CHAPTER 5 FEASIBILITY STUDY ON PRIORITY PROJECT

5.1 Definition of Priority Project for Feasibility Study

5.1.1 Priority Project for the Feasibility Study

Siem Reap Town has small public water supply system, New French System, which recently started its operation at the end of July 1999. Capacity of the system is 1,440 m^3/day and this is far smaller than the estimated potential water demand. Water supply system is indispensable for the human hygienic life and basic infrastructure for various kinds of activities, especially for the development of tourism industry. Siem Reap Town needs urgent improvement of the water supply system.

Under such circumstance, Stage 1 project is identified as the priority project for urgent implementation in the Master Plan and Stage 1 project is thus to address the development and improvement of water supply condition for the town.

5.1.2 Target Year and Water Demand of the Priority Project : Stage 1

Target year of Stage 1 will be year 2006 as described in Section 4.5. Population and water demand in the target year 2006 is as shown on Table 5.1.1.

Table 5.1.1 Population and Water Demand in Year 2006 : Stage 1

Description	Figures in Year 2006
Population in Service Area	39,244
Service Ratio	65%
Served Population	25,508
Domestic Water Demand (Daily Average)	3,061 m^3/day
Tourism Water Demand (Daily Average)	2,060 m^3/day
Special Water Demand (Daily Average)	156 m^3/day
Total Water Demand (Daily Average)	5,277 m^3/day
Total Water Demand (Daily Maximum)	8,352 m^3/day
Number of Domestic Connection	4,475
Total Number of Connection	4,797

Relation of the system capacity of Stage 1 and future water demand is show on Figure 5.1.1.

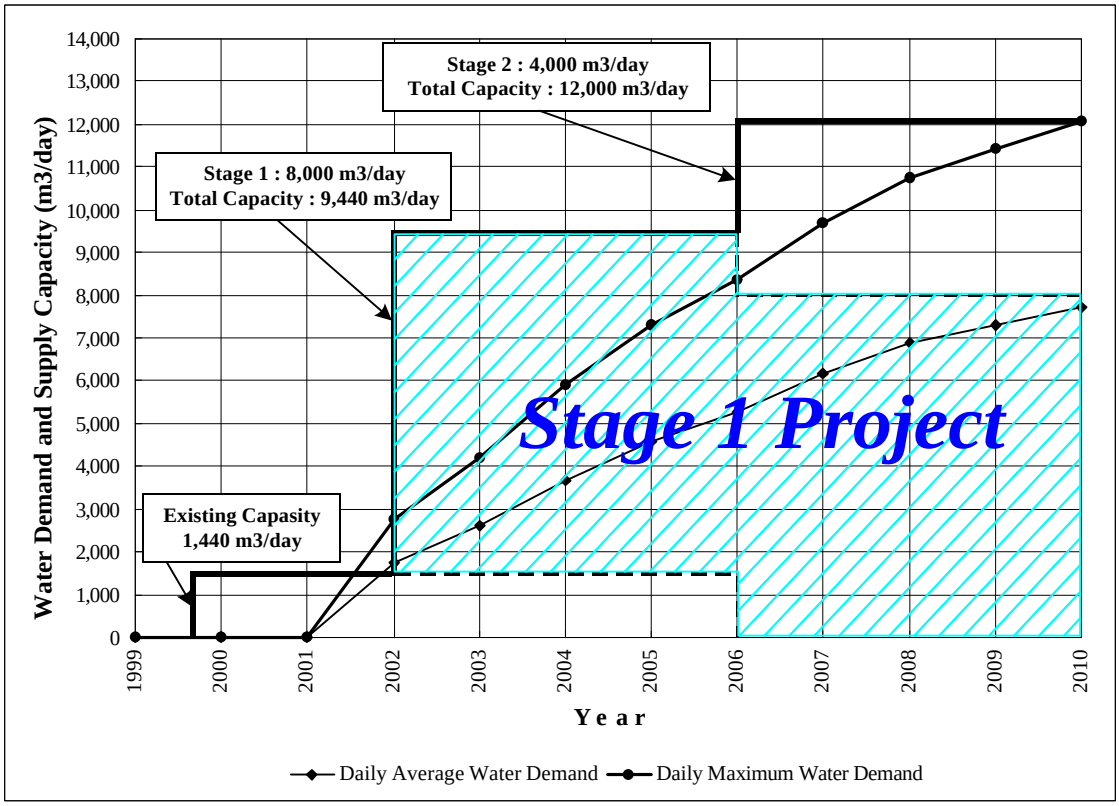


Figure 5.1.1 Stage 1 Project

5.1.3 Scope of Priority Project, Stage 1, for Feasibility Study

Scope of the priority project, Stage 1, for the Feasibility Study are as shown below.

Stage 1 System Capacity : 8,000 m^3/day

- Construction of 10 wells
  Along the National Road No. 6. Distance of wells is @400 m
  Capacity : 800 m^3/day/well
- Installation of well connecting pipes
  Diameter is 150 to 250 m. Pipe material is DIP.
  Total Length is 4,360 m
- Construction of receiving well
  Detention time is 5 minutes. Capacity is 42 m^3. RC made
- Construction of clear water reservoir
  Detention time is about 8 hours. 2 basins of
  W15 m x L25 m x D3.5 m

- Installation of disinfection facilities
  Liquid gas solution chlorinator
- Construction of distribution pumping station
  5 operation and 2 stand-by : 7 pumps
- Installation of distribution pipelines
  Diameter range : 500 mm to 75 mm Total length is 17,025 m
  Pipe material is DIP for pipe larger than 200 mm,
  PVC or PE for smaller than 150 mm in diameter
- Installation of service mains
  Diameter is 50 to 75 mm Total length is 6,200 m
  Pipe material will be PVC or PE
- Rehabilitation of existing distribution pipeline
  Diameter range : 100 to 400 mm
  Total length is 6,310 m
- Installation of house connections
  Total number of connections is 4,797

5.2 Additional Topographic Survey

(1) Introduction

A topographic survey was carried out in the proposed distribution trunk main route, distribution center, and other related locations. This would contribute to preliminary designing of the water supply facilities. The work was completed by using local contractors.

(2) Description of Work Items

The location of the survey work is shown in Figure 5.2.1. The work consists of the following items.

1) Route Survey

The route survey was carried out to prepare longitudinal profile and cross sections. The route survey consisted of three lines named as A, B and C. The length of line A is 11.8 km along the National Road No. 6. The start of line A is a point 1.8 km northwest from the intersection of National Road No. 6 and road to West Baray. Line B is 1.8 km long along the road to West Baray. The starting point is 1.8 km from the intersection of National Road No. 6 and road to west Baray. Length of line C is 1.4 km in the direction of the Lake Tonle Sap from the crossroads in the city area (near Spean Thmor Bridge). The total length of route survey is 15 km. In all cases, a 40-m cross-section was taken at 200 m interval. Drawings are made at scale of 1/1,000 horizontal and 1/100 vertical for longitudinal profile and at scale of 1/100 horizontal and 1/20 vertical for cross section.

2) Topographic Mapping Survey

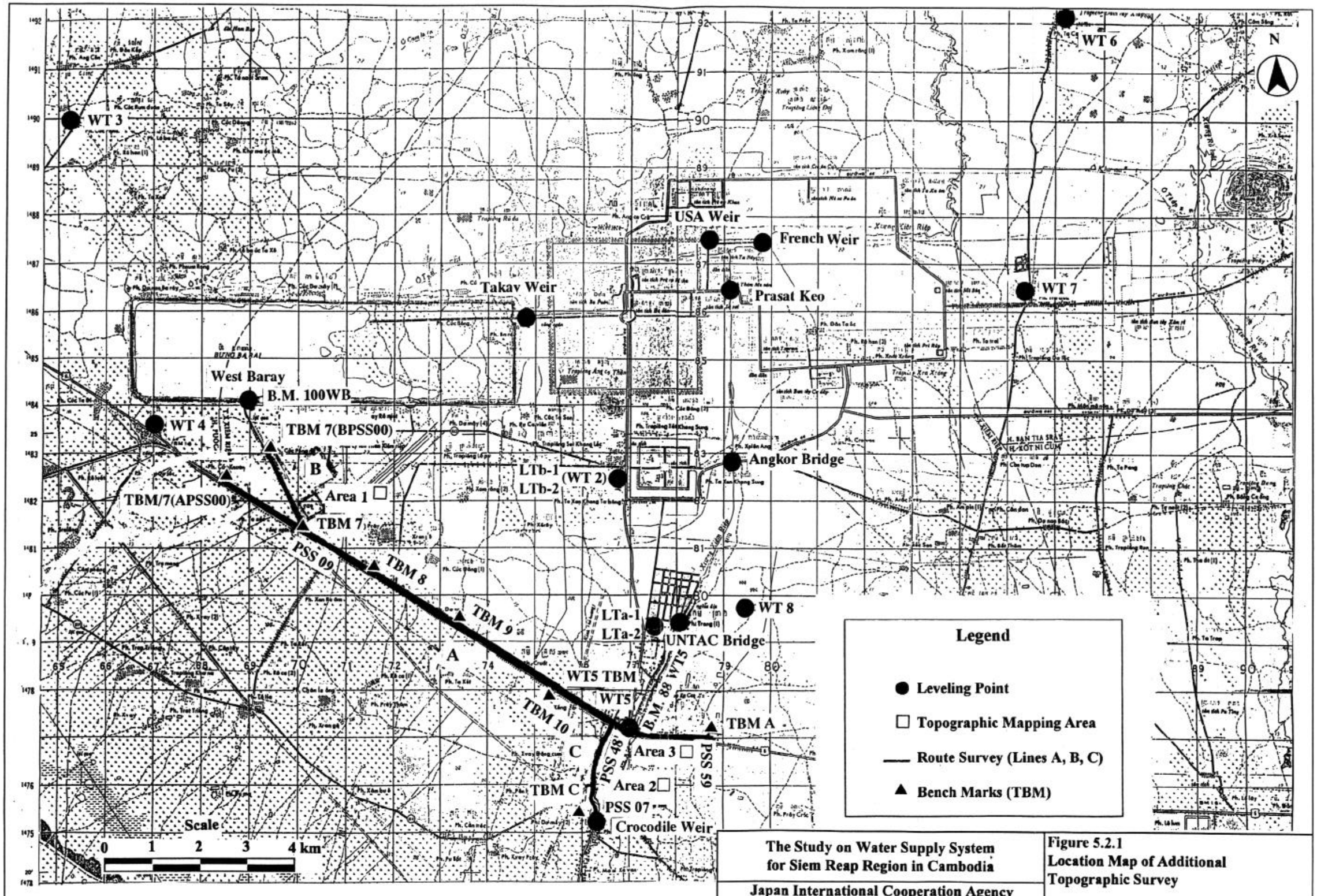
The topographic mapping survey was carried out in three places, namely, around proposed distribution center, Spean Thmor Bridge, and Spean Wat Damnak Bridge. The area covered by topographic survey is around 15,000 m^2. Drawings are made at a scale of 1:500.

3) Leveling Survey

The leveling survey was carried out for 20 points. The list is given in Table 5.2.1 along with respective elevation surveyed.

4) Establishing Benchmarks

Using the two existing benchmarks, 8 new benchmarks were established. The list is given in Table 5.2.2 along with elevation found.



The Study on Water Supply System for Siem Reap Region in Cambodia	Figure 5.2.1 Location Map of Additional Topographic Survey
Japan International Cooperation Agency	

Table 5.2.1 List of Point Leveling (20 points)

No.	Name	Elevation	Remarks
1	LT a	17.430 m	+ marking point
2	LT b (WT 2)	21.317 m	+ marking point
3	WT 3	16.445 m	Top of rivet
4	WT 4	13.656 m	Top of rivet
5	WT 5	15.836 m	Top of drilling pipe
6	WT 6	32.862 m	Top of rivet
7	WT 7	26.030 m	Top of rivet
8	WT 8	17.074 m	Top of rivet
9	WT 5 TBM	15.240 m	Leg of water tank (water supply office)
10	French Weir	26.407 m	Top of structure
11	French Weir	21.987 m	0.0 m of SG (left side of structure)
12	USA Weir	26.822 m	Top of structure
13	Takav Weir	21.801 m	Top of structure
14	Prasat Keo	14.857 m	0.0 m of SG (top of SG – 7 m)
15	Angkor Bridge	21.670 m	+ marking point (downstream of bridge)
16	UNTAC Bridge	11.238 m	0.0 m of SG (top of SG – 5 m)
17	West Baray	19.420 m	+ marking point -1
18	West Baray	26.558 m	+ marking point - 2
19	West Baray	16.476 m	+ marking point - 3
20	Crocodile Weir	15.255 m	Top of structure

Table 5.2.2 List of New Benchmarks

No.	Name	Elevation	Remarks
1	TBM 7 (APSS00)	13.776 M	Top of nail concrete (Line A)
2	TBM 7	14.895 M	Top of structure (Line A) Tuk Vel Bridge
3	TBM 8	15.026 M	Top of culvert (Line A)
4	TBM 9	15.440 M	Top of culvert (Line A)
5	TBM 10	15.210 M	Top of nail concrete (Line A)
6	TBM A	15.213 M	Top of footing electric pole (Line A)
7	TBM 7 (BPSS00)	15.457 M	Top of nail concrete (Line B) to Baray
8	TBM C	13.469 M	Top of footing electric pole (Line C)

(3) Equipment and Methodology

The main equipment used was total station and automatic level.

Work was carried out according to the following specifications:

- Difference of double running error for leveling should be less than 6 cm $s^{1/2}$ (s in km)
- Loop closer error should be less than 6 cm $s^{1/2}$ (s in km)
- Closure error between existing and new bench marks should be less than 6 cm + 6 cm $s^{1/2}$ (s in km)

(4) Outcome

The results of work item 3) and 4) are shown in Table 5.2.1 and Table 5.2.2. All drawings for work item 1) and 2) will be fully utilized for the preliminary design work.