追加調査報告書　1

Additional Survey Report 1

Báo cáo điều tra them 1

Water Quality Analysis Results of Tri An Lake and Dau Tieng Lake

WATER SUPPLY, SEWERAGE AND ENVIRONMENT CONSULTANCY
JOINT STOCK COMPANY

REPORT

WATER QUALITY ANALYSIS RESULTS OF TRI AN LAKE AND DAU TIENG LAKE

"THE STUDY ON WATER SUPPLY IMPROVEMENT IN HO CHI MINH CITY"

MARCH, 2013

WATER SUPPLY, SEWERAGE AND ENVIRONMENT CONSULTANCY
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WATER SUPPLY, SEWERAGE AND ENVIRONMENT CONSULTANCY JS COMPANY
(WASE)

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REPORT

WATER QUALITY ANALYSIS RESULTS OF TRI AN LAKE AND DAU TIENG LAKE "THE STUDY ON WATER SUPPLY IMPROVEMENT IN HO CHI MINH CITY "

I. PURPOSE - REQUIREMENT

Pursuant to the contract dated 16/10/2012 between TOYO ENGINEERING CORPORATION, Japan (TEC) and the Water Supply, Sewerage and Environment Consultancy Joint Stock Company (WASE) about the sampling study and the water quality analysis of Tri An Lake and Dau Tieng Lake for HCM City water supply improvement project to select the water source for construction and to improve the water supply systems in order to serve the growing economic development needs of HCM city, Wase Laboratory has performed the sampling and water quality analysis in the two Tri An and Dau Tieng lakes with the coordination of TEC expert team.

II. STUDY CONTENTS

1. **Location :**
   - Tri An lake : Vinh Cuu town – Dong Nai Province
   - Dau Tieng lake : Dau Tieng town – Binh Duong Province
2. **Sampling location** : See Sampling position diagram in appendix 1
   - Tri An lake : 2 intake point (Code: position (1) & position (2))
   - Dau Tieng lake: 2 intake point (Code: position (1) & position (2))
3. **Sampling time :**

   02 sampling phases :
   - Oct 2012 : 18 & 19/10/2012 (rainy season)
   - Mar 2012 : 11 & 12/03/2013 (dry season)
4. **Sampling & testing sample quantity :**
   - Tri An lake : 04 samples
   - Dau Tieng lake: 04 samples

   Total: 08 samples

5. Analysis parameters :

No	Parameters	Unit	Quantity
1	Air temperature	oC	8
2	Water temperature	oC	8
3	Transparency	m	8
4	Total bacteria	MPN/ml	8
5	E. Coli	MPN/100ml	8
6	Chloride	mg/l	8
7	Total Organic Carbon (TOC)	mg/l	8
8	pH	-	8
9	Turbidity	NTU	8
10	Colour	Đv Co	8
11	COD	mg/l	8
12	Total Coliform	MPN/100ml	8
13	Conductivity	µS/cm	8
14	Suspended solids (SS)	mg/l	8
15	Alkalinity	mg/l	8
16	Dissolved oxygen (DO)	mg/l	8
17	BOD 5	mg/l	8
18	UV Absorption (E260)	-	8
19	Total dissolved solids (TDS)	mg/l	8
20	Ammonia (NH_4) as N	mg/l	8
21	Nitrite (NO_2) as N	mg/l	8
22	Nitrate (NO_3) as N	mg/l	8
23	T – N	mg/l	8
24	Dissolved Organic Carbon (DOC)	mg/l	8
25	Phosphate (PO_4)	mg/l	8
26	T – P	mg/l	8
27	Biological ZooPlankton	Count/ml	8
28	Biological Phytoplankton	Count/ml	8
39	Total Iron (Fe)	mg/l	8
30	Mangan (Mn)	mg/l	8
31	Anionic	mg/l	8
32	Odor	-	8
33	Floride (F)	mg/l	4
34	Cyanide (CN)	mg/l	4

35	Arsenic (As)	mg/l	4
36	Cadmium (Cd)	mg/l	4
37	Lead (Pb)	mg/l	4
38	Chromium IV (Cr^{6+})	mg/l	4
39	Copper (Cu)	mg/l	4
40	Zinc (Zn)	mg/l	4
41	Nickel (Ni)	mg/l	4
42	Mercury (Hg)	mg/l	4
43	Total oil and Gease	mg/l	4
44	Total phenol	µg/l	4
45	Potassium Permanganate	mg/l	4

6. Implementation measures:

- Field study and select the sampling positions in Tri An lake and Dau Tieng lake by the TEC experts in collaboration with ODA technical teams of SAWACO.
- Prepare and carry on the sampling study according to the predefined schedule in combination of the supervision of TEC experts and technical teams of SAWACO.
- Take all samples far from the shore, deep 3.0m under the surfacewater, at the natural weather conditions when sampling.
- After field sampling, transport the samples immediately to the WASE laboratory for testing. The samples for microbiological, DO, BOD... tests were stored in coolers at low temperature. The items as pH, air temperature, water temperature were measured in the field.
- Carry out the water sample tests by the method of the document "Standard Method For Examination Of Water And Waste Water, 21st Edition, 2005" (APHA) and the standard methods TCVN of Vietnam.
- Data processing and report the results of each phase and the final summary report after the end of two phases.

III. APPLICABLE STANDARDS

- The environmental standards QCVN 01: 2009/BTNMT: National Technical Regulation on drinking water Quality.
- The environmental standards QCVN 08: 2008/BTNMT: National Technical Regulation on surface water Quality.
- The Construction Standard TCXD 233:2009 : The selection criteria of surface water and ground water for water supply system.
- TCVN 4556-88: Methods of sampling, sample transport and storage.
- Criteria and test methods of TCVN, ALPHA on testing water quality

IV. OVERVIEW

1. Tri An lake, located on the Dong Nai River, Dong Nai province, is an artificial lake which supplies water to Tri An hydroelectric power Plant.

Tri An lake was built in 1984 and completed in early 1987. The capacity of lake is 2.765 km^3, useful capacity is 2.547 km^3 and surface area is 323 km^2. The lake is designed to supply water to the Tri An hydroelectric power plant with the capacity of 400MW and an annual power output of 1.7 billion kWh.

Tri An's upstream is Nam Cat Tien National Park, with remaining precious vegetation and rare animals. The new potentiality always starts with the most spectacular breakthrough from the years after the liberation day of the south. In this Southeast land, Tri An hydroelectric power plant was built by human hands.

Tri An lake is a water reservoir for annual regulation. It aims to generate electricity with the normal water level (HN) of 62m, lowest water level (HD) of 50m, the flood level of 63.9m. Designed flood flow discharge is 18,450 m^3s.

The main dam is kind of mixed rock and soil. Dam height is 40m, length 420m and width 10m. The main dam and the auxiliary dams create a reservoir of 323 km^2 with a toatl capacity of 2.765 million m^3, useful capacity of 2.547 million m^3, lowest capacity of 218,000 m^3.

The largest flow discharge through the turbine in the hydroelectric power plant (Qmax) is 900m^3/s, the minimum flow discharge (Qmin) is 220m^3/s, the water difference level is 52m. The hydroelectric power plant was built with a toatl installed capacity of 4 combinations x 100 MW = 400 MW, annual power output of 1,76 MW.h. The amount of water taken from the reservoir to provide running water and irrigation activities is 17 m^3/s.

Sedimentation rate is an important factor affecting the life-span and the economic nature of the works. As a consequence of the natural process, the lake capacity is subject to be reduced by the accumulation of eroded products from the basin. Normally, the reduction of the lake capacity due to the alluvial has been also taken into account in the technical feasibility study report. However, the initial forecast is often different from the reality, especially in the context of a deforestation and uncontrolled basin exploitation in our country as currently.

Tri An lake sedimentation was assessed in 1994 based on the monitoring figures of suspended sediment flow into the lake and the level of deposits in specific sections was measured by ultrasound. However, monitoring the density of silt in the water is not continuously carried on during the operation of the lake. The volume of mud and sand deposit into the lake through the mechanism of bottom movement can not be measured but only estimated. The difficulty in the exploration of the bottom movement at the specific sections by ultrasound is that the next measure does not coincide with the initial design, which leads to the large errors in the results.

Currently, due to the sedimentation process of the basin as well as the massive exploitation on the submerged part of the lake for the agriculture and aquaculture development without any control, the agricultural wastes and the soil erosion situation have narrowed down the lake area, causing adverse impacts to the water environment of the Tri An reservoir.

2. Dau Tieng Lake is one of the largest artificial lake in Vietnam and Southeast Asia.

Dau Tieng Lake is located in Dau Tieng district, Binh Duong province and Hon Quan district of Binh Phuoc province but the basin is mainly located on the territory of Duong Minh Chau District and a small part on the territory of Tan Chau district, Tay Ninh Province , 25 km far from Tay Ninh town to the east, with a surface area of 270 km ^{2} of water and 45.6 km ^{2} of semi-submerged land, and a capacity of 1.58 billion m^3 of water. The construction began on April 29th 1981 and completed on Oct, 1st 1985

This works mobilized most of the people at young age in Tay Ninh province for attending digging Dau Tieng lake with a dam flood discharge to the upstream of Saigon River. In addition there are two canals East Canal and West Canal for irrigating the fields of wheat, sugar cane, rice in Tay Ninh and Cu Chi (Ho Chi Minh City). There is also water supply for Dong Canal Water treatment plant in Cu Chi currently in period of completely and .as a responsible for pushing salinity in dry season.

Currently Dau Tieng is not only an effective irrigational works in Tay Ninh, Binh Duong province but also a tourist site.

Location of works: in Phuoc Minh commune, Duong Minh Chau district, Tay Ninh province

Works tasks

- Regulate the Saigon River in many years, irrigate for the agricultural area of 93.000ha in districts: Tan Bien, Chau Thanh, Ben Cau, Duong Minh Chau, Phu Khuong, Go Dau, Trang Bang and Tay Ninh town.
- Water supply for industrial activity and domestic demand of 100 million m^3 each year.
- Take advantage of the water surface area and the volume of reservoir to raise fishes.

The main technical parameters:

- Headworks level : level I
- Designed flood frequency : P = 0.1%
- Normal water level : 24.4m
- Reinforced water level : 25.1m
- Lowest water level : 17.0m
- Total capacity : 1580 x $10^6 m^3$
- Useful capacity : 110 x $10^6 m^3$

Composition works scale

- **Main dam**

- Aspect : homogeneous soil dam
- Top dam level : 28.0m
- Breakwater wall level : 29.0m
- Length of Top dam : 1.100m
- Height of dam : 28.0m
- Width of Top dam : 8.0m

- **Auxiliary dam:**

- Aspect : homogeneous soil dam
- Height of dam : 27.0m
- Length of Top dam : 27.000m
- Width of Top dam : 6.0m

- **Flood overflow discharge**

- Designed flow : 2.800m3 / s
- Size : nx (BxH) = 6x (6x10) m
- The overflow aspect : concrete composition, energy gutterway

- **Water Drain**

❖ ***Drain No.1 and No.2***

- Size of drain : nx (BxH) = 3x (3x4) m
- Length of drain : 160m
- Designed flow : 93.0m ³ / s.

❖ ***Drain No. 3***

- Size : nx (BxH) = 1x (3x5) m
- Length: 50m : 50m

- Designed flow : 12.8m ^{3} / s.

- **Canal system :**

- The East canal : 46km, QTK = 64m ^{3} / s
- The West canal : 39km, QTK = 70m ^{3} / s
- Tan Hung canal : 29km, QTK = 12.8m ^{3} / s
- Canal level 1 : 81cannals, 350 km long.

According to Dau Tieng Irrigation Exploitation Limited Company, currently the water quality is not guaranteed due to the increasingly pollution. This is the result from many rubber treatment plants, tapioca processing factories discharging waste water into the lake. At the same time, many livestock farms settled in small islands in the lake, especially for breeding pigs, also directly discharge waste water into the lake. When the Dau Tieng lake water level downs to 17.28m, it stinks if we passed by the area. These issues are beyond the management competence and the control of the company

In fact, water pollution have happened in Dau Tieng Lake many years ago despite the requirement that to ensure the quality for industrial water and domestic water, aquaculture is not allowed on the lake. But since 2005 there were more than 1,200 fish cages of 200 households polluted the surrounding environment.

Due to the forest exploitation in the upstream, forest land became rubber plantation or agricultural land or due to the impoundment for crops irrigation, Dau Tieng Lake is short of water in dry season. In the last 26 years, only 2 times excess stored water in Dau Tieng Lake must be discharged.

With the remaining water, it is very hard for Tan Hiep WTP (HCM City) to supply water for agriculture, domestic demands and industrial activities and also for flood discharge and for Saigon river desalination as well.

V. WATER ANALYSIS RESULTS

The results of water quality of the Tri An lake and Dau Tiếng lake at the sampling time are shown in sumary Table 1 and Table 2 :

TABLE 1: WATER QUALITY ANALYSIS RESULT IN TRI AN & DAU TIENG RESERVOIR - PHASE 1 (RAIN SEASON)

No	ITEM	UNIT	TRI AN RESERVOIR		DAU TIENG RESERVOIR		ANALYSIS METHOD
			OCTORBER 18, 2012		OCTORBER 19, 2012		
			Position (1)	Position (2)	Position (1)	Position (2)	
1	Temperature of air	oC	31.5	31	34.8	35	Themometer
2	Temperature of water	oC	28.8	29.5	30.7	31.2	Themometer
3	Transparency	cm	<100	<100	<100	<100	Dienert method
4	Total bacterias	MPN/ml	2.4×10^4	4.6×10^4	3.1×10^3	4.0×10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	KPH	KPH	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	9	8	10	10	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	3.69	4.44	5.4	5.4	TCVN 6634:2000
8	pH	-	7.28	7.37	6.89	6.95	SMEWW 2130-98
9	Turbidity	NTU	10.4	7.7	9.5	9.8	TCVN 6184-96
10	Color	Co Unit	15	15	15	15	TCVN 6185-96
11	COD	mg/l	27.76	24.33	17.38	20.85	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	2.3×10^1	9	9.3×10^1	4.3×10^3	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	36.7	36.1	37.8	39.5	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	10	8	9	10	SMEWW 2540-98
15	Alkalinity	mg/l	12	12	16	16	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.4	5.45	5.6	5.6	SMEWW 2540-98
17	BOD 5	mg/l	8	8.5	7	8	SMEWW 5210-B
18	UV Absorption (E260)	-	KPH	0.0914	0.1165	0.1135	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	18.5	18.5	18.6	20	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.75	0.47	0.45	0.41	TCVN 6179-96
21	Nitrite (NO_2) as N	mg/l	0.01	0.01	0.01	0.01	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.1	0.15	0.1	0.1	TCVN 6180-96
23	T – N	mg/l	2.2	2.15	1.8	1.85	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	3.6	4.07	4.6	4.6	TCVN 6634:2000

No	ITEM	UNIT	TRI AN RESERVOIR		DAU TIENG RESERVOIR		ANALYSIS METHOD
			OCTORBER 18, 2012		OCTORBER 19, 2012		
			Position (1)	Position (2)	Position (1)	Position (2)	
25	Phosphate (PO_4)	mg/l	0.15	0.1	0.1	0.1	SMEWW 4500-P-D
26	T – P	mg/l	0.07	0.06	0.04	0.05	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	13,000	80,000	82,000	136,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	61,339	79,108	40,009	51,461	Andersen Method
29	Total Iron (Fe)	mg/l	0.6	0.58	0.5	0.55	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.01	0.01	0.015	0.014	TCVN 6002-95
31	Anionic Surfactant	mg/l	KPH	KPH	KPH	KPH	SMEWW5540C:2005
32	Odor	Sense	KPH	KPH	KPH	KPH	SMEWW 2150-98

NOTE:

- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- The detail results show in appendix (2) & (3)

TABLE 2 : WATER QUALITY ANALYSIS RESULT IN TRI AN & DAU TIENG RESERVOIR - PHASE 2 (DRY SEASON)

No	ITEM	UNIT	TRI AN RESERVOIR		DAU TIENG RESERVOIR		ANALYSIS METHOD
			March 11, 2013		March 12, 2013		
			Position (1)	Position (2)	Position (1)	Position (2)	
1	Temperature of air	oC	33.4	33.8	34.8	34.9	Themometer
2	Temperature of water	oC	30.9	30.6	30.4	30.6	Themometer
3	Transparency	cm	<100	<100	<100	<100	Dienert method
4	Total bacterias	MPN/ml	9.3×10^3	7.9×10^3	4.3×10^3	4.9×10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	KPH	KPH	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	8	8	14	14	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	6.67	6.15	6.23	6.10	TCVN 6634:2000
8	pH	-	6.97	7.05	6.95	6.90	SMEWW 2130-98
9	Turbidity	NTU	4.75	5.12	5.84	6.2	TCVN 6184-96
10	Color	Co Unit	10	10	10	10	TCVN 6185-96
11	COD	mg/l	16	15	16	12	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	2.3×10^1	2.1×10^1	9	2.1×10^1	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	46	47	40	37	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	7	6	6	7	SMEWW 2540-98
15	Alkalinity	mg/l	18	18	16	16	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.60	5.65	5.78	5.80	SMEWW 2540-98
17	BOD 5	mg/l	8	9	10	8	SMEWW 5210-B
18	UV Absorption (E260)	-	0.7628	0.5130	0.0561	0.1022	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	22.8	23.4	19.5	18.7	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.48	0.5	0.67	0.64	TCVN 6179-96
21	Nitrite (NO_2) as N	mg/l	0.008	0.007	0.008	0.008	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.1	0.09	0.13	0.12	TCVN 6180-96
23	T – N	mg/l	3.75	3.52	6.14	6.08	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	5.99	3.60	5.38	5.45	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.27	0.26	0.35	0.28	SMEWW 4500-P-D

REPORT ON WATER QUALITY ANALYSIS RESULTS OF TRI AN AND DAU TIENG LAKE - 2012-2013

No	ITEM	UNIT	TRI AN RESERVOIR		DAU TIENG RESERVOIR		ANALYSIS METHOD
			March 11, 2013		March 12, 2013		
			Position (1)	Position (2)	Position (1)	Position (2)	
26	T – P	mg/l	0.09	0.08	0.11	0.09	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	2,000	1,000	4,500	5,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	94,972	75,913	51,824	68,852	Andersen Method
29	Total Iron (Fe)	mg/l	0.3	0.4	0.3	0.3	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.005	0.005	0.01	0.01	TCVN 6002-95
31	Anionic Surfactant	mg/l	0.23	0.14	KPH	KPH	SMEWW5540C:2005
32	Odor	Sense	KPH	KPH	KPH	KPH	SMEWW 2150-98
33	Floride (F)	mg/l	KPH	KPH	KPH	0.11	SMEWW 4500-F
34	Cyanide (CN)	mg/l	KPH	KPH	KPH	KPH	TCVN 6181-1996
35	Arsenic (As)	mg/l	KPH	KPH	KPH	KPH	SMEWW 3500-2005
36	Cadmium (Cd)	mg/l	KPH	KPH	KPH	KPH	SMEWW 3500-2005
37	Lead (Pb)	mg/l	KPH	KPH	KPH	KPH	SMEWW 3500-2005
38	Chromium VI (Cr6+)	mg/l	KPH	KPH	KPH	KPH	SMEWW 3500-2005
39	Copper (Cu)	mg/l	KPH	KPH	KPH	KPH	SMEWW 3500-2005
40	Zinc (Zn)	mg/l	KPH	KPH	0.017	KPH	SMEWW 3500-2005
41	Nickel (Ni)	mg/l	KPH	KPH	KPH	KPH	SMEWW 3500-2005
42	Mercury (Hg)	mg/l	KPH	KPH	KPH	KPH	SMEWW 3112B-2005
43	Total Oil and Grease	mg/l	0.037	KPH	KPH	KPH	SMEWW 5520B-2005
44	Total Phenol	µg/l	KPH	KPH	0.11	KPH	KTSK21-GCMS
45	Potassium Permanganate (KMnO4)	mg/l	1.2	1.2	1.4	1.4	Oxidation KMnO4

NOTE:

- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- The detail results of Items show in appendix (2) & (3)

VI. GENERAL REMARKS:

Based on the water quality analysis results of Tri An and Dau Tiếng lake at a sampling time in rainy season and dry season, the following remarks are highlighted :

Tri An lake:

From the Tri An lake water sample analysis results on chemical-physical and microbiological parameters, it is shown that, in general, the water quality is fairly good at the 2 positions (1) and (2) during the rainy season and the dry season. The water can be used for the purpose of domestic water supply, agricultural irrigation and aquaculture. The chemical and physical factors such as: pH, turbidity, suspended solids, color, chloride, iron, manganese... have normal value reach the standard limits of type A2 of QCVN 08:2008.

The amount of organic substances with Nitrogen, Phosporus in the water sample is still at an acceptable level, not yet causing heavy pollution to the water environment. The amount of bacteria in the water sample at the 2 positions is still at the standard limits type A2 of National technical regulation on surface water quality (QCVN 08:2008 / BTNMT).

However, in rainy season, the amount of COD and BOD_5, Ammonium (NH_4) at the 2 positions (1) and (2) is higher than the A2 type standard limits of QCVN 08:2008. This is a sign of probable contamination of the water quality recently (the possible cause could be from local points such as drainage-ditch from sugar mills, the surroundings of fish breeding areas where the amount of food residues are discharged into the water, same as fish droppings during their evolution, the untreated plant's waste water or the uncontrolled sand mining bank which seriously affected the water quality of the entire region). In dry season, the amount of COD, BOD_5 is lower, around 15 – 16 mg/l, and nearly reach the standard limits of type A2 of QCVN 08:2008.

The water quality at the two positions has no significant difference (in both seasons) .

Other factors as heavy metals, oil and grease, surface-active substances, phenol in dry season are not considerable, they are in or close to the authorised limits (A2 type of QCVN 08:2008) (except for the total of oil and grease at position (1) with a slight increase to 0.037 mg/l compared to the standards). The amount of TOC and DOC of the phase 2 (dry season) at the 2 positons is slightly higher than the amount of the phase 1 (rainy season).

❖ **Phytoplankton**

In dry season 2013, Phytoplankton in Tri An Lake is recorded 45 species, compared with in rainy season 2012, the total number of species increased more than 9 species, belonging to 4 algae phylum including Cyanophyta, Chlorophyta, Bacillariophyta and Dinophyta. The species composition of phytoplankton in this area are mostly freshwater species.

The number of species of Phytoplankton in Tri An Lake increases significantly in dry season 2013. Specifically, at position (1) there is an increase of 9 species (from 28 species to 37 species), at position (2) there is an increase of 7 species (from 32 to 39 species).

The density of Phytoplankton in Tri An Lake has a big variation. In rainy season 2012, the density of phytoplankton ranges from 61,339 to 79,108 cells/liter, while in dry season 2013, it ranges from 75,913 to 94,972 cells/liter. This big increase is from the contribution of Chlorophyta in amount and in density as well.

❖ **Zooplankton**

The results of species composition and individual density of Zooplankton of both survey phases (in rainy season 2012 and in dry season 2013) at 2 sampling positions in Tri An Lake are relatively low. The total of species in rainy season 2012 (phase 1) recorded 9 species belonging to 4 groups, and in dry season 2013 (phase 2) recorded 5 species belonging to 4 groups.

Such as, the structure of species had difference between phase 1 and phase 2. Compared with phase 1, the total of species in phase 2 has decreased to 5 species,

and all the number of species in each group has decreased from 1 to 2 species/group. Except for the appearance of a new group which is Amoebozoa in phase 2, and the absence of Rotifera group.

The number of species and the individuals density of Zooplankton, at each sampling site, varies a lot in accordande with the time, all the sampling sites in phase 2 has a huge decrease in number of species and individual density. Compared to phase 1, the decrease at position (1) is 2 species/site and 11,000 individual/m^3, at position (2) is 6 species/site and 79,000 individual/m^3 .

Dau Tieng lake:

From the Dau Tieng lake water sample analysis results on chemical-physical and microbiological parameters, it is shown that at the 2 locations (1) and (2) during the rainy season, has the results of COD and BOD have far exceeded the A2 type standard limits of surface water environment (COD > 15 mg/l, BOD > 6 mg/l and NH_4-N> 0,2). The reasons are from existing households still having fish-feeding on the lake, livestock farms, rubber treatment plants, sand exploitation bank... still in operation and discharge waste matters, waste water into the lake affecting the lake environment. In dry season, the wate quality is rather better. The other chemical and physical factors such as : pH, turbidity, suspended solids, color, chlorur, iron, manganese .....and microbiological contents are in the limits of type A2 of QCVN 08:2008.

Like Tri An lake, there is no significant difference in the water quality between the 2 locations (1) and (2) (for both seasons) except for the amount of plankton which has an abnormal variation and is significantly different between the 2 seasons and the 2 locations.

Other factors as heavy metals, oil and grease , surface-active substances, phenol in dry season are not considerable, they are in or close to the authorised limits (A2 type of QCVN 08:2008). The amount of TOC and DOC of the phase 2 (dry season) at the 2 positions is slightly higher than the amount of the phase 1 (rainy season).

❖ **Phytoplankton**

The analysis result species composition of Phytoplankton of Dau Tieng Lake in dry season 2013 is recorded 64 species, compared with in rainy season 2012, the total number of species increased more than 22 species. They all belong to 5 algae phylum including Cyanophyta, Chrysophyta, Chlorophyta, Bacillariophyta and Dinophyta. The species composition of phytoplankton in this area are mostly freshwater species.

The number of species of Phytoplankton in Dau Tieng Lake increases significantly in dry season 2013. Specifically, at position (1) there is an increase of 17 species (from 38 species to 55 species), at position (2) there is an increase of 17 species (from 36 to 53 species).

The cells density of Phytoplankton in Dau Tieng Lake also has a big variation. In rainy season 2012, the cells density ranges from 40,009 to 51,461cells/liter, while in dry season 2013, it ranges significantly from 51,824 to 68,852 cells/liter. This big increase is from the abloom of Cyanophyta in addition with the increase of Chlorophyta in amount.

❖ **Zooplankton**

Species composition of Zooplankton in Dau Tieng Lake typically are in fresh water, these are species adaptive with the ponds, lakes, rivers and fresh water springs. Through both survey phase rainy season 2012 (phase 1) and dry season 2013 (phase 2) at 2 sampling positionss, it is shown that :

The total number of species in phase 2 decreases significantly compared to phase 1 (from 18 species decrease to 8 species), all the groups has the tendency to decrease from 1 – 5 species/group. The structure of species, in phase 2, is the appeareance of the new group of Amoebozoa, but Rotifera is completely absent.

The number of species and the individuals density of Zooplankton, which recorded at 2 sampling positions in phase 2, have deceased a huge compared with phase 1. Specifically, at position (1) there is a decrease to 1 specie/site and 8,500

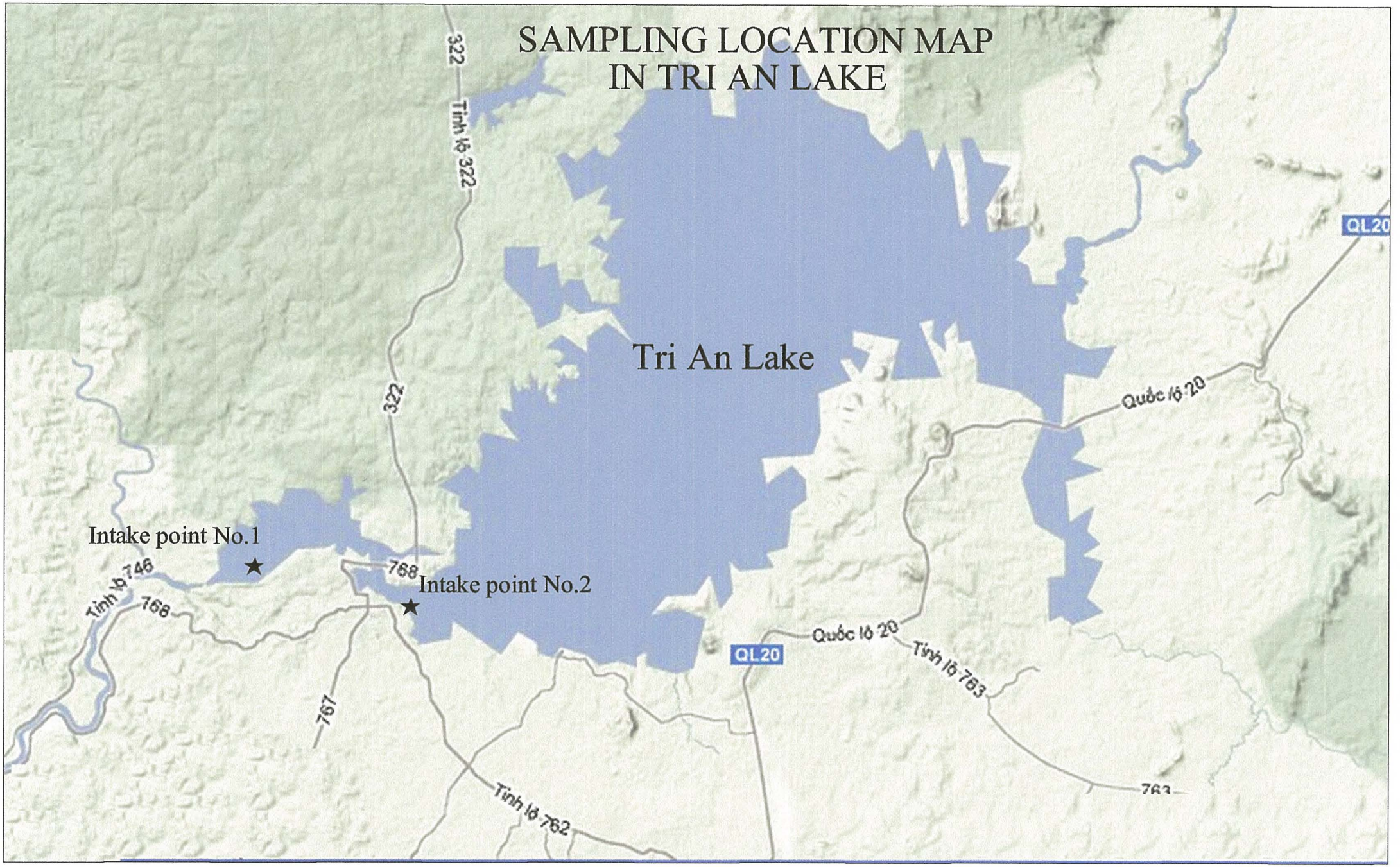
individual/m^3, and at position (2) it decreases to 3 species/site and 75,000 individual/m^3.

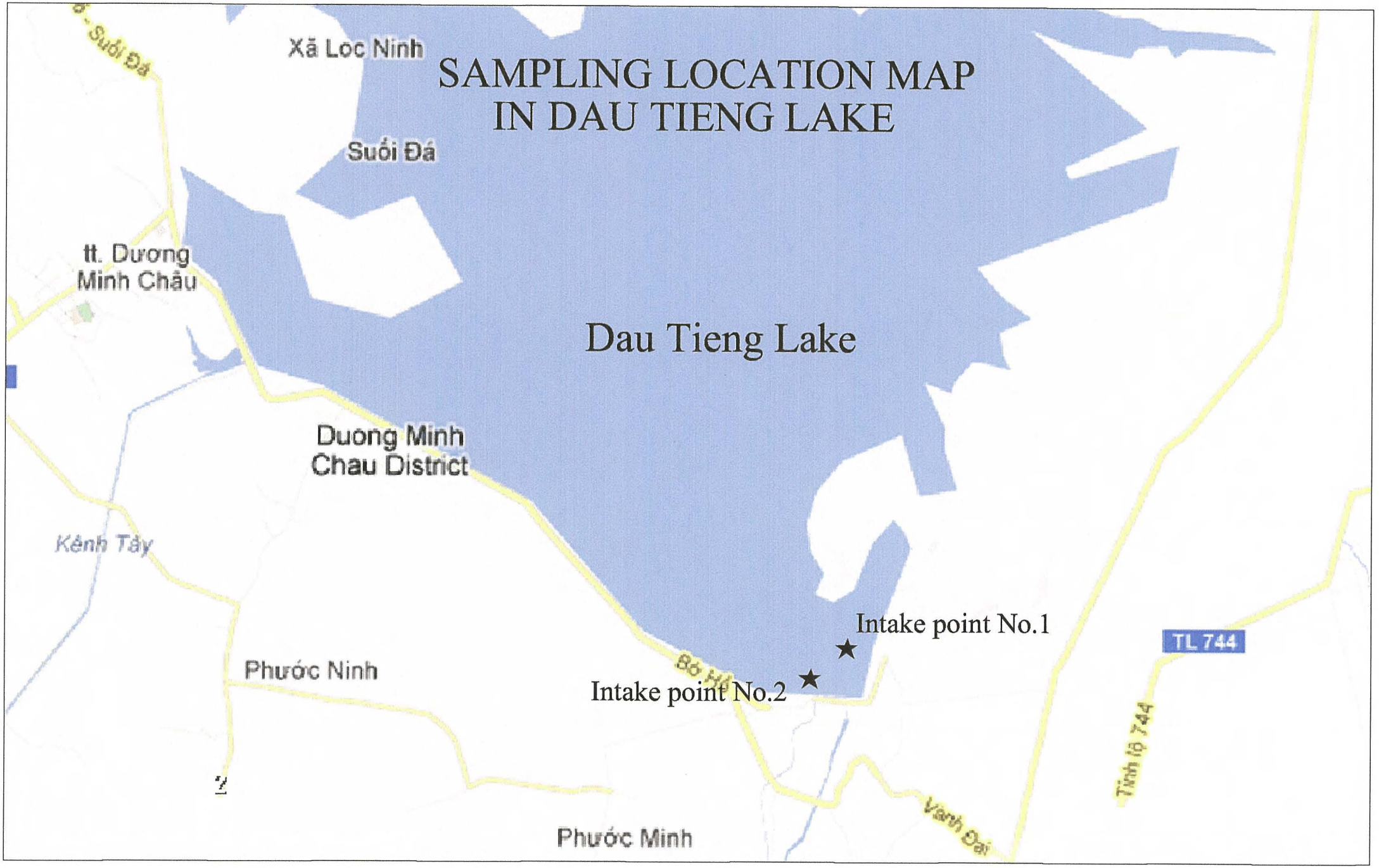
VII. CONCLUSION

According to the analysis results, the water quality in general, in the 2 positions of Tri An Lake and Dau Tieng Lake is fairly good, meeting water domestic supply needs through the normal treatment processes. However, it is required to intensify the supervision on the households doing aquaculture on the lake, on the waste discharge from livestock farms, from treatment plants, to closely manage the water quality of the lake, to dredge the lake basin.... in order to keep a clean environment. As the water quality analysis have been conducted only at 2 periods and at 2 selected positions, it is not sufficient to have a more accurated and more complete basis to assess the water quality of the 2 lakes.

APPENDIX I

LOCATION MAP OF WATER SAMPLING IN TRI AN LAKE AND HO DAU TIENG LAKE


SAMPLING LOCATION MAP
IN TRI AN LAKE
Tri An Lake
Intake point No.1
Intake point No.2
322
Tỉnh lộ 322
QL20
Quốc lộ 20
Tỉnh lộ 746
768
767
Tỉnh lộ 763
Tỉnh lộ 762


SAMPLING LOCATION MAP
IN DAU TIENG LAKE
Xã Lộc Ninh
Suối Đá
tt. Dương
Minh Châu
Dau Tieng Lake
Dương Minh
Châu District
Kênh Tây
Intake point No.1
Intake point No.2
TL 744
Phước Ninh
Phước Minh
Tỉnh lộ 744

APPENDIX II

FIGURES AND DIAGRAM CHARTS OF WATER QUALITY ANALYSIS IN TRI AN LAKE

WATER SUPPLY, SEWERAGE & ENVIRONMENT CONSULTANT JS COMPANY
10 Pho Quang Street, Ward 2 – Tan Binh District, Ho Chi Minh City
Phone: (08) 38475164 - (08) 38475165

No : 12-10-101 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Dong Nai Province – Vinh Cuu District – Tri An Lake
- Place of Sampling : Position (1) Sample Sign : **TA _01**
- Type of Water : Surface Water
- Sampling Date : 11h20 18/10/2012 Testing Date : 18/10/2012
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	31.5	Themometer
2	Temperature of water	oC	28.8	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	2.4×10^4	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	9	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	3.69	TCVN 6634:2000
8	pH	-	7.28	SMEWW 2130-98
9	Turbidity	NTU	10.4	TCVN 6184-96
10	Color	Đv Co	15	TCVN 6185-96
11	COD	mg/l	27.76	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	2.3×10^1	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	36.7	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	10	SMEWW 2540-98
15	Alkalinity	mg/l	12	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.4	SMEWW 2540-98
17	BOD 5	mg/l	8	SMEWW 5210-B
18	UV Absorption (E260)	-	KPH (LOD=0.01)	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	18.5	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.75	TCVN 6179-96

21	Nitrite (NO_2) as N	mg/l	0.01	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.1	TCVN 6180-96
23	T – N	mg/l	2.2	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	3.60	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.15	SMEWW 4500-P-D
26	T – P	mg/l	0.07	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	13,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	61,339	Andersen Method
29	Total Iron (Fe)	mg/l	0.6	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.010	TCVN 6002-95
31	Anionic Surfactant	mg/l	KPH(LOD=0.06)	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

November 02, 2012

Vice Director (WASE)

S.Đ.K.K.D: 0300394676-C.T.C.P
CÔNG TY CỔ PHẦN TƯ VẤN CẤP THOÁT NƯỚC VÀ MÔI TRƯỜNG
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Phone: (08) 38475164 - (08) 38475165

No : 12-10-102 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Dong Nai Province – Vinh Cuu District – Tri An Lake
- Place of Sampling : Position (2) Sample Sign : **TA _02**
- Type of Water : Surface Water
- Sampling Date : 11h00 18/10/2012 Testing Date : 18/10/2012
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	31.0	Themometer
2	Temperature of water	oC	29.5	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	4.6×10^4	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	8	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	4.44	TCVN 6634:2000
8	pH	-	7.37	SMEWW 2130-98
9	Turbidity	NTU	7.7	TCVN 6184-96
10	Color	Đv Co	15	TCVN 6185-96
11	COD	mg/l	24.33	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	9	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	36.1	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	8	SMEWW 2540-98
15	Alkalinity	mg/l	12	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.45	SMEWW 2540-98
17	BOD 5	mg/l	8.5	SMEWW 5210-B
18	UV Absorption (E260)	-	0.0914	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	18.5	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.47	TCVN 6179-96

21	Nitrite (NO_2) as N	mg/l	0.01	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.15	TCVN 6180-96
23	T – N	mg/l	2.15	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	4.07	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.10	SMEWW 4500-P-D
26	T – P	mg/l	0.06	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	80,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	79,108	Andersen Method
29	Total Iron (Fe)	mg/l	0.58	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.010	TCVN 6002-95
31	Anionic Surfactant	mg/l	KPH(LOD=0.06)	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

November 02, 2012

Vice Director (WASE)

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Phone: (08) 38475164 - (08) 38475165

No : 13-03-03 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Dong Nai Province – Vinh Cuu District – Tri An Lake
- Place of Sampling : Position (1) Sample Sign : **TA _01**
- Type of Water : Surface Water
- Sampling Date : 10h20 11/03/2013 Testing Date : 11/03/2013
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	33.4	Themometer
2	Temperature of water	oC	30.9	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	9.3×10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	8	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	6.67	TCVN 6634:2000
8	pH	-	6.97	SMEWW 2130-98
9	Turbidity	NTU	4.75	TCVN 6184-96
10	Color	Đv Co	10	TCVN 6185-96
11	COD	mg/l	16.0	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	2.3×10^1	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	46	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	7	SMEWW 2540-98
15	Alkalinity	mg/l	18	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.6	SMEWW 2540-98
17	BOD 5	mg/l	8	SMEWW 5210-B
18	UV Absorption (E260)	-	0,7628	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	22.8	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.48	TCVN 6179-96
21	Nitrite (NO_2) as N	mg/l	0.008	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.1	TCVN 6180-96

23	T – N	mg/l	3.75	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	5.99	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.27	SMEWW 4500-P-D
26	T – P	mg/l	0.09	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	2,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	94,972	Andersen Method
29	Total Iron (Fe)	mg/l	0.3	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.005	TCVN 6002-95
31	Anionic Surfactant	mg/l	0,23	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98
33	Floride (F)	mg/l	KPH(LOD=0.01)	SMEWW4500:2005
34	Cyanide (CN)	mg/l	KPH(LOD=0.005)	TCVN 6181-1996
35	Arsenic (As)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
36	Cadmium (Cd)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
37	Lead (Pb)	mg/l	KPH(LOD=0.001)	SMEWW3500:2005
38	Chromium IV (Cr^{6+})	mg/l	KPH(LOD=0.01)	SMEWW3500:2005
39	Copper (Cu)	mg/l	KPH(LOD=0.02)	SMEWW3500:2005
40	Zinc (Zn)	mg/l	KPH(LOD=0.01)	SMEWW3500:2005
41	Nickel (Ni)	mg/l	KPH(LOD=0.05)	SMEWW3500:2005
42	Mercury (Hg)	mg/l	KPH(LOD=0.0001)	SMEWW3112B:2005
43	Total oil and Gease	mg/l	0.037	SMEWW5520B:2005
44	Total phenol	µg/l	KPH(LOD=0.02)	KTSK 21-GCMS
45	Potassium Permanganate	mg/l	1,2	Oxidation $KMnO_4$

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

March 25, 2013

Vice Director (WASE)

CÔNG TY CỔ PHẦN TƯ VẤN CẤP THOÁT NƯỚC VÀ MÔI TRƯỜNG

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Phone: (08) 38475164 - (08) 38475165

No : 13-03-04 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Dong Nai Province – Vinh Cuu District – Tri An Lake
- Place of Sampling : Position (2) Sample Sign : **TA _02**
- Type of Water : Surface Water
- Sampling Date : 10h00 11/03/2013 Testing Date : 11/03/2013
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	33.8	Themometer
2	Temperature of water	oC	30.6	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	7.9×10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	8	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	6.15	TCVN 6634:2000
8	pH	-	7.05	SMEWW 2130-98
9	Turbidity	NTU	5.12	TCVN 6184-96
10	Color	Đv Co	10	TCVN 6185-96
11	COD	mg/l	15.0	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	2.1×10^1	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	47	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	6	SMEWW 2540-98
15	Alkalinity	mg/l	18	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.65	SMEWW 2540-98
17	BOD 5	mg/l	9	SMEWW 5210-B
18	UV Absorption (E260)	-	0.5130	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	23.4	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.50	TCVN 6179-96
21	Nitrite (NO_2) as N	mg/l	0.007	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.09	TCVN 6180-96

23	T – N	mg/l	3.52	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	3.60	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.26	SMEWW 4500-P-D
26	T – P	mg/l	0.08	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	1,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	75,913	Andersen Method
29	Total Iron (Fe)	mg/l	0.4	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.005	TCVN 6002-95
31	Anionic Surfactant	mg/l	0.14	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98
33	Floride (F)	mg/l	KPH(LOD=0.01)	SMEWW4500:2005
34	Cyanide (CN)	mg/l	KPH(LOD=0.005)	TCVN 6181-1996
35	Arsenic (As)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
36	Cadmium (Cd)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
37	Lead (Pb)	mg/l	KPH(LOD=0.001)	SMEWW3500:2005
38	Chromium IV (Cr^{6+})	mg/l	KPH(LOD=0.01)	SMEWW3500:2005
39	Copper (Cu)	mg/l	KPH(LOD=0.02)	SMEWW3500:2005
40	Zinc (Zn)	mg/l	KPH(LOD=0.01)	SMEWW3500:2005
41	Nickel (Ni)	mg/l	KPH(LOD=0.05)	SMEWW3500:2005
42	Mercury (Hg)	mg/l	KPH(LOD=0.0001)	SMEWW3112B:2005
43	Total oil and Gease	mg/l	KPH (LOD=0.01)	SMEWW5520B:2005
44	Total phenol	µg/l	KPH(LOD=0.02)	KTSK 21-GCMS
45	Potassium Permanganate	mg/l	1.2	Oxidation $KMnO_4$

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

March 25, 2013

Vice Director (WASE)

CÔNG TY CỔ PHẦN TƯ VẤN CẤP THOÁT NƯỚC VÀ MÔI TRƯỜNG

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Nguyễn Chí Hiếu

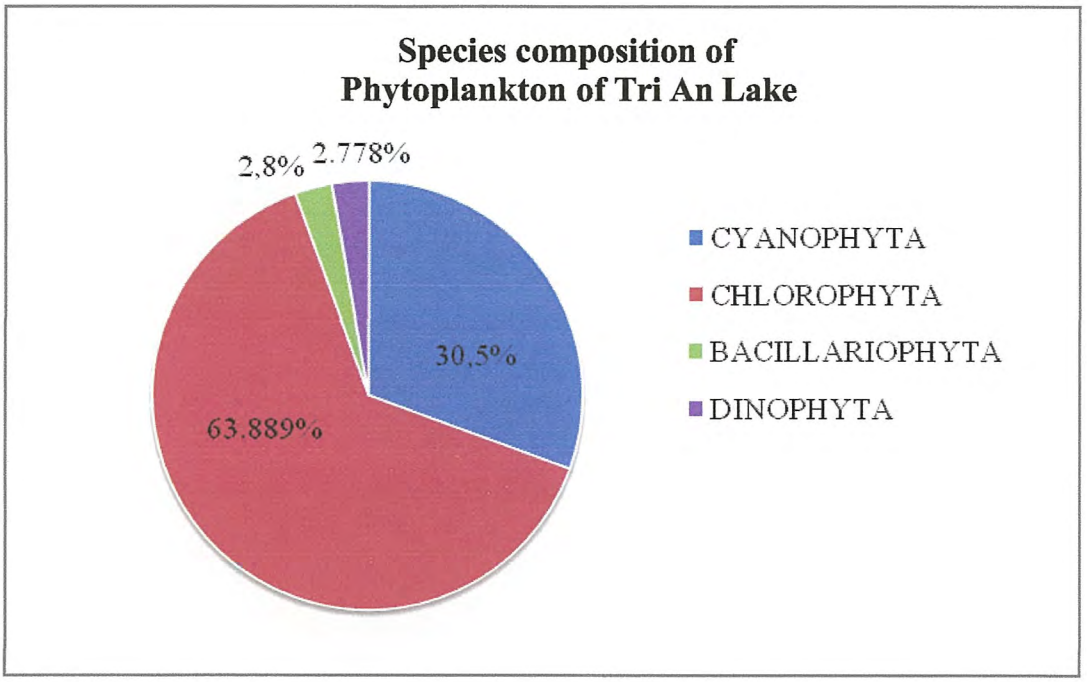
Laboratory

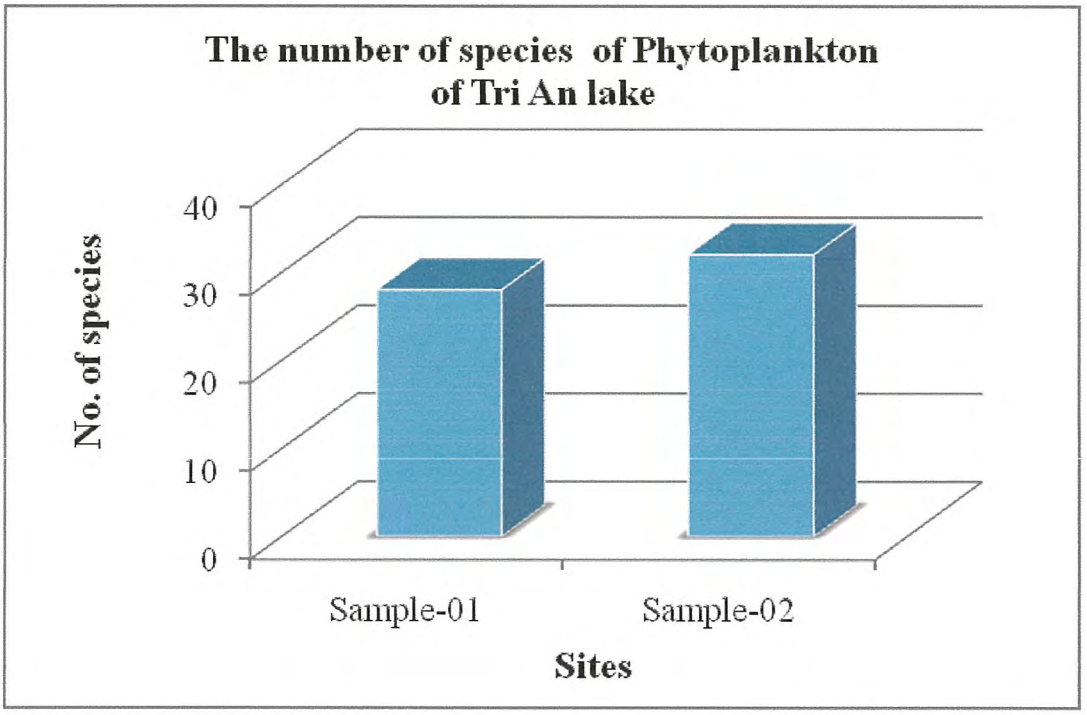
Eng. Tran Tuan Giao

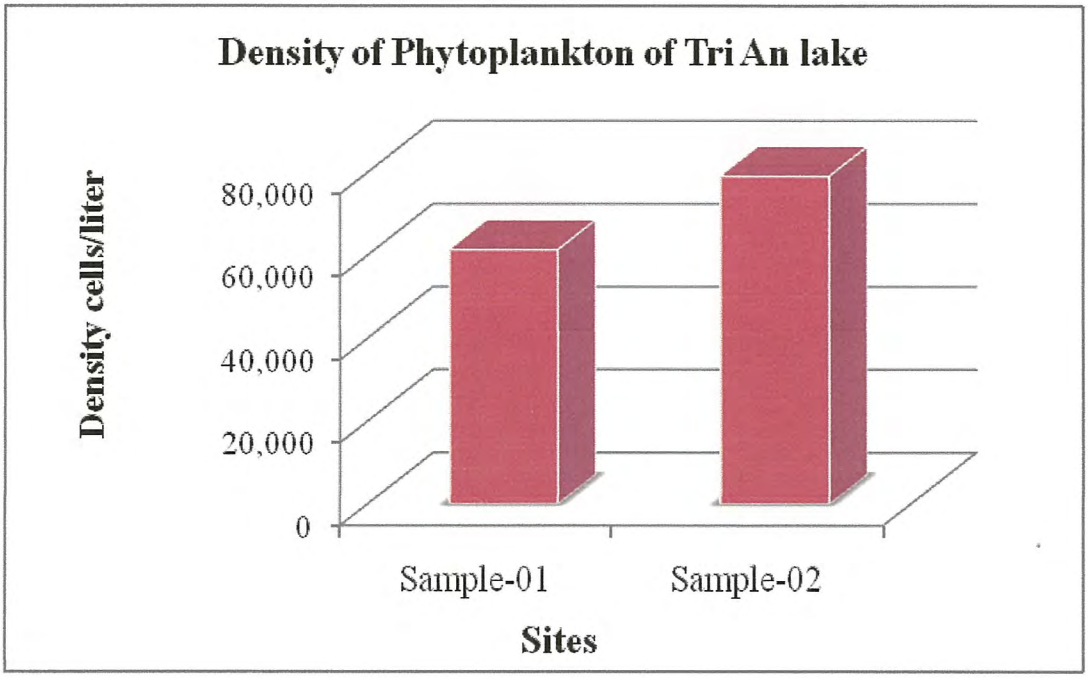
Appendix 1: Composition and density of Phytoplankton in Tri An lake Area

Phase 1 - 18/10/2012 (Rain Season)

No.	Taxon	Sites	
		Sample-01	Sample-02
	CYANOPHYTA		
1	*Anabaena circinalis* (Rabenhorst, 1863)	117	4,480
2	*Anabaena flos-aquae* (Brébisson ex Bornet & Flauhault, 1886)	213	4,427
3	*Anabaena* sp.	5,067	4,533
4	*Aphanocapsa delicatissima* (West et G.S.West, 1912)	8,533	4,800
5	*Microcystis aeruginosa* (Kützing) Kützing, 1846	10,400	18,400
6	*Microcystis botrys* (Teiling, 1942)	4,000	3,200
7	*Microcystis flos - aquae* (Wittrock) Kirchner		6,933
8	*Microcystis wesenbergii* (Komárek, 1968)	15,467	16,160
9	*Oscillatoria limosa* (C.Agardh et Gomont, 1892)	128	640
10	*Pseudanabaena mucicola* (Naumann & Huber-Pestalozzi) Schwabe, 1964	1,600	1,333
11	*Stigonema ocellatum* ((Dillwyn) Thuret ex Bornet & Flahault, 1886		1,280
	CHLOROPHYTA		
12	*Arthrodesmus convergens* (Ehrenberg ex Ralfs, 1848)	16	
13	*Cosmarium contractum* (O.Kirchner, 1878)	32	139
14	*Cosmarium granatum* (Brébisson ex Ralfs, 1848)		48
15	*Cosmarium moniliforme* (Ralfs, 1848)	144	421
16	*Cosmarium tinctum* (Ralfs, 1848)		91
17	*Cosmarium* sp.	11	133
18	*Dictyosphaerium pulchellum* (H.C.Wood, 1872)		267
19	*Eudorina elegans* (Ehrenberg, 1832)	128	
20	*Micrasterias tropica* (Nordstedt, 1870)		5
21	*Oocystis borgei* (J.Snow, 1903)	85	
22	*Pediastrum duplex* (Meyen, 1829)	171	
23	*Staurastrum arctiscon* (Ehrenberg ex Ralfs) P.Lundell, 1871	533	592
24	*Staurastrum chaetoceras* (Schröder) G.M.Smith, 1924		91
25	*Staurastrum dejectum* (Brébisson, 1848)	128	491
26	*Staurastrum dickiei* (Ralfs, 1848)	69	544
27	*Staurastrum gracilie* (Ralfs, 1848)	256	442
28	*Staurastrum javanicum* (Nordstedt) W.B.Turner, 1893	75	107
29	*Staurastrum natator* (W.West, 1892)	149	155
30	*Staurastrum setigerum* (Cleve, 1864)		11
31	*Staurastrum paradoxum* (Meyen ex Ralfs,1848)	16	32
32	*Staurastrum wildemanii* (Gutwinski)	11	58
33	*Staurastrum* sp.	405	1,280
34	*Volvox aureus* (Ehrenberg, 1832)	2,667	1,600
	BACILLARIOPHYTA		
35	*Melosira granulata* (Ehr.) Ralfs, 1861	10,901	6,325
	DINOPHYTA		
36	*Ceratium hirundinella* (O.F.Müller) Dujardin, 1841	16	91
Total of species		**28**	**32**
Total quantity cells/liter		**61,339**	**79,108**


Species composition of
Phytoplankton of Tri An Lake
2,8%
2.778%
30,5%
63.889%
CYANOPHYTA
CHLOROPHYTA
BACILLARIOPHYTA
DINOPHYTA

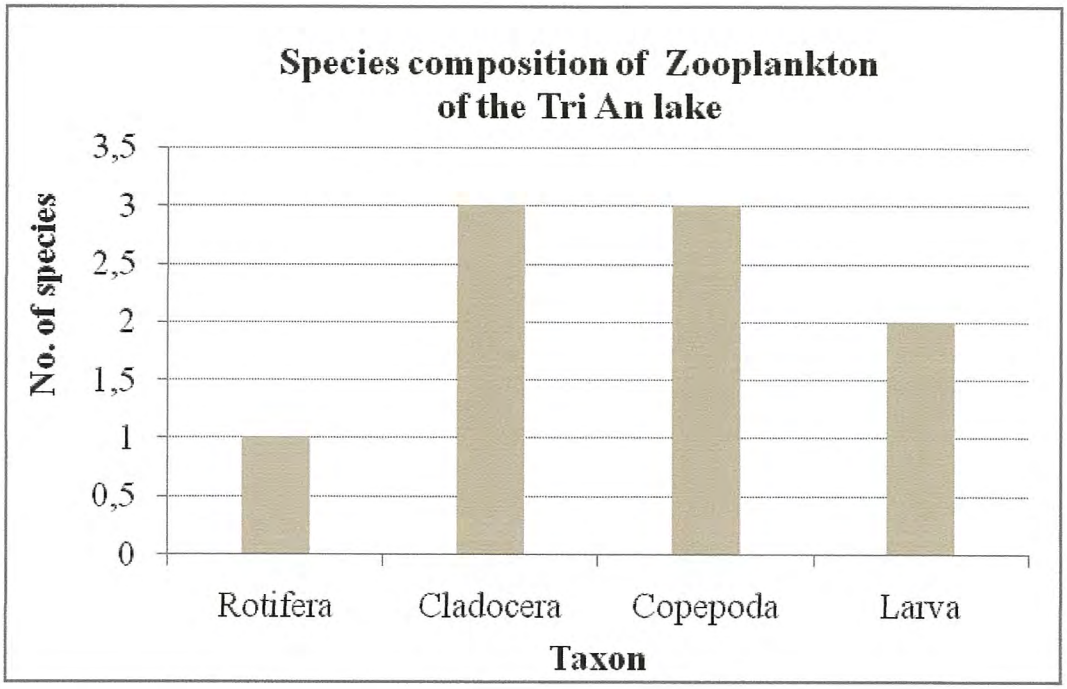

The number of species of Phytoplankton
of Tri An lake
No. of species
40
30
20
10
0
Sample-01
Sample-02
Sites

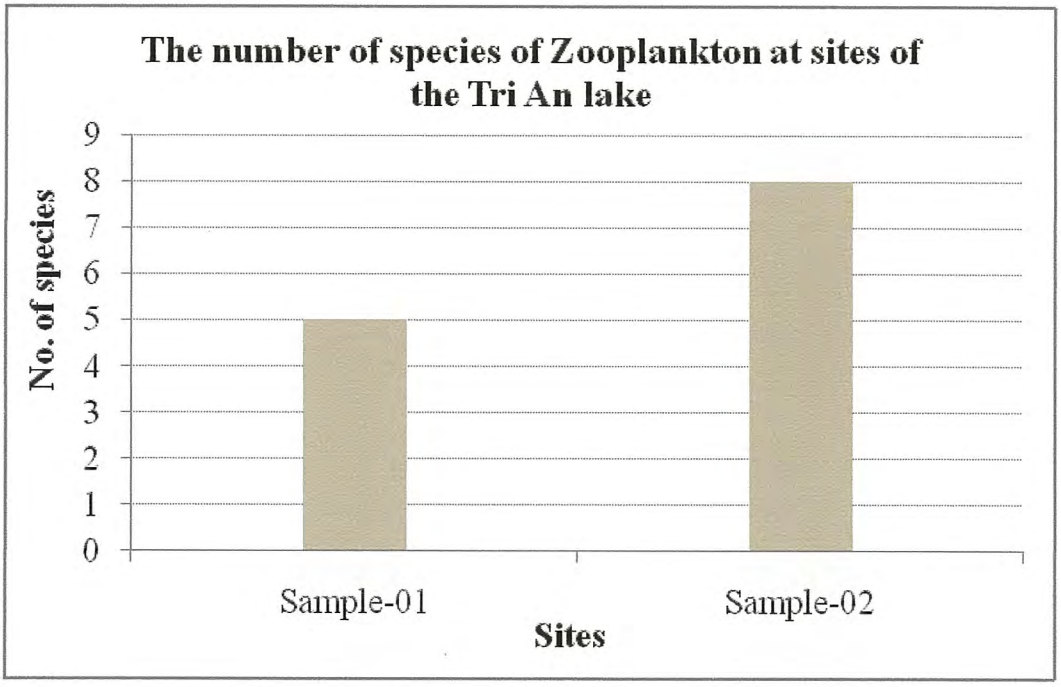

Density of Phytoplankton of Tri An lake
Density cells/liter
80,000
60,000
40,000
20,000
0
Sample-01
Sample-02
Sites

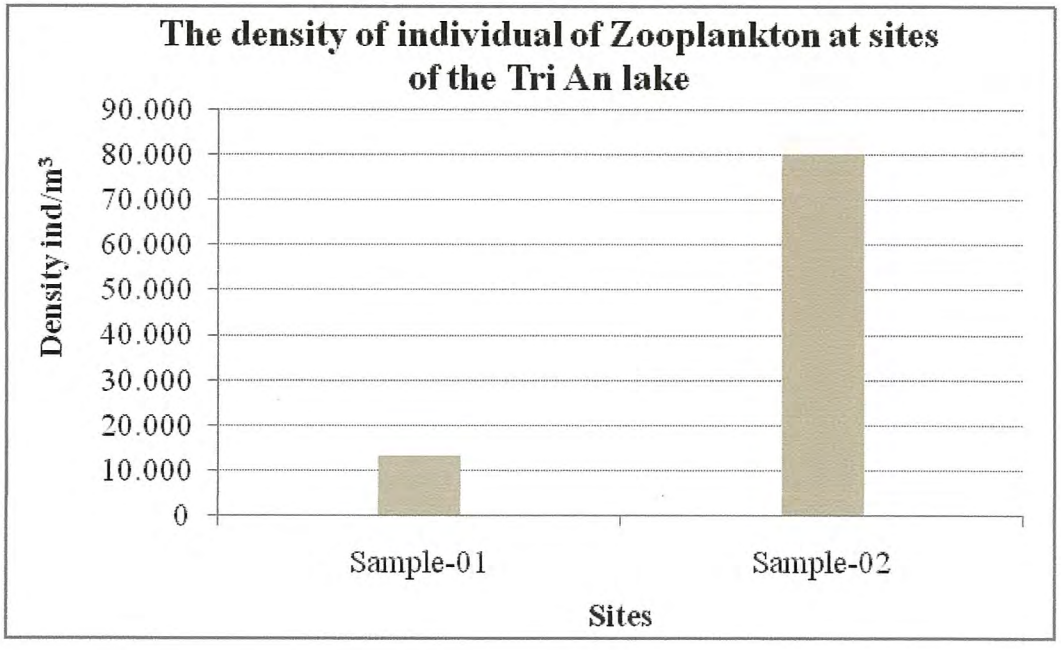
Appendix 2: Composition and density of Zooplankton in Tri An lake Area

Phase 1 - 18/10/2012 (Rain Season)

No.	Taxon	Sites	
		Sample-01	Sample-02
	Phylum Rotifera		
	Class Monogononta		
	Family Conochilidae		
1	*Conochiloides dossuarius* (Hudson, 1885)		30,000
	Phylum Arthropoda		
	Class Branchiopoda		
	Order Cladocera		
	Family Chydoridae		
2	*Chydorus sphaericus sphaericus* (O.F. Müller, 1785)		1,500
	Family Daphniidae		
3	*Ceriodaphnia rigaudi* Richard, 1894	4,000	30,000
4	*Simocephalus elizabethae* (King, 1853)	6,500	14,000
	Class Copepoda		
	Order Cyclopoida		
	Family Cyclopidae		
5	*Mesocyclops leuckarti* (Claus, 1857)	500	500
6	*Tropocyclops prasinus* (Fischer, 1860)		3,000
	Order Calanoida		
	Family Diaptomidae		
7	*Allodiaptomus gladiolus* Shen & Lee, 1963		500
	Larva		
8	*Bivalvia larva*	500	
9	*Copepoda nauplius*	1,500	500
Total of species		**5**	**8**
Total ind./m3		**13,000**	**80,000**


Species composition of Zooplankton of the Tri An lake
No. of species
3,5
3
2,5
2
1,5
1
0,5
0
Rotifera
Cladocera
Copepoda
Larva
Taxon

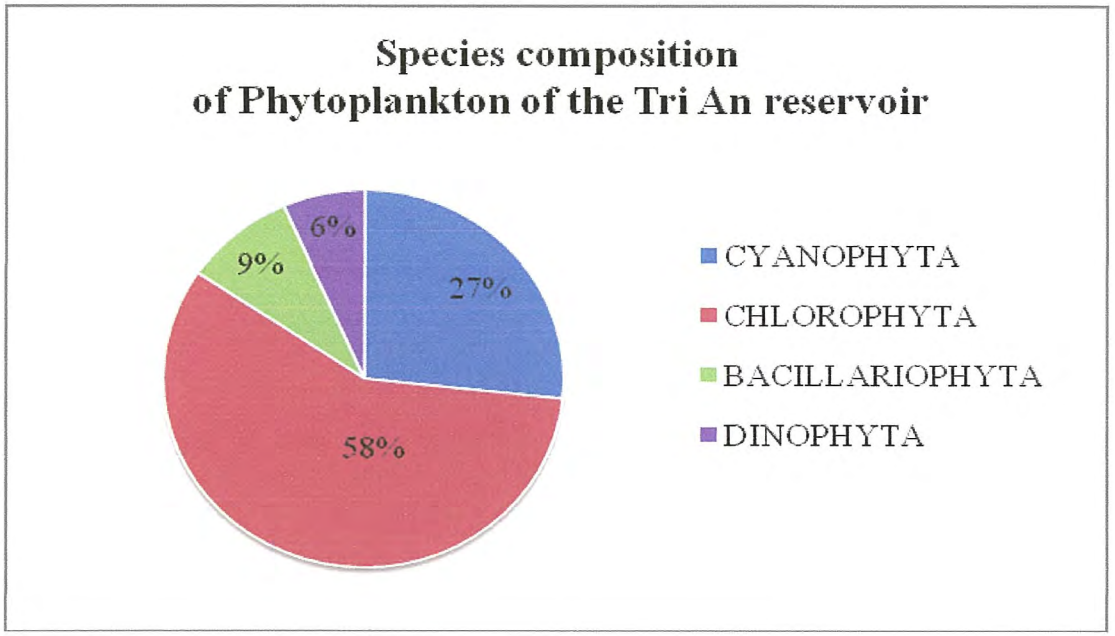

The number of species of Zooplankton at sites of the Tri An lake
No. of species
9
8
7
6
5
4
3
2
1
0
Sample-01
Sample-02
Sites

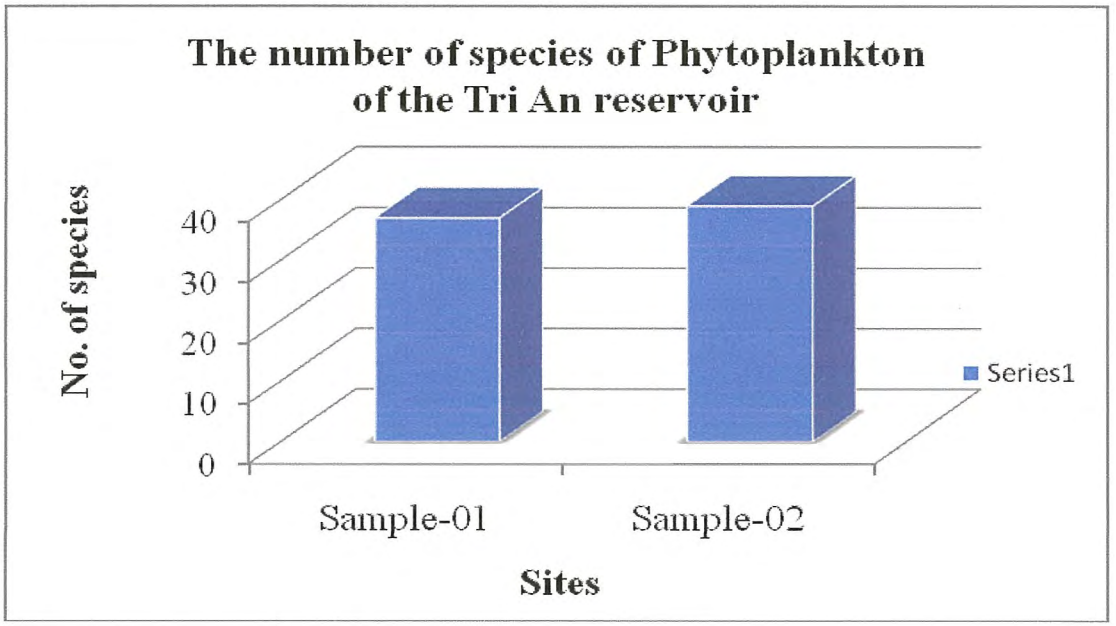

The density of individual of Zooplankton at sites of the Tri An lake
Density ind/m3
90.000
80.000
70.000
60.000
50.000
40.000
30.000
20.000
10.000
0
Sample-01
Sample-02
Sites

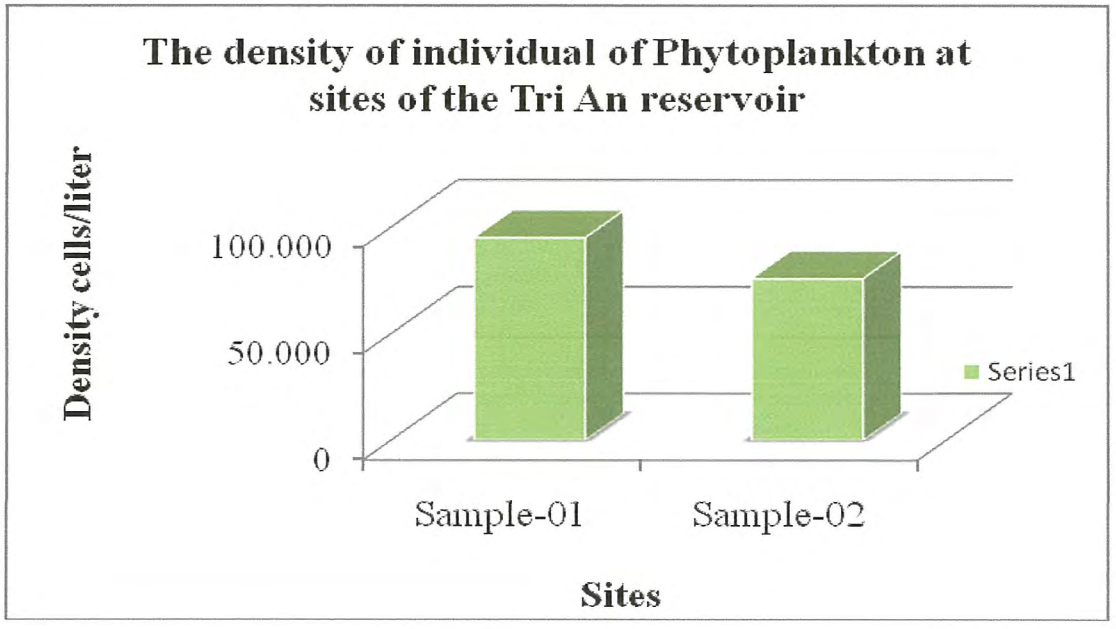
Appendix 3: Composition and density of Phytoplankton in Tri An lake
Phase 2 – March 11, 2013 (Dry Season)

No.	Taxon	Sites	
		Sample-01	Sample-02
	CYANOPHYTA		
1	*Anabaena circinalis* Rabenhorst, 1863	500	880
2	*Anabaena* sp1.	580	2.184
3	*Anabaena* sp2.	684	2.728
4	*Coelosphaerium kuetzinggianum* Naegeli, 1849	200	
5	*Microcystis aeruginosa* (Kützing) Kützing, 1846	11.400	8.100
6	*Microcystis botrys* Teiling, 1942	3.000	1.300
7	*Microcystis protocystis* Crow, 1923	600	3.800
8	*Microcystis wesenbergii* Komárek, 1968	1.940	2.700
9	*Oscillatoria perornata* Skuja, 1949	2.686	429
10	*Oscillatoria princeps* Vaucher ex Gamont, 1892	1.800	2.000
11	*Pseudanabaena mucicola* (Naumann & H.Pestalozzi) Schwabe, 1964	600	1.000
12	*Stigonema ocellatum* ((Dillwyn) Thuret ex Bornet & Flahault, 1886	2.000	200
	CHLOROPHYTA		
13	*Cosmarium contractum* O.Kirchner, 1878	4.212	2.700
14	*Cosmarium moniliforme* Ralfs, 1848	180	300
15	*Cosmarium obsoletum* (Hantzsch) Reinsch	2	
16	*Cosmarium* sp.	288	234
17	*Coscinodiscus asteromphalus* Ehrenberg, 1844	18	6
18	*Coscinodiscus excentricus* Ehrenberg, 1839		4
19	*Coscinodiscus subtilis* Ehrenberg, 1841	18	8
20	*Dictyosphaerium reniforme* Bulnheim, 1859		400
21	*Dictyosphaerium pulchellum* H.C.Wood, 1872	2.356	2.796
22	*Eudorina elegans* Ehrenberg, 1832	48	72
23	*Gonatozygon aculeatum* Hastings, 1892		2
24	*Kirchneriella obesa* (W.West) Schmidle, 1893		40
25	*Pediastrum simplex*	64	48
26	*Pediastrum duplex* Meyen, 1829	32	
27	*Staurastrum arctiscon* (Ehrenberg ex Ralfs) P.Lundell, 1871	28.080	13.716
28	*Staurastrum dejectum* Brébisson, 1848	1.512	756
29	*Staurastrum dickiei* Ralfs, 1848	756	4.536
30	*Staurastrum freemanii* West & G.S.West	54	18
31	*Staurastrum gracilie* Ralfs, 1848	264	126
32	*Staurastrum limneticum* Schmidle	252	216
33	*Staurastrum pinatum*	72	
34	*Staurastrum* sp1.	20.304	14.364
35	*Staurastrum* sp2.	216	54
36	*Staurodesmus convergens* (Ehrenberg ex Ralfs) S.Lilleroth, 1950	90	
37	*Staurodesmus cuspidatus* var. *curvatus* (West) Teiling, 1967	126	36

No.	Taxon	Sites	
		Sample-01	**Sample-02**
38	*Thalassionema frauenfeldii* (Grunow) Hallegraeff, 1986		4
	BACILLARIOPHYTA		
39	*Melosira granulata* (Ehr.) Ralfs, 1861	9.928	10.020
40	*Pleurosigma angulatum* (Queckett) W.Smith 1852		2
41	*Pleurosigma elongatum* W. Smith, 1852		2
42	*Synedra ulna (Nitzsch)* Ehrenberg, 1832	2	
	DINOPHYTA		
43	*Ceratium hirundinella* (O.F.Müller) Dujardin, 1841	106	90
44	*Peridinium cinctum* (O.F.Müller) Ehrenberg, 1832	2	6
45	*Peridinium* sp.		36
Total of species		**37**	**39**
Total quantity cells/liter		**94.972**	**75.913**

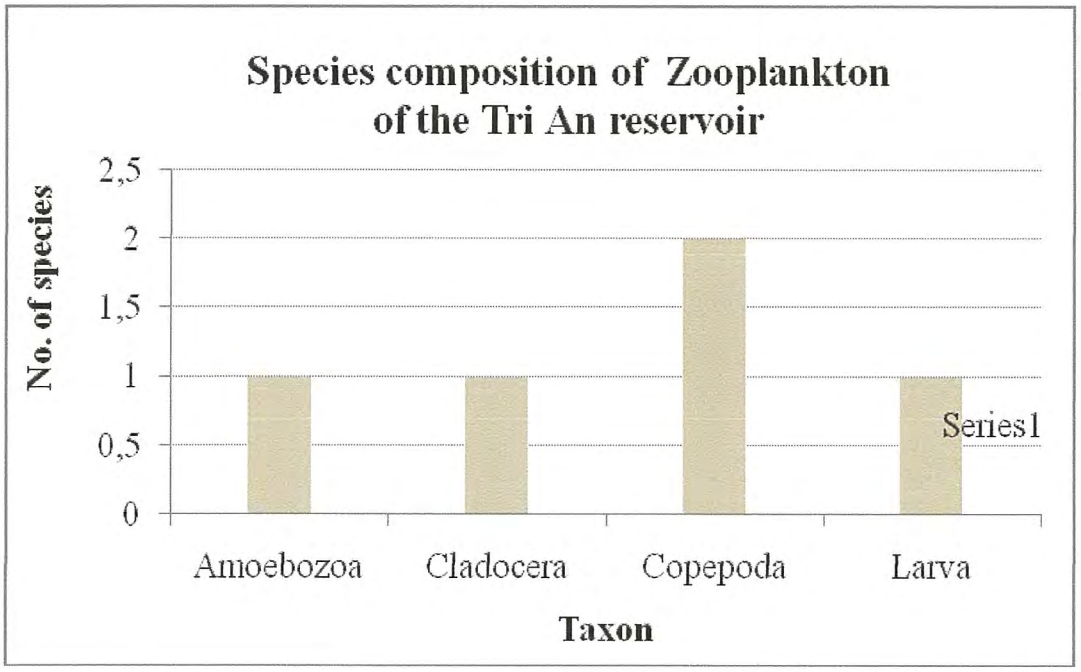

Species composition
of Phytoplankton of the Tri An reservoir
6%
9%
27%
58%
CYANOPHYTA
CHLOROPHYTA
BACILLARIOPHYTA
DINOPHYTA

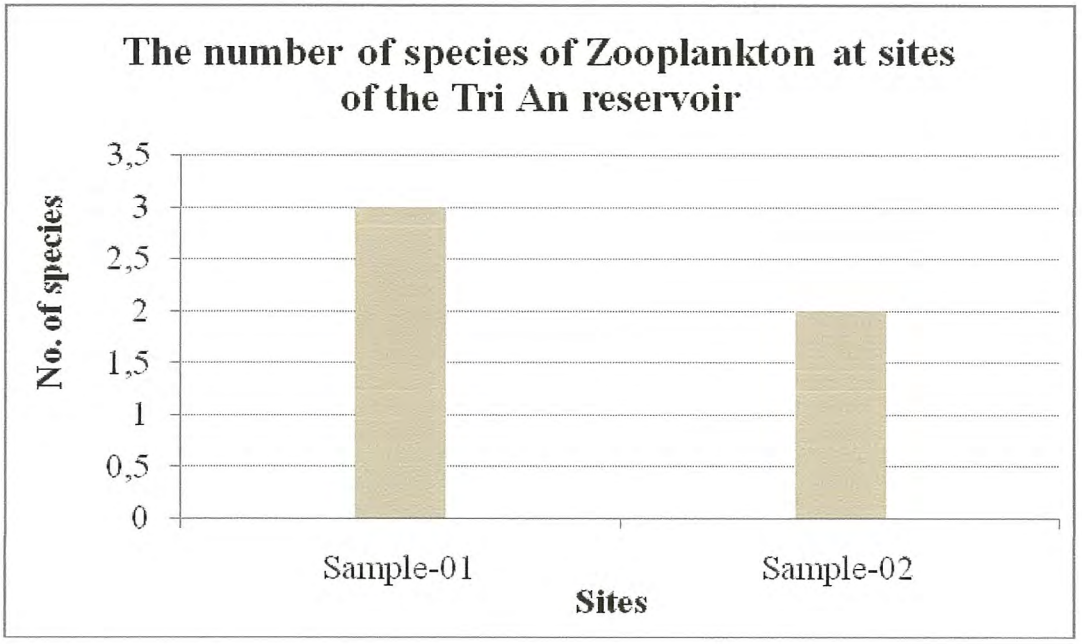

The number of species of Phytoplankton
of the Tri An reservoir
No. of species
40
30
20
10
0
Sample-01
Sample-02
Sites
Series1

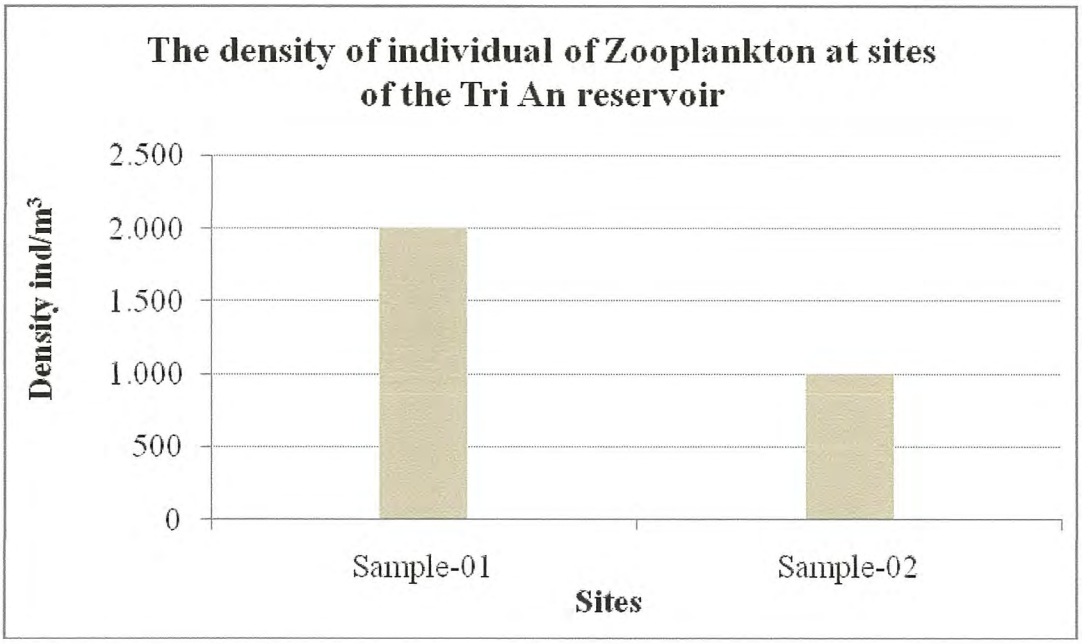

The density of individual of Phytoplankton at
sites of the Tri An reservoir
Density cells/liter
100.000
50.000
0
Sample-01
Sample-02
Sites
Series1

Appendix 4: Composition and density of Zooplankton at Tri An lake Phase 2 – March 11, 2013 (Dry Season)

No.	Taxon	Sites	
		Sample-01	Sample-02
	Phylum Amoebozoa		
	Class Lobosa		
	Order Arcellinida		
	Family Centropyxidae		
1	*Centropyxis aculeata* Stein, 1859		500
	Phylum Arthropoda		
	Class Branchiopoda		
	Order Cladocera		
	Family Daphniidae		
2	*Simocephalus elizabethae* (King, 1853)	500	
	Class Copepoda		
	Order Cyclopoida		
	Family Cyclopidae		
3	*Tropocyclops prasinus* (Fischer, 1860)	1.000	
	Order Calanoida		
	Family Pseudodiaptomidae		
4	*Pseudodiaptomus incisus* Shen & Lee, 1963		500
	Larva		
5	*Copepoda nauplius*	500	
Total of species		**3**	**2**
Total ind./m^3		**2.000**	**1.000**


Species composition of Zooplankton of the Tri An reservoir
No. of species
2,5
2
1,5
1
0,5
0
Series1
Amoebozoa
Cladocera
Copepoda
Larva
Taxon


The number of species of Zooplankton at sites of the Tri An reservoir
No. of species
3,5
3
2,5
2
1,5
1
0,5
0
Sample-01
Sample-02
Sites


The density of individual of Zooplankton at sites of the Tri An reservoir
Density ind/m3
2.500
2.000
1.500
1.000
500
0
Sample-01
Sample-02
Sites

APPENDIX III

FIGURES AND DIAGRAM CHARTS OF WATER QUALITY ANALYSIS IN DAU TIENG LAKE

WATER SUPPLY, SEWERAGE & ENVIRONMENT CONSULTANT JS COMPANY
10 Pho Quang Street, Ward 2 – Tan Binh District, Ho Chi Minh City
Phone: (08) 38475164 - (08) 38475165

No : 12-10-103 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Tây Ninh Province – Dau Tieng District – Dau Tieng Lake
- Place of Sampling : Position (1) Sample Sign : **DT _01**
- Type of Water : Surface Water
- Sampling Date : 11h50 19/10/2012 Testing Date : 19/10/2012
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	34.8	Themometer
2	Temperature of water	oC	30.7	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	3.1×10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	10	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	5.40	TCVN 6634:2000
8	pH	-	6.89	SMEWW 2130-98
9	Turbidity	NTU	9.5	TCVN 6184-96
10	Color	Đv Co	15	TCVN 6185-96
11	COD	mg/l	17.38	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	9.3×10^1	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	37.8	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	9	SMEWW 2540-98
15	Alkalinity	mg/l	16	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.60	SMEWW 2540-98
17	BOD 5	mg/l	7.0	SMEWW 5210-B
18	UV Absorption (E260)	-	0.1165	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	18.6	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.45	TCVN 6179-96

21	Nitrite (NO_2) as N	mg/l	0.01	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.10	TCVN 6180-96
23	T – N	mg/l	1.80	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	4.6	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.10	SMEWW 4500-P-D
26	T – P	mg/l	0.04	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	82,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	40,009	Andersen Method
29	Total Iron (Fe)	mg/l	0.50	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.015	TCVN 6002-95
31	Anionic Surfactant	mg/l	KPH(LOD=0.06)	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

November 02, 2012

Deputy Director (WASE)

CÔNG TY CỔ PHẦN TƯ VẤN CẤP THOÁT NƯỚC VÀ MÔI TRƯỜNG

KT.GIÁM ĐỐC
PHÓ GIÁM ĐỐC
Trần Văn Uyên

Laboratory

Engr. Tran Tuan Giao

WATER SUPPLY, SEWERAGE & ENVIRONMENT CONSULTANT JS COMPANY
10 Pho Quang Street, Ward 2 – Tan Binh District, Ho Chi Minh City
Phone: (08) 38475164 - (08) 38475165

No : 12-10-104 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Tây Ninh Province – Dau Tieng District – Dau Tieng Lake
- Place of Sampling : Position (2) Sample Sign : **DT _02**
- Type of Water : Surface Water
- Sampling Date : 12h30 19/10/2012 Testing Date : 19/10/2012
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	35.0	Themometer
2	Temperature of water	oC	31.2	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	4.0 x10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	10	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	5.40	TCVN 6634:2000
8	pH	-	6.95	SMEWW 2130-98
9	Turbidity	NTU	9.8	TCVN 6184-96
10	Color	Đv Co	15	TCVN 6185-96
11	COD	mg/l	20.85	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	4.3 x10^3	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	39.5	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	10	SMEWW 2540-98
15	Alkalinity	mg/l	16	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.60	SMEWW 2540-98
17	BOD 5	mg/l	8.0	SMEWW 5210-B
18	UV Absorption (E260)	-	0.1135	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	20	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.41	TCVN 6179-96

21	Nitrite (NO_2) as N	mg/l	0.01	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.10	TCVN 6180-96
23	T – N	mg/l	1.85	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	4.6	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.10	SMEWW 4500-P-D
26	T – P	mg/l	0.05	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	136,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	51,461	Andersen Method
29	Total Iron (Fe)	mg/l	0.55	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.014	TCVN 6002-95
31	Anionic Surfactant	mg/l	KPH(LOD=0.06)	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

November 02, 2012

Vice Director (WASE)

CÔNG TY CỔ PHẦN TƯ VẤN CẤP THOÁT NƯỚC VÀ MÔI TRƯỜNG

KT. GIÁM ĐỐC
PHÓ GIÁM ĐỐC

Trần Văn Uyên

Laboratory

Eng. Tran Tuan Giao

WATER SUPPLY, SEWERAGE & ENVIRONMENT CONSULTANT JS COMPANY
10 Pho Quang Street, Ward 2 – Tan Binh District, Ho Chi Minh City
Phone: (08) 38475164 - (08) 38475165

No : 13-03-05 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Tây Ninh Province – Dau Tieng District – Dau Tieng Lake
- Place of Sampling : Position (1) Sample Sign : **DT _01**
- Type of Water : Surface Water
- Sampling Date : 10h40 12/03/2013 Testing Date : 12/03/2013
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	34.8	Themometer
2	Temperature of water	oC	30.4	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	4.3×10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	14	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	6.23	TCVN 6634:2000
8	pH	-	6.95	SMEWW 2130-98
9	Turbidity	NTU	5.84	TCVN 6184-96
10	Color	Đv Co	10	TCVN 6185-96
11	COD	mg/l	16.0	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	9	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	40	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	6	SMEWW 2540-98
15	Alkalinity	mg/l	16	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.78	SMEWW 2540-98
17	BOD 5	mg/l	10	SMEWW 5210-B
18	UV Absorption (E260)	-	0.0561	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	19.5	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.67	TCVN 6179-96
21	Nitrite (NO_2) as N	mg/l	0.008	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.13	TCVN 6180-96

23	T – N	mg/l	6.14	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	5.38	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.35	SMEWW 4500-P-D
26	T – P	mg/l	0.11	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	4,500	Utermohl Method
28	Biological Phytoplankton	Count/liter	51,824	Andersen Method
29	Total Iron (Fe)	mg/l	0.3	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.01	TCVN 6002-95
31	Anionic Surfactant	mg/l	KPH(LOD=0.06)	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98
33	Floride (F)	mg/l	KPH(LOD=0.01)	SMEWW4500:2005
34	Cyanide (CN)	mg/l	KPH(LOD=0.005)	TCVN 6181-1996
35	Arsenic (As)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
36	Cadmium (Cd)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
37	Lead (Pb)	mg/l	KPH(LOD=0.001)	SMEWW3500:2005
38	Chromium IV (Cr^{6+})	mg/l	KPH(LOD=0.01)	SMEWW3500:2005
39	Copper (Cu)	mg/l	KPH(LOD=0.02)	SMEWW3500:2005
40	Zinc (Zn)	mg/l	0.017	SMEWW3500:2005
41	Nickel (Ni)	mg/l	KPH(LOD=0.05)	SMEWW3500:2005
42	Mercury (Hg)	mg/l	KPH(LOD=0.0001)	SMEWW3112B:2005
43	Total oil and Gease	mg/l	KPH(LOD=0.01)	SMEWW5520B:2005
44	Total phenol	µg/l	0.11	KTSK 21-GCMS
45	Potassium Permanganate	mg/l	1.4	Oxidation $KMnO_4$

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

March 25, 2013

Vice Director (WASE)

CÔNG TY CỔ PHẦN TƯ VẤN CẤP THOÁT NƯỚC VÀ MÔI TRƯỜNG

KT.GIÁM ĐỐC
PHÓ GIÁM ĐỐC

Nguyễn Chí Hiếu

Laboratory

Eng. Tran Tuan Giao

WATER SUPPLY, SEWERAGE & ENVIRONMENT CONSULTANT JS COMPANY
10 Pho Quang Street, Ward 2 – Tan Binh District, Ho Chi Minh City
Phone: (08) 38475164 - (08) 38475165

No : 13-03-06 /PTN-TVCTNMT

RESULT OF WATER QUALITY ANALYSIS

- Project : The Study On Water Supply Improvement in Ho Chi Minh City
- From : TOYO ENGINEERING CORPORATION, Tokyo, Japan
- Source of Water : Tây Ninh Province – Dau Tieng District – Dau Tieng Lake
- Place of Sampling : Position (2) Sample Sign : **DT _02**
- Type of Water : Surface Water
- Sampling Date : 11h30 12/03/2013 Testing Date : 12/03/2013
- Sampling Unit : Wase Laboratory

No	Contents	Unit	Results	Test methods
1	Temperature of air	oC	34.9	Themometer
2	Temperature of water	oC	30.6	Themometer
3	Transparency	cm	<100	Dienert method
4	Total bacterias	MPN/ml	4.9×10^3	Pharmacopoeia VN IV
5	E. Coli	MPN/100ml	KPH	TCVN 6187-2:1996
6	Chloride	mg/l	14	TCVN 6194-96
7	Total Organic Carbon (TOC)	mg/l	6.10	TCVN 6634:2000
8	pH	-	6.90	SMEWW 2130-98
9	Turbidity	NTU	6.20	TCVN 6184-96
10	Color	Đv Co	10	TCVN 6185-96
11	COD	mg/l	12.0	SMEWW 5220B-C
12	Total Coliform	MPN/100ml	9	TCVN 6187-2:1996
13	Electric Conductivity	µS/cm	37	SMEWW 2510-98
14	Suspended solids (SS)	mg/l	7	SMEWW 2540-98
15	Alkalinity	mg/l	16	SMEWW 2320-98
16	Dissolved Oxygene (DO)	mg/l	5.80	SMEWW 2540-98
17	BOD 5	mg/l	8	SMEWW 5210-B
18	UV Absorption (E260)	-	0.1022	UV 1800 meter
19	Dissolved solids (TDS)	mg/l	18.7	SMEWW 2540-98
20	Ammonia (NH_4) as N	mg/l	0.64	TCVN 6179-96
21	Nitrite (NO_2) as N	mg/l	0.008	TCVN 6178-96
22	Nitrate (NO_3) as N	mg/l	0.12	TCVN 6180-96

23	T – N	mg/l	6.08	SMEWW 4500-N
24	Dissolved Organic Carbon (DOC)	mg/l	5.45	TCVN 6634:2000
25	Phosphate (PO_4)	mg/l	0.28	SMEWW 4500-P-D
26	T – P	mg/l	0.09	SMEWW 4500-P-D
27	Biological ZooPlankton	Count/m^3	5,000	Utermohl Method
28	Biological Phytoplankton	Count/liter	68,852	Andersen Method
29	Total Iron (Fe)	mg/l	0.3	TCVN 6177-96
30	Manganese (Mn)	mg/l	0.01	TCVN 6002-95
31	Anionic Surfactant	mg/l	KPH(LOD=0.06)	SMEWW5540C:2005
32	Odor	Sense	KPH	SMEWW 2150-98
33	Floride (F)	mg/l	0.11	SMEWW4500:2005
34	Cyanide (CN)	mg/l	KPH(LOD=0.005)	TCVN 6181-1996
35	Arsenic (As)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
36	Cadmium (Cd)	mg/l	KPH(LOD=0.0005)	SMEWW3500:2005
37	Lead (Pb)	mg/l	KPH(LOD=0.001)	SMEWW3500:2005
38	Chromium IV (Cr^{6+})	mg/l	KPH(LOD=0.01)	SMEWW3500:2005
39	Copper (Cu)	mg/l	KPH(LOD=0.02)	SMEWW3500:2005
40	Zinc (Zn)	mg/l	KPH(LOD=0.01)	SMEWW3500:2005
41	Nickel (Ni)	mg/l	KPH(LOD=0.05)	SMEWW3500:2005
42	Mercury (Hg)	mg/l	KPH(LOD=0.0001)	SMEWW3112B:2005
43	Total oil and Gease	mg/l	KPH(LOD=0.01)	SMEWW5520B:2005
44	Total phenol	µg/l	KPH(LOD=0.02)	KTSK 21-GCMS
45	Potassium Permanganate	mg/l	1.4	Oxidation $KMnO_4$

- Notes : The result is only valuable on the actual sample
- SMEWW : Standard Method for The Examination of Water And WasteWater (APHA), Edition 20
- KPH : Not Detection
- LOD : Limited Of Detection
- **Marks** : Sample Water testing for Requests

March 25, 2013

Vice Director (WASE)

CÔNG TY CỔ PHẦN TƯ VẤN CẤP THOÁT NƯỚC VÀ MÔI TRƯỜNG

KT.GIÁM ĐỐC
PHÓ GIÁM ĐỐC

Nguyễn Chí Hiếu

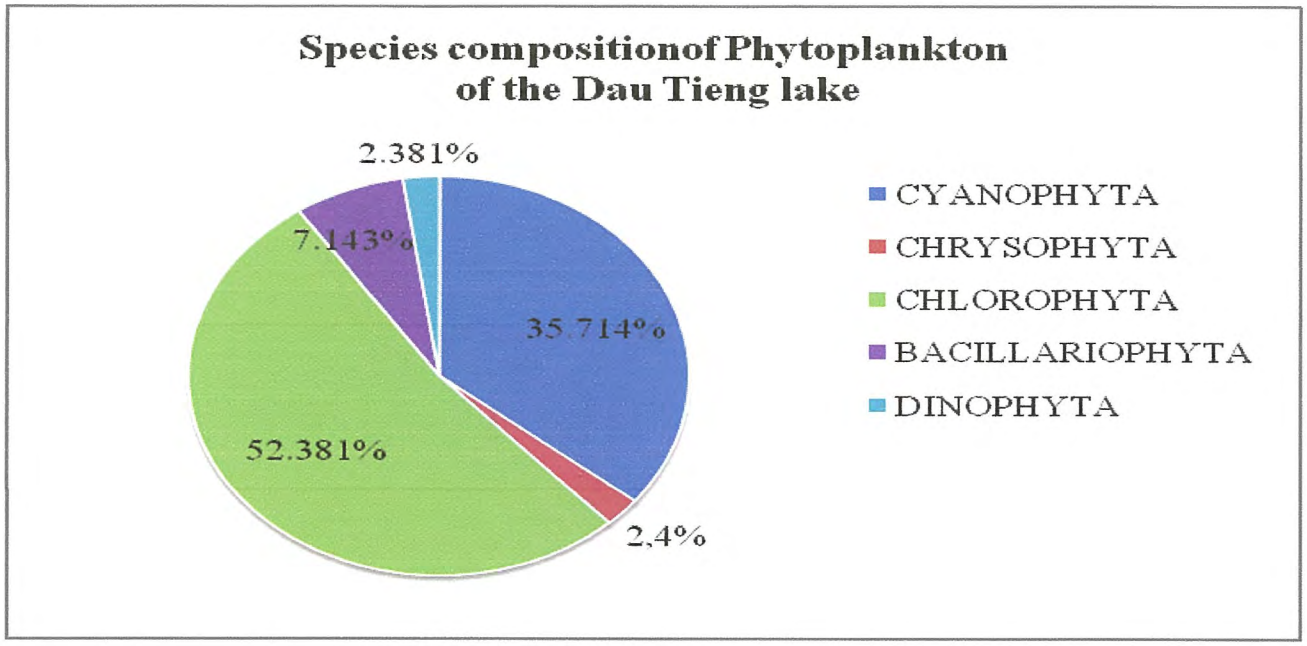
Laboratory

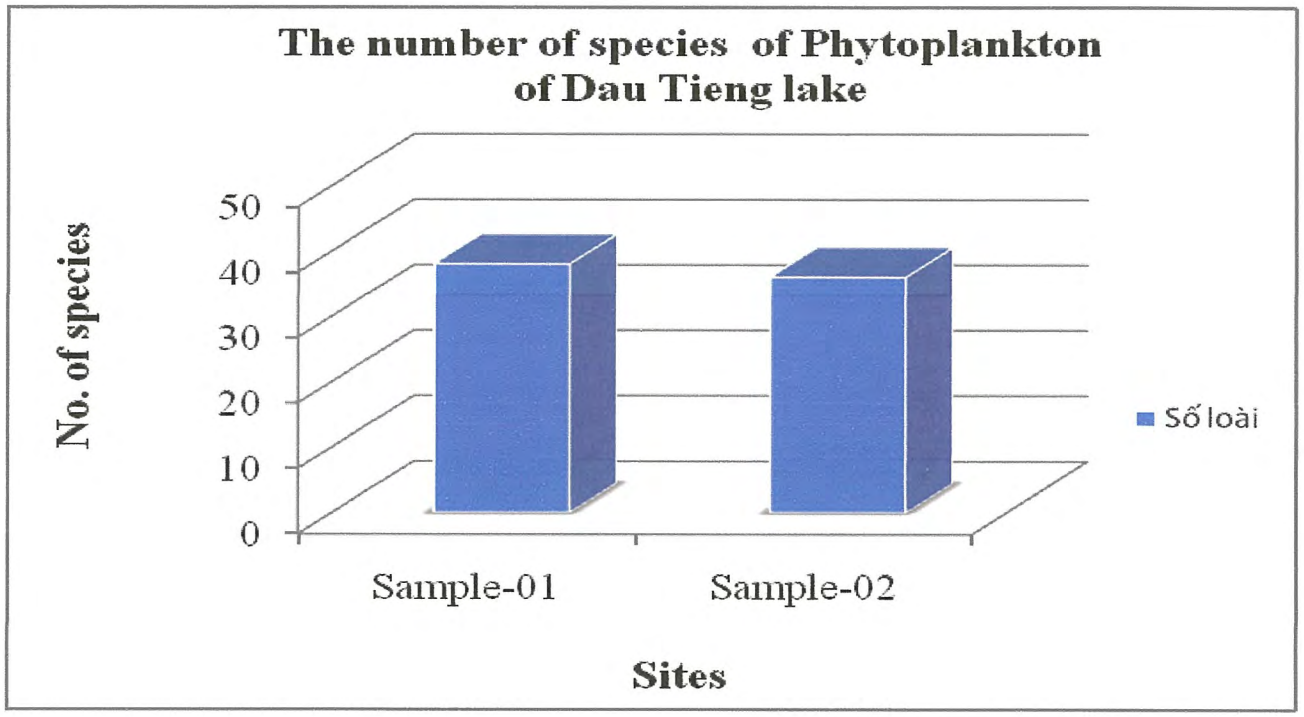
Eng. Tran Tuan Giao

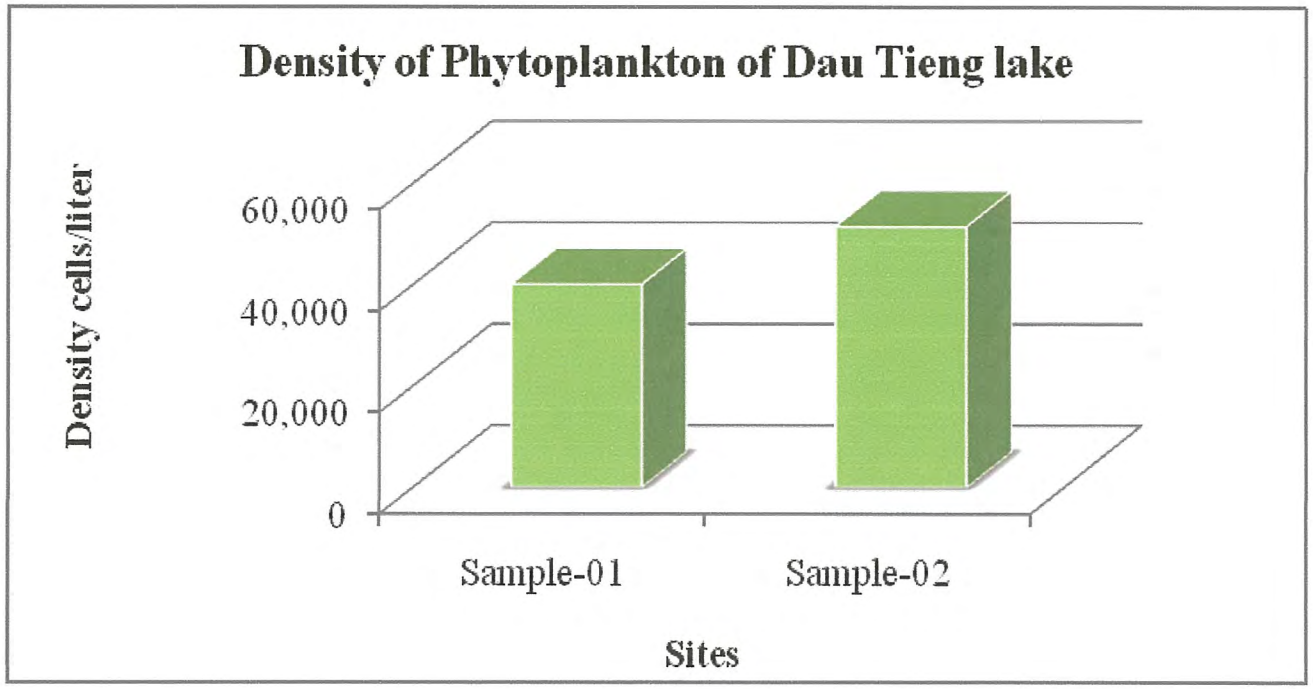
Appendix 1: Composition and density of Phytoplankton at Dau Tieng lake Area

Phase 1 - 19/10/2012 (Rain season)

No.	Taxon	Sites	
		Sample-01	Sample-02
	CYANOPHYTA		
1	*Anabaena viguieri* Denis et Frémy, 1923		261
2	*Anabaena spiroides* Klebahn, 1895	267	507
3	*Anabaena circinalis* Rabenhorst, 1863	123	240
4	*Anabaena flos-aquae* Brébisson ex Bornet & Flauhault, 1886	11,381	15,387
5	*Anabaena* sp.	2,725	1,333
6	*Aphanocapsa delicatissima* West et G.S.West, 1912	1,867	1,867
7	*Microcystis aeruginosa* (Kützing) Kützing, 1846	8,293	13,013
8	*Microcystis botrys* Teiling, 1942	2,000	560
9	*Microcystis flos - aquae* (Wittrock) Kirchner, 1898	3,200	6,667
10	*Microcystis protocystis* Crow, 1923	800	1,200
11	*Microcystis wesenbergii* Komárek, 1968	533	267
12	*Oscillatoria limosa* C.Agardh et Gomont, 1892		320
13	*Raphidiopsis mediterranea* Skuja, 1938	457	229
14	*Pseudanabaena mucicola* (Naumann & Huber-Pestalozzi) Schwabe, 1964	560	267
15	*Stigonema ocellatum* ((Dillwyn) Thuret ex Bornet & Flahault, 1886	213	
	CHRYSOPHYTA		
16	*Dinobryon sertularia* Ehrenberg, 1834	61	152
	CHLOROPHYTA		
17	*Ankistrodesmus falcatus* (Corda) Ralfs, 1848		24
18	*Actinastrum hantzchii* Lagerh., 1882	21	
19	*Cosmarium contractum* O.Kirchner, 1878	43	53
20	*Cosmarium moniliforme* Ralfs, 1848	288	731
21	*Cosmarium portianum* Archer, 1860	8	32
22	*Cosmarium* sp.	11	5
23	*Dictyosphaerium pulchellum* H.C.Wood, 1872	341	800
24	*Euastrum binale* (Turpin) Ehrenberg ex Ralfs, 1848		3
25	*Eudorina elegans* Ehrenberg, 1832	464	299
26	*Kirchneriella obesa* (W.West) Schmidle, 1893	64	336
27	*Oocystis borgei* J.Snow, 1903	117	160
28	*Pandorina morum* (O.F.Müller) Bory de Saint-Vincent, 1824	21	
29	*Pediastrum duplex* Meyen, 1829	85	
30	*Staurastrum arctiscon* (Ehrenberg ex Ralfs) P.Lundell, 1871	11	19
31	*Staurastrum chaetoceras* (Schröder) G.M.Smith, 1924	8	16
32	*Staurastrum dickiei* Ralfs, 1848	5	16
33	*Staurastrum gracilie* Ralfs, 1848	93	136
34	*Staurastrum paradoxum* Meyen ex Ralfs, 1848	35	29
35	*Staurastrum wildemanii* Gutwinski	5	
36	*Staurastrum* sp.	11	51
37	*Xanthidium* sp.	11	
38	*Volvox aureus* Ehrenberg, 1832	2,667	3,200
	BACILLARIOPHYTA		
39	*Melosira granulata* (Ehr.) Ralfs, 1861	2,789	2,419
40	*Eucampia* sp.	373	800
41	*Rhizosolenia longiseta* O. Zacharias, 1893	48	51
	DINOPHYTA		
42	*Peridinium* sp.	8	13
Total of species		**38**	**36**


Species compositionof Phytoplankton
of the Dau Tieng lake
2.381%
7.143%
35.714%
52.381%
2.4%
CYANOPHYTA
CHRYSOPHYTA
CHLOROPHYTA
BACILLARIOPHYTA
DINOPHYTA

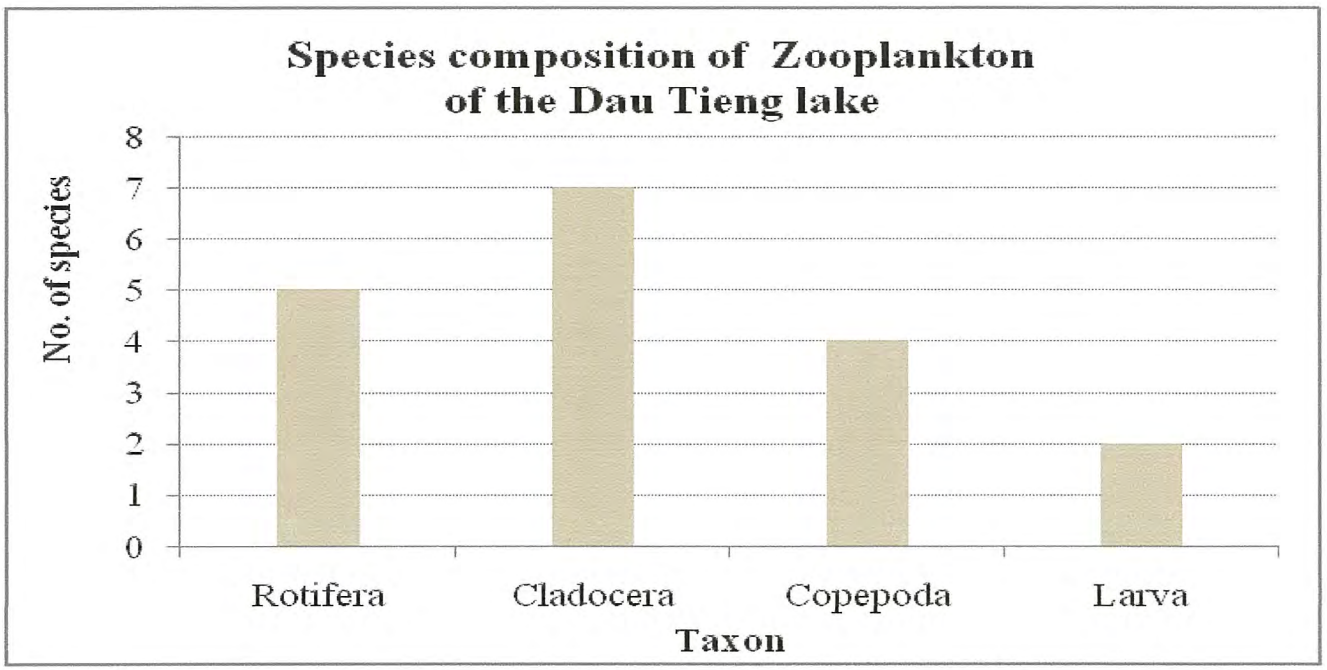

The number of species of Phytoplankton
of Dau Tieng lake
No. of species
50
40
30
20
10
0
Sample-01
Sample-02
Sites
Số loài

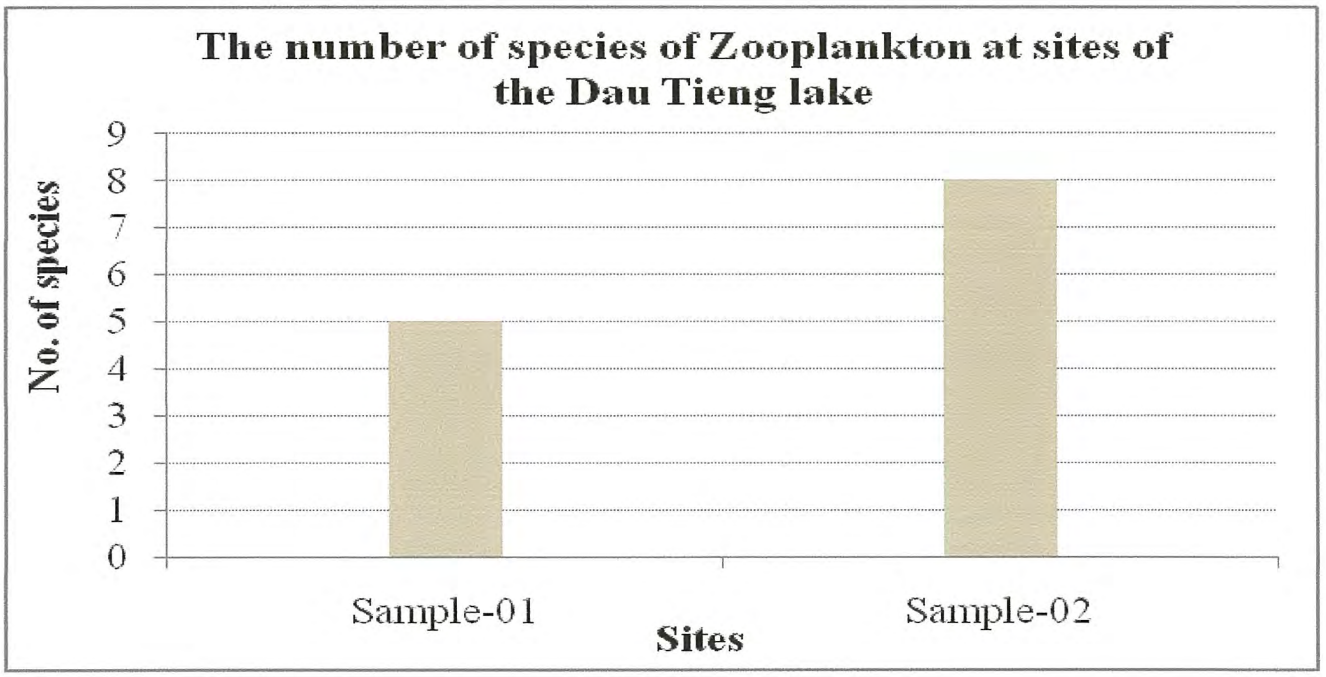

Density of Phytoplankton of Dau Tieng lake
Density cells/liter
60,000
40,000
20,000
0
Sample-01
Sample-02
Sites

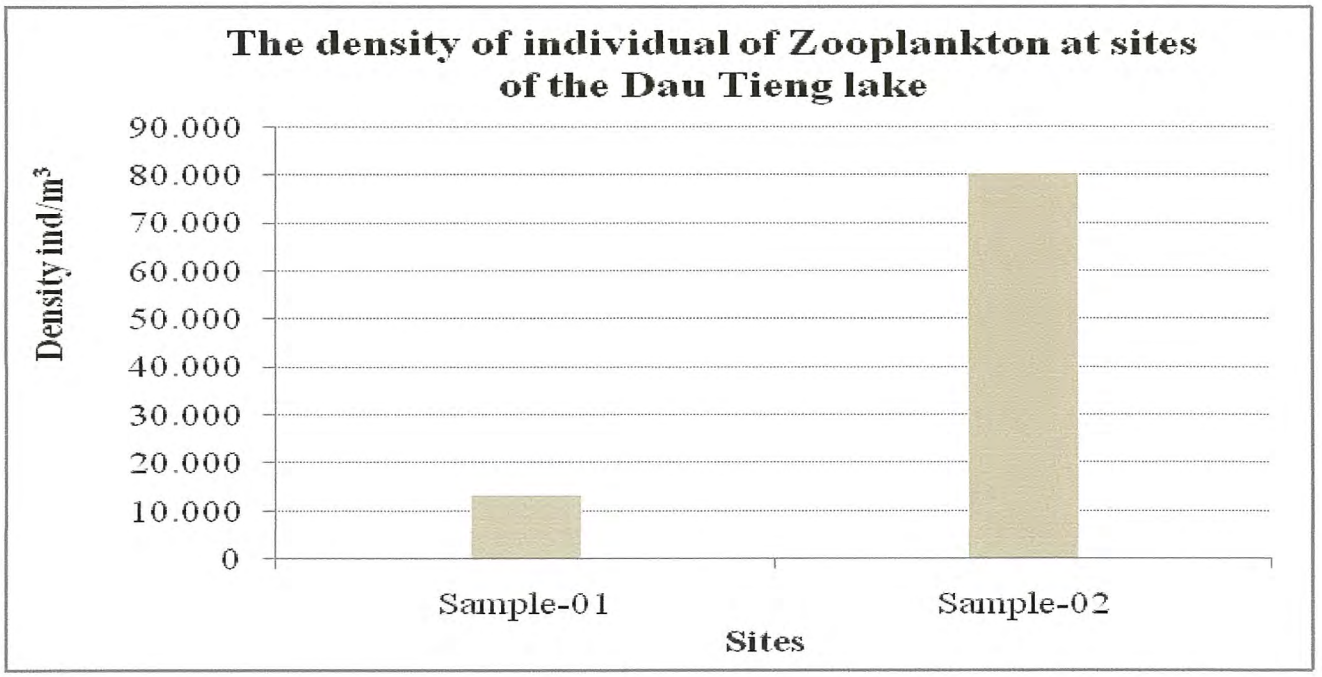
Appendix 2: Composition and density of Zooplankton in Dau Tieng lake Area

Phase 1 - 19/10/2012 (Rain Season)

No	Scientific Name	Sites	
		Sample-01	Sample-02
	Phylum Rotifera		
	Class Monogononta		
	Family Asplanchnidae		
1	*Asplanchna priodonta* Gosse, 1850	7,500	1,000
	Family Conochilidae		
2	*Conochiloides dossuarius* (Hudson, 1885)	50,000	99,000
	Family Filiniidae		
3	*Filinia opoliensis* (Zacharias, 1898)		500
	Family Hexathridae		
4	*Hexarthra mira* (Hudson, 1871)		500
	Family Synchaetidae		
5	*Polyarthra vulgaris* (Carlin, 1943)	500	
	Phylum Arthropoda		
	Class Branchiopoda		
	Order Cladocera		
	Family Bosminidae		
6	*Bosminopsis deitersi* Richard, 1897	9,500	2,500
7	*Bosmina longirostris* (O.F. Müller, 1785)	2,500	5,000
	Family Daphniidae		
8	*Ceriodaphnia rigaudi* Richard, 1894	500	3,000
9	*Simocephalus elizabethae* (King, 1853)	1,000	5,000
	Family Moinidae		
10	*Moina macrocopa* (Straus, 1820)	1,000	
11	*Moinodaphnia macleayii* (King, 1853)		1,000
	Family Sididae		
12	*Diaphanosoma sarsi* Richard, 1895	1,000	
	Class Copepoda		
	Order Cyclopoida		
	Family Cyclopidae		
13	*Mesocyclops leuckarti* (Claus, 1857)	500	
14	*Microcyclops varicans* (Sars, 1863)	500	500
15	*Tropocyclops prasinus* (Fischer, 1860)	3,000	12,000
	Order Calanoida		
	Family Diaptomidae		
16	*Neodiaptomus* sp.	3,000	4,500
	Larva		
17	*Bivalvia larva*	500	
18	*Copepoda nauplius*	1,000	1,500
Total of species		**15**	**13**
Total ind./m^3		**82,000**	**136,000**


Species composition of Zooplankton of the Dau Tieng lake
No. of species
8
7
6
5
4
3
2
1
0
Rotifera
Cladocera
Copepoda
Larva
Taxon

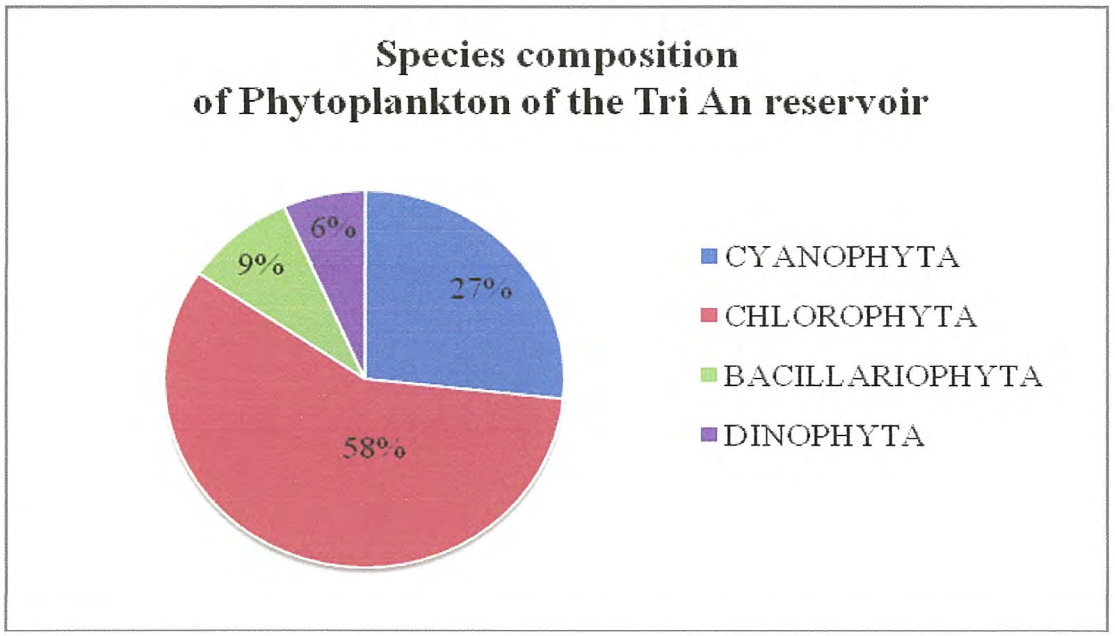

The number of species of Zooplankton at sites of the Dau Tieng lake
No. of species
9
8
7
6
5
4
3
2
1
0
Sample-01
Sample-02
Sites

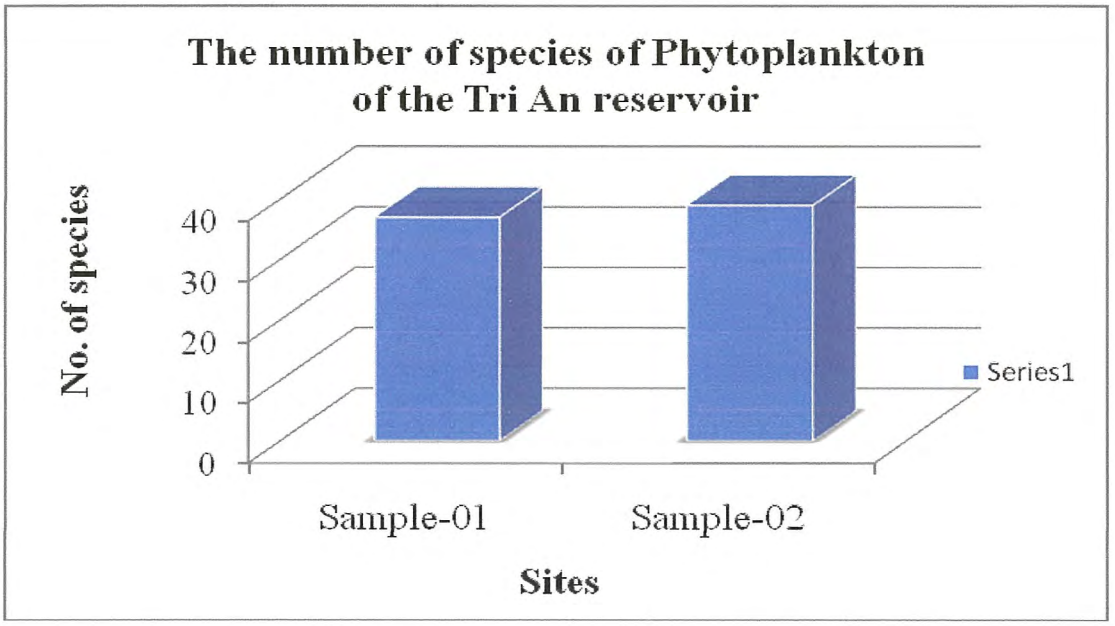

The density of individual of Zooplankton at sites of the Dau Tieng lake
Density ind/m³
90.000
80.000
70.000
60.000
50.000
40.000
30.000
20.000
10.000
0
Sample-01
Sample-02
Sites

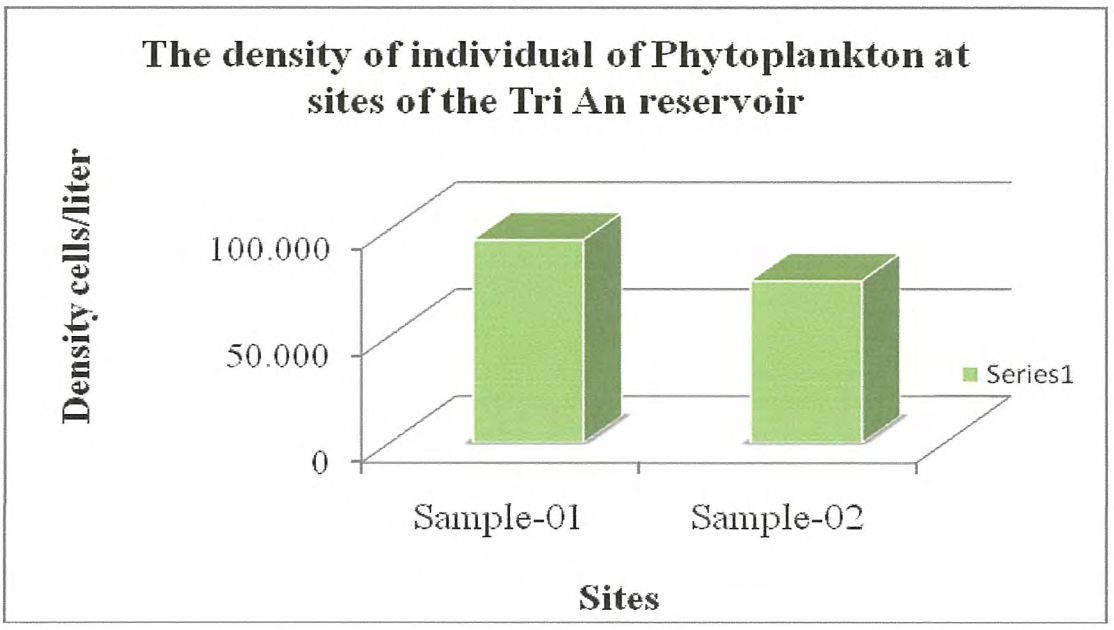
Appendix 3: Composition and Density of Phytoplankton at Dau Tieng lake
Phase 2 – March 12, 2013 (Dry Season)

No.	Taxon	Sites	
		Sample-01	Sample-02
	CYANOPHYTA		
1	*Anabaena* sp.	92	40
2	*Athrospira* sp.		400
3	*Chroccocus* sp.	3.140	4.760
4	*Coelosphaerium kuetzinggianum* Naegeli, 1849	4.400	2.400
5	*Merismopedia marssonii* Lemmermann, 1900	1.216	4.448
6	*Microcystis aeruginosa* (Kützing) Kützing, 1846	12.100	9.800
7	*Microcystis botrys* Teiling, 1942	4.300	2.800
8	*Microcystis flos - aquae* (Wittrock) Kirchner, 1898	2.800	4.636
9	*Microcystis wesenbergii* Komárek, 1968	1.600	400
10	*Oscillatoria princeps* Vaucher ex Gamont, 1892		96
11	*Pseudanabaena mucicola* (Naumann & H.Pestalozzi) Schwabe, 1964	700	1.000
	CHRYSOPHYTA		
12	*Dinobryon divergens* O.E.Imhof, 1890	2	
13	*Dinobryon sertularia* Ehrenberg, 1834	30	856
14	*Mallomonas* sp1.	4	16
15	*Mallomonas* sp2.	16	16
16	*Synura adamsii* G.M.Smith, 1924		12
	CHLOROPHYTA		
17	*Ankistrodesmus falcatus* (Corda) Ralfs, 1848	2	
18	*Ankistrodesmus gracilis* (Reinsch) Korshikov, 1953		240
19	*Chlamydomonas* sp.	12	4
20	*Chlorella* sp.	20	96
21	*Coelastrum reticulatum* (P.A.Dangeard) Senn, 1899	32	256
22	*Cosmarium contractum* O.Kirchner, 1878	156	472
23	*Cosmarium moniliforme* Ralfs, 1848	218	380
24	*Cosmarium stigmosum* (Nordstedt) Krieger, 1932	10	12
25	*Cosmarium* sp.		12
26	*Coscinodiscus subtilis* Ehrenberg, 1841	2	
27	*Desmidium baileyi* (Ralfs) Nordstedt, 1880	812	1.496
28	*Dimorphococcus lunatus* A.Braun,1855	120	760
29	*Dictyosphaerium reniforme* Bulnheim, 1859	560	3.800
30	*Dictyosphaerium pulchellum* H.C.Wood, 1872	3.848	6.544
31	*Eudorina elegans* Ehrenberg, 1832	48	
32	*Golenkinia radiata* Chodat, 1894		12
33	*Gonatozygon aculeatum* Hastings, 1892	2	4

No.	Taxon	Sites	
		Sample-01	**Sample-02**
34	*Hyalotheca dissiliens* Brébisson ex Ralfs, 1848		400
35	*Kirchneriella obesa* (W.West) Schmidle, 1893	920	560
36	*Micrasterias alata* G.C.Wallich, 1860		4
37	*Micrasterias furcata* C.Agardh ex Ralfs, 1848	2	
38	*Oocystis borgei* J.Snow, 1903	16	64
39	*Pediastrum simplex* Meyen, 1829		32
40	*Pediastrum duplex* Meyen, 1829	256	512
41	*Sphaerozosma excavata* Ralfs, 1848	908	1.040
42	*Sphaerozosma granulatum* J.Roy & Bisset, 1886	520	2.920
43	*Staurastrum arctiscon* (Ehrenberg ex Ralfs) P.Lundell, 1871	384	288
44	*Staurastrum bigibbum* Skuja	2	
45	*Staurastrum dejectum* Brébisson, 1848	10	24
46	*Staurastrum dickiei* Ralfs, 1848	12	48
47	*Staurastrum indentatum* (West & G.S.West) Teiling, 1967	12	12
48	*Staurastrum gracilie* Ralfs, 1848	36	60
49	*Staurastrum limneticum* Schmidle	26	20
50	*Staurastrum pinnatum* W.B.Turner	4	8
51	*Staurastrum subsaltans* West & G.S.West	2	
52	*Staurastrum* sp1.	16	12
53	*Staurastrum* sp2.	94	156
54	*Spirogyra ionia* Wade, 1949	168	
55	*Schizomeris leibleinii* Kützing, 1843	40	
56	*Xanthidium sexmamillatum* West & G.S.West	10	4
	BACILLARIOPHYTA		
57	*Gyrosigma* sp.	2	
58	*Melosira granulata* (Ehr.) Ralfs, 1861	11.868	16.672
59	*Rhizosolenia longiseta* O. Zacharias, 1893	88	28
60	*Pinnularia braunii* (Grunow) Cleve, 1895	2	
	DINOPHYTA		
61	*Ceratium hirundinella* (O.F.Müller) Dujardin, 1841	40	60
62	*Peridinium gatunense* Nygaard, 1925	104	52
63	*Peridinium cinctum* (O.F.Müller) Ehrenberg, 1832	38	16
64	*Peridinium* sp.	2	92
Total of species		**55**	**53**
Total quantity cells/liter		**51.824**	**68.852**

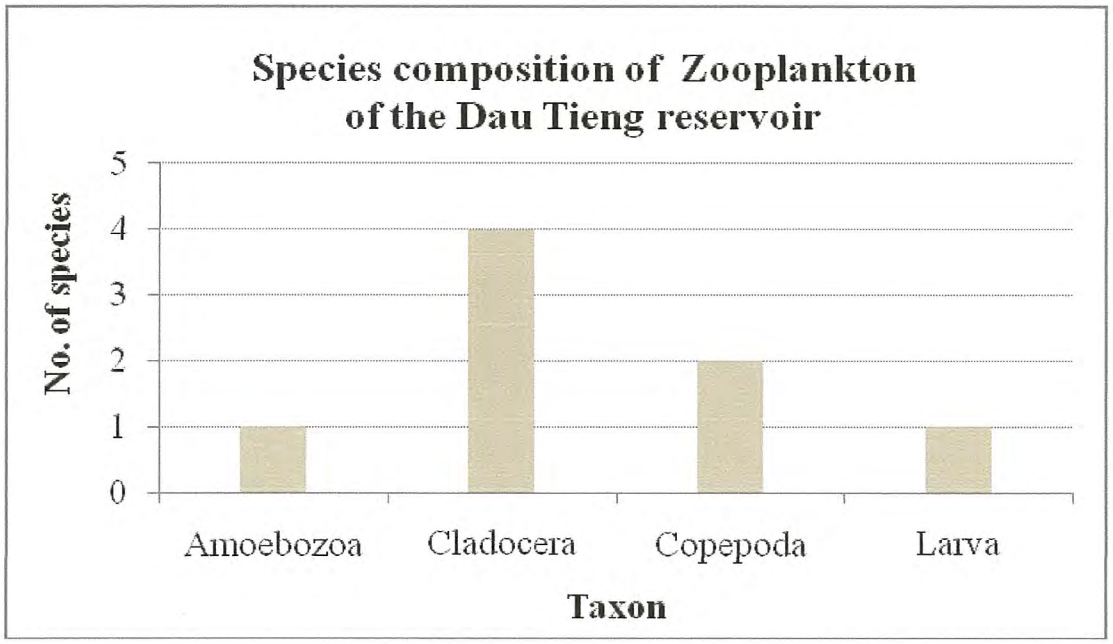

Species composition
of Phytoplankton of the Tri An reservoir
6%
9%
27%
58%
CYANOPHYTA
CHLOROPHYTA
BACILLARIOPHYTA
DINOPHYTA

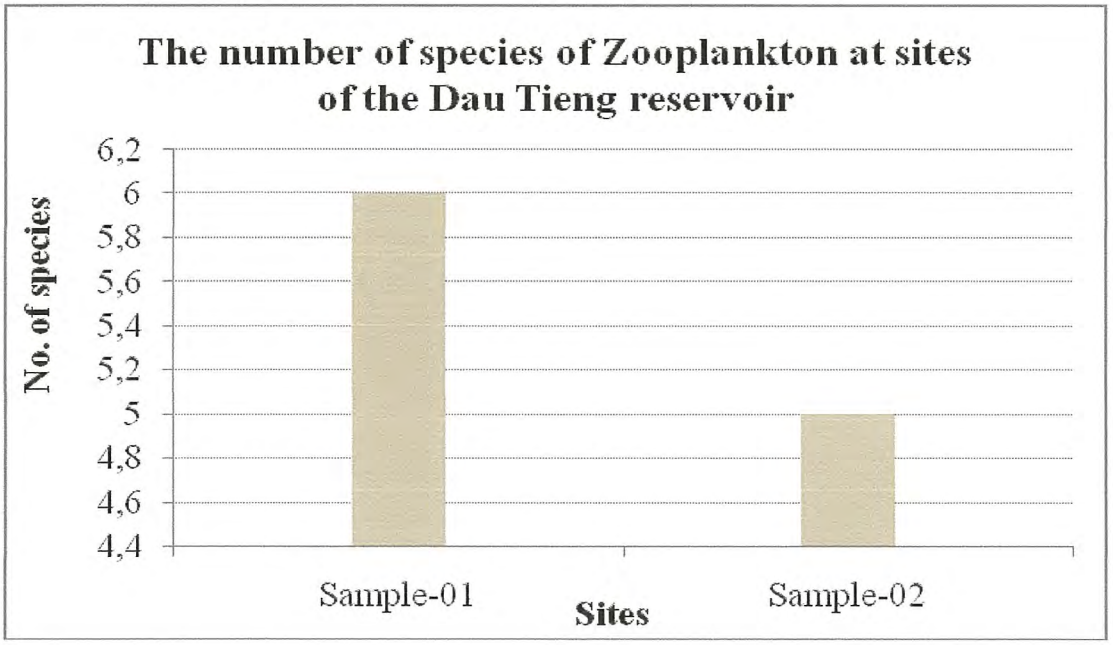

The number of species of Phytoplankton
of the Tri An reservoir
No. of species
40
30
20
10
0
Sample-01
Sample-02
Sites
Series1

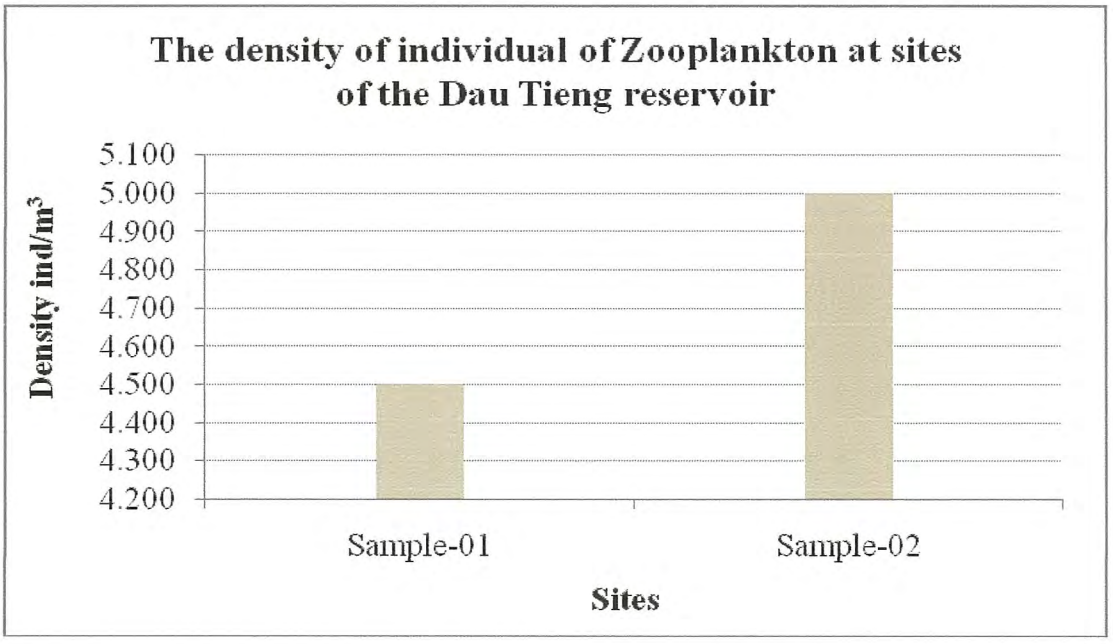

The density of individual of Phytoplankton at
sites of the Tri An reservoir
Density cells/liter
100.000
50.000
0
Sample-01
Sample-02
Sites
Series1

Appendix 4: Composition and density of Zooplankton at Dau Tieng lake
Phase 2 – March 12, 2013 (Dry Season)

No.	Taxon	Sites	
		Sample-01	Sample-02
	Phylum Amoebozoa		
	Class Lobosa		
	Order Arcellinida		
	Family Difflugidae		
1	*Difflugia urceolata* Carter, 1864	500	
	Phylum Arthropoda		
	Class Branchiopoda		
	Order Cladocera		
	Family Bosminidae		
2	*Bosminopsis deitersi* Richard, 1897		500
3	*Bosmina longirostris* (O.F. Müller, 1785)	500	1.000
	Family Daphniidae		
4	*Ceriodaphnia rigaudi* Richard, 1894	1.000	
5	*Simocephalus elizabethae* (King, 1853)		1.000
	Class Copepoda		
	Order Cyclopoida		
	Family Cyclopidae		
6	*Tropocyclops prasinus* (Fischer, 1860)	1.000	2.000
	Order Calanoida		
	Family Diaptomidae		
7	*Allodiaptomus* Kiefer, 1936	500	
	Larva		
8	*Copepoda nauplius*	1.000	500
Total of species		**6**	**5**
Total ind./m^3		**4.500**	**5.000**


Species composition of Zooplankton of the Dau Tieng reservoir
No. of species
5
4
3
2
1
0
Amoebozoa
Cladocera
Copepoda
Larva
Taxon


The number of species of Zooplankton at sites of the Dau Tieng reservoir
No. of species
6,2
6
5,8
5,6
5,4
5,2
5
4,8
4,6
4,4
Sample-01
Sample-02
Sites


The density of individual of Zooplankton at sites of the Dau Tieng reservoir
Density ind/m3
5.100
5.000
4.900
4.800
4.700
4.600
4.500
4.400
4.300
4.200
Sample-01
Sample-02
Sites

APPENDIX IV

IMAGES OF WATER QUALITY SURVEY OF TRI AN AND DAU TIENG LAKE

Tri An reservoir – Vinh Cuu Distric – Dong Nai Province

TEC & Wase experts team survey water sampling in Tri An lake

Taking water sample in Tri An lake by cano (18/10/2012)

Taking water sample of plankton in Tri An lake (18/10/2012)

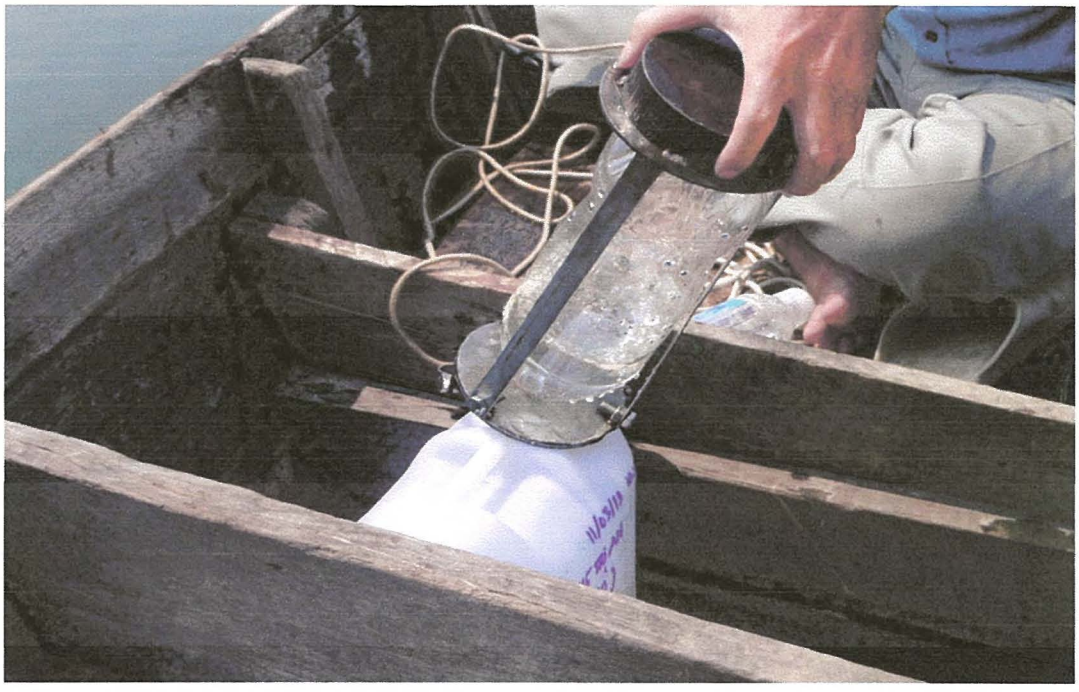
Taking water sample in Dau Tieng lake (19/10/2012)

Testing temperature and conductivity on field (19/10/2012)

Dau Tieng Irrigation dam – Dau Tieng District – Binh Duong Province

Dau Tieng reservoir - Dau Tieng District – Binh Duong Province

Taking water sample of plankton in Tri An lake (11/03/2013)



Taking water sample in Tri An lake – phase 2 (11/03/2013)

Taking water sample in Dau Tieng lake (12/03/2013)

Taking water sample in Dau Tieng lake (12/03/2013)

SOCIALIST REPUBLIC OF VIETNAM

QCVN 08: 2008/BTNMT

NATIONAL TECHNICAL REGULATIONS
SURFACE WATER QUALITY
National technical Regulation on surface water quality

HANOI - 2008

Foreword

QCVN 08:2008 / MONRE by *The draft national technical regulations on water quality* compilation, VEA and Legal browser, issued the Decision 16/2008/QD-BTNMT 31 months 12, 2008 of the Minister of Natural Resources and Environment.

NATIONAL TECHNICAL REGULATIONS
SURFACE WATER QUALITY
National technical Regulation on surface water quality

1. GENERAL PROVISIONS

1.1. Scope of application

1.1.1. This regulation specifies the limit surface water quality parameters.

1.1.2. This regulation applies to evaluate and control the quality of surface water, as a basis for the protection and use of water appropriately.

1.2. Definitions

Surface water is mentioned in this standard Qui water flowing through or deposited on the ground: rivers, streams, canals, slots, ditches, lakes, ponds, swamps, etc.

2. TECHNICAL REGULATIONS

Limit values of the water quality parameters specified in Table 1.

Table 1: Limit values of surface water quality parameters

TT	Parameters	Unit	Limit values			
			A		B	
			A1	A2	B1	B2
1	pH		6 to 8.5	6 to 8.5	5.5 to 9	5.5 to 9
2	Dissolved oxygen (DO)	mg / l	≥ 6	≥ 5	≥ 4	≥ 2
3	Total suspended solids (TSS)	mg / l	20	30	50	100
4	COD	mg / l	10	15	30	50
5	BOD_5 (20 °C)	mg / l	4	6	15	25
6	Ammonium (NH^+_4) (N)	mg / l	0.1	0.2	0.5	1
7	Chloride (Cl-)	mg / l	250	400	600	-
8	Fluoride (F-)	mg / l	1	1.5	1.5	2
9	Nitrite (NO^-_2) (N)	mg / l	0.01	0.02	0.04	0.05
10	Nitrate (NO^-_3) (N)	mg / l	2	5	10	15
11	Phosphate (PO_4^{3-}) (P)	mg / l	0.1	0.2	0.3	0.5
12	Cyanide (CN-)	mg / l	0.005	0.01	0.02	0.02
13	Arsenic (As)	mg / l	0.01	0.02	0.05	0.1
14	Cadmium (Cd)	mg / l	0.005	0.005	0.01	0.01
15	Lead (Pb)	mg / l	0.02	0.02	0.05	0.05
16	Chromium III (Cr^{3+})	mg / l	0.05	0.1	0.5	1
17	Chromium VI (Cr^{6+})	mg / l	0.01	0.02	0.04	0.05
18	Copper (Cu)	mg / l	0.1	0.2	0.5	1
19	Zinc (Zn)	mg / l	0.5	1.0	1.5	2
20	Nickel (Ni)	mg / l	0.1	0.1	0.1	0.1
21	Iron (Fe)	mg / l	0.5	1	1.5	2
22	Mercury (Hg)	mg / l	0.001	0.001	0.001	0.002
23	Surface-active substances	mg / l	0.1	0.2	0.4	0.5
24	Total oil and grease (oils & Grease)	mg / l	0.01	0.02	0.1	0.3
25	Phenol (total)	mg / l	0.005	0.005	0.01	0.02
26	**Chemical plant protection organic chlorine**					
	Aldrin + Dieldrin	µg / l	0.002	0.004	0.008	0.01
	Endrin	µg / l	0.01	0.012	0.014	0.02
	BHC	µg / l	0.05	0.1	0.13	0.015
	DDT	µg / l	0.001	0.002	0.004	0.005
	Endosunfan (Thiodan)	µg / l	0.005	0.01	0.01	0.02
	Lindan	µg / l	0.3	0.35	0.38	0.4
	Chlordane	µg / l	0.01	0.02	0.02	0.03
	Heptachlor	µg / l	0.01	0.02	0.02	0.05
27	**Chemical plant protection organic phosphorus**					
	Paration	µg / l	0.1	0.2	0.4	0.5
	Malation	µg / l	0.1	0.32	0.32	0.4
28	Chemical herbicides					
	2.4 D	µg / l	100	200	450	500
	2,4,5 T	µg / l	80	100	160	200
	Paraquat	µg / l	900	1200	1800	2000
29	Total radioactivity of a	Bq / l	0.1	0.1	0.1	0.1
30	Total radioactivity b	Bq / l	1.0	1.0	1.0	1.0
31	E. Coli	MPN /100ml	20	50	100	200
32	Coliform	MPN /100ml	2500	5000	7500	10 000

Note: The classification of surface water to assess and control the quality of water for various water uses:

A1 - good use for the purpose of water supply and other purposes, such as A2, B1 and B2.

A2 - For the purpose of water supply but to apply the appropriate treatment technology; aquatic plant and animal conservation, or the purpose of use as B1 and B2.

B1 - Use for irrigation irrigation purposes or other purposes have similar water quality requirements or other purposes such as type B2.

B2 - navigation and other purposes with low water quality requirements.

3. METHOD FOR DETERMINING

3.1. sampling for surface water quality monitoring conducted under the guidance of national standards:

- TCVN 5992:1995 (ISO 5667-2: 1991) - Water quality-Sampling. Guide sampling techniques.

- TCVN 5993:1995 (ISO 5667-3: 1985) - Water quality-Sampling. Instructions for storage and handling of samples.

- TCVN 5994:1995 (ISO 5667-4: 1987) - Water quality - Sampling. Guidance on sampling in natural and artificial lakes and ponds.

- TCVN 5996:1995 (ISO 5667-6: 1990) - Water quality - Sampling. Guidance on sampling in rivers and streams.

3.2. analytical method to determine the parameters of surface water quality shall comply with the guidance of the national standards or standards corresponding analysis of international organizations:

- TCVN 6492-1999 (ISO 10523-1994) - Water quality - Determination of pH.

- TCVN 5499-1995. Water quality - Determination of dissolved oxygen - Winkler method.

- TCVN 6625-2000 (ISO 11923-1997) - Water quality - Determination of suspended solids by filtration through glass fiber filters.

- TCVN 6001-1995 (ISO 5815-1989) - Water quality - Determination of biochemical oxygen demand after 5 days (BOD_5) and diluted culture method.

- TCVN 6491-1999 (ISO 6060-1989) - Water quality - Determination of the chemical oxygen demand.

- TCVN 6494-1999 - Water quality - Determination of fluoride ions, chloride, nitrite, Orthophotphat, bromide, nitrate and sulphate dissolved by liquid chromatography ion.

- TCVN 6194-1996 (ISO 9297-1989) - Water quality - Determination of chloride. The titration of silver nitrate with chromate indicator (MO method).

- TCVN 6195-1996 (ISO 10359-1-1992) - Water quality - Determination of fluoride. Electrochemical detection method for water and slightly polluted water.

- TCVN 6178-1996 (ISO 6777-1984) - Water quality - Determination of nitrite. Molecular absorption spectrometric method.

- TCVN 6180-1996 (ISO 7890-3-1988) - Water quality - Determination of nitrate - spectrometric method used acid sunfosalixylic.

- TCVN 5988-1995 (ISO 5664-1984) - Water quality - Determination of ammonium - Distillation and titration method.

- TCVN 6181-1996 (ISO 6703-1-1984) - Water quality - Determination of total cyanide.

- TCVN 6336-1998 (ASTM D 2330-1988) - Test method for surface activity by methylene blue.

- TCVN 5991-1995 (ISO 5666-3-1984) - Water quality - Determination of total mercury by atomic absorption spectrometric method does not fire - after method inorganic chemistry with bromine.

- TCVN 6002-1995 (ISO 6333-1986)) - Water quality - Determination of manganese - photometric method use fomaldoxim.

- TCVN 6053-1995 (ISO 9696-1992) - Water quality - Measurement of synthesis of alpha radioactivity in the saline water - thick source method.

- TCVN 6177-1996 (ISO 6332-1988) - Water quality - Determination of iron by spectrometric methods used a 1.10-phenantrolin reagent.

- TCVN 6193-1996 (ISO 8288-1986) - Water quality - Determination of cobalt, nickel, copper, zinc, cadmium and lead. Method flame atomic absorption spectrometry.

- TCVN 6197-1996 (ISO 5961-1994) - Water quality - Determination of cadmium by atomic absorption spectrometry method.

- TCVN 6222-1996 (ISO 9174-1990) - Water quality - Determination of chromium - atomic absorption spectrometry method.

- TCVN 6626-2000 (ISO 11969-1996) - Water quality - Determination of arsenic. Measure the atomic absorption method (hydride technique).

- TCVN 6216-1996 (ISO 6439-1990) - Water quality - Determination of phenol index. Spectrometric method using 4-aminoantipyrin after the distillation.

- TCVN 5070-1995 - Water quality - Methods of determine the volume of oil and oil products

- TCVN 6053-1995 (ISO 9696-1992) - Water quality - Measurement of synthesis of alpha radioactivity in the water is not salty. Thick source method.

- TCVN 6219-1995 (ISO 9697-1992) - Water quality - Measurement of total beta radioactivity.

- TCVN 6187-1-1996 (ISO 9308-1-1990) Water quality - Detection and enumeration of coliform bacteria, heat-resistant coliform bacteria and Escherichia coli assumptions. Part 1: Membrane filtration method.

The parameters specified in this Regulation do not have national standards guiding the analytical method shall apply the standards corresponding analysis of the international organization.

4. IMPLEMENTATION

This standard applies instead TCVN 5942:1995 - Water quality - surface water quality standards in the list of environmental standards Vietnam mandatory issued together with Decision No. 35/2002/QD -BKHCNMT June 25, 2002 of the Minister of Science, Technology and Environment.

Where national standards referred to in this regulation amendment, supplement or replacement shall apply the new text.

追加調査報告書　２

Additional Survey Report 2

Báo cáo điều tra them 2

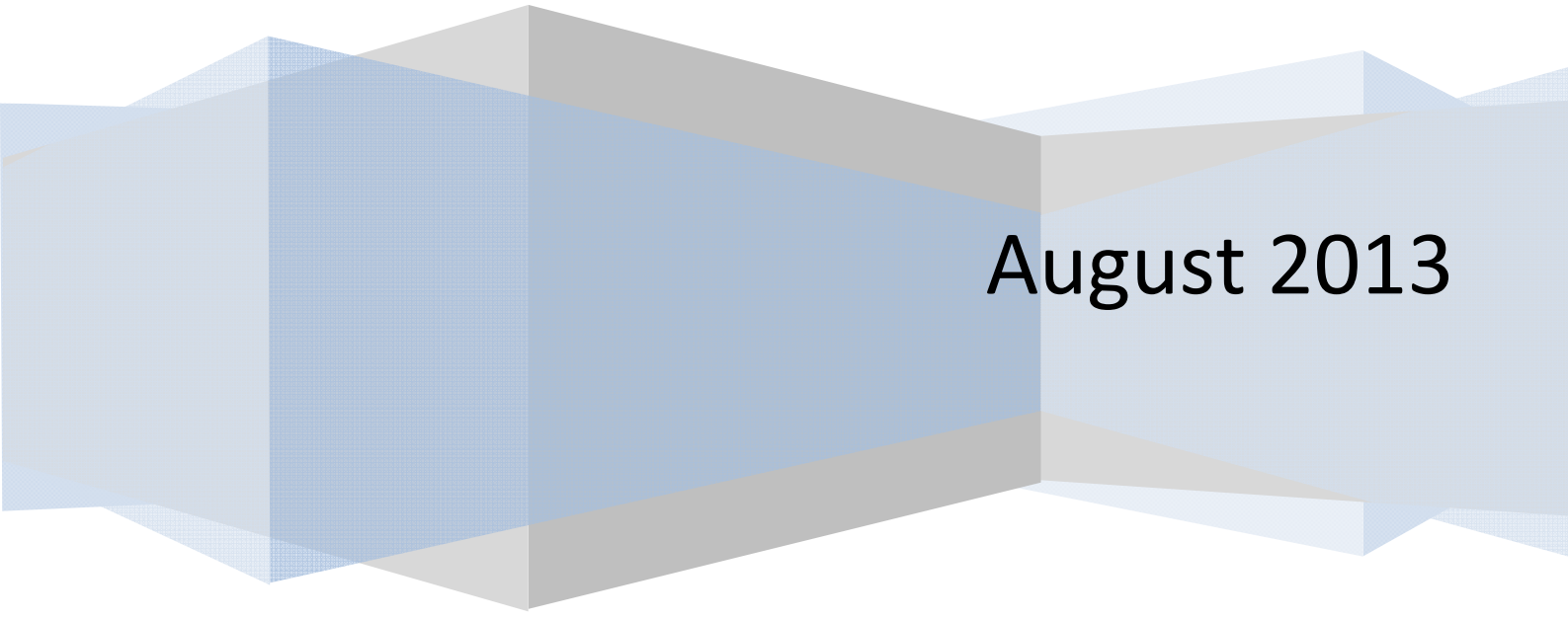
Memorandum on the Selected Legal Issues Concerning Water Supply Project in Vietnam

Water Distribution Plant Project

MEMORANDUM ON THE SELECTED LEGAL ISSUES CONCERNING WATER SUPPLY PROJECTS IN VIETNAM

For Toyo Engineering Corporation

Prepared by Nishimura & Asahi Hanoi and HCMC Office



August 2013

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DEFINITIONS

No.	Terms	Definition & Interpretation
1.	2006 CII Prospectus	means the 2006 Prospectus of Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII) downloadable from the website of the Ho Chi Minh City Stock Exchange (HOSE).
2.	2010 CII Prospectus	means the 2010 Public Offering Prospectus of Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII).
3.	Basic Schemes	means preliminary schemes for implementation of the project comprising Scheme II-A, Scheme II-B and Scheme II-A-BOO as discussed in Section II.
4.	BOO Contract	means Build – Own – Operate contracts.
5.	BOO Project	means the project carried out in a form of BOO Contract.
6.	BOO Thu Duc	means Thu Duc B.O.O. Water Plant project as approved in 2004 by the People's Committee of Ho Chi Minh city in accordance with Decision No. 5569/QD-UB dated 9 November 2004.
7.	BOO Dong Tam	means Dong Tam B.O.O Water Plant project as approved in 2007 by the People's Committee of Tien Giang Province.
8.	BOT	means Build – Operate – Transfer.
9.	BOT Decree	means Decree No. 108/2009/ND-CP dated 27 November 2009 issued by the Government on investment forms of BOT, BTO and BT contracts as amended by Decree 24.
10.	BOT Group Contract	means collectively the investment contracts in forms of BOT, BTO and BT as regulated under the BOT Decree.
11.	BOT Group Project List	means a list of proposed BOT Group Projects as publicly announced by a Public Party via media in accordance with relevant laws.
12.	BT	means Build – Transfer.
13.	BTO	means Build – Transfer – Operate.

No.	Terms	Definition & Interpretation
14.	CII Website	means the official website of Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII) which is available at http://www.cii.com.vn as of 28 July 2013.
15.	Circular 01	means Circular No. 01/2008/TT-BXD dated 2 January 2008 issued by the Ministry of Construction on guiding the Decree 117.
16.	Circular 03	means Circular No. 03/2011/TT-BKHDT dated 27 January 2011 issued by the MPI on guidance of certain provisions under the BOT Decree.
17.	Circular 08	means Circular No. 08/2012/TT-BXD dated 21 November 2012 issued by the Ministry of Construction on Securing the Safety of Water Supply
18.	Circular 186	means Circular No. 186/2010/TT-BTC dated 18 November 2010 issued by the Ministry of Finance guiding remittance of profit overseas by foreign organizations and individuals having profit from direct investment on Vietnam
19.	Civil Code	means Civil Code No. 33/2005/QH11 as adopted by the National Assembly on 14 June 2005.
20.	Construction Law	means Law No. 16/2003/QH11 on construction as adopted by the National Assembly on 26 November 2003 and amended and supplemented by the Law No. 38/2009/QH12 as adopted by the National Assembly on 19 June 2009.
21.	Decision 87	means Decision No. 87/2004/QD-TTg dated 19 May 2004 issued by the Prime Minister on management of foreign contractors as amended by Decision No. 03/2012/QD-TTg dated 16 January 2012.
22.	Decree 117	means Decree No. 117/2007/ND-CP dated 11 July 2007 issued by the Government on production, supply and consumption of clean water, as amended.
23.	Decree 24	means Decree No. 24/2011/ND-CP dated 5 April 2011 on amendment and supplements to the BOT Decree.

No.	Terms	Definition & Interpretation
24.	Decree 85	means Decree No. 85/2009/ND-CP dated 15 October 2009 issued by the Government on guidance of implementation of certain provisions under the Law on Tendering and Construction Law.
25.	Draft Revised PPP Regulations	means the 2nd draft of the regulation for replacing the PPP Regulations.
26.	Enterprise Law	means Law No. 60/2005/QH11 on enterprises as adopted by the National Assembly on 29 November 2005.
27.	EPC Contractor	means an Engineering, Procurement and Construction contractor which may be engaged for development of the Water Supply System in the Basic Schemes.
28.	Investment Law	means Law No. 59/2005/QH11 on investment as adopted by the National Assembly on 29 November 2005.
29.	Investors	means investors who contribute capital for the establishment of the Project Company or the Service Company to carry out the relevant investment project.
30.	JICA	means Japan International Corporation Agency.
31.	Joint Circular 75	means Joint Circular No. 75/2012/TTLT-BTC-BXD-BNNPTNT dated 15 May 2012 on Principles and Methods of Determination of Clean Water Tariffs.
32.	JVC	means a joint venture contract.
33.	JV Company	means the company established by the Investors as a commercial presence in Vietnam to carry out the an investment project pursuant to a JVC as discussed in Section I.B.II below.
34.	Law on Tendering	means Law No. 61/2005/QH11 on tendering as adopted by the National Assembly on 29 November 2005 and amended and supplemented by Law No. 38/2009/QH12 as adopted by the National Assembly on 19 June 2009.
35.	MPI	means the Ministry of Planning and Investment.
36.	PPP Contract	means investment contracts in a form of Public – Private

No.	Terms	Definition & Interpretation
		Partnership (PPP) as regulated under the PPP Regulations.
37.	PPP Project	means a project carried out in a form of PPP Contract.
38.	PPP Regulations	means the regulation of piloting the investment forms of Public – Private Partnership (PPP) attached to Decision No. 71/2010/QD-TTg dated 9 November 2010 issued by the Prime Minister.
39.	Private Party	means the Investors and the Project Company who will enter into the Project Contract.
40.	Project Company	means the company established by the Investors for management and implementation of the Project in a form of BOT Group Contracts, PPP Contracts or BOO Contracts.
41.	Project Contract	means an investment contract entered into by and between a competent State authority and the Private Party in order to implement an investment project which include development of construction works as defined in Section I.A below.
42.	Project Works	means construction works developed in accordance with the Project Contract.
43.	Public Party	means the competent State authority who will enter into the Project Contract.
44.	SAWACO	means Saigon Water Corporation, an SOE incorporated and existing under Decision No. 85/2005/QD-UB dated 24 May 2005 of the People's Committee of Ho Chi Minh city, with the main business in clean water supply service and related services.
45.	Service Company	means the company established by the Investors as a commercial presence in Vietnam for providing the services as permitted under the Investment Certificate as discussed in Section I.B.II below.
46.	Service Contract	means a contract entered into by and between the Service Company with a client in order to provide the services as permitted under the Investment Certificate of the Service Company.

No.	Terms	Definition & Interpretation
47.	SOE	means a State-owned enterprise.
48.	SPC	means a special purpose company to be established by Toyo and co-investors to perform certain works and/or services pertaining to the water distribution plant, which also acts as the Project Company or JV Company under Scheme II-A and Scheme II-A-BOO or the Service Company under Scheme II-B respectively.
49.	State Participating Portion	means the contribution by the State to a PPP Contract as discussed in Section I.A.II(3) below.
50.	Study	means the PPP feasibility study for the water supply improvement project in Ho Chi Minh City, Vietnam.
51.	Study Team	means the consortium selected and commissioned by JICA to carry out the Study.
52.	TDW Website	means the official website of B.O.O Water Thu Duc Joint Stock Company which is available at http://tdw.com.vn as of 28 July 2013.
53.	Toyo	means Toyo Engineering Corporation.
54.	Water Resource Law	means Law No. 17/2012/QH13 on water resources as adopted by the National Assembly on 21 June 2012.
55.	Water Safety Plan	means a plan for safety in supplying water as discussed in Section I.C.II(6) below.
56.	Water Supply System	means the water distribution plant and ancillary works to be constructed, operated and maintained by the SPC in the Basic Schemes.
57.	WTO Commitments	means the commitments of Vietnam in opening the service market to foreign investments that Vietnam made upon her accession to the WTO.

MEMORANDUM ON SELECTED LEGAL ISSUES CONCERNING WATER SUPPLY PROJECTS IN VIETNAM

On July 31th, 2012, Toyo Engineering Corporation ("**Toyo**") entered into a contract with Japan International Corporation Agency ("**JICA**") for a PPP feasibility study on the water supply improvement in Ho Chi Minh City, Vietnam (the "**Study**"), which will mainly address three themes which are the (1) new water resources, (2) effective water distribution, and (3) human resource development. The Study will be carried out by a consortium selected and commissioned by JICA (the "**Study Team**").

Bearing in mind that one of the main aims of the Study is to develop the PPP scheme in the field of water supply business in Vietnam, the Study Team is exploring the possibility to construct, operate, and maintain such water distribution plant under the cooperation between public sectors and private sectors.

Although the Study Team has not built a concrete structure for this business yet, there are some ideas for the project structures to be examined below (the "**Basic Schemes**") comprising Scheme II-A, Scheme II-B and Scheme II-A-BOO as described in their respective sections below. In this context, we, Nishimura & Asahi, have been retained by Toyo to provide this legal memorandum ("Memorandum") covering and addressing the following issues:

1) Vietnamese Laws, Decrees and/or Regulations involved in establishment of an SPC for the implementation of the Scheme;
2) Vietnamese BOT/BTO/BOO or other PPP regulations applicable to the Basic Schemes and the applicable contract form;
3) Vietnamese Laws, Decrees and/or Regulations involved in the SPC holding the property of water distribution plant;
4) Tendering requirement under the Scheme;
5) Vietnamese Laws, Decrees and/or Regulations other than the above which impact on the SPC carrying out the project;
6) Any restrictions and/or regulations relating to the remittance of dividends and fees from the SPC to foreign investors;
7) Any tax incentives available for the SPC in implementing the Basic Schemes.

This Memorandum is divided into five main sections as follows:

1) Executive Summary
2) Overview of Vietnamese laws and regulations regulating the formation, licensing and implementation of investment projects in water supply business; the incorporation of the SPC; the tendering process; conditions for distribution of profit

to its stakeholders by the SPC; and the construction activities including the case rendered by a foreign contractor;

3) Analysis on the Basic Schemes, in which we will analyze a number of major legal issues pertaining to the Basic Schemes and discuss how the laws and regulations mentioned in the first section apply to the Basic Schemes;

4) Case Study, where we will be a case study in which we will present the information about two typical water supply projects implemented in form of BOO Contract, namely BOO Thu Duc and BOO Dong Tam; and

5) In the final section we will examine the participation of SAWACO in the project as a shareholder of the SPC and as an O&M contractor.

Please be noted that the laws of Vietnam governing the project in question is in early stage of development and thus constantly changing. As of 28 July, 2013, while the new Water Resource Law has come into effect for several months, and implementing legislations thereunder have not been much issued. Additionally, the regulations on PPP are currently in the process of being revised by the Government. This Memorandum will be therefore subject to further improvement or amendment in the near future.

EXECUTIVE SUMMARY

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
1.	Vietnamese Laws, Decrees and/or Regulations involved in establishment of an SPC for the implementation of the Scheme;	1. Project is implemented in the form of a Project Contract The SPC is allowed to be set up under the Enterprise Law, but required to acquire an investment certificate under the Investment Law, and the BOT Decree or PPP Regulations, subject to the type of the project. Unless engaging in businesses which are explicitly restricted by an industrial laws, neither the BOT Decree nor PPP Regulations prohibit establishment of a 100 % foreign owned SPC as the Project Company. **See Section I.A.I(8) and Section I.A.II(9) below for more details.** 2. Project is implemented in the form of a JVC The SPC is allowed to be set up under the Enterprise Law, but required to acquire an investment certificate under the Investment Law. Given that a water supply project has material	The SPC is allowed to be set up under the Enterprise Law, but required to acquire an investment certificate under the Investment Law. Operation and Management (O&M) services for water distribution systems does not fall into the business sectors which the Vietnamese Government is committed to open to foreign investors under the WTO Commitment. Thus, the incorporation of a Service Company by a foreign entity shall be considered by the Vietnamese Government on a case-by-case basis and may be subject to the discretion of the licensing authority, except in a case where a free trade agreement such as Japan - Vietnam EPA provides otherwise. **See Section I.B.II below for more details.**	The SPC is allowed to be set up by the Enterprise Law. However, the SPC is required to have an investment certificate under the Investment Law. In addition, there is a room for this scheme to be subject to the BOT Decree pursuant to the approval rendered by the Prime Minister or an authorized State authority.

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
		effects on public interest and due to the lack of legislation governing foreign investment in the sector, however, it should be noted that forming a water supply project as a JVC without entering into a Project Contract may be practically considered by licensing authorities on a case by case basis only. **See Section I.B.I(5) below for more details.**		
2.	Vietnamese BOT/BTO/BOO or other PPP regulations applicable to the Basic Schemes and the applicable contract form	In Vietnam, two types of regulations relate to this type of BOT scheme: the BOT Decree and the PPP Regulations. Key differences between BOT Group Contract and PPP Contract are illustrated in Appendix I attached hereto. While both Contracts must be made in specific areas regulated under the BOT Decree and the PPP Regulations respectively, only projects satisfying selection criteria may be implemented either in a form of BOT or PPP Contract. It appears that SAWACO is neither a competent State authority nor a direct subordinate State agency thereof. As a result, it is unlikely that SAWACO is eligible to enter into the Project Contract as the Public Party in this Scheme. Instead, the People's Committee of Ho Chi Minh City appears to fit into the status of the Public Party unless the project contemplated in this Scheme II-A	The BOT Group Contract and PPP Contract (and likely the BOO Contract) under the laws of Vietnam require the development of Project Works by the Project Company as the employer. However, in this Scheme II-B, given the fact that SAWACO, instead of the SPC, will be the employer and owner of the Water Supply System, the BOT Group Contract and PPP Contract (and likely the BOO Contract) will not be applicable for this Scheme. Therefore, it is likely that the SPC will enter into a Service Contract with SAWACO to provide SAWACO with O&M services. **See Section I.B.II below for more details.**	BOO Contract has not been explicitly provided in the current law of Vietnam. However, BOO Contract may be deemed as a derivative form of BOT contract because the BOT Decree also provides, in addition to BOT Group Contract, "other similar project contract forms" as approved by the Prime Minister. Therefore, there is the possibility that BOO Contract should also be regulated by the BOT Decree unless otherwise approved by the Prime Minister or an authorized State authority.

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
		falls within the competence of a ministry or equivalent State body. The Investors and the SPC will jointly be the Private Party to the Scheme II-A. SAWACO will be eligible to join the Private Party to the project and able to contribute equity to the SPC subject to the restriction on the State Participating Portion mentioned hereunder. **See Section I.A.I and Section I.A.II respectively below for more details.** Different from the investment in the form of a Project Contract, the JVC may be subject to neither the BOT Decree nor the PPP Regulations. Instead, it is subject to the general provisions regulated under the Investment Law. **See Section I.B.I below for more details.**		
3.	Vietnamese Laws, Decrees and/or	**BOT contract** The ownership of the Project Works in general is not clearly stipulated under the relevant laws. However, if the SPC enters into the BOT contract under the	The SPC will not hold the ownership of the Water Supply System in this Scheme II-B; instead, the ownership will be vested in SAWACO.	As its name suggests, BOO Contract would enable the Project Company to own the Water Supply System during its

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
	Regulations involved in the SPC holding the property of water distribution plant	BOT Decree, where the ownership and other terms and conditions shall be clearly articulated, the SPC shall be allowed to hold ownership of the Water Supply System, subject to the following restrictions: • Given the fact that the Water Supply System will be transferred to the State at a specified point of time, the Project Company would not be permitted to transfer the Water Supply System to any other entity; and • The mortgage of the Water Supply System by the SPC is subject to approval of the competent State authority. **PPP Contract** Unlike the BOT Decree, the current PPP Regulations do not explicitly provide for the requirement of transfer of the Project Works from the Private Party to the Public Party. This may be interpreted that the transfer of Project Works may differ on a case by case basis. The Project Company in a PPP Project is conditionally entitled to create pledge and/or mortgage over assets subject to the State authority's approval as in the case of BOT Group Contract. As it is not clearly stipulated under the current PPP		existence.

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
		Regulations as to the ownership in respect to the Project Works, detailed terms and conditions concerning the ownership and the transfer thereof shall be articulated under a specific PPP Contract. **See Section I.A.I(10) and Section I.A.II(11) respectively below for more details.** **JVC** The ownership over the Project Works is recognized under the general laws including the Civil Code, the Enterprise Law, the Law on Land and the Law on Real Estate Business. **See Section I.B.I(2) below for more details.**		
4.	Tendering requirement - Selection of Investor(s)	**1. In respect of the investment in the form of a Project Contract** **Tendering** Under the current PPP Regulations, an investor of PPP Projects shall undergo open domestic or international tendering. In BOT Group Projects, the investor shall be selected through open domestic or international tendering if two or more investors are interested in a project. Open international tendering	As SAWACO is expected to implement the project, no need to discuss about the selection of investor.	**Tendering** It appears that tendering for selection of investor could be also required unless otherwise approved by the Prime Minister or an authorized State authority. Nevertheless, it appears from our research that a BOO water plant project such as BOO Dong Tam did not go

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
		may only be carried out if no domestic investor registers to implement the project or no domestic investor is selected after an open domestic tendering. **No Tendering** In BOT Group Project, if there is only one investor registering for implementation of a project within a regulatory time-limit or if being permitted by the Prime Minister, such investor shall be appointed without tendering. **See Section I.A.I(7), Section I.A.II(7), Section I.D,** and **Section II.I(6) respectively below for more details.** **2. In respect of the investment in the form of the JVC** The bidding will not be required unless the project is contemplated as an important project under a master planning for water supply sector of Ho Chi Minh City and there are two or more investors having interest in such project independently or separately. In practice, such investment form is less likely to trigger with the tendering requirement		through any tender bidding process for selection of the investors. **See Section III.I(6) and Section III.II(4) below for more details.**

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
		process due to the nature to form such a project. **See Section I.B.I(5) and Section II.I(6).**		
5.	Tendering requirement - Selection of contractor(s)	**Tendering** The contracts executed between the SPC and the contractors (e.g. the construction contracts with the EPC Contractors) may also be subject to the tendering requirement if the value of the relevant contracts is funded by 30% or more State capital. [Note: State capital is defined to include State budget funds, credit facilities guaranteed by the State, investment and development funds of State owned enterprises and other capital funds managed by the State.] **No Tendering** A contractor shall be individually appointed without tendering in the following circumstances notwithstanding the satisfaction of the said 30% of the State capital or more: (i) it is an emergency as a result of a force majeure event which needs prompt remedy; (ii) it is required by the foreign financers of the project; (iii) the project is classified as a national secret or national emergency;	**Tendering** SAWACO shall be responsible for selecting contractors (e.g. EPC Contractor) for implementation of the approved project, which include the O&M contract with the SPC. The contracts executed between the SAWACO and contractors, including the O&M contract and construction contracts with the EPC Contractors, may also be subject to the tendering requirement if the value of the relevant contracts is funded by 30% or more through the State capital. **No Tendering** The investor shall be individually appointed without tendering in the circumstances enumerated in the left column. **See Section II.II.(4) below for more details.**	**Tendering** Tendering for selection of contractors would be, in principle, required to make if the value of relevant contract is funded with 30% State capital or more. **No Tendering** The investor shall be individually appointed without tendering in the circumstances enumerated in the second column unless otherwise decided in the approval rendered by the Prime Minister or an authorized State authority while permitting to carry out the project in a form of BOO.

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
		(iv) the project is for procurement of materials and equipment from a previous supplier who cannot be replaced as a result of compatibility requirements; (v) the project value is not higher than the following thresholds: VND 3 billion for consultant contract, VND 2 billion for procurement contract, VND 5 billion for construction contract, VND 100 million for procurement of normal supplies for operation; or (vi) it is based on other special requirements of the Prime Minister. **See Section I.D and Section II.I(6) below for more details.**		
6.	Any Vietnamese Laws, Decrees and/or Regulations other than the above which	As the SPC will hold and operate the Water Supply System, it must comply with the Water Resource Law which provides that organizations and individuals that manage and operate water supply systems must comply with technical regulations and operate supply systems so as to meet the requirements for stable, safe and constant water supply and reduce water loss and waste.	Although the SPC just gives O&M service, it must also comply with the Water Resource Law which generally provides that organizations and individuals that manage and operate water supply systems shall comply with technical regulations and operate supply systems so as to meet the requirements	As the SPC will own and operate the Water Supply System, it must comply with the Water Law which generally provides that organizations and individuals that manage and operate water supply systems shall comply with technical

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
	impacts on the SPC carrying out the Scheme	Further, the SPC shall subject to all investment conditions, business conditions and restrictions discussed in Section I.C below.	for stable, safe and constant water supply and reduce water loss and waste. Further, the SPC shall subject to all investment conditions, business conditions and restrictions discussed in Section I.C below.	regulations and operate supply systems so as to meet the requirements for stable, safe and constant water supply and reduce water loss and waste. Further, the SPC shall subject to all investment conditions, business conditions and restrictions discussed in Section I.C below.
7.	Any restrictions and/or regulations relating to the remittance of dividends and fees from the SPC to foreign investor(s)	General restrictions described in Section I.G below will apply to the SPC.		
8.	Any investment incentives available for the SPC in	The SPC shall be entitled to tax incentives mentioned in Section I.F below.	As the SPC participates in the project as an O&M contractor, it shall not be eligible for the tax incentives mentioned in Section I.F below.	The SPC shall be entitled to investment incentives mentioned in Section I.F below.

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
	implementing the Basic Scheme			
9.	BOO Case Study in respect of water plant project	In respect of water plant project, it appears from our research that both Thu Duc water plant project in Ho Chi Minh city and Dong Tam water plant project in Tien Giang province have been implemented in a form of BOO Contract. In both cases, State owned companies hold majority of equities in the Project Company. In this sense, further research is required to identify if these cases can be good examples for the water plant project in question where foreign investors are supposed to hold majority of shares of the Project Company.		
10.	SAWACO's Involvement and legal consequences	I. Selection of investors First, even with the participation of SAWACO as an capital contributor, the SPC will be established and operating under the Enterprise Law irrespective of whatever Basic Scheme is taken; Second, the involvement in the project by SAWACO may significantly affect the operation of the SPC if SAWACO owns more than 50% of the equity capital of the SPC given the fact that the SPC is deemed a State owned company. In such situation the SPC will be subject to specific regulations on investment, tendering or construction applicable to State owned companies;Third, in case where the conditions as set forth in Section I.D.IV-4 hereunder are met, SAWACO may not be eligible for joining a tender for selecting O&M contractor held by the SPC because of its equity interests in the SPC. Forth, the participation of SAWACO would not affect the ownership of the SPC in respect to the Project Works though the possibility to negotiate with the Public Party to retain the title over the Project Works or Water Supply System by the SPC may be practically easier.		
11.	Conclusion on the main cases whereby a tendering	I. Selection of Investor(s) There are following main cases whereby a tender bidding process may not be required or applied for selection of investors for the project: First, the project is implemented in the form of BOT Group Contract if (1) there is only one investor registering for implementation		

No	Queries	Scheme II-A (BOT/PPP/JVC Scheme)	Scheme II-B (O&M Scheme)	Scheme II-A-BOO (BOO Scheme)
	requirement may not be applied	of a project within a regulatory time-limit or (2) being permitted by the Prime Minister. Second, the project is implemented in the form of BOO Contract while no tender requirement is specified in the approval of the Prime Minister or an authorized State authority. Third, the project shall be implemented through a JV Company to be established by foreign investors and Vietnamese partners (including SAWACO) or a subsidiary 100% owned by foreign investors; provided however that (1) the project is not clarified as an important project under a master planning for water supply sector of Ho Chi Minh City or there is only one investor (or a number of investors joining together to implement the project) having interest in such project and (2) the project is not clarified to implement in the form of any of BOT Group Contract, BOO Contract and PPP Contract. II. Selection of contractor(s) With regard to procurement of goods or retaining services by the SPC, there are the following main cases whereby a tender bidding process may not be applied for selection of contractors, suppliers or service providers: (1) The value of the relevant contracts/projects is funded by less than 30% through the State capital; or (2) The value of the relevant contracts/projects is, regardless of being funded by 30% or more through the State capital, less than certain amount which is not required to go through a bidding process or the contract/project falls into other cases exempted from the requirement of tender bidding process as set forth in Section I.D.III(2) hereunder.		

SECTION I. OVERVIEW OF VIETNAMESE LEGISLATION REGULATING THE CONTEMPLATED PROJECTS

Both taking effect from July 1, 2006, the Law on Investment No. 59/2005/QH11 (the "**Investment Law**") regulates investment activities in Vietnam by both domestic and foreign investors, and the Law on Enterprises No. 60/2005/QH11 (the "**Enterprise Law**") sets out the types of corporate vehicles that the investors may establish to carry out their investment projects as registered.

Investment Law

The Investment Law regulates investment activities for business purposes and provides for rights and obligations of investors; the State's guarantee of lawful rights and interests of investors; general rules on investment incentives and State administration of investment activities in Vietnam including licensing matters.[1]

There are several forms of direct investment that foreign investors may select, depending on, inter alia, their business plans; however, in infrastructure development sectors, it is common in Vietnam that foreign investors enter into certain specified contracts with the state body of Vietnam, namely BOT, BTO and BT contracts. In Vietnam, PPP is relatively a new terminology adopted on a "pilot project" basis under a subordinate legislation of the Investment Law. The BOO arrangement has also been introduced and implemented in practice though it has not been clearly and thoroughly codified in the current laws and regulations.

In Section I.A below, we will introduce features of BOT, BTO and BT contracts one-by-one under the law of Vietnam and discuss how these types of contracts differ with the PPP and BOO arrangements.

However, as in the discussion in Section I.B below, if the project contemplated in the Basic Schemes cannot adopt the above-said contract forms, the investors may consider establishing either (i) a JV Company without project contracts to carry out the project in accordance with the general laws and regulations or (b) the SPC as a Vietnam-based commercial presence (i.e. a subsidiary) for the purpose of rendering O&M services. In Section I.B we will discuss how these commercial presences without a Project Contract such as BOT, BTO or BT contract can be set up.

Enterprise Law

As a "unified law" applicable to all forms of enterprise, the Enterprise Law applies to the establishment, management and operation of all enterprises established in Vietnam irrespective of the source of investment capital.[2] This law makes available corporate forms in which an enterprise may be incorporated and set out the management structure for each corporate form. Other issues relating to operation of an enterprise such as business registration, corporate governance, and company restructuring are also addressed in this law.

Water Business Laws

[1] Article 1 of the Investment Law
[2] Article 1 of the Enterprise Law

On June 21, 2012, the National Assembly of Vietnam adopted the new Law on Water Resources No. 17/2012/QH13, effective from January 1, 2013 (the "**Water Resource Law**") replacing Law on Water Resources No. 08/1998/QH10 issued in 1998.

The Water Resource Law provides for the management, protection, exploitation and use of water resources, as well as for the prevention, control and remedy of harmful effects caused by water.[3] The exploitation and use of water resources shall be performed for the following purposes: water supply for domestic use, agricultural production, hydropower generation, salt production, aquaculture, industrial production and mining, navigation, among others.[4] The exploitation and use of water resources is subject to the possession of a license issued by the competent State agencies except in the case of small-scale use and in other cases as specified in the text.[5]

In Section I.C we will point out the conditions that the SPC must satisfy or the restrictions that the SPC may be subject to during its course of operation. Investment incentives that are available to a water plant construction project are also mentioned in Section I.F below.

Other relevant laws and regulations

Other laws and regulations that may govern the projects contemplated in the Basic Schemes such as laws on tendering, foreign exchange control and profit remittance shall be analyzed in Sections I.D, Section I.E and Section I.G respectively.

Attached hereto as Appendix II is the list of main legal basis governing the contemplated projects which are briefed hereunder.

A. INVESTMENT IN FORM OF CONTRACTS

Within the scope of this Memorandum, investment in a form of contracts can be defined as a form of direct investment whereby private investors enters into a contract with the State of Vietnam to carry out their investment projects in the country. Such contract must be formulated in certain types specified under the local law, including BOT Group Contract, PPP Contract and BOO Contract (collectively, "**Project Contract**").

I. BOT GROUP CONTRACT

BOT (Build - Operate - Transfer) contracts together with BTO (Build - Transfer - Operate) and BT (Build - Transfer) contracts have long existed in the legal system of Vietnam. Currently, these types of contract are regulated under the same normative legal document.

[3] Article 2 of the Water Resource Law
[4] Articles 45 though 51 of the Water Resource Law
[5] Articles 43 and 44 of the Water Resource Law

For ease of reference, in this Memorandum, these contracts are grouped and referred to as "**BOT Group Contract**" to distinguish them with PPP Contracts and BOO Contracts as analysed below and the projects carried out thereunder will be referred to as "**BOT Group Project**".

1. Legislation

The Investment Law generally provides that the BOT Group Contracts are entered into between the investors and the competent State authorities to implement infrastructure developing projects in the sectors of traffic, power, water supply, waste treatment and other sectors as specified by the Government [6]. For implementation of the Investment Law, the Government issued Decree No. 108/2009/ND-CP as amended by Decree 24 (collectively, the "**BOT Decree**") providing more detailed guidance on BOT Group Contracts. Below are the main features of the BOT Group Contract are outlined, as contemplated in the BOT Decree.

2. Contracting Parties

The BOT Group Contract shall be executed between the following parties:

a) Public Party

The following state agencies may represent the State of Vietnam to become a party to the BOT Group Contract (the "**Public Party**"):[7]

(i) Ministries or ministerial equivalent bodies;

(ii) Government bodies; or

(iii) Provincial People's Committees.

The BOT Decree furthermore allows the said authorized State bodies to delegate one of their subsidiary units[8] to act as the Public Party to the BOT Group Contract for projects of Class B or Class C[9].

[6] Article 23.2 of the Investment Law
[7] Article 3.1 of the BOT Decree
[8] As clarified by the MPI in Article 4.1 of Circular 03/2011/TT-BKHDT ("**Circular 03**") these subsidiary units must be agencies implementing a State administrative function.
[9] Projects in construction are classified into one of 04 classes, namely Class C, Class B, Class A and Class of National Important Project. For water supply and infrastructure projects, if the investment capital

b) Private Party

The following entities may become a contract party to the BOT Group Contract (the "**Private Party**"):

(i) Investors, including domestic and foreign individuals, companies and organizations, among others.[10] There may be multiple investors in a consortium; each of which must directly sign the BOT contract with a Public Party[11]; and

(ii) A Project Company which is incorporated and jointly owned by the Investors in order to manage and operate the investment project (the "**Project Company**")[12].

3. Project Financing

a) Contribution by the State[13]

The total State capital for a BOT Group Project shall not exceed 49% of the total investment capital of such a project. If the BOT Group Project is required to meet with emergency of infrastructure works and other important works, the competent State authorities may use the public budget to develop ancillary works, carry out compensation and relocation of population on the site, land clearance or other works for the project. The costs incurred for such works shall not be accounted for the total investment capital of the BOT Group Project and shall be created, managed and used in accordance with the laws on State-funded projects.

b) Contribution by the Private Party[14]

The investors or the Project Company must be responsible for raising the capital for the implementation of a BOT Group Project as agreed in the BOT Group Contract. In particular, if the total investment capital of a BOT Group Project is less than or equal to VND 1,500 billion, the equity capital by the private investors in the charter capital of the Project Company must be equivalent to at least 15% of total investment capital of the Project. If the total investment capital of a BOT Group Project is more than VND 1,500 billion, the equity capital of the Project Company shall be fixed on the following progressive ratio of each portion:

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is more than VND 1,000 billion, it shall be classified in Class A. Otherwise, it may be classified in Class B (VND 50 - 1,000 billion) or Class C (below VND 50 billion) in accordance with Decree No. 12/2009/ND-CP.

[10] Article 2.7 of the BOT Decree and Article 3.4 of the Investment Law

[11] Article 49.3 of Circular 03.

[12] Article 2.8 of the BOT Decree

[13] Article 6 of the BOT Decree

[14] Article 5 of the BOT Decree and Article 6.1 of Circular 03

- With respect to that portion of investment capital up to 1,500 billion dong, it must not be lower than 15% of such portion; and
- With respect to that portion of investment capital above 1,500 billion dong, it must not be lower than 10% of such portion.

4. Security for Project Contract Performance[15]

The investor must provide security for the performance of its obligations under the Project Contract, including bank guarantees or other forms of security in accordance with the civil laws of Vietnam. The monetary amount of the security must be no less than two per cent (2%) of the total investment capital if the total investment capital is not more than VND 1,500 billion. If the total investment capital is more than VND 1,500 billion:

- For the portion of investment capital not more than VND 1,500 billion, the monetary amount of the security must be no less than 2% of such portion; and
- For the portion of investment capital more than VND 1,500 billion, the monetary amount of the security must be no less than 1% of such portion.

5. Proposing BOT Group Projects

a) Projects proposed by the State

A list of proposed BOT Group Projects (the "**BOT Group Project List**") shall be publicly announced by the Public Party via the following media in January of each calendar year[16]:

- Official website of the competent State authorities; and
- Three (03) consecutive issues of the Tendering Newsletter (which is published by the MPI);

The maximum period within which an investor may select and register to implement a project shall be 30 business days from the last publication date of the BOT Group Project List[17].

[15] Article 23 of the BOT Decree
[16] Article 10.1 of the BOT Decree
[17] Article 10.2 of the BOT Decree

b) Projects proposed by the investors

An investor may at any time submit a proposal for a project outside the list of projects mentioned above to the competent State authority for their consideration.[18] Once the proposal is approved, the competent State body shall add such project to the BOT Group Project List and publish the basic contents of the projects in its website and also in 3 consecutive editions of the Tendering Newsletter.[19]

The project proposal must address a number of matters related to the project, including, among others, the following[20]:

- The necessity and advantages of the project in the form of a BOT Group Contract in comparison with other investment forms;
- Proposed goods, services, fees and charges related to the Project Works (except BT contract);
- Duration for construction and operation and measures of management and commercial operation of the Project Works (except BT contract);
- Conditions and method of hand-over of the Project Works;
- Proposals of investment incentives and support and Government guarantee (if any);
- Conditions for cash payment or implementation of other projects (only applicable for BT contract); and
- Other matters required under the construction laws.

6. Feasibility Reports

The competent State authority shall arrange formulation of a feasibility report to provide the basis for formulation of tender invitation documents and project contract negotiations with the investor[21]. The feasibility report must also be prepared by the competent State authority even if the project is proposed by the investor[22].

[18] Article 11.1 of the BOT Decree
[19] Article 11.5 of the BOT Decree
[20] Article 11.2, 12.2 and 12.3 of the BOT Decree
[21] Article 12.1 of the BOT Decree
[22] Article 13 of Circular 03

7. Selection of Investor[23]

a) Public Tendering

The selection of an investor must be made through an open domestic or international tender process in the case where 2 or more investors have registered to implement a project which is available on the BOT Group Project List[24]. Open international tendering may only be carried out if no domestic investor registers to implement the project or if no domestic investor is selected after an open domestic tender process[25].

b) Appointment of an investor

Appointment of an investor shall only occur in one of the following circumstances[26]:

(i) There is only one investor that has registered to implement a BOT Group Project within 30 business days since the last publication of the BOT Group Project List;

(ii) The project is proposed by an investor and no other investor has registered to implement a BOT Group Project within 30 business days from the last publication of the proposed project contents as mentioned above; or

(iii) A BOT Group Project is required to be implemented in order to satisfy an urgent need to use infrastructure facilities as decided by the Prime Minister on the basis of a proposal from the competent state body and an evaluation report from the MPI.

8. The Project Company

After the Project Contract being agreed initially by the parties, the Project Company will be set up by the investor(s); and the Investment Certificate which acts as the governmental approval for the BOT Group Project and concurrently as the business registration certificate (i.e. the incorporation license) of the Project Company shall be issued to the investors.

a) Role of the Project Company

The Project Company is established for the purpose of managing and implementing

[23] Please note that the investor may be a single investor or a consortium of multiple investors.
[24] Article 13 of the BOT Decree
[25] Article 18.1 of Circular 03
[26] Article 14 of the BOT Decree

the project by way of, among others, (i) selecting the contractors, (ii) preparing the technical designs and (iii) managing and commercially operating the Project Works. As discussed above, the Project Company may be one party to the Project Contract jointly with the investors or it may, as agreed by the investors, assume all rights and obligations of the investors stated in the Project Contract.[27]

b) Corporate Form and Management Organization

The Project Company may be established as a wholly-foreign-owned company or as a joint venture company with one or more Vietnamese parties in a form of a limited liability company or a joint stock company. The managerial organization of the Project Company shall be in accordance with the Enterprise Law[28].

c) Licensing Authority

The MPI shall be the licensing authority for the Project Company in the following circumstances[29]:

(i) The relevant BOT Group Project is of national importance;

(ii) The relevant BOT Group Contract is executed between the investors with a ministry, branch (i.e. line ministry) or their authorized bodies; and

(iii) The relevant BOT Group Project will be implemented on an area covering a number of provinces.

Other BOT Group Projects than those related to the circumstances mentioned above shall fall within the jurisdiction of the provincial People's Committee[30].

d) Requisite Documents

In order to establish the Project Company, the investors must submit the following main documents to the licensing authority[31]:

(i) Request for issuance of the Investment Certificate;

(ii) The primary-signed Project Contract and other contracts related to the project (if any);

(iii) The Feasibility study report;

[27] Articles 2.8, 16, 29, 31 and 32 of the BOT Decree
[28] Article 27 of the BOT Decree
[29] Article 24.1 of the BOT Decree.
[30] Articles 24.2 and 27 of the BOT Decree.
[31] Article 25.2 of the BOT Decree.

(iv) The Charter of the Project Company and Joint venture agreement with Vietnamese partners (if any).

e) Timing

In law, the Investment Certificate shall be issued to the Investors after 45 working days from to the full receipt of valid documents by the licensing authority[32].

9. Contract Formation and Project Implementation

a) Negotiation and Execution of Project Contract

Upon successful selection of the investor, the Public Party shall hold a negotiation with the selected investor before the Project Contract is initiated between the parties[33]. Once the Investment Certificate for the project is issued (and the Project Company is incorporated), the parties shall enter into an official Project Contract.[34]

b) Selection of Contractors

The Project Company shall be responsible for selection of contractors for consultancy, procurement, construction and installation and other contractors to implement the project. If such selection is within the scope of the Law on Tendering, the Project Company must comply therewith.[35] In particular, if the total investment capital of the project is funded with state capital of 30% or more, the selection of such contractors must be compliant with the Law on Tendering and related regulations and the head of the Project Company must approve the tendering plan based on the written consent of the competent state authority[36].

The selection results must be reported to the Public Party within 15 business days from the date of the selection[37].

c) Site Clearance

The relevant provincial People's Committee shall be responsible for site clearance and for completing legal procedure for allocation or lease of land in accordance with

[32] Article 25.4 of the BOT Decree.
[33] Article 15 of the BOT Decree.
[34] Article 15.4 of the BOT Decree
[35] Article 29.1 of the BOT Decree
[36] Article 50 of Circular 03.
[37] Article 29 of the BOT Decree

law and the terms and conditions of the Project Contract.[38] However, the Project Company shall be responsible for compensation to and relocation of the population in the project land area, except for certain limited cases where the Public Party may consider using State budget capital to organize the compensation, site clearance and relocation for the purpose of assisting implementation of the project[39].

10. Ownership of assets

Pursuant to the BOT Decree, the Private Party to a BOT Group Contract shall be required to transfer the construction works of the project developed thereunder (the "**Project Works**") to the Public Party at a certain point of time in accordance with the conditions prescribed therein[40], in particular:

- For BTO contracts, the transfer shall take place immediately upon completion of Project Works although the Government shall assign the Investors the rights to operate the Project Works for a limited time to recover their expenses and gain profits[41]. For BT contracts, the transfer shall take place immediately upon completion of Project Works although the Government shall grant the Investors other projects for recovering expenses and gaining profits or make monetary compensation to the Investors in accordance with the terms and conditions of the BT contracts[42]. That means the ownership over the Project Works should not be granted by the State to the Project Company.
- For BOT contracts, the Investors shall be allowed a period of time for recovering expenses and gaining profits prior to the transfer of the Project Works without compensation[43]. The law however fails to provide explicitly whether the Project Company may own the Project Works or not. However, even so, the law enable the Project Company to exercise certain rights that are similar to those an asset owner may be entitled to, including the right to possess and the right to use[44].

  First, the Project Company is permitted to manage and commercially operate the Project Works before transferring the same to the state[45];

[38] Article 30.1 of the BOT Decree
[39] Articles 6.2 and 30 of the BOT Decree
[40] Articles 20 and 35 of the BOT Decree.
[41] Articles 2.2, 35.2, 36 and 37.2 of the BOT Decree.
[42] Articles 2.3, 35.3 and 37.1 of the BOT Decree.
[43] Article 2.1 and 35.1 of the BOT Decree.
[44] See Article 164 of the Civil Code
[45] Article 32.1 of the BOT Decree

Second, the Project Company is permitted to pledge and/or mortgage assets in accordance with the law, provided that such pledge and/or mortgage must be approved by the competent state authorities and does not adversely affect the objectives, progress and operation of the project as stipulated in the Project Contract[46];

Furthermore, the state also guarantees that the investment capital and legitimate assets of the Investors shall not be nationalized or expropriated by any administrative action[47].

As it is not clearly stipulated under the laws that the ownership of the Project Works belongs to the Project Company, in practice, the investors shall make all the terms and conditions in relation to the ownership and the transfer clearly articulated in the Project Contract. However, considering the BOT Project shall be transferred back to the State at the end of the operation term, ownership rights of the Project Works held by the investors are subject to certain restrictions.

II. PPP CONTRACTS

In this section we will discuss about the public - private partnership contract (hereinafter, "**PPP Contract**", and the project carried thereunder, "**PPP Project**"), a relatively new concept under the law of Vietnam. We note that PPP Contract is different from the BOT Group Contract and regulated in a separate regulation.

1. Legal basis

PPP Contracts are now provided for in the Regulations on Trial Public Private Partnership (PPP) investment form issued by the Prime Minister under Decision No. 71/2010/QD-TTg dated 9 November 2010 ("**PPP Regulations**"). It should be noted that PPP Contracts appear to be viewed by the State of Vietnam as an alternative form of investment to BOT Group Contracts or BOO Contracts (as discussed below). For instance, in Decision No. 1624/QD-TTg dated 9 November 2011 on Establishment of the PPP Investment Steering Committee, PPP Contract is listed along with the BOT Group Project as one of the investment forms in which there is co-ordination between the State and an investor. More importantly, there are a number of different points at law between PPP and BOT Group Project which will be

[46] Article 41 of the BOT Decree.
[47] Article 45 of the BOT Decree.

also illustrated hereunder.

Under PPP Regulations, PPP Contract is defined as a contract signed between an authorized State body and an investor in which the State cedes the right and grants permission to the investor to make the investment, and to operate the project works (i.e. facilities) and to provide public services for a specified duration[48].

As the current PPP Regulations are implemented on a trial basis for from 3 to 5 year from the effective date,[49] new regulations which are aimed at replacing the PPP Regulations are now being drafted by the MPI (the "**Draft Revised PPP Regulations**")[50]. For your further reference, in this Section we will also mention about certain key new provisions on PPP Contract introduced in the draft.

2. Contracting Parties to a PPP Contract

The parties that may enter into a PPP Contract as Public Party and Private Party are the same as those that may execute a BOT Group Contract as discussed in Section I.A.I(2) above[51], particularly in relation to the Private Party due to the reason that the Investment Law is also referred to as the legal basis for the PPP Regulations.

3. PPP Project Financing

a) Contribution by the State

The contribution by the State to a PPP Contract (a.k.a. the "**State Participating Portion**") which is not the term "State capital" regulated under the BOT Decree is newly introduced, comprising of:

(i) State capital;

(ii) Investment incentives; and/or

(iii) Related financial policies.

[48] Article 2.7 of the PPP Regulations
[49] Article 52.1 of the PPP Regulations
[50] A copy of the draft is downloadable from the MPI's official website at http://www.mpi.gov.vn/portal/page/portal/bkhdt/968926#1,5075 (last visit on 28 July 2013)
[51] Articles 7.1 and 32.3 of the PPP Regulations

Of which, the State capital is defined to comprise State budget capital, ODA capital, Government bonds, loan capital guaranteed by the State, investment and development loan capital of the State, investment and development capital of the State owned enterprises and other capital resulting in public debt managed by the State.[52] It appears that the State capital regulated under the BOT Decree may be of the same meaning as the State capital included in the State Participating Portion in a PPP Project.

Depending on the nature of each PPP Project, the State Participating Portion may include one or more of the above-mentioned items, provided that such participation shall not exceed 30% of the total investment capital of a PPP Project unless otherwise decided by the Prime Minister[53]. However, it is specially noted under the current PPP Regulations that the State Participating Portion is not an equity contribution in the Project Company and not associated with the entitlement of profit distributed from of the project revenue[54].

b) Contribution by the Private Party

The Private Party's participating portion shall comprise equity capital of the Investors, domestic and international commercial capital and other capital to be raised on a condition that it shall not result in public debt.[55]

Unlike the BOT Group Project, the equity of an investor in a PPP Project, pursuant to the current PPP Regulations[56], must be at least equal to 30% of the Private Party's participating portion in the project. The Investor may raise a commercial loan and other capital source (without a Government guarantee) at a maximum 70% of the Private Party's participating portion in the project[57].

4. Security for Project Contract Performance

[52] Article 2.5 of the PPP Regulations
[53] According to Article 3.5 of the Draft Revised PPP Regulations, the State Participating Portion may not exceed 49% of the total investment capital of a PPP Project.
[54] Articles 2.4 and 9.2 of the PPP Regulations
[55] Article 3.2 of the PPP Regulations
[56] According to Article 3.7 of the Draft Revised PPP Regulations, the capital contributed by the Investors may be in form of a least-priority loan funded by the Investors to the Project Company. Anyhow, if the total investment capital of a PPP Project is less than or equal to VND 1,000 billion, the equity capital of the Investors must be equivalent to at least 15% of the total investment capital of the Project; if the total investment capital of the project is more than VND 1,000 billion, the following progressive ratios shall apply: at least 15% of for the part below VND 1,000 billion and at least 10% for the part above VND 1,000 billion.
[57] Article 3.3 of the PPP Regulations

Like the BOT Group Contract, the investor must also provide security for PPP Contract in form of a bank guarantee or other security prescribed in the civil law of Vietnam, which must be valid from the execution of the Project Contract until the completion of Project Works. The amount of money as security for performance of a PPP Contract, however, must be no less than 2% of the total investment capital of the project regardless of the amount of the capital.[58]

5. Proposing a PPP Project

To be implemented under the PPP Regulations, a project must satisfy ONE of the following selection criteria[59]:

(i) The project is of great importance, large scale and development emergency;

(ii) The project is capable of return on investment to the investor from revenues collected from consumers;

(iii) The project is capable of taking advantage of the private sector's technology, management and operations experience and effective use of financial capacity; or

(iv) The project qualifies other criteria as specified by the Prime Minister.

With the criteria set forth above, the competent State authorities or the Investors shall devise and submit the proposal of a PPP Project to the MPI for consideration and compilation of the list of PPP Projects calling for investment. The list however is subject to approval of the Prime Minister[60] as well as subject to the areas regulated by law.[61]

After being approved, the list shall then be announced on the Tendering Newsletter and websites of the MPI and relevant State authorities and other mass media (where necessary)[62].

6. Feasibility Reports

[58] Article 28 of the PPP Regulations
[59] Article 5 of the PPP Regulations
[60] Articles 12, 13 and 14 of the PPP Regulations
[61] Article 4 of the PPP Regulations
[62] Article 15 of the PPP Regulations

Based on the list of available PPP Projects, a feasibility study shall be essentially carried out and the feasibility report shall be prepared in the manner similar to that is applicable to the BOT Group Project[63]. One of key differences is that for the PPP Project, the State Participating Portion, the investment guaranty measures and other matters beyond the authority of the relevant Ministries and People's Committees shall be considered and decided by the Prime Minister before the feasibility report is approved[64].

7. Selection of Investor

Based on the approved feasibility study report, the Public Party must hold open international or domestic tendering to select the investor to implement a PPP Project, which is, among others, consistent with the Law on Tendering. Unlike the BOT Group Contract, for the time being[65], no appointment of investor without tendering is explicitly regulated for a PPP Project under the PPP Regulations[66].

8. Investment Certificate

The Investor must obtain the Investment Certificate in order to implement the PPP Project by submitting the following main documents to the MPI[67]:

(i) Request for issuance of the Investment Certificate;

(ii) An initially-signed Project Contract and contracts related to the project (if any);

(iii) A feasibility study report;

(iv) The Charter of the Project Company and the Joint venture agreement with Vietnamese partners (if any).

In law, the Investment Certificate will be issued to the Investor after 45 working days from the full receipt of valid documents by the MPI[68].

[63] Articles 16 and 17 of the PPP Regulations
[64] Article 18 of the PPP Regulations
[65] For your reference, under Article 18 of the Draft Revised PPP Regulations, the direct appointment of investor without tendering may be permitted.
[66] Article 19 of the PPP Regulations
[67] Article 30.2 of the PPP Regulations
[68] Article 30.4 of the PPP Regulations

9. The Project Company

The role, corporate form and management organization of the Project Company shall be substantially the same as in the case of the BOT Group Contract.

However, unlike BOT Group Contract, the Project Company shall be established after the Investment Certificate is issued to the relevant PPP Project as explicitly regulated under the PPP Regulations. The registration documents and procedures must follow the regulations under the Enterprise Law[69]. Meanwhile, the Enterprise Law stipulates that if the Project Company is established by foreign investors, investment procedures shall apply and the Investment Certificate shall also act as the business registration certificate (i.e. incorporation license) of the Project Company[70]. Therefore, it is likely that the Investment Certificate of the PPP Project as mentioned above should also act as the business registration certificate of the Project Company in a single step (i.e., obtaining the Investment Certificate for the PPP Project and the establishment of the Project Company at the same time) although it is not explicitly provided for in the PPP Regulation.

10. Project Implementation Process

a) Negotiation and Execution of Project Contract

Upon successful selection of the investor, the Public Party shall hold a negotiation with the selected investor before the Project Contract is initiated between the parties[71]. Once the Investment Certificate for the project is issued (and the Project Company is incorporated), the parties shall enter into an official Project Contract. [72]

b) Selection of Contractors

Like the BOT Group Contract, the Project Company under a PPP Contract shall be responsible for selection of contractors for consultancy, procurement, construction and installation and other contractors to implement the project. If such selection is within the scope of the Law on Tendering, the Project Company must comply therewith. The selection results must be reported to the Public Party within 15 business days from the date of the selection.[73]

[69] Article 32.1 of the PPP Regulations
[70] Article 20 of the Enterprise Law
[71] Article 20.1 of the PPP Regulations
[72] Article 20.2 of the PPP Regulations
[73] Article 33 of the PPP Regulations

c) Site Clearance

The relevant provincial People's Committee shall be responsible for site clearance and for completing legal procedure for allocation or lease of land in accordance with law and the terms and conditions of the Project Contract. Depending on the nature of each specific project, State capital may be used to arrange compensation and to carry out site clearance and relocation if necessary.[74]

11. Ownership of assets

Unlike the BOT Decree, the current PPP Regulations do not explicitly provide for the requirement of transfer of the Project Works from the Private Party to the State. In light of Article 40.1 of the PPP Regulations, the transfer of the Project Works in a PPP Project shall be carried out in accordance with the particular characteristic of such contract form, depending on the form of each specific contract. This may be interpreted that the transfer of Project Works may differ from each PPP Contract to each PPP Contract.

In addition, the Project Company in a PPP Project is also conditionally entitled to create pledge and/or mortgage over assets subject to the State authority's approval as in the case of BOT Group Contract.

As it is not clearly articulated under the current PPP Regulations[75] as to the ownership in respect to the Project Works, in practice, detailed terms and conditions in relation to the ownership right and the transfer of the Project Works shall be clearly stipulated under a specific PPP Contract.

III. BOO CONTRACTS

The form of Build - Own - Operate contract ("**BOO Contract**") is, as opposed to the BTO Group Contract and PPP Contract, not definitely provided for under the current law of Vietnam; its legal features therefore have not been specified. That being said, investment projects carried out in a form of BOO Contract ("**BOO Project"**) were already licensed in practice, likely based on the

[74] Articles 10 and 34 of the PPP Regulations

[75] For your reference, pursuant to Article 39.1 of the Draft Revised PPP Regulations, the State appears to open a window for the investors to have the ownership over the Project Works in accordance with the terms and conditions of the PPP Contract. Accordingly, the Project Works shall be transferred if such transfer is provided for in the relevant PPP Contract. Nevertheless, it appears from current opinions of the MPI that the ownership in respect to the Project Works should be retained by the Public Party

following legal basis.

1. Legislation

In the BOT Decree, after listing up the BOT Group Contract, the Government enables the MPI to make a submission to the Prime Minister for his decision on a case by case basis with respect to "other similar project contract forms"[76]. The prevailing law however fails to specify what "other similar project contract forms" are.

Additionally, in various subordinate normative legal documents and governmental official guidance, BOO Contract is mentioned as an investment form for development of infrastructure. By way of example, in Article 35 of Decree 11/2013/ND-CP dated January 14, 2013 of the Government on Investment Management of Urban Development, BOO Contract is suggested by the central Government to be adopted by the local governments in order to complete infrastructure projects in shortfall of State-funded capital.

With respect to the water supply sector, BOO Contracts are also decided by the Prime Minister as one form of project capital mobilization[77]. Utilizing the BOO Contract in water projects is also advised by the Ministry of Construction to certain local People's Committees as an alternative form to BOT and BT contracts[78].

Other than that, the BOO Contract is legally applicable to power projects due to the Ministry of Industry's (now the Ministry of Industry and Trade) Decision No. 30/2006/QD-BCN dated 30 August 2006.

2. Case Study Approach

In absence of a legal framework for the BOO Contract, we will present basic aspects of the BOO Contract merely based on publicly-available information of two BOO Projects in the water supply sector, namely BOO Thu Duc and BOO Dong Tam in Section III - Case Study below.

B. INVESTMENT FORMS WITHOUT PROJECT CONTRACTS

I. SETTING UP AN INCORPORATED JOINT VENTURE WITHOUT ENTERING INTO A

[76] Article 1 of the BOT Decree
[77] Decision No. 439/QD-TTg dated 3 April 2009 on Development of Water Projects in Populated Islands.
[78] Official Letter No. 2103/BXD-HTDT dated 3 October 2007 issued by the Ministry of Construction to the People's Committee of Binh Phuoc Province and Official Letter No. 2461/BXD-HTDT dated 19 November 2007 issued by the Ministry of Construction to the People's Committee of Nghe An Province.

PROJECT CONTRACT

Subject to the conditions discussed below, foreign investors may opt to implement an infrastructure project by forming a joint venture with one or more local investors without entering into any Project Contract with a local government.

1. Legislation

The Investment Law lists setting up an incorporated joint venture with local partners as one of direct investment forms available to foreign investors, whereby the investors will jointly establish a company ("**JV Company**") to carry out an investment project pursuant to a joint venture contract ("**JVC**")[79].

In light the current law, projects for development of infrastructure including water supply systems are not explicitly prohibited from being implemented in other forms than a Project Contract though (1) those infrastructure development projects are included in the areas which a Project Contract should be performed or encouraged to be performed under both BOT Decree and PPP Regulations[80] and (2) they are normally performed in the form of a Project Contract as a matter of facts. Meanwhile, the Ministry of Construction which is in charge of management of water supply projects in urban zones also expresses its provisional view that capital sources for financing a water supply projects should be diversified and should not be limited to BOT Group Contract, PPP Contract and BOO Contract[81].

Therefore, a project for construction and operation of a water supply system should be allowed to be carried out under a JVC except for the following cases[82]:

(i) Such project is already included in the BOT Group Project List or the list of PPP Projects calling for investment as discussed above;

[79] Article 21.2 of the Investment Law
[80] Article 4 of the BOT Decree and Article 4 of PPP Regulations
[81] See Official Letter No. 2103/BXD-HTDT dated 3 October 2007 issued by the Ministry of Construction to the People's Committee of Binh Phuoc Province and Official Letter No. 2461/BXD-HTDT dated 19 November 2007 issued by the Ministry of Construction to the People's Committee of Nghe An Province.
[82] As far as we are aware, there's no formal and established criteria was publicly issued by the relevant authorities about this point. As such, we note that our analysis here is just our own view and what we believe is the most reasonable interpretation of the relevant laws. Our view is not binding nor is it a guarantee that any particular position will be taken or adopted by any regulatory authority or the court, and does not guarantee that such regulatory authority or the court will always take the same view.

(ii) Such project is not included in any master plans even national, regional or provincial in which it is explicitly required to be implemented pursuant BOT Group Contract, PPP Contract and BOO Contract; or

(iii) Such project contradicts with the underlying policy of BOT Decree or PPP Regulations.[83]

Given that a water supply project has material effects on public interest and due to the lack of legislation governing foreign investment in the sector, it should be noted that forming a water supply project as a joint venture without entering into a Project Contract which does not fall in any cases mentioned above may be practically considered by licensing authorities on a case by case basis only. Additionally, foreign investors should be aware that financial capacity, experience and qualification of the investors may be evaluated by the licensing authorities before the investment is officially approved. In particular, foreign ownership limitation in the JV Company may be raised in practice by the licensing authority as well due to lacking of transparent regulations.

2. Contracting Party

As opposed to investment in form of Project Contract, no State authorities will be a party to the JVC. Instead, foreign investors will execute the JVC with Vietnamese companies, whether Stated-owned or privately-owned ones. This means that SAWACO can participate in such form of investment as a Vietnamese party.

3. Project Financing

The project is funded by the investors in form of equity capital and loan capital to the JV Company. For avoidance of doubt, the loan capital can be mobilized from a third party such as credit institutions.

4. Project Proposal

[83] Since the scope of mandatory application of BOT Decree or PPP Regulations is not clearly stipulated, the regulatory authority or the court may retain discretion as to the application and/or interpretation of it. When analysing such scope, Articles 1 and 4 of BOT Decree and Articles 1, 3, 4 and 5 of PPP Regulations, among other things, should be taken into account.

The investors themselves are allowed, on their own initiative, to formulate and propose a project and shall be responsible before the law for their proposals.[84]

5. Selection of Investor

The Investment Law provides ambiguously that "where two or more investors express interest in an important project identified in master planning for an industry, the selection of the investor to implement the project must be conducted by way of tendering in accordance with the laws on tendering".[85]

This regulation may be broadly interpreted to mean that, if a project is contemplated as an important project under a master planning for water supply sector of a province, e.g. Ho Chi Minh City and there are two or more investors having interest in such project independently or separately a tendering must be done to select the awarding investor. However, given the nature of this JVC investment form which is normally initiated by investors rather than a State authority (which means to be private and confidential till the filing at the licensing authority), it is less likely that an investment project in the form of JVC without a Project Contract can practically trigger with the tendering process.

6. Investment Certificate

The Investment Certificate issued for the project shall also serve as the business registration certificate for the JV Company.[86] Depending on the location where the JV Company is located, the Investment Certificate issuing body may be either the People's Committee or the management authority of an industrial park or the like[87]. However, as water supply business is a conditional investment sector, the Investment Certificate issuing body will seek evaluation opinions from related ministries such as the Ministry of Construction, Ministry of Natural Resource and Environment and Ministry of Planning and Investment[88].

7. JV Company

[84] Article 53.1 of the Investment Law
[85] Article 54 of the Investment Law
[86] Article 50.1 of the Investment Law
[87] Article 38 and 39 of Decree 108/2006/ND-CP dated 22 September 2006 issued by the Government.
[88] Article 47.2 of the Investment Law

The JV Company may adopt the corporate form of limited liability company (LLC) or joint stock company (JSC) and have its corporate management structured in accordance with the Enterprise Law.[89]

8. Project Implementation Process

Different from the investment project in the form of a Project Contract, this investment form requires an official joint venture agreement to be entered into by the investors before issuance of the Investment Certificate which shall act as a fundamental document to run and manage the JV Company and the project thereof.

Under the law, tendering process for selection of contractors may be required for this form of investment if so agreed by the investors or 30% or more of capital of the project is sourced from the State capital.

9. Ownership of the Assets

As the JV Company enjoys the legal entity status and operates as an enterprise under the Enterprise Law, the JV Company will be entitled to possess, use and dispose of assets created through lawful business activities.[90] Therefore, the ownership of the JV Company in respect to the Project Works should be recognized.

II. SETTING UP A SERVICE COMPANY

Given the fact that the BOT Group Contract, the PPP Contract, the BOO Contract and the JVC form as mentioned above all entail development of the Project Works (i.e. facilities) by the Project Company, those forms may not be adoptable in cases where the Project Company wishes to merely act as a service provider/contractor to the BOT Group Project or PPP Project without developing the facility. In such cases, the investors may consider establishing a service

[89] We note that Vietnamese law (i.e., Resolution No. 71/2006/QH11) specially favors a JV Company by allowing it to adopt in its corporate charter the matters subject to resolution of the highest decision making body as well as the voting threshold to pass the resolution thereof at its sole discretion.

[90] Article 8.8 of the Enterprise Law; Article 8.3 of Decree 108/2006/ND-CP and Article 170 of the Civil Code

company ("**Service Company**"[91]) in the country separately in accordance with normal procedures regulated under the Investment Law and the Enterprise Law, which may then provide services to others through a service contract ("**Service Contract**").

1. Legislation

The Investment Law definitely permits a foreign investor, by itself or in a joint venture with a Vietnamese partner, to establish a company in Vietnam for the purpose of rendering services to local organizations and individuals[92].

2. Corporate Form and Managerial organization

Like a Project Company and the JV Company, a Service Company may adopt the corporate form of a limited liability company (LLC) or a joint stock company (JSC) and have its corporate management structured in light of the Enterprise Law.

3. Investment Conditions

The incorporation of the Service Company, as a foreign-capital-invested one, shall be subject to the commitments of Vietnam in opening the service market to foreign investments that Vietnam made under international treaties, including the commitments Vietnam made on its accession to the WTO (the "**WTO Commitments**")[93].

The Operation and Management (O&M) services for water distribution systems which are provided by the Service Company to a Vietnam-based service consumer however are not covered by the WTO Commitments and therefore Vietnam has no committed obligations to open the market for foreign investors to render the O&M services for water distribution systems in the country. The incorporation of the Service Company therefore shall be considered by the State on a case-by-case basis and subject to the discretion of the licensing authority, except for cases involving foreign investors coming from countries which entered into free trade agreements with Vietnam permitting foreign investors to engage in such services in Vietnam and Vietnam such activities.[94] Nevertheless, a number of factors including

[91] In this Memorandum, the term "Service Company" is used to indicate the company set up not to execute a construction contract with the EPC Contractor (i.e., not engaging in development and investment of construction works of the Project) in contrary to a "Project Company" discussed in Section I.A above or a "JV Company" discussed in Section I.B.I. above.
[92] Article 22 of the Investment Law
[93] Article 29.2 of the Investment Law
[94] We note that Vietnam and Japan entered into a kind of free trade agreement namely agreement for the liberation, promotion and protection of investment whereby Japanese investors are not prohibited from engaging in the O&M services for water distribution systems in Vietnam

financial capacity, experience and qualification of the investors, in our experience, may be taken into account by the licensing authority during the licensing process when deciding whether or not the Service Company should be approved to be incorporated.

4. Procedures for Establishment of the Service Company

a) Licensing Authority

Depending on the location where the Service Company is headquartered, the licensing authority may be either the People's Committee or the management authority of an industrial park or the like[95].

b) Requisite Documents

An application file for issuance of the Investment Certificate (which concurrently serves as the business registration certificate of the Service Company) shall consist of the Service Company's constituent documents (including but not limited to the draft Charter and/or the joint venture contract executed with Vietnamese partners) and other documents evidencing the investors' legal status as well as the satisfaction of investment conditions by the investors[96].

c) Timing

In law, the licensing process will take 30 working days or less from the full receipt by the licensing authority of the valid application file[97]. However, the issuance usually expects to be delayed as a matter of practice.

C. INVESTMENT CONDITIONS - BUSINESS CONDITIONS AND RESTRICTIONS IN WATER BUSINESS SECTOR

I. INVESTMENT CONDITIONS

1. Compliance with Strategies and Master Plans

[95] Article 38 and 39 of Decree 108/2006/ND-CP dated 22 September 2006 issued by the Government.
[96] Articles 44-46 of Decree 108/2006/ND-CP dated 22 September 2006 issued by the Government
[97] Article 47 of the Investment Law

Article 3.3 of the Water Resource Law sets forth a principle that the exploitation and use of water resources must comply with water resource strategies and master plans approved by competent State agencies, and be linked with the protection of the environment, natural landscape, historical-cultural relics, scenic places and other natural resources, and the assurance of national defense, security and social order and safety.

The country water resource strategy which is subject to the Prime Minister's approval shall be elaborated for a 10-year period, with a 20-year vision, corresponding to the period of the relevant socio-economic development strategy. This strategy will contain viewpoints, guiding principles, visions and objectives on; and orientations, tasks and general solutions for, the protection, exploitation and use of water resources and prevention, control and remedy of harmful effects caused by water.[98]

National, inter-provincial and provincial master plans on water resources which span a 10-year period, with a 20-year vision shall be approved by the Prime Minister, concerned Ministries and provincial People's Council respectively. For reference, the current master plan of HCMC is added hereto as Appendix III.

2. Community consultation

The Water Resource Law requires an investor of a project involving the building of a structure for water resource exploitation which will greatly affect production and daily-life activities of local people to coordinate with local administrations in consulting representatives of local communities in affected geographical areas on the project contents related to exploitation of water resources; summarizing and absorbing opinions, giving their explanations and attaching these opinions and explanations to their projects' dossiers for submission to the licensing authorities. The project information concerning exploitation of water resources and all possible effects then must be publicized before the project is implemented. Additionally, all costs incurred from the activities hereto should be borne by the investor.[99]

II. BUSINESS CONDITIONS AND RESTRICTIONS

1. Compliance with Statutory Obligations

[98] Article 14 of the Water Resource Law
[99] Article 6 of the Water Resource Law

It is provided in Article 43.2 of the Water Resource Law that organizations that exploit and use water resources have the following obligations, among other things:

- To protect water resources and prevent, control and remedy harmful effects caused by water, in accordance with the law;
- To use water for proper purposes in an economical, safe and efficient manner;
- Not to obstruct or cause damage to the lawful exploitation and use of water resources by others;
- To protect water sources which they directly exploit and use;
- To perform their financial obligations; to pay compensation in accordance with law for damage caused by themselves in the process of water resource exploitation and use;
- To supply information and data relating to the exploitation and use of water resources at the request of competent State agencies; to facilitate scientific research activities licensed by the State;
- To supplement or change the purpose of scope of water resource exploitation and use only after obtaining necessary governmental permission.

2. Governmental Licenses

Before conducting exploration, exploitation and use of water, or discharging wastewater into a water source, the SPC must obtain respective licenses from the Ministry of Environment and Natural Resources or provincial People's Committee (as the case may be), which can be revoked on non-compliance grounds. The valid terms of such licenses shall be as follows[100]:

- For exploration and use of surface water, no more than 20 years with a possible extension of up to 10 years;
- For exploration and use of underground water, no more than 3 years and possible extension of up to 2 years;
- For exploitation of underground water, no more than 15 years, which may be extended multiple times for no more than 10 years per extension; and

[100] Article 7 of Decree 149/2004/ND-CP dated 27 July 2004 on licensing in exploration, exploitation and use of water resources and discharge of wastewater into water sources

- For discharge of wastewater into water source, no more than 10 years, with a possible extension of up to 5 years.

Please note that under the Water Resource Law, licenses will be granted on the basis of master plan on water resources, exploration and basic survey results, reserves of underground water, among other things. Exploitation of underground water in the following areas, in particular, shall be subject to the following restrictions[101]:

(i) Areas having surface water sources capable of satisfying stable use demands;

(ii) Areas having underground water levels which are declining and where exists hazard of such levels being excessively decreased;

(iii) Areas where hazard of land subsidence, saline infiltration or increases pollution due to exploitation of underground water exists;

(iv) Areas where underground water sources are being polluted or having signal of pollution but have not yet technological solution to process ensuring quality; and

(v) Urban areas, concentrated rural residential areas, concentrated industrial areas or clusters, trade villages which already have centralized systems of water supply and water supply services satisfying requirements of quality and quantity.

Restrictions may be imposed based on the subject and purpose of the exploitation; output and duration of exploration; the quantity of work involved in for exploitation; the depth and type of aquifers to be exploited.

3. Professional Practicing Licenses

Organizations and individuals conducting underground water drilling must possess appropriate drilling practicing licenses[102].

4. Agreements with local governments, wholesaling and retailing agreements

a) <u>General agreement</u>

In order to supply water, the SPC needs to enter into a general agreement with the local People's Committee which contains the following terms and conditions[103]:

[101] Articles 52.4 and 52.5 of the Water Resource Law
[102] Article 36 of the Water Resource Law

- the area supplied with water;
- the orientations of the water supply development plan;
- the projected financial sources for implementation of the water supply development plan;
- the water supply charges, the roadmap and principles for its adjustment;
- service conditions (water quality, pressure, flow and continuity), roadmap for improvement of service conditions; and
- specific obligations and rights of the parties.

Decree 117 requires both water wholesalers and retailers to enter into the general agreement with the local People's Committee regardless of the scale of the relevant water supply system. Nevertheless, in light of Article IV of Circular 01/2008/TT-BXD dated 2 January 2008 issued by the Ministry of Construction on guiding the Decree 117 ("**Circular 01**"), the SPC may not be required to enter into the general agreement with the local People's Committee on the following conditions:

(i) The SPC is a "dependent member" of a water supply company (e.g. SAWACO) which already signs a general agreement with the local People's Committee to supply water in a specified water supply area;

(ii) The SPC is only in charge of a part of such specified water supply area or a stage of the water supply process carried out by such water supply company.

Please note, however, that it is unclear under the laws on water supply as to criteria based on which the SPC will be deemed as a "dependent member" of SAWACO. Such criteria may be elaborated in details in an implementing legislation of the Water Resource Law to be issued in the future.

b) Wholesaling agreement

The water wholesaling agreement between the wholesaler and the retailer must be approved by the local People's Committee which is already entered into the water supply agreement with such retailer[104]. The wholesaling agreement must stipulate the rights and obligations of the contracting parties, quality of clean water, wholesale tariff, payment method, regulations for stability, safety and quality of clean water supply in accordance with the agreement template of the State authority[105].

[103] Article 31 of Decree No. 117/2007/ND-CP dated 11 July 2007 issued by the Government on production, supply and consumption of clean water ("**Decree 117**")
[104] Article 44.3 of Decree 117
[105] Clause VI.2 of Circular 01 and the Annex 3 attached thereto

c) Retailing agreement

The agreement between the water supplier and a water consumer shall include, among other things, the following items: (i) the use purpose; (ii) the service standards and quality; (iii) the rights and obligations of the contractual parties; (iv) the water supply charges, payment mode and time limit; (v) conditions for termination of contract; and handling of contractual breaches.[106]

5. Ministry of Construction's Prior Consensus

The law also requires that an investment project for construction of water supply works of a capacity of 30,000 m3/day or more each, for urban centres of special grade, or 10,000 m3/day or more each, for other urban centres, must be consented in writing by the Ministry of Construction before it is submitted to competent authorities for approval[107].

6. Ensuring Safety of Water Supply

The SPC is obligated to prepare and perform a plan for safety in supplying water ("**Water Safety Plan**") which is aimed at (i) maintaining water pressure, providing stable and sufficient water and ensuring water quality according to prescribed standards; (ii) having solutions to cope with unusual incidents, threats or risks which may occur in the entire production process and supply of clean water from sources to customers, (iii) contributing to the protection of public health, reduction of water-related diseases, prevention of epidemic diseases and socio-economic development; and (iv) contributing to reduction of leakage, saving of water sources and environmental protection[108]. In the Water Safety Plan, the SPC shall:[109]

- Evaluate the current state of operation of the water supply system;
- Identify, analyze and evaluate level of threats and risks for the water supply system;
- Identify measures of control, prevention and remedy of risks and make plans for deployment and application ;

[106] Clause VI.1 of Circular 01
[107] Article 38.3 of Decree 117
[108] Articles 3 and 7.4(a) of Circular No. 08/2012/TT-BXD dated 21 November 2012 issued by the Ministry of Construction on securing the safety of water supply ("**Circular 08**")
[109] Article 4 of Circular 08

- Formulate plans for inspection and assessment of the implementation of measures of control, prevention and remedy of threats and risks;
- Formulate plans and processes responding to changes occurring in the operating conditions with incidents, loss of control and emergency situations ;
- Develop criteria and indicators for monitoring and control limits to assess the implementation of the Water Safety Plan;
- Manage databases related to safe water supply;
- Develop supporting programs and deployment plans;
- Develop plans to assess the performance result of safe water supply; proposing and recommending adjustment of the Water Safety Plan for the next stage.

The provincial People's Committee shall approve the Water Safety Plan, while each lower-level People's Committee shall be in charge of supervising the implementation thereof in the area under its management[110].

7. Financial obligations

Other than water resource royalty and other taxes according to tax laws; charges and fees according to laws on charges and fees, the SPC would be required to pay money for the grant of the rights to exploit water resources. Money for the grant of the right to exploit water resources shall be determined based on the quality and type of water resources, exploitation condition, scope and duration and water use purposes[111].

8. Strictly Controlled Water Tariffs

Water tariffs in Vietnam are strictly controlled by the State and differ from locality to locality and among usage purposes of clean water. On the one hand the law enables the water supplier to decide water tariffs to ensure full cost recovery with a reasonable profit but on the other hand, it restricts the tariffs by introducing principles and rules for price calculation[112].

[110] Articles 7.1(b) and 7.2 of Circular 08
[111] Articles 64 and 65 of the Water Resource Law
[112] Articles 51-54 of Decree 117

In general, water tariffs shall be set on the following grounds:[113]

(i) The regulatory principles for water tariff calculation;

(ii) The socio-economic development conditions of the country and regions and people's incomes in each period;

(iii) The clean water supply-demand relationship;

(iv) Clean water production and business costs and reasonable profits of the water supplier;

(v) The changes in water-treating technology, service quality standards, fluctuations in market prices and state policies; and

(vi) The roadmap for water tariffs as specified by the relevant provincial-level People's Committee.

Specific principles and methods of determination of clean water selling prices to urban areas, industrial parks and rural areas are now prescribed in Joint Circular 75/2012/TTLT-BTC-BXD-BNNPTNT dated 15 May 2012 ("**Joint Circular 75**"). Accordingly, the Ministry of Finance shall be responsible to promulgate the daily-life clean water tariff that is applied nationwide.[114] Based on the promulgated national water tariff, the regulatory principles and methods for calculation of water tariffs, the water supplier is responsible for formulating the daily-life clean water price scheme before submitting the same to the provincial People's Committees for their approval.[115] People's Committees shall then decide the daily-life clean water tariff appropriately applicable to their respective localities with a flexible adjustment not exceeding 50% of the maximum price of the price frame set by the Ministry of Finance.[116]

Annually, when there is any change in the factors forming clean water production and supply costs calculated on the principles and the methods of determination of total production costs as specified in law or when there is any change in the water treatment technology or service quality regulations or the State' relevant mechanisms and policies, leading to an increase (or reduction) in clean water selling prices, the competent authorities shall consider increasing (or reducing) the clean water selling price frame and specific prices as appropriate.[117]

[113] Article 52 of Decree 117 as amended by Decree 124/2011/ND-CP dated 28 December 2011
[114] Article 9.1 of Joint Circular 75
[115] Article 8.2 of Joint Circular 75
[116] Article 9.2 of Joint Circular 75
[117] Article 4 of Joint Circular 75

Clean water wholesale price shall be agreed upon by a wholesaling water supplier (a water supplier that sells clean water to another water supplier for direct sale to water consumers) and a retailing water supplier (a water supplier that directly sells water to water consumers) to ensure that wholesaling and retailing water suppliers may cover production and business costs and earn reasonable profits in accordance with Joint Circular 75, and not higher than the retail price set by competent authorities. In case no price agreement can be reached, either party may request the provincial Department of Finance to organize price consultation in accordance with law.[118] Meanwhile, rates of clean water consumption for daily-life are applied by progressive mechanism, consumers being the households that use amount of water lower than norm of water use are applied a lower price and vice versa. Water prices for different purposes are applied the one-rate mechanism, but there are different rates for each use purpose. [119]

The latest daily-life water tariff frame applicable throughout the country issued by the Ministry of Finance under Circular No. 88/2012/TT-BTC dated 28 May 2012 is as follows:

Type **(Clean water for)**	**Minimum tariff** **(VND per cubic metre)**	**Maximum tariff** **(VND per cubic metre)**
Special or 1st class urban areas	3,500	18,000
2nd - 5th class urban areas	3,000	15,000
Rural areas	2,000	11,000

D. TENDERING

This section will cover the general laws and regulations on tendering activities, which are applicable to the selection for Investors as mentioned in the sections above[120] and may be applicable to subordinate and related contracts including contracts for construction activities which may be executed.

[118] Article 7.1 of Joint Circular 75
[119] Article 7.2 of Joint Circular 75
[120] We however note that the tendering for selection of an ultimate investor for a BOT Group Project must also be in conformity with guidance of the MPI under Circular 03/2011/TT-BTC mentioned above.

I. GOVERNING SCOPE

The Law on Tendering provides for tender packages for, among others, the contracts or projects funded by 30% or more State capital[121]. State capital is defined to include State Budget funds, credit facilities guaranteed by the State, investment and development funds of State owned enterprises and other capital funds managed by the State[122]. It should be worth noting that the state capital is calculated based on the total investment capital of the project as approved on the basis of each individual project, which is unrelated to the paid-up capital funded by the State in the registered (charter) capital of the related company (including the Project Company)[123].

The below sections shall therefore only be applicable if the said contract is subject to the above requirement, or if the employer of the contract voluntarily selects to apply the Law on Tendering[124].

II. INTERNATIONAL TENDERING

The Law on Tendering also provides for tender packages to be conducted by means of international tendering, in the following circumstances[125]:

(i) Tender packages belonging to projects using ODA funds in which the donor stipulates that international tendering must be conducted;

(ii) Tender packages for procurement of goods where the goods are not yet able to be manufactured domestically;

(iii) Tender packages for which domestic tenderers are incapable of satisfying the requirements of the party calling for tender, or in which domestic tendering has been held but without selection of a winning tenderer.

III. FORM OF SELECTION OF CONTRACTORS

[121] Article 1 of the Law on Tendering.
[122] Article 4.1 of the Law on Tendering.
[123] Article 2.1 of Decree 85/2009/ND-CP dated 15 October 2009 issued by the Government ("**Decree 85**").
[124] Article 2 of the Law on Tendering.
[125] Article 13 of the Law on Tendering.

The Law on Tendering provides for the following forms for selection of contractor:

1. Tendering

a) Public Tendering

This is the default form of tendering for projects subject to the scope of the Law on Tendering. No limitation shall be produced to the participation of the tenderers under this form.[126]

b) Limited Tendering

This form shall be applicable only if:

(i) it is required by foreign financers of the project; or

(ii) the project requires high technology or unique technology or is experimental or piloting and only a few tenderers may qualify.

Furthermore, at least five (05) tenderers must be identified to have sufficient capacity and experience if this form of tendering is selected.[127]

2. Appointment of contractor without tendering

This form shall be applicable only if[128]:

(vii) required for an emergency as a result of a force majeure event which needs prompt remedy;

(viii) it is required by foreign financers of the project;

(ix) the project is classified as a national secret or national emergency;

(x) the project is for procurement of materials and equipment from a previous supplier who cannot be replaced as a result of compatibility requirements;

(xi) the project value is not higher than the following thresholds[129]: VND 3 billion for consultant contract, VND 2 billion for procurement contract, VND 5 billion for construction contract, VND 100 million for procurement of normal supplies for operation; or

[126] Article 18 of the Law on Tendering.
[127] Article 19 of the Law on Tendering.
[128] Article 20 of the Law on Tendering.
[129] Article 40 of the Decree 85.

(xii) the project is based on other special requirements of the Prime Minister.

Appointment of investor without tendering shall occur in accordance with the laws and regulations of the Government.

3. Other Forms

a) Direct Procurement

This form is applicable for contracts which have been executed with similar details within six (06) months, provided that the quotations shall not exceed those for previously executed contracts for the same items[130].

b) Competitive Offers

This form may be used only if the following conditions are satisfied:

(i) the total value is less than VND 2 billion; and

(ii) the items to be purchased are commonly used goods which are readily available on the market and have standardized technical features and which are similar to each other in quality.

When this form is applied, a request for quotations must be sent to the tenderers and at least three (03) quotations from three (03) different tenderers must be obtained.[131]

c) Self-Implementation

This form shall be applicable only if the employer is also a contractor with sufficient capability and experience to implement the contract as part of its own project. The cost estimation must be approved in accordance with the laws and the contract supervisor must be independent in terms of organization and finance.[132]

d) Special Cases

[130] Article 21 of the Law on Tendering.
[131] Article 22 of the Law on Tendering.
[132] Article 23 of the Law on Tendering.

If none of the other forms are applicable as a result of the unique features of the project/contract, the employer may submit another proposed method to the Prime Minister for consideration and approval.[133]

IV. TENDERING PROCESS

1. Methods of Tendering

Three methods of tendering are provided for in the Law on Tendering, namely single envelope tendering, dual envelope tendering and two-phase tendering. Of these, single envelope tendering is applicable for procurement of goods, for construction and installation and for EPC tender package. Dual envelope tendering is applicable for selection of consultants, under which technical proposal is first opened for assessment and then financial proposal is assessed. Two-phase tendering is applicable to contracts with technical, new technological, complex and diversified requirements.[134]

2. Tender Guarantee

Tenderers must provide a tender guarantee not exceeding 3% of the approved tender package price prior to the deadline for tender closing[135].

3. Tender Result

The tender result is required to be approved by authorized person prior to official announcement followed by negotiation and execution of the contract with winning tenderer[136].

4. Competitiveness in Tendering

[133] Article 24 of the Law on Tendering.
[134] Article 26 of the Law on Tendering.
[135] Article 27 of the Law on Tendering.
[136] Articles 41 and 42 of the Law on Tendering.

In tendering, it is required that competitiveness must be ensured. As such, any tenderer who participates in tendering for a tender package subject to tendering requirement must satisfy the requirements on competitiveness as below. [137]

First, any tenderer participating in tendering must be organizationally independent, not under the control of the same managing body, and financially independent of the consultancy tenderer who prepared the tender invitation documents and/or who assesses tenders.

Second, the consultancy tenderer for supervision of implementation of the contract must be organizationally independent, not under the control of the same managing body, and financially independent of the contractor performing the contract.

Third, any tenderer participating in tendering for tender packages of a project must be organizationally independent, not under the control of the same managing body, and financially independent of the project investor.

For the purpose of clarifications, a tenderer participating in tendering and a consultancy tenderer who prepared the tender invitation documents and/or assessed tenders; and a tenderer performing the contract and a consultancy tenderer for supervision of implementation of the contract shall be deemed to be organizationally independent of each other, not under the control of the same managing body, and financially independent when meeting all the following conditions:[138]

- They are enterprises operating pursuant to the Enterprise Law or do not belong to the same body or unit which directly issued their decision on establishment; and
- They do not have shareholding or capital contribution in each other above 30%.

Additionally, investors and tenderers participating in tendering for tender packages belonging to the same project shall be deemed to be organizationally independent of each other, not under the control of the same managing body, and financially

[137] Article 11 of the Law on Tendering
[138] Article 3.1 of Decree 85

independent in the following cases:[139]

- With regard to tenderers operating pursuant to the Enterprise Law, they do not have shareholding or capital contribution in each other above 50%.

- In relation to tenderers being professional units, they do not belong to the same body or unit which directly issued their decision on establishment and they must be financially autonomous and self-responsible when they are engaged in the supply of services and goods.

- In respect of tenderers being State owned enterprises established pursuant to the 2003 Law on State Owned Enterprises which must be converted pursuant to the Enterprise Law, they do not have shareholding or capital contribution in each other above 50% from the date the conversion is required to be completed in accordance with the decision of a competent authority.

- Notwithstanding the foregoing, with respect to tenderers being State owned enterprises operating in particular and specialized sectors in which the State requires to hold controlling capital contribution, the regulations of the Prime Minister of the Government shall apply.

E. INVESTMENT INCENTIVES IN WATER BUSINESS SECTOR

Projects for construction of water plants and water supply systems, among other projects for development of infrastructure facilities, are listed as projects which are entitled to investment incentives. Below are certain investment incentives that would be available to the SPC during its course of operation.

1. Preferential financial sources

[139] Article 3.2 of Decree 85

Investment projects on water supply development in small urban centers and concentrated population areas are eligible for access to preferential financial sources from the Water Supply Rotation Fund managed by the Vietnam Development Bank (VDB)[140].

2. Land use fees and rental

The SPC shall be absolutely exempted from land use fees and land rental for water supply facilities including exploitation and treatment works, pipes and facilities in the network and supporting works for management and operation of water supply systems (e.g. executive and managing houses, workshops, and warehouses)[141].

3. Corporate income tax – CIT

A special incentive CIT rate of 10%[142] for a period of 15 years (or even 30 years) is available to enterprises newly established from investment projects for development of water plants or water systems accompanying with 4 year CIT exemption followed by 50% CIT reduction for a 9 subsequent years[143].

4. Value added tax – VAT

Clean water for manufacturing and for living purposes[144] is subject to a VAT rate of 5% while the common rate applicable to other goods is 10%[145].

5. Import and Export Duties

Developments of water plants are entitled to exemption of import and export duties with respect of the goods imported to form fixed assets of the project, which include

[140] Article 30.2 of Decree 117
[141] Article 6 of Decree 117
[142] The common CIT rate is 25%
[143] Articles 15 and 16 of Decree No. 124/2008/ND-CP dated 11 December 2008 issued by the Government on Corporate Income Tax (as amended by Decree No. 122/2011/ND-CP)
[144] This kind of water is exclusive of bottled drinking water and the like.
[145] Article 8.2 of Law on VAT

inter alia equipment and machinery and their components, accessories, and spare parts.[146]

6. Royalties/natural resource tax[147]

The tax rate applicable to exploitation of water for production of clean water mainly ranges from 1% to 3% which is relatively lower than for other purposes[148].

7. Other support

The law also provides that water supply projects shall be supported by the State in the following methods[149]:

- Investing in construction of infrastructure "outside of the fence" (e.g. roads and power facilities);
- Costs of land clearance and compensation in implementation of projects in urban zones, and projects in regions with shortage of water sources;
- Priority in support of post-investment interest rates; and
- Priority in granting preferential financial sources for water supply projects.

F. DISTRIBUTION OF PROFIT AND REMITTANCE OF SERVICE FEES

1. Conditions for distribution of profit

Even if set up in the form of a limited liability company (LLC) or a joint stock company (JSC), the SPC shall be entitled to distribute after-tax profits earned to its stakeholders in keeping with the rules and principles set forth in the Enterprise Law, the company's own Charter and relevant regulations (as discussed in Section I.G(4) below).

[146] Article 12.6 of Decree No. 87/2010/ND-CP dated 13 August 2010 issued by the Government on Import and Export Duties and Item B.31 of the Annex I attached thereto
[147] This kind of tax levied on exploitation of natural resources including water
[148] Resolution 928/2010/UBTVQH12 of the Standing Committee of the National Assembly dated April 19, 2010 promulgating royalties tariff
[149] Article 30.3 of Decree 117 (as amended by Decree 124/2011/ND-CP dated 28 December 2011)

2. Payment of dividend in an LLC

Being an LLC, the LLC may only distribute profits to its members when (i) it generates profits from its business; (ii) it has fulfilled its tax obligations and other financial obligations in accordance with the law; and (iii) it has ensured that debts and other property obligations have been paid in full after distribution of profits. The Members' Council of the LLC is vested the power to approve the plans for use or distribution of profits earned[150].

3. Payment of dividend in a JSC

Dividends in a JSC paid on ordinary shares shall be determined on the basis of the net profit achieved and payment for dividends shall be sourced from profits retained by the company. A shareholding company may only pay dividends to its shareholders when (i) it has fulfilled its tax obligations and other financial obligations in accordance with the law; (ii) it has appropriated all of its funds and fully covered previous losses in accordance with law and its charter; and (iii) it, upon payment of all intended dividends, is still able to satisfy its debts and other property obligations which become due.

Dividends may be paid in cash, by shares of the company or by other assets stipulated in the SPC's Charter. The general meeting of shareholders shall decide the amount of dividend payable on each class of share based on the recommendation of the board of management. Notably, shareholders holding dividend preference shares of the SPC shall be paid dividend at an annual fixed rate or at a rate higher than that paid for shareholders holding ordinary shares.[151]

4. Remittance of profit abroad

Even though the Investment Law only provides that foreign investors, after discharging fully its financial obligations to the State of Vietnam, shall be permitted to remit overseas their profit derived from business activities[152], the SPC's foreign stakeholders (through the SPC) must also satisfy other conditions introduced under ministerial Circular No. 186/2010/TT-BTC dated 18 November 2010 of the Ministry

[150] Articles 47.2(g) and 61 of the Enterprise Law
[151] Articles 82.1; 93.2; 97.2(d) and 108.2(n) of the Enterprise Law
[152] Article 9 of the Investment Law

of Finance guiding remittance of profit overseas by foreign organizations and individuals gaining profit from direct investment in Vietnam ("**Circular 186**"). Accordingly, the SPC will be allowed to distribute profit to its offshore stakeholders (and such stakeholders are entitled to remit distributed profit overseas) only when the following conditions are satisfied:

(i) No accumulated losses remain after carrying forward losses from previous years[153]; and

(ii) The SPC has fully discharged its financial obligations to the State of Vietnam in accordance with law and has lodged audited financial statements and corporate income tax finalization declarations to the competent tax office and at the same time has fully discharged its obligations in accordance with relevant tax laws.[154]

The SPC (or the foreign stakeholders themselves) shall submit a notice of profit remittance to the relevant tax authority seven business days in advance of the profit remittance date[155].

5. Foreign exchange control over the profit outward remittance

Under the current law, the SPC shall be required to open a direct investment capital foreign currency account at an authorized credit institution for the purpose of receiving capital contributed by its foreign investors and remitting earned profit overseas. The law also provides that lawful revenue in Vietnamese dong shall be permitted to be converted into foreign currency for remittance abroad via authorized credit institutions[156]. Notably, the right to purchase foreign currencies is conferred upon the Project Company or investors under both the BOT Decree and the PPP Regulations.[157]

6. Foreign exchange control over remittance of service fees

The SPC is a business entity established in Vietnam so it is subject to the same treatment as other residents in Vietnam in respect of foreign exchange transactions[158]. Therefore, the SPC is permitted to purchase foreign currency from

[153] Article 3.3 of Circular 186
[154] Article 4.2 of Circular 186
[155] Article 5 Circular 186
[156] Article 11 of the Ordinance No. 28/2005/PL-UBTVQH11 dated 13 December 2005 issued by the Standing Committee of the National Assembly on Foreign Exchange Control (as amended by the Ordinance No. 06/2013/UBTVQH13 dated 18 March 2013) and Article 11 of Decree 160/2006/ND-CP on guidance thereof
[157] Article 42 of the BOT Decree and Article 44 of the PPP Regulations
[158] Article 4.2 of the Ordinance on Foreign Exchange Control

licensed credit institutions to make payments/remittance of overseas service fees in connection with or arising from the current transactions ("giao dịch vãng lai" in Vietnamese)[159], provided that such payments/remittance must be made through licensed credit institutions[160] and the SPC must present, and guarantee the truthfulness and accuracy of, the documentation as required by the relevant credit institution[161].

G. CONSTRUCTION MATTER

As regulated by the Construction Law, organizations conducting construction activities must have their capability for construction activities certified in accordance with grades on the basis of the capability for practising construction activities of individuals within such organization, and on the basis of experience in construction activities, financial capacity, equipment, and managerial capability of the organization.[162] Additionally, foreign organizations and individuals engaged in construction activities in the territory of Vietnam must have the capability regulated by laws and must be granted an operating permit or licence by the State administrative body.[163]

As such, if the SPC wishes to engage in construction activities for the Project Works directly, it shall be required to meet statutory conditions on construction activities; otherwise, the SPC should hire qualified contractors including foreign contractors and/or domestic ones to provide construction activities.

Under law, contractors being domestic entities shall be conducted construction activities as registered under the Enterprise Registration Certificate or Investment Certificate or the like and subject to meeting statutory conditions imposed on the type of construction works which will be carried out by the domestic entities. Meanwhile, contractors being foreign ones are also permitted to provide construction services in Vietnam on the condition that (1) the foreign contractors are selected or hired by investors of the construction work and

[159] Article 7.1 of the Ordinance on Foreign Exchange Control
[160] Article 7.3 of the Ordinance on Foreign Exchange Control and Article 6.3 of Decree 160/2006/ND-CP Guiding the Implementation of the Ordinance on Foreign Exchange Control
[161] Article 5.2 of Decree 160/2006/ND-CP Guiding the Implementation of the Ordinance on Foreign Exchange Control
[162] Article 7.3 of the Construction Law
[163] Article 7.4 of the Construction Law

(2) the foreign contracts have obtained a valid contractor permit.[164]

In order to obtain a contractor permit, a foreign contractor shall meet the following statutory conditions and requirements:[165]

First, in general, the foreign contractor should have won a tender or have been selected for the construction activities, or there is a contract assigning the contract work to the foreign contractor.

Second, unless otherwise permitted by the Prime Minister of the Government or otherwise provided by the law of Vietnam, a foreign contractor must have a partnership with a Vietnamese contractor or must engage a Vietnamese sub-contractor.

Third, the foreign contractor must undertake to implement fully the provisions of the law of Vietnam relating to conduct of the contract work in Vietnam.

The foreign contractor shall prepare an application file comprising of the following main documents to obtain a contractor permit:[166]

- Application for issuance of a contractor permit;
- Copy report on tender results, decision on selection of contractor or legal contract assigning the contract work to the contractor;
- Copy licence for establishment and charter of the contractor and practising certificate issued in the country of nationality of the contractor;
- Report on operational experience relevant to the contract work assigned and audited financial statements for the last three years;
- Contract of partnership with a Vietnamese contractor or undertaking to engage a Vietnamese sub-contractor to perform the contract work assigned (already in the tender bid or file containing the offer to act as contractor);
- Power of attorney to any person who is not the legal representative of the contractor.

[164] Article 3.1 of Decision No. 87/2004/QD-TTg dated 19 May 2004 issued by the Prime Minister on management of foreign contractors as amended by Decision No. 03/2012/QD-TTg dated 16 January 2012 ("**Decision 87**")
[165] Article 4 of Decision 87
[166] Article 5 of Decision 87

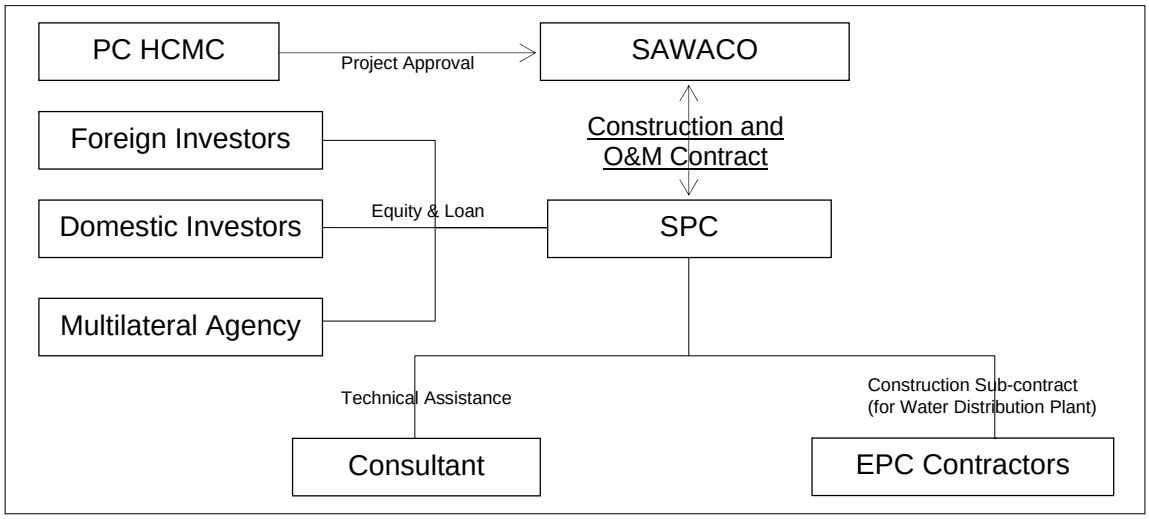
After being granted with the contractor permit, the foreign contractor is responsible for establishing the management/operation office; registering address, phone and fax number, email of the management/operation office with competent authorities of these areas.[167]

[167] Article 7.1 of Circular No. 01/2012/TT-BXD dated 08 May 2012 issued by the Ministry of Construction

SECTION II. ANALYSIS OF THE BASIC SCHEMES

I. ANALYSIS OF SCHEME II-A

1. Description of Scheme II-A



In this Scheme II-A, we assume that:

- The foreign and domestic investors (the "**Investors**") will establish a special purpose company ("**SPC**") for the project contemplated in this scheme;
- The SPC will enter into a Project Contract with SAWACO for construction and/or operation and maintenance (O&M) of a water distribution plant and ancillary works (the "**Water Supply System**");
- The Water Supply System will be constructed and owned by the SPC; and
- The SPC will execute contracts with the technical consultants and the EPC Contractor ("**EPC Contractor**") for implementation of the Project Contract.

2. Available Types of Project Contract

As the Project Company wish to retain ownership over the Water Supply System, the issue of ownership of the Water Supply System in each type of Project Contract (BOT Group Contract, PPP Contract or BOO Contract but except for the JVC) will decide which type of Project Contract should be adopted in this scheme.

a) BOT Group Contract

(i) As discussed in Section I.A.I(10) above, the ownership of the Project Company over the Project Works in general is not clearly stipulated under the laws. However, in BOT contract, it shall be interpreted to the effect that the Project Company may hold ownership over the Water Supply System. This is because:

- The construction development and operation of the Water Supply System should be handled by the Project Company, while the Civil Code of Vietnam provides that the ownership right of an owner in respect to a property may be created on the basis of lawful business activities[168];
- The Project Company would be entitled to grant mortgage over assets of the project (including the Water Supply System), while under the Civil Code of Vietnam, only asset owner is entitled to mortgage its own asset[169];
- The Project Company has the right to manage (i.e. the right to possess) and the right to commercially operate (i.e. the right to use) in respect to the Water Supply System, which are similar to statutory rights of an asset owner[170].

Due to its nature of the project, the ownership of the Project Company (if any) over the assets will be limited as follow:

- Given the fact that the Water Supply System will be transferred to the State at a specified point of time,[171] the Project Company would not be permitted to transfer the Water Supply System to any other entities;
- The mortgage of the Water Supply System by the Project Company is subject to approval of the competent State

[168] Article 170.1 of the Civil Code
[169] Articles 36.3(c) and Article 41 of the BOT Project, Article 342 of the Civil Code, and Article 1.1 of Decree No. 163/2006/ND-CP dated 29 December 2006 issued by the Government on secured transactions as amended by Decree No. 11/2012/ND-CP dated 22 February 2012
[170] Article 32 of the BOT Decree
[171] Article 35 of the BOT Decree

authority.[172]

As such, the detailed terms and conditions of the ownership and the transfer of the Water Supply System to the State shall be clearly articulated in the Project Contract.

(ii) In BTO contract and BT contract, as the Project Company must transfer the Water Supply System to the State immediately upon completion of construction, it would not be have ownership over the built-up Water Supply System. Therefore, the BTO contract and BT contract should not be adopted by the Investors for this Scheme II-A.

b) PPP Contract

As discussed in Section I.A.II(11), ownership of the Project Company in respect to the Water Supply System under the PPP Contract is also not clearly articulated in the current legal text. However, in practice, the Project Company under the PPP Contract holds ownership over the Water Supply System based on the legal grounds we analysed in respect to the BOT Group Project above.

c) BOO Contract

As its name suggests, BOO Contract would enable the Project Company to own the Water Supply System during its existence. We will further discuss about ownership of the Project Company in respect to the Project Contract under the BOO Contract in the case studies in Section III hereof.

d) JVC

As discussed in Section I.B.I(8) above and subject to conditions to perform the project in the form of a JVC, the ownership of the JV Company over the Water Supply System should be respected by the law.

[172] Article 41.2 of the BOT Decree

3. Contracting Parties

a) <u>The project is implemented pursuant to a Project Contract</u>

In our opinion, based on the legal basis for the BOT Group Contract, PPP Contract mentioned above and case study of BOO Contract below, the contracting parties to the Project Contract in this Scheme II-A should be as follows:

(i) Public Party: the People's Committee of Ho Chi Minh City.

As shown in the diagram of Scheme II-A above, SAWACO appears to be designated as the Public Party to the Project Contract. However, as discussed above, only a competent State authority may be allowed to enter into the Project Contract with the Investors. Although we are not provided with the constitutional documents of SAWACO, it appears that SAWACO is neither a competent State authority nor a direct subordinate State agency thereof[173]. As a result, it is unlikely that SAWACO is eligible to enter into the Project Contract as the Public Party in this Scheme. Instead, the People's Committee of Ho Chi Minh City appears to fit the status of the Public Party unless the project contemplated in this Scheme II-1 falls within the competence of a ministry or equivalent State body.

(ii) Private Party: The Investors and the SPC.

- The Investors may be domestic or overseas individuals or organizations. We understand that the Clients shall form a consortium of investors for this project.
- The SPC will be the Project Company, as the SPC, in this Scheme II-1, is expected to manage and commercially operate the Water Supply System.

Subject to restriction on the State participating portion mentioned above, SAWACO appears to be possible to participate in the contemplated project as an investor of the Private Party and/or of the SPC.

[173] Please be noted that People's Committee of Ho Chi Minh City may only assign its status as the Public Party to one of its direct subordinate agencies with State administration duty (e.g. the Department of Natural Resources and Environment) if the project is implemented with BOT, BTO or BT contract and the project is classified in Class B or Class C (i.e. the capital of which must not exceed VND 1,000 billion). However, even in such case, SAWACO appears not to be able to act as the Public Party because it may not be considered as a subordinate agency having State administration function.

b) The project is implemented pursuant to a JVC

One or more foreign investors will execute the JVC with one or more Vietnamese companies, whether Stated-owned or privately-owned ones.

4. Proposing the Project

If the project contemplated in this Scheme II-A is exclusive of the list of projects calling for investment in form of the BOT Group Contract, PPP Contract and BOO Contract, it is very likely that the Investors may actively propose the project to the competent State authorities for their inclusion into the announced list. For instance, in this Scheme, the Investors may submit the project proposal to the People's Committee.

On the other hand, if the project contemplated in this Scheme II-A is performed in the form of a JVC, then it is often the same investors that would initiate the project and concurrently carry out the project.

5. Competent Authorities

In order to determine the competent authorities related to the project, we must base our analysis on the information as supplied by Toyo as follows:

- The project is a new one, rather than a continuing project or a sub-project within a larger project which has been approved and licensed by a particular authority;
- The project is expected to be carried out within the territories of Ho Chi Minh City, rather than stretching on multiple provinces;

Subject to the above assumptions, the competent authorities will be involved as follows:

For BOT Group Project

If the project is included in the available BOT Group Project List as announced by the People's Committee of Ho Chi Minh City, the People's Committee of Ho Chi Minh City shall be the competent licensing authority and Public Party to the project, being responsible for most procedures related to the project. The same is applicable to the Ministry of Construction except for the competent licensing authority which will be the MPI, if the project is included in the available BOT Group Project List as

announced by the Ministry of Construction.

However, if the project is a newly proposed initiative of the Investors, the laws stay silent on whether the People's Committee of Ho Chi Minh City or the Ministry of Construction will be the Public Party to the project. As a matter of practice, the proposal is filed with the People's Committee of Ho Chi Minh City, which may be forwarded to the Ministry of Construction if it is considered to be beyond the capacity or authority of the People's Committee of Ho Chi Minh City on a case-by-case basis.

It should be noted that even if the Ministry of Construction does not act as the Public Party to the project, its opinion will still be sought after by the People's Committee of Ho Chi Minh City because the Ministry of Construction is in charge of urban and industrial water supply sector[174]. Other related authorities may also be consulted by the People's Committee of Ho Chi Minh City at its discretion.

For PPP Project

The competent authority and Public Party to a PPP Project will be the same as in the case of BOT Group Project above, except that the Ministry of Planning and Investment, which is the competent licensing authority, will issue the Investment Certificate in all cases. Other related authorities may also be consulted.

For BOO Project

Given the unregulated status of the BOO form, it is unclear which authority will be in charge of the procedures. However, as mentioned in the legal sections above, the Prime Minister's approval for unregulated form of investment, i.e. BOO form, will be required. Furthermore, in the case of BOO Thu Duc and BOO Dong Tam, it appears that the People's Committees (of Ho Chi Minh City and Tien Giang Province, respectively) are in charge of most procedures in similar manner to a BOT Group Project. Other related authorities may also be consulted.

For Joint Venture without Project Contract

If the headquarter of the JV Company is located within the territories of Ho Chi Minh City, the People's Committee of Ho Chi Minh City will be the competent licensing authority for the JV Company. Other related authorities may also be consulted during the licensing period and thereafter.

For convenience in reference, please find below our summary of the main

[174] Article 60.2 of the Decree 117

competent authorities having jurisdiction over the project and respective requisite approvals rendered thereby:

No.	Procedures	Competent Authorities			
		BOT Group Contract	**PPP Contract**	**BOO Contract**	**Joint Venture Without a Project Contract**
1.	Approval of project proposal in addition to the public project list	• People's Committee of Ho Chi Minh City[175] or Ministry of Construction	• Prime Minister (based on submissions from People's Committee of Ho Chi Minh City or Ministry of Construction and Ministry of Planning and Investment)	• Prime Minister (for approval of unregulated form of contract); • People's Committee of Ho Chi Minh city for BOO Thu Duc; • People's Committee of Tien Giang Province for BOO Dong Tam	*Not applicable*
2.	Ministry's Prior Consensus[176]	• Ministry of Construction	• Ministry of Construction	• Ministry of Construction	• Ministry of Construction
3.	Tender for selecting the investor	• People's Committee of Ho Chi Minh City or Ministry of Construction	• People's Committee of Ho Chi Minh City; or • Ministry of Construction	• People's Committee of Ho Chi Minh city for BOO Thu Duc; • Unclear for BOO Dong Tam;	*Less likely to be applicable*[177]
4.	Appointment of the investor	• People's Committee of Ho Chi Minh	*Not applicable*	*Unclear*	*Not applicable*

[175] Please note that if the total investment capital for water supply project is less than VND 1,000 billion, the People's Committee of Ho Chi Minh City may delegate a subordinate department to act as the competent authority, e.g. the Department of Construction or the Department of Planning and Investment

[176] Applicable to an investment project for construction of water supply works of a capacity of 30,000 m3/day or more each, for urban centres of special grade, or 10,000 m3/day or more each, for other urban centres

[177] Subject to the analysis stated in Section B.I.8

No.	Procedures	Competent Authorities			
		BOT Group Contract	**PPP Contract**	**BOO Contract**	**Joint Venture Without a Project Contract**
	without tender	City or Ministry of Construction;			
5.	Signing Project Contract	• People's Committee of Ho Chi Minh City or Ministry of Construction	• People's Committee of Ho Chi Minh City or Ministry of Construction	• People's Committee of Ho Chi Minh city for BOO Thu Duc; • People's Committee of Tien Giang Province for BOO Dong Tam	*Not applicable*
6.	Issuance of Investment Certificate for the project	• People's Committee of Ho Chi Minh City; or • Ministry of Planning and Investment[178]	• Ministry of Planning and Investment	*Unclear but should be either the People's Committee of Ho Chi Minh City or the Ministry of Planning and Investment*	• People's Committee of Ho Chi Minh City or its subordinate agency
7.	Signing water supply agreement (general agreement)	• People's Committee of Ho Chi Minh City	• People's Committee of Ho Chi Minh City	• People's Committee of Ho Chi Minh City	• People's Committee of Ho Chi Minh City

6. Tendering Requirements

a) <u>Selection of ultimate investor for the project</u>

- If the Investors adopt the BOT contract for this Scheme II-A, the Investors will have to undergo the tendering process unless there is no other investors being interested in the project or the project is of urgent needs;
- If the Investors select the PPP Contract, the Investors will be selected through an open tendering in light of the current law;

[178] If the project falls in the cases as listed in Section I.A.I.(8).(c)

- If the Investors opt for the BOO Contract, as shown in the case studies, it is likely that the tendering should be required, except for the case where there is no other investors being interested in the project or the project is of urgent needs or where so approved by the Prime Minister. That is because BOO Contract may be deemed as a similar form of contract to the BOT Group Contract, the rules applicable to BOO Contract therefore may be similar to those applicable to the BOT Group Contract. Nevertheless, as mentioned in Section III.II.4 hereunder, it appears from our research that BOO Dong Tam was NOT subject to the tendering process though the project is now under a danger to be held to comment certain breaches including those in term of the procedures;
- If the JVC is permitted, the bidding may not be required unless project is contemplated as an important project under a master planning for water supply sector of Ho Chi Minh City and there are two or more investors having interest in such project independently or separately, a tendering may be done to select the awarding investor.

b) Selection of contractors

The SPC shall be responsible for selecting contractors including subcontractors (e.g. an EPC Contractor) for implementation of the approved project. The contracts executed between the SPC and the contractors (e.g. the construction contracts with the EPC Contractors) may also be subject to the tendering requirement if the project contemplated by this Scheme II-A is funded by 30% or more State capital.

7. Investment conditions

The project contemplated in Scheme II-A shall be subject to all investment conditions, business conditions and restrictions discussed in Section I.C above even being implemented pursuant to the BOT Group Contract, PPP Contract, BOO Contract or JVC .

8. Tax incentives

The SPC will be entitled to all tax incentives mentioned in Section I.F above.

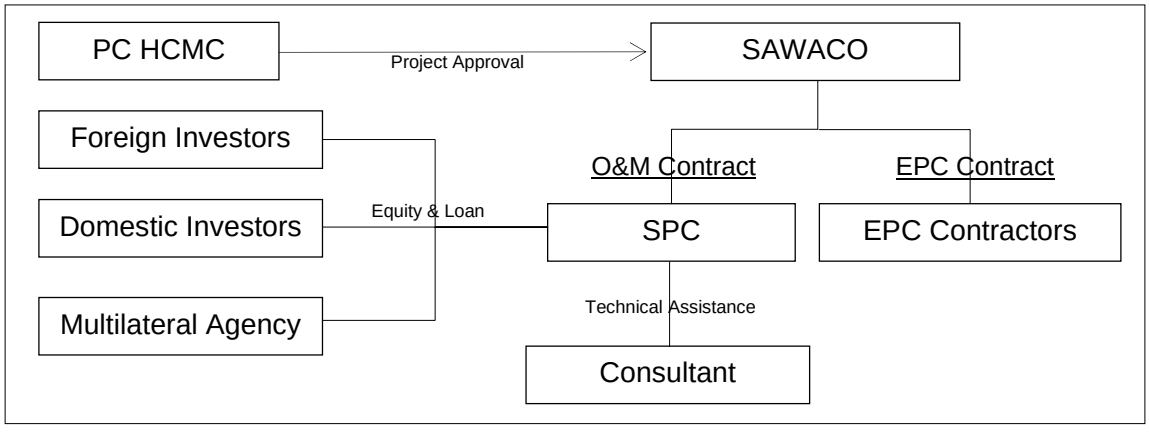
9. EPC Contractors

For construction activities in respect of the Project Works, it appears that the SPC shall utilize EPC Contractors (i.e., main contractor) which can be either foreign construction companies or domestic construction companies or both. As noted in Section II.I.5.(b) above, selection of such EPC Contractor shall trigger the requirement of tendering regulated under the Law on Tendering if the contemplated project is funded by 30% or more State capital. Additionally, if any of the selected EPC Contractors is a foreign construction company, such foreign construction company is required to obtain a contractor permit as well as establishing a management office to carry out the contracted works for the contemplated project.

It should be noted that ensuring competitiveness in tendering is a must under Vietnamese laws which is briefed in Section I.D.IV.(4) hereunder. If (1) there is an intention that the EPC Contractors would be selected from the SPC's equity investors and (2) the contemplated project is subject to tendering requirement, each of such equity investors should hold up to 50% of the equity interest in the SPC only.

II. ANALYSIS OF SCHEME II-B

1. Description of Scheme II-B



In this Scheme II-B, we assume that:

- The Water Supply System will be constructed and owned by SAWACO who will execute an independent construction contract with the EPC Contractor;
- Certain foreign and domestic investors will establish an SPC which will

provide the services of operation and maintenance (O&M) of the Water Supply System to SAWACO through an O&M contract; and

- The SPC in turn will retain a technical consultant for performance of the O&M contract.

2. Available form of contract

The BOT Group Contract and PPP Contract (and likely the BOO Contract) under the laws of Vietnam require the development of Project Works by the Project Company as the employer. However, in this Scheme II-B, SAWACO, instead of the SPC, will be the employer and owner of the Water Supply System, the BOT Group Contract and PPP Contract (and likely the BOO Contract) are unlikely applicable for this Scheme. Therefore, it likely that the SPC will have to enter into a Service Contract as detailed in Section I.B.II with SAWACO to provide the latter with O&M services.

3. Ownership of the Water Supply Construction Works

Obviously, in this Scheme II-B, the ownership right in respect to the Water Supply System should be vested in SAWACO.

4. Tendering Requirement

If the Service Contract is funded by 30% or more State capital, the provisions of the Law on Tendering shall apply and a public tendering may be held by SAWACO in order to select a contractor for the Service Contract.

5. Investment and Operation Conditions

As discussed in Section I.B.II(3) above, the establishment of the SPC will be considered by the licensing authority on a case by case basis. To the experience, a memorandum of understanding (or the like) executed between the Investors and SAWACO for provision of the O&M services may facilitate the licensing process in corporation of the SPC.

Once the SPC is established, it must comply with the Water Resource Law which generally provides that organizations and individuals that manage and operate water

supply systems shall comply with technical regulations and operate supply systems so as to meet the requirements for stable, safe and constant water supply and reduce water loss and waste.

6. Competent Authorities

The People's Committee of Ho Chi Minh City (or its subordinate agency) will be the licensing authority issuing the Investment Certificate to the SPC. However, during the licensing process it will most likely seek evaluation opinion from related authorities, including Ministry of Planning and Investment, Ministry of Construction, Ministry of Natural Resources and Environment, among others.

7. Tax incentives

As the SPC merely participates in the project contemplated in this Scheme II-B as an O&M contractor, it is less likely to be eligible for the tax incentives mentioned in Section I.F above.

8. EPC Contractors

Different from Scheme II-A, it appears that SAWACO (not the SPC) shall be the investor to select and contract EPC Contract. Given the fact that SAWACO is a State owned company and the contemplated project may be consequently funded by 30% or more State capital, there is a high possibility that selection of the EPC Contractors is required to go through a tendering process. However, given the SPC is assumed not to involve in providing construction services, there should have no concern as to the competitiveness in tendering if the equity investors of the SPC participates in the tendering package for EPC Contractors under this Scheme. In other words, an equity investor of the SPC may hold up to 100% of the equity interest in the SPC without being prohibited from participating in the tender due to competitiveness issue in tendering.

SECTION III. CASE STUDY

For your reference, in this Section, we present publicly-available information of the Thu Duc B.O.O. Water Plant project ("**BOO Thu Duc**") implemented in Ho Chi Minh City and Dong Tam B.O.O Water Plant project ("**BOO Dong Tam**")[179] carried out in the Mekong Delta province of Tien Giang in an attempt to point out the basic features of the BOO Contract that are seemingly adopted in practice for your reference. As the information has been obtained from the publicly available source, we assume no responsibility for its accuracy and completeness.

I. BOO THU DUC

The information on this project is mainly extracted and compiled from the following sources:

- The 2006 Prospectus of Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII) downloadable from the website of the Ho Chi Minh City Stock Exchange (HOSE)[180] ("**2006 CII Prospectus**");
- Official website of B.O.O Water Thu Duc Joint Stock Company at http://tdw.com.vn ("**TDW Website**");
- Official website of Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII) at http://www.cii.com.vn ("**CII Website**"); and
- The mass media.

1. Registered Business of the Project Company

The Project Company, namely B.O.O Water Thu Duc Joint Stock Company registers to engage in the following business activities[181]:

- Investing, constructing, exploiting and operating Thu Duc water plant according to the BOO contract;
- Exploiting, operating and supplying clean water; and
- Investing to develop technical constructions for water supply, sewage and

[179] Apparently, there are certain breaches of regulations during the implementation of this project; its structure however may be worth for your reference.
[180] http://www.hsx.vn/hsx/Modules/Danhsach/SymbolDetail.aspx?type=S&MCty=CII (last visit on 28 July 2013)
[181] TDW Website (last visit on 28 July 2013)

water treatment.

2. Project Works

The following seem to be Project Works developed under the executed BOO contracts[182]:

- Water pumping station with the capacity of 315,000 cubic metres per day at Hoa An district, Dong Nai province;
- Water treatment plant with the capacity of 300,000 cubic metres per day at Thu Duc district, Ho Chi Minh city;
- Clean water tanks with a total capacity of 43,500 cubic metres;
- Clean water pumping station with an average capacity of 300,000 cubic metres per day;
- Water pipelines from the water treatment plant with a total of 25.7 kilometres in length and 2,000 millimetres in diameter.

3. Contracting Parties

The Public Party is the People's Committee of Ho Chi Minh city[183].

The Private Party comprises of the following founding shareholders of the Project Company[184]:

- Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII), undertaken to pay up 40% of the charter capital;
- Construction Corporation No. 1, undertaken to pay up 20% of the charter capital;
- Ho Chi Minh City Investment Fund for Urban Development (HIFU), now Ho Chi Minh City Finance and Investment State-Owned Company (HFIC), undertaken to pay up 16% of the charter capital;
- Refrigeration Electrical Engineering Corporation (REE), undertaken to pay up 10% of the charter capital;

[182] CII Website (last visit on 28 July 2013) and Page 18 of 51 of the 2006 CII Prospectus
[183] Page 19 of 51 in the 2006 CII Prospectus
[184] TDW Website and CII Website (last visit on 28 July 2013)

- Thu Duc House Development Joint-Stock Company (Thuduc House), undertaken to pay up 10% of the charter capital;
- Water and Environment Joint-Stock Company (WACO), undertaken to pay up 4% of the charter capital.

In late 2011, Manila Water, a foreign investor, already acquired 49% shares of the Project Company from CII and HFIC[185].

4. Project Finance Structure

- The total investment capital of the project is VND 1,487.24 billion[186].
- A loan of VND 1,047 billion in form of the State credit development capital was granted by the Vietnam Development Fund (now the Vietnam Development Bank) with the initial loan term of 12 years at the interest rate of 7.8% per annum[187]; and
- The registered charter capital of the Project Company was VND 500 billion[188].

5. Ownership of the Project Works

It has been publicly announced that no transfer of the Project Works will be carried out and the Project Works will remain under the ownership of the Project Company pursuant to the BOO contract[189].

6. Selection of Investors

A consortium of tenderers, including the Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII) and other Investors, was approved as the successful tenderer in accordance with the Decision No. 5569/QD-UB dated 9 November 2004

[185] http://www.baomoi.com/VCSC-CII-hoan-tat-chuyen-nhuong-49-co-phan-cua-CTCP-BOO-Nuoc-Thu-Duc-cho-doi-tac-Manila/127/7530490.epi (last visit on 28 July 2013)
[186] Page 18 of the 2006 CII Prospectus
[187] Page 19 of the 2006 CII Prospectus
[188] TDW Website and CII Website (last visit on 28 July 2013) and Page 18 of the 2006 CII Prospectus
[189] Page 20 of the 2006 CII Prospectus

issued by the People's Committee of Ho Chi Minh city for Thu Duc Project[190].

7. Role of SAWACO

It appears that SAWACO is not an investor of the project but a water distributor which buys water produced by the Project Company before retailing the same to consumers.

II. BOO DONG TAM

The information on this project is mainly extracted and compiled from the following sources:

- The 2010 Public Offering Prospectus of Ho Chi Minh City Infrastructure Investment Joint Stock Company (CII) ("**2010 CII Prospectus**");
- Official website of Ho Chi Minh City Infrastructure Investment Joint Stock Company at CII Website; and
- Official Letter No. 116/BXD-HTKT dated January 19, 2012 issued by the Ministry of Construction addressing the Project Company, namely Dong Tam BOO Water Joint Stock Company.

1. Project Works

The Project Works of Dong Tam BOO seems to comprise of the following water supply works[191]:

- Tien River raw water pumping station with the capacity of 100,000 cubic metres per day;
- Raw water reservoir with the capacity of 450,000 cubic metres;
- Treatment plant with the capacity of 90,000 cubic metres per day;
- Clean water tank with the capacity of 24,000 cubic metres;
- Clean water pumping station with the average capacity of 90,000 cubic metre

[190] TDW Website, CII Website (last visit on 28 July 2013) and Page 18 of the 2010 CII Prospectus
[191] CII Website (last visit on 28 July 2013)

sper day;

- Booster pumping station in Cho Gao with the capacity of 50,000 cubic metres per day; and
- Pipeline.

2. Contracting Parties

The BOO Contract No. 41/BB-HD-UBND was signed by the People's Committee of Tien Giang province as the Public Party and the following companies as the Private Party:[192]

- Ho Chi Minh City Infrastructure Investment Joint-Stock Company (CII) has undertaken to pay up 57.5% of the charter capital;
- Tien Giang Investment and Development Fund has undertaken to pay up 17.5% of the charter capital;
- Tien Giang Lottery Company has undertaken to pay up 20% of the charter capital;
- Tien Giang Water Supply and Sewerage Company has undertaken to pay up 2.5% of the charter capital; and
- Investment and Construction Joint-Stock Company (INVESCO) has undertaken to pay up 2.5% of the charter capital.

3. Project Finance Structure

- Total investment capital is VND 1,412.27 billion
- Registered charter capital of the Project Company is VND 375 billion; and
- A loan of uncertain amount was provided by the Vietnam Development Bank at the interest rate of 7.89% per annum[193].

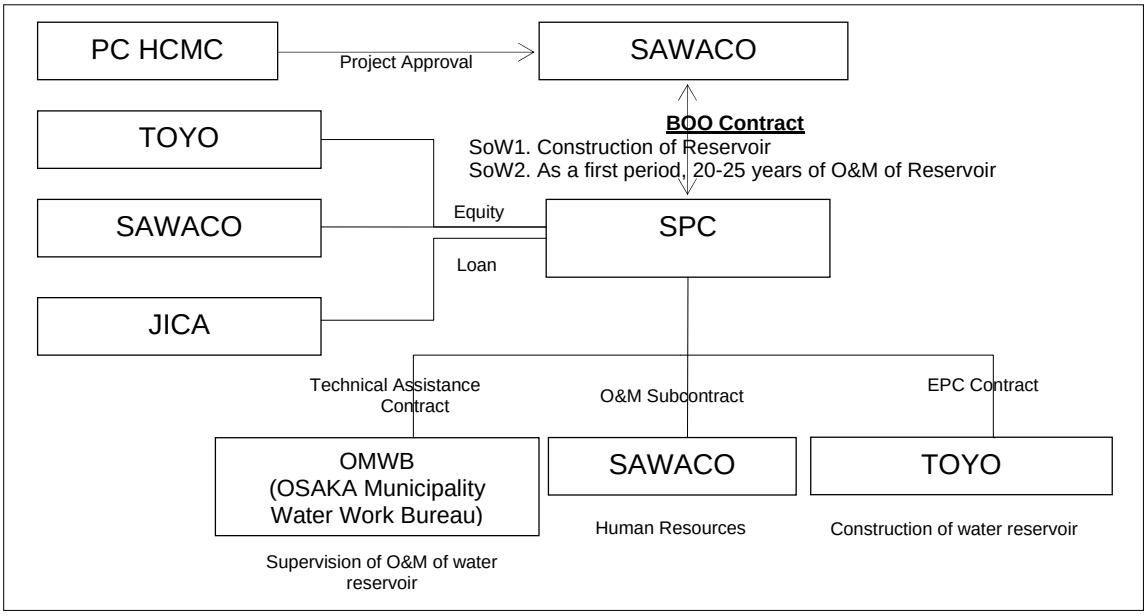
[192] See at http://nld.com.vn/20120611110223491p0c1002/sai-pham-lon-tai-nha-may-nuoc-dong-tam.htm and at http://www.cii.com.vn/ChitietEn.aspx?nid=40&ttid=Dong%20Tam%20Water%20Plant&cid=81&caid=1 (last visit on 28 July 2013)
[193] See at http://www.thanhtravietnam.vn/vi-VN/News/PrintDraft.aspx?ID=7083 (last visit on 28 July 2013)

4. Selection of Investors

It appears that the investors of BOO Dong Tam were not selected via an open tendering. However, given that the project is being investigated for breaches in procedures as noted above, it may be one of the breaches committed during the formulation of the project.

SECTION IV. SAWACO PARTICIPATION AND ITS LEGAL IMPACTS ON THE SCHEME OF BOO CONTRACT OR O&M SERVICE CONTRACT

We understand that, if the project contemplated in Schedule II-A is carried out in a form of the BOO Contract, SAWACO is expected to join the project as a stakeholder of the Project Company and an O&M contractor. The project' structure is illustrated in the following diagram:



As far as we know from the publicly available information, SAWACO is a single member limited liability company wholly owned by the State[194]. The capital contributed by SAWACO into the equity capital of the SPC shall be treated as capital of the State[195]. As such, the participation of SAWACO in the SPC as a capital contributor may significantly affect the management and operation of the SPC in case where SAWACO owns more than 50% of the charter capital of the SPC. That is because the SPC, in such a case, shall be a State-owned enterprise ("**SOE**")[196]. Being an SOE, the SPC may be subject to specific regulations on investment, tendering or construction which are different from those applicable to a non-state owned companies.

However, the SPC will be established and operated under the Enterprise Law regardless of the

[194] See at http://hieudinh.dangkykinhdoanh.gov.vn/SearchEnterprises/tabid/41/e/115603/language/vi-VN/Default.aspx (last visit on 28 July 2013)
[195] Article 9.2 of Decree No. 09/2009/ND-CP dated 5 February 2009 issued by the Government on management of SOE and State capital in enterprises
[196] Article 4.22 of the Enterprise Law

percentage of capital held by SAWACO in the SPC[197], and the State (via SAWACO) will undertake its control over the SPC by performing the rights of a member or shareholder of the SPC as those that other shareholders or members of the SPC are entitled to in accordance with the Enterprise Law as well as the SPC's Charter[198]. The SPC therefore may run its business as other foreign capital invested companies commonly set up in Vietnam.

In case where SAWACO also takes part in the contemplated project as an O&M contractor, such participation will not affect the legal status, management and operation of the SPC other than the fact that it is a counterparty of the SPC in a business transaction. However, if the O&M contractor is selected by the SPC through a tendering process, it is worthnoting that SAWACO may be barred from participating in such tender given the fact that SAWACO and the SPC may be deemed as organizationally dependent of each other under the Law on Tendering.

[197] Article 1 of the Enterprise Law

[198] Article 168 of the Enterprise Law and Article 5.2 of Decree 09/2009/ND-CP dated 5 February 2009 issued by the Government on management of SOE and State capital in enterprises

SECTION V. ASSUMPTION AND QUALIFICATION

The discussion in this memorandum is based on the assumptions mentioned above and, in addition, based on the assumptions and qualifications below.

Where an assumption is stated to have been made in this memorandum, or a view is given subject to a qualification, we have not made any independent investigation in respect of the matters which are the subject of such assumption or qualification.

We express no opinion on the accuracy or completeness of any of the given facts. We further have not undergone any independent investigation to determine the existence or absence of any facts.

Unless otherwise explicitly specified hereunder, we neither express nor imply any view as to laws other than the laws as at 28 July 2013.

This memorandum may only be relied upon by the addressees for the purposes of the matters contemplated in this memorandum. It may not, without our prior written consent, be relied upon for any other purposes or be disclosed to or relied upon by any other person. This memorandum is limited to the matters stated herein and is not to be construed as extending by implication to any other matter.

The view expressed in this memorandum represents our own view and what we believe is the most reasonable interpretation of the relevant laws. Our view is not binding nor is it a guarantee that any particular position will be taken or adopted by any regulatory authority or the court, and does not guarantee that such regulatory authority or the court will always take the same view.

In absence of formal direction or to the extent that the relevant law is unclear, the regulatory authority or the court may retain discretion as to the application and/or interpretation of such relevant law.

Additionally, opinions obtained from the relevant State authority that are mentioned hereunder should be used with caution and for the reference purpose only. We are able to neither verify nor guarantee such opinions.

APPENDIX I - COMPARISON BETWEEN THE BOT DECREE & PPP REGULATIONS

BOT Decree	PPP Regulations
Areas subject to investment	
Water drainage systems, power transmission lines, water waste, and sewage treatment systems, infrastructure facilities in the sectors of medical health, education, training, occupational training, culture, sports, and working headquarters of State bodies	+ Traffic in urban areas, waste treatment plants[199], and healthcare (hospitals).
Form of the Investment Agreement	
BOT, BTO, BT and other forms as decided by the Prime Minister	Public private partnership (i.e., co-ordination between the State and an investor to implement a project for infrastructure development [and/or] provision of public services on the basis of a project contract)
Selection Criteria	
None;	A project must satisfy ONE of the following selection criteria: (i) The project is of great importance, large scale and development emergency; (ii) The project is capable of return on investment to the investor from revenues collected from consumers; (iii) The project is capable of taking advantage of the private sector's technology, management and operations experience and effective

[199] There may be overlapping projects between the area "water waste and sewage treatment systems" stipulated under the BOT Decree and the area "waste treatment plants" stipulated under the PPP Regulations.

BOT Decree	PPP Regulations
	use of financial capacity; or (iv) The project qualifies other criteria as specified by the Prime Minister;
State contribution	
State capital shall not exceed 49% of the total investment capital of such a project;	State Participating Portion shall not exceed 30% of the total investment capital of a PPP Project unless otherwise decided by the Prime Minister, which is NOT deemed as the equity of the Project Company and NOT associated with the right to be distributed dividends from the project's income;
Investor's contribution	
• The equity capital raised by the investor must be no less than 15% if the total investment capital is less than or equal to VND 1,500 billion; • The equity capital raised by the investor must be no less than 15% for the portion of investment capital up to VND 1,500 billion and no less than 10% for the portion of investment capital above VND 1,500 billion;	The equity capital of an investor in a PPP Project must be no less than 30% of the investor's contribution in the project and thus, no less than 21% of the total project (because the investor's contribution must be no less than 70% of total project capital);
Selection of Investor	
• The investor shall be selected through open domestic or international tendering in case where there are 2 or more investors have registered to implement of the project; • The investor shall be selected through no-bid appointment if there is only one investor that has registered to implement the project or the project is urgently required at the discretion of the Prime Minister; • Detailed tendering process is provided for	• The investor shall be selected through open international or domestic tendering; • The tendering process is NOT provided for under PPP Regulations but subject to the law on tendering, etc.

BOT Decree	PPP Regulations
under Chapter 3 of Circular 03. • Stipulated in detail in Chapter 3 of the Circular No. 03/2011/TT-BKH	
Security for Project Contract	
• The investor must provide a security at no less than 2% of the total investment capital if the total investment capital is not more than VND 1,500 billion; • The investor must provide a security at no less than 2% for the portion of investment capital up to VND 1,500 billion and no less than 1% for the portion of investment capital above VND 1,500 billion;	The investor must provide a security at no less than 2% of the total investment capital regardless of the amount of the capital;
Ownership of the assets	
• No ownership in cases of BTO and BT contracts; • Limited ownership in case of BOT contract, in which Investors shall be allowed to exercise certain rights that are similar to those an asset owner may be entitled to, including the right to possess and the right to use;	The Project Works must be transferred in accordance with the terms and conditions of the contract. However, it may be possible to maintain the ownership in the next version of the PPP Regulations which are being considered by the relevant authorities;
Delegation to Execute the project contract by the public party	
A delegation to a ministry, branch, or provincial people's committee is allowed with respect to a Group B or Group C project	Not provided

APPENDIX II – LIST OF THE MAJOR LEGAL DOCUMENTS

No	Code	Category	Issued by	Issued on	Subject	Remarks
1.	33/2005/QH11	Code	National Assembly	14 Jun 2005	Civil Code	
2.	16/2003/QH11	Law	National Assembly	26 Nov 2003	Law on Construction	
3.	60/2005/QH11	Law	National Assembly	29 Nov 2005	Law on Enterprises	
4.	59/2005/QH11	Law	National Assembly	29 Nov 2005	Law on Investment	
5.	61/2005/QH11	Law	National Assembly	29 Nov 2005	Law on Tendering	
6.	108/2006/ND-CP	Decree	Government	22 Sep 2006	Guidance of the Investment Law	
7.	38/2009/QH12	Law	National Assembly	19 Jun 2009	Law on amendment and supplement to constructions and tendering	
8.	108/2009/ND-CP	Decree	Government	27 Nov 2009	Regulations on investment forms of BOT Group Contract	
9.	71/2010/QD-TTg	Decision	Prime Minister	09 Nov 2010	Regulations of piloting the investment forms of PPP Contract	
10.	12/2009/ND-CP	Decree	Government	12 Feb 2009	Management of construction	

No	Code	Category	Issued by	Issued on	Subject	Remarks
					investment project	
11.	24/2011/ND-CP	Decree	Government	5 Apr 2011	Amendment and supplements to the regulations of BOT Group Contract	
12.	85/2009/ND-CP	Decree	Government	15 Oct 2009	Guidance of implementation of certain provisions under the Law on Tendering and Construction Law	
13.	1624/QD-TTg	Decision	Prime Minister	09 Nov 2011	Establishment of the PPP Investment Steering Committee	
14.	03/2011/TT-BKHDT	Circular	Ministry of Planning and Investment	27 Jan 2011	Guidance of certain provisions on BOT Group Contracts	
15.	17/2012/QH13	Law	National Assembly	21 Jun 2012	Law on Water Resources	Water Business Sector
16.	08/2012/TT-BXD	Circular	Ministry of Construction	21 Nov 2012	Securing the safety of water supply	
17.	75/2012/TTLT-BTC-BXD-BNNPTNT	Joint Circular	Ministry of Finance, Ministry of Construction and Ministry of Agriculture and Rural Development	15 May 2012	Principles and Methods of Determination of Clean Water Tariffs	

No	Code	Category	Issued by	Issued on	Subject	Remarks
18.	439/QD-TTg	Decision	Prime Minister	03 April 2009	Development of Water Projects in Populated Islands	
19.	149/2004/ND-CP	Decree	Government	27 Jul 2004	Licensing in exploration, exploitation and use of water resources and discharge of wastewater into water sources	
20.	117/2007/ND-CP	Decree	Government	11 Jul 2007	Production, supply and consumption of clean water	
21.	01/2008/TT-BXD	Circular	Ministry of Construction	2 Jan 2008	Guidance of production, supply and consumption of clean water	
22.	124/2011/ND-CP	Decree	Government	28 Dec 2011	Amendments and supplements on production, supply and consumption of clean water	
23.	88/2012/TT-BTC	Circular	Ministry of Finance	28 May 2012	Guidelines of daily-life clean water tariff	
24.	124/2008/ND-CP	Decree	Government	11 Dec 2008	Guidance of Corporate Income Tax	Taxes and Duties
25.	122/2011/ND-CP	Decree	Government	27 Dec 2011	Amendments and supplements on corporate income tax	
26.	87/2010/ND-CP	Decree	Government	13 Aug 2010	Guidance of import and export duties	
27.	928/2010/UBTVQH12	Resolution	Standing Committee of	19 Apr 2010	Royalties tariff	

No	Code	Category	Issued by	Issued on	Subject	Remarks
			the National Assembly			
28.	186/2010/TT-BTC	Circular	Ministry of Finance	18 Nov 2010	Guiding remittance of profit overseas by foreign organizations and individuals having profit from direct investment on Vietnam	Profit Remittance and Foreign Currency
29.	28/2005/PL-UBTVQH11	Ordinance	Standing Committee of the National Assembly	13 Dec 2005	Foreign exchange control	
30.	06/2013/UBTVQH13	Ordinance	Standing Committee of the National Assembly	18 March 2013	Amendments and supplements on foreign exchange control	
31.	160/2006/ND-CP	Decree	Government	28 December 2006	Guidance of foreign exchange control	
32.	87/2004/QD-TTg	Decision	Prime Minister	19 May 2004	Management of foreign contractors	
33.	03/2012/QD-TTg	Decision	Prime Minister	16 Jan 2012	Amendments and supplements on management of foreign contractors	
34.	163/2006/ND-CP	Decree	Government	29 Dec 2006	Regulations of secured transactions	
35.	11/2012/ND-CP	Decree	Government	22 Feb 2012	Amendments and supplements on	

No	Code	Category	Issued by	Issued on	Subject	Remarks
					regulations of secured transactions	
36.	09/2009/ND-CP	Decree	Government	05 Feb 2009	Management of SOE and State capital in enterprises	

APPENDIX III

MASTER PLAN ON WATER RESOURCE IN HOCHIMINH CITY

PHẦN VĂN BẢN KHÁC

THỦ TƯỚNG CHÍNH PHỦ

THỦ TƯỚNG CHÍNH PHỦ

CỘNG HÒA XÃ HỘI CHỦ NGHĨA VIỆT NAM
Độc lập - Tự do - Hạnh phúc

Số: 729/QĐ-TTg

Hà Nội, ngày 19 tháng 6 năm 2012

QUYẾT ĐỊNH
Phê duyệt Quy hoạch cấp nước thành phố Hồ Chí Minh đến năm 2025

THỦ TƯỚNG CHÍNH PHỦ

Căn cứ Luật Tổ chức Chính phủ ngày 25 tháng 12 năm 2001;

Căn cứ Luật Quy hoạch đô thị ngày 17 tháng 6 năm 2009;

Căn cứ Luật Xây dựng ngày 26 tháng 11 năm 2003;

Căn cứ Nghị định số 37/2010/NĐ-CP ngày 07 tháng 4 năm 2010 của Chính phủ về lập, thẩm định, phê duyệt và quản lý quy hoạch đô thị;

Căn cứ Nghị định số 117/2007/NĐ-CP ngày 11 tháng 7 năm 2007 của Chính phủ về sản xuất, cung cấp và tiêu thụ nước sạch và Nghị định số 124/2011/NĐ-CP ngày 28 tháng 12 năm 2011 về sửa đổi, bổ sung một số điều của Nghị định số 117/2007/NĐ-CP;

Xét đề nghị của Chủ tịch Ủy ban nhân dân thành phố Hồ Chí Minh, ý kiến thẩm định của Bộ Xây dựng,

QUYẾT ĐỊNH:

Điều 1. Phê duyệt Quy hoạch cấp nước thành phố Hồ Chí Minh đến năm 2025 với những nội dung chủ yếu sau đây:

1. Phạm vi quy hoạch:

Bao gồm toàn bộ địa giới hành chính của thành phố Hồ Chí Minh với diện tích 2.095 km^2.

2. Quan điểm quy hoạch:

- Quy hoạch cấp nước thành phố Hồ Chí Minh đến năm 2025 phù hợp Quy hoạch phát triển kinh tế xã hội, Quy hoạch chung xây dựng thành phố Hồ Chí Minh đến năm 2025, Quy hoạch cấp nước 3 vùng kinh tế trọng điểm Bắc bộ, miền

Trung và phía Nam, Định hướng phát triển cấp nước đô thị và khu công nghiệp Việt Nam đến năm 2025 và các quy hoạch chuyên ngành khác có liên quan.

- Phát triển hoạt động cấp nước bền vững trên cơ sở khai thác tối ưu mọi nguồn lực, đáp ứng nhu cầu sử dụng nước sạch; cung cấp nước sạch cho thành phố Hồ Chí Minh ổn định với chất lượng bảo đảm, dịch vụ tốt và hiệu quả.

- Bảo đảm khai thác, sử dụng nguồn nước hợp lý, tiết kiệm có xem xét đến các ảnh hưởng của biến đổi khí hậu, ô nhiễm môi trường; hạn chế khai thác nguồn nước ngầm.

- Khuyến khích các thành phần kinh tế tham gia đầu tư và phát triển cấp nước.

3. Mục tiêu quy hoạch:

- Cụ thể hóa định hướng cấp nước trong Quy hoạch chung xây dựng thành phố Hồ Chí Minh đến năm 2025.

- Xác định nhu cầu sử dụng nước sạch; khai thác hợp lý các nguồn nước (nước ngầm, nước mặt); xác định nhu cầu đầu tư và phát triển hệ thống cấp nước thành phố Hồ Chí Minh đáp ứng nhu cầu sử dụng nước sạch từng giai đoạn.

- Không ngừng nâng cao chất lượng dịch vụ cấp nước, đảm bảo an toàn cấp nước. Từng bước hiện đại hóa hệ thống sản xuất, quản lý và kinh doanh nước sạch.

- Tỷ lệ dân cư được sử dụng nước sạch đến năm 2015 đạt 100% đối với khu vực nội thành cũ và 98% đối với khu vực nội thành mới, khu vực ngoại thành và đến năm 2025 đạt 100%.

- Giảm tỷ lệ thất thoát, thất thu nước sạch đến năm 2015 đạt 32%, đến năm 2025 đạt 25%.

- Mở rộng phạm vi bao phủ dịch vụ cấp nước ra ngoại thành; cải thiện và nâng cao điều kiện vệ sinh, sức khỏe người dân vùng nông thôn.

4. Tiêu chuẩn cấp nước:

Căn cứ theo tiêu chuẩn, quy chuẩn kỹ thuật hiện hành.

5. Dự báo nhu cầu sử dụng nước:

TT	Nhu cầu	**Năm 2015** (m^3/ngđ)	**Năm 2025** (m^3/ngđ)
1	Nhu cầu sử dụng nước sinh hoạt	1.420.000	1.887.000
2	Nhu cầu sử dụng nước công nghiệp	165.000	246.000
3	Nhu cầu sử dụng nước các loại hình dịch vụ khác	340.000	589.000
4	Nước thất thoát	825.000	848.000
	Tổng nhu cầu sử dụng nước	**2.750.000**	**3.570.000**

6. Nội dung quy hoạch:

a) Các nhà máy nước:

TT	Nhà máy nước	Công suất (m^3/ngđ)		
		Hiện trạng năm 2010	Giai đoạn đến năm 2015	Giai đoạn đến năm 2025
I	**Nguồn sông Đồng Nai/Hồ Trị An**			
1	Nhà máy nước Thủ Đức	750.000	750.000	750.000
2	Nhà máy nước Thủ Đức II (BOO)	300.000	300.000	300.000
3	Nhà máy nước Thủ Đức III (năm 2012)		300.000	300.000
4	Nhà máy nước Thủ Đức IV (sau năm 2018)			300.000
5	Nhà máy nước Thủ Đức V (năm 2024)			500.000
6	Nhà máy nước Bình An	100.000	100.000	100.000
	Tổng công suất	**1.150.000**	**1.450.000**	**2.250.000**
II	**Nguồn sông Sài Gòn/Hồ Dầu Tiếng**			
1	Nhà máy nước Tân Hiệp I	300.000	300.000	300.000
2	Nhà máy nước Tân Hiệp II (2015)		300.000	300.000
3	Nhà máy nước Tân Hiệp III (2020)			300.000
4	Nhà máy nước Kênh Đông I (năm 2012) + Cấp cho nội thành + Cấp cho Củ Chi		200.000 150.000 50.000	200.000 150.000 50.000
5	Nhà máy nước Kênh Đông II (năm 2015 cấp cho Củ Chi và Long An)		150.000	250.000
	Tổng công suất	**300.000**	**950.000**	**1.350.000**
III	**Nguồn nước ngầm**			
1	Nhà máy nước Tân Bình	65.000	75.000	75.000
2	Các giếng lẻ nội thành	2.000	0	0
3	Nhà máy nước Gò Vấp	10.000	10.000	10.000
4	Nhà máy nước Bình Trị Đông	8.000	8.000	0
5	Nguồn xã hội hóa (nước ngầm)	3.000	2.000	0
6	Nhà máy nước Bình Hưng		15.000	15.000

TT	Nhà máy nước	Công suất (m^3/ngđ)		
		Hiện trạng năm 2010	Giai đoạn đến năm 2015	Giai đoạn đến năm 2025
7	Công nghiệp (đã cấp phép)	350.861	190.000	0
8	Sinh hoạt/dân cư/hộ gia đình	256.000	140.000	0
	Tổng công suất	**694.861**	**440.000**	**100.000**
	Tổng cộng công suất toàn thành phố:	**2.144.861**	**2.840.000**	**3.700.000**

b) Nguồn nước:

- Sông Đồng Nai (có sự điều tiết của hồ Trị An): Khai thác với lưu lượng 2,5 triệu m^3/ngày đêm để cung cấp nước thô cho các nhà máy nước sử dụng nguồn nước sông Đồng Nai.

- Sông Sài Gòn (có sự điều tiết của hồ Dầu Tiếng và hồ Phước Hòa): Khai thác với lưu lượng 01 triệu m^3/ngày đêm để cung cấp nước thô cho các nhà máy nước sử dụng nguồn nước sông Sài Gòn.

- Kênh chính Đông (có sự điều tiết của hồ Dầu Tiếng và từ hồ Phước Hòa): Khai thác với lưu lượng 0,5 triệu m^3/ngày đêm cung cấp nước thô cho các nhà máy nước sử dụng nguồn nước Kênh Đông.

- Nghiên cứu sử dụng nguồn nước trực tiếp từ các hồ Dầu Tiếng, Trị An, Phước Hòa đáp ứng yêu cầu sản xuất và cấp nước an toàn, hiệu quả.

- Nước ngầm trên địa bàn Thành phố: Giai đoạn đến 2025 khai thác quy mô công nghiệp với lưu lượng khoảng 100.000 m^3/ngày. Các giếng khoan công nghiệp quy mô nhỏ, giếng khoan hộ gia đình phải ngừng hoạt động theo lộ trình hạn chế khai thác nước ngầm của thành phố Hồ Chí Minh.

c) Công trình dẫn nước thô:

- Tuyến ống nước thô Hóa An - Nhà máy nước Thủ Đức: Xây dựng và lắp đặt bổ sung máy bơm, trang thiết bị và các công trình phụ trợ để tổng công suất đạt 2.500.000 m^3/ngày đêm giai đoạn 2025; xây dựng thêm tuyến ống nước thô D2400 mm dài 11 km từ Hóa An về Nhà máy nước Thủ Đức.

- Tuyến ống nước thô Hòa Phú - Nhà máy nước Tân Hiệp: Xây dựng và lắp đặt bổ sung máy bơm, trang thiết bị và các công trình phụ trợ để tổng công suất đạt 1.000.000 m^3/ngày đêm giai đoạn 2025; xây dựng thêm tuyến ống nước thô D2000 mm dài 9,1 km từ Hòa Phú về Nhà máy nước Tân Hiệp ngay từ giai đoạn 2015.

d) Công nghệ xử lý nước:

- Công nghệ xử lý đối với nước ngầm và nước mặt, bảo đảm chất lượng nước theo tiêu chuẩn, quy chuẩn kỹ thuật. Đối với nước ngầm là Làm thoáng - Lắng - Lọc - Khử trùng, đối với nước mặt là Keo tụ - Lắng - Lọc - Khử trùng.

- Áp dụng công nghệ tiên tiến, hiện đại để nâng cao hiệu quả của công tác khai thác, vận hành, quản lý cấp nước và tiết kiệm năng lượng.

đ) Mạng lưới đường ống cấp nước:

- Các tuyến ống chuyển tải:

+ Các tuyến ống chuyển tải từ Nhà máy nước Thủ Đức: Cải tạo tuyến D2000 mm hiện hữu trên xa lộ Hà Nội; hoàn thành xây dựng và đưa vào sử dụng tuyến D2000 mm BOO Thủ Đức, tuyến ống D2400 mm Thủ Đức - Bình Thái.

+ Các tuyến ống chuyển tải từ Nhà máy nước Tân Hiệp: Tuyến ống D1500 mm hiện hữu; hoàn thành xây dựng và đưa vào sử dụng tuyến ống D2000 mm.

- Mạng đường ống cấp 1:

+ Giai đoạn 2015:

. Xây dựng mới tuyến ống D2400 mm từ Bình Thái đến cầu Điện Biên Phủ;

. Xây dựng mới tuyến ống D1800 mm - D1500 mm từ Bình Thái đến cầu Phú Mỹ (vành đai 2);

. Xây dựng mới tuyến ống D800 mm xa lộ Hà Nội từ Nhà máy nước Thủ Đức đến cầu vượt Suối Tiên;

. Tuyến D900 mm Lũy Bán Bích hiện hữu của Nhà máy nước ngầm Tân Bình sẽ đấu nối với D1500 mm hiện hữu tại ngã ba Trường Chinh - Cộng Hòa;

. Cải tạo các tuyến cấp 1 hiện hữu: D2000 mm từ Bình Thái đến cầu Điện Biên Phủ, D900 mm Phan Đăng Lưu, D1500 mm Nguyễn Bỉnh Khiêm, D1200 - D1050 mm Trần Hưng Đạo, D1200 - D1050 mm Võ Thị Sáu - đường 3/2, D800 - 1.000 mm Nguyễn Thị Minh Khai... và các tuyến khác.

+ Giai đoạn 2025:

. Xây dựng mới tuyến D800 mm Kha Vạn Cân - Xuyên Á - Lê Văn Khương;

. Xây dựng mới tuyến D1000 mm Nguyễn Duy Trinh - đại lộ Đông Tây;

. Xây dựng mới tuyến D1000 mm Cầu Phú Mỹ - Nguyễn Văn Linh;

. Xây dựng mới tuyến Trục Bắc, Ung Văn Khiêm - Nguyễn Xí;

. Xây dựng mới tuyến Nguyễn Hữu Cảnh;

. Xây dựng mới tuyến Vành đai 3;

. Xây dựng mới tuyến tỉnh lộ 15, dọc sông Nhà Bè.

- Mạng đường ống cấp 2

Dự kiến xây dựng mới các tuyến cấp 2 đường kính D400 - D600 với tổng chiều dài khoảng 250 km; cải tạo, sửa chữa khoảng 120 km đường ống cấp 2 hiện hữu.

e) Các trạm bơm tăng áp:

Xây dựng mới các trạm tăng áp:

- Trạm bơm Bình Chánh: Cấp nước cho khu vực lân cận và cấp nước cho các đô thị và khu công nghiệp của tỉnh Long An; công suất 30.000 m^3/ngày đêm giai đoạn năm 2010 - 2012, công suất 50.000 m^3/ngày đêm giai đoạn năm 2016 - 2018, công suất 100.000 m^3/ngày đêm giai đoạn năm 2024 - 2025.

- Trạm bơm Nhà Bè: Cấp nước khu vực Hiệp Phước, khu vực lân cận và cấp nước cho Cần Giờ; công suất 50.000 m^3/ngày đêm giai đoạn năm 2015 và 150.000m^3/ngày đêm giai đoạn năm 2025. Trong tương lai có thể xem xét cấp nước cho các đô thị và khu công nghiệp huyện Cần Đước, Cần Giuộc tỉnh Long An.

7. Các dự án ưu tiên thực hiện trong giai đoạn 2010 - 2015:

a) Các dự án ưu tiên về nguồn nước thô:

- Dự án 1: Nghiên cứu khả năng và quy mô khai thác nguồn nước từ hồ Trị An, hồ Dầu Tiếng, hồ Phước Hòa thay thế cho nguồn nước sông Đồng Nai và sông Sài Gòn (trong trường hợp sông Đồng Nai và sông Sài Gòn bị ô nhiễm và nhiễm mặn) để cung cấp nước cho thành phố Hồ Chí Minh.

- Dự án 2: Xây dựng hệ thống chuyển tải nước thô từ hồ Trị An cung cấp nước cho các nhà máy nước sử dụng nguồn nước sông Đồng Nai.

- Dự án 3: Xây dựng hệ thống chuyển tải nước thô từ hồ Dầu Tiếng đến cung cấp nước cho các nhà máy nước sử dụng nguồn nước sông Sài Gòn.

Các dự án 2 và 3 được thực hiện sau khi hoàn thành Dự án 1 và khẳng định sự cần thiết, quy mô và thời gian đầu tư.

b) Các dự án ưu tiên đầu tư xây dựng nhà máy nước:

- Dự án đầu tư xây dựng Nhà máy nước Thủ Đức III công suất 300.000 m^3/ngày đêm.

- Dự án đầu tư xây dựng Nhà máy nước Tân Hiệp giai đoạn II công suất 300.000 m^3/ngày đêm.

c) Các dự án ưu tiên phát triển mạng lưới đường ống:

- Các dự án đầu tư giảm thất thoát, thất thu nước thành phố Hồ Chí Minh, mở rộng mạng lưới đường ống và phạm vi cấp nước sử dụng.

- Dự án nghiên cứu tái cấu trúc mạng lưới đường ống cấp nước thành phố Hồ Chí Minh theo các nhánh lớn.

- Các dự án cải tạo, nâng cấp và xây dựng mới các đường ống chuyển tải, cấp 1, 2.

- Các dự án cải tạo, nâng cấp và xây dựng mới các đường ống cấp 3.

8. Khái toán kinh phí và nguồn vốn đầu tư:

a) Thực hiện Quy hoạch cấp nước thành phố Hồ Chí Minh đến năm 2025 khoảng 68.000 tỷ đồng. Trong đó, giai đoạn đến năm 2015, đầu tư xây dựng nhà máy nước Thủ Đức III, Tân Hiệp giai đoạn II và mạng lưới đường ống cấp nước khoảng 15.000 tỷ đồng.

b) Nguồn vốn đầu tư:

- Vốn ngân sách nhà nước.

- Vốn ODA, vốn tài trợ nước ngoài.

- Vốn tín dụng đầu tư.

- Vốn vay thương mại trong nước.

- Vốn từ các nhà đầu tư trong, ngoài nước.

- Các nguồn vốn hợp pháp khác.

9. Đánh giá môi trường chiến lược

a) Khai thác và sử dụng nguồn nước:

- Nguồn nước mặt:

+ Khai thác nguồn nước mặt từ các sông Đồng Nai, sông Sài Gòn và các hồ chứa Dầu Tiếng, Trị An, Phước Hòa theo quy hoạch, cân bằng nguồn nước và tuân thủ quy trình kỹ thuật.

+ Hệ thống hồ thủy lợi đầu nguồn phải tuân thủ nghiêm nghặt chế độ điều tiết nước hồ, đặc biệt trong các tháng mùa khô để đảm bảo chất lượng và lưu lượng khai thác nước đáp ứng yêu cầu cấp nước an toàn.

+ Kiểm soát chặt chẽ các nguồn gây ô nhiễm trong lưu vực sông như nước thải từ các đô thị, khu công nghiệp, chất thải từ sản xuất nông nghiệp...

- Nguồn nước ngầm:

+ Khai thác, sử dụng hợp lý, đúng quy trình kỹ thuật…, hạn chế sử dụng nguồn nước ngầm, không khai thác tập trung trên từng khu vực.

+ Kiểm soát chất lượng nguồn nước ngầm bị ô nhiễm trong quá trình đô thị hóa.

b) Kiểm soát hoạt động xây dựng

- Giải pháp thiết kế, công nghệ đáp ứng về bảo vệ môi trường sinh thái và nguồn nước.

- Trong giai đoạn xây dựng:

+ Xây dựng biện pháp thi công hợp lý, các giải pháp hạn chế thấp nhất các tác động đến môi trường.

+ Các biện pháp xử lý ô nhiễm môi trường không khí, chất thải, tiếng ồn đối với các phương tiện vận chuyển, thi công cơ giới trên công trường và dọc tuyến đường vận chuyển.

+ Các biện pháp phòng chống sự cố trong quá trình xây dựng.

- Trong giai đoạn quản lý vận hành:

+ Nâng cao năng lực quản lý và vận hành nhà máy nước của đơn vị cấp nước.

+ Xây dựng kế hoạch cấp nước an toàn và triển khai thực hiện.

+ Xây dựng quy trình phòng, ngừa, phát hiện và xử lý sự cố của hệ thống cấp nước sạch.

- Các biện pháp hỗ trợ khác.

Điều 2. Tổ chức thực hiện

1. Ủy ban nhân dân thành phố Hồ Chí Minh:

- Tổ chức triển khai thực hiện Quy hoạch cấp nước thành phố Hồ Chí Minh đến năm 2025.

- Chủ trì, phối hợp với các Bộ, ngành tổ chức triển khai thực hiện có hiệu quả các dự án đầu tư theo Quy hoạch cấp nước thành phố Hồ Chí Minh đến năm 2025.

- Xây dựng kế hoạch tài chính phù hợp với kế hoạch đầu tư phát triển cho từng giai đoạn; xây dựng cơ chế, chính sách để huy động các nguồn vốn triển khai Quy hoạch này.

- Khuyến khích các thành phần kinh tế trong nước tham gia đầu tư xây dựng và quản lý hệ thống cấp nước trên địa bàn.

2. Các Bộ, ngành có liên quan:

- Bộ Tài nguyên và Môi trường chủ trì, phối hợp với các Bộ, ngành, Ủy ban nhân dân các tỉnh, thành phố trong lưu vực sông theo dõi, giám sát chặt chẽ các nguồn nước thô và tình hình ô nhiễm nguồn nước; tổ chức triển khai các giải pháp bảo vệ nguồn nước bảo đảm nguồn nước cho thành phố Hồ Chí Minh; nghiên cứu, đánh giá toàn diện về nguồn nước của hồ Trị An, hồ Dầu Tiếng, hồ Phước Hòa, sông Đồng Nai và sông Sài Gòn trong bối cảnh có tác động của biến đổi khí hậu, phát triển kinh tế - xã hội.

- Các Bộ, ngành căn cứ theo chức năng, nhiệm vụ được Chính phủ giao, phối hợp với Ủy ban nhân dân thành phố Hồ Chí Minh thực hiện Quy hoạch cấp nước thành phố Hồ Chí Minh đến năm 2025.

Điều 3. Quyết định này có hiệu lực thi hành kể từ ngày ký ban hành.

Các Bộ trưởng, Thủ trưởng cơ quan liên quan và Chủ tịch Ủy ban nhân dân thành phố Hồ Chí Minh chịu trách nhiệm thi hành Quyết định này./.

KT. THỦ TƯỚNG
PHÓ THỦ TƯỚNG

Hoàng Trung Hải