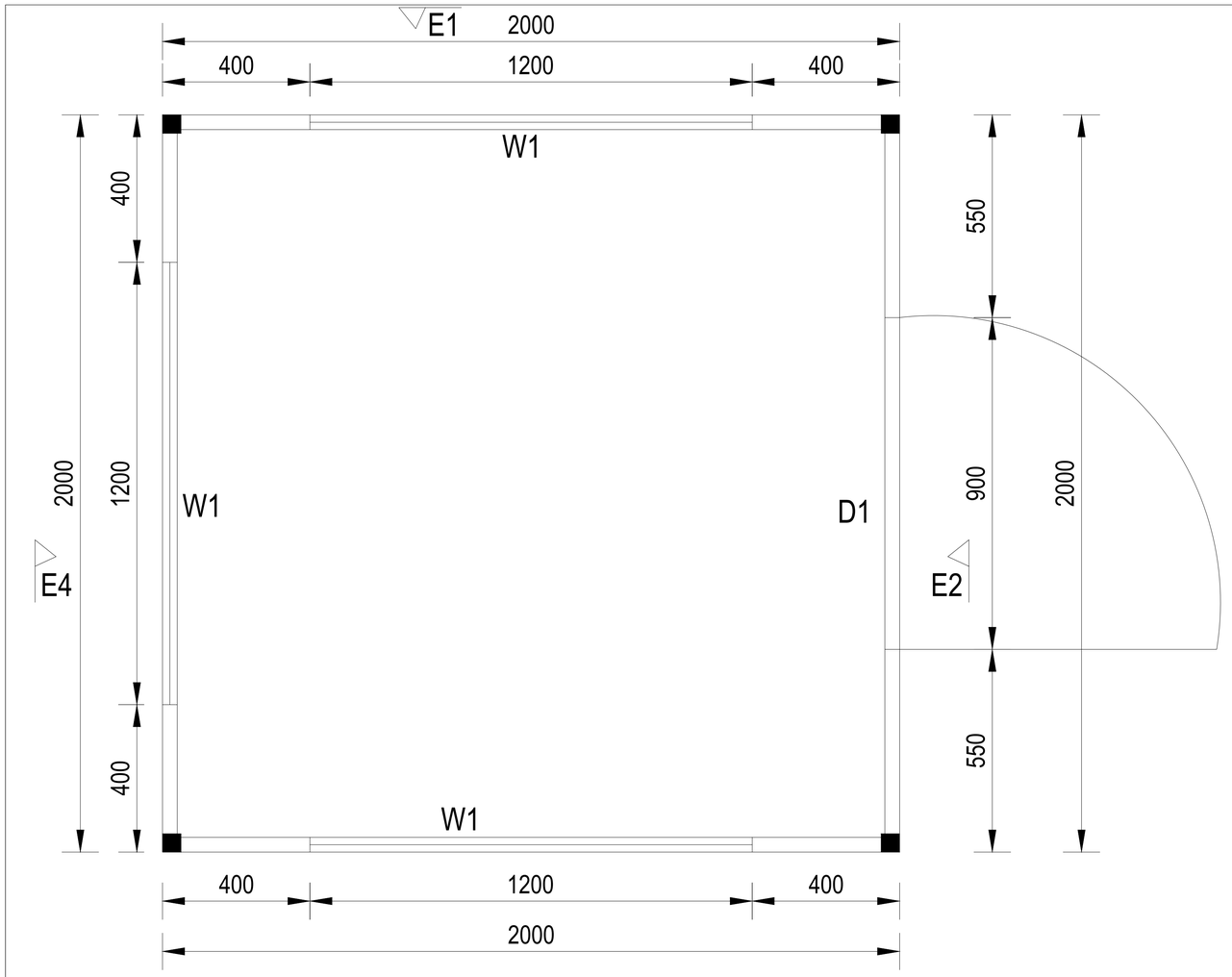
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
6 CHROLINATION HOUSE
SHEET 2 OF 2

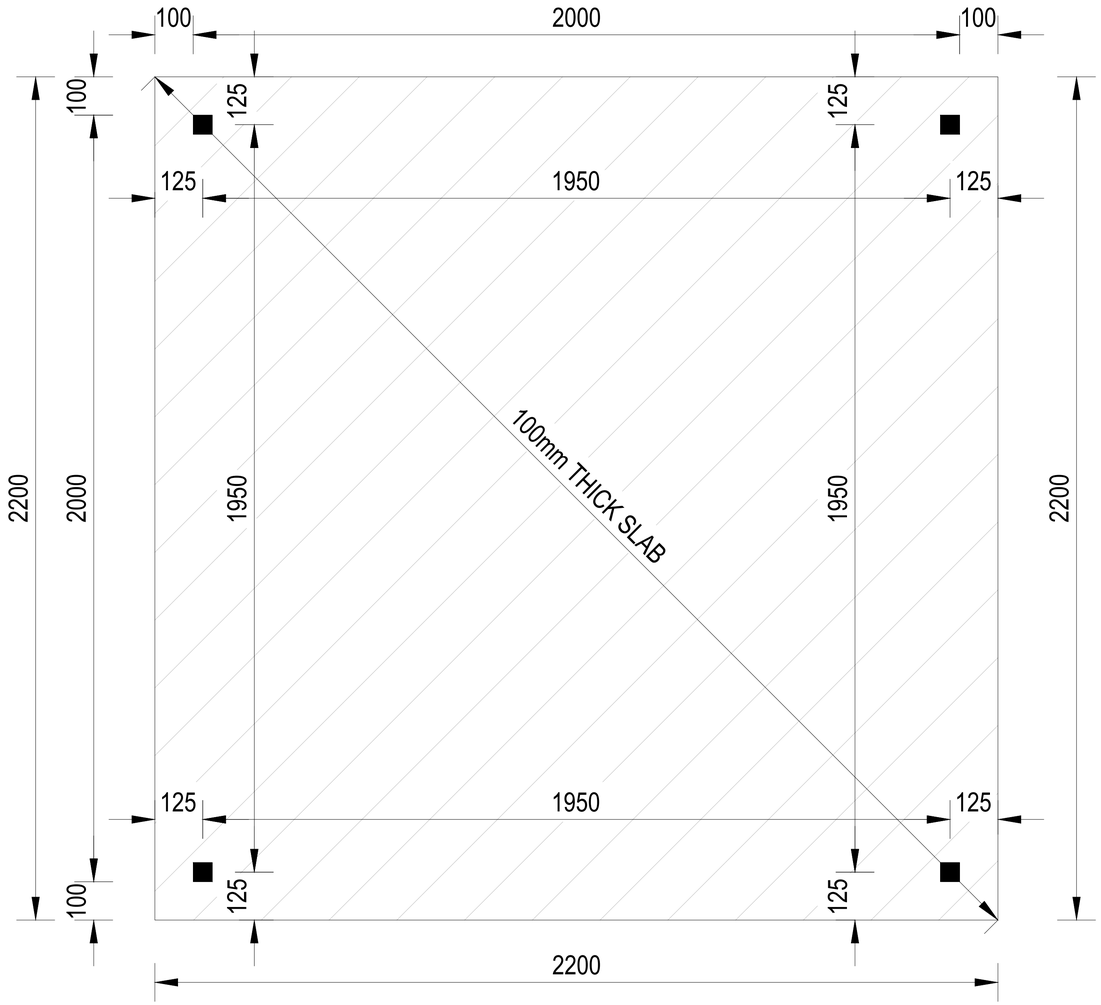
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-06

Jun 20, 2025 - 2:22pm



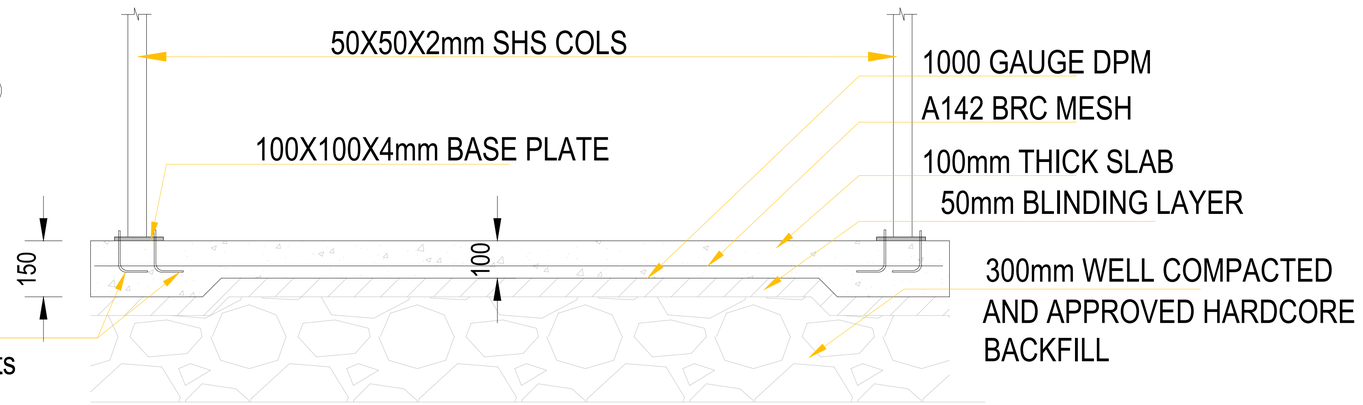
E3 PLAN LAYOUT (SCALE 1:50)



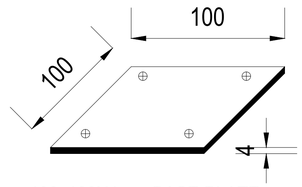
FOUNDATION LAYOUT (SCALE 1:50)

DOOR SCHEDULE

ITEM	SIZE(MM)	NO
D1	900x2100	1



SHS TO SLAB ANCHORAGE DETAIL



100x100X4mm BASE PLATE

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WATER SECTOR TRUST FUND 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	**THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	**Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd**, Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS

Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE: STANDARD DRAWINGS

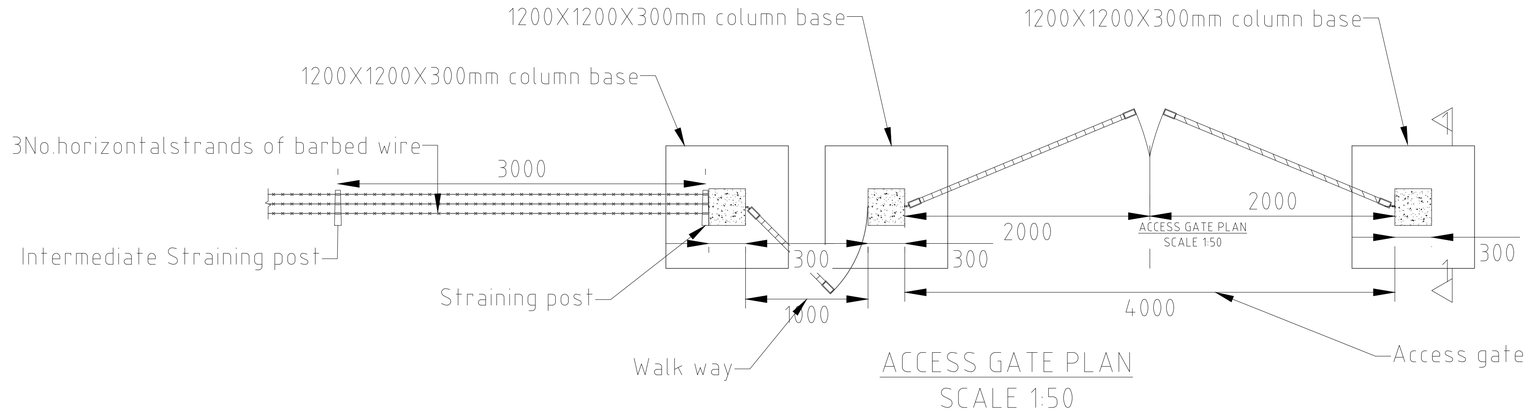
6 CHROLINATION HOUSE

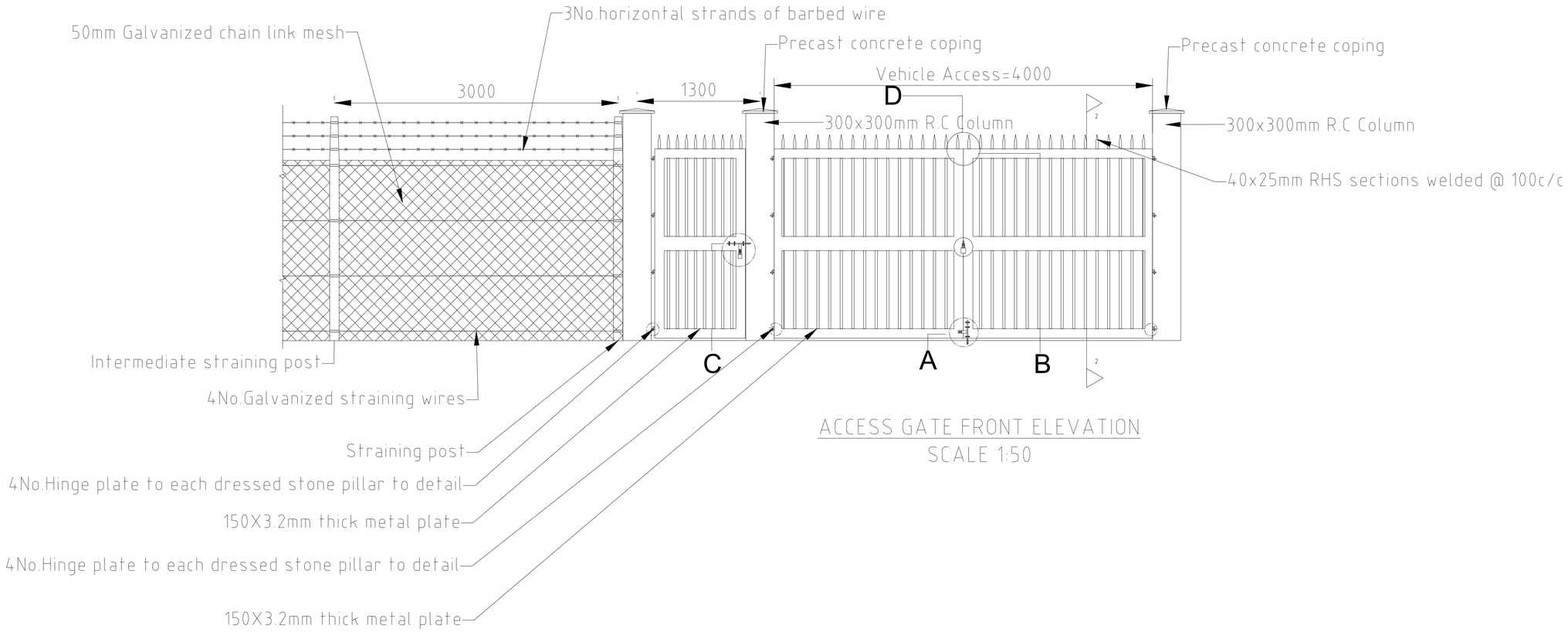
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-06

Jun 20, 2025 - 2:22pm





CLIENT:

WaterFund

WATER SECTOR TRUST FUND

1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,

Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

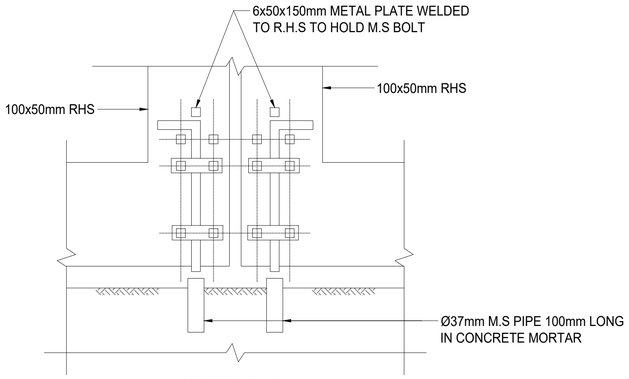
7.GATE DETAILS

SHEET 1 OF 2

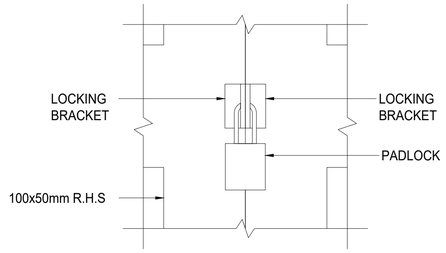
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-07.01

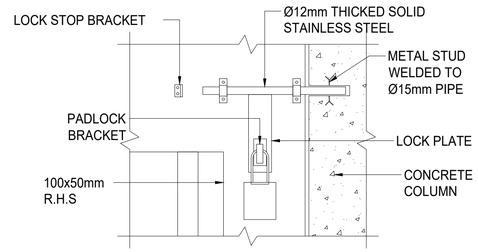
Jun 03, 2025 - 10:24am



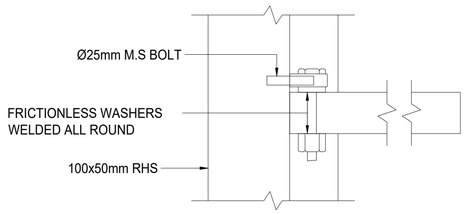
DETAIL A
SCALE 1:4



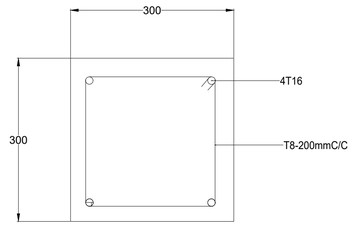
DETAIL B
SCALE 1:4



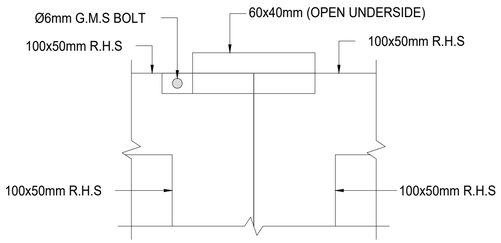
DETAIL C
SCALE 1:4



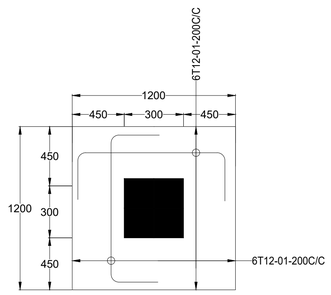
HINGE DETAIL
SCALE 1:4



300X300 COLUMN REINFORCEMENT DETAILS
SCALE 1:25



DETAIL D
SCALE 1:4



1200X1200X300mm COL BASE
SCALE 1:25

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

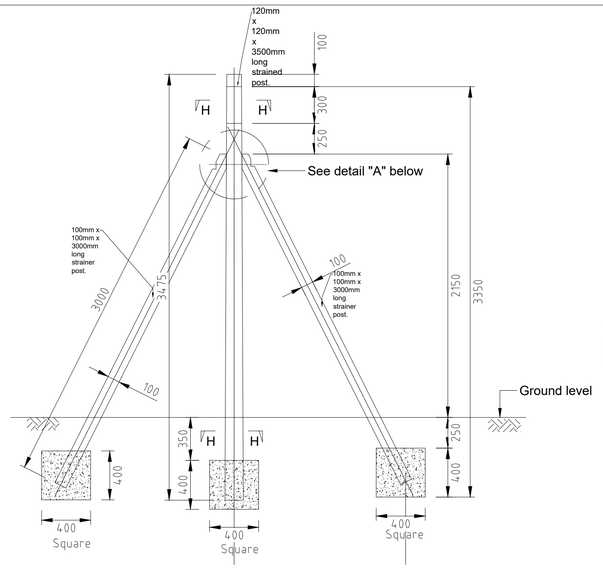
7.GATE DETAILS

SHEET 2 OF 2

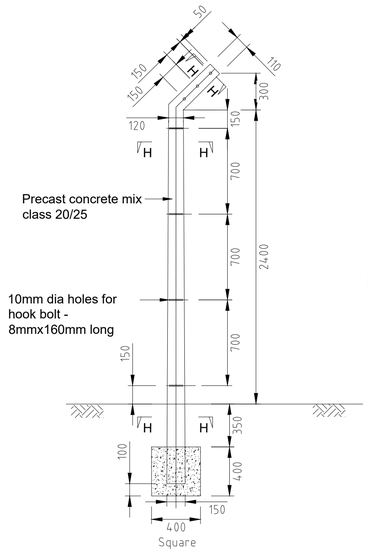
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-07.02

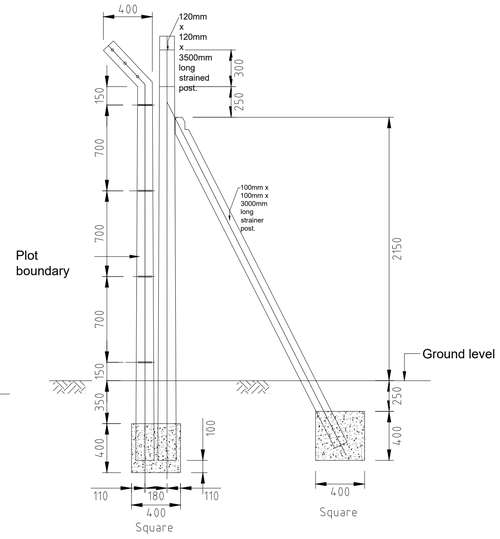
Jun 03, 2025 - 10:24am



P.C.C STRAINING POST
(At every 2.5m Centers)
SCALE 1:25



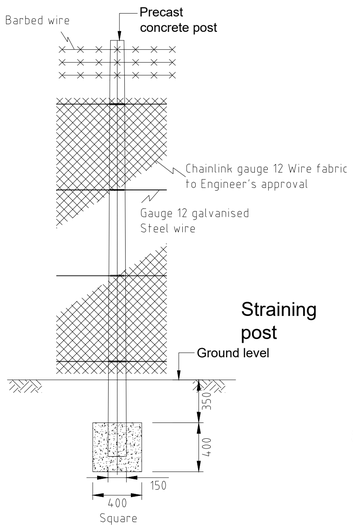
SINGLE P.C.C POST
(At every 2.5m Centers)
SCALE 1:25



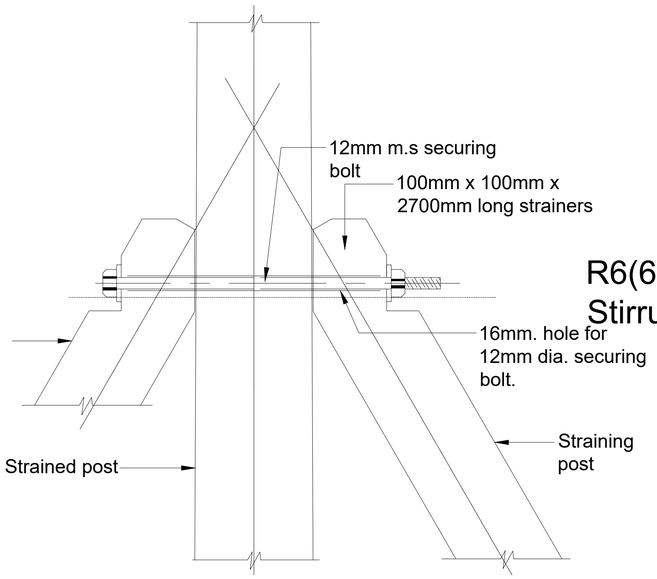
P.C.C CORNER POST
SCALE 1:25

NOTES:

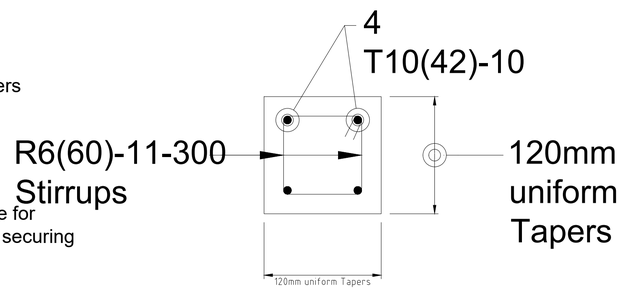
a. Every 10th post to be strained.
b. Post to be at 2500mm centers.
c. Top of all posts to be kept in uniform line.
d. Concrete mixes for
   1. Posts: Class 20/20
   2. Strainer posts: Class 20/20
   3. Foundation concrete: Class 20/20
e. Chain link to be gauge 12 galvanized steel wire.
f. Straining wires to be 12 gauge galvanized steel plain wires.
g. Wires on crank to be 12 gauge galvanized steel barbed wire.
h. All structural opening dimensions to be confirmed by the Engineer on site before commencing any fabrication.
i. Straining wires to be fixed to post with galvanized hook bolts 8mm dia. x 60mm long.
j. Where the posts encroach on private land, the fence should be erected with crank pointing towards the site.
k. All dimensions are in mm unless otherwise stated.
l. C/C = Center to center.
m. CTS = Centers
n. M.S = Mild steel.
o. P.C.C = Precast Concrete.



FENCING ELEVATION DETAIL
SCALE 1:25



DETAIL A: ELEVATION
SCALE 1:5



Section H-H
SCALE 1:20

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE: STANDARD DRAWINGS

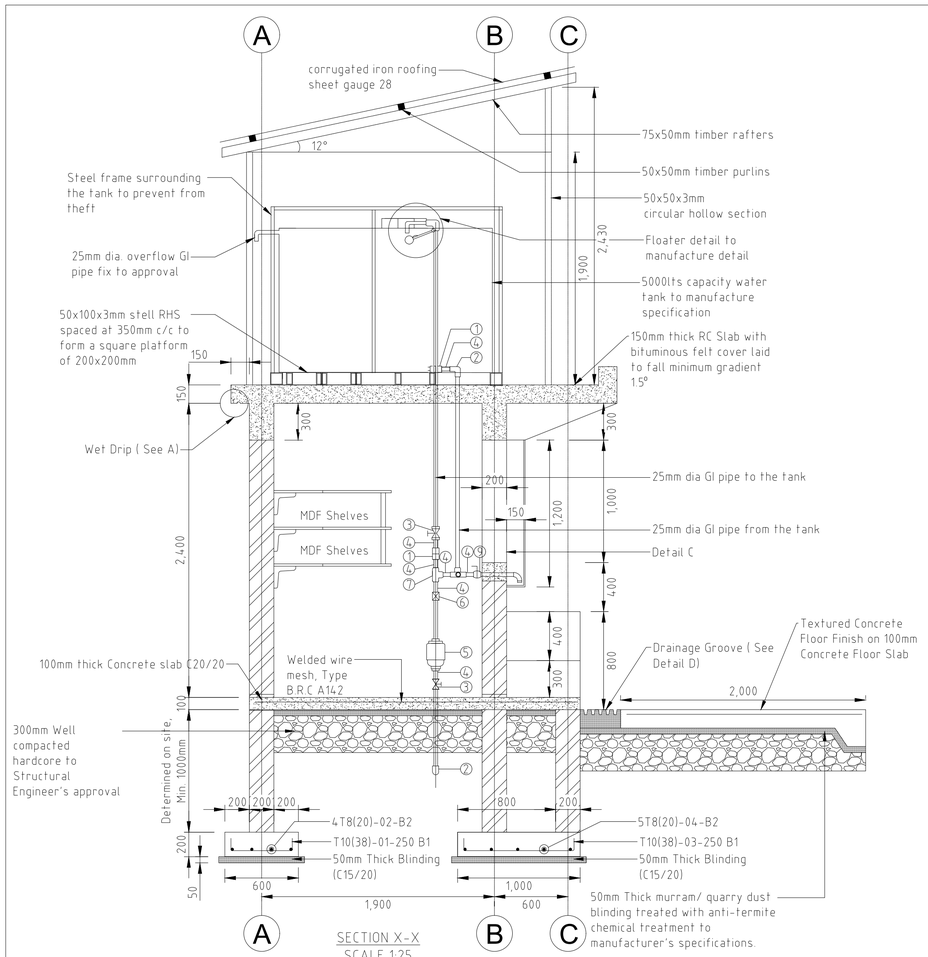
8.CHAIIN-LINK FENCE DETAILS

SHEET 1 OF 1

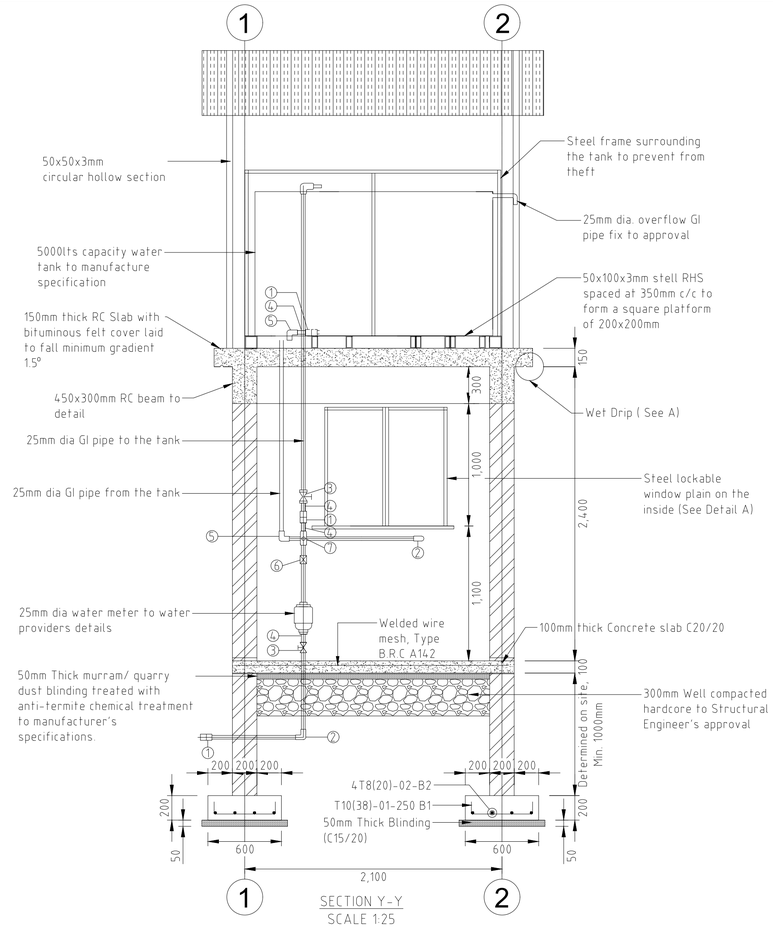
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-08

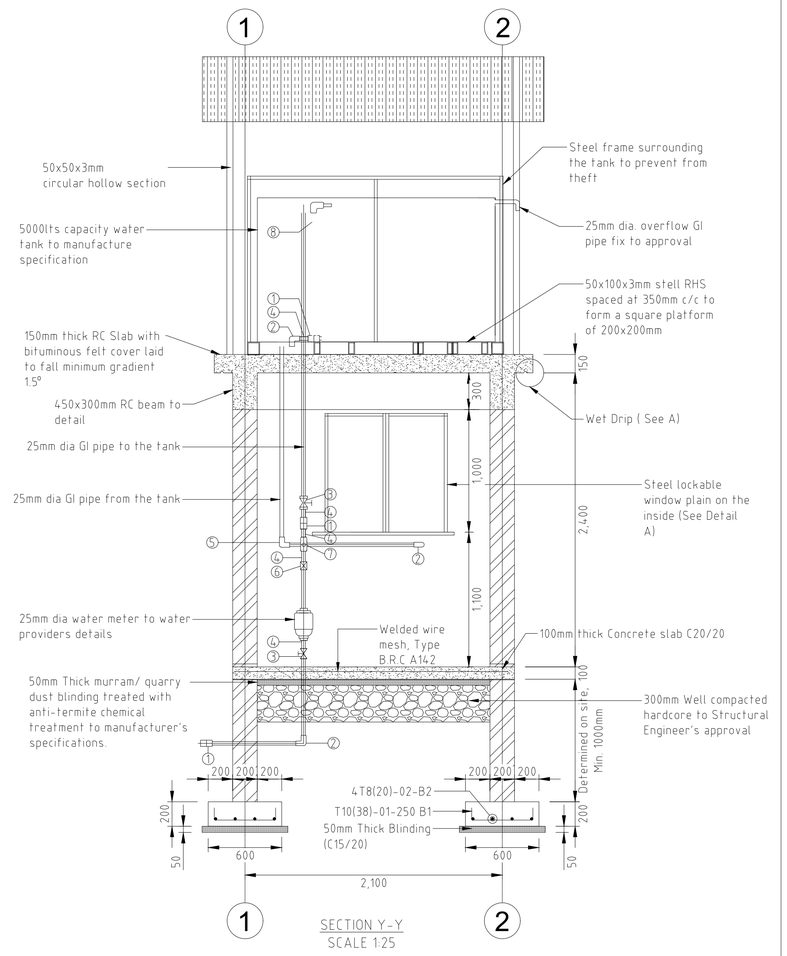
Jun 03, 2025 - 10:26am



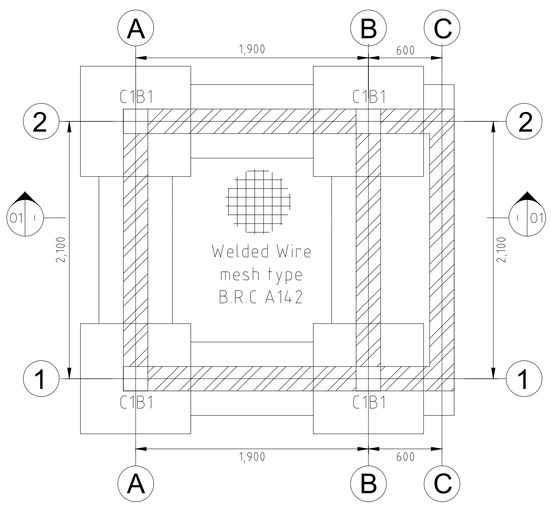
SECTION X-X
SCALE 1:25



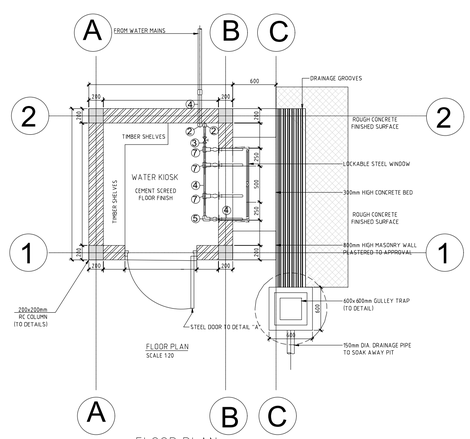
SECTION Y-Y
SCALE 1:25



SECTION Y-Y
SCALE 1:25

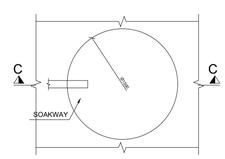


FOUNDATION/ GROUND FLOOR R.C SLAB LAYOUT
(150mm Thick Solid Slab: Concrete C20/20)
SCALE 1:25

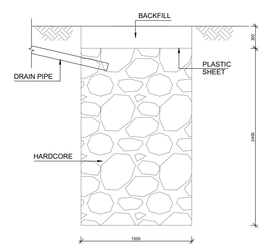


FLOOR PLAN
SCALE 1:20

FLOOR PLAN
SCALE 1:25



SOAKWAY PLAN
SCALE 1:50



SOAKAWAY - SECTION C-C
SCALE 1:50

SCHEDULE OF PIPE FITTINGS

ITEM NUMBER	DESCRIPTION	NO. REQUIRED PER CONNECTION
1	25mm Ø ADJUSTING COUPLING	3
2	25mm Ø GMS 90° BEND	3
3	25mm Ø GMS GATE VALVE	2
4	25mm Ø GALVANISED IRON NIPPLES	14
5	25mm Ø WATER METER	2
6	25mm Ø NON RETURN VALVE	1
7	25mm Ø GMS EQUAL TEE	6
8	90° BEND GALVANISED IRON	5
9	25mm Ø BALL COCK WATER TAPS	4

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

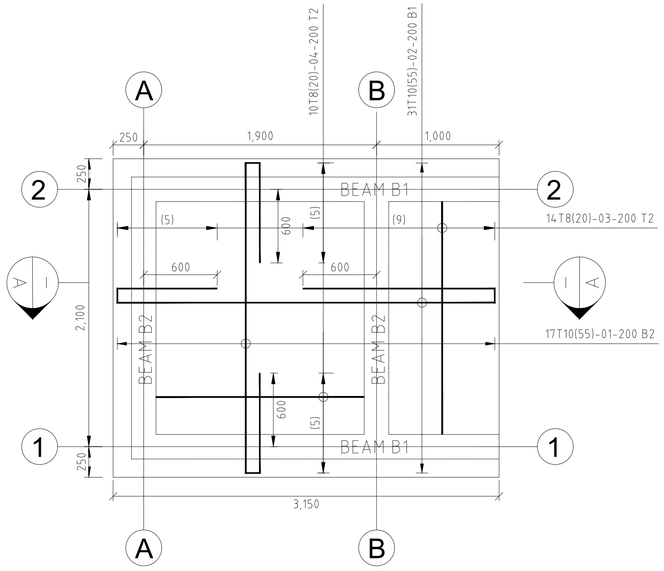
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
9.WATER KIOSK TYPE 1
SHEET 1 OF 2

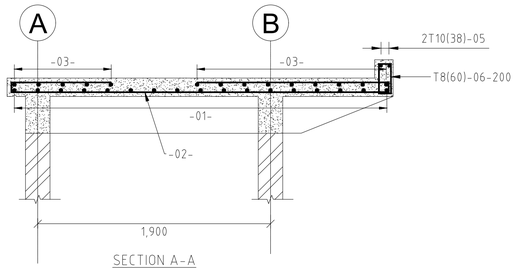
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-9.01

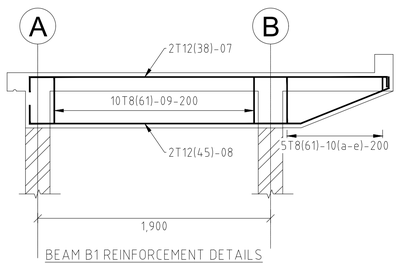
Jun 22, 2025 - 11:38pm



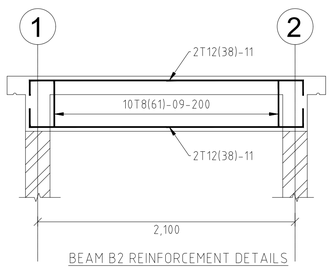
ROOF SLAB REINFORCEMENT DETAILS
SCALE 1:25



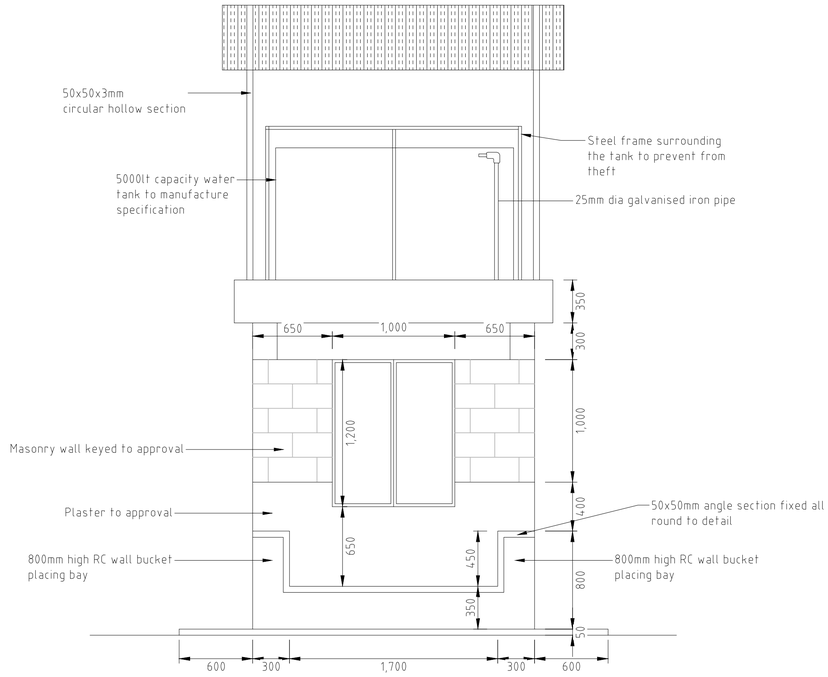
SECTION A-A
SCALE 1:25



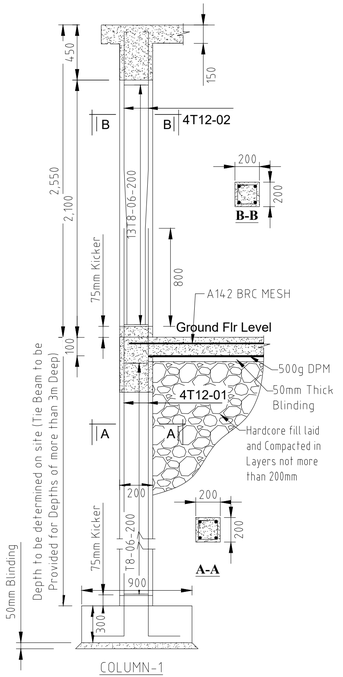
BEAM B1 REINFORCEMENT DETAILS
SCALE 1:25



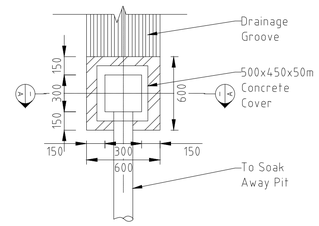
BEAM B2 REINFORCEMENT DETAILS
SCALE 1:25



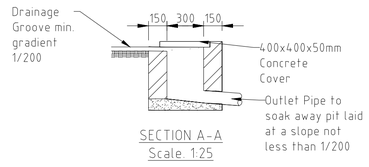
FRONT ELEVATION
SCALE 1:25



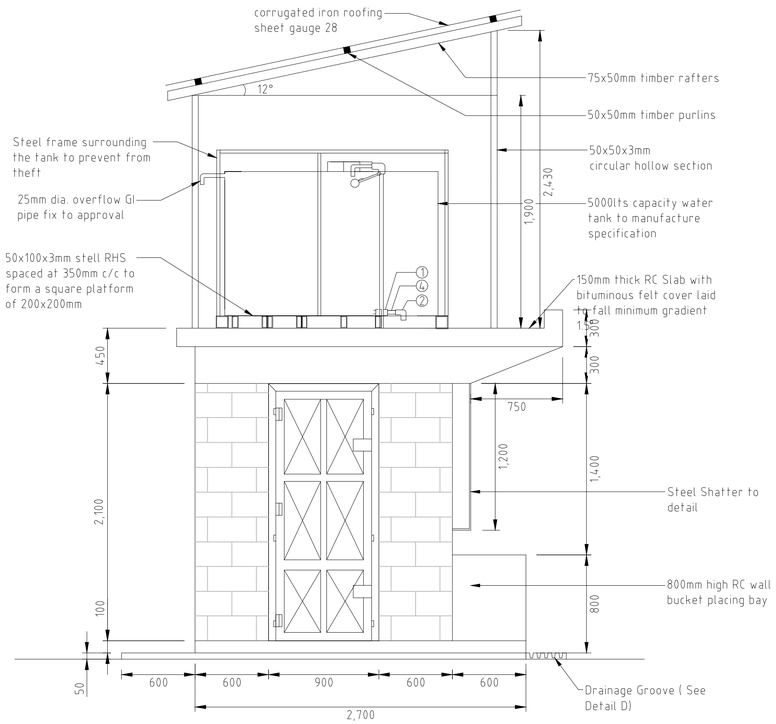
COLUMN-1
4 No. Scale. 1:25



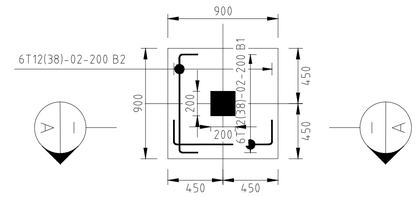
DRAINAGE GROOVE DETAILS
Scale. 1:25



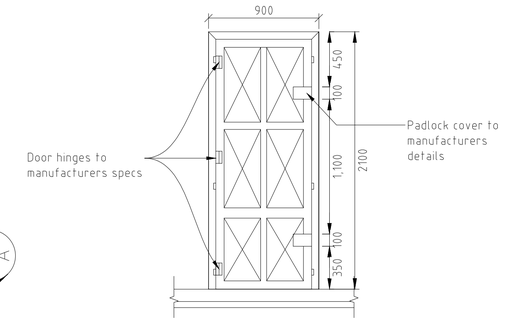
SECTION A-A
Scale. 1:25



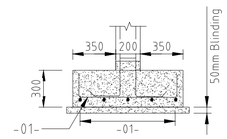
SIDE ELEVATION
SCALE 1:25



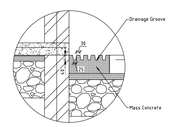
BASE - 1: (900x900x300)
4 NO. Scale. 1:25



DOOR FRAME DETAILS
SCALE 1:25



SECTION A-A
Scale. 1:25



DRAINAGE GROOVE
SCALE 1:25

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund Financing the Water Sector **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

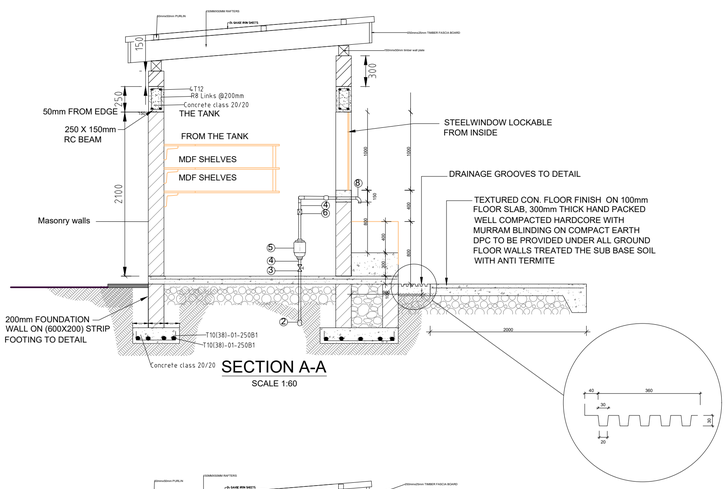
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
9.WATER KIOSK TYPE 1
SHEET 2 OF 2

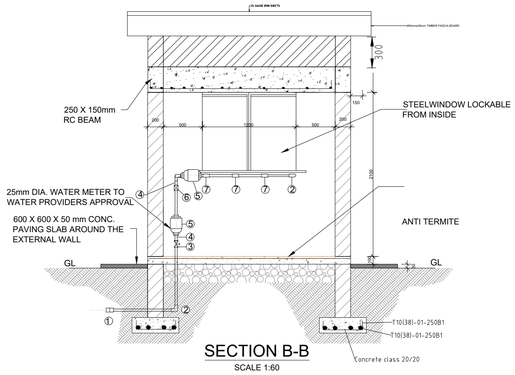
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-9.02

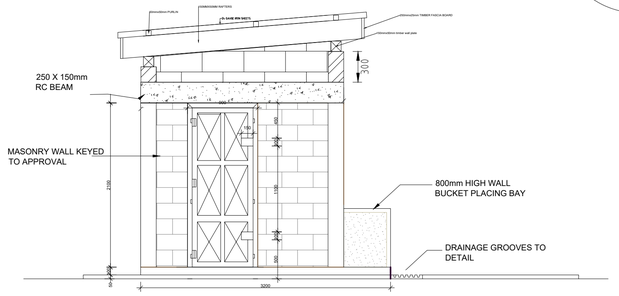
Jun 22, 2025 - 11:39pm



SECTION A-A
SCALE 1:60

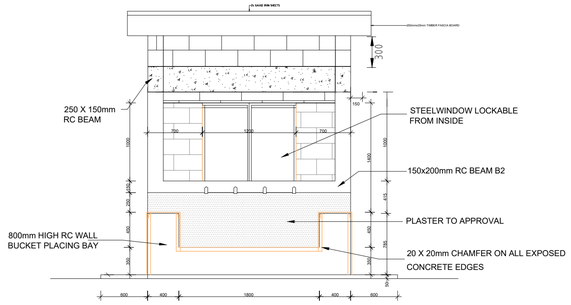


SECTION B-B
SCALE 1:60

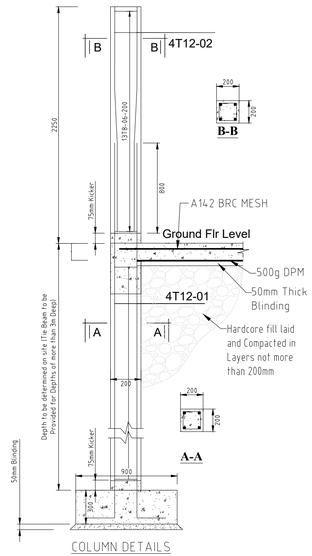


ELEVATION 1
SCALE 1:60

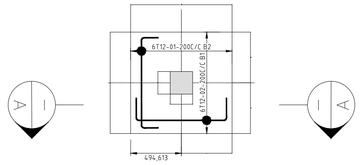
SCREED FLOOR FINISH ON 100mm FLOOR SLAB, 300mm THICK HAND PACKED WELL COMPACTED HARDCORE WITH MURRAM BLINDING ON COMPACT EARTH DPC TO BE PROVIDED UNDER ALL GROUND FLOOR WALLS TREATED THE SUB BASE SOIL WITH



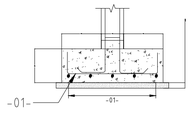
ELEVATION 2
SCALE 1:60



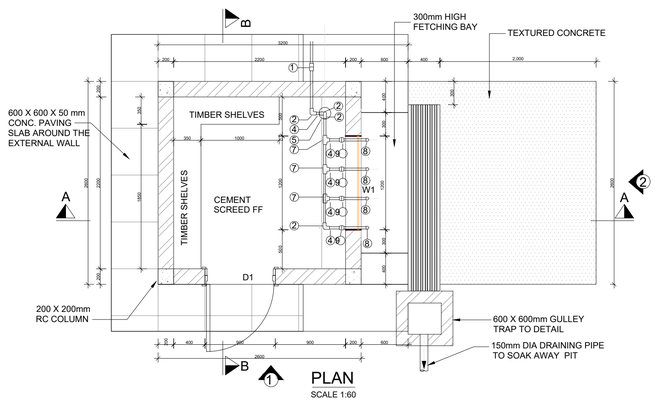
COLUMN DETAILS
4 No. Scale 1:25



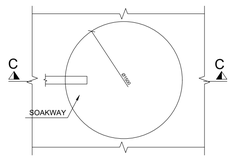
BASE - 1: (900×900×300)
4 NO. Scale 1:25



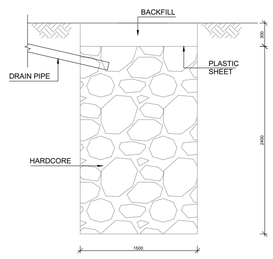
SECTION A-A
Scale 1:25



PLAN
SCALE 1:60

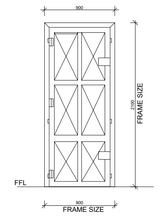


SOAKWAY PLAN
SCALE 1:50

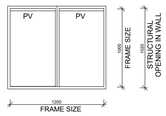


SOAKAWAY - SECTION C-C
SCALE 1:50

DOOR SCHEDULE

TYPE		D1
SKETCH		
QUANTITY		1
DESCRIPTION		SINGLE LEAF, STEEL DOOR 25mm THICK
FIXING		WITH LUGS
IRON MONGERY		
	HINGES	1 1/2 PAIRS STANDARD STEEL BUTT HINGES
	ACCESS.	1x UNION AL8730AS DOOR STOP

WINDOW SCHEDULE

TYPE	W1
SKETCH	
QUANTITY	1
DESCRIPTION	1200x1000mm STEEL WINDOW WITH 25mm THICK FLAT STEEL SHEET ON THE INSIDE PAINTED TO APPROVAL WITH HEAVY DUTY HINGES OPENING180°
OPENING	2 OPENABLE SIDE HUNG PANELS
GLAZING	NONE

SCHEDULE OF PIPE FITTINGS

ITEM NUMBER	DESCRIPTION	NO. REQUIRED PER CONNECTION
1	25mm Ø ADJUSTING COUPLING	3
2	25mm Ø GMS 90° BEND	3
3	25mm Ø GMS GATE VALVE	2
4	25mm Ø GALVANISED IRON NIPPLES	14
5	25mm Ø WATER METER	2
6	25mm Ø NON RETURN VALVE	1
7	25mm Ø GMS EQUAL TEE	6
8	90° BEND GALVANISED IRON	5
9	25mm Ø BALL COCK WATER TAPS	4

CLIENT:
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

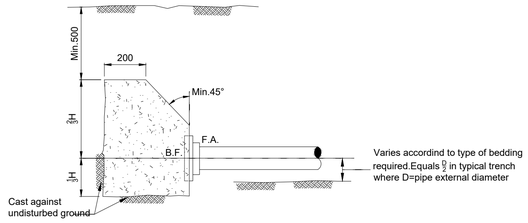
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
10.WATER KIOSK TYPE 2
SHEET 1 OF 1

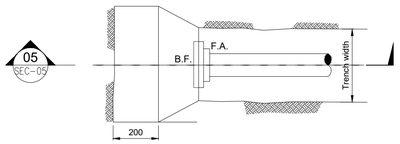
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-10

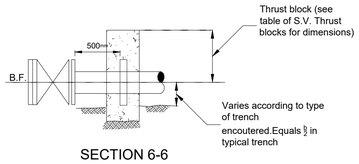
Jun 03, 2025 - 10:41am



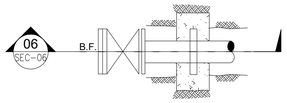
SECTION 5-5
N.T.S



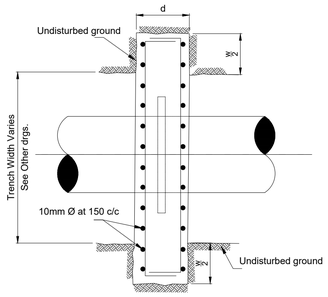
PLAN
WHERE BLANK END HAS
NO ISOLATING VALVE
N.T.S



SECTION 6-6
N.T.S

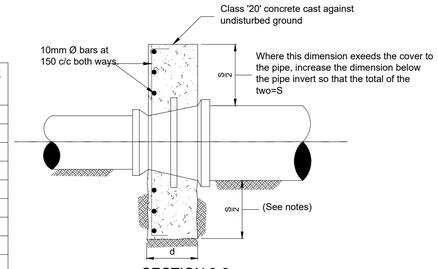


PLAN
WHERE BLANK END HAS
ISOLATING VALVE
N.T.S

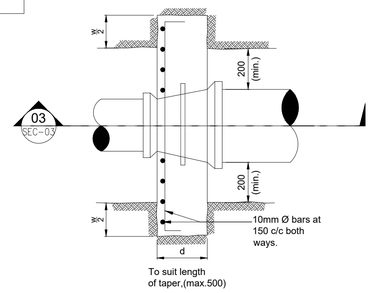


SECTION 2-2
N.T.S

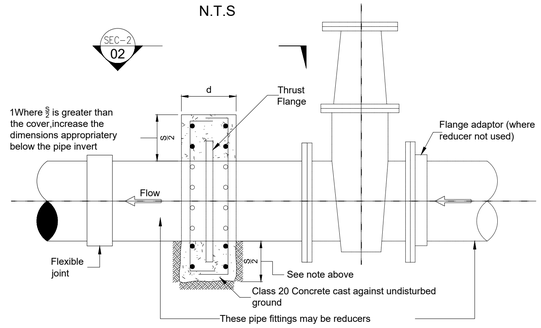
TEST HEAD (m)	MAIN SIZE (MM)	BLOCK TYPE
120 See Note 8	700	E
	600	E
	500	D
	450	D
	400	D
	350	C
	300	B
	250	B
	200	A
	150	A
	100	A



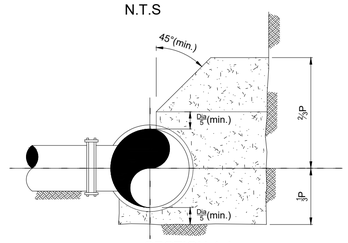
SECTION 3-3
N.T.S



PLAN
ANCHOR BLOCKS FOR TAPERS
N.T.S



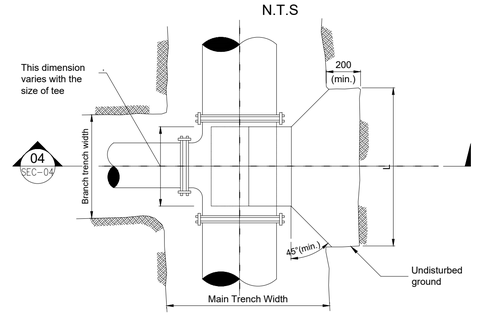
ELEVATION
ANCHOR BLOCKS FOR SLUICE VALVES
N.T.S



SECTION 4-4
N.T.S

TEST HEAD (m)	MAIN SIZE (MM)	DIMENSIONS (S)mx(W)m TAPER (SMALLER SIZE)mm											
		800	700	600	500	450	400	350	300	250	200	150	100
120 See Note 8	1000	D	—	—	—	—	—	—	—			—	—
	900	C	D	—	—	—	—	—	—	—	—	—	—
	800	—	C	D	—	—	—	—	—	—	—	—	—
	700	—	—	C	D	—	—	—	—	—	—	—	—
	600	—	—	—	C	C	D	—	—	—	—	—	—
	500	—	—	—	—	A	B	C	—	—	—	—	—
	450	—	—	—	—	—	A	B	C	—	—	—	—
	400	—	—	—	—	—	—	A	B	B	—		—
	350	—	—	—	—	—	—	—	A	B	B	—	—
	300	—	—	—	—	—	—	—	—	A	A	B	B
	250	—	—	—	—	—	—	—	—	—	A	A	B
	200	—	—	—	—	—	—	—	—	—	—	A	A

TABLE OF ANCHOR BLOCKS FOR TAPERS
(CLASS "20" CONCRETE)
N.T.S



PLAN
THRUST BLOCKS FOR TEE
N.T.S

TEST HEAD (m)	MAIN SIZE (MM)	DIMENSIONS (L)mx(P)m BRANCH SIZE (mm)										
		800	700	600	500	450	400	350	300	250	200	150/100
120 See Note 8	1000	2.4x2.1	1.8x2.1	1.4x2.1	1.9x2.1	0.8x2.1	0.6x2.1	0.5x2.1	0.4x2.1	0.3x2.1	0.3x2.1	0.3x2.1
	900	2.6x1.9	2.0x1.9	1.5x1.9	1.0x1.9	0.9x1.9	0.7x1.9	0.5x1.9	0.4x1.9	0.3x1.9	0.3x1.9	0.3x1.9
	800	2.9x1.7	2.3x1.7	1.7x1.7	1.1x1.7	0.9x1.7	0.8x1.7	0.6x1.7	0.4x1.7	0.3x1.7	0.3x1.7	0.3x1.7
	700	—	2.5x1.5	1.9x1.5	1.3x1.5	1.0x1.5	0.9x1.5	0.7x1.5	0.5x1.5	0.4x1.5	0.3x1.5	0.3x1.5
	600	—	—	2.2x1.3	1.5x1.3	1.2x1.3	1.0x1.3	0.8x1.3	0.6x1.3	0.4x1.3	0.3x1.3	0.3x1.3
	500	—	—	—	1.8x1.1	1.4x1.1	1.2x1.1	0.9x1.1	0.7x1.1	0.5x1.1	0.3x1.1	0.3x1.1
	450	—	—	—	—	1.6x1.0	1.3x1.0	1.0x1.0	0.7x1.0	0.5x1.0	0.3x1.0	0.3x1.0
	400	—	—	—	—	—	1.4x0.9	1.0x0.9	0.8x0.9	0.6x0.9	0.4x0.9	0.3x0.9
	350	—	—	—	—	—	—	1.2x0.8	0.9x0.8	0.6x0.8	0.4x0.8	0.3x0.8
	300	—	—	—	—	—	—	—	1.0x0.7	0.7x0.7	0.5x0.7	0.3x0.7
	250	—	—	—	—	—	—	—	—	0.8x0.6	0.5x0.6	0.3x0.6
	200	—	—	—	—	—	—	—	—	—	0.6x0.5	0.4x0.5

TABLE OF THRUST BLOCKS FOR TEES
(CLASS "20" CONCRETE)
N.T.S

BLOCK TYPE	S (m)	W (m)	d (mm)	MAIN STEEL	DISTRIBUTION STEEL
A	0.5	0.5	300	Y10-150	Y10-150
B	0.5	0.9	300	Y10-150	Y10-150
C	0.5	1.2	400	Y12-150	Y10-150
D	0.6	1.8	500	Y16-150	Y12-150
E	1.0	2.2	500	Y20-150	Y12-150

DETAILS OF ANCHOR BLOCKS FOR TAPER
& SLUICE VALVES
N.T.S

NOTES.

1. All concrete thrust blocks shall be constructed on and against firm ground directly. The thrust or Anchor blocks shall not be cast against black cotton soil and reference shall be made to the Engineers Representative for further instructions.
2. The concrete thrust blocks are designed to bear on the original earth surface with safe bearing pressure of 120 KN/m²
3. Concrete to be class '15' unless otherwise stated.
4. Concrete in thrust and anchor blocks must be cast clear of joints.
5. Dimension 'W' for thrust blocks on horizontal bends to suit the size of bend and clearance required for joints.
6. For table of thrust blocks for horizontal bends refer to other Drawings.
7. For thrust blocks to vertical bends refer to other Drawings.
8. The thrust blocks dimensions in the tables given hereon are for a test pressure of 12 bars .For special test pressures thrust blocks sizes are to be reduced or increased proportionately, or as directed by the Engineers Representative.
9. For sluice valves on mains of diameters greater than 700mm,thrust blocks will be individually designed to suit the actual test pressure at each location.

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

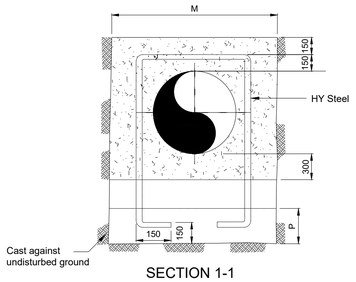
DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

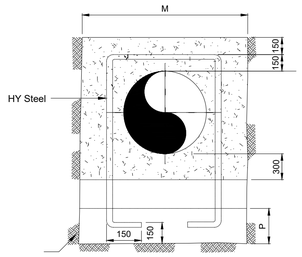
DRAWING TITLE:
STANDARD DRAWINGS
11.THRUST BLOCKS AND ANCHOR BLOCKS
SHEET 1 OF 2

DRAWING SCALE: AS SHOWN
DRAWING No.: GW4R-WJR-STD-11.01

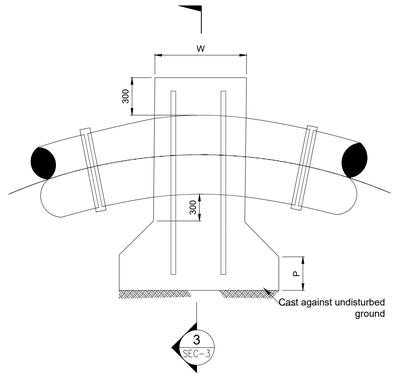
Jun 03, 2025 - 10:48am



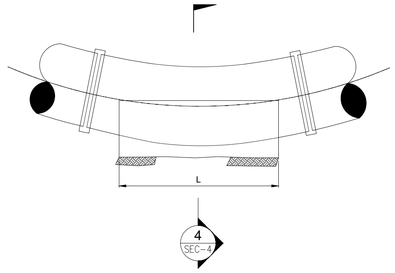
SECTION 1-1
N.T.S

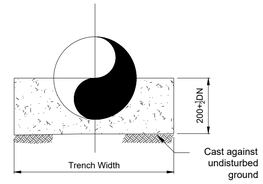


SECTION 3-3
N.T.S

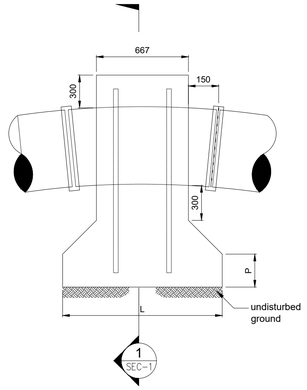


22.5° VERTICAL BENDS - TYPICAL
(SEE NOTE SEVEN)
N.T.S





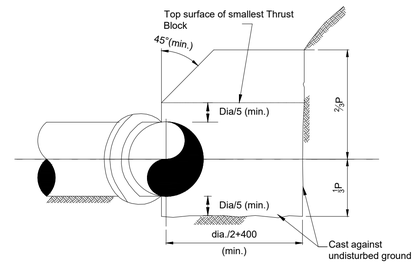
SECTION 4-4
N.T.S



11.25° VERTICAL BENDS - TYPICAL
SEE NOTE 7)
N.T.S

TEST HEAD (m)	BEND	DIMENSIONS (L)mx(P)m											
		SIZE OF BEND DN(mm)											
		1000	900	800	700	600	500	450	400	350	300	250	200 OR LESS
120	$11\frac{1}{4}°$	0.8x2.0	0.7x1.8	0.6x1.7	0.5x1.5	0.4x1.4	0.3x1.2	0.3x1.1	0.3x1.1	0.3x1.0	0.3x0.9	0.3x0.8	0.3x0.8
	$22\frac{1}{2}°$	1.5x2.0	1.4x1.8	1.2x1.7	1.0x1.5	0.8x1.4	0.7x1.2	0.6x1.1	0.5x1.1	0.4x1.0	0.3x0.9	0.3x0.8	0.3x0.8
	45°	3.0x2.0	2.7x1.8	2.3x1.7	2.0x1.5	1.5x1.4	1.3x1.2	1.1x1.1	0.9x1.1	0.8x1.0	0.6x0.9	0.5x0.8	0.3x0.8
	90°	5.5x2.0	4.9x1.8	4.1x1.7	3.6x1.5	2.8x1.4	2.3x1.2	2.0x1.1	1.6x1.1	1.4x1.0	1.1x0.9	0.9x0.8	0.6x0.8
150	$11\frac{1}{4}°$	1.0x2.0	0.9x1.8	0.7x1.7	0.6x1.5	0.5x1.4	0.4x1.2	0.4x1.1	0.3x1.1	0.3x1.0	0.3x0.9	0.3x0.8	0.3x0.8
	$22\frac{1}{2}°$	1.9x2.0	1.7x1.8	1.4x1.7	1.3x1.5	1.0x1.4	0.8x1.2	0.7x1.1	0.6x1.1	0.5x1.0	0.4x0.9	0.3x0.8	0.3x0.8
	45°	3.7x2.0	3.3x1.8	2.8x1.7	2.4x1.5	1.9x1.4	1.6x1.2	1.4x1.1	1.1x1.1	0.9x1.0	0.8x0.9	0.6x0.8	0.4x0.8
	90°	6.8x2.0	6.2x1.8	5.1x1.7	4.5x1.5	3.5x1.4	2.9x1.2	2.5x1.1	2.0x1.1	1.7x1.0	1.4x0.9	1.1x08	0.7x0.8

TABLE OF THRUST BLOCKS FOR HORIZONTAL BENDS

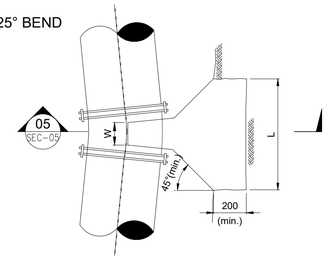


SECTION 5-5
N.T.S

TEST HEAD (m)	DIMENSIONS (L)mx(P)m							
	SIZE OF BEND DN(mm)							
	600	500	450	400	300	300	250	200
	1.4x0.6	1.4x0.5	1.4x0.5	1.2x0.5	1.2x0.5	1.0x0.5	0.8x0.5	0.6x0.5

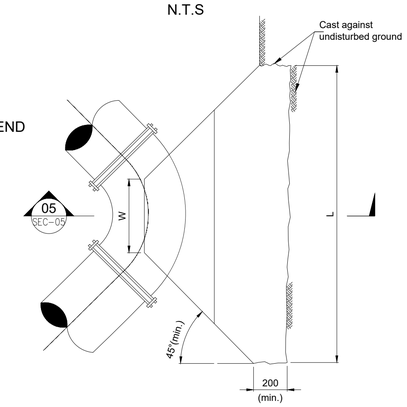
TABLE OF THRUST BLOCKS FOR BLANK ENDS

11.25° BEND

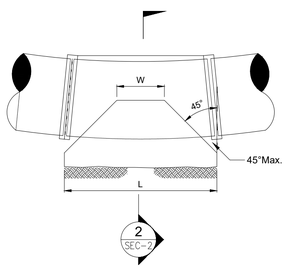


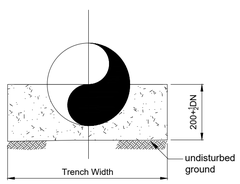
PLAN
N.T.S

90° BEND



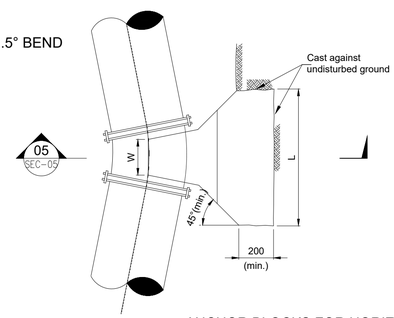
PLAN





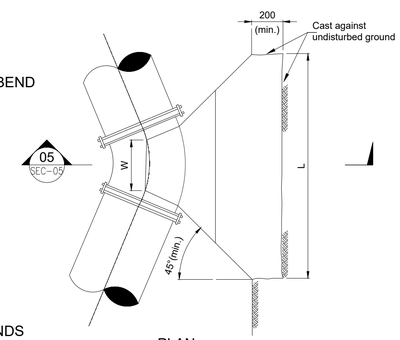
SECTION 2-2
N.T.S

22.5° BEND



PLAN

45° BEND



PLAN

ANCHOR BLOCKS FOR HORIZONTAL BENDS

NOTES.

1. All concrete thrust blocks shall be constructed on and against firm ground directly. The thrust or Anchor blocks shall not be cast against black cotton soil and reference shall be made to the Engineers Representative for further instructions.
2. The concrete thrust blocks are designed to bear on the original earth surface with safe bearing pressure of 120 KN/m²
3. Concrete to be class '15' unless otherwise stated.
4. Concrete in thrust and anchor blocks must be cast clear of joints.
5. Dimension 'W' for thrust blocks on horizontal bends to suit the size of bend and clearance required for joints.
6. For table of thrust blocks for horizontal bends refer to other Drawings.
7. For thrust blocks to horizontal bends refer to other Drawings.
8. The steel ancharing reinforcement and the dimensions L.P and M are to be decided by the Engineers representative to suit each individual bend.

LEGEND

DN-Nominal diameter
BF-Blank flange

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

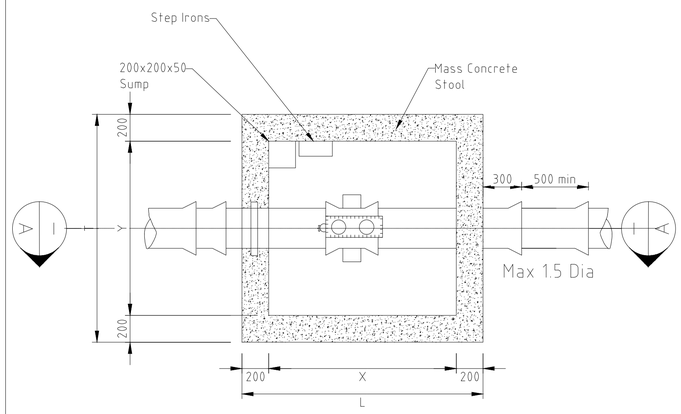
DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

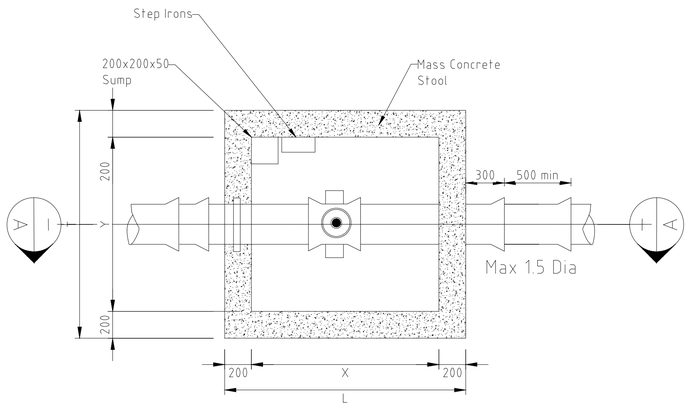
DRAWING TITLE:
STANDARD DRAWINGS
11.THRUST BLOCKS AND ANCHOR BLOCKS
SHEET 2 OF 2

DRAWING SCALE: AS SHOWN
DRAWING No.: GW4R-WJR-STD-11.02

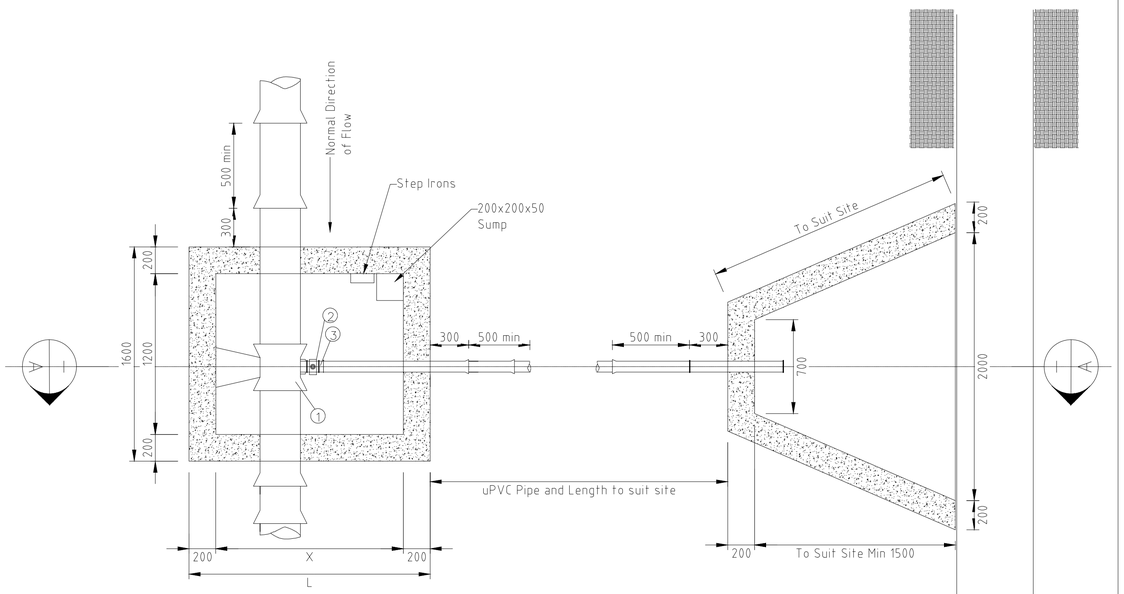
Jun 03, 2025 - 10:48am



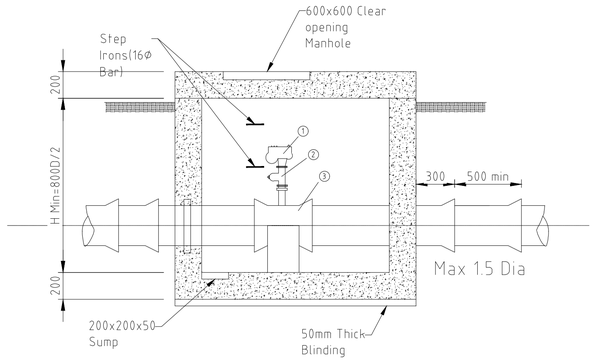
DOUBLE AIR VALVE
Scale. 1:25



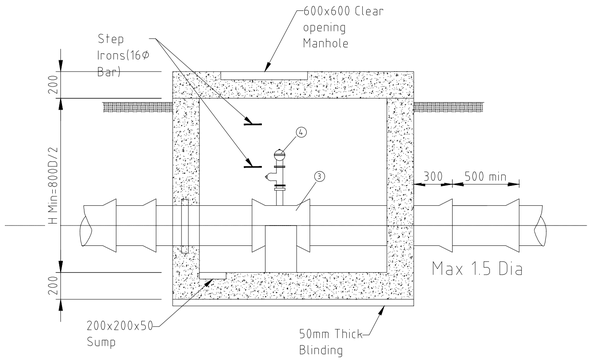
SINGLE AIR VALVE
Scale. 1:25



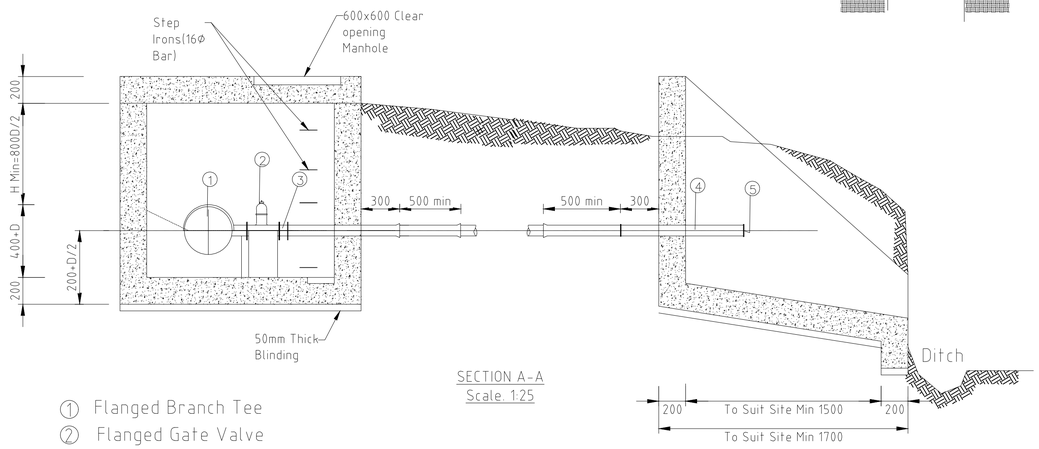
TYPICAL WASHOUT
Scale. 1:25



SECTION A-A
Scale. 1:25



SECTION A-A
Scale. 1:25



SECTION A-A
Scale. 1:25

① Flanged Double Orifice Air Valve
② Flanged Gate Valve
③ Flanged Branched Tee on Double Socket Tee
④ Small Orifice Single Air Valve with Isolating Lock and DN 80 Flange

① Flanged Branch Tee
② Flanged Gate Valve
③ Flanged Adapter
④ Socket/Spigot Pipe

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund Financing the Water Sector **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

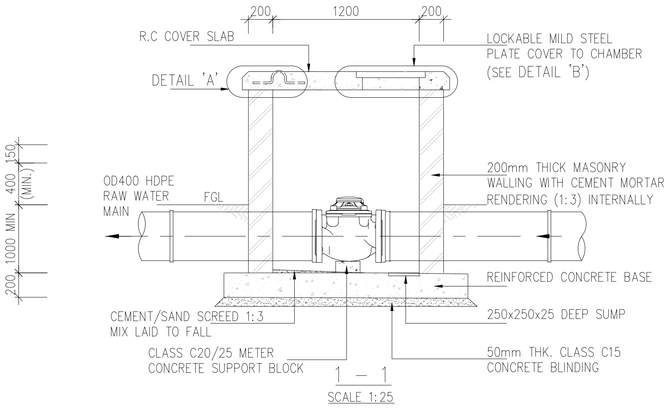
DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

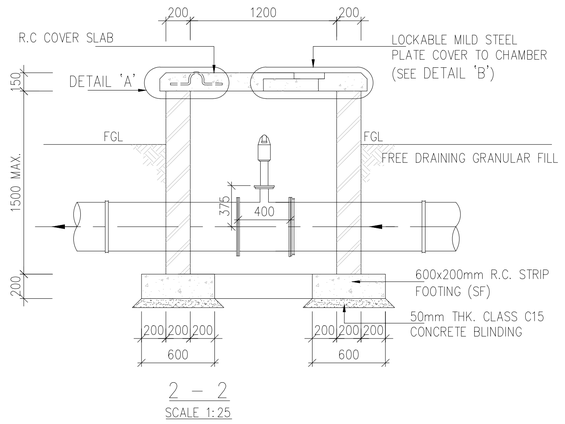
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

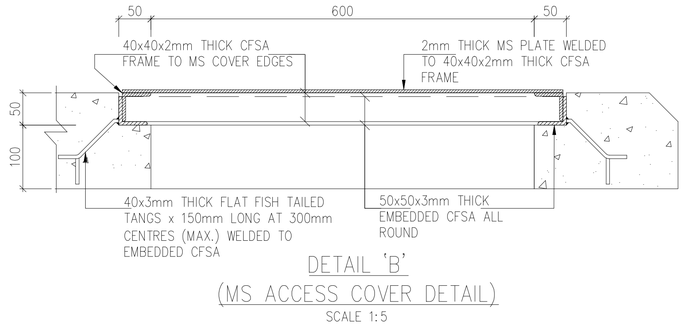
DRAWING TITLE:
STANDARD DRAWINGS
12.GATE VALVES,AIR VALVES,WASH OUT VALVES DETAILS
SHEET 1 OF 1

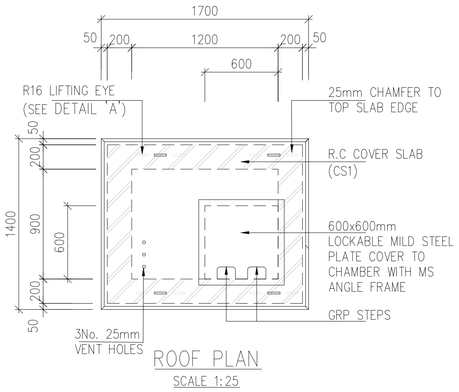
DRAWING SCALE: AS SHOWN
DRAWING No.: GW4R-WJR-STD-12

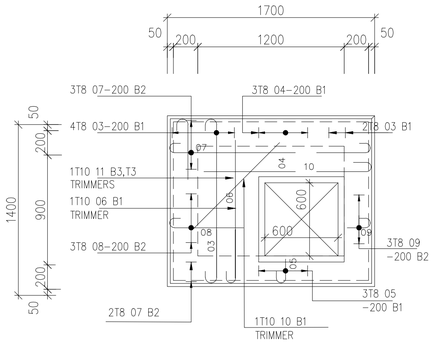
Jun 03, 2025 - 10:51am



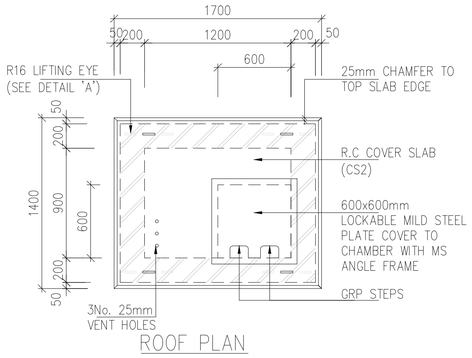


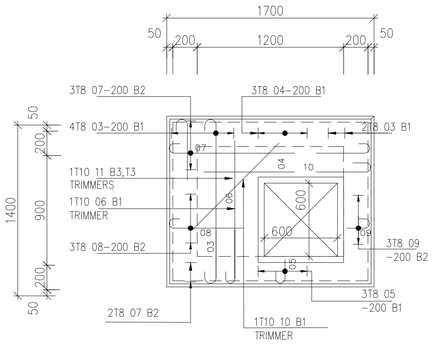




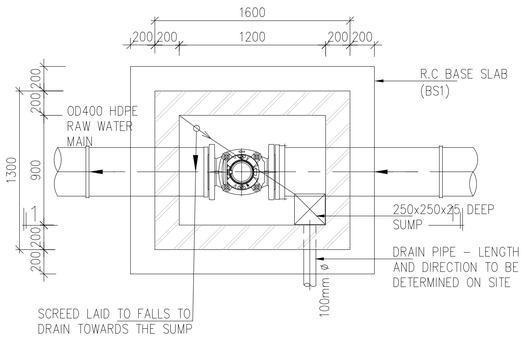


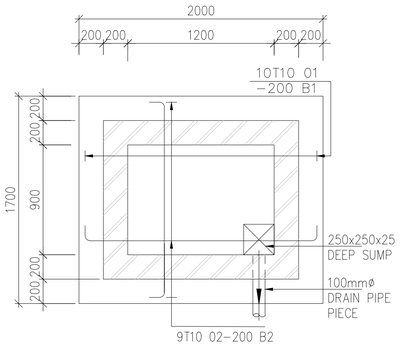
FLOWMETER CHAMBER ROOF

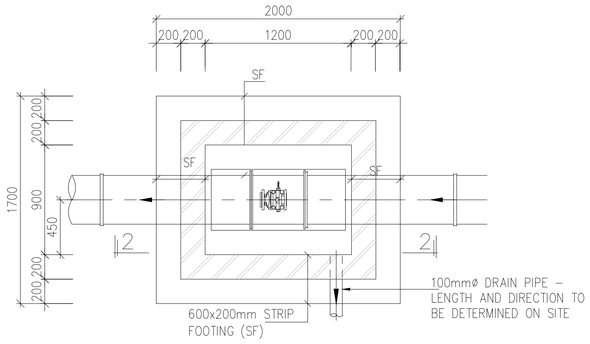


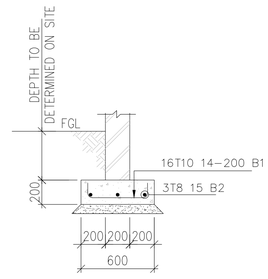


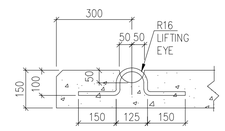
AIR VALVE CHAMBER ROOF











FLOWMETER CHAMBER BASE

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

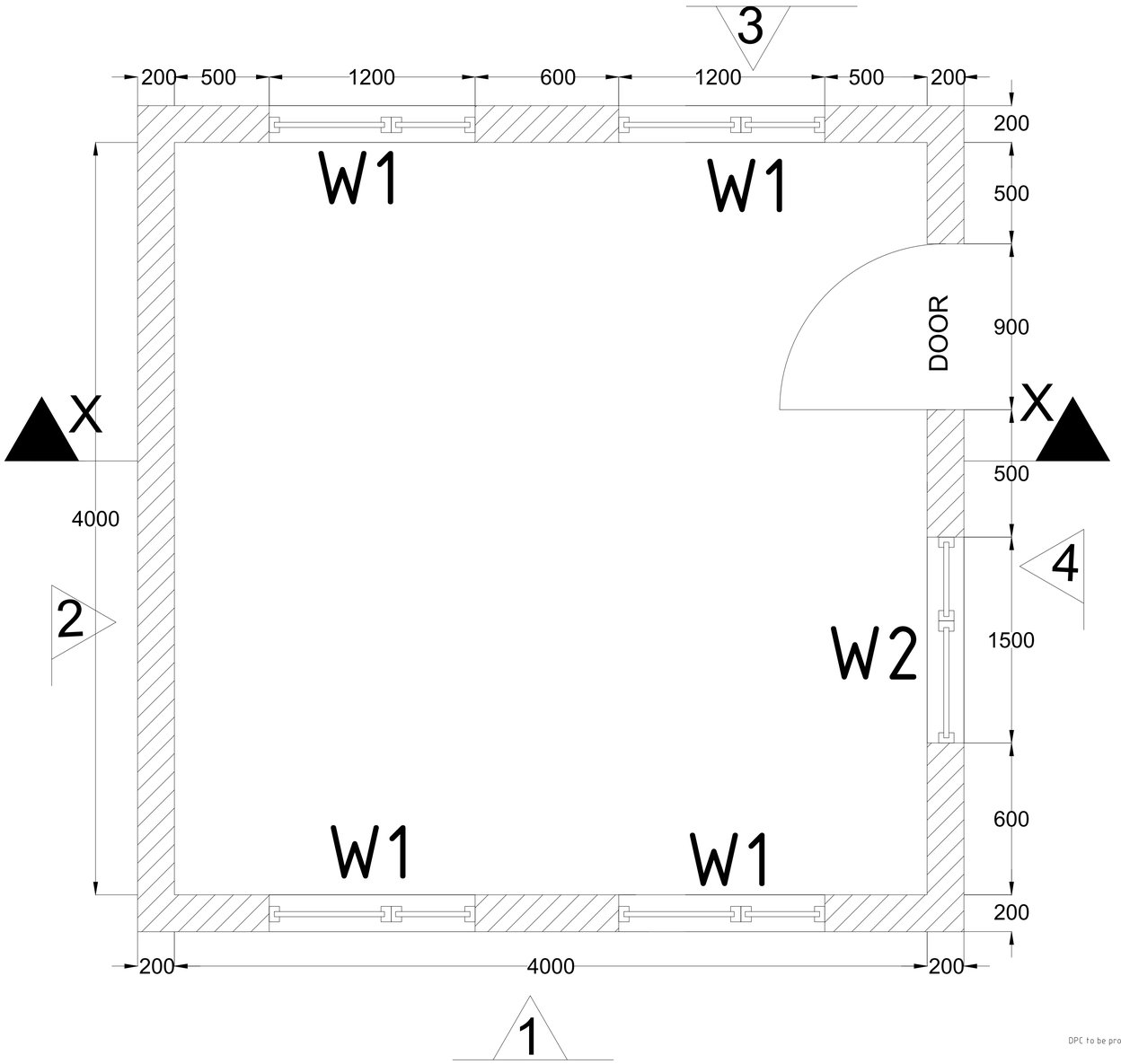
13.METER CHAMBER DETAILS

SHEET 1 OF 1

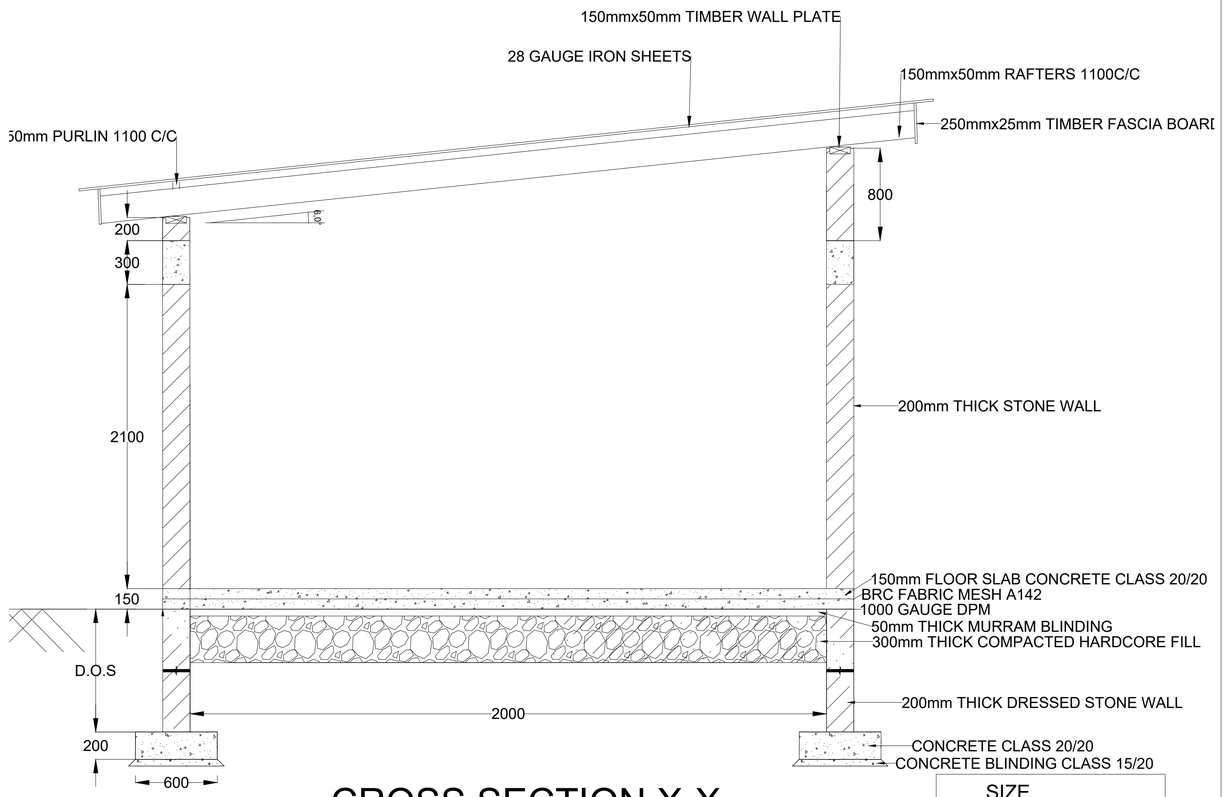
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-13

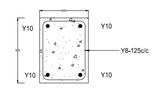
Jun 03, 2025 – 10:54am



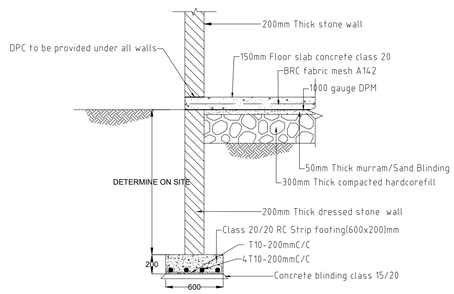
FLOOR PLAN
SCALE 1:50



CROSS SECTION X-X
SCALE 1:50



TYPICAL CROSS SECTION THROUGH RING BEAM
SCALE 1:5

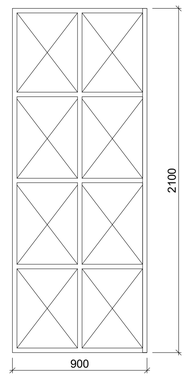


TYPICAL FLOOR AND FOUNDATION DETAIL
SCALE (A1) 1:25

WIDOW SCHEDULE

	SIZE	
	WIDTH	HEIGHT
W1	1200	1500
W2	1500	1500

DOOR SCHEDULE

TYPE	D1
SKETCH	
QUANTITY	1
DESCRIPTION	SINGLE LEAF, STEEL DOOR 25mm THICK

CLIENT:
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	V.K	JUNE 2025
Approved by:	D.L	JUNE 2025

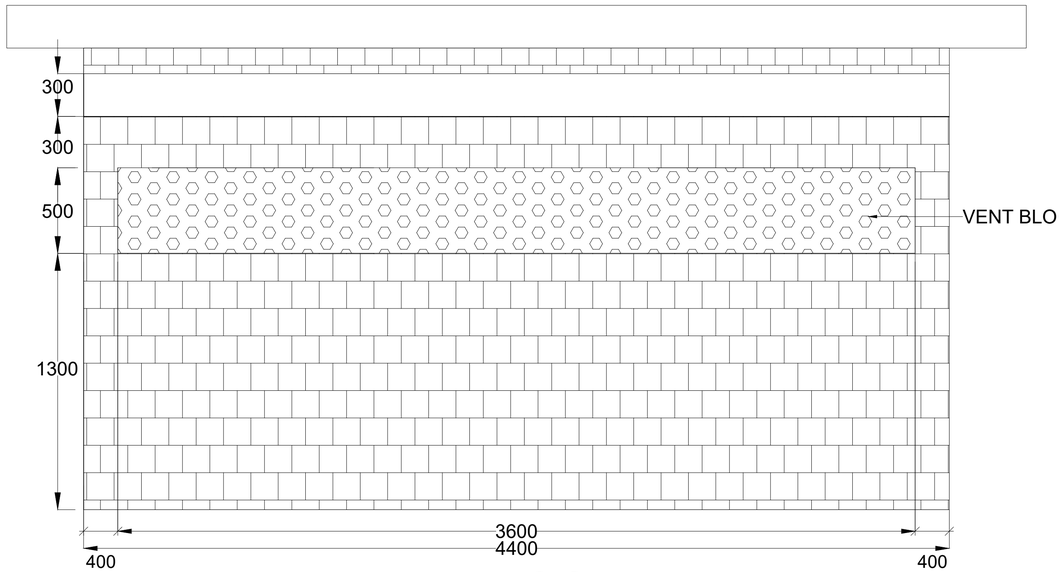
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
14.PLANT ROOM
PLAN, SECTION, ELEVATION VIEWS AND FOUNDATION DETAILS
SHEET 1 OF 1

DRAWING SCALE: AS SHOWN
DRAWING No.: GW4R-WJR-STD-14.01

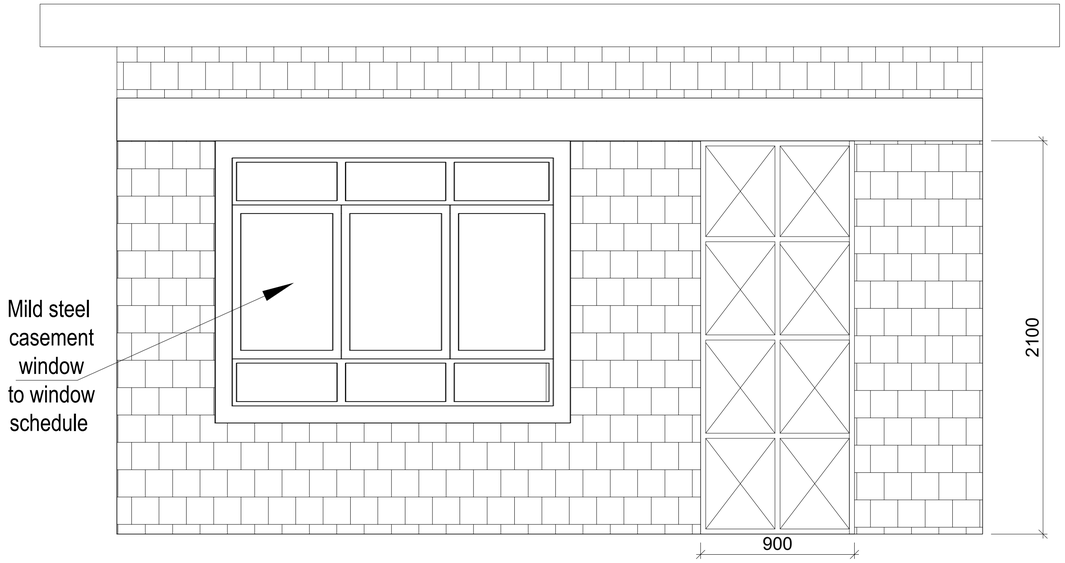
Jun 22, 2025 - 11:40pm

ELEVATION-1 SCALE 1:50



ELEVATION-2 SCALE 1:50

ELEVATION-3 SCALE 1:50



ELEVATION-4 SCALE 1:50

CLIENT:

WaterFund

WATER SECTOR TRUST FUND

1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,

Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

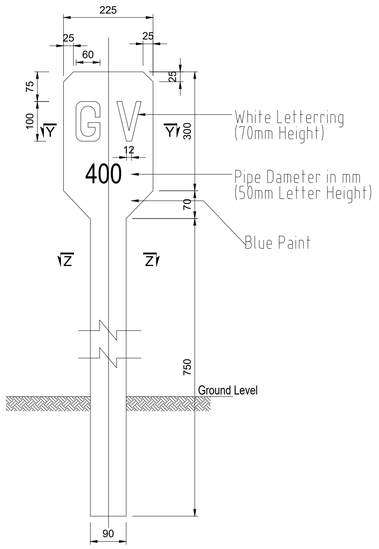
STANDARD DRAWINGS

14.PLANT ROOM
PLAN, SECTION, ELEVATION VIEWS
AND FOUNDATION DETAILS
SHEET 2 OF 2

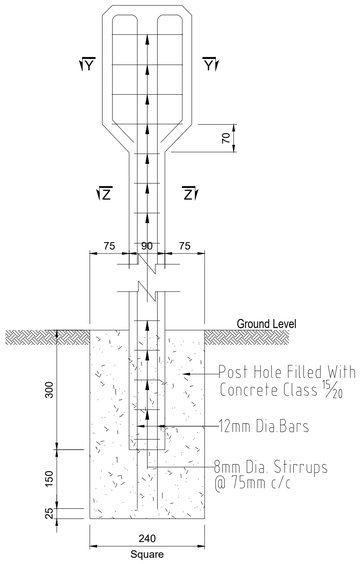
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-14.02

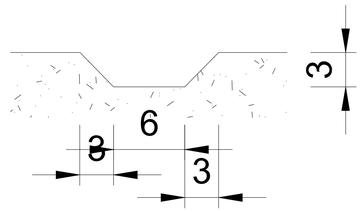
Jun 03, 2025 - 11:01am



MARKER POST FOR GATE VALVE
(DISTRIBUTION NETWORK)
N.T.S



MARKER POST
REINFORCEMENT DETAILS
(DISTRIBUTION NETWORK)
N.T.S



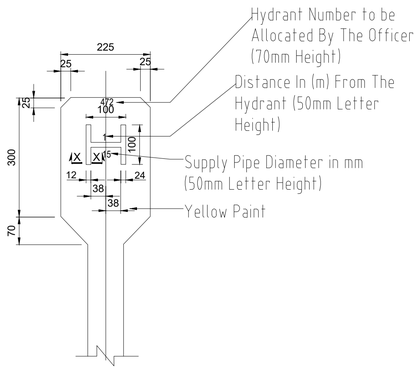
SECTION X-X
N.T.S

NOTE

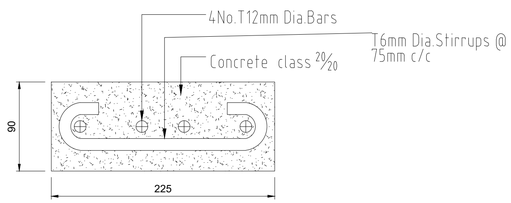
1. Details For Indicator Posts to be as Follows:

For	Use
Gate Valve	GV
Air Valve	AV
Washout	WO
Fire Hydrant	FH
Water Main	WM
Bulk Meter	M

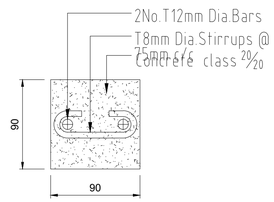
2. All Indicator Posts Except Fire Hydrant Posts to be Painted With 2 Coats of Blue Oil Based Paint And Lettering to Engineer's Approval.
3. Maker Posts to be Positioned in Safe Locations Where Possible Aganinst Boundary of Road Reserve.



FIREHYDRANT POST
N.T.S



SECTION Y-Y
N.T.S



SECTION Z-Z
N.T.S

CLIENT:

WaterFund
Financing the Water Sector

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates
architects engineers & consultants pvt. ltd.

ADVANCED
ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

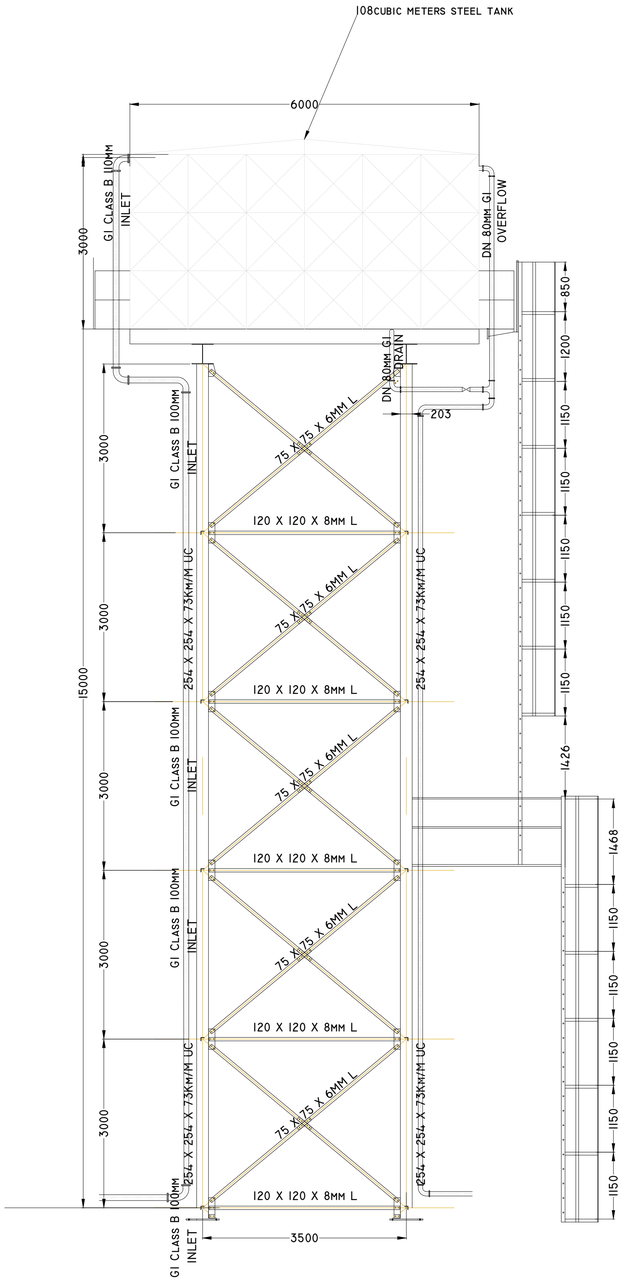
STANDARD DRAWINGS

15.MARKER POST DETAILS

DRAWING SCALE: AS SHOWN

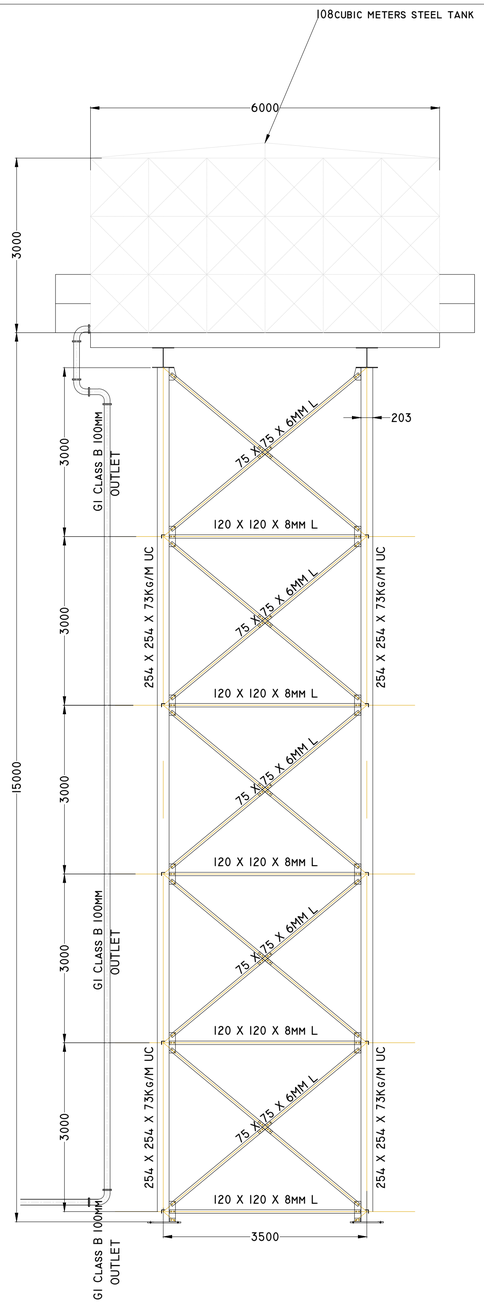
DRAWING No.: GW4R-WJR-STD-15

Jun 03, 2025 - 11:04am



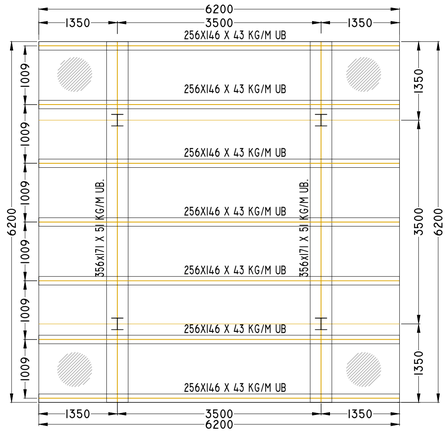
GENERAL ARRANGEMENT: FRONT VIEW

1:50

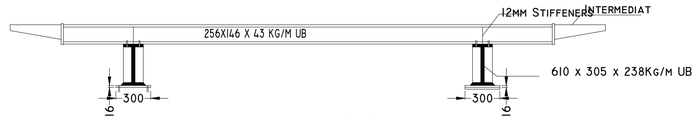


GENERAL ARRANGEMENT: SIDE VIEW

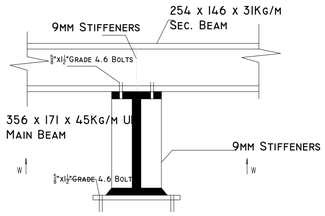
1:50



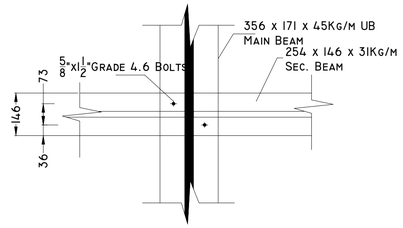
GRILLAGE: PLAN VIEW



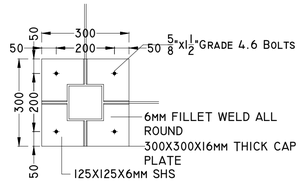
GRILLAGE: SECTION



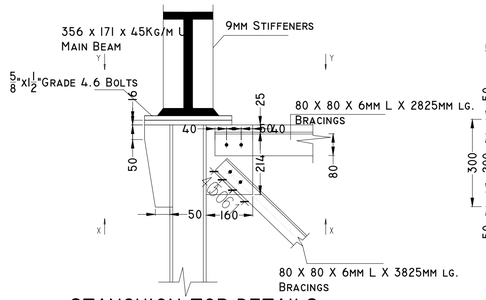
SEC.BEAM TO MAIN BEAM CONNECTION



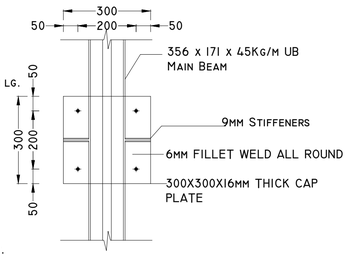
VIEW 'WW'
SEC.BEAM TO MAIN BEAM CONNECTION



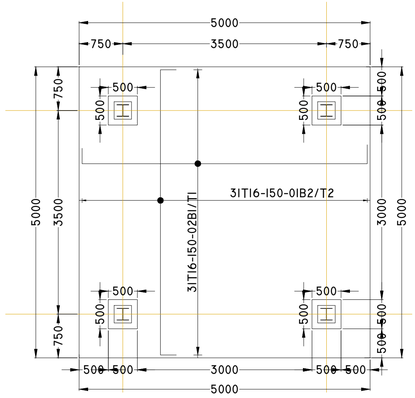
VIEW 'XX'
CAP GUSSET DETAILS: PLAN



STANCHION TOP DETAILS
CAP GUSSET DETAILS: SECTION

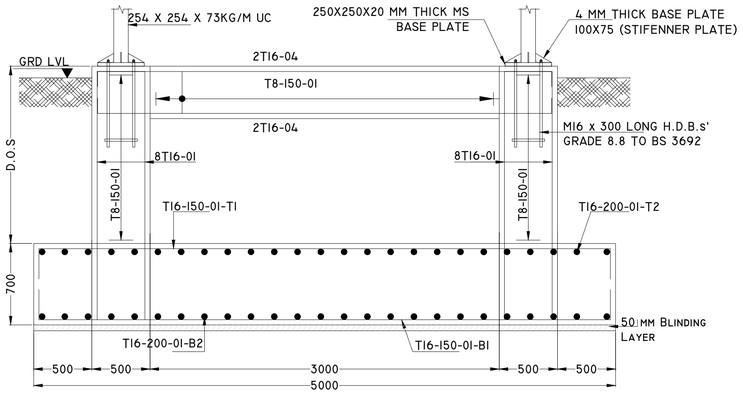


VIEW 'YY'

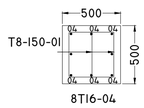


TANK TOWER FOUNDATION LAYOUT

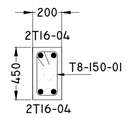
(SCALE 1:25)



SECTION B-B THROUGH BASE CB2



TYPICAL SECTION THROUGH STUB COLUMN



GROUND BEAM 450X200

CLIENT:

WaterFund

WATER SECTOR TRUST FUND

1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,

Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

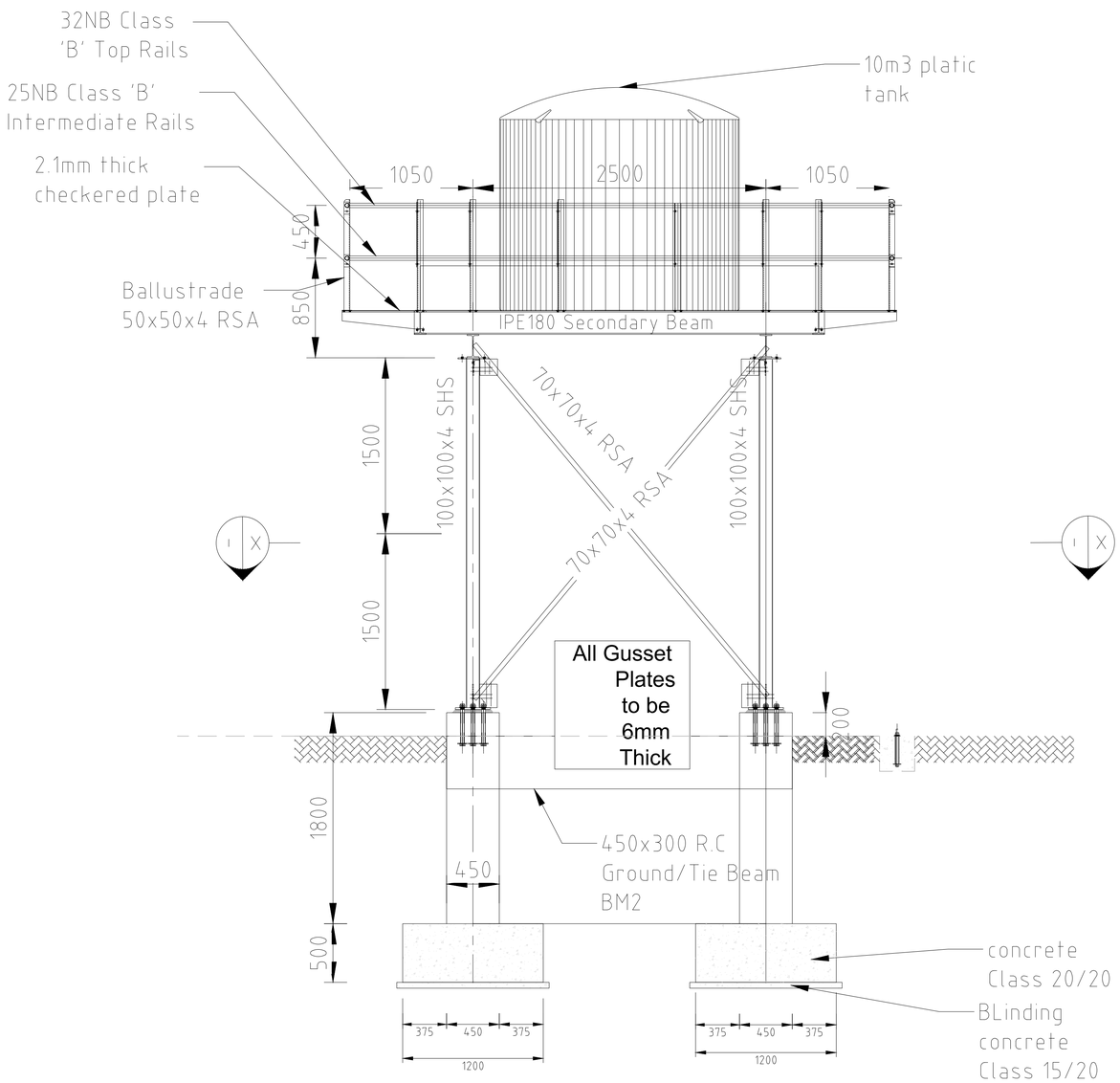
16.ELEVATED STEEL TANK

SHEET 1 OF 1

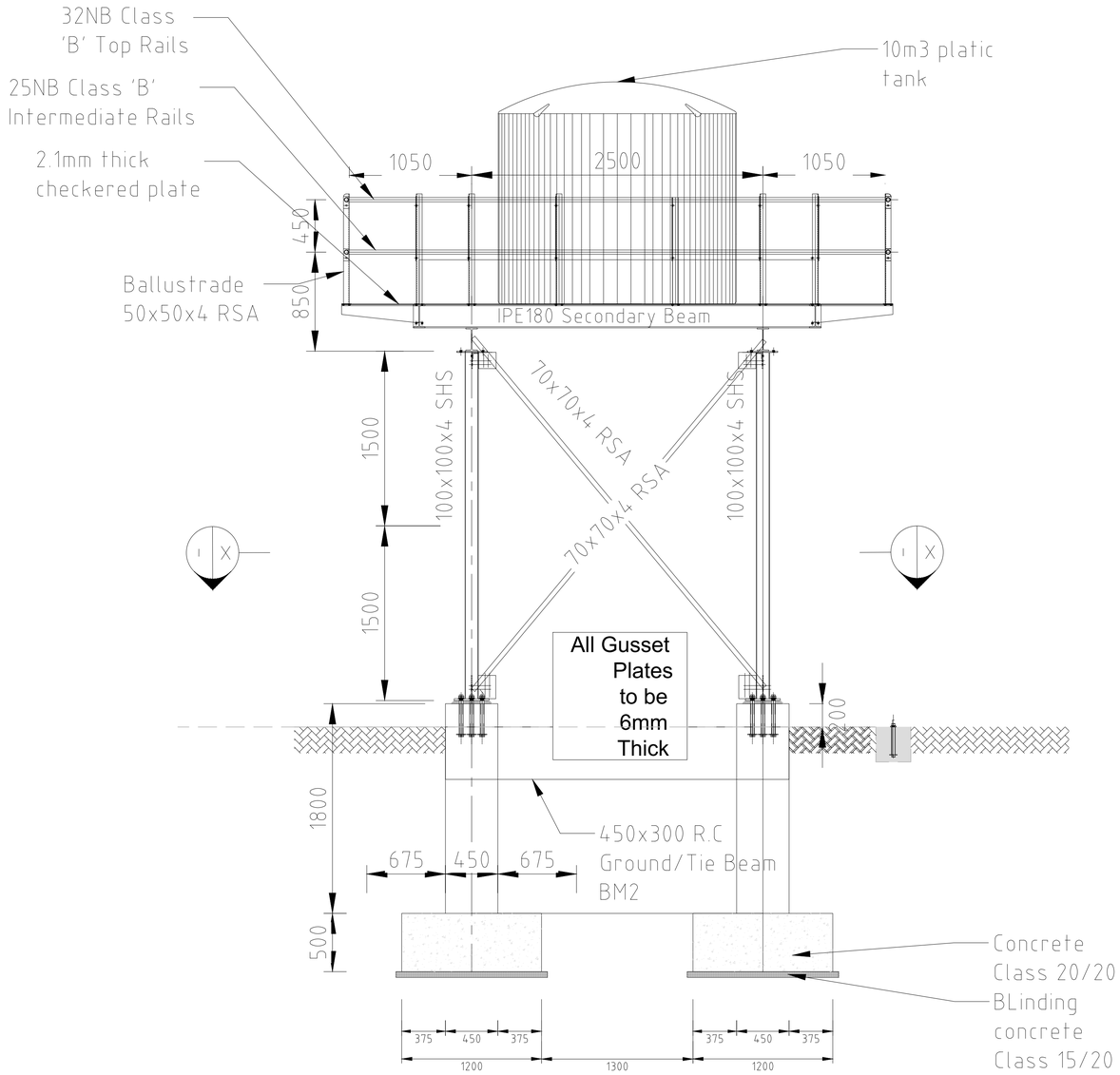
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-16

Jun 03, 2025 - 11:06am



GENERAL ARRANGEMENT FRONT VIEW
SCALE 1:50



GENERAL ARRANGEMENT SIDE VIEW
SCALE 1:50

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

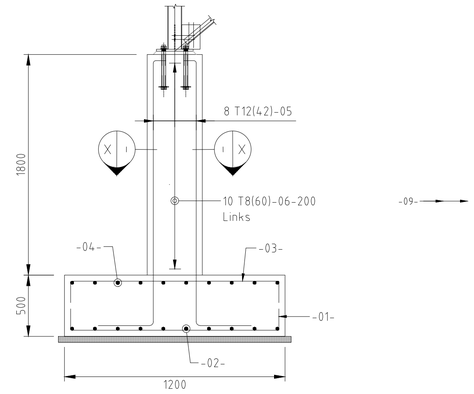
DRAWING TITLE: STANDARD DRAWINGS

17.ELEVATED PLASTIC TANK
SHEET 1 OF 3

DRAWING SCALE: AS SHOWN

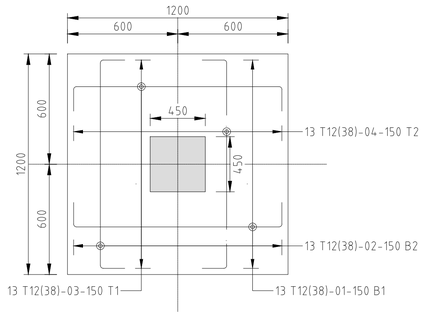
DRAWING No.: GW4R-WJR-STD-17.01

Jun 23, 2025 - 7:31pm



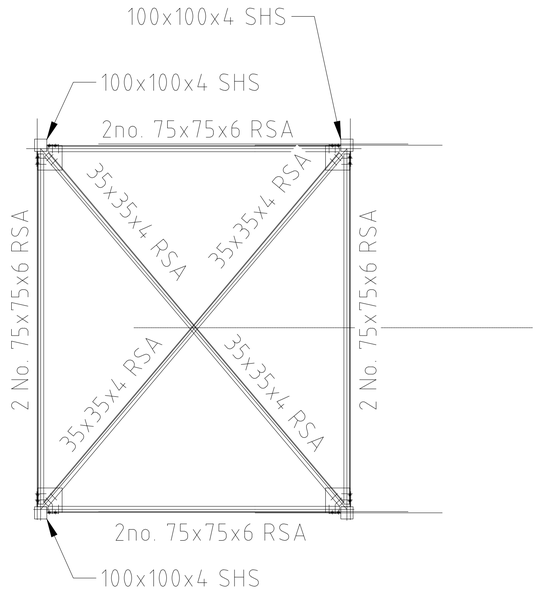
450x450 COLUMN TYPE C2

SCALE 1:25



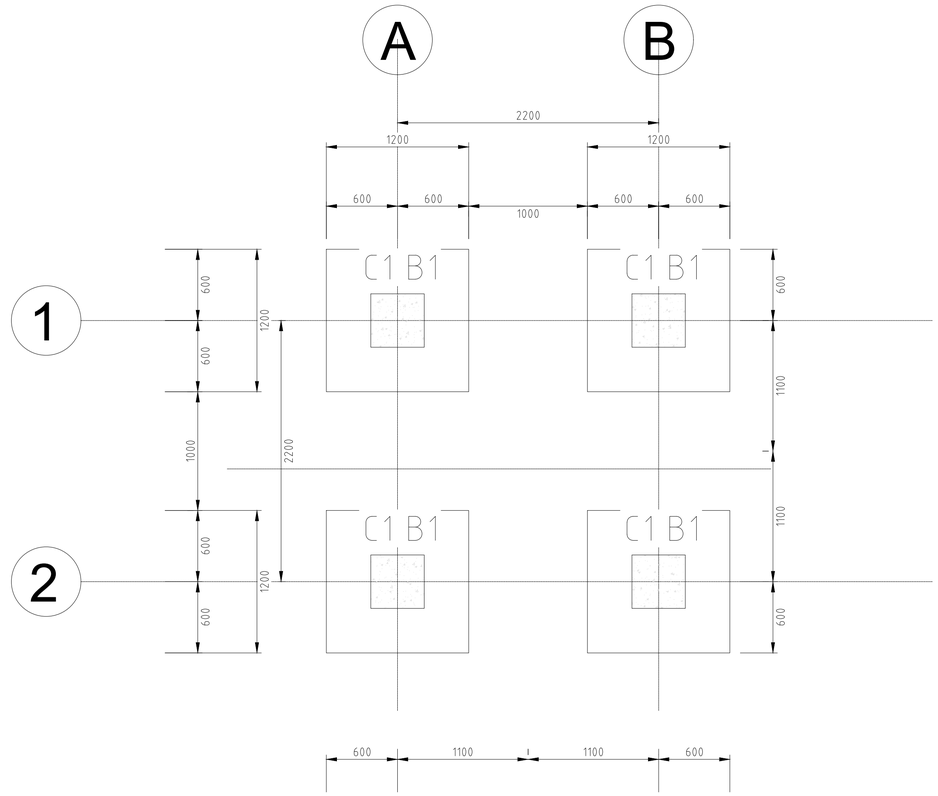
1200x1200x500 COLUMN BASE TYPE C2 B2

SCALE 1:25



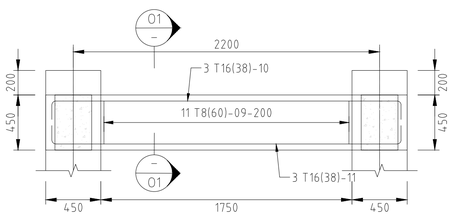
PLAN VIEW X-X

SCALE 1:50

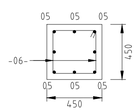


ELEVATED WATER TANK TOWER (1 No.): FOUNDATION LAYOUT

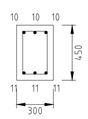
SCALE 1:50



450x300 GROUND/ TIE BEAM TYPE
BM1
(4 No. THUS)
SCALE 1:25



Section X-X
SCALE 1:20



Section 01-01
SCALE 1:20

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd**, Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE: STANDARD DRAWINGS

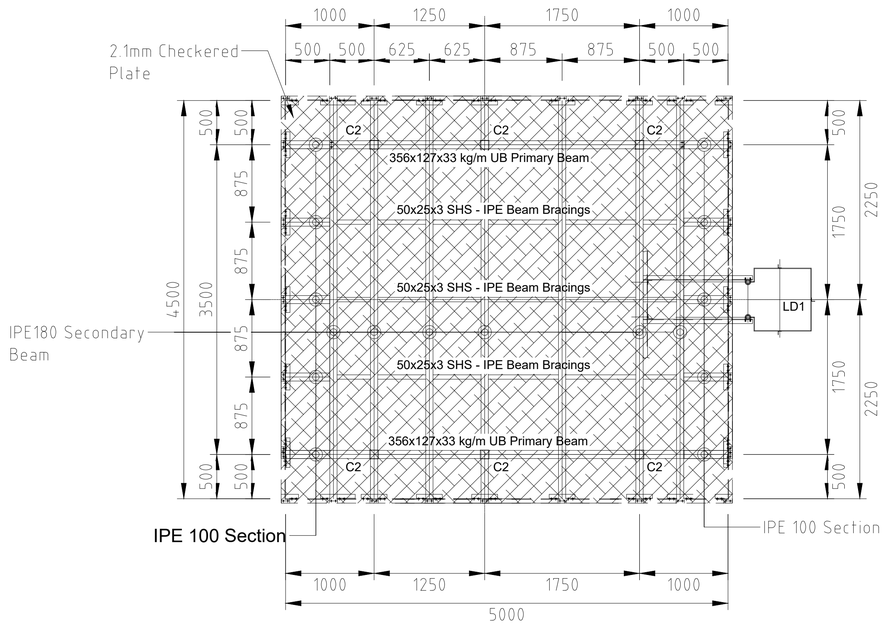
17.Elevated Plastic Tank

SHEET 2 of 3

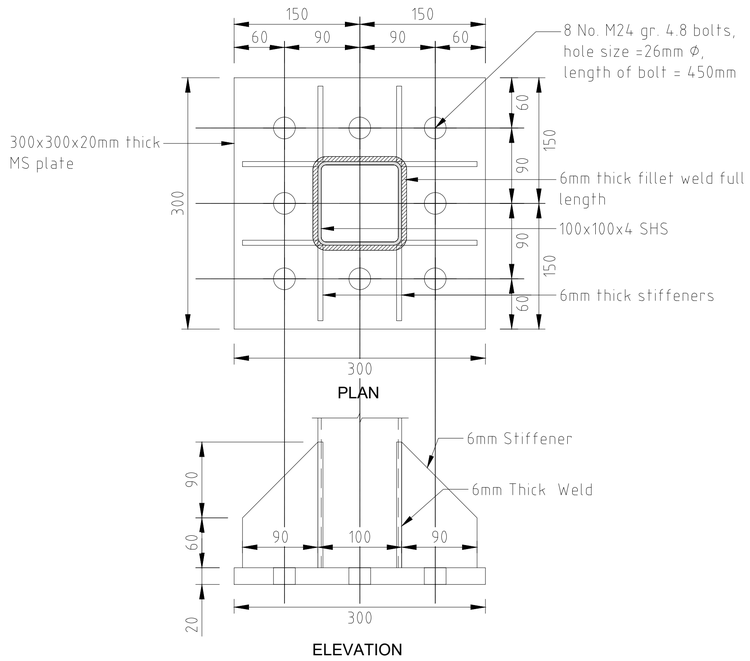
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-17.02

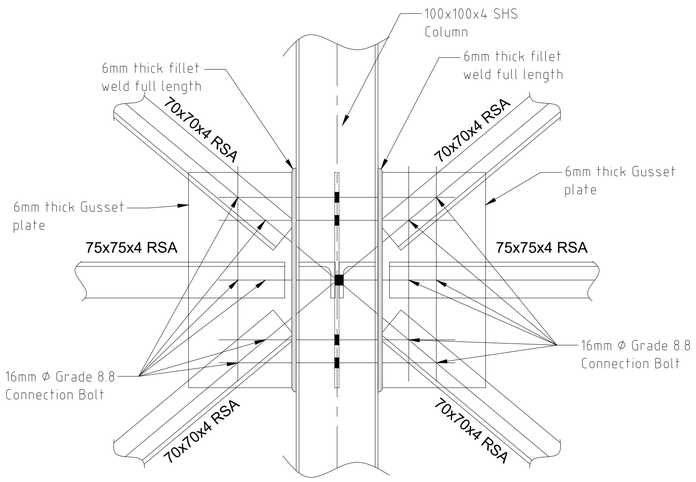
Jun 23, 2025 - 7:31pm



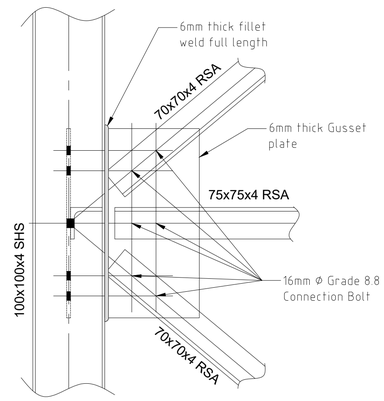
PLAN VIEW AT PLATFORM 3m
SCALE 1:50



COLUMN BASE PLATE DETAILC
(6 No.)
SCALE 1:5



DETAIL B
SCALE 1:5



DETAIL A
SCALE 1:5

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

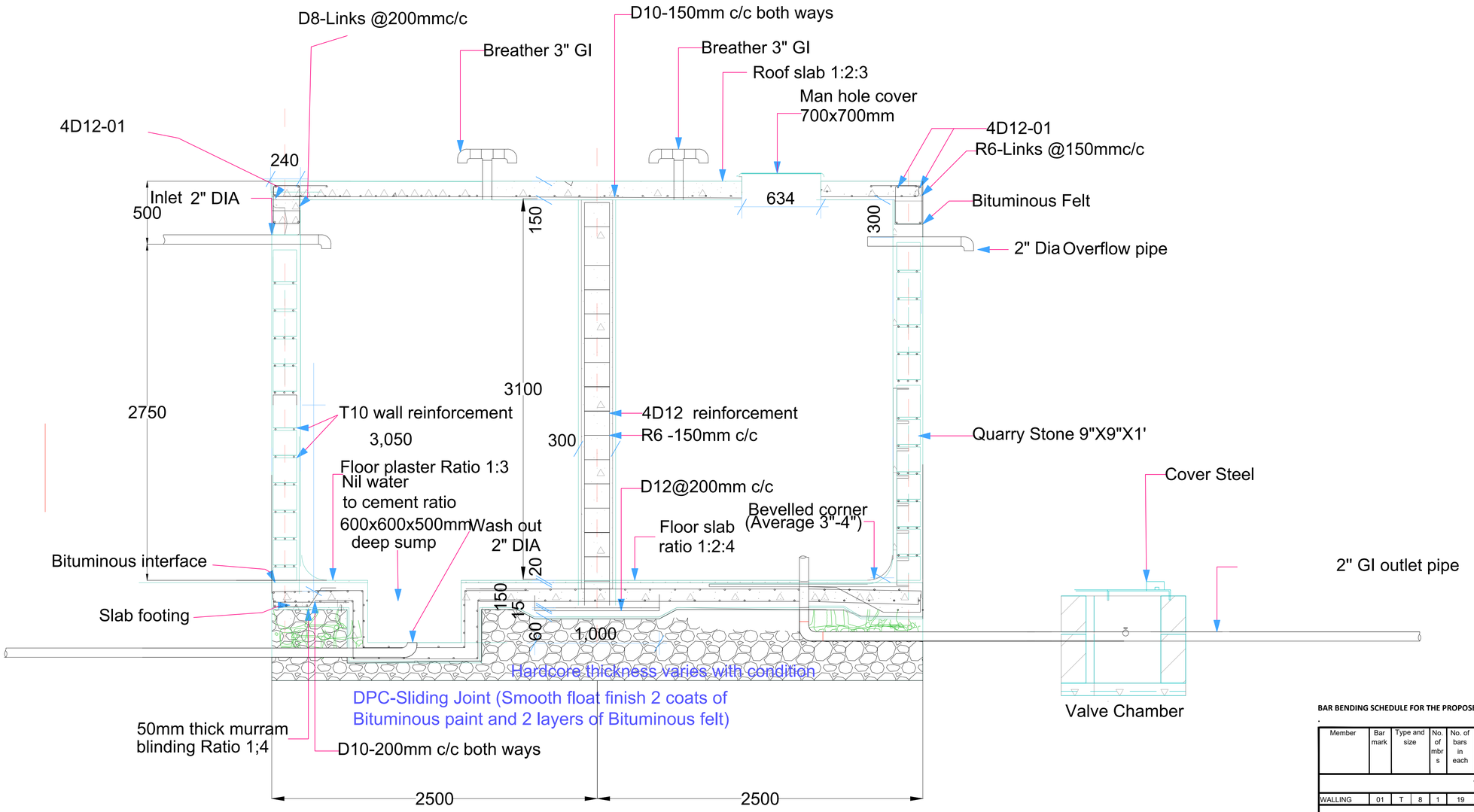
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
17.Elevated Plastic Tank
SHEET 3 of 3

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-17.03

Jun 23, 2025 - 7:31pm



50M3 MASONRY TANK

BAR BENDING SCHEDULE FOR THE PROPOSED 50M3 MASONRY TANK

.

Member	Bar mark	Type and size		No. of mbrs	No. of bars in each	Total no.	Length of each bar † mm	Shape code	A * mm	B * mm	C * mm	D * mm	E/R * mm	TOTAL BAR LENGTH (M)
TANK WALLING														
WALLING	01	T	8	1	19	19	22000	20	12000					418
COLUMN BASE														
BASE,B1	02	T	12	6	6	12	1150	38	150	500	150			13.8
COLUMN														
CENTRE COLUMN,C1	01	T	12	2	2	8	3600	37	390	2100				28.8
COLUMN,C1 LINKS	02	R	6	1	11	11	900	61	410	160				9.90
BEAM														
BEAM,B1	01	T	12	1	4	6	24000	20	12000					144
BEAM,B1 LINKS	02	R	6	1	142	284	1000	61	410	160				284.00
FLOOR SLABS														
FLOOR SLAB	01	T	10	1	12	49	9300	55	800	250	9420	250	800	341.78
FLOOR SLAB	02	T	10	1	12	49	9300	55	800	250	9420	250	800	341.78
ROOF SLAB	03	T	10	1	8	50	9300	55	800	250	7070	250	800	348.75

SUMMARY

SIZE	TOTAL LENGTH(M)		TOTAL BARS 12M EACH
R6	294		24
T8	418		35
T10	1032		86
T12	187		16

CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No:

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

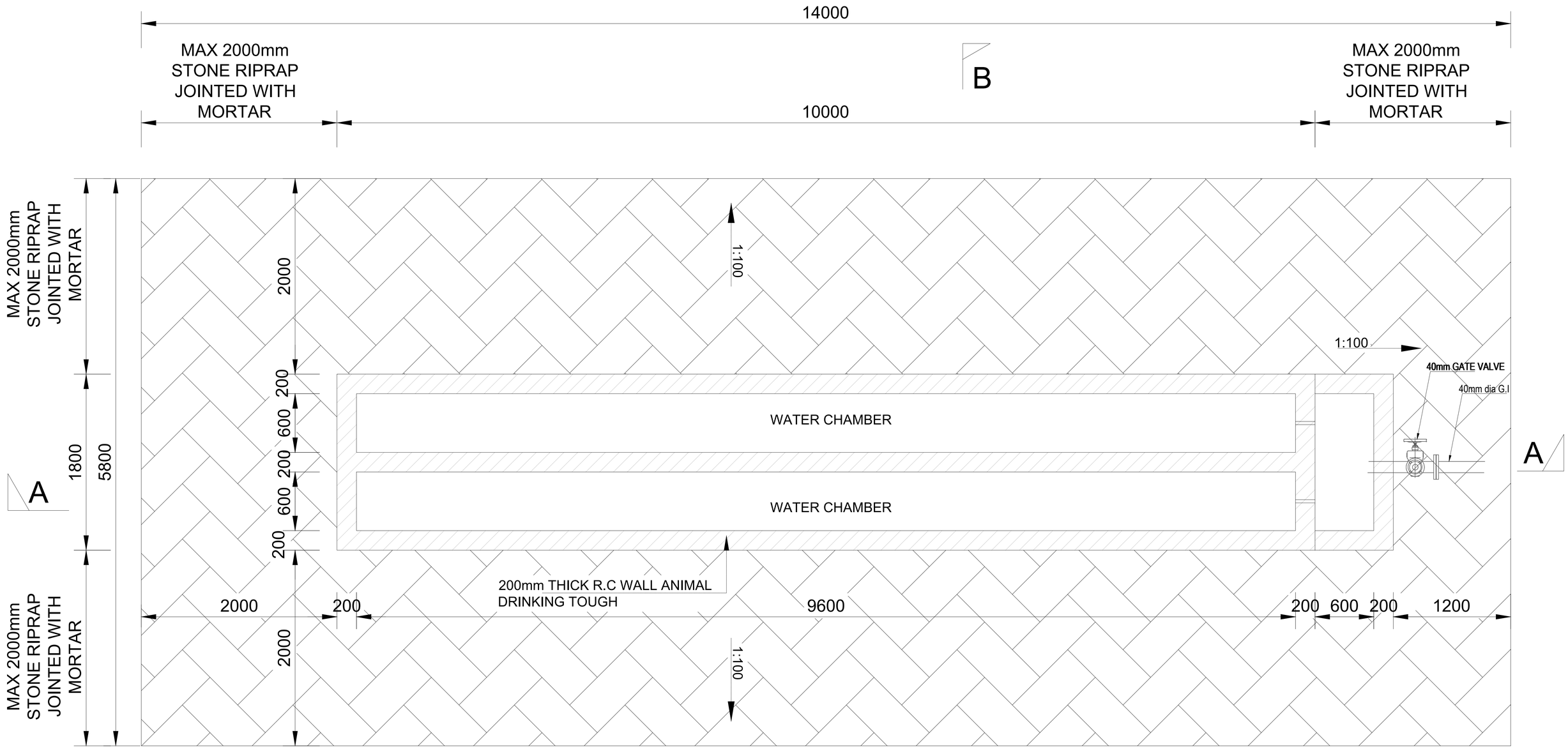
18.50M3 GROUND MASONRY TANK

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-18

Jun 03, 2025 - 11:23am



CATTLE AND CAMEL WATER TROUGHS
SCALE 1:25

B

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

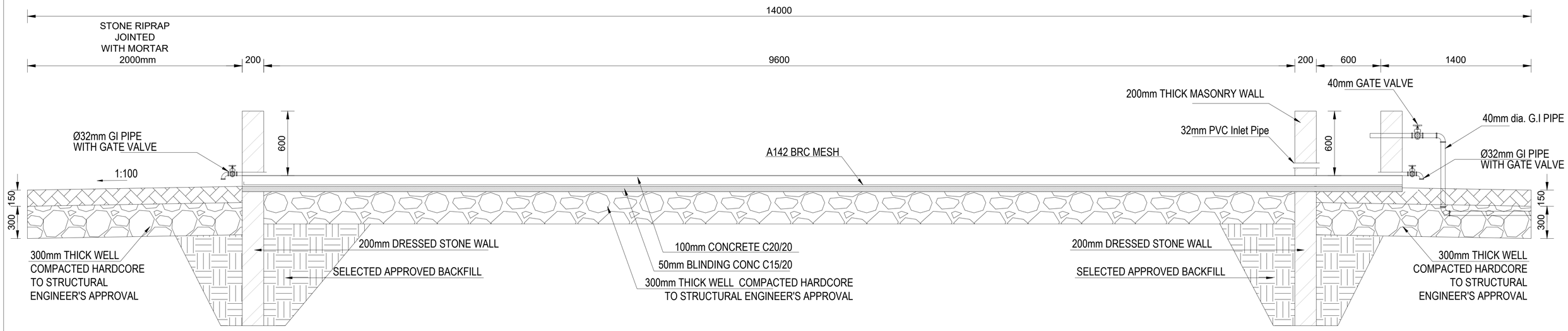
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
19.WATER TROUGHS
CAMEL AND CATTLE WATER TROUGH PLAN
SHEET 1 OF 4

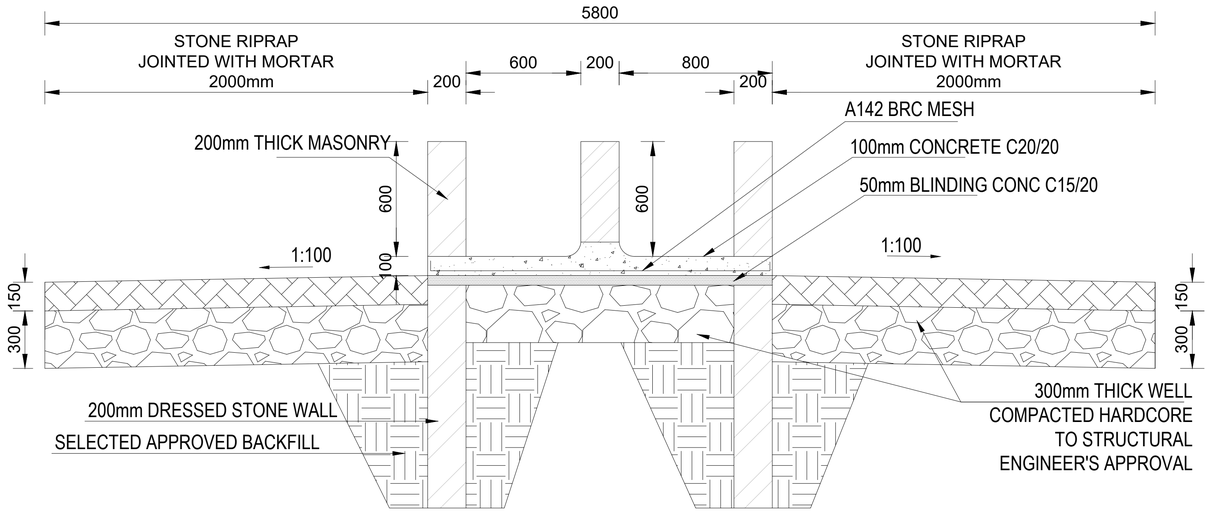
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-19.01

Jun 17, 2025 - 3:04pm



CATTLE AND CAMEL WATER TROUGH
SECTION A - A
SCALE 1:25



CATTLE AND CAMEL WATER TROUGH
SECTION B - B
SCALE 1:25

CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

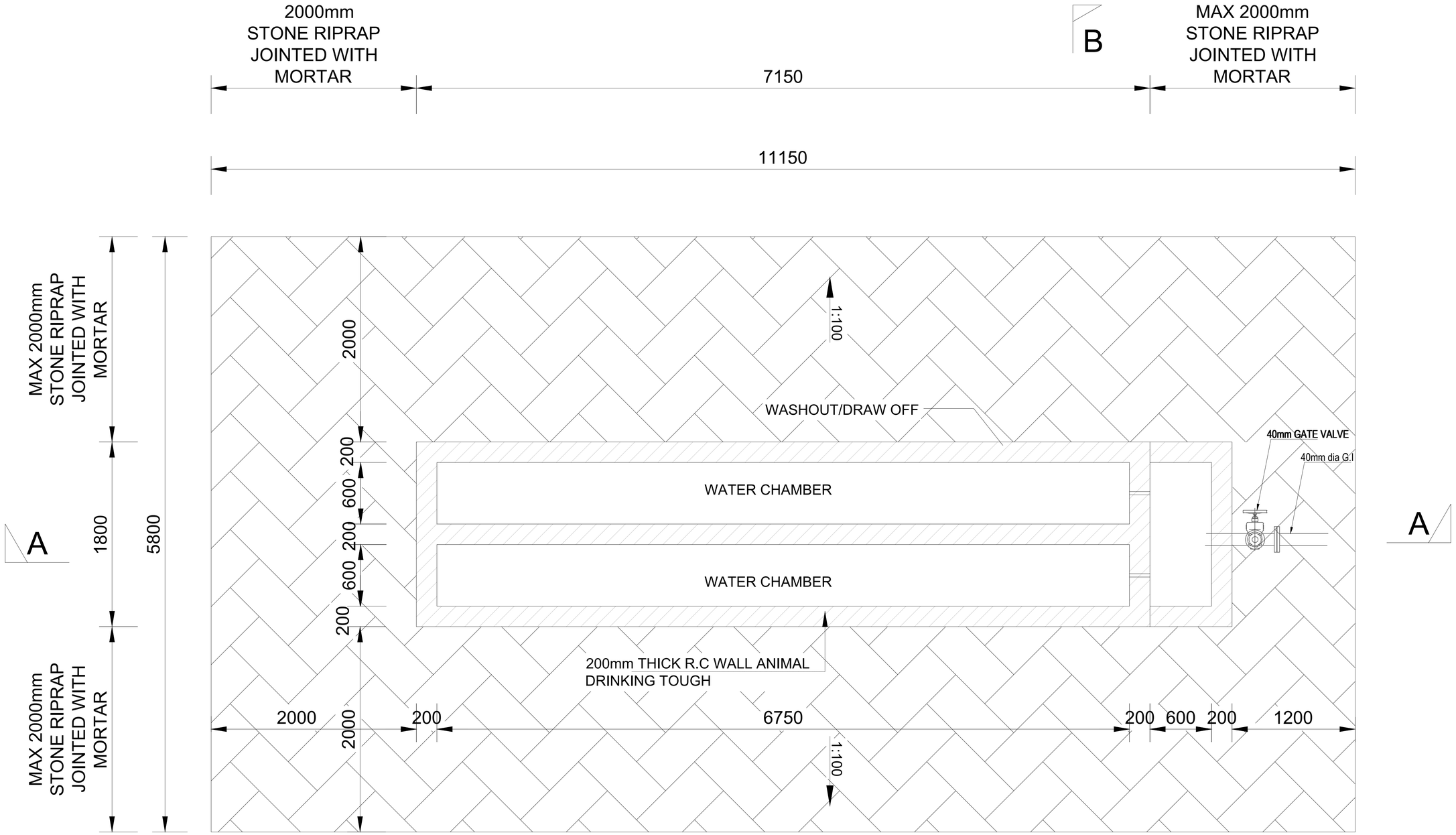
DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
19.WATER TROUGHS
CAMEL AND CATTLE CROSS SECTIONAL ELEVATIONS
SHEET 2 OF 4

DRAWING SCALE: AS SHOWN
DRAWING No.: GW4R-WJR-STD-19.02

Jun 17, 2025 - 3:04pm



SHOATS WATER TROUGH PLAN

SCALE 1:25

B

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,** Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

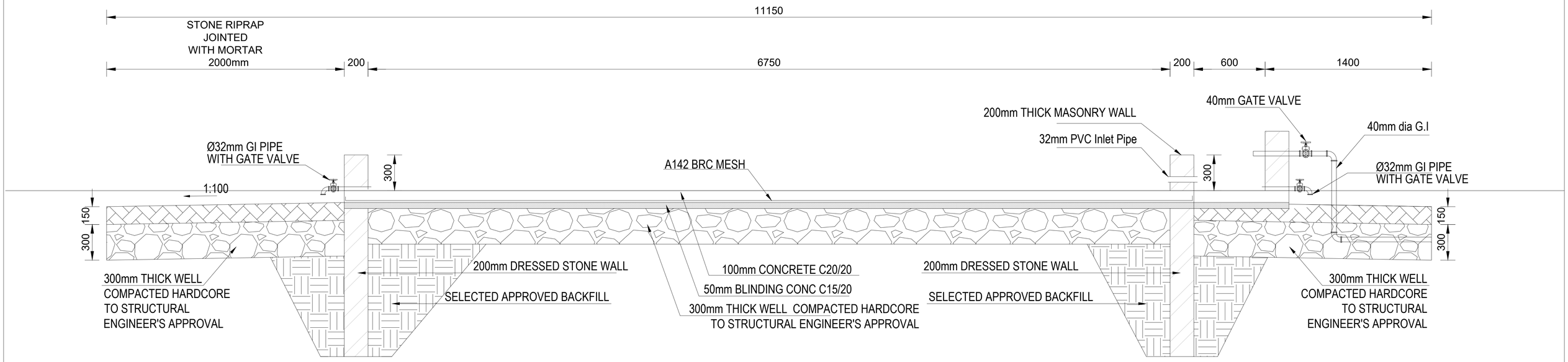
STANDARD DRAWINGS

19.WATER TROUGHS
SHOATS PLAN
SHEET 3 OF 4

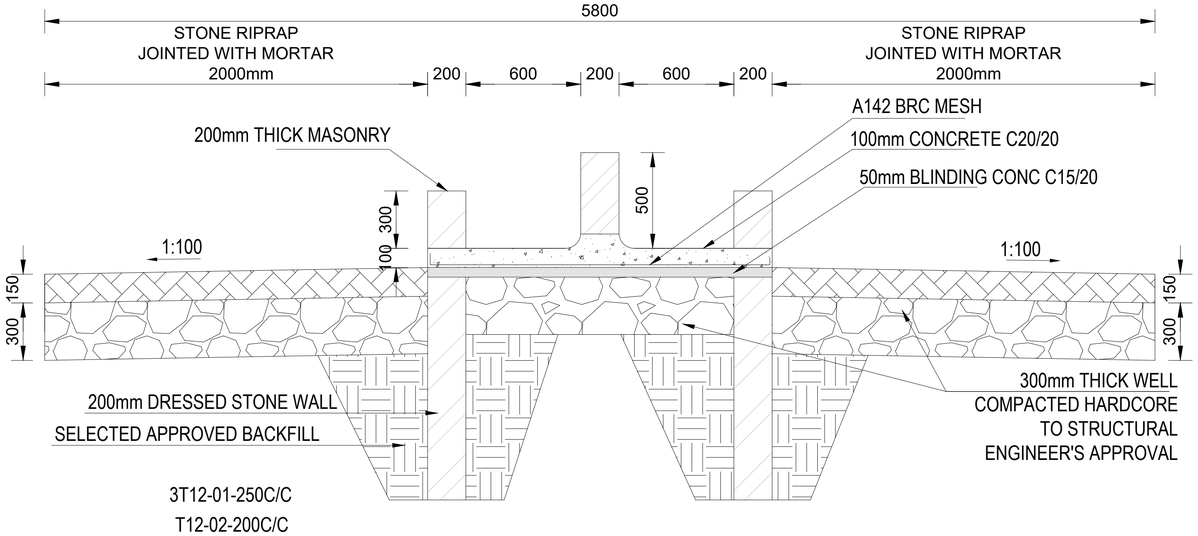
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-19.03

Jun 17, 2025 - 3:04pm



SHOATS WATER TROUGH
SECTION A - A
SCALE 1:25



SHOATS WATER TROUGH
SECTION B - B
SCALE 1:25

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund Financing the Water Sector **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd**, Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

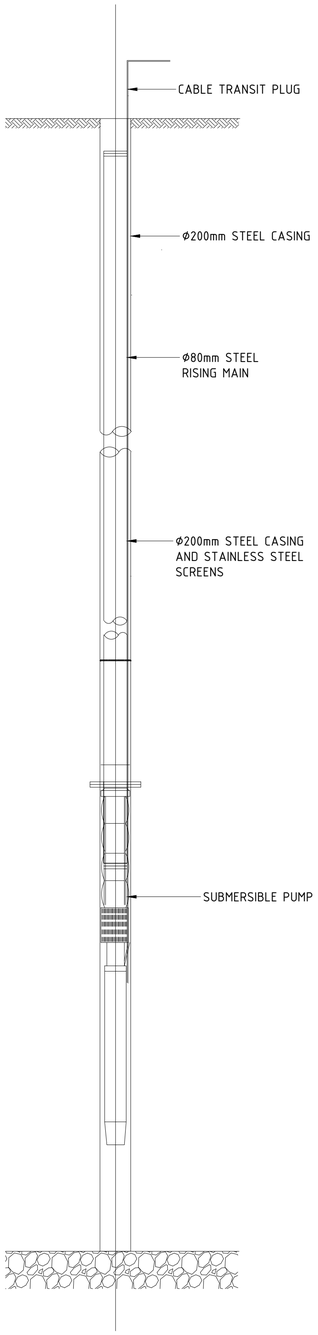
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
19.WATER TROUGHS
SHOATS CROSS SECTIONAL ELEVATIONS
SHEET 4 OF 4

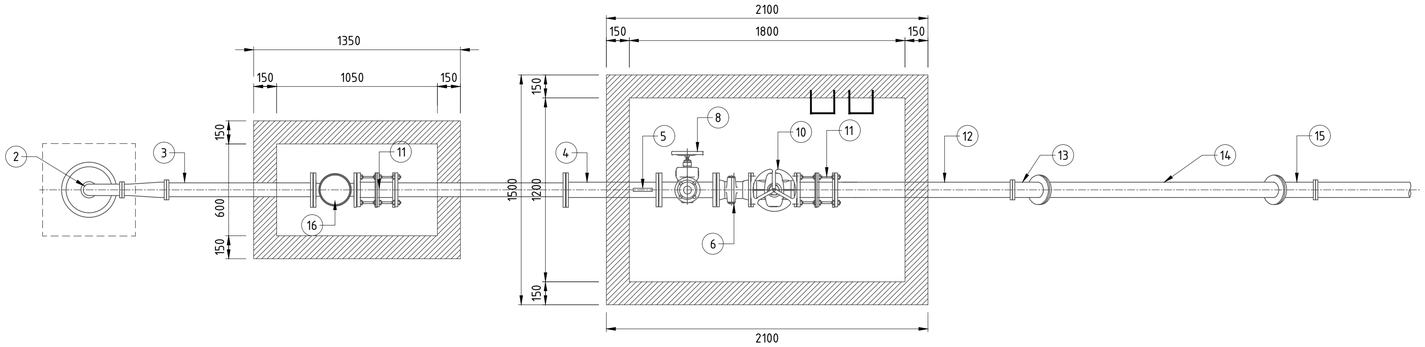
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-19.04

Jun 17, 2025 - 3:04pm



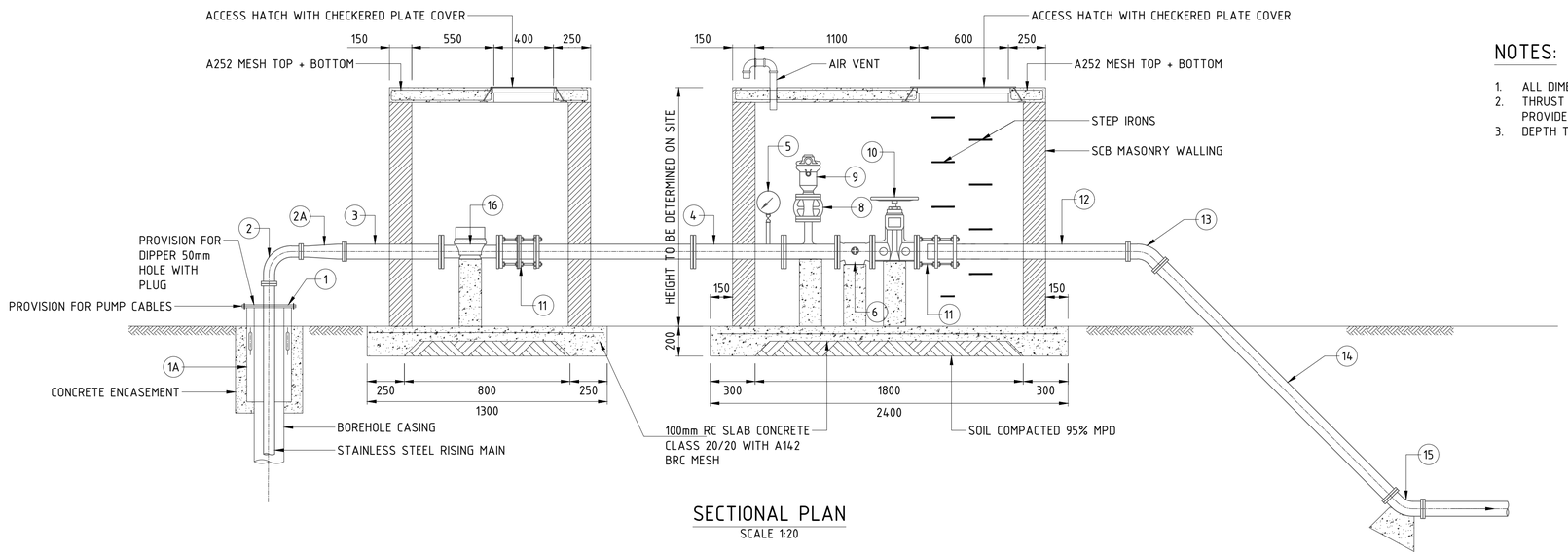
BOREHOLE SECTION
SCALE 1:20



SECTIONAL ELEVATION
SCALE 1:20

SCHEDULE OF PIPEWORK & FITTINGS PER BOREHOLE

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



SECTIONAL PLAN
SCALE 1:20

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS STATED OTHERWISE.
2. THRUST BLOCKS AT BENDS ARE OMITTED FOR CLARITY BUT SHALL BE PROVIDED AS DIRECTED BY ENGINEER.
3. DEPTH TO BE DETERMINED ON SITE.

CLIENT:
WaterFund
Financing the Water Sector
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

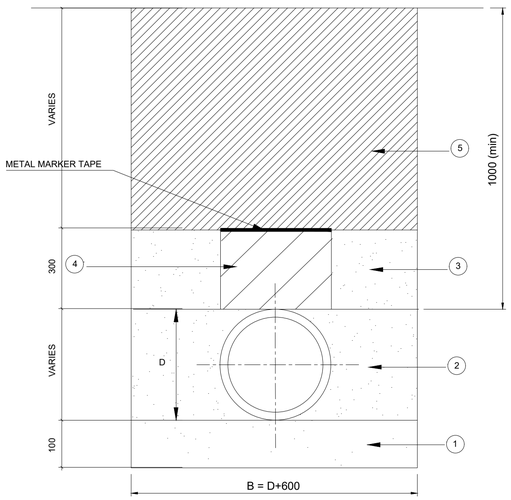
DRAWING TITLE:
STANDARD DRAWINGS
20.BOREHOLE HEAD CHAMBER AND FITTING DETAILS

DRAWING SCALE: AS SHOWN

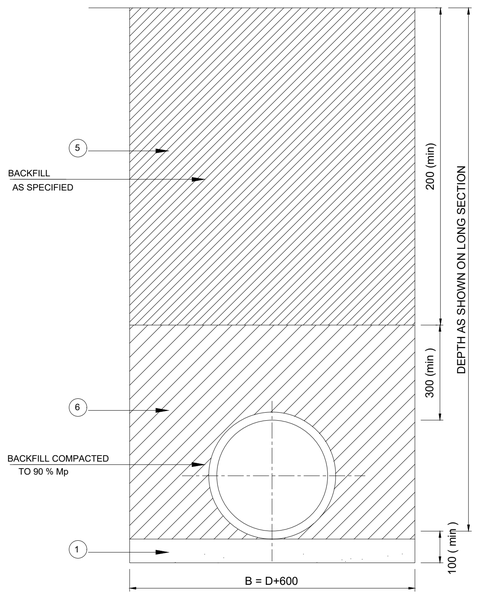
DRAWING No.: GW4R-WJR-STD-20

Apr 19, 2025 - 10:36am

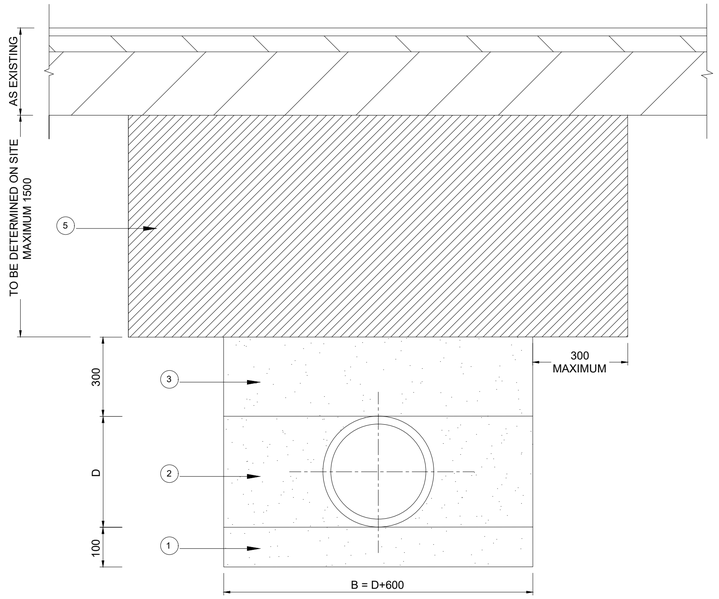
TYPICAL TRENCH EXCAVATION AND BACKFILLING FOR HDPE AND STEEL PIPES



BEDDING FOR STEEL PIPES



PIPE PROTECTION AT ROAD CROSSING



TRENCH WIDTHS FOR uPVC/PE PIPES

NOMINAL DIAMETER D (mm)	50	75	100	125	150
WIDTH OF TRENCH B (m)	1.15	1.2	1.25	1.4	1.45

≃ B - D + 1.0 m

TABLE 1 : MATERIAL DESCRIPTION CHART

SOIL TYPE	DESCRIPTION	GROUP SYMBOL
A	ANGULAR, CRUSHED ROCK NEGLIGIBLE FINES	-
B	WELL GRADED GRAVEL - SAND MIXTURES FEW FINES	GW
C	FINE GRAVEL, NO FINES	GP
D	GRAVEL - SAND MIX, UPTO 50 % FINES	GF

TYPICAL X-SECTION OF CONCRETE BED/ SURROUND FOR 800 DIA. PIPE

TABLE 2 : COMPACTION CHART

% Mp	SOIL TYPE	COMPACTION METHOD	
		THICKNESS OF LAYER (mm).	No. OF PASSES
90	A AND B CD	300 300 150	1 2 2

1. Minimum and normal trench width are defined as normal pipe diameter plus 1000 mm.
2. The backfill around the pipe from the trench bottom to the crown of the pipe carried out in layers whose depths do not exceed the maximum thickness of the layer as defined for each class of bedding and soil type nor half the normal pipe diameter whichever is the lesser.
3. The bedding used is 150 mm in all cases.
4. The embedment specifies the degree of compaction required in order to fulfill. Design requirements.
5. In general, the method of attaining the required compaction is ascertained as follows :
   (i) The engineer's representative identifies, classifies and agrees the soil type of embedment material available from the trench.
   (ii) The site soil type is compared with those on the material description chart [see table 1]
   (iii) The compaction method required is then selected from the compaction chart for the appropriate soil type and class of embedment [see table 2]
6. Not all soils are given in table 1. it should be noted that :
   (i) Fine grained soil with high plasticity shall not be used as backfill.
   (ii) Fine grained soil with low plasticity shall not be used as backfill.
7. Where site material is condemned, imported material shall be used. well graded soil from fines upto 30 mm gravel or as is approved by the engineer's representative.
8. Where some doubt existed as to the compactibility of the soil as defined above, recourse shall be made to the modified proctor density test. the site and laboratory tests shall be carried out to tests 14 b and 12 respectively to ssrn 601 the contractor shall included in his rates for backfilling with available soil.
9. Where stones or rock are present, imported selected bedding as approved by the engineer's representative shall be used under the pipe.
10. The backfill shall be placed in layers as defined above, each layer shall be compacted with a small vibratory rammer. the required number of passes of the rammer is given in table
11. Only when there is 300 mm cover over the pipe is a heavier compacting equipment used. the remainder of the backfill is then suitably compacted in keeping with the reinstatement of the ground to be carried out. this shall be agreed upon with the engineer's representative.
12. Steel pipe shall be wrapped in polyethylene sleeving as corrosion protection when and as when directed by the engineer's representative. soil tests shall be carried out in advance of pipe laying to ascertain requirements.
13. Pipes laid in embankment shall be surrounded as shown in the drawing. the material immediately around the pipe shall be compacted in accordance with the equivalent trench bedding as directed by the engineer's representative.
14. All dimensions are in millimetres unless stated otherwise.

LEGEND :

D PIPE OUTSIDE DIAMETER

B TRENCH WIDTH (SEE TABLE)

(1) APPROVED GRANULAR BEDDING MATERIAL (10 - 20 mm) COMPACTED IN 50 mm LAYERS TO A THICKNESS OF 100 mm OR AS DIRECTED BY THE ENGINEER'S REPRESENTATIVE.

(2) APPROVED GRANULAR BEDDING MATERIAL COMPACTED IN LAYERS OF 75 mm THICK. CAREFUL TAMPING ON EITHER SIDE OF THE PIPE SHOULD BE MAINTAINED TO ENSURE EQUAL PRESSURE ON BOTH SIDES OF THE BEDDING.

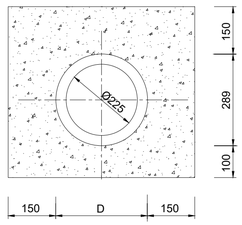
(3) APPROVED GRANULAR BEDDING MATERIAL COMPACTED IN SHALLOW LAYERS TO A MAXIMUM OF 150 mm THICK.

(4) AS IN (3) ABOVE, BUT EXCESSIVE TAMPING TO BE AVOIDED.

(5) NORMAL BACKFILL MATERIAL PROPERLY RAMMED IN LAYERS. NOT EXCEEDING 100 mm THICK.

(6) APPROVED GRANULAR BACKFILL MATERIAL COMPACTED TO 90% MDD IN LAYERS NOT EXCEEDING 300 mm THICK

TYPICAL X-SECTION OF CONCRETE BED/ SURROUND FOR 150 DIA. PIPE



CLIENT:
WaterFund
WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:
THE WORLD BANK
THE WORLD BANK GROUP

PROJECT:
CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:
aarvee associates architects engineers & consultants pvt. ltd.
ADVANCED ENGINEERING CONSULTANTS
Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

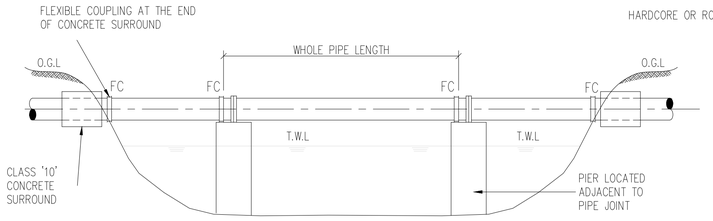
No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:
STANDARD DRAWINGS
22.PIPE TRENCHES DETAILS
SHEET 1 OF1

DRAWING SCALE: AS SHOWN

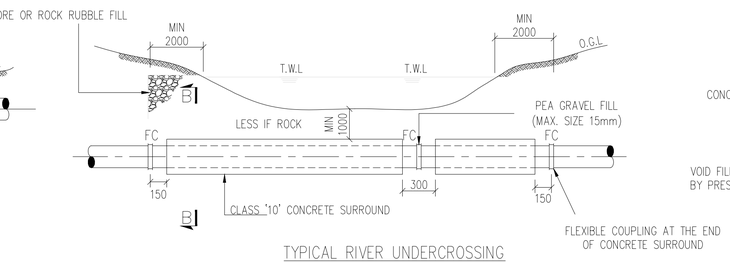
DRAWING No.: GW4R-WJR-STD-22

Jun 03, 2025 - 11:45am



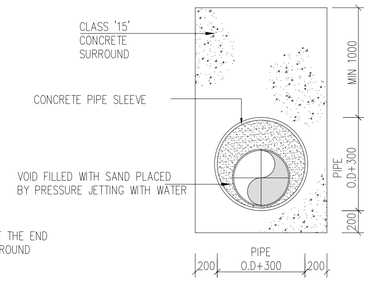
TYPICAL RIVER OVERCROSSING

N.T.S



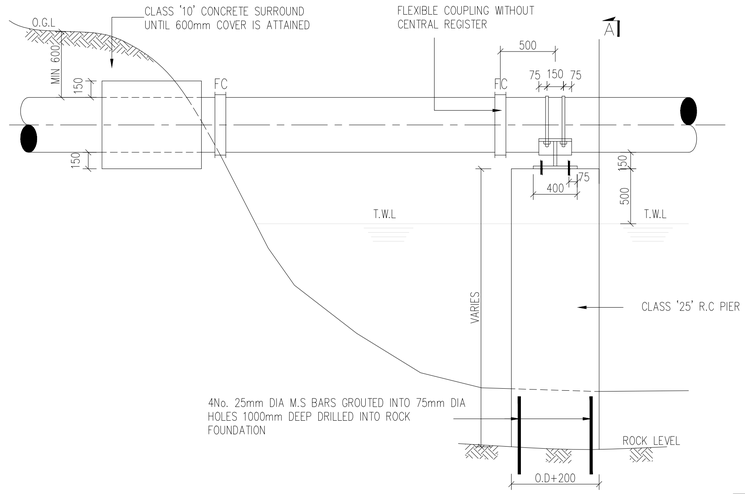
TYPICAL RIVER UNDERCROSSING

N.T.S



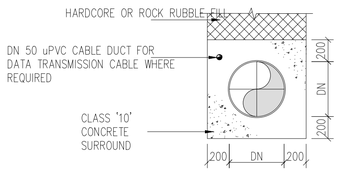
SECTION D-D

N.T.S



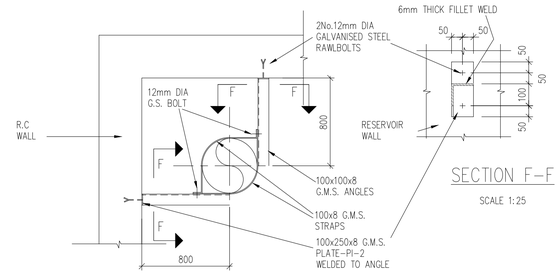
TYPICAL RIVER OVERCROSSING – DETAILS

N.T.S



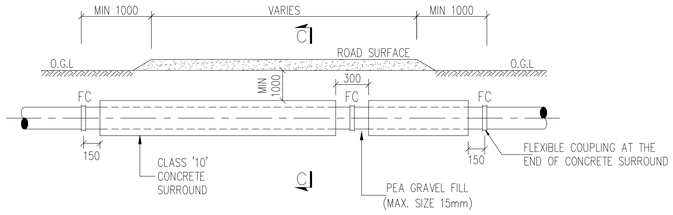
SECTION B-B

N.T.S



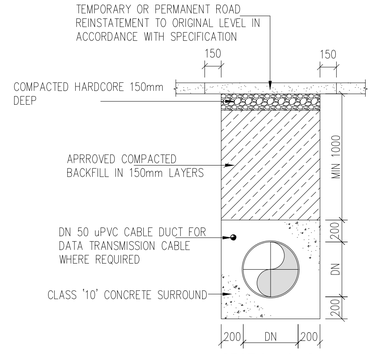
DETAIL OF PIPE ANCHOR BRACKET ON R.C WALL

N.T.S



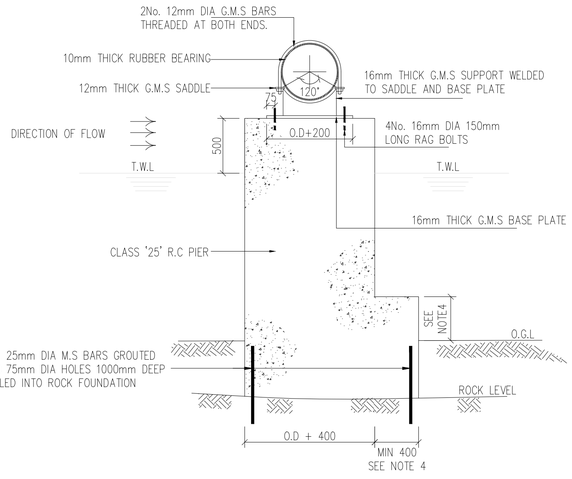
TYPICAL ROAD CROSSING

N.T.S



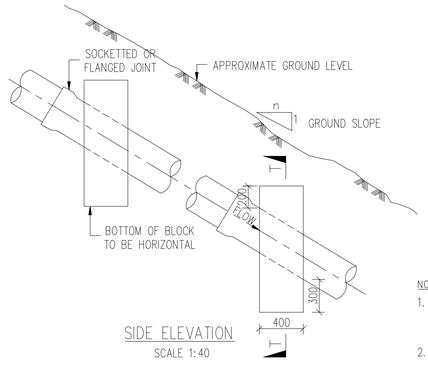
SECTION C-C

N.T.S



SECTION A-A

N.T.S



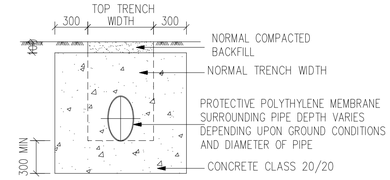
SIDE ELEVATION

SCALE 1:40

RANGE OF GROUND SLOPE (1:n)	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS (m)
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)

NOTES

1. 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.
2. SOCKETTED JOINT TO BE LAID WITH SOCKET FACING UPSTREAM OF GRADE.
3. ANCHOR BLOCK TO BE CONSTRUCTED ON LOWER SIDE OF JOINT.



SECTION T-T

ANCHOR BLOCKS FOR STEEP GRADIENTS (SLOPES>1:6)

SCALE 1:40

CLIENT:

WaterFund

WATER SECTOR TRUST FUND

1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,

Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS			No.	Revision Details	Reviewed	initials	Date	Approved
Action	Name	Date	1	DRAFT DETAILED DESIGN	By			
					Checked			
Designed by:	W.O	JUNE 2025	2	FINAL DETAILED DESIGN	By			
					Checked			
Drawn by:	V.K	JUNE 2025			By			
					Checked			
Checked by:	M.J	JUNE 2025			By			
					Checked			
Approved by:	D.L	JUNE 2025			By			
					Checked			

DRAWING TITLE:

CROSSING DETAILS

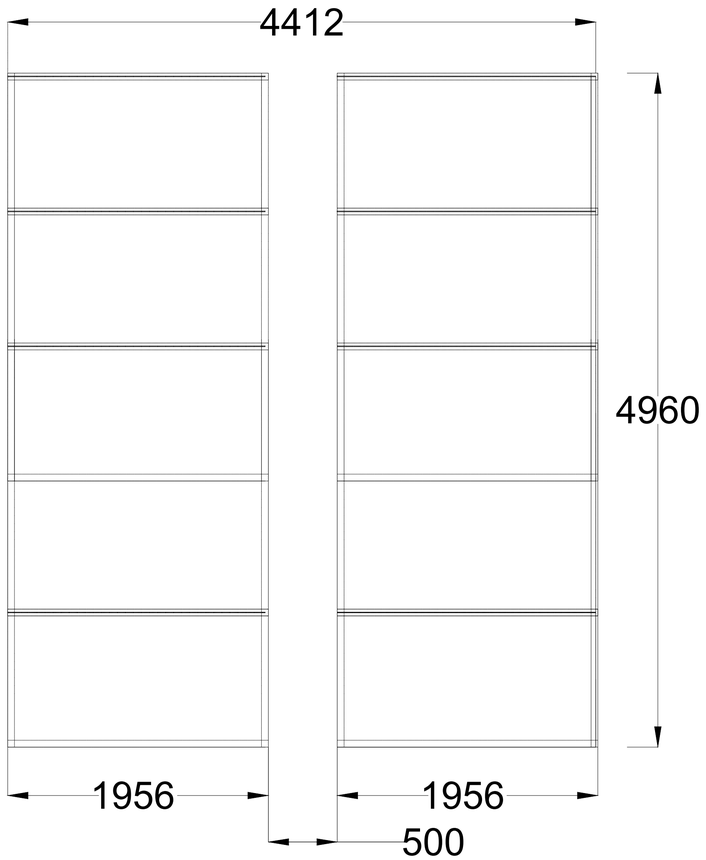
23.RIVER AND LAGHA CROSSING DETAILS

SHEET 1 OF 1

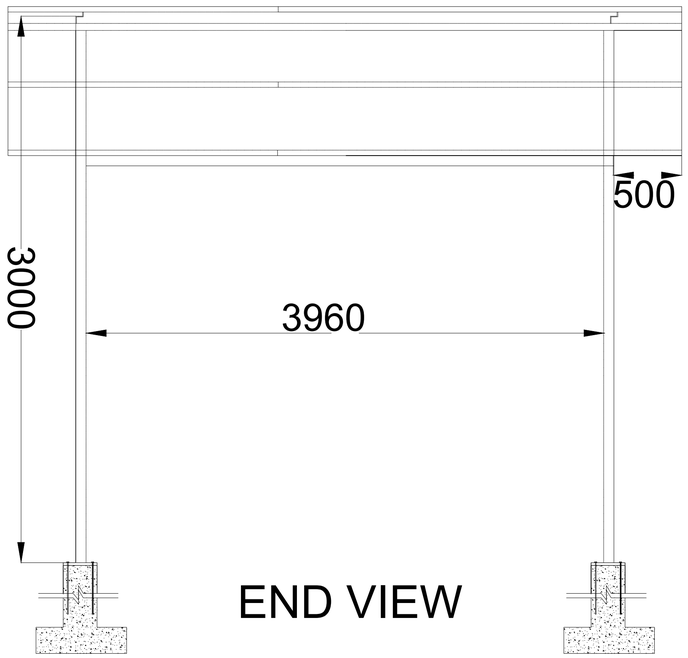
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-23

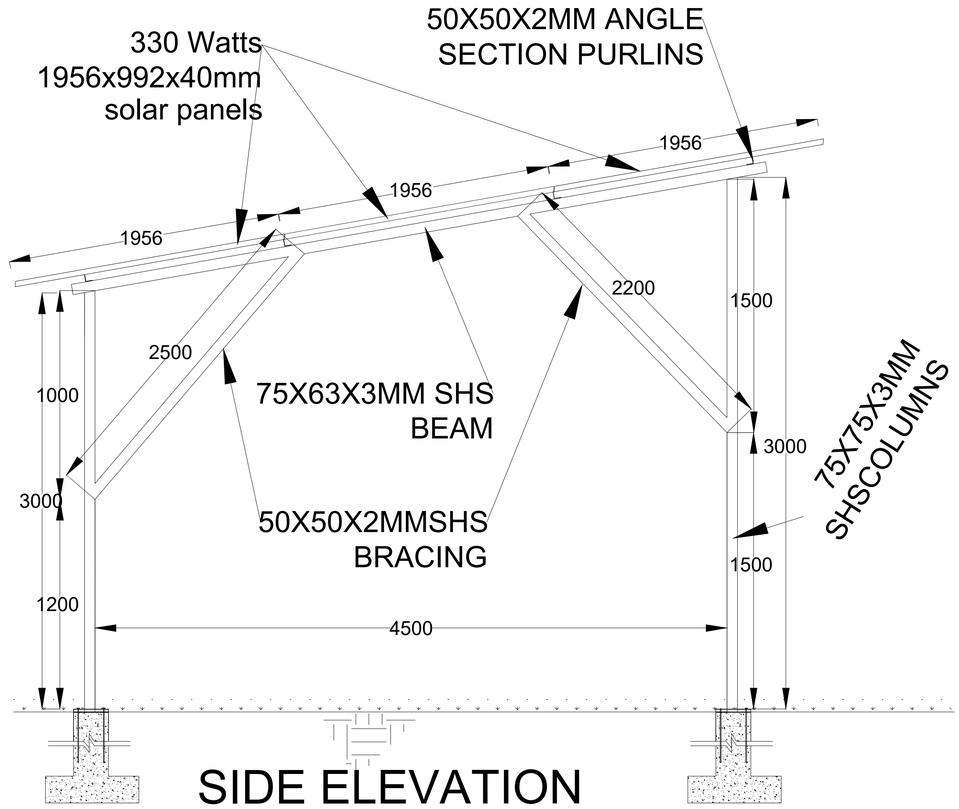
Jun 03, 2025 - 11:47am



PLAN VIEW (10 PANELS)



END VIEW



SIDE ELEVATION

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd**, Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE: STANDARD DRAWINGS

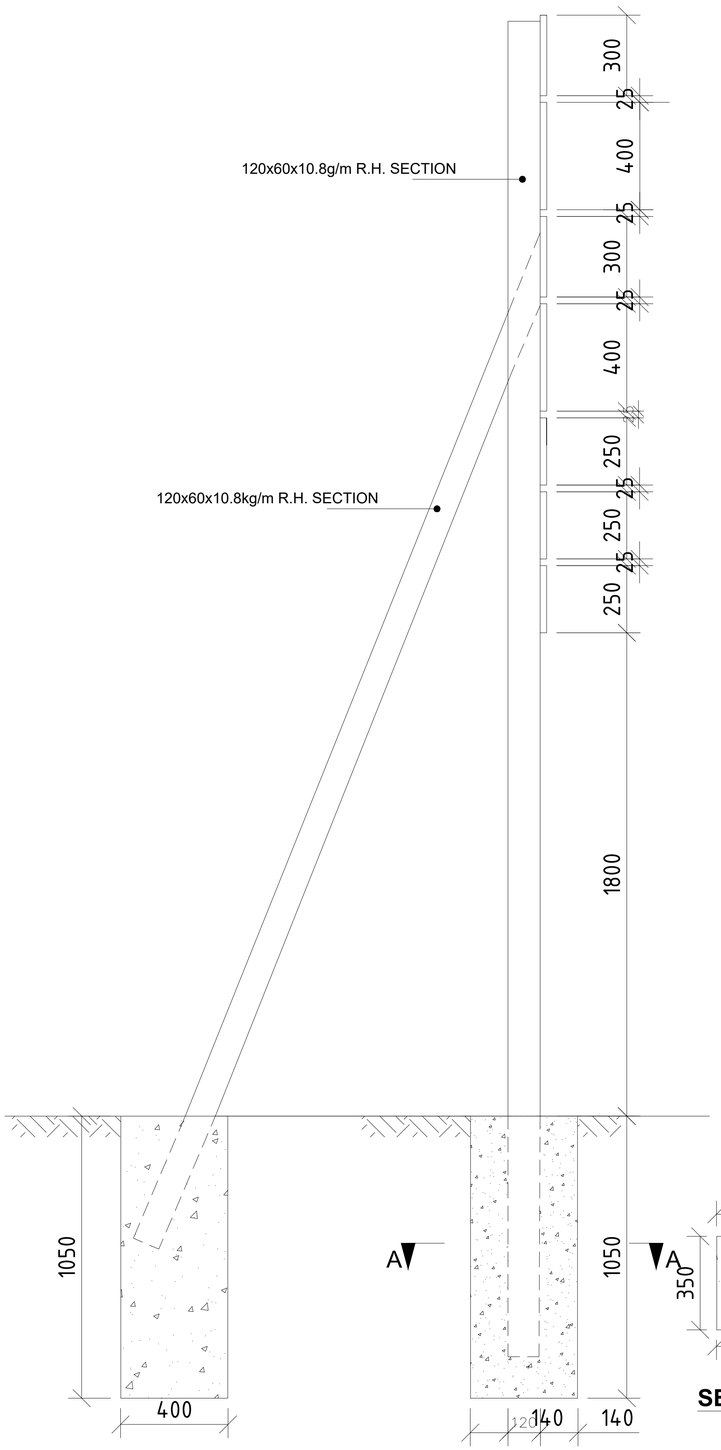
24.SOLAR SUPPORT STRUCTURES

SHEET 1 OF 1

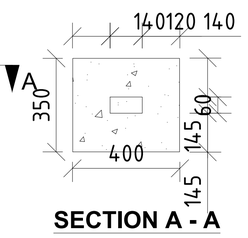
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-24

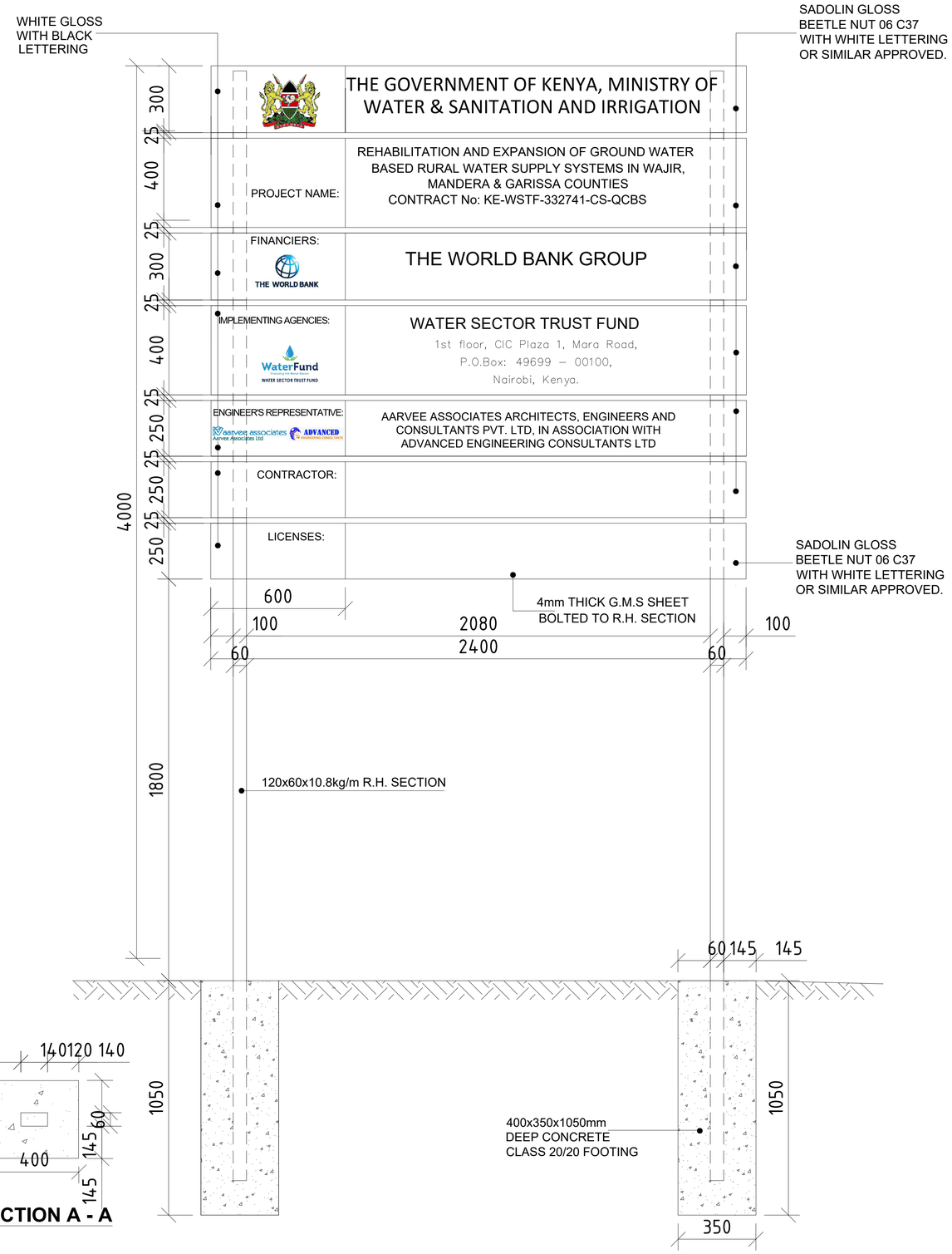
Jun 03, 2025 - 11:49am



SIDE ELEVATION



SECTION A - A



FRONT ELEVATION

NOTES:

1. FINAL WORDING ON SIGN BOARD AS APPROVED BY THE EMPLOYER.
2. DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
3. THE EXACT LOCATION FOR THE SIGNBOARD ERECTION TO BE APPROVED ON SITE.

CLIENT:

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

Aarvee Associates Architects Engineers and Associates Pvt Ltd
in Association with
Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

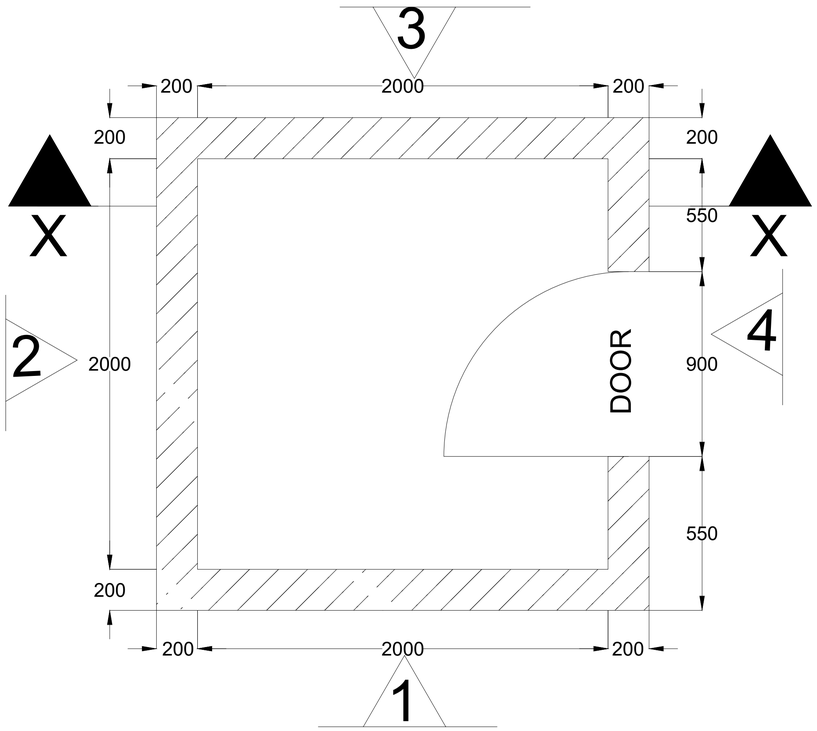
25.PROJECT SIGN BOARD

SHEET 1 OF 1

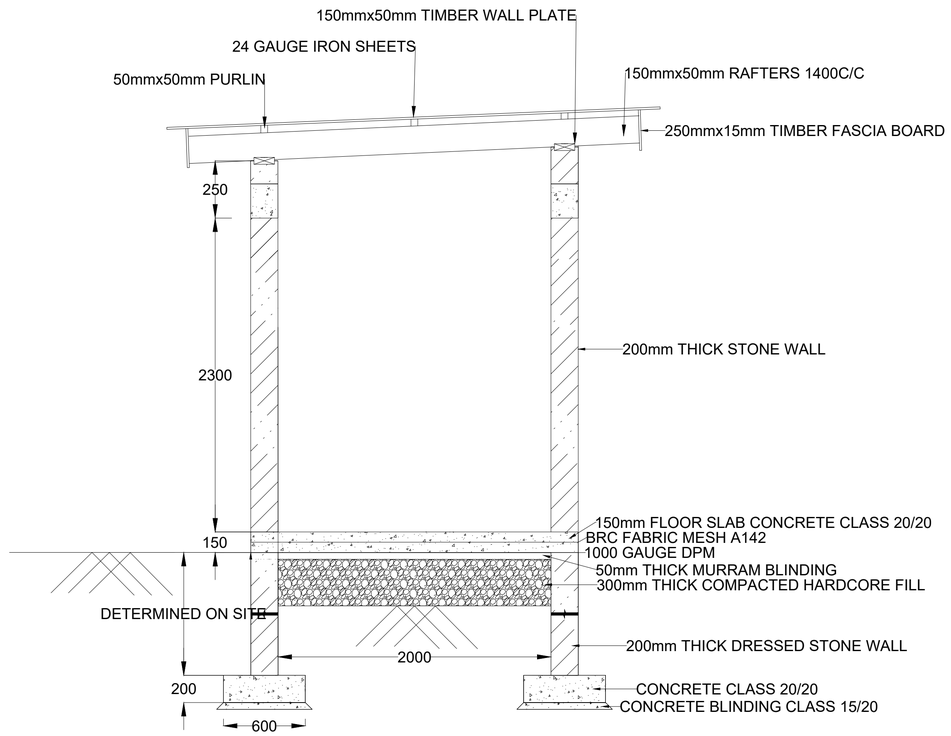
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-25

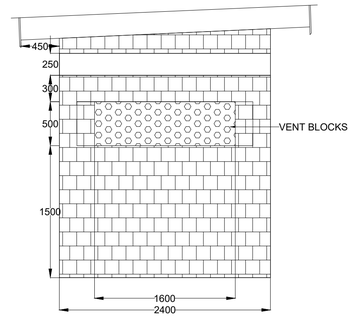
Jun 03, 2025 - 11:50am



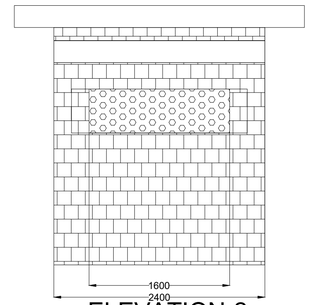
FLOOR PLAN
SCALE 1:50



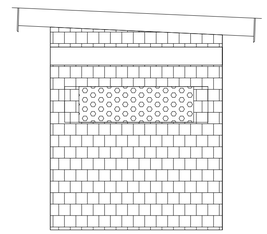
CROSS SECTION X-X
SCALE 1:50



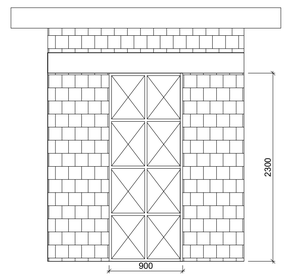
ELEVATION-1



ELEVATION-2
SCALE 1:50

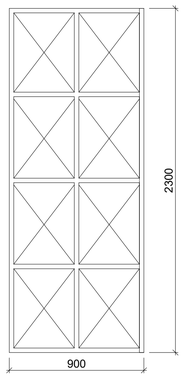


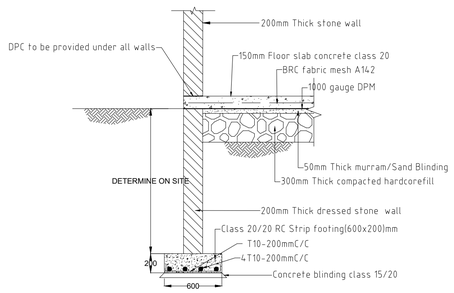
ELEVATION-3
SCALE 1:50



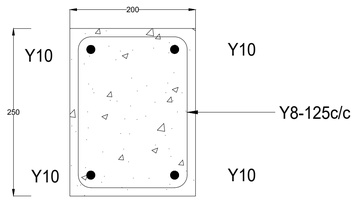
ELEVATION-4
SCALE 1:50

DOOR SCHEDULE

TYPE	D1
SKETCH	
QUANTITY	1
DESCRIPTION	SINGLE LEAF, STEEL DOOR 25mm THICK



TYPICAL FLOOR AND FOUNDATION DETAIL
SCALE (A1) 1:25



TYPICAL CROSS SECTION
THROUGH RING BEAM
SCALE 1:5

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WaterFund **WATER SECTOR TRUST FUND** 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	THE WORLD BANK **THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	aarvee associates architects engineers & consultants pvt. ltd. ADVANCED ENGINEERING CONSULTANTS **Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd**, Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	R.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

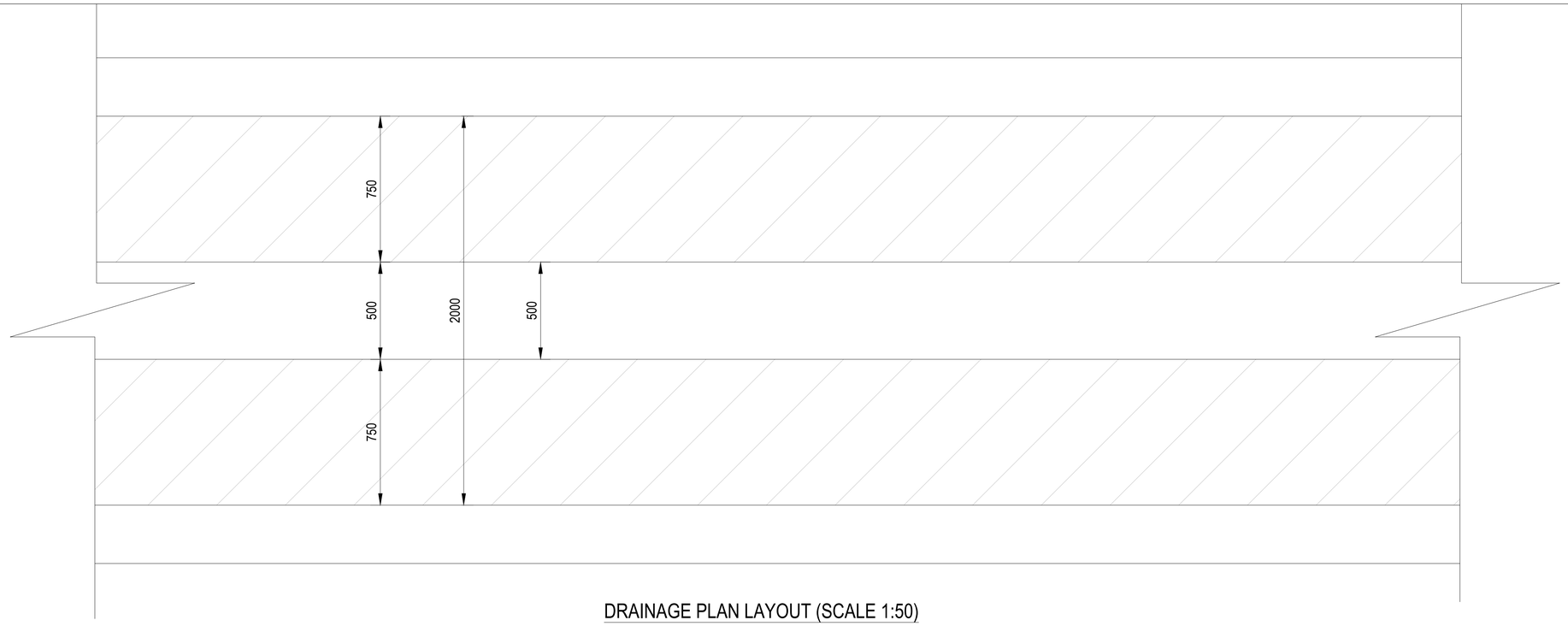
DRAWING TITLE:
STANDARD DRAWINGS

26. PUMP HOUSE
PLAN, SECTION, ELEVATION VIEWS
AND FOUNDATION DETAILS
SHEET 1 OF 1

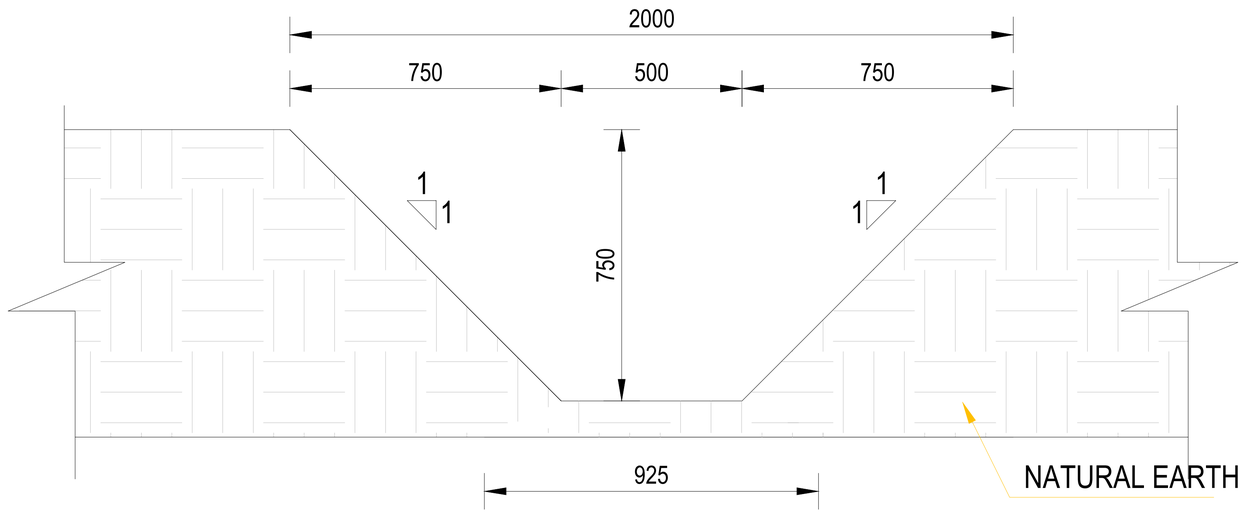
DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-26

Jun 03, 2025 - 11:52am



DRAINAGE PLAN LAYOUT (SCALE 1:50)



TYPICAL DRAINAGE SECTION DETAIL

CLIENT:	FINANCIER:	PROJECT:	CONSULTANT:
WATER SECTOR TRUST FUND 1st floor, CIC Plaza 1, Mara Road, P.O.Box: 49699 - 00100, Nairobi, Kenya.	**THE WORLD BANK GROUP**	CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR Contract No: KE-WSTF-332741-CS-QCBS	**Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd**, Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India Telephone: +91-7966776800 / +254-714-198-805 Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	W.O	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

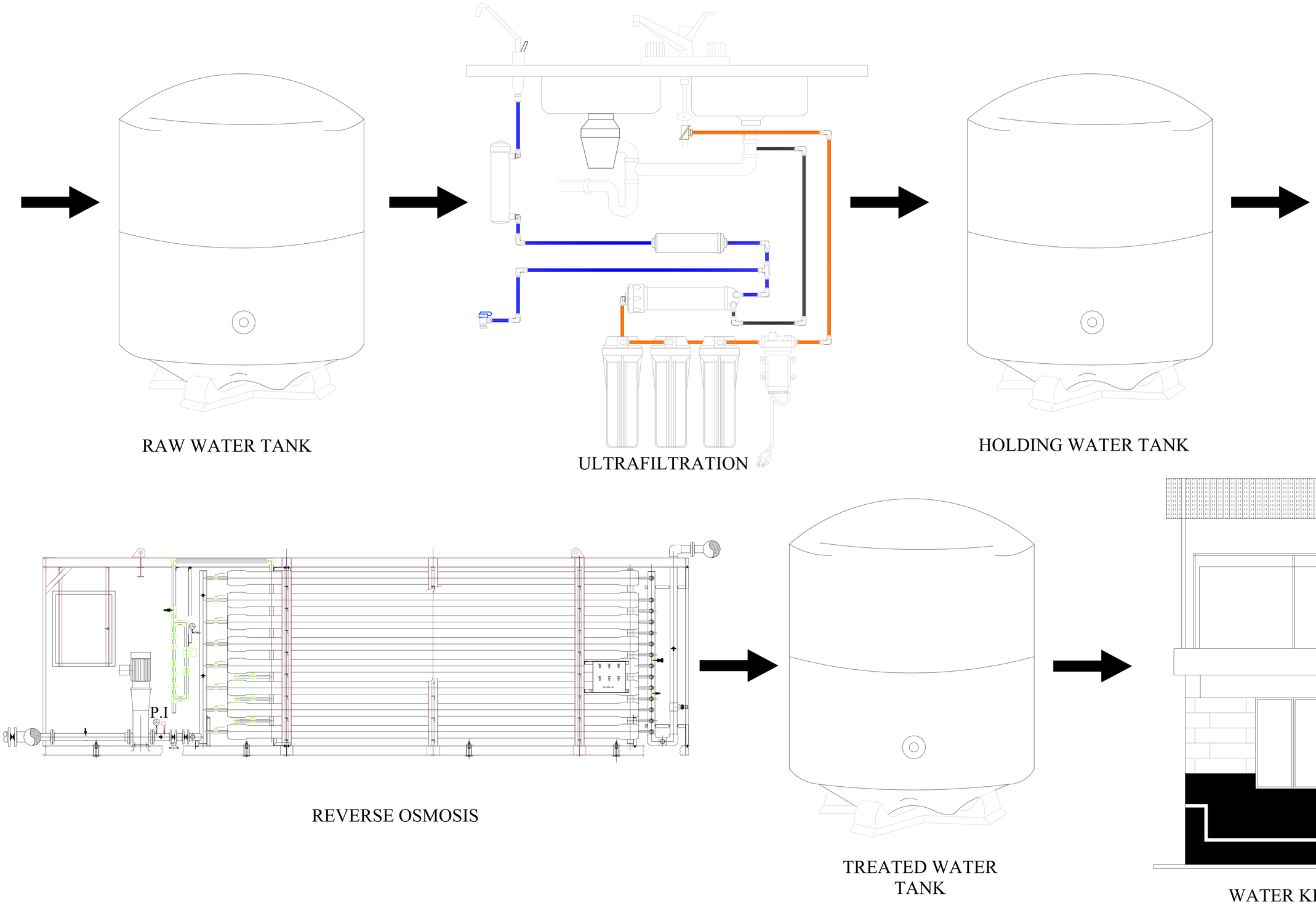
STANDARD DRAWINGS

27. CHANNEL DRAINAGE

SHEET 1 OF 1

DRAWING SCALE:	DRAWING No.:
AS SHOWN	GW4R-WJR-STD-27

Jun 18, 2025 - 9:31am



CLIENT:

WaterFund

WATER SECTOR TRUST FUND
1st floor, CIC Plaza 1, Mara Road,
P.O.Box: 49699 - 00100,
Nairobi, Kenya.

FINANCIER:

THE WORLD BANK

THE WORLD BANK GROUP

PROJECT:

CONSULTANCY SERVICES TO UNDERTAKE FEASIBILITY STUDIES, DETAILED DESIGN, ENVIRONMENTAL & SOCIAL IMPACTS ASSESSMENTS (ESIAs)(PHASE 1) AND CONSTRUCTION SUPERVISION OF WORKS (PHASE 2) ON THE REHBILITATION AND EXPANSION OF GROUNDWATER - BASED RURAL WATER SUPPLY SYSTEMS IN THE COUNTIES OF GARISSA, MANDERA AND WAJIR

Contract No: KE-WSTF-332741-CS-QCBS

CONSULTANT:

aarvee associates architects engineers & consultants pvt. ltd.

ADVANCED ENGINEERING CONSULTANTS

Aarvee Associates Architects Engineers and Associates Pvt Ltd in Association with Advanced Engineering Consultants Ltd,
Ravula Residency, Srinagar Colony Main Road, Hyderabad-500082 Telangana, India
Telephone: +91-7966776800 / +254-714-198-805
Email: abhik@aarvee.net / info@aecglobal-ltd.com

DESIGN DETAILS		
Action	Name	Date
Designed by:	W.O	JUNE 2025
Drawn by:	V.K	JUNE 2025
Checked by:	M.J	JUNE 2025
Approved by:	D.L	JUNE 2025

No.	Revision Details	Reviewed	initials	Date	Approved
1	DRAFT DETAILED DESIGN	By			
		Checked			
2	FINAL DETAILED DESIGN	By			
		Checked			
		By			
		Checked			
		By			
		Checked			
		By			
		Checked			

DRAWING TITLE:

STANDARD DRAWINGS

28. RO SCHEMATIC DRAWING

SHEET 1 OF 1

DRAWING SCALE: AS SHOWN

DRAWING No.: GW4R-WJR-STD-28

Jun 19, 2025 - 4:30pm