

**CHAPTER 10**  
**ALTERNATIVE SEWERAGE SYSTEMS**  
**OPTIONS STUDIED**

## **CHAPTER 10 ALTERNATIVE SEWRAGE SYSTEMS OPTIONS STUDIED**

### **10.1 General**

The chapter presents several options on the appropriate sites for the STP, trunk sewers, and the priority project to be implemented as soon as possible. Through the comparison of each alternative, the best option will be selected as the most appropriate sewerage system for the Greater Tirana area.

The appropriate site selection for the STP is a key task for the preparation of an appropriate sewerage system and helps to ensure the system is technically, socially and environmentally sound. The following two alternatives for the system design were developed:

- Case A: Single STP System (with two primary treatment plants at 1)Kashar and 2)Kamza); and
- Case B: Multi STP System.

Criteria for the alternative sewerage plans include the following:

- 1) The plan should aim to begin sewage treatment as soon as possible so that the water quality in the Lana and Tirana Rivers improves. In particular, the plan should aim to treat about 80% of the sewage generated in Tirana municipality, as a priority, so that the system is cost effective.
- 2) The site must be suitable and there should be enough space for the STP to include required sewage and sludge treatment facilities. The site should allow the system to meet the requirements of low energy consumption, ease of operation, and low O&M costs.

### **10.2 Case A: Single STP System**

The previous JICA study (1998, JICA), the Strategic Plan (2001, World Bank) and the Master Plan –Technical and Financial Assistance to UKT (2002, Italian Cooperation), proposed one STP to be located in the north-west section of the planning area, about 15km from the urban center of Tirana municipality. A recent site visit indicated the following disadvantages with this “Original Case”:

- 1) The proposed STP site is located more than 15 km from the center of Tirana municipality. Most of the sewage is produced in Tirana municipality, therefore large and long trunk sewers would be necessary to convey the sewage.
- 2) The proposed routes for the trunk sewer to the STP are not practical because the existing roads are curved and narrow meaning installation of large scale trunk sewers would be difficult. Also, laying the trunk sewer along the rivers would make access for maintenance difficult.
- 3) The proposed STP site is no longer available because a road connecting the Tirana International Airport to the Highway is being constructed through the proposed site. A nearby site is smaller and would not provide for a lower cost sewage treatment process.

Case A in this current study is an improved version of the former plan. Case A includes modifications to solve the above disadvantages. To solve issues 1) and 2) above, two primary treatment plants ( Pri-Ts)

are proposed, one at Kashar commune and one at Kamza municipality, as shown in *Figure 10.2.1*.

The Kashar Pri-T would treat sewage collected from Tirana municipality and the eastern part of Kashar commune. The Kamza Pri-T treats sewage collected mainly from Kamza commune. Before the construction of the STP at Berxulle commune is completed, both Pri-Ts will be discharging primary treated effluent into the near-by river.

To solve issue 2) above, the trunk sewers are proposed to be aligned in a straight line by applying a tunnel shield method or a pipe jacking method. The method will be chosen depending on the depth at the points where the trunk sewers and the existing/new main sewers connect. It is expected that there would be 20 connection points. These connection points would be linked by trunk sewers to convey the collected sewage to the proposed STP. Branch sewers from houses/buildings would collect and discharge sewage to these points directly or through main sewers.

*Table 10.2.1* shows a plan to develop the sewerage system for Case A.

**Table 10.2.1 Development Plan for Major Sewerage Facilities for Case A**

Feature	Implementation Stage		
	1st Stage	2nd Stage	3rd Stage
One STP with separated Pri-T facilities	Blue Area (Figure 10.2.1) Trunk sewer No.1,2,3,4,5,6,7, and 9	Yellow Area (Figure 10.2.1) Trunk sewer No. 8,10,14,15,16, and 17	Pink Area (Figure 10.2.1) Trunk sewer No. 11,12,13, and 18
	Kashar Pri-T	Kamza Pri-T	Full Treatment Facility in Berxulle STP

Note: Trunk Sewers No. 11,12,and 13 are connecting sewers from Kashar Pri-T to Berxulle STP which are required in Case A.

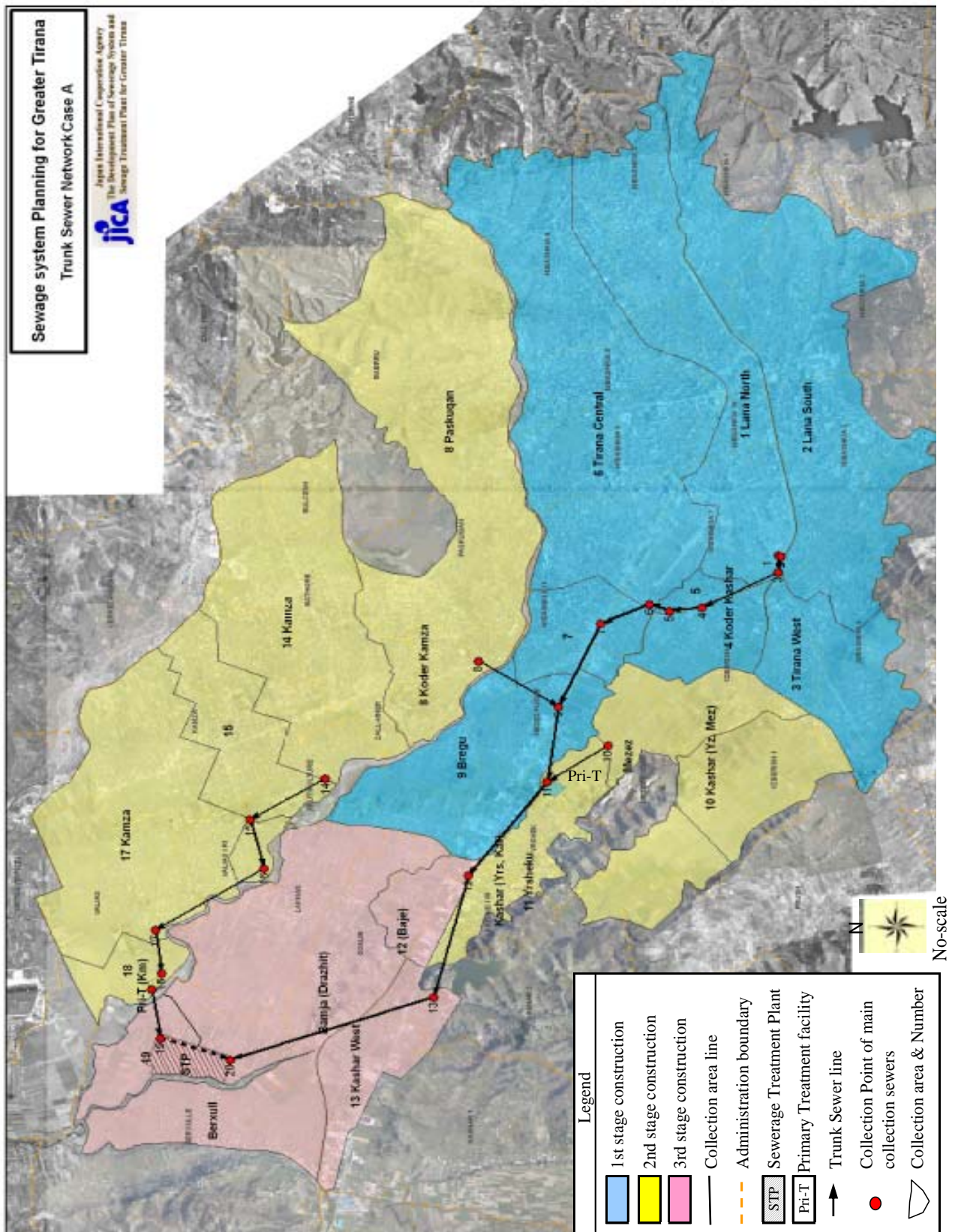


Figure 10.2.1 Case A: Single STP System

### 10.3 Case B: Multi STP System

The problem with Case A is that it would be a long time before secondary treatment is implemented. Case B addresses this by proposing a multi STP system. In this case additional STPs would be located in Kashar commune and Tirana municipality. This plan requires two or three STPs but the length of trunk sewers would be shorter than for Case A. The Pri-Ts proposed in Case A would be a pumping station in Case B.

#### 10.3.1 Sub-Alternatives

Four sub-alternatives have been prepared for Case B. These sub-alternatives are based on sufficient land area being available for construction of the STPs. This was done by carefully checking the orthophotos that cover the planning area and through field reconnaissance. *Figures 10.3.1 to Figure 10.3.4* show the locations of the STPs, PSs and Trunk Sewers for Cases B-1, B-2, B-3, and B-4, respectively. *Table 10.3.1* summarizes the main features of each sub-alternative and outlines the planned sewerage components for each implementation stage.

**Table 10.3.1 Development Plan for Major Sewerage Components for each Sub-Alternative**

Case	Main Features	Sewerage Components Development in the Implementation Stage		
		1st Stage	2nd Stage	3rd Stage
B-1	Two STPs in Kashare (Mezezi Eger) and Berxulle, one PS in Kamza	Trunk Sewer: No.1,2,3,4,5,6,7,9,10	Trunk Sewer: No.8	Trunk Sewer: No.14,15,16,17,18
		Primary Treatment Facility in Kashar STP(Mezezi Eger)	Secondary Treatment Facility in Kashar STP(Mezezi Eger)	PS in Kamza Full Treatment Facility in Berxulle STP
B-2	Two STPs in Kashare (Mezezi Kosova) and Berxulle, one PS in Kamza	Trunk Sewer: Same as Case B-1	Trunk Sewer: Same as Case B-1	Trunk Sewer: Same as Case B-1
		Primary Treatment Facility in Kashare (Mezezi Kosova) STP	Secondary Treatment Facility: in Kashare (Mezezi Kosova) STP	PS: same as Case B-1 STP: same as Case B-1
B-3	Two STPs in Kashare (Mezezi stalla) and Berxulle, two PSs in Kashare (Mezezi Kosova) and Kamza	Trunk Sewer: Same as Case B-1	Trunk Sewer: Same as Case B-1	Trunk Sewer: Same as Case B-1
		PS in Kashar Pressure pipeline No.10b Primary Treatment Facility in Kashare STP	Secondary Treatment Facility in Kashare STP	PS: same as Case B-1 STP: same as Case B-1
B-4	Three STPs in Tirana (Pri-T at the former airport, STP behind Tirana Railway Station), Kashare (Mezezi Kosova) and Berxulle, One PS in Kamza	Trunk Sewer: No.1,2,3,4,5,6,7,9,10a,12b	Trunk Sewer: Same as Case B-1	Trunk Sewer: Same as Case B-1
		Primary Treatment Facility in Tirana STP and Kashare (Mezezi Kosova) STP	In Tirana STP and in Kashare (Mezezi Kosova)	PS: same as Case B-1 STP: same as Case B-1



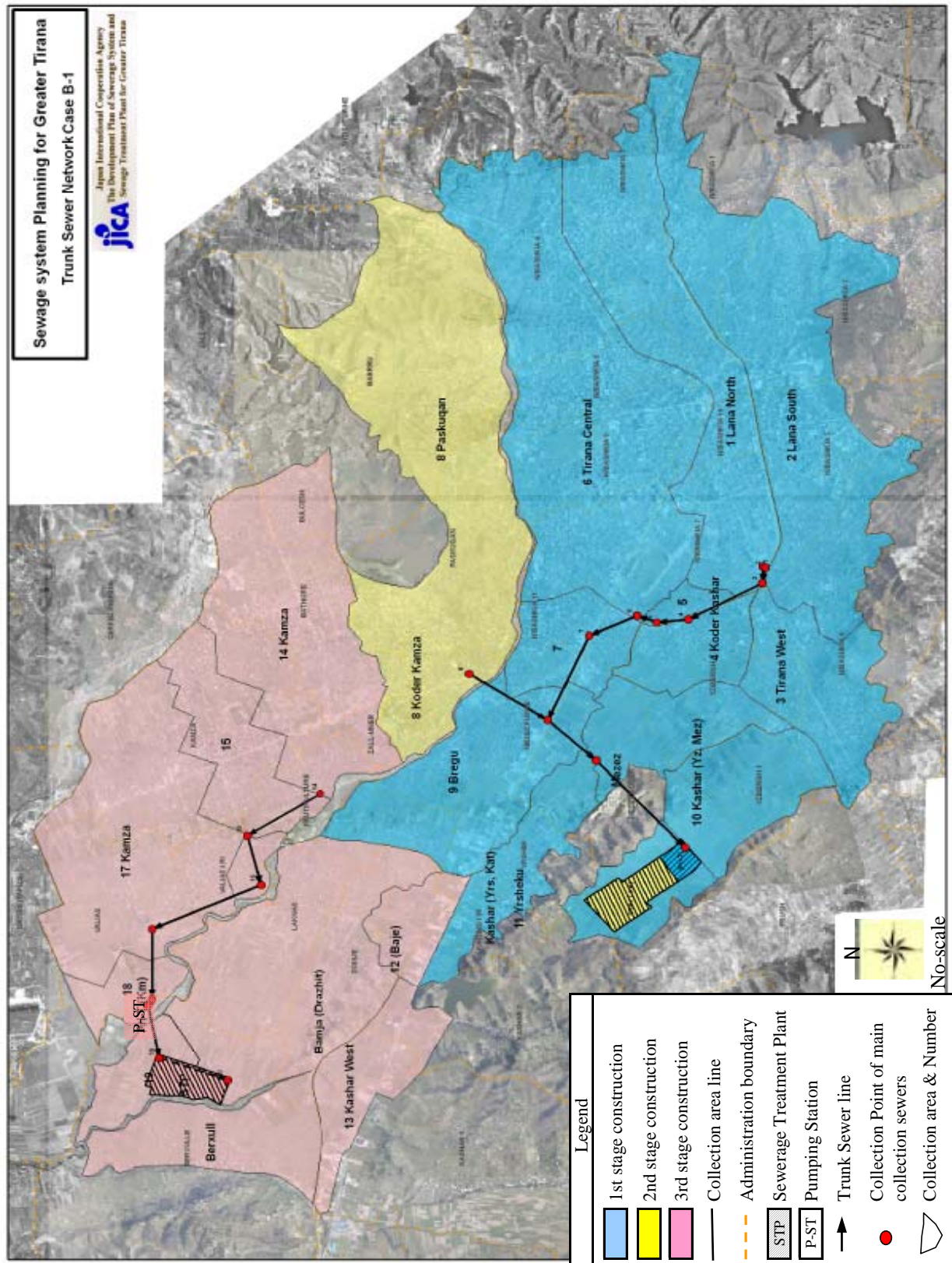


Figure10.3.1 Case B: Multi STP System, Sub-Alternative B-1



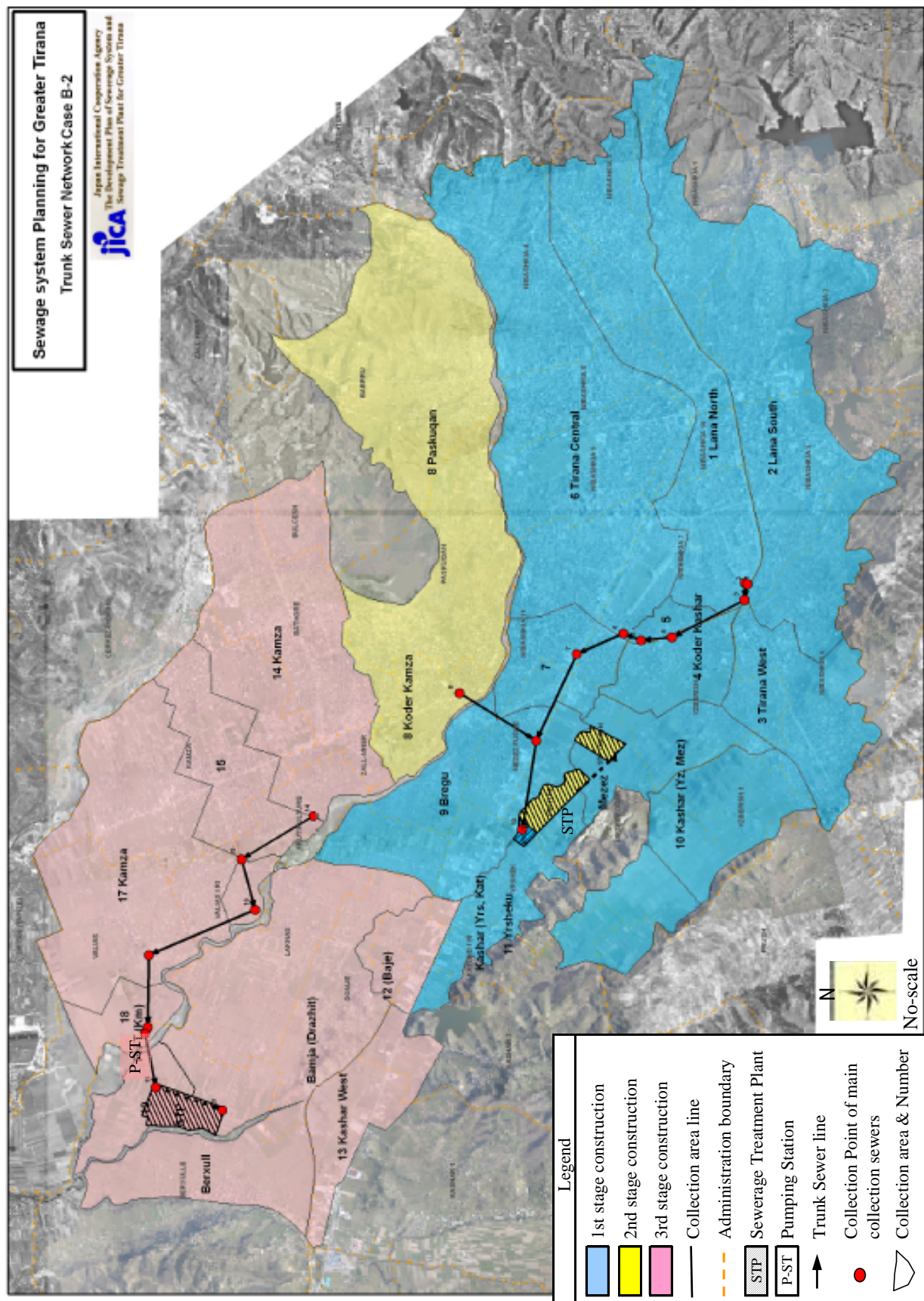


Figure 10.3.2 Case B: Multi STP System, Sub-Alternative B-2



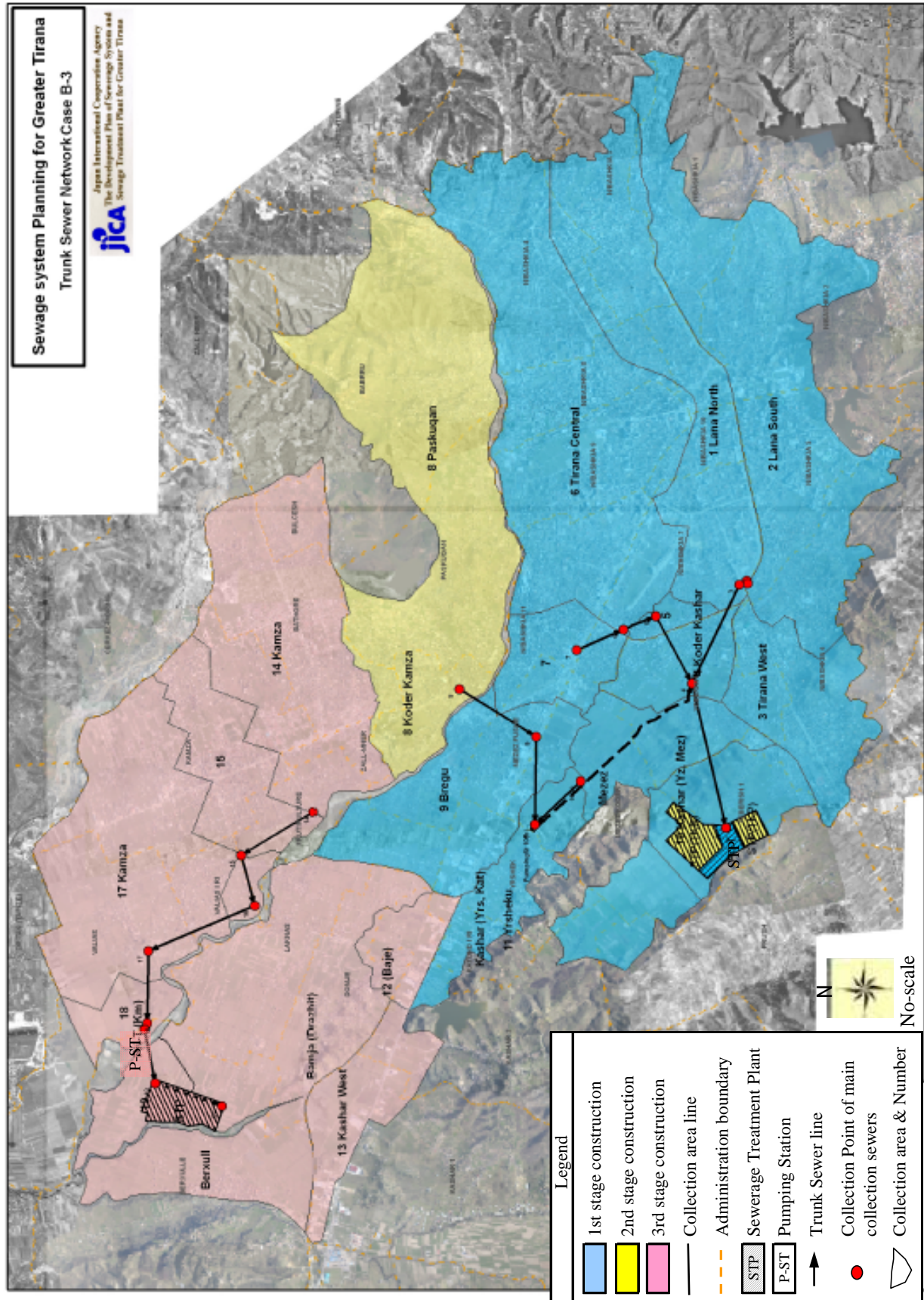


Figure 10.3.3 Case B: Multi STP System, Sub-Alternative B-3



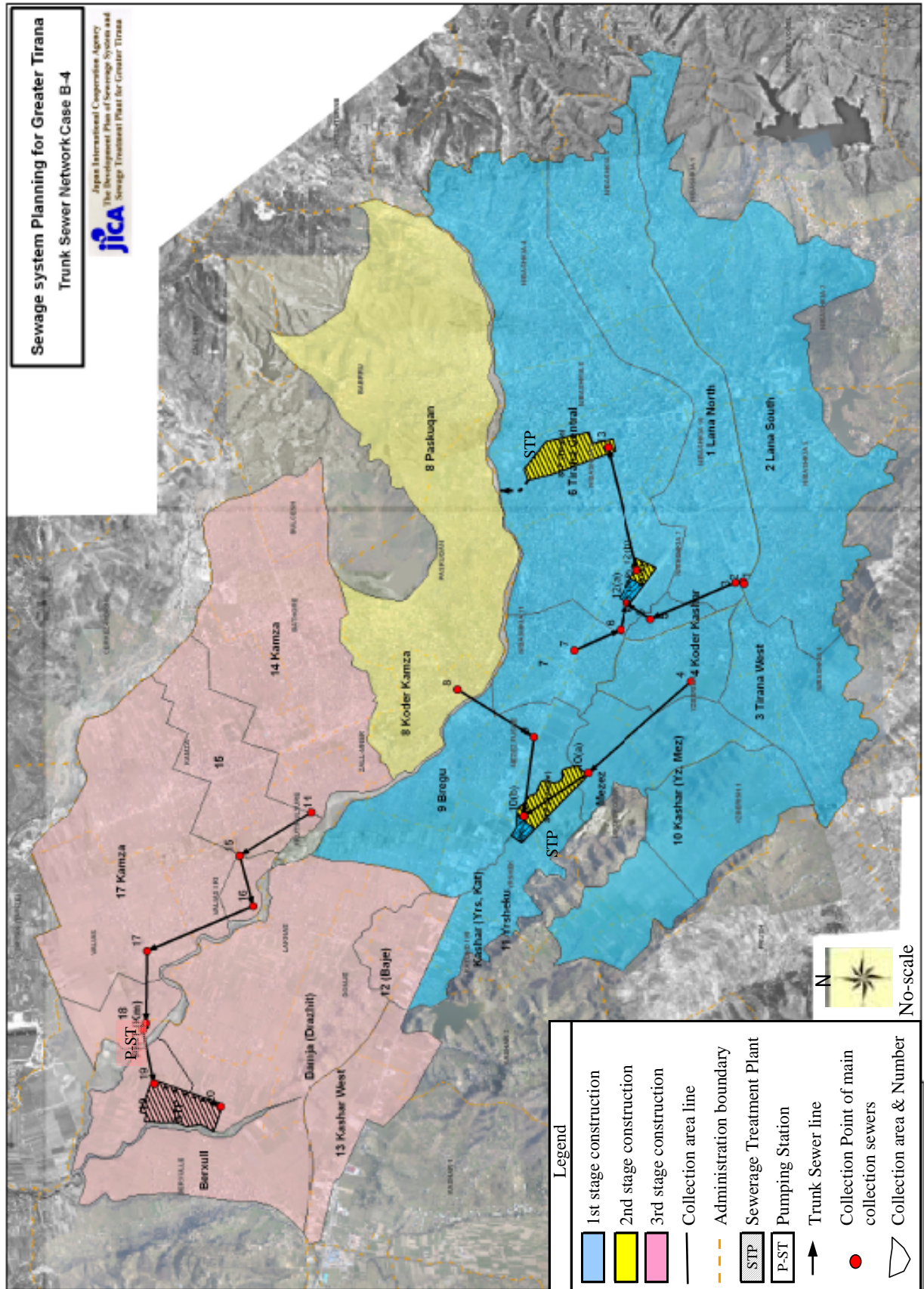


Figure 10.3.4 Case B: Multi STP System, Sub-Alternative B-4

*Table 10.3.2* summarizes the main features of the STP sites for each sub-alternative. The STP site for Case B-1 is located in Kashar commune, which is an agricultural area with a beautiful landscape and is surrounded by hills. The ground level is the highest of the candidate sites. There is an opinion that the area should be used for recreational purposes by people living in the urban center.

The STP site for Case B-2 is located in Kashar commune. This is the lowest point in Tirana municipality. Therefore, this sub-alternative has the advantage of being able to convey the sewage by gravity. The site is located near the industrial area and there is not enough space to construct the full sewage and sludge treatment facilities in the one spot. Therefore, the sludge and sewage treatment facilities need to be constructed in separate locations, which cause O&M problems.

The STP site for Case B-3 is located in Kashar commune near the former industrial complex. The area is now used for agriculture including an old abandoned poultry farm. For Case B-4, two separate STP sites in Tirana municipality are proposed.

**Table 10.3.2 Main Features of the Alternative STP Sites**

Case		Berxulle STP	Kashar (Mezezi Eger) STP	Kashar (Mezezi Kosova) STP	Kashar (Mezezi Stalla) STP	Tirana STP	Tirana Pri-T
B-1	Area	40 ha	60 ha				
	Features	Locates in the agricultural area. Lowest ground level among the STP sites.	Locates in agriculture area. Highest ground level among STP sites. Beautiful landscape but nearest location to the urban area can be usable for recreational purposes.				
B-2	Area	Same as Case B-1		30 ha for sewage treatment and 10 ha for sludge treatment.			
	Features	Same as Case B-1		Two separate locations. Locates near the new industrial zone. The ground level is the lowest near Tirana Municipality.			
B-3	Area	Same as Case B-1			50 ha		
	Features	Same as Case B-1			Locates near the former industrial complex.		
B-4	Area	Same as Case B-1		20 ha		10 ha for sewage treatment and 10 ha for sludge treatment	30 ha
	Features	Same as Case B-1		Locates near the industrial zone. 2 <sup>nd</sup> Lowest ground level among the STP sites.		Locates in the former airport in Tirana Municipality	Locates behind Tirana Railway Station. Higher ground level.