

## LAMPIRAN

### Lampiran 1 Analisa Jaringan Distribusi Eksisting PDAM Tirta Kandilo

Tabel Hasil Analisa Jaringan Pipa Distribusi Pada EPANET 2.0

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
1	2	Pipe 2	T42	250	2260	150	0,56	1,09
2	T42	Pipe 3	T30	250	2130	150	0,38	0,52
3	T30	Pipe 4	T7	250	804	150	0,32	0,39
4	17	Pipe 5	T41	250	394	150	0,36	0,49
5	17	Pipe 6	T28	150	237	150	0,11	0,10
6	T28	Pipe 7	T26	150	437	150	0,44	1,30
7	T26	Pipe 8	T24	150	162	150	0,64	2,55
8	T24	Pipe 9	15	150	104	150	0,78	3,69
9	T40	Pipe 10	16	250	656	150	0,41	0,62
10	15	Pipe 11	16	400	50	140	0,68	1,02
11	16	Pipe 12	6	400	2110	140	0,52	0,62
12	2	Pipe 13	5	400	623	140	0,73	1,18
13	5	Pipe 14	6	400	574	140	0,52	0,62
14	5	Pipe 15	T40	250	1240	150	0,55	1,06
15	T19	Pipe 16	15	400	437	140	0,57	0,74
16	T19	Pipe 17	T33	400	218	140	0,46	0,51
17	T33	Pipe 18	7	400	223	140	0,44	0,46
18	T19	Pipe 19	T32	150	327	150	0,59	2,22
19	T32	Pipe 20	T36	150	193	150	0,47	1,45
20	T36	Pipe 21	T35	150	221	150	0,40	1,05
21	T35	Pipe 22	11	150	305	150	0,31	0,65
22	11	Pipe 23	T1	150	50	150	0,31	0,65
23	7	Pipe 24	T37	250	526	150	0,20	0,16
24	T37	Pipe 25	8	250	301	150	0,10	0,04
25	8	Pipe 26	10	250	410	150	0,04	0,01
26	T41	Pipe 27	3	150	519	150	0,65	2,60
27	7	Pipe 28	4	400	65	140	0,36	0,32
28	4	Pipe 29	T7	150	265	150	0,89	4,74
29	T7	Pipe 30	3	150	347	150	0,73	3,23
30	4	Pipe 31	T12	400	201	140	0,24	0,15
31	T12	Pipe 32	T6	400	149	140	0,23	0,14
32	T6	Pipe 33	T23	400	195	140	0,23	0,14
33	18	Pipe 34	T2	150	105	150	0,18	0,25
34	T2	Pipe 35	T5	150	337	150	0,15	0,16
35	T5	Pipe 36	T37	150	301	150	0,21	0,32
36	8	Pipe 37	T3	150	410	150	0,15	0,17
37	T3	Pipe 38	T25	150	340	150	0,16	0,19
38	18	Pipe 39	T15	400	144	140	0,09	0,02
39	T15	Pipe 40	T25	400	148	140	0,08	0,02
40	T23	Pipe 41	18	400	30	140	0,11	0,04
41	T25	Pipe 42	9	250	422	150	0,02	0,00

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
42	9	Pipe 43	T4	250	548	150	0,02	0,00
43	T4	Pipe 44	10	250	206	150	0,04	0,01
44	T23	Pipe 45	T20	150	485	150	0,81	3,96
45	T20	Pipe 46	T31	150	214	150	0,60	2,23
46	T31	Pipe 47	T21	150	332	150	0,41	1,10
47	T21	Pipe 48	12	150	378	150	0,24	0,42
48	13	Pipe 49	12	150	137	150	0,38	0,99
49	13	Pipe 50	T29	250	335	150	0,44	0,70
50	T29	Pipe 51	3	250	294	150	0,49	0,87
51	12	Pipe 52	T18	150	728	150	0,63	2,44
52	13	Pipe 53	T11	250	225	150	0,30	0,35
53	T11	Pipe 54	T38	250	367	150	0,15	0,09
54	T38	Pipe 55	T43	250	7220	150	0,08	0,03

Tabel Hasil Analisa Node Pada EPANET 2.0

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
1	2	0	32	43,33
2	T2	0,67	6	66,16
3	T3	5,41	4	68,11
4	T5	6,25	5	67,10
5	T4	1,08	4	68,18
6	T1	5,39	6	65,03
7	T7	2,96	6	65,01
8	T11	7,6	6	63,32
9	T12	0,67	7	65,23
10	T15	0,34	5	67,18
11	T18	11,05	7	60,48
12	T19	2,45	8	64,50
13	T20	3,84	7	63,26
14	T21	2,94	7	62,42
15	T23	0,72	7	65,18
16	T24	2,49	6	66,43
17	T25	8,73	6	66,18
18	T26	3,47	10	62,02
19	T28	5,86	7	64,45
20	T29	2,75	5	64,63
21	17	0	10	61,43
22	T31	3,32	6	63,79
23	T32	2,16	5	66,77
24	T33	2,84	6	66,39
25	T36	1,35	5	66,49
26	T35	1,6	5	66,26
27	T37	1,3	5	67,20
28	T38	3,29	7	62,29

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
29	T40	6,88	24	49,27
30	T42	8,94	31	41,86
31	T41	6,63	8	63,24
32	5	0	23	51,59
33	6	0	9	65,24
34	3	0	7	62,89
35	4	0	8	64,26
36	7	0	6	66,28
37	8	0	7	65,18
38	9	0	6	66,18
39	10	0	4	68,18
40	11	0	2	69,06
41	12	0	5	64,26
42	13	0	5	64,40
43	T43	3,85	25	44,08
44	15	0	7	65,82
45	16	0	8	64,87
46	T30	2,64	32	39,75
47	T6	0,08	7	65,21
48	18	0	6	66,18

## Lampiran 2 Rencana Perbaikan Jaringan Distribusi PDAM Tirta Kandilo

Tabel Hasil Analisa Jaringan Pipa Distribusi Pada EPANET 2.0

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
1	2	Pipe 2	T42	250	2260	150	0,63	1,38
2	T42	Pipe 3	T30	250	2130	150	0,45	0,74
3	T30	Pipe 4	T7	150	804	150	1,11	7,01
4	17	Pipe 5	T41	200	394	150	0,80	2,73
5	17	Pipe 6	T28	100	237	150	0,70	4,82
6	T28	Pipe 7	T26	150	437	150	0,64	2,57
7	T26	Pipe 8	T24	150	162	150	0,84	4,20
8	T24	Pipe 9	15	150	104	150	0,98	5,61
9	T40	Pipe 10	16	250	656	150	0,87	2,49
10	15	Pipe 11	16	250	50	140	1,66	8,17
11	16	Pipe 12	6	250	2110	140	0,78	2,05
12	2	Pipe 13	5	400	623	140	0,70	1,09
13	5	Pipe 14	6	250	574	140	0,78	2,05
14	5	Pipe 15	T40	250	1240	150	1,01	3,28
15	T19	Pipe 16	15	250	437	140	1,30	5,24
16	T19	Pipe 17	T33	250	218	140	1,04	3,45
17	T33	Pipe 18	7	200	223	140	1,53	9,20
18	T19	Pipe 19	T32	150	327	150	0,59	2,22
19	T32	Pipe 20	T36	150	193	150	0,47	1,45
20	T36	Pipe 21	T35	150	221	150	0,40	1,05
21	T35	Pipe 22	11	150	305	150	0,31	0,65
22	11	Pipe 23	T1	150	50	150	0,31	0,65
23	7	Pipe 24	T37	150	526	150	1,03	6,10
24	T37	Pipe 25	8	150	301	150	0,52	1,71
25	8	Pipe 26	10	100	410	150	0,34	1,25
26	T41	Pipe 27	3	150	519	150	1,05	6,43
27	7	Pipe 28	4	200	65	140	0,96	3,84
28	4	Pipe 29	T7	150	265	150	0,52	1,75
29	T7	Pipe 30	3	100	347	150	0,80	6,14
30	4	Pipe 31	T12	150	201	140	1,18	7,92
31	T12	Pipe 32	T6	150	149	140	1,14	7,46
32	T6	Pipe 33	T23	150	195	140	1,14	7,40
33	18	Pipe 34	T2	50	105	150	0,40	3,84
34	T2	Pipe 35	T5	75	337	150	0,33	1,67
35	T5	Pipe 36	T37	150	301	150	0,44	1,25
36	8	Pipe 37	T3	150	410	150	0,37	0,90
37	T3	Pipe 38	T25	5-	340	150	0,54	6,65
38	18	Pipe 39	T15	100	144	140	0,82	6,48
39	T15	Pipe 40	T25	100	148	140	0,78	5,86
40	T23	Pipe 41	18	100	30	140	0,72	5,10
41	T25	Pipe 42	9	75	422	150	0,35	1,92
42	9	Pipe 43	T4	75	548	150	0,35	1,92
43	T4	Pipe 44	10	100	206	150	0,34	1,25

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
44	T23	Pipe 45	T20	150	485	150	0,78	3,65
45	T20	Pipe 46	T31	150	214	150	0,56	1,99
46	T31	Pipe 47	T21	150	332	150	0,37	0,93
47	T21	Pipe 48	12	100	378	150	0,46	2,25
48	13	Pipe 49	12	100	137	150	0,94	8,40
49	13	Pipe 50	T29	150	335	150	1,25	8,85
50	T29	Pipe 51	3	200	294	150	0,79	2,71
51	12	Pipe 52	T18	150	728	150	0,63	2,40
52	13	Pipe 53	T11	250	225	150	0,30	0,35
53	T11	Pipe 54	T38	150	367	150	0,40	1,09
54	T38	Pipe 55	T43	100	7220	150	0,49	2,50

Tabel Hasil Analisa Node Pada EPANET 2.0

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
1	2	0	32	43,33
2	T2	0,67	6	53,10
3	T3	5,41	4	55,15
4	T5	6,25	5	54,66
5	T4	1,08	4	54,75
6	T1	5,39	6	58,58
7	T7	2,96	6	56,53
8	T11	7,6	6	50,56
9	T12	0,67	7	54,40
10	T15	0,34	5	52,76
11	T18	11,05	7	46,71
12	T19	2,45	8	58,05
13	T20	3,84	7	50,08
14	T21	2,94	7	49,34
15	T23	0,72	7	51,85
16	T24	2,49	6	61,76
17	T25	8,73	6	50,89
18	T26	3,47	10	57,08
19	T28	5,86	7	58,95
20	T29	2,75	5	54,60
21	17	0	10	54,81
22	T31	3,32	6	50,65
23	T32	2,16	5	60,32
24	T33	2,84	6	59,30
25	T36	1,35	5	60,04
26	T35	1,6	5	59,81
27	T37	1,3	5	55,04
28	T38	3,29	7	49,16
29	T40	6,88	24	46,38
30	T42	8,94	31	41,01

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
31	T41	6,63	8	55,75
32	5	0	23	51,45
33	6	0	9	64,27
34	3	0	7	53,40
35	4	0	8	54,99
36	7	0	6	57,24
37	8	0	7	52,52
38	9	0	6	51,70
39	10	0	4	55,01
40	11	0	2	62,61
41	12	0	5	50,49
42	13	0	5	51,64
43	T43	3,85	25	13,15
44	15	0	7	61,34
45	16	0	8	60,75
46	T30	2,64	32	38,45
47	T6	0,08	7	53,29
48	18	0	6	52,69

### Lampiran 3 Perhitungan Proyeksi Penduduk

Tabel Jumlah Penduduk Kecamatan Tanah Grogot 8 Tahun Kebelakang

No.	Tahun	Jumlah Penduduk (Jiwa)	Pertumbuhan	
			Jiwa	Persen
1	2011	61626	-	-
2	2012	63265	1639	3%
3	2013	64790	1525	2%
4	2014	66393	1603	2%
5	2015	67981	1588	2%
6	2016	69505	1524	2%
<b>TOTAL</b>			<b>7879</b>	<b>12%</b>

- Contoh perhitungan:

- Tahun 2012 :

Pertumbuhan (jiwa) = Penduduk Tahun 2012 – Penduduk Tahun 2011

$$= 63265 - 61626$$

$$= 1639 \text{ Jiwa}$$

$$\text{Pertumbuhan (persen)} = \frac{\text{Pertumbuhan (jiwa) Tahun 2012}}{\text{Jumlah penduduk Tahun 2011}} \times 100 \%$$

$$= \frac{1639}{61626} \times 100 \%$$

$$= 3 \%$$

Tabel Proyeksi Mundur Penduduk Kecamatan Tanah Grogot Metode Aritmatik

No.	Tahun	Jumlah Penduduk (Jiwa)	Ka	Proyeksi penduduk (Jiwa)
1	2011	61626	1575,8	61626
2	2012	63265	1575,8	63202
3	2013	64790	1575,8	64778
4	2014	66393	1575,8	66353
5	2015	67981	1575,8	67929
6	2016	69505	1575,8	69505

- Contoh perhitungan :

$$Ka = \frac{P_2 - P_1}{T_2 - T_1}$$

$$= \frac{69505-61626}{2016-2011} = 1575,8$$

Tahun 2012 :

$$P_n = P_0 + K_a (T_n - T_0)$$

$$P_{12} = 69505 + 200,7(2012 - 2016)$$

$$P_{12} = 63202$$

Tabel Proyeksi Mundur Penduduk Kecamatan Tanah Grogot Metode Geometrik

No.	Tahun	Jumlah Penduduk (Jiwa)	r	Proyeksi penduduk (Jiwa)
1	2011	61626	0,018	63574
2	2012	63265	0,018	64718
3	2013	64790	0,018	65883
4	2014	66393	0,018	67069
5	2015	67981	0,018	68276
6	2016	69505	0,018	69505

o Contoh perhitungan :

$$r = \frac{\sum \text{Pertumbuhan penduduk } (\%)}{N}$$

$$r = \frac{0,12}{6} = 0,018$$

Tahun 2012 :

$$P_n = P_0 (1 + r)^n$$

$$P_{12} = 69505 (1 + 0,018)^{(2012-2016)}$$

$$P_{12} = 64178$$

Tabel Proyeksi Mundur Penduduk Kecamatan Tanah Grogot Metode Least Square

No.	Tahun	Tahun ke-n (X)	Jumlah Penduduk (Y)	XY	X <sup>2</sup>	a	b	Proyeksi penduduk
1	2011	1	61626	61626	1	60078	1575,6	61654
2	2012	2	63265	126530	4	60078	1575,6	63229
3	2013	3	64790	194370	9	60078	1575,6	64805
4	2014	4	66393	265572	16	60078	1575,6	66380
5	2015	5	67981	339905	25	60078	1575,6	67956
6	2016	6	69505	417030	36	60078	1575,6	69532
<b>TOTAL</b>		21	393560	1405033	91	-	-	393556
<b>RATA-RATA</b>		4	65593	234172	15	-	-	65593



- Contoh perhitungan :

$$b = \frac{(n(\sum X \times Y) - (\sum X \times \sum Y))}{n \sum X^2 - (\sum X)^2}$$

$$b = \frac{(6(1405033) - (21 \times 393560))}{6(91) - (21)^2} = 1575,6$$

$$a = \bar{Y} - b\bar{X}$$

$$a = 65593 - 1575,6(15) = 60078$$

Tahun 2012 :

$$\bar{Y} = a + bX$$

$$\bar{Y}_{12} = 60078 + (1575,6 \times (2))$$

$$\bar{Y}_{12} = 63229$$

## Lampiran 4 Standar Deviasi (S)

Tabel Standar Deviasi Metode Arimatik

No.	Tahun	Tahun ke-n (X)	Jumlah Penduduk (Y)	Hasil Proyeksi Aritmatik (Yi)	Yi - Ymean	(Yi - Ymean) <sup>2</sup>
1	2011	1	61626	61626	-3967	15739734
2	2012	2	63265	63202	-2392	5719432
3	2013	3	64790	64778	-816	665421
4	2014	4	66393	66353	760	577701
5	2015	5	67981	67929	2336	5456273
6	2016	6	69505	69505	3912	15301136
<b>Total</b>		<b>21</b>	<b>393560</b>	<b>393393</b>	<b>-167</b>	<b>43459697</b>
<b>Y mean</b>			<b>65593</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Standar Deviasi</b>						<b>2691,19</b>

- Contoh perhitungan :

Standar deviasi (S) :

$$S = \sqrt{\frac{\sum(Y_i - Y_{mean})^2}{n}}$$

$$S = \sqrt{\frac{(43459697)^2}{(6)}} = 227,22$$

Tabel Standar Deviasi Metode Geometrik

No.	Tahun	Tahun ke-n (X)	Jumlah Penduduk (Y)	Hasil Proyeksi Geometrik (Yi)	Yi - Ymean	(Yi - Ymean) <sup>2</sup>
1	2011	1	61626	63574	-2020	4079114
2	2012	2	63265	64718	-875	766248
3	2013	3	64790	65883	290	83849
4	2014	4	66393	67069	1475	2176982
5	2015	5	67981	68276	2683	7196869
6	2016	6	69505	69505	3912	15301136
<b>Total</b>		<b>21</b>	<b>393560</b>	<b>399024</b>	<b>5464</b>	<b>29604199</b>
<b>Y mean</b>			<b>65593</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Standar Deviasi</b>						<b>2025,98</b>

Tabel Standar Deviasi Metode Least Square

No.	Tahun	Tahun ke-n (X)	Jumlah Penduduk (Y)	Hasil Proyeksi Least Square (Yi)	Yi - Ymean	(Yi - Ymean) <sup>2</sup>
1	2011	1	61626	61654	-3940	15521499
2	2012	2	63265	63229	-2364	5589126
3	2013	3	64790	64805	-789	621785
4	2014	4	66393	66380	787	619474
5	2015	5	67981	67956	2363	5582194
6	2016	6	69505	69532	3938	15509944
<b>Total</b>		<b>21</b>	<b>393560</b>	<b>393556</b>	<b>-4</b>	<b>43444022</b>
<b>Y mean</b>			<b>65593</b>	<b>-</b>	<b>-</b>	<b>-</b>
<b>Standar Deviasi</b>						<b>2690,85</b>

### Lampiran 5 Analisa Jaringan Distribusi PDAM Tirta Kandilo Tahun 2032

Tabel Hasil Analisa Jaringan Pipa Distribusi Pada EPANET 2.0

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
1	2	Pipe 2	T42	250	2260	150	0,93	2,82
2	T42	Pipe 3	T30	250	2130	150	0,75	1,89
3	T30	Pipe 4	T7	150	804	150	1,94	19,82
4	17	Pipe 5	T41	200	394	150	1,48	8,64
5	17	Pipe 6	T28	100	237	150	1,57	21,65
6	T28	Pipe 7	T26	150	437	150	1,03	6,16
7	T26	Pipe 8	T24	150	162	150	1,23	8,51
8	T24	Pipe 9	15	150	104	150	1,37	10,41
9	T40	Pipe 10	16	250	656	150	1,44	6,33
10	15	Pipe 11	16	250	50	140	2,69	20,07
11	16	Pipe 12	6	250	2110	140	1,25	4,84
12	2	Pipe 13	5	400	623	140	1,11	2,54
13	5	Pipe 14	6	250	574	140	1,25	4,84
14	5	Pipe 15	T40	250	1240	150	1,58	7,51
15	T19	Pipe 16	15	250	437	140	2,20	13,81
16	T19	Pipe 17	T33	250	218	140	1,54	7,11
17	T33	Pipe 18	7	200	223	140	2,31	19,63
18	T19	Pipe 19	T32	150	327	150	1,70	15,59
19	T32	Pipe 20	T36	150	193	150	1,58	13,58
20	T36	Pipe 21	T35	150	221	150	0,40	1,05
21	T35	Pipe 22	11	150	305	150	0,31	0,65
22	11	Pipe 23	T1	150	50	150	0,31	0,65
23	7	Pipe 24	T37	150	526	150	1,20	8,18
24	T37	Pipe 25	8	150	301	150	0,61	2,31
25	8	Pipe 26	10	100	410	150	0,46	2,22
26	T41	Pipe 27	3	150	519	150	2,28	26,71
27	7	Pipe 28	4	200	65	140	1,63	10,34
28	4	Pipe 29	T7	150	265	150	1,11	7,06
29	T7	Pipe 30	3	100	347	150	2,12	37,60
30	4	Pipe 31	T12	150	201	140	1,80	17,22
31	T12	Pipe 32	T6	150	149	140	1,76	16,55
32	T6	Pipe 33	T23	150	195	140	1,75	16,47
33	18	Pipe 34	T2	50	105	150	1,17	27,85
34	T2	Pipe 35	T5	75	337	150	0,67	6,22
35	T5	Pipe 36	T37	150	301	150	0,52	1,74
36	8	Pipe 37	T3	150	410	150	0,40	1,08
37	T3	Pipe 38	T25	50	340	150	0,86	16,03
38	18	Pipe 39	T15	100	144	140	0,62	3,81
39	T15	Pipe 40	T25	100	148	140	0,57	3,33
40	T23	Pipe 41	18	100	30	140	0,32	1,16
41	T25	Pipe 42	9	75	422	150	0,57	4,67
42	9	Pipe 43	T4	75	548	150	0,57	4,67
43	T4	Pipe 44	10	100	206	150	0,46	2,22
44	T23	Pipe 45	T20	150	485	150	1,57	13,40

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
45	T20	Pipe 46	T31	150	214	150	1.35	10.17
46	T31	Pipe 47	T21	150	332	150	1.16	7.70
47	T21	Pipe 48	12	100	378	150	2.24	41.71
48	13	Pipe 49	12	100	137	150	1.29	14.90
49	13	Pipe 50	T29	150	335	150	3.06	46.28
50	T29	Pipe 51	3	200	294	150	1.81	12.49
51	12	Pipe 52	T18	150	728	150	0.63	2.44
52	13	Pipe 53	T11	250	225	150	0.90	2.62
53	T11	Pipe 54	T38	150	367	150	2.06	22.22
54	T38	Pipe 55	T43	100	7220	150	4.22	134.39
55	12	Pipe 56	T14	100	2503	150	2.12	37.66
56	T92	Pipe 57	T53	250	404	250	0.40	0.58

Tabel Hasil Analisa Node Pada EPANET 2.0

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
1	2	0	32	51,50
2	T2	0,67	6	73,89
3	T3	5,41	4	76,05
4	T5	6,25	5	75,12
5	T4	1,08	4	75,95
6	T1	5,39	6	74,40
7	T7	2,96	6	74,36
8	T11	7,6	6	70,84
9	T12	0,67	7	73,19
10	T15	0,34	5	74,52
11	T18	11,05	7	69,59
12	T19	2,45	8	73,28
13	T20	3,84	7	71,88
14	T21	2,94	7	71,38
15	T23	0,72	7	72,58
16	T24	2,49	6	75,81
17	T25	8,73	6	73,47
18	T26	3,47	10	71,66
19	T28	5,86	7	74,37
20	T29	2,75	5	73,57
21	17	0	10	70,82
22	T31	3,32	6	72,65
23	T32	2,16	5	75,73
24	T33	2,84	6	75,11
25	T36	1,35	5	75,45
26	T35	1,6	5	75,42
27	T37	1,3	5	75,18
28	T38	3,29	7	68,86
29	T40	6,88	24	58,48

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
30	T42	8,94	31	51,87
31	T41	6,63	8	72,45
32	5	0	23	80,48
33	6	0	9	74,18
34	3	0	7	71,96
35	4	0	8	72,57
36	7	0	6	74,64
37	8	0	7	73,10
38	9	0	6	73,68
39	10	0	4	76,00
40	11	0	2	78,40
41	12	0	5	71,68
42	13	0	5	71,80
43	T43	33,13	25	-53,40
44	15	0	7	74,82
45	16	0	8	74,03
46	T30	2,64	32	50,53
47	T6	0,08	7	72,93
48	18	0	6	59,54
49	T14	16,67	7	59,54
50	14	19,58	4	75,42

**Lampiran 6 Rencana Pengembangan Jaringan Distribusi PDAM Tirta  
Kandilo Tahun 2032 Skenario 1**

Tabel Hasil Analisa Jaringan Pipa Distribusi Pada EPANET 2.0

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
1	2	Pipe 2	T42	250	2260	150	1,07	3,65
2	T42	Pipe 3	T30	250	2130	150	0,89	2,58
3	T30	Pipe 4	T7	150	804	150	0,84	2,30
4	17	Pipe 5	T41	200	394	150	1,25	4,88
5	17	Pipe 6	T28	100	237	150	0,65	1,90
6	T28	Pipe 7	T26	150	437	150	0,84	3,02
7	T26	Pipe 8	T24	150	162	150	0,95	3,79
8	T24	Pipe 9	15	150	104	150	1,03	4,40
9	T40	Pipe 10	16	250	656	150	1,00	2,58
10	15	Pipe 11	16	250	50	140	1,77	7,49
11	16	Pipe 12	6	250	2110	140	1,12	3,93
12	2	Pipe 13	5	400	623	140	1,05	2,31
13	5	Pipe 14	6	250	574	140	1,12	3,93
14	5	Pipe 15	T40	250	1240	150	1,58	7,46
15	T19	Pipe 16	15	250	437	140	1,32	4,31
16	T19	Pipe 17	T33	250	218	140	1,23	4,71
17	T33	Pipe 18	7	200	223	140	1,17	4,31
18	T19	Pipe 19	T32	150	327	150	0,96	3,84
19	T32	Pipe 20	T36	150	193	150	0,89	3,35
20	T36	Pipe 21	T35	150	221	150	0,40	1,05
21	T35	Pipe 22	11	150	305	150	0,31	0,65
22	11	Pipe 23	T1	150	50	150	0,31	0,65
23	7	Pipe 24	T37	150	526	150	0,58	1,52
24	T37	Pipe 25	8	150	301	150	0,52	1,73
25	8	Pipe 26	10	100	410	150	0,34	1,28
26	T41	Pipe 27	3	150	519	150	1,12	3,99
27	7	Pipe 28	4	200	65	140	0,80	2,13
28	4	Pipe 29	T7	150	265	150	0,54	1,86
29	T7	Pipe 30	3	100	347	150	0,84	6,72
30	4	Pipe 31	T12	150	201	140	0,95	3,77
31	T12	Pipe 32	T6	150	149	140	0,93	3,62
32	T6	Pipe 33	T23	150	195	140	0,92	3,60
33	18	Pipe 34	T2	50	105	150	0,44	4,57
34	T2	Pipe 35	T5	75	337	150	0,35	1,84
35	T5	Pipe 36	T37	150	301	150	0,44	1,27
36	8	Pipe 37	T3	150	410	150	0,37	0,91
37	T3	Pipe 38	T25	5-	340	150	0,55	6,94
38	18	Pipe 39	T15	100	144	140	0,81	6,37
39	T15	Pipe 40	T25	100	148	140	0,77	5,76

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
40	T23	Pipe 41	18	100	30	140	0,70	4,87
41	T25	Pipe 42	9	75	422	150	0,36	2,00
42	9	Pipe 43	T4	75	548	150	0,36	2,00
43	T4	Pipe 44	10	100	206	150	0,34	1,28
44	T23	Pipe 45	T20	150	485	150	0,73	2,30
45	T20	Pipe 46	T31	150	214	150	1,07	6,64
46	T31	Pipe 47	T21	150	332	150	0,89	4,65
47	T21	Pipe 48	12	100	378	150	0,40	0,78
48	13	Pipe 49	12	100	137	150	0,85	4,31
49	13	Pipe 50	T29	150	335	150	1,20	4,51
50	T29	Pipe 51	3	200	294	150	1,26	4,91
51	12	Pipe 52	T18	150	728	150	0,63	2,44
52	13	Pipe 53	T11	250	225	150	0,90	2,62
53	T11	Pipe 54	T38	150	367	150	0,74	1,85
54	T38	Pipe 55	T43	100	7220	150	0,40	0,58
55	T65	Pipe 57	T48	50	14073	150	0,67	1,55
56	T92	Pipe 60	T53	150	20926	150	0,94	5,23

Tabel Hasil Analisa Node Pada EPANET 2.0

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
1	2	0	32	27,90
2	T2	0,67	6	35,47
3	T3	5,41	4	37,58
4	T5	6,25	5	37,09
5	T4	1,08	4	37,16
6	T1	5,39	6	36,90
7	T7	2,96	6	36,64
8	T11	7,6	6	30,76
9	T12	0,67	7	35,37
10	T15	0,34	5	35,07
11	T18	11,05	7	27,98
12	T19	2,45	8	37,26
13	T20	3,84	7	33,02
14	T21	2,94	7	30,06
15	T23	0,72	7	34,13
16	T24	2,49	6	40,69
17	T25	8,73	6	33,22
18	T26	3,47	10	36,07
19	T28	5,86	7	37,75
20	T29	2,75	5	33,86
21	17	0	10	34,30
22	T31	3,32	6	32,60



No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
23	T32	2,16	5	39,00
24	T33	2,84	6	38,23
25	T36	1,35	5	38,36
26	T35	1,6	5	38,13
27	T37	1,3	5	37,47
28	T38	3,29	7	29,08
29	T40	6,88	24	25,21
30	T42	8,94	31	20,66
31	T41	6,63	8	34,38
32	5	0	23	35,46
33	6	0	9	47,21
34	3	0	7	33,31
35	4	0	8	35,13
36	7	0	6	37,27
37	8	0	7	34,95
38	9	0	6	34,06
39	10	0	4	37,43
40	11	0	2	40,93
41	12	0	5	31,76
42	13	0	5	32,35
43	T43	33,13	25	30,49
44	15	0	7	40,14
45	16	0	8	39,52
46	T30	2,64	32	14,15
47	T6	0,08	7	34,84
48	18	0	6	34,99
49	T14	16,67	7	57,28
50	14	19,58	4	38,12
51	19	0	7	59,67
51	20	0	4	77,37

**Lampiran 7 Rencana Pengembangan Jaringan Distribusi PDAM Tirta  
Kandilo Tahun 2032 Skenario 2**

Tabel Hasil Analisa Jaringan Pipa Distribusi Pada EPANET 2.0

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
1	2	Pipe 2	T42	250	2260	150	0,75	1,90
2	T42	Pipe 3	T30	250	2130	150	0,57	1,14
3	T30	Pipe 4	T7	200	804	150	0,81	2,81
4	17	Pipe 5	T41	200	394	150	1,17	5,59
5	17	Pipe 6	T28	200	237	150	0,36	0,64
6	T28	Pipe 7	T26	200	437	150	0,55	1,38
7	T26	Pipe 8	T24	200	162	150	0,66	1,93
8	T24	Pipe 9	15	200	104	150	0,74	2,38
9	T40	Pipe 10	16	300	656	150	0,72	1,41
10	15	Pipe 11	16	300	50	140	1,53	5,67
11	16	Pipe 12	6	300	2110	140	0,81	1,74
12	2	Pipe 13	5	400	623	140	0,91	1,78
13	5	Pipe 14	6	250	574	140	1,16	4,23
14	5	Pipe 15	T40	250	1240	150	1,17	4,32
15	T19	Pipe 16	15	300	437	140	1,20	3,61
16	T19	Pipe 17	T33	250	218	140	1,06	3,57
17	T33	Pipe 18	7	250	223	140	1,00	3,22
18	T19	Pipe 19	T32	200	327	150	0,96	3,84
19	T32	Pipe 20	T36	200	193	150	0,89	3,35
20	T36	Pipe 21	T35	150	221	150	0,40	1,05
21	T35	Pipe 22	11	150	305	150	0,31	0,65
22	11	Pipe 23	T1	150	50	150	0,31	0,65
23	7	Pipe 24	T37	250	526	150	0,35	0,51
24	T37	Pipe 25	8	150	301	150	0,50	1,60
25	8	Pipe 26	10	200	410	150	0,31	1,08
26	T41	Pipe 27	3	200	519	150	0,97	3,93
27	7	Pipe 28	4	250	65	140	0,72	1,75
28	4	Pipe 29	T7	100	265	150	0,81	6,33
29	T7	Pipe 30	3	100	347	150	0,43	1,99
30	4	Pipe 31	T12	250	201	140	0,59	1,21
31	T12	Pipe 32	T6	250	149	140	0,58	1,16
32	T6	Pipe 33	T23	250	195	140	0,58	1,15
33	18	Pipe 34	T2	75	105	150	0,72	7,07
34	T2	Pipe 35	T5	75	337	150	0,57	4,55
35	T5	Pipe 36	T37	75	301	150	0,85	9,66
36	8	Pipe 37	T3	150	410	150	0,36	0,87
37	T3	Pipe 38	T25	50	340	150	0,47	5,21

No.	Start Node	Link ID	End Node	Diameter (mm)	Panjang (m)	Roughness	Velocity (m/s)	Unit Headloss (m/Km)
38	18	Pipe 39	T15	100	144	140	0,86	7,10
39	T15	Pipe 40	T25	100	148	140	0,82	6,45
40	T23	Pipe 41	18	125	30	140	0,81	4,88
41	T25	Pipe 42	9	75	422	150	0,31	1,50
42	9	Pipe 43	T4	75	548	150	0,31	1,50
43	T4	Pipe 44	10	100	206	150	0,31	1,08
44	T23	Pipe 45	T20	150	485	150	1,00	5,77
45	T20	Pipe 46	T31	150	214	150	0,78	3,66
46	T31	Pipe 47	T21	150	332	150	0,59	2,19
47	T21	Pipe 48	12	150	378	150	0,42	1,19
48	13	Pipe 49	12	200	137	150	0,64	1,84
49	13	Pipe 50	T29	200	335	150	0,99	4,09
50	T29	Pipe 51	3	200	294	150	1,08	4,79
51	12	Pipe 52	T18	150	728	150	0,63	2,44
52	13	Pipe 53	T11	150	225	150	0,62	2,38
53	T11	Pipe 54	T38	100	367	150	0,42	1,87
54	22	Pipe 56	23	250	1230	150	0,40	0,58
55	T14	Pipe 60	20	150	2503	150	0,94	5,23

Tabel Hasil Analisa Node Pada EPANET 2.0

No.	Junction ID	Base Demand (LPS)	Elevation (m)	Pressure (m)
1	2	0	32	36,42
2	T2	0,67	6	50,03
3	T3	5,41	4	52,56
4	T5	6,25	5	49,49
5	T4	1,08	4	52,25
6	T1	5,39	6	50,81
7	T7	2,96	6	49,88
8	T11	7,6	6	45,88
9	T12	0,67	7	50,31
10	T15	0,34	5	50,75
11	T18	11,05	7	43,38
12	T19	2,45	8	51,17
13	T20	3,84	7	47,12
14	T21	2,94	7	45,61
15	T23	0,72	7	49,92
16	T24	2,49	6	54,50
17	T25	8,73	6	48,79
18	T26	3,47	10	50,19

<b>No.</b>	<b>Junction ID</b>	<b>Base Demand (LPS)</b>	<b>Elevation (m)</b>	<b>Pressure (m)</b>
19	T28	5,86	7	52,59
20	T29	2,75	5	48,78
21	17	0	10	49,43
22	T31	3,32	6	47,34
23	T32	2,16	5	52,91
24	T33	2,84	6	52,39
25	T36	1,35	5	52,27
26	T35	1,6	5	52,04
27	T37	1,3	5	52,4
28	T38	3,29	7	44,19
29	T40	6,88	24	37,95
30	T42	8,94	31	33,12
31	T41	6,63	8	49,23
32	5	0	23	44,31
33	6	0	9	55,88
34	3	0	7	48,19
35	4	0	8	49,56
36	7	0	6	51,67
37	8	0	7	49,92
38	9	0	6	49,43
39	10	0	4	52,48
40	11	0	2	54,84
41	12	0	5	47,16
42	13	0	5	47,41
44	15	0	7	53,75
45	16	0	8	53,03
46	T30	2,64	32	29,7
47	T6	0,08	7	50,14
48	18	0	6	50,77
49	T14	16,67	7	68,99
50	14	19,58	5	52,03
51	20	0	5	75,07
52	22	35	5	35,96
53	23	0	5	38,06

**Lampiran 8 Bill Of Quantity (BOQ) dan Rancangan Anggaran Biaya (RAB)  
Rencana Pengembangan Jaringan Distribusi Tahun 2032 Skenario 1**

Tabel BOQ Pengadaan Pipa

No	Jenis Pipa	Diameter (mm)	Panjang lapangan (m)	Panjang pasaran (m)	Jumlah Pipa	Jumlah Pipa (pembulatan)
1	PVC	50	340	6	56,67	57
2	PVC	75	1713	6	285,50	286
3	PVC	100	1917	6	319,50	320
4	PVC	150	6152	6	1025,33	962
5	PVC	200	3943	6	657,17	658
6	PVC	250	8889	6	1481,50	1482
7	PVC	300	3353	6	558,83	559
8	PE	400	623	6	103,83	104

Tabel RAB Pengadaan Pipa

No.	Jenis	Ukuran (inchi)	Ukuran (mm)	Jumlah	Harga Satuan	Harga Total
1	PVC	2"	50	57	Rp 170.820	Rp 9.736.740
2	PVC	3"	75	286	Rp 312.780	Rp 89.298.690
3	PVC	4"	100	320	Rp 455.880	Rp 145.881.600
4	PVC	6"	150	962	Rp 950.340	Rp 914.227.080
5	PVC	8"	200	658	Rp 1.478.100	Rp 972.589.800
6	PVC	10"	250	1481,5	Rp 2.100.000	Rp 3.111.150.000
7	PVC	12"	300	559	Rp 3.000.720	Rp 1.676.902.360
8	PVC	16"	400	104	Rp 5.288.180	Rp 549.970.720
<b>TOTAL</b>						<b>Rp 7.469.756.990</b>

Tabel RAB Pengerjaan Pipa

No	Jenis Bahan Dan Tenaga	Satuan	Koefisien	Harga Satuan	Jumlah Harga (Rp)
<b>Pipa PVC 2"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 170.820	Rp59.787
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 2"			m	340
<b>BIAYA SUB-TOTAL</b>					<b>Rp21.757.620</b>
<b>Pipa PVC 3"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 312.780	Rp109.473
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080

No	Jenis Bahan Dan Tenaga	Satuan	Koefisien	Harga Satuan	Jumlah Harga (Rp)
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 3"			m	1713
<b>BIAYA SUB-TOTAL</b>					<b>Rp194.732.127</b>
<b>Pipa PVC 4"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 455.880	Rp159.558
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 4"			m	1917
<b>BIAYA SUB-TOTAL</b>					<b>Rp313.935.588</b>
<b>Pipa PVC 6"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 950.340	Rp332.619
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 6"			m	6152
<b>BIAYA SUB-TOTAL</b>					<b>Rp2.072.147.400</b>
<b>Pipa PVC 8"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 1.478.100	Rp517.335
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 8"			m	3943
<b>BIAYA SUB-TOTAL</b>					<b>Rp2.056.436.163</b>
<b>Pipa PVC 10"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 2.100.000	Rp735.000
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 10"			m	8889
<b>BIAYA SUB-TOTAL</b>					<b>Rp6.570.802.134</b>

No	Jenis Bahan Dan Tenaga	Satuan	Koefisien	Harga Satuan	Jumlah Harga (Rp)
<b>Pipa PVC 12"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 3.000.720	Rp1.050.252
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 12"			m	3353
<b>BIAYA SUB-TOTAL</b>					<b>Rp3.535.597.674</b>
<b>Pipa PVC 16"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 5.288.180	Rp1.850.863
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 16"			m	623
<b>BIAYA SUB-TOTAL</b>					<b>Rp1.155.707.987</b>
<b>BIAYA TOTAL</b>					<b>Rp15.921.116.693</b>

Tabel BOQ Galian Pipa

No.	Nomor Pipa	Elevasi MT		Elev.dasar pipa		Kedalaman		Kedalaman rata-rata (m)	Lebar Galian (m)	Diameter	Diameter	Panjang Pipa (m)	Volume Galian (m <sup>3</sup> )
		Awal	Akhir	Awal	Akhir	Awal	Akhir			(mm)	(m)		
1	2	32	31	31	30	1	1	1,25	1,25	250	0,25	2260	3531,25
2	3	31	32	30	31	1	1	1,25	1,25	250	0,25	2130	3328,13
3	4	32	10	31	9	1	1	1,25	1,25	250	0,25	804	1256,25
4	5	10	8	9	7	1	1	1,25	1,25	250	0,25	394	615,63
5	6	10	7	9	6	1	1	1,2	1,2	200	0,2	237	341,28
6	7	7	10	6	9	1	1	1,2	1,2	200	0,2	437	629,28
7	8	10	6	9	5	1	1	1,2	1,2	200	0,2	162	233,28
8	9	6	7	5	6	1	1	1,2	1,2	200	0,2	104	149,76
9	10	24	8	23	7	1	1	1,3	1,3	300	0,3	656	1108,64
10	11	8	7	7	6	1	1	1,3	1,3	300	0,3	50	84,50
11	12	9	8	8	7	1	1	1,25	1,25	250	0,25	2210	3453,13
12	13	32	23	31	22	1	1	1,4	1,4	400	0,4	623	1221,08
13	14	23	9	22	8	1	1	1,25	1,25	250	0,25	574	896,88
14	15	23	24	22	23	1	1	1,25	1,25	250	0,25	1240	1937,50
15	16	7	8	6	7	1	1	1,3	1,3	300	0,3	437	738,53
16	17	8	6	7	5	1	1	1,25	1,25	250	0,25	218	340,63
17	18	6	6	5	5	1	1	1,25	1,25	250	0,25	223	348,44
18	19	8	5	7	4	1	1	1,2	1,2	200	0,2	327	470,88
19	20	5	5	4	4	1	1	1,193	1,193	193	0,193	200	284,65
20	21	5	5	4	4	1	1	1,15	1,15	150	0,15	221	292,27
21	22	5	2	4	1	1	1	1,15	1,15	150	0,15	305	403,36
22	23	2	7	1	6	1	1	1,15	1,15	150	0,15	50	66,13



No.	Nomor Pipa	Elevasi MT		Elev.dasar pipa		Kedalaman		Kedalaman rata-rata (m)	Lebar Galian (m)	Diameter	Diameter	Panjang Pipa (m)	Volume Galian (m <sup>3</sup> )
		Awal	Akhir	Awal	Akhir	Awal	Akhir			(mm)	(m)		
23	24	8	5	7	4	1	1	1,2	1,2	200	0,2	526	757,44
24	25	5	7	4	6	1	1	1,15	1,15	150	0,15	301	398,07
25	26	7	4	6	3	1	1	1,1	1,1	100	0,1	410	496,10
26	27	8	7	7	6	1	1	1,25	1,25	250	0,25	519	810,94
27	28	6	8	5	7	1	1	1,25	1,25	250	0,25	65	101,56
28	29	6	8	5	7	1	1	1,15	1,15	150	0,15	265	350,46
29	30	6	7	5	6	1	1	1,1	1,1	100	0,1	347	419,87
30	31	8	7	7	6	1	1	1,1	1,1	100	0,1	201	243,21
31	32	7	7	6	6	1	1	1,2	1,2	200	0,2	149	214,56
32	33	7	7	6	6	1	1	1,2	1,2	200	0,2	195	280,80
33	34	6	6	5	5	1	1	1,05	1,05	50	0,05	105	115,76
34	35	6	6	5	5	1	1	1,075	1,075	75	0,075	337	389,45
35	36	5	5	4	4	1	1	1,15	1,15	150	0,15	301	398,07
36	37	7	4	6	3	1	1	1,15	1,15	150	0,15	410	542,23
37	38	6	4	5	3	1	1	1,05	1,05	50	0,05	340	374,85
38	39	6	5	5	4	1	1	1,1	1,1	100	0,1	144	174,24
39	40	5	6	4	5	1	1	1,1	1,1	100	0,1	1548	1873,08
40	41	7	6	6	5	1	1	1,1	1,1	100	0,1	30	36,30
41	42	6	6	5	5	1	1	1,075	1,075	75	0,075	422	487,67
42	43	6	4	5	3	1	1	1,075	1,075	75	0,075	548	633,28
43	44	4	4	3	3	1	1	1,1	1,1	100	0,1	206	249,26
44	45	7	7	6	6	1	1	1,2	1,2	200	0,2	485	698,40
45	46	6	7	5	6	1	1	1,15	1,15	150	0,15	214	283,02

No.	Nomor Pipa	Elevasi MT		Elev.dasar pipa		Kedalaman		Kedalaman rata-rata (m)	Lebar Galian (m)	Diameter	Diameter	Panjang Pipa (m)	Volume Galian (m <sup>3</sup> )
		Awal	Akhir	Awal	Akhir	Awal	Akhir			(mm)	(m)		
46	47	7	6	6	5	1	1	1,15	1,15	150	0,15	332	439,07
47	48	5	7	4	6	1	1	1,2	1,2	200	0,2	378	544,32
48	49	5	5	4	4	1	1	1,15	1,15	150	0,15	137	181,18
49	50	5	5	4	4	1	1	1,25	1,25	250	0,25	335	523,44
50	51	5	7	4	6	1	1	1,25	1,25	250	0,25	294	459,38
51	52	5	7	4	6	1	1	1,15	1,15	150	0,15	728	962,78
52	53	5	6	4	5	1	1	1,25	1,25	250	0,25	225	351,56
53	54	6	7	5	6	1	1	1,25	1,25	250	0,25	367	573,44
54	55	7	25	6	24	1	1	1,25	1,25	250	0,25	7220	11281,25
55	57	5	5	4	4	1	1	1,25	1,25	250	0,25	404	631,25
56	60	5	7	4	6	1	1	1,15	1,15	150	0,15	2503	3310,22

Tabel RAB Galian Pipa

No.	Nomor Pipa	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
1	2	3531,25	Rp55.000	Rp194.218.750
2	3	3328,125	Rp55.000	Rp183.046.875
3	4	1256,25	Rp55.000	Rp69.093.750
4	5	615,625	Rp55.000	Rp33.859.375
5	6	341,28	Rp55.000	Rp18.770.400
6	7	629,28	Rp55.000	Rp34.610.400
7	8	233,28	Rp55.000	Rp12.830.400
8	9	149,76	Rp55.000	Rp8.236.800
9	10	1108,64	Rp55.000	Rp60.975.200
10	11	84,5	Rp55.000	Rp4.647.500
11	12	3453,125	Rp55.000	Rp189.921.875
12	13	1221,08	Rp55.000	Rp67.159.400
13	14	896,875	Rp55.000	Rp49.328.125
14	15	1937,5	Rp55.000	Rp106.562.500
15	16	738,53	Rp55.000	Rp40.619.150
16	17	340,625	Rp55.000	Rp18.734.375
17	18	348,4375	Rp55.000	Rp19.164.063
18	19	470,88	Rp55.000	Rp25.898.400
19	20	284,6498	Rp55.000	Rp15.655.739
20	21	292,2725	Rp55.000	Rp16.074.988
21	22	403,3625	Rp55.000	Rp22.184.938
22	23	66,125	Rp55.000	Rp3.636.875
23	24	757,44	Rp55.000	Rp41.659.200
24	25	398,0725	Rp55.000	Rp21.893.988
25	26	496,1	Rp55.000	Rp27.285.500
26	27	810,9375	Rp55.000	Rp44.601.563
27	28	101,5625	Rp55.000	Rp5.585.938
28	29	350,4625	Rp55.000	Rp19.275.438
29	30	419,87	Rp55.000	Rp23.092.850
30	31	243,21	Rp55.000	Rp13.376.550
31	32	214,56	Rp55.000	Rp11.800.800
32	33	280,8	Rp55.000	Rp15.444.000
33	34	115,7625	Rp55.000	Rp6.366.938
34	35	389,4456	Rp55.000	Rp21.419.509
35	36	398,0725	Rp55.000	Rp21.893.988
36	37	542,225	Rp55.000	Rp29.822.375
37	38	374,85	Rp55.000	Rp20.616.750

No.	Nomor Pipa	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
38	39	174,24	Rp55.000	Rp9.583.200
39	40	1873,08	Rp55.000	Rp103.019.400
40	41	36,3	Rp55.000	Rp1.996.500
41	42	487,6738	Rp55.000	Rp26.822.056
42	43	633,2825	Rp55.000	Rp34.830.538
43	44	249,26	Rp55.000	Rp13.709.300
44	45	698,4	Rp55.000	Rp38.412.000
45	46	283,015	Rp55.000	Rp15.565.825
46	47	439,07	Rp55.000	Rp24.148.850
47	48	544,32	Rp55.000	Rp29.937.600
48	49	181,1825	Rp55.000	Rp9.965.038
49	50	523,4375	Rp55.000	Rp28.789.063
50	51	459,375	Rp55.000	Rp25.265.625
51	52	962,78	Rp55.000	Rp52.952.900
52	53	351,5625	Rp55.000	Rp19.335.938
53	54	573,4375	Rp55.000	Rp31.539.063
54	55	11281,25	Rp55.000	Rp620.468.750
55	57	631,25	Rp55.000	Rp34.718.750
56	60	3310,218	Rp55.000	Rp182.061.963
<b>TOTAL</b>				<b>Rp2.822.487.617</b>

Tabel BOQ Urukun Pipa

No.	Nomor Pipa	Diameter (mm)	Panjang (m)	Kedalaman Galian (m)	Lebar Galian (m)	Urukun Pasir (m <sup>3</sup> )	Urukun Tanah (m <sup>3</sup> )
1	2	250	2260	1,25	1,25	8898,75	1836,25
2	3	250	2130	1,25	1,25	8386,88	1730,63
3	4	250	804	1,25	1,25	3165,75	653,25
4	5	250	394	1,25	1,25	1551,38	320,13
5	6	200	237	1,2	1,2	881,64	170,64
6	7	200	437	1,2	1,2	1625,64	314,64
7	8	200	162	1,2	1,2	602,64	116,64
8	9	200	104	1,2	1,2	386,88	74,88
9	10	300	656	1,3	1,3	2728,96	596,96
10	11	300	50	1,3	1,3	208,00	45,50
11	12	250	2210	1,25	1,25	8701,88	1795,63
12	13	400	623	1,4	1,4	2878,26	697,76
13	14	250	574	1,25	1,25	2260,13	466,38

No.	Nomor Pipa	Diameter (mm)	Panjang (m)	Kedalaman Galian (m)	Lebar Galian (m)	Urukan Pasir (m <sup>3</sup> )	Urukan Tanah (m <sup>3</sup> )
14	15	250	1240	1,25	1,25	4882,50	1007,50
15	16	300	437	1,3	1,3	1817,92	397,67
16	17	250	218	1,25	1,25	858,38	177,13
17	18	250	223	1,25	1,25	878,06	181,19
18	19	200	327	1,2	1,2	1216,44	235,44
19	20	193	200	1,193	1,193	737,99	141,49
20	21	150	221	1,15	1,15	775,16	139,78
21	22	150	305	1,15	1,15	1069,79	192,91
22	23	150	50	1,15	1,15	175,38	31,63
23	24	200	526	1,2	1,2	1956,72	378,72
24	25	150	301	1,15	1,15	1055,76	190,38
25	26	100	410	1,1	1,1	1353,00	225,50
26	27	250	519	1,25	1,25	2043,56	421,69
27	28	250	65	1,25	1,25	255,94	52,81
28	29	150	265	1,15	1,15	929,49	167,61
29	30	100	347	1,1	1,1	1145,10	190,85
30	31	100	201	1,1	1,1	663,30	110,55
31	32	200	149	1,2	1,2	554,28	107,28
32	33	200	195	1,2	1,2	725,40	140,40
33	34	50	105	1,05	1,05	325,24	49,61
34	35	75	337	1,075	1,075	1077,77	172,08
35	36	150	301	1,15	1,15	1055,76	190,38
36	37	150	410	1,15	1,15	1438,08	259,33
37	38	50	340	1,05	1,05	1053,15	160,65
38	39	100	144	1,1	1,1	475,20	79,20
39	40	100	1548	1,1	1,1	5108,40	851,40
40	41	100	30	1,1	1,1	99,00	16,50
41	42	75	422	1,075	1,075	1349,61	215,48
42	43	75	548	1,075	1,075	1752,57	279,82
43	44	100	206	1,1	1,1	679,80	113,30
44	45	200	485	1,2	1,2	1804,20	349,20
45	46	150	214	1,15	1,15	750,61	135,36
46	47	150	332	1,15	1,15	1164,49	209,99
47	48	200	378	1,2	1,2	1406,16	272,16
48	49	150	137	1,15	1,15	480,53	86,65
49	50	250	335	1,25	1,25	1319,06	272,19
50	51	250	294	1,25	1,25	1157,63	238,88
51	52	150	728	1,15	1,15	2553,46	460,46

No.	Nomor Pipa	Diameter (mm)	Panjang (m)	Kedalaman Galian (m)	Lebar Galian (m)	Urukan Pasir (m <sup>3</sup> )	Urukan Tanah (m <sup>3</sup> )
52	53	250	225	1,25	1,25	885,94	182,81
53	54	250	367	1,25	1,25	1445,06	298,19
54	55	250	7220	1,25	1,25	28428,75	5866,25
55	57	250	404	1,25	1,25	1590,75	328,25
56	60	150	2503	1,15	1,15	8779,27	1583,15
<b>TOTAL</b>						<b>131551,39</b>	<b>25981,08</b>

Tabel RAB Urukan Pipa

No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
1	Pasir	2	m <sup>3</sup>	8898,75	Rp 70.000	Rp 622.912.500
2		3	m <sup>3</sup>	8386,875	Rp 70.000	Rp 587.081.250
3		4	m <sup>3</sup>	3165,75	Rp 70.000	Rp 221.602.500
4		5	m <sup>3</sup>	1551,375	Rp 70.000	Rp 108.596.250
5		6	m <sup>3</sup>	881,64	Rp 70.000	Rp 61.714.800
6		7	m <sup>3</sup>	1625,64	Rp 70.000	Rp 113.794.800
7		8	m <sup>3</sup>	602,64	Rp 70.000	Rp 42.184.800
8		9	m <sup>3</sup>	386,88	Rp 70.000	Rp 27.081.600
9		10	m <sup>3</sup>	2728,96	Rp 70.000	Rp 191.027.200
10		11	m <sup>3</sup>	208	Rp 70.000	Rp 14.560.000
11		12	m <sup>3</sup>	8701,875	Rp 70.000	Rp 609.131.250
12		13	m <sup>3</sup>	2878,26	Rp 70.000	Rp 201.478.200
13		14	m <sup>3</sup>	2260,125	Rp 70.000	Rp 158.208.750
14		15	m <sup>3</sup>	4882,5	Rp 70.000	Rp 341.775.000
15		16	m <sup>3</sup>	1817,92	Rp 70.000	Rp 127.254.400
16		17	m <sup>3</sup>	858,375	Rp 70.000	Rp 60.086.250
17		18	m <sup>3</sup>	878,0625	Rp 70.000	Rp 61.464.375
18		19	m <sup>3</sup>	1216,44	Rp 70.000	Rp 85.150.800
19		20	m <sup>3</sup>	737,9898	Rp 70.000	Rp 51.659.286
20		21	m <sup>3</sup>	775,1575	Rp 70.000	Rp 54.261.025
21		22	m <sup>3</sup>	1069,7875	Rp 70.000	Rp 74.885.125
22		23	m <sup>3</sup>	175,375	Rp 70.000	Rp 12.276.250
23		24	m <sup>3</sup>	1956,72	Rp 70.000	Rp 136.970.400
24		25	m <sup>3</sup>	1055,7575	Rp 70.000	Rp 73.903.025

No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
25		26	m <sup>3</sup>	1353	Rp 70.000	Rp 94.710.000
26		27	m <sup>3</sup>	2043,5625	Rp 70.000	Rp 143.049.375
27		28	m <sup>3</sup>	255,9375	Rp 70.000	Rp 17.915.625
28		29	m <sup>3</sup>	929,4875	Rp 70.000	Rp 65.064.125
29		30	m <sup>3</sup>	1145,1	Rp 70.000	Rp 80.157.000
30		31	m <sup>3</sup>	663,3	Rp 70.000	Rp 46.431.000
31		32	m <sup>3</sup>	554,28	Rp 70.000	Rp 38.799.600
32		33	m <sup>3</sup>	725,4	Rp 70.000	Rp 50.778.000
33		34	m <sup>3</sup>	325,2375	Rp 70.000	Rp 22.766.625
34		35	m <sup>3</sup>	1077,768125	Rp 70.000	Rp 75.443.769
35		36	m <sup>3</sup>	1055,7575	Rp 70.000	Rp 73.903.025
36		37	m <sup>3</sup>	1438,075	Rp 70.000	Rp 100.665.250
37		38	m <sup>3</sup>	1053,15	Rp 70.000	Rp 73.720.500
38		39	m <sup>3</sup>	475,2	Rp 70.000	Rp 33.264.000
39		40	m <sup>3</sup>	5108,4	Rp 70.000	Rp 357.588.000
40		41	m <sup>3</sup>	99	Rp 70.000	Rp 6.930.000
41		42	m <sup>3</sup>	1349,60875	Rp 70.000	Rp 94.472.613
42		43	m <sup>3</sup>	1752,5725	Rp 70.000	Rp 122.680.075
43		44	m <sup>3</sup>	679,8	Rp 70.000	Rp 47.586.000
44		45	m <sup>3</sup>	1804,2	Rp 70.000	Rp 126.294.000
45		46	m <sup>3</sup>	750,605	Rp 70.000	Rp 52.542.350
46		47	m <sup>3</sup>	1164,49	Rp 70.000	Rp 81.514.300
47		48	m <sup>3</sup>	1406,16	Rp 70.000	Rp 98.431.200
48		49	m <sup>3</sup>	480,5275	Rp 70.000	Rp 33.636.925
49		50	m <sup>3</sup>	1319,0625	Rp 70.000	Rp 92.334.375
50		51	m <sup>3</sup>	1157,625	Rp 70.000	Rp 81.033.750
51		52	m <sup>3</sup>	2553,46	Rp 70.000	Rp 178.742.200
52		53	m <sup>3</sup>	885,9375	Rp 70.000	Rp 62.015.625
53		54	m <sup>3</sup>	1445,0625	Rp 70.000	Rp 101.154.375
54		55	m <sup>3</sup>	28428,75	Rp 70.000	Rp 1.990.012.500
55		57	m <sup>3</sup>	1590,75	Rp 70.000	Rp 111.352.500
56		60	m <sup>3</sup>	8779,2725	Rp 70.000	Rp 614.549.075
<b>Jumlah Biaya Uruk Pasir</b>						<b>Rp 9.208.597.592</b>

No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
57	Pasir	2	m <sup>3</sup>	1836,25	Rp 60.000	Rp 110.175.000
58		3	m <sup>3</sup>	1730,625	Rp 60.000	Rp 103.837.500
59		4	m <sup>3</sup>	653,25	Rp 60.000	Rp 39.195.000
60		5	m <sup>3</sup>	320,125	Rp 60.000	Rp 19.207.500
61		6	m <sup>3</sup>	170,64	Rp 60.000	Rp 10.238.400
62		7	m <sup>3</sup>	314,64	Rp 60.000	Rp 18.878.400
63		8	m <sup>3</sup>	116,64	Rp 60.000	Rp 6.998.400
64		9	m <sup>3</sup>	74,88	Rp 60.000	Rp 4.492.800
65		10	m <sup>3</sup>	596,96	Rp 60.000	Rp 35.817.600
66		11	m <sup>3</sup>	45,5	Rp 60.000	Rp 2.730.000
67		12	m <sup>3</sup>	1795,625	Rp 60.000	Rp 107.737.500
68		13	m <sup>3</sup>	697,76	Rp 60.000	Rp 41.865.600
69		14	m <sup>3</sup>	466,375	Rp 60.000	Rp 27.982.500
70		15	m <sup>3</sup>	1007,5	Rp 60.000	Rp 60.450.000
71		16	m <sup>3</sup>	397,67	Rp 60.000	Rp 23.860.200
72		17	m <sup>3</sup>	177,125	Rp 60.000	Rp 10.627.500
73		18	m <sup>3</sup>	181,1875	Rp 60.000	Rp 10.871.250
74		19	m <sup>3</sup>	235,44	Rp 60.000	Rp 14.126.400
75		20	m <sup>3</sup>	141,4898	Rp 60.000	Rp 8.489.388
76		21	m <sup>3</sup>	139,7825	Rp 60.000	Rp 8.386.950
77		22	m <sup>3</sup>	192,9125	Rp 60.000	Rp 11.574.750
78		23	m <sup>3</sup>	31,625	Rp 60.000	Rp 1.897.500
79		24	m <sup>3</sup>	378,72	Rp 60.000	Rp 22.723.200
80		25	m <sup>3</sup>	190,3825	Rp 60.000	Rp 11.422.950
81		26	m <sup>3</sup>	225,5	Rp 60.000	Rp 13.530.000
82		27	m <sup>3</sup>	421,6875	Rp 60.000	Rp 25.301.250
83		28	m <sup>3</sup>	52,8125	Rp 60.000	Rp 3.168.750
84		29	m <sup>3</sup>	167,6125	Rp 60.000	Rp 10.056.750
85		30	m <sup>3</sup>	190,85	Rp 60.000	Rp 11.451.000
86		31	m <sup>3</sup>	110,55	Rp 60.000	Rp 6.633.000
87		32	m <sup>3</sup>	107,28	Rp 60.000	Rp 6.436.800
88		33	m <sup>3</sup>	140,4	Rp 60.000	Rp 8.424.000
89		34	m <sup>3</sup>	49,6125	Rp 60.000	Rp 2.976.750



No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
90		35	m <sup>3</sup>	172,080625	Rp 60.000	Rp 10.324.838
91		36	m <sup>3</sup>	190,3825	Rp 60.000	Rp 11.422.950
92		37	m <sup>3</sup>	259,325	Rp 60.000	Rp 15.559.500
93		38	m <sup>3</sup>	160,65	Rp 60.000	Rp 9.639.000
94		39	m <sup>3</sup>	79,2	Rp 60.000	Rp 4.752.000
95		40	m <sup>3</sup>	851,4	Rp 60.000	Rp 51.084.000
96		41	m <sup>3</sup>	16,5	Rp 60.000	Rp 990.000
97		42	m <sup>3</sup>	215,48375	Rp 60.000	Rp 12.929.025
98		43	m <sup>3</sup>	279,8225	Rp 60.000	Rp 16.789.350
99		44	m <sup>3</sup>	113,3	Rp 60.000	Rp 6.798.000
100		45	m <sup>3</sup>	349,2	Rp 60.000	Rp 20.952.000
101		46	m <sup>3</sup>	135,355	Rp 60.000	Rp 8.121.300
102		47	m <sup>3</sup>	209,99	Rp 60.000	Rp 12.599.400
103		48	m <sup>3</sup>	272,16	Rp 60.000	Rp 16.329.600
104		49	m <sup>3</sup>	86,6525	Rp 60.000	Rp 5.199.150
105		50	m <sup>3</sup>	272,1875	Rp 60.000	Rp 16.331.250
106		51	m <sup>3</sup>	238,875	Rp 60.000	Rp 14.332.500
107		52	m <sup>3</sup>	460,46	Rp 60.000	Rp 27.627.600
108		53	m <sup>3</sup>	182,8125	Rp 60.000	Rp 10.968.750
109		54	m <sup>3</sup>	298,1875	Rp 60.000	Rp 17.891.250
110		55	m <sup>3</sup>	5866,25	Rp 60.000	Rp 351.975.000
111		57	m <sup>3</sup>	328,25	Rp 60.000	Rp 19.695.000
112		60	m <sup>3</sup>	1583,1475	Rp 60.000	Rp 94.988.850
<b>Jumlah Biaya Urukan Tanah</b>						<b>Rp 1.558.864.901</b>
<b>JUMLAH TOTAL</b>						<b>Rp 10.767.462.493</b>

Tabel RAB Persiapan

Pengukuran					
Jenis	Keterangan	Satuan	Volume	Harga Satuan	Jumlah Harga
Tenaga	Pengawas	oh	1	Rp160.000,00	Rp160.000
	Ass. ahli ukur	oh	2	Rp80.000,00	Rp160.000
	Pekerja	oh	10	Rp30.000,00	Rp300.000
	Mandor	oh	2	Rp120.000,00	Rp240.000
Jumlah					Rp860.000
Pemasangan Bowplank					
Jenis	Keterangan	Satuan	Volume	Harga Satuan	Jumlah Harga
Tenaga	Tukang kayu	oh	1	Rp90.000,00	Rp90.000
	Kepala tukang kayu	oh	1	Rp110.000,00	Rp110.000
	Pekerja	oh	6	Rp30.000,00	Rp180.000
	Mandor	oh	1	Rp120.000,00	Rp120.000
Jumlah					Rp500.000
Pekerjaan Pembersihan Lapangan					
Jenis	Keterangan	Satuan	Volume	Harga Satuan	Jumlah Harga
Tenaga	Pekerja	oh	4	Rp30.000,00	Rp120.000
	Mandor	oh	1	Rp120.000,00	Rp120.000
Jumlah					Rp240.000
<b>Total Biaya</b>					<b>Rp1.600.000</b>

Tabel RAB Pengadaan Aksesoris

No.	Jenis	Ukuran (inch)	Ukuran (mm)	Jumlah	Harga Satuan	Harga Total
1	Ellbow 45	6"	150	4	Rp 195.700	Rp 782.800
		8"	200	2	Rp 154.500	Rp 309.000
		10"	250	4	Rp 215.100	Rp 860.400
		12"	300	2	Rp 338.200	Rp 676.400
2	Ellbow 90	3"	75	1	Rp 31.200	Rp 31.200
		4"	100	2	Rp 58.000	Rp 116.000
		6"	150	5	Rp 146.700	Rp 733.500
		8"	200	4	Rp 332.400	Rp 1.329.600
		10"	250	5	Rp 444.200	Rp 2.221.000
3	Gate Valve	2"	50	2	Rp 1.174.750	Rp 2.349.500
		3"	75	6	Rp 1.985.000	Rp 11.910.000
		4"	100	9	Rp 2.706.750	Rp 24.360.750
		6"	150	11	Rp 5.567.500	Rp 61.242.500
		8"	200	16	Rp 9.432.250	Rp 150.916.000
		10"	250	15	Rp 13.886.750	Rp 208.301.250
		12"	300	1	Rp 18.729.750	Rp 18.729.750
4	Tee	16"	400	1	Rp 20.000.000	Rp 20.000.000
		2"	50	1	Rp 16.600	Rp 16.600
		3"	75	2	Rp 38.600	Rp 77.200
		4"	100	1	Rp 77.200	Rp 77.200
		6"	150	5	Rp 194.300	Rp 971.500
	8"	200	2	Rp 403.000	Rp 806.000	

No.	Jenis	Ukuran (inch)	Ukuran (mm)	Jumlah	Harga Satuan	Harga Total
		10"	250	1	Rp 550.000	Rp 550.000
5	Cross/Double tee	8"	200	1	Rp 500.000	Rp 500.000
6	Water Meter	2"	50	1	Rp 7.750.000	Rp 7.750.000
		3"	75	1	Rp 9.350.000	Rp 9.350.000
		4"	100	2	Rp 11.600.000	Rp 23.200.000
		6"	150	5	Rp 20.200.000	Rp 101.000.000
		8"	200	3	Rp 26.500.000	Rp 79.500.000
		10"	250	7	Rp 41.000.000	Rp 287.000.000
		12"	300	1	Rp 119.500.000	Rp 119.500.000
7	Reducer	4" x 3"	100 x 75	1	Rp 150.989	Rp 150.989
		3" x 2"	75 x 50	1	Rp 138.842	Rp 138.842
		6" x 4"	150 x 100	4	Rp 346.832	Rp 1.387.328
		8" x 6"	200 x 150	8	Rp 555.315	Rp 4.442.520
		10" x 6"	250 x 150	6	Rp 1.118.914	Rp 6.713.484
		10" x 8"	250 x 200	4	Rp 1.118.914	Rp 4.475.656
		13" x 10"	315 x 250	1	Rp 1.617.475	Rp 1.617.475
		12" x 8"	300 x 200	2	Rp 1.512.277	Rp 3.024.554
		16" x 13"	400 x 315	1	Rp 2.313.056	Rp 2.313.056
<b>TOTAL</b>						<b>Rp1.159.432.054</b>

Tabel RAB Pengadaan Pompa

No.	Jenis Pompa	Merk/Type	Jumlah	Harga Satuan	Biaya
1	Pompa Booster	Ebara 125X100 Fska	2	Rp 60.300.000	Rp 120.600.000
2	Sentrifugal	GRUNDFOS NB 150-400/438	1	Rp 235.462.000	Rp 235.462.000
<b>TOTAL</b>					<b>Rp 356.062.000</b>

Tabel BOQ Pengerjaan Reservoir

Keterangan	Panjang (m)	Lebar (m)	Kedalaman (m)	Jumlah	Volume (m <sup>3</sup> )
Dimensi Rencana	34	17	4	2	4624
Galian Tanah	34,2	17,2	4,2	2	4941
<b>Volume Beton</b>					<b>317</b>

Tabel RAB Pengerjaan Reservoir

Keterangan	Volume	Harga Satuan	Jumlah Harga
Pekerjaan Galian	4624	Rp 55.000	Rp 254.320.000
Pekerjaan Beton	317	Rp 3.829.145	Rp 1.214.666.060
<b>Total</b>			<b>Rp 1.468.986.060</b>

**Lampiran 9 Bill Of Quantity (BOQ) dan Rancangan Anggaran Biaya (RAB)  
Rencana Pengembangan Jaringan Distribusi Tahun 2032 Skenario 2**

Tabel BOQ Pengadaan Pipa

No	Jenis Pipa	Diameter (mm)	Panjang lapangan (m)	Panjang pasaran (m)	Jumlah Pipa	Jumlah Pipa (pembulatan)
1	PVC	50	340	6	56,67	57
2	PVC	75	1713	6	285,50	286
3	PVC	100	1917	6	319,50	320
4	PVC	150	6152	6	1025,33	962
5	PVC	200	3943	6	657,17	658
6	PVC	250	8889	6	1481,50	1482
7	PVC	300	3353	6	558,83	559
8	PE	400	623	6	103,83	104

Tabel RAB Pengadaan Pipa

No.	Jenis	Ukuran (inchi)	Ukuran (mm)	Jumlah	Harga Satuan	Harga Total
1	PVC	2"	50	57	Rp 170.820	Rp 9.736.740
2	PVC	3"	75	286	Rp 312.780	Rp 89.298.690
3	PVC	4"	100	320	Rp 455.880	Rp 145.881.600
4	PVC	6"	150	962	Rp 950.340	Rp 914.227.080
5	PVC	8"	200	658	Rp 1.478.100	Rp 972.589.800
6	PVC	10"	250	1481,5	Rp 2.100.000	Rp 3.111.150.000
7	PVC	12"	300	559	Rp 3.000.720	Rp 1.676.902.360
8	PVC	16"	400	104	Rp 5.288.180	Rp 549.970.720
<b>TOTAL</b>						<b>Rp 7.469.756.990</b>

Tabel RAB Pengerjaan Pipa

No	Jenis Bahan Dan Tenaga	Satuan	Koefisien	Harga Satuan	Jumlah Harga (Rp)
<b>Pipa PVC 2"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 170.820	Rp59.787
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 2"			m	340
<b>BIAYA SUB-TOTAL</b>					<b>Rp21.757.620</b>
<b>Pipa PVC 3"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 312.780	Rp109.473
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080

No	Jenis Bahan Dan Tenaga	Satuan	Koefisien	Harga Satuan	Jumlah Harga (Rp)
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 3"			m	1713
<b>BIAYA SUB-TOTAL</b>					<b>Rp194.732.127</b>
<b>Pipa PVC 4"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 455.880	Rp159.558
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 4"			m	1917
<b>BIAYA SUB-TOTAL</b>					<b>Rp313.935.588</b>
<b>Pipa PVC 6"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 950.340	Rp332.619
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 6"			m	6152
<b>BIAYA SUB-TOTAL</b>					<b>Rp2.072.147.400</b>
<b>Pipa PVC 8"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 1.478.100	Rp517.335
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 8"			m	3943
<b>BIAYA SUB-TOTAL</b>					<b>Rp2.056.436.163</b>
<b>Pipa PVC 10"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 2.100.000	Rp735.000
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 10"			m	8889
<b>BIAYA SUB-TOTAL</b>					<b>Rp6.570.802.134</b>

No	Jenis Bahan Dan Tenaga	Satuan	Koefisien	Harga Satuan	Jumlah Harga (Rp)
<b>Pipa PVC 12"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 3.000.720	Rp1.050.252
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 12"			m	3353
<b>BIAYA SUB-TOTAL</b>					<b>Rp3.535.597.674</b>
<b>Pipa PVC 16"</b>					
1	Bahan				
	Perlengkapan pipa	%	35	Rp 5.288.180	Rp1.850.863
2	Tenaga				
	Pekerja	org	0,036	Rp30.000	Rp1.080
	Tukang Pipa	org	0,06	Rp40.000	Rp2.400
	Kepala Tukang	org	0,006	Rp85.000	Rp510
	Mandor	org	0,0018	Rp120.000	Rp216
3	Panjang total pipa PVC 16"			m	623
<b>BIAYA SUB-TOTAL</b>					<b>Rp1.155.707.987</b>
<b>BIAYA TOTAL</b>					<b>Rp15.921.116.693</b>

Tabel BOQ Galian Pipa

No.	Nomor Pipa	Elevasi MT		Elev.dasar pipa		Kedalaman		Kedalaman rata-rata (m)	Lebar Galian (m)	Diameter	Diameter	Panjang Pipa (m)	Volume Galian (m <sup>3</sup> )
		Awal	Akhir	Awal	Akhir	Awal	Akhir			(mm)	(m)		
1	2	32	31	31	30	1	1	1,25	1,25	250	0,25	2260	3531,25
2	3	31	32	30	31	1	1	1,25	1,25	250	0,25	2130	3328,13
3	4	32	10	31	9	1	1	1,25	1,25	250	0,25	804	1256,25
4	5	10	8	9	7	1	1	1,25	1,25	250	0,25	394	615,63
5	6	10	7	9	6	1	1	1,2	1,2	200	0,2	237	341,28
6	7	7	10	6	9	1	1	1,2	1,2	200	0,2	437	629,28
7	8	10	6	9	5	1	1	1,2	1,2	200	0,2	162	233,28
8	9	6	7	5	6	1	1	1,2	1,2	200	0,2	104	149,76
9	10	24	8	23	7	1	1	1,3	1,3	300	0,3	656	1108,64
10	11	8	7	7	6	1	1	1,3	1,3	300	0,3	50	84,50
11	12	9	8	8	7	1	1	1,25	1,25	250	0,25	2210	3453,13
12	13	32	23	31	22	1	1	1,4	1,4	400	0,4	623	1221,08
13	14	23	9	22	8	1	1	1,25	1,25	250	0,25	574	896,88
14	15	23	24	22	23	1	1	1,25	1,25	250	0,25	1240	1937,50
15	16	7	8	6	7	1	1	1,3	1,3	300	0,3	437	738,53
16	17	8	6	7	5	1	1	1,25	1,25	250	0,25	218	340,63
17	18	6	6	5	5	1	1	1,25	1,25	250	0,25	223	348,44
18	19	8	5	7	4	1	1	1,2	1,2	200	0,2	327	470,88
19	20	5	5	4	4	1	1	1,193	1,193	193	0,193	200	284,65
20	21	5	5	4	4	1	1	1,15	1,15	150	0,15	221	292,27

No.	Nomor Pipa	Elevasi MT		Elev.dasar pipa		Kedalaman		Kedalaman rata-rata (m)	Lebar Galian (m)	Diameter	Diameter	Panjang Pipa (m)	Volume Galian (m <sup>3</sup> )
		Awal	Akhir	Awal	Akhir	Awal	Akhir			(mm)	(m)		
21	22	5	2	4	1	1	1	1,15	1,15	150	0,15	305	403,36
22	23	2	7	1	6	1	1	1,15	1,15	150	0,15	50	66,13
23	24	8	5	7	4	1	1	1,2	1,2	200	0,2	526	757,44
24	25	5	7	4	6	1	1	1,15	1,15	150	0,15	301	398,07
25	26	7	4	6	3	1	1	1,1	1,1	100	0,1	410	496,10
26	27	8	7	7	6	1	1	1,25	1,25	250	0,25	519	810,94
27	28	6	8	5	7	1	1	1,25	1,25	250	0,25	65	101,56
28	29	6	8	5	7	1	1	1,15	1,15	150	0,15	265	350,46
29	30	6	7	5	6	1	1	1,1	1,1	100	0,1	347	419,87
30	31	8	7	7	6	1	1	1,1	1,1	100	0,1	201	243,21
31	32	7	7	6	6	1	1	1,2	1,2	200	0,2	149	214,56
32	33	7	7	6	6	1	1	1,2	1,2	200	0,2	195	280,80
33	34	6	6	5	5	1	1	1,05	1,05	50	0,05	105	115,76
34	35	6	6	5	5	1	1	1,075	1,075	75	0,075	337	389,45
35	36	5	5	4	4	1	1	1,15	1,15	150	0,15	301	398,07
36	37	7	4	6	3	1	1	1,15	1,15	150	0,15	410	542,23
37	38	6	4	5	3	1	1	1,05	1,05	50	0,05	340	374,85
38	39	6	5	5	4	1	1	1,1	1,1	100	0,1	144	174,24
39	40	5	6	4	5	1	1	1,1	1,1	100	0,1	1548	1873,08
40	41	7	6	6	5	1	1	1,1	1,1	100	0,1	30	36,30
41	42	6	6	5	5	1	1	1,075	1,075	75	0,075	422	487,67



No.	Nomor Pipa	Elevasi MT		Elev.dasar pipa		Kedalaman		Kedalaman rata-rata (m)	Lebar Galian (m)	Diameter	Diameter	Panjang Pipa (m)	Volume Galian (m <sup>3</sup> )
		Awal	Akhir	Awal	Akhir	Awal	Akhir			(mm)	(m)		
42	43	6	4	5	3	1	1	1,075	1,075	75	0,075	548	633,28
43	44	4	4	3	3	1	1	1,1	1,1	100	0,1	206	249,26
44	45	7	7	6	6	1	1	1,2	1,2	200	0,2	485	698,40
45	46	6	7	5	6	1	1	1,15	1,15	150	0,15	214	283,02
46	47	7	6	6	5	1	1	1,15	1,15	150	0,15	332	439,07
47	48	5	7	4	6	1	1	1,2	1,2	200	0,2	378	544,32
48	49	5	5	4	4	1	1	1,15	1,15	150	0,15	137	181,18
49	50	5	5	4	4	1	1	1,25	1,25	250	0,25	335	523,44
50	51	5	7	4	6	1	1	1,25	1,25	250	0,25	294	459,38
51	52	5	7	4	6	1	1	1,15	1,15	150	0,15	728	962,78
52	53	5	6	4	5	1	1	1,25	1,25	250	0,25	225	351,56
53	54	6	7	5	6	1	1	1,25	1,25	250	0,25	367	573,44
54	56	7	25	6	24	1	1	1,25	1,25	250	0,25	1230	1921,88
55	57	5	5	4	4	1	1	1,25	1,25	250	0,25	404	631,25
56	60	5	7	4	6	1	1	1,15	1,15	150	0,15	2503	3310,22

Tabel RAB Galian Pipa

No.	Nomor Pipa	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
1	2	3531,25	Rp55.000	Rp194.218.750
2	3	3328,125	Rp55.000	Rp183.046.875
3	4	1256,25	Rp55.000	Rp69.093.750
4	5	615,625	Rp55.000	Rp33.859.375
5	6	341,28	Rp55.000	Rp18.770.400
6	7	629,28	Rp55.000	Rp34.610.400
7	8	233,28	Rp55.000	Rp12.830.400
8	9	149,76	Rp55.000	Rp8.236.800
9	10	1108,64	Rp55.000	Rp60.975.200
10	11	84,5	Rp55.000	Rp4.647.500
11	12	3453,125	Rp55.000	Rp189.921.875
12	13	1221,08	Rp55.000	Rp67.159.400
13	14	896,875	Rp55.000	Rp49.328.125
14	15	1937,5	Rp55.000	Rp106.562.500
15	16	738,53	Rp55.000	Rp40.619.150
16	17	340,625	Rp55.000	Rp18.734.375
17	18	348,4375	Rp55.000	Rp19.164.063
18	19	470,88	Rp55.000	Rp25.898.400
19	20	284,6498	Rp55.000	Rp15.655.739
20	21	292,2725	Rp55.000	Rp16.074.988
21	22	403,3625	Rp55.000	Rp22.184.938
22	23	66,125	Rp55.000	Rp3.636.875
23	24	757,44	Rp55.000	Rp41.659.200
24	25	398,0725	Rp55.000	Rp21.893.988
25	26	496,1	Rp55.000	Rp27.285.500
26	27	810,9375	Rp55.000	Rp44.601.563
27	28	101,5625	Rp55.000	Rp5.585.938
28	29	350,4625	Rp55.000	Rp19.275.438
29	30	419,87	Rp55.000	Rp23.092.850
30	31	243,21	Rp55.000	Rp13.376.550
31	32	214,56	Rp55.000	Rp11.800.800
32	33	280,8	Rp55.000	Rp15.444.000
33	34	115,7625	Rp55.000	Rp6.366.938
34	35	389,4456	Rp55.000	Rp21.419.509
35	36	398,0725	Rp55.000	Rp21.893.988
36	37	542,225	Rp55.000	Rp29.822.375
37	38	374,85	Rp55.000	Rp20.616.750

No.	Nomor Pipa	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
38	39	174,24	Rp55.000	Rp9.583.200
39	40	1873,08	Rp55.000	Rp103.019.400
40	41	36,3	Rp55.000	Rp1.996.500
41	42	487,6738	Rp55.000	Rp26.822.056
42	43	633,2825	Rp55.000	Rp34.830.538
43	44	249,26	Rp55.000	Rp13.709.300
44	45	698,4	Rp55.000	Rp38.412.000
45	46	283,015	Rp55.000	Rp15.565.825
46	47	439,07	Rp55.000	Rp24.148.850
47	48	544,32	Rp55.000	Rp29.937.600
48	49	181,1825	Rp55.000	Rp9.965.038
49	50	523,4375	Rp55.000	Rp28.789.063
50	51	459,375	Rp55.000	Rp25.265.625
51	52	962,78	Rp55.000	Rp52.952.900
52	53	351,5625	Rp55.000	Rp19.335.938
53	54	573,4375	Rp55.000	Rp31.539.063
54	56	1921,875	Rp55.000	Rp105.703.125
55	57	631,25	Rp55.000	Rp34.718.750
56	60	3310,218	Rp55.000	Rp182.061.963
<b>TOTAL</b>				<b>Rp2.307.721.992</b>

Tabel BOQ Urukkan Pipa

No.	Nomor Pipa	Diameter (mm)	Panjang (m)	Kedalaman Galian (m)	Lebar Galian (m)	Urukkan Pasir (m <sup>3</sup> )	Urukkan Tanah (m <sup>3</sup> )
1	2	250	2260	1,25	1,25	8898,75	1836,25
2	3	250	2130	1,25	1,25	8386,88	1730,63
3	4	250	804	1,25	1,25	3165,75	653,25
4	5	250	394	1,25	1,25	1551,38	320,13
5	6	200	237	1,2	1,2	881,64	170,64
6	7	200	437	1,2	1,2	1625,64	314,64
7	8	200	162	1,2	1,2	602,64	116,64
8	9	200	104	1,2	1,2	386,88	74,88
9	10	300	656	1,3	1,3	2728,96	596,96
10	11	300	50	1,3	1,3	208,00	45,50
11	12	250	2210	1,25	1,25	8701,88	1795,63
12	13	400	623	1,4	1,4	2878,26	697,76
13	14	250	574	1,25	1,25	2260,13	466,38

No.	Nomor Pipa	Diameter (mm)	Panjang (m)	Kedalaman Galian (m)	Lebar Galian (m)	Urukan Pasir (m <sup>3</sup> )	Urukan Tanah (m <sup>3</sup> )
14	15	250	1240	1,25	1,25	4882,50	1007,50
15	16	300	437	1,3	1,3	1817,92	397,67
16	17	250	218	1,25	1,25	858,38	177,13
17	18	250	223	1,25	1,25	878,06	181,19
18	19	200	327	1,2	1,2	1216,44	235,44
19	20	193	200	1,193	1,193	737,99	141,49
20	21	150	221	1,15	1,15	775,16	139,78
21	22	150	305	1,15	1,15	1069,79	192,91
22	23	150	50	1,15	1,15	175,38	31,63
23	24	200	526	1,2	1,2	1956,72	378,72
24	25	150	301	1,15	1,15	1055,76	190,38
25	26	100	410	1,1	1,1	1353,00	225,50
26	27	250	519	1,25	1,25	2043,56	421,69
27	28	250	65	1,25	1,25	255,94	52,81
28	29	150	265	1,15	1,15	929,49	167,61
29	30	100	347	1,1	1,1	1145,10	190,85
30	31	100	201	1,1	1,1	663,30	110,55
31	32	200	149	1,2	1,2	554,28	107,28
32	33	200	195	1,2	1,2	725,40	140,40
33	34	50	105	1,05	1,05	325,24	49,61
34	35	75	337	1,075	1,075	1077,77	172,08
35	36	150	301	1,15	1,15	1055,76	190,38
36	37	150	410	1,15	1,15	1438,08	259,33
37	38	50	340	1,05	1,05	1053,15	160,65
38	39	100	144	1,1	1,1	475,20	79,20
39	40	100	1548	1,1	1,1	5108,40	851,40
40	41	100	30	1,1	1,1	99,00	16,50
41	42	75	422	1,075	1,075	1349,61	215,48
42	43	75	548	1,075	1,075	1752,57	279,82
43	44	100	206	1,1	1,1	679,80	113,30
44	45	200	485	1,2	1,2	1804,20	349,20
45	46	150	214	1,15	1,15	750,61	135,36
46	47	150	332	1,15	1,15	1164,49	209,99
47	48	200	378	1,2	1,2	1406,16	272,16
48	49	150	137	1,15	1,15	480,53	86,65
49	50	250	335	1,25	1,25	1319,06	272,19
50	51	250	294	1,25	1,25	1157,63	238,88
51	52	150	728	1,15	1,15	2553,46	460,46

No.	Nomor Pipa	Diameter (mm)	Panjang (m)	Kedalaman Galian (m)	Lebar Galian (m)	Urukan Pasir (m <sup>3</sup> )	Urukan Tanah (m <sup>3</sup> )
52	53	250	225	1,25	1,25	885,94	182,81
53	54	250	367	1,25	1,25	1445,06	298,19
54	56	250	1230	1,25	1,25	4843,13	999,38
55	57	250	404	1,25	1,25	1590,75	328,25
56	60	150	2503	1,15	1,15	8779,27	1583,15
<b>TOTAL</b>						<b>107965,77</b>	<b>21114,21</b>

Tabel RAB Urukan Pipa

No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
1	Pasir	2	m <sup>3</sup>	8898,75	Rp 70.000	Rp 622.912.500
2		3	m <sup>3</sup>	8386,875	Rp 70.000	Rp 587.081.250
3		4	m <sup>3</sup>	3165,75	Rp 70.000	Rp 221.602.500
4		5	m <sup>3</sup>	1551,375	Rp 70.000	Rp 108.596.250
5		6	m <sup>3</sup>	881,64	Rp 70.000	Rp 61.714.800
6		7	m <sup>3</sup>	1625,64	Rp 70.000	Rp 113.794.800
7		8	m <sup>3</sup>	602,64	Rp 70.000	Rp 42.184.800
8		9	m <sup>3</sup>	386,88	Rp 70.000	Rp 27.081.600
9		10	m <sup>3</sup>	2728,96	Rp 70.000	Rp 191.027.200
10		11	m <sup>3</sup>	208	Rp 70.000	Rp 14.560.000
11		12	m <sup>3</sup>	8701,875	Rp 70.000	Rp 609.131.250
12		13	m <sup>3</sup>	2878,26	Rp 70.000	Rp 201.478.200
13		14	m <sup>3</sup>	2260,125	Rp 70.000	Rp 158.208.750
14		15	m <sup>3</sup>	4882,5	Rp 70.000	Rp 341.775.000
15		16	m <sup>3</sup>	1817,92	Rp 70.000	Rp 127.254.400
16		17	m <sup>3</sup>	858,375	Rp 70.000	Rp 60.086.250
17		18	m <sup>3</sup>	878,0625	Rp 70.000	Rp 61.464.375
18		19	m <sup>3</sup>	1216,44	Rp 70.000	Rp 85.150.800
19		20	m <sup>3</sup>	737,9898	Rp 70.000	Rp 51.659.286
20		21	m <sup>3</sup>	775,1575	Rp 70.000	Rp 54.261.025
21		22	m <sup>3</sup>	1069,7875	Rp 70.000	Rp 74.885.125
22		23	m <sup>3</sup>	175,375	Rp 70.000	Rp 12.276.250
23		24	m <sup>3</sup>	1956,72	Rp 70.000	Rp 136.970.400

No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
24		25	m <sup>3</sup>	1055,7575	Rp 70.000	Rp 73.903.025
25		26	m <sup>3</sup>	1353	Rp 70.000	Rp 94.710.000
26		27	m <sup>3</sup>	2043,5625	Rp 70.000	Rp 143.049.375
27		28	m <sup>3</sup>	255,9375	Rp 70.000	Rp 17.915.625
28		29	m <sup>3</sup>	929,4875	Rp 70.000	Rp 65.064.125
29		30	m <sup>3</sup>	1145,1	Rp 70.000	Rp 80.157.000
30		31	m <sup>3</sup>	663,3	Rp 70.000	Rp 46.431.000
31		32	m <sup>3</sup>	554,28	Rp 70.000	Rp 38.799.600
32		33	m <sup>3</sup>	725,4	Rp 70.000	Rp 50.778.000
33		34	m <sup>3</sup>	325,2375	Rp 70.000	Rp 22.766.625
34		35	m <sup>3</sup>	1077,768125	Rp 70.000	Rp 75.443.769
35		36	m <sup>3</sup>	1055,7575	Rp 70.000	Rp 73.903.025
36		37	m <sup>3</sup>	1438,075	Rp 70.000	Rp 100.665.250
37		38	m <sup>3</sup>	1053,15	Rp 70.000	Rp 73.720.500
38		39	m <sup>3</sup>	475,2	Rp 70.000	Rp 33.264.000
39		40	m <sup>3</sup>	5108,4	Rp 70.000	Rp 357.588.000
40		41	m <sup>3</sup>	99	Rp 70.000	Rp 6.930.000
41		42	m <sup>3</sup>	1349,60875	Rp 70.000	Rp 94.472.613
42		43	m <sup>3</sup>	1752,5725	Rp 70.000	Rp 122.680.075
43		44	m <sup>3</sup>	679,8	Rp 70.000	Rp 47.586.000
44		45	m <sup>3</sup>	1804,2	Rp 70.000	Rp 126.294.000
45		46	m <sup>3</sup>	750,605	Rp 70.000	Rp 52.542.350
46		47	m <sup>3</sup>	1164,49	Rp 70.000	Rp 81.514.300
47		48	m <sup>3</sup>	1406,16	Rp 70.000	Rp 98.431.200
48		49	m <sup>3</sup>	480,5275	Rp 70.000	Rp 33.636.925
49		50	m <sup>3</sup>	1319,0625	Rp 70.000	Rp 92.334.375
50		51	m <sup>3</sup>	1157,625	Rp 70.000	Rp 81.033.750
51		52	m <sup>3</sup>	2553,46	Rp 70.000	Rp 178.742.200
52		53	m <sup>3</sup>	885,9375	Rp 70.000	Rp 62.015.625
53		54	m <sup>3</sup>	1445,0625	Rp 70.000	Rp 101.154.375
54		56	m <sup>3</sup>	4843,125	Rp 70.000	Rp 339.018.750
55		57	m <sup>3</sup>	1590,75	Rp 70.000	Rp 111.352.500
56		60	m <sup>3</sup>	8779,2725	Rp 70.000	Rp 614.549.075

No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
<b>Jumlah Biaya Urukan Pasir</b>						<b>Rp 7.557.603.842</b>
57	Pasir	2	m <sup>3</sup>	1836,25	Rp 60.000	Rp 110.175.000
58		3	m <sup>3</sup>	1730,625	Rp 60.000	Rp 103.837.500
59		4	m <sup>3</sup>	653,25	Rp 60.000	Rp 39.195.000
60		5	m <sup>3</sup>	320,125	Rp 60.000	Rp 19.207.500
61		6	m <sup>3</sup>	170,64	Rp 60.000	Rp 10.238.400
62		7	m <sup>3</sup>	314,64	Rp 60.000	Rp 18.878.400
63		8	m <sup>3</sup>	116,64	Rp 60.000	Rp 6.998.400
64		9	m <sup>3</sup>	74,88	Rp 60.000	Rp 4.492.800
65		10	m <sup>3</sup>	596,96	Rp 60.000	Rp 35.817.600
66		11	m <sup>3</sup>	45,5	Rp 60.000	Rp 2.730.000
67		12	m <sup>3</sup>	1795,625	Rp 60.000	Rp 107.737.500
68		13	m <sup>3</sup>	697,76	Rp 60.000	Rp 41.865.600
69		14	m <sup>3</sup>	466,375	Rp 60.000	Rp 27.982.500
70		15	m <sup>3</sup>	1007,5	Rp 60.000	Rp 60.450.000
71		16	m <sup>3</sup>	397,67	Rp 60.000	Rp 23.860.200
72		17	m <sup>3</sup>	177,125	Rp 60.000	Rp 10.627.500
73		18	m <sup>3</sup>	181,1875	Rp 60.000	Rp 10.871.250
74		19	m <sup>3</sup>	235,44	Rp 60.000	Rp 14.126.400
75		20	m <sup>3</sup>	141,4898	Rp 60.000	Rp 8.489.388
76		21	m <sup>3</sup>	139,7825	Rp 60.000	Rp 8.386.950
77		22	m <sup>3</sup>	192,9125	Rp 60.000	Rp 11.574.750
78		23	m <sup>3</sup>	31,625	Rp 60.000	Rp 1.897.500
79		24	m <sup>3</sup>	378,72	Rp 60.000	Rp 22.723.200
80		25	m <sup>3</sup>	190,3825	Rp 60.000	Rp 11.422.950
81		26	m <sup>3</sup>	225,5	Rp 60.000	Rp 13.530.000
82		27	m <sup>3</sup>	421,6875	Rp 60.000	Rp 25.301.250
83		28	m <sup>3</sup>	52,8125	Rp 60.000	Rp 3.168.750
84		29	m <sup>3</sup>	167,6125	Rp 60.000	Rp 10.056.750
85		30	m <sup>3</sup>	190,85	Rp 60.000	Rp 11.451.000
86		31	m <sup>3</sup>	110,55	Rp 60.000	Rp 6.633.000
87		32	m <sup>3</sup>	107,28	Rp 60.000	Rp 6.436.800
88		33	m <sup>3</sup>	140,4	Rp 60.000	Rp 8.424.000

No.	Jenis	Nomor Pipa	Satuan	Volume (m <sup>3</sup> )	Harga Satuan	Jumlah Harga
89		34	m <sup>3</sup>	49,6125	Rp 60.000	Rp 2.976.750
90		35	m <sup>3</sup>	172,080625	Rp 60.000	Rp 10.324.838
91		36	m <sup>3</sup>	190,3825	Rp 60.000	Rp 11.422.950
92		37	m <sup>3</sup>	259,325	Rp 60.000	Rp 15.559.500
93		38	m <sup>3</sup>	160,65	Rp 60.000	Rp 9.639.000
94		39	m <sup>3</sup>	79,2	Rp 60.000	Rp 4.752.000
95		40	m <sup>3</sup>	851,4	Rp 60.000	Rp 51.084.000
96		41	m <sup>3</sup>	16,5	Rp 60.000	Rp 990.000
97		42	m <sup>3</sup>	215,48375	Rp 60.000	Rp 12.929.025
98		43	m <sup>3</sup>	279,8225	Rp 60.000	Rp 16.789.350
99		44	m <sup>3</sup>	113,3	Rp 60.000	Rp 6.798.000
100		45	m <sup>3</sup>	349,2	Rp 60.000	Rp 20.952.000
101		46	m <sup>3</sup>	135,355	Rp 60.000	Rp 8.121.300
102		47	m <sup>3</sup>	209,99	Rp 60.000	Rp 12.599.400
103		48	m <sup>3</sup>	272,16	Rp 60.000	Rp 16.329.600
104		49	m <sup>3</sup>	86,6525	Rp 60.000	Rp 5.199.150
105		50	m <sup>3</sup>	272,1875	Rp 60.000	Rp 16.331.250
106		51	m <sup>3</sup>	238,875	Rp 60.000	Rp 14.332.500
107		52	m <sup>3</sup>	460,46	Rp 60.000	Rp 27.627.600
108		53	m <sup>3</sup>	182,8125	Rp 60.000	Rp 10.968.750
109		54	m <sup>3</sup>	298,1875	Rp 60.000	Rp 17.891.250
110		56	m <sup>3</sup>	999,375	Rp 60.000	Rp 59.962.500
111		57	m <sup>3</sup>	328,25	Rp 60.000	Rp 19.695.000
112		60	m <sup>3</sup>	1583,1475	Rp 60.000	Rp 94.988.850
<b>Jumlah Biaya Urukun Tanah</b>						<b>Rp 1.266.852.401</b>
<b>JUMLAH TOTAL</b>						<b>Rp 8.824.456.243</b>



Tabel RAB Persiapan

Pengukuran					
Jenis	Keterangan	Satuan	Volume	Harga Satuan	Jumlah Harga
Tenaga	Pengawas	oh	1	Rp160.000,00	Rp160.000
	Ass. ahli ukur	oh	2	Rp80.000,00	Rp160.000
	Pekerja	oh	10	Rp30.000,00	Rp300.000
	Mandor	oh	2	Rp120.000,00	Rp240.000
Jumlah					Rp860.000
Pemasangan Bowplank					
Jenis	Keterangan	Satuan	Volume	Harga Satuan	Jumlah Harga
Tenaga	Tukang kayu	oh	1	Rp90.000,00	Rp90.000
	Kepala tukang kayu	oh	1	Rp110.000,00	Rp110.000
	Pekerja	oh	6	Rp30.000,00	Rp180.000
	Mandor	oh	1	Rp120.000,00	Rp120.000
Jumlah					Rp500.000
Pekerjaan Pembersihan Lapangan					
Jenis	Keterangan	Satuan	Volume	Harga Satuan	Jumlah Harga
Tenaga	Pekerja	oh	4	Rp30.000,00	Rp120.000
	Mandor	oh	1	Rp120.000,00	Rp120.000
Jumlah					Rp240.000
<b>Total Biaya</b>					<b>Rp1.600.000</b>

Tabel RAB Pengadaan Aksesoris

No.	Jenis	Ukuran (inch)	Ukuran (mm)	Jumlah	Harga Satuan	Harga Total
1	Ellbow 45	6"	150	4	Rp 195.700	Rp782.800
		8"	200	2	Rp 154.500	Rp309.000
		10"	250	4	Rp 215.100	Rp860.400
		12"	300	2	Rp 338.200	Rp676.400
2	Ellbow 90	3"	75	1	Rp 31.200	Rp31.200
		4"	100	2	Rp 58.000	Rp116.000
		6"	150	5	Rp 146.700	Rp733.500
		8"	200	4	Rp 332.400	Rp1.329.600
		10"	250	5	Rp 444.200	Rp2.221.000
3	Gate Valve	2"	50	2	Rp 1.174.750	Rp2.349.500
		3"	75	6	Rp 1.985.000	Rp11.910.000
		4"	100	9	Rp 2.706.750	Rp24.360.750
		6"	150	11	Rp 5.567.500	Rp61.242.500
		8"	200	16	Rp 9.432.250	Rp150.916.000
		10"	250	15	Rp 13.886.750	Rp208.301.250
		12"	300	1	Rp 18.729.750	Rp18.729.750
4	Tee	16"	400	1	Rp 20.000.000	Rp20.000.000
		2"	50	1	Rp 16.600	Rp16.600
		3"	75	2	Rp 38.600	Rp77.200
		4"	100	1	Rp 77.200	Rp77.200
		6"	150	5	Rp 194.300	Rp971.500
		8"	200	2	Rp 403.000	Rp806.000

No.	Jenis	Ukuran (inch)	Ukuran (mm)	Jumlah	Harga Satuan	Harga Total
		10"	250	1	Rp 550.000	Rp550.000
5	Cross/Double tee	8"	200	1	Rp 500.000	Rp500.000
6	Water Meter	2"	50	1	Rp 7.750.000	Rp7.750.000
		3"	75	1	Rp 9.350.000	Rp9.350.000
		4"	100	2	Rp 11.600.000	Rp23.200.000
		6"	150	5	Rp 20.200.000	Rp101.000.000
		8"	200	3	Rp 26.500.000	Rp79.500.000
		10"	250	6	Rp 41.000.000	Rp246.000.000
		12"	300	1	Rp 119.500.000	Rp119.500.000
7	Reducer	4" x 3"	100 x 75	1	Rp 150.989	Rp150.989
		3" x 2"	75 x 50	1	Rp 138.842	Rp138.842
		6" x 4"	150 x 100	4	Rp 346.832	Rp1.387.328
		8" x 6"	200 x 150	8	Rp 555.315	Rp4.442.520
		10" x 6"	250 x 150	6	Rp 1.118.914	Rp6.713.484
		10" x 8"	250 x 200	4	Rp 1.118.914	Rp4.475.656
		13" x 10"	315 x 250	1	Rp 1.617.475	Rp1.617.475
		12" x 8"	300 x 200	2	Rp 1.512.277	Rp3.024.554
		16" x 13"	400 x 315	1	Rp 2.313.056	Rp2.313.056
<b>TOTAL</b>						<b>Rp1.118.432.054</b>

Tabel RAB Pengadaan Pompa

No.	Jenis Pompa	Merk/Type	Jumlah	Harga Satuan	Biaya
1	Pompa Booster	Ebara 125X100 Fska	2	Rp 60.300.000	Rp 120.600.000
2	Sentrifugal	GRUNDFOS NB 150-400/438	1	Rp 235.462.000	Rp 235.462.000
<b>TOTAL</b>					<b>Rp 356.062.000</b>

Tabel BOQ Pengerjaan Reservoir


Keterangan	Panjang (m)	Lebar (m)	Kedalaman (m)	Jumlah	Volume (m <sup>3</sup> )
Dimensi Rencana	34	17	4	2	4624
Galian Tanah	34,2	17,2	4,2	2	4941
<b>Volume Beton</b>					<b>317</b>

Tabel RAB Pengerjaan Reservoir


Keterangan	Volume	Harga Satuan	Jumlah Harga
Pekerjaan Galian	4624	Rp 55.000	Rp 254.320.000
Pekerjaan Beton	317	Rp 3.829.145	Rp 1.214.666.060
<b>Total</b>			<b>Rp 1.468.986.060</b>



Reducer	90×63	3×2	Rp	138,842
	110×63	4×2	Rp	169,861
	110×90	4×3	Rp	150,989
	160×63	6×2	Rp	315,955
	160×90	6×3	Rp	334,266
	160×110	6×4	Rp	346,832
	200×110	8×4	Rp	527,789
	200×160	8×6	Rp	555,315
	250×160	10×6	Rp	1,118,914
	250×200	10×8	Rp	1,118,914
	315×160	12×6	Rp	1,499,350
	315×200	12×8	Rp	1,512,277
	315×250	12×10	Rp	1,617,475
	400×315	16×12	Rp	2,313,056



**MORE VIEWS**







Grundfos NB 150-400/438 Pump 1450RPM 415V (95109835)

**MRRP: ~~£23,340.00~~ + VAT**

**OUR PRICE**  
**£16,338.00**

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🏠 / Ebara Pompa / Pompa Air Ebara 125X100 Fska 90 Kw - 3000 Rpm (Ebara Transfer Pump)

◀ 34 / 36 ▶



### Jual Pompa Air Ebara 125X100 Fska 90 Kw - 3000 Rpm (Ebara Transfer Pump)

Terakhir Diupdate 03 Apr 2017  
 Negara Asal Indonesia  
 Pembelian Minimum 1 Unit

Harga  
**IDR 60.300.000,00**

Butuh Penawaran Harga, bantuan atau Konsultasi Produk?

- ✉ Kirim Pertanyaan
- ✍ Minta Penawaran



Bagikan

### Pipa Maspion Tipe AW

Ukuran (Inci)	Harga per 4m (Rp)	Harga per 6m (Rp)
0,5	27.120	40.680
0,75	33.040	49.560
1	41.600	62.560
1,25	58.880	88.320
1,5	76.880	115.020
2	113.880	170.820
2,5	146.200	219.300
3	208.520	312.780
4	303.920	455.880
5	479.380	719.040
6	633.580	950.340
8	985.400	1.478.100
10	1.400.000	2.100.000
12	2.000.480	3.000.720
14	2.814.580	4.221.840
16	3.518.120	5.288.180

### PRICE LIST ITRON WATER METER

Effective : 1 January 2016

Meter Type	Size (DN)		Body	Connection	Temp	Price (Rp)
	mm	inch	Material	Type	(°C)	( Incl. Tera, Excl. PPn)
<b>RESIDENTIAL CLASS B</b>						
<b>MULTIMAG</b>						
<b>MULTIMAG SNI 2457:2008</b> (Horizontal, Multijet)	15	½"	Brass	Thread	30	430,000
	20	¾"	Brass	Thread	30	910,000
	25	1"	Brass	Thread	30	2,450,000
	30/32	1 ¼"	Brass	Thread	30	2,750,000
	40	1 ½"	Brass	Thread	30	3,450,000
<b>INDUSTRIAL CLASS B</b>						
<b>WOLTEX</b> (All position, Turbine Woltmann)	50	2"	Cast Iron	PN10	50	7,750,000
	60/65	2 ½"	Cast Iron	PN10	50	9,150,000
	80	3"	Cast Iron	PN10	50	9,350,000
	100	4"	Cast Iron	PN10	50	11,600,000
	150	6"	Cast Iron	PN10	50	20,200,000
	200	8"	Cast Iron	PN10 or 16	50	26,500,000
	250	10"	Cast Iron	PN10 or 16	50	41,000,000
300	12"	Cast Iron	PN10 or 16	50	119,500,000	


**PT. ABADI METAL UTAMA**

Jl. Raya Sukomanunggal Jaya A6, Satelit Town Square, Surabaya, Jawa Timur  
 Telp. : (031) 7317975; 7325885 (Hunting) Fax. : (031) 7325030, 7326050  
 E-mail : abadimetaltama@gmail.com  
 Website : www.abadimetaltama.com


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 Website : www.abadimetaltama.com

**DAFTAR HARGA ELBOW PVC RUCIKA PER 31 MARET 2017**

DAFTAR HARGA ELBOW 90° ( AW )		
DIAMETER	ISI / BOX	HARGA
1/2"	225	Rp1,500
3/4"	145	Rp2,000
1"	80	Rp3,100
1 1/4"	40	Rp5,500
1 1/2"	25	Rp7,700
2"	18	Rp11,800
2 1/2"	28	Rp18,600
3"	16	Rp31,200
4"	9	Rp58,000
5"	5	Rp87,700
6"	5	Rp146,700
8"	2	Rp332,400
10"	1	Rp444,200

DAFTAR HARGA ELBOW 45° ( AW )		
DIAMETER	ISI / BOX	HARGA
2"	44	Rp13,400
4"	18	Rp56,500
6"	4	Rp161,700

DAFTAR HARGA ELBOW 45° ( D )		
DIAMETER	ISI / BOX	HARGA
1 1/4"	100	Rp2,000
1 1/2"	75	Rp2,400
2"	100	Rp5,000
2 1/2"	60	Rp6,600
3"	35	Rp11,000
4"	15	Rp18,900
5"	15	Rp36,000
6"	10	Rp70,000
8"	4	Rp154,500
10"	2	Rp215,100
12"	1	Rp338,200

DAFTAR HARGA ELBOW 90° ( D )		
DIAMETER	ISI / BOX	HARGA
1 1/4"	90	Rp2,100
1 1/2"	60	Rp2,800
2"	100	Rp4,700
2 1/2"	45	Rp7,700
3"	30	Rp11,200
4"	15	Rp22,700
5"	15	Rp55,800
6"	10	Rp66,500
8"	3	Rp146,600
10"	2	Rp292,000
12"	1	Rp441,500

DAFTAR HARGA FAUCET ELBOW ( AW )		
DIAMETER	ISI / BOX	HARGA
1/2"	200	Rp1,500
1/2" X 3/4"	175	Rp1,800
3/4"	130	Rp2,400
1"	85	Rp3,600

Daftar harga FAUCET ELBOW with metal insert ( AW )		
DIAMETER	ISI / BOX	HARGA
1/2"	200	Rp7,200
3/4"	120	Rp12,200
½" x ¾"	180	10,500

DAFTAR HARGA LARGE RADIUS ELBOW ( D )		
DIAMETER	ISI / BOX	HARGA
1 1/4"	60	Rp3,600
2"	20	Rp7,900
3"	18	Rp17,900
4"	8	Rp37,300
5"	5	Rp67,500
6"	6	Rp112,700

**KETERANGAN :**

HARGA SUDAH TERMASUK PPN  
 HARGA TIDAK MENGIKAT  
 HARGA NEGOTIASI, TERGANTUNG JUMLAH PENGAMBILAN

**DAFTAR HARGA TEE PVC RUCIKA PER 31 MARET 2017**

DAFTAR HARGA TEE ( D )		
DIAMETER	ISI / BOX	HARGA
1 1/4"	55	2,900
1 1/2"	40	4,200
2"	65	6,400
2 1/2"	32	11,600
3" X 1 1/2"	36	11,600
3" X 2"	30	13,200
3" X 2 1/2"	22	14,800
3"	20	17,300
4" X 2"	15	22,100
4" X 3"	12	26,100
4"	8	30,000
5" X 4"	6	53,100
5"	10	50,800
6" X 4"	8	71,800
6"	6	91,700
8" X 4"	4	97,400
8"	2	190,400

DAFTAR HARGA TEE ( AW )		
DIAMETER	ISI / BOX	HARGA
1/2"	150	2,050
3/4" X 1/2"	100	2,800
3/4"	100	2,800
1" X 1/2"	65	4,200
1" X 3/4"	65	4,400
1"	60	4,600
1 1/4" X 1/2"	45	6,300
1 1/4" X 3/4"	45	6,600
1 1/4" X 1"	35	7,500
1 1/4"	30	7,800
1 1/2" X 1/2"	25	8,700
1 1/2" X 3/4"	24	8,700
1 1/2" X 1"	24	9,200
1 1/2" X 1 1/4"	20	10,400
1 1/2"	20	10,400
2" X 1/2"	17	10,500
2" X 3/4"	15	10,600
2" X 1"	15	11,000
2" X 1 1/4"	40	15,100
2" X 1 1/2"	12	15,200
2"	30	16,600
2 1/2"	16	25,500
3" X 2"	20	29,600
3"	12	38,600
4"	5	77,200
6"	3	194,300
8"	2	403,000

DAFTAR HARGA LARGE RADIUS TEE ( AW )		
DIAMETER	ISI / BOX	HARGA
4" X 2"	15	74,200
4"	7	125,300
6" X 4"	5	238,200

DAFTAR HARGA LARGE RADIUS TEE ( D )		
DIAMETER	ISI / BOX	HARGA
1 1/2" X 1 1/4"	35	5,300
1 1/2"	30	5,400
2" X 1 1/2"	18	7,900
2"	15	10,900
2 1/2" X 1 1/2"	10	11,000
2 1/2" X 2"	30	13,500
2 1/2"	18	17,000
3" X 2"	20	17,800
3" X 2 1/2"	16	23,400
3"	15	23,000
4" X 2"	14	27,500
4" X 3"	8	37,700
4"	6	43,200
5" X 4"	4	74,600
6" X 4"	5	95,000
6"	4	140,200

DAFTAR HARGA LARGE RADIUS DOUBLE TEE ( D )		
DIAMETER	ISI / BOX	HARGA
2" X 2"	10	13,600
3" X 2"	15	20,200
4" X 4"	8	70,000

Daftar harga FAUCET TEE with metal insert ( AW )		
DIAMETER	ISI / BOX	HARGA
1/2"	140	11,200
½" x ¾"	110	11,800
¾"	85	20,500

DAFTAR HARGA FAUCET TEE ( AW )		
DIAMETER	ISI / BOX	HARGA
1/2"	140	2,700
3/4" X 1/2"	100	2,800
3/4"	85	3,000

**KETERANGAN :**

- HARGA SUDAH TERMASUK PPN  
 - HARGA TIDAK MENGIKAT DAPAT BERUBAH SEWAKTU WAKTU  
 - HARGA NEGOTIASI, TERGANTUNG JUMLAH PENGAMBILAN

**Lampiran 11 Gambar Teknis Perencanaan Pengembangan Jaringan Pipa  
Distribusi PDAM Tirta Kandilo Tahun 2032**

Peta Jaringan Skenario 1 & 2 (Autocad)

Detail Junction (Autocad)

Galian (Autocad)

Reservoar (Autocad)