(4) Alternative T-2

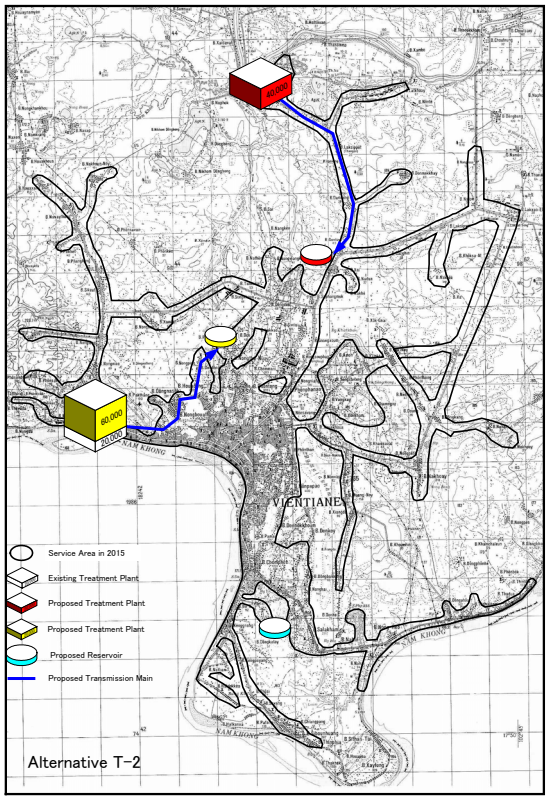
1) Intake and Treatment Plant

1st Stage (Construction of the new Thangone Water Treatment Plant, see Figure 7)

- Intake Facilities: Construction of new intake facilities in the Nam Ngum River
- Treatment Plant: Capacity of 40,000 m3/day

2nd Stage (Expansion of Kaolieo Water Treatment Plant, see Figure 6)

- Intake Facilities: Construction of new intake facilities in the Mekong River
- Treatment Plant: Expansion of 60,000 m3/day



A new treatment plant with a capacity of 40,000 m3/day at Thangone for the 1st Stage and capacity expansion of 60,000 m3/day at the existing Kaolieo Treatment Plant for the 2nd Stage are considered for this alternative, T-2. Process treatment is planned to be the same as at the existing Chinaimo Treatment Plant. Both the construction of the new Thangone Treatment Plant for the 1st Stage and expansion of the existing Kaolieo Treatment Plant for the 2nd Stage, will require additional intake structures to be constructed. Figure 25 and Figure 26 show a plan of the treatment facilities and a flow diagram for the construction of 40,000 m3/day at the Thangone Treatment Plant for the 1st Stage. The plan of the treatment facilities and the flow diagram for the expansion of 60,000 m3/day at Kaolieo Treatment Plant for the 2nd Stage are the same as alternative C-2, as is shown in Figure 17 and Figure 18 respectively. Detailed specifications of the treatment facilities for alternative T-2 are attached to Annex 14.

2) Pipelines

1st Stage

- Clear Water Transmission Pipelines: Installation of 10.6 km of pipelines
- Distribution Trunk Mains: Installation of 22.7 km of pipelines
- Distribution Centre: Construction of a new distribution centre with a capacity of 40,000 m3/day

2nd Stage

- Clear Water Transmission: Installation of 9.9 km of pipelines

- Distribution Centre: Construction of a new distribution centre with a capacity of 60,000 m3/day
- Booster Pumping Stations: Improvement of the Km12 BP station
- Distribution Trunk Mains: Installation of 71.9 km of pipelines

For this alternative, improvement of the Km6 BP station in the 1st Stage will not be required because the water supply to the northern area of the city can be covered from the new distribution centre which will be located near the junction of National Road No. 10 and 13. Improvement of the Km12 BP station in the 2nd Stage will be necessary mainly for water supply to the new industrial area in the eastern part of the city.

For the 2nd Stage, clear water is transmitted from the Kaolieo Treatment Plant to a distribution centre and then distributed to consumers. The distribution centre is proposed to be constructed in the Phonetong area in the northern part of the downtown central Vientiane.

Figure 27 shows the clear water transmission pipelines and the distribution trunk mains required in alternative T-2. These required pipelines are obtained from a hydraulic network analysis prepared for this alternative. The required pipeline lengths by pipeline diameters by stages are summarized in Figure 24.

Figure 24 Required Pipelines by Diameters for Alternative T-2

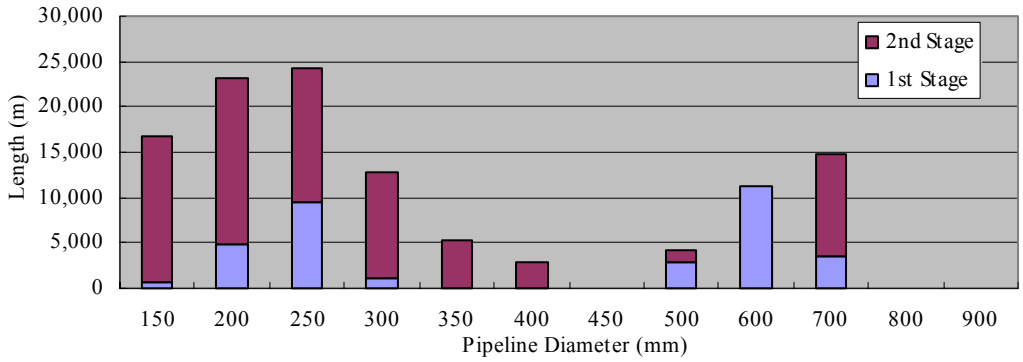


Figure 25 Plan of Treatment Facilities for Proposed Thangone Treatment Plant, 40,000 m3/day

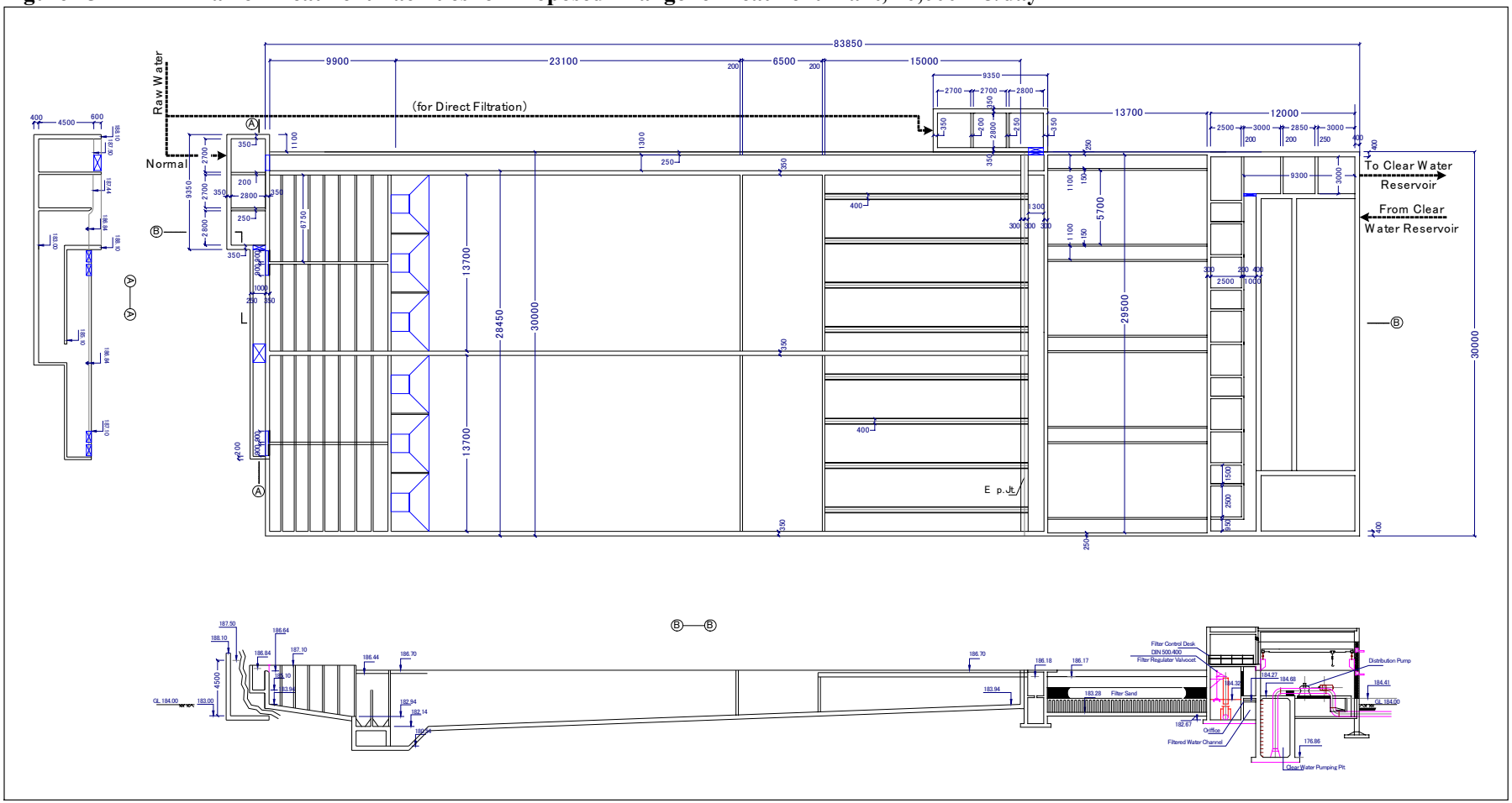


Figure 26 **Flow Diagram for Proposed Thangone Treatment Plant, 40,000 m3/day**

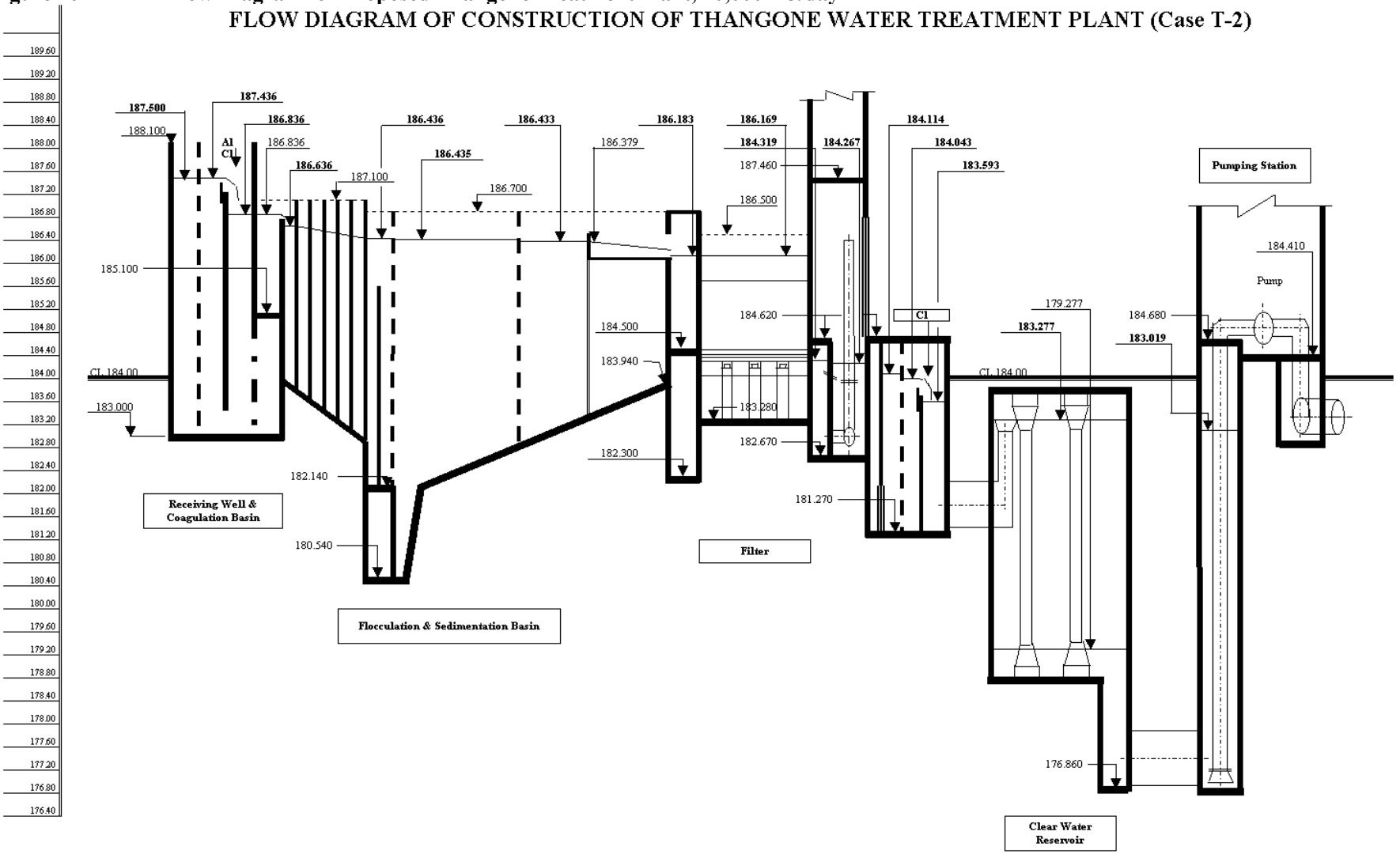
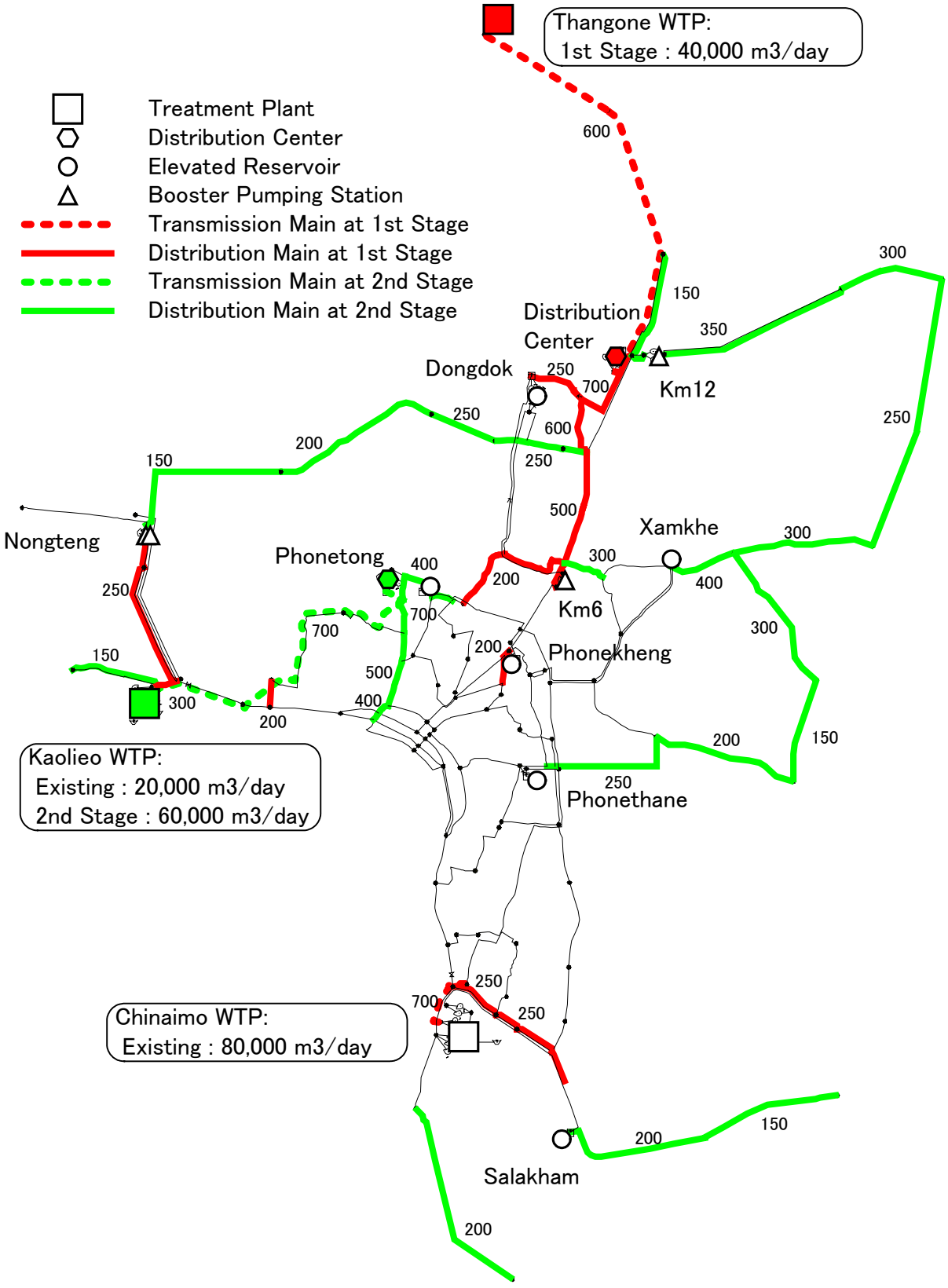


Figure 27 **Clear Water Transmission and Distribution Trunk Mains Required for Alternative T-2**



3) Costs (Construction, O/M)

Based on the results of facility planning for alternative T-2, preliminary cost estimates have been conducted for the alternative comparison. The results of the cost estimates are as shown in Table 7 in US Dollars.

Table 7 Preliminary Cost Estimates for Alternative T-2

(x 1,000 US$)

Alternative T-2	Total	Foreign	Local
1. Construction Cost	59,882	41,493	18,389
1.1 Treatment Plants	22,979	14,875	8,104
Expansion of Kaolieo T.P.	13,427	8,693	4,734
Construction of Thangone T.P.	9,552	6,182	3,370
1.2 Clear Water Transmission Pipelines	13,494	11,003	2,491
For the 1st Stage	6,456	5,203	1,253
For the 2nd Stage	7,038	5,800	1,238
1.3 Distribution Center	7,882	5,348	2,534
For the 1st Stage	3,506	2,364	1,142
For the 2nd Stage	4,376	2,984	1,392
1.4 Booster Pump Station	366	294	72
For the 1st Stage	-	-	-
For the 2nd Stage	366	294	72
1.5 Distribution Trunk Mains	15,161	9,973	5,188
For the 1st Stage	5,228	3,694	1,534
For the 2nd Stage	9,933	6,279	3,654
2. Operation and Maintenance Cost	6,852	907	5,945
2.1 Electricity	5,713	-	5,713
Expanded Kaolieo T.P.	846	-	846
Thangone T.P.	1,780	-	1,780
Distribution Center	2,398	-	2,398
Booster Pump Station	689	-	689
5.2 Chemical Cost	907	907	-
Expanded Kaolieo T.P.	402	402	-
Alum	384	384	-
Polymer	10	10	-
Chlorine	8	8	-
Thangone T.P.	505	505	-
Alum	248	248	-
Chlorine	257	257	-
2.3 Salary	232	-	232
Treatment Plant	232	-	232
Expanded Kaolieo T.P.	16	-	16
Thangone T.P.	216	-	216
Total Costs	66,734	42,400	24,334