

**NOTE**

ALL DIMENSIONS ARE IN mm  
UNLESS OTHERWISE STATED

**ABBREVIATIONS**

CL - CENTRE LINE

mm - MILIMETER

G.L. - GROUND LEVEL

M - METER

PCC - PRECAST CONCRETE  
CEMENT

---

**LIMURU WATER AND SEWERAGE COMPANY**

---

**RELOCATION OF WATER AND SEWERAGE INFRASTRUCTURE  
ALONG THE PROJECT ROAD - SECTION I: RIRONI - MAGUMU FLYOVER  
& RIRONI - MUTARAKWA****Project Name and Address**

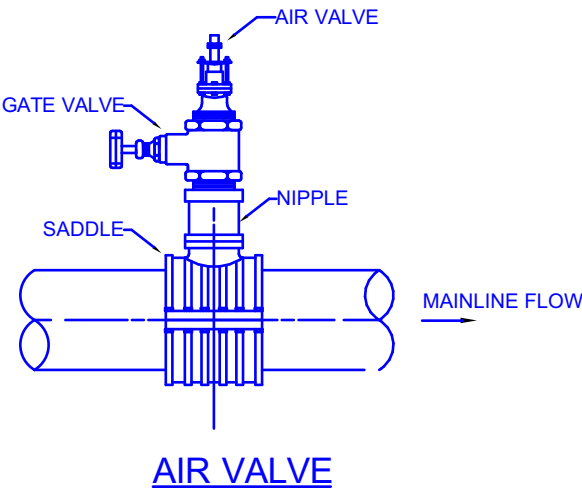
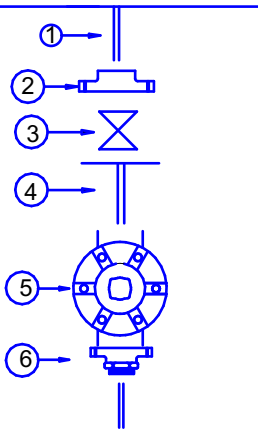
RELOCATION OF WATER  
AND SEWERAGE  
INFRASTRUCTURE ALONG THE  
PROJECT ROAD

**DRG NO.001**

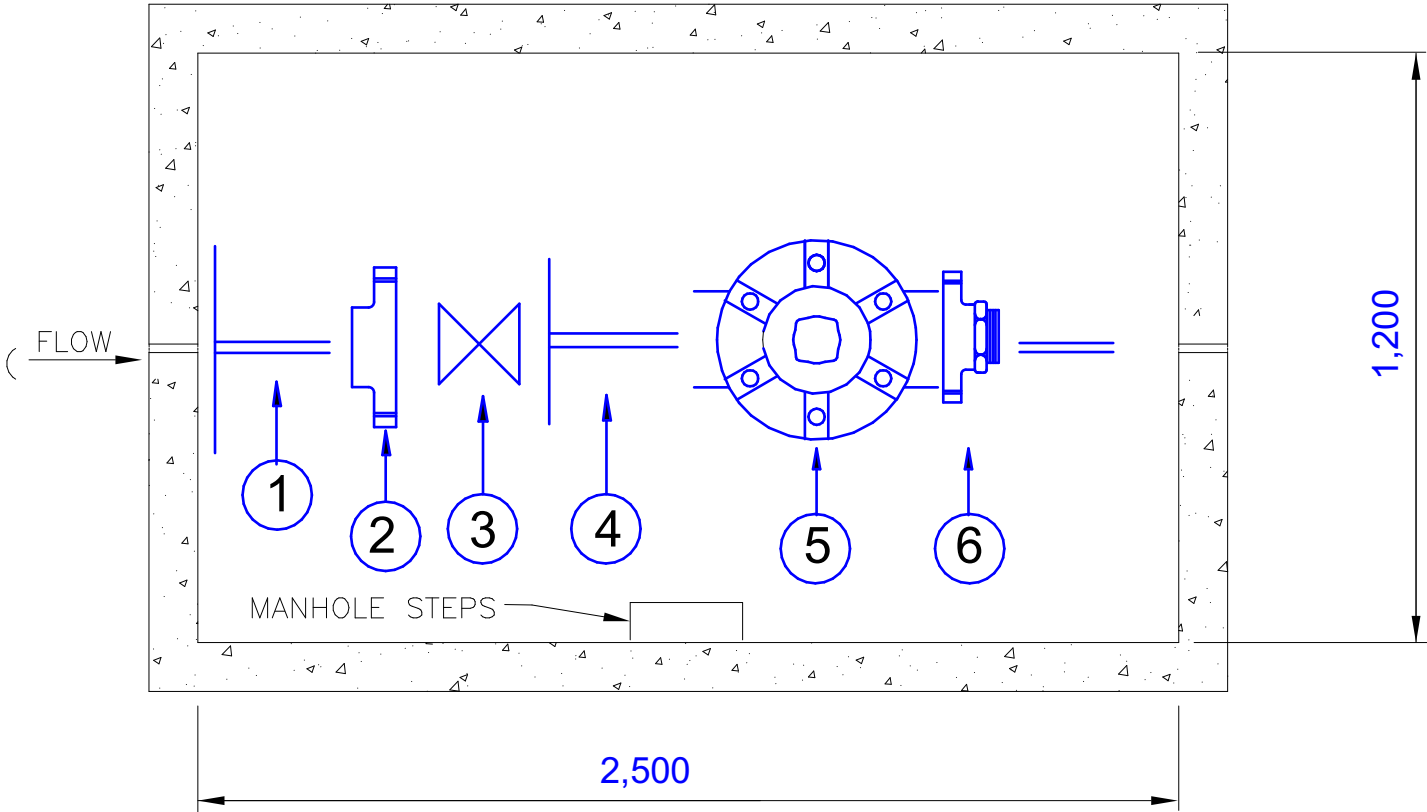
PROJECT:	Sheet: 001
DATE: FEBRUARY, 2021	Drawn By:
SCALE: #	Checked By:

OFFTAKE CONNECTIONS SUMMARY		No.
1.	Outlet Pipe From Elevated Tank	1
2.	160mm x 6" Range Adaptor	1
3.	6" AVK Sluice Valve	1
4.	160mm Double Flanged GI Pipe 1m Long	1
5.	6" Cold Water Meter	1
6.	160mm HDPE Butt Fused Stub Complete With Flange	1
7.	Sluice Valve & Meter Chamber (2500x1200x1200mm)	1

Pipe1



METER CHAMBER



General Notes

**NOTE**  
ALL DIMENSIONS ARE IN mm  
UNLESS OTHERWISE STATED

**ABBREVIATIONS**

CL - CENTRE LINE  
mm - MILIMETER  
G.L. - GROUND LEVEL  
M - METER  
PCC - PRECAST CONCRETE  
CEMENT



RELOCATION OF WATER AND  
SEWER INFRASTRUCTURE  
ALONG THE PROJECT ROAD

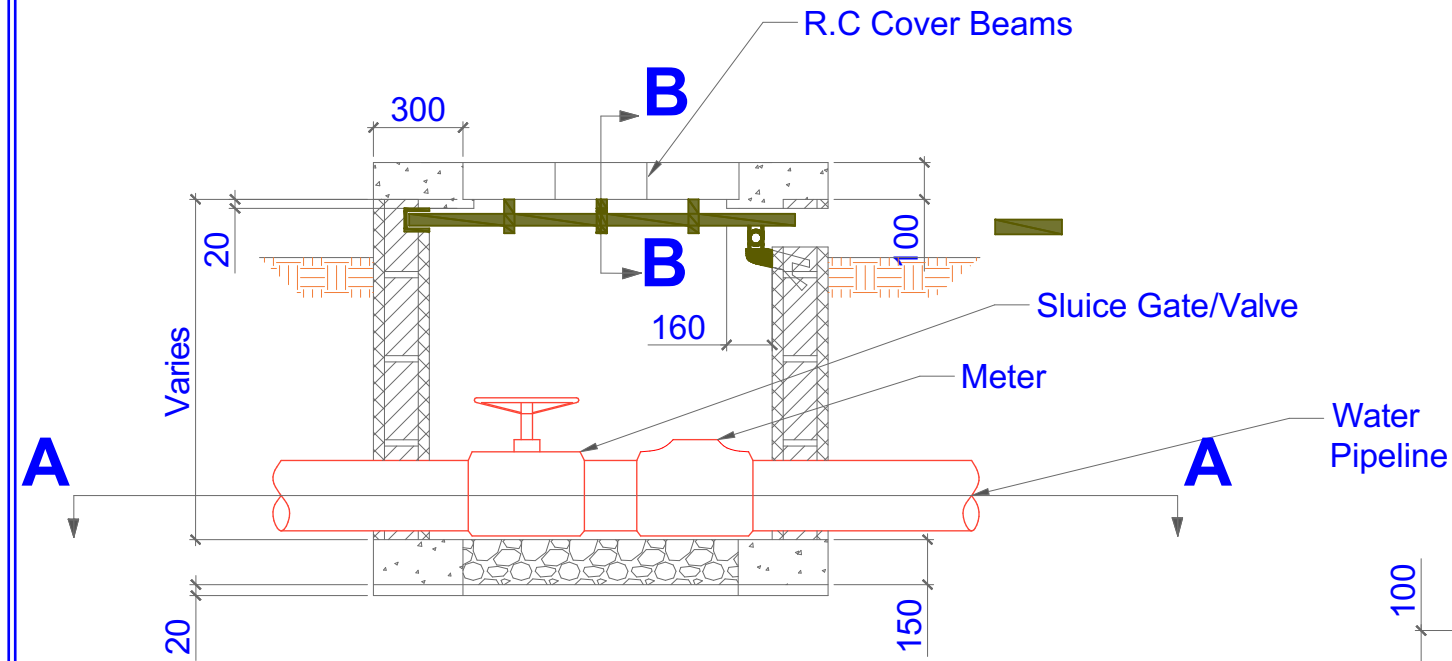
DRG NO. 002

PROJECT:	Sheet: 013
DATE: FEBRUARY, 2021	Drawn By:
SCALE: #	Checked By:

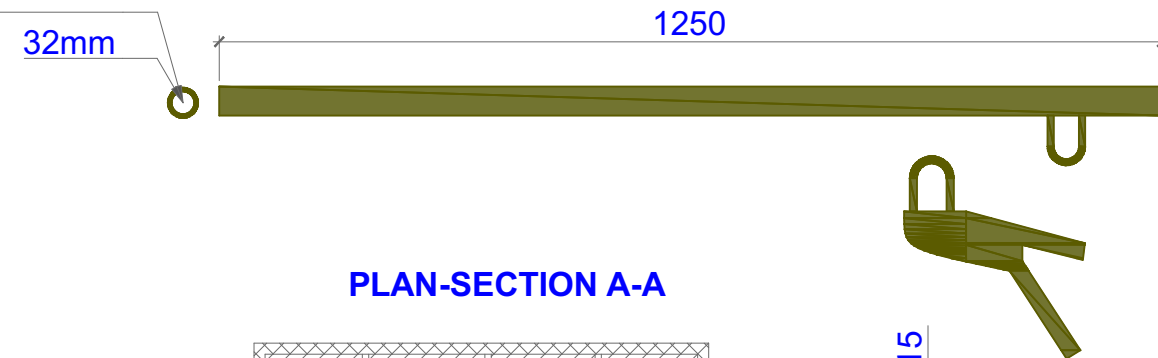
# VALVES/METER CHAMBER

# SECTION B-B

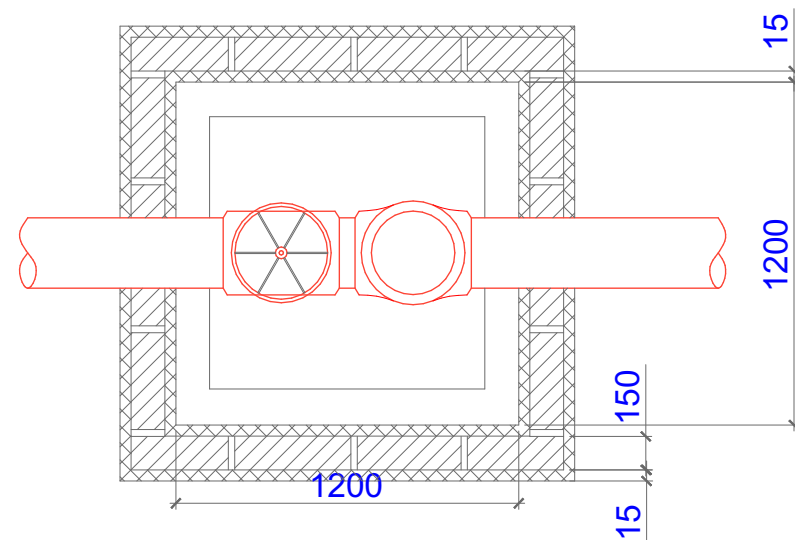
## SIDE VIEW SECTION



## LOCKING UNIT



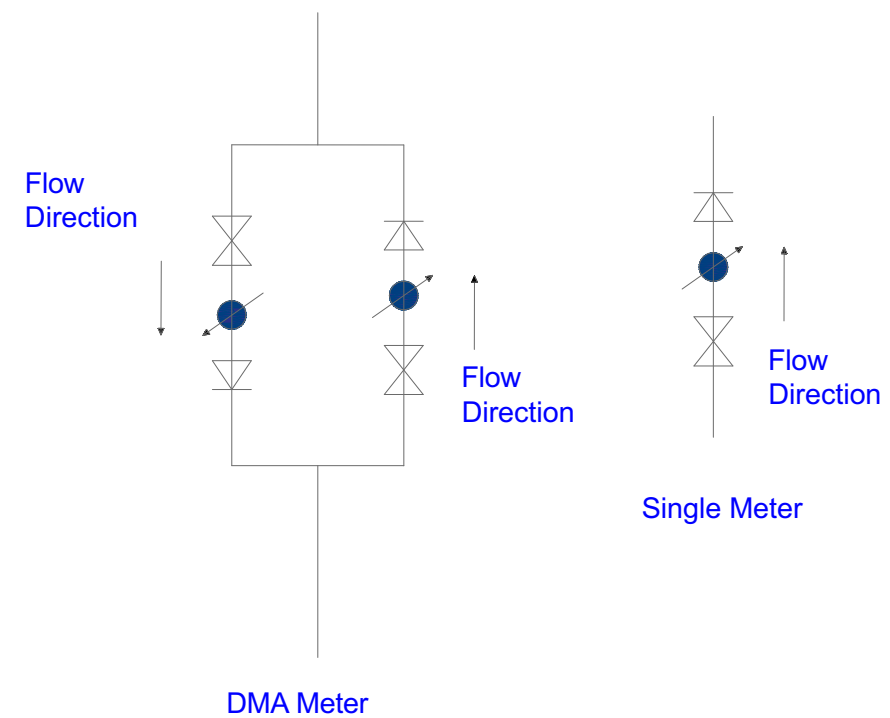
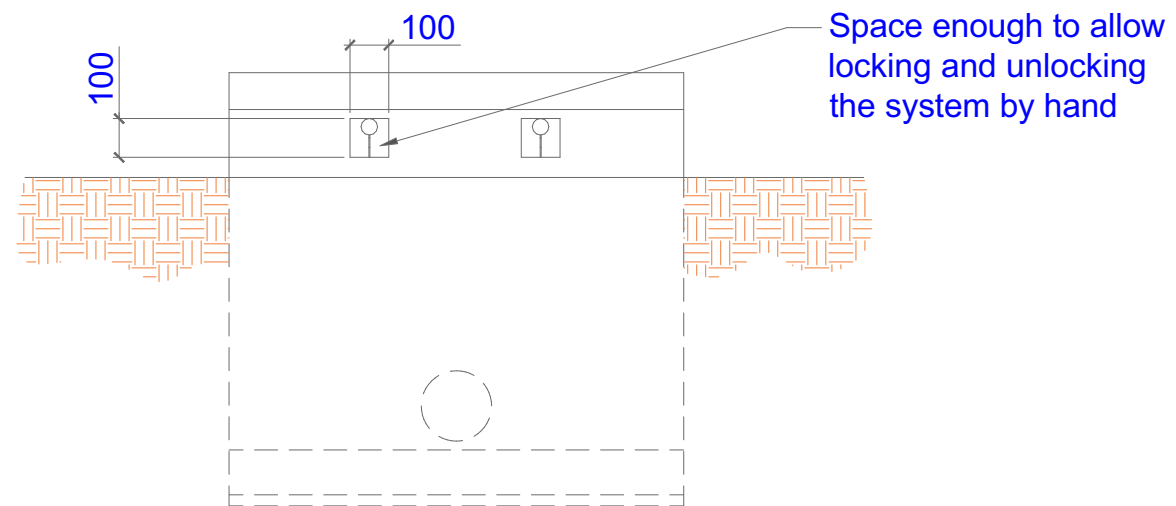
## PLAN-SECTION A-A



## LEGEND

	Ductile Iron
	Concrete finishing
	Building Stones
	Blinding
	Packed Gravel
	Earth
	Reinforced Concrete

## SIDE VIEW



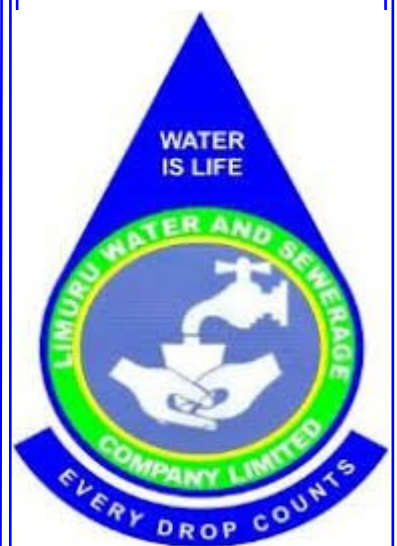
## General Notes

## NOTE

ALL DIMENSIONS ARE IN mm  
UNLESS OTHERWISE STATED

## ABBREVIATIONS

CL - CENTRE LINE  
mm - MILIMETER  
G.L. - GROUND LEVEL  
M - METER  
PCC - PRECAST CONCRETE  
CEMENT



**Project Name and Address**  
RELOCATION OF WATER AND  
SEWER INFRASTRUCTURE  
ALONG THE PROJECT ROAD

**DRG NO. 003**

PROJECT:	Sheet: 014
DATE: FEBRUARY, 2021	Drawn By:
SCALE: #	Checked By:

**NOTE**

ALL DIMENSIONS ARE IN mm  
UNLESS OTHERWISE STATED

**ABBREVIATIONS**

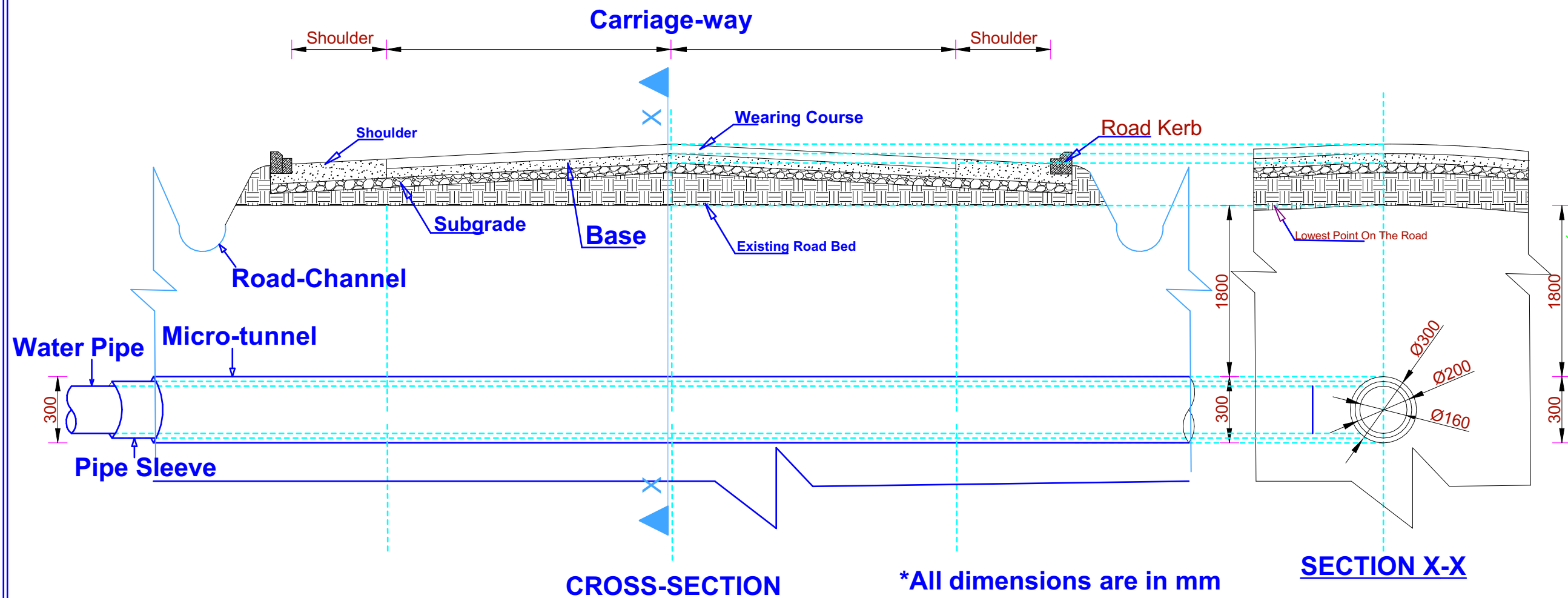
CL - CENTRE LINE

mm - MILLIMETER

G.L. - GROUND LEVEL

M - METER

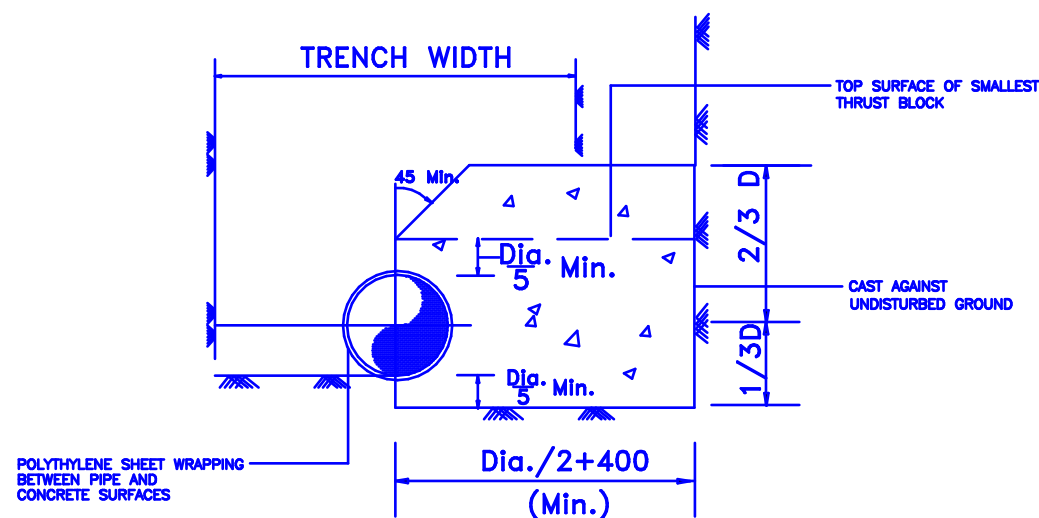
PCC - PRECAST CONCRETE  
CEMENT

**MICRO-TUNNELING DETAILS****Project Name and Address**

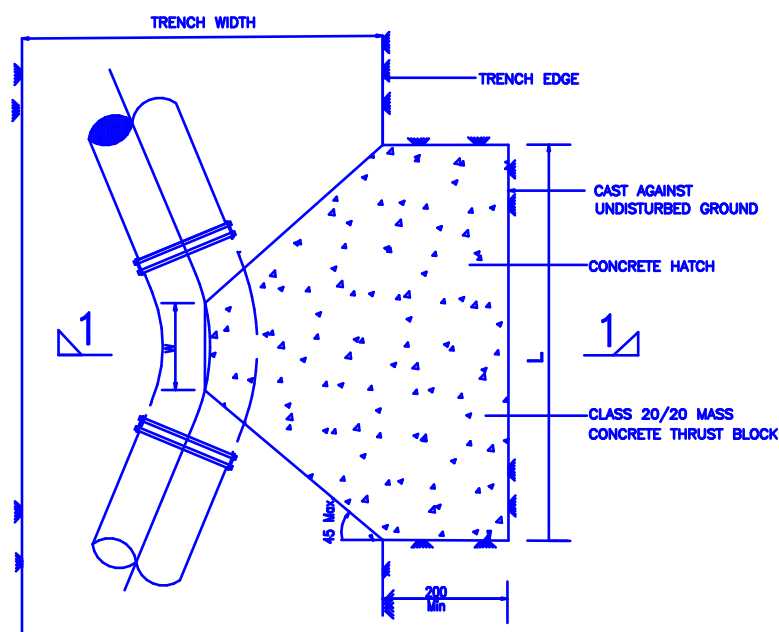
RELOCATION OF WATER AND  
SEWER INFRASTRUCTURE  
ALONG THE PROJECT ROAD

**DRG NO. 004**

PROJECT:	Sheet: 015
DATE: FEBRUARY, 2022	Drawn By:
SCALE: #	Checked By:



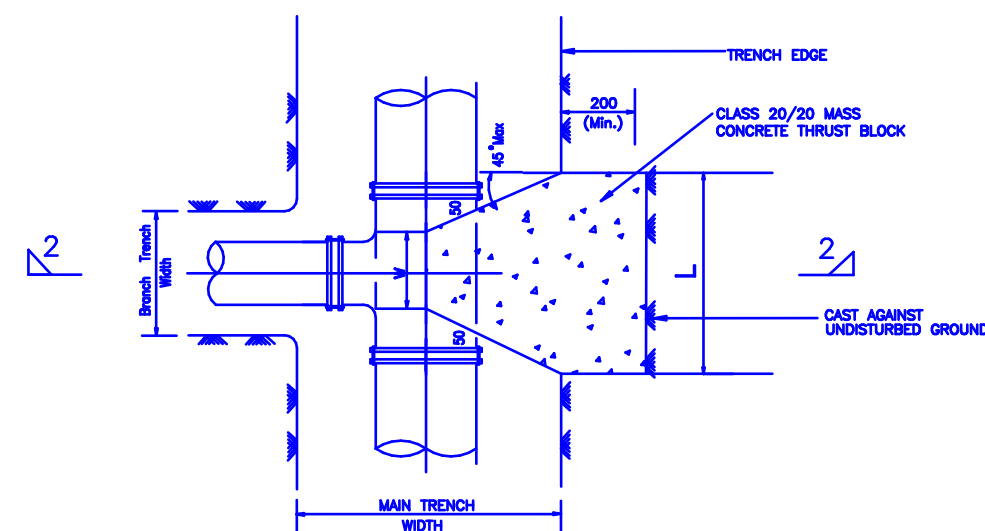
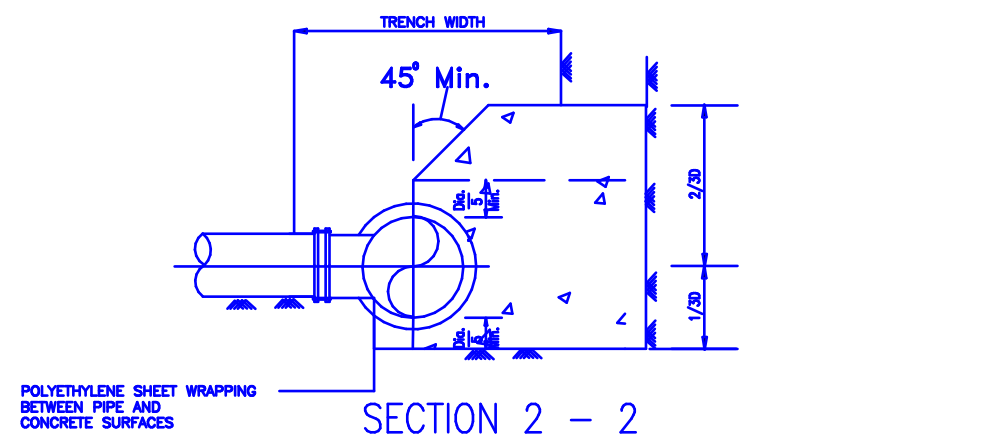
Section 1 - 1



SECTIONAL PLAN  
THRUST BLOCK FOR HORIZONTAL BENDS

TABLE OF THRUST BLOCKS FOR HORIZONTAL BENDS												
TEST HEAD (m)	BEND	DIMENSIONS (D)m x (L)m x V(m³)										
		SIZE OF BEND DN (mm)										
		800	700	600	500	450	400	350	300	250	200	150/100
100 SEE NOTE 8	1 1/4"	1.8x0.8x0.7	1.6x0.8x0.6	1.4x0.7x0.4	1.2x0.6x0.3	1.1x0.5x0.2	1.0x0.5x0.2	0.9x0.4x0.1	0.8x0.4x0.1	0.7x0.3x0.1	0.5x0.3x0.1	0.5x0.3x0.1
	2 1/2"	1.8x1.6x1.4	1.6x1.6x1.2	1.4x1.3x0.8	1.2x1.2x0.6	1.1x1.0x0.5	1.1x0.8x0.4	1.0x0.7x0.3	0.8x0.7x0.2	0.8x0.5x0.1	0.8x0.3x0.1	0.5x0.3x0.1
	30°	1.8x2.1x1.9	1.6x2.0x1.5	1.4x1.8x1.1	1.2x1.5x0.8	1.1x1.3x0.6	1.1x1.1x0.5	1.0x0.9x0.3	0.9x0.8x0.3	0.8x0.7x0.2	0.8x0.4x0.1	0.5x0.4x0.1
	45°	1.8x3.2x2.9	1.6x3.2x2.4	1.6x2.2x1.6	1.4x1.8x1.1	1.1x2.0x0.9	1.2x1.5x0.7	1.0x1.4x0.5	1.0x1.0x0.4	0.8x1.0x0.3	0.8x0.6x0.2	0.6x0.5x0.1
	90°	2.4x4.0x4.8	2.0x3.8x3.6	1.8x3.5x2.8	1.6x2.7x1.8	1.4x2.6x1.5	1.2x2.5x1.2	1.2x2.0x0.9	1.2x1.5x0.7	1.0x1.4x0.5	1.0x0.8x0.3	0.6x0.9x0.2

Table of Thrust Blocks for Horizontal Bends



SECTIONAL PLAN  
THRUST BLOCK FOR TEES

TABLE OF THRUST BLOCKS FOR TEES													
TEST HEAD (m)	MAIN SIZE (mm)	DIMENSIONS (D)m x (L)m x V (m³)											
		BRANCH SIZE (mm)											
		800	700	600	500	450	400	350	300	250	200	150/100	
100 SEE NOTE No. 8	800	2.0x3.5x3.5	1.8x3.2x2.7	1.6x2.7x1.9	1.6x2.0x1.4	1.6x1.6x1.1	1.6x1.2x0.8	1.6x1.0x0.6	1.6x0.7x0.4	1.6x0.5x0.3	1.6x0.3x0.2	1.6x0.3x0.2	
	700		1.6x3.6x2.7	1.6x2.7x1.9	1.5x2.1x1.4	1.5x1.7x1.1	1.5x1.3x0.8	1.5x1.0x0.6	1.5x0.8x0.5	1.4x0.6x0.3	1.4x0.4x0.2	1.4x0.3x0.2	
	600			1.5x3.0x2.0	1.5x2.1x1.4	1.5x1.7x1.1	1.2x1.8x0.9	1.2x1.4x0.7	1.2x1.0x0.5	1.2x0.7x0.3	1.2x0.5x0.2	1.2x0.3x0.1	
	500				1.4x2.3x1.4	1.3x2.0x1.1	1.2x1.8x0.9	1.2x1.4x0.7	1.2x1.0x0.5	1.1x0.8x0.3	1.1x0.5x0.2	1.1x0.3x0.1	
	450					1.2x2.3x1.1	1.2x1.8x0.9	1.1x1.6x0.7	1.1x1.2x0.5	1.1x0.8x0.3	1.0x0.6x0.2	1.0x0.4x0.1	
	400						1.0x1.3x0.9	1.0x1.8x0.7	1.0x1.3x0.5	1.0x0.9x0.3	1.0x0.6x0.2	1.0x0.4x0.1	
	350							1.0x1.8x0.7	1.0x1.3x0.5	1.0x0.9x0.3	1.0x0.5x0.2	1.0x0.4x0.1	
	300								0.8x1.7x0.5	0.8x1.2x0.3	0.8x0.8x0.2	0.8x0.5x0.1	
	250									0.8x1.2x0.3	0.8x0.8x0.2	0.8x0.5x0.1	
	200										0.6x1.1x0.2	0.6x0.7x0.1	
	150											0.5x0.8x0.1	

Table of Thrust Blocks for Tees  
(CLASS '20/20' CONCRETE)

General Notes

## NOTE

ALL DIMENSIONS ARE IN mm  
UNLESS OTHERWISE STATED

## ABBREVIATIONS

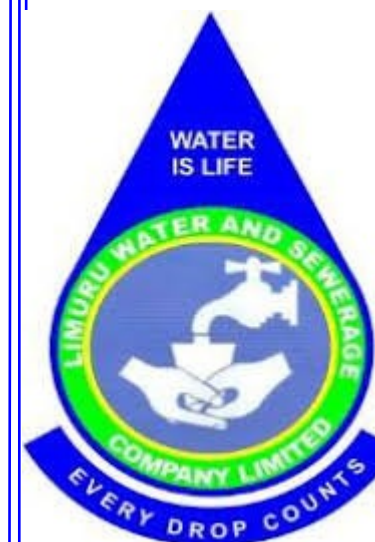
CL - CENTRE LINE

mm - MILIMETER

G.L. - GROUND LEVEL

M - METER

PCC - PRECAST CONCRETE  
CEMENT

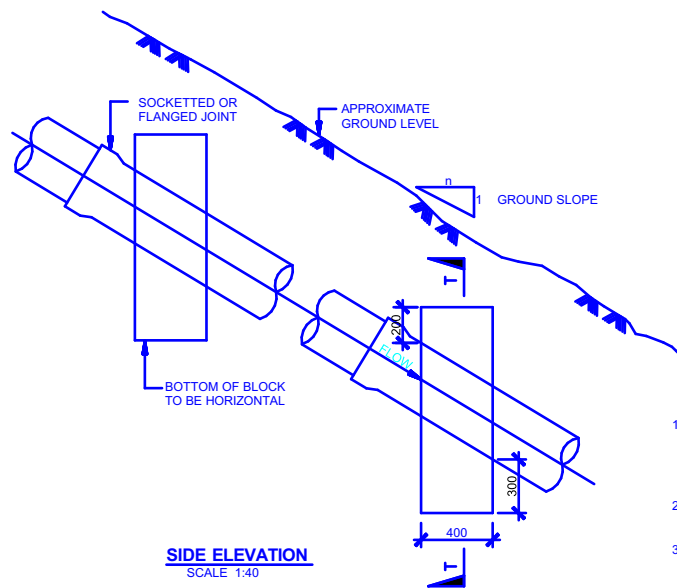


Project Name and Address  
RELOCATION OF WATER AND  
SEWER INFRASTRUCTURE  
ALONG THE PROJECT ROAD

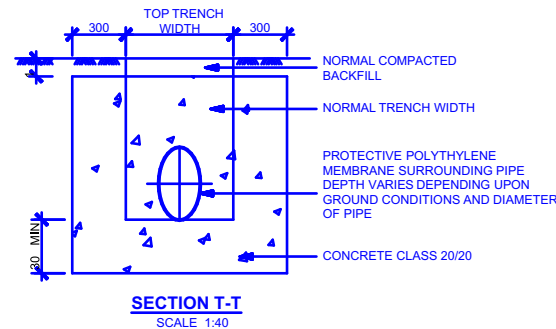
DRG NO. 005

PROJECT:	Sheet: 016
DATE: FEBRUARY, 2024	Drawn By: _____
SCALE: #	Checked By: _____



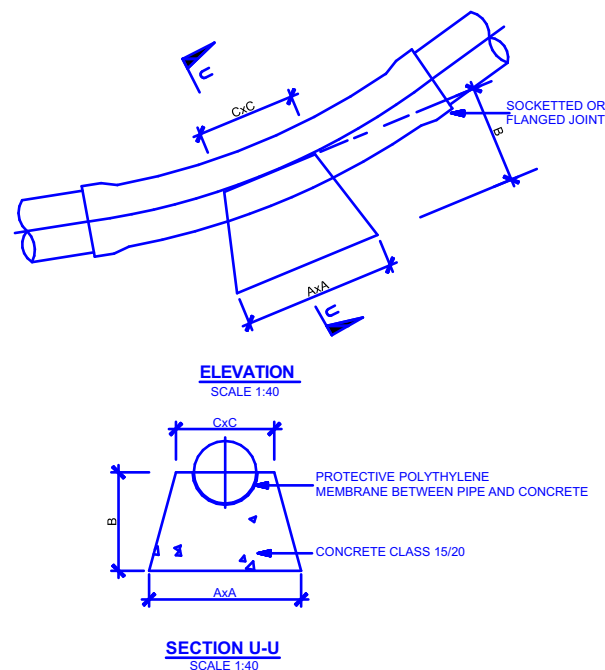


RANGE OF GROUND SLOPE (1:n)	MAXIMUM DISTANCE BETWEEN ANCHOR BLOCKS (m)
1:6 - 1:5	24
1:5 - 1:4	18
1:4 - 1:2	12
>1:2	EVERY PIPE LENGTH TO BE ANCHORED (BASED ON PIPE LENGTH OF 6m)

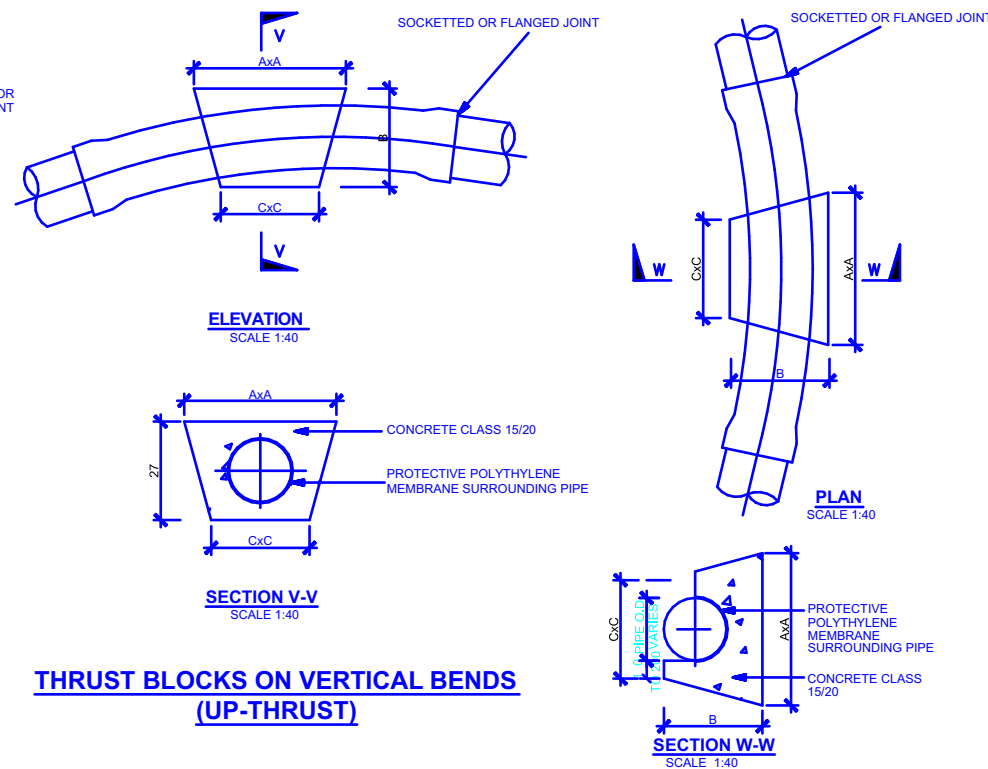


- NOTES**
1. SAME ARRANGEMENT CAN BE USED AS SUPPORTS FOR PIPES LAID IN VERY SOFT GROUND BUT BLOCKS TO BE CAST ON SOUND ROCK OR HARD STRATUM
  2. SOCKETTED JOINT TO BE LAID WITH SOCKET FACING UPSTREAM OF GRADE
  3. ANCHOR BLOCK TO BE CONSTRUCTED ON LOWER SIDE OF JOINT

### ANCHOR BLOCK FOR STEEP GRADIENTS (SLOPES>1:6)



### THRUST BLOCKS ON VERTICAL BENDS (DOWN-THRUST)

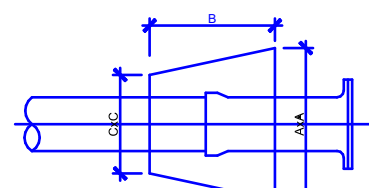


### THRUST BLOCKS ON VERTICAL BENDS (UP-THRUST)

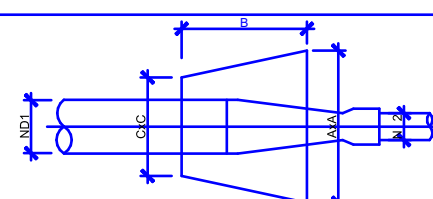
(ND) NOMINAL DIAMETER (mm)	11° BENDS	22° BENDS	30° BENDS	45° BENDS	60° BENDS	CAPPED ENDS	REDUCERS ND1-ND2
80	0.2x0.2x0.2	0.25x0.2x0.2	0.25x0.2x0.2	0.3x0.2x0.2	0.35x0.2x0.2	0.4x0.2x0.2	0.35x0.2x0.2
100	0.2x0.2x0.2	0.3x0.2x0.2	0.35x0.2x0.2	0.4x0.2x0.2	0.45x0.25x0.25	0.55x0.3x0.3	0.45x0.25x0.25
150	0.3x0.25x0.25	0.4x0.25x0.25	0.5x0.3x0.3	0.55x0.3x0.3	0.65x0.35x0.35	0.8x0.4x0.35	0.65x0.35x0.35
200	0.4x0.3x0.3	0.55x0.35x0.35	0.6x0.4x0.4	0.75x0.4x0.4	0.85x0.45x0.4	1.0x0.5x0.4	0.85x0.45x0.4
250	0.5x0.35x0.35	0.65x0.4x0.4	0.75x0.45x0.45	0.9x0.45x0.45	1.1x0.55x0.45	1.2x0.6x0.45	1.1x0.55x0.45
300	0.55x0.45x0.45	0.8x0.5x0.5	0.9x0.5x0.5	1.1x0.6x0.5	1.25x0.65x0.5	1.5x0.75x0.5	1.25x0.65x0.5
350	0.6x0.5x0.5	0.85x0.55x0.55	1.0x0.55x0.55	1.2x0.6x0.55	1.4x0.7x0.55	1.6x0.8x0.55	1.4x0.7x0.55
400	0.7x0.6x0.6	0.95x0.6x0.6	1.1x0.6x0.6	1.3x0.65x0.6	1.6x0.8x0.6	1.8x0.9x0.6	1.6x0.8x0.6
450	0.8x0.65x0.65	1.1x0.65x0.65	1.3x0.65x0.65	1.5x0.75x0.65	1.8x0.9x0.65	2.0x1.0x0.65	1.8x0.9x0.65
500	0.9x0.7x0.7	1.2x0.7x0.7	1.4x0.7x0.7	1.7x0.85x0.7	2.0x1.0x0.7	2.3x1.2x0.7	2.0x1.0x0.7
600	1.1x0.8x0.8	1.5x0.8x0.8	1.7x0.9x0.8	2.0x1.0x0.8	2.3x1.2x0.8	2.7x1.4x0.8	2.3x1.2x0.8

NOTE:- THE ABOVE VALUES APPLY FOR SOCKETTED uPVC AND FLANGED OR COUPLED LINED STEEL PIPES SUBJECT TO A WORKING PRESSURE HEAD OF 12 BAR

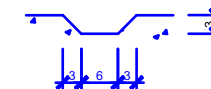
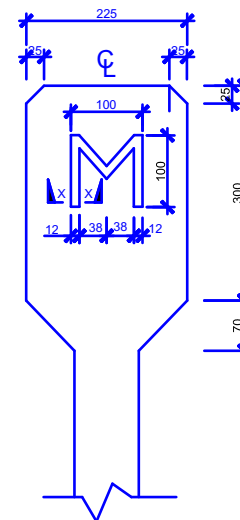
### THRUST BLOCK ON HORIZONTAL BENDS AND TEES



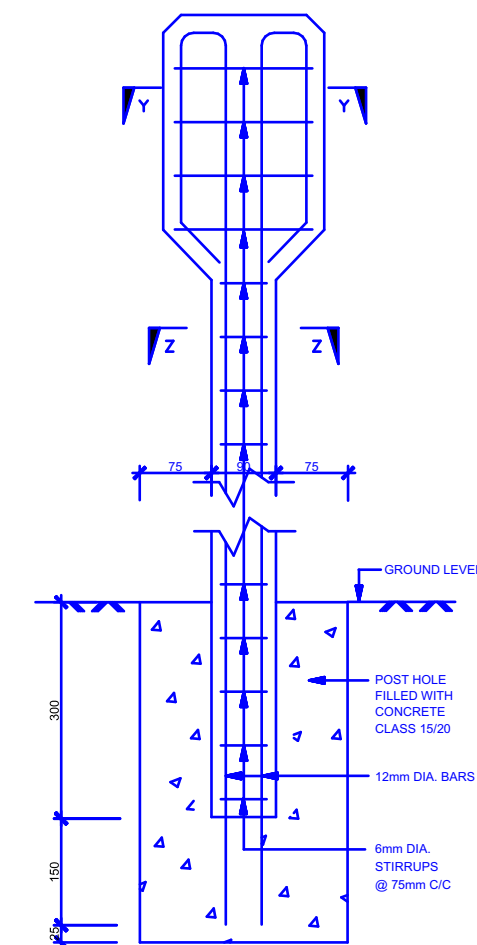
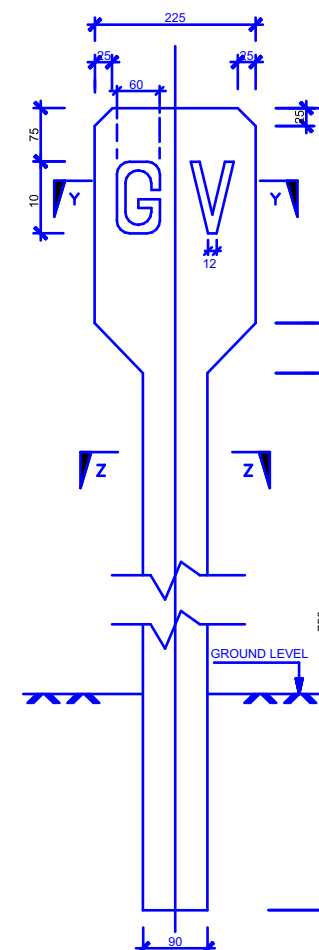
### THRUST BLOCK AT CAPPED ENDS



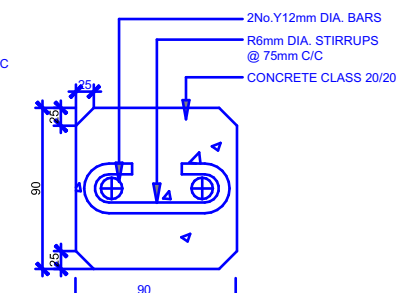
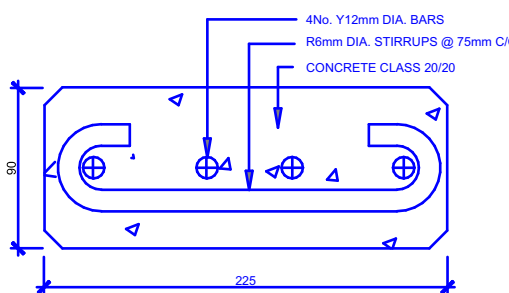
### THRUST BLOCK AT REDUCER



NOTE:- ALL DETAILS TO BE SAME AS GATE VALVE BUT THE SIGN TO BE CHANGED AS INDICATED



### INDICATOR POST DETAILS



### General Notes

### NOTE

ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED

### ABBREVIATIONS

CL - CENTRE LINE

mm - MILIMETER

G.L. - GROUND LEVEL

M - METER

PCC - PRECAST CONCRETE CEMENT

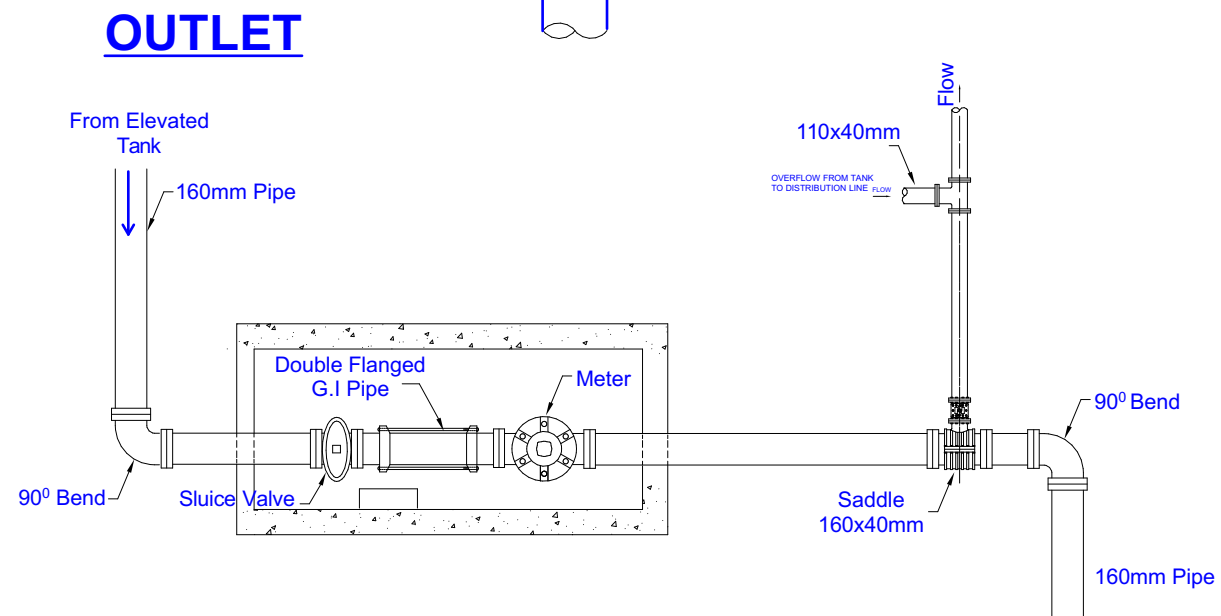
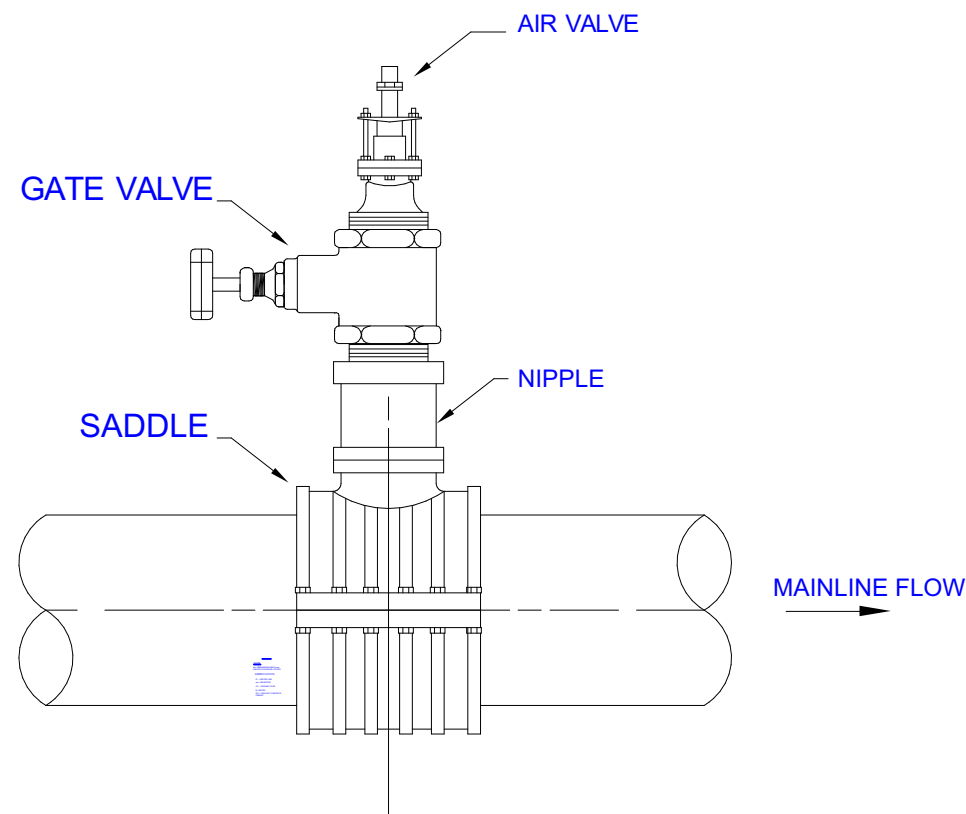
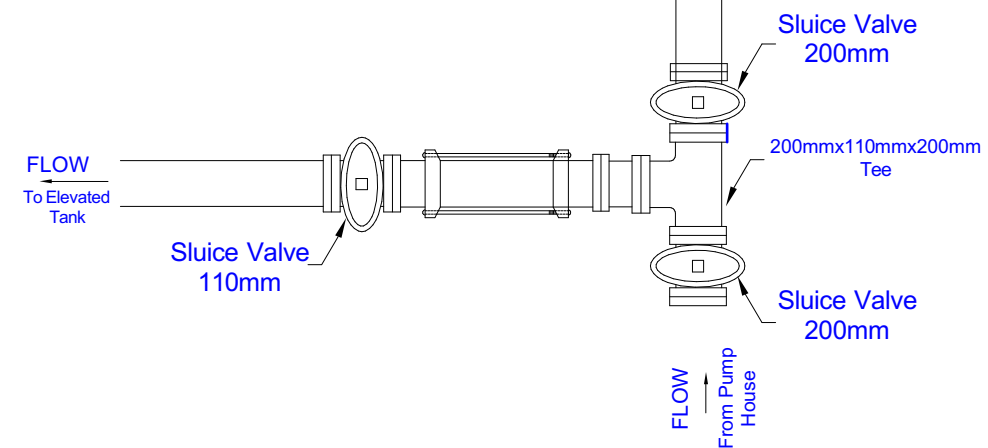
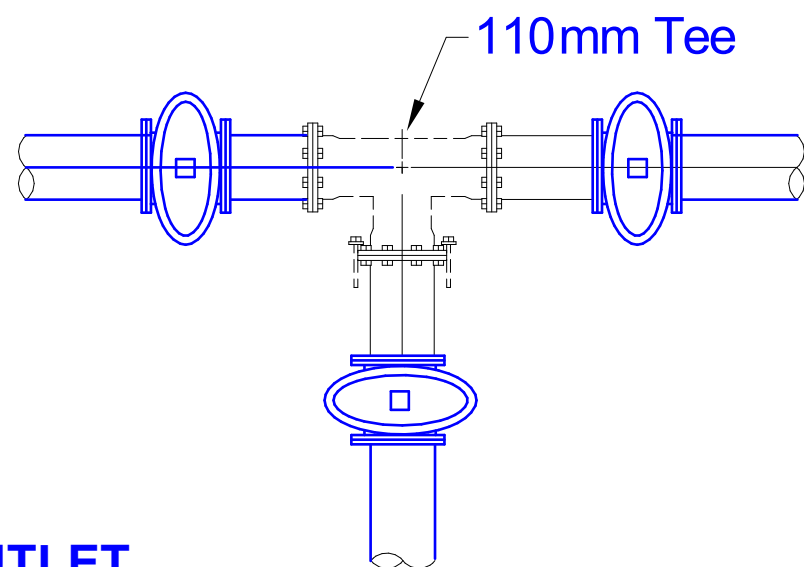
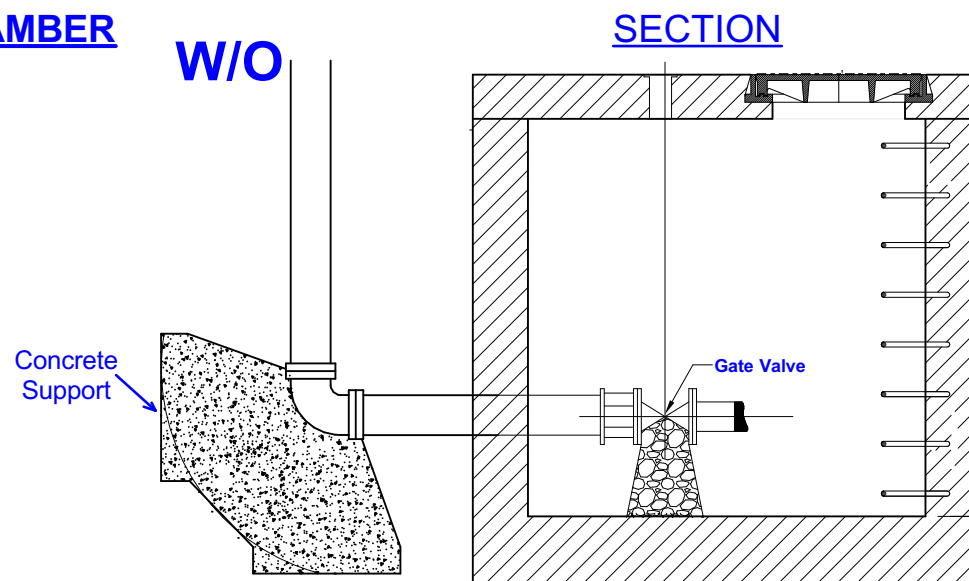
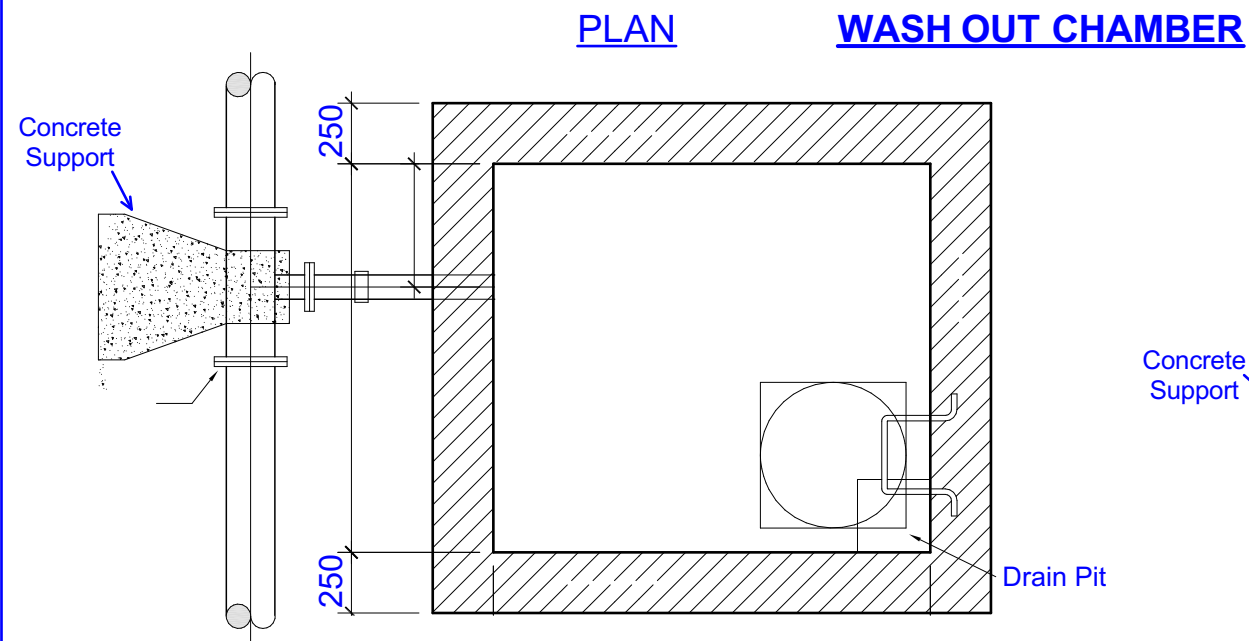


### Project Name and Address

RELOCATION OF WATER AND SEWER INFRASTRUCTURE ALONG THE PROJECT ROAD

**DRG NO. 006**

PROJECT:	Sheet: 017
DATE: FEBRUARY, 2021	Drawn By: _____
SCALE: #	Checked By: _____



General Notes

**NOTE**

ALL DIMENSIONS ARE IN mm  
UNLESS OTHERWISE STATED

**ABBREVIATIONS**

CL - CENTRE LINE

mm - MILIMETER

G.L. - GROUND LEVEL

M - METER

PCC - PRECAST CONCRETE  
CEMENT



**Project Name and Address**

RELOCATION OF WATER AND  
SEWER INFRASTRUCTURE  
ALONG THE PROJECT ROAD

**DRG NO. 007**

PROJECT:	Sheet: 022
DATE: FEBRUARY, 2021	Drawn By: _____
SCALE: #	Checked By: _____