

5.1.6 Preliminary Design in Khanh Hoa Province

(1) Outline

The basic design outline of water supply systems is summarized in Table 5.1.23.

Table 5.1.23 Outline of the System in Khanh Hoa Province

System	(1) Daily average (m ³ /d)	(2) Daily Max. (m ³ /d)	(3) Intake water flow (m ³ /d)	(4) Hourly max. (m ³ /hr.)
FKS-6	485	600	600	50
FKS-8	526	600	650	50

(2) Water Supply Process

The contents of the process are categorized based on water source and topographical conditions as follows;

Table 5.1.24 Water Source and Facility

Water source	Facility	
	Without treatment plant	With treatment plant
Groundwater	FKS-8*	FKS-6
Surface water	-	FKS-8*

Note: * Water source of system FKS-8 combines groundwater with surface water.

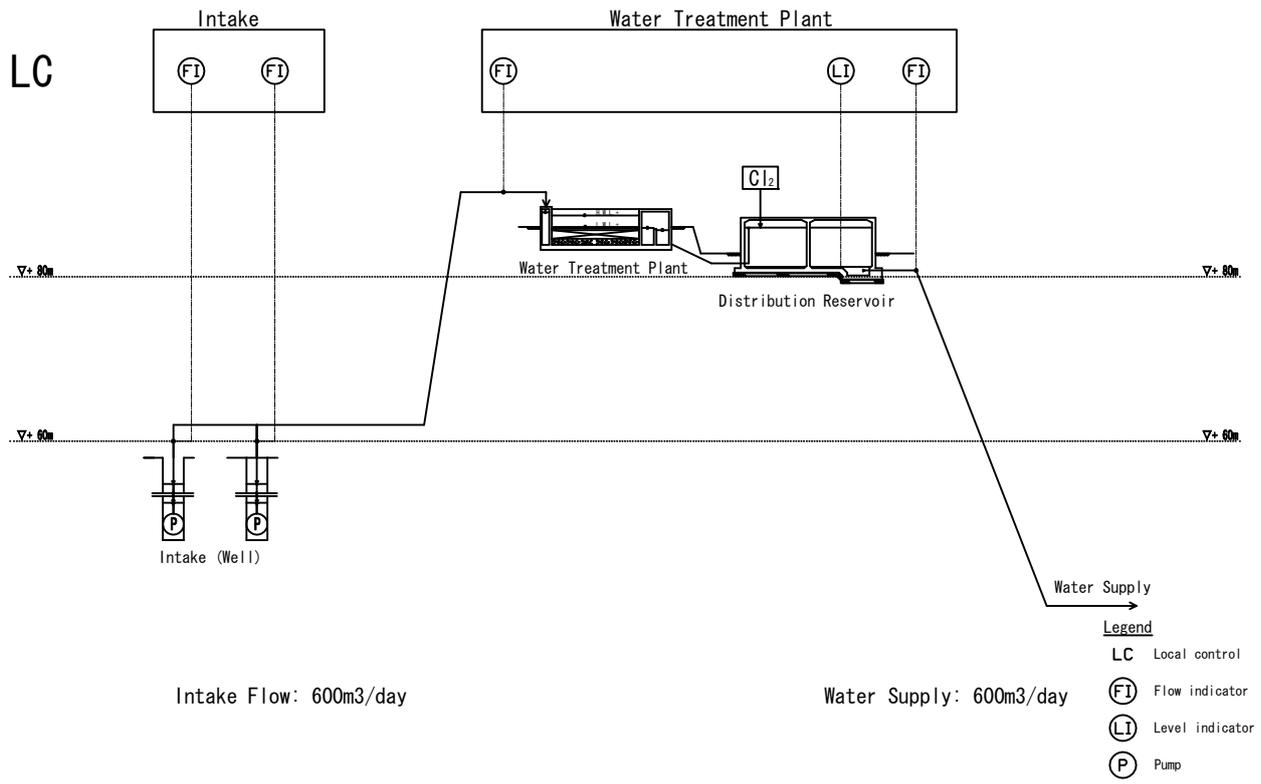
Table 5.1.25 Topographical Condition and Facility

system	Figure. No.	Facility		
		Intake	Transmission pump	Distribution pump
FKS-6	Figure 5.1.15	Well pump	Non (from well pump)	Non (gravity flow)
FKS-8	Figure 5.1.15	Well pump Intake pump	Non (from well pump and intake pump)	Distribution pump

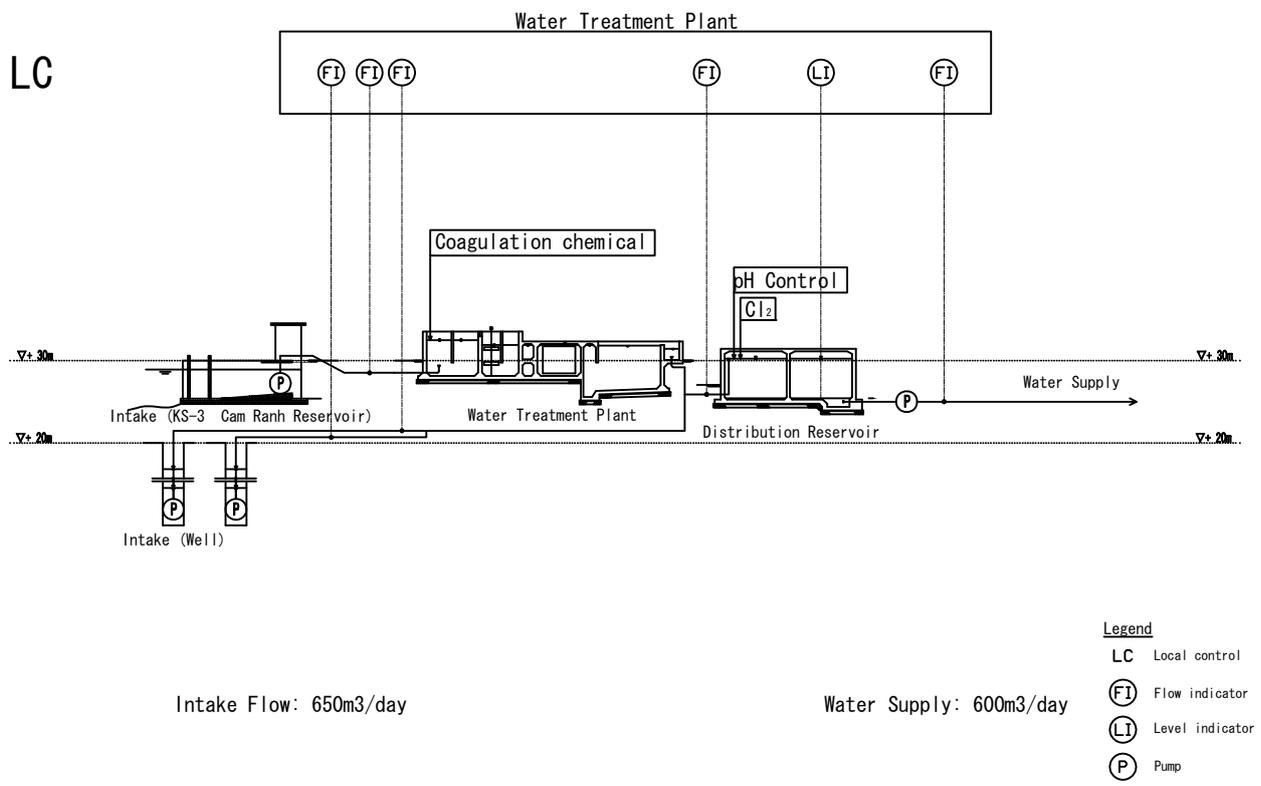
(3) System Layout Plan

Based on the result of meeting with P-CERWASS and CPC, the location and alignment of facilities such as intake, transmission pipe, treatment plant, reservoir tank and distribution network pipe is arranged. The detailed layout plan is shown in Figure 5.1.16 and Figure 5.1.17.

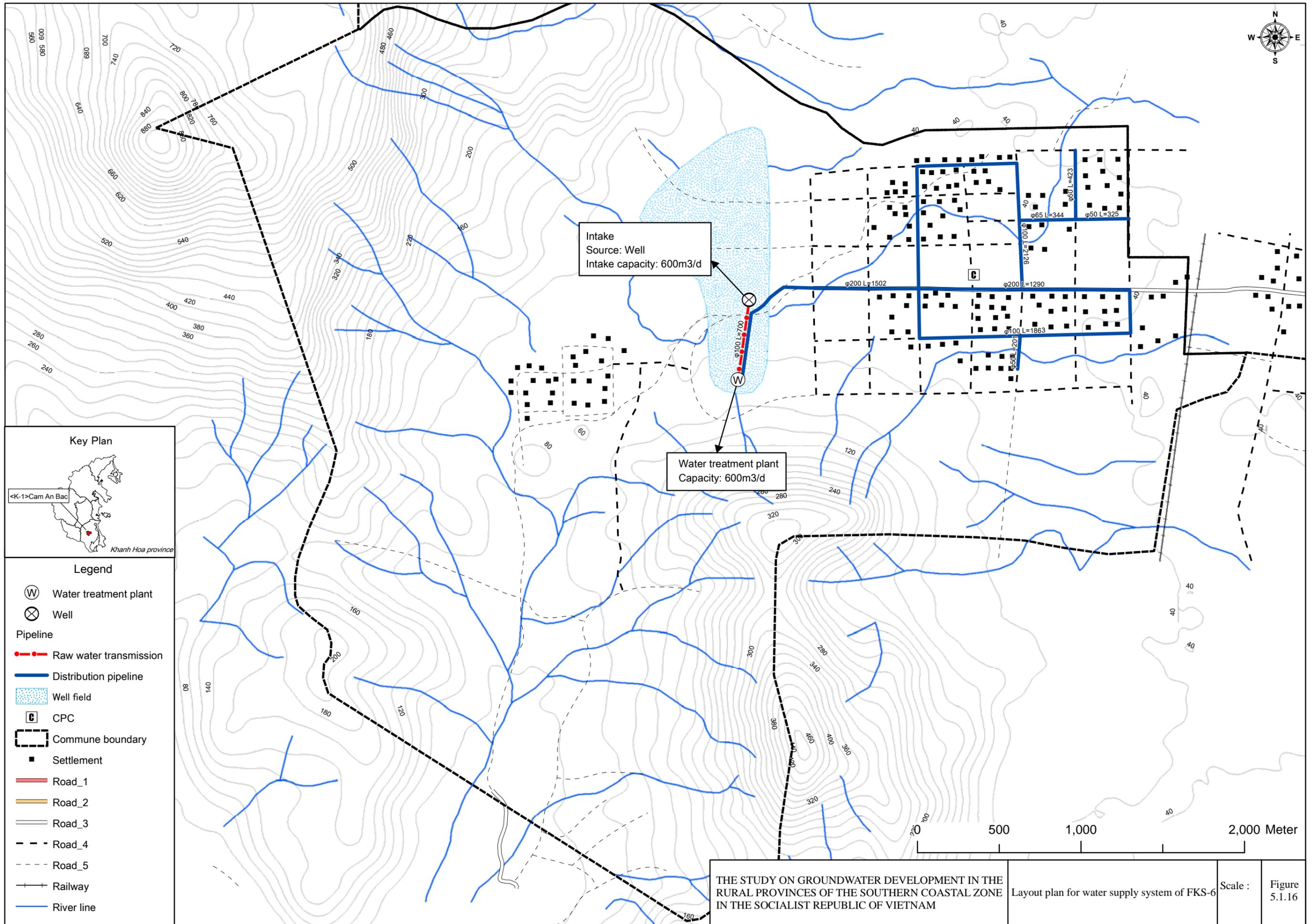
FKS-6 (K-1)



FKS-8 (K-3)



Preliminary

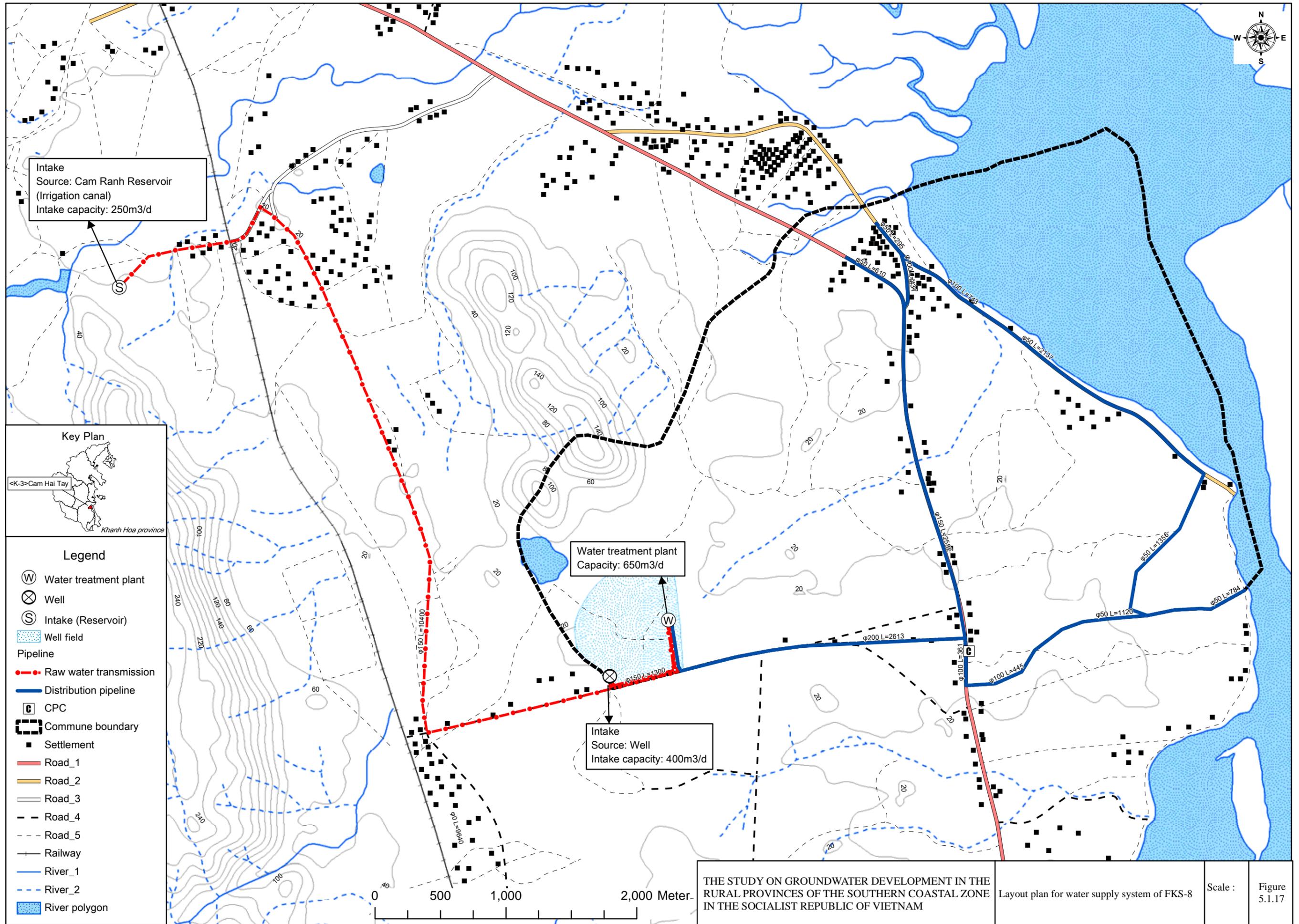


- Legend**
- Water treatment plant
 - Well
 - Pipeline**
 - Raw water transmission
 - Distribution pipeline
 - Well field
 - CPC
 - Commune boundary
 - Settlement
 - Road_1
 - Road_2
 - Road_3
 - Road_4
 - Road_5
 - Railway
 - River line

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Layout plan for water supply system of FKS-6

Scale : Figure 5.1.16



(4) Facility Plan

1) System FKS-6

a. Process Flow

The process flow chart of this system is shown in Figure 5.1.18.

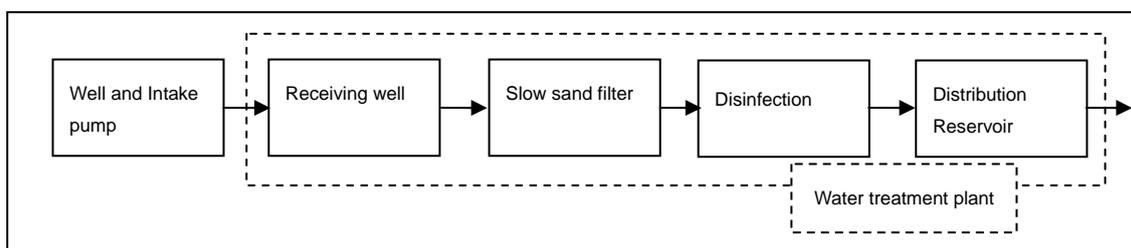


Figure 5.1.18 Process Flow Chart

b. Intake Facility and Transmission Main

In this system, raw water will be secured from wells. The total number of designed wells is two (2). Specification of intake facility and transmission main is shown in Table 5.1.26.

Table 5.1.26 Intake Facility and Transmission Main

Items	Specifications
Well:	
Drilling depth	75m
No of wells	2 nos
Casing diameter	140mm
Casing material	Steel pipe
Screen diameter	140mm
Screen material	Steel pipe
Intake pump:	
Type	Submersible pump
Specification	0.25m ³ /min X 46.0mH X 3.7kW
No. of pumps	2 nos
Transmission main:	
Material	PVC
Diameter	100mm
Length	L= 0.7 km

c. Water Treatment Plant

c-1. Component

According to the result of water quality test, FKS-6 is required to install slow sand filter and disinfection. The filter type is slow sand filter and the filtration speed is from 4 m to 5 m/day.

c-2. Specification

The specification of water treatment plant is listed in table below.

Table 5.1.27 Water Treatment Plant

Items	Specifications
Filter: Structure Type Dimension No. of basins Total filtration area Filtration speed Operation Washing Equipments	Reinforced concrete (RC) Slow sand filter W 6.0m X L 10.0m 2 basins 120.0 m ² 5 m/d Manual Sand scraping by manual Valve, mild steel pipe, washing pump, under drain system
Clear water tank and distribution reservoir: Structure Dimension No. of basins Capacity Detention time	Reinforced concrete (RC) W 4.5m X L 9.5 m X H 3.0m 2 basins 257 m ³ (Clear water tank: 51m ³ , Distribution reservoir: 206m ³) Clear water tank: 2.0hrs, Distribution reservoir: 8.2hrs
Chemical dosing Chlorine gas (Cl ₂): Dosing rate (Max.) Dosing capacity Equipments	3.0 ml/L 1.8 kg/day Chlorine cylinder, chlorination, booster pump (if necessary) and gas mask

d. Distribution Facility

d-1. Hydraulic Calculation

The result of hydraulic analysis of distribution network is shown in Supporting report.

d-2. Specification

Table 5.1.28 Distribution Facility

Items	Specifications
Distribution pipeline: Material Length	PVC with rubber joint ND 50mm L= 949m ND 65-80mm L= 344m ND 100-150mm L= 3,989m ND 200-300mm L= 2,792m Total length L= 8,074m

2) System FKS-8

a. Process Flow

The process flow is shown in Figure 5.1.19.

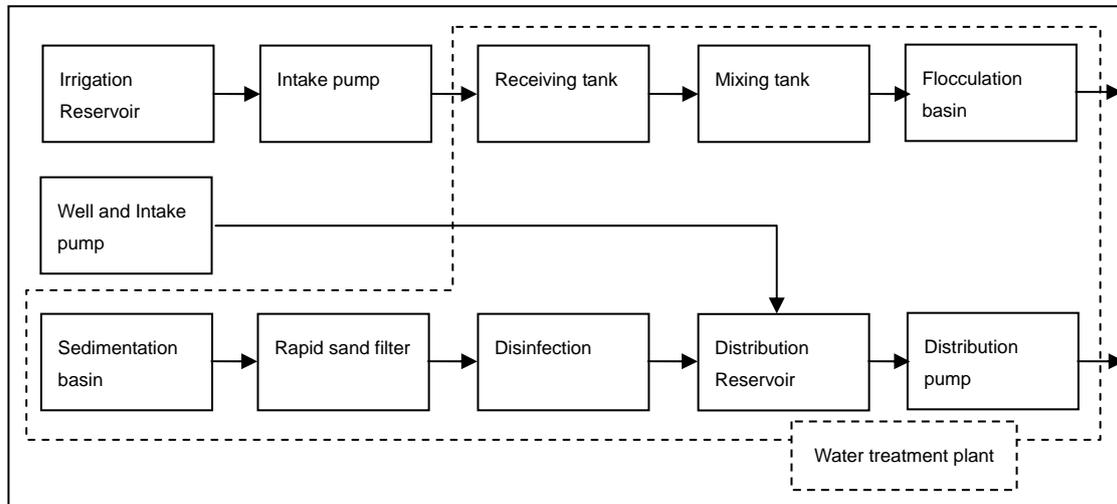


Figure 5.1.19 Process Flow Chart

b. Intake Facility and Transmission Main

In this system, raw water is secured from wells and irrigation canal in Cam Ranh reservoir. The intake volume from wells is approximately 400m³/d and remaining 250 m³/d is to be drawn from irrigation canal. Specification of intake facility and transmission main is shown in Table 5.1.29.

Table 5.1.29 Intake Facility and Transmission Main

Items	Specifications
Well:	
Drilling depth	70m
No. of wells	2 nos
Casing diameter	140mm
Casing material	Steel pipe
Screen diameter	140mm
Screen material	Steel pipe
Intake:	
Transmission open culvert	W1.0m X L5.0m X H4.0m
Pumping well	W3.0m X L3.0m X H4.5m
Intake pump (Well):	
Type	Submersible pump
Specification	0.17m ³ /min X 26.0mH X 2.2kW
No. of pumps	2 nos
Intake pump (River):	
Type	Submersible pump
Specification	0.10m ³ /min X 12.0mH X 0.5kW
No. of pumps	3 nos
Transmission main:	
Material	PVC
Diameter	150mm
Length	11.7 km

c. Water Treatment Plant

c-1 Specification

Specification of water treatment facility is listed in Table below.

Table 5.1.30 Water Treatment Plant

Items	Specifications
Flocculation tank: Type Structure Dimension No. of basins Capacity Detention time	Mechanical flocculator with motor Fabricated mild steel W 1.8m X L 1.8m X H 2.0m 1 basin 6.5 m ³ 38.2 min
Sedimentation: Type Structure Dimension No. of basins Capacity Detention time	High speed settling with inclined plate Fabricated mild steel W 1.8m X L 5.0m X H 1.4m 1 basin 12.6 m ³ 1.2 hrs
Filter: Type Structure Dimension No. of basins Total filtration area Filtration rate Operation Washing Equipments	Rapid sand filter Fabricated mild steel W 0.9m X L 1.4m 2 basins 2.6 m ² 96.2 m/d Semiautomatic Surface and back washing Valve, mild steel pipe, washing pump, under drain system and surface wash pipe
Back wash water tank: Structure Dimension No. of basins Capacity Detention time	Fabricated steel plate W 0.9m X L 4.2 m X H 0.9m 2 basins 6.8 m ³ 0.7hrs
Clear water tank and Distribution reservoir: Dimension No. of basins Capacity Detention time	W 4.5m X L 9.5m X H 3.0m 2 basins 254.4 m ³ (Clear water tank: 54.5m ³ , Distribution reservoir: 202.0m ³) Clear water tank 2.0hrs, Distribution reservoir 8.1hrs
Distribution pump: Type Specification No. of pumps	Centrifugal pump 0.5m ³ /min X 25.0mH X 3.7kW 3 nos

Chemical dosing PAC (Al ₂ O ₃ , 30%): Dosing rate (Max.) Dosing capacity (Max.) Pump Total capacity of dissolution tank No. of tanks	12.0 ml/L 54.5 L/day (0.04 L/min) Metering pump 0.5 m ³ PE tank 2 tanks
Chemical dosing Lime (Ca(OH) ₂ , 70%): Dosing rate (Max.) Dosing capacity (Max.) Pump Total capacity of dissolution tank No. of tanks	4.6 ml/L 60.9 L/day (0.01 L/min) Metering pump 0.5 m ³ PE tank 2 tanks
Chemical dosing Chlorine gas (Cl ₂): Dosing rate (Max.) Dosing capacity (Max.) Equipments	3.0 ml/L 2.0 kg/day Chlorine cylinder, chlorination, booster pump (if necessary) and gas mask

c-2. Layout Plan

It is necessary to secure an area of 800 m² (20m X 40m) for water treatment plant. It is also planned to locate pump station, chemical building, administration office and chlorinator building in the area of water treatment plant. . Layout plan for water treatment plant in this system is shown in ANNEX 3.

d. Distribution Facility

d-1. Hydraulic Calculation

The result of hydraulic analysis of distribution network is shown in Supporting report.

d-2. Specification

Table 5.1.31 Distribution Facility

Items	Specifications
Distribution pipeline:	
Material	PVC with rubber joint
Length	ND 50mm L= 6,302m ND 100-150mm L= 4,562m ND 200-300mm L= 2,613m Total length L= 13,477m

5.1.7 Preliminary Design in Ninh Thuan Province

(1) Outline

The basic design outline of the water supply system is summarized in Table 5.1.30.

Table 5.1.32 Outline of the System in Ninh Thuan Province

System	(1) Daily average (m ³ /d)	(2) Daily Max. (m ³ /d)	(3) Intake water flow (m ³ /d)	(4) Hourly max. (m ³ /hr.)
FNG-10	2,149	2,600	2,900	217

(2) Water Supply Process

The content of the process is characterized based on water source and topographical conditions as follows;

Table 5.1.33 Water Source and Facility

Water source	Facility	
	Without treatment plant	With treatment plant
Surface water	-	FNG-10

Table 5.1.34 Topographical Condition and Facility

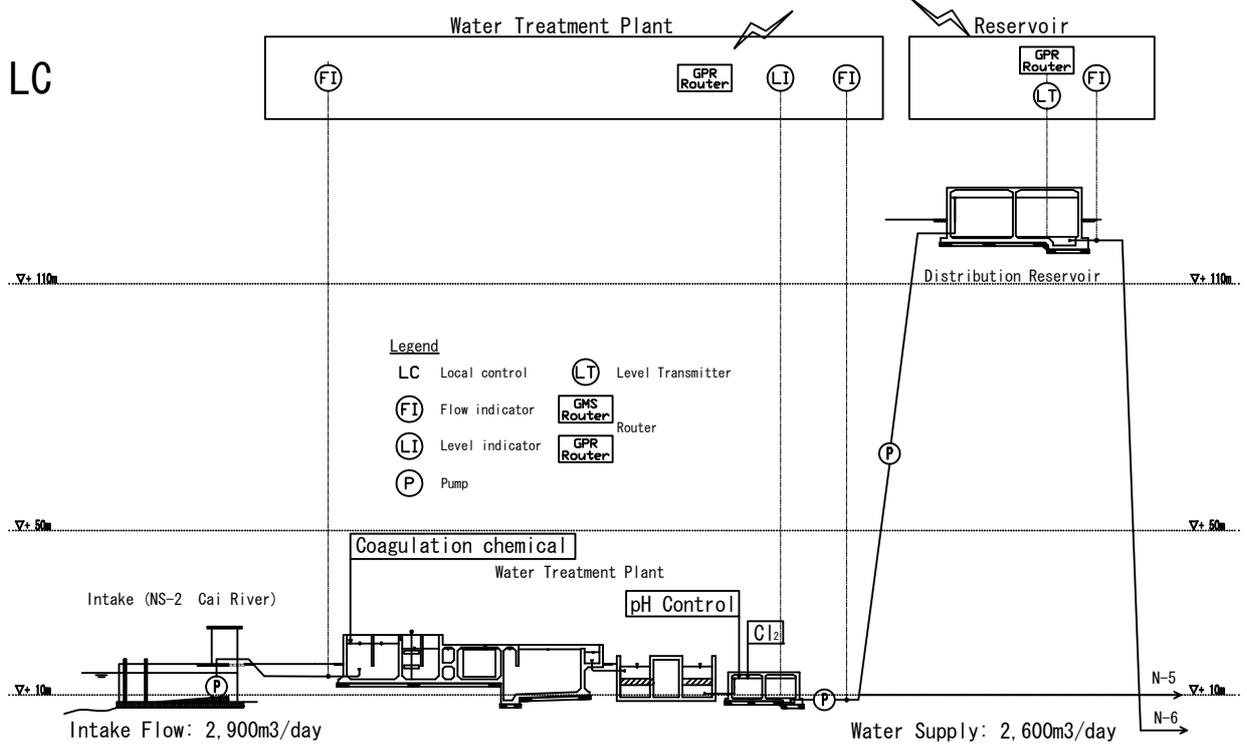
system	Figure. No.	Facility		
		Intake	Transmission pump	Distribution pump
FNG-10	Figure 5.1.20	Intake pump	Transmission pump	Distribution pump and gravity flow

(3) System Layout Plan

Based on the result of meeting with P-CERWASS and CPC, the location and alignment of facilities such as intake, transmission pipe, treatment plant, reservoir tank and distribution network pipe is arranged. The detailed layout plan for this system is shown in Figure 5.1.21.

FNG-10 (N-5, 6)

LC



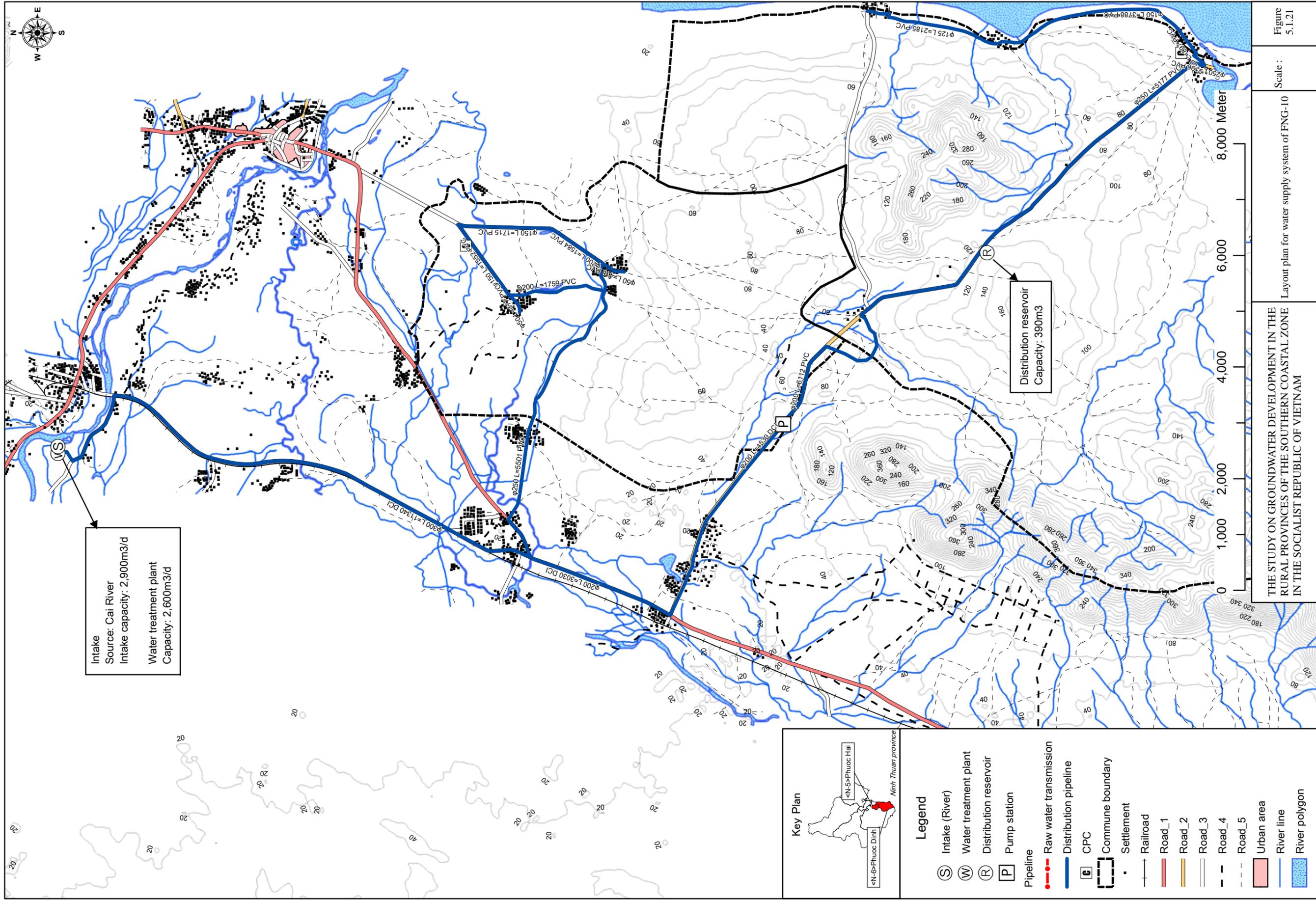
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Water Supply Process (FNG-10)

Scale :
Non

Figure
5.1.20



Intake
 Source: Cai River
 Intake capacity: 2,900m³/d
 Water treatment plant
 Capacity: 2,600m³/d

Distribution reservoir
 Capacity: 390m³

Figure 5.1.21

Scale :

Layout plan for water supply system of FNG-10

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Key Plan

Legend

- Ⓢ Intake (River)
- Ⓦ Water treatment plant
- Ⓡ Distribution reservoir
- Ⓟ Pump station
- Pipeline
 - Raw water transmission
 - Distribution pipeline
- CPC
- Commune boundary
- Settlement
- Railroad
- Road_1
- Road_2
- Road_3
- Road_4
- Road_5
- Urban area
- River line
- River polygon

(4) Main Facility Plan

1) System FNG-10

a. Process Flow

The process flow chart is shown in Figure 5.1.22.

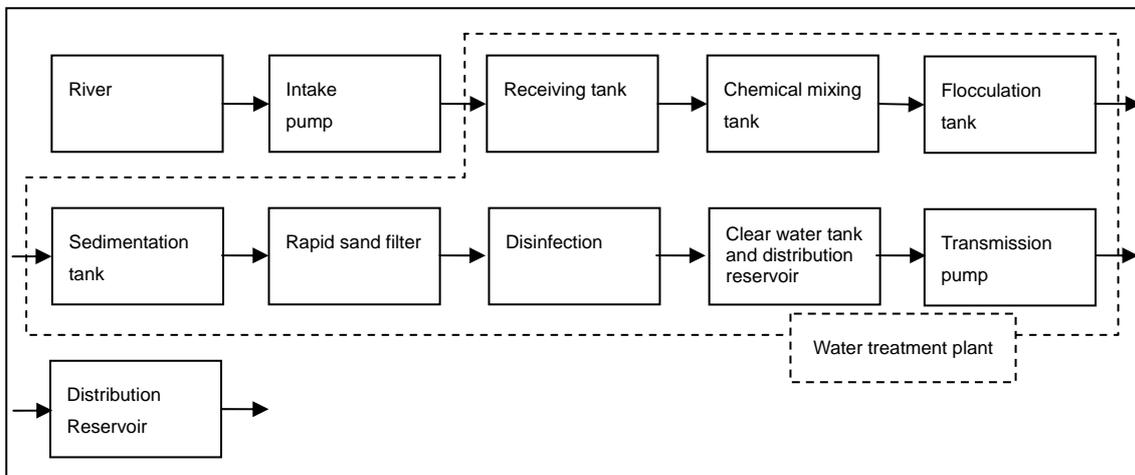


Figure 5.1.22 Process Flow Chart

b. Intake Facility and Transmission Main

In this system, raw water is planned to be withdrawn from Cai River.

Specification of intake facility and transmission main is shown in Table 5.1.35.

Table 5.1.35 Intake Facility and Transmission Main

Items	Specifications
Intake: Open channel type Pump suction well	W 1.5m X L 10.2m X H 4.0m W 3.0m X L 5.0m X H 4.5m
Intake pump: Type Specification No. of pumps	Submersible pump 1.21m ³ /min X 11.0mH X 3.7kW 3 nos
Transmission main: Material Diameter Length	DCI 250-300mm 18.9 km

c. Water Treatment Plant

c-1 Specification

The specification of water treatment plant is listed in Table below.

Table 5.1.36 Specification of Water Treatment Facilities

Items	Specifications
Flocculation tank: Structure Dimension No. of basins Capacity	Reinforced concrete (RC) W 5.0m X L 3.0m X H 2.0m 2 basins 60.0 m ³

Detention time	29.9 min
Sedimentation: Structure Dimension No. of basins Capacity Detention time	Reinforced concrete (RC) W 5.0m X L 15.0m X H 3.0m 2 basins 450.0 m ³ 3.7 hrs
Filter: Structure Type Dimension No. of basins Total filtration area Filtration rate Operation Washing Equipments	Reinforced concrete (RC) Rapid sand filter W 2.0m X L 3.0m 2 basins 24.0 m ² 120.8 m/d Semi-automatic Surface and back washing Valve, mild steel pipe, washing pump, under drain system and surface wash pipe
Clear water tank and distribution reservoir: Structure Dimension No. of basins Capacity Detention time	Reinforced concrete (RC) W 7.3m X L 16.5 m X H 3.0m 2 basins 723.0 m ³ (Clear water tank: 243m ³ , Distribution reservoir: 480m ³) Clear water tank: 2.0hrs, Distribution reservoir: 8.0hrs
Transmission and distribution pump: Type Specification No. of pumps	Centrifugal pump 1.11m ³ /min X 72.0mH X 22.0kW 4 nos
Chemical dosing PAC (Al ₂ O ₃ , 30%): Dosing rate (Max.) Dosing capacity Pump Dissolution tank No. of tanks	17.0 ml/L 896.0 L/day (0.62 L/min) Metering pump 6.5 m ³ 2 tanks
Chemical dosing Lime (Ca(OH) ₂ , 70%): Dosing rate (Max.) Dosing volume Pump Total capacity of dissolution tank No. of tanks	6.5 ml/L 171.8 L/day (0.12 L/min) Metering pump 1.5 m ³ 2 tanks
Chemical dosing Chlorine gas (Cl ₂): Dosing rate (Max.) Dosing capacity Equipments	3.0 ml/L 8.7 kg/day Chlorine cylinder, chlorination, booster pump (if necessary) and gas mask

c-2. Layout Plan

It is necessary to secure an area of 4,225 m² (65m X 65m) for water treatment plant. It is planned to

place the pump station, chemical building, administration office and chlorinator building also in the complex of water treatment plant, in addition to the facilities for water treatment. Layout plan of water treatment plant for this system is shown in ANNEX 3.

d. Transmission and Distribution Facility

d-1. Hydraulic Calculation

The result of hydraulic analysis of distribution network in this system is shown in Supporting report.

d-2. Specification

Table 5.1.37 Transmission and Distribution Facility

Items	Specifications
Transmission booster pump: Type Specification No. of pumps	Centrifugal pump 0.5m ³ /min X 85.0mH X 15.0kW 3 nos
Distribution reservoir: Dimension No. of basins Capacity Detention time	W 5.0m X L 13.0m X H 3.0m 2 basins 390.0 m ³ 8.0hrs
Distribution pipeline: Material Length	PVC with rubber joint ND 50mm L= 795m ND 100-150mm L= 9,240m ND 200-300mm L= 19,024m Total length L= 29,059m

5.1.8 Preliminary Design in Binh Thuan Province

(1) Outline

The basic design outline of the water supply systems is summarized in Table 5.1.38.

Table 5.1.38 Outline of the System

System	(1) Daily average (m ³ /d)	(2) Daily Max. (m ³ /d)	(3) Intake water flow (m ³ /d)	(4) Hourly max. (m ³ /hr.)
FBS-11	557	700	800	58
FBG-13	3,730	4,500	5,000	375

(2) Water Supply Process

The contents of the process are characterized based on water source and topographical conditions as follows;

Table 5.1.39 Water Source and Facility

Water source	Facility	
	Without treatment plant	With treatment plant
Surface water	-	FBS-11, FBG-13

Table 5.1.40 Topographical Condition and Facility

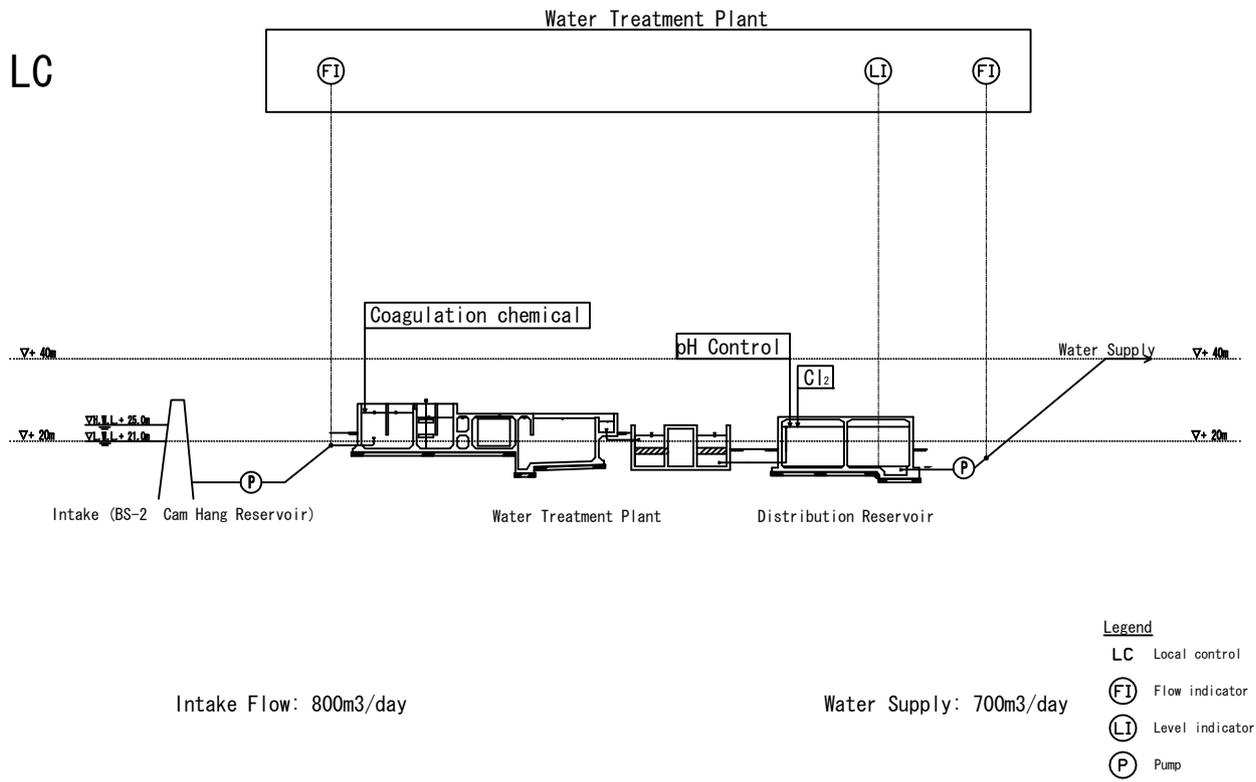
system	Figure. No.	Facility		
		Intake	Transmission pump	Distribution pump
FBS-11	Figure 5.1.23	Intake pump	Non (intake pump)	Distribution pump
FBG-13	Figure 5.1.24	Intake pump	Transmission pump	Non (Gravity flow)

(3) System Layout Plan

Based on the result of meeting with P-CERWASS and CPC, the location and alignment of facilities such as intake, transmission pipe, treatment plant, reservoir tank and distribution network pipe is arranged. The detailed layout plan for this system is shown in Figure 5.1.25 and Figure 5.1.26.

FBS-11 (B-1)

LC

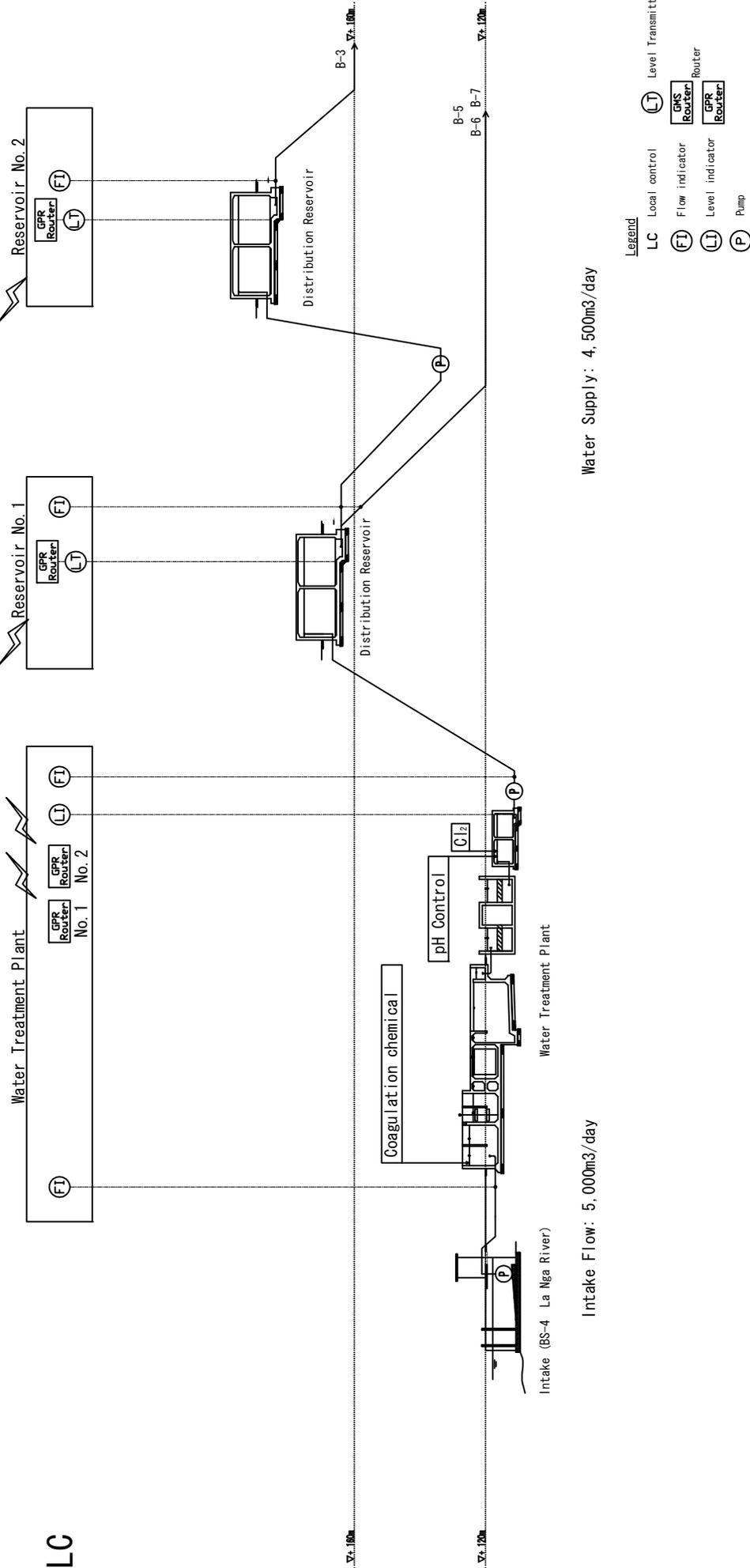


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<p>THE STUDY ON GROUNDWATER DEVELOPMENT IN THE RURAL PROVINCES OF THE SOUTHERN COASTAL ZONE IN THE SOCIALIST REPUBLIC OF VIETNAM</p>	<p>Water Supply Process (FBS-11)</p>	<p>Scale : Non</p>	<p>Figure 5.1.23</p>
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FBG-13 (B-3, 5, 6, 7)

LC



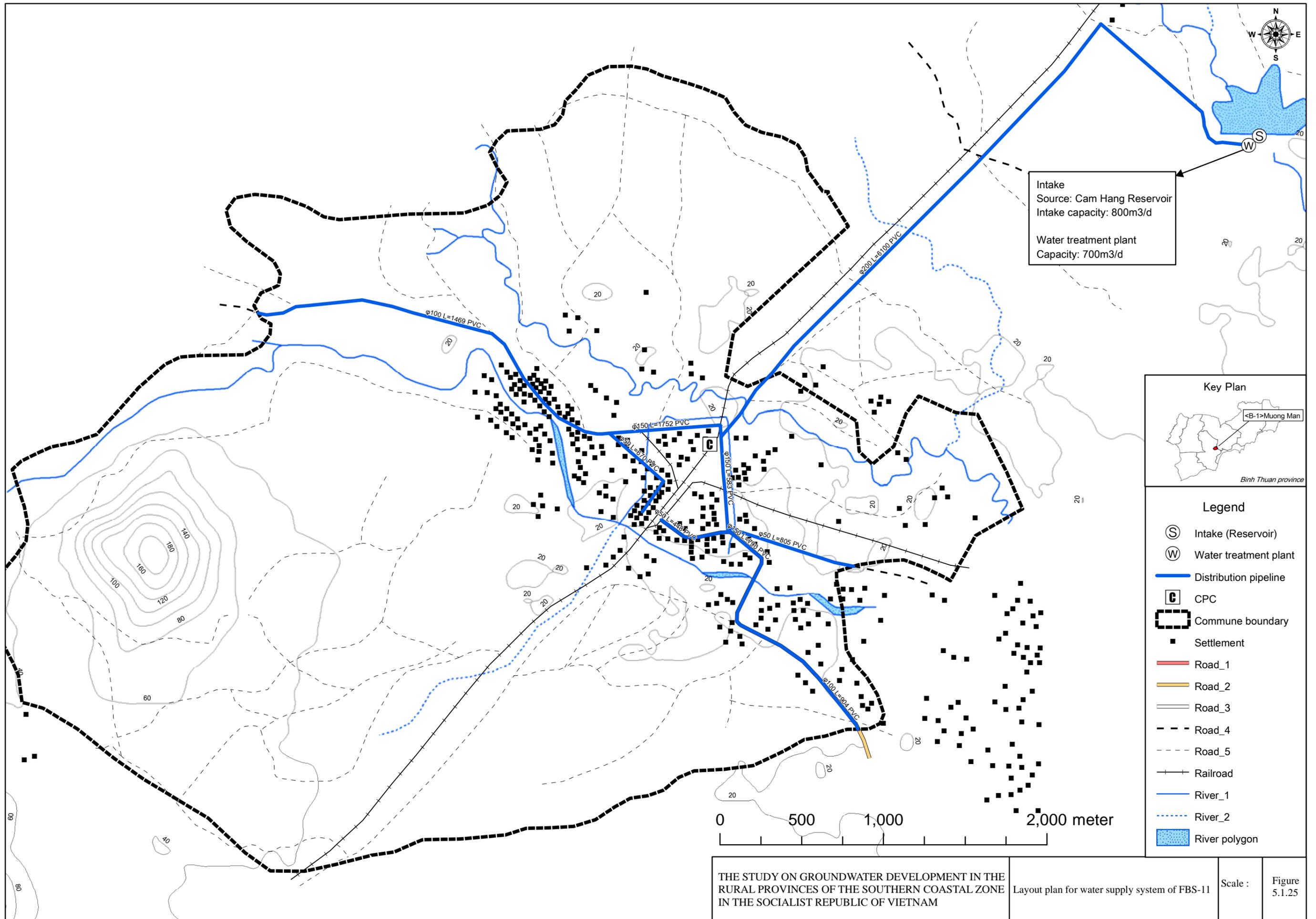
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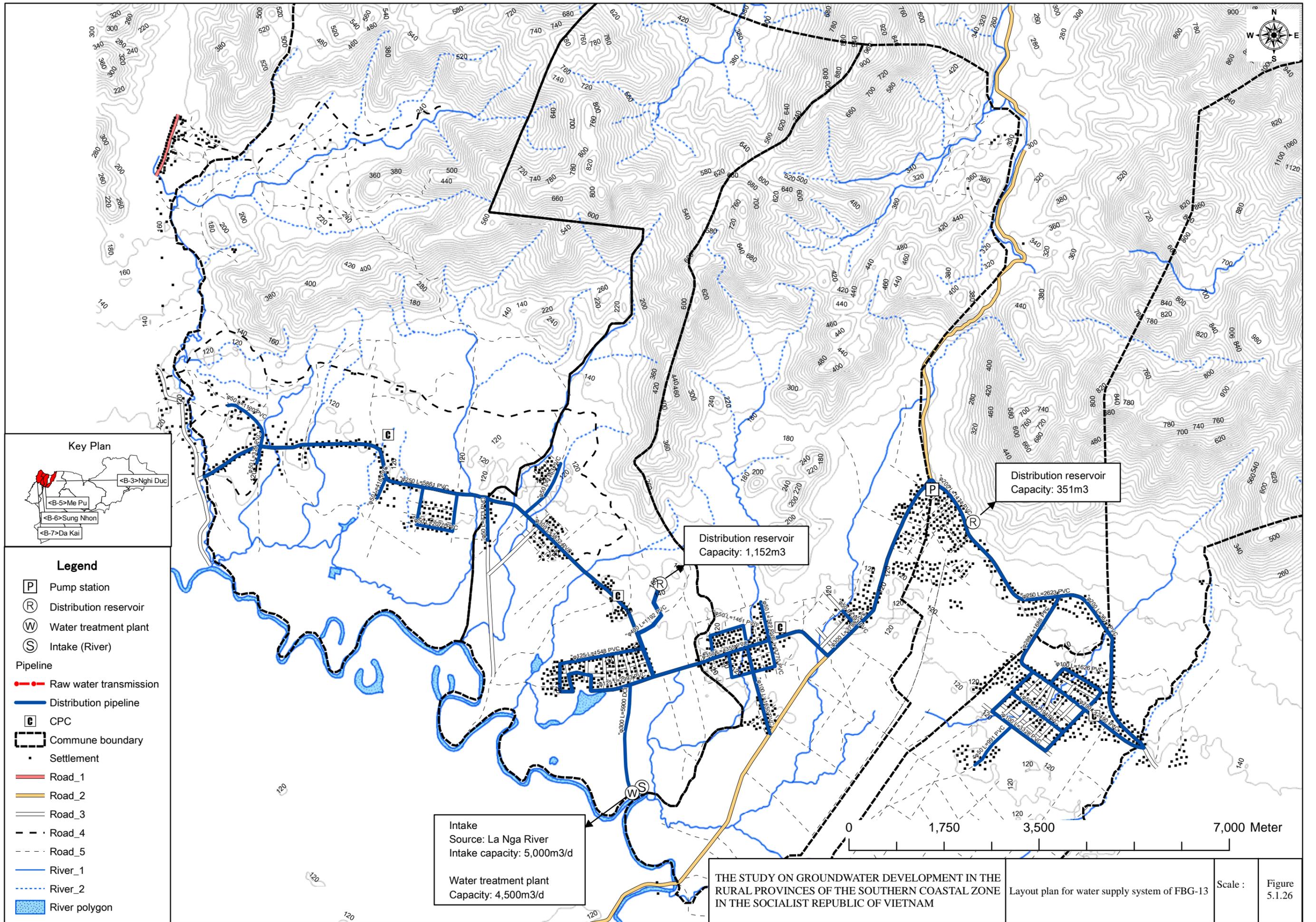
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Water Supply Process (FBG-13)

Scale: Non

Figure 5.1.24





(4) Facility Plan

1) System FBS-11

a. process flow

The process flow chart is shown in Figure 5.1.27.

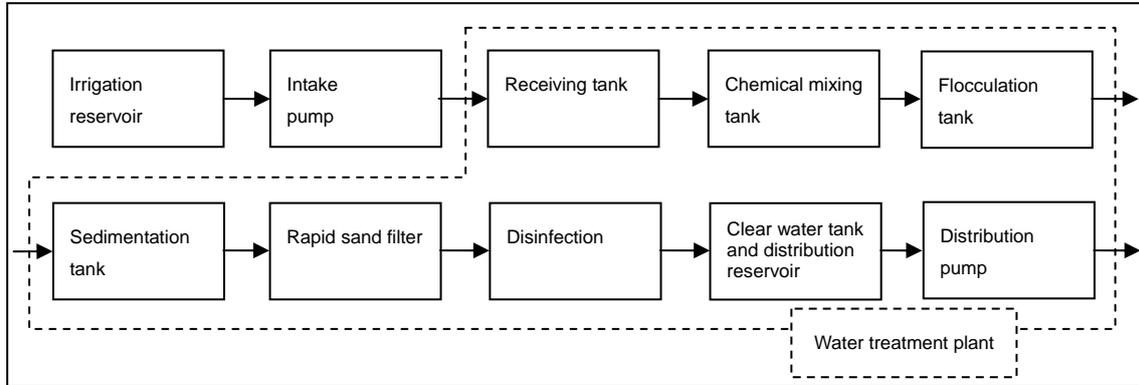


Figure 5.1.27 Process Flow Chart

b. Intake Facility and Transmission Main

In this system, raw water has intake from outlet of Cam Hang reservoir.

Specification of intake facility and transmission main is shown in following table.

Table 5.1.41 Intake Facility and Transmission Main

Items	Specifications
Intake: Open channel type Pump suction well	W 1.0m X L 5.0m X H 2.5m W 3.0m X L 3.0m X H 3.0m
Intake pump: Type Specification No. of pumps	Submersible pump 0.33m ³ /min X 8.0mH X 1.1kW 3 nos
Transmission main: Material Diameter Length	PVC 200mm L= 6.1 km

c. Water Treatment Plant

c-1 Specification

The specification of water treatment facility is listed in the following Table.

Table 5.1.42 Water Treatment Facility

Items	Specifications
Flocculation tank: Structure Dimension No. of basins Capacity Detention time	Reinforced concrete (RC) W 2.6m X L 1.8m X H 2.0m 2 basins 18.7 m ³ 33.4 min

Sedimentation: Type Structure Dimension No. of basins Capacity Detention time	Horizontal flow conventional sedimentation Reinforced concrete (RC) W 2.6m X L 7.8m X H 3.0m 2 basins 121.6 m ³ 3.6 hrs
Filter: Type Structure Dimension No. of basins Total filtration area Filtration rate Operation Washing Equipments	Rapid sand filter Reinforced concrete (RC) W 1.5m X L 2.2m 2 basins 6.6 m ² 121.2 m/d Manual Surface and back washing Valve, mild steel pipe, washing pump, under drain system and surface wash pipe
Clear water tank and distribution reservoir: Structure Dimension No. of basins Capacity Detention time	Reinforced concrete (RC) W 4.5m X L 10.0 m X H 3.5m 2 basins 315.0 m ³ (Clear water tank: 70m ³ , Distribution reservoir: 245m ³) Clear water tank: 2.1hrs, Distribution reservoir: 8.4hrs
Distribution pump: Type Specification No. of pumps	Centrifugal pump 0.58m ³ /min X 29.0mH X 5.5kW 3 nos
Chemical dosing PAC (Al ₂ O ₃ , 30%): Dosing rate (Max.) Dosing capacity (Max.) Pump Total capacity of dissolution tank No. of tanks	12.0 ml/L 174.5.0 L/day (0.12 L/min) Metering pump 1.5 m ³ PE tank 2 tanks
Chemical dosing Lime (Ca(OH) ₂ , 70%): Dosing rate (Max.) Dosing volume Pump Total capacity of dissolution tank No. of tanks	4.6 ml/L 33.6 L/day (0.02 L/min) Metering pump 0.5 m ³ 2 tanks
Disinfection Chlorine gas (Cl ₂): Dosing rate (Max.) Dosing capacity Equipments	3.0 ml/L 2.4 kg/day Chlorine cylinder, chlorination, booster pump (if necessary) and gas mask

c-2 Layout Plan

It is necessary to secure an area of 1,500 m² (30m X 50m) for water treatment plant. In this case also it is planned to locate pump station, chemical building, administration office and chlorinator

building in the water treatment plant. . Layout plan of water treatment plant is shown in ANNEX 3.

d. Distribution Facility

d-1. Hydraulic Calculation

The result of hydraulic analysis of distribution network in this system is shown in Supporting report.

d-2. Specification

Table 5.1.43 Distribution Facility

Items	Specifications
Distribution pipeline:	
Material	PVC with rubber joint
Length	ND 50mm L= 1,923m
	ND 100-150mm L= 5,498m
	Total length L= 7,421m

2) System FBG-13

a. Process Flow

The process flow chart is shown in Figure 5.1.28.

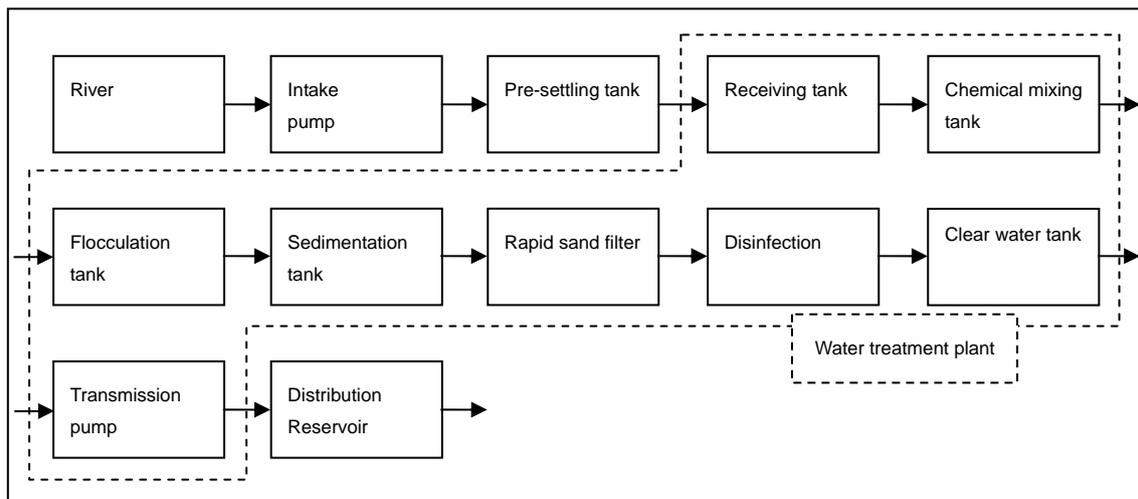


Figure 5.1.28 Process Flow Chart

b. Intake Facility and Transmission Main

In this system, raw water has intake from La Nga River.

Specification of intake facility and transmission main is shown in Table below.

Table 5.1.44 Intake Facility and Transmission Main

Items	Specifications
Intake: Open channel Inlet pipe	W 1.5m X L 8.9m X H 3.5m Concrete pipe
Intake pump: Type	Submersible pump

Specification	2.08m ³ /min X 13.0mH X 7.5kW
No. of pumps	3 nos
Transmission main:	
Material	DCI
Diameter	300mm
Length	L= 5.9 km

c. Water Treatment Plant

c-1. Pre-Settling Tank

The geological condition along La Nga River basin is Reddish-Brown Lateritic soil. The people living in peripheral areas produce brick using the special soil. However, much soil flows in to the river in the rainy season. This results into high turbidity in the river. Size of the soil is fine grains and these soils are much more difficult to settle out by the conventional sedimentation.

According to pre-feasibility study report of Red river by Hanoi Water Business Company in May 2004, more than 0.01mm grain size can be expected to treat by pre-settling without coagulation. If cumulative per-cent and grain size of La Nga River is assumed as shown in Figure 5.1.29, 30% of suspended solids can be expected to remove by pre-settling.

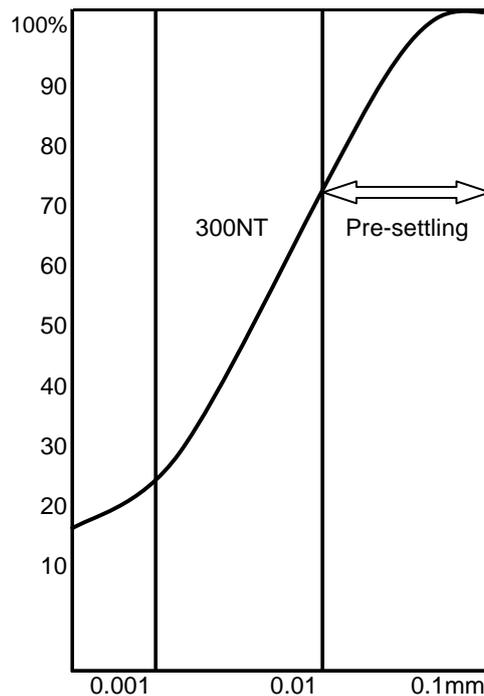


Figure 5.1.29 Grain Size Distribution

Hence the pre-settling tank which has detention time of 4 hours is proposed in the design. The function of the tank is natural sedimentation without any coagulant. The raw water after treatment by the pre settling tank flows in to conventional water treatment plant.

c-2 Specification

The specification of water treatment facility is listed in Table below.

Table 5.1.45 Water Treatment Plant

Items	Specifications
Pre-settling tank Type Detention time Drain method	Horizontal flow non chemical sedimentation tank 4 hrs. Discharge by slurry pump
Flocculation tank: Structure Dimension No. of basins Capacity Detention time	Reinforced concrete (RC) W 6.0m X L 3.6m X H 2.5m 2 basins 108.0 m ³ 31.1 min
Sedimentation: Type Structure Dimension No. of basins Capacity Detention time	Horizontal flow combinational sedimentation tank Reinforced concrete (RC) W 6.0m X L 18.0m X H 3.5m 2 basins 756.0 m ³ 3.6 hrs
Filter: Type Structure Dimension No. of basins Total filtration area Filtration speed Operation Washing Equipments	Rapid sand filter Reinforced concrete (RC) W 2.6m X L 4.0m 2 basins 41.6 m ² 120.2 m/d Semi-automatic Surface and back washing system Motor driven valve, mild steel pipe, washing pump, under drain equipment, filter media and surface wash pipe
Clear water tank: Structure Dimension No. of basins Capacity Detention time	Reinforced concrete (RC) W5.5m X L 13.0 m X H 3.0m 2 basins 429.0 m ³ 2.1 hrs
Transmission pump: Type Specification No. of pumps	Centrifugal pump 1.88m ³ /min X 53.0mH X 30.0kW 3 nos
Chemical dosing PAC (Al ₂ O ₃ , 30%): Dosing rate (Max.) Dosing capacity Pump Total capacity of dissolution tank No. of tanks	17.0 mg/L 1,545.5 L/day (1.07 L/min) Metering pump 11.0 m ³ 2 tanks
Chemical dosing Lime (Ca(OH) ₂ , 70%): Dosing rate (Max.) Dosing capacity (Max.) Pump Total capacity of dissolution tank No. of tanks	6.5 mg/L 295.5 L/day (0.21 L/min) Metering pump 2.5 m ³ PE tank 2 tanks

Disinfection Chlorine gas (Cl ₂): Dosing rate (Max.) Dosing capacity (Max.) Equipment	3.0 mg/L 15.0 kg/day Chlorine cylinder, chlorination, booster pump (if necessary) and gas mask
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c-3. Layout Plan

It is necessary to secure an area of 6,750 m² (75m X 90m) for water treatment plant. In the water treatment plant, it is also planned to place pump station, chemical building, administration office and chlorinator building. Layout plan of water treatment plant is shown in ANNEX 3.

d. Transmission and Distribution Facility

d-1. Hydraulic Calculation

The result of hydraulic analysis of distribution network is shown in Supporting report.

d-2 Specification

Table 5.1.46 Transmission and Distribution Facility

Items	Specifications
Transmission pump: Type Specifications No. of pumps	Centrifugal pump 0.44m ³ /min X 50.0mH X 7.5kW 3 nos
Distribution reservoir No.1: Dimension No. of basins Capacity Detention time	W 8.0m X L 18.0m X H 4.0m 2 basins 1,152 m ³ 8.0 hrs
Distribution reservoir No.2: Dimension No. of basins Capacity Detention time	W 4.5m X L 13.0m X H 3.0m 2 basins 351 m ³ 8.1 hrs
Distribution pipeline: Material Length	PVC with rubber joint ND 50mm L= 12,402m ND 100-150mm L= 11,145m ND 200-300mm L= 25,375m ND 350mm- L= 5,547m Total length L= 54,469m