付録

付録 2 - A 関連主要ベトナム法規

No.	Documents	Key content
Investment Conditions and Procedures		
General		
1	Law 59/2005/QH11	Regulating investment activities for business purposes, rights and obligations of investors and Vietnamese government's guarantee about such rights and obligations; encouragement of investment and investment incentives; state administration of investment activities in Vietnam.
2	Decree 108/2006/ND-CP	Detailing and guiding the implementation of a number of articles of the November 29, 2005 Law on Investment regarding investment activities for business purposes; rights and obligations of investors; guarantees for legitimate rights and interests of investors; investment encouragement and incentives; and state management of investment in Vietnam.
3	Resolution 49/2010/QH12	List of projects and works of national importance to be submitted to the National Assembly for decision on their investment.
BOT Regulations		
4	Decree 108/2009/ND-CP	Regulating investment in the form of BOT, BTO and BT contracts.
5	Decree 24/2011/ND-CP	Amending and supplementing a number of articles of Decree No. 108/2009/ND-CP on investment in the form of BOT, BTO and BT contracts.
6	Circular 03/2011/TT-BKHDT	Guiding a number of provisions of the government's Decree No. 108/2009/ND-CP on investment in the form of BOT, BTO, BT contracts.
PPP Regulations		
7	Decision 71/2010/QD-TTg	Regulations on pilot investment in the public-private partnership form.
Government Guarantee		
8	Decree 15/2011/ND-CP	Providing the provision of government guarantee; management of government guarantee and responsibilities of agencies in the provision and management of government guarantee for domestic and foreign loans, including issue of domestic and international bonds
Project Company's Organization and Management		
9	Law 60/2005/QH11	Regulations on establishment, management organization, and operation of limited liability company, joint stock company, partnership and private enterprises.
10	Decree 43/2010/ND-CP	Regulations on company registration.
11	Decree 102/2010/ND-CP	Guiding in detail a number of articles of the Law on Enterprises regarding the establishment, management organization, operation, reorganization and dissolution of enterprises.
12	Circular 01/2013/TT-BKHDT	Specifying the contents of documentation, the order, procedure, and some issues related to the registration of enterprises.
Water Industry		

No.	Documents	Key content
13	Decision 81/2006/QD-TTg	Approving the national strategy on water resources to 2020.
14	Law 17/2012/QH13	Providing regulations on management, protection, exploitation and use of water resources, as well as the prevention of, combat against and overcoming of harmful effects caused by water in Vietnam.
15	Decree 117/2007/ND-CP	Regulating activities in the domains of production, supply and consumption of clean water under the complete concentrated water supply systems in urban areas, rural areas, industrial parks, export processing zones, hi-tech parks and economic zones; the rights and obligations of organizations, individuals and households engaged in activities related to clean water production, supply and consumption in the Vietnamese territory.
16	Decree 124/2011/ND-CP	Amending and supplementing some Articles of Decree No.117/2007/ND-CP dated July 11, 2007 by the Government on the production, supply, and consumption of clean water.
17	Decree 149/2004/ND-CP	Regulating the issuance, extension, change, invalidation and withdrawal of permits for water resource exploration, exploitation and use, or discharge of wastewater into water source.
18	Decree 38/2011/ND-CP	Amending and supplementing a number of articles of Decree 149/2004/ND-CP.
19	Circular 02/2005/TT-BTNMT	Detail guidelines on: granting and issuing, renewing, amending, suspending and revoking licenses for groundwater exploration, groundwater abstraction and utilization, surface water exploitation and utilization, and waste water discharge into water sources including rivers, streams, coastal waters, reservoirs, lakes, ponds; the regulation of application forms and dossiers, and the form of licenses.
20	Circular 01/2008/TT-BXD	Guiding the implementation of Decree 117/2007/ND-CP on clean water production, supply and consumption.
21	75/2012/TTLT-BTC-BXD-BNNPTNT	Guiding principles and method of determination and competence to decide water consumption price in the urban areas, industrial zones and rural areas.
22	Circular 88/2012/TT-BTC	Promulgating together with this Circular the consumption price bracket of domestic clean water.
23	Circular 04/2009/TT-BYT	National Technical Regulation on the Drinking Water Quality.
24	Decision 14/2004/QĐ-BXD	Cost standards (material) for calculation of water production costs.
25	Decision 11/2011/QĐ-UBND	Promulgating water price for household and business consumption in Binh Duong Province
Environmental Protection Regulations		
26	Law 52/2005/QH11	Providing for environmental protection; for policies, measures and resources for environmental protection; and for the rights and obligations of organizations, households and individuals for environmental protection.
27	Decree 80/2006/ND-CP	Detailing and guiding the implementation of a number of articles of the Law on Environmental Protection regarding environmental standards; strategic environmental assessment; environmental impact assessment and environmental protection commitments; environmental protection in production, business and services; hazardous waste management; and disclosure of environmental information and data.
28	Decree	Amending and supplementing a number of articles of the Government's Decree No.

No.	Documents	Key content
	21/2008/ND-CP	80/2006/ND-CP dated August 9, 2006, detailing and guiding the implementation of a number of articles of the Law on Environmental Protection
Construction Regulations		
29	Law 16/2003/QH11	Prescribes construction activities; and rights and obligations of organizations and individuals that invest in the construction of works and conduct construction activities.
30	Law 38/2009/QH12	Amending and supplementing a number of articles of the Construction Law 16/2003/QH11
31	Law 61/2005/QH11	Regulates tendering activities in order to select contractors for provision of consultancy services, for procurement of goods, and for construction and installation for tender packages belonging to the following projects: ▪ Investment and development projects financed by the State as to thirty (30) per cent or more; ▪ Projects financed by the State for procurement of assets for the purpose of maintaining regular activities of State bodies; ▪ Projects financed by the State for procurement of assets for the purpose of renovation or major repairs to equipment, production lines, building works and factories of State owned enterprises in which investment has already been made
32	Decree 12/2009/ND-CP	Guiding the implementation of the Construction Law regarding the formulation, evaluation and approval of investment projects on the construction of works; the implementation of investment projects on the construction of works; and capability conditions of organizations and individuals engaged in construction activities
33	Decree 83/2009/ND-CP	Amending and supplementing a number of articles of the Government's Decree No. 12/2009/ND-CP on management of work construction investment projects
34	Decree 64/2012/ND-CP	Prescribing the conditions, order, procedures, and competence to grant construction permits; supervision of the construction under the construction permits; rights and responsibilities of organizations and individuals involved in construction permit issue and construction management under construction permits
35	Decree 85/2009/ND-CP	Guiding the Bidding Law and the selection of construction contractors under the Construction Law.
36	Decree 68/2012/NĐ-CP	Amending and supplementing a number of articles of the Government's Decree No. 85/2009/NĐ-CP dated September 15, 2009, guiding the implementation of the Law on Bidding and the selection of bidders in accordance with the Law on Construction.
37	Circular 10/2012/TT-BXD	Guiding in detail some contents of Decree 64/2012/ND-CP dated September 04, 2012 of the Government concerning issuance of construction permits.
38	Circular 04/2010/TT-BKH	Detailing dossiers of requirements on appointment of construction and installation contractors.
39	Circular 01/2010/TT-BKH	Detailing the making of construction and installation bidding dossiers.
40	Circular 05/2010/TT-BKH	Detailing the making of goods procurement bidding dossiers.
41	Circular 06/2010/TT-BKH	Detailing the making of consultancy service bidding dossiers.
Foreign Exchange Control		

No.	Documents	Key content
42	Ordinance 28/2008/PL-UBTVQH11	Governing foreign exchange activities in Vietnam.
43	Decree 160/2006/ND-CP	Detailing the implementation of a number of articles of the Ordinance on Foreign Exchange regarding foreign exchange activities of residents and nonresidents in current transactions, capital transactions, use of foreign exchange, provision of foreign exchange services, foreign currency markets and foreign exchange rates as well as the management of gold import and export in Vietnam.
44	Circular 186/2010/TT-BTC	Guiding the remittance abroad of profits earned by foreign organizations and individuals from direct investment in Vietnam.
Project Legal Basis		
45	Letter No. 1797/TTg-KNT of the Prime Minister	Approving in principle for construction of the pipeline system from Phuoc Hoa Lake to the central of Binh Duong Urban Zone.
46	Letter No. 399/QBND-SX of Binh Duong People's Committee	Approving for BIWASE to be the investor to construct the pipeline system from Phuoc Hoa Lake to the central of Binh Duong Urban Zone.
Labor and Wage Regulations		
47	Law 10/2012/QH13	Specifying the labor standards; the rights, obligations and responsibilities of the employees, the employers, the labor representative organizations, the employer representative organizations in the labor relation and other relations directly related to the labor relation, the State management of labor.
48	Decree 34/2008/ND-CP	Regulating the employment and administration of foreigners working in Vietnam; the order and procedures for issuance of work permits and the use of work permits; and the responsibilities of foreigners, employers and State bodies in the employment and administration of foreigners working in Vietnam.
49	Decree 46/2011/ND-CP	Amending, supplementing some Articles of the Decree No. 34/2008/ND-CP dated March 25. 2008 of the Government on employment and administration of foreign employees working in Vietnam.
50	Decree 103/2012/ND-CP	Stipulating the region-based minimum wage levels applied to laborers working for companies, enterprises, cooperatives, cooperative groups, farms, households and individuals and agencies, organizations employing laborers.
51	Circular 31/2011/TT-BLDTBXH	Guiding the implementation of Decree 34/2008/ND-CP and Decree 46/2011/ND-CP on employment and administration of foreign employees working in Vietnam.
52	Circular 29/2012/TT-BLDTBXH	Guiding the implementation of region-based minimum wage levels for laborers working for enterprises, companies, enterprises, cooperatives, cooperative groups, farms, households and individuals and agencies, organizations employing laborers.

付録 5 - A　水使用量の予測

1. New Residential Area and Existing Urban Area

Year 2012

Table 6

No.	City District/town	Population as planned	Utilization factor (%)	Population	Water demand of households 150l/capita/day (m3/day)	Water demand of administrative agencies 10% x (5) (m3/day)	Water demand of businesses 15% x (5) (m3/day)	Total water demand (5)+(6)+(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(3)*	*(4)*		*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**									
26	Res. area 5F Hamlet 5 (LU)	26,920		0	0	0	0	0	0	0
27	Res. area 5C Hamlet 5 (LU)	4,000		0	0	0	0	0	0	0
28	Res. area 5D Hamlet 5 (LU)	11,864		0	0	0	0	0	0	0
29	Res. area 5B Hamlet 5 (LU)	10,704	1	107	16	2	2	20	2	22
30	Res. area 5E Hamlet 5 (LU)	5,200		0	0	0	0	0	0	0
31	Res. area 5A Hamlet 5 (LU)	12,824	1	128	19	2	3	24	2	26
32	Lai Hung Res. area	7,464	1	75	11	1	2	14	1	15
33	Royal Town area	10,864		0						
34	Lai Hung Resettlement area	2,052		0						
	Total A	**91,892.0**		**310**		**4.6**	**7.0**	**58.1**	**5.8**	**63.9**
B	**An Tay area**									
36	Rach Bap Res. area	10,000		0	0	0	0	0	0	0
	Bac Ben Cat Urban area			0						
	Total B	**10,000.0**		**0.0**		**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
C	**My Phuoc area**									
37	Cau Do Res. area	3,600		0						
38	My Phuoc 3 Res. area (Biconsi)	3,448		0						
39	My Phuoc 4 Res. area (Thien Phu)	4,140		0						
40	My Phuoc expanded Resettlement area	12,160	50	6,080	912	91	137	1,140	114	1,254
41	Res. area Hamlet 3(TH)	12,212	4	488	73	7	11	92	9	101
42	Thoi Hoa Resettlement housing area	6,264	4	251	38	4	6	47	5	52
43	Res. area Hamlet 5C	14,440		0						
44	Res. area Hamlet 5A	12,824		0						
45	Res. area Hamlet 5B	7,092		0						
46	Res. area Hamlet 2 (TH)	10,544	4	422	63	6	9	79	8	87
47	Res. area Hamlet 3A (TH)	12,212	4	488	73	7	11	92	9	101
48	Res. area Hamlet 3B (TH)	10,104	4	404	61	6	9	76	8	83
49	Res. area Hamlet 1 (TH)	12,824	4	513	77	8	12	96	10	106
50	My Phuoc 3 Res. area (TH)	14,240	4	570	85	9	13	107	11	117
51	Res. area Hamlet 6 (TH)	10,212	4	408	61	6	9	77	8	84
52	Res. area Hamlet 5 (CPH)	10,452	4	418	63	6	9	78	8	86
53	Res. area Hamlet 7 (CPH)	5,960	4	238	36	4	5	45	4	49
	Total C	**162,728.0**		**10,280.0**		**154.2**	**231.3**	**1,927.7**	**192.8**	**2,120.4**
D	**Expanded VSIP II area**									
54	Res. area Hamlet 4 (TB)	11,880		0	0	0	0	0	0	0
55	Suoi Tre Res. area	8,932		0	0	0	0	0	0	0
56	Res. area Hamlet 1 (Vinh Tan)	6,904		0	0	0	0	0	0	0
57	Res. area Hamlet 4 (Vinh Tan)	8,932	1	89	13	1	2	17	2	18
58	Res. area Hamlet 5 (VT)	8,664	1	87	13	1	2	16	2	18
59	Hoa Loi Res. area	5,268	1	53	8	1	1	10	1	11
35	Cong Xanh University area			0						
	Total D	**50,580.0**		**229**		**3.4**	**5.1**	**42.9**	**4.3**	**47.2**
E	**New City area**									
60	Hoa Loi Res. area	10,424	5	521	78	8	12	98	10	107
61	Hoa Loi Resettlement area	3,840	5	192	29	3	4	36	4	40
62	Dinh Hoa Resettlement area	2,260	5	113	17	2	3	21	2	23
63	Phu My Resettlement area	3,624	5	181	27	3	4	34	3	37
64	Tan Vinh Hiep Resettlement area	5,148	5	257	39	4	6	48	5	53
65	Phu Chanh Resettlement area	5,944	5	297	45	4	7	56	6	61
66	New Urban area	152,056	2	3,041	456	46	68	570	57	627
	Total E	**183,296.0**		**4,602**		**69.0**	**103.6**	**863.1**	**86.3**	**949.4**
	Grand total A+B+C+D+E = Z	**498,496**		**15,421**		**231**	**347**	**2,892**	**289**	**3,181**
F	**Existing Urban area**									
1	Thu Dau Mot city	266,039	44		17,559	1,756	2,634	21,948	2,195	24,143
2	Ben Cat	284,507	5		2,134	213	320	2,667	267	2,934
3	Tan Uyen	242,659	1		364	36	55	455	45	500
4	Thuan An City	455,559	44		30,067	3,007	4,510	37,584	3,758	41,342
5	Di An City	356,409	44		23,523	2,352	3,528	29,404	2,940	32,344
	Total	**793,205**			**73,646**	**7,365**	**11,047**	**92,058**	**9,206**	**101,264**
	Grand total Z + F					**104,445**				

Year 2015

No.	City District/town	Population as planned	Utilization factor (%)	Population	Water demand of households 150l/capita/day (m3/day)	Water demand of administrative agencies 10% x (5) (m3/day)	Water demand of businesses 15% x (5) (m3/day)	Total water demand (5)+(6)+(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(3)*	*(4)*		*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**									
26	Res. area 5F Hamlet 5 (LU)	26,920	1	269	40	4	6	50	5	56
27	Res. area 5C Hamlet 5 (LU)	4,000	1	40	6	1	1	8	1	8
28	Res. area 5D Hamlet 5 (LU)	11,864	1	119	18	2	3	22	2	24
29	Res. area 5B Hamlet 5 (LU)	10,704	5	535	80	8	12	100	10	110
30	Res. area 5E Hamlet 5 (LU)	5,200	1	52	8	1	1	10	1	11
31	Res. area 5A Hamlet 5 (LU)	12,824	5	641	96	10	14	120	12	132
32	Lai Hung Res. area	7,464	5	373	56	6	8	70	7	77
33	Royal Town area	10,864	1	109	16	2	2	20	2	22
34	Lai Hung Resettlement area	2,052	1	21	3	0	0	4	0	4
	Total A	**91,892.0**		**2,159**		**32.4**	**48.6**	**404.7**	**40.5**	**445.2**
B	**An Tay area**									
36	Rach Bap Res. area	10,000	1	100	15	2	2	19	2	21
	Bac Ben Cat Urban area			0						
	Total B	**10,000.0**		**100**		**1.5**	**2.3**	**18.8**	**1.9**	**20.6**
C	**My Phuoc area**									
37	Cau Do Res. area	3,600	1	36	5	1	1	7	1	7
38	My Phuoc 3 Res. area (Biconsi)	3,448	1	34	5	1	1	6	1	7
39	My Phuoc 4 Res. area (Thien Phu)	4,140	1	41	6	1	1	8	1	9
40	My Phuoc expanded Resettlement area	12,160	60	7,296	1,094	109	164	1,368	137	1,505
41	Res. area Hamlet 3(TH)	12,212	10	1,221	183	18	27	229	23	252
42	Thoi Hoa Resettlement housing area	6,264	10	626	94	9	14	117	12	129
43	Res. area Hamlet 5C	14,440	1	144	22	2	3	27	3	30
44	Res. area Hamlet 5A	12,824	1	128	19	2	3	24	2	26
45	Res. area Hamlet 5B	7,092	1	71	11	1	2	13	1	15
46	Res. area Hamlet 2 (TH)	10,544	10	1,054	158	16	24	198	20	217
47	Res. area Hamlet 3A (TH)	12,212	10	1,221	183	18	27	229	23	252
48	Res. area Hamlet 3B (TH)	10,104	10	1,010	152	15	23	189	19	208
49	Res. area Hamlet 1 (TH)	12,824	10	1,282	192	19	29	240	24	264
50	My Phuoc 3 Res. area (TH)	14,240	10	1,424	214	21	32	267	27	294
51	Res. area Hamlet 6 (TH)	10,212	10	1,021	153	15	23	191	19	211
52	Res. area Hamlet 5 (CPH)	10,452	10	1,045	157	16	24	196	20	216
53	Res. area Hamlet 7 (CPH)	5,960	10	596	89	9	13	112	11	123
	Total C	**162,728.0**		**18,250**		**273.8**	**410.7**	**3,422.6**	**342.3**	**3,764.9**
D	**Expanded VSIP II area**									
54	Res. area Hamlet 4 (TB)	11,880	1	119	18	2	3	22	2	25
55	Suoi Tre Res. area	8,932	1	89	13	1	2	17	2	18
56	Res. area Hamlet 1 (Vinh Tan)	6,904	1	69	10	1	2	13	1	14
57	Res. area Hamlet 4 (Vinh Tan)	8,932	5	447	67	7	10	84	8	92
58	Res. area Hamlet 5 (VT)	8,664	5	433	65	6	10	81	8	89
59	Hoa Loi Res. area	5,268	5	263	40	4	6	49	5	54
35	Cong Xanh University area			0						
	Total D	**50,580.0**		**1,420**		**21.3**	**32.0**	**266.3**	**26.6**	**292.9**
E	**New City area**									
60	Hoa Loi Res. area	10,424	10	1,042	156	16	23	195	20	215
61	Hoa Loi Resettlement area	3,840	10	384	58	6	9	72	7	79
62	Dinh Hoa Resettlement area	2,260	10	226	34	3	5	42	4	47
63	Phu My Resettlement area	3,624	10	362	54	5	8	68	7	75
64	Tan Vinh Hiep Resettlement area	5,148	10	515	77	8	12	97	10	106
65	Phu Chanh Resettlement area	5,944	10	594	89	9	13	111	11	123
66	New Urban area	152,056	5	7,603	1,140	114	171	1,426	143	1,568
	Total E	**183,296.0**		**10,726**		**160.9**	**241.4**	**2,011.3**	**201.1**	**2,212.4**
	Grand total A+B+C+D+E = Z	**498,496**		**32,655**		**490**	**735**	**6,124**	**612**	**6,736**
F	**Existing Urban area**									
1	Thu Dau Mot city	314,469	50		23,585	2,359	3,538	29,481	2,948	32,430
2	Ben Cat	427,718	10		6,416	642	962	8,020	802	8,822
3	Tan Uyen	285,875	5		2,144	214	322	2,680	268	2,948
4	Thuan An City	542,578	50		40,693	4,069	6,104	50,867	5,087	55,953
5	Di An City	424,489	50		31,837	3,184	4,776	39,796	3,980	43,775
	Total	**1,995,129**			**104,675**	**10,468**	**15,701**	**130,844**	**13,084**	**143,928**
	Grand total Z + F					**150,664**				

Year 2020

No.	City District/town	Population as planned	Utilization factor (%)	Population	Water demand of households 150l/capita/day (m3/day)	Water demand of administrative agencies 10% x (5) (m3/day)	Water demand of businesses 15% x (5) (m3/day)	Total water demand (5)+(6)+(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(3)*	*(4)*		*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**									
26	Res. area 5F Hamlet 5 (LU)	26,920	5	1,346	202	20	30	252	25	278
27	Res. area 5C Hamlet 5 (LU)	4,000	5	200	30	3	5	38	4	41
28	Res. area 5D Hamlet 5 (LU)	11,864	5	593	89	9	13	111	11	122
29	Res. area 5B Hamlet 5 (LU)	10,704	15	1,606	241	24	36	301	30	331
30	Res. area 5E Hamlet 5 (LU)	5,200	5	260	39	4	6	49	5	54
31	Res. area 5A Hamlet 5 (LU)	12,824	15	1,924	289	29	43	361	36	397
32	Lai Hung Res. area	7,464	15	1,120	168	17	25	210	21	231
33	Royal Town area	10,864	5	543	81	8	12	102	10	112
34	Lai Hung Resettlement area	2,052	5	103	15	2	2	19	2	21
	Total A	**91,892.0**		**7,695**		**115.4**	**173.1**	**1,442.6**	**144.3**	**1,586.8**
B	**An Tay area**									
36	Rach Bap Res. area	10,000	5	500	75	8	11	94	9	103
	Bac Ben Cat Urban area			0						
	Total B	**10,000.0**		**500**		**7.5**	**11.3**	**93.8**	**9.4**	**103.1**
C	**My Phuoc area**									
37	Cau Do Res. area	3,600	5	180	27	3	4	34	3	37
38	My Phuoc 3 Res. area (Biconsi)	3,448	5	172	26	3	4	32	3	36
39	My Phuoc 4 Res. area (Thien Phu)	4,140	5	207	31	3	5	39	4	43
40	My Phuoc expanded Resettlement area	12,160	70	8,512	1,277	128	192	1,596	160	1,756
41	Res. area Hamlet 3(TH)	12,212	20	2,442	366	37	55	458	46	504
42	Thoi Hoa Resettlement housing area	6,264	20	1,253	188	19	28	235	23	258
43	Res. area Hamlet 5C	14,440	5	722	108	11	16	135	14	149
44	Res. area Hamlet 5A	12,824	5	641	96	10	14	120	12	132
45	Res. area Hamlet 5B	7,092	5	355	53	5	8	66	7	73
46	Res. area Hamlet 2 (TH)	10,544	20	2,109	316	32	47	395	40	435
47	Res. area Hamlet 3A (TH)	12,212	20	2,442	366	37	55	458	46	504
48	Res. area Hamlet 3B (TH)	10,104	20	2,021	303	30	45	379	38	417
49	Res. area Hamlet 1 (TH)	12,824	20	2,565	385	38	58	481	48	529
50	My Phuoc 3 Res. area (TH)	14,240	20	2,848	427	43	64	534	53	587
51	Res. area Hamlet 6 (TH)	10,212	20	2,042	306	31	46	383	38	421
52	Res. area Hamlet 5 (CPH)	10,452	20	2,090	314	31	47	392	39	431
53	Res. area Hamlet 7 (CPH)	5,960	20	1,192	179	18	27	224	22	246
	Total C	**162,728.0**		**31,793**		**476.9**	**715.4**	**5,961.4**	**596.1**	**6,557.5**
D	**Expanded VSIP II area**									
54	Res. area Hamlet 4 (TB)	11,880	5	594	89	9	13	111	11	123
55	Suoi Tre Res. area	8,932	5	447	67	7	10	84	8	92
56	Res. area Hamlet 1 (Vinh Tan)	6,904	5	345	52	5	8	65	6	71
57	Res. area Hamlet 4 (Vinh Tan)	8,932	15	1,340	201	20	30	251	25	276
58	Res. area Hamlet 5 (VT)	8,664	15	1,300	195	19	29	244	24	268
59	Hoa Loi Res. area	5,268	15	790	119	12	18	148	15	163
35	Cong Xanh University area			0						
	Total D	**50,580.0**		**4,816**		**72.2**	**108.3**	**902.9**	**90.3**	**993.2**
E	**New City area**									
60	Hoa Loi Res. area	10,424	20	2,085	313	31	47	391	39	430
61	Hoa Loi Resettlement area	3,840	20	768	115	12	17	144	14	158
62	Dinh Hoa Resettlement area	2,260	20	452	68	7	10	85	8	93
63	Phu My Resettlement area	3,624	20	725	109	11	16	136	14	149
64	Tan Vinh Hiep Resettlement area	5,148	20	1,030	154	15	23	193	19	212
65	Phu Chanh Resettlement area	5,944	20	1,189	178	18	27	223	22	245
66	New Urban area	152,056	15	22,808	3,421	342	513	4,277	428	4,704
	Total E	**183,296.0**		**29,057**		**435.8**	**653.8**	**5,448.1**	**544.8**	**5,992.9**
	Grand total A+B+C+D+E = Z	**498,496**		**73,861**		**1,108**	**1,662**	**13,849**	**1,385**	**15,234**
F	**Existing Urban area**									
1	Thu Dau Mot city	413,250	60		37,193	3,719	5,579	46,491	4,649	51,140
2	Ben Cat	861,314	20		25,839	2,584	3,876	32,299	3,230	35,529
3	Tan Uyen	374,058	10		5,611	561	842	7,014	701	7,715
4	Thuan An City	726,092	60		65,348	6,535	9,802	81,685	8,169	89,854
5	Di An City	568,062	60		51,126	5,113	7,669	63,907	6,391	70,298
	Total	**2,942,776**			**185,117**	**18,512**	**27,767**	**231,396**	**23,140**	**254,535**
	Grand total Z + F					**269,769**				

Year 2025

No.	City District/town	Population as planned	Utilization factor (%)	Population	Water demand of households 150l/capita/day (m3/day)	Water demand of administrative agencies 10% x (5) (m3/day)	Water demand of businesses 15% x (5) (m3/day)	Total water demand (5)+(6)+(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(3)*	*(4)*		*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**									
26	Res. area 5F Hamlet 5 (LU)	26,920	15	4,038	606	61	91	757	76	833
27	Res. area 5C Hamlet 5 (LU)	4,000	15	600	90	9	14	113	11	124
28	Res. area 5D Hamlet 5 (LU)	11,864	15	1,780	267	27	40	334	33	367
29	Res. area 5B Hamlet 5 (LU)	10,704	25	2,676	401	40	60	502	50	552
30	Res. area 5E Hamlet 5 (LU)	5,200	15	780	117	12	18	146	15	161
31	Res. area 5A Hamlet 5 (LU)	12,824	25	3,206	481	48	72	601	60	661
32	Lai Hung Res. area	7,464	25	1,866	280	28	42	350	35	385
33	Royal Town area	10,864	15	1,630	244	24	37	306	31	336
34	Lai Hung Resettlement area	2,052	15	308	46	5	7	58	6	63
	Total A	**91,892.0**		**16,884**		**253.2**	**379.9**	**3,165.6**	**316.6**	**3,482.1**
B	**An Tay area**									
36	Rach Bap Res. area	10,000	15	1,500	225	23	34	281	28	309
	Bac Ben Cat Urban area			0						
	Total B	**10,000.0**		**1,500**		**22.5**	**33.8**	**281.3**	**28.1**	**309.4**
C	**My Phuoc area**									
37	Cau Do Res. area	3,600	15	540	81	8	12	101	10	111
38	My Phuoc 3 Res. area (Biconsi)	3,448	15	517	78	8	12	97	10	107
39	My Phuoc 4 Res. area (Thien Phu)	4,140	15	621	93	9	14	116	12	128
40	My Phuoc expanded Resettlement area	12,160	80	9,728	1,459	146	219	1,824	182	2,006
41	Res. area Hamlet 3(TH)	12,212	30	3,664	550	55	82	687	69	756
42	Thoi Hoa Resettlement housing area	6,264	30	1,879	282	28	42	352	35	388
43	Res. area Hamlet 5C	14,440	15	2,166	325	32	49	406	41	447
44	Res. area Hamlet 5A	12,824	15	1,924	289	29	43	361	36	397
45	Res. area Hamlet 5B	7,092	15	1,064	160	16	24	199	20	219
46	Res. area Hamlet 2 (TH)	10,544	30	3,163	474	47	71	593	59	652
47	Res. area Hamlet 3A (TH)	12,212	30	3,664	550	55	82	687	69	756
48	Res. area Hamlet 3B (TH)	10,104	30	3,031	455	45	68	568	57	625
49	Res. area Hamlet 1 (TH)	12,824	30	3,847	577	58	87	721	72	793
50	My Phuoc 3 Res. area (TH)	14,240	30	4,272	641	64	96	801	80	881
51	Res. area Hamlet 6 (TH)	10,212	30	3,064	460	46	69	574	57	632
52	Res. area Hamlet 5 (CPH)	10,452	30	3,136	470	47	71	588	59	647
53	Res. area Hamlet 7 (CPH)	5,960	30	1,788	268	27	40	335	34	369
	Total C	**162,728.0**		**48,068**		**721.0**	**1,081.5**	**9,012.5**	**901.3**	**9,913.8**
D	**Expanded VSIP II area**									
54	Res. area Hamlet 4 (TB)	11,880	15	1,782	267	27	40	334	33	368
55	Suoi Tre Res. area	8,932	15	1,340	201	20	30	251	25	276
56	Res. area Hamlet 1 (Vinh Tan)	6,904	15	1,036	155	16	23	194	19	214
57	Res. area Hamlet 4 (Vinh Tan)	8,932	25	2,233	335	33	50	419	42	461
58	Res. area Hamlet 5 (VT)	8,664	25	2,166	325	32	49	406	41	447
59	Hoa Loi Res. area	5,268	25	1,317	198	20	30	247	25	272
35	Cong Xanh University area			0						
	Total D	**50,580.0**		**9,874**		**148.1**	**222.2**	**1,851.3**	**185.1**	**2,036.4**
E	**New City area**									
60	Hoa Loi Res. area	10,424	30	3,127	469	47	70	586	59	645
61	Hoa Loi Resettlement area	3,840	30	1,152	173	17	26	216	22	238
62	Dinh Hoa Resettlement area	2,260	30	678	102	10	15	127	13	140
63	Phu My Resettlement area	3,624	30	1,087	163	16	24	204	20	224
64	Tan Vinh Hiep Resettlement area	5,148	30	1,544	232	23	35	290	29	319
65	Phu Chanh Resettlement area	5,944	30	1,783	267	27	40	334	33	368
66	New Urban area	152,056	25	38,014	5,702	570	855	7,128	713	7,840
	Total E	**183,296.0**		**47,385**		**710.8**	**1,066.2**	**8,884.9**	**888.5**	**9,773.4**
	Grand total A+B+C+D+E = Z	**498,496**		**123,711**		**1,856**	**2,783**	**23,195**	**2,320**	**25,515**
F	**Existing Urban area**									
1	Thu Dau Mot city	472,126	70		49,573	4,957	7,436	61,967	6,197	68,163
2	Ben Cat	1,257,600	30		56,592	5,659	8,489	70,740	7,074	77,814
3	Tan Uyen	424,116	15		9,543	954	1,431	11,928	1,193	13,121
4	Thuan An City	763,130	65		74,405	7,441	11,161	93,006	9,301	102,307
5	Di An City	597,039	65		58,211	5,821	8,732	72,764	7,276	80,041
	Total	**3,514,010**			**248,324**	**24,832**	**37,249**	**310,405**	**31,041**	**341,446**
	Grand total Z + F					**366,961**				

Year 2030

No.	City District/town	Population as planned	Utilization factor (%)	Population	Water demand of households 150l/capita/day (m3/day)	Water demand of administrative agencies 10% x (5) (m3/day)	Water demand of businesses 15% x (5) (m3/day)	Total water demand (5)+(6)+(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)
A	**Bau Bang area**									
26	Res. area 5F Hamlet 5 (LU)	26,920	25	6,730	1,010	101	151	1,262	126	1,388
27	Res. area 5C Hamlet 5 (LU)	4,000	25	1,000	150	15	23	188	19	206
28	Res. area 5D Hamlet 5 (LU)	11,864	25	2,966	445	44	67	556	56	612
29	Res. area 5B Hamlet 5 (LU)	10,704	35	3,746	562	56	84	702	70	773
30	Res. area 5E Hamlet 5 (LU)	5,200	25	1,300	195	20	29	244	24	268
31	Res. area 5A Hamlet 5 (LU)	12,824	35	4,488	673	67	101	842	84	926
32	Lai Hung Res. area	7,464	35	2,612	392	39	59	490	49	539
33	Royal Town area	10,864	25	2,716	407	41	61	509	51	560
34	Lai Hung Resettlement area	2,052	25	513	77	8	12	96	10	106
	Total A	**91,892.0**		**26,071**		**391.1**	**586.6**	**4,888.5**	**488.9**	**5,377.4**
B	**An Tay area**									
36	Rach Bap Res. area	10,000	25	2,500	375	38	56	469	47	516
	Bac Ben Cat Urban area			0						
	Total B	**10,000.0**		**2,500**		**37.5**	**56.3**	**468.8**	**46.9**	**515.6**
C	**My Phuoc area**									
37	Cau Do Res. area	3,600	25	900	135	14	20	169	17	186
38	My Phuoc 3 Res. area (Biconsi)	3,448	25	862	129	13	19	162	16	178
39	My Phuoc 4 Res. area (Thien Phu)	4,140	25	1,035	155	16	23	194	19	213
40	My Phuoc expanded Resettlement area	12,160	90	10,944	1,642	164	246	2,052	205	2,257
41	Res. area Hamlet 3(TH)	12,212	40	4,885	733	73	110	916	92	1,007
42	Thoi Hoa Resettlement housing area	6,264	40	2,506	376	38	56	470	47	517
43	Res. area Hamlet 5C	14,440	25	3,610	542	54	81	677	68	745
44	Res. area Hamlet 5A	12,824	25	3,206	481	48	72	601	60	661
45	Res. area Hamlet 5B	7,092	25	1,773	266	27	40	332	33	366
46	Res. area Hamlet 2 (TH)	10,544	40	4,218	633	63	95	791	79	870
47	Res. area Hamlet 3A (TH)	12,212	40	4,885	733	73	110	916	92	1,007
48	Res. area Hamlet 3B (TH)	10,104	40	4,042	606	61	91	758	76	834
49	Res. area Hamlet 1 (TH)	12,824	40	5,130	769	77	115	962	96	1,058
50	My Phuoc 3 Res. area (TH)	14,240	40	5,696	854	85	128	1,068	107	1,175
51	Res. area Hamlet 6 (TH)	10,212	40	4,085	613	61	92	766	77	842
52	Res. area Hamlet 5 (CPH)	10,452	40	4,181	627	63	94	784	78	862
53	Res. area Hamlet 7 (CPH)	5,960	40	2,384	358	36	54	447	45	492
	Total C	**162,728.0**		**64,342**		**965.1**	**1,447.6**	**12,063.7**	**1,206.4**	**13,270.0**
D	**Expanded VSIP II area**									
54	Res. area Hamlet 4 (TB)	11,880	25	2,970	446	45	67	557	56	613
55	Suoi Tre Res. area	8,932	25	2,233	335	33	50	419	42	461
56	Res. area Hamlet 1 (Vinh Tan)	6,904	25	1,726	259	26	39	324	32	356
57	Res. area Hamlet 4 (Vinh Tan)	8,932	35	3,126	469	47	70	586	59	645
58	Res. area Hamlet 5 (VT)	8,664	35	3,032	455	45	68	569	57	625
59	Hoa Loi Res. area	5,268	35	1,844	277	28	41	346	35	380
35	Cong Xanh University area			0						
	Total D	**50,580.0**		**14,931**		**224.0**	**336.0**	**2,799.6**	**280.0**	**3,079.6**
E	**New City area**									
60	Hoa Loi Res. area	10,424	40	4,170	625	63	94	782	78	860
61	Hoa Loi Resettlement area	3,840	40	1,536	230	23	35	288	29	317
62	Dinh Hoa Resettlement area	2,260	40	904	136	14	20	170	17	186
63	Phu My Resettlement area	3,624	40	1,450	217	22	33	272	27	299
64	Tan Vinh Hiep Resettlement area	5,148	40	2,059	309	31	46	386	39	425
65	Phu Chanh Resettlement area	5,944	40	2,378	357	36	53	446	45	490
66	New Urban area	152,056	35	53,220	7,983	798	1,197	9,979	998	10,977
	Total E	**183,296.0**		**65,717**		**985.7**	**1,478.6**	**12,321.7**	**1,232.2**	**13,553.8**
	Grand total A+B+C+D+E = Z	**498,496**		**173,561**		**2,603**	**3,905**	**32,542**	**3,254**	**35,797**
F	**Existing Urban area**									
1	Thu Dau Mot city	541,833	80		65,020	6,502	9,753	81,275	8,127	89,402
2	Ben Cat	1,853,318	40		111,199	11,120	16,680	138,999	13,900	152,899
3	Tan Uyen	484,069	20		14,522	1,452	2,178	18,153	1,815	19,968
4	Thuan An City	802,057	70		84,216	8,422	12,632	105,270	10,527	115,797
5	Di An City	627,494	70		65,887	6,589	9,883	82,359	8,236	90,594
	Total	**4,308,770**			**340,844**	**34,084**	**51,127**	**426,055**	**42,605**	**468,660**
	Grand total Z + F					**504,457**				

Year 2035

No.	City District/town	Population as planned	Utilization factor (%)	Population	Water demand of households 150l/capita/day (m3/day)	Water demand of administrative agencies 10% x (5) (m3/day)	Water demand of businesses 15% x (5) (m3/day)	Total water demand (5)+(6)+(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(3)*	*(4)*		*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**									
26	Res. area 5F Hamlet 5 (LU)	26,920	35	9,422	1,413	141	212	1,767	177	1,943
27	Res. area 5C Hamlet 5 (LU)	4,000	35	1,400	210	21	32	263	26	289
28	Res. area 5D Hamlet 5 (LU)	11,864	35	4,152	623	62	93	779	78	856
29	Res. area 5B Hamlet 5 (LU)	10,704	35	3,746	562	56	84	702	70	773
30	Res. area 5E Hamlet 5 (LU)	5,200	35	1,820	273	27	41	341	34	375
31	Res. area 5A Hamlet 5 (LU)	12,824	45	5,771	866	87	130	1,082	108	1,190
32	Lai Hung Res. area	7,464	45	3,359	504	50	76	630	63	693
33	Royal Town area	10,864	35	3,802	570	57	86	713	71	784
34	Lai Hung Resettlement area	2,052	35	718	108	11	16	135	13	148
	Total A	**91,892.0**		**34,190**		**512.9**	**769.3**	**6,410.8**	**641.1**	**7,051.9**
B	**An Tay area**									
36	Rach Bap Res. area	10,000	35	3,500	525	53	79	656	66	722
	Bac Ben Cat Urban area			0						
	Total B	**10,000.0**		**3,500**		**52.5**	**78.8**	**656.3**	**65.6**	**721.9**
C	**My Phuoc area**									
37	Cau Do Res. area	3,600	35	1,260	189	19	28	236	24	260
38	My Phuoc 3 Res. area (Biconsi)	3,448	35	1,207	181	18	27	226	23	249
39	My Phuoc 4 Res. area (Thien Phu)	4,140	35	1,449	217	22	33	272	27	299
40	My Phuoc expanded Resettlement area	12,160	100	12,160	1,824	182	274	2,280	228	2,508
41	Res. area Hamlet 3(TH)	12,212	50	6,106	916	92	137	1,145	114	1,259
42	Thoi Hoa Resettlement housing area	6,264	50	3,132	470	47	70	587	59	646
43	Res. area Hamlet 5C	14,440	35	5,054	758	76	114	948	95	1,042
44	Res. area Hamlet 5A	12,824	35	4,488	673	67	101	842	84	926
45	Res. area Hamlet 5B	7,092	35	2,482	372	37	56	465	47	512
46	Res. area Hamlet 2 (TH)	10,544	50	5,272	791	79	119	989	99	1,087
47	Res. area Hamlet 3A (TH)	12,212	50	6,106	916	92	137	1,145	114	1,259
48	Res. area Hamlet 3B (TH)	10,104	50	5,052	758	76	114	947	95	1,042
49	Res. area Hamlet 1 (TH)	12,824	50	6,412	962	96	144	1,202	120	1,322
50	My Phuoc 3 Res. area (TH)	14,240	50	7,120	1,068	107	160	1,335	134	1,469
51	Res. area Hamlet 6 (TH)	10,212	50	5,106	766	77	115	957	96	1,053
52	Res. area Hamlet 5 (CPH)	10,452	50	5,226	784	78	118	980	98	1,078
53	Res. area Hamlet 7 (CPH)	5,960	50	2,980	447	45	67	559	56	615
	Total C	**162,728.0**		**80,612**		**1,209.2**	**1,813.8**	**15,114.8**	**1,511.5**	**16,626.3**
D	**Expanded VSIP II area**									
54	Res. area Hamlet 4 (TB)	11,880	35	4,158	624	62	94	780	78	858
55	Suoi Tre Res. area	8,932	35	3,126	469	47	70	586	59	645
56	Res. area Hamlet 1 (Vinh Tan)	6,904	35	2,416	362	36	54	453	45	498
57	Res. area Hamlet 4 (Vinh Tan)	8,932	35	3,126	469	47	70	586	59	645
58	Res. area Hamlet 5 (VT)	8,664	35	3,032	455	45	68	569	57	625
59	Hoa Loi Res. area	5,268	45	2,371	356	36	53	444	44	489
35	Cong Xanh University area			0						
	Total D	**50,580.0**		**18,229**		**273.4**	**410.2**	**3,418.1**	**341.8**	**3,759.9**
E	**New City area**									
60	Hoa Loi Res. area	10,424	50	5,212	782	78	117	977	98	1,075
61	Hoa Loi Resettlement area	3,840	50	1,920	288	29	43	360	36	396
62	Dinh Hoa Resettlement area	2,260	50	1,130	170	17	25	212	21	233
63	Phu My Resettlement area	3,624	50	1,812	272	27	41	340	34	374
64	Tan Vinh Hiep Resettlement area	5,148	50	2,574	386	39	58	483	48	531
65	Phu Chanh Resettlement area	5,944	50	2,972	446	45	67	557	56	613
66	New Urban area	152,056	45	68,425	10,264	1,026	1,540	12,830	1,283	14,113
	Total E	**183,296.0**		**84,045**		**1,260.7**	**1,891.0**	**15,758.5**	**1,575.8**	**17,334.3**
	Grand total A+B+C+D+E = Z	**498,496**		**220,576**		**3,309**	**4,963**	**41,358**	**4,136**	**45,494**
F	**Existing Urban area**									
1	Thu Dau Mot city	624,096	90		84,253	8,425	12,638	105,316	10,532	115,848
2	Ben Cat	2,137,080	50		160,281	16,028	24,042	200,351	20,035	220,386
3	Tan Uyen	557,257	25		20,897	2,090	3,135	26,121	2,612	28,734
4	Thuan An City	842,970	75		94,834	9,483	14,225	118,543	11,854	130,397
5	Di An City	659,502	75		74,194	7,419	11,129	92,743	9,274	102,017
	Total	**4,820,906**			**434,459**	**43,446**	**65,169**	**543,074**	**54,307**	**597,381**
	Grand total Z + F					**642,876**				

Year 2040

No.	City District/town	Population as planned	Utilization factor (%)	Population	Water demand of households 150l/capita/day (m3/day)	Water demand of administrative agencies 10% x (5) (m3/day)	Water demand of businesses 15% x (5) (m3/day)	Total water demand (5)+(6)+(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)	(9)	(10)
A	**Bau Bang area**									
26	Res. area 5F Hamlet 5 (LU)	26,920	45	12,114	1,817	182	273	2,271	227	2,499
27	Res. area 5C Hamlet 5 (LU)	4,000	45	1,800	270	27	41	338	34	371
28	Res. area 5D Hamlet 5 (LU)	11,864	45	5,339	801	80	120	1,001	100	1,101
29	Res. area 5B Hamlet 5 (LU)	10,704	45	4,817	723	72	108	903	90	993
30	Res. area 5E Hamlet 5 (LU)	5,200	45	2,340	351	35	53	439	44	483
31	Res. area 5A Hamlet 5 (LU)	12,824	55	7,053	1,058	106	159	1,322	132	1,455
32	Lai Hung Res. area	7,464	55	4,105	616	62	92	770	77	847
33	Royal Town area	10,864	45	4,889	733	73	110	917	92	1,008
34	Lai Hung Resettlement area	2,052	45	923	139	14	21	173	17	190
	Total A	**91,892.0**		**43,380**		**650.7**	**976.1**	**8,133.8**	**813.4**	**8,947.2**
B	**An Tay area**									
36	Rach Bap Res. area	10,000	45	4,500	675	68	101	844	84	928
	Bac Ben Cat Urban area			0						
	Total B	**10,000.0**		**4,500**		**67.5**	**101.3**	**843.8**	**84.4**	**928.1**
C	**My Phuoc area**									
37	Cau Do Res. area	3,600	45	1,620	243	24	36	304	30	334
38	My Phuoc 3 Res. area (Biconsi)	3,448	45	1,552	233	23	35	291	29	320
39	My Phuoc 4 Res. area (Thien Phu)	4,140	45	1,863	279	28	42	349	35	384
40	My Phuoc expanded Resettlement area	12,160	100	12,160	1,824	182	274	2,280	228	2,508
41	Res. area Hamlet 3(TH)	12,212	60	7,327	1,099	110	165	1,374	137	1,511
42	Thoi Hoa Resettlement housing area	6,264	60	3,758	564	56	85	705	70	775
43	Res. area Hamlet 5C	14,440	45	6,498	975	97	146	1,218	122	1,340
44	Res. area Hamlet 5A	12,824	45	5,771	866	87	130	1,082	108	1,190
45	Res. area Hamlet 5B	7,092	45	3,191	479	48	72	598	60	658
46	Res. area Hamlet 2 (TH)	10,544	60	6,326	949	95	142	1,186	119	1,305
47	Res. area Hamlet 3A (TH)	12,212	60	7,327	1,099	110	165	1,374	137	1,511
48	Res. area Hamlet 3B (TH)	10,104	60	6,062	909	91	136	1,137	114	1,250
49	Res. area Hamlet 1 (TH)	12,824	60	7,694	1,154	115	173	1,443	144	1,587
50	My Phuoc 3 Res. area (TH)	14,240	60	8,544	1,282	128	192	1,602	160	1,762
51	Res. area Hamlet 6 (TH)	10,212	60	6,127	919	92	138	1,149	115	1,264
52	Res. area Hamlet 5 (CPH)	10,452	60	6,271	941	94	141	1,176	118	1,293
53	Res. area Hamlet 7 (CPH)	5,960	60	3,576	536	54	80	671	67	738
	Total C	**162,728.0**		**95,667**		**1,435.0**	**2,152.6**	**17,938.0**	**1,793.8**	**19,731.8**
D	**Expanded VSIP II area**									
54	Res. area Hamlet 4 (TB)	11,880	45	5,346	802	80	120	1,002	100	1,103
55	Suoi Tre Res. area	8,932	45	4,019	603	60	90	754	75	829
56	Res. area Hamlet 1 (Vinh Tan)	6,904	45	3,107	466	47	70	583	58	641
57	Res. area Hamlet 4 (Vinh Tan)	8,932	45	4,019	603	60	90	754	75	829
58	Res. area Hamlet 5 (VT)	8,664	45	3,899	585	58	88	731	73	804
59	Hoa Loi Res. area	5,268	55	2,897	435	43	65	543	54	598
35	Cong Xanh University area			0						
	Total D	**50,580.0**		**23,287**		**349.3**	**524.0**	**4,366.5**	**436.6**	**4,803.1**
E	**New City area**									
60	Hoa Loi Res. area	10,424	60	6,254	938	94	141	1,173	117	1,290
61	Hoa Loi Resettlement area	3,840	60	2,304	346	35	52	432	43	475
62	Dinh Hoa Resettlement area	2,260	60	1,356	203	20	31	254	25	280
63	Phu My Resettlement area	3,624	60	2,174	326	33	49	408	41	448
64	Tan Vinh Hiep Resettlement area	5,148	60	3,089	463	46	69	579	58	637
65	Phu Chanh Resettlement area	5,944	60	3,566	535	53	80	669	67	736
66	New Urban area	152,056	55	83,631	12,545	1,254	1,882	15,681	1,568	17,249
	Grand total A+B+C+D+E = Z	**498,496**		**269,208**		**4,038**	**6,057**	**50,477**	**5,048**	**55,525**
F	**Existing Urban area**									
1	Thu Dau Mot city	720,913	100		108,137	10,814	16,221	135,171	13,517	148,688
2	Ben Cat	2,470,575	60		222,352	22,235	33,353	277,940	27,794	305,734
3	Tan Uyen	641,986	30		28,889	2,889	4,333	36,112	3,611	39,723
4	Thuan An City	885,970	80		106,316	10,632	15,947	132,895	13,290	146,185
5	Di An City	693,144	80		83,177	8,318	12,477	103,972	10,397	114,369
	Total	**5,412,587**			**548,872**	**54,887**	**82,331**	**686,090**	**68,609**	**754,699**
	Grand total Z + F					**810,224**				

2. Industrial Park

Year 2012

Table 7

No.	Name of Industrial Park	Planning area (Ha)	Available area for rent (Ha)	Utilization factor (%)	Water supply standard 45m3/day/ha (m3/day)	Total water demand (5)*(6)*(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**							
1	Bau Bang IP	1,000	699.2	1.75	45	551	55	606
	Total A	**1,000**	**699**			**551**	**55**	**606**
B	**An Tay area**							
7	An Tay IP	500	373.9	1	45	168	17	185
9	Rach Bap IP	279	188.2					
10	Mai Trung IP	51	34.6					
11	Viet Huong II IP	250	168.6					
	Total B	**1,080**	**765**			**168**	**17**	**185**
C	**My Phuoc area**							
12	My Phuoc I IP	377	276.3	75	45	9,325	933	10,258
13	My Phuoc II IP	477	333.0	60	45	8,991	899	9,890
14	My Phuoc III IP	978	655.7	30	45	8,852	885	9,737
15	Thoi Hoa IP	202	134.6					
	Total C	**2,034**	**1,400**			**27,168**	**2,717**	**29,885**
D	**Tan Uyen area**							
16	VSIP II expanded area	1,008	675.4	10	45	3,039	304	3,343
	Total D	**1,008**	**675**			**3,039**	**304**	**3,343**
E	**New City area**							
19	Dong An II + Expansion IP	205	148.1	15	45	1,000	100	1,100
20	Phu Gia IP (Viet E.M.A.X)	133	85.6	15	45	578	58	636
21	VSIP II IP	345	231.2	35	45	3,641	364	4,006
22	Kim Huy IP	214	144.7	15	45	977	98	1,074
23	Song Than III IP	534	327.4	15	45	2,210	221	2,431
24	Dai Dang IP	274	166.0	15	45	1,121	112	1,233
25	Mapletree Hi-Tech Park	75	52.4	5	45	118	12	130
	Total E	**1,780**	**1,155**			**9,644**	**964**	**10,608**
F	**Thuan An district**							
1	VSIP I Industrial Park	473	315.9	78	45	11,088	1,109	12,197
2	Viet Huong Industrial Park	36	25.1	90	45	1,015	102	1,117
3	An Thanh Industrial group	46	32.3	90	45	1,307	131	1,438
4	Binh Chuan Industrial group	68	47.3	90	45	1,914	191	2,105
	Total F	**623**	**420**			**15,324**	**1,532**	**16,856**
G	**Di An district**							
1	Song Than I IP	178	139.7	90	45	5,658	566	6,224
2	Song Than II PI	279	217.6	90	45	8,812	881	9,694
3	Binh Duong IP	17	14.1	87	45	551	55	606
4	Dong An IP	138	112.3	92	45	4,672	467	5,139
5	Tan Dong Hiep A IP	50	40.2	82	45	1,484	148	1,633
6	Tan Dong Hiep B IP	163	111.8	70	45	3,521	352	3,873
7	Binh An Textile and Garment IP	26	18.8	86	45	728	73	800
8	Tan Binh I Industrial group	55	38.5		45	0	0	0
9	Tan Dong Hiep manufacturing zone	58	40.6	81	45	1,480	148	1,628
	Total G	**964**	**733.6**			**26,907**	**2,691**	**29,597**
	Grand total	**8,489**	**5,849**			**82,801**	**8,280**	**91,081**

Year 2015

Table 7

No.	Name of Industrial Park	Planning area (Ha)	Available area for rent (Ha)	Utilization factor (%)	Water supply standard 45m3/day/ha (m3/day)	Total water demand (5)*(6)*(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**							
1	Cay Truong IP	500	345.0					
3	Bau Bang IP (MR)	1,500	1,005.0					
4	Bau Bang IP	1,000	699.2	20	45	6,293	629	6,922
5	Lai Hung IP	1,000	690.0					
6	Lai Hung Industrial group	78	53.0					
	Total A	**4,078**	**2,792**			**6,293**	**629**	**6,922**
B	**An Tay area**							
7	An Tay IP	500	373.9	10	45	1,683	168	1,851
8	An Tay IP (MR)	850	578.0		45	0	0	0
9	Rach Bap IP	279	188.2	5	45	423	42	466
10	Mai Trung IP	51	34.6	20	45	311	31	343
11	Viet Huong II IP	250	168.6	30	45	2,276	228	2,504
	Total B	**1,930**	**1,343**			**4,694**	**469**	**5,163**
C	**My Phuoc area**							
12	My Phuoc I IP	377	276.3	85	45	10,568	1,057	11,625
13	My Phuoc II IP	477	333.0	70	45	10,490	1,049	11,538
14	My Phuoc III IP	978	655.7	40	45	11,803	1,180	12,983
15	Thoi Hoa IP	202	134.6	5	45	303	30	333
	Total C	**2,034**	**1,400**			**33,163**	**3,316**	**36,480**
D	**Tan Uyen area**							
16	VSIP II expanded area	1,008	675.4	20	45	6,079	608	6,686
17	Tan Binh IP	350	241.5		45	0	0	0
18	Binh Lap IP	500	340.0					
	Total D	128	89.0			**6,079**	**608**	**6,686**
E	**New City area**	**1,986**	**1,346**					
19	Dong An II + Expansion IP	205	148.1	25	45	1,666	167	1,833
20	Phu Gia IP (Viet E.M.A.X)	133	85.6	25	45	963	96	1,059
21	VSIP II IP	345	231.2	45	45	4,682	468	5,150
22	Kim Huy IP	214	144.7	25	45	1,628	163	1,791
23	Song Than III IP	534	327.4	25	45	3,683	368	4,052
24	Dai Dang IP	274	166.0	25	45	1,868	187	2,054
25	Mapletree Hi-Tech Park	75	52.4	15	45	354	35	389
	Total E	**1,780**	**1,155**			**14,843**	**1,484**	**16,328**
F	**Thuan An district**							
1	VSIP I Industrial Park	473	315.9	87.1	45	12,379	1,238	13,617
2	Viet Huong Industrial Park	36	25.1	100.0	45	1,128	113	1,241
3	An Thanh Industrial group	46	32.3	100.0	45	1,452	145	1,597
4	Binh Chuan Industrial group	68	47.3	100.0	45	2,126	213	2,339
	Total F	**623**	**420**			**17,085**	**1,709**	**18,794**
G	**Di An district**							
1	Song Than I IP	178	139.7	100.0	45	6,287	629	6,916
2	Song Than II PI	279	217.6	99.5	45	9,744	974	10,718
3	Binh Duong IP	17	14.1	97.4	45	617	62	679
4	Dong An IP	138	112.3	92.4	45	4,672	467	5,139
5	Tan Dong Hiep A IP	50	40.2	100.0	45	1,810	181	1,991
6	Tan Dong Hiep B IP	163	111.8	77.7	45	3,906	391	4,296
7	Binh An Textile and Garment IP	26	18.8	96.0	45	812	81	893
8	Tan Binh I Industrial group	55	38.5		45	0	0	0
9	Tan Dong Hiep manufacturing zone	58	40.6	100.0	45	1,827	183	2,010
	Total G	**964**	**733.6**			**29,675**	**2,967**	**32,642**
	Grand total	**11,537**	**7,934**			**111,832**	**11,183**	**123,015**

Year 2020

Table 7

No.	Name of Industrial Park	Planning area (Ha)	Available area for rent (Ha)	Utilization factor (%)	Water supply standard 45m3/day/ha (m3/day)	Total water demand (5)*(6)*(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**							
1	Cay Truong IP	500	345.0		45	0	0	0
2	Long Hoa IP	1,380	952.2					
3	Bau Bang IP (MR)	1,500	1,035.0	5	45	2,329	233	2,562
4	Bau Bang IP	1,000	699.2	30	45	9,439	944	10,383
5	Lai Hung IP	1,000	690.0	5				
6	Lai Hung Industrial group	78	53.0	5	45	119	12	131
	Total A	**5,458**	**3,774**			**11,887**	**1,189**	**13,076**
B	**An Tay area**							
7	An Tay IP	500	373.9	20	45	3,365	337	3,702
8	An Tay IP (MR)	850	578.0	5	45	1,301	130	1,431
9	Rach Bap IP	279	188.2	15	45	1,270	127	1,397
10	Mai Trung IP	51	34.6	30	45	467	47	514
11	Viet Huong II IP	250	168.6	40	45	3,035	303	3,338
	Total B	**1,930**	**1,343**			**9,438**	**944**	**10,382**
C	**My Phuoc area**							
12	My Phuoc I IP	377	276.3	95	45	11,812	1,181	12,993
13	My Phuoc II IP	477	333.0	80	45	11,988	1,199	13,187
14	My Phuoc III IP	978	655.7	50	45	14,753	1,475	16,229
15	Thoi Hoa IP	202	134.6	15	45	909	91	999
	Total C	**2,034**	**1,400**			**39,462**	**3,946**	**43,408**
D	**Tan Uyen area**							
16	VSIP II expanded area	1,008	675.4	40	45	12,157	1,216	13,373
17	Tan Binh IP	350	241.5	5	45	543	54	598
18	Binh Lap IP	500	345.0	5	45	776	78	854
	Total D	128	89.0	5		**13,477**	**1,348**	**14,825**
E	**New City area**	**1,986**	**1,351**					
19	Dong An II + Expansion IP	205	148.1	40	45	2,666	267	2,932
20	Phu Gia IP (Viet E.M.A.X)	133	85.6	40	45	1,541	154	1,695
21	VSIP II IP	345	231.2	55	45	5,722	572	6,294
22	Kim Huy IP	214	144.7	40	45	2,605	260	2,865
23	Song Than III IP	534	327.4	40	45	5,893	589	6,483
24	Dai Dang IP	274	166.0	40	45	2,988	299	3,287
25	Mapletree Hi-Tech Park	75	52.4	30	45	707	71	778
	Total E	**1,780**	**1,155**			**22,122**	**2,212**	**24,334**
F	**Thuan An district**							
1	VSIP I Industrial Park	473	315.9	87.1	45	12,379	1,238	13,617
2	Viet Huong Industrial Park	36	25.1	100.0	45	1,128	113	1,241
3	An Thanh Industrial group	46	32.3	100.0	45	1,452	145	1,597
4	Binh Chuan Industrial group	68	47.3	100.0	45	2,126	213	2,339
	Total F	**623**	**420**			**17,085**	**1,709**	**18,794**
G	**Di An district**							
1	Song Than I IP	178	139.7	100.0	45	6,287	629	6,916
2	Song Than II PI	279	217.6	99.5	45	9,744	974	10,718
3	Binh Duong IP	17	14.1	97.4	45	617	62	679
4	Dong An IP	138	112.3	92.4	45	4,672	467	5,139
5	Tan Dong Hiep A IP	50	40.2	100.0	45	1,810	181	1,991
6	Tan Dong Hiep B IP	163	111.8	77.7	45	3,906	391	4,296
7	Binh An Textile and Garment IP	26	18.8	96.0	45	812	81	893
8	Tan Binh I Industrial group	55	38.5		45	0	0	0
9	Tan Dong Hiep manufacturing zone	58	40.6	100.0	45	1,827	183	2,010
	Total G	**964**	**733.6**			**29,675**	**2,967**	**32,642**
	Grand total	**12,917**	**8,916**			**143,145**	**14,315**	**157,460**

Year 2025

Table 7

No.	Name of Industrial Park	Planning area (Ha)	Available area for rent (Ha)	Utilization factor (%)	Water supply standard 45m3/day/ha (m3/day)	Total water demand (5)*(6)*(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**							
1	Cay Truong IP	500	345.0	5	45	776	78	854
2	Long Hoa IP	1,380	952.2	10	45	4,285	428	4,713
3	Bau Bang IP (MR)	1,500	1,035.0	15	45	6,986	699	7,685
4	Bau Bang IP	1,000	699.2	45	45	14,159	1,416	15,575
5	Lai Hung IP	1,000	690.0	15	45	4,658	466	5,123
6	Lai Hung Industrial group	78	53.0	15	45	358	36	394
	Total A	**5,458**	**3,774**			**31,221**	**3,122**	**34,344**
B	**An Tay area**							
7	An Tay IP	500	373.9	35	45	5,889	589	6,478
8	An Tay IP (MR)	850	578.0	15	45	3,902	390	4,292
9	Rach Bap IP	279	188.2	25	45	2,117	212	2,329
10	Mai Trung IP	51	34.6	40	45	623	62	685
11	Viet Huong II IP	250	168.6	50	45	3,794	379	4,173
	Total B	**1,930**	**1,343**			**16,324**	**1,632**	**17,956**
C	**My Phuoc area**							
12	My Phuoc I IP	377	276.3	100	45	12,434	1,243	13,677
13	My Phuoc II IP	477	333.0	90	45	13,487	1,349	14,835
14	My Phuoc III IP	978	655.7	65	45	19,179	1,918	21,097
15	Thoi Hoa IP	202	134.6	30	45	1,817	182	1,999
	Total C	**2,034**	**1,400**			**46,916**	**4,692**	**51,608**
D	**Tan Uyen area**							
16	VSIP II expanded area	1,008	675.4	55	45	16,716	1,672	18,388
17	Tan Binh IP	350	241.5	15	45	1,630	163	1,793
18	Binh Lap IP	500	345.0	15	45	2,329	233	2,562
	Total D	128	89.0	15		**20,675**	**2,068**	**22,743**
E	**New City area**	**1,986**	**1,351**					
19	Dong An II + Expansion IP	205	148.1	55	45	3,665	367	4,032
20	Phu Gia IP (Viet E.M.A.X)	133	85.6	55	45	2,119	212	2,330
21	VSIP II IP	345	231.2	70	45	7,283	728	8,011
22	Kim Huy IP	214	144.7	55	45	3,581	358	3,939
23	Song Than III IP	534	327.4	55	45	8,103	810	8,913
24	Dai Dang IP	274	166.0	55	45	4,109	411	4,519
25	Mapletree Hi-Tech Park	75	52.4	45	45	1,061	106	1,167
	Total E	**1,780**	**1,155**			**29,921**	**2,992**	**32,913**
F	**Thuan An district**							
1	VSIP I Industrial Park	473	315.9	87.1	45	12,379	1,238	13,617
2	Viet Huong Industrial Park	36	25.1	100.0	45	1,128	113	1,241
3	An Thanh Industrial group	46	32.3	100.0	45	1,452	145	1,597
4	Binh Chuan Industrial group	68	47.3	100.0	45	2,126	213	2,339
	Total F	**623**	**420**			**17,085**	**1,709**	**18,794**
G	**Di An district**							
1	Song Than I IP	178	139.7	100.0	45	6,287	629	6,916
2	Song Than II PI	279	217.6	99.5	45	9,744	974	10,718
3	Binh Duong IP	17	14.1	97.4	45	617	62	679
4	Dong An IP	138	112.3	92.4	45	4,672	467	5,139
5	Tan Dong Hiep A IP	50	40.2	100.0	45	1,810	181	1,991
6	Tan Dong Hiep B IP	163	111.8	77.7	45	3,906	391	4,296
7	Binh An Textile and Garment IP	26	18.8	96.0	45	812	81	893
8	Tan Binh I Industrial group	55	38.5		45	0	0	0
9	Tan Dong Hiep manufacturing zone	58	40.6	100.0	45	1,827	183	2,010
	Total G	**964**	**733.6**			**29,675**	**2,967**	**32,642**
	Grand total	**12,917**	**8,916**			**191,818**	**19,182**	**210,999**

Year 2030

Table 7

No.	Name of Industrial Park	Planning area (Ha)	Available area for rent (Ha)	Utilization factor (%)	Water supply standard 45m3/day/ha (m3/day)	Total water demand (5)*(6)*(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
3	Bau Bang IP (MR)	1,500	1,035.0	25	45	11,644	1,164	12,808
4	Bau Bang IP	1,000	699.2	60	45	18,878	1,888	20,766
5	Lai Hung IP	1,000	690.0	25	45	7,763	776	8,539
6	Lai Hung Industrial group	78	53.0	25	45	596	60	656
	Total A	**5,458**	**3,774**			**49,779**	**4,978**	**54,757**
B	**An Tay area**							
7	An Tay IP	500	373.9	50	45	8,413	841	9,254
8	An Tay IP (MR)	850	578.0	30	45	7,803	780	8,583
9	Rach Bap IP	279	188.2	40	45	3,388	339	3,726
10	Mai Trung IP	51	34.6	45	45	701	70	771
11	Viet Huong II IP	250	168.6	65	45	4,932	493	5,425
	Total B	**1,930**	**1,343**			**25,236**	**2,524**	**27,759**
C	**My Phuoc area**							
12	My Phuoc I IP	377	276.3	100	45	12,434	1,243	13,677
13	My Phuoc II IP	477	333.0	100	45	14,985	1,499	16,484
14	My Phuoc III IP	978	655.7	75	45	22,130	2,213	24,343
15	Thoi Hoa IP	202	134.6	45	45	2,726	273	2,998
	Total C	**2,034**	**1,400**			**52,274**	**5,227**	**57,501**
D	**Tan Uyen area**							
16	VSIP II expanded area	1,008	675.4	70	45	21,275	2,128	23,403
17	Tan Binh IP	350	241.5	30	45	3,260	326	3,586
18	Binh Lap IP	500	345.0	25	45	3,881	388	4,269
	Total D	128	89.0	25		**28,417**	**2,842**	**31,258**
E	**New City area**	**1,986**	**1,351**					
19	Dong An II + Expansion IP	205	148.1	70	45	4,665	467	5,132
20	Phu Gia IP (Viet E.M.A.X)	133	85.6	70	45	2,696	270	2,966
21	VSIP II IP	345	231.2	85	45	8,843	884	9,728
22	Kim Huy IP	214	144.7	70	45	4,558	456	5,014
23	Song Than III IP	534	327.4	70	45	10,313	1,031	11,344
24	Dai Dang IP	274	166.0	70	45	5,229	523	5,752
25	Mapletree Hi-Tech Park	75	52.4	60	45	1,415	141	1,556
	Total E	**1,780**	**1,155**			**37,720**	**3,772**	**41,492**
F	**Thuan An district**							
1	VSIP I Industrial Park	473	315.9	87.1	45	12,379	1,238	13,617
2	Viet Huong Industrial Park	36	25.1	100.0	45	1,128	113	1,241
3	An Thanh Industrial group	46	32.3	100.0	45	1,452	145	1,597
4	Binh Chuan Industrial group	68	47.3	100.0	45	2,126	213	2,339
	Total F	**623**	**420**			**17,085**	**1,709**	**18,794**
1	Song Than I IP	178	139.7	100.0	45	6,287	629	6,916
2	Song Than II PI	279	217.6	99.5	45	9,744	974	10,718
3	Binh Duong IP	17	14.1	97.4	45	617	62	679
4	Dong An IP	138	112.3	92.4	45	4,672	467	5,139
5	Tan Dong Hiep A IP	50	40.2	100.0	45	1,810	181	1,991
6	Tan Dong Hiep B IP	163	111.8	77.7	45	3,906	391	4,296
7	Binh An Textile and Garment IP	26	18.8	96.0	45	812	81	893
8	Tan Binh I Industrial group	55	38.5		45	0	0	0
9	Tan Dong Hiep manufacturing zone	58	40.6	100.0	45	1,827	183	2,010
	Total G	**964**	**733.6**			**29,675**	**2,967**	**32,642**
	Grand total	**12,917**	**8,916**			**240,185**	**24,019**	**264,204**

Year 2035

Table 7

No.	Name of Industrial Park	Planning area (Ha)	Available area for rent (Ha)	Utilization factor (%)	Water supply standard 45m3/day/ha (m3/day)	Total water demand (5)*(6)*(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**							
1	Cay Truong IP	500	345.0	25	45	3,881	388	4,269
2	Long Hoa IP	1,380	952.2	30	45	12,855	1,285	14,140
3	Bau Bang IP (MR)	1,500	1,035.0	35	45	16,301	1,630	17,931
4	Bau Bang IP	1,000	699.2	70	45	22,025	2,202	24,227
5	Lai Hung IP	1,000	690.0	35	45	10,868	1,087	11,954
6	Lai Hung Industrial group	78	53.0	35	45	835	83	918
	Total A	**5,458**	**3,774**			**66,764**	**6,676**	**73,441**
B	**An Tay area**							
7	An Tay IP	500	373.9	60	45	10,095	1,010	11,105
8	An Tay IP (MR)	850	578.0	40	45	10,404	1,040	11,444
9	Rach Bap IP	279	188.2	50	45	4,235	423	4,658
10	Mai Trung IP	51	34.6	55	45	856	86	942
11	Viet Huong II IP	250	168.6	75	45	5,690	569	6,259
	Total B	**1,930**	**1,343**			**31,280**	**3,128**	**34,408**
C	**My Phuoc area**							
12	My Phuoc I IP	377	276.3	100	45	12,434	1,243	13,677
13	My Phuoc II IP	477	333.0	100	45	14,985	1,499	16,484
14	My Phuoc III IP	978	655.7	90	45	26,556	2,656	29,211
15	Thoi Hoa IP	202	134.6	60	45	3,634	363	3,998
	Total C	**2,034**	**1,400**			**57,609**	**5,761**	**63,369**
D	**Tan Uyen area**							
16	VSIP II expanded area	1,008	675.4	85	45	25,834	2,583	28,417
17	Tan Binh IP	350	241.5	45	45	4,890	489	5,379
18	Binh Lap IP	500	345.0	35	45	5,434	543	5,977
	Total D	128	89.0	40		**36,158**	**3,616**	**39,774**
E	**New City area**	**1,986**	**1,351**					
19	Dong An II + Expansion IP	205	148.1	85	45	5,665	566	6,231
20	Phu Gia IP (Viet E.M.A.X)	133	85.6	85	45	3,274	327	3,602
21	VSIP II IP	345	231.2	95	45	9,884	988	10,872
22	Kim Huy IP	214	144.7	85	45	5,535	553	6,088
23	Song Than III IP	534	327.4	85	45	12,523	1,252	13,775
24	Dai Dang IP	274	166.0	85	45	6,350	635	6,984
25	Mapletree High-Tech Park	75	52.4	75	45	1,769	177	1,945
	Total E	**1,780**	**1,155**			**44,999**	**4,500**	**49,499**
	Grand total A + B + C + D + E	**11,330**	**7,762**			**236,810**	**23,681**	**260,491**
F	**Thuan An district**							
1	VSIP I Industrial Park	473	315.9	87.1	45	12,379	1,238	13,617
2	Viet Huong Industrial Park	36	25.1	100.0	45	1,128	113	1,241
3	An Thanh Industrial group	46	32.3	100.0	45	1,452	145	1,597
	Total F	**623**	**420**			**17,085**	**1,709**	**18,794**
G	**Di An district**							
1	Song Than I IP	178	139.7	100.0	45	6,287	629	6,916
2	Song Than II PI	279	217.6	99.5	45	9,744	974	10,718
3	Binh Duong IP	17	14.1	97.4	45	617	62	679
4	Dong An IP	138	112.3	92.4	45	4,672	467	5,139
5	Tan Dong Hiep A IP	50	40.2	100.0	45	1,810	181	1,991
6	Tan Dong Hiep B IP	163	111.8	77.7	45	3,906	391	4,296
7	Binh An Textile and Garment IP	26	18.8	96.0	45	812	81	893
8	Tan Binh I Industrial group	55	38.5		45	0	0	0
9	Tan Dong Hiep manufacturing zone	58	40.6	100.0	45	1,827	183	2,010
	Total G	**964**	**733.6**			**29,675**	**2,967**	**32,642**
	Grand total	**14,903**	**10,267**			**283,570**	**28,357**	**311,927**

Year 2040

Table 7

No.	Name of Industrial Park	Planning area (Ha)	Available area for rent (Ha)	Utilization factor (%)	Water supply standard 45m3/day/ha (m3/day)	Total water demand (5)*(6)*(7) (m3/day)	Water leak and loss 10% x (8) (m3/day)	Plant capacity (m3/day)
(1)	*(2)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
A	**Bau Bang area**							
1	Cay Truong IP	500	345.0	35	45	5,434	543	5,977
2	Long Hoa IP	1,380	952.2	40	45	17,140	1,714	18,854
3	Bau Bang IP (MR)	1,500	1,035.0	50	45	23,288	2,329	25,616
4	Bau Bang IP	1,000	699.2	85	45	26,744	2,674	29,419
5	Lai Hung IP	1,000	690.0	50	45	15,525	1,553	17,078
6	Lai Hung Industrial group	78	53.0	50	45	1,193	119	1,312
	Total A	**5,458**	**3,774**			**89,323**	**8,932**	**98,255**
B	**An Tay area**							
7	An Tay IP	500	373.9	75	45	12,619	1,262	13,881
8	An Tay IP (MR)	850	578.0	55	45	14,306	1,431	15,736
9	Rach Bap IP	279	188.2	65	45	5,505	550	6,055
10	Mai Trung IP	51	34.6	70	45	1,090	109	1,199
11	Viet Huong II IP	250	168.6	90	45	6,828	683	7,511
	Total B	**1,930**	**1,343**			**40,348**	**4,035**	**44,382**
C	**My Phuoc area**							
12	My Phuoc I IP	377	276.3	100	45	12,434	1,243	13,677
13	My Phuoc II IP	477	333.0	100	45	14,985	1,499	16,484
14	My Phuoc III IP	978	655.7	100	45	29,507	2,951	32,457
15	Thoi Hoa IP	202	134.6	75	45	4,543	454	4,997
	Total C	**2,034**	**1,400**			**61,468**	**6,147**	**67,615**
D	**Tan Uyen area**							
16	VSIP II expanded area	1,008	675.4	95	45	28,873	2,887	31,761
17	Tan Binh IP	350	241.5	60	45	6,521	652	7,173
18	Binh Lap IP	500	345.0	50	45	7,763	776	8,539
	Total D	128	89.0	55		**43,156**	**4,316**	**47,472**
E	**New City area**	**1,986**	**1,351**					
19	Dong An II + Expansion IP	205	148.1	100	45	6,665	666	7,331
20	Phu Gia IP (Viet E.M.A.X)	133	85.6	100	45	3,852	385	4,237
21	VSIP II IP	345	231.2	100	45	10,404	1,040	11,444
22	Kim Huy IP	214	144.7	100	45	6,512	651	7,163
23	Song Than III IP	534	327.4	100	45	14,733	1,473	16,206
24	Dai Dang IP	274	166.0	100	45	7,470	747	8,217
25	Mapletree High-Tech Park	75	52.4	100	45	2,358	236	2,594
	Total E	**1,780**	**1,155**			**51,993**	**5,199**	**57,192**
F	**Thuan An district**							
1	VSIP I Industrial Park	473	315.9	87.1	45	12,379	1,238	13,617
2	Viet Huong Industrial Park	36	25.1	100.0	45	1,128	113	1,241
3	An Thanh Industrial group	46	32.3	100.0	45	1,452	145	1,597
4	Binh Chuan Industrial group	68	47.3	100.0	45	2,126	213	2,339
	Total F	**623**	**420**			**17,085**	**1,709**	**18,794**
G	**Di An district**							
1	Song Than I IP	178	139.7	100.0	45	6,287	629	6,916
2	Song Than II PI	279	217.6	99.5	45	9,744	974	10,718
3	Binh Duong IP	17	14.1	97.4	45	617	62	679
5	Tan Dong Hiep A IP	50	40.2	100.0	45	1,810	181	1,991
6	Tan Dong Hiep B IP	163	111.8	77.7	45	3,906	391	4,296
7	Binh An Textile and Garment IP	26	18.8	96.0	45	812	81	893
8	Tan Binh I Industrial group	55	38.5		45	0	0	0
9	Tan Dong Hiep manufacturing zone	58	40.6	100.0	45	1,827	183	2,010
	Total G	**964**	**733.6**			**29,675**	**2,967**	**32,642**
	Grand total	**12,917**	**8,916**			**333,047**	**33,305**	**366,352**

付録 5 - B　導水管の水理計算及び費用見積

1. Hydraulic Calculation

Hydraulic Calculation for transmission pipeline is conducted employing Hazen-Williams formula. The formula is expressed for full flow in a circular pipe as follow.

$J = 6.824 \times (V/C)^{1.852} \times D^{-1.167}$

Where; J : Hydraulic Gradient, V : Velocity (m/s), C : Flow Coefficient, D : Diameter of pipe (m)

(1) Basic Figures for calculation

Flow, Diameter, Velocity, Flow Coefficient and Hydraulic Gradient for calculation

First Pipe

Flow		Diameter (m)	Velocity (m/s)	Flow Coefficient (C)	Hydraulic Gradient (J)
(m^3/day)	(m^3/s)				
686,400	7.944	2.6	1.497	130	0.000574

Second Pipe

Flow		Diameter (m)	Velocity (m/s)	Flow Coefficient (C)	Hydraulic Gradient (J)
(m^3/day)	(m^3/s)				
457,600	5.296	2.3	1.275	130	0.000492

(2) Calculation of Required water level of Connection Chamber and Total Pump Head of Intake Pumping Station

Loss of Pressure

First Pipe

From	To	Q (m3/d)	Diameter (m)	Length (m)	J	Loss of Pressure (m)
Pump	WWTP	686,400	2.6	23,858.5	0.000574	13.69

Second Pipe

From	To	Q (m3/d)	Diameter (m)	Length (m)	J	Loss of Pressure (m)
Pump	WWTP	457,600	2.3	23,858.5	0.000492	11.74

1) Calculation for Required water level of Connection Chamber

Item	First Pipe	Second Pipe
a. Loss of pressure along the pipeline	H_1= 13.69 m	H_1=11.74 m
b. Excessive pressure at Receiving Tank (WTP)	H_2= 2.00 m	H_2= 2.00 m
c. Standby pressure (=10% of H_1)	H_3= 1.38 m	H_3= 1.18 m
d. $H = H_1 + H_2 + H_3$	H =17.07 m	H =14.92 m
e. Additional hight to clear the highest point of theline(H_4)	0.0	2.0
f. Required water level of Connection Chamber = The level at the receiving tank (34.7 m) +H+H_4	34.7 m + H (17.1m) = 51.8m	34.7 m + H (14.9 m)+2.00 = 51.6m

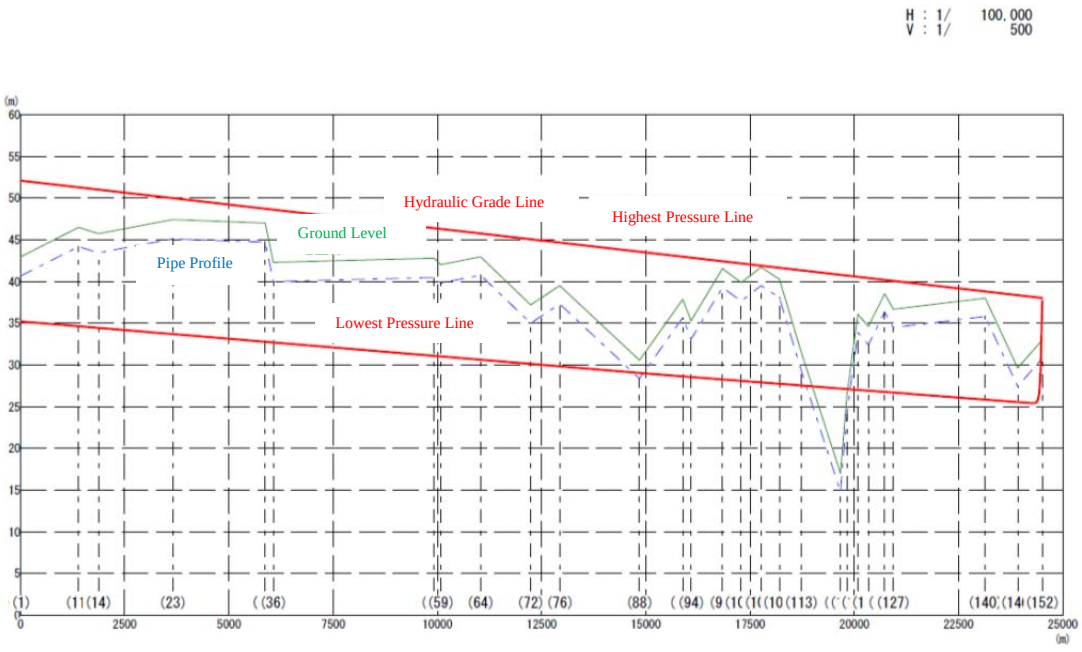
2) Calculation for required total pump head of Intake Pumping Station with Connection Chamber

Item	First Pipe	Second Pipe
a. Difference in level between Connection Chamber and low water level at intake	H_1= 51.8-37.0 =14.8 m	H_1=51.6-37.0 =14.6 m
b. Excessive pressure at Connection Chamber	H_2= 2.0 m	H_2= 2.0 m
c. Pumping Station internal loss	H_3 = 3.0 m	H_3 = 3.0 m
d. Required total pump head $H = H_1 + H_2 + H_3$	H = 19.8 m	H = 19.6 m

3) Check for Water Hammer for the transmission line from Intake Pumping Station without Connection Chamber and Counter Measure

a. From Intake Pumping Station to WTP
Flow Rate : 686,400m^3/d = 477m^3/minute
Number of Pump : 4
Flow Rate per Pump :119.2m^3/minute

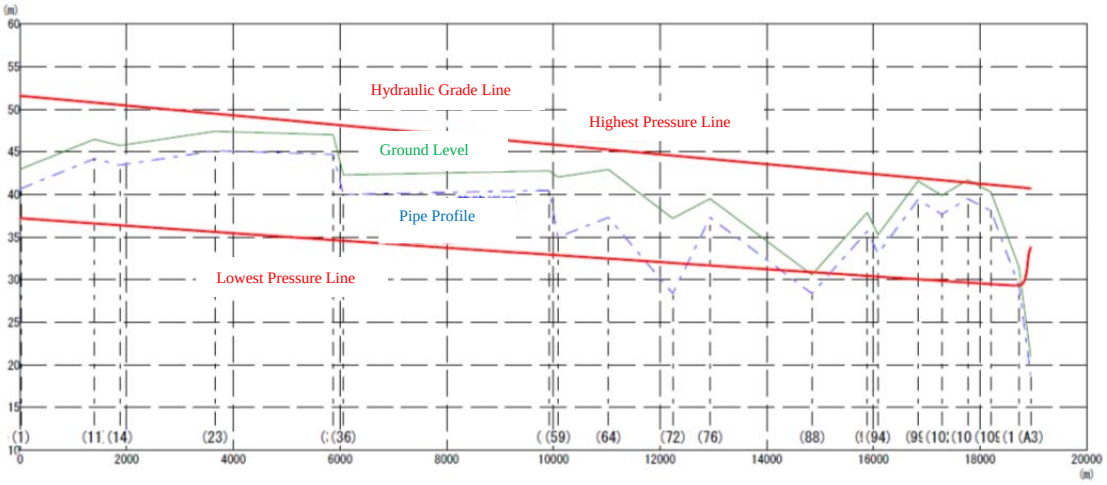
As shown in the Figure below, negative pressure is less than -10 m, and thus preventive measure for water hammer is not required.



b. From Intake Pumping Station to Regulating Reservoir
Flow Rate : 686,400m^3/d = 477m^3/minute
Number of Pump : 4
Flow Rate per Pump : 119.2 m^3/minute

As shown in the Figure below, negative pressure is generated about -14m around 18km downstream from Intake Pumping Station and water column separation occurs, and thus preventive measure for water hummer is required.

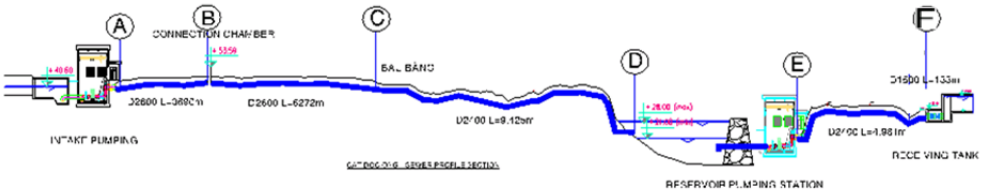
H : 1/ 80,000
V : 1/ 500



Mechanical solution with attaching a fly wheel is not effective, as the area occurring negative pressure is beyond the effective reach of fly wheel.

As the above results, attaching a fly wheel at Intake pumping station is not effective and installing a surge tank (connection chamber) is the most reliable way to isolate the downstream pipeline from water hammering.

(3) From Regulating Reservoir Pumping Station to WTP



Loss of Pressure

First and Second Pipe

From	To	Q (m3/d)	Diameter (m)	Length (m)	J	Loss of Pressure (m)
Pump	WWTP	343,200	1.8	5,285.5	0.000954	5.043

Third and fourth Pipe

From	To	Q (m3/d)	Diameter (m)	Length (m)	J	Loss of Pressure (m)
Pump	WWTP	228,800	1.5	5,285.5	0.001094	5.782

1) Calculation for required total pump head of Regulating Reservoir Pumping Station

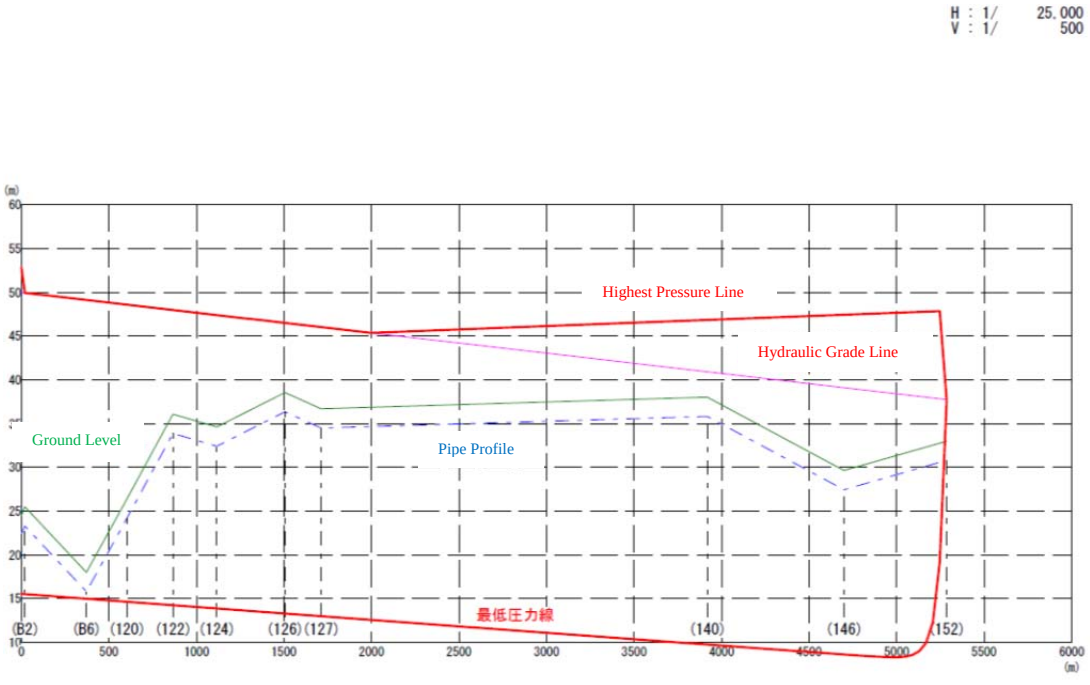
Item	First and Second Pipe	Third and fourth Pipe
a. Loss of pressure along the pipeline	H_1= 5.05 m	H_1= 5.79 m
b. Difference in level between Receiving Tank of WTP (34.70) and dead water level at Regulating Reservoir (21.00)	H_2= 13.70 m	H_2= 13.70 m
c. Excessive pressure at Receiving Tank	H_3= 2.00 m	H_3= 2.00 m
d. Pumping Station internal loss	H_4 = 3.00 m	H_4 = 3.00 m
e. Required total pump head $H = H_1 + H_2 + H_3 + H_4$	H = 23.75 m	H = 24.49 m

2) Check for Water Hammer for the transmission line from Regulating Reservoir Pumping Station and Counter Measure

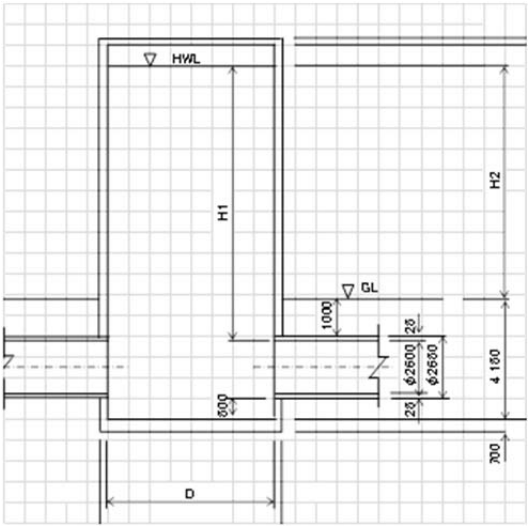
a. From Regulating Reservoir Pumping Station to WTP
Flow Rate : 343,200m^3/d = 238m^3/minute
Number of Pump : 2
Flow Rate per Pump : 119.2 m^3/minute

As shown in the Figure below, negative pressure is generated about -16m around 1,500m downstream from Regulating Reservoir Pumping Station and water column separation occurs, and thus preventive measure for water hammer is required.

Mechanical solution with attaching a fly wheel is not practical, as over 7,000 kg of wheel is required. Installing a surge tank (connection chamber) or one-way surge tank is considerable. One-way surge tank with 9m height is recommendable instead of connection chamber with 16m height.



(4) Design of Connection Chamber
Basic feature of connection chamber

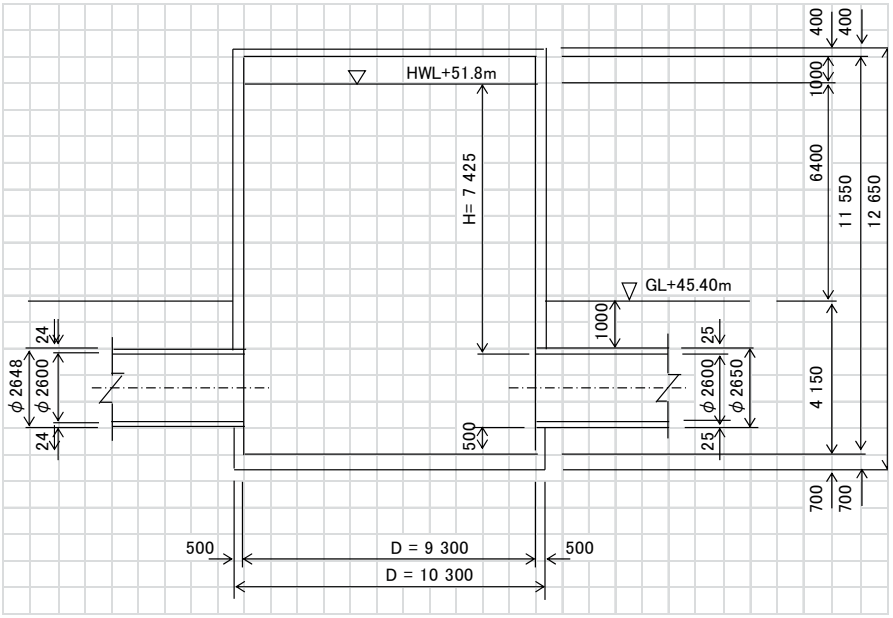


1) The dimension of connection camber

Calculation for connection Chamber

Item	First Pipe	Second Pipe
a. Required capacity	715 m^3	477 m^3
b. GL	+45.40 m	+45.40m
c. HWL	+51.8 m	+51.6 m
d. H1	7.425 m	7.225 m
e. D	9.30m	6.01 m
f. H2	6.400 m	6.200m

Dimension of connection camber Connection

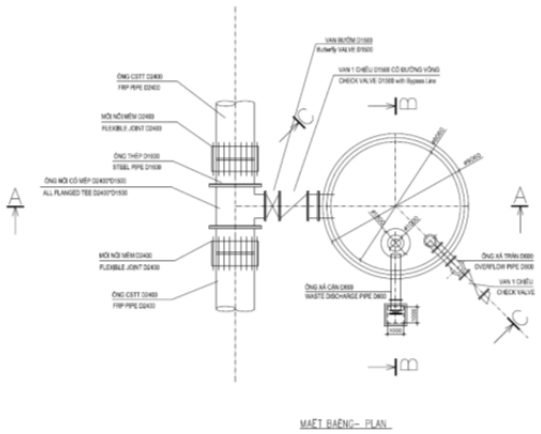


(5) Design of One-Way Surge Tank

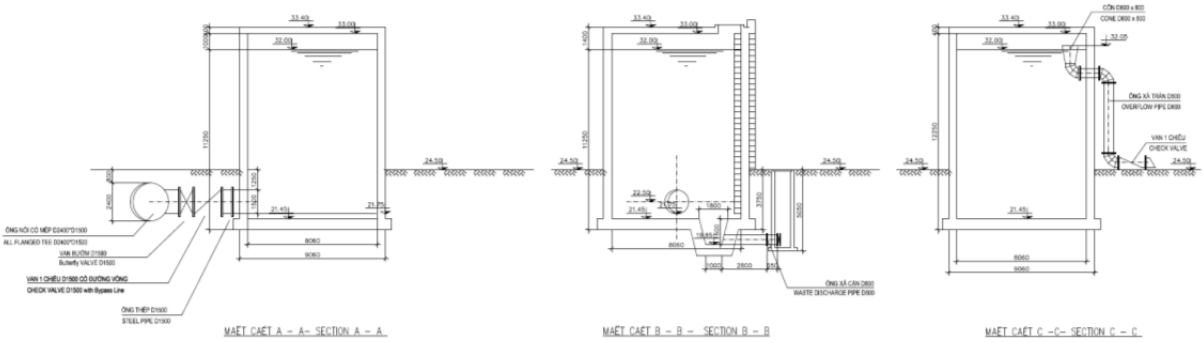
1) The dimension of One-way Surge Tank

Calculation for One-way Surge Tank

Item	First and Second Pipe	Third and fourth Pipe
g. Required capacity	523 m^3	523 m^3
h. GL	+24.50 m	+24.50 m
i. HWL	+32.00 m	+32.00 m
j. H1	8.75 m	8.75 m
k. D	8.06 m	8.06 m
l. H2	7.50 m	7.50 m



MẶT BẰNG– PLAN



MẶT CẮT A – A– SECTION A – A　　MẶT CẮT B – B – SECTION B – B　　MẶT CẮT C –C– SECTION C – C

2. Hydraulic Calculation for Phase 1

(1) Basic Figures for calculation

Flow, Diameter, Velocity, Flow Coefficient and Hydraulic Gradient for calculation

First Pipe in Phase 1

From	To	Q (m3/d)	Diameter (m)	Length (m)	J	Loss of Pressure (m)
Pump	WWTP	343,200	2.6	23,858.5	0.000159	3.79

(2) Calculation for Required water level of Connection Chamber

1) Required water level to clear critical point (critical point is 5,534.4 m downstream with GL = 47.2 (m)

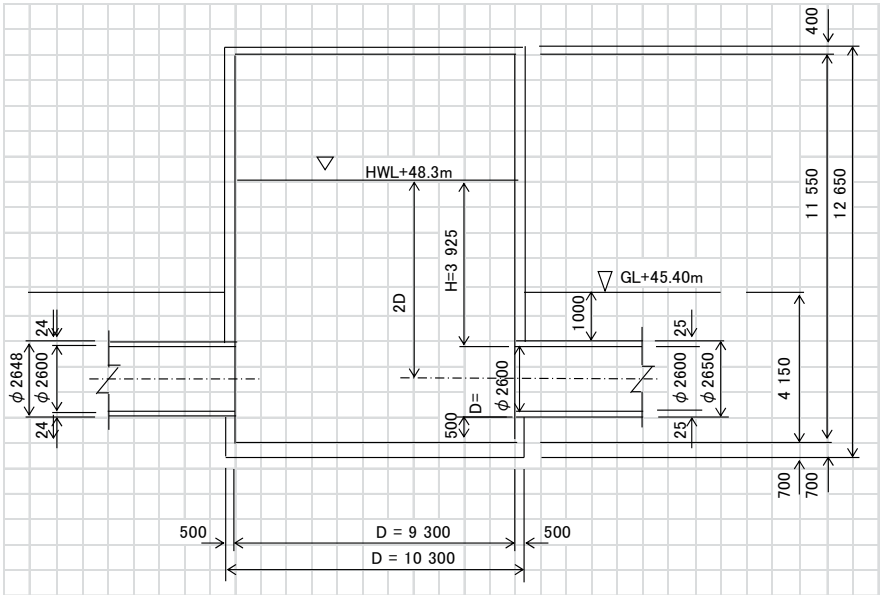
Item	First Pipe
g. Loss of pressure along the pipeline for 5,534.4 m	H_1= 0.88 m
h. Ground level at critical point	47.2m
i. Required water level of Connection Chamber $_4$	48.08m

2) Safety suction level

2 D from center of outflow pipe

= 2 x 2.6 + 45.40 – (1.0 + 0.025 + 2.6/2)

= 48.275 (m) (48.3m)



3) Calculation for required total pump head of Intake Pumping Station (Phase 1)

Item	First Pipe
e. Difference in level between Connection Chamber and low water level at intake	H_1= 48.3-37.0 =11.3 m
f. Excessive pressure at Connection Chamber	H_2= 2.0 m
g. Pumping Station internal loss	H_3 = 3.0 m
h. Required total pump head $H = H_1 + H_2 + H_3$	H = 16.3 m

4) Intake Pumping Station

Description of Intake Pumping Station for Phase 1

Flow rate:	3.972m^3/sec = 343,200m^3/day
Number of pumps:	- 3 pumps including 1 standby in Phase I
Total pump head	- 16.3 m
Dimensions:	W24.0m x L36.0m

3. Cost Estimate for Alternatives of Raw Water Transmission System
   1) Construction Cost of Pipeline and Pumping Station

Case G-1

Pipe Dia (mm).	Depth(m)	Material	Length (m)	Unit Cost (VND)	Amount (VND)	Amount (USD)
2600	3-4	FRP		44,033,436		
2600	4-5	FRP	672.1	45,761,113	30,756,044,047	
2600	5-6	FRP	264.2	65,956,788	17,425,783,390	
2600	6-7	FRP	690.0	70,724,225	48,799,715,250	
2600	7-8	FRP	1642.1	75,491,662	123,964,858,170	
2600	8-9	FRP	2165.2	81,812,931	177,141,358,201	
2600	9-10	FRP	2297.6	84,595,046	194,365,577,690	
2600	10-11	FRP	1742.0	86,814,865	151,231,494,830	
2600	11-12	FRP	2446.3	89,490,837	218,921,435,294	
2600	12-13	FRP	2842.7	91,709,135	260,701,557,536	
2600	13-14	FRP	4188.0	93,927,432	393,368,086,579	
					0	
1800	3-4	SP	5285.5	34,677,152	183,286,086,896	
others					34,978,605,707	
Pipe Total			24,235.7		1,834,940,603,590	87,910,917
Pumping Station		M&E	JNY	716,352,000		7,800,000
		C & A	VND		26,570,407,586	1,272,972
One-way Surge Tank					7,539,092,435	361,193
Pumping Station Total					34,109,500,021	9,434,166
Regulating Reservoir					194,250,706,274	9,306,436
Ground Total						106,651,520

P-2

Pipe Dia (mm).	Depth(m)	Material	Length (m)	Unit Cost (VND)	Amount (VND)	Amount (USD)
2600	3-4			65,977,625	0	
2600	4-5	DIP	18,301.3	67,253,849	1,230,832,866,704	
2600	5-6				0	
1800	3-4	SP	5285.5	34,677,152	183,286,086,896	
others					42,423,568,608	
Pipe Total			23,586.8		1,456,542,522,208	69,782,089
Grit Chamber					13,805,748,808	661,425
Intake Pumping Station		M & E	JNY	707,168,000		7,700,000
		C & A	VND		27,799,262,544	1,331,846
Connection Chamber					8,075,959,355	386,914
					35,875,221,899	9,418,761
Reservoir Pumping Station		E &M	JNY	716,352,000		7,800,000
		C & A	VND		26,570,407,586	1,272,972
One-way Surge Tank					7,539,092,435	361,193
					34,109,500,021	9,434,166
Pumping Station Total						18,852,927
Regulating Reservoir					194,250,706,274	9,306,436
Ground Total						98,602,878

P-3

Pipe Dia (mm).	Depth(m)	Material	Length (m)	Unit Cost (VND)	Amount (VND)	Amount (USD)
2600	3-4			65,977,625	0	
2600	4-5	DIP	23,858.5	67,253,849	1,604,575,956,367	
2600	5-6				0	
others					48,137,278,691	
Pipe Total			23,858.5		1,652,713,235,058	79,180,512
Intake Pumping Station		M & E	JNY	707,168,000		7,700,000
		C & A	VND		27,799,262,544	1,331,846
Connection Chamber				8,075,959,355	8,075,959,355	386,914
Pumping Station Total						9,418,761
Regulating Reservoir					292,854,338,601	14,030,478
Ground Total						102,629,751

2) O&M Cost for Pumping Station

Pumping Station

Pumping Station	Intake Pumping Station	Regulating Reservoir Pumping Station	Remarks
Flow (m^3/minutes)	119	119	
Pump Head (m)	20m	24m	
Number of Pump (No.)	3 (1:Stund-by)	3 (1:Stund-by)	
Pump Power (kw)	360	500	
Operation (hr/day)	24	24	
Efficiency	0.8	0.8	
Power Consumption (kw/year)	5,045,760	7,008,000	
Electricity Cost (USD/year)	398,870	553,986	VND1,650/kwh
M&E Initial Cost (USD)	7,700,000	7,800,000	
M&E Repair Cost (USD/year)	77,000	78,000	1 % of Initial cost
O&M Cost except Manpower (USD/Year)	475,870	631,986	

Alternative Case

Item	Case G-1	Case P-2	Case P-3
Electricity Cost	0.554	0.953	0.399
E&M Replace Cost	0.078	0.155	0.077
Annual O&M Cost (Except Man Power)	0.632	1.108	0.476

付録 5 - C ベトナム国飲料水水質基準

SOCIALIST REPUBLIC OF VIETNAM

QCVN 01 : 2009/BYT

NATIONAL TECHNICAL REGULATION ON DRINKING WATER QUALITY

HANOI – 2009

Preface:

QCVN 01: 2009/BYT is compiled by Department of Preventive Medicine & Environment and promulgated by MOH's Minister at the Circular No.04/2009/TT-BYT dated 17th June 2009.

NATIONAL TECHNICAL REGULATION ON THE DRINKING WATER QUALITY

PART I. GENERAL RULES

I. Applicable scope

This Technical Regulation stipulates limits of quality criteria for water used for drinking and processing food (hereinafter called drinking water).

II. Applicable subject

This Technical Regulation applies to institutions, organizations, individuals and households who exploit, trade drinking water, including piped water providers for domestic purposes with capacity of 1,000 m^3/day or above (hereafter called water providers).

III. Explanation of words/phrases

In this Regulation, following words/phrases will be thoroughly understood as:

1. Perceptible criteria are elements on color and taste which are felt by human senses.

2. AOAC stands for *Association of Official Analytical Chemists*.

3. SMEWW stands for *Standard Methods for the Examination of Water and Waste Water*.

4. US EPA stands for *United States Environmental Protection Agency*.

5. TCU stands for *True Color Unit*.

6. NTU stands for *Nephelometric Turbidity Unit*.

7. pCi/l stands for *Picocuri per litre*.

PART II. STIPULATIONS ON TECHNICAL AREAS

Table on the limits of quality parameters:

Or.	Parameter	Unit	Maximum limit	Testing method	Examination Level
I. Perceptible parameters and inorganic constituents					
1.	Color (*)	TCU	15	TCVN 6185 - 1996 (ISO 7887 - 1985) or SMEWW 2120	A
2.	Taste and odour (*)	-	No strange taste & odour	Perceptible, or SMEWW 2150 B and 2160 B	A

3.	Turbidity (*)	NTU	2	TCVN 6184 - 1996 (ISO 7027 - 1990) or SMEWW 2130 B	A
4.	pH(*)	-	Within 6,5-8,5	TCVN 6492:1999 or SMEWW 4500 - H^+	A
5.	Hardness, calculated by $CaCO_3$(*)	mg/l	300	TCVN 6224 - 1996 or SMEWW 2340 C	A
6.	Total Dissolved Solid (TDS) (*)	mg/l	1000	SMEWW 2540 C	B
7.	Aluminum(*)	mg/l	0,2	TCVN 6657 : 2000 (ISO 12020 :1997)	B
8.	Ammoniac(*)	mg/l	3	SMEWW 4500 - NH_3 C or SMEWW 4500 - NH_3 D	B
9.	Antimony	mg/l	0,005	US EPA 200.7	C
10.	Total Arsenic	mg/l	0,01	TCVN 6626:2000 or SMEWW 3500 - As B	B
11.	Barium	mg/l	0,7	US EPA 200.7	C
12.	Boron and boric acid	mg/l	0,3	TCVN 6635: 2000 (ISO 9390: 1990) or SMEWW 3500 B	C
13.	Cadmium	mg/l	0,003	TCVN6197 - 1996 (ISO 5961 - 1994) or SMEWW 3500 Cd	C
14.	Chloride (*)	mg/l	250 300(**)	TCVN6194 - 1996 (ISO 9297 - 1989) or SMEWW 4500 - Cl^- D	A
15.	Total Chromium	mg/l	0,05	TCVN 6222 - 1996 (ISO 9174 - 1990) or SMEWW 3500 - Cr^-	C
16.	Total Copper (*)	mg/l	1	TCVN 6193 - 1996 (ISO 8288 - 1986) or SMEWW 3500 - Cu	C
17.	Cyanide	mg/l	0,07	TCVN 6181 - 1996 (ISO 6703/1 - 1984) or SMEWW 4500 - CN^-	C
18.	Flouride	mg/l	1,5	TCVN 6195 - 1996 (ISO10359 - 1 - 1992) or SMEWW 4500 - F^-	B
19.	Hydrogen sulfide(*)	mg/l	0,05	SMEWW 4500 - S^{2-}	B
20.	Total Iron (Fe^{2+} + Fe^{3+})(*)	mg/l	0,3	TCVN 6177 - 1996 (ISO 6332 - 1988) or SMEWW 3500 - Fe	A
21.	Lead	mg/l	0,01	TCVN 6193 - 1996 (ISO 8286 - 1986) SMEWW 3500 - Pb A	B
22.	Total Manganese	mg/l	0,3	TCVN 6002 - 1995 (ISO 6333 - 1986)	A
23.	Total Mercury	mg/l	0,001	TCVN 5991 - 1995 (ISO 5666/1-1983 - ISO 5666/3 -1983)	B

24.	Molybdenum	mg/l	0,07	US EPA 200.7	C
25.	Nickel	mg/l	0,02	TCVN 6180 -1996 (ISO8288 -1986) SMEWW 3500 - Ni	C
26.	Nitrate	mg/l	50	TCVN 6180 - 1996 (ISO 7890 -1988)	A
27.	Nitrite	mg/l	3	TCVN 6178 - 1996 (ISO 6777-1984)	A
28.	Selenium	mg/l	0,01	TCVN 6183-1996 (ISO 9964-1-1993)	C
29.	Sodium	mg/l	200	TCVN 6196 - 1996 (ISO 9964/1 - 1993)	B
30.	Sulfate (*)	mg/l	250	TCVN 6200 - 1996 (ISO9280 - 1990)	A
31.	Zinc (*)	mg/l	3	TCVN 6193 - 1996 (ISO8288 - 1989)	C
32.	Permanganate	mg/l	2	TCVN 6186:1996 or ISO 8467:1993 (E)	A
II. Content of organic substances					
***a.* Chlorinated alkenes**					
33.	Carbon tetrachloride	µg/l	2	US EPA 524.2	C
34.	Dichloromethane	µg/l	20	US EPA 524.2	C
35.	1,2 Dichloroethane	µg/l	30	US EPA 524.2	C
36.	1,1,1 - Trichloroethane	µg/l	2000	US EPA 524.2	C
37.	Vinyl chloride	µg/l	5	US EPA 524.2	C
38.	1,2 Dichloroethene	µg/l	50	US EPA 524.2	C
39.	Trichloroethene	µg/l	70	US EPA 524.2	C
40.	Tetrachloroethene	µg/l	40	US EPA 524.2	C
***b.* Aromatic hydrocarbons**					
41.	Phenol and derivatives of Phenol	µg/l	1	SMEWW 6420 B	B
42.	Benzene	µg/l	10	US EPA 524.2	B
43.	Toluene	µg/l	700	US EPA 524.2	C
44.	Xylenes	µg/l	500	US EPA 524.2	C
45.	Ethyl benzene	µg/l	300	US EPA 524.2	C
46.	Styrene	µg/l	20	US EPA 524.2	C
47.	Benzo(a)pyrene	µg/l	0,7	US EPA 524.2	B
***c.* Chlorinated benzenes**					
48.	Monochlorobenzens	µg/l	300	US EPA 524.2	B
49.	1,2- Dichlorobenzene	µg/l	1000	US EPA 524.2	C
50.	1,4- Dichlorobenzene	µg/l	300	US EPA 524.2	C
51.	Trichlorobenzene	µg/l	20	US EPA 524.2	C
d. Groups of complex organic substances					
52.	Di(2-etylhexyl) adipate	µg/l	80	US EPA 525.2	C

53.	Di(2-etyhlexyl) phtalat	µg/l	8	US EPA 525.2	C
54.	Acrylamide	µg/l	0,5	US EPA 8032A	C
55.	Epiclohydrin	µg/l	0,4	US EPA 8260A	C
56.	Hexacloro butadiene	µg/l	0,6	US EPA 524.2	C
III. Pesticides					
57.	Alachlor	µg/l	20	US EPA 525.2	C
58.	Aldicarb	µg/l	10	US EPA 531.2	C
59.	Aldrin/Dieldrin	µg/l	0,03	US EPA 525.2	C
60.	Atrazine	µg/l	2	US EPA 525.2	C
61.	Bentazone	µg/l	30	US EPA 515.4	C
62.	Carbofuran	µg/l	5	US EPA 531.2	C
63.	Chlordane	µg/l	0,2	US EPA 525.2	C
64.	Chlorotoluron	µg/l	30	US EPA 525.2	C
65.	DDT	µg/l	2	SMEWW 6410B, or SMEWW 6630 C	C
66.	1,2 - Dibromo - 3 Chloropropane	µg/l	1	US EPA 524.2	C
67.	2,4 - D	µg/l	30	US EPA 515.4	C
68.	1,2 - Dichloropropane	µg/l	20	US EPA 524.2	C
69.	1,3 - Dichloropropene	µg/l	20	US EPA 524.2	C
70.	Heptachlor & heptachlor epoxide	µg/l	0,03	SMEWW 6440C	C
71.	Hexachlorobenzene	µg/l	1	US EPA 8270 - D	C
72.	Isoproturon	µg/l	9	US EPA 525.2	C
73.	Lindane	µg/l	2	US EPA 8270 - D	C
74.	MCPA	µg/l	2	US EPA 555	C
75.	Methoxychlor	µg/l	20	US EPA 525.2	C
76.	Methachlor	µg/l	10	US EPA 524.2	C
77.	Molinate	µg/l	6	US EPA 525.2	C
78.	Pendimetalin	µg/l	20	US EPA 507, US EPA 8091	C
79.	Pentaclorophenol	µg/l	9	US EPA 525.2	C
80.	Permethrin	µg/l	20	US EPA 1699	C
81.	Propanil	µg/l	20	US EPA 532	C
82.	Simazine	µg/l	20	US EPA 525.2	C
83.	Trifuralin	µg/l	20	US EPA 525.2	C
84.	2,4 DB	µg/l	90	US EPA 515.4	C
85.	Dichloprop	µg/l	100	US EPA 515.4	C
86.	Fenoprop	µg/l	9	US EPA 515.4	C
87.	Mecoprop	µg/l	10	US EPA 555	C
88.	2,4,5 - T	µg/l	9	US EPA 555	C
IV. Disinfectants and disinfectant by-products					
89.	Monochloramine	µg/l	3	SMEWW 4500 - Cl G	B

90.	Chlorine residue	mg/l	Within 0,3 - 0,5	SMEWW 4500Cl or US EPA 300.1	A
91.	Bromate	µg/l	25	US EPA 300.1	C
92.	Chlorite	µg/l	200	SMEWW 4500 Cl or US EPA 300.1	C
93.	2,4,6 Trichlorophenol	µg/l	200	SMEWW 6200 or US EPA 8270 - D	C
94.	Formaldehyde	µg/l	900	SMEWW 6252 or US EPA 556	C
95.	Bromoform	µg/l	100	SMEWW 6200 or US EPA 524.2	C
96.	Dibromchlorometane	µg/l	100	SMEWW 6200 or US EPA 524.2	C
97.	Bromodichlorometane	µg/l	60	SMEWW 6200 or US EPA 524.2	C
98.	Chloroform	µg/l	200	SMEWW 6200	C
99.	Dichloroacetic acid	µg/l	50	SMEWW 6251 or US EPA 552.2	C
100.	Tricloroacetic acid	µg/l	100	SMEWW 6251 or US EPA 552.2	C
101.	Chloral hydrate (trichloroacetaldehyde)	µg/l	10	SMEWW 6252 or US EPA 8260 - B	C
102.	Dichloroacetonitrile	µg/l	90	SMEWW 6251 or US EPA 551.1	C
103.	Dibromoacetonitrile	µg/l	100	SMEWW 6251 or US EPA 551.1	C
104.	Trichloroacetonitrile	µg/l	1	SMEWW 6251 or US EPA 551.1	C
105.	Cyano chlorite (as CN^-)	µg/l	70	SMEWW 4500J	C
V. Radioactive constituents					
106.	Gross α activity	pCi/l	3	SMEWW 7110 B	B
107.	Gross β activity	pCi/l	30	SMEWW 7110 B	B
VI. Micro-organism					
108.	Total Coliform	Bacterial/100ml	0	TCVN 6187 - 1,2 :1996 (ISO 9308 - 1,2 - 1990) or SMEWW 9222	A
109.	E.coli or thermo-tolerant coliform	Bacterial/100ml	0	TCVN6187 - 1,2 : 1996 (ISO 9308 - 1,2 - 1990) or SMEWW 9222	A

Note:

- (*) perceptible parameters.

- (**) Applicable to maritime areas and islands.

- Both Nitrate and Nitrite might possibly create Methaemoglobin. Thus, in case both substances exist in drinking water, then the concentration (C) of each substance in compared with maximum limit is not allowed to exceed 1 and is calculated by following formula :**C**nitrate/max limit of Nitrate + **C**nitrite/max limit of Nitrite $\leq$ 1

PART III.
FREQUENCY OF WATER QUALITY MONITORING/INSPECTION

I. Monitoring/inspection prior to the use of water sources

- Testing of all parameters under A, B, C levels to be carried out by water providers.

II. Regular monitoring

1. For parameters under A level:

a) Test at least 01 time per week, to be done by water providers ;

b) Test, monitor and experiment at least 01 time per month by functional agencies.

2. For parameters under B level:

a) Test at least 01 time per 6 months, to be done by water providers;

b) Test, monitor and experiment at least 01 time per 6 months by functional agencies.

3. For parameters under C level:

a) Test at least 01 time per 2 years, to be done by water providers;

b) Test, monitor and experiment at least 01 time per 2 years by functional agencies

III. Unscheduled monitoring/inspection

1. Following circustances are required to have urgent monitoring/inspection:

a) The results of testing of water sources' hygiene or epicdemic investigations reveal that water sources have potentially risks to contamination.

b) Environmental incidents appeared, which might negatively impact to the hygienic quality of water sources;

c) Other specific requirements.

PART IV.
IMPLEMENTATION ARRANGEMENTS

I. Responsibilities of water providers:

1. Ensure water quality and carry out the testing/monitoring as per stipulations in this Technical Regulation.

2. Subject to the testing, monitoring/inspection of functional agencies.

II. Responsibilities of provincial Department of Health

Provincial DOHs will be responsible to provide guidance, inspection/monitoring on the compliance of this Technical Regulation of relevant organizations, institutions, individuals who

involve in the process of exploitation, production and trading water for drinking purposes within the provincity/city.

III. Responsibilities of Ministry of Health

MOH will lead relevant agencies/institutions to provide guidance, inspection/monitoring on the compliance of this Technical Regulation.

IV. In case of possible changes/supplementation or adjustment of stipulations in this Technical Regulation, the new/revised regulatory document issued by MOH's Minister will be followed.

付録 5 - D　原水調整池に係る基本設計（Ong Te 川に建設した場合）

1.　原水調整池

(1) 原水調整池の位置

原水調整池は、ビンズオン省 Ben Cat 区 Tan Hung 地区にある Ong Te 川に建設される予定で、北緯 11°12’19”、東経 106°39’15”に位置する。近くを国道 13 号線が走っており、Thu Dau Mot 街区から北へ 37km 離れている。

(2) 原水調整池の機能

1) 機能

必要とされる原水調整池の機能は以下のとおりである。

- メンテナンスのために Phuoc Hoa – Dau Tieng 運河からの取水が止まった場合にも、ビンズオン省北部の新都市、工業団地及び既存都市域に安定かつ継続的に水道を供給できるようにする。
- 原水調整池より下流の Ong Te 川の河川環境に悪影響がないように、ダムからの放流量を調整する。

2) 段階的整備と容量

水文事業投資建設管理委員会による 2012 年 5 月 23 日付け農業農村開発省 Decision No. 307 QD-BQL9 の承認に基づき、新規に建設する浄水場の 2～3 日分の容量の原水調整池を建設することとする。また、以下に示すように、建設フェーズに応じて、段階的に原水調整池の整備を行うものとする。

- 第 1 期；Ong Te 川に新規ダムを建設し、有効貯水容量 1,000,000m^3 の原水調整池を整備、浄水場容量は 312,000m^3/日。
- 将来；ダム堤体を高くし、有効貯水容量 2,500,000m^3 の原水調整池を整備、浄水場容量は 1,200,000m^3/日。

表 1.1　原水調整池の容量および水位

フェーズ	浄水場容量	貯水容量	最低水位	常時満水位	設計洪水位	湛水エリア	
						標高	面積
第 1 期	312,000m^3/day	1,000,000m^3	21.0m	24.5m	25.7m	26.0m	53.0 ha
将来	1,200,000m^3/day	2,500,000m^3	21.0m	27.5m	29.0m	29.0m	91.5 ha

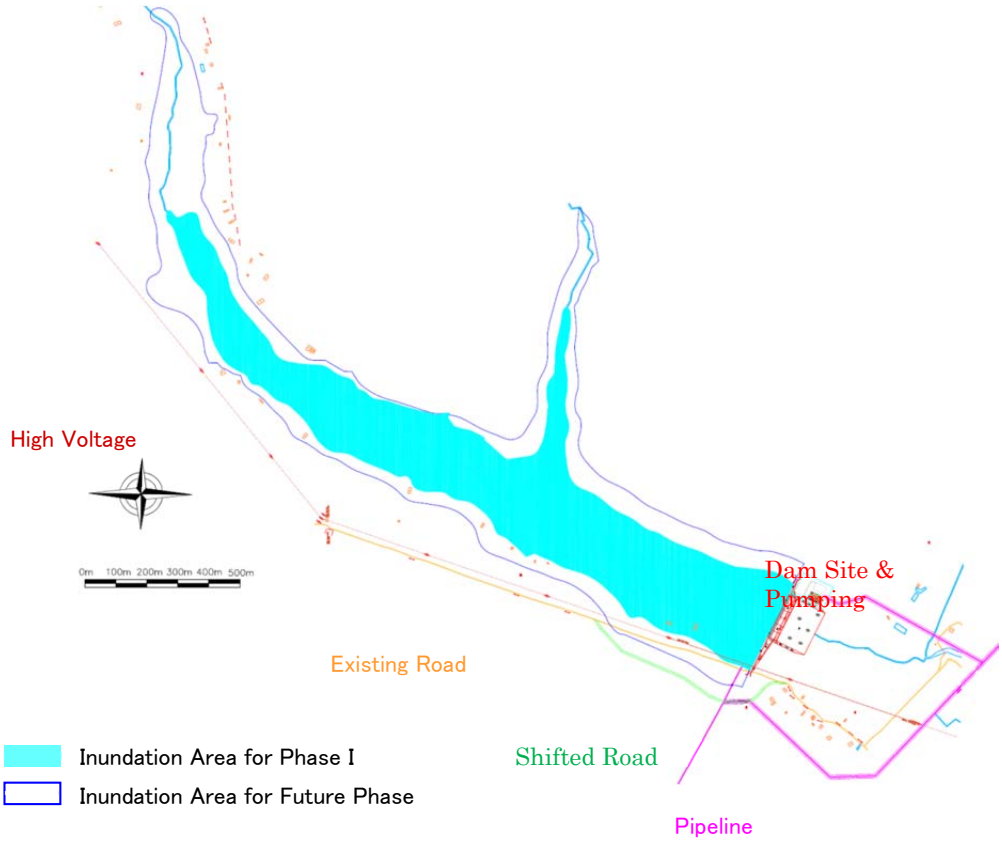


図 1.1　原水調整池の湛水エリア

(3)　建設等級と設計基準

1)　建設等級

河川構造物に関する技術基準 QCVN04-05:2012/BNNPTNT によると、Ong Te 調整池の建設等級は以下のとおりである。

- 第 1 期場容量は 3.61m^3/s(312,000m^3/日)であり、2～10m^3/s までの Class II に相当。
- 将来；浄水場容量は 13.9m^3/s(1,200,000m^3/日)であり、10～20m^3/s までの Class I に相当。

2)　設計基準

上記建設等級に基づき、河川構造物に関する技術基準 QCVN04-05:2012/BNNPTNT によると、原水調整池に求められる設計基準は**表 1.2** のとおりである。

表 1.2　原水調整池の設計基準

No.	項目	単位	数値	
			第 1 期	将来
1	給水保証確率	%	95	95
2	設計洪水確率	%	1	0.5
3	照査洪水確率	%	0.2	0.1
4	建設工事における渇水流量確率	%	10	5
5	風に関する設計確率 - 常時満水位 - 設計洪水位	%	 2 25	 2 25
6	許容安全係数 [k] （アースダムの設計基準 14 TCN 157-2005 による） - 通常 - 特別な場合	-	 1.35 1.15	 1.5 1.2
7	ダム堤体の余裕高 - 重力式コンクリートダム - アースダム（常時満水位）	m	 0.6 1.2	 0.8 1.5

(4) ダムサイト予定地

1) ダムサイト案の比較

Ong Te 川に建設するダムサイトの位置について、以下のとおり 2 案の検討を行った。

表 1.3　ダムサイト案の比較

項目	Location 1	Location 2
位置	Ong Te 川と Bong Trang 川の合流点から上流へ約 300m の位置	Location 1 から 300m 上流で、高圧鉄塔 No. 3299 から上流へ 100m の位置
利点	- 道路輸送路に近いため、ダム建設に都合がよい - Location 2 よりも湛水面積が小さい	- 高圧鉄塔 No. 3299 に影響を与えない
欠点	- 高圧鉄塔 No. 3299 が原水調整池予定地に含まれる	- Location 1 よりも湛水面積が大きい - ポンプ場からの導水管が 300m 余分に必要
湛水面積	91.5 ha （将来フェーズ）	145.2 ha （将来フェーズ）

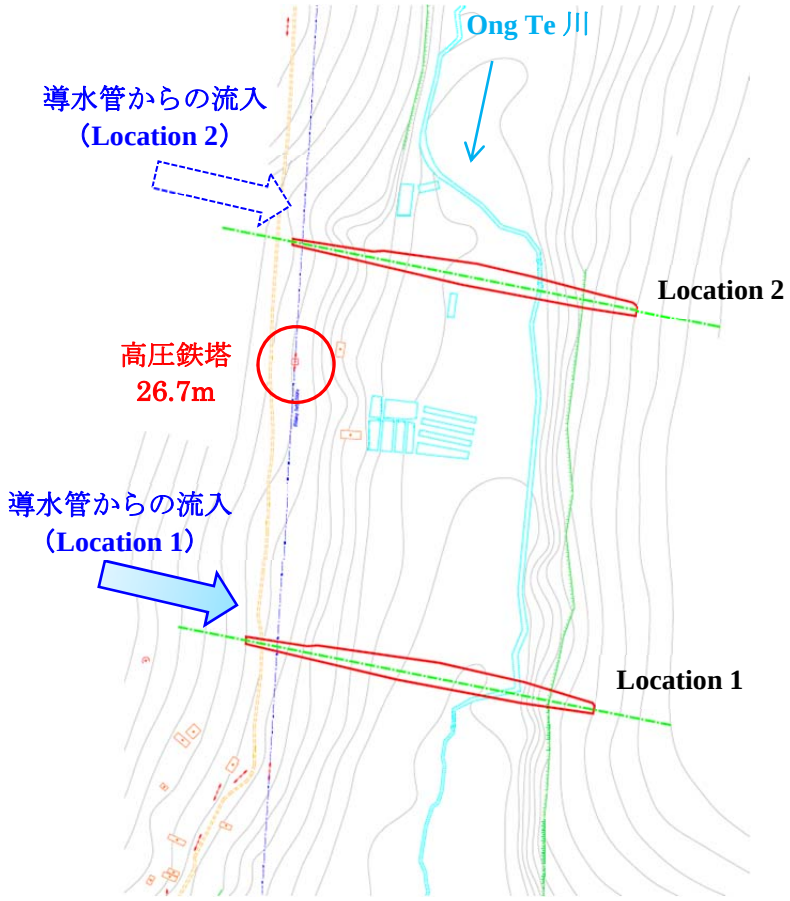


図 1.2　ダムサイト案

2)　高圧鉄塔

Location 1 において高圧鉄塔 No. 3299 が湛水しないように以下に示す代替案を検討した上で、管轄の電力送電会社 No.4 –EVN と協議を行った。電力送電会社 No.4 –EVN との協議の結果、以下の情報を入手することができた。

- コンクリートの基礎や壁を建設して高圧鉄塔を原水調整池の水から隔離する、代替案 E1 や E2 は、高圧鉄塔のメンテナンスの実施が困難となるため、実現性は低い。
- 原水調整池の貯水位に応じて高圧鉄塔の前面にダム堤体を建設する代替案 E3 のほうが、より実現性がある。
- 高圧鉄塔の移設に関しては、時間の制約や高圧であることから、より詳細な検討が必要である。

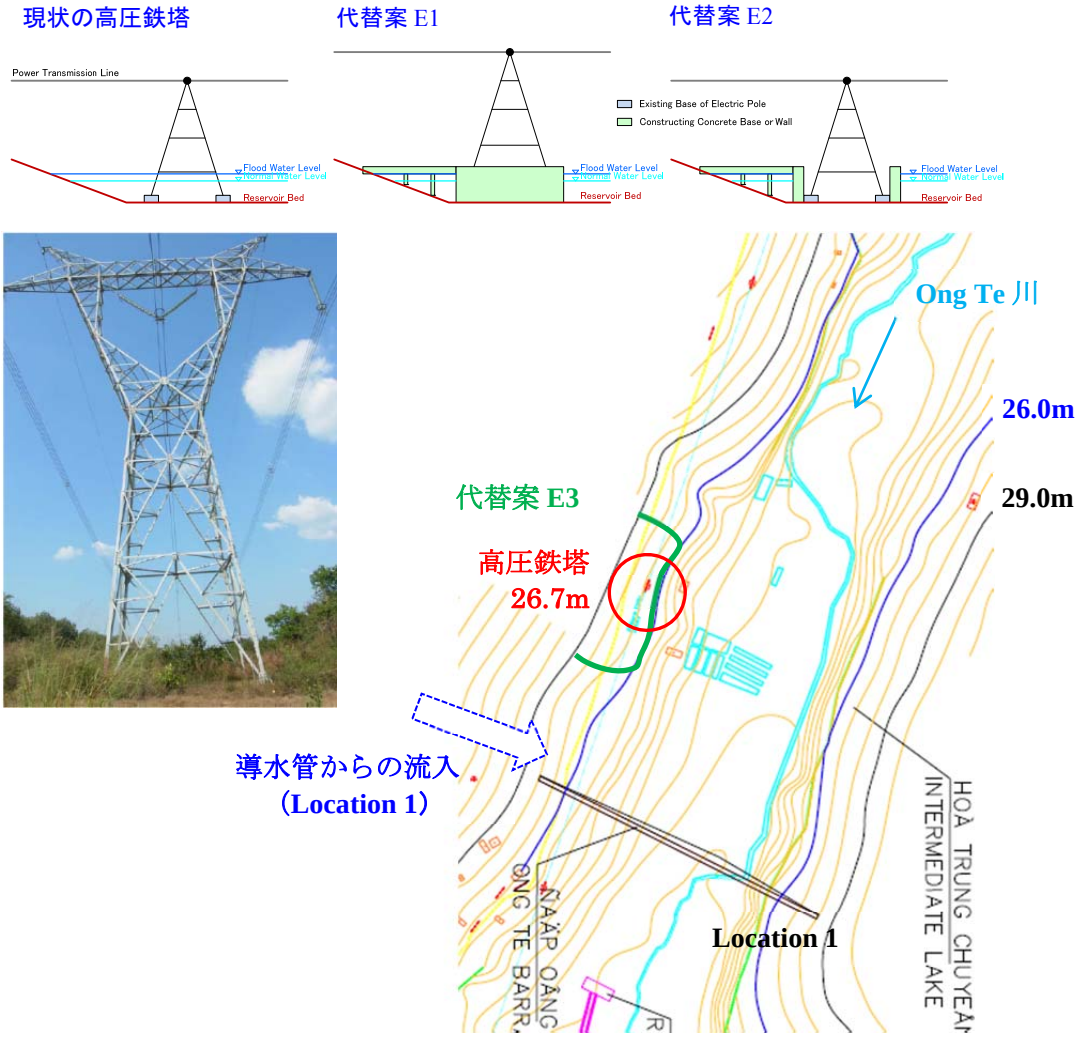


図 1.3　高圧鉄塔に関する代替案

3) ダムサイト予定地の結論

結論として、以下の理由から Location 1 をダムサイト予定地に設定した。

- 第 1 期では、高圧鉄塔は調整池予定地に含まれない。
- 貯水容量の増加に即して、将来的に高圧鉄塔の移設や前面の堤体の建設などを実施する。

(5) 水文条件

Ong Te 川の長さは約 10km、流域面積は 48km^2 である。Ong Te 流域は大きく 2 つの土地利用に大別される。川沿いにはまばらな森林があり、残りのエリアにはゴム園や畑が広がっている。気候は乾季と雨季に区分され、季節変化に応じて Ong Te 流域の流量は変化する。

気象および水文観測データや計算結果に基づく、Ong Te 調整池における水文諸元を以下に示す。

表 1.4　Ong Te 調整池における水文諸元

No.	諸元	記号	単位	数値
1	流域面積	Flv	km^2	48.0
2	流域平均雨量	Xo	mm	1900.0
3	平均流量	Qo	m^3/s	1.22
4	平均比流量	Mo	$l/s.km^2$	25.4
5	平均流出高	Yo	mm	800.0
6	85%確率 年平均流量	$Q_{85\%}$	m^3/s	0.847
7	85%確率 全流出量	$W_{85\%}$	10^6m^3	26.725
8	流域蒸発散高	ΔZ	mm	508
9	設計洪水流量, P = 1%	$Q_{1\%}$	m^3/s	346
10	設計洪水流量, P = 0.5%	$Q_{0.5\%}$	m^3/s	398
11	照査洪水流量, P = 0.2%	$Q_{0.2\%}$	m^3/s	470
12	照査洪水流量, P = 0.1%	$Q_{0.1\%}$	m^3/s	526
13	年堆砂量	V	m^3/year	13,732

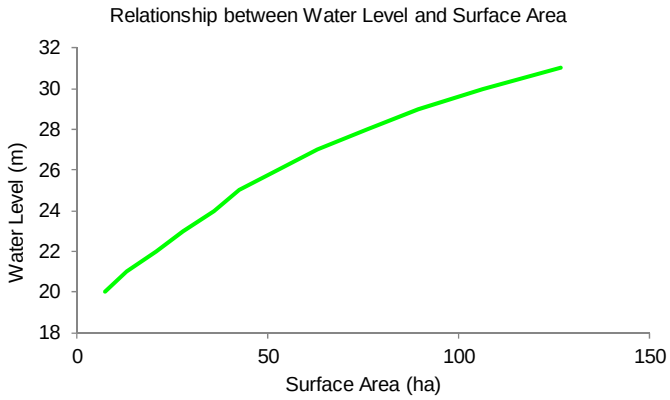
(6) 原水調整池の貯留量

1) 貯留量曲線

既往検討における標高データをもとに算定した、原水調整池の水位、貯留量、湛水面積の関係を**表 1.5**、**図 1.4** に示す。

表 1.5　原水調整池の水位、貯留量、湛水面積の関係

水位 Z(m)	湛水面積 F(ha)	貯留量 W(10^6 m^3)
20	7.4	0.074
21	13.0	0.176
22	20.9	0.345
23	27.8	0.589
24	36.0	0.908
25	42.6	1.301
26	52.9	1.778
27	62.9	2.357
28	76.2	3.052
29	91.5	3.879
30	106.3	4.858
31	126.8	6.023



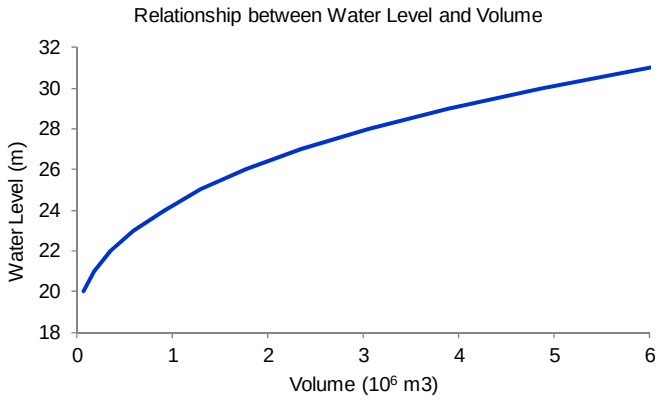


図 1.4　原水調整池の水位、貯留量、湛水面積の関係

2)　最低水位

水文計算の結果から、原水調整池における年堆砂量は約 13,732m^3 となる。原水調整池の水位、貯留量の関係から、最低水位を 21.0m に設定した場合、原水調整池は 13 年間分の堆砂容量を有することとなる。原水調整池の運用開始後には堆砂量の確認や必要に応じて浚渫を行うこととし、ダムの規模等も考慮して、最低水位は 21.0m に設定することとした。

3)　有効貯水量

以上の検討をもとに、有効貯水容量ならびに常時満水位、最低水位は以下のとおりとなる。

表 1.6　原水調整池の諸元

No.	諸元	単位	数値	
			第 1 期	将来
1	常時満水位	m	24.5	27.5
2	最低水位	m	21.0	21.0
3	総貯水容量（常時満水位）	m^3	1,200,000	2,700,000
4	堆砂容量	m^3	200,000	200,000
5	有効貯水容量	m^3	1,000,000	2,500,000

(7)　原水調整池の設計概要

1)　洪水吐ならびに減勢工

洪水流量をもとに原水調整池の設計洪水位を設定し、洪水吐ならびに減勢工の規模を設定した。

表 1.7　洪水吐ならびに減勢工の諸元

No.	諸元	単位	数値	
			第 1 期	将来
1	洪水吐敷高	m	24.5	27.5
2	設計洪水流量	m^3	346	398
3	照査洪水流量	m^3	470	526
4	設計洪水位	m	25.6	28.7
5	照査洪水位	m	25.71	28.96
6	洪水吐堤頂長	m	153	153
7	減勢工長さ	m	10.0	10.0
8	減勢工深さ	m	1.0	1.0
9	下流流路の堤高	m	21.5	23.0

2)　ダム堤体

ダム堤体の材料として、重力式コンクリートダムとアースフィルダムの 2 種類のダム形式を検討することとした。ダム堤頂高は、重力式コンクリートダムは設計基準 14 TCN 56-88、アースフィルダムは設計基準 14 TCN 157-2005 に基づいて設定した。

表 1.8　ダム堤体の諸元

No.	諸元	単位	第 1 期		将来	
			コンクリートダム	アースフィルダム	コンクリートダム	アースフィルダム
1	ダム堤頂高	m	27.0	27.0	30.0	30.0
2	最深河床高	m	19.0	19.0	19.0	19.0
3	ダム堤高	m	8.0	8.0	11.0	11.0
4	ダム堤頂長	m	214	207	382	350
5	ダム堤頂幅	m	7.0	7.0	7.0	7.0

3)　取水塔

取水塔はダム堤体から 10m 上流に設置するものとする。原水は取水塔から直接取水され、導水管を通って下流のポンプ場に送られる。

- 取水塔; 15.0 x 15.0 x 9 m
- ゲートの数; 2
- ゲートの大きさ; 6.0 x 3.0 m
- バースクリーンの数; 2
- 細目スクリーンの数; 2
- 導水管の数; 2 （第 1 期と将来用）
- 導水管の管径; D = 2,400 mm

(8)　ダム堤体の材料

原水調整池のダム堤高は将来フェーズにおいて 15m 以下であり、比較的小さな規模のダムである。ダム堤体および基礎地盤の遮水性や耐荷重性を評価した上で、重力式コンクリートダムおよびアースフィルダムの比較検討を行った。

1)　重力式コンクリートダム

重力式コンクリートダムのダム堤体は中心部をコンクリート M150 で構成し、周囲をコンクリート M200 で覆う構造とする。基礎地盤は砂で耐荷重性が小さいので、M300 のコンクリート杭を打ち込み耐荷重性を確保する。

2)　アースフィルダム

アースフィルダムのダム堤体は、透水性の小さい土壌（透水係数 $kt \leq 10^{-5}$cm/s）で構成する。アースフィルダムの上流側表面は、浸食や浸透を防ぐため 30cm の厚さの石工で補強し、下流側表面は芝張とする。

基礎地盤については、第 2 層までの土質を取り除き、透水性の小さい土壌（透水係数 $kt \leq 10^{-5}$cm/s）に入れ替えることで、遮水性を確保する。

3)　ダム堤体の材料の比較

ダム堤体の 2 種類の材料について比較した結果を以下に示す。重力式コンクリートダム、アースダムともに、ダム堤体および基礎地盤の遮水性や耐荷重性は確保されており、構造的な安定性を有している。アースフィルダムは材料が異なる洪水吐や取水パイプとの接合部分の工事が複雑になるものの、重力式コンクリートダムに比べて建設コストが安い。一方で、重力式コンクリートダムは、耐荷重性確保のために多数のコンクリート杭を打つ必要があり、工事が複雑になるとともにアースフィルダムに比べて建設費が高くなる。

表 1.9　ダム堤体の材料の比較

項目	重力式コンクリートダム	アースフィルダム
ダム堤体	- コンクリート表面のため、遮水性が確保され、浸食から守られる	- 透水性の小さい土壌ならびに石工によるダム表面の補強により、遮水性が確保され、浸食から守られる
基礎地盤の耐荷重性	- コンクリート杭を打ち込み、基礎地盤の耐荷重性を確保する	- 荷重は比較的小さく、耐荷重性は十分に確保される
建設工事	- ダム堤体と洪水吐は同じ材料なので、建設工事を進めやすい - 基礎地盤へのコンクリート杭の打ち込み工事が複雑	- ダム堤体と材料が異なる洪水吐や取水パイプとの接合部分の工事が複雑

表 1.10　調整池必要容量と建設費（Ong Te 川）

フェーズ	浄水場容量 (m^3/day)	調整池必要容量 (m^3)	最低水位 (m)	設計洪水位 (m)	湛水エリア(ha)	建設費 (百万 US$)	
						コンクリートダム	アースダム
第 1 期	312,000	1,000,000	24.5	25.7	53.0	9.3	5.8

2. 調整池ポンプ場

一方向サージタンクを併設した調整池ポンプ場の平面図を以下に示す。

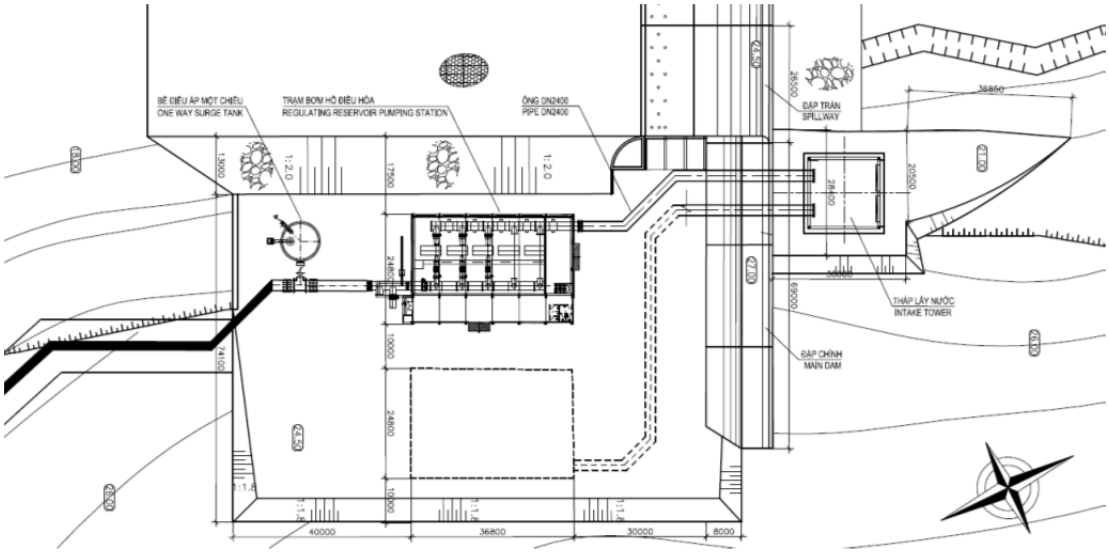


図 2.1　一方向サージタンクを併設した調整池ポンプ場の平面図

(1) 調整池ポンプ場

調整池ポンプ場の必要全ポンプ楊程を**表 2.1** に示す。送水量 343,2000m3/日の損失水頭は、**付録 5 - B** に示す動水勾配 0.0009543 から計算される。

調整池ポンプ場から北ビンズオン浄水場までの導水管損失水頭は、5,286 (m) x 0.0009543 = 5.04 (m)となる。

表 2.1　第 1 期における調整池ポンプ場の必要全ポンプ揚程の算出

項目	第 1 期
a. 導水管損失水頭	H_1= 5.04m
b. 浄水場着水井水位(34.70) と調整池最低水位 (21.00) の差	H_2= 13.70 m
c. 着水井での余裕水頭	H_3= 2.00 m
d. ポンプ場内の損失水頭	H_4 = 3.00 m
e. 所要全ポンプ楊程 $H = H_1 + H_2 + H_3 + H_4$	H = 23.74 m

表 2.2 に調整池ポンプ場の概要を示す。

表 2.2　第 1 期における調整池ポンプ場の概要

流量	3.61m^3/秒 = 312,000m^3/日
ポンプ数	- 3 台（内予備 1 台、Phase I） - 2 台（将来）
全ポンプ揚程	- 22.7 m
外形寸法	W18m x L44.0m

(2) サージタンク

サージタンクは、ポンプ急停止時の水撃現象による管路への悪影響の軽減と、調整池ポンプ場から北ビンズオン浄水場（NBDWTP）へ管路によって原水を導水するのに必要な水頭を確保するために設置される。調整池ポンプ場の下流側に設置されるサージタンクの必要水頭および構造図を**図 2.2** に示す。サージタンクの必要水頭の詳細な計算については、**付録 5 - B** に示す。

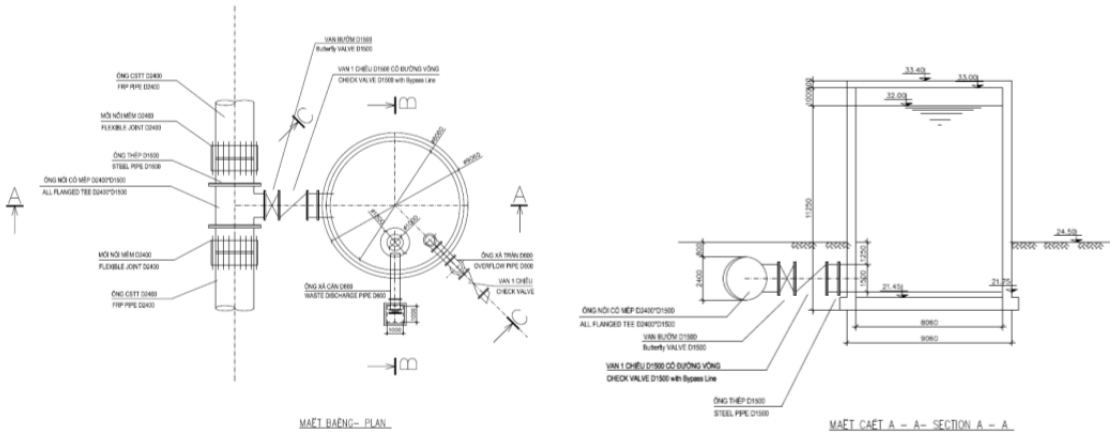


図 2.2　サージタンク

付録 5 - E　原水調整池に係る基本設計（取水地点に建設した場合）

1.　関連規則に基づく必要容量

ベトナム基準（TCXDVN33:2006 水道・配水システムと施設設計基準）によると、水道システムの建設等級 Class I に相当する事業の場合、少なくとも給水量 70%を 3 日間確保する必要がある。

一方、HEC II（Hydraulic Engineering Consultants Corp.II）によって作成された「Phuoc Hoa – Dau Tieng 導水路の運転維持管理システム（第二版）No. 315D-12-B01B」によると、「Phuoc Hoa – Dau Tieng 導水路は点検や補修のため、2～5 年に 1 度水の流れを止める必要がある」ことが提案されている。この提案については、水文事業投資建設管理委員会による 2012 年 5 月 23 日付け農業農村開発省 Decision No. 307 QD-BQL9 により承認されている。

この承認に基づき、世銀調査では新規に建設する浄水場の 2～3 日分の容量の原水調整池を建設することを提案していた。浄水場容量は、BIWASE と Dau Tieng - Phuoc Hoa 運河の管理会社（Dau Tieng - Phuoc Hoa Irrigation Mining Limited Liability Company）との間で締結される、導水路の点検や補修に要する最大日数に係る合意に依存することとなる。

導水路の点検や補修に要する最大日数を 2～3 日と想定した場合、ベトナム基準（TCXDVN33:2006 水道・配水システムと施設設計基準）において規定される原水調整池の必要容量は以下のように算定される。なお、北ビンズオン浄水場（NBDWTP）の給水エリアを、Thu Dau Mot、Di An、Tan Hiep の 3 つの既存浄水場によってカバーすることを想定している。

図 1　取水地点における原水調整池の必要容量

浄水場容量 (m^3/d)		(c)=(a)+(b) 合計 (m^3/d)	(d)=(c)x0.7 必要最小容量 (m^3/d)	(e)=((d)-(a))x3 原水調整池の必要容量 (m^3)	(f)=((d)-(a))x3-(b) 原水調整池の必要容量 (m^3)
(a) Thu Dau Mot Di An Tan Hiep	(b) NBDWTP				
421,600	150,000	571,600	400,120	0	0
421,600	300,000	721,600	505,120	250,560	0
421,600	600,000	1,021,600	715,120	880,560	280,560
421,600	1,000,000	1,421,600	995,120	1,720,560	720,560

(e) 導水停止期間が 3 日の場合

(f) 導水停止期間が 2 日の場合

2.　原水調整池の諸元

導水路が点検や補修を実施している期間（導水停止期間）において、北ビンズオン浄水場（NBDWTP）の給水エリアでは 70%の給水量が確保されることとなる。導水停止期間を 2 日とした場合の各ケースにおける原水調整池の諸元を以下に示す。なお、原水調整池有効水深を 3.5m と設定している。

図 2　取水地点における原水調整池の諸元

ケース	導水停止期間	NBDWTP の浄水場容量 (m^3/d)	原水調整池の必要容量 (m^3)	石積護岸擁壁工		コンクリート護岸擁壁工	
				一辺の堤体の長さ (m)	面積 (ha)	一辺の堤体の長さ (m)	面積 (ha)
Case A (100%給水)	2 日	600,000	1,200,000	657	43.2	623	38.8
		1,000,000	2,000,000	827	68.4	794	63.0
Case B (70%給水)	2 日	150,000	0	-	-	-	-
		300,000	0	-	-	-	-
		600,000	280,560	354	12.5	321	10.3
		1,000,000	720,560	525	27.6	491	24.1

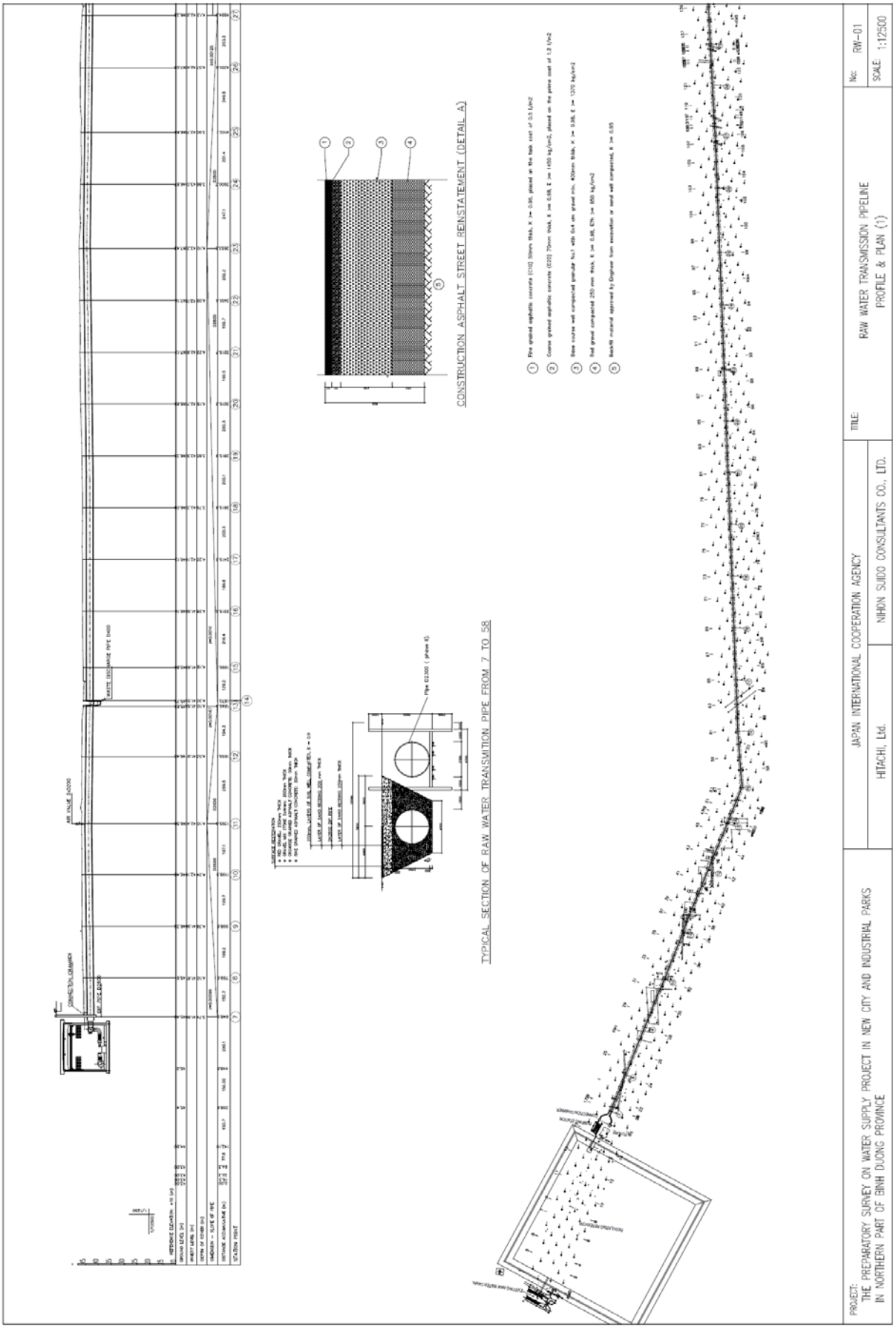
3.　原水調整池の建設費

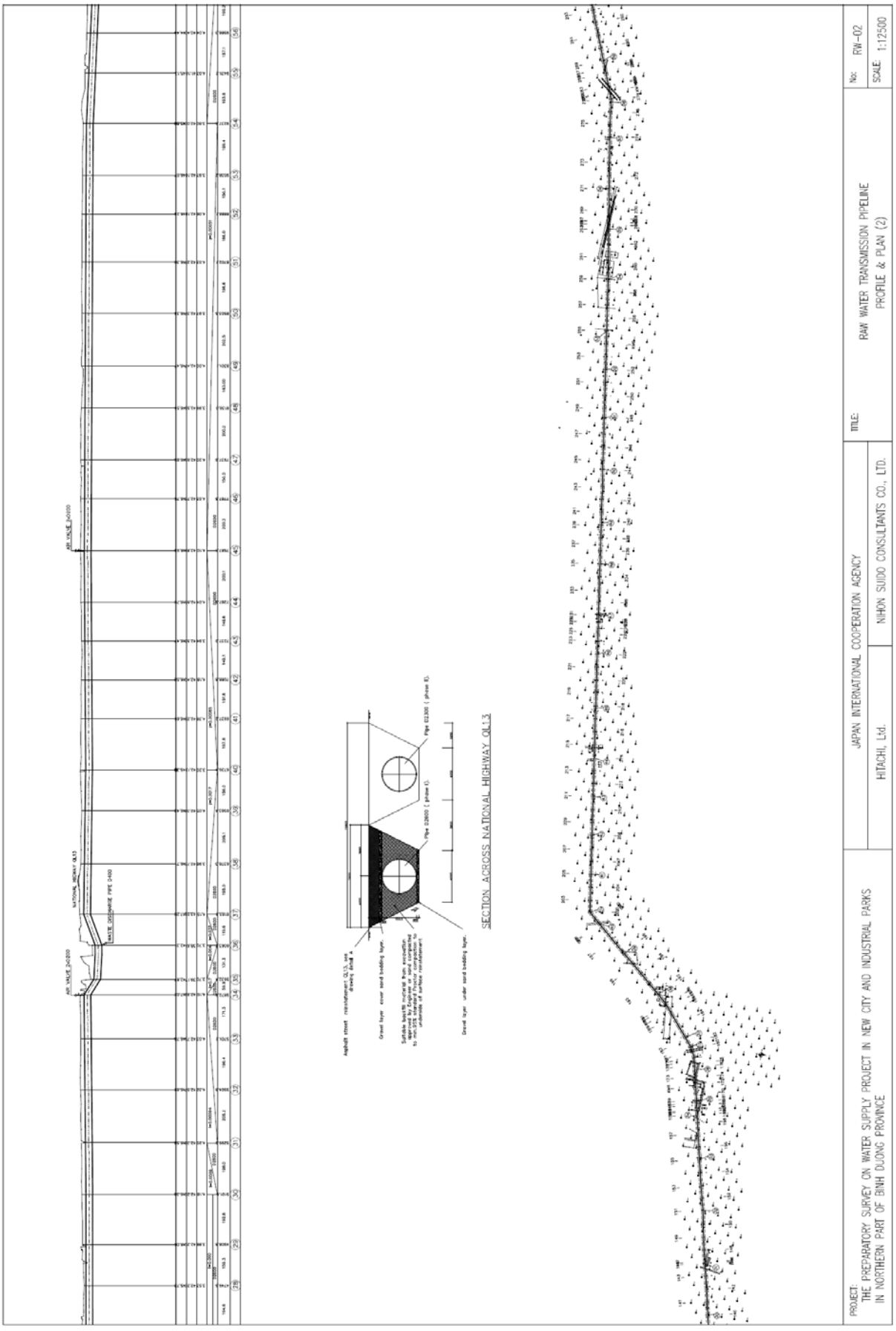
各ケースにおける原水調整池の建設費を以下に示す。

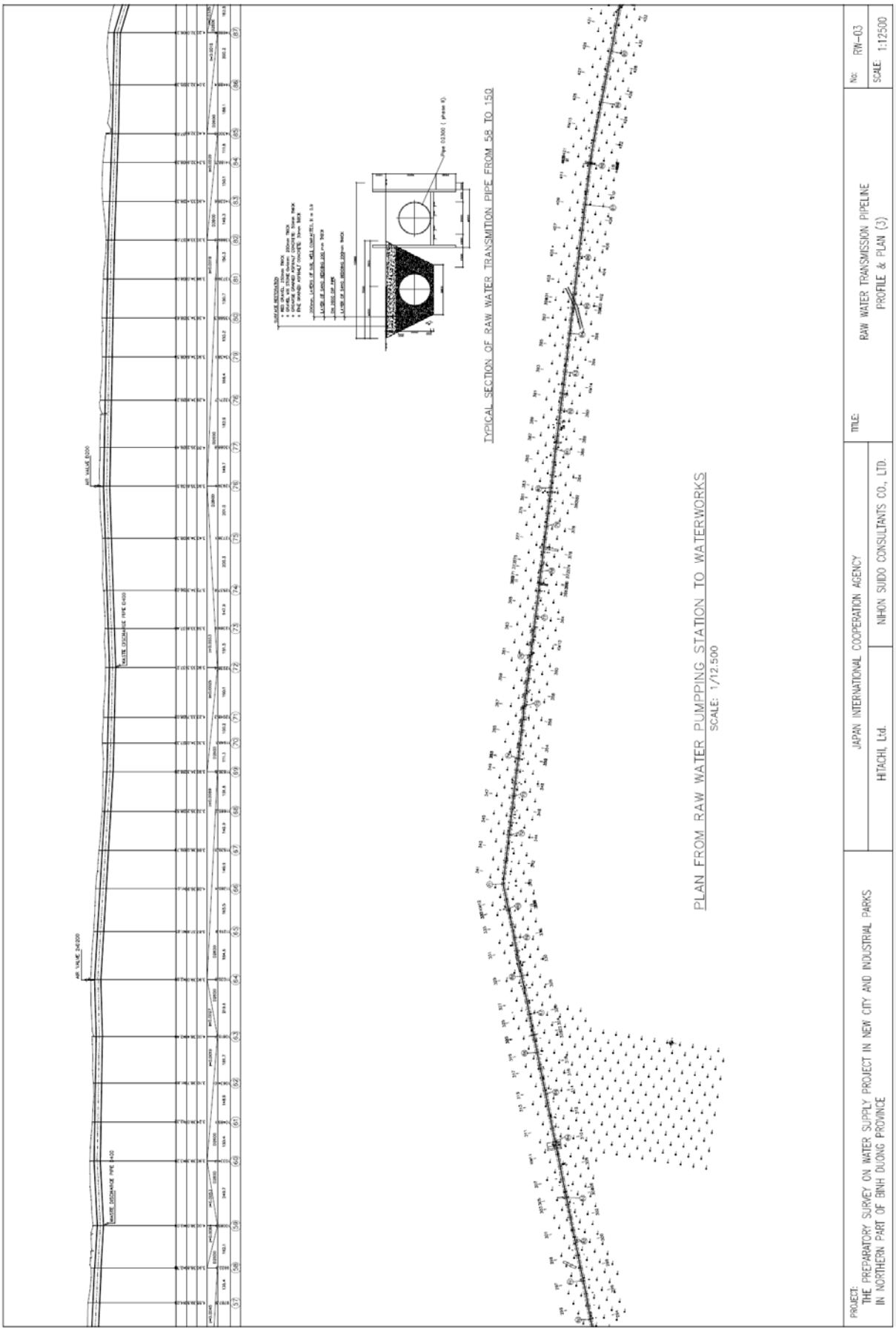
図 3　取水地点における原水調整池の建設費

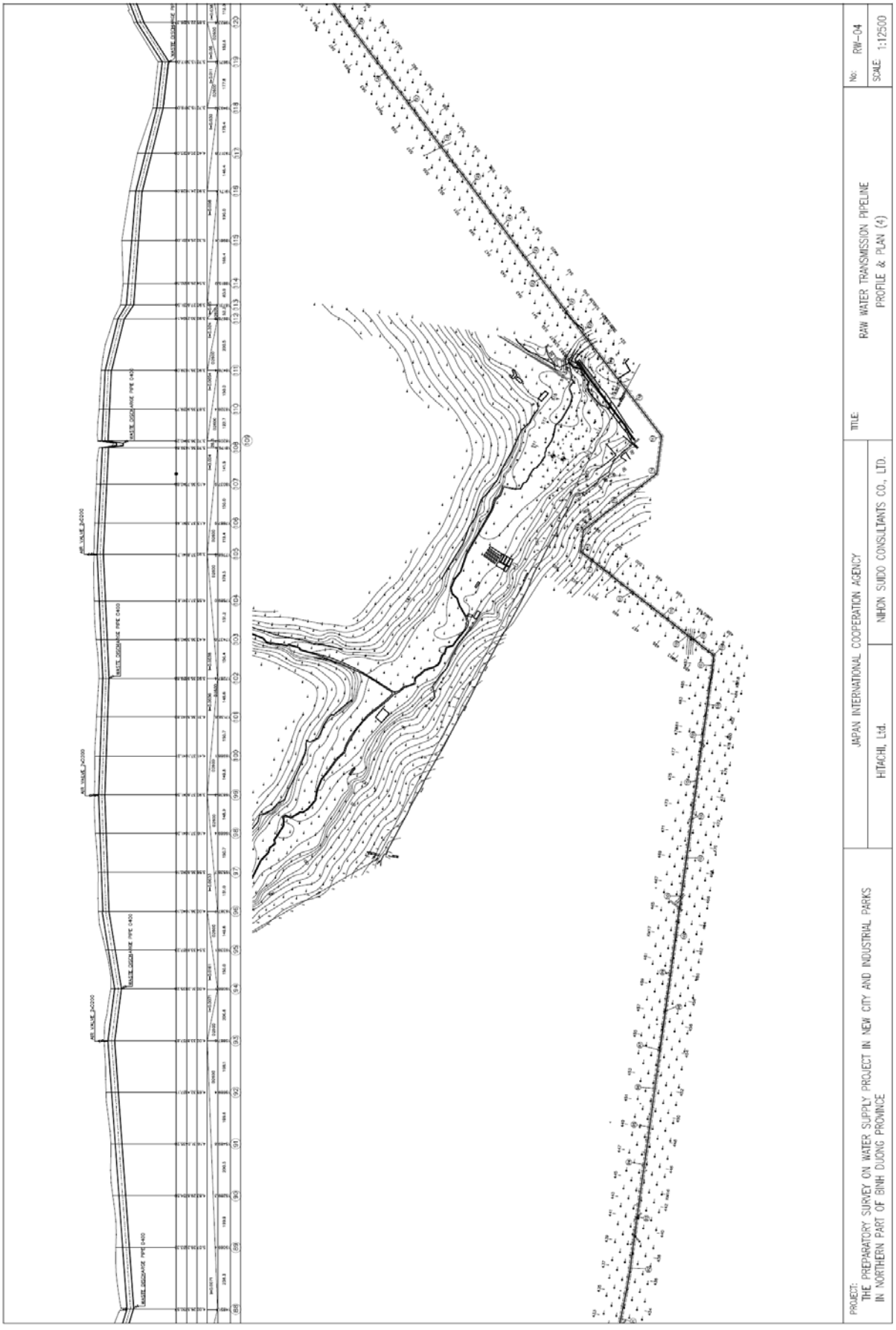
原水調整池の必要容量 (m^3)	石積護岸擁壁工				コンクリート護岸擁壁工			
	一辺の堤体の長さ (m)	面積 (ha)	建設費		一辺の堤体の長さ (m)	面積 (ha)	建設費	
			十億 VND	百万 US$			十億 VND	百万 US$
1,000,000	606	36.7	112.8	5.5	572	32.7	292.9	14.0
1,200,000	657	43.2	131.1	6.3	623	38.8	327.8	15.7
2,000,000	827	68.4	202.3	9.7	794	63.0	453.4	21.7
250,560	339	11.5	38.4	1.8	305	9.3	130.6	6.3
880,560	573	32.8	101.6	4.9	539	29.1	271.0	13.0
1,720,560	772	59.6	178.1	8.5	739	54.6	411.5	19.7
280,560	354	12.5	41.7	2.0	321	10.3	139.1	6.7
720,560	525	27.6	86.3	4.1	491	24.1	240.1	11.5

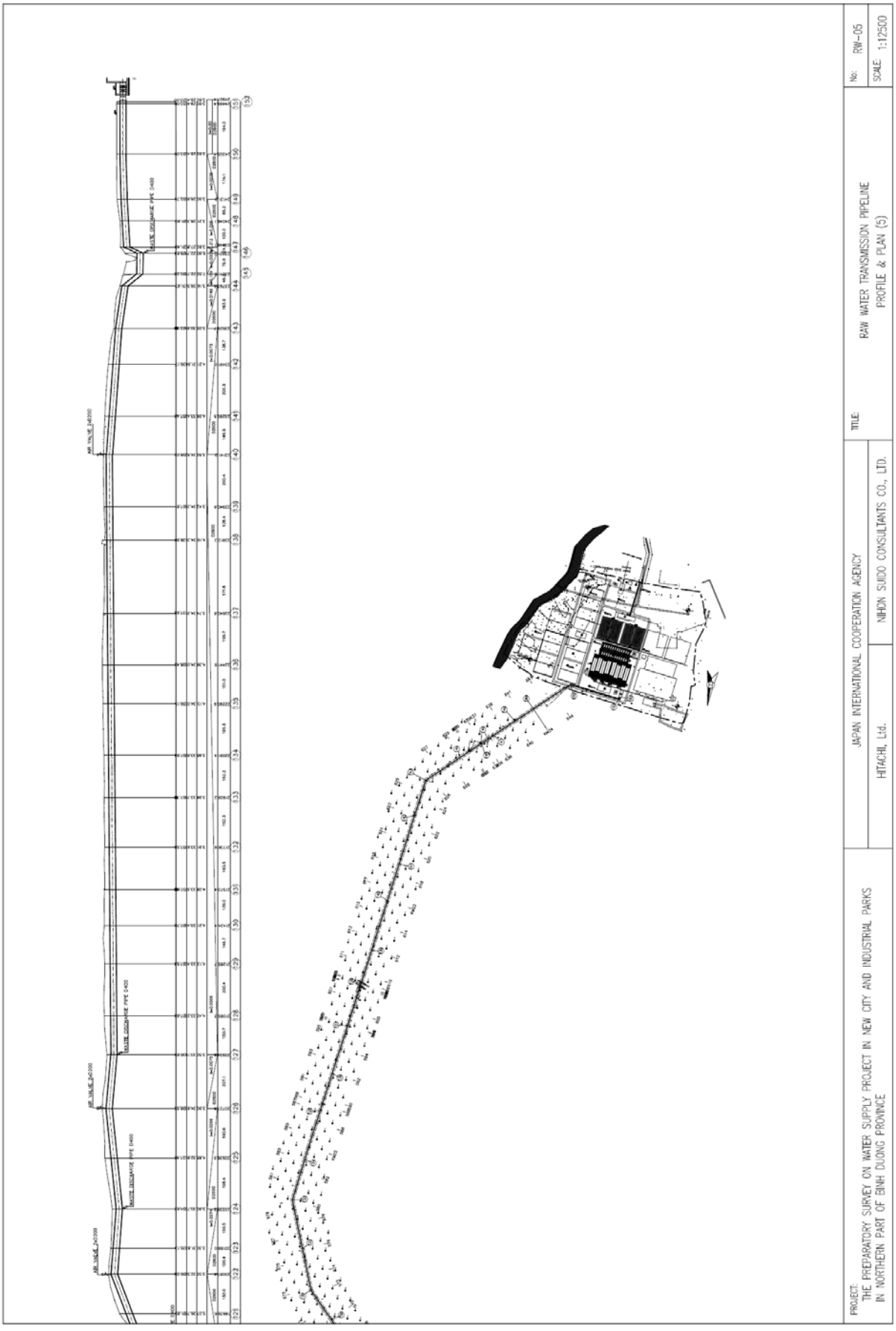
付録 6 - A　導水管平面図及び縦断図


CONSTRUCTION ASPHALT STREET REINSTATEMENT (DETAIL A)
TYPICAL SECTION OF RAW WATER TRANSMITION PIPE FROM 7 TO 58
PROJECT:
THE PREPARATORY SURVEY ON WATER SUPPLY PROJECT IN NEW CITY AND INDUSTRIAL PARKS IN NORTHERN PART OF BINH DUONG PROVINCE
JAPAN INTERNATIONAL COOPERATION AGENCY
HITACHI, Ltd.
NIHON SUIDO CONSULTANTS CO., LTD.
TITLE:
RAW WATER TRANSMISSION PIPELINE
PROFILE & PLAN (1)
No: RW-01
SCALE: 1:12500


SECTION ACROSS NATIONAL HIGHWAY QL13
PROJECT:
THE PREPARATORY SURVEY ON WATER SUPPLY PROJECT IN NEW CITY AND INDUSTRIAL PARKS IN NORTHERN PART OF BINH DUONG PROVINCE
JAPAN INTERNATIONAL COOPERATION AGENCY
HITACHI, Ltd.
NIHON SUIDO CONSULTANTS CO., LTD.
TITLE:
RAW WATER TRANSMISSION PIPELINE
PROFILE & PLAN (2)
No: RW-02
SCALE: 1:12500


TYPICAL SECTION OF RAW WATER TRANSMITTION PIPE FROM 58 TO 150
PLAN FROM RAW WATER PUMPING STATION TO WATERWORKS
SCALE: 1/12.500
PROJECT:
THE PREPARATORY SURVEY ON WATER SUPPLY PROJECT IN NEW CITY AND INDUSTRIAL PARKS IN NORTHERN PART OF BINH DUONG PROVINCE
JAPAN INTERNATIONAL COOPERATION AGENCY
HITACHI, Ltd.
NIHON SUIDO CONSULTANTS CO., LTD.
TITLE:
RAW WATER TRANSMISSION PIPELINE
PROFILE & PLAN (3)
No: RW-03
SCALE: 1:12500


PROJECT:
THE PREPARATORY SURVEY ON WATER SUPPLY PROJECT IN NEW CITY AND INDUSTRIAL PARKS IN NORTHERN PART OF BINH DUONG PROVINCE
JAPAN INTERNATIONAL COOPERATION AGENCY
HITACHI, Ltd.
NIHON SUIDO CONSULTANTS CO., LTD.
TITLE:
RAW WATER TRANSMISSION PIPELINE
PROFILE & PLAN (4)
No: RW-04
SCALE: 1:12500


PROJECT:
THE PREPARATORY SURVEY ON WATER SUPPLY PROJECT IN NEW CITY AND INDUSTRIAL PARKS IN NORTHERN PART OF BINH DUONG PROVINCE
JAPAN INTERNATIONAL COOPERATION AGENCY
HITACHI, Ltd.
NIHON SUIDO CONSULTANTS CO., LTD.
TITLE:
RAW WATER TRANSMISSION PIPELINE
PROFILE & PLAN (5)
No: RW-05
SCALE: 1:12500

付録 6 - B　調整池に関する水文条件および設計根拠

1.　水文条件

1.1　河川特性

天然資源環境省下の地理調査部作成による 25,000 分の 1 地形図によると、Ong Te 川の河川特性は以下のとおり。

表 1.1　Ong Te 川の河川特性

流域名	流域面積 F (km^2)	流路長 L_S (km)	平均河床勾配 J_S (‰)	平均流域勾配 J_{Sd} (‰)
Ong Te basin	48.0	10.0	4.0	150.0

1.2　気象条件

気象条件については、HECII による「特別報告書第 4 編、水源開発に関する水文気象条件 Part 4A、No. 315C-03-B01 (2004 年 7 月)」を参照して設定した。

(1)　流域平均雨量

流域平均雨量は、水文気象部発行の水源地図より、X_o = 1900 mm と設定される。

また、Ong Te 川流域の最大日雨量については、最寄りの Binh Long 観測所の最大日雨量データを用いることとする。確率規模別の最大日雨量は以下のとおり。

表 1.2　確率規模別の最大日雨量

P (%)	0.1	0.2	0.5	1.0	5.0	10
X_P (mm)	378.0	343.6	299.0	266.0	192.0	161.0

1.3　水文条件

(1)　平均流量

a)　年平均流量

年平均流量 Q_o は、以下の式により算定される。

$$Q_o = \frac{Y_o * F}{1000 * T}$$

ここに、

F: 流域面積、

T: 年あたりの秒数、

Y_o: 年平均流出等量、

である。年平均流出等量は以下の式により算定される。

$Y_o = X_o - 1100 = 1900 - 1100 = 800$ mm

表 1.3　Ong Te 川の年平均流量

F (km^2)	X_o (mm)	Q_o (m^3/s)	M_o ($l/s.km^2$)	Y_o (mm)
48.0	1900	1.22	25.4	800

b) 確率規模別の平均流量

確率規模別の平均流量は、確率密度関数を以下の条件で設定することにより、算定される。

+ 変動係数；Cv = 0.3

+ バイアス係数；Cs = 2Cv

（基準 QP.TL C6-77 によると、年平均流量のデータが無い場合には、経験的に Cs = 2Cv を用いる。）

Ong Te 川における確率規模別の平均流量は、以下のとおり。

表 1.4 Ong Te 川の確率規模別の年平均流量

F (km^2)	Q_o (m^3/s)	Cv	Cs	Q_P (m^3/s)			
				$Q_{80\%}$	$Q_{85\%}$	$Q_{90\%}$	$Q_{95\%}$
48.0	1.22	0.3	0.6	0.905	0.847	0.779	0.685

表 1.5 Ong Te 川の確率規模別の月平均流量（単位:m^3/s）

P (%)	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Average
Average	0.308	0.154	0.088	0.117	0.272	0.716	1.486	3.071	3.258	2.756	1.678	0.711	1.218
50	0.299	0.150	0.086	0.114	0.264	0.694	1.442	2.978	3.159	2.673	1.627	0.690	1.181
75	0.241	0.121	0.069	0.092	0.214	0.562	1.166	2.409	2.556	2.162	1.316	0.558	0.956
80	0.229	0.115	0.066	0.087	0.202	0.532	1.104	2.280	2.419	2.047	1.246	0.528	0.905
85	0.214	0.107	0.061	0.082	0.189	0.498	1.034	2.136	2.267	1.918	1.167	0.495	0.847
90	0.197	0.099	0.057	0.075	0.174	0.458	0.951	1.964	2.084	1.763	1.073	0.455	0.779
95	0.173	0.087	0.050	0.066	0.153	0.403	0.836	1.727	1.833	1.551	0.944	0.400	0.685

(2) 洪水流量

a) ピーク流量

水文条件設定のための基準 QP.TL C6-77 によると、ピーク流量は Alecxayep の経験式より計算される。

$$Q_{MAX} = \alpha * \overline{\psi}(\tau_a) * X_p * F = q * F$$

ここに、

α: 流出係数 (α=16.67)、

$\overline{\psi}(\tau_a)$: 洪水到達時間毎の降雨減衰曲線、

τ_a: 洪水到達時間、

X_P: 確率規模別の最大日雨量、

F: 流域面積、

q:ピーク流出高、

である。洪水到達時間は以下の式により算定される。

$$\tau_a = \tau_{sa} + \tau_{da}$$

$$\tau_{sa} = \frac{1000 L_a}{m_a J_a^{1/3} F_a^{1/4} q_{pa}^{1/4}} = \frac{1000 L_a}{V_a q_{pa}^{1/4}}$$

ここに、

τ_{sa} : 河道内の洪水伝播時間、

τ_{da} : 雨水が 流域から河道に至る流入時間、

L_a, m_a, J_a, F_a, q_{pa}: 似通った流域における特性係数、

V_a: 河川流速、

である。

以上の計算式より、Ong Te 川におけるピーク流量の計算結果は以下のとおり。

表 1.6　Ong Te 川における確率規模別のピーク流量

P(%)	0.1	0.2	0.5	1.0	5.0	10
Q(m^3/s)	526	470	398	346	232	193

b)　全洪水流量

水文条件設定のための基準 QP.TL C6-77 によると、ピーク流量は Alecxayep の経験式より計算される。

$W_P = X_P * \varphi * F$

ここに、

X_p: 確率規模別の最大日雨量、

φ: 流出係数 (φ=0.6)、

F: 流域面積、

である。

以上の計算式より、Ong Te 川における全洪水流量の計算結果は以下のとおり。

表 1.7　Ong Te 川における確率規模別の全洪水流量

P(%)	0.1	0.2	0.5	1.0	5.0	10
W(10^3m^3)	10,886	9,896	8,611	7,661	5,530	4,637

c)　ハイドログラフ

洪水流量のハイドログラフは以下のとおり。

表 1.8　Ong Te 川における確率規模別のハイドログラフ

Time (hour)	Flood discharge according to frequencies Q (m^3/s)					
	0.1%	0.2%	0.5%	1.0%	5.0%	10.0%
1	2.7	2.1	1.3	0.8	0.0	0.0
2	111.5	93.3	71.1	56.0	26.8	18.2
3	365.1	316.6	256.0	213.7	122.8	86.7
4	519.5	459.4	383.3	329.0	208.0	156.5
5	539.0	483.0	410.0	357.0	241.0	189.0
6	442.6	404.2	352.9	314.1	225.1	193.0
7	337.9	313.0	279.4	253.3	191.1	162.5
8	244.0	227.8	205.5	188.6	149.5	131.9
9	166.0	157.2	145.2	135.4	112.4	101.0

10	113.4	107.7	101.1	95.2	80.8	75.4
11	74.1	70.9	68.0	65.3	58.1	54.9
12	47.6	45.8	44.2	43.2	40.5	39.5
13	30.7	30.0	29.0	28.5	27.4	27.5
14	20.5	19.8	18.6	18.7	18.7	18.7
15	13.6	13.6	13.4	13.1	12.6	13.0
16	7.9	7.6	8.3	8.7	9.0	8.9
17	5.2	5.3	5.3	5.2	6.3	6.7
18	2.7	3.0	3.4	3.6	3.7	4.6
19	2.1	2.0	1.9	1.9	2.7	2.9
20	1.5	1.5	1.5	1.4	1.7	2.1
21	0.9	1.0	1.0	1.1	1.1	1.3
22	0.3	0.4	0.6	0.7	0.8	0.9
23	0.0	0.0	0.2	0.3	0.6	0.7
24	0.0	0.0	0.0	0.0	0.4	0.5
25	0.0	0.0	0.0	0.0	0.1	0.3
26	0.0	0.0	0.0	0.0	0.0	0.1

1.4　堆砂条件

(1) 流入浮遊物質

+ 年平均流量；$Q_o = 1.22 m^3/s$
+ 流入 SS 濃度；$\rho_o = 300$ g/m^3
+ 全 SS 流入量； 11,542 ton
+ SS 比重；1.2 ton/m^3,
+ 年流入浮遊物質量；9,618 m^3

(2) 河床浸食

+ 全河床浸食量；4,617 ton (流入浮遊物質量の 40%)
+ 比重；1.6 ton/m^3
+年河床浸食量；2,886 m^3

(3) 河岸浸食

+ 年河岸浸食量；1,250 m^3 (経験的に流入浮遊物質量と河床浸食量の 10%)

(4) Ong Te 調整池における年堆砂量

$V_s = 9,618 + 2,886 + 1,250 = 13,754$ m^3

1.5　洪水吐放流量と減勢工水位

洪水吐からの放流量と減勢工における水位の関係は、減勢工の横断形状から等流計算により算定される。

$$Q = \frac{1}{n}.\omega.R^{2/3}.J^{1/2}$$

洪水吐からの放流量と減勢工における水位の関係の計算結果は、以下のとおり。

表 1.9　洪水吐放流量と減勢工水位の関係

Z_S (m)	17.0	17.5	18.0	18.5	19.0	19,5	20.0	20.5	21.0
Q_S (m^3)	0.0	2.79	17.7	51,9	114	223	363	531	729

2.　ダムの設計

2.1　洪水吐

(1) 洪水吐の形状と幅

洪水吐の大きさは、洪水吐の形状と設計洪水流量時における調整池の最大水位によって決定される。

調整池における洪水吐には、通常、ゲート式と自由越流式の 2 つの形状が用いられる。以下の理由から、Ong Te 調整池では自由越流式の洪水吐を採用することとした。

+ ゲートや開閉装置を設置する必要がない。

+ 水位監視やゲートおよび開閉装置の操作のための人員を配置する必要がない。

+自由越流式の洪水吐では、流木や流下物等による影響の可能性が低い。

a)　フェーズ I

フェーズ I における設計洪水位は、高圧電線の鉄塔を避けるため、26.5m 以下でなければならない。

洪水吐の幅に関して、3 つのケース（Bt = 100 m、150 m、200 m）を検討することとした。洪水位は洪水吐からの放流能力に関する以下の計算式から算定される。

$$Q = m * Bt * \sqrt{2g} * H^{3/2}$$

ここに、

Q: 洪水吐放流量、

m: 流量係数、

Bt: 洪水吐の幅、

g: 重力加速度、

H: 洪水吐の堤頂を基準面とした全水頭、

である。

表 2.1　フェーズ I における洪水吐の幅ごとの設計洪水位

No.	ケース	単位	洪水位 (m)		
			Bt=100 m	Bt=150 m	Bt=200 m
1	洪水吐敷高 (常時満水位)	m	24.50	24.50	24.50
2	設計洪水位 (P=0.5%)	m	25.95	25.6	25.41
3	照査洪水位 (P=0.1%)	m	26.01	25.71	25.45

上記計算結果より、洪水吐の幅が Bt = 100 m の場合、設計洪水位が 26.0m 近くに達し、高圧電線の鉄塔の安全性が保たれないことが分かる。一方で、洪水吐の幅が Bt = 150 m および Bt = 200 m の場合は、設計洪水位は 26.5m よりも低い。したがって、建設費も考慮したうえで、フェーズ I における洪水吐の幅は Bt = 150 m を採用することとした。

b)　将来フェーズ

将来フェーズにおいて洪水吐を拡幅することは、ダムの堤体の安全性に影響を及ぼしかねない。したがって、将来フェーズにおいては、洪水吐の幅はフェーズ I における 150 m に維持し、洪水吐敷高のみを常時満水位相当の 27.5 m の高さまで嵩上げすることとした。

将来フェーズにおける洪水吐の水理計算結果を以下に示す。

表 2.2　将来フェーズにおける設計洪水位

No.	ケース	単位	洪水位 (m)
1	洪水吐敷高 (常時満水位)	m	27.50
2	設計洪水位 (P=0.5%)	m	28.70
3	照査洪水位 (P=0.1%)	m	28.96

常時満水位は 27.5 m となるため、高圧電線の鉄塔の基礎は水没することとなる。したがって、高圧電線の鉄塔の移設や鉄塔周辺のダム堤体の建設を、将来フェーズまでに実施する必要がある。

(2)　減勢工

ダム建設予定地の河床は軟弱な土質で構成されており、ダム下流における放流エネルギーを散逸させるため、減勢工が必要となる。

減勢工の大きさは将来フェーズに変更することができないので、以下のように将来フェーズを基準に減勢工の規模を決定する。

+ 設計流量: Q = 398 m^3/s
+ 洪水吐敷高: Ht = 27.5 m

減勢工の規模は以下のように設定される。

+ 減勢工の水叩き長

$$lb = \beta * ln$$
$$ln = 4.5 * hc$$

ここに、

lb: 水叩き長、

β: 係数 (通常 0.9 が用いられる)、

ln: 跳水の長さ、

hc: 跳水後の共役水深、

である。結果として、減勢工の水叩き長は、lb = 10.0 m となる。

+ 減勢工の深さ

$$d = \sigma * hc - h_h - \Delta Z$$

$$\Delta Z = \frac{Q^2}{2g.\varphi'^2.\omega_h^2} - \frac{\alpha.Q^2}{2g.\omega_b^2}$$

ここに、

d: 減勢工の深さ、

σ: 係数、

h_h: 原水調整池建設前の下流水深、

hc: 跳水後の共役水深、

ΔZ: 減勢工出口における水頭差、

である。結果として、減勢工の深さは、d = 1.0 m となる。

2.2 ダム堤体

(1) ダム堤頂高

ダムの堤体材料として、重力式コンクリートダムとアースフィルダムの 2 種類のダム形式を検討することとした。ダム堤頂高は、重力式コンクリートダムは設計基準 14 TCN 56-88、アースフィルダムは設計基準 14 TCN 157-2005 に基づき、以下の式によって設定した。

$$C_{n,d,c} = H_{n,d,c} + \Delta h + h_{sl} + a_{n,d,c}$$

ここに、

$C_{n,d,c}$: 堤体の非越流部の高さ、

$H_{n,d,c}$: 常時満水位(n)、設計洪水位(d)、照査洪水位(c)、

Δh: 風による波浪の高さ、

h_{sl}: ダム表面における波の打ち上げ高さ、

$a_{n,d,c}$: 余裕高

である。余裕高は以下のとおり。

+ アースフィルダム

表 2.3　アースフィルダムの余裕高

ケース	余裕高 a (m)	
	フェーズ I (Class II)	将来フェーズ(Class I)
常時満水位	1.2	1.5
設計洪水位	1.0	1.0
照査洪水位	0.3	0.5

+ 重力式コンクリートダム

- フェーズ I (Class II): a = 0.6 m
- 将来フェーズ (Class I): a = 0.8 m

である。ダム堤頂高の計算結果は以下のとおり。

表 2.4　重力式コンクリートダムとアースフィルダムのダム堤頂高

ケース	ダム堤頂高 (m)			
	フェーズ I (Class II)		将来フェーズ (Class I)	
	ｺﾝｸﾘｰﾄﾀﾞﾑ	ｱｰｽﾀﾞﾑ	ｺﾝｸﾘｰﾄﾀﾞﾑ	ｱｰｽﾀﾞﾑ
常時満水位	26.33	27.45	29.62	30.54
設計洪水位	26.66	26.64	29.79	29.75
照査洪水位	27.00	26.15	29.46	29.46

上記計算結果より、ダム堤体の非越流部の堤頂高を以下のように設定した。

表 2.5　ダム堤体の非越流部の堤頂高

ダム堤頂高 (m)			
フェーズ I (Class II)		将来フェーズ (Class I)	
ｺﾝｸﾘｰﾄﾀﾞﾑ	ｱｰｽﾀﾞﾑ	ｺﾝｸﾘｰﾄﾀﾞﾑ	ｱｰｽﾀﾞﾑ
27.0	27.0 + 0.6 (防波堤)	30.0	30.0 + 0.6 (防波堤)

(2)　ダム表面

a)　　重力式コンクリートダム

重力式コンクリートダムのダム表面は以下のように設定した。

+ 上流側表面；鉛直形状
+ 下流側表面；m = 1:0.8 (将来フェーズも含む)

b)　　アースフィルダム

アースフィルダムのダム表面は以下のように設定した。

+ 上流側表面；m = 1:3.0
+ 下流側表面；m = 1:2.5

アースフィルダムの上流側表面は、浸食を防ぐために厚さ 30 cm の石工で補強される。また下流側断面は、芝張りとする。

3.　　ダムの安定性確保のための対策工

3.1　　基礎地盤処理

(1)　浸透性地盤に対する対策工

ダム建設予定地の基礎地盤は、主に砂層で構成され透水性が大きい第 2 層に位置しており、浸透水に対する堤体の安定性を確保するため、浸透性地盤に対する対策工を実施する必要がある。

a)　　重力式コンクリートダム

コンクリート杭を第 2 層から第 4 層まで打ち込む。

b)　　アースフィルダム

第 2 層の土質を取り除き、遮水材料（透水係数 $kt \leq 10^{-5}$ cm/s）に置き換える。

(2) 基礎地盤の耐荷重性確保

a) 重力式コンクリートダム

ダム建設予定地の基礎地盤は主に砂であり耐荷重性が小さいので、M300 のコンクリート杭を打ち込み耐荷重性を確保する。

ダム堤体の安定計算を実施した上で、以下のようにコンクリート杭の諸元および数量を決定した。

+ 杭の諸元；(0.35 x 0.35 x 10.5) m
+ 断面あたりの杭の数；70

3.2 将来フェーズにおけるダム嵩上げの施工方法

a) 重力式コンクリートダム

将来フェーズにおける施工方法としては、コンクリートによって必要とされる 30.0 m の高さまでダム堤頂高を嵩上げすることである。ダムの基礎地盤については、将来フェーズで必要となる安定性を確保できるように、フェーズ I のダム建設時に施行される。

b) アースフィルダム

アースフィルダムの嵩上げについては、重力式コンクリートダムよりも複雑な施工が求められる。以下のような施工方法が必要とされる。

+ フェーズ I のダム堤頂は上流側の歩道として使う。
+ 下流側の堤体を裏腹付けにより嵩上げする。
+ 堤体内のドレーンを拡張する。
+ アースフィルダムと洪水吐の間の 2 つの隔壁を鉄筋コンクリート工により嵩上げする。

3.3 洪水吐

(1) 洪水吐の断面形状

洪水吐の横断形状にはたくさんの種類があるが、Ong Te 調整池の状況を踏まえ、下記の理由から実用的な Ophixerop の横断形状を採用した。

+ 放流能力が大きい。
+ コンクリートの下流表面に損傷を与えることなく、放流時に振動しない。

(2) 洪水吐の基礎地盤処理

a) 浸透性地盤に対する対策工

洪水吐の基礎地盤は、主に砂層で構成され透水性が大きい第 2 層に位置しており、浸透水に対する洪水吐の安定性を確保するため、浸透性地盤に対する対策工を実施する必要がある。

この浸透性地盤に対する対策工のため、コンクリート杭を第 2 層から第 4 層まで打ち込む。

b) 基礎地盤の耐荷重性確保

洪水吐の基礎地盤は主に砂であり耐荷重性が小さいので、M300 のコンクリート杭を打ち込み耐荷重性を確保する。

洪水吐の安定計算を実施した上で、以下のようにコンクリート杭の諸元および数量を決定した。

+ 杭の諸元；(0.35 x 0.35 x 10.5) m
+ 断面あたりの杭の数；80

4. 原水調整池の設計諸元

以上の検討結果より、原水調整池の設計諸元一覧を以下に示す。

表 4.1 原水調整池の設計諸元一覧

No.	諸元名	単位	アースフィルダム		重力式コンクリートダム	
			フェーズ I	将来フェーズ	フェーズ I	将来フェーズ
I	**原水調整池**					
1	流域面積	km^2	48.0	48.0	48.0	48.0
2	常時満水位	m	24.5	27.5	24.5	27.5
3	最低水位	m	21.0	21.0	21.0	21.0
4	設計洪水位	m	25.6	28.7	25.6	28.7
5	照査洪水位	m	25.71	28.96	25.71	28.96
6	総貯水容量（常時満水位）	10^6m^3	1.2	2.7	1.2	2.7
7	堆砂容量	10^6m^3	0.2	0.2	0.2	0.2
8	有効貯水容量	10^6m^3	1.0	2.5	1.0	2.5
9	湛水面積（洪水位）	ha	53.0	91.5	53.0	91.5
II	**ダム堤体**					
1	ダム堤頂高	m	27.0	30.0	27.0	30.0
2	最深河床高	m	19.0	19.0	19.0	19.0
3	ダム堤高	m	8.0	11.0	8.0	11.0
4	ダム堤頂長（洪水吐を除く）	m	214	382	207	350
5	ダム堤頂幅	m	7.0	7.0	7.0	7.0
III	**洪水吐**					
1	洪水吐敷高	m	24.5	27.5	24.5	27.5
2	設計洪水流量	m^3/s	346	398	346	398
3	照査洪水流量	m^3/s	470	526	470	526
4	洪水吐堤頂長（隔壁を含む）	m	153	153	153	153
IV	**取水塔**					
1	諸元: B x L x H	m	15x15x9	15x15x9	15x15x9	15x15x9

5. 既存の原水調整池

(1) Kenh Dong 調整池

・位置；Dau Tieng 貯水池から導水している Kenh Dong 導水路沿い
・目的；Kenh Dong 浄水場への原水供給
・調整池容量；1,200,000m3
・浄水場容量；200,000m3/day
・堤体材料；アースフィル、堤体の内側表面をコンクリート工で補強
・堤体高さ；4.5m（水深）
・現地調査日；2013 年 3 月 21 日
・ヒアリング相手；Mr.Vo Quang Chau, Vice General Director, Saigon Water Corporation (SAWACO)
Mr.Ha Van Sang, General Director, Kenh Dong Water Supply Joint Stock Co


ダム堤体の内側表面


ダム堤頂


取水施設


Kenh Dong 導水路からの取水路

写真 5.1　Kenh Dong 調整池

(2) Suoi Cam 調整池

・位置；Dau Tieng 貯水池から導水している Kenh Dong 導水路沿い
・目的；Kenh Dong 浄水場への原水供給
・調整池容量；1,700,000m3
・浄水場容量；10,000m3/day
・堤体材料；アースフィル、堤体の上流側表面を石工で補強
・堤体高さ；15m（堤体）
・現地調査日；2013 年 3 月 21 日


ダム堤体の上流側表面


ダム堤頂


取水施設


洪水吐

写真 5.2　Suoi Cam 調整池

6. 電力送電会社 No.4 –NPT との議事録

The Preparatory Survey on Water supply project in New City and industrial parks in northern part of Binh Duong Province/ Khảo sát chuẩn bị cho Dự án cấp nước tại Thành Phố Mới và các khu công nghiệp phía Bắc tỉnh Bình Dương			
Minutes of Meeting: Biên Bản cuộc họp		**No./:** **Date: 6th March 2013**	
	1. Mr. Huỳnh Hữu Phúc	Electricity Transmission Company No.4 – NPT/ Công ty Truyền Tải Điện 4 – NPT	
	2. Mr. Nguyễn Văn Thiều	NPT/ Công ty Truyền Tải Điện 4 – NPT	
	3. Mr. Lê Văn Hoàng	NPT/ Công ty Truyền Tải Điện 4 – NPT	
	4. Mr. Tatsuya Tobe	JICA Survey Team/Đoàn Nghiên Cứu JICA	
	5. Ms. Vũ Hồng Nhung	Interpreter/Phiên dịch	
Commencement/Bắt đầu: 14:00	Closure/Kết thúc: 15:00	Place/Địa điểm: Công ty Truyền Tải Điện 4 – NPT	Recorded by/Ghi bởi: Tatsuya Tobe

Content of the meeting/Nội dung cuộc họp:

After the discussion of the issues related to the alternative for the high voltage electric pole:
Sau khi thảo luận các vấn đề liên quan đến phương án bảo vệ trụ điện cao thế:

+ Đoàn Nghiên Cứu JICA đề xuất xây dựng bệ bê tông hoặc tường bê tông bao quanh trụ điện cao thế số 3299 của đường dây 500KV Pleiku – Phú Lâm để chống ngập trụ điện trong khu vực hồ chứa nước dự kiến. Công ty TT Điện 4 cho biết ý kiến về đề xuất trên: + Việc xây dựng bệ bê tông nâng cao trình hoặc tường bê tông quanh trụ điện là không khả thi cho Công ty TT Điện 4. + Vì rất khó tiến hành công tác bảo trì quanh trụ điện do không gian xung quanh vị trí trụ điện hạn chế. + Việc thay mới trụ điện đòi hỏi phải cân nhắc các chi tiết do thời gian hạn chế và điện thế cao. + Khoảng cách hiện hữu từ chân đế đến đỉnh trụ điện cao thế phải được giữ nguyên. + Xây đập bê tông để bao quanh 03 mặt chắn nước của trụ 3299, đảm bảo không ảnh hưởng đến kết cấu móng trụ và vận hành của đường dây: • Khoảng cách tối thiểu từ đỉnh đập đến dây điện cao thế phải lớn hơn 10m. • Khoảng cách tối thiểu từ chân trụ điện cao thế ra chân đập phải lớn hơn 21m.	+ JICA Survey Team suggested that the concrete base or wall is constructed around the high voltage electric pole No. 3299 of 500KV electric wire from Pleiku - Phu Lam to prevent it from the storage water in planned regulating reservoir. NPT gave comments on the above suggestion: + Construction of concrete base or wall around the high voltage electric pole is not feasible for NPT. + Because it is difficult to execute the maintenance around the high voltage electric pole due to narrow space. + Replacement work for the pole needs more detailed consideration due to time restriction and high voltage. + The existing distance from base to top of the high voltage electric pole must be kept. + A concrete dam should be built covering 03 water retaining faces of electric pole No. 3299, to ensure that reserved water will not affect on pole foundation structure and operation of electric line" • Minimum distance from the dam crest to the electric wire must be more than 10m. • The minimum distance from the foot of high voltage electric pole to the dam embankment must be more than 21m.

+ Phương án khác được đề xuất là vị trí đập sẽ dời về phía thượng lưu của trụ điện cao thế, phương án này khả thi hơn đối với Công ty TT Điện 4.	+ The another alternative that the dam site is shifted to upstream of the high voltage electric pole is more feasible for NPT.

Signed by/Ký bởi:

Huỳnh Hữu Phước

PTC4's representative
Đại diện Công ty Truyền Tải Điện 4

Team Member of JICA Survey Team
Thành viên Đoàn Nghiên Cứu Khảo Sát JICA

2

付録 6 - C　配水コントロールシステム導入評価シミュレーション

1　シミュレーションの前提条件

(1) 目標末端圧力

図 1.1 に示すように、現在のポンプ運転を分析した結果から、目標圧力は 200kPA とした。Tan Hiep 浄水場のポンプ設定画面のサンプルを基に一日のポンプ運転を再現し、管網計算を実施した。その結果、最も遠い場所での最低圧力がおよそ 200kPA であった。

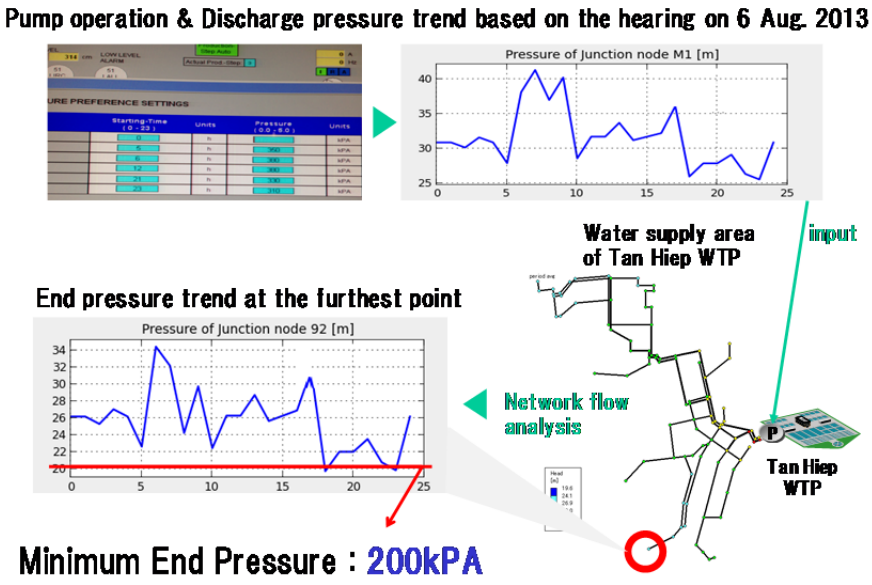
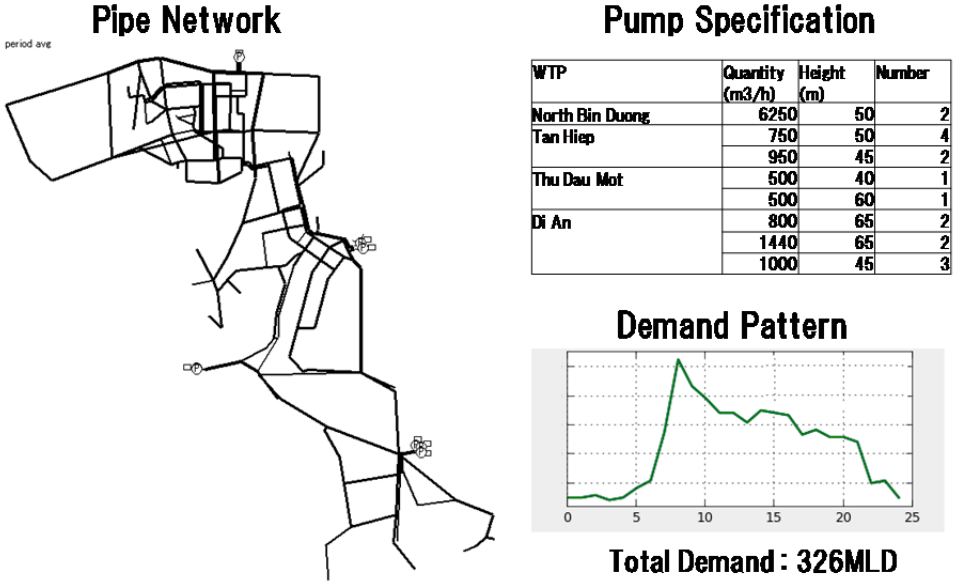


図 1.1　現行の目標末端圧力の推定

(2) 配水管網、配水設備、需要量

北ビンズオン浄水場が 300,000m^3/日での稼動に必要な配管とした。総需要は 326,000 m^3/日で北ビンズオン浄水場の稼動初期を想定している。各浄水場での配水設備も同時期までの設備計画を考慮したものとしている。



WTP	Quantity (m3/h)	Height (m)	Number
North Bin Duong	6250	50	2
Tan Hiep	750	50	4
	950	45	2
Thu Dau Mot	500	40	1
	500	60	1
Di An	800	65	2
	1440	65	2
	1000	45	3

図 1.2　シミュレーションに用いたデータ

2　シミュレーション結果

(1) ケース 1

すべての浄水場が現行方式の下、それぞれ独立して運転される。BIWASE 本社がすべての浄水場を監視し、必要に応じて調整する。吐出圧力は、各浄水場のオペレータによって決められる。

圧力分布では、赤色のノードが多く、圧力がやや高めであることを示している。

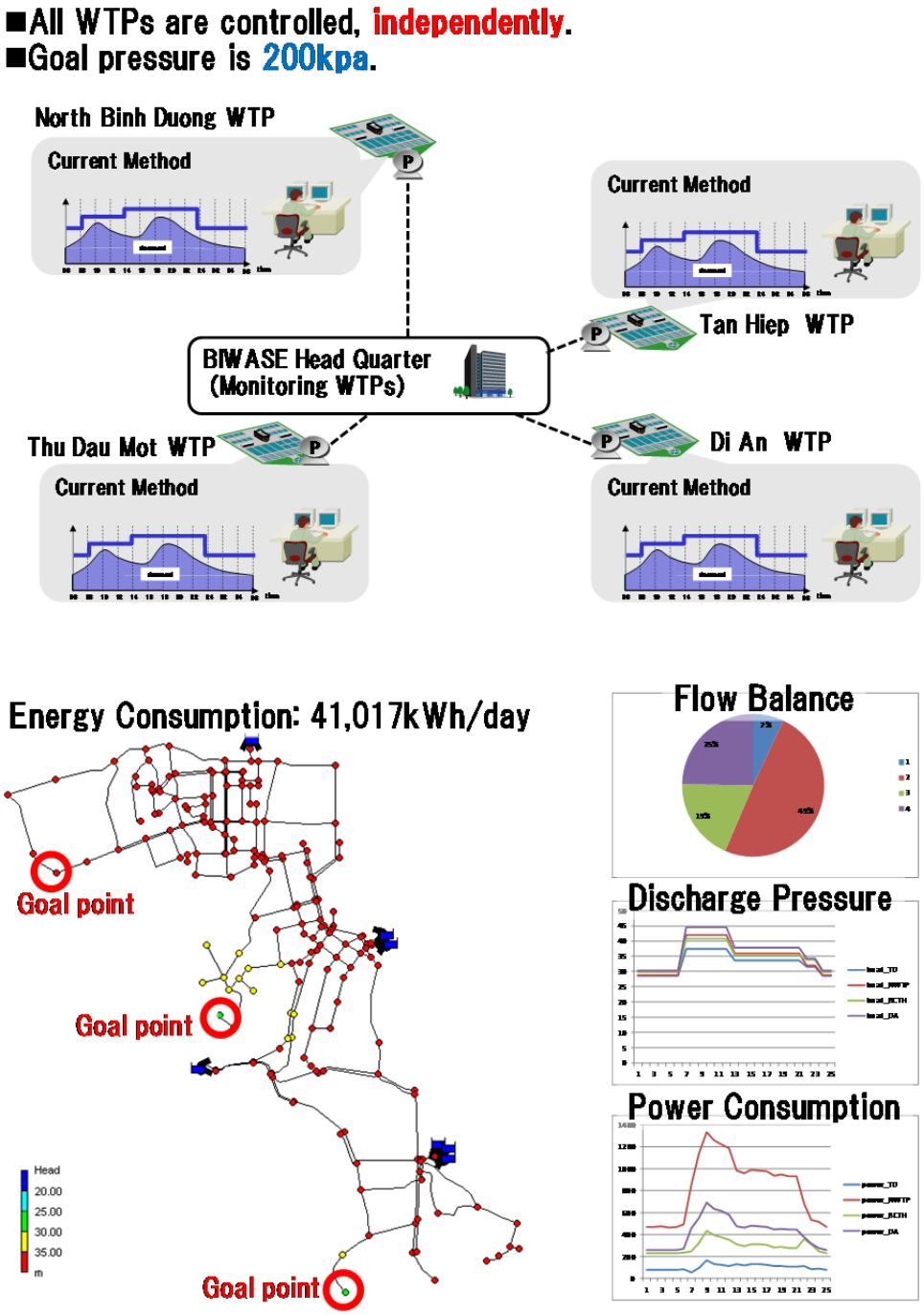


図 1.3　ケース 1

(2) ケース 2

北ビンズオン浄水場のみに高機能な制御法が導入されたケースである。北ビンズオン浄水場の周辺で多くのノードが赤色から黄色に変化している。吐出圧力のグラフで、北ビンズオン浄水場を現す赤い線が、需要パターンに追従するように正確に制御されているのがわかる。エネルギー消費は、ケース 1 に比べて 3.9%の削減となっている。

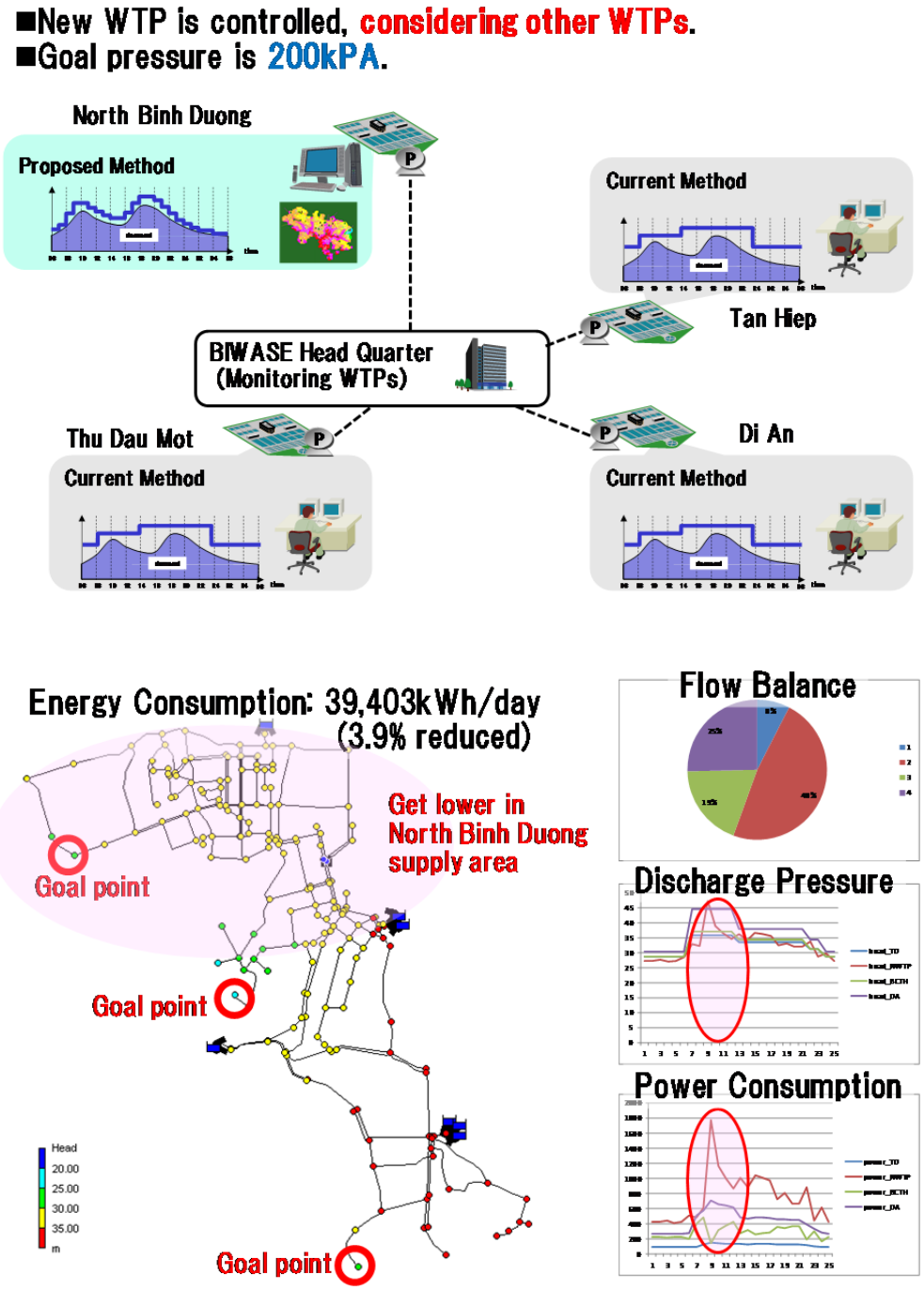


図 1.4　ケース 2

(3) ケース 3(1)

すべての浄水場に、高機能な制御法が導入され、一ヶ所のセンタからの集中制御となる。コントロールセンタは、北ビンズオン浄水場でも、BIWASE 本社でもどちらに置く事も可能である。

圧力分布では、黄色のノードが他の浄水場の配水エリアで増えていることがわかる。吐出圧力のトレンドグラフでは、すべての浄水場からの吐出圧力が需要パターンに追従している。

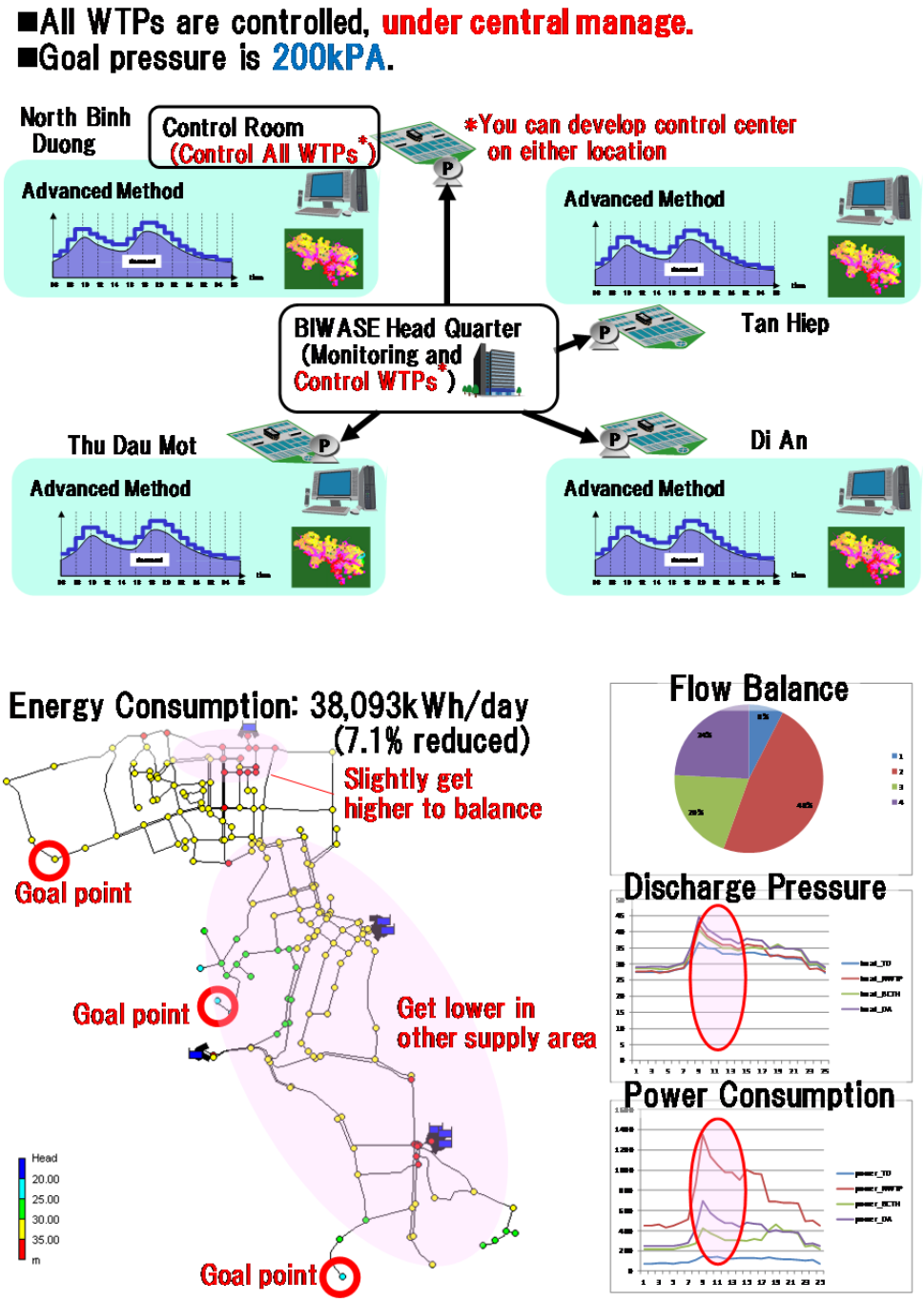


図 1.5　ケース 3(1)

(4) ケース 3(2)

制御条件はケース 3(2)と同様である。目標圧力は省エネ運転を想定した 180kPA としている。目標圧力は余裕を持って少し高めに設定するのが一般的である。高機能な制御法を導入すれば、正確に圧力を制御できるため、余裕を少なく見て目標を低く設定することが可能である。

圧力分布では、緑色のノードが増え、すべての配水エリアでさらに圧力が下がっていることがわかる。全エネルギー消費量は、12.9%の削減となっている。

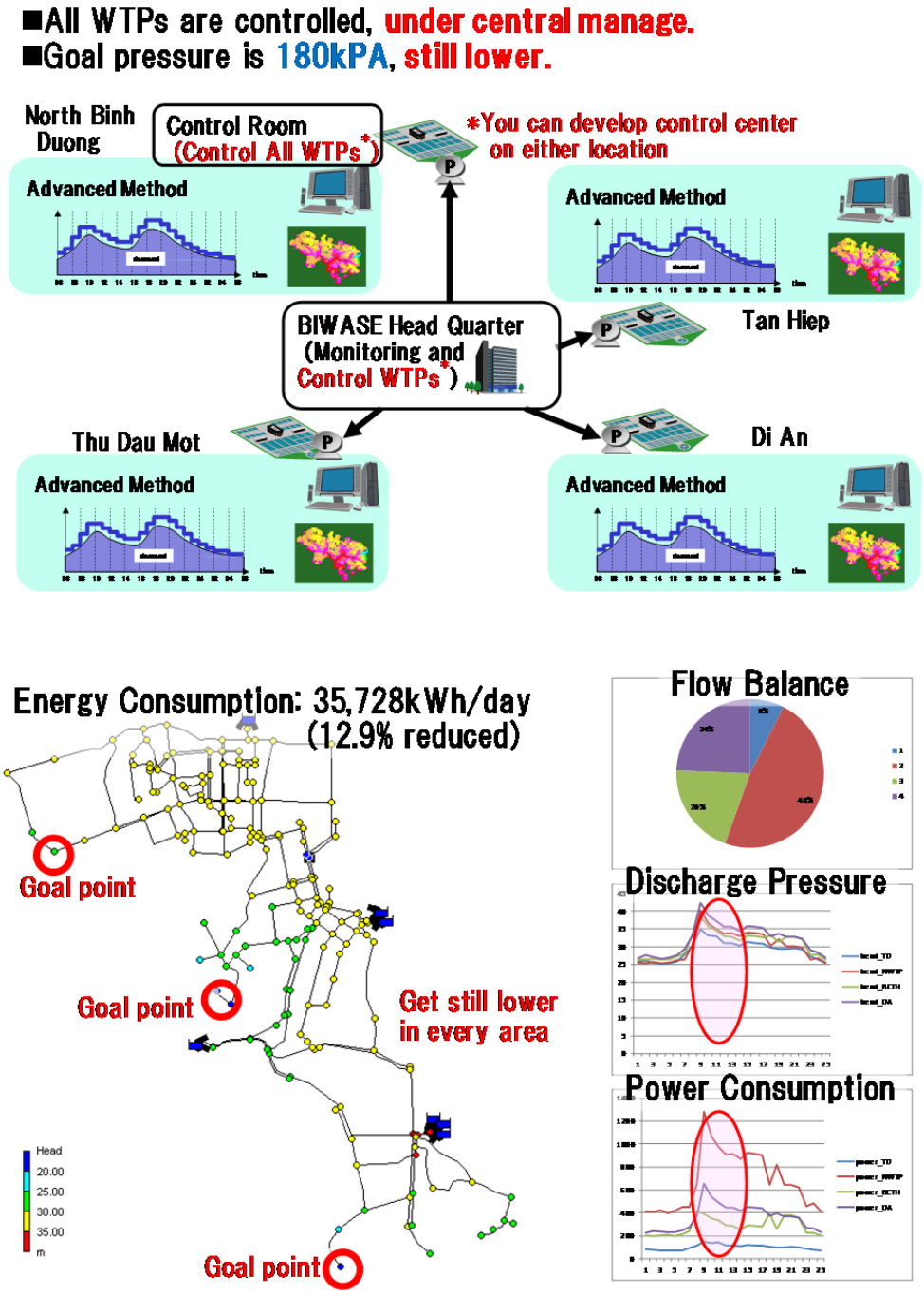


図 1.6　ケース 3(2)

付録 7 - A　環境社会配慮チェックリスト

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) N (b) N (c) N/A (d) N	(a) The reports will be prepared by the end of 2015. (b) The reports should be approved by filling the draft reports. (c) Conditions are unknown before the approval (d) No additional approvals are necessary.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders? (b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	(a) Y (b) Y	(a) By holding the stakeholder meetings, adequate explanation was done and stakeholders agreed on the project components basically. (b) Comments and requests from the stakeholders are already considered and corresponded in the suvey. The countermeasures are disclosed in reports.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	(a) Y	(a) Alternative plans are examined for water resouce, pipeline routes, raw water maintenance and location of WTP.
2 Pollution Control	(1) Air Quality	(a) Is there a possibility that chlorine from chlorine storage facilities and chlorine injection facilities will cause air pollution? Are any mitigating measures taken? (b) Do chlorine concentrations within the working environments comply with the country's occupational health and safety standards?	(a) N/Y (b) Y	(a) By complying safety standard concentration of chlorine (i.e. 0.02mg/m3), air pollution should not occur. / For accident prevention, leakage monitoring system will be installed. (b) By utilising closed system (no emission to atmosphere), the chlorine concentrations comply with the standards.
	(2) Water Quality	(a) Do pollutants, such as SS, BOD, COD contained in effluents discharged by the facility operations comply with the country's effluent standards?	(a) Y	(a) In the current design, no effluents are to be produced (closed system).
	(2)' Water Quality (from checklist for Hydropower, Dam, Reservoir)	(a) Does the water quality of dam pond/reservoir comply with the country's ambient water quality standards? Is there a possibility that proliferation of phytoplankton and zooplankton will occur? (b) Does the quality of water discharged from the dam pond/reservoir comply with the country's ambient water quality standards? (c) Are adequate measures, such as clearance of woody vegetation from the inundation zone prior to flooding planned to prevent water quality degradation in the dam pond/reservoir? (d) Is there a possibility that reduced the river flow downstream will cause water quality degradation resulting in areas that do not comply with the country's ambient water quality standards? (e) Is the discharge of water from the lower portion of the dam pond/reservoir (the water temperature of the lower portion is generally lower than the water temperature of the upper portion) planned	(a) Y (b) Y (c) Y (d) N (e) N/A	(a) According to the water quality test results, the water has good quality and the standards should be complied. It is planned to circulate dam water periodically to prevent nutrient enrichment. (b) As described above, the water quality is good and the standards will be complied. (c) Clearance of vegetation is planned. (d) It is planned to maintain water amount during and after the construction as before. (e) Discharge method is not yet fixed and should be studied in the Detailed Design.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		by considering the impacts to downstream areas?		
	(2)" Water Quality (from checklist for Forestry)	(a) Is there a possibility that the use of chemicals, such as fertilizers, and agrochemicals will cause water pollution? (b) Where facilities, such as forest products manufacturing facilities are installed, do effluents from the facilities comply with the country's effluent standards and ambient water quality standards?	(a) N (b) N	(a) No chemicals are planned to be used at the site. (b) There is no manufacturing facility in the area.
	(3) Wastes	(a) Are wastes, such as sludge generated by the facility operations properly treated and disposed in accordance with the country's regulations?	(a) Y	(a) The sludge can be disposed in BIWASE-owned landfill and it is rather valuable resource and sellable.
	(4) Noise and Vibration	(a) Do noise and vibrations generated from the facilities, such as pumping stations comply with the country's standards?	(a) Y	(a) The transmittion pump will be installed in the intake facility building and noise will not reach the boundary of the residential area.
	(5) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence?	(a) N/A	(a) No groundwater will be exploited.
	(6) Soil Contamination (from checklist for Forestry)	(a) Are adequate measures taken to prevent contamination of soil and groundwater by use of chemicals, such as agrochemicals? (b) Are any agrochemicals management plans prepared? Are any usages or any implementation structures organized for proper use of the plans?	(a) N (b) N/A	(a) It is not planned to use chemicals. (b) As above
3 Natural Environment	(1) Protected Areas	(a) Is the project site or discharge area located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) No protected areas exist in Binh Duong Province.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?(b) Does the project site or discharge area encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?(d) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by project will adversely affect aquatic environments, such as rivers? Are	(a) N(b) N(c) N(d) N	(a) The sites are all within secondary forests or agricultural lands.(b) No protected habitats are expected (confirmed by related agencies) and EIA study will be conducted.(c) As above(d) Water resource is canal water and no impacts to natural environment is expected.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?		
	(2)' Ecosystem (from checklist for Forestry)	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) Is there a possibility that changes in localized micro-meteorological conditions, such as solar radiation, temperature, and humidity due to a large-scale timber harvesting will affect the surrounding vegetation? (d) Is there a possibility that a large-scale timber harvesting will result in loss of breeding and feeding grounds for wildlife? (e) In the case of reforestation projects, is there a possibility that mono-species plantations will adversely affect wildlife habitats? Is there a possibility that mono-species plantations will cause outbreaks of pests? (f) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem? (g) Isn't an illegal deforestation associated with the project being carried out, or is an acquisition of the forest certification by the project proponent being carried out?	(a) N (b) N (c) Y (d) N (e) N/A (f) N (g) N	(a) The sites are all within secondary forests or agricultural lands. (b) No protected habitats are expected and will be examined by field studies. (c) The issue should be studied in the EIA. (d) Wildlife is not expected and will be examined by field studies (e) No reforestation is planned. (f) The site is an old reservoir and natural ecosystem is not expected to exist. It will be studied in the EIA (g) Deforestation will be managed by the project proponent after legal land acquisition.
	(3) Hydrology	(a) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect surface water and groundwater flows?	(a) N	(a) Water resource is canal water and no impacts to aquatic environment is expected.
	(4) Topography and Geology (from checklist for Hydropower, Dam, Reservoir)	(a) Is there a possibility that reductions in sediment loads downstream due to settling of suspended particles in the reservoir will cause impacts, such as scouring of the downstream riverbeds and soil erosion? Is there a possibility that sedimentation of the reservoir will cause loss of the storage capacity, water logging upstream, and formation of sediment deposits at the reservoir entrance? Are the possibilities of the impacts studied, and adequate prevention measures taken? (b) Is there a possibility that the project will cause a large-scale alteration of the topographic features and geologic structures in the surrounding areas (especially in run of the river generation projects and geothermal power generation projects)?	(a) N (b) N	(a) Turbidity of the existing river is very low and problems concerning sediment will not be likely to occur. (b) Topographic alteration will not take place in large-scale because the site was a reservoir.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(5) Management of Abandoned Sites	(a) Are adequate restoration and revegetation plans considered for the harvested areas? In particular, are adequate measures taken to prevent soil runoff from the harvested areas? (b) Is a sustainable management system for the harvested areas established? (c) Are adequate financial provisions secured to manage the harvested areas?	(a) Y (b) Y (c) Y	(a) The reservoir is a permanent land use and managed by PMU (b) As above (c) As above
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensations going to be paid prior to the resettlement? (e) Is the compensation policies prepared in document? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan? (i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?	(a) Y (b) Y (c) Y (d) Y (e) Y (f) Y (g) Y (h) Y (i) Y (j) Y	(a) Mitigation measures to avoid impacts were taken in the ARP.Thus, involuntary resettlement will be caused in 2 components(raw water pipelines and the regulating reservoir) but compensation will be given in order to minimize the impact to the DPs. (b) PAPs joined in public consultation with PMU and LFDC where Resettlement Plan was fully revealed. (c) LFDC has a survey about the price of the land, house, etc. every year. Compensation price and rehabilitation will be stipulated in ARP. (d)They pay compensation to the DPs 30days or more in advance. (e) Compensation Policy is Included in the ARP (f) Special asistance,such as special allowance,vocational training and income restoration for the vulnerable groups are stipulated in ARP. (g) PAPs agreed in public consultation already. (h) BIWASE will set up PMU as a main institution. The PMU is a permanent agency. The budget form PPC includes the cost estimation of ARP. (i) The Monitoring is planned. (j)The grievance redress mechanism will be established in each government level.
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Is there a possibility that the amount of water used (e.g., surface water, groundwater) by the project will adversely affect the existing water uses and water area uses?	(a) Y (b) N	(a) Resettlement will take place and adequate compensation will be given to PAPs. (b) Water resource is canal water and no impacts to aquatic environment is expected.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(2)' Living and Livelihood (from checklist for Hydropower, Dam, Reservoir)	(a) Is there any possibility that the project will adversely affect the living conditions of inhabitants? Are adequate measures considered to reduce the impacts, if necessary? (b) Is there any possibility that the project causes the change of land uses in the neighboring areas to affect adversely livelihood of local people? (c) Is there any possibility that the project facilities adversely affect the traffic systems? (d) Is there any possibility that diseases, including infectious diseases, such as HIV, will be brought due to the immigration of workers associated with the project? Are adequate considerations given to public health, if necessary? (e) Is the minimum flow required for maintaining downstream water uses secured? (f) Is there any possibility that reductions in water flow downstream or seawater intrusion will have impacts on downstream water and land uses? (g) Is there any possibility that water-borne or water-related diseases (e.g., schistosomiasis, malaria, filariasis) will be introduced? (h) Is there any possibility that fishery rights, water usage rights, and common usage rights, etc. would be restricted?	(a) Y (b) N (c) N (d) N (e) Y (f) N (g) N (h) N	(a) Resettlement will take place and adequate compensation will be given to PAPs. (b) Change of land use will take place but adequate compensation will be given to PAPs. (c) The project area does not encompass public roads. (d) The project proponent will have consultation with the Department of Health who has special program for prevention of infectious diseases. (e) The water flow will be maintained and will not change. (f) The water flow will be maintained and will not change. (g) The reservoir is for water supply whose treatment methods include sanitation by chlorination. Water-related diseases will not be introduced. (h) Any right will not be restricted because no change is expected in the downstream reach.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) Cultural buildings are all along the main road and the pipline route is planned detouring the road.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	(a) N	(a) Basically, the facilities are built in gum tree fields. The reservoir is constructed in the old reservoir site and no significant change will occur.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and resources respected?	(a) N/A (b) N/A	(a) Existance of ethnic minorities will be confirmed by ARP. Lifestyle of them are no longer unique at present in Binh Duong Province, in either case. (b) Even though ethnic minorities may inhabit, the land is either the secondary forest or the agricultural land (no traditional land).
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.? (d) Are appropriate measures taken to	(a) Y (b) Y (c) Y (d) Y	(a)(b) Safety requirements will be complied with according to Circular No22/2010/TT-BXD (c) Adequate program will be held by consultation with the Local PCs (d) As above

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		ensure that security guards involved in the project not to violate safety of other individuals involved, or local residents?		
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts? (d) If the construction activities might cause traffic congestion, are adequate measures considered to reduce such impacts?	(a) Y (b) N/A (c) Y (d) Y	(a) Any possible impacts are considered and mitigations are suggested in the EMP. The examples are as follows. i) Noise / Vibration - Drive construction vehicles slowly when transferring soil. Maximize use of low-vibration & low-noise machineries. ii) Turbid water - Monitor potential impacts iii) Dust - Use watering agents to prevent or reduce dust. Drive construction vehicles slowly with load covers. iv) Wastes - Institute a regular solids waste collection and disposal program. Ensure adequate number of latrines at camp cleaned regularly. (b) The sites are all within secondary forests or agricultural lands and no impacts on ecosystem are expected. (c) Construction activities can cause inconvenience to inhabitants and the countermeasures for impact minimization such as detouring pipeline routes from populated places were agreed in the stakeholder meeting. (d) Construction along R13 can cause significant impact to surrounding society. In order to minimize the impact, alternative route through agricultural lands is adopted.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a) Y (b) Y (c) Y (d) Y	(a) The monitoring plan was prepared and shown in the final report. (b) The contents of monitoring are specified at Article 25 [11]; Circular 12/2011/TT-BTNMT. The examples of the (items / methods / frequencies) are; - Dust / TSP or PM10/ twice with an interval greater than 2 months - Noise & Vibration / Decibel (dBa) levels / As above - Surface water quality / Turbidity / As above - Soil contamination / As, Cd, Cu, Pb, Zn / quarterly - Worker & public safety / Number of worker and public injuries /

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
				quarterly (c) The monitoring framework is designated. Main implement unit is PMU in cooperation with the contractor and/or the environmental consultant. The budget should be covered by the construction fee. The monitoring will be supervised by authorities such as DONRE, BDPPC, PMU or Consultant. (d) Format and frequency of reports are specified at Article 25 [11]; Circular 12/2011/TT-BTNMT and required to be submitted to the regulatory authorities.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Dam and River Projects checklist should also be checked.	(a) Y	(a) Dam and River Projects checklists are also referred but the project does not have significant impacts that the checklists describe.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to transboundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) N/A	(a) The project does not have possibility of significant adverse impacts on transboundary or global issues

1) Regarding the term “Country’s Standards” mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made. In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which the project is located.

付録 **8 - A** 簡易住民移転計画

ABBRIVIATED RESETTLEMENT PLAN

THE PREPARATORY SURVEY ON WATER SUPPLY PROJECT IN NEW CITY AND INDUSTRIAL PARKS IN NORTHERN PART OF BINH DUONG PROVINCE IN THE SOCIALIST REPUBLIC OF VIETNAM

TABLE OF CONTENTS

PART 1 EXECUTIVE SUMMARY ..... 8A - 1
PART 2 GENERAL INTRODUTION 4
2.1 Overview of the Project 4
2.2 Outline of the Project Components 4
2.3 Objectives of the ARP 5
2.4 Socio-economic Conditions of the Project Area 5
2.4.1 About Binh Duong province 5
2.4.2 About Ben Cat District 6
PART 3 LEGAL FRAMEWORKS AND ENTITLEMENT POLICY 7
3.1 Vietnamese Laws, Decrees, and Circulars 7
3.2 Binh Duong Province Regulations on Resettlement 8
3.3 JICA Guideline on Involuntary Resettlement 8
3.4 The Comparison between JICA Guideline and Vietnamese Laws and Decrees 9
3.5 The Project's Land Acquisition and Resettlement Policy 11
PART 4 THE NEED OF LAND ACQUISITION AND RESETTLEMENT 13
4.1 The Need of Land Acquisition and Resettlement 13
4.2 Mitigation Measures 13
PART 5 SCOPE OF LAND ACQUISITION AND RESETTLEMENT 15
5.1 Scope of Land Acquisition and Resettlement 15
5.1.1 Impacts on Land 15
5.1.2 Impacts on Housing 15
5.1.3 Impacts on Other Objects and Architectures 16
5.1.4 Impacts on Trees and Crops 16
5.1.5 Impacts on Business 16
5.1.6 Impacts on Institutions and Organizations 17
5.1.7 Impacts on Public Works 17
5.1.8 Impacts on cultural structures Heritages 17
5.1.9 Temporary Impacts 17
5.2 Socio-economic Profile of PAP 17
5.2.1 Household Population and Labor Force 17
5.2.2 Education 18
5.2.3 Household Occupation 19
5.2.4 Living Standards, Income and Expenditure 20
5.2.5 Accommodations and home comforts 23
5.2.6 Socio-economic Profile of Vulnerable Group 23
5.2.7 Issue of Ethnic Minorities 24
5.2.8 Gender Issues 24
PART 6 COMPENSATION POLICY 24
6.1 Objectives for Resettlement 24
6.2 Eligibility 24
6.3 Principles of Resettlement 25
6.4 Cut-off Date 25
6.5 Site Preparation and Relocation 25
6.6 Rehabilitation 25
6.7 Project Entitlements 26
PART 7 GRIVANCE REDNESS PROCEDURE 36
PART 8 INSTITUTIONAL ARRANGEMENTS 36
8.1 Land Acquisition and Resettlement Procedures 36
8.2 Institutional Arrangements 38

8.3 Institutional Capacity 39
PART 9 IMPLEMENTATION SCHEDULE 39
PART10 COST ESTIMATE AND BUDGET 41
10.1 Flow of Funds 41
10.2 Adjustment for Inflation 41
10.3 Compensation Prices 41
10.3.1 Prices for land 41
10.3.2 Prices for trees and crops 41
10.3.3 Allowances 41
10.4 Cost estimates 41
PART11 MONITORING AND EVALUATION 42
11.1 Monitoring 42
11.2 Monitoring Report 42
PART 12 PUBLIC PARTICIPATION, CONSULTATION, AND GRIEVANCE MECHANISMS 43
12.1 Objectives of Public Information and Consultation 43
12.2 Consultation during Project Preparation 43
12.2.1 Information Dissemination and Consultation 44
12.2.2 Public Meetings 44
12.2.3 Information Disclosure 45

Annex

Annex A – Minute of public consultation ..... Annex A - 1
Annex B – Monitoring Form ..... Annex B - 1
Annex C – Template for Socio-Economic Survey ..... Annex C - 1
Annex D – Template of DMS ..... Annex D - 1
Annex E – Land Unit Price in the Project Area ..... Annex E - 1
Annex F – PAHs inventory ..... Annex F - 1

TABLE INDEX

Table 1 Summary of Facilities Proposed ..... 8A - 4
Table 2 JICA's Policy on Involuntary Resettlement 8
Table 3 Comparison Table between JICA Guideline and Laws of Vietnam 9
Table 4 Summary of land acquisition and resettlement 15
Table 5 Summaries on Impacts on the Other Objects and Architectures 16
Table 6 Impacts on Trees and Crops 16
Table 7 Household Population and Size 18
Table 8 Education of affected households 18
Table 9 Occupation of affected households 19
Table 10 Average Income of Affected Households 20
Table 11 Structure of Income Sources of Affected Households 20
Table 12 Structure of Expenditure of Households 21
Table 13 Monthly Income, Expenditure and Accumulation of the Households by Component 21
Table 14 Living Standard Classification of Households 22
Table 15 Furnitures of the Surveyed Households 23
Table 16 Summary of other vulnerable PAPs 23
Table 17 Entitlement Matrix 26
Table 18 Major procedures of Land Acquisition and Resettlement 37
Table 19 Schedule of Land Acquisition and Resettlement 40
Table 20 Implementation Costs of ARP 42
Table 21 Community Meeting Consultations 45

LIST OF FIGURES

Figure 1 Summary of Facilities Proposed for Water Supply Development of Northern Binh Duong Province ..... 8A - 5
Figure 2 Map of Ben Cat District 6
Figure 3 Economic Structure in Ben Cat District 6
Figure 4 Education of Affected Household 18
Figure 5 Occupation structure of affected households 19
Figure 6 Level of Expenditure by Poor/None Poor Classification 21
Figure 7 Living Standard Classification of Households According to Surveyor’s Evaluation 22
Figure 8 Relationship of organization 38

ABBREVIATIONS

ARP	Abbreviated Resettlement Plan
BIWASE	Binh Duong Water Supply – Sewerage - Environment Co., Ltd. Binh Duong Water Supply & Drainage Environment One-Member Company Ltd.
CPC	Commune People's Committee
CSRP	Compensation, Support and Resettlement Plan
DMS	Detailed Measurement Survey
DONRE	Department of Natural Resources and Environment
DPC	District People's Committee
EA	Executing Agency
JICA	Japan International Cooperation Agency
JICA GL	JICA Guidelines for Environmental and Social Considerations
LFDC	Land Fund Development Center
LURC	Land User Rights Certificate
ODA	Official Development Assistance
PAH	Project Affected Household
PAP	Project Affected Person
PC	People's Committee
PMU	Project Management Unit
PPC	Provincial People's Committee
PPP	Public Private Partnerships
RAP	Resettlement Action Plan
SES	Socio-Economic Survey
VND	Vietnam Dong
WB	World Bank
WTP	Water Treatment Plant

DEFINITION OF TERMS

Cut-off date	This refers to the date prior to which the occupation or use of the project area makes residents/users of the same eligible to be categorized as PAP. Persons not covered in the census are not eligible for compensation and other entitlements, unless they can show proof that (i) they have been inadvertently missed out during the census and the DMS; or (ii) they have lawfully acquired the affected assets following completion of the census and the DMS and prior to the conduct of the detailed measurement survey (DMS).
Detailed Measurement Survey (DMS)	This is the process where all fixed assets (i.e. lands used for residence, commerce, agriculture, including ponds; dwelling units; stalls and shops; secondary structures, such as fences, tombs, wells; trees with commercial value; etc.) and sources of income and livelihood inside the Project right-of-way are measured, detailed survey, level of lose identified and list of affected people as well as their replacement costs calculated. Additionally, the severity of impact to the affected assets and the severity of impact to the livelihood and productive capacity of PAPs will be determined.
Entitlement	Refers to a range of measures comprising compensation, income restoration support, transfer assistance, income substitution, relocation support, etc. which are due to the PAPs, depending on the type and severity of their losses, to restore their economic and social base.
Host Community	Means the community already in residence at a proposed resettlement or relocation site.
Income restoration	This is the re-establishment of sources of income and livelihood of the affected households.
Land Acquisition	Refers to the process whereby an individual, household, firm or private institution is compelled by a public agency to alienate all or part of the land it owns or possesses to the ownership and possession of that agency for public purposes in return for compensation at replacement costs.
Project Affected Persons	In the context of involuntary resettlement, Project Affected Persons (PAP) are those who are physically relocated (relocation, loss of residential land, or loss of shelter) and/or economically displaced (loss of land, assets, access to assets, income sources, or means of livelihood) as a result of (i) involuntary expropriation of land, or (ii) involuntary restrictions on land use or on access to legally designated parks and protected areas. In the case of affected household, it includes all members residing under one roof and operating as a single economic unit, who are adversely affected by a project or any of its components.

Relocation	This is the physical relocation of a PAP from her/his pre-project place of residence and/or business.
Replacement cost	Means the amount of cash or kind needed to replace an asset and is the value determined as compensation for: i. Agricultural land at the pre-project or pre-displacement level, whichever is higher and is based on productive value; and residential or commercial land based on market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of any registration and transfer taxes; ii. Land in urban areas, it is the pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes; iii. Houses and other related structures based on current market prices of materials, transportation of materials to construction site, cost of labour and other essential costs as well as taxes. In determining replacement cost, depreciation of assets and value of salvaged building materials are not taken into account and no deductions are made for the value of benefits to be derived from the project or transaction costs; iv. Crops, trees and other perennials based on current market value; and v. Other assets (i.e. income, cultural or aesthetic resources) based on replacement cost or cost of mitigating measures.
Replacement Cost Study	This refers to the process involved in determining replacement costs of affected land and assets based on empirical data.
Seriously Affected Households	This refers to affected households who will (i) lose 20% or more of total productive land and/or assets, and/or (ii) have to relocate; and/or (iii) lose 20% or more of their total income sources due to the Project.
Vulnerable Groups	These are distinct groups of people who might suffer disproportionately or face the risk of being further marginalized by the effects of resettlement and specifically include: (i) female headed households with dependents, (ii) disabled household heads, (iii) poor households, (iv) policy households such as martyr households, households with invalid or agent orange persons, and (v) landless households, (vi) indigenous people or ethnic minorities.

PART 1 EXECUTIVE SUMMARY

Overview of the Project. For ensuring adequate water for the development of the province, especially in the Northern part of Binh Duong in which many industrial parks and new city of the province are located, The Water Supply Project in the New City and Industrial Complex in the Northern Part of Binh Duong Province (herein after referred to as "the Project") is conducted basing on the Public Private Partnerships (PPP) between the BIWASE and JICA. The Project consists of 05 major components such as: i) Raw Water Pipeline I (between the existing canal and regulating reservoir) with an Intake Facility, ii) Raw Water Regulating Reservoir with a Pumping Station, iii) Raw Water Pipeline II (between the pumping station and WTP), iv) WTP and v) Distribution Mains. Some of the planned sites for facilities are occupied, so land acquisition with resettlement issue is in progress.

In order to be funded by the Japan International Cooperation Agency (JICA), Abbreviated Resettlement Plan (ARP) should be conducted in compliance with the JICA Guidelines for Environmental and Social Considerations (JICA GL). This report as "Abbreviated Resettlement Plan" is prepared to summarize the result of RAP complied with JICA GL. Since JICA GL refers to World Bank Policy, its references are also described in this report.

This draft report is prepared by the JICA Survey Team in the preparatory survey for the Project before the Alternative is fixed, so it is described based on general ideas and should be modified in accordance with the future situation.

The Project aims to ensure the needs of water supply and environment sanitation for the Binh Duong northern area; Existing Supply for Urban areas; Thu Dau Mot, Ben Cat, Tan Uyen, Thuan An and Di An, New Housing areas and Industrial Parks areas; An Tay, My Phuoc I, II, III, IV, VSIP I, Expanded VSIP II, and New City, and Bau Bang area for raw water supply.

Scope of Land Acquisition and Resettlement Impacts. There are around 500 of households who are acquired their land. Total of acquired area is 1,304,830m^2. There is no any school, health and religion facilities as well as the architects are affected by the Project.

Legal and Policy Framework. The legal and policy framework for compensation, resettlement and rehabilitation under the Project is defined by the relevant laws and regulations of the Government of Viet Nam and the JICA's policy on Involuntary Resettlement in 2010. Where there are gaps between the Vietnam legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practices and JICA's Policy.

Objectives of Compensation and Entitlements. The overall objective of the compensation and entitlement policy for the Project is to ensure that all people affected by the Project will be able to restore their pre-project conditions while the poor and vulnerable households will be able to improve their pre-project living standards and income-earning capacity through compensation for the loss of physical and non-physical assets and, as required, other assistance and rehabilitation measures. Compensation will be based on the principle of replacement cost while additional assistance in cash and in-kind will also be provided depending on the severity of impacts. Income restoration measures or programs for severely affected and vulnerable households will be designed and implemented in consultation with PAPs during ARP updating.

Project Policies. The basic principle applied in this ARP is that all PAPs must be "supported in their efforts to improve their living standards, income-generating capacity and production to at least the

same as or better than their standards of living before the project implementation. The lack of a legal basis for land use does not bar affected households from the entitlements of economic recovery compensation and/or support. Affected assets must be compensated on the basis of their replacement cost.
The cut-off-date for eligibility for entitlement is the day after completing the detailed measure survey (DMS). Affected Persons and local communities have been informed of the cut-off date. Accordingly, after this date new invest lands/assets in the Project's affected areas will not eligible to receive any compensation and/or support from the Project.

Mitigation Measures. In the process of preparing the Project, there was close cooperation between the technical consultant and the social consultant to achieve the Project's two objectives of promoting the efficiency of the investment in the Project and minimizing land acquisition. Accordingly, there are 08 mitigation measures proposed, include (i) Recommended the different alternatives, (ii) Disseminating Information about the Project's policy and entitlements to gain people's participation and support, (iii) Compensation for PAPs based on the replacement cost, (iv) conduct closely monitoring and evaluating activities, including internal monitoring if necessary, (v) all trees and crops will be harvested before land acquisition, (vi) Particularly pay intention to the vulnerable groups which include none-land household, poor, loneliness elderlies, disabled persons, policy households (vii) Beside the compensation according the replacement cost, the project will provide assistances such as livelihood stability assistance, support for vocational training and career change, income restoration of these households, (viii) Encourage the contractors to use the local labors and attract the members in working-age of PAPs to work long-term for the Project. In addition, further comprehensive studies and recommendations for resolving negative social and cultural impacts.

Ethnicity, Vulnerability and Gender Issues. All affected households are Kinh. The census identified 22 households who are considered vulnerable households as the household head or members of the household fall on one or more types of vulnerability: female-headed household, elderly households, and poor households as defined by the Ministry of Invalids and Social Affairs (MOLISA), policy households, households with Agent Orange persons, none-land households. These vulnerable households will be particularly paid attention by the Project. They are invited to the community meetings during ARP implementation to disseminate on the Project's policies and collect their expectations, to ensure that their special needs and concerns are identified and addressed and that restoration or improvement of their socio-economic conditions will be carefully monitored.

Entitlements of PAPs. The project entitlements developed correspond to the impacts identified during the census and detailed measure survey. Entitlements adopted are based on the JICA's policies, the Government Decisions, and the results of consultation with PAPs (to ensure that losses are restored, if not improved). Entitlements for each type of PAPs are based on the types and levels of losses. Unit rates presented in the ARP and Entitlement Matrix basing on the replacement cost units evaluated by Binh Duong PPC.

All households to be displaced in the affected areas attended the public consultations to receive information, consider the levels of the Project impact, and present their recommendations for the plan for their new lives. Information obtained during the consultations was used to establish project resettlement policies and assist in making the compensation plans for the Project's implementation.
06 public consultation meetings were held by the LFDC, covered 100% of PAPs (53.5% participants was men and 46.5% was women). Content of the meetings were major focused on consultation of Project's related policies (compensation procedures, income & livelihood restoration programs, resettlement selections, etc), expectation of PAPs. On the other hand, the meetings also introduced to PAPs the project's information (such as project components & investment targets, time for land clearance, compensation and resettlement, entitlement and benefits of relocation PAPs and etc). Public consultation result showed that, 100% PAPs agreed with the project's policy.

Relocation and Resettlement of P**APs.** The displaced household expected to resettle by themselves and that is why it is no necessary to prepare a resettlement site.

Income Rehabilitation Measures. Some income rehabilitation measures are applied in this Project such as (i) Assistance for Living and Production Rehabilitation for the affected households with agricultural land, without agricultural land, or business and production; (ii) Assistance for the poor households and the other vulnerable groups; (iii) Assistance for Vocational Training and Job Creation;

Implementation Arrangements and Capacity Building Interventions. PMU will be responsible to prepare the ARP and submit to JICA for approval and PMU responsible for implementing and monitoring on the ARP implementation with the support from LFDC.

Grievance Redress Mechanism. A well-defined grievance redress and resolution mechanism was established to address the grievances and complaints of PAPs regarding land acquisition, compensation and resettlement in a timely and satisfactory manner. PAPs are entitled to lodge complaints regarding any aspect of the land acquisition and resettlement requirements; compensation policy, entitlements, rates and payment; and, strategies and procedures for resettlement including assistance from livelihood & income restoration programs. A four-stage procedure for redress of grievances is provided in the main report. The grievance mechanism was also disclosed to PAPs during consultations with them.
In the implementation of the ARP, complaints will be resolved in accordance with the approved procedure in the ARP. All complaints from PAPs will be resolved fairly and quickly by authorities at levels and project staff. There will be no administrative charge for the settlement of complaints or for redressing grievances.

Monitoring and Evaluation. Regular monitoring will be undertaken by the PMU will submit quarterly progress reports to JICA.

Resettlement Budget. The total budget for implementing this ARP is VND 444,581,108,000,. This amount covers compensation and allowances, design and implementation of income restoration measures, administration cost and contingency. As cost of land acquisition and resettlement will be paid by the Viet Nam government.

Implementation Plan. The compensation has been paid to the affected households part by part since December, 2012. And it is expected to complete the compensation payment and the site clearance in Mar, 2014. The PMU will not allow construction activities in specific sites until all resettlement activities have been satisfactorily completed, agreed rehabilitation assistance is in place, and that the site is free of all encumbrances.

PART 2 GENERAL INTRODUTION

2.1 Overview of the Project

For ensuring adequate water for the development of the province, especially in the Northern part of Binh Duong in which many industrial parks and new city of the province are located, The Water Supply Project in the New City and Industrial Complex in the Northern Part of Binh Duong Province (herein after referred to as "the Project") is conducted basing on the Public Private Partnerships (PPP) between the BIWASE and JICA. The Project consists of 05 major components are: i) Raw Water Intake Facilities; ii) Raw Water Transmission Pipeline; iii) Regulating Reservoir; iv) North Binh Duong Water Treatment Plant; and v) Distribution Mains. Some of the planned sites for facilities are occupied, so land acquisition with resettlement issue is in progress.

The Project aims to ensure the needs of water supply and environment sanitation for the Binh Duong northern area; Existing Supply for Urban areas; Thu Dau Mot, Ben Cat, Tan Uyen, Thuan An and Di An, New Housing areas and Industrial Parks areas; An Tay, My Phuoc I, II, III, IV, VSIP I, Expanded VSIP II, and New City, and Bau Bang area for raw water supply..

In order to be funded by the Japan International Cooperation Agency (JICA), Abbreviated Resettlement Plan (ARP) should be conducted in compliance with the JICA Guidelines for Environmental and Social Considerations (JICA GL). This report as "Abbreviated Resettlement Plan" is prepared to summarize the result of RAP complied with JICA GL. Since JICA GL refers to World Bank Policy, its references are also described in this report.
This draft report is prepared by the JICA Survey Team in the preparatory survey for the Project before the Option is fixed, so it is described based on general ideas and should be modified in accordance with the future situation.

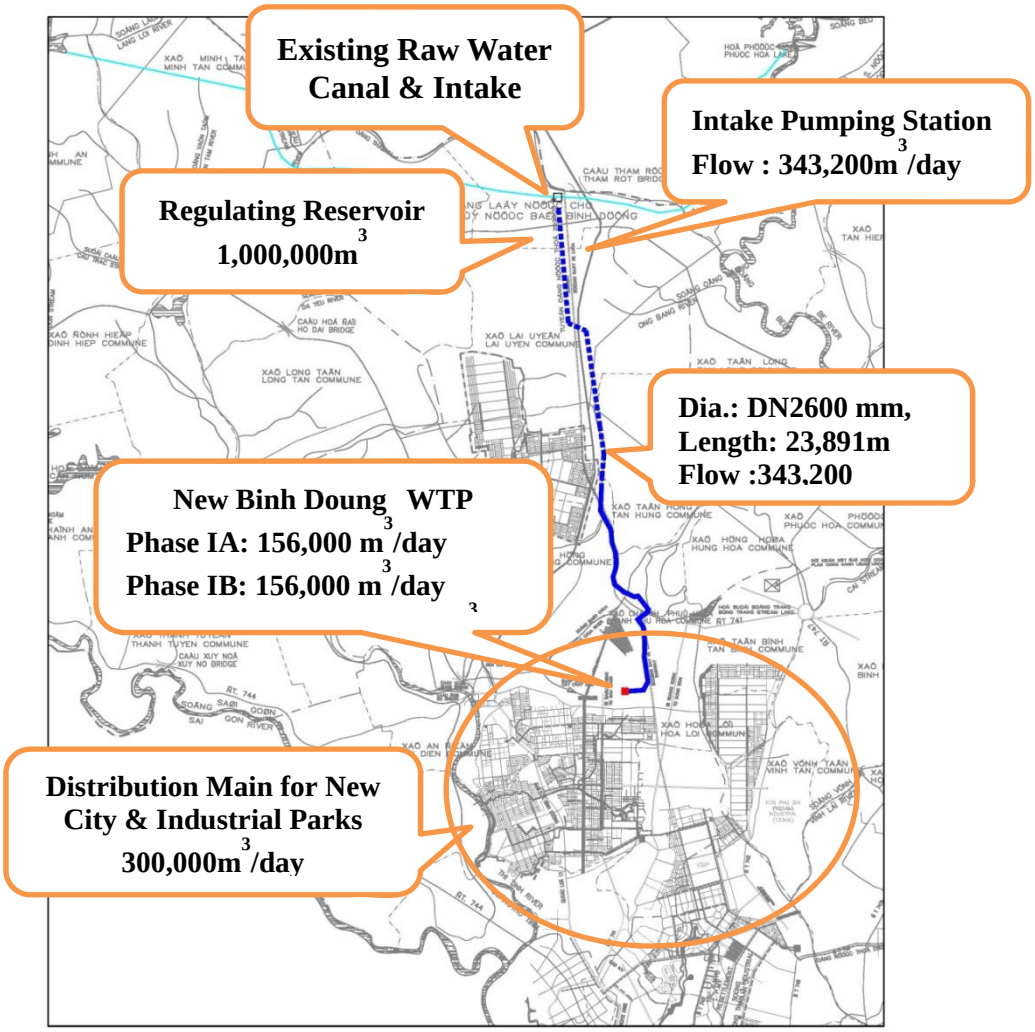
2.2 Outline of the Project Components

Main components of the project are: i) Raw Water Intake Facilities; ii) Raw Water Transmission Pipeline; iii) Regulating Reservoir; iv) North Binh Duong Water Treatment Plant; and v) Distribution Mains. Some of the planned sites for facilities are occupied, so land acquisition with resettlement issue is in progress. Summary of Facilities Proposed forFor Water Supply Development of Northern Binh Duong Province is shown in **Table 1** and **Figure 1**.

Table 1 Summary of Facilities Proposed
For Water Supply Development of Northern Binh Duong Province

Facility	Capacity of the Facilities	
	Phase I with 300,000 m^3/d of NBDWTP	Final Stage with 1,000,000 m^3/d of NBDWTP
Regulating Reservoir	1,000,000 m^3 near intake facility	2,000,000 m^3 near intake facility
Intake Pumping Station	Pump: 3 pumps including 1 standby Flow : 3.97m^3/sec = 343,200m^3/day Head: 13.3 m	Pump: 5 pumps including 1 standby Flow : 3.97m^3/sec = 343,200m^3/day Head: 13.3 m
Raw Water Pipeline	Dia.: DN2600 mm, Length: 23,891m Flow :343,200 m^3/day Pressurized main from Regulating Reservoir to NBDWTP	Dia.: DN2600 mm, length: 23,891m, Dia.: DN2300 mm, length: 23,891m Flow:1,144,000m^3/d Pressurized main from Regulating Reservoir to NBDWTP
NBDWTP	Capacity Phase IA: 156,000 m^3/day Phase IB: 156,000 m^3/day Total of Phase I: 312,000 m^3/d	Capacity : 1,040,000 m^3/d
Distribution Main	DN 400 - 2500, Length: 48.58 km	DN 300 - 2500, Length: 299.33 km

Source: JICA Survey Team



Source: JICA Survey Team

Figure 1 Summary of Facilities Proposed for Water Supply Development of Northern Binh Duong Province

2.3 Objectives of the ARP

The overall objectives of this resettlement policy are (i) to avoid, if not, minimize resettlement impacts; (ii) if impacts are unavoidable, ARP is prepared in a way to ensure that affected persons are not worse off; rather, they should be able to at least maintain or otherwise improve their pre-project living standards and income-earning capacity.

2.4 Socio-economic Conditions of the Project Area

2.4.1 About Binh Duong province

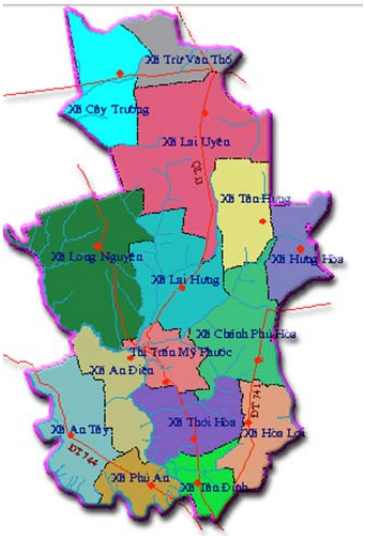
Binh Duong is a province located in the southern key economic zone, its economic growth is very fast. Especially the industrial sector is strongly developing compared to other provinces in the economic quadrangle in particular and the country in general. Province's economic growth rate is quite high and stable during the period 2005-2010, GDP per capita increased by 14%/year and continue to maintain high growth rates in the period 2010-2020.

With an open policy, incentives and calling for domestic and foreign investment in Binh Duong province, over the years, a series of industrial parks have been established and put into operation. Binh Dương currently has 28 industrial parks has been approved by the Government with a total area of 8,925 ha and 5,337 ha of leased IPs' land.

Along with the development of the industry, is the development of the urban population is increasing rapidly. Beside Thu Dau Mot Town, Di An Town, Thuan An Town and the existed towns such as Uyen Hung, My Phuoc, Dau Tieng and Phuoc Vinh, now Binh Duong is forming the new urban areas with total area of 7,554 ha. The province is investing to build the administrative center of the city Binh Duong locates in the Industry - Services – Urban Complex with scale 1,000 ha. The survey data of 2008, the population in the project area nearly 1.2 million people. Mechanical speed of population growth in the region is a large fluctuations is proportional to the industrial development of the province. Forecast for the years, the population growth rate of approximately 7.3%/year. It is expected that by 2020, the population concentrated in urban areas, urban clusters and nearby industrial parks in the province of nearly is 2.3 million people.
In these accomplishments, Ben Cat District have a large role in the process of economic restructuring in the province, namely planning, urban and industrial development with high efficiency, such as: the Industrial zones My Phuoc 1, 2, 3, Industrial Zones Bau Bang, Lai Hung, An Tay, Rach Bap, Thoi Hoa, Tan Dinh Viet Huong, ...

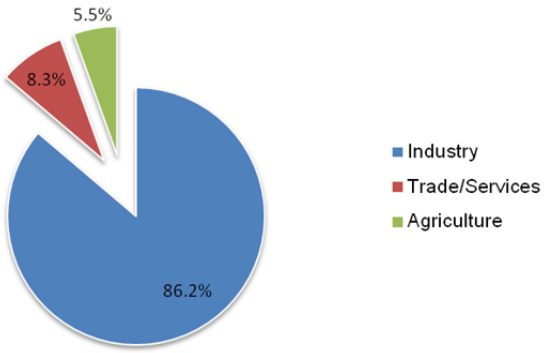
2.4.2 About Ben Cat District

Ben Cat district consists of 01 town and 14 communes. The whole population of the District is 151,097 persons.
Ben Cat District is located in the southern key economic region; the district center is away from Thu Dau Mot Town 20km, away from Ho Chi Minh City 50km, with National Highway13acrossing. The district has large reserves of non-metallic minerals such as kaolin, clay for brick, red gravel; rich surface water and ground water, with 2 rivers Saigon and Thi Tinh flowing through the district area, the weather is good all year.
System of waterways, roads developed links the districts in the province and Ho Chi Minh City. Ben Cat has great potential for development of industrial crops, fruit trees and industrial parks construction planning, industrial complexes, is prerequisite for industrial production. The total natural area is 584.37km^2.



Source: http://eng.binhduong.gov.vn
Figure 2 Map of Ben Cat District

Economic Conditions of Ben Cat district
GDP Growth in 2012 is 16.9%. Industry sector play a key role in this district. Economic structure is developing and shifting towards increasing the proportion of industry and services in GDP. In 2012, Industry presents for 86.2% of economic structure, the rests are services (8.3%), agriculture (5.5%).



Source: JICA Survey Team
Figure 3 Economic Structure in Ben Cat District

Up to now, the district have 08 industrial zones, with total area is 4,086 ha and 18 urban or residential areas with total area is 4,744 ha.
Average income: 35,500,000 VND or 1,730 USD per person per year (2012, Ben Cat's DPC)

PART 3 LEGAL FRAMEWORKS AND ENTITLEMENT POLICY

The legal and policy framework for compensation, resettlement and rehabilitation under the Project is defined by the relevant laws and regulations of the JICA and the Viet Nam Government. Where there are gaps between the Vietnam legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practices and JICA's Policy.

3.1 Vietnamese Laws, Decrees, and Circulars

1. The Constitution of the Socialist Republic of Viet Nam (1992) confirms the right of citizens to own and protect the ownership of a house. In addition, the Government has enacted a number of laws, decrees and regulations that constitute the legal framework for land acquisition, compensation and resettlement. The principal documents include:

* Decree No.197/2004/ND-CP, on compensation, rehabilitation and resettlement in the event of land recovery by the State, as amended by Decree No.17/2006/ND-CP;

* Decree 69/2009/ND-CP of 13/8/2009 (Supplementary Regulations Regarding Land Use Planning, Land Pricing, Land Acquisition, Compensation, Assistance and Resettlement) amends Decree No. 197/2004/ND-CP, extends eligibility and provides additional entitlements, compensation and assistance over previous legislation.

* Circular No.14/2009/TT-BTNMT dated 01/10/2009 of Ministry of Natural Resources and Environment regulated details on compensation, assistances and resettlement and procedures for land acquisition, handing over land, land lease takes effect;

* The Land Law No. 13/2003/QH11, providing a comprehensive land administration law;

* Decrees No. 188/2004/ND-CP and 123/2007, specifying the methods for land pricing and land price frameworks in the event of land recovery by the State. There is also Decree No.84/2007/ND-CP, which stipulates issue of LURC, land acquisition, land use right implementation, procedure of compensation, and assistance in the event of land recovery by the state and grievance redress.

2. Other laws, decrees and regulations relevant to land management, land acquisition and resettlement include the Construction Law 16/2003/QH11 on compensation and relocation of people affected by ground clearance for investment projects, Decree 16/2005-ND-CP on the implementation of the Construction Law, Decree 182/2004/ND-CP on penalties for administrative violations in land issues, Decree 198/2004/ND-CP on land use fees.

3. Laws, decrees and decisions relevant to public disclosure of information include Land Law, No.13/2003/QH11, Article 39, requiring disclosure of information to affected people prior to recovery of agricultural and non-agricultural land of, respectively, 90 and 180 days minimum and Decision 3037/QD-BGTVT, 2003, making the Project Management Unit (PMU) together with the Resettlement Committee responsible for public disclosure through mass media of the Project policies and the extent of site clearance to local people, particularly those that will be affected. The Decree 69/2009/ND-CP, Article 29, regulated about introduction of location and notice of land acquisition.

4. Decrees relevant to protection and preservation of cultural property include Decree No.172/1999/ND-CP, Article 25, requiring that sites currently recognized for cultural and historical preservation and that are situated within the boundaries of waterway safety corridors, should be kept

intact according to current legal regulations.

3.2 Binh Duong Province Regulations on Resettlement

Binh Duong Province Regulations on Resettlement is followings;

• Decision No. 87/2009/QĐ-UBND dated 21 December 2009 on compensation, assistance and resettlement in Binh Duong Province. This decision applied the Decree No. 69/2009/ND-CP of the Central Government.

• Decision No. 58/2011/QĐ-UBND dated 19/12/2011 regulated on unit price on compensation, assistance for housing, asset, architecture, trees and crops when the State acquires land in Binh Duong Province in 2012.

• Decision No. 67/2011/QĐ-UBND, issued the regulation on of land price adjustment coefficient (K) in 2012 in Binh Duong province

3.3 JICA Guideline on Involuntary Resettlement

JICA's policy on involuntary resettlement is summarized in **Table 2**:

Table 2 JICA's Policy on Involuntary Resettlement

The key principle of JICA policies on involuntary resettlement is summarized below.

I. Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives.

II. When, population displacement is unavoidable, effective measures to minimize the impact and to compensate for losses should be taken.

III. People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels.

IV. Compensation must be based on the full replacement cost as much as possible.

V. Compensation and other kinds of assistance must be provided prior to displacement.

VI. For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. It is desirable that the resettlement action plan include elements laid out in the World Bank Safeguard Policy, OP 4.12, Annex A.

VII. In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people.

VIII. Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans.

IX. Appropriate and accessible grievance mechanisms must be established for the affected people and their communities.

Above principles are complemented by World Bank OP 4.12, since it is stated in JICA Guideline that "JICA confirms that projects do not deviate significantly from the World Bank's Safeguard Policies". Additional key principle based on World Bank OP 4.12 is as follows

X. Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits.)

XI. Eligibility of Benefits include, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying.

XII. Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based.

XIII. Provide support for the transition period (between displacement and livelihood restoration.

XIV. Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (

XV. For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared.

In addition to the above core principles on the JICA policy, it also laid emphasis on a detailed resettlement policy inclusive of all the above points; project specific resettlement plan; institutional framework for implementation; monitoring and evaluation mechanism; time schedule for implementation; and, detailed Financial Plan etc.

Description of "replacement cost" is as follows.

Land	Agricultural Land	The pre-project or pre-displacement, whichever is higher, market value of land of equal productive potential or use located in the vicinity of the affected land, plus the cost of preparing the land to levels similar to those of the affected land, plus the cost of any registration and transfer taxes.
	Land in Urban Areas	The pre-displacement market value of land of equal size and use, with similar or improved public infrastructure facilities and services and located in the vicinity of the affected land, plus the cost of any registration and transfer taxes.
Structure	Houses and Other Structures	The market cost of the materials to build a replacement structure with an area and quality similar or better than those of the affected structure, or to repair a partially affected structure, plus the cost of transporting building materials to the construction site, plus the cost of any labor and contractors' fees, plus the cost of any registration and transfer taxes.

Source: JICA GL

3.4 The Comparison between JICA Guideline and Vietnamese Laws and Decrees

The contents of JICA GL on involuntary resettlement are compared with the Government's Laws and Decrees. The differences between the Government's Laws and Decrees and JICA GL with regard to resettlement and compensation for this Project, and how to address these gaps are shown in **Table 3**.

Table 3 Comparison Table between JICA Guideline and Laws of Vietnam

No.	JICA GL	Laws of Vietnam	JICA GL not covered by Laws of Vietnam	Counter-measures
1.	Involuntary resettlement and loss of means of livelihood are to be avoided when feasible by exploring all viable alternatives. (JICA GL)	"Location options should be in line with construction planning and provide solutions to minimize the social and environmental impacts" and "assessment of conditions and reasoning for selected location". Decision 48/2008/QD-TT on development of F/S	Alternatives	Alternatives were considered in FS and EIA report
2.	When population displacement is unavoidable, effective measures to minimize impact and to compensate for losses should be taken. (JICA GL)	Decision 48/2008/QD-TT	Equivalent	Not necessary
3.	People who must be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported, so that they can improve or at least restore their standard of living, income opportunities and production levels to pre-project levels. (JICA GL)	Decision 48/2008/QD-TT	Equivalent	Not necessary
4.	Compensation must be based on the full replacement cost as much as possible. (JICA GL)	Decision 48/2008/QD-TT	Equivalent	Not necessary
5.	Compensation and other kinds of assistance must be provided prior to displacement. (JICA GL)	Land hand over: "Within twenty (20) days after being fully paid the compensation and support money, the person having land recovered shall hand over land to the compensation and ground clearance organization." (Article 29; Circular 14/2009/TT-BTNMT) dated 01 October 2009	Equivalent	Not necessary
6.	For projects that entail large-scale involuntary resettlement, resettlement action plans must be prepared and made available to the public. (JICA GL)	The scale-criterion is not yet specified for involuntary resettlement.	Specific countermeasures for large-scale resettlement	Abbreviated resettlement plan will be adopted because DP are estimated less than

No.	JICA GL	Laws of Vietnam	JICA GL not covered by Laws of Vietnam	Counter-measures
				200.
7.	In preparing a resettlement action plan, consultations must be held with the affected people and their communities based on sufficient information made available to them in advance. (JICA GL)	RAP should include information of public consultation. Decision 48. Issuing general guidelines on feasibility study reports of projects using ODA funds of the 5 bank group	Equivalent	Not necessary
8.	When consultations are held, explanations must be given in a form, manner, and language that are understandable to the affected people. (JICA GL)	Not properly specified. RAP should include information of public consultation. Decision 48. Issuing general guidelines on feasibility study reports of projects using ODA funds of the 5 bank group	Language designation	Explanations were given in local language
9.	Appropriate participation of affected people must be promoted in planning, implementation, and monitoring of resettlement action plans. (JICA GL)	Not specified	Participation promotion	Participation of affected people is promoted (Described in 12 in this report, check)
10.	Appropriate and accessible grievance mechanisms must be established for the affected people and their communities. (JICA GL)	Properly specified at Article 138 of Land Law (2003); Article 63 & 64, Decree 84/2007/ND-CP and Decree 136/2006/ND-CP	Equivalent	Not necessary
11.	Affected people are to be identified and recorded as early as possible in order to establish their eligibility through an initial baseline survey (including population census that serves as an eligibility cut-off date, asset inventory, and socioeconomic survey), preferably at the project identification stage, to prevent a subsequent influx of encroachers of others who wish to take advance of such benefits. (WB OP4.12 Para.6)	An initial baseline survey is not specified. Decree 136/2006/ND-CP	Cut-off-date specification	Cut-off-date shall be defined
12.	Eligibility of benefits includes, the PAPs who have formal legal rights to land (including customary and traditional land rights recognized under law), the PAPs who don't have formal legal rights to land at the time of census but have a claim to such land or assets and the PAPs who have no recognizable legal right to the land they are occupying. (WB OP4.12 Para.15)	Compensation will be paid to current users of land recovered by the State who fully satisfy the conditions specified in Clauses 1, 2, 3, 4, 5, 7, 9, 10 and 11, Article 8 of Decree No. 197/2004/ND-CP and Articles 44, 45 and 46 of Decree No. 84/2007/ND-CP. For land users who are ineligible for compensation, provincial level PC shall consider these cases in order to provide support.	Similar	Eligibility is defined.
13.	Preference should be given to land-based resettlement strategies for displaced persons whose livelihoods are land-based. (WB OP4.12 Para.11)	"Land used for a certain purpose which is recovered by the State shall be compensated with new land with the same use purpose," Decree 69; Article 14[2] Compensation and support principles	Preference specification	Livelihoods of displaced persons are basically land-based.
14.	Provide support for the transition period (between displacement and livelihood restoration). (WB OP4.12 Para.6)	Supports include: (i) support for relocation and resettlement in case of recovery of residential land; (ii) support for life and production and stabilization; (iii) support for job-change training and job creation in case of recovery of agricultural land; (iv) support upon recovery of agricultural land in residential	Covered	Not necessary

No.	JICA GL	Laws of Vietnam	JICA GL not covered by Laws of Vietnam	Counter-measures
		areas or garden or pond land not recognized as residential land and other supports. Article 17; Decree 69.		
15.	Particular attention must be paid to the needs of the vulnerable groups among those displaced, especially those below the poverty line, landless, elderly, women and children, ethnic minorities etc. (WB OP4.12 Para.8)	Not specified.	Vulnerable groups specification	PPCs are in charge of attention in the process of important decisions
16.	For projects that entail land acquisition or involuntary resettlement of fewer than 200 people, abbreviated resettlement plan is to be prepared. (WB OP4.12 Para.25)	Not specified.	Preparation of ARP	Preparation of ARP
17.	Threshold of serious effect to the household income source due to agricultural land acquisition (WB OP4.12 P)	Losing over 30% of agricultural land	Losing over 20% of agricultural land.	Losing 20% or more of their total productive land

Source: JICA Survey Team

3.5 The Project's Land Acquisition and Resettlement Policy

With consideration of Item 3.4., The Project's principles are shown as following.

(i) The Government of Vietnam will use the Project Resettlement Policy (the Project Policy) for the Project specifically because existing national laws and regulations have not been designed to address involuntary resettlement according to international practice, including JICA's policy. The Project Policy is aimed at filling-in any gaps in what local laws and regulations cannot provide in order to help ensure that PAPs are able to rehabilitate themselves to at least their pre-project condition. This section discusses the principles of the Project Policy and the entitlements of the PAPs based on the type and degree of their losses. Where there are gaps between the Vietnam legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Government practices and JICA's Policy.

(ii) Land acquisition and involuntary resettlement will be avoided where feasible, or minimized, by identifying possible alternative project designs that have the least adverse impact on the communities in the project area.

(iii) Where displacement of households is unavoidable, all PAPs (including communities) losing assets, livelihoods or resources will be fully compensated and assisted so that they can improve, or at least restore, their former economic and social conditions.

(iv) Compensation and rehabilitation support will be provided to any PAPs, that is, any person or household or business which on account of project implementation would have his, her or their:

・Standard of living adversely affected;

・Right, title or interest in any house, interest in, or right to use, any land (including premises, agricultural and grazing land, commercial properties, tenancy, or right in annual or perennial crops and trees or any other fixed or moveable assets, acquired or possessed, temporarily or permanently;

・Income earning opportunities, business, occupation, work or place of residence or habitat adversely affected temporarily or permanently; or

・Social and cultural activities and relationships affected or any other losses that may be identified during the process of resettlement planning.

(v) All affected people will be eligible for compensation and rehabilitation assistance, irrespective of tenure status, social or economic standing and any such factors that may discriminate against achievement of the objectives outlined above. Lack of legal rights to the assets lost or adversely affected tenure status and social or economic status will not bar the

PAPs from entitlements to such compensation and rehabilitation measures or resettlement objectives. All PAPs residing, working, doing business and/or cultivating land within the project impacted areas as of the date of the latest census and inventory of lost assets(IOL), are entitled to compensation for their lost assets (land and/or non-land assets), at replacement cost, if available and restoration of incomes and businesses, and will be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-project living standards, income-earning capacity and production levels.

(vi) PAPs that lose only part of their physical assets will not be left with a portion that will be inadequate to sustain their current standard of living. The minimum size of remaining land and structures will be agreed during the resettlement planning process.

(vii) People temporarily affected are to be considered PAPs and resettlement plans address the issue of temporary acquisition.

(viii) Where a host community is affected by the development of a resettlement site in that community, the host community shall be involved in any resettlement planning and decision-making. All attempts shall be made to minimize the adverse impacts of resettlement upon host communities.

(ix) The resettlement plans will be designed in accordance with Vietnam's National Involuntary Resettlement Policy and JICA's Policy on Involuntary Resettlement.

(x) The Resettlement Plan will be translated into local languages and disclosed for the reference of PAPs as well as other interested groups.

(xi) Payment for land and/or non-land assets will be based on the principle of replacement cost.

(xii) Compensation for PAPs dependent on agricultural activities will be land-based wherever possible. Land-based strategies may include provision of replacement land, ensuring greater security of tenure, and upgrading livelihoods of people without legal land titles. If replacement land is not available, other strategies may be built around opportunities for re-training, skill development, wage employment, or self-employment, including access to credit. Solely cash compensation will be avoided as an option if possible, as this may not address losses that are not easily quantified, such as access to services and traditional rights, and may eventually lead to those populations being worse off than without the project.

(xiii) Replacement lands, if the preferred option of PAPs, should be within the immediate vicinity of the affected lands wherever possible and be of comparable productive capacity and potential. As a second option, sites should be identified that minimize the social disruption of those affected; such lands should also have access to services and facilities similar to those available in the lands affected.

(xiv) Resettlement assistance will be provided not only for immediate loss, but also for a transition period needed to restore livelihood and standards of living of PAPs. Such support could take the form of short-term jobs, subsistence support, salary maintenance, or similar arrangements.

(xv) The resettlement plan must consider the needs of those most vulnerable to the adverse impacts of resettlement (including the poor, those without legal title to land, ethnic minorities, women, children, elderly and disabled) and ensure they are considered in resettlement planning and mitigation measures identified. Assistance should be provided to help them improve their socio-economic status.

(xvi) PAPs will be involved in the process of developing and implementing resettlement plans.

(xvii) PAPs and their communities will be consulted about the project, the rights and options available to them, and proposed mitigation measures for adverse effects, and to the extent possible be involved in the decisions that are made concerning their resettlement.

(xviii) Adequate budgetary support will be fully committed and made available to cover the costs of land acquisition (including compensation and income restoration measures) within the agreed implementation period. The funds for all resettlement activities will come from the Government.

(xix) Displacement does not occur before provision of compensation and of other assistance required for relocation. Sufficient civic infrastructure must be provided in resettlement site prior to relocation. Acquisition of assets, payment of compensation, and the resettlement and start of the livelihood rehabilitation activities of PAPs, will be completed prior to any construction activities, except when a court of law orders so in expropriation cases.

(Livelihood restoration measures must also be in place but not necessarily completed prior to construction activities, as these may be ongoing activities.)

(xx) Organization and administrative arrangements for the effective preparation and implementation of the resettlement plan will be identified and in place prior to the commencement of the process; this will include the provision of adequate human resources for supervision, consultation, and monitoring of land acquisition and rehabilitation activities.

(xxi) Appropriate reporting (including auditing and redress functions), monitoring and evaluation mechanisms, will be identified and set in place as part of the resettlement management system.

Cut-off-date of Eligibility

The cut-off-date of eligibility refers to the date prior to which the occupation or use of the project area makes residents/users of the same eligible to be categorized as PAPs and be eligible to Project entitlements. In the Project, cut-off dates for titleholders will be the date of notification under the land acquisition and for non-titled holders will be the beginning date of the population census. This date has been disclosed to each affected village by the relevant local governments and the villages have disclosed to their populations. The establishment of the eligibility cut-off date is intended to prevent the influx of ineligible non-residents who might take advantage of Project entitlements

Principle of Replacement Cost

All compensation for land and non-land assets owned by households/shop owners who meet the cut-off-date will be based on the principle of replacement cost. Replacement cost is the amount calculated before displacement, which is needed to replace an affected asset without depreciation and without deduction for taxes and/or costs of transaction as follows:

a. Productive Land based on actual current market prices that reflect recent land sales in the area, and in the absence of such recent sales, based on recent sales in comparable locations with comparable attributes, fees and taxes or in the absence of such sales, based on productive value;

b. Residential land based on actual current market prices that reflect recent land sales, and in the absence of such recent land sales, based on prices of recent sales in comparable locations with comparable attributes; fees and taxes.

c. Existing local government regulations for compensation calculations for building, crops and trees will be used wherever available.

d. Houses and other related structures based on actual current market prices of affected materials;

e. Annual crops equivalent to current market value of crops at the time of compensation;

f. For perennial crops, cash compensation at replacement cost that should be in line with local government regulations, if available, equivalent to current market value given the type and age at the time of compensation payment.

g. For timber trees, cash compensation at replacement cost that should be in line with local government regulations, if available, will be equivalent to current market value for each type, age and relevant productive value at the time of compensation based on the diameter at breast height of each tree.

PART 4 THE NEED OF LAND ACQUISITION AND RESETTLEMENT

4.1 The Need of Land Acquisition and Resettlement

Some of the planned sites for facilities are occupied, so land acquisition with resettlement issue is in progress. The land acquisition related to both 04 component of the project; i) Raw Water Intake Facilities; ii) Raw Water Transmission Pipeline; iii) Regulating Reservoir; and iv) North Binh Duong Water Treatment Plant.

4.2 Mitigation Measures

Along with positive impacts on socio-economic development and social lives, the Project will also cause negative impacts to households involved in land acquisition and site clearance, and in the area through which the Project passes. Identifying the negative impacts of land acquisition and site clearance, and proposing mitigation measures, is essential to eliminate or reduce negative impacts.

During Project preparation and design, the resettlement consultant has been closely cooperated with the PMU to minimize the impacts of the project on the lives of people in the project area. To mitigate the impacts on these households, in the Project and ARP implementation process, the following mitigation measures have been and would be applied:

In the Project preparation stage, technical and social teams have worked together to reduce the social impacts of the Project. Appropriate technical designs and construction alternatives have been made to avoid or detour around residential areas, acquiring public land without structures thereon, etc. Avoiding impacts is the Project's most effective mitigation measure and avoids any original negative impacts. At the same time, the technical consultant recommended the different alternatives to choose an optimal one, minimizing land acquisition and resettlement impacts. If negative impacts on properties are unavoidable, adequate compensation plans will be made to at least cover or restore any damages.
In the early stages of the Project's preparation, activities for disseminating information about the Project, land acquisition, site clearance, compensation and resettlement have been widely propagated to gain people's participation and support. On the other hand, getting the right information from the initial phase will help people prepare spirit and facilities for expected impacts from the project. The LFDC conducted public consultations over the project sites to (i) publicize project information and (ii) publicize some projected impacts, land acquisition and compensation scale, compensation and support for production. After populating project information, many opinions were exchanged. In general, local people strongly supported the Project and hoped that it would be soon executed to solve the social issues during construction period.

During implementation for compensation, the PAPs are compensated according to the replacement cost (market price). The unit price for compensation is surveyed by the LFDC and submits to the PPC for approval. Beside market price - based-compensating, the PAPs also get assistance depending on the level of impacts, socio-economic situation of the PAPs. Monitoring and evaluating activities for compensation and site clearance are closely implemented to mitigate the impacts arising from construction.
For the households with their trees and crops affected, they would harvest their trees and crops before land acquisition. They are also informed about the cut-off date of the project to stop cultivating on the affected land.
Particularly pay attention to the vulnerable group, including the poor, loneliness elderlies, single female headed households, disable persons, none-land person. Some PAPs who have no LURC and PAPs who eligible to acquire LURC but have yet receive LURC, the project implementation may strongly impact to those groups. Therefore, full compensation, supports and legally entitlements for them would be taken into account in ARP preparation stage. Especially, the majorities of displaced households are low-income households without land ownership and belong to the vulnerable group, so in the process of ARP implementation, they must be consulted and prioritized choosing income restoration programs.
To the agricultural and business households, beside the compensation according the replacement cost, the ARP will provide assistances such as livelihood stability assistance, support for vocational training and career change, and income restoration for them, etc.

In the construction stage, the Project will encourage the contractors to use the local labors in order to raise jobs and income for people in the project area, especially poor households and directly relocated households by the project.

PART 5 SCOPE OF LAND ACQUISITION AND RESETTLEMENT

A complete census and detailed measure survey (DMS) have been being conducted in the project area since March, 2012. The DMS determined the corridor of impact by juxtaposing project technical design drawings applicable at the time with cadastral maps of each affected commune. A preliminary list of affected land plots and their owners was accordingly derived from the cadastral records of each area.
The DMS collected data on all affected land and assets (structures, trees, and crops) as well as affected businesses by measuring and enumerating land and other assets with presence of affected households' representatives. The collected DMS data of each household is recorded in one minute with signatures of task team members and household's representative. The Socio-Economic Survey (SES) was conducted on a 100% relocated households, and 20% remaining households.

5.1 Scope of Land Acquisition and Resettlement

5.1.1 Impacts on Land

There are around 500 of households who are acquired their land. Total of acquired area is 1,679,830m^2. There is no any school, health and religion facilities as well as the architects are affected by the Project.

Table 4 Summary of land acquisition and resettlement

Work Items		Acquired (m^2)				Number of relocated households	Number of relocated Persons
		Residential Land	Agricultural Land	Public Land	TOTAL		
1	Raw Water Intake Facilities	0	10,500	0	10,500	0	0
2	Raw Water Transmission Pipeline	2,000	259,330	120,000	381,330	9	32
3	Regulating Reservoir	1,500	899,140	74,360	975,000	18	60
4	North Binh Duong Water Treatment Plant	0	310,900	2,100	313,000	0	0
Total		**3,500**	**1,479,870**	**196,460**			
		0.2%	**88.1%**	**11.7%**	**1,679,830**	**27**	**92**

Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

5.1.2 Impacts on Housing

There are total 27 displaced houses due to land acquisition with total of using area 1,890m^2. In which, there are 9 houses are under the Raw Water Pipeline Component, and 18 houses are under Reservoir Component. All affected houses are private-own, include 5 permanent ones and 22 semi-permanent ones.

5.1.3 Impacts on Other Objects and Architectures

Project causes the impacts on the other objects and architectures. Summary is shown in **Table 5**.

Table 5 Summaries on Impacts on the Other Objects and Architectures

No	Work Items	Toilet-Detached	Kitchen-Detached	Bath Room	Animal Stall	Ground, pavement	Graves	Water Pipeline
		piece	m^2	piece	m^2	m^2	piece	m
1	Raw Water Intake Facilities	-	-	-	-	-	-	-
2	Raw Water Transmission Pipeline	9	135.0	9	40.0	30.0	1	-
3	Regulating Reservoir	18	270.0	18	50.6	184.0	-	500.0
4	North Binh Duong Water Treatment Plant	-	-	-	-	-	-	-
Total		27	405.0	27	90.6	214.0	1	500.0

Source: JICA Survey Team (This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

5.1.4 Impacts on Trees and Crops

Project causes the impacts on the rubber trees. Besides, the Project also causes the impact on some other trees such as cashews, peppers.

Table 6 Impacts on Trees and Crops

No	Work Items	Rubber Trees over 10 year olds	Rubber Trees from5 to 10 year olds	Rubber Trees under 5 year olds	Pepper	Cashew	Crops
		Tree	Tree	Tree	Tree	Tree	m2
1	Raw Water Intake Facilities	25,000	30	-	-	-	2,000
2	Raw Water Transmission Pipeline	1,800	4,800	7,150	300	-	-
3	Regulating Reservoir	6,000	15,650	24,420	47,070	88,140	-
4	North Binh Duong Water Treatment Plant	2,400	6,660	8,325	-	-	-
Total		**35,200**	**27,140**	**39,895**	**47,370**	**88,140**	**2,000**

Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

5.1.5 Impacts on Business

There are one household doing small business which have to relocate their business location. This household has no registered certificate and using family labour instead of hiring labours from outside. Business Income is only the secondary source of the household. Average income from business of this

household is under 500,000 dong per month.

5.1.6 Impacts on Institutions and Organizations

There is no any institution and organization affected by the Project.

5.1.7 Impacts on Public Works

There is no any public work affected by the Project

5.1.8 Impacts on cultural structures Heritages

There are not any cultural structures and heritages such as pagodas, temples, historical vestiges, cultural heritage or nature reserve area affected by the project.

5.1.9 Temporary Impacts

Besides 500 permanently affected households, the project may temporarily impact some households in the project area during project construction. However, optimal technical design and construction methods will be applied to avoid or minimize causing damage to production and business as well as the lives of local people. Any losses due to temporary impacts occurring during construction will be determined and compensated as per the entitlement matrix.

5.2 Socio-economic Profile of PAP

To find out about the socioeconomic conditions, a socioeconomic survey by the questionnaires was conducted with the participation of 100% relocated households (27 households) and 20% other affected households (86 households).

5.2.1 Household Population and Labor Force

According to the survey, total population of surveyed households is 461 persons. The average household size is 4.1 persons per household. It is different from household size between the project components: Raw Water Intake Facilities Component and Reservoir Components have average population size is 3.8 person per household and Water Transmission Pipeline and North Binh Duong Water Treatment Plant components are 4.2. and 4.3 person per household. By age category, there are 41.4% of members of the households are in the working – age (from 18 to 55 years old), dependant rate is 51.6% (29.8% under 18 years old and 21.8% from 56 years old or more). Number of average labour per household is 1.97. Table 7 shows the household population that will be affected by land acquisition in wards and communes by the components.

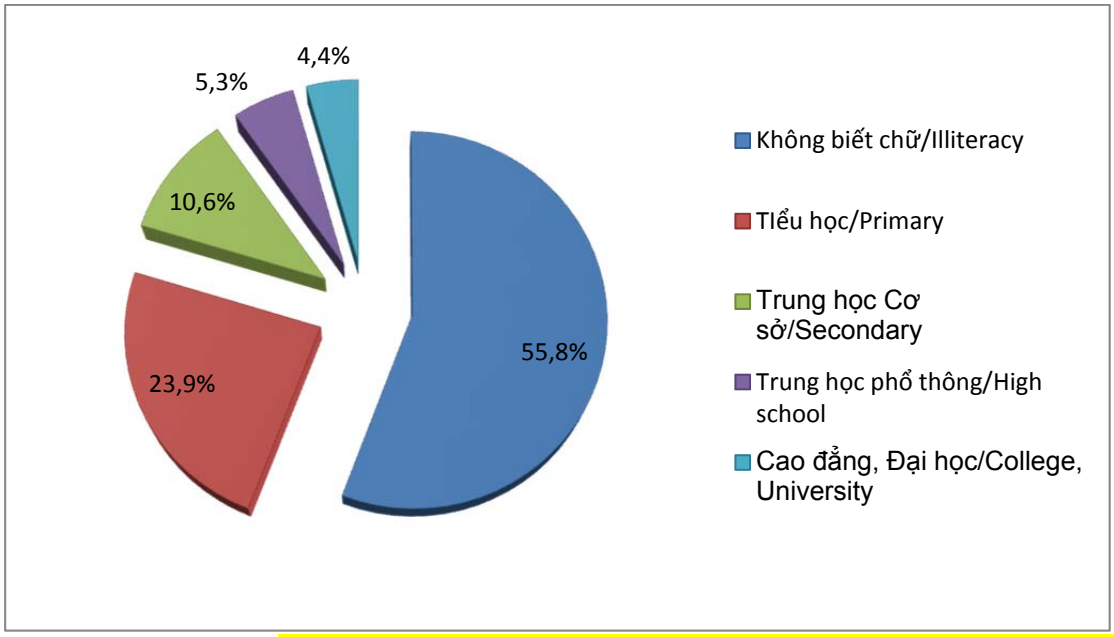
Table 7 Household Population and Size

No	Work Items	HHs	Individuals	No. of Male	No.of Women	No.of labours in HHs	Size of HHs
1	Raw Water Intake Facilities	5	19	10	9	9	3.8
2	Raw Water Transmission Pipeline	47	195	96	99	58	4.2
3	Regulating Reservoir	29	109	54	55	33	3.8
4	North Binh Duong Water Treatment Plant	32	138	68	70	41	4.3
TOTAL		**110**	**461**	**228**	**233**	**141**	**4.1**
Rate		**20**	**-**	**49.5**	**50.5**	**30.6**	**-**

Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

5.2.2 Education

According to the survey, the education of the surveyed persons is generally very low. Illiteracy rate presents for 55.8%. Primary education rate presents for 23.9% and secondary one presents for 10.6%. High school rate accounts 5.3% only. College or university accounts for 4.4% only and it is high concentrated in the Water Treatment Component where has living standard is much higher than other project sites.



Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

Figure 4 Education of Affected Household

Detailed education by component is shown in the **Table 8**:

Table 8 Education of affected households

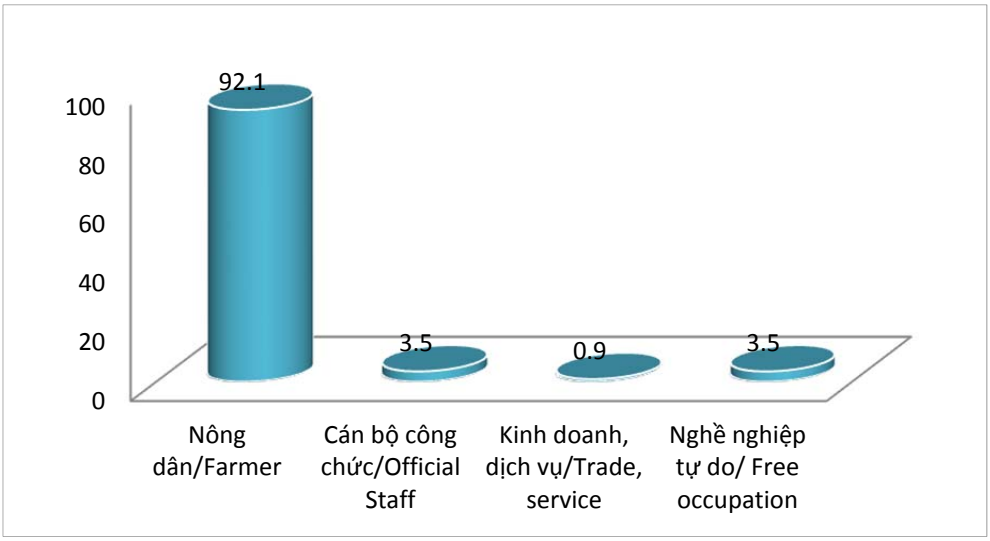
No	Work Items		Illiteracy	Primary School	Secondary School	High School	College or University
1	Raw Water Intake Facilities	Quantity	3	1	1	0	0
		Rate	60.0	20.0	20.0	0.0	0.0
2	Raw Water Transmission Pipeline	Quantity	31	7	5	2	2
		Rate	65.9	14.9	10.6	4.3	4.3

No	Work Items		Illiteracy	Primary School	Secondary School	High School	College or University
3	Regulating Reservoir	Quantity	13	12	2	1	1
		Rate	44.8	41.5	6.9	3.4	3.4
4	North Binh Duong Water Treatment Plant	Quantity	16	7	4	3	2
		Rate	50.0	21.9	12.5	9.4	6.2
TOTAL		Quantity	**63**	**27**	**12**	**6**	**5**
		Rate	**55.8**	**23.9**	**10.6**	**5.3**	**4.4**

Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

5.2.3 Household Occupation

Most of interviewees are farmers (presents 92.1%). Main occupation of these households are growing and harvest the rubber gums. There are only 3.5% are state officials, and 3.5% are free occupations. Occupation structure of affected households is shown at the chart below:



Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

Figure 5 Occupation structure of affected households

Details are showed at the **Table 9**.

Table 9 Occupation of affected households

No	Work Items	Farmers	State Officials	Business, services	Free Occupations
1	Raw Water Intake Facilities	4	0	1	0
2	Raw Water Transmission Pipeline	40	3	0	4
3	Regulating Reservoir	87	0	0	0
4	North Binh Duong Water Treatment Plant	31	1	0	0
TOTAL		**103**	**4**	**1**	**4**
Rate		**92.1**	**3.5**	**0.9**	**3.5**

Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

5.2.4 Living Standards, Income and Expenditure

a) Income of Affected Households

According to surveyed result, average income per capita of affected household is very high, at VND4.112.000/month. Average income per capita from 3 million to 5 million per month presents 31.9% and from 5 million per month or more presents 29.2%. Average income from 1 million to 2 million per month presents 16.8%. Average income per capita under 1 million dong presents 6.2% only.

Table 10 Average Income of Affected Households

Unit: Vietnam dong

No	Work Items	500,000-1,000,000	1,000,000-2,000,000	2,000,000-3,000,000	3,000,000 - 5,000,000	5,000,000 or more
1	Raw Water Intake Facilities	0	1	1	2	1
2	Raw Water Transmission Pipeline	6	9	11	11	10
3	Regulating Reservoir	0	4	5	12	8
4	North Binh Duong Water Treatment Plant	1	5	1	11	14
TOTAL		**7**	**19**	**18**	**36**	**33**
Rate		**6.2**	**16.8**	**15.9**	**31.9**	**29.2**

Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

Most of income source of affected households come from gum trees (78.9%), only 9.6% from trade or business or service and 8.9% from salary.

Table 11 Structure of Income Sources of Affected Households

Income Source	Raw Water Intake Facilities	Raw Water Transmission Pipeline	Regulating Reservoir	North Binh Duong Water Treatment Plant	% Total
Agriculture (Gum Trees)	58.0	78.4	81	74.2	78.9
Salary	0.0	9.1	8.8	5.1	8.9
Business/Services	41.4	9.8	8.8	19.8	9.6
Allowance/Giving	0.6	0.4	0.3	0.1	0.3
Free Occupation	0.0	2.3	1.1	0.8	2.3

Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

b) Expenditure of Affected Households

Expenditure on food accounts for a large proportion of the expenditure structure of affected households (52.9%), following is expenditure on education (21.8%) and clothing, transportation and customs (accounting for 11.9%). Expenditure distribution are shown in the table below:

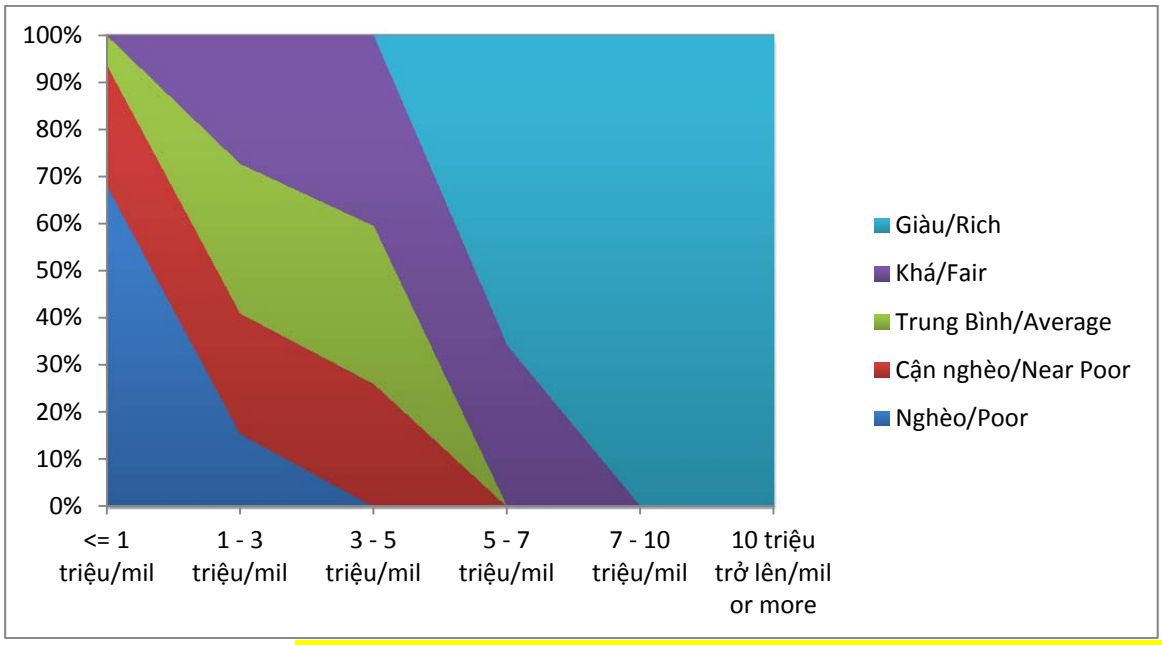
Table 12 Structure of Expenditure of Households

Expense items	Raw Water Intake Facilities	Raw Water Transmission Pipeline	Regulating Reservoir	North Binh Duong Water Treatment Plant
Food	52.0	62.0	55	44.5
School	22.0	16.5	15.3	30.1
Health	3.3	3.1	3.1	2.8
Travel, clothes, customs	12.5	10.7	13.0	12.4
Electricity	2.3	1.6	1.7	3
Others	7.9	6.1	11.9	7.2
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: JICA Survey Team (This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

c) Evaluation of Classification

There are significant differences in per capita income, per capita expenditures and accumulation between the Project components. In other words, there are significant differences in living standards between the areas under the Project's different components. Income, expenditure and accumulation of the Wastewater Treatment Plant component are significantly higher than the remaining components. Income, expenditure and accumulation of the Raw Water Pipeline component are lowest in comparison to other component.



Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

Figure 6 Level of Expenditure by Poor/None Poor Classification

Table 13 Monthly Income, Expenditure and Accumulation of the Households by Component

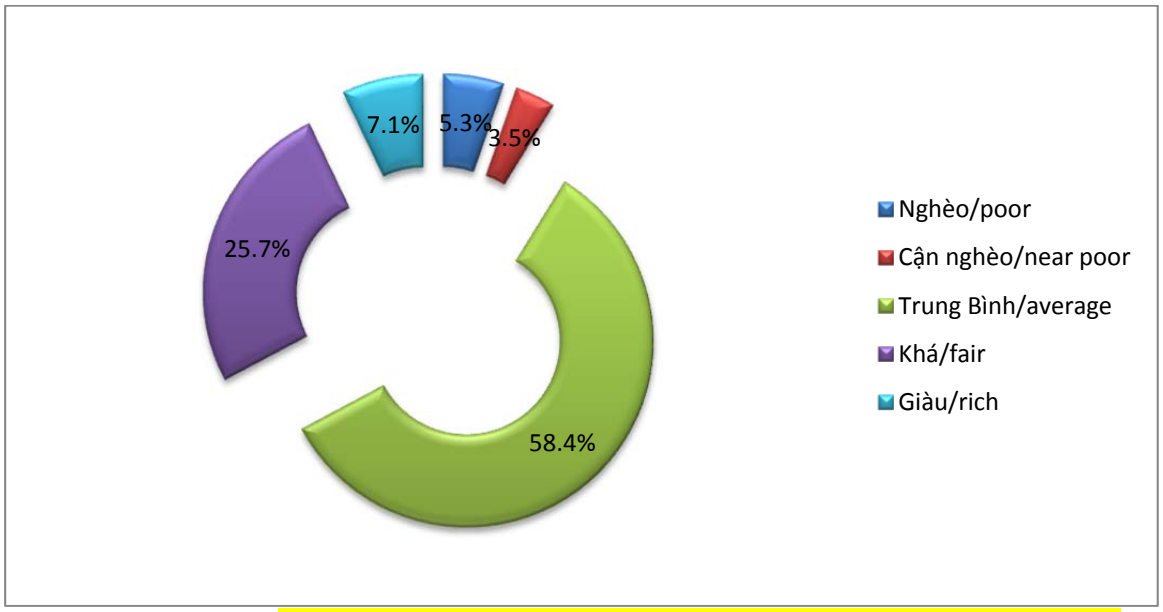
Unit: Vietnam dong

No.	Work Items	Monthly Income	Monthly Expenditure	Monthly Accumulation
1	Raw Water Intake Facilities	3,019,000	2,562,000	456,000
2	Raw Water Transmission Pipeline	3,625,000	2,225,000	1,400,000
3	Regulating Reservoir	4,410,000	2,644,000	1,767,000
4	North Binh Duong Water Treatment Plant	5,388,000	3,359,000	2,028,000

No.	Work Items	Monthly Income	Monthly Expenditure	Monthly Accumulation
	Total	**4,180,000**	**2,564,000**	**1,616,000**

Source: JICA Survey Team (This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

The analysis showed that the accumulation of the surveyed households is generally quite high, especially in the WTP where having a large of the rubber tree area. Through the investigator's classification based on income, expenditure and living accommodations, most households have an average living standard (58.4%) and fair one presents 25.7%, and rich household portion is 7.1%. However, the rich-poor gap is also shown quite clearly the project area. 32.8% of households have fair and rich living standards and wealth, while 8.8% of the households have poor living standard, in other words, these are under vulnerable group. Therefore, it is necessary for the Project to specially pay its attention to this group, priority and special support for them, avoid impoverishment.



Source: JICA Survey Team(This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

Figure 7 Living Standard Classification of Households According to Surveyor's Evaluation

Table 14 Living Standard Classification of Households According to Surveyor's Evaluation

No.	Work Items		Poor	Near Poor	Average	Fair	Rich	Total
1	Raw Water Intake Facilities	Quantity	1	0	3	1	0	1
		Rate %	20.0	0.0	60.0	20.0	0.0	20.0
2	Raw Water Transmission Pipeline	Quantity	4	2	26	13	2	4
		Rate %	8.5	4.3	55.3	27.6	4.3	8.5
3	Regulating Reservoir	Quantity	0	1	19	6	3	0
		Rate %	0.0	3.4	65.5	20.7	10.3	0.0
4	North Binh Duong Water Treatment Plant	Quantity	1	1	18	9	3	1
		Rate %	3.1	3.1	56.3	28.1	9.4	3.1
	Total	Quantity	6	4	66	29	8	6
		Rate %	5.3	3.5	58.4	25.7	7.1	5.3

Source: JICA Survey Team (This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

5.2.5 Accommodations and home comforts

Another indicator is the living means and accomodations of the households which can help categorizing living standards more objectively when based on observations and interviews by the investigators. Table below gives quite detailed description of the means and facilities of living of households from the sample survey results.

Table 15 Furnitures of the Surveyed Households

(%)

	Raw Water Intake Facilities	Raw Water Transmission Pipeline	Regulating Reservoir	North Binh Duong Water Treatment Plant	% Total
Bicycle	0.0	6.4	13.8	28.1	14.2
Motorbike	60.0	89.4	93.1	100.0	92.0
Car	0.0	2.1	3.4	34.4	11.5
Air Conditioner	20.0	2.1	6.8	20.7	8.8
Washing Machine	20.0	25.5	51.7	78.1	46.9
Bed/Wood Furniture	100.0	100.0	100.0	100.0	100.0
Television	100.0	100.0	100.0	100.0	100.0
Telephone Set	0.0	0.0	0.0	0.0	97.3
Mobile Phone	100.0	95.7	96.6	100.0	3.5
CD/DVD player	0.0	0.0	10.4	3.1	6.2
Computer	20.0	0.0	3.4	15.6	100.0
Rice-Cooker	100.0	91.5	100.0	100.0	95.6
Gas Cooker	60.0	98.0	89.7	100.0	93.8
Refrigerator	80.0	89.4	3.4	100.0	14.2

Source: JICA Survey Team (This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

According to the survey result, the most common accommodations are bed/wood furniture (100.0%), television (100.0%), rice-cooker (100.0%), mobile phone (97.3%), gas cooker (95.6%), fridge (93.8%). The expensive living home comforts are common in the Water Treatment Plant Component but not common in another components. Also in this component, car rate presents 11.5% and washing machine rate is 46.9%. This shown a clear difference in living standards between the households in this component in comparision to the remaining components.

5.2.6 Socio-economic Profile of Vulnerable Group

Households are under vulnerable group include i) poor households; ii) landless households; single women headed households; iii) households with martyrs or invalid persons; iv) households with disabled persons and the other persons who are entitled from the Viet Nam government's social policies.
A summary of other vulnerable PAPs households is presented in the **Table16**.

Table 16 Summary of other vulnerable PAPs

No.	Work Items		Poor	Single Woman-Headed HHs	HHs with Invalid Persons	Others	% Total
1	Raw Water Intake Facilities	Quantity	1	0	1	1	3
		Rate	33.3	0.0	33.3	33.3	60.0
2	Raw Water Transmission Pipeline	Quantity	0	0	5	4	9
		Rate	0.0	0.0	55.6	44.4	19.1
3	Regulating Reservoir	Quantity	2	1	2	2	7
		Rate	28.6	14.2	28.6	28.6	24.1

No.	Work Items		Poor	Single Woman-Headed HHs	HHs with Invalid Persons	Others	% Total
4	North Binh Duong Water Treatment Plant	Quantity	1	0	2	0	3
		Rate	33.3	0.0	66.7	0.0	9.4
	Total	**Quantity**	**4**	**1**	**10**	**7**	**22**
		Rate	**3.5**	**0.9**	**8.8**	**6.2**	**19.5**

Source: JICA Survey Team (This table will be updated by BIWASE because Regulating Reservoir's location will be changed)

The above table shows that rate of vulnerable group is relatively high in the project area (present 19.5%) and scattered in all project components. The process of land acquisition should be paid its attention to and special support for these groups so that they can recover their economic and lives as quickly as possible.

5.2.7 Issue of Ethnic Minorities

There are no affected Ethnic Minorities in this Project.

5.2.8 Gender Issues

During project implementation, the attentions should be paid to women to:

- Ensure women participation in meetings and consultations in HIV/AIDs protection and prevention of women trafficking;
- Ensure payments to be paid directly or with presence of the women;
- Ensure the grievances to be solved satisfactorily for both men and women;
- Ensure women to be enjoyed the income and livelihood restoration programs;
- Ensure jobs creation for the local women in the project to be a priority.

PART 6 COMPENSATION POLICY

6.1 Objectives for Resettlement

The objectives of the Vietnamese legislation governing resettlement and rehabilitation of displaced persons, and that of JICA's Policy concerning involuntary resettlement, have been adapted for the preparation of this Abbreviated Resettlement Plan (ARP). The objectives are set out below. Where there are gaps between the Vietnam legal framework for resettlement and JICA's Policy on Involuntary Resettlement, practicable mutually agreeable approaches will be designed consistent with Vietnamese law and JICA's Policy.

The main objective of the ARP is to ensure that all PAPs will be compensated for their losses at replacement cost.

6.2 Eligibility

Any person who at the cut-off-date was located within the area affected by the project, its components, or other project's parts thereof, and would;
(a) The person have formal legal rights to land (including customary and traditional rights recognized under the Vietnamese laws); or
(b) The person does not have formal legal rights to land at the time the census begins but have a claim to such land or assets - provided that such claims are recognized under the laws of Vietnam or become recognized through processes identified in the resettlement plan; or

(c) The person does not have legal nor recognizable by law rights to the land they are occupying or land have properties/assets within the project areas before the cut-off date.

Persons covered under (a) and (b) are provided compensation for the land they lose and other assistance at full replacement cost. Persons covered under (c) are provided resettlement assistance in lieu of compensation for the land they occupy, and other assistance, as necessary, to achieve the objectives set in this ARP, if they occupy the project area prior to the cut-off date. Persons who encroach on the area after the cut-off date are not entitled to compensation or other form of resettlement assistance. All persons in (a), (b) or (c) are provided compensation for loss of assets other than land.

6.3 Principles of Resettlement

The principle for resettlement policy in the Project will be as follows:
(i) Acquisition of land and other assets, and resettlement of people will be minimized as much as possible.
(ii) All PAPs residing, working, doing business or cultivating land within the recovered area under the Project as of the cut-off-date are entitled to be provided with rehabilitation measures sufficient to assist them to improve or at least maintain their pre-Project living standards, income earning capacity and production levels. Lack of legal rights to the assets lost will not bar the PAP from entitlement to such rehabilitation measures.
(iii) Compensation for loss of land and trees at replacement cost
(iv) Adequate budgetary support will be fully committed and be made available to cover the costs of land acquisition and resettlement and rehabilitation within the agreed implementation period. Physical resources for resettlement and rehabilitation will be made available as and when required.
(v) Civil works contractors will not be issued a notice of possession or a notice to proceed for any sub-project unless the Government has
a. Completed, satisfactorily and in accordance with the approved ARP for that sub-project, compensation payments, and
b. Entitlements will be provided to PAPs no later than one month prior to expected start-up of civil works at the respective project site.
(vi) Institutional arrangements will ensure effective and timely design, planning, consultation and implementation of the ARP.

6.4 Cut-off Date

For the Project, the cut-off-date for eligibility for entitlement is defined as the completion of the measurement survey on affected land. The survey is based on the preliminary scheme design. Should the design be developed further to require more, or different land, the inventory of loss will be updated and the cut-off date revised in accordance. Those whose livelihood activities may be affected by temporary land acquisition as the result of civil works will also receive compensation and assistance.

6.5 Site Preparation and Relocation

Through the consultation meetings, the relocated households expected and can arrange to resettle by themselves, therefore, it would have no resettlement site to be prepared.
In case the PAPs arise the need of resettlement land, the Project will provide the resettlement land lots will full infrastructure meeting their needs.

6.6 Rehabilitation

The project ensures to fully compensate and to assist for affect land/assets/works basing on replacement price. Besides, the policies of rehabilitation supports for affected person will be

implemented based on the JICA's and Viet Nam Government's policies, to ensure their livelihood is equal or better in comparison to the Pre-project. The rehabilitation includes;

(i) Supports for Living and Production Stabilization (include supports for PAPs with affected agricultural land, supports for PAPs with affected business and production, support for relocating and temporary residence, support for temporary impacts on production and business,
(ii) (ii)Support for Vocational Training and Job Creation, and
(iii) (iii) Special supports for the affected vulnerable groups.

Details of the rehabilitation activities is listed in the **Table 17**.

6.7 Project Entitlements

The Entitlement Matrix, presented in **Table 17**, covers the impacts currently identified during project preparation. It covers also the impacts which could arise during the construction period.

Table 17 Entitlement Matrix

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
I. LAND					
1	Productive land (agricultural , orchard land, aquaculture, garden)	Losing less than 20% of total landholding, remaining unaffected portion is viable for productive use	a. Owners with LURC, eligible to acquire LURC according to Government regulations, or otherwise legalizable under Government regulations	(i) Cash compensation for acquired land at replacement cost which is equivalent to current market price and free from transaction costs (e.g., taxes, certification, administration costs); (ii) Assistances for the PAPs affected their productive land, see the item III below (iii) For none-land affected assets, see item II below.	If the area of the remaining land is not viable, and if the PAP so agrees, then the remaining portion of land will be acquired according to the project's compensation/ assistance regime. PAPs are obliged to pay pre-existing outstanding financial obligations to the state related to affected land from land compensation. Affected households to be notified at least 3 months prior to the date that the land will actually be acquired by the Project
			b. User with lease or temporary right	(i) No compensation for land, but compensation for investment costs for land and/or remaining contract period; (ii) Compensation for non-land affected assets, see item II below.	LFDC will determine the value of investments on the affected land in consultation with the PAP.
			c. Non-titled user not eligible to become legalized	(i) No compensation for land; (ii) Compensation for non-land assets (crops, trees and structures), see item II below. (iii) If the PAP is classified as poor and directly use the land they are entitled to receive cash assistance as per PPC decision.	
		Losing 20% or more of total landholding (Entire land affected or the	a. Owners with LURC, eligible to acquire LURC according to Government regulations, or	(i) Due to limitation of agricultural land, affected households will get compensate by cash for the lost land at replacement cost which is equivalent to current market price and free from	Affected households to be notified at least 3 months prior to the date that the land will actually be acquired by the Project;

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
		remaining unaffected portion is not viable for productive use)	otherwise legalizable under Government regulations.	transaction costs (e.g., taxes, certification, administration costs); (ii) If loss is equivalent to 20% or more of total agricultural land: assistance for livelihood restoration programs will be provided; (iii)Assistances for the PAPs affected their productive land, see the item III below. (iv) Compensation for non-land affected assets, see item II below. (v) Entitle for allowances due to severe loss, see item 8 and 10 below.	
			b. User with lease or temporary right	(i) No compensation for land, but compensation for investment costs for land and/or remaining contract period; (ii) Compensation for non-land affected assets, see item II below.	LFDC will determine the value of investments on the affected land in consultation with the PAP.
			c. Non-titled user and not eligible to become legalized	(i) No compensation for land; (ii) Compensation for non-land assets (crops, trees and structures) See item II below. (iii) If the PAP is classified as poor and they directly use the land they are entitled to cash assistance as per PPC decision.	
		Temporary loss	Land users regardless of tenure status.	(i) Cash compensation based on average productivity of three years multiplied by the duration of using time. The amount of the compensation will not be less than the minimum wage for those whose labor is displaced from the affected land. (ii) Full restoration of affected land to pre-impact conditions. (iii) PAPs being thus displaced for periods in excess of one year will be entitled to participate in vocational training programs.	Temporary impacts will be minimized by reducing the area used, utilizing areas being permanently acquired for the project where feasible and reducing the time of the temporary acquisition as much as possible.
2	Residential land	Residential land with structures where remaining land is sufficient to rebuild a house and not requiring relocation.	a. Owners with LURC, eligible to acquire LURC according to Government regulations, or otherwise legalizable under Government regulations.	(i) Cash compensation for the portion to be acquired permanently at replacement cost which is equivalent to current market price and free from transaction costs (e.g., taxes, certification, and administration costs). (ii) Compensation for non-land affected assets see items II below.	Minimum permitted residential lot size to rebuild house is according to provincial regulations (100m2). Affected household to be notified at least 6 months prior to the date that the land will actually be acquired by the Project
			b. Non-titled user and not eligible to	(i) No compensation for land, (ii) Compensation for non-	

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
			become legalized.	land assets (structures, crops and trees), see item II below.	
		Residential land with structures where remaining land is insufficient to rebuild a house.	a. Owners with LURC, eligible to acquire LURC according to Government regulations, or otherwise legalizable under Government regulations.	**Relocated households are entitled to selecting one of the following options:** ***Cash compensation*** (i) Cash compensation at replacement cost which is equivalent to current market price and free from transaction costs (e.g., taxes, certification, and administration costs) if PAPs refusing receive a plot of resettlement land. (ii) Those entitled to receive a resettlement lot, but choose self-relocation shall receive a lot infrastructure development grant as per relevant provincial decision. (iii) Entitle for allowances associated with relocation of house, see item 9 below (iv) Assistance for livelihood stabilization. ***Residential plot at a resettlement site*** (v) Relocated households shall be entitled to provision of at least one standard resettlement lot; (vi) Relocated households whose directly work on agricultural production (land-based income) will be given preference to resettle near the former residence. These households will also be paid compensation by cash and support priority to resettle in the new residence at least equal to or better than the former residence. (vii) Where extended families jointly reside on the same acquired lot and would be eligible for separate household registration books, or if there are multiple households jointly holding the same LURC then additional resettlement lots will be granted with an equivalent value. (viii) PAPs who receive resettlement land but the value of the compensation and assistance is higher than the value of a standard lot in resettlement site, shall receive the balance of the value of the lot as assistance. If they do	Resettlement sites are to have adequate infrastructure and access to social services. Depending on the area, category and location of affected land, PAPs may be entitled to additional resettlement lots as specified in the relevant PPC's decision. Where the entitlement for number of lots granted are less than the actual number of households of an extended family living separately on the acquired land, favorable consideration will be given to grant priority access of remaining households to purchase resettlement plots and facilitate suitable payment arrangements as needed. The allocation of resettlement lots will be taken account of the needs of extended families to be co-located. In this regard, special attention will be paid to the elderly residing separately, female headed households and vulnerable PAPs. Affected household to be notified at least 6 months prior to the date that the land will actually be acquired by the Project

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
				not receive a resettlement lot they will receive the equivalent value of the difference between the amount of compensation/ assistance and the minimum value of one resettlement lot as cash. [ND 69/2009:19(1)] (ix) PAPs who have no other places of residence will be provided with residential land or houses for resettlement. In case their compensation and support amount is smaller than the value of a minimum quota, PAPs will receive the difference as resettlement support. If refusing to receive residential land or houses in resettlement areas, PAPs are entitled to a cash amount equivalent to such difference.	
			b. Land users without LURC and whose land use is not legalizable.	(i) No compensation for land. (ii) Entitled to participate in livelihood restoration programs. (iii) Those displaced from land they are residing on prior to the cut-off date, have no alternative accommodation and who are otherwise ineligible for a resettlement lot shall be favorably considered in accordance with Decision of PPC. (iv) Compensation for non-land affected assets see items II below. (v) Entitle for allowances associated with relocation of houses, see item 7 below.	Affected household to be notified at least 6 months prior to the date that the land will actually be acquired
		Residential land with no residential structures	Owners with LURC, or eligible to acquire LURC according to Government regulations	(i) Cash compensation for the portion of the land to be acquired permanently at replacement cost.	If the remaining portion of the land is less than minimum permitted residential lot size then the entire lot will be acquired and compensated.
3	Public land			(i) No compensation for affected public land. The project will be supported for the acquired public land of the commune or ward by decision of the PPC. (ii) Compensate for the non-land assets according to the market price.	
II	**STRUCTURES, CROPS & TREES**				
4	House and other structures	Houses and other structures partially affected and	Owner of structures regardless of tenure status	(i) Cash compensation at replacement cost equivalent to current market prices without depreciation or deductions for salvaged	

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
		the remaining is still used		building materials for the affected portion at the time of compensation. (ii) Compensate for repair cost equal to the actual cost of repair (materials and labor). (iii)For allowances, see item 7 below	
		Houses and other structures totally affected or partly affected but the remaining is not used	Owner of structures regardless of tenure status	(i) Cash compensation at replacement cost equivalent to current market prices without depreciation or deductions for salvaged building materials for the entire structure at the time of compensation. (ii) Compensate for repair costs equal to the actual payments (labor & materials) (iii)For allowances, see item 7 below	PAPs who affected the houses, but have no land shall be favorably considered for assistance.
		Business structures	Owner of structures regardless of tenure status	(i) Cash compensation at replacement cost equivalent to current market prices without depreciation or deductions for salvaged building materials for the entire structure at the time of compensation. (ii) Other business assets (not structures): Owners of businesses will be considered (by PPC) to be assisted with relevant costs of not fixed business assets (material and equipment) remaining at the time of displacement. The PPC will decide on assistance based on each specific case after receiving a request from the owner of the business. (iii)For allowances, see item 10 below	Affected business structures built after the cut-off date shall not be compensated.
		Graves	Affected household	(i) All costs for excavation, relocation and reburial will be reimbursed in cash.	For ownerless affected graves, compensation will be given to Commune PCs to relocate them to a local cemetery. Graves to be exhumed and relocated in culturally sensitive and appropriate manner.
5	Crops, trees, and aquaculture products	Loss of or damage to trees/crops	Owners regardless of tenure status	(i) Cash compensation for annual crops and aquaculture products equivalent to current market value of crops/aquaculture products at the time of compensation; (ii) For perennial crops and trees, cash compensation at replacement cost equivalent to current market value given the type, age and productive value (future production) at the time of compensation. (iii) Timber trees are compensated by cash, based	PAPs have the right to use salvageable trees. PAPs will be notified at least 3 months prior to land acquisition. PAPs will receive cash compensation based on market cost of ripened crops/fruit for any un-harvested crops that were planted prior to the land acquisition announcement. No compensation for trees/crops is going to harvest.

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
				on diameter at breast height at current market value.	
6	Public facilities	Loss of or damage to assets	Relevant agencies	Cash compensation to cover the cost of restoration or repair the facilities	Relocation or reconstruction of public facilities will be done with minimal disruption to public service.
III	**ASSISTANCEs**				
7	Displacement from residential housing	Severe impacts on house	Relocating households regardless of tenure status	***Transport allowance*** as follows: (i) The relocated households also get support for relocation with VND3.000.000 for each household to relocate within 10km or less and VND5.000.000 to relocate within over 10km. (ii) For the political organizations or offices: Getting support for relocating fee; (iii) For the other organizations which are eligible to get compensation for land and assets: Get supports for the actual costs for relocating, dismantling, and installing when they are relocated. (iv) For those without alternative accommodation and are: shall be arranged the temporarily residence or receive assistant in cash at VND2.000.000 in 06 months during awaiting for resettlement house; (v) For the households who are acquired their land entitled to get a residential land or house expecting to get cash to be self- resettled, they will get assistances according to the regulations besides getting compensation. (vi) The persons who are using the state-owned house (hiring houses or self-managed houses of agencies) if relocate: - Be compensated for the costs of self-improvement, repairing, upgrading, and the level of compensation is made by the Province's PC. - Be hired house according to the state-owned rent price in the resettlement areas with an area equivalent to the former hiring area. - For the cases without resettlement houses, PAPs will be supported in cash to self-resettle, level of	Transport allowance to be provided to PAPs displaced from rented accommodation and those temporarily displaced from owned residential accommodation in addition to those permanently displaced from owned accommodation.

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
				assistance equivalent to 60% of the land value and 60% of the value of the current hiring house. (vii) The PAPs who are unstate-owned hiring house if relocate: - Support for relocating as resettlement relocating. - Support for livelihood and production stabilization last for 6 months with 30kg of rice per capita per month at an average price at the time of support. (vii) PPC will review and decide on the higher assistance level for the cases as the follows: - House hiring lasts for a long time (6 months or more) - The affected households who have many members or many affected households are living in a family - Hiring the office for organization(s) or business locations/ production facilities for businesses ***Vocational training and income restoration*** (viii) Household members whose livelihoods are impacted due to relocation are entitled to participate in livelihood restoration programs including: • Any one vocational training course within the province free of charge; • Income restoration programs sponsored under the project.	
8	Loss of income/ livelihood due to loss of agricultural land	Losing 20% or more of total agricultural land and/or relocation	PAPs directly farming affected land	***Stabilization allowance*** (i) losing 20-<70% of agricultural land: Cash grant at VND 500.000 per person per month for a period of 6 months if not required to relocate and for a period of 12 months if required to relocate and for a period of 24 months for the households relocating to the extremely difficult area of agriculture. (ii) losing 70-100% of agricultural land: Cash grant at VND 500.000 per person per month for a period of 12 months if not required to relocate and for a period of 24 months if required to relocate and for a period of 36 months	PAPs not eligible for compensation of affected agricultural land will be entitled to stabilisation allowance, income restoration allowance, and vocational training assistance. However, the above does not affect the entitlements that vulnerable PAHs are otherwise eligible for under ARP entitlements.

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
				for the households relocating to the extremely difficult area of agriculture. ***Job creation and vocational training allowance*** (see item 9 below) ***Agricultural extension services*** • PAPs compensated by land-for-land shall receive technical and material support to promote their farming production. The type of agricultural extension services provided shall be based on consultations with the respective PAPs.	
9	Job creation and vocational training allowance	Losing agricultural land located outside residential/urban area	PAPs directly cultivate on affected land	Cash support equivalent to 1.3 - 3 times of the current market value of the agricultural land acquired depending on land position but not excess the quota of agricultural land allocation in locality.	
10	Loss of Income/ livelihood due to relocation of business	Severe impacts on businesses (20% or more of total of income)	PAPs losing business Income	***Business stabilization allowance*** (i) For registered businesses: - Business with revenue less than VND 10 million per month, cash assistance equivalent to 10% of revenue within 6 months. - Business with revenue from VND10 million or more per month, cash assistance according to actual income within 6 months, but not less than VND6 million per household. - Enterprises are stopped producing or business by the Project: Cash assistance based on actual profits within 3 months. Revenue and profits are calculated according to average of the most recent year with confirmation from the tax office. (ii) For non-registered businesses: Cash assistance equivalent to 50% of monthly revenue for a period of 3 months certified by local taxation if PAP pay taxes and duties. If PAPs not paid taxes and duties, they need collecting the local authority and community's endorsement of revenue.	Affected business owners may nominate an immediate family member at working-age to participate in vocational training in lieu of themselves.

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
				Business rental assistance Due to early relocation request that affected businesses renting business premises will be entitled to cash assistance following decision of PPC.	
			Employees losing their job in affected businesses	***Allowance for employees*** (i) Employees with minimum 6 working months through labor contracts employed by registered businesses: Cash allowance equivalent to 70% of pre-tax wage for the duration of cessation of the affected business or 3 months, which every period is less, according to the confirmation from the tax office. (ii) Workers did not sign labor contracts with the enterprises or business households but have worked at least 6 months: Support in cash equivalent to 70% of monthly-paid salary on average of last 6 months, with the endorsement of the local taxation on the employment and wages status if enterprises or business households paid tax. If no pay tax, enterprises or business households need collecting local authority & community on the employment and wages of such PAPs. Time for support is 3 months. ***Vocational training and income restoration*** (iii) All owners/partners of the affected business (registered or non-registered), if in need, are entitled to participation in: • any one vocational training course within the province free of charge; • Income restoration programs sponsored under the project.	Local community and PC of ward/commune where the affected business located will certify employment status and wage of affected employees without labor contracts.
11	Support for affected agricultural land	Affected land is located next to residential land parcel with houses but not classified as residential land	Eligible owner	PAPs whose garden land, pondage which is located on the same land lot having a residential house but not classified as residential land; garden land, pondage on the same land lot having separate house; garden land, pondage on the same land lot having house located along a canal and traffic road; In addition to the	

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
				compensation based on agricultural land price of orchard land, are entitled to assistance from 20% to 50% of the value of residential land (at replacement cost), depending on the land position, in the locality of the affected land. The maximum area calculated for this assistance is not larger than 5 times the quota of residential land allocation in the local area.	
12	Support affected agricultural land located within or next to residential area or wards	Affected land is located within or next to resident area or wards	Eligible owner	Assistance from 20% to 50% of average price of residential land (at replacement cost), depending on the land position, in the locality of the affected land. The maximum area calculated for this assistance is not larger than 5 times the quota of residential land allocation in the local.	
IV	**SPECIAL ASSISTANCE**				
13	Higher risks of impoverishment/ hardship due to loss of resource base/ relocation.	Loss of land and non-land assets and relocation.	Affected vulnerable groups regardless of severity of impacts	***Special Assistance*** - Heroic Vietnamese Mothers, Heroes of the People's Armed Forces, Labor Heroes get assistance VND5,000,000 per household; - War invalids, martyrs' families (father, mother, wife, husband, children are martyrs) get assistance VND3,000,000 per household; - Families with people whom contributed to the revolution, revolutionary veterans home, families with retirement state officials and beneficiaries of other regularly social assistance get assistance at VND2,000,000 per person per household. - In case of a household with many people get the assistance as above, the Project only assist for the person who get the highest level. - For the particular case, LFDC submit their propose to the PPC for approval ***Vocational training and income restoration*** In addition to other income restoration, entitlements mentioned elsewhere vulnerable and female headed households are entitled to: • One additional vocational	Several other cases belonging to the vulnerable group need consider to assist, such as landless households, poor households, single women headed households with dependants, the disabled and the other cases are entitled assistances following Vietnam Government Policy.

No	Impact	Level Of Impact	Eligible Persons	Entitlements	Implementation Issues
				training course per household member at working-age within the province free of charge; • Additional income restoration program assistance sponsored under the project.	
14	Progressive Bonus		Relocated households who hand over their affected land to the project on time	The relocated PAPs who hand over their affected land on time shall receive an incentive bonus of VND1 million – 3million million per household	
15	Other assistances			PPC will consider supporting for other cases, such as: Land user without land title and not eligible for legalization, the recovered leased ahead of time. Tenants who be recovered before the expiration.	

Source: JICA Survey Team

PART 7 GRIVANCE REDNESS PROCEDURE

PAPs will be able lodge their complaints regarding any aspect of compensation policy, rates, land acquisition, resettlement and entitlements relating to rehabilitation assistance programs. Complaints by PAPs can be lodged verbally or in written form, but if they are lodged verbally, the committee to which it is lodged will write it down during the first meeting with the PAPs. PAPs will be exempted from administrative and legal fees.

A four-stage procedure for redressing grievances is proposed as follows:

Stage 1- Complaints from PAPs regarding any aspect of the resettlement program or losses not previously addressed shall first be lodged verbally or in written form at the PC at the commune level. The complaint can be discussed in an informal meeting with the plaintiff and the chairperson of the PC at commune level. The PC at the commune level will be responsible for resolving the issue within 15 days from the day it is lodged.
Stage 2 - If no understanding or amicable solution can be reached, or if the PAP receives no response from the Commune PC within 15 days of registering the complaint, he/she can appeal to the DPC. The DPC will provide a decision within 15 days of the registering of the appeal.
Stage 3 - If the PAP is not satisfied with the decision of the DPC or its representative, or, in the absence of any response by the DPC, the PAPs can appeal to the PPC. The PPC will provide a decision on the appeal within 15 days from the day it is lodged with the PPC.
Stage 4 - If the PAP is still not satisfied with the decision of the PPC on appeal, or in absence of any response from the PPC within the stipulated time, the PAPs may submit his/her case to the district court.

PART 8 INSTITUTIONAL ARRANGEMENTS

8.1 Land Acquisition and Resettlement Procedures

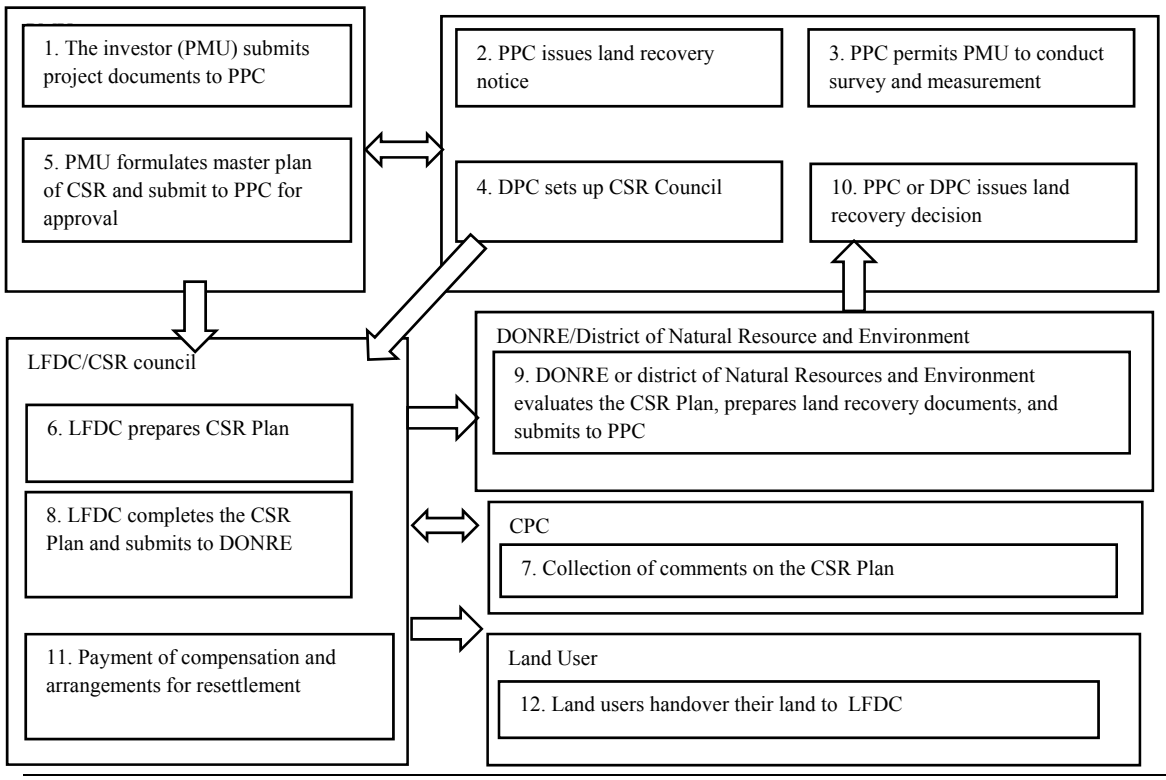
Land acquisition and resettlement procedure are based on the Decree 69/2009/ND-CP, section 4 described as in **Table 18**. Relationship of organization is described as in **Figure 8**.

Table 18 Major procedures of Land Acquisition and Resettlement

	Major Procedures	Responsible Organization	Remarks
1	The investor (PMU) submits project documents to PPC	PMU, PPC	-
2	PPC issues land recovery notice	PPC or DPC	Reasons, area and location, etc., information disclosure by local mass media
3	PPC permits PMU to conduct survey and measurement	PPC	CPC shall coordinate with PMU for the survey and measurement
4	DPC sets up CSR Council	DPC or LFDC	-
5	PMU formulates master plan of CSR and submit to PPC for approval	PMU	Following Decree No.197/2004/ND-CP and No.17/2006/DN-CP
6	LFDC prepares CSR Plan	LFDC	1) Names and address of land users, 2) area, type, location of the land, assets loss, 3) land and house prices, no. of households, 4) compensation and supports amounts, 5) resettlement arrangement
7	Collection of comments on the CSR Plan	CPC	More than 20 days, posted up at CPC office and the areas where to be recovered land and replacement
8	LFDC completes the CSR Plan and submits to DONRE	LFDC, DONRE	-
9	DONRE or district of Natural Resources and Environment evaluates the CSR Plan, prepares land recovery documents, and submits to PPC	DONRE or district of Natural Resources and Environment, PPC, DPC	-
10	PPC or DPC issues land recovery decision	PPC, DPC	-
11	Payment of compensation and arrangements for resettlement	CSR Council or LFDC	-
12	Land users handover their land to LFDC	Land Users	Within 20 days after receiving compensation

Source: Decree 69/2009/ND-CP, Section 4, JICA Survey Team

Note: PC-People's Committee, PPC-Provincial PC, DPC-District PC, CPC-Commune PC, CSR-Compensation, Support and Resettlement, LFDC-Land Fund Development Center, DONRE- Department of Natural Resources and Environment, PMU- Project Management Unit



Source: JICA Survey Team

Figure 8 Relationship of organization

8.2 Institutional Arrangements

The implementation of resettlement activities requires the involvement of agencies at the national, provincial, district and commune level. The provisions and policies of the ARP will form the legal basis for the implementation of resettlement activities during the Project. The Project Management Unit (PMU) can agree with the PAPs on their compensation payment options for losses, following the provisions in the ARP.

The following is a general overview of key responsibilities with respect to land acquisition and resettlement at/for each level/unit involved in Project implementation.

1) Binh Duong Water Supply and Sewerage – Environment Co.LTD (BIWASE)
BIWASE is responsible as the Executing Agency (EA) for overall coordination and direction of the Project, including the implementation of the ARP. The BIWASE is responsible for preparing the ARP for the Project. The latter includes decisions relating to compensation rates and rehabilitation assistance measures for PAPs. The BIWASE is also responsible for providing the budget for resettlement compensation. BIWASE is responsible for implementation of the Project as the Investor.
After detailed engineering designs have been completed, the number of PAPs will be revised, and compensation unit rates and allowances will be updated for all categories of lost assets, based on replacement cost surveys carried out during project implementation. Following approval by JICA of the updated ARP, the BIWASE will be responsible for directing and supervising ARP implementation. This will include ensuring speedy resolution of any grievances voiced by PAPs or town/district authorities. Based on local requirements for implementing resettlement, in each project implementation stages, the BIWASE will delegate responsibilities for resettlement implementation to agencies at the appropriate level, in accordance with Decree No. 197/2004/ND-CP and Decree 69/2009/ND-CP.
2) The Project Management Unit (PMU)
The BIWASE will set up PMU for daily project implementation. The PMU will include technical, institutional, social and resettlement, administrative management, and representatives of accounting divisions. Key responsibilities of the PMU will include, but not be limited to, the following:

(i) Updating the ARP at the time of project implementation, when the detailed design is available, and then submitting the updated ARP to JICA for approval.
(ii) Coordinating civil works with land acquisition and resettlement activities;
(iii) Instigating information campaigns, in accordance with established Project guidelines. This includes preparation and distribution of the public information booklet, and stakeholder consultation with the PAPs. It includes having primary responsibility for letters, forms and other relevant documents, although the preparation of these may be delegated as required;
(iv) Developing the mechanisms through which resettlement disbursements and compensation payments for PAPs will be made, and preparing any associated documents that may be required;
(v) Coordinating with other departments for the effective implementation of the ARP, as approved for the project, and in compliance with the JICA resettlement principles and objectives. This will include ensuring that rehabilitation measures and supporting activities are properly implemented;
(vi) Ensuring a timely resettlement budget flow for the delivery of compensation payments and the rehabilitation of PAPs, and providing the compensation payments to the PAPs, and
(vii) Implementing project accounting and auditing with respect to resettlement implementation, and preparing and submitting regular progress reports to the BIWASE and PPC on the civil works and status of ARP activities.

3) Ben Cat District People's Committee (DPC)
The Ben Cat District People's Committees will be responsible for identification of land and trees loss and assigning functional tasks for the various agencies. The District People's Committee (DPC) will be responsible for the DMS in collaboration with town/commune People's Committees.

4) Land Fund Development Center (LFDC)
Land Fund Development Center responsible for conducting the loss survey of land and assets, consultation with affected communities and organizations, making compensation plans, submits to the DONRE for approval and pay compensation, and site clearance for the Project.

5) Commune People's Committees (CPC)
Commune People's Committees will be responsible for the following:

(i) Assigning concerned ward/commune officials/professionals to carry out all resettlement activities in its ward/commune;
(ii) Assisting other bodies/agencies, including the PMU, in the dissemination of project information and facilitating public meetings and consultation with PAPs;
(iii) Assisting other agencies, including the PMU, in census surveys, a replacement cost survey, DMS and other resettlement related activities;
(iv) Checking and confirming the legal status of affected land, houses, structures and other assets/losses of organizations; and
(v) Ensuring the PAPs grievances redress mechanisms are appropriate and properly put in place, documenting PAPs grievances and maintaining records of PAPs grievances, and assisting and advising PAPs with respect to the speedy redress of grievances.

8.3 Institutional Capacity

If necessary, specific training courses on resettlement will be required for an agency involved.

PART 9 IMPLEMENTATION SCHEDULE

The implementation schedule is as follows:

(i) Updating Compensation Rates.
During the preparation of CSRP process, the PMU will update unit rates at replacement cost for all categories of loss. This will be done in consultation with PAPs and local government agencies.

(ii) Detailed Measurement and Census Survey.
These surveys will serve as a basis for compensation and updating ARP. Data will be computerized by the PMU.

(iii) Pricing Application and Compensation to PAPs.
DPC will be responsible for price application (calculating payments on the basis of the market survey) and preparing compensation charts for each affected commune/district. Unit prices, quantity of affected assets, PAPs' entitlements, etc. will be subject to verification by the PMU and PPC before being posted in each commune for people to review and comment on. All compensation forms must be checked and signed by the APs to indicate their agreement.

(iv) Compensation will be handled under the supervision of representatives of Commune/Town People's Committee, DPC and representatives of PAPs.

PMU shall ensure that civil works contractors are not issued a notice of possession of site for construction works until PMU has (i) satisfactorily completed, in accordance with the approved ARP, compensation payments and relocation to new sites; and (ii) ensured that required rehabilitation assistance is in place and the area required for civil works is free of all encumbrances.

The compensation has been paid to the affected households part by part since December, 2012. And it is expected to complete the compensation payment and the site clearance in Mar, 2014. The PMU will not allow construction activities in specific sites until all resettlement activities have been satisfactorily completed, agreed rehabilitation assistance is in place, and that the site is free of all encumbrances.

Land acquisition is implemented. Schedule of land acquisition and resettlement is **Table 19**;

Table 19 Schedule of Land Acquisition and Resettlement

Year	2013												2014						
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	…
Raw Water Intake Facilities												Plan							
Raw Water Transmission Pipeline						Completed													
Regulating Reservoir																			
North Binh Duong Water Treatment Plant																			

Source: JICA Survey Team

PART10 COST ESTIMATE AND BUDGET

10.1 Flow of Funds

Funds for compensation and implementation of the plan will be from PMU and PPC. PMU will be responsible for channeling funds for the compensation for land acquisition and resettlement to the Binh Duong PPC (or Binh DuongLFDC) that will be responsible for making payments directly to displaced persons.

10.2 Adjustment for Inflation

The rates for compensation and cash entitlements for rehabilitation as well as allowances payable to displaced persons will be adjusted annually, based on the current annual inflation rate. PPC will determine the annual inflation rates and all cash entitlements.

10.3 Compensation Prices

10.3.1 Prices for land

Unit Prices for land compensation, assistance and resettlement are based on the Decisions below:
- Decision 87/2009/QD-UBND dated 21/12/ 2009 on compensation, assistance and resettlement policies when the State acquire land in Binh Duong Province.
- Decision 66/2011/QD-UBND dated 20/12/2011 of Binh Duong PPC on Unit Price of Land in 2012;
- Decision 67/2011/QD-UBND dated 20/12/2011 of Binh Duong PPC on adjust of Unit Price in 2012 in Binh Duong Province.

Land unit price of each project area is specified in the **Annex E** of this ARP. These rates have been found acceptable by the owners.

10.3.2 Prices for trees and crops

Decision No.58/2011/QĐ-UBND dated 19/12/2011, of Binh Duong PPC stipulates compensation rates for trees and crops. These prices apply in all of Binh Duong province.

10.3.3 Allowances

Based on Decision No. 31/2009/QĐ-UBND, a cash allowance of 3 times the compensation rate for agriculture land is required. This allowance applies only to cultivated land. This allowance intends to cover the eventual cost of training in case the land owner has to change of career.

10.4 Cost estimates

Table 20 presents the cost estimates for ARP at December 2012. This amount covers administration and implementation activities. A contingency of 10% has been added.

Table 20 Implementation Costs of ARP

No	CONTENT	COST(VND)
1	A. Compensation, support costs	354,594,175,000
2	B. Cost of implementation of compensation	12,377,775,000
3	C. Cost of project management	6,690,322,000
3.1	Cost of project appraisal	75,500,000
3.2	Cost of project preparation	1,652,243,000
3.3	Cost of appraisal, approval of finalization : A x 0.1%	452,388,000
3.4	Cost of audit : A x 0.15%	678,583,000
3.5	Other related costs:	3,831,108,000
4	D. Contingency of Spiraling price : A x 10% (10% per year x 1 year)	35,459,418,000
5	E. Contingency of unexpected occurred quantity: A x 10%	35,459,418,000
	Total cost of implementation(A+B+….+E)	444,581,108,000

Source: CSRP

PART11 MONITORING AND EVALUATION

11.1 Monitoring

Monitoring is the continuous process of assessing project implementation in relation to agreed schedules, the use of inputs, and the provision of infrastructure and services by the Project. Monitoring provides all stakeholders with continuous feedback on implementation. It identifies actual or potential successes. It also identifies problems as early as possible to facilitate timely correction during project operation. Monitoring has two purposes:

(i) to verify that project activities have been effectively completed including quantity, quality, and timeliness, and
(ii) to assess whether and how well these activities are achieving the stated goal and purpose of the Project.

Regular monitoring of the ARP implementation will be conducted by the PMU.

11.2 Monitoring Report

Monitoring of the implementation of the ARP will be the responsibility of the PMU. The implementing agencies will oversee the progress in resettlement preparation and implementation through regular progress reports.

The main indicators that will be monitored regularly are:
(i) payment of compensation to PAPs in various categories, according to the compensation policy described in the ARP;
(ii) public information dissemination and consultation procedures;
(iii) adherence to grievance procedures and outstanding issues requiring management's attention; and
(iv) coordination and completion of resettlement activities in context of the awarding of civil works contracts.

PMU will submit a quarterly monitoring report to the PPC on the progress of the implementation of the ARP. The internal monitoring reports shall include the following topics:
(i) the number of PAPs, by category of impact per component, and the status of compensation payment and relocation and income restoration for each category;
(ii) the amount of funds allocated for operations or for compensation, and the amount of funds disbursed for each;
(iii) the eventual outcome of complaints and grievances and any outstanding issues requiring action by management;
(iv) implementation problems, and
(v) revised actual resettlement implementation schedules.

PART 12 PUBLIC PARTICIPATION, CONSULTATION, AND GRIEVANCE MECHANISMS

12.1 Objectives of Public Information and Consultation

Information dissemination to PAPs and involved agencies is an important part of sub-project preparation and implementation. Consultation with PAPs and ensuring their active participation will reduce the potential for conflicts and minimize the risk of project delays. The objectives of the public information and consultation program are as follows:
(i) to ensure that both local authorities and representatives of PAPs, are included in the planning and decision-making processes. The PMU will work closely with the PPC, the DPC and the Commune PC during project implementation.
(ii) to fully share information about the proposed project components and activities with the PAPs;
(iii) to obtain information about the needs and priorities of the PAPs, as well as information about their reactions to proposed policies and activities;
(iv) to ensure that PAPs are able to make fully informed decisions that will directly affect their incomes and living standards, and that they will have the opportunity to participate in activities and decision-making about issues that will directly affect them;
(v) to obtain the co-operation and participation of the PAPs and communities in activities necessary for resettlement planning and implementation, and
(vi) to ensure transparency in all activities related to land acquisition, resettlement, and rehabilitation.
(vii) to ensure that basically all PAPs should be informed in advance of public consultation and all or parts of PAPs should be accepted to the consultation meetings.

12.2 Consultation during Project Preparation

A consultation with local authorities and affected persons were organized from 08/03/2011. The consultation meetings will be continuously organized after that. In these meetings, local authorities and administrative leaders at all levels and potential affected people are informed about the proposed project and its objectives and various components. They are thoroughly consulted and actively participated in discussions about their demands for development and their priorities, as well as their awareness of the Project's objectives. PAPs are consulted about impacts and applicable measures to minimize negative impacts and improve the benefits for local residents. Local authorities are also consulted about their agreement with and commitment to implementing the Project’s resettlement policies. Summary of consultation results is attached in the annex of the ARP.
In the meantime, the PMU combined with LFDC also conducted community consultations (meeting with the affected communities) to disseminate information includes characteristics of the project, scope of land acquisition, policy on resettlement (essentially concept of replacement costs), schedule of work, grievances mechanism as well as collect information about demographic status, sources of income, expectations for compensation prices, etc. After the Project is officially approved, project information including the project objectives and components and policy, were published via the

national and local presses and televisions as well as the PPC's papers to disseminate to the project areas.
In general, 100% people and other stakeholder agreed to implement the Project.

12.2.1 Information Dissemination and Consultation

During project implementation, the PMUs will undertake the following:
(i) Disseminate information to and consult with PAPs throughout the life of the Project.
(ii) Update the provincial unit prices, and confirms the land acquisition requirements and impact on properties through a DMS, carried out in consultation with PAPs.

The DPC will then apply prices, calculate compensation entitlements, and complete the Compensation Forms for each affected household. Information on entitlements will then be presented on an individual basis to PAPs in a DMS follow-up visit to each household.
The Compensation Form, showing a household's affected assets and compensation entitlements, will then need to be signed by the PAPs to indicate their agreement with the assessment. Any complaints the PAPs have about the contents of the form will be recorded at the time.

12.2.2 Public Meetings

During ARP preparation process for the Project, the LFDC have been conducted community meetings in affected wards/communes to provide additional information for PAPs and create opportunities for them to participate in open discussions about resettlement policies and procedures. The ward or commune PCs or resettlement consulting groups held meetings to consider and resolve issues related to compensation policies, household land use status, and land use origins. There are 06 community meetings were organized, summaries on community meetings are showed in the **Table 21**.

The affected communes were consulted about following issues:

a. Representative of each affected household should participate in the measurement and inventory of their assets, and sign in minute of inventory.
b. Affected households receive the detailed calculation list of compensation, assistance for livelihood and production stablelization for review and check the information.
c. Any complaint of the PAPs on the compensation plan will be collected and considered carefully based on the real situation, include the issues related to the compensation price.
d. After that, the city RC will calculate compensation based on the determined prices and complete the compensation plan for affected assets. The PMU together with the city RC will present information on entitlements for PAPs in the next consultation.
e. Next, the compensation plan shall clearly state affected assets and the compensation to which PAPs are entitled, and this shall be signed by the PAPs to show their agreement with the evaluation results. Any questions of PAPs on the contents of the plan shall be noted at this time.
f. Sending PAPs letters and/or questions related to the ARPs to inform them about the plans and clearly explain the consequences of each plan.
g. Each household has the right to reflect, raise their questions related to resettlement such as prices, installment payments and procedures for documenting ownership in the new place, etc. Their questions will be resolved satisfactorily and timely.
h. Requesting PAPs confirm their choice of resettlement areas and the location of the resettlement areas. It is necessary to introduce to the PAPs about the resettlement areas.
i. Requesting PAPs to state services clearly they are currently using such as education, health care, and markets, and the distance they travel for these services.
j. Consultation with affected people about their desire to the support and recovery plan. This section applies for severely affected and vulnerable PAPs. The RC will inform PAPs about the plan and their entitlement to technical assistance before requesting them to present their desires for restoration assistance clearly.

Table 21 Community Meeting Consultations

Project communes	Time	Location	Number of Meeting	Total of Participants	In which, female
Tru Van Tho	15/3/2011	PPC's Office	1	53	24
Tan Hung	12/3/2011	PPC's Office	1	53	26
Lai Uyen	11/3/2011	PPC's Office	1	74	34
Chanh Phu Hoa	9&26/3/2011	PPC's Office	2	119	60
Lai Hung		PPC's Office	1 (Institute of Gum Tree Research)	2	
			6	**301**	**144**

Source: JICA Survey Team

12.2.3 Information Disclosure

Beside the public consultation for the PAPs and the communities in the project area, , the ARP will be available at the PMU office (address: BIWASE, No.11 Ngô Văn Trị, Phu Loi Ward, Thu Dau Mot Town, Binh Duong Province), Ben Cat district PC, Project Commune PC's Offices (Trừ Văn Thố, Tân Uyên, Tân Hưng, Lai Hưng, Lai Uyên, Chánh Phú Hòa).
The main content is designed as a brochure to provide information for each affected household. The mass media, directly is the ward and village's radio system, disseminate the information of the project's policies.

Annex A Minutes of Public Meetings and Consultations

Summary of Community Consultation Meetings

Date, Venue & Participants	Main Issues raised by PAPs	Responses of representatives of relevant agencies
Mar 8th, 2011 **Lai Hung Commune's PC, Ben Cat District, Binh Duong Province** *Number of Participants: 7* Representatives of Lai Hung Commune's PC, Ben Cat District LFDC, representatives of BIWASE and 02 representatives from Institute of Rubber Research Lai Khe. *Consultation contents:* - Information dissemination of the Project (leaflets, brief introduction of the Project such as benefits of the Project, planning sites, land acquisition area, affected households in Lai Hung commune). - Introduced policies on compensation, assistance and resettlement for the Project affected Persons (PAPs); - Plan on compensation and land clearance plan - Grievance redness mechanism.	Mr.Huynh Huu Hien - PAPs agreed with the land acquisition plan of the State; - Requiring to conduct detailed measurement survey to report to the management level	- Agreed with opinion of the representatives of Institute of Rubber Research Lai Khe
Mar 9th, 2011 **Chanh Phu Hoa Commune's PC, Ben Cat District, Binh Duong Province** *Number of Participants: 102* Representatives of Chanh Phu Hoa Commune's PC, Ben Cat District LFDC, representatives of BIWASE and 89 PAPs. *Consultation contents:* - Information dissemination of the Project (leaflets, brief introduction of the Project such as benefits of the Project, planning sites, land acquisition area, affected households in Chanh Phu Hoa commune). - Introduced policies on compensation, assistance and resettlement for the PAPs; - Plan on compensation and land clearance plan	- PAPs mainly concern about compensation prices, specific time for compensation, time for relocation, resettlement sites.	- Representative of Ben Cat District LFDC explained on compensation price of each position, each area and coefficient K of land price.
	- PAPs concern about compensation policy for mostly affected housing	- Mr.Nguyen Van De, vice director of LFDC explained about compensation policy for affected housing
	- PAPs concern about compensation policy for affected rubber trees	- Mr.Nguyen Van De, vice director of LFDC explained about compensation policy

Date, Venue & Participants	Main Issues raised by PAPs	Responses of representatives of relevant agencies
- Grievance redness mechanism.		for affected trees
Mar 11th, 2011 **Lai Uyen Commune's PC, Ben Cat District, Binh Duong Province**. *Number of Participants: 86* Representatives of Lai Uyen Commune's PC, Ben Cat District LFDC, representatives of BIWASE and 74 PAPs. *Consultation contents:* - Information dissemination of the Project (leaflets, brief introduction of the Project such as benefits of the Project, planning sites, land acquisition area, affected households in Lai Uyen commune). - Introduced policies on compensation, assistance and resettlement for the PAPs; - Plan on compensation and land clearance plan - Grievance redness mechanism.	- PAPs agreed with the land acquisition plan of the State;	- Mr.Nguyen Van De, vice director of LFDC explained about compensation policy for affected trees
	- PAPs concern about the compensation and assistance policies	- Mr.Nguyen Van De, vice director of LFDC explained about compensation policy for affected trees
Mar 12th, 2011 **Tan Hung Commune's PC, Ben Cat District, Binh Duong Province**. *Number of Participants: 63* Representatives of Tan Hung Commune's PC, Ben Cat District LFDC, representatives of BIWASE and 53 PAPs. *Consultation content:* - Information dissemination of the Project (leaflets, brief introduction of the Project such as benefits of the Project, planning sites, land acquisition area, affected households in Tan Hung commune). - Introduced policies on compensation, assistance and resettlement for the PAPs; - Plan on compensation and land clearance plan - Grievance redness mechanism.	- PAPs agreed with the land acquisition plan of the State; - Requiring to conduct detailed measurement survey soon to stabilize PAPs' life and production	- Will conduct detailed measurement survey as soon as possible

Date, Venue & Participants	Main Issues raised by PAPs	Responses of representatives of relevant agencies
Mar 15th, 2011 **Tru Van Tho Commune's PC, Ben Cat District, Binh Duong Province** *Number of Participants: 62* Representatives of Tru Van Tho Commune's PC, Ben Cat District LFDC, representatives of BIWASE and 53 PAPs. *Consultation contents:* - Information dissemination of the Project (leaflets, brief introduction of the Project such as benefits of the Project, planning sites, land acquisition area, affected households in Tru Van Tho commune. - Introduced policies on compensation, assistance and resettlement for the PAPs; - Plan on compensation and land clearance plan - Grievance redness mechanism.	- PAPs agreed with the land acquisition plan of the State; - Requiring to conduct detailed measurement survey soon	- Will conduct detailed measurement survey as soon as possible
Mar 26th, 2011 **Chanh Phu Hoa Commune's PC, Ben Cat District, Binh Duong Province** *Number of Participants: 40* Representatives of Chanh Phu Hoa Commune's PC, Ben Cat District LFDC, representatives of BIWASE and 30 PAPs. *Consultation contents:* - Information dissemination of the Project (leaflets, brief introduction of the Project such as benefits of the Project, planning sites, land acquisition area, affected households in Chanh Phu Hoa commune). - Introduced policies on compensation, assistance and resettlement for the PAPs; - Plan on compensation and land clearance plan - Grievance redness mechanism.	Mr.Le Quoc Cuong: - PAPs concern about the compensation and assistance policies - The land owners should join during conducting loss inventory	- Compensation plan is detailed in the master plan on the compensation, assistance and resettlement for the project which sent to the PAPs; - Agreed that the land owners should join during conducting loss inventory
	Mr.Le Minh Sang: PAPs concern about compensation policy for affected rubber trees, should be based on annual unit price	- Land position and unit price is detailed in the master plan on the compensation, assistance and resettlement for the project which sent to the

Date, Venue & Participants	Main Issues raised by PAPs	Responses of representatives of relevant agencies
	Mr.Le Van Luong: - Want to know about land position and unit price before conduct loss inventory	PAPs

Annex B Monitoring Form

Preparation of Resettlement Site (where necessary)

No.	Explanation of site (e.g. Area, No of resettlement HH,etc)	Status (Completed(date)/not compleated)	Deatails (Site Selection, identification of candidate site, discussion with PAPs, Development of the Site, etc)	Expected Date of Completion
1				
2				

Public Consultation

No.	Date	Place	Contents of the consultation/ main comments and answer
1			
2			

Resettlement Activity

Resettlement Activity	Planned/ total	Unit	Progress in Quantity			Progress in %		Expected Date of Completion	Responsible Organization
			During the Quarter	Till the Last Quarter	Up to the Quarter	Till the Last Quarter	Up to the Quarter		
Preparation of RAP									
Employment of Consultants		Man-month							
Implementation of Census Survey									
Approval RAP			Date of Approval;						
Finalized PAPs List		No.of PAPs							
(i)Progress of Compensation Payment									
Lot 1		No.of HH							
Lot 2		No.of HH							
Progress of Land Acquisition									
Lot 1		ha							
Lot 2		ha							
Progress of Assets Replacement									
Lot 1		No.of HH							
Lot 2		No.of HH							
Progress of Relocation People									
Lot 1		No.of HH							
Lot 2		No.of HH							
(ii) Progress of Information dissemination and public Meeting									
Lot 1									

Lot 2									
(iii) Grievance Redness									
Member of Grievance Redness		Nos.							
Receiving complain									
Disposing off complain									
Assist HH in replacement									
(iv) adjust a schedule with construction									
Lot 1									
Lot 2									

Annex C Template for Socio-Economic Survey

SOCIO – ECONOMIC QUESTIONNAIRES OF AFFECTED HOUSEHOLDS

Code: | | | |

Project Name:
Component:
……..……..
Commune/Ward: ……...Hamlet/Quarter:
……..…….
Name of Investigator:
Date of survey:...../...../.....

I. GENERAL OF INTERVIEWEE AND HOUSEHOLD:

C1. Full Name of Interviewee: …….....

C2. Occupation (look at Code (d) in C8): ……

1.Farmers;	6.Solders, Security;	11. Unemployment;
2.Wokers;	7. Unstable Employment ;	12. Housekeeper;
3.State Officials ;	8. Students/Pupil ;	13. Disabled Persons;
4.Retires;	9. Handicraft;;	14. Others
5.Businessmen;	10. Under School Age ;	

C3a. Gender: 1. Male 2. Female

C3b. Year of Birth: …….

C3c. Education

0. Illteracy	3. High School
1. Primary	4. College/University
2. Secondary	5. Post Graduate

C4. Group:.....

C5. Vulnerable Household: 1. Yes ➔ C6 2. No➔C7

C6. If YES, in detailed:

1. Poor Household (Certificated) 2. Disabled Household
3. Invalid or “revolution” household 4. Invalid of “revolution” household

5. Loneliness Elder　　6. Loneliness Household
7. Single woman (with dependant)　　8. Other:.....

C7. Displaced or not ?

1. Yes　　2. No

C8. Information of Members of the household: Scale of household:..... persons

No	Relationship with head of household (a)	Group	Gender (b)	Year of birth	Education (c)	Main Occupation (d)	Average General Income per month (dong/month/person)
1							
2							
3							
4							
5							
6							
7							
8							
9							

Code:(a): Relationship with head of household: 1.Head; 2.Husband/wife; 3.Children; 4.Father/mother; 5.Grand mother/Grand father; 6.Niece; 7.Sibling; 8.Relative.
(b):Gender: 1.Male; 2.Female
(c):Education: 1.Illteracy; 2.Primary; 3. Secondary; 4.High School; 5. College/University; 6. Post Graduate
(d):Occupation: 1.Farmers; 2.Workers; 3. State Officials; 4.Retires; 5.Businessmen; 6.Solders, Securityi; 7. Unstable Employment; 8.Students/Pupil; 9.Handicraft; 10.Under School Age; 11.Unemployment; 12.Housekeeper; 13.Disabled Persons; 14.Elders; 15.Others.

C9a. Income Source of household:

No	*Income Source (estimate)*	*Amount (dong/household/month)*
1	From Salary	
2	From farming/forest/aquaculture	
3	From business/service	
4	From gift/assistance, etc	
5	From other source	
6	***Total of Income Source***	

C9b. Household living standard according to the classification of commune/ward:

1. Poor　　2.Near Poor　　3. Average　　4. Fair　　5. Rich

C10. Expenditure Average of of Households per month (dong/month):

No	*Expenditure(estimate)*	*Amount (dong/household/month)*
1	Food	
2	School	
3	Health	

4	Electricity	
5	Water	
6	Sanitation, Security Fees	
7	Expenditure for production/business/service	
8	Traveling, shopping, wedding, etc.	
9	Other cost	
10	***Total of Expenditure***	

II. ACCOMODATIONS

C11. Available Accommodation of the Household

Name of Asset	Quantity	Name of Asset	Quantity
1. Bycicle		8. Telephone	
2. Motorbike		9. Mobile	
3. Car		10. Video/CD	
4. Air Condition		11. Computer	
5. Washing Machine		12. Rice Cooker	
6. Bed/board/wood furniture		13. Gas Cooker	
7. Television		14. Fridge	

III. LAND

C12. LURC for Residential land

1. Tittled　　2. Legalizable　　3. None-tittle

C13. LURC for Agricultural land

1. Tittled　　2. Legalizable　　3. None-tittle

C14. LURC for Pond/Lake/Garden land

1. Tittled　　2. Legalizable　　3. None-tittle

C15. LURC for Forest/mountain land

1. Tittled　　2. Legalizable　　3. None-tittle

C16. Source of land or house:

1. Inheritance
2. Issued by the State
3. Renting land
4. Buying
5. Other.....

C17. Expectations of the affected household of compensation, assistance and resettlement:

a):.....

.....

.....

.....

b):.....

.....

.....

.....

c):.....

.....

.....

.....

IV. EVALUATION OF THE INVESTIGATOR:

……
……..
……
……..
……
……..

Bình Dương, date_____month_____year_____

Investigator	**Head of Hamlet/Quarter**
(Signature, name)	*(Signature, name)*

Annex D Template of Loss Inventory

"MINUTE OF DETAILED MEASURE SURVEY FOR AFFECTED LAND/ASSETS
OF THE HOUSEHOLDS OR THE AGENCIES/ORGANIZATIONS"

No:……../BBKK
Project Name :
Component: …….
Name of Head of Household: …… Man (female): …….
Commune/ward:…….Hamlet/quarter: …….
Group: ….. …Occupation: …….. No. of member: ……..…… No. of labour:…….

Economic Situation: Wealthy Average Poor "Policy" family

Members take part in the Survey:

Mr (Mrs): ……- Position: ……...……

Mr (Mrs) : ……- Position: ……...……

Mr (Mrs): …… - Position: ……...……

Mr (Mrs): ……..……- Position: ……...……

Mr (Mrs): ……...…. - Position: ……...……

Mr (Mrs): ……..……- Position: ……...……

Mr (Mrs): ……...……. - Position: ……...……

Mr (Mrs): ……...……. - Position: ……...……

Mr (Mrs): ……..…… - Position: ……...……

Representative of affected persons (voted by the affected households)

Mr (Mrs): ……

After survey, detailed measure, we agree to set the minute of affected land and assets of the households named ..... As the follows:

I. Land

If the land has a conlict or not ?　Yes　No

State of Own:　Legal　Legalizable　Non-titled

No	Type of land	LURC		Position	Total of Area (m^2)	Lost Area (m^2)	% lost land	In which		Vialbe to use on remaining land	Unit Price (dong)	Ammount (dong)
		Yes	No					Permanent lost	Temporary lost (m^2)			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
I	***Resident Land***											
II	***Argricultural Land***											
III	***Pond, garden***											
IV	***Forest Land***											
V	***Other Land***											
Total												**-**

Description of land situation
(can take a photo or drawing)

Source of land:

II. ACQUIRRED ASSETS AND OBJECTS ON THE LAND

No	House, works (housing category)	Unit	Size	Goal of using	Area of using (m^2)	Compensated Area (m^2)	Remaining land (m^2)	Unit Price (đồng)	Ammount (đồng)
(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
1	Main house (preliminary description)								
2	Sub-Objects (Cook, toilet)								
3	Other works								
Total									

III . AFFECTED TREES AND CROPS

No	Name of Tree	Group	Unit	Quantity	Unit Price	Ammount
I	***Wood trees***					
1						
2						
3						
II	***Fruit trees***					
1						
2						
3						
III	***Other tree***					
1						
2						
3						
IV	***Crops***					
1						
2						
3						
4						
5						
Total						

IV. GRAVE

No	Type	Unit	Size	Quantity	Unit Price	Ammount
Total						

V.AFFECTED OTHERS (included income):

No	Type of lost	Unit	Quantiy	Compensation Cost	Note
	Renting house				
	Renting location for business				
	Renting land				
	Lost income from business				
	Lost income from production				
	Lost income from other source				
	Other (detailed)				

Note:

VI: BUSINESS ACTIVITIES AND NUMBER OF STAFF

a. Registered or None-Registered Business?
1-Registered, no of register:……2-None-Registered (Small bunisess)

b. If none-registered bussiness, how much average income after tax in recent 6 months is?

c. If none-registered bussiness, how much average revenue in recent 6 months is?

d. Hire staff:

No	Name of Staff	Occupation	Working State	Note

V. CLASSIFICATION OF AFFECTED HOUSEHOLDS

1. Type of Impact :
   1.Affected Agricultaral land ≥ 10%
   2. Affected resident land but viable to use on the remaining land
   3. Affected resident land and must relocate (resettlement)
   4. Business household

5. Poor household
6. Policy household

2. Expectation of Affected Households
Relocate to the resettment site
Free Resettlement
In need of job transition
Get assistance by cash without vocational training
Other need:
……..

VI . ASSISTANCE IN ACCORDANCE WITH THE PROJECT POLICY

No	Assistance	Unite	Quantiy	Unit	Ammount
1	Relocation				
2	Resettlement				
3	Renting house				
4	Agricultural land				
5	Livelihood and production stablilazation				
6	Job transition and				
7	Invalid (or "revolution") household				
8	Business assistance				
9	Other assistance				
Total					

VII . BUGGET OF COMPENSATION, ASSISTANCE AND RESETTLEMENT:

Total of Budget:

By word :

In which:

Land:	đồng
None-landed Assets, Objects on land:	đồng
Tree/crop:	đồng
Assistance:	đồng

This minute will be set in 3 versions, these are equipvalent in legal, in which the Thanh Hoa City Site Clearance and Resettlement Department (RC) keeps 2 versions. Head of affected household keep one version

Representative of The LFDC　　Representative of Commune/Ward People's Commitee

(Signature, Stamp)　　(Signature, Stamp)

Members　　Representative of Affected Person

Head of Household

Signature, Name　　(Signature, name)

(Signature, name)

1 ……..

2 ……..

3 ……..

4 ……..

5 ……..

6 ……..

7 ……..

8 ……..

Annex E Land Unit Price in the Project Area

土地用途別の再取得価格を BIWASE より入手した。再取得価格は、LFDC より発刊された基礎単価に対して用途別の係数を乗じて再取得価格を算出している。

A. Rural Residential Land

1. Trừ Văn Thố commune

Position	Standard Price (dong/m^2)	Coefficient Đ	coefficient K	Unit Price (dong/m^2)
Road DT750 (T-junction to border of Long Hoa commune):				
Position 1	1.200.000	0,7	1,2	1.008.000
Position 2	880000	0,7	1,2	739.200
Position 3	550000	0,7	1,2	462.000
Position 4	330000	0,7	1,2	277.200
Rural Road with 4m width or more				
Position 1	940.000	0,6	1,2	676.800
Position 2	610.000	0,6	1,2	439.200
Position 3	420.000	0,6	1,2	302.400
Position 4	330.000	0,6	1,2	237.600

2. Lai Uyen commune

Position	Standard Price (dong/m^2)	Coefficient Đ	coefficient K	Unit Price (dong/m^2)
National Road 13 (From border of My Phuoc Town to Tham Rot Bridge):				
Position 1	1.200.000	0,9	1,2	1.296.000
Position 2	880.000	0,9	1,2	950.400
Position 3	550.000	0,9	1,2	594.000
Position 4	330.000	0,9	1,2	356.400
Road ĐH – 612 (From Bia Bàu Bàng to Bố Lá T-junction)				
Position 1	940.000	0,8	1,2	902.400
Position 2	610.000	0,8	1,2	585.600
Position 3	420.000	0,8	1,2	403.200
Position 4	330.000	0,8	1,2	316.800
Road ĐH – 613 (From Bia Bàu Bàng to Tân Long)				
Position 1	940.000	0,7	1,2	789.600
Position 2	610.000	0,7	1,2	512.400
Position 3	420.000	0,7	1,2	352.800
Position 4	330.000	0,7	1,2	277.200
Rural Road with 4m width or more				
Position 1	940.000	0,6	1,2	676.800
Position 2	610.000	0,6	1,2	439.200
Position 3	420.000	0,6	1,2	302.400
Position 4	330.000	0,6	1,2	237.600

3. Tân Hưng commune

Position	Standard Price (dong/m^2)	Coefficient Đ	coefficient K	Unit Price (dong/m^2)
Road ĐH – 612 (From Bia Bàu Bàng to Bố Lá T-junction)				
Position 1	1.200.000	0,8	1,2	902.400
Position 2	880000	0,8	1,2	585.600
Position 3	550000	0,8	1,2	403.200
Position 4	330000	0,8	1,2	316.800

Rural Road with 4m width or more				
Position 1	940.000	0,6	1,2	676.800
Position 2	610.000	0,6	1,2	439.200
Position 3	420.000	0,6	1,2	302.400
Position 4	330.000	0,6	1,2	237.600

4. Lai Hưng commune

Rural Road with 4m width or more				
Position 1	940.000	0,6	1,2	676.800
Position 2	610.000	0,6	1,2	439.200
Position 3	420.000	0,6	1,2	302.400
Position 4	330.000	0,6	1,2	237.600

5. Chánh Phú Hòa commune

Position	**Standard Price (dong/m^2)**	**Coefficient Đ**	**coefficient K**	**Unit Price (dong/m^2)**
Road 2/9 (7B) (intersection Ông Giáo to ĐT 741):				
Position 1	1.200.000	0,7	1,3	1.092.000
Position 2	880000	0,7	1,3	800.800
Position 3	550000	0,7	1,3	500.500
Position 4	330000	0,7	1,3	300.300
Road ĐH 605 (intersection Ông Giáo to ĐT 741) (T-junction Ông Kiểm)				
Position 1	1.200.000	0,7	1,2	1.008.000
Position 2	880000	0,7	1,2	739.200
Position 3	550000	0,7	1,2	462.000
Position 4	330000	0,7	1,2	277.200
Rural Road with 4m width or more				
Position 1	940.000	0,6	1,2	676.800
Position 2	610.000	0,6	1,2	439.200
Position 3	420.000	0,6	1,2	302.400
Position 4	330.000	0,6	1,2	237.600

B. Productive and none-agriculture land in rural

Position	**Standard Price (dong/m^2)**	**Coefficient Đ**	**coefficient K**	**Unit Price (dong/m^2)**
National Road 13 (From border of My Phuoc Town to Tham Rot Bridge):				
Position 1	840.000	0,9	1,2	907.200
Position 2	620.000	0,9	1,2	669.600
Position 3	390.000	0,9	1,2	421.200
Position 4	230.000	0,9	1,2	248.400
Road DT750 (T-junction to border of Long Hoa commune):				
Position 1	840.000	0,7	1,2	705.600
Position 2	620.000	0,7	1,2	520.800
Position 3	390.000	0,7	1,2	327.600
Position 4	230.000	0,7	1,2	193.200
Road 2/9 (7B) (intersection Ông Giáo to ĐT 741):				
Position 1	840.000	0,7	1,3	764.400
Position 2	620.000	0,7	1,3	564.200
Position 3	390.000	0,7	1,3	354.900
Position 4	230.000	0,7	1,3	300.300
Road ĐH 605 (intersection Ông Giáo to ĐT 741) (T-junction Ông Kiểm)				
Position 1	840.000	0,7	1,2	705.600

Position 2	620.000	0,7	1,2	520.800
Position 3	390.000	0,7	1,2	327.600
Position 4	230.000	0,7	1,2	193.200
Road ĐH – 612 (From Bia Bàu Bàng to Bố Lá T-junction)				
Position 1	660.000	0,8	1,2	633.600
Position 2	430.000	0,8	1,2	412.800
Position 3	290.000	0,8	1,2	278.400
Position 4	230.000	0,8	1,2	220.800
Road ĐH – 613 (From Bia Bàu Bàng to Tân Long)				
Position 1	660.000	0,7	1,2	554.400
Position 2	430.000	0,7	1,2	361.200
Position 3	290.000	0,7	1,2	243.600
Position 4	230.000	0,7	1,2	193.200
Rural Road with 4m width or more				
Position 1	660.000	0,6	1,2	475.200
Position 2	430.000	0,6	1,2	309.600
Position 3	290.000	0,6	1,2	208.800
Position 4	230.000	0,6	1,2	165.600

C. Agricultural Land

1. Trừ Văn Thố Commune

Road DDT750 (T-junction Trừ Văn Thố to border of Long Hòa commune):

- Annual crop land:
  - + Position 1: 140.000 dong/m^2
  - + Position 2: 110.000 dong/m^2
  - + Position 3: 95.000 dong/m^2
  - + Position 4: 70.000 dong/m^2
- Perennial tree land:
  - + Position 1: 150.000 dong/m^2
  - + Position 2: 130.000 dong/m^2
  - + Position 3: 110.000 dong/m^2
  - + Position 4: 80.000 dong/m^2

Rural Road with 4m width or more:

- Annual crop land:
  - + Position 1: 100.000 dong/m^2
  - + Position 2: 90.000 dong/m^2
  - + Position 3: 80.000 dong/m^2
  - + Position 4: 70.000 dong/m^2
- Perennial tree land:
  - + Position 1: 130.000 dong/m^2
  - + Position 2: 100.000 dong/m^2
  - + Position 3: 90.000 dong/m^2
  - + Position 4: 80.000 dong/m^2

2. Lai Uyên Commune:

Road 13 (border of Mỹ Phước Town to Tham Rớt Bridge)

- Annual crop land:
  - + Position 1: 140.000 dong/m^2
  - + Position 2: 110.000 dong/m^2
  - + Position 3: 95.000 dong/m^2
  - + Position 4: 70.000 dong/m^2
- Perennial tree land:
  - + Position 1: 150.000 dong/m^2
  - + Position 2: 130.000 dong/m^2

+ Position 3: 110.000 dong/m^2
+ Position 4: 80.000 dong/m^2

Road ĐH-612 (Bia Bàu Bàng to T-Junction Bố Lá):

- Annual crop land:
  + Position 1: 100.000 dong/m^2
  + Position 2: 90.000 dong/m^2
  + Position 3: 80.000 dong/m^2
  + Position 4: 70.000 dong/m^2
- Perennial tree land:
  + Position 1: 130.000 dong/m^2
  + Position 2: 100.000 dong/m^2
  + Position 3: 90.000 dong/m^2
  + Position 4: 80.000 dong/m^2

Road ĐH-613 (Bia Bàu Bàng to Tân Long)

- Annual crop land:
  + Position 1: 100.000 dong/m^2
  + Position 2: 90.000 dong/m^2
  + Position 3: 80.000 dong/m^2
  + Position 4: 70.000 dong/m^2
- Perennial tree land:
  + Position 1: 130.000 dong/m^2
  + Position 2: 100.000 dong/m^2
  + Position 3: 90.000 dong/m^2
  + Position 4: 80.000 dong/m^2

Rural Road with 4m width or more:

- Annual crop land:
  + Position 1: 100.000 dong/m^2
  + Position 2: 90.000 dong/m^2
  + Position 3: 80.000 dong/m^2
  + Position 4: 70.000 dong/m^2
- Perennial tree land:
  + Position 1: 130.000 dong/m^2
  + Position 2: 100.000 dong/m^2
  + Position 3: 90.000 dong/m^2
  + Position 4: 80.000 dong/m^2

3. Tân Hưng commune

Road ĐH-612 (Bia Bàu Bàng to T-Junction Bố Lá):

- Annual crop land:
  + Position 1: 100.000 dong/m^2
  + Position 2: 90.000 dong/m^2
  + Position 3: 80.000 dong/m^2
  + Position 4: 70.000 dong/m^2
- Perennial tree land:
  + Position 1: 130.000 dong/m^2
  + Position 2: 100.000 dong/m^2
  + Position 3: 90.000 dong/m^2
  + Position 4: 80.000 dong/m^2

Rural Road with 4m width or more:

- Annual crop land:
  + Position 1: 100.000 dong/m^2
  + Position 2: 90.000 dong/m^2
  + Position 3: 80.000 dong/m^2
  + Position 4: 70.000 dong/m^2
- Perennial tree land:

+ Position 1: 130.000 dong/m^2
+ Position 2: 100.000 dong/m^2
+ Position 3: 90.000 dong/m^2
+ Position 4: 80.000 dong/m^2

4. Lai Hưng commune:

Rural Road with 4m width or more:

- Annual crop land:
  + Position 1: 100.000 dong/m^2
  + Position 2: 90.000 dong/m^2
  + Position 3: 80.000 dong/m^2
  + Position 4: 70.000 dong/m^2
- Perennial tree land:
  + Position 1: 130.000 dong/m^2
  + Position 2: 100.000 dong/m^2
  + Position 3: 90.000 dong/m^2
  + Position 4: 80.000 dong/m^2

5. Chánh Phú Hòa commune

Road 2/9 (7B) intersection Ông Giáo to ĐT 741:

- Annual crop land:
  + Position 1: 140.000 dong/m^2 x 1,2 (coefficient K) = 168.000 dong/m^2
  + Position 2: 110.000 dong/m^2 x 1,2 (coefficient K) = 132.000 dong/m^2
  + Position 3: 95.000 dong/m^2 x 1,2 (coefficient K) = 114.000 dong/m^2
  + Position 4: 70.000 dong/m^2 x 1,2 (coefficient K) = 84.000 dong/m^2
- Perennial tree land:
  + Position 1: 150.000 dong/m^2 x 1,2 (coefficient K) = 180.000 dong/m^2
  + Position 2: 130.000 dong/m^2 x 1,2 (coefficient K) = 156.000 dong/m^2
  + Position 3: 110.000 dong/m^2 x 1,2 (coefficient K) = 132.000 dong/m^2
  + Position 4: 80.000 dong/m^2 x 1,2 (coefficient K) = 96.000 dong/m^2

Road ĐH 605 (intersection Ông Giáo to ĐT 741 (T-Junction)):

- Annual crop land:
  + Position 1: 140.000 dong/m^2 x 1,2 (coefficient K) = 168.000 dong/m^2
  + Position 2: 110.000 dong/m^2 x 1,2 (coefficient K) = 132.000 dong/m^2
  + Position 3: 95.000 dong/m^2 x 1,2 (coefficient K) = 114.000 dong/m^2
  + Position 4: 70.000 dong/m^2 x 1,2 (coefficient K) = 84.000 dong/m^2
- Perennial tree land:
  + Position 1: 150.000 dong/m^2 x 1,2 (coefficient K) = 180.000 dong/m^2
  + Position 2: 130.000 dong/m^2 x 1,2 (coefficient K) = 156.000 dong/m^2
  + Position 3: 110.000 dong/m^2 x 1,2 (coefficient K) = 132.000 dong/m^2
  + Position 4: 80.000 dong/m^2 x 1,2 (coefficient K) = 96.000 dong/m^2

Rural Road with 4m width or more:

- Annual crop land:
  + Position 1: 100.000 dong/m^2 x 1,2 (coefficient K) = 120.000 dong/m^2
  + Position 2: 90.000 dong/m^2 x 1,2 (coefficient K) = 108.000 dong/m^2
  + Position 3: 80.000 dong/m^2 x 1,2 (coefficient K) = 96.000 dong/m^2
  + Position 4: 70.000 dong/m^2 x 1,2 (coefficient K) = 84.000 dong/m^2
- Perennial tree land:
  + Position 1: 130.000 dong/m^2 x 1,2 (coefficient K) = 156.000 dong/m^2
  + Position 2: 100.000 dong/m^2 x 1,2 (coefficient K) = 120.000 dong/m^2
  + Position 3: 90.000 dong/m^2 x 1,2 (coefficient K) = 108.000 dong/m^2
  + Position 4: 80.000 dong/m^2 x 1,2 (coefficient K) = 96.000 dong/m^2

Annex F PAHs inventory

The List of PAH in WTP

No	No of profile	Name	Address	Acquired area (m^2)	Note
1		Lê Thị Nga	150, hamlet 5, Chánh Phú Hòa commune	10,190.60	Gum land
2		Lê Quốc Cường	Kp1, Mỹ Phước, Town	4,447.00	Gum land
3		Nguyễn Văn Hơi	Hòa Lợi commune	6,375.50	Gum land
4		Ngô Văn Nhị	Hamlet 1A, Chánh Phú Hòa commune	5,974.00	Empty land
5		Võ Văn Bình	Hamlet 4, Chánh Phú Hòa commune	10,671.70	Empty land
6		Huỳnh Thi Ngọc	Hamlet 1, Chánh Phú Hòa commune	5,514.00	Gum land
7		Trương Văn Ân	Hamlet 2, Chánh Phú Hòa commune	6,718.86	Gum land
8		Lê Văn Sung	166, Hamlet 4, group 6, Chánh Phú Hòa commune	7,501.50	Empty land
9		Nguyễn Thị Mỹ	Hamlet 2, Chánh Phú Hòa commune	5,568.72	Gum land
10		Huỳnh Văn Đeo	Kp3, Mỹ Phước, Town	6,768.22	Gum land
11		Thượng Văn Sĩ	Hamlet 1B, Chánh Phú Hòa commune	12,122.80	Empty land
12		Nguyễn Văn Lỹ	Chánh Phú Hòa commune	14,195.00	Gum land
13		Lê Thị Vàng (đại diện Huỳnh Văn Việt)	Chánh Phú Hòa commune	4,544.00	Empty land
14		Nguyễn Văn Huề	Chánh Phú Hòa commune	23,232.00	Gum land

No	No of profile	Name	Address	Acquired area (m^2)	Note
15		Nguyễn Văn Anh	Chánh Phú Hòa commune	5,388.00	Empty land
16		Lê Minh Sang	Chánh Phú Hòa, commune	13,194.00	Empty land
17		Trương Văn Bá	Chánh Phú Hòa, commune	7,426.60	Gum land
18		Phạm Thị Gái	Chánh Phú Hòa, commune	72,188.50	Gum land

付録 9 - A　概算工事費の内訳

Exchange rate: VND 1.0 = JPY 0.0044, US$ 1.0 = JPY 91.84

(1) Regulating Reservoir

Element No.			Element Description	Number	Quantity	Unit	Total cost estimation without VAT	VND/Unit	Value [VND]	Value [USD]	Value [JPY]
A			**Earth Dam**						**114,482,460,006**	**5,484,787**	**503,722,824**
			100.00	**%**							
A	1		Construction Costs						114,482,460,006	5,484,787	503,722,824
A	1	1	Excavated soil	1	2,708,746	m³	28,969	VND/m³	78,470,532,965	3,759,477	345,270,345
			520.2*520.2*8.9		2,408,412						
			4*542.6*(0.5*(1+8.9)*22.4)		240,654						
			4*552.6*(0.5*(3+10.5)*4)		59,681						
			4*572.6*(0.5*(21.52+3)*13)		365,044						
A	1	2	Backfilled soil with K>=0.97	1	665,379	m³	14,222	VND/m³	9,463,294,928	453,381	41,638,498
A	1	3	Concrete, grade 200	1	1,259	m³	2,015,600	VND/m³	2,537,301,779	121,561	11,164,128
			4*542.6*(0.4+0.18)		1,259						
A	1	4	Concrete, grade 150	1	416	m³	1,850,000	VND/m³	769,896,000	36,885	3,387,542
			4*520.2*0.4*0.5		416						
A	1	5	Lined Stone	1	12,805	m³	205,643	VND/m³	2,633,328,933	126,161	11,586,647
			4*542.6*(23.6*0.25)		12,805						
A	1	6	Stone for drainage	1	7,683	m³	417,866	VND/m³	3,210,555,590	153,816	14,126,445
			4*542.6*(23.6*0.15)		7,683						
A	1	7	Filter Sand	1	10,244	m³	349,254	VND/m³	3,577,854,827	171,413	15,742,561
			4*542.6*(23.6*0.2)		10,244						
A	1	8	Grass	1	41,011	m^2	120,398	VND/m^2	4,937,604,773	236,558	21,725,461
			4*553.6*18.52		41,011						
A	1	9	Surrounding road	1	2,186	m	2,567,000	VND/m	5,612,488,800	268,891	24,694,951
			2*(546.6+546.6)		2,186						
A	1	10	Reinforcing steel bar	1	101	ton	21,353,190	VND/ton	2,150,406,310	103,025	9,461,788
A	1	11	Steel for mechanical work	1	32	ton	34,714,488	VND/ton	1,119,195,101	53,620	4,924,458

(2) Raw Water Intake Pumping Station

1) Phase 1A

Element No.			Element Description	Number	Quantity	Unit	Total cost estimation without VAT	VND/Unit	Value [VND]	Value [USD]	Value [JPY]
A	2		**Raw Water Intake Pumping Station**						**129,052,862,544**	**6,182,846**	**567,832,595**
A	2		Construction Costs						27,799,262,544	1,331,846	122,316,755
A	2	1	Excavation	1	70.9	100m³	3,370,167	VND/100m³	239,012,209	11,451	1,051,654
A	2	2	Back-fill	1	90.3	100m³	3,913,873	VND/100m³	353,229,502	16,923	1,554,210
A	2	3	Lean concrete, d= 0.1-0.15m	1	140.4	m³	2,200,000	VND/m³	308,880,000	14,798	1,359,072
A	2	4	R/C foundation base, d= 0.8-1m	1	763.2	m³	6,400,000	VND/m³	4,884,480,000	234,013	21,491,712
A	2	5	R/C walls, d= 0.8-1 m	1	771.6	m³	6,400,000	VND/m³	4,937,932,800	236,573	21,726,904
A	2	6	R/C columns	1	72.2	m³	6,400,000	VND/m³	461,990,400	22,134	2,032,758
A	2	7	R/C Beams	1	69.6	m³	6,400,000	VND/m³	445,440,000	21,341	1,959,936
A	2	8	R/C floor, covering slab d=0.15m	1	135.4	m³	6,400,000	VND/m³	866,816,000	41,529	3,813,990
A	2	9	Mass concrete	1	669.2	m³	4,200,000	VND/m³	2,810,707,200	134,659	12,367,112
A	2	10	Brick work	1	98.5	m³	1,200,000	VND/m³	118,176,000	5,662	519,974
A	2	11	Tile work	1	216.0	m2	330,000	VND/m2	71,280,000	3,415	313,632
A	2	12	Doors&Windowns	1	410.5	m2	2,300,000	VND/m2	944,104,000	45,231	4,154,058
A	2	13	Ladder steel	1	5.0	set	28,400,000	VND/set	142,000,000	6,803	624,800
A	2	14	Fence&landscaping	1	1.0	L/S	4,800,000,000	VND	4,800,000,000	229,965	21,120,000
A	2	15	Other parts built in = 30%*(2.1-2.14)	1	1.0	L/S	6,415,214,433	VND	6,415,214,433	307,349	28,226,944
A	2		Mechanical & Electrical Equipment						101,253,600,000	4,851,000	445,515,840
A	2	16	Mechanical & Electrical Equipment	1	1.0	L/S	101,253,600,000	VND	101,253,600,000	4,851,000	445,515,840
A	3		**Connection Chamber**						**8,075,959,355**	**386,914**	**35,534,221**
A	3		Construction Costs						4,142,636,101	198,471	18,227,599
A	3	1	Excavation	1	4.3	100m³	3,370,167	VND/100m³	14,444,871	692	63,557
A	3	2	Back-fill	1	3.6	100m³	3,913,873	VND/100m³	14,010,101	671	61,644
A	3	3	Lean concrete, d= 0.1m	1	7.9	m³	2,200,000	VND/m³	17,270,000	827	75,988
A	3	4	R/C foundation base, d= 0.8m	1	62.8	m³	6,400,000	VND/m³	401,920,000	19,256	1,768,448
A	3	5	R/C walls, d= 0.8m	1	383.8	m³	6,400,000	VND/m³	2,456,020,582	117,666	10,806,491
A	3	6	R/C floor, covering slab d=0.4m	1	25.4	m³	6,400,000	VND/m³	162,777,600	7,799	716,221
A	3	7	Ladder steel	1	2.0	set	35,100,000	VND/set	70,200,000	3,363	308,880
A	3	8	Waste discharge manhole	1	1.0	LS	50,000,000	VND	50,000,000	2,395	220,000
A	3	9	Other parts built in = 30%*(A.1.1 - A.1.8)	1	1.0	L/S	955,992,946	VND	955,992,946	45,801	4,206,369
A	3		Mechanical Equipment						3,933,323,254	188,443	17,306,622
A	3	10	Coupling D2600	1	1.0	Set	180,303,397	VND/set	180,303,397	8,638	793,335
A	3	11	Valve D2600	1	1.0	Set	2,900,000,000	VND/set	2,900,000,000	138,937	12,760,000
A	3	12	Steel bend 45^0 D2600	1	1.0	Set	66,097,284	VND/set	66,097,284	3,167	290,828
A	3	13	Steel pipe D2600	1	3.0	m	89,932,800	VND/m	269,798,400	12,926	1,187,113
A	3	14	Steel pipe D600	1	12.0	m	7,670,423	VND/m	92,045,076	4,410	404,998
A	3	15	Valve D600	1	1.0	Set	102,241,000	VND/set	102,241,000	4,898	449,860
A	3	16	Check Valve D600	1	1.0	Set	184,033,800	VND/set	184,033,800	8,817	809,749
A	3	17	Steel bend 90^0 D600	1	3.0	Set	33,048,642	VND/set	99,145,926	4,750	436,242
A	3	18	Steel Reducer D800x600	1	1.0	Set	39,658,371	VND/set	39,658,371	1,900	174,497

2) Phase 1B

Element No.			Element Description	Number	Quantity	Unit	Total cost estimation without VAT	VND/Unit	Value [VND]	Value [USD]	Value [JPY]
A	2		**Raw Water Intake Pumping Station**						**59,466,400,000**	**2,849,000**	**261,652,160**
A	2		Mechanical & Electrical Equipment						59,466,400,000	2,849,000	261,652,160
A	2	16	Mechanical & Electrical Equipment	1	1.0	L/S	59,466,400,000	VND	59,466,400,000	2,849,000	261,652,160

(3) Raw Water Pipeline

Pipe Dia (mm).	Depth(m)	Material	Length (m)	Unit Cost (VND)	Amount (VND)	Amount (USD)
2600	3-4			65,977,625	0	
	4-5	DIP	23,858.5	67,253,849	1,604,575,956,367	
	5-6				0	
others					48,137,278,691	
Pipe Total			23,858.5		1,652,713,235,058	79,180,512

FRP を用いた場合

Pipe Dia (mm).	Depth(m)	Material	Length (m)	Unit Cost (VND)	Amount (VND)	Amount (JNY)
2600	3-4	FRP		44,033,436	0	
	4-5	FRP	23,858.5	45,761,113	1,091,791,514,511	
	5-6	FRP		65,956,788	0	
others					34,978,605,707	
Pipe Total			23,858.5		1,126,770,120,218	4,957,788,529

(4) Water Treatment Plant

1) Phase 1A + Phase 1B

No.	Description	FC Portion	LC Portion	Combined Equivalent Total
		JPY	VND	JPY
(1)	Receiving and Distribution Tank		5,724,408,016	25,187,395
(2)	Mixing Well, Flocculation & Sedimentation Basins		140,685,267,915	619,015,179
(3)	Filters		97,154,514,219	427,479,863
(4)	Distribution Reservoirs		120,458,810,324	530,018,765
(5)	Distribution Pumping Station		46,609,545,177	205,081,999
(6)	Activated Carbon and Lime Building		5,307,500,000	23,353,000
(7)	PAC Building		1,215,000,000	5,346,000
(8)	Chlorine Building		3,045,000,000	13,398,000
(9)	Sludge Lagoon		13,104,000,000	57,657,600
(10)	Wastewater Basin		3,196,800,000	14,065,920
(11)	Administration Building		10,545,600,000	46,400,640
(12)	Power Substation		2,272,500,000	9,999,000
(13)	Generator Room		922,500,000	4,059,000
(14)	Workshop & Ware House		1,215,000,000	5,346,000
(15)	Garage		273,000,000	1,201,200
(16)	Guard House		135,000,000	594,000
(17)	Other mechanical work		16,450,000,000	72,380,000
(18)	Other electrical work		11,600,000,000	51,040,000
(19)	Yard piping work		76,578,898,640	336,947,154
(20)	Earth work&Fence		34,930,700,485	153,695,082
(21)	Landscaping work		6,450,000,000	28,380,000
(22)	Mechanical & Electrical Work	6,127,792,000	0	6,127,792,000
Base Cost	**Total**	**6,127,792,000**	**597,874,044,776**	**8,758,437,797**

2) Phase 1A

No.	Description	FC Portion	LC Portion	Combined Equivalent Total
		JPY	VND	JPY
(1)	Receiving and Distribution Tank		5,724,408,016	25,187,395
(2)	Mixing Well, Flocculation & Sedimentation Basins		70,342,633,957	309,507,589
(3)	Filters		48,577,257,110	213,739,931
(4)	Distribution Reservoirs		60,229,405,162	265,009,383
(5)	Distribution Pumping Station		46,609,545,177	205,081,999
(6)	Activated Carbon and Lime Building		5,307,500,000	23,353,000
(7)	PAC Building		1,215,000,000	5,346,000
(8)	Chlorine Building		3,045,000,000	13,398,000
(9)	Sludge Lagoon		13,104,000,000	57,657,600
(10)	Wastewater Basin		3,196,800,000	14,065,920
(11)	Administration Building		10,545,600,000	46,400,640
(12)	Power Substation		2,272,500,000	9,999,000
(13)	Generator Room		922,500,000	4,059,000
(14)	Workshop & Ware House		1,215,000,000	5,346,000
(15)	Garage		273,000,000	1,201,200
(16)	Guard House		135,000,000	594,000
(17)	Other mechanical work		16,450,000,000	72,380,000
(18)	Other electrical work		11,600,000,000	51,040,000
(19)	Yard piping work		61,263,118,912	269,557,723
(20)	Earth work&Fence		34,930,700,485	153,695,082
(21)	Landscaping work		6,450,000,000	28,380,000
(22)	Mechanical & Electrical Work	3,077,785,600	0	3,077,785,600
Base Cost	**Total**	**3,077,785,600**	**403,408,968,819**	**4,852,785,063**

3) Phase 1B

No.	Description	FC Portion	LC Portion	Combined Equivalent Total
		JPY	VND	JPY
(2)	Mixing Well, Flocculation & Sedimentation Basins		70,342,633,957	309,507,589
(3)	Filters		48,577,257,110	213,739,931
(4)	Distribution Reservoirs		60,229,405,162	265,009,383
(19)	Yard piping work		15,315,779,728	67,389,431
(22)	Mechanical & Electrical Work	3,050,006,400	0	3,050,006,400
Base Cost	**Total**	**3,050,006,400**	**194,465,075,957**	**3,905,652,734**

4) Cost breakdown of Phase 1A

Element No.			Element Description	Number	Quantity	Unit	Total cost estimation without VAT	VND/Unit	Value [VND]	Value [USD]	Value [JPY]
D			**Water treatment plant**						**1,102,905,696,092**	**52,839,559**	**4,852,785,063**
D	1		**Receiving Tank**						**5,724,408,016**	**274,253**	**25,187,395**
	1		Construction Costs						5,724,408,016	274,253	25,187,395
D	1	1	Excavation	1	28.0	100m³	3,370,167	VND/100m³	94,493,234	4,527	415,770
D	1	2	Back-filling	1	25.1	100m³	3,913,873	VND/100m³	98,314,347	4,710	432,583
D	1	3	Crushed stone, 0.2m	1	64.9	m³	2,200,000	VND/m³	142,692,000	6,836	627,845
D	1	4	Lean concrete, 0.1m	1	32.4	m³	6,400,000	VND/m³	207,552,000	9,944	913,229
D	1	5	R/C foundation base, d=0.6m	1	194.6	m³	6,400,000	VND/m³	1,245,312,000	59,662	5,479,373
D	1	6	R/C walls, d=0.3 - 0.5m	1	332.6	m³	6,400,000	VND/m³	2,128,934,400	101,996	9,367,311
D	1	7	R/C channels	1	5.3	m³	6,400,000	VND/m³	34,124,800	1,635	150,149
D	1	8	R/C floor, covering slab d=0.15 - 0.2 m	1	70.6	m³	6,400,000	VND/m³	451,968,000	21,654	1,988,659
D	1	9	Other parts built-in = 30%*(C.1.1-C.1.8)	1	1.0	L/S	1,321,017,234	VND	1,321,017,234	63,289	5,812,476
D	2		**Mixing well, Plocculation&Sedimentation basins**						**70,342,633,957**	**3,370,074**	**309,507,589**
D	2		Construction Costs						70,342,633,957	3,370,074	309,507,589
D	2	1	Excavation	1	78.6	100m³	3,370,167	VND/100m³	264,870,823	12,690	1,165,432
D	2	2	Back-filling	1	9.2	100m³	3,913,873	VND/100m³	35,934,806	1,722	158,113
D	2	3	Crushed stone, 0.2m	1	1,456.1	m³	2,200,000	VND/m³	3,203,383,040	153,472	14,094,885
D	2	4	Lean concrete, 0.1m	1	728.0	m³	6,400,000	VND/m³	4,659,466,240	223,232	20,501,651
D	2	5	R/C foundation base, d=0.6m	1	4,757.0	m³	6,400,000	VND/m³	30,444,902,400	1,458,597	133,957,571
D	2	6	R/C walls, d=0.3 - 0.5m	1	2,131.5	m³	6,400,000	VND/m³	13,641,605,120	653,561	60,023,063
D	2	7	R/C Floors, d=0.3 - 0.4m	1	161.5	m³	6,400,000	VND/m³	1,033,472,000	49,513	4,547,277
D	2	8	R/C channels	1	78.4	m³	6,400,000	VND/m³	501,760,000	24,039	2,207,744
D	2	9	Mass concrete	1	77.2	m³	4,200,000	VND/m³	324,324,000	15,538	1,427,026
D	2	10	Other parts built-in = 30%*(C.2.1-C.2.9)	1	1.0	L/S	16,232,915,529	VND	16,232,915,529	777,709	71,424,828
D	3		**Filters**						**48,577,257,110**	**2,327,308**	**213,739,931**
D	3		Construction Costs						48,577,257,110	2,327,308	213,739,931
D	3	1	Excavation	1	84.3	100m³	3,370,167	VND/100m³	284,130,517	13,613	1,250,174
D	3	2	Back-filling	1	23.9	100m³	3,913,873	VND/100m³	93,589,008	4,484	411,792
D	3	3	Crushed stone, 0.2m	1	677.0	m³	2,200,000	VND/m³	1,489,357,056	71,354	6,553,171
D	3	4	Lean concrete, 0.1m	1	338.5	m³	6,400,000	VND/m³	2,166,337,536	103,788	9,531,885
D	3	5	R/C foundation base, d=0.8m	1	2,632.9	m³	6,400,000	VND/m³	16,850,313,216	807,289	74,141,378
D	3	6	R/C walls, d=0.4 - 0.7m	1	1,824.6	m³	6,400,000	VND/m³	11,677,459,200	559,460	51,380,820
D	3	7	R/C Floors, d=0.3 - 0.4m	1	646.3	m³	6,400,000	VND/m³	4,136,056,320	198,156	18,198,648
D	3	8	R/C channels	1	69.1	m³	6,400,000	VND/m³	442,112,000	21,181	1,945,293
D	3	9	Mass concrete	1	54.2	m³	4,200,000	VND/m³	227,766,000	10,912	1,002,170
D	3	10	Other parts built-in = 30%*(C.3.1-C.3.9)	1	1.0	L/S	11,210,136,256	VND	11,210,136,256	537,071	49,324,600
D	4		**Distribution water reservoir (02 units)**						**60,229,405,162**	**2,885,555**	**265,009,383**
D	4		Construction Costs						60,229,405,162	2,885,555	265,009,383
D	4	1	Excavation	2	119.8	100m³	3,370,167	VND/100m³	807,410,878	38,683	3,552,608
D	4	2	Back-filling	2	89.0	100m³	3,913,873	VND/100m³	697,012,009	33,393	3,066,853
D	4	3	Lean concrete, 0.1m	2	253.5	m³	2,200,000	VND/m³	1,115,224,000	53,430	4,906,986
D	4	4	R/C foundation base, d=0.6 m	2	1,512.3	m³	6,400,000	VND/m³	19,357,593,600	927,411	85,173,412
D	4	5	R/C walls, d=0.5 m	2	1,308.7	m³	6,400,000	VND/m³	16,750,720,000	802,517	73,703,168
D	4	6	R/C columns	2	266.5	m³	6,400,000	VND/m³	3,411,763,200	163,456	15,011,758
D	4	7	R/C floor, covering slab d=0.3 m	2	68.9	m³	6,400,000	VND/m³	881,280,000	42,222	3,877,632
D	4	8	Other parts built-in = 20%*(C.4.1-C.4.7)	2	1.0	L/S	8,604,200,737	VND	17,208,401,475	824,444	75,716,966
D	5		**Distribution Pumping station**						**46,609,545,177**	**2,233,036**	**205,081,999**
D	5		Construction Costs						46,609,545,177	2,233,036	205,081,999
D	5	1	Excavation	1	238.4	100m³	3,370,167	VND/100m³	803,420,736	38,491	3,535,051
D	5	2	Back-fill	1	188.8	100m³	3,913,873	VND/100m³	738,909,554	35,401	3,251,202
D	5	3	Lean concrete, d= 0.2m	1	521.4	m³	2,200,000	VND/m³	1,147,080,000	54,956	5,047,152
D	5	4	R/C foundation base, d= 1m	1	2,464.0	m³	6,400,000	VND/m³	15,769,600,000	755,512	69,386,240
D	5	5	R/C walls, d= 0.8-1 m	1	1,438.1	m³	6,400,000	VND/m³	9,203,712,000	440,944	40,496,333
D	5	6	R/C columns	1	213.4	m³	6,400,000	VND/m³	1,365,504,000	65,420	6,008,218
D	5	7	R/C Beams	1	323.1	m³	6,400,000	VND/m³	2,067,968,000	99,075	9,099,059
D	5	8	R/C floor, covering slab d=0.15-0.2m	1	404.3	m³	6,400,000	VND/m³	2,587,200,000	123,951	11,383,680
D	5	9	Pump thrust block concrete	1	126.0	m³	4,200,000	VND/m³	529,200,000	25,354	2,328,480
D	5	10	Brick work	1	449.0	m³	1,200,000	VND/m³	538,752,000	25,811	2,370,509
D	5	11	Tile work	1	1,155.0	m2	330,000	VND/m2	381,150,000	18,261	1,677,060
D	5	12	Doors&Windowns	1	190.0	m2	2,300,000	VND/m2	437,000,000	20,936	1,922,800
D	5	13	Ladder steel	1	10.0	set	28,400,000	VND/set	284,000,000	13,606	1,249,600
D	5	14	Other parts built in = 30%*(C.5.1-C.5.13)	1	1.0	L/S	10,756,048,887	VND	10,756,048,887	515,316	47,326,615
D			**Buildings**						**41,231,900,000**	**1,975,396**	**181,420,360**
D	6		**Activated Carbon and Lime building**						**5,307,500,000**	**254,279**	**23,353,000**
D	6		Construction Costs						5,307,500,000	254,279	23,353,000
D	6	1	Construction costs	1	965.0	m²	5,500,000	VND/m²	5,307,500,000	254,279	23,353,000
D	7		**PAC building**						**1,215,000,000**	**58,210**	**5,346,000**
D	7		Construction Costs						1,215,000,000	58,210	5,346,000
D	7	1	Construction costs	1	162.0	m²	7,500,000	VND/m²	1,215,000,000	58,210	5,346,000
D	8		**Chlorine building**						**3,045,000,000**	**145,884**	**13,398,000**
D	8		Construction Costs						3,045,000,000	145,884	13,398,000
D	8	1	Construction costs	1	406.0	m²	7,500,000	VND/m²	3,045,000,000	145,884	13,398,000
D	9		**Sludge Lagoon**						**13,104,000,000**	**627,805**	**57,657,600**
D	9		Construction Costs						13,104,000,000	627,805	57,657,600
D	9	1	Construction costs	1	10,920.0	m²	1,200,000	VND/m²	13,104,000,000	627,805	57,657,600
D	10		**Wastewater Basin**						**3,196,800,000**	**153,157**	**14,065,920**
D	10		Construction Costs						3,196,800,000	153,157	14,065,920
D	10	1	Construction costs	1	666.0	m²	4,800,000	VND/m²	3,196,800,000	153,157	14,065,920
D	11		**Administration building**						**10,545,600,000**	**505,233**	**46,400,640**
D	11		Construction Costs						10,545,600,000	505,233	46,400,640
D	11	1	Construction costs	1	1,352.0	m²	7,800,000	VND/m²	10,545,600,000	505,233	46,400,640
D	12		**Power substation**						**2,272,500,000**	**108,874**	**9,999,000**
D	12		Construction Costs						2,272,500,000	108,874	9,999,000
D	12	1	Construction costs	1	303.0	m²	7,500,000	VND/m²	2,272,500,000	108,874	9,999,000
D	13		**Generator building**						**922,500,000**	**44,196**	**4,059,000**
D	13		Construction Costs						922,500,000	44,196	4,059,000
D	13	1	Construction costs	1	123.0	m²	7,500,000	VND/m²	922,500,000	44,196	4,059,000
D	14		**Ware house & workshop building**						**1,215,000,000**	**58,210**	**5,346,000**
D	14		Construction Costs						1,215,000,000	58,210	5,346,000
D	14	1	Construction costs	1	162.0	m²	7,500,000	VND/m²	1,215,000,000	58,210	5,346,000
D	15		**Garage building**						**273,000,000**	**13,079**	**1,201,200**
D	15		Construction Costs						273,000,000	13,079	1,201,200
D	15	1	Construction costs	1	42.0	m²	6,500,000	VND/m²	273,000,000	13,079	1,201,200
D	16		**Guard building**						**135,000,000**	**6,468**	**594,000**
D	16		Construction Costs						135,000,000	6,468	594,000
D	16	1	Construction costs	1	18.0	m²	7,500,000	VND/m²	135,000,000	6,468	594,000
D			**Overall Installations**						**130,693,819,397**	**6,261,463**	**575,052,805**
D	17		**Other mechanical work**						**16,450,000,000**	**788,110**	**72,380,000**
D	17	1	Firefighting equipment (pump, etc.)	1	1.0	L/S	3,200,000,000	VND	3,200,000,000	153,310	14,080,000
D	17	2	Septic tank	1	1.0	L/S	750,000,000	VND	750,000,000	35,932	3,300,000
D	17	3	Plumbing, drainage, sanitation	1	1.0	L/S	12,500,000,000	VND	12,500,000,000	598,868	55,000,000
D	18		**Other Electrical work**						**11,600,000,000**	**555,749**	**51,040,000**
D	18	1	Security camera/ITV camera	1	1.0	L/S	500,000,000	VND	500,000,000	23,955	2,200,000
D	18	2	Security system (alarm, etc.)	1	1.0	L/S	800,000,000	VND	800,000,000	38,328	3,520,000
D	18	3	Fire alarm, sprinkler	1	1.0	L/S	2,200,000,000	VND	2,200,000,000	105,401	9,680,000
D	18	4	Communication and sound system	1	1.0	L/S	450,000,000	VND	450,000,000	21,559	1,980,000
D	18	5	Lightning system	1	1.0	L/S	2,850,000,000	VND	2,850,000,000	136,542	12,540,000
D	18	6	Outdoor lighting system	1	1.0	L/S	4,800,000,000	VND	4,800,000,000	229,965	21,120,000
D	19		**Yard Piping work**						**61,263,118,912**	**2,935,080**	**269,557,723**
D	19	1	- Subtoal	1	1.0	L/S	61,263,118,912	VND	61,263,118,912	2,935,080	269,557,723
D	20		**Earth work&Fence**						**34,930,700,485**	**1,673,509**	**153,695,082**
D	20	1	- Subtoal	1	1.0	L/S	34,930,700,485	VND	34,930,700,485	1,673,509	153,695,082
D	21		**Landscaping work**						**6,450,000,000**	**309,016**	**28,380,000**
D	21	1	- Subtoal	1	1.0	L/S	6,450,000,000	VND	6,450,000,000	309,016	28,380,000
D	22		**Mechanical & Electrical Equipment**						**699,496,727,273**	**33,512,474**	**3,077,785,600**
D	22	1	Mechanical & Electrical Equipment	1	1.0	L/S	699,496,727,273	VND	699,496,727,273	33,512,474	3,077,785,600

5) Cost breakdown of Phase 1B

Element No.			Element Description	Number	Quantity	Unit	Total cost estimation without VAT	VND/Unit	Value [VND]	Value [USD]	Value [JPY]
D			**Water treatment plant**						**887,648,348,684**	**42,526,707**	**3,905,652,734**
D	2		**Mixing well, Plocculation&Sedimentation basins**						**70,342,633,957**	**3,370,074**	**309,507,589**
D	2		Construction Costs						70,342,633,957	3,370,074	309,507,589
D	2	1	Excavation	1	78.6	100m³	3,370,167	VND/100m³	264,870,823	12,690	1,165,432
D	2	2	Back-filling	1	9.2	100m³	3,913,873	VND/100m³	35,934,806	1,722	158,113
D	2	3	Crushed stone, 0.2m	1	1,456.1	m³	2,200,000	VND/m³	3,203,383,040	153,472	14,094,885
D	2	4	Lean concrete, 0.1m	1	728.0	m³	6,400,000	VND/m³	4,659,466,240	223,232	20,501,651
D	2	5	R/C foundation base, d=0.6m	1	4,757.0	m³	6,400,000	VND/m³	30,444,902,400	1,458,597	133,957,571
D	2	6	R/C walls, d=0.3 - 0.5m	1	2,131.5	m³	6,400,000	VND/m³	13,641,605,120	653,561	60,023,063
D	2	7	R/C Floors, d=0.3 - 0.4m	1	161.5	m³	6,400,000	VND/m³	1,033,472,000	49,513	4,547,277
D	2	8	R/C channels	1	78.4	m³	6,400,000	VND/m³	501,760,000	24,039	2,207,744
D	2	9	Mass concrete	1	77.2	m³	4,200,000	VND/m³	324,324,000	15,538	1,427,026
D	2	10	Other parts built-in = 30%*(C.2.1-C.2.9)	1	1.0	L/S	16,232,915,529	VND	16,232,915,529	777,709	71,424,828
D	3		**Filters**						**48,577,257,110**	**2,327,308**	**213,739,931**
D	3		Construction Costs						48,577,257,110	2,327,308	213,739,931
D	3	1	Excavation	1	84.3	100m³	3,370,167	VND/100m³	284,130,517	13,613	1,250,174
D	3	2	Back-filling	1	23.9	100m³	3,913,873	VND/100m³	93,589,008	4,484	411,792
D	3	3	Crushed stone, 0.2m	1	677.0	m³	2,200,000	VND/m³	1,489,357,056	71,354	6,553,171
D	3	4	Lean concrete, 0.1m	1	338.5	m³	6,400,000	VND/m³	2,166,337,536	103,788	9,531,885
D	3	5	R/C foundation base, d=0.8m	1	2,632.9	m³	6,400,000	VND/m³	16,850,313,216	807,289	74,141,378
D	3	6	R/C walls, d=0.4 - 0.7m	1	1,824.6	m³	6,400,000	VND/m³	11,677,459,200	559,460	51,380,820
D	3	7	R/C Floors, d=0.3 - 0.4m	1	646.3	m³	6,400,000	VND/m³	4,136,056,320	198,156	18,198,648
D	3	8	R/C channels	1	69.1	m³	6,400,000	VND/m³	442,112,000	21,181	1,945,293
D	3	9	Mass concrete	1	54.2	m³	4,200,000	VND/m³	227,766,000	10,912	1,002,170
D	3	10	Other parts built-in = 30%*(C.3.1-C.3.9)	1	1.0	L/S	11,210,136,256	VND	11,210,136,256	537,071	49,324,600
D	4		**Distribution water reservoir (02 units)**						**60,229,405,162**	**2,885,555**	**265,009,383**
D	4		Construction Costs						60,229,405,162	2,885,555	265,009,383
D	4	1	Excavation	2	119.8	100m³	3,370,167	VND/100m³	807,410,878	38,683	3,552,608
D	4	2	Back-filling	2	89.0	100m³	3,913,873	VND/100m³	697,012,009	33,393	3,066,853
D	4	3	Lean concrete, 0.1m	2	253.5	m³	2,200,000	VND/m³	1,115,224,000	53,430	4,906,986
D	4	4	R/C foundation base, d=0.6 m	2	1,512.3	m³	6,400,000	VND/m³	19,357,593,600	927,411	85,173,412
D	4	5	R/C walls, d=0.5 m	2	1,308.7	m³	6,400,000	VND/m³	16,750,720,000	802,517	73,703,168
D	4	6	R/C columns	2	266.5	m³	6,400,000	VND/m³	3,411,763,200	163,456	15,011,758
D	4	7	R/C floor, covering slab d=0.3 m	2	68.9	m³	6,400,000	VND/m³	881,280,000	42,222	3,877,632
D	4	8	Other parts built-in = 20%*(C.4.1-C.4.7)	2	1.0	L/S	8,604,200,737	VND	17,208,401,475	824,444	75,716,966
D	19		**Yard Piping work**						**15,315,779,728**	**733,770**	**67,389,431**
D	19	1	- Subtoal	1	1.0	L/S	15,315,779,728	VND	15,315,779,728	733,770	67,389,431
D	22		**Mechanical & Electrical Equipment**						**693,183,272,727**	**33,210,000**	**3,050,006,400**
D	22	1	Mechanical & Electrical Equipment	1	1.0	L/S	693,183,272,727	VND	693,183,272,727	33,210,000	3,050,006,400

(5) Distribution Mains

Element No.			Element Description	Number	Quantity	Unit	Total cost estimation without VAT	VND/Unit	Value [VND]	Value [USD]	Value [JPY]
F			**Distribution Mains**						**891,000,800,833**	**42,687,321**	**3,920,403,524**
F	1	1	HDPE Pipe D400, As Type1	1	*4,222.0*	m	6,703,191		28,300,873,776	1,355,878	124,523,845
F	1	2	HDPE Pipe D400			100m			670,319,133	32,115	2,949,404
F	1	3	HDPE Pipe D400, 1m length	1	100.0	100m	3,242,482	VND/100m	324,248,160	15,535	1,426,692
F	1	4	Sluice Valve, PN10, DN400	1	1.5	100m	52,164,000	VND/100m	78,246,000	3,749	344,282
F	1	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	1	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	1	7	As Type1 for D400	1	100.0	100m	2,629,381	VND/100m	262,938,093	12,597	1,156,928
F	2	1	HDPE Pipe D400, As Type2	1	*2,126.0*	m	6,973,910		14,826,532,751	710,330	65,236,744
F	2	2	HDPE Pipe D400			100m			697,391,004	33,412	3,068,520
F	2	3	HDPE Pipe D400, 1m length	1	100.0	100m	3,242,482	VND/100m	324,248,160	15,535	1,426,692
F	2	4	Sluice Valve, PN10, DN400	1	1.5	100m	52,164,000	VND/100m	78,246,000	3,749	344,282
F	2	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	2	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	2	7	As Type2 for D400	1	100.0	100m	2,900,100	VND/100m	290,009,965	13,894	1,276,044
F	3	1	HDPE Pipe D500, As Type1	1	*2,497.0*	m	9,094,392		22,708,697,797	1,087,960	99,918,270
F	3	2	HDPE Pipe D500			100m			909,439,239	43,571	4,001,533
F	3	3	HDPE Pipe D500, 1m length	1	100.0	100m	4,880,046	VND/100m	488,004,551	23,380	2,147,220
F	3	4	Sluice Valve, PN10, DN500	1	1.0	100m	93,895,200	VND/100m	93,895,200	4,498	413,139
F	3	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	3	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	3	7	As Type1 for D500	1	100.0	100m	3,226,526	VND/100m	322,652,607	15,458	1,419,671
F	4	1	Ductile Iron Pipe D600, As Type1	1	*3,400.0*	m	11,872,567		40,366,728,151	1,933,946	177,613,604
F	4	2	Ductile Iron Pipe D600			100m			1,187,256,710	56,881	5,223,930
F	4	3	Ductile Iron Pipe D600, 1m length	1	100.0	100m	7,375,709	VND/100m	737,570,945	35,337	3,245,312
F	4	4	Butterfly Valve, PN10, DN600	1	1.0	100m	102,241,440	VND/100m	102,241,440	4,898	449,862
F	4	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	4	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	4	7	As Type1 for D600	1	100.0	100m	3,425,574	VND/100m	342,557,446	16,412	1,507,253
F	5	1	Ductile Iron Pipe D600, As Type2	1	*11,581.0*	m	12,226,584		141,596,067,998	6,783,784	623,022,699
F	5	2	Ductile Iron Pipe D600			100m			1,222,658,389	58,577	5,379,697
F	5	3	Ductile Iron Pipe D600, 1m length	1	100.0	100m	7,375,709	VND/100m	737,570,945	35,337	3,245,312
F	5	4	Butterfly Valve, PN10, DN600	1	1.0	100m	102,241,440	VND/100m	102,241,440	4,898	449,862
F	5	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	5	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	5	7	As Type2 for D600	1	100.0	100m	3,779,591	VND/100m	377,959,124	18,108	1,663,020
F	6	1	Ductile Iron Pipe D600, As Type3	1	*1,743.0*	m	12,937,104		22,549,372,506	1,080,327	99,217,239
F	6	2	Ductile Iron Pipe D600			100m			1,293,710,413	61,981	5,692,326
F	6	3	Ductile Iron Pipe D600, 1m length	1	100.0	100m	7,375,709	VND/100m	737,570,945	35,337	3,245,312
F	6	4	Butterfly Valve, PN10, DN600	1	1.0	100m	102,241,440	VND/100m	102,241,440	4,898	449,862
F	6	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	6	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	6	7	As Type3 for D600	1	100.0	100m	4,490,111	VND/100m	449,011,149	21,512	1,975,649
F	7	1	Ductile Iron Pipe D800, As Type1	1	*3,496.0*	m	16,927,458		59,178,392,337	2,835,202	260,384,926
F	7	2	Ductile Iron Pipe D800			100m			1,692,745,776	81,098	7,448,081
F	7	3	Ductile Iron Pipe D800, 1m length	1	100.0	100m	11,068,514	VND/100m	1,106,851,374	53,029	4,870,146
F	7	4	Butterfly Valve, PN10, DN800	1	1.0	100m	198,640,400	VND/100m	198,640,400	9,517	874,018
F	7	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	7	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	7	7	As Type1 for D800	1	100.0	100m	3,823,671	VND/100m	382,367,122	18,319	1,682,415
F	8	1	Ductile Iron Pipe D800, As Type2	1	*3,137.0*	m	17,323,124		54,342,638,670	2,603,524	239,107,610
F	8	2	Ductile Iron Pipe D800			100m			1,732,312,358	82,994	7,622,174
F	8	3	Ductile Iron Pipe D800, 1m length	1	100.0	100m	11,068,514	VND/100m	1,106,851,374	53,029	4,870,146
F	8	4	Butterfly Valve, PN10, DN800	1	1.0	100m	198,640,400	VND/100m	198,640,400	9,517	874,018
F	8	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	8	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	8	7	As Type2 for D800	1	100.0	100m	4,219,337	VND/100m	421,933,704	20,215	1,856,508
F	9	1	Ductile Iron Pipe D1000, As Type2	1	*6,426.0*	m	23,147,635		148,746,699,467	7,126,366	654,485,478
F	9	2	Ductile Iron Pipe D1000			100m			2,314,763,453	110,899	10,184,959
F	9	3	Ductile Iron Pipe D1000, 1m length	1	100.0	100m	16,539,345	VND/100m	1,653,934,509	79,239	7,277,312
F	9	4	Butterfly Valve, PN10, DN1000	1	0.5	100m	292,118,400	VND/100m	146,059,200	6,998	642,660
F	9	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	9	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	9	7	As Type2 for D1000	1	100.0	100m	5,098,829	VND/100m	509,882,863	24,428	2,243,485
F	10	1	Ductile Iron Pipe D1200, As Type2	1	*1,478.0*	m	30,325,780		44,821,502,510	2,147,372	197,214,611
F	10	2	Ductile Iron Pipe D1200			100m			3,032,577,978	145,289	13,343,343
F	10	3	Ductile Iron Pipe D1200, 1m length	1	100.0	100m	22,109,271	VND/100m	2,210,927,094	105,924	9,728,079
F	10	4	Butterfly Valve, PN10, DN1200	1	0.5	100m	525,813,120	VND/100m	262,906,560	12,596	1,156,789
F	10	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	10	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	10	7	As Type2 for D1200	1	100.0	100m	5,538,574	VND/100m	553,857,443	26,535	2,436,973
F	11	1	Ductile Iron Pipe D1500, As Type1	1	*6,170.0*	m	36,881,021		227,555,900,553	10,902,068	1,001,245,962
F	11	2	Ductile Iron Pipe D1500			100m			3,688,102,116	176,695	16,227,649
F	11	3	Ductile Iron Pipe D1500, 1m length	1	100.0	100m	26,835,270	VND/100m	2,683,526,970	128,566	11,807,519
F	11	4	Butterfly Valve, PN10, DN1500	1	0.5	100m	876,355,200	VND/100m	438,177,600	20,993	1,927,981
F	11	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	11	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	11	7	As Type1 for D1500	1	100.0	100m	5,615,107	VND/100m	561,510,666	26,902	2,470,647
F	12	1	Ductile Iron Pipe D1500, As Type2	1	*2,254.0*	m	37,464,108		84,444,098,591	4,045,667	371,554,034
F	12	2	Ductile Iron Pipe D1500			100m			3,746,410,763	179,488	16,484,207
F	12	3	Ductile Iron Pipe D1500, 1m length	1	100.0	100m	26,835,270	VND/100m	2,683,526,970	128,566	11,807,519
F	12	4	Butterfly Valve, PN10, DN1500	1	0.5	100m	876,355,200	VND/100m	438,177,600	20,993	1,927,981
F	12	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	12	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429
F	12	7	As Type2 for D1500	1	100.0	100m	6,198,193	VND/100m	619,819,313	29,695	2,727,205
F	13	1	Ductile Iron Pipe D1500, As None	1	*50.0*	m	31,265,914		1,563,296,725	74,897	6,878,501
F	13	2	Ductile Iron Pipe D1500			100m			3,126,591,450	149,793	13,757,002
F	13	3	Ductile Iron Pipe D1500, 1m length	1	100.0	100m	26,835,270	VND/100m	2,683,526,970	128,566	11,807,519
F	13	4	Butterfly Valve, PN10, DN1500	1	0.5	100m	876,355,200	VND/100m	438,177,600	20,993	1,927,981
F	13	5	Stop Valve, PN10, DN50	1	0.7	100m	3,920,000	VND/100m	2,744,000	131	12,074
F	13	6	Air Valve, PN10, DN50	1	1.0	100m	2,142,880	VND/100m	2,142,880	103	9,429

付録 10 - A　北ビンズオン浄水場の事業費評価

A.1 設計変更前の事業費及び事業範囲の拡大 （2011 年 4 月世銀によるオプションスタディー）

単位: USD Million (為替レート: VND20,893/US$,　JY80.0/USD)

項目	A	B	C	D	E	F	G	H
	水事業者による全投資額 (BIWASE+SPC)	取水ゲート 600,000m^3/d	導水管 運河から調整池	調整池	導水管 調整池から浄水場	ポンプ場	浄水場 300,000m^3/d	配水主管 -2015 (第 1 期)
EPC コスト	215.8	不含み	37.7	3.1	12.5	1.7	120.0	40.8
ﾌｧｲﾅﾝｽｺｽﾄ	40.5	(-)	7.1	0.6	2.3	0.3	22.5	7.7
E I A & R A P	不含み	(-)	(-)	(-)	(-)	(-)	(-)	(-)
合計	256.3	0	44.8	3.7	14.8	2.0	142.5	48.5

A.2 設計変更後の事業費及び事業範囲 （2013 年 7 月 インテリムレポート、事業費算定 2013 年 3 月）

単位: USD Million (為替レート: VND20,873/US$,　JY91.84/USD, ダイレクトローンの場合)

EPC コスト	326.8	不含み	←	101.3	→	18.0	103.7	103.8
ﾌｧｲﾅﾝｽｺｽﾄ	59.2	(-)	←	17.0	→	3.3	19.5	19.4
E I A & R A P	不含み	(-)	(-)	(-)	(-)	(-)	(-)	(-)
合計	386.0	不含み	←	118.3	→	21.3	123.2	123.2.

A.3 設計変更後の事業費及び事業範囲 （2013 年 12 月、事業費算定 2013 年 3 月）

単位: USD Million (為替レート: VND20,873/US$, ダイレクトローンの場合)

項目	A	B	C	D	E	F	G	H
EPC コスト	260.0	不含み	←	75.5	→	19.4	113.6	51.5
ﾌｧｲﾅﾝｽｺｽﾄ	43.0	(-)	←	12.4	→	3.2	18.8	8.6
E I A & R A P	不含み	(-)	(-)	(-)	(-)	(-)	(-)	(-)
合計	303.0	不含み	←	87.9	→	22.6	132.4	60.1.

A.4 G-1 事業費 （2014 年 9 月 ドラフトファイナルレポート、2013 年 3 月 事業費算定）

単位: USD Million (為替レート: VND20,873/US$, JY91.84/USD, ダイレクトローンの場合)

項目	A	B	C	D	E	F	G	H
	全投資額 (BIWASE+SPC)	取水ゲート 600,000m^3/d	導水管 運河から調整池	調整池	導水管 調整池から浄水場	ポンプ場	浄水場 300,000m^3/d	配水主管 -2015 （第 1 期）
サブトータル	297.1	不含み	←	120.3	→	10.8	111.2	54.8
ﾌｧｲﾅﾝｽｺｽﾄ	25.2	(-)	←	0.0	→	2.2	23.0	0.0
E I A & R A P	不含み	(-)	(-)	(-)	(-)	(-)	(-)	(-)
合計	322.3	不含み	←	120.3	→	13.0	134.2	54.8

A.5 P-3 事業費 （2014 年 9 月 ドラフトファイナルレポート、2013 年 3 月 事業費算定）

単位: USD Million (為替レート: VND20,873/US$, JY91.84/USD, ダイレクトローンの場合)

項目	A	B	C	D	E	F	G	H
サブトータル	272.7	不含み	←	95.9	→	10.8	111.2	54.8
ﾌｧｲﾅﾝｽｺｽﾄ	25.2	(-)	←	0.0	→	2.2	23.0	0.0
E I A & R A P	不含み	(-)	(-)	(-)	(-)	(-)	(-)	(-)
合計	297.9	不含み	←	95.9	→	13.0	134.2	54.8

A.6 P-3 管種変更後事業費 （2015 年 7 月 ファイナルレポート、2013 年 3 月 事業費算定）

単位: USD Million (為替レート: VND20,873/US$、JY91.84/USD、ダイレクトローンの場合)

項目	A	B	C	D	E	F	G	H
	全投資額 (BIWASE+SPC)	取水ゲート 600,000m^3/d	導水管 運河から調整池	調整池	導水管 調整池から浄水場	ポンプ場	浄水場 300,000m^3/d	配水主管 -2015 （第 1 期）
サブトータル	304.9	不含み	←	128.1	→	10.8	111.2	54.8
ﾌｧｲﾅﾝｽｺｽﾄ	25.2	(-)	←	0.0	→	2.2	23.0	0.0
ＥＩＡ＆ＲＡＰ	不含み	(-)	(-)	(-)	(-)	(-)	(-)	(-)
合計	330.1	不含み	←	128.1	→	13.0	134.2	54.8

A.7 P-3 管種変更後事業費 （2015 年 7 月 ファイナルレポート、2015 年 3 月 事業費調整）

単位: USD Million (為替レート: VND21,255/US$, JY119.03/USD, ダイレクトローンの場合)

項目	A	B	C	D	E	F	G	H
サブトータル	284.9	不含み	←	127.2	→	8.9	94.4	54.4
ﾌｧｲﾅﾝｽｺｽﾄ	21.1	(-)	←	0.0	→	1.8	19.3	0.0
ＥＩＡ＆ＲＡＰ	不含み	(-)	(-)	(-)	(-)	(-)	(-)	(-)
合計	306.0	不含み	←	127.2	→	10.7	113.7	54.4

付録 10 - B　官民分担

B.1 設計変更前の事業費及び事業範囲の拡大 （2011 年 4 月 世銀によるオプションスタディー）

単位: USD Million

項目	A	B	C	D	E	F	G	H
	全投資額 官民分担 BIWASE/SPC	取水ゲート 600,000m^3/d	導水管 運河から 調整池	調整池	導水管 調整池から 浄水場	ポンプ場	浄水場 300,000m^3/d	配水主管 -2015 （第 1 期）
案 1	0.0/256.3	不含み	SPC	SPC	SPC	SPC	SPC	SPC
案 2	48.5/207.8	不含み	SPC	SPC	SPC	SPC	SPC	BIWASE
案 3	111.8/144.5	不含み	BIWASE	BIWASE	BIWASE	SPC	SPC	BIWASE

B.2 設計変更の事業費及び事業範囲 （2013 年 7 月 インテリムレポート、2013 年 3 月 事業費算定）

単位: USD Million

項目	A	B	C	D	E	F	G	H
案 1	0.0/386.0	不含み	SPC	SPC	SPC	SPC	SPC	SPC
案 2	123.2/262.8	不含み	SPC	SPC	SPC	SPC	SPC	BIWASE
案 3	241.5/144.5	不含み	BIWASE	BIWASE	BIWASE	SPC	SPC	BIWASE

B.3 設計変更後の事業費及び事業範囲 （2013 年 12 月、2013 年 3 月 事業費算定）

単位: USD Million

項目	A	B	C	D	E	F	G	H
	全投資額 官民分担	取水ゲート 600,000m^3/d	導水管 運河から 調整池	調整池	導水管 調整池から 浄水場	ポンプ場	浄水場 300,000m^3/d	配水主管 -2015 （第 1 期）
案 1	0.0/303.0	不含み	SPC	SPC	SPC	SPC	SPC	SPC
案 2	60.1/242.9	不含み	SPC	SPC	SPC	SPC	SPC	BIWASE
案 3	148.0/155.0	不含み	BIWASE	BIWASE	BIWASE	SPC	SPC	BIWASE

B.4 G-1 事業費 （2014 年 9 月 ドラフトファイナルレポート、2013 年 3 月 事業費算定）

単位: USD Million

項目 s	A	B	C	D	E	F	G	H
案 3	175.4/147.2	不含み	BIWASE	BIWASE	BIWASE	SPC	SPC	BIWASE

B.5 P-3 事業費 （2014 年 9 月 ドラフトファイナルレポート、2013 年 3 月 事業費算定）

案 3	150.7/147.2	不含み	BIWASE	BIWASE	BIWASE	SPC	SPC	BIWASE

B.6 P-3 管種変更後事業費 （2015 年 7 月 ファイナルレポート、2013 年 3 月 事業費算定）

案 3	182.9/147.2	不含み	BIWASE	BIWASE	BIWASE	SPC	SPC	BIWASE

B.7 P-3 管種変更後事業費 （2015 年 7 月 ファイナルレポート、2015 年 3 月 事業費調整）

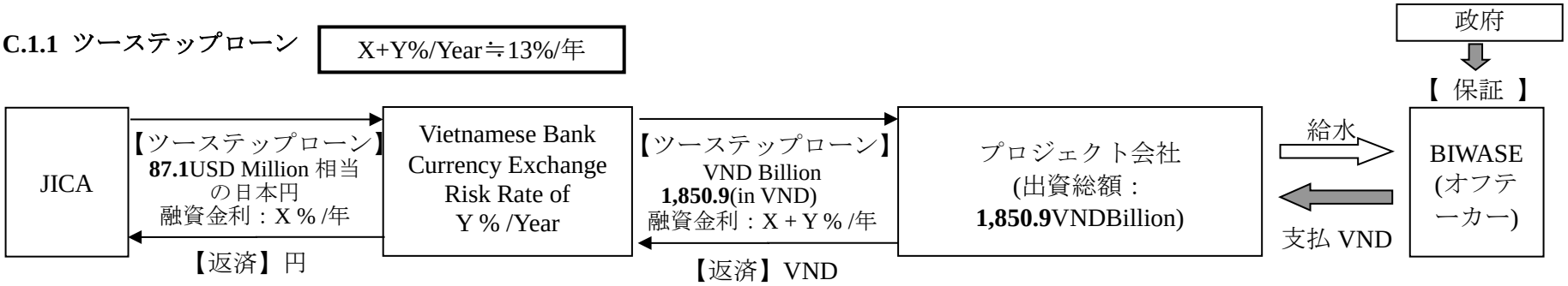
案 3	181.6/124.4	不含み	BIWASE	BIWASE	BIWASE	SPC	SPC	BIWASE

付録 10 - C　財務構成及びバルク給水タリフ

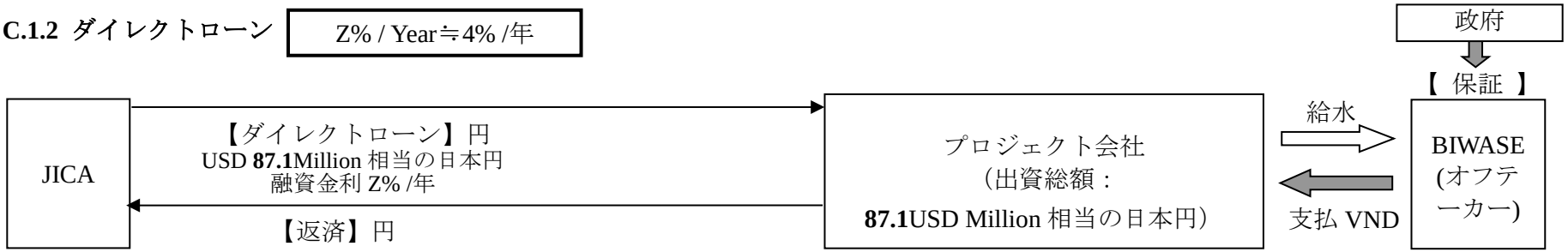
(2015 年 7 月 ファイナルレポート、2015 年 3 月事業費調整、為替レート: VND21,255/US$、JY119.03/USD、ダイレクトローンの場合)

C.1 JICA 海外投融資 (P-3 案 3　事業費 US$124.4 Million ベース、USD87.1Million の 70%ローン)

C.1.1 ツーステップローン　X+Y%/Year≒13%/年

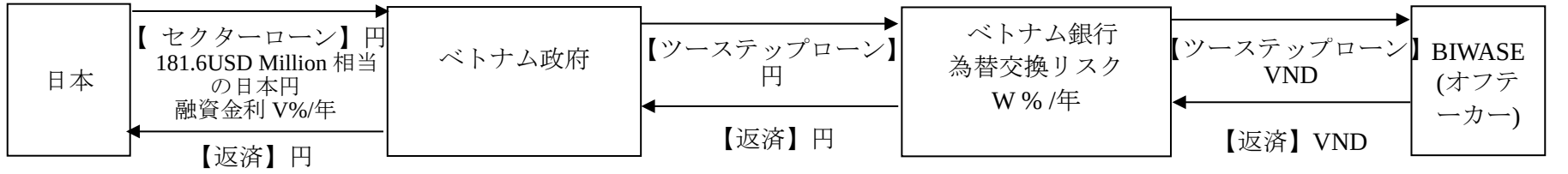


C.1.2 ダイレクトローン　Z% / Year≒4% /年



* VND/円為替変動を補償するタリフ計算式及び指数を設定

C.2 日本 ODA セクターローン (事業費 US$ 150.7Million)　V%+W%/Year ≒6%/年



付録 10 - D　給水タリフ

D.1 300,000m^3/d ツーステップローン

単位: USD/m^3 (P0 – 2013 年現在価格)、原水使用料は SPC に含む。VAT 不含み

	G-1	P-3	P-3(2015)
SPC 範囲	0.353	0354	0.321
BIWASE 範囲	0.106	0.091	0.110
合計	0.459	0.445	0.430

単位: VND/m^3 (P0 - 2013 年現在価格)、原水使用料は SPC に含む。VAT 不含み

	G-1	P-3	P-3(2015)
SPC 範囲	7,380	7,380	6,820
BIWASE 範囲	2,210	1,900	2,330
合計	9,590	9,280	9,150

D.2 300,000m3/d ダイレクトローン

	G-1	P-3	P-3(2015)
SPC 範囲	0.253	0254	0.237
BIWASE 範囲	0.106	0.091	0.110
合計	0.359	0.345	0.347

	G-1	P-3	P-3(2015)
SPC 範囲	5,290	5,300	5,050
BIWASE 範囲	2,210	1,900	2,330
合計	7,500	7,200	7,380

D.3 150,000m3/d with Two Step Loan

	G-1 Phase1/Phase2	P-3 Phase1/Phase2	P-3(2015) Phase1/Phase2
SPC 範囲	0.397/ 0.336	0.397/ 0.336	0.365 / 0.298
BIWASE 範囲	0.211/ -	0.182/ -	0.219/ -
合計	0.608/ 0.336	0.579 / 0.336	0.584/ 0.298

	G-1 Phase1/Phase2	P-3 Phase1/Phase2	P-3(2015) Phase1/Phase2
SPC 範囲	8280/ 7010	8,290/ 7,010	7,760/ 6,330
BIWASE 範囲	4420/ -	3,800/ -	4,660/ -
合計	12700/	12,090/ 7,010	12,420/ 6,330

D.4 150,000m3/d ダイレクトローン

	G-1 Phase1/Phase2	P-3 Phase1/Phase2	P-3(2015) Phase1/Phase2
SPC 範囲	0.284 / 0.235	0.284/ 0.235	0.268/ 0.216
(ﾍﾞｰｽﾀﾘﾌ)	(0.216) /(0.175)	(0.216) /(0.175)	(0.197)/(0.154)
(大型更新)	(0.026) /(0.017)	(0.026) /(0.017)	(0.027)/(0.018)
(原水使用料)	(0.042)/ (0.042)	(0.042)/ (0.042)	(0.044)/ (0.044)
BIWASE 範囲	0.212 / -	0.183/ -	0.219/ -
合計	0.495/ 0.235	0.466/ 0.235	0.487/ 0.216

	G-1 Phase1/Phase2	P-3 Phase1/Phase2	P-3(2015) Phase1/Phase2
SPC 範囲	5,920 / 4,900	5,920 / 4,900	5,690/ 4,590
(ﾍﾞｰｽﾀﾘﾌ)	(4,500) /(3,660)	(4,500) /(3,660)	(4,190)/(3,280)
(大型更新)	(540) /(360)	(540) /(360)	(570)/(380)
(原水使用料)	(880)/ (880)	(880)/ (880)	(930)/ (930)
BIWASE 範囲	4,420 / -	3,810 / -	4,660/ -
合計	10,340 / 4,900	9,730/4,900	10,350/ 4,590

付録 10 - E　SPC キャッシュフロー概要 (150,000m^3/d P-3 Phase1 案 3　ダイレクトローン)
(2014 年 9 月　ドラフトファイナルレポート、2013 年 3 月事業費算定)

E.1. SPC キャッシュフロー概要　タリフ：5,920/m^3 VND(FIRR 14.1%)

単位: VND Billion/年 (平均)

商業運転開始日からの年数	2020-2023	2024-2031	2032-2033	2034-2039	2040-2044
収入	369	460	525	582	564
支出	281	322	338	349	322
O&M	136	181	217	250	253
減価償却	73	78	78	78	66
金利支払	52	44	28	10	0
その他	21	20	15	8	4
税前利益	87	138	187	234	241
法人税(*)	0	7	19	47	45
税後利益	87	131	168	187	196
運転からのキャッシュフロー	240	268	286	282	259

借入金返済	48	74	99	106	0
金利支払	52	44	28	10	0
配当	83	110	102	105	181

(*)運転開始後の法人税　1~4 年: 0%、5~13 年: 5%、14~15 年: 10%、16 年~ : 20%

E.2. SPC キャッシュフロー概要　タリフ：5,690/m^3 VND(FIRR 14.2%)
(2015 年 7 月 ファイナルレポート、2015 年 3 月事業費調整)

単位: VND Billion/年 (平均)

商業運転開始日からの年数	2022-2025	2026-2034	2035-2036	2037-2042	2043-2047
収入	339	453	521	578	597
支出	261	323	344	358	354
O&M	137	197	236	271	291
減価償却	62	71	71	71	63
金利支払	44	40	27	12	0
その他	18	15	10	4	0
税前利益	79	131	178	221	243
法人税(*)	0	7	18	22	21
税後利益	79	125	160	199	222
運転からのキャッシュフロー	207	250	268	285	281

借入金返済	41	66	88	99	0
金利支払	44	40	27	12	0
配当	75	96	92	109	183

(*)運転開始後の法人税 1~4 年: 0%、5~13 年: 5%、14~15 年: 10%、16 年~ : 10%

付録 10 - F　タリフ低減対策推移

(2014 年 9 月 ドラフトファイナルレポート、2013 年 3 月事業費算定)

F.1 300,000m^3/d

項目	目標 (2012 年 11 月 28 日)	見直し(インテリム 2013 年 8 月)	見直し (ドラフトファイナル 2014 年 9 月)
a. タリフ	＞VND 10,447/m^3(＞US$ 0.5/m^3)	＜VND 6,200/m^3(＜US$ 0.3/m^3)	＜VND 5,300 /m^3 (＜US$ 0.254/m^3)
b. 事業費	＜USD 207.8Million　案 2	＜USD 144.5Million as Option 案 3	＜USD 147.2 Million　案 3
c. O&M コスト	＜VND 2,230/m^3 （＜US$ 0.1068/m^3）	＜VND 1,920/m^3 (＜US$ 0.0920/m^3)	＜VND 2,391/m^3 (＜US$ 0.1145m^3)
d. 給水契約（テイクオアペイ）	オフテーカー義務 ：製造水の 90%引取り	オフテーカー義務 ：製造水の 90%引取り	オフテーカー義務 ：製造水の 95%引取り
e. 融資金利	＜15.0%/年 (ツーステップ)	＜5.0%/年 (ダイレクト)	＜4.0%/年 (ダイレクト)
f. 融資期間	2.5(建設)+15 年	2.5(建設)+20 年	2.5(建設)+20 年

F.2 150,000m^3/d×2 系列 (Phase1 + Phase2)

Items	Phase1 (ドラフトファイナル 2014 年 9 月)	Phase2 (ドラフトファイナル 2014 年 9 月)
a. タリフ	＜VND 5,920 /m^3 (＜US$ 0.2836/m^3)	＜VND 4,900 /m^3 (＜US$ 0.2348/m^3)
b. 事業費	＜USD 83.2Million as Option 3	＜USD 63.3Million as Option 3
c. O&M コスト	＜VND 2,603/m^3 (＜US$ 0.1247m^3)	＜VND 2,206/m^3 (＜US$ 0.1057m^3)
d. 給水契約（テイクオアペイ）	オフテーカー義務 ：製造水の 95%引取り	オフテーカー義務 ：製造水の 95%引取り
e. 融資金利	＜4.0%/年 (ダイレクト)	＜4.0%/年 (ダイレクト)
f. 融資期間	2.5(建設)+20 年	2.5(建設)+20 年

(2015 年 7 月 ファイナルレポート、2015 年 3 月事業費調整**)**

F.3 300,000m^3/d

項目	見直し (ファイナルレポート 2015 年 7 月)
a. タリフ	＜VND 5,050/m^3 (＜US$ 0.237/m^3)
b. 事業費	＜USD 124.4Million 案 3
c. O&M コスト	＜2,519VND/m^3 (＜0.1185US$ m^3)
d. 給水契約（テイクオアペイ）	オフテーカー義務 ：製造水の 95%引取り
e. 融資金利	＜4.0%/Year (ダイレクト)
f. 融資期間	2.5(建設)+20 年

F.4 150,000m^3/d×2 系列 (Phase1 + Phase2)

Items	Phase1 (ファイナルレポート 2015 年 7 月)	Phase2 (ファイナルレポート 2015 年 7 月)
a. タリフ	＜VND 5,690/m^3 (＜0.268US$ /m^3)	＜VND 4,590/m^3 (＜0.216US$ /m^3)
b. 事業費	＜USD72.5Million 案 3	＜USD51.9Million 案 3
c. O&M コスト	＜2,743VND /m^3 (＜0.1291US$ m^3)	＜2,324VND /m^3 (＜0.1093US$ m^3)
d. 給水契約（テイクオアペイ）	オフテーカー義務 ：製造水の 95%引取り	オフテーカー義務 ：製造水の 95%引取り
e. 融資金利	＜4.0%/Year (ダイレクト)	＜4.0%/Year (ダイレクト)
f. 融資期間	2.5(建設)+20 年	2.5(建設)+20 年

付録 10 - G　リスクと対応

段階：
Ａ．事業計画及び設計段階　：事業計画及び設計→ＳＰＣ設立→資本金調達→借入金調達
Ｂ．建設段階　：ファイナンスクローズ→建設開始→建設中→工事完了
Ｃ．運営段階　：運営

No.	ﾘｽｸ分担	フェーズ	事象	内容	対策
Ａ．事業計画及び設計段階					
1	**BIWASE／BDPC**	事業計画及び設計	地元住民による建設反対	事業推進への合意が得られない	1. BOT 契約は、BDPC が地元調整を行うよう規定 2. プロジェクトサイト、及び周辺地域住民への十分な事前説明、及びコンセンサスの取得
2	**BIWASE／BDPC**	事業計画及び設計	土地収容困難	浄水場、導水菅、配水主管の用地が取得できない	1. 土地関連法制に係るデューディリジェンスの実施 2. BOT 契約は、土地の準備に係る費用･責任については BDPC の負担と規定
3	**BIWASE／BDPC**	SPC 設立	事業権が取得できない	プロジェクト建設･運営に必要な投資許可が取得できない	1. 必要な許可と承認に関わる法務デューディリジェンスの実施 2. プロジェクトに必要な、許可と承認の取得条件と要求事項等の確認 3. BOT 契約は、 BDPC が、投資家とプロジェクト会社に必要な許可と承認取得をサポートするよう規定
4	**BIWASE／BDPC**	SPC 設立	各種許可と承認が取得ができない	プロジェクト建設・運営に必要な許可（建設許可・事業権・水利権・土地使用権等）が取得できない	1. 必要な許可と承認に関わる法務デューディリジェンスの実施 2. プロジェクトに必要な、許可と承認の取得条件と要求事項等の確認 3. BOT 契約は、 BDPC が、投資家とプロジェクト会社に必要な許可と承認取得をサポートするよう規定
5	**BIWASE／BDPC**	SPC 設立	環境評価報告に認可が下りない	ベトナム国の環境基準を満たせず、環境報告認可が下りない。事業権を取得できない。	1. デューディリジェンスの実施（ベ国環境基準の確認） 2. 早い段階からの Environmental Impact Assessment (EIA)の実施 3. BOT 契約は、 BDPC が、投資家とプロジェクト会社に必要な許可と承認取得をサポー

					トするよう規定
6	**SPC**	資本金調達	資本金が集まらない	予定のＳＰＣ出資金拠出のコミットメントが投資家から得られない	1. スポンサー候補者の早期確定 2. パートナーの信用力の精査 3. 株主間契約において、出資割合や確保すべき議決権数、取締役の派遣枠等を含めた明確な投資方針の策定
7	**SPC**	借入金調達	借入金の確保ができない	予定の借入金融資のコミットメントが融資機関から得られない	ポテンシャルレンダー（JICA 殿）の意見を踏まえた、プロジェクトストラクチャー、ファイナンスストラクチャーの構築
8	**SPC**	借入金調達	環境評価報告許可が下りない	環境関連の世界基準、融資機関の環境基準・手続を満足できない	1. ポテンシャルレンダー（JICA 殿）への事前相談 2. 環境審査基準等の確認
Ｂ．建設段階					
1	**SPC／BIWASE／BDPC**	建設中	資本金の確保ができない	投資家が事前合意通りの金額・タイミングで出資金をＳＰＣに払い込まない	1. 株主間契約において、出資拒否の際のペナルティーの設定 2. パートナーの信用力の精査 3. 第三者による信用補完の確保（保証等）
2	**BIWASE／BDPC**	完工	（官）側整備施設完工遅延	（官）側整備予定の導水菅、調整池、配水主管等、関連施設の整備遅延	1. 卸売り給水契約は、（官）側整備予定施設の建設・完工は、BIWASE の義務として規定 2. 卸売り給水契約は、政府事象として、BIWASE が（プロジェクト会社の）建設期間の延長、給水価格の調整、及び追加コストの負担に合意する旨規定 3. BOT 契約は、政府事象として、BDPC は（プロジェクト会社の）建設期間の延長や契約期間の延長に合意する旨規定
3	**BIWASE／BDPC**	建設中	地元住民による建設工事反対	建設現場における建設期間中の地元住民による反対運動の発生	1. BOT 契約にて、政府事象として地元住民対策は BDPC の責任とするよう規定 2. 卸売り給水契約は、政府リスク事象として、BIWASE が（プロジェクト会社の）建設期間の延長、給水価格の調整、及び追加コストの負担に合意する旨規定
4	**SPC**	完工	完工遅延	EPC コントラクターの落ち度で完工が遅延する	1. EPC 契約は、固定価格、確定期日での完工保証を規定 2. EPC 契約は Liquidated

				（政府事象、 自然災害を除く）	Damages を設定 3. 民間保険により、完工遅延による損害、得べかりし利益の喪失に係る保険を付保 4. プロジェクトコストに十分なコンティンジェンシーコストを見積る
5	**BIWASE／BDPC**	建設中	設計変更	（官）側の設計変更による建設費増加	1. ＦＳにて基本設計を実施し、顧客承認を得る。 2. BOT 契約は、政府側の設計変更がなされた場合、建設期間・BOT 期間の延長等が認められるよう規定 3. 卸売り給水契約は、政府事象として、BIWASE が（プロジェクト会社の）建設期間の延長、給水価格の調整、及び追加コストの負担に合意する旨規定
6	**BIWASE／BDPC**	建設中	労働争議 よる完工遅延	労働争議による完工遅延と建設費増加	卸売り給水契約は、政府事象として、BIWASE が（プロジェクト会社の）建設期間の延長、給水価格の調整、及び追加コストの負担に合意する旨規定 （※１） ※１資機材の破損リスクは Construction All Risks（"CAR"）保険適用が可能である
7	**BIWASE／BDPC**	建設中	政治事象 よる完工遅延	テロ・内乱等の発生による完工遅延、資機材の損壊（コスト増）	卸売り給水契約は、政府事象として、BIWASE が（プロジェクト会社の）建設期間の延長、給水価格の調整、及び追加コストの負担に合意する旨規定 （※２） ※２但し、テロ・内乱・戦争等は民間保険カバー事象の対象外である可能性が高い
8	**SPC／BIWASE／BDPC**	建設中	自然災害 よる完工遅延	自然災害・伝染病等の発生による完工遅延、資機材の損壊（コスト増）	1. 民間保険を付保 2. 卸売り給水契約は、政府事象として、BIWASE が（プロジェクト会社の）建設期間の延長、給水価格の調整、及び追加コストの負担に合意する旨規定
9	**SPC**	建設中	施設の 損壊	工事中の事故･火災による施設損壊	1. EPC 契約にて、固定価格、確定期日での完工保証を規定 2. 建設工事に必要な保険の付保
10	**BIWASE／**	建設中			1. 環境・技術デューディリジェンスによりリスクがないこと

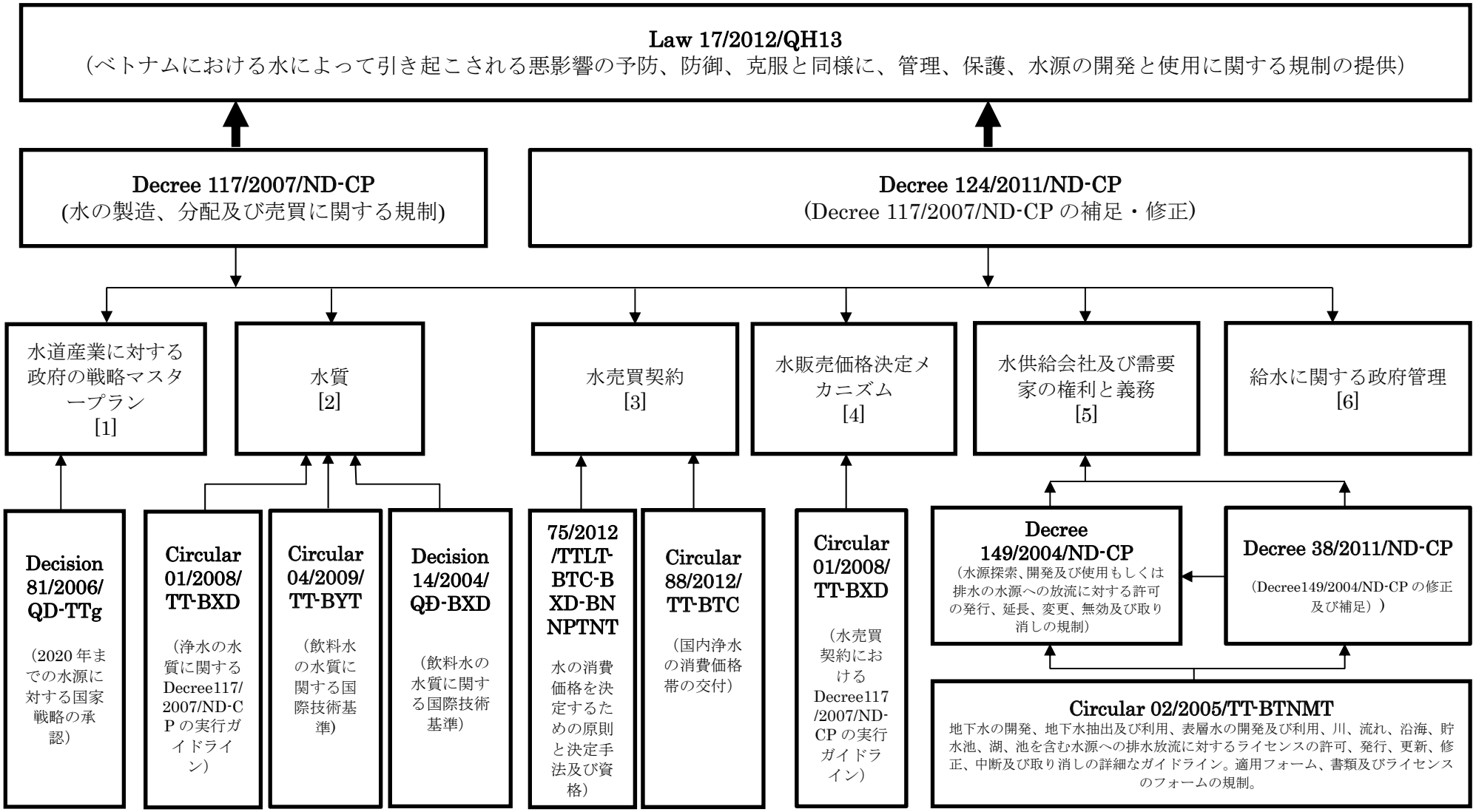
	BDPC		文化財の発見	プロジェクトサイトにおける史跡等の重要文化財の発見	を事前調査 2. 事前調査で確認不可能なリスクについて、BOT 契約は、政府事象として BDPC による補償対象とするよう規定 3. 卸売り給水契約は、政府事象として、BIWASE も同様に責任を負うよう規定
11	**BIWASE／BDPC**	建設中	土壌汚染の発見	プロジェクトサイトにおける土壌の開発前汚染の発見	1. 環境・技術デューディリジェンスによりリスクがないことを事前調査 2. 事前調査で確認不可能なリスクについて、BOT 契約は、政府事象として BDPC による補償対象とするよう規定 3. 卸売り給水契約は、政府事象として、BIWASE も同様に責任を負うよう規定
C．運営段階					
1	**SPC**	運営	施設の期待性能が満足されない	必要性能が満たされず、処理能力が不足し、施設が必要な機能を維持できない	1. EPC コントラクターの技術面での能力、信用力に係る十分な事前調査の実施 2. EPC 契約は、設計・工事と施設性能に関わる責任が EPC コントラにあると規定（完工後一定期間の保証期間も規定）
2	**SPC**	運営	施設運転が適切でない	不適切な運転による運転・保守費用の増大と施設、機器の損傷	1. O&M（運転・保守）契約は、施設運転会社が設備の運転・保守管理に責任を負うよう規定 2. 必要に応じて技術アドバイザ等とテクニカルサポート契約を締結
3	**BIWASE／BDPC**	運営	原水水質の変化	原水の水質悪化による運転・保守費用の増加	1. 卸売り給水契約は、原水水質を規定 2. 卸売り給水契約は、政府事象として、BIWASE が責任を負うよう規定
4	**BIWASE／BDPC**	運営	労働争議	労働争議による施設運転の中断	労働争議は事前調査で確認不可能なリスクであり、卸売り給水契約は、政府事象として、BIWASE が責任を負うよう規定
5	**SPC**	運営	施設運転会社の能力低下	施設運転会社の契約義務不履行、倒産等により、施設の運転が停止	1. 施設運転会社の技術面での能力、経験、信用力に係る十分な事前調査の実施 2. 必要に応じ、施設運転会社は

					履行保証を差し入れ
6	**SPC／BIWASE／BDPC**	運営	運転中の事故	施設運転中の事故により、施設の運転が停止する	1. 民間保険を付保 2. 民間保険でカバーできない部分は、卸売り給水契約にて、自然災害として、BIWASE による補償の対象とするよう規定
7	**BIWASE／BDPC**	運営	原水供給が予定量を満たさない	渇水、水源の汚染等何らかの理由で、処理可能な水が確保できない	1. 卸売り給水契約は、政府事象又は自然災害を BIWASE による補償の対象とするよう規定 2. 卸売り給水契約にて、プラントのアベイラビリティの維持に対して一定の金額が支払われるよう規定
8	**BIWASE／BDPC**	運営	停電	停電により施設の運転が停止する（SPC の落ち度でない場合）	1. BOT 契約は、BDPC が電力供給契約のもとでの電力供給に責任を有するものと規定。停電は、政府事象として BDPC による補償の対象とするよう規定 2. 卸売り給水契約にて、政府事象として、BIWASE も同様に責任を負うよう規定
9	**BIWASE／BDPC**	運営	運転必要物資の価格上昇	インフレにより運転必要物資の価格が上昇し運営費が増加する	卸売り給水契約は、給水タリフの運営費相当分について、インフレ補正にしたがうと規定
10	**BIWASE／BDPC**	運営	水需要の減少	水需要の減少により、想定した収入が減少する	1. 卸売り給水契約は、プラントのアベイラビリティの維持に対して一定の金額が支払われるよう規定 2. BOT 期間をカバーする長期卸売り給水契約の締結
11	**BIWASE／BDPC**	運営	BIWASE の対価支払遅延	BIWASE の支払遅延により収入が減少する	1. BIWASE の信用力の十分な調査 2. 必要に応じ、エスクローアカウント等セキュリテイパッケージを検討
12	**BIWASE／BDPC**	運営	ベトナムドンの減価	ベトナムドンの減価により為替差損が発生する	卸売り給水契約は、給水タリフは現地通貨と投資通貨との間の為替変動補正にしたがうものと規定
13	**BDPC**	運営	規制法の変更	規制法の変更に対応するためのコスト負担の発生	1. BOT 契約にて、政府事象は BDPC による補償事項とするよう規定 2. 規制法の変更により損害が発

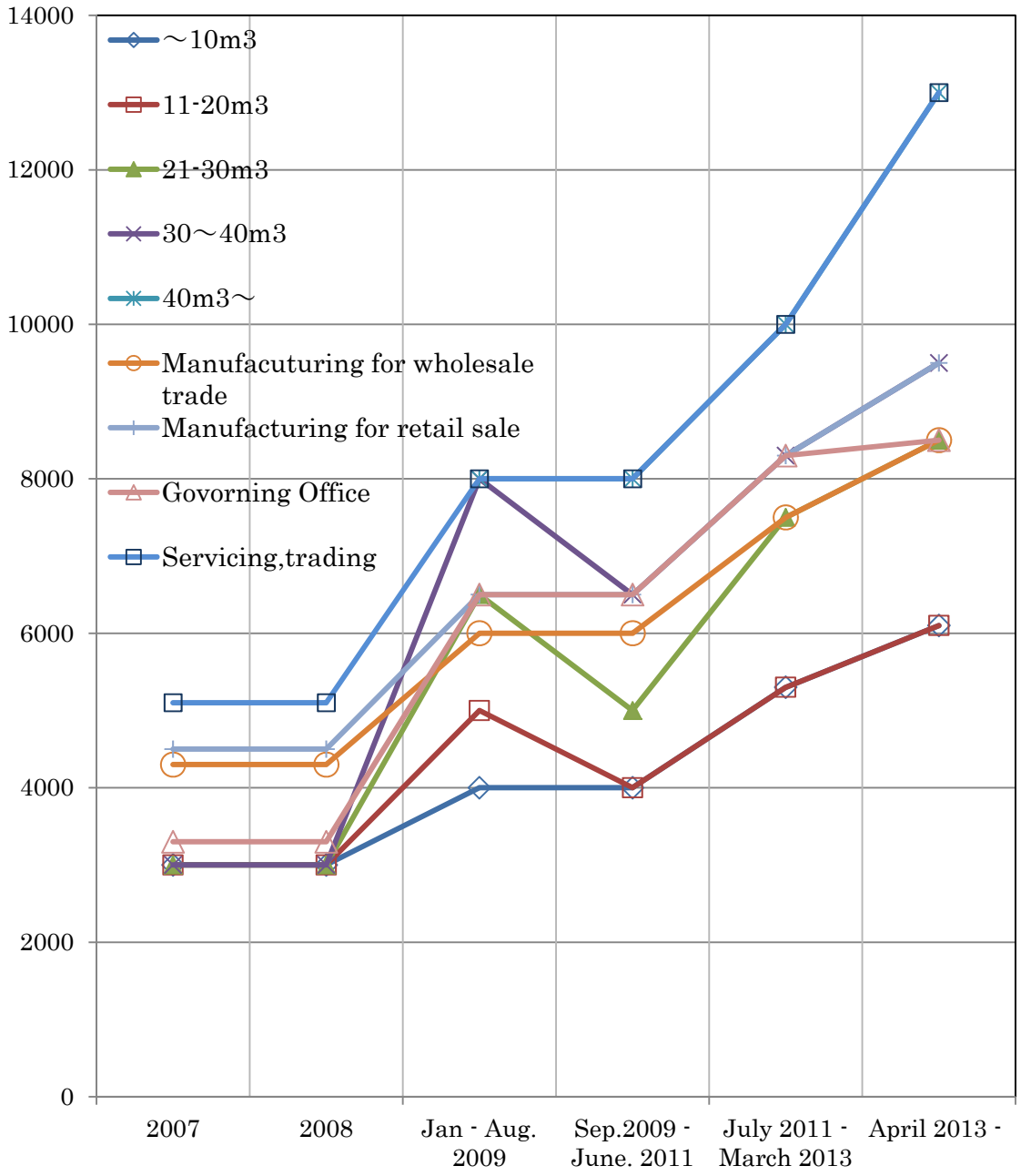
					生する場合、BOT 契約にて、BDPC 側にて負担するよう規定
14	**BDPC**	運営	税法の変更	税法の変更による新たな税負担の発赤	1. BOT 契約にて、政府事象は BDPC による補償事項とするよう規定 2. 税法の変更により損害が発生する場合、BOT 契約にて、BDPC 側にて負担するよう規定
15	**SPC**	運営	大規模改修の頻度上昇	大規模改修頻度の上昇による設備改修コスト負担の増加	1. 大規模改修コストを想定して水供給タリフを設定 2. 大規模改修積立金を設定

以上

付録 11 - A　水道供給サービスに関する法規制



付録 11 - B　ビンズオン省の水道料金



付録 11 - C　BOT 契約条件書

1	**定義及び解釈**	
1.1	BOT 契約	プロジェクトサイトにおける設計容量 150,000m^3/d の浄水場の建設、運転及び移転に関する BOT 契約（以下、「本契約」）
1.2	プロジェクト	BOT 法規制と本契約条項に基づきプロジェクトサイトに設計容量 150,000m^3/d の浄水場を建設し運転する BOT プロジェクト
1.3	プロジェクト会社	本プロジェクトを実行するために設立される BOT 会社
1.4	法規制	別途指定されるものを除き、ベトナムにおける法規制
1.5	投資家	プロジェクト会社の株主。以下を含む、[後日決定]。
1.6	施設	本契約の第 4.1 項で規定されるプロジェクトの元で建設される主な施設
1.7	財務計画	本契約の第 6.4 項に詳細が記載されているプロジェクトの予想収入及び費用計画
1.8	プロジェクトサイト	ベトナムビンズオン省 Ben Cat 地区の Chanh Phu Hoa 居住区に位置する… ha のエリア
1.9	ベトナム主要プロジェクト契約	ベトナム主要プロジェクト契約は以下を含む ・水卸売契約(WPA)：プロジェクト会社と Binh Duong Water Supply Sewerage Environment Co, Ltd (BIWASE)との間で締結され、原水購入契約も含まれる。 ・土地賃貸契約：プロジェクト実行のためビンズオン省 Ben Cat 地区 Chanh Phu Hoa 居住区のエリアの賃貸に関するプロジェクト会社とビンズオン省が締結する契約 ・電力購入契約：プロジェクトへの電力供給に関するプロジェクト会社とビンズオン電力会社で締結する契約 ・本契約
2	**プロジェクトの目的**	
2.1	プロジェクトの目的	50 万人の人口が期待される開発中の新都市地域ビンズオン新都市の住民、ビジネスへの浄水供給。浄水は BIWASE により買い取られ、最終消費者に配水される。
3	**プロジェクト所在地及び実行期間**	
3.1	プロジェクトの所在地	プロジェクト施設はベトナムビンズオン省 Ben Cat 地区 Chanh Phu Hoa に位置する… ha の地点に建設される。
3.2	プロジェクト実行期間及び工程	本契約書の第 16.2 項の規定に従いプロジェクトが延長されるか、もしくは第 16.3 項の規定に従い早期に終了することが無い限り、このプロジェクトの実施期間はプロジェクト会社が投資認可を受けプロジェ

		クトサイトが引き渡された日（リース形式による場合を含む。以下同様。）から…年である プロジェクト実行の詳細な仮スケジュールは以下： ▪ 投資認可及び土地リースの予定日時：[後日決定] ▪ 建設期間：[後日決定] ▪ 試運転：[後日決定] ▪ 営業運転開始日：[後日決定] ▪ 所有権移転日：[後日決定]
4	**プロジェクト施設の範囲、設計案及び技術基準**	
4.1	施設範囲	プロジェクトで建設すべき主な施設は以下： ▪ 調整池地点のポンプ場 ▪ 設計容量 150,000m^3/d の浄水場
4.2	設計	[後日決定]
4.3	設計要求	プロジェクト会社は三段階設計を採用する：基本設計、技術設計、詳細設計 設計は、全ての関連規制、即ち、建設業務における投資プロジェクトの管理を規定した 2009 年 2 月 12 日付ベトナム政府発行の Decree12/2009/ND-CP に従わなくてはならない。 施設設計は建設前にビンズオン省人民委員会によって承認される。
4.4	施設の技術基準	施設は、産業建設業務に適用される関連する全てのベトナムの技術基準を充足していなければならない。特に：[後日決定]
4.5	施設の品質要求	プロジェクト施設は、本契約で規定された品質基準、ビンズオン省人民委員会によって承認された設計、及び他の法規制に従って建設・完工されなければならない。
4.6	設計コンサルタント、建設会社及び他のコンサルタント、契約者の選定	プロジェクト会社は施設の建設に必要な設計コンサルタント、建設会社及び他のコンサルタントを自身の責任で選定する。 コンサルタント及び/もしくは建設会社の選定に関する決定は Decree 108/2009/ND-CP の第 29 条の記載に従いビンズオン省人民委員会に報告されなければならない。
4.7	ビンズオン省人民委員会の統括権	建設期間中、ビンズオン省人民委員会はプロジェクト会社及びその契約者による建設業務の品質を検査し監視する権限を持つ。 ビンズオン省人民委員会は、プロジェクト会社の設計、建設期間の建設業務及び運転段階の検査及び監督をするための独立した組織を雇うことができる。 検査もしくは監督の結果、設計・建設がプロジェクト会社もしくは選定した契約者の落ち度によって要求される基準を満たしていないと証明された場合は、その検査費用はすべてプロジェクト会社の負担とする。もし、そうでない場合は、その検査費用は、Decree No.108/2009/ND-CP の規制及び財務省ガイダンスにより、国側の費用として計算され、ビンズオン省人民委員会によって負担されるものとする。ビンズオン省人民委員会による検査・監督は、Decree 108/2009/ND-CP の第 63 条、及び建設に関する法律の規定に従うもの

		とする。 プロジェクト会社もしくは建設、調達、据付を含むプロジェクト会社のコントラクタもしくはプロジェクト会社のコンサルタントの落ち度による建設事業の品質改善にかかるすべての費用は、プロジェクト会社が負担し、プロジェクトの財務計画（水道料金計算）には含めてはならない。
5	**浄水の品質に関する製造技術及び要求事項**	
5.1	浄水技術	[後日決定]
5.2	浄水の水質要件	プロジェクト会社の浄水はベトナム MOH（健康省）により発行された Circular04/2009/TT-BYT に規定されている飲料水の品質基準に合致していなければならない。
6	**投資資本及び財務計画**	
6.1	全投資資本	プロジェクトの全投資資本は　　USD で、詳細は以下となる。 プロジェクトの全投資資本は以下状況が起きた場合は調整される ▪ プロジェクトによって消費される物品やサービスの価格に予期せぬ重大な変動があった場合、 ▪ ベトナム法規制もしくは本契約書の他の条項により規定された要因が起こった場合
6.2	投資資本の原資及び構造	プロジェクトの投資資本はプロジェクト会社の株主資本とプロジェクト会社への貸出人からの借入資本で構成される。 プロジェクト会社は Decree108/2009/ND-CP の第 5(1)項に規定されるように、必要な資本原資を調達する責任がある。プロジェクト会社は本契約で合意した資本調達スケジュール毎に資本原資を調達することをコミットしなければならず、必要な全投資資本の調整は登記する責任を有する。 総投資資本構成は以下： ▪ 株主資本：USD ... (…%) ▪ 借入資本：USD … (…%) 施設建設に必要な資本構成は以下： ▪ 株主資本：USD ... (…%) ▪ 借入資本：USD … (…%)
6.3	資本拠出	プロジェクト会社の株主資本は、資本金と他の法的に認められた株主資本で構成される。出資者の株式資本拠出スケジュールは以下の通り ▪ プロジェクト会社の投資認可：… ▪ … 借入資本について、プロジェクト会社は、融資契約を結び、プロジェクトスケジュールをタイムリーに実行できるように、借入資本が支払われることを確約しなければならない。

		投資家は貸出人に対する返済において以下を含む担保を提供する権利を有する；a) 契約に於ける資本金と権利、権利に対する権利譲渡、抵当権設定及び・又は質権設定、b) 政府保証の元での権利、権利に対する権利譲渡、抵当権設定及び・又は質権設定 さらにプロジェクト会社は、貸出人に対して返済のために以下の担保を提供する権利を有する。a) 動産 b)土地、及び土地使用権、c)プロジェクト契約、d)全てのプロジェクト契約上の収入源、e)国内外の銀行口座、及び f)その他貸出人が合理的に要求するもの ビンズオン省人民委員会は、その権限内で、融資契約書類で要求されている担保を提供するために、すべての必要な許可を取得しなければならない。
6.4	投下資本回収及び利益創出のための財務計画	**収入の源泉** ビンズオン省人民委員会は､プロジェクト会社と BIWASE の間で締結した水卸売契約(WPA)により、製造された（後日決定）m^3/d の全ての水を BIWASE が買い取ることを保証する。 プロジェクト会社の主な収入源は以下で決定される BIWASE への給水価格である。 ✓以下で構成される固定費支払い（アベイラビリティ・ペイメント）： 1) 投下資本回収費用支払い 2)固定 O&M 費支払い 3)固定電力料金支払い ✓以下で構成される変動費支払い（アウトプット・ペイメント） 1) 変動 O&M 費支払い 2) 変動電力料金支払い **投資及び運営コスト** 投資及び維持・運営コストは以下の通り ▪ 住民移転及び整地コスト： ▪ 建設コスト ▪ 年間操業コスト ▪ 年間維持費
7	**プロジェクトサイト引き渡し**	
7.1	プロジェクトサイトの引き渡し	ビンズオン省人民委員会は、調整池、導水管及び浄水場建設サイトからの住民移転を Decree108/2009/NCD-CP 第 6 条(2,3)項記載に従い自身の費用で実施する責任がある。 ビンズオン省人民委員会は、本契約書の第 3.2 項での合意に従い、建設予定日の 90 日前までに整地したプロジェクトサイトを引き渡さなければならない。 プロジェクトサイトとして要求されている土地がプロジェクト会社に引き渡された後、プロジェクト会社が本契約書の第 9.1 項で合意した建設スケジュールを守れないか、もしくは本契約で合意した使用目

		的以外で使用した場合、関係する土地とプロジェクト会社の投資許可は土地法と投資法に基づき剥奪される。 プロジェクト会社は土地法及び他の関係法に従う責任がある。 建設及び運転期間中、ビンズオン省人民委員会はプロジェクトの土地の使用や建設作業を監視する権利を有する。
8	**環境保護対策**	
8.1	環境保護対策	プロジェクトの建設及び運転期間中、プロジェクト会社は環境保護法、建設法及び関係省庁によって承認された環境影響評価報告書に則り環境保護対策を実行しなければならない。 プロジェクト実施期間中、プロジェクト会社は環境保護機関から指導、監督を受ける。 プロジェクト会社は以下の行為を防ぐため関係省庁と協力する責任がある： ▪ 個人もしくは組織を汚染空気、汚染水もしくは固体廃棄物、危険な廃棄物のプロジェクトエリアへの排出から守る。もしくは環境に悪影響を与える他の行為、プロジェクト会社へダメージを与えるもの、プロジェクトの建設、運転工程を遅らせるものから守ること。 ▪ プロジェクトの建設もしくは運転を遅らせる事件、状態、もしくは状況を引き起こす環境汚染、もしくはプロジェクト会社による環境規則の順守を妨げること。
9	**プロジェクト施設の建設期間及びスケジュール**	
9.1	着工	プロジェクト会社が…から投資認可を受け､プロジェクトサイトを[日付]に与えられ、WPA 上の全ての先行する条件が満たされるとの仮定の下、プロジェクトの着工日は[日付]とする
9.2	完工	プロジェクト会社は、本契約の第 9.3 項に従い建設スケジュールが調整されない限り、建設及び試運転を着工から…ヶ月以内に完了させなければならない。
9.3	建設工程調整	第 9.2 項記載の建設期間は、下記状況発生時には延長されなければならない： ▪ 本契約書の第 15.1 項記載の不可抗力事象（フォースマジュール）発生時 ▪ 承認済み設計が関係当局の要請により設計変更となり、結果として全投資資本の見直しが発生した場合 ▪ プロジェクト会社もしくはその建設会社、コンサルタントの過失によらない重大事故発生時 ▪ 本契約書第 7.1 項に基づくスケジュール通りに土地が引き渡されなかった場合 ▪ その他の予期せぬ事象で、ビンズオン省人民委員会が認めるもの 上記状況の場合、延長工程はビンズオン省人民委員会とプロジェクト会社の間で議論し合意される。

10	**プロジェクト施設の評価、運転、維持及び事業推進上の条件**	
10.1	プロジェクト会社の権利	プロジェクトの運営期間中、プロジェクト会社は Decree 108/2009/NC-CP に規定された権利、特に以下を有する ▪ プロジェクト会社は本契約書の第 11 項に従い、施設を譲渡するまでの間、関連法規や本契約条項の条件の元、施設の運転、利用及び維持する権利を有する。 ▪ プロジェクト会社は現存の法規及び本契約書の条項の条件に反しない限り、その組織構成、管理運営手法の決定権を持つ。 ▪ プロジェクト会社は施設を自身で管理運営することも、外注することもできる。 ▪ プロジェクト会社は施設の維持もしくは計画修繕のために運転を中断することができる。 ▪ プロジェクト施設が修繕のために運転を中断しなければならない緊急事態が発生した場合、プロジェクト会社は施設の運転を中断することができ、その場合運転中断を決定してから 24h 時間以内にビンズオン省人民委員会に報告する
10.2	プロジェクト会社の義務	運転期間中、プロジェクト会社は以下の義務を負う ▪ 関連法規及び本契約書の条項に従った施設の運転及び管理 ▪ BIWASE に対する、給水容量のアベイラビリティ確保、及び必要な給水量の提供 ▪ 施設をプロジェクト期間中、及び譲渡時に、適正に機能させるために必要な定期的維持 ▪ 関係法規に則った定期報告書の提出 ▪ 要求される保険の契約と更新（オールリスク保険、機械破損保険、利益・事業中断保険、ほか関係法規で要求される保険） ▪ 関係する税制度に基づく全ての税金等の支払い ▪ 契約終了時、施設の無償譲渡
10.3	ビンズオン省人民委員会の権利	プロジェクト期間中のビンズオン省人民委員会の権利は以下の通り： ▪ プロジェクト期間中、ビンズオン省人民委員会は、本契約の第 10.2 項に従い施設の運転維持管理に関してプロジェクト会社の義務履行を検査・監督する権利を有している。 ▪ ビンズオン省人民委員会は、その独自の裁量で、その検査・監督権限をひとつもしくは複数の組織に委託することができる。この場合、ビンズオン省人民委員会は、その権限移譲又は権限付与について、プロジェクト会社に知らせなければならない。 ▪ 運転期間中、ビンズオン省人民委員会は、深刻な品質問題を確認した場合、運転の中断と修繕をプロジェクト会社に要求することができる。 ▪ ビンズオン省人民委員会はプロジェクト会社から定期的な報告を受ける権利を有する。 ▪ ビンズオン省人民委員会は本契約終了時に BOT 事業を譲り受ける権利を有する。

10.4	ビンズオン省人民委員会の義務	ビンズオン省人民委員会は運転期間中以下の義務を負う： ▪ 本契約書第 10.1 項及び第 10.2 項規定に規定されるとおり、プロジェクト会社の権利と義務履行に対する遵守と支援 ▪ 本契約書及び他の関連法規規定の義務の履行 ▪ BIWASE に対する以下の指導 i) 所定のスケジュールでの配管施設の完工 ii) 当該施設の維持管理の確保 iii) プロジェクト会社との連携確保 iv) プロジェクト会社への原水の提供確保（原水は、一定の質と量を満たさなければならない） ▪ 電力を含む他の必要なユーティリティへの接続と供給確保 ▪ プロジェクト会社が施設を建設、運転、維持するために必要な全てのライセンスを取得・維持し、そして本契約に規定された権利と義務を履行できること
11	**プロジェクト施設の譲渡**	
11.1	施設の譲渡と受領に対する責任	本契約書の第 16.1 項規定に基づき、本契約が満了となった場合、プロジェクト会社は施設を無償譲渡するとともに、運転維持に関わる全ての技術図書をビンズオン省人民委員会、ビンズオン省人民委員会が承認した機関、もしくは中央政府が指定した関連機関に移管しなければならない。
11.2	施設の条件	譲渡時において、プロジェクト会社は、施設が以下の条件を満たすことを確約しなければならない： ▪ 全ての施設は普通に運転でき、認可された設計に見合ったものであること。 ▪ 実際に残存する施設の価値は、会計上の施設の残存価値と一致していなければならない。施設の残存価値は、承認された財務計画における減価償却に従って計算される。 ▪ ビンズオン省人民委員会、もしくは権限を与えられた組織は、譲渡前に施設の品質、価値及び実際の状態を検査する権利を有する。もし損傷が認められた場合、ビンズオン省人民委員会はプロジェクト会社に、施設譲渡前に、独自の資金で必要な修繕を行うことを要求することができる。
11.3	譲渡手続き	施設の譲渡手続きは以下の通り： ▪ 譲渡一年前に、プロジェクト会社は、新聞上に、譲渡及び関連手続き、契約の清算期限、第三者への負債返済期限について公表しなければならない。 ▪ ビンズオン省人民委員会、もしくはビンズオン省人民委員会または中央政府によりその権限を与えられた組織は、施設の品質、価値、及び実際の状態を検査する。もし損傷が認められた場合、ビンズオン省人民委員会は、プロジェクト会社に、施設譲渡前に独自の資金で必要な修繕を行うことを要求することができる。 ▪ プロジェクト会社は、譲渡の観点から、施設が債務を保証する資産でないこと、プロジェクト会社もしくは投資者の義務を果たすための担保でなく、質権設定等がないことを確約しなければ

		ならない。 ▪ 施設の譲渡と共に、プロジェクト会社は、ビンズオン省人民委員会の担当者、もしくはビンズオン省人民委員会、または中央政府によって権限を与えられた組織に対して、無償で技術と適切なトレーニングを提供しなければならない。
12	**投資インセンテイブ及び保証**	
12.1	優遇税制	プロジェクト会社は、浄水場プロジェクトや BOT プロジェクトに適応される税法上のインセンテイブを享受することができる。特に以下： ▪ プロジェクト会社は、Decree124/2008/ND-CP の第 15(1,2)項及び第 16(1)項規定に従い、法人税の支払に関しては、最初に収入を得た年から 15 年間 10%を適用するルール、及び最初 4 年間は法人税免除(0%)、その後 9 年間は 50%減免（すなわち 5%）とするルールが適用となる。 ▪ プロジェクト会社もしくはプロジェクト会社の契約会社の輸入品は、Decree87/2010/ND-CP 第 12(6)項及び第 12(14)項に従い輸入税が免除される。 ▪ その他ベトナム法規制に従って、浄水場プロジェクトや BOT プロジェクトが享受可能な税のインセンテイブが与えられる。
12.2	土地賃貸	プロジェクト会社はプロジェクト期間中（本契約書の 16.2 項規定の期間延長を含み）、Decree108/2009/ND-CP 第 38 項規定に従い、土地賃貸料の支払いは免除される。
12.3	資本及び施設の保証	本契約期間中、投資家による株主資本と合法的資産は行政措置により国営化されたり、押収されることはない。 本契約当事者が、本契約書第 16.3 項の規定により、合意済プロジェクト期間の終了前に本プロジェクトを終了する必要が生じた場合、投資家（及び貸出人）は、本契約書第 16.5 項規定に則った計算に基づく支払いを受ける権利を有する。
12.4	BIWASE の義務に対する保証	ビンズオン省人民委員会は WPA に基づき BIWASE の義務を保証しなければならない。（以下、「ビンズオン省人民委員会保証」） ビンズオン省人民委員会は、プロジェクト会社が、中央政府の保証（ビンズオン省人民委員会保証、及び本契約書に基づくビンズオン省人民委員会の義務履行に対する保証）を得られるようプロジェクト会社を支援しなければならない。
12.5	外貨交換の権利の保証	ビンズオン省人民委員会は、プロジェクト会社が、ベトナム国営銀行又はベトナム政府から以下保証を獲得できるようサポートする。 ベトナム国営銀行もしくは他の換金銀行（本契約関係当事者により決定）が、i)プロジェクト会社の収入を建設又は操業のため、もしくは株主配当や資本送金のために行う外貨交換、ii)海外への送金。

12.6	法規制が変わった場合の保証	新しい法律、規制が発効された場合、もしくは既存の法規制が更新、修正、変更された等いかなる場合においても、これまでプロジェクト会社が受けてきたインセンティブ以上のインセンティブが与えられることになった場合､[ビンズオン省人民委員会はプロジェクト会社がより望ましいインセンティブが受けられるよう保証し、かつ政府に働きかけなければならない。] 新しい法律、規制が発効された場合、もしくは既存の法規制が更新、修正、変更された等いかなる場合においても、これまでのプロジェクト会社もしくはプロジェクト会社投資家の法的利益に悪影響を与えるようになる場合､[ビンズオン省人民委員会はプロジェクト会社もしくは投資家が、本契約書もしくはプロジェクト会社投資認可に規定されているこれまでと同じインセンティブを享受されるよう保証し、かつ政府に働きかけなければならない。]一方、プロジェクト会社及び投資家の利益は以下いずれかの方法で守られる。 ▪ 給水価格の調整 ▪ 本契約の延長 ▪ 損失を負った場合は課税所得から控除される ▪ 国家予算による直接補償、もしくは ▪ プロジェクト会社による契約終了前での早期契約終了、及び本契約書第 16.3 項及び第 16.5 項に規定された補償金の受領
13	**契約修正及び/もしくは補足**	
13.1	契約修正及び/もしくは補足の必要な場合	本契約の関係者は、以下の状況が起こった場合は、本契約書が修正/補足する必要があることに同意する。 ▪ ビンズオン省人民委員会の要求による、規模、技術基準、もしくはトータル投下資本の変更 ▪ 実際の建設コストが、本契約書で計画・合意したコストと異なる場合 ▪ プロジェクト会社及び投資家の、投下資本回収及び期待利益に影響する BOT 法及び規制の変更 ▪ その他、本契約書の他の条項に規定する状況 ▪ その他、本契約当事者の一方から提案され、他の契約当事者に了承された状況
13.2	契約書の修正及び/もしくは補足の内容	契約書の修正/補足が起こった場合､関係者の合理的権利と利益が守られるように、本契約書の内容に対する以下の変更は、関係者の間で検討され合意されなければならない。 ▪ 本契約書第 16.2 項の状況が発生した場合は契約期間の延長 ▪ 財務計画の見直し ▪ 政府の承認が得られれば特別な支援政策の採用 ▪ その他、本契約当事者の一方から提案され、他の契約当事者に了承された法規制に反しないアプローチ 本契約書の契約条項は、直接修正されるか、もしくは本契約当事者 2 者のサインで修正/補足を契約書の添付もしくは付録として追加することができる。

13.3	契約書の修正/補足手続き	契約書に対する修正や補足もしくは、契約書に対する付帯物は以下の手続きに従って実行されなければならない ▪ 契約書もしくは契約書の付帯物による修正/補足を要求する契約当事者は、他の契約当事者に対して、その意向と内容のドラフトを少なくとも実行希望日の 30 日前までに通知しなければならない。 ▪ 他の契約当事者は、その告知と内容のドラフトを受け取ってから 30 日以内に返答しなければならない。 ▪ 提案の修正/補足に合意できる場合、契約当事者は 30 日以内にそれらの修正/補足を交渉決定する。 ▪ 上記の修正/補足は 2 者の法律担当によって承認された後、効力を発する。上記修正/補足が、政府もしくは関係省庁の同意が必要な場合、それらの修正/補足は政府もしくは関連省庁の承認が得られた後、効力を発する。 ▪ 本契約書の条項で修正/補足の無かったものは、いかなる状況においても有効であり、契約当事者は法的に拘束される。
14	**BOT 契約の権利と義務の移譲**	
14.1	投資家の出資資本の譲渡	プロジェクト会社の投資家は、自身の判断でプロジェクト会社への一部もしくは全ての払込済み出資資本を、投資法もしくは他の関連法規に従って譲渡することができる。
14.2	契約上の権利と義務の譲渡	投資許可を得た後、プロジェクト会社は、以下の手順に従い、契約上の一部もしくは全ての権利と義務を第三者（債権者を含む）に譲渡することができる。 ▪ 譲渡は、本契約の目的、スコープ、技術基準、プロジェクトの実行スケジュール及び本契約書の条項に影響を与えてはならない。 ▪ 譲渡は、法規制上で求められる場合は、ビンズオン省人民委員会及び他の関連省庁の承認を得なければならない。 ▪ プロジェクト会社は、ビンズオン省人民委員会に、譲渡する日までのプロジェクトの進捗状況の報告、移譲提案書、移譲契約書ドラフト及び他に必要な書類を提出する責任がある。 ▪ プロジェクト会社は、第三者（譲渡先）が、プロジェクト会社から移譲された全ての権利と義務を実行するために必要な手続きを取る責任がある。 ▪ 譲り受ける投資家は、本契約の契約条項、投資法、建設法及び他の関連法規に規定されている条件及び手続きを守らなければならない。
15	**不可抗力事象**	

15.1	不可抗力事象及び不可抗力事象と定義する原則	不可抗力事象は A)自然災害、B)政府事象及び C)海外政治的事象に分けられる A. 自然災害 全体的または部分的に、または避けられない程度に当事者の義務の履行を遅延させる事象、またはそのような事象 1) 影響を受ける当事者の義務履行を実際に妨げる事象 2) 影響を受ける当事者の合理的な統制下に無い事象 3) 以下の事象を含む、 ▪ 流行病、疫病もしくは隔離検疫、等 ▪ 爆発、事故、汚染、放射線もしくは火災、等 ▪ 異常気象（稲妻、台風、洪水、干ばつ）または/もしくは空からの落下物（隕石、物体他）、等 ▪ 船舶事故、航空機墜落、難破、列車事故、等 ▪ 自然災害による EPC/O&M 契約者の契約不履行 ▪ 前述の事象に類似した全ての事象 B. 政府事象 ベトナム国内で発生する事象、または直接政府及び/または地方政府が関与しプロジェクト会社に重大な影響を与える事象で、以下を含む。 ▪ 戦争行為、侵入、テロ行為等、ベトナムを巻き込む戦争侵略行為 ▪ ストライキ、順法闘争等、それに相当する労働争議 ▪ プロジェクト会社が政府承認を得られない ▪ ベトナム側主契約者が主たるプロジェクト契約の締結を拒否する ▪ ベトナム側主契約者による不履行（プロジェクト会社の不履行は除く） ▪ 政府事象による EPC/O&M 契約者の契約不履行 ▪ 政府が、政府保証事項である義務を履行しない ▪ プロジェクト契約の有効性が否定される指令が発布された場合、もしくは前述の類似事象が発生した場合 ▪ ベトナム政府機関による支払い拒絶 ▪ ベトナム政府機関によるプロジェクトの国営化もしくは終了 ▪ ベトナムの税関にて建設に必要な資材の通関ができない ▪ プロジェクトサイトに関するリスク。次の内容を含む；a)不発弾もしくは歴史的発見、b)サイトの土壌汚染、c)ベトナム政府機関によるサイト汚染 ▪ 合意した水質、水量での原水供給がされない、もしくは遅れる場合 ▪ ベトナム側関係者の義務履行に多大な影響を与える政治的事変 ▪ 前述に類似した全ての状況 C. 海外政治的事象 ベトナム国外で起こる以下の事象で、直接的にベトナムは関係しないが、プロジェクト会社に不利に影響する事象。以下を含む、

		▪ ベトナム国外で起こる、戦争行為、武力侵入、武力衝突もしくは海外軍事行動、封鎖、通商停止、革命、暴動、反乱、国内動乱あるいはテロ行為、政治的動機を持つサボタージュ、誘拐 ▪ ベトナム国外で起こる、ストライキ、順法闘争、労働遅延もしくは類似の労働争議 ▪ 外国の政治的事象による EPC/O&M 契約者の契約不履行 ▪ 前述に類似した全ての事象
15.2	不可抗力事象の結果、権利及び義務	プロジェクト会社が、前述の事象の一つに直面した場合、またはビンズオン省人民委員会が前条第 15.1 項の自然災害事象に直面した場合（ビンズオン省人民委員会にとって政府事象と海外の政治的事象は不可抗力としては考慮しない）、それにより関係者がタイムリーにその義務を実行できなくなる、もしくは遅延する場合、当事者は他の契約当事者に事象発生から 72 時間以内に連絡しなければならない。 不可抗力事象によって影響を受けた関係者は、不可抗力事象によって影響を受けたもの以上の規模もしくは時間に亘ってその義務の実行を保留してはならない。当事者は、本契約の下でのその義務を継続するために、できるだけ速やかに合理的な努力をはらう。 不可抗力事象の影響を受けた契約当事者は本契約の第 16 項の規定に従って本契約を終わらせることができる。
16	**契約の期間と終了**	
16.1	契約期間	本契約は、プロジェクト会社の投資承認が得られた日から、第 16.2 項に従い延長されるか、もしくは第 16.2 項に従い早期終了される場合を除き、….（契約終了日）まで有効でなければならない。 契約の期限切れに関する関係者の権利と義務は本契約書の第 16.4 項に記載されている。
16.2	契約期間の延長	本契約期間は以下の状況となった場合延長可能である： ▪ プロジェクトの全投資額が本契約第 6.1 項に記載の通り調整された場合 ▪ 本契約第 9.3 項記載に従って建設期間が延長された場合。この場合、契約期間は、関係者間で合意した建設期間の延長期間と同等の期間延長できる。 ▪ 本契約第 15.1 項記載の不可抗力事象によるプロジェクトの中断。この場合、契約期間は、プロジェクト会社が通常業務に戻れるまでの間延長できる。 ▪ 法規制の変更がプロジェクト会社及び／もしくは本契約第 12.6 項記載のプロジェクト会社の投資家の法的権利に悪影響を与える場合で、契約延長がプロジェクト会社及び／もしくは本契約 12.6 項記載のプロジェクト会社投資家の法的権利を守る方法であると合意された場合。 ▪ その他、プロジェクト会社の投資回収もしくは利益創出に影響を与えるが、給水価格を決定する式には反映されない予期せぬ状況が発生した場合

		契約期間の延長の長さは、上記状況発生時、関係者間で合意されねばならない。 契約期間の延長手続きは、本契約の第 13.3 項に従わなければならない。
16.3	早期契約終了	ビンズオン省人民委員会は、もしプロジェクト会社が契約不履行状態にあり、その不履行状態がビンズオン省人民委員会からの不履行状態の回復通知及び要求を受けてから[180]日以内に効果的に回復されない場合、本契約の第 16.1 項に従い契約終了日より前に本契約終了を要求することができる。 プロジェクト会社の不履行状態とは以下を言う： ▪ プロジェクト会社が卸売り給水契約の重要条項を遵守しなかった場合 ▪ プロジェクト会社の投資家による出資金を含む必要な支払いの不履行 ▪ プロジェクト会社による重大違反によるベトナムの主要プロジェクト契約の終了 プロジェクト会社は、本契約第 16.1 項に基づき、本契約終了前に早期契約終了を要請する事ができる： ▪ 第 15.1 項に定義する不可抗力事象の結果が関係者の合理的な努力によっても[180]日以内に修復できない場合 ▪ ビンズオン省人民委員会、もしくは他のベトナム側の契約当事者の契約不履行状態が、プロジェクト会社がビンズオン省人民委員会に対して債務不履行状態の治癒に関する通知及び要求を送ってから[180]日以内に効果的に修復されない状況が存在する場合 A. ベトナム側の契約不履行には以下を含む: ▪ 第 15.1 項記載の政治事象が 1 つ、もしくはそれ以上発生した場合 ▪ ビンズオン省人民委員会が、本契約の重要条項に従わなかった場合（第 12.6 項の法律変更時の保証を含む） ▪ BIWASE が WPA 記載の重要条項に従わなかった場合 ▪ 本契約第 12.4 項に基づき、BIWASE の代わりにビンズオン省人民委員会が水道料金を支払う場合を除き、BIWASE による支払い不履行 ▪ プロジェクト会社による重大な違反による場合を除く、ベトナム重要契約の終了 契約が有効期限前に終了した場合、プロジェクト会社は建設中もしくは施設をビンズオン省人民委員会に譲渡し、ビンズオン省人民委員会より補償金を受け取る。 施設譲渡の条件及び手続きは本契約の第 11.2 項及び第 11.3 項に従って行われる。 プロジェクト会社による保証金の受け取りは本契約の第 16.5 項の下計算される。

<table>
<tr><td>16.4</td><td>早期終了の場合の貸出人のステップイン・ライト</td><td>ビンズオン省人民委員会は、プロジェクト会社の契約不履行の際、貸出人のステップイン・ライトとして、必要な関係者間で認められた義務をまず第一に遵守することなく本契約を終了させてはならない。
ビンズオン省人民委員会は、貸出人のステップイン・ライトに関するプロジェクト会社及び貸出人の権利を認め同意しなければならない。</td></tr>
<tr><td>16.5</td><td>早期終了時の補償金の計算</td><td>ビンズオン省人民委員会のプロジェクト会社及びその投資家に対する補償金支払いは以下に従う。

<table>
<tr><th>No.</th><th>内容</th><th>総額</th></tr>
<tr><td>1.</td><td>ベトナム側契約不履行／政治的事象</td><td>A + B + C</td></tr>
<tr><td>2.</td><td>プロジェクト会社の契約不履行</td><td>A + B</td></tr>
<tr><td>3.</td><td>自然災害／海外政治的事象（影響を受けた当事者/BOT 会社）</td><td>A + B + D</td></tr>
<tr><td>4.</td><td>自然災害／海外政治的事象（影響を受けた当事者／ベトナム側プロジェクト関係者）</td><td>A + B + C</td></tr>
</table>

ここで:

A: 借入金残高（追加借入金を含む）－受取保険金
B: 終了日に存在する株主資本（いかなる追加資本も含む）
C: プロジェクト会社の期待利益、すなわち、契約終了日、もしくは COD のうち遅い方の日から、操業期間の最終日までの期間にプロジェクト会社が得るはずであった「税引後利益」の 正味現在価値（契約終了日において、[10%]のデイスカウントレートの適用によって決定）
D: プロジェクト会社が負った自然災害及び海外政治的事象対策費用</td></tr>
<tr><td>17</td><td colspan="2">決議への異議</td></tr>
<tr><td>17.1</td><td>決議への異議</td><td>ビンズオン省人民委員会、プロジェクト会社もしくはプロジェクト会社の投資家のいかなる異議も、まずは交渉と調停によって解決させるべきである。

もし交渉もしくは調停に失敗した場合、契約当事者はベトナムの法規の下で解決させるためベトナムの仲裁組織もしくは裁判所に持ち込むことができる。</td></tr>
</table>

付録 11 - D　卸売り給水契約条件書

1	**定義及び解釈**	
1.1	BOT 契約	プロジェクト会社、ビンズオン省人民委員会、及びスポンサー間で締結される BOT 契約をいう。
1.2	運転開始日（COD）	2020 年かそれ以降
1.3	効力発行日	本契約書の第 4 項に従い、それぞれの先行要件が充足された日、もしくは免除された日を意味する。
1.4	施設	BOT 契約の第 4.1 項に示される、本プロジェクトで建設される主要な施設
1.5	オフテーカー	Binh Duong Water Supply Sewerage Environment Co., Ltd (BIWASE)
1.6	オフテーカー側施設	オフテーカーによって建設される以下の施設： ・調整池 ・調整池から浄水場までの導水管 ・浄水供給地点からの配水主管
1.7	浄水供給地点	浄水場出口の流量計測点（浄水供給地点）
1.8	ベトナム主要プロジェクト契約	ベトナム主要プロジェクト契約は以下： ・BOT 契約 ・土地借用契約：プロジェクトを実行するためにビンズオン省 Ben Cat 地区 Chanh Phu Hoa 居住区のエリアの賃貸に関するプロジェクト会社とビンズオン省が締結する契約 ・電力売買契約：プロジェクト会社とビンズオン電力会社でが結ぶ契約 ・本契約書
2	**契約の範囲**	
2.1	浄水の売買	オフテーカーは、プロジェクト会社の要求する質と量の原水を供給しなければならない。プロジェクト会社は、浄水をオフテーカーに売り、オフテーカーは浄水供給地点でその浄水を買い取らねばならない。もし引き取らなくても、運転期間は、本契約の条件に従い、浄水の稼働可能容量（アベイラブル・キャパシティー）に対して、支払いを行わなくてはならない。
3	**有効性と期間**	

3.1	有効性、期間、終了	本契約書は第 1.3 項記載の効力発行日から、BOT 契約満了日までの契約期間となる。 BOT 契約書第 16.2 項の規定に従い BOT 契約期間が延長された場合、もしくは BOT 契約が BOT 契約書第 16.3 項に従い終了した場合、本契約の期間はそれぞれに応じ調整される。
4	**先行要件**	
4.1	先行要件	▪ プロジェクト会社は、プロジェクトの融資契約調印を完了していること、 ▪ プロジェクト会社、は関係当局より、BOT プロジェクトの投資許可を得ていること、 ▪ プロジェクト会社とビンズオン人民委員会との間の BOT 契約が有効となっていること、 ▪ プロジェクト会社はオフテーカーの支払い義務に対する有効な保証書をベトナム政府、及びビンズオン省人民委員会から受理済みであり、オフテーカーはプロジェクト会社が受理できるよう支援をしていること ▪ プロジェクト会社は、BOT 契約に従い、ビンズオン人民委員会から、サイト保有の権利を得ており、かつプロジェクト会社の社員、契約者、エージェント、コンサルタントらがそのサイトに自由にアクセスできていること、☒ ▪ プロジェクト会社は、エンジニアリング、調達、施設の建設のための契約を含むプロジェクトと施設のために必要なすべてのプロジェクト契約を締結しているものとし、ベトナムの主要なプロジェクト契約、およびそのような契約は完全に有効とされていること、 ▪ プロジェクト会社及びオフテーカーは、プロジェクト施設の建設開始に必要な承認／許可を責任部局から得ていること。
5	**税金、租税、給水代金**	
5.1	税金及び代金	給水代金にはベトナムの付加価値税、その他ベトナム政府から処理水にかけられる間接税及び経費は含まれない。斯かる税金等については、プロジェクト会社がオフテーカーに発行する請求書にて追加で請求される。
6	**義務と約束**	
6.1	プロジェクト会社の義務	プロジェクト会社は、自己の費用において、本タームシート規定の義務を逸脱することなく、以下の追加事項を、、遵守し、保証し、対応し、実行しなければならない： ▪ BOT 契約に規定された技術要件と仕様を満たした施設を建設する、 ▪ 原水を抽出、処理し、ベトナム厚生医療省の飲料水基準に合致した処理水（浄水）を、プロジェクトサイト内の浄水供給地点まで送水しオフテーカーに引き渡す、

		▪ 施設の建設に必要な全ての承認・認可を得るために、責任部局への必要な申請書を作成し、適用法令・基準に従ってそのような承認・認可を得るための合理的な努力を行う。 ▪ 必要に応じて施設に使用するもしくは導入する材料、手法、プロセス及びシステムに対する適切な所有権、ライセンス、契約、許可を獲得する。本契約に定める全ての義務を順守する。
6.2	オフテーカーの義務	質・量ともに要求水準を満たした原水の供給条項を含め、本契約書に記載されるすべての義務について遵守する。
7	**プロジェクトの開発及び運転**	
7.1	プロジェクトの開発と運転開始日の遅延	▪ プロジェクト会社は、BOT 契約条件に従って施設の建設を請け負い、運転開始予定日と同日もしくはそれより前までの運転開始を達成するため、あらゆる合理的な努力を払わなくてはならない。 ▪ オフテーカーは、全てのオフテーカー側の施設の建設を請け負う。オフテーカー側の施設は、少なくとも施設の全体設計容量の引取りに適合するものでなければならない。 ▪ オフテーカーは、オフテーカー側の施設の建設、試験及び試運転を完了しなければならない。オフテーカー側の施設は、遅くとも運転開始日の３か月前までに、同業種の慣行に従い、建設、試験、試運転の完了に関する独立コンサルタントの証明書を要する。 ▪ 本契約当事者は、オフテーカーによる、稼働可能容量（アベイラブル・キャパシティ）をベースとした処理水の買い取り義務は、[引取り施設が滞りなく完成しているかどうかに関わりなく]運転開始日に有効となるということを合意する。
7.2	試運転	▪ プロジェクト会社は、オフテーカーに対し、少なくとも運転開始 30 日前に試運転完了日及び試運転完了し商業運転を開始する日を書面で連絡しなくてはならない。 ▪ 性能試験で適用される手順、及び評価手順は、融資契約調印までにお互いに合意しておかなければならない。 ▪ 施設は以下の場合には、運転開始日に至ったものと見なす： ✓ 合意されたスケジュールに従って性能試験が実施されたとき； ✓ 性能試験の結果、設備容量が設計容量の 95%を下回っていないことが示されたとき； ✓ 性能試験の結果、施設が運用できると示されたとき。 ▪ もし、施設が性能試験に失敗した場合、プロジェクト会社は直前の試験日から 7 日以内に再び必要な試験を実施しなければならない。
7.3	操作要求及び操作手順	▪ 要求される運転開始予定日の 6 か月前には、プロジェクト会社は、プロジェクト会社とオフテーカー間の以下を含む全ての運転操作インターフェースを示した手順書（操作手順書）を準備しなければならない。 ✓ プロジェクト会社とオフテーカーの日々の連絡方法、

		✓ 給水手順、 ✓ 本契約に従った詳細な支払い手続き、 ✓ 安全調整、 ✓ 事故報告、 ✓ 施設の試験と監視。 ▪ 操作手順書は、関係者間で合意し、関係者で合意した日から有効としなければならない。
7.4	施設の運転維持管理	▪ プロジェクト会社は、本契約上の義務を履行するため、所定の法律・規則、及び BOT 契約に従い、自己の負担により、施設の運転・維持管理を行う責任を有する。 ▪ オフテーカーは、本契約上の義務を履行するため、所定の法律・規則に従い、自己の負担により、オフテーカー側の施設の運転・維持管理を行う責任を有する。
7.5	検査	▪ オフテーカーは、プロジェクト会社に、3 か月毎に書面で、プロジェクト会社が両者間で合意した手続きに従って運転しているかどうか、かつ誰が施設にアクセスしているかを検証する目的で、施設の検査に責任を持つ最大 5 人もしくは承認された代理人を指名する権利を有する。 ▪ 検査権利の行使において、オフテーカーは、施設の従業員が適切な運転維持管理の妨げになっていないことを確認しなければならない。
7.6	記録の維持管理	▪ 本契約当事者は、完全で正確な記録、及び本契約の適正な管理のために、他の契約当事者が要求する全てのデータを保存しなければならない。 ▪ 全ての記録は、記録してから最低 60 か月間保存しなければならない。 ▪ 本契約当事者は、通常の勤務時間内のいかなる時でも、合理的な内容での事前通知のもと、施設の運転維持管理に関する他の契約当事者の記録やデータを調べる権利を有している。
8	**設備容量、稼働可能率（アベイラビリティ）及び供給量**	
8.1	施設容量	▪ 施設の設計容量は 150MLD であり、設計容量に応じた建設が行われなければならない。 ▪ 施設の稼働可能容量（アベイラブル・キャパシティ）は、運転開始日に達成した施設の試験済容量（テスト・キャパシティ）を意味する。 ▪ プロジェクト会社は、給水のため設備を稼働可能な状態にする事を保証し、オフテーカーは、商業運転開始以降、いかなる日でもその稼働可能容量（アベイラブル・キャパシティ）の購入を保証しなければならない。 ▪ すべてのケースで、稼働可能容量（アベイラブル・キャパシティ）は浄水供給地点で測定されなければならない。

8.2	稼働可能容量の売買と浄水供給	▪ プロジェクト会社は、運転開始日から毎日オフテーカーに、稼働可能容量を上限として水を売り、契約終了までオフテーカーはそれを購入することに合意する。 ▪ オフテーカーは、合意した条件に従って、プロジェクト会社がオフテーカーに販売する浄水の総料金の支払いを行う。総料金は固定費支払（アベイラビリティ・ペイメント）分と変動費支払（アウトプット・ペイメント）分からなる。 ▪ オフテーカーは、運転期間を通じ毎日稼働可能容量の 100%を買取ることを保証する。可能稼動容量を引き取れない場合もどんな理由があろうとも以下の支払を要求される。 ・第 10.1 項で規定する稼働可能容量に対する固定費支払分 ・第 10.1 項で規定する実際の給水量に対する変動費支払
8.3	施設の維持	▪ プロジェクト会社は、計画の有無に関わらず、運転手順に従い施設の維持管理を行う期間は、施設に影響がある場合、給水義務は免除される。
9	**計測及び水質チェック**	
9.1	流量計の所有	▪ プロジェクト会社は、浄水供給地点に設置する流量計を購入し設置しなければならない。プロジェクト会社は自己の費用において、浄水供給地点に設置する流量計を所有し、毎月オフテーカーへの給水量を計測する責任を有する。
9.2	水質チェック	▪ プロジェクト会社は、あらかじめ決められた周期で、浄水供給地点の水質をチェックし、供給する水質が BOT 契約や本契約条件書の要求に合致していることを確認しなければならない。 ▪ もし浄水供給地点で水質が要求を満たさない事態が発生し、その事実を再試験で確認した場合、直ちに報告するとともに、必要で適切な矯正措置を取り、浄水供給地点で要求に合致する水質を供給することができることを確認しなければならない。また、浄水の水質が要求を満たさない場合には、オフテーカーは、斯かる基準外の水を引き取る義務はなく、従って、基準外の水に関係する料金の支払い義務は生じない。 ▪ プロジェクト会社は、浄水供給地点以降の水質及び水量に関してはいかなる責任も負わない。
9.3	オフテーカーによる検査	▪ オフテーカーは、自身もしくは権限委譲された委託先により、検査を実施する 48 時間前にプロジェクト会社へ告知することにより、検査を実施する権利を有する。その告知は、日時、場所及び目的を明確にしなければならない。 ▪ オフテーカーは、その検査の間、プロジェクト会社の検査責任者の同行を受けなければならない。 ▪ プロジェクト会社は、検査の過程でオフテーカーから合理的な範囲で要求される情報、記録、及びそれらのコピーを提供する事に合意し、オフテーカーは関係費用を負担する。
10	**料金、請求及び支払い**	

10.1	給水代金	▪ オフテーカーは、プロジェクト会社の処理水の給水に対し、以下を支払わなければならない： ✓ 以下からなる固定費支払（アベイラビリティ・ペイメント） 1) 投下資本回収費支払い 2) 固定 O&M 費支払い 3) 固定電力料金支払い ✓ 以下の変動費支払い（アウトプット・ペイメント） 1) 変動 O&M 費支払い 2) 変動電力料金支払い ✓ [固定費支払い及び変動費支払いの両者は性能試験に基づき決定する] ✓ 詳細な料金算定式は[添付／別途議論]とするが、基本概念は以下に従う： - 固定費支払は、稼働可能容量と、料金計算期間の全運転時間に基づき計算される（アベイラビリティ）。 - 変動費支払はプロジェクト会社から供給される実際の給水量を元に計算される。 - 稼働可能容量、及び／または、プロジェクトの稼働可能率（アベイラビリティ）がプロジェクト会社の契約不履行事象により減じられた場合、オフテーカーは、プロジェクトの実際の稼働率（アクチュアルアベイラビリティ）に応じて固定費支払を、また実際の給水量に応じて変動費支払を行う。 - オフテーカーの義務不履行、政府事象、自然災害、もしくはベトナム主要プロジェクト契約の当事者に影響を与える海外政治的事象によって、プロジェクトの稼働可能容量、及び／または、プロジェクトの稼働率が損なわれる場合には、オフテーカーは(i)全固定費支払（プロジェクトは、稼働可能容量及び稼働率のおいて、完全にアベイラブルであると見なされる）、及び(ii)オフテーカーに供給される実際の給水量を基にした出来高払いを行わなければならない。 - 自然災害、もしくはプロジェクト会社に影響を与える政治的事象によって、プロジェクトの稼働可能容量、及び／または、プロジェクトの稼働率が損なわれる場合、オフテーカーは(i)調整された全固定費支払、及び(ii)オフテーカーに供給された実際の給水量を基にした出来高払いを行わなければならない。 調整内容に関しては、不可抗力のカテゴリー別に、[付録として添付／別途協議]する必要がある。
10.2	料金と支払	**請求書** ▪ プロジェクト会社は、毎月以下の計算を記載した請求書（以下、「請求書」）をオフテーカーに発行しなければならない（営業日でない場合は、翌営業日とする）： **支払期日、罰則等**

		▪ 請求料金は請求日から 30 日以内に支払われる。 ▪ オフテーカーは、請求総額を期日もしくはその前日までに、プロジェクト会社から書面で指定されている銀行口座に直ちに利用可能で移動自由な明確な資金で支払わなければならない（オペレーション口座）。 ▪ もしオフテーカーによる支払が期日までにオペレーション口座に入金されない場合、未払い分にかかる課金は請求書発行から実際に支払われる日までの間、遅滞単価で支払われることとなる。
10.3	オフテーカーの支払い義務支援	▪ 本契約書、及び BOT 契約書に規定されているオフテーカーの支払い義務に対する全ての支援に加え、オフテーカーは以下の同意書を作成しなければならない（サポート契約）： ✓ 信用維持口座同意書 オフテーカーは全てのユーザーからの全収入を、プロジェクト会社が指定した銀行口座（信用維持口座）に直接預託することを保証する。信用維持口座契約は以下の重要項目を含む： (i) オフテーカーは、翌月分の合計料金と同額を信用口座に預託し、同額を全契約期間を通して維持しなければならない。 (ii) 最小限の預託金は、翌月分の合計料金と同額となるよう、定期的に再計算される (iii) 信用口座の預託金は、以下の順に利用される。(a)第一に、本契約条件書に基づくオフテーカーからプロジェクト会社への支払い；(b)第二に上記(i)記載の引当金の補填/維持；(c)最後に、オフテーカーの裁量による、信用口座の解除清算。 ✓ 担保・抵当契約 オフテーカーは、プロジェクト会社の信用口座のために、第一級の唯一で占有的な担保と抵当を入れなければならない。オフテーカーの契約不履行が発生した場合、プロジェクト会社は、本担保・抵当契約を実行できる。
10.4	請求に対する異議	▪ オフテーカーが請求書を受け取ってから 15 日以内に疑義を申し立てなければ、オフテーカーが合理的な理由でその請求書の間違いや脱落等を発見できなかった場合を除き、その請求書は正しいと見なされ、関係者間で最終決定となる。 ▪ もしオフテーカーが請求書のいかなる項目、もしくはその一部にでも疑義を唱えた場合、オフテーカーはそれらの疑義及びそれがどうあるべきかを示した通知（請求書疑義通知）をプロジェクト会社へ提出しなければならない。 ▪ オフテーカーが請求書の全て、もしくはいかなる部分でも疑義が生じた場合でも、期日までに以下の大きい方を支払わなくてはならない。(i)いかなる停止期間を除いた過去 3 か月の移動平均の最小値、もしくは(ii)疑義のない部分の全料金 ▪ .契約当事者間で請求書疑義通知発行から 14 日以内に有効な解決ができない場合、プロジェクト会社とオフテーカーそれぞれの 2 名の代表からなる委員会により 15 日以内に解決させる。

		▪ 紛争の解決にあたっては、勝訴側が支払ってもらうべき総額（もしあれば）は、勝訴側がもともと支払った日から本支払の払い戻しの受理日までの所定の遅延利率で計算される利子とともに、7日以内に支払わなければならない。
11	**不可抗力事象**	
11.1	不可抗力事象	不可抗力事象は A)自然災害、B)政府事象、C)海外政治的事象に分類される。 A. 自然災害 契約当事者の義務の履行を完全に、もしくは部分的に、もしくは不可避に遅延させる下記のようないかなる事象 1) 影響を受ける当事者の義務履行を実際に妨げる事象； 2) 影響を受ける当事の合理的な統制下に無い事象、 3) 以下の事象を含む、 ▪ 流行病、疫病もしくは隔離検疫、等 ▪ 爆発、事故、汚染、電離放射線、火災、等 ▪ 異常な天候（日照り、台風、洪水、干ばつ）及び/もしくは空からの落下物（隕石、物体他）、等 ▪ 船舶事故、航空機事故、難破、列車事故、等 ▪ 自然災害による EPC/O&M 契約者の債務不履行 ▪ 前述の事象に類似した全ての事象 B. 政府事象 ベトナム国内で発生する事象、または直接政府及び/または地方政府が関与し、プロジェクト会社に重大な影響を与える事象で、以下を含む。； ▪ 戦争行為、侵入、テロ行為等、ベトナムを巻き込む戦争侵略行為 ▪ ストライキ、順法闘争等、それに相当する労働争議 ▪ プロジェクト会社が政府承認を得られない ▪ ベトナム側主契約者が主たるプロジェクト契約の締結を拒否する ▪ ベトナム側主契約者による不履行（プロジェクト会社の不履行は除く） ▪ 政府事象による EPC/O&M 契約者の契約不履行 ▪ 政府が政府保証事項である重要な義務を履行しない ▪ プロジェクト契約の有効性が否定される指令が発布された場合、もしくは類似事象が発生した場合、 ▪ ベトナム政府機関による支払い拒絶 ▪ ベトナム政府機関によるプロジェクトの国営化もしくは終了 ▪ ベトナム税関にて建設に必要な資材の通関ができない ▪ プロジェクトサイトに関するリスク。次の内容を含む；a)不発弾もしくは歴史的発見、b)サイトの土壌汚染　c)ベトナム政府機関によるサイト汚染

		▪ 合意した水質・水量での原水供給がされない、もしくは遅れる場合 ▪ ベトナム側関係者の履行に多大な影響を与える政治的事変 ▪ 前述に類似した全ての状況 C. 海外政治的事象 ベトナム国外で起こる以下の事象で、直接的にベトナムは関係しないが、プロジェクト会社に不利に影響を与える事象；以下を含む ▪ ベトナム国外で起こる、戦争、武力侵略、武力衝突もしくは外国軍行動、封鎖、通商停止、革命、暴動、反乱、市民動乱、もしくはテロ行為、政治的な動機によるサボタージュ、誘拐 ▪ ベトナム国外で起こる、ストライキ、順法闘争、労働遅延もしくは類似の労働争議 ▪ 海外政治的事変による EPC/O&M 契約者の契約不履行 ▪ 前述に類似した全ての事象
11.2	不可抗力の報告義務	不可抗力が発生した際は、影響を受ける契約当事者は、他の契約当事者にそのような事象の発生を報告しなければならない。報告には以下を含むこと； ✓ 第 11 項に従って救済を求める不可抗力の特徴と程度 ✓ 予想される期間と影響、もしくは不可抗力によって影響を受けた契約当事者が、本契約書に基づく義務履行に与えるであろう影響 ✓ 影響を受けた契約当事者が不可抗力の影響を緩和するために既に取っている方法、もしくは取る方法の提案 ✓ 影響を受けた契約当事者の要求に関連する他の情報 ▪ 影響を受けた契約当事者は、他の契約当事者に不可抗力事象の発生を、合理的に実行可能な限り速やかに、他の契約当事者に通知しない限り、不可抗力事象に対するいかなる救済措置も受ける事はできない。そしてそれは、いかなる場合であっても、影響を受ける契約当事者が、その事象の発生を認知してから、又は合理的に認知すべき状況となってから、14 日以内に行わなくてはならず、また本契約の義務履行にどのような重大な影響を及ぼすかにつき具体的に示さなくてはならない。 ▪ 影響を受けた契約当事者は、そのような不可抗力事象により重大な影響を受けたと主張し続ける場合、第 11.2 項で要求されている情報、及び他の契約当事者が影響を受けた当事者に対して合理的に要求するその他の情報を含む定例報告を（最低 1 週間毎に）提供しなければならない。
11.3	効力発行日前に発生した不可抗力の影響	効力発行日前に不可抗力事象が発生した場合、その不可抗力事象が継続する期間によって、効力発行日は延長される。
11.4	効力発行日以降の不可抗力の影響	効力発行日以降に不可抗力が発生した場合、以下が適用される： ✓ 不可抗力が運転開始日前に発生した場合、運転開始予定日、

		及び契約期間は、その不可抗力事象が存続する期間分延長される。また不可抗力事象が運転開始日以降に発生した場合、プロジェクト会社の要求で、契約期間の累積が BOT 契約期間を超えないという限りにおいて、不可抗力事象が継続する期間分契約期間を延長することができる。 ✓ 不可抗力事象が運転開始日以降に発生した場合、プロジェクト会社は、処理水の稼働可能容量をオフテーカーに対して提供するという義務を含め、本契約書に基づく義務から解放される。ただしプロジェクト会社は、施設を危険にさらすことなく、可能な限り安全に運転する努力は継続しなければならない。 ✓ 必要な追加投資による建設工事により、非政治的不可抗力事象が解決し取り除かれる場合、プロジェクト会社は、見積もりを含む投資計画をオフテーカーに提出しなければならない。もしコスト評価と補償の手法が両者で合意できれば、プロジェクト会社は関連の建設作業に取り掛からなければならない。そのようなコストは、オフテーカーにより、総料金の調整かもしくは関係者間の合意による他の方法により補償されなければならない。 ✓ 不可抗力事象によって発生した全コストは第 11.5 項の条項に従って負担される。
11.5	不可抗力によって生じるコストの割り付け	▪ 効力発行日の前に不可抗力事象が発生した場合、契約当事者は各々の責任コストを算出しなければならず、互いに他方の契約当事者に発生したコストを支払う必要はない。 ▪ 効力発行日以降の不可抗力事象の発生の場合、その発生コストは以下に従い割り振られ支払われることとなる： ✓ 自然災害もしくは海外政治的事象の場合、全ての自然災害、もしくは海外政治的事象による不可抗力事象コストは、商業的に合理的な範囲において保険によりカバーされるものは、プロジェクト会社によって支払われるが、それ以上の被害を受けた場合はオフテーカーにより弁済される。 ✓ 政府事象発生の場合、全ての不可抗力事象コストはオフテーカーからプロジェクト会社へ弁済される。 ▪ 疑義を回避する意味で、不可抗力事象コストには、借入金の利息返済と元本返済、O&M 費用、インフレによる建設コストの増加や、直接不可抗力事象によって引き起こされた他の全てのコストを含める。 ▪ 本契約において明示的に定められること以外は、どちらの契約当事者も、いかなる不可抗力事象により生じ、もしくはそれに対する権利行使を行った事による、損失、損害、コスト、出費、主張、要求および訴訟等に関して、他の契約当事者を巻き込んではならない。
12	**契約不履行事象**	

12.1	プロジェクト会社の契約不履行事象	契約当事者間で合意した所定の期間内に、以下の違反や不履行をプロジェクト会社が解決できなければ、以下の事象はプロジェクト会社の契約不履行事象となる。 プロジェクト会社による本契約の重大な契約違反 準拠法もしくは本契約書に基づくプロジェクト会社の権利、及び/もしくは義務、またはプロジェクト会社の全てもしくは重要な資産、または事業の移譲 プロジェクト会社の株主が会社の任意の解散を議決したとき プロジェクト会社の倒産もしくは支払不能が宣告された場合、またはプロジェクト会社もしくはプロジェクトに重要影響を及ぼす資産に対し、管財人もしくは管理人が指名された場合 プロジェクト会社の解散請願が管轄の裁判所によって認められるか、もしくは裁判所から解散を命令される オフテーカーの事前同意なしにプロジェクト会社がプロジェクトを放棄する プロジェクト会社は、重要な影響を及ぼす部分の設備に対し、強制執行が課せられている 本契約書で期日を迎えた支払の遅延 プロジェクト会社が、不可抗力事象またはオフテーカーの契約不履行以外の理由で、運転開始予定日 から[後日決定]か月以内に運転開始日に至らない プロジェクト会社が、稼動可能容量割り当ての条件を満足できない（稼動可能容量割り当てとは 24 か月の稼働可能容量の[ ]%を言う） プロジェクト会社の違反による主要なプロジェクト合意の終結
12.2	オフテーカーの契約不履行事象	▪ 契約当事者間で合意した所定の期間内に、以下の違反や不履行をオフテーカーが解消できなければ、以下の事象はオフテーカーの契約不履行事象となる。 ✓ 信用維持口座にいかなる支払い分があろうとも、オフテーカーが本契約に基づく期日を迎えた支払に遅れる ✓ オフテーカーが信用維持口座合意もしくは他の取り決めの義務を実行しない ✓ オフテーカーの本契約条項の重大な違反 ✓ オフテーカーが本契約を拒否するかもしくは本契約により拘束されない不変の意図を示す ✓ オフテーカーもしくはベトナム側スポンサーの自発的解散をオフテーカーの株主もしくはベトナム側スポンサーが議決する ✓ オフテーカーもしくはベトナム側スポンサーの破産もしくは支払不能が宣告される、またはオフテーカーもしくはベトナム側スポンサーもしくはその資産の全てに対し管財人もしくは受取人が指名される ✓ オフテーカーもしくはベトナム側スポンサーの解散請願が管轄の裁判所によって認められる、もしくは裁判所から解散命令される ✓ 運転開始日までに要求されるサイトクリアランスの失敗、もしくはプロジェクト会社が要求されるクリアランスの支援の失敗

		✓ オフテーカーの違反による主要なプロジェクト合意の終結
13	**終了**	
13.1	[事業中断]	▪ オフテーカーが本契約の重大な違反を犯し、プロジェクト会社がそれを認知してから[45]日以内にその違反の治癒に失敗した場合、プロジェクト会社は本契約書に基づきオフテーカーへの給水を中断するために、契約終了の権利を含む他の権利や救済も損なうことなく、独自の裁量権利を与えられる。但し、第 13.1 項のためのいかなる中断も第 10.1 項にて規定されるオフテーカーの固定費支払義務を緩和するものではない。 ▪ プロジェクト会社によるいかなる中断もオフテーカーへの書面による申し入れが必要であり、オフテーカーからの受取書を持って有効となる。しかし、本項に基づく中断期間は 45 日間を超えないものとする。第 13.2 項に基づく早期契約終了の場合を除いて、本項に従ういかなる中断も、オフテーカーが中断期間中にプロジェクト会社が満足する形で重大な違反を回復する事ができた場合には、直ちに取り消されなくてはならない。
13.2	契約終了	プロジェクト会社の不履行事象に対する終了 いかなる権利や救済も損なうことなく、オフテーカーは本契約書に従い、プロジェクト会社による契約不履行事象が発生した場合、プロジェクト会社に対する契約終了通知により本契約を終了させる権利を有する。但し、オフテーカーは、契約終了通知を出す前に、契約終了通知を発行する意思を書面で申し入れ（事前通知）、プロジェクト会社に契約終了通知に対する反論のため 30 日間の猶予を与えるものとする。当該 30 日が過ぎた後は、その反論の有無にかかわらず、独自の判断により契約終了通知を出すことができる。 オフテーカーの不履行事象に対する終了 いかなる権利や救済も損なうことなく、プロジェクト会社は本契約書に従い、オフテーカーによる契約不履行事象が発生した場合、オフテーカーに対する契約終了通知により本契約を終了させる権利を有する。但し、プロジェクト会社は、契約終了通知を出す前に、契約終了通知を発行する意思を書面で申しいれ（事前通知）、オフテーカーに契約終了通知に対する反論のため 30 日間の猶予を与えるものとする。さらに 30 日が過ぎた後は、その反論の有無にかかわらず、独自の判断により契約終了通知を出すことができる。 不可抗力事象による終了 第 11 項で定義している不可抗力事象が発生し、関係者による合理的な努力にもかかわらず 180 日以内に治癒できない場合、いずれの関係者も 30 日間の事前通知のもと本契約を終わらせることができる。