Tbale III-1-1 Population Living in Phase 1 of HHTP (Alternative Plan)

	Household	Population	No of houses/ apartments	Density (pop/ha)	Site area (ha)	House Unit				Remarks
						Lot area (m2:net)	Floor area (m2:net)	Dimension (average) Lot	Dimension (average) Floor	
1 High Grade Residential Zone										
1) Detached house	200	800	200	80	10.0	500	max 300m2	20m x 25m	1 -2 floor	
2) Apartment	345	1,380	23	94	14.7	-	200	-	10m x 15m x 3F	5household x 3 floor x 23 apart.=345 households
3) Residential area total	545	2,180		29	75.6					inclusive of road, etc.
2 Total	545	2,180		29	75.6					

Employment Opportunity in HHTP (Alternative Plan)

	Worker	Others	Total
1 R&D Zone	3,900		
2 High Tech Industrial Zone	17,700		
3 Urban/Business Zone	1,300		
4 High Grade Residential Zone	100		
5 Center Area	300		
1) *Technical Institute*	50	300 (Student)	
2) *High-Tech Park Center*	130		
3) *OJT Technical Support Center*	20	200 (Trainee)	
4) *Technopartnership Center*	100		
6 Total	23,300	500	23,800

→ Population= 46,600

2 pop./worker

HHTP Pop/Pop Total= 5%

Table III-1-2 Land Use Plan of Phase 1 (Alternative Plan)

	Area (ha)	Ratio (%)	Remarks
I R & D	117.5	14.8	
1 R & D institute	83.3		} 98.3
2 Software park	15.0		
3 Park	5.7		
4 Internal main road	11.6		width=26m, length=4,450m
5 Internal sub-main road	2.0		width=14m, length=1,400m
II Center Area	16.3	2.1	
1 Technical Institute	4.7		
2 Hi-Tech Park Center	6.1		
3 OJT Technical Support Center	1.4		
4 Technopartnership center	4.1		
III High-Tech Industrial Zone	141.2	17.8	
1 Factory lot	115.0		
2 Park/IP center	12.7		
3 Road	13.5		
- Main road	5.4		width=22m, length=2,445m
- Sub main road	8.2		width=20m, length=4,080m
IV Urban/Business Zone	25.7	3.2	
1 Business/commercial lot	13.6		
2 Park in urban/business area	10.3		
3 Bus terminal	1.8		
V High Grade Residential Zone	75.6	9.5	
1 Housing lot	24.7		
- Detached house	10.0		
- Apartment	14.7		
2 Town center	0.2		
3 Road	7.0		
- Main road	3.3		width=22m, length=1,500m
- Submain road	0.6		width=20m, length=320m
- Feeder road	1.7		width=14m, length=1,230m
- Collector road	1.3		width=7.5m, length=1,760m
4 Park	2.7		
5 Green area	41.1		
VI Skeleton Road of High-Tech Park	46.8	5.9	
1 Main road	29.8		width=50m, length=5,950m
2 Sub-main road	13.3		width=26m, length=5,110m
3 Road in urban/business area	1.2		width=14m, length=850m
4 Connection roads with Highway & R.21	2.6		width=50m, length=410m, width=26m, length=200m,
VII Others	371.0	46.7	
1 Central park	45.8		
2 Reservoir(Tan Xa Lake)	120.3		
3 Sewage treatment plant	10.0		net plant site is app. 4 ha
4 Retention pond	34.2		
5 Green area	114.3		
6 Reserve area	46.4		
VIII Total	794.2	100.0	

Table III-1-3 Water Demand Projection for Hoa Lac High-Tech Park
(Alternative Plan)

Water Consumption / Categories	Phase		
	Phase 1 (2005)	Phase 2 (2010)	Phase 3 (2020)
1. R&D Zone			
Net Area (ha)	102	102	141
Unit Rate (m^3/ha.d)	20	20	20
Water Demand (m^3/d)	2,040	2,040	2,820
2. Center Area			
Gross Area (ha)	12	12	44
Daytime Population (capita)	200	200	780
Unit Rate (lit/cap.d)	200	230	250
Water Demand (m^3/d)	40	46	195
Unit Rate (m^3/ha.d)	3.3	3.8	4.4
3. High-Tech Industrial Zone			
Gross Area (ha)	141	186	453
Water Demand (m^3/d)	11,900	15,600	38,100
Unit Rate (m^3/ha.d)	84.4	83.9	84.1
4. Urban/Business Zone			
Gross Area (ha)	26	34	81
Daytime Population (capita)	1,300	1,900	5,400
Unit Rate (lit/cap.d)	200	230	250
Water Demand (m^3/d)	260	437	1,350
Unit Rate (m^3/ha.d)	10.0	12.9	16.7
5. High Grade Residential Zone			
Net Area (ha)	25		
Daytime Population (capita)	100	200	200
Unit Rate (lit/cap.d)	200	250	300
Daytime Water Demand (m^3/d)			
Living Population (capita)	2,200	3,800	3,800
Unit Rate (lit/cap.d)	300	350	400
Living Water Demand (m^3/d)	660	1,330	1,520
Total Water Demand (m^3/d)	680	1,380	1,580
Unit Rate (m^3/ha.d)	26.4		
6. Existing Residential Zone			
Gross Area (ha)			150
Population (capita)			5,400
Unit Rate (lit/cap.d)			200
Water Demand (m^3/d)			1,080
Unit Rate (m^3/ha.d)			7.2
7. Other Uses and Contingency			
Water Demand (m^3/d)	1,080	1,497	4,875
Total Water Demand (m^3/d)	16,000	21,000	50,000

Table III-1-4 Hydraulic Design for Water Supply Facilities in Phase 1 (Alternative Plan) (1/2)

Parameters / Pipe No	Pipe Material	Flow	Diameter	Length	Hydraulic Gradient	Velocity	Friction Head Loss	Accumulated Head Loss	Gland Level	Residual Head
		(L/sec)	(mm)	(m)	(1/1000)	(m/sec)	(m)	(m)	(m+MSL)	(m)
1. High-Tech Industrial Zone										
LWL in Reservoir:				16.0 (m+MSL)						
Head of Distribution Pump:				32.0 (m)						
Dynamic Water Level:				48.0 (m)						
HI- 100	DIP	528.7	600	200	7.9	1.9	1.6	1.6	16.0	30.4
HI- 101	DIP	291.5	600	200	2.6	1.0	0.5	2.1	12.0	33.9
HI- 102	DIP	86.9	300	170	8.1	1.2	1.4	3.5	12.0	32.5
HI- 103	DIP	61.9	300	170	4.3	0.9	0.7	4.2	12.0	31.8
HI- 104	DIP	55.7	300	150	3.6	0.8	0.5	4.8	12.0	31.2
HI- 105	DIP	25.0	150	180	23.7	1.4	4.3	7.7	14.0	26.3
HI- 106	DIP	43.7	200	430	16.4	1.4	7.1	11.8	14.0	22.2
HI- 107	DIP	29.4	200	270	7.9	0.9	2.1	9.3	14.0	24.7
HI- 108	DIP	40.1	200	180	14.0	1.3	2.5	7.1	14.0	26.9
HI- 109	DIP	94.9	300	280	9.6	1.3	2.7	7.1	14.0	26.9
HI- 110	DIP	143.6	400	410	5.1	1.1	2.1	4.4	18.0	25.6
HI- 111	DIP	205.3	500	70	3.3	1.0	0.2	2.4	18.0	27.6
HI- 112	DIP	237.2	500	130	4.3	1.2	0.6	2.1	18.0	27.9
HI- 113	DIP	4.5	100	200	7.2	0.6	1.4	8.6	14.0	25.4
HI- 114	DIP	26.3	200	170	6.4	0.8	1.1	5.5	14.0	28.5
HI- 115	DIP	31.9	200	250	9.2	1.0	2.3	4.4	16.0	27.6
HI- 116	DIP	15.4	150	310	9.7	0.9	3.0	7.4	16.0	24.6
HI- 117	DIP	61.7	300	210	4.3	0.9	0.9	3.3	14.0	30.7
HI- 118	DIP	17.2	150	350	11.9	1.0	4.2	7.4	16.0	24.6
HI- 119	DIP	18.7	150	210	13.9	1.1	2.9	6.5	12.0	29.5
HI- 120	DIP	9.8	100	320	30.2	1.2	9.7	16.2	12.0	19.8
HI- 121	DIP	25.8	200	410	6.2	0.8	2.5	6.1	16.0	25.9
HI- 122	DIP	19.6	150	400	15.1	1.1	6.1	12.2	16.0	19.8
HI- 123	DIP	204.6	500	370	3.3	1.0	1.2	3.3	16.0	28.7
HI- 124	DIP	11.2	100	330	38.7	1.4	12.8	16.1	16.0	15.9
HI- 125	DIP	171.5	400	230	7.1	1.4	1.6	17.7	12.0	18.3
HI- 126	DIP	11.2	150	280	5.4	0.6	1.5	19.2	12.0	16.8
HI- 127	DIP	160.3	400	170	6.2	1.3	1.1	18.8	12.0	17.2
HI- 128	DIP	34.8	300	490	1.5	0.5	0.7	20.3	12.0	15.7
HI- 129	DIP	88.0	400	430	2.1	0.7	0.9	20.4	12.0	15.6
HI- 130	DIP	59.4	400	330	1.0	0.5	0.3	20.8	12.0	15.2
HI- 131	DIP	44.5	300	130	2.4	0.6	0.3	3.6	14.0	30.4
HI- 132	DIP	7.5	200	290	0.6	0.2	0.2	19.0	12.0	17.0
HI- 133	DIP	122.8	400	210	3.8	1.0	0.8	19.6	12.0	16.4
2. Urban/Business Zone										
LWL in Reservoir:				15.0 (m+MSL)						
Head of Distribution Pump:				27.0 (m)						
Dynamic Water Level:				42.0 (m)						
UB- 201	DIP	12.0	100	100	44.0	1.5	4.4	4.4	14.0	23.6
UB- 202	DIP	6.5	100	270	14.1	0.8	3.8	8.2	14.0	19.8
UB- 203	DIP	4.1	100	250	6.0	0.5	1.5	9.7	16.0	16.3
UB- 204	DIP	1.7	100	350	1.2	0.2	0.4	10.1	16.0	15.9
UB- 205	DIP	5.5	100	480	10.4	0.7	5.0	9.4	14.0	18.6
UB- 206	DIP	3.1	100	250	3.6	0.4	0.9	10.3	16.0	15.7
UB- 207	DIP	0.7	100	160	0.2	0.1	0.0	10.3	16.0	15.7
3. Center Area										
HC- 107		4.6	100	250	7.5	0.6	1.9	13.8	16.0	15.2
HC- 203		10.5	200	370	1.2	0.3	0.4	11.8	18.0	16.2
(Note : The HITP Center Zone is served through the elevated tank and the distribution reservoir for the R & D Zone)										
4. R & D Zone										
4.1 South Zone										
LWL in Reservoir:				21.0 (m+MSL)						
Head of Distribution Pump:				45.0 (m)						
Dynamic Water Level:				66.0 (m)						
LWL in Elevated Tank:				45.0 (m+MSL)						

(Continued)

Table III-1-5 Hydraulic Design for Water Supply Facilities in Phase 1 (Alternative Plan) (2/2)

Parameters / Pipe No	Pipe Material	Flow	Diameter	Length	Hydraulic Gradient	Velocity	Friction Head Loss	Accumulated Head Loss	Gland Level	Residual Head
		(L/sec)	(mm)	(m)	(1/1000)	(m/sec)	(m)	(m)	(m+MSL)	(m)
RD- 101	DIP	35.8	200	600	11.4	1.1	6.8	6.8	18.0	41.2
RD- 102	DIP	3.0	100	700	3.4	0.4	2.4	9.2	16.0	40.8
RD- 103	DIP	32.8	200	940	9.7	1.0	9.1	15.9	18.0	50.1
RD- 104	DIP	32.8	200	60	9.7	1.0	0.6	0.6	18.0	26.4
RD- 105	DIP	14.2	150	310	8.3	0.8	2.6	3.2	16.0	25.8
RD- 106	DIP	9.6	100	300	29.1	1.2	8.7	11.9	14.0	19.1
RD- 108	DIP	15.6	150	270	9.9	0.9	2.7	3.3	16.0	25.7
RD- 109	DIP	12.6	150	260	6.7	0.7	1.7	5.0	14.0	26.0
RD- 110	DIP	9.6	100	340	29.1	1.2	9.9	14.9	14.0	16.1
RD- 111	DIP	3.0	100	130	3.4	0.4	0.4	15.3	14.0	15.7
RD- 112	DIP	3.6	100	410	4.7	0.5	1.9	17.3	12.0	15.7
4.1 North Zone										
LWL in Reservoir:				21.0 (m+MSL)						
Head of Distribution Pump:				34.0 (m)						
Dynamic Water Level:				55.0 (m)						
LWL in Elevated Tank:				46.0 (m+MSL)						
RD- 201	DIP	60.4	300	920	4.2	0.9	3.8	3.8	18.0	51.2
RD- 202	DIP	16.7	150	950	11.3	0.9	10.7	11.4	16.0	18.6
RD- 204	DIP	60.4	300	70	4.2	0.9	0.3	0.3	18.0	27.7
RD- 205	DIP	11.2	150	70	5.4	0.6	0.4	0.7	18.0	27.3
RD- 206	DIP	3.2	100	450	3.8	0.4	1.7	2.4	18.0	25.6
RD- 207	DIP	7.0	100	350	16.2	0.9	5.7	6.3	18.0	21.7
RD- 208	DIP	4.6	100	300	7.5	0.6	2.2	8.6	18.0	19.4
RD- 209	DIP	32.5	200	240	9.5	1.0	2.3	2.6	16.0	27.4
RD- 210	DIP	16.4	150	330	10.9	0.9	3.6	6.2	14.0	25.8
RD- 211	DIP	2.5	100	250	2.4	0.3	0.6	6.8	14.0	25.2
RD- 212	DIP	3.2	100	280	3.8	0.4	1.1	7.2	14.0	24.8
5. High Grade Residential Zone										
LWL in Reservoir:						21.0 (m+MSL)				
Head of Distribution Pump:						45.0 (m)				
Dynamic Water Level at Pump Outlet:						66.0 (m)				
LWL in Elevated Tank:						46.0 (m+MSL)				
HH- 301	DIP	30.4	200	218	8.4	1.0	1.8	1.8	18.0	46.2
HH- 302	DIP	30.4	200	60	8.4	1.0	0.5	0.5	18.0	27.5
HH- 303	DIP	15.1	150	300	9.3	0.9	2.8	3.3	18.0	24.7
HH- 304	DIP	6.4	100	90	13.7	0.8	1.2	4.5	18.0	23.5
HH- 305	DIP	5.7	100	90	11.1	0.7	1.0	5.5	18.0	22.5
HH- 306	DIP	1.7	100	350	1.2	0.2	0.4	6.0	18.0	22.0
HH- 307	DIP	8.1	100	210	21.3	1.0	4.5	5.9	18.0	22.1
HH- 308	DIP	9.2	150	250	3.7	0.5	0.9	1.4	18.0	26.6
HH- 309	DIP	3.3	100	90	4.0	0.4	0.4	0.9	18.0	27.1
HH- 310	VP	2.5	75	290	9.8	0.6	2.8	8.4	18.0	19.6
HH- 311	VP	2.8	75	70	12.1	0.6	0.8	1.4	18.0	26.6
HH- 312	VP	0.9	50	240	10.7	0.5	2.6	3.9	18.0	24.1
HH- 313	VP	0.7	50	280	6.7	0.4	1.9	3.2	18.0	24.8
HH- 314	DIP	7.2	100	180	17.1	0.9	3.1	9.0	18.0	19.0
HH- 315	VP	2.6	75	370	10.5	0.6	3.9	12.9	18.0	15.1
HH- 316	DIP	2.9	100	320	3.2	0.4	1.0	10.0	18.0	18.0
HH- 317	VP	0.4	50	210	2.4	0.2	0.5	5.0	18.0	23.0
HH- 318	DIP	7.4	100	130	18.0	0.9	2.3	5.6	18.0	22.4
HH- 319	VP	0.4	50	190	2.4	0.2	0.5	6.1	18.0	21.9
HH- 320	DIP	6.7	100	120	15.0	0.9	1.8	7.4	18.0	20.6
HH- 321	VP	2.8	75	150	12.1	0.6	1.8	9.3	18.0	18.7
HH- 322	VP	0.6	50	240	5.0	0.3	1.2	10.5	18.0	17.5
HH- 323	VP	1.1	75	90	2.1	0.2	0.2	9.4	18.0	18.6
HH- 324	DIP	3.5	100	630	4.5	0.4	2.8	10.3	18.0	17.7

(Note : The High Grade Residential Zone is served through the elevated tank and the distribution reservoir for the R&D Zone)

Table III-1-6 Hydraulic Design for Sewerage Facilities in Phase 1 (Alternative Plan) (1/2)

Parameters / Pipe No		Flow (lit/sec)	Diameter (mm)	Length (m)	Hydraulic Gradient (1/1000)	Velocity (m/sec)	Gland Elevation (m + MSL)	Elevation of Pipe at Down End (m + MSL)	Earth Covering (m)	Remarks
1. High-Tech Industrial Zone										
1.2 West Zone										
HI- 101	HPC	4.5	200	200	5.0	0.74	16.0	13.5	2.4	
HI- 102	HPC	16.2	200	190	5.0	0.74	16.0	13.6	2.4	
HI- 103	HPC	68.8	400	190	3.0	0.91	14.0	12.2	1.6	
HI- 104	HPC	15.0	200	190	5.0	0.74	14.0	11.6	2.4	
HI- 105	HPC	27.0	300	330	3.0	0.75	14.0	10.6	3.3	
HI- 106	HPC	1.2	200	140	5.0	0.74	14.0	11.8	2.1	
HI- 107	HPC	48.2	400	260	3.0	0.91	14.0	9.8	4.0	
HI- 108	HPC	151.8	500	280	3.0	1.05	14.0	8.9	4.8	
HI- 109	HPC	26.3	300	170	5.0	0.97	16.0	13.7	2.2	
HI- 110	HPC	220.5	600	130	3.0	1.19	12.0	8.6	3.2	
HI- 111	HPC	12.4	200	260	5.0	0.74	12.0	9.2	2.7	
HI- 112	HPC	268.9	700	220	3.0	1.32	12.0	7.9	3.8	
HI- 113	HPC	58.1	400	260	3.0	0.91	16.0	12.8	3.0	
1.2 East Zone										
HI- 201	HPC	5.0	200	90	5.0	0.74	18.0	16.1	1.9	
HI- 202	HPC	17.4	200	200	5.0	0.74	18.0	15.5	2.4	
HI- 203	HPC	23.9	300	240	5.0	0.97	18.0	14.3	3.6	
HI- 204	HPC	33.9	300	210	3.0	0.75	16.0	13.7	2.2	
HI- 205	HPC	5.2	200	60	5.0	0.74	18.0	16.2	1.7	
HI- 206	HPC	10.2	200	350	5.0	0.74	16.0	14.5	1.5	
HI- 207	HPC	49.1	400	140	10.0	1.66	14.0	12.3	1.5	
1.3 North Zone										
HI- 301	HPC	9.0	200	270	5.0	0.74	12.0	9.2	2.8	
HI- 302	HPC	17.9	200	180	5.0	0.74	14.0	8.3	5.7	
HI- 303	HPC	3.2	200	220	5.0	0.74	16.0	13.4	2.5	
HI- 304	HPC	6.2	200	300	5.0	0.74	14.0	11.9	2.0	
HI- 305	HPC	24.1	300	40	3.0	0.75	14.0	8.1	5.7	
HI- 401	HPC	19.6	300	30	3.0	0.75	16.0	14.3	1.5	
1.4 South Zone										
HI- 501	HPC	10.0	200	290	5.0	0.74	18.0	15.1	2.9	
HI- 502	HPC	11.2	200	240	5.0	0.74	18.0	15.3	2.6	
HI- 503	HPC	33.1	300	270	10.0	1.37	12.0	10.4	1.5	
HI- 504	HPC	5.0	200	230	5.0	0.74	16.0	13.4	2.6	
HI- 505	HPC	11.2	200	180	10.0	1.04	12.0	10.5	1.5	
HI- 506	HPC	44.3	300	170	3.0	0.75	12.0	9.8	2.0	
HI- 507	HPC	7.5	200	290	5.0	0.74	12.0	9.1	2.9	
HI- 508	HPC	74.3	400	210	3.0	0.91	12.0	8.4	3.4	
2. Urban/Business Zone										
UB- 301	HPC	1.5	200	300	5.0	0.74	16.0	13.0	2.9	
UB- 302	HPC	3.0	200	300	5.0	0.74	16.0	11.5	4.4	
UB- 303	HPC	4.5	200	350	5.0	0.74	14.0	9.8	4.2	
UB- 304	HPC	1.5	200	240	5.0	0.74	16.0	13.3	2.6	
UB- 305	HPC	3.0	200	260	5.0	0.74	16.0	12.0	3.9	
UB- 306	HPC	4.5	200	390	5.0	0.74	14.0	10.1	3.9	
UB- 307	HPC	1.5	200	150	5.0	0.74	14.0	11.8	2.2	
UB- 308	HPC	12.0	200	50	5.0	0.74	14.0	9.5	4.4	
3. Center Area										
HC- 101	HPC	3.0	200	350	5.0	0.74	18.0	14.8	3.2	
HC- 102	HPC	7.6	200	240	3.0	0.57	16.0	14.0	1.9	
HC- 201	HPC	7.8	200	210	5.0	0.74	22.0	19.5	2.5	
HC- 202	HPC	12.8	200	450	7.0	0.87	18.0	16.3	1.6	

(Continued)

Table III-1-7 Hydraulic Design for Sewerage Facilities in Phase 1 (Alternative Plan) (2/2)

Parameters / Pipe No		Flow (lit/sec)	Diameter (mm)	Length (m)	Hydraulic Gradient (1/1000)	Velocity (m/sec)	Gland Elevation (m + MSL)	Elevation of Pipe at Down End (m + MSL)	Earth Covering (m)	Remarks
4. R&D Zone										
4.1 South Zone										
RD- 103	HPC	12.6	200	290	6.0	0.81	14.0	12.3	1.6	
RD- 104	HPC	17.2	300	340	3.0	0.75	18.0	11.3	6.6	
RD- 105	HPC	20.2	300	260	3.0	0.75	17.0	10.5	6.4	
RD- 106	HPC	23.2	300	260	3.0	0.75	16.0	9.7	6.1	
RD- 107	HPC	26.2	300	380	3.0	0.75	14.0	8.6	5.3	
RD- 108	HPC	63.3	400	130	3.0	0.91	14.0	10.2	3.6	
RD- 109	HPC	92.5	500	400	3.0	1.05	12.0	7.4	4.4	
RD- 110	HPC	96.1	500	400	3.0	1.05	10.0	6.2	3.6	
4.2 North Zone										
RD- 203	HPC	19.0	300	380	3.0	0.75	18.0	15.2	2.7	
RD- 204	HPC	4.6	200	230	4.0	0.66	18.0	15.6	2.3	
RD- 205	HPC	3.2	200	400	3.0	0.57	18.0	15.3	2.6	
RD- 206	HPC	7.0	200	320	3.0	0.57	18.0	14.6	3.3	
RD- 207	HPC	11.2	200	80	5.0	0.74	18.0	14.2	3.7	
RD- 208	HPC	38.3	300	250	3.0	0.75	18.0	13.5	4.4	
RD- 209	HPC	46.3	400	330	2.0	0.74	18.0	12.8	5.0	
RD- 210	HPC	2.5	200	260	3.0	0.57	16.0	13.7	2.2	
RD- 211	HPC	57.1	400	280	2.0	0.74	14.0	12.3	1.6	
RD- 212	HPC	60.3	400	850	2.0	0.74	14.0	10.6	3.3	
5. High Grade Residential Zone										
5.1 East Zone										
HH- 301	VP	3.5	150	550	5.0	0.61	16.0	11.8	4.2	
HH- 302	VP	0.6	150	240	5.0	0.61	18.0	15.3	2.6	
HH- 303	VP	1.1	150	90	5.0	0.61	18.0	16.1	1.9	
HH- 304	VP	2.8	150	150	5.0	0.61	18.0	14.6	3.4	
HH- 305	VP	0.3	150	120	5.0	0.61	18.0	15.9	2.0	
HH- 306	VP	3.5	150	70	5.0	0.61	18.0	14.2	3.7	
HH- 307	VP	0.4	150	190	5.0	0.61	18.0	15.6	2.4	
HH- 308	VP	3.9	150	100	5.0	0.61	17.0	13.7	3.2	
HH- 309	VP	7.4	150	360	5.0	0.61	20.0	18.3	1.6	Relay Pump
5.2 West Zone										
HH- 401	VP	0.7	150	100	5.0	0.61	18.0	16.0	1.9	
HH- 402	VP	1.0	150	180	5.0	0.61	18.0	15.6	2.3	
HH- 403	VP	0.9	150	220	5.0	0.61	18.0	15.4	2.5	
HH- 404	VP	0.0	150	280	5.0	0.61	20.0	18.3	1.6	Relay Pump
5.3 West Zone										
HH- 501	VP	0.3	150	70	5.0	0.61	20.0	18.2	1.8	
HH- 502	VP	1.3	150	80	5.0	0.61	20.0	18.1	1.8	
HH- 503	VP	2.6	150	90	5.0	0.61	20.0	17.7	2.3	
HH- 504	VP	0.4	150	210	5.0	0.61	20.0	17.5	2.5	
HH- 505	VP	3.3	150	240	5.0	0.61	20.0	16.3	3.7	
HH- 506	VP	2.0	150	180	5.0	0.61	20.0	17.6	2.3	
HH- 507	VP	0.6	150	210	5.0	0.61	20.0	17.5	2.5	
HH- 508	VP	2.9	150	140	5.0	0.61	20.0	16.8	3.2	
HH- 509	VP	7.5	150	130	5.0	0.61	20.0	15.6	4.3	
HH- 510	VP	1.5	150	280	5.0	0.61	20.0	17.1	2.8	
HH- 511	HCP	10.0	200	70	5.0	0.74	18.0	15.3	2.7	
HH- 512	VP	0.5	150	220	5.0	0.61	18.0	15.4	2.5	
HH- 513	HCP	13.1	200	190	5.0	0.74	16.0	14.3	1.6	
HH- 514	HCP	14.8	200	370	5.0	0.74	14.0	12.5	1.5	
HH- 515	VP	2.9	150	440	5.0	0.61	14.0	10.3	3.6	
HH- 516	HCP	20.3	300	20	3.0	0.75	14.0	10.2	3.6	

Table III-1-8 Hydraulic Design for Drainage Facilities in Phase 1 (Alternative Plan) (1/4)

Parameters / Pipe No	Type of Drainage	Accumulated Drainage Area (ha)	Pipe Length in Subject Area (m)	Concentration Time (min)	Rain Fall (mm/hr)	Runoff Coefficient (-)	Peak Flow (m3/sec)	Dimensions: Diameter of Pipe (mm)	Dimensions: Width of Channel (mm)	Dimensions: Depth of Channel (mm)	Hydraulic Gradient (1/1000)	Velocity (m/sec)
1. High-Tech Industrial Zone												
HI- 101	U-Channel	6.2	230	13.2	140	0.80	1.9		1000	1000	3.5	2.2
HI- 102	U-Channel	12.4	250	16.7	130	0.80	3.6		1200	1200	3.5	2.5
HI- 103	U-Channel	6.2	240	13.3	140	0.80	1.9		1000	1000	3.0	2.0
HI- 104	U-Channel	1.9	190	12.6	142	0.80	0.6		800	800	3.0	1.7
HI- 105	U-Channel	3.8	220	15.7	132	0.80	1.1		1000	1000	2.5	1.8
HI- 106	U-Channel	24.3	200	19.4	122	0.80	6.6		1200	1200	2.5	2.1
HI- 107	U-Channel	6.2	210	12.9	141	0.80	1.9		1000	1000	2.5	1.8
HI- 108	U-Channel	12.4	330	17.5	127	0.80	3.5		1200	1200	3.5	2.5
HI- 109	U-Channel	1.9	180	12.5	142	0.80	0.6		800	800	3.0	1.7
HI- 110	U-Channel	3.8	300	16.7	130	0.80	1.1		800	800	3.0	1.7
HI- 111	U-Channel	2.0	150	12.1	144	0.80	0.6		600	600	14.0	3.1
HI- 112	U-Channel	20.1	210	20.4	120	0.80	5.4		1600	1600	3.0	2.8
HI- 113	U-Channel	2.5	370	15.1	134	0.80	0.7		600	600	6.5	2.1
HI- 114	U-Channel	25.1	285	24.4	111	0.80	6.2		1400	1400	5.0	3.3
HI- 115	U-Channel	2.3	410	15.7	132	0.80	0.7		800	800	5.0	2.3
HI- 116	U-Channel	4.6	250	19.2	123	0.80	1.3		800	800	5.0	2.3
HI- 117	U-Channel	2.3	135	11.9	145	0.80	0.7		600	600	14.0	3.1
HI- 118	U-Channel	33.0	130	21.0	119	0.80	8.7		1600	1600	5.0	3.6
HI- 119	U-Channel	2.5	130	11.8	145	0.80	0.8		800	800	3.0	1.7
HI- 120	U-Channel	5.0	285	15.8	132	0.80	1.5		800	800	15.0	3.9
HI- 121	U-Channel	1.2	275	13.8	138	0.80	0.4		400	400	15.0	2.5
HI- 122	U-Channel	2.3	250	13.5	139	0.80	0.7		600	600	8.0	2.4
HI- 123	U-Channel	43.8	190	23.6	113	0.80	11.0		1800	1800	6.0	4.2
HI- 124	U-Channel	2.3	430	16.0	131	0.80	0.7		800	800	2.0	1.4
HI- 125	U-Channel	2.5	220	13.1	141	0.80	0.8		800	800	2.0	1.4
HI- 126	U-Channel	48.6	210	26.5	107	0.80	11.6		1800	1800	15.0	6.7
HI- 201	U-Channel	3.0	340	14.7	135	0.80	0.9		800	800	6.0	2.5
HI- 202	U-Channel	4.0	85	15.9	132	0.80	1.2		800	800	4.0	2.0
HI- 203	U-Channel	1.0	340	14.7	135	0.80	0.3		600	600	6.0	2.0
HI- 204	U-Channel	6.0	305	14.2	137	0.80	1.8		1000	1000	3.0	2.0
HI- 205	U-Channel	12.0	320	18.7	124	0.80	3.3		1200	1200	4.0	2.6
HI- 206	U-Channel	1.2	260	13.6	139	0.80	0.4		600	600	2.0	1.2
HI- 207	U-Channel	2.7	250	13.5	139	0.80	0.8		800	800	2.0	1.4
HI- 208	U-Channel	16.9	260	22.3	116	0.80	4.3		1200	1200	12.0	4.6
HI- 301	U-Channel	1.5	280	13.9	138	0.80	0.5		600	600	3.0	1.4
HI- 302	U-Channel	1.5	100	15.3	134	0.80	0.4		600	600	15.0	3.2
HI- 401	U-Channel	1.1	330	14.6	136	0.80	0.3		600	600	3.0	1.4
HI- 402	U-Channel	2.1	170	16.9	129	0.80	0.6		800	800	3.0	1.7
HI- 403	U-Channel	1.1	250	13.5	139	0.80	0.3		600	600	3.0	1.4
HI- 404	U-Channel	2.1	125	15.2	134	0.80	0.6		800	800	3.0	1.7
HI- 405	U-Channel	2.4	90	16.5	130	0.80	0.7		800	800	3.0	1.7
HI- 406	U-Channel	1.0	90	11.3	147	0.80	0.3		600	600	1.5	1.0
HI- 407	U-Channel	2.0	240	14.6	136	0.80	0.6		800	800	2.0	1.4
HI- 408	U-Channel	2.5	135	16.5	130	0.80	0.7		800	800	2.0	1.4
HI- 409	U-Channel	3.5	130	18.3	125	0.80	1.0		800	800	3.0	1.7
HI- 410	U-Channel	6.2	180	20.8	119	0.80	1.6		1000	1000	3.0	2.0
HI- 411	U-Channel	2.0	140	11.9	144	0.80	0.6		800	800	2.0	1.4
HI- 412	U-Channel	1.3	310	14.3	136	0.80	0.4		600	600	2.0	1.2
HI- 413	U-Channel	3.6	160	18.5	125	0.80	1.0		1000	1000	2.0	1.7
HI- 414	U-Channel	9.8	140	22.7	115	0.80	2.5		1000	1000	15.0	4.5
HI- 501	U-Channel	1.0	220	13.1	141	0.80	0.3		400	400	9.0	1.9
HI- 502	U-Channel	2.0	260	16.7	130	0.80	0.6		600	600	15.0	3.2

(Continued)

Table III-1-9 Hydraulic Design for Drainage Facilities in Phase 1 (Alternative Plan) (2/4)

Parameters / Pipe No	Type of Drainage	Accumulated Drainage Area (ha)	Pipe Length in Subject Area (m)	Concentration Time (min)	Rain Fall (mm/hr)	Ruoff Coefficient (-)	Peak Flow (m3/sec)	Dimensions: Diameter of Pipe (mm)	Dimensions: Width of Channel (mm)	Dimensions: Depth of Channel (mm)	Hydraulic Gradient (1/1000)	Velocity (m/sec)
HI- 503	U-Channel	2.3	300	14.2	137	0.80	0.7		600	600	15.0	3.2
HI- 504	U-Channel	1.0	200	12.8	141	0.80	0.3		600	600	4.0	1.7
HI- 505	U-Channel	2.0	140	14.7	135	0.80	0.6		800	800	3.0	1.7
HI- 506	U-Channel	0.6	400	15.6	133	0.80	0.2		400	400	14.0	2.4
HI- 507	U-Channel	2.6	210	18.5	125	0.80	0.7		800	800	2.0	1.4
HI- 508	U-Channel	8.9	90	19.7	122	0.80	2.4		1000	1000	15.0	4.5
HI- 601	U-Channel	6.2	440	16.1	131	0.80	1.8		1000	1000	4.5	2.5
HI- 602	U-Channel	7.2	340	20.8	119	0.80	1.9		1000	1000	3.0	2.0
HI- 603	U-Channel	9.7	420	26.7	107	0.80	2.3		1200	1200	3.0	2.3
HI- 604	U-Channel	0.8	300	14.2	137	0.80	0.2		400	400	15.0	2.5
HI- 605	U-Channel	1.8	250	17.6	127	0.80	0.5		600	600	3.0	1.4
HI- 606	U-Channel	0.6	100	11.4	146	0.80	0.2		600	600	2.0	1.2
HI- 607	U-Channel	2.0	330	14.6	136	0.80	0.6		600	600	14.0	3.1
HI- 608	U-Channel	4.5	280	18.5	125	0.80	1.2		800	800	5.0	2.3
HI- 609	U-Channel	7.9	180	21.0	119	0.80	2.1		1000	1000	5.0	2.6
HI- 610	U-Channel	2.7	320	14.4	136	0.80	0.8		800	800	6.0	2.5
HI- 611	U-Channel	21.3	390	32.1	98	0.80	4.6		1400	1400	3.0	2.5
HI- 612	U-Channel	24.3	400	37.6	91	0.80	4.9		1600	1600	3.0	2.8
HI- 613	U-Channel	24.3	50	38.3	90	0.80	4.8		1600	1600	3.0	2.8
HI- 701	U-Channel	5.0	250	13.5	139	0.80	1.5		1000	1000	2.0	1.7
HI- 702	U-Channel	10.0	270	17.2	128	0.80	2.8		1200	1200	2.5	2.1
HI- 703	U-Channel	10.0	60	18.1	126	0.80	2.8		1200	1200	2.5	2.1
2. Urban/Business Zone												
UB- 501	HCP	1.5	315	14.4	136	0.80	0.5	800			5.0	1.9
UB- 502	HCP	3.5	320	18.8	124	0.80	1.0	1000			4.0	1.9
UB- 503	HCP	1.8	220	13.1	141	0.80	0.6	800			3.0	1.4
UB- 504	HCP	7.3	190	21.5	118	0.80	1.9	1200			7.0	2.9
UB- 505	HCP	9.3	185	24.0	112	0.80	2.3	1200			15.0	4.2
UB- 506	HCP	2.0	180	12.5	142	0.80	0.6	600			11.0	2.3
UB- 507	HCP	11.3	40	24.6	111	0.80	2.8	1200			10.0	3.4
UB- 601	HCP	1.5	190	12.6	142	0.80	0.5	600			10.0	2.2
UB- 602	HCP	3.0	110	14.2	137	0.80	0.9	800			10.0	2.6
UB- 603	HCP	1.5	230	13.2	140	0.80	0.5	600			8.0	1.9
UB- 604	HCP	4.5	30	14.6	136	0.80	1.4	1000			10.0	3.1
2. Center Area												
HC- 101	U-Channel	1.00	190	12.6	142	0.80	0.32		600	600	2.0	1.2
HC- 102	U-Channel	1.50	160	14.9	135	0.80	0.45		600	600	10.0	2.6
HC- 103	U-Channel	1.50	290	14.0	137	0.80	0.46		600	600	2.0	1.2
HC- 104	U-Channel	3.00	40	15.4	133	0.80	0.89		800	800	15.0	3.9
HC- 201	U-Channel	2.50	340	14.7	135	0.80	0.75		800	800	2.0	1.4
HC- 202	U-Channel	6.00	260	18.3	125	0.80	1.67		800	800	15.0	3.9
HC- 203	U-Channel	6.00	20	18.6	124	0.80	1.66		800	800	15.0	3.9
HC- 301	U-Channel	2.50	260	13.6	139	0.80	0.77		600	600	8.0	2.4
HC- 302	U-Channel	3.50	260	13.6	139	0.80	1.08		800	800	9.0	3.0
HC- 303	U-Channel	6.00	50	14.3	136	0.80	1.82		800	800	15.0	3.9
HC- 401	U-Channel	2.50	280	13.9	138	0.80	0.77		600	600	15.0	3.2
HC- 402	U-Channel	5.00	200	16.7	130	0.80	1.44		800	800	5.0	2.3
HC- 403	U-Channel	7.50	30	17.1	128	0.80	2.14		800	800	15.0	3.9
HC- 501	U-Channel	5.00	310	14.3	136	0.80	1.52		1000	1000	3.0	2.0
HC- 502	U-Channel	0.50	165	12.3	143	0.80	0.16		400	400	3.0	1.1
HC- 503	U-Channel	5.50	20	14.6	136	0.80	1.66		1000	1000	10.0	3.7
HC- 601	U-Channel	5.00	330	14.6	136	0.80	1.51		800	800	6.0	2.5
HC- 602	U-Channel	5.50	145	16.6	130	0.80	1.59		800	800	8.0	2.9
HC- 603	U-Channel	5.50	20	16.9	129	0.80	1.58		800	800	15.0	3.9

(Continued)

Table III-1-10 Hydraulic Design for Drainage Facilities in Phase 1 (Alternative Plan) (3/4)

Parameters / Pipe No	Type of Drainage	Accumulated Drainage Area (ha)	Pipe Length in Subject Area (m)	Concentration Time (min)	Rain Fall (mm/hr)	Runoff Coefficient (-)	Peak Flow (m3/sec)	Dimensions: Diameter of Pipe (mm)	Dimensions: Width of Channel (mm)	Dimensions: Depth of Channel (mm)	Hydraulic Gradient (1/1000)	Velocity (m/sec)
3. R & D Zone												
3.1 South Zone												
RD- 101	U-Channel	0.40	230	13.2	140	0.80	0.12		300	300	9.0	1.6
RD- 102	U-Channel	0.90	260	16.8	129	0.80	0.26		400	400	8.0	1.8
RD- 103	U-Channel	0.90	90	18.1	126	0.80	0.25		400	400	10.0	2.0
RD- 104	U-Channel	4.70	220	13.1	141	0.80	1.47		800	800	10.0	3.2
RD- 105	U-Channel	9.50	270	16.8	129	0.80	2.73		1000	1000	8.0	3.3
RD- 106	U-Channel	14.30	250	20.3	120	0.80	3.82		1200	1200	10.0	4.2
RD- 107	U-Channel	0.50	320	14.4	136	0.80	0.15		400	400	4.0	1.3
RD- 108	U-Channel	1.00	320	18.9	124	0.80	0.27		600	600	6.0	2.0
RD- 109	U-Channel	1.00	20	19.2	123	0.80	0.27		600	600	15.0	3.2
RD- 110	U-Channel	5.00	320	14.4	136	0.80	1.51		800	800	6.0	2.5
RD- 111	U-Channel	7.10	300	18.6	124	0.80	1.96		1000	1000	5.0	2.6
RD- 112	U-Channel	9.20	170	21.0	119	0.80	2.43		1000	1000	15.0	4.5
RD- 113	U-Channel	0.50	330	14.6	136	0.80	0.15		400	400	3.0	1.1
RD- 114	U-Channel	0.80	170	16.9	129	0.80	0.23		400	400	7.0	1.7
RD- 115	U-Channel	1.00	110	18.5	125	0.80	0.28		400	400	10.0	2.0
RD- 116	U-Channel	0.50	190	12.6	142	0.80	0.16		400	400	3.0	1.1
RD- 117	U-Channel	0.50	50	13.3	140	0.80	0.16		400	400	3.0	1.1
RD- 118	U-Channel	5.80	330	14.6	136	0.80	1.75		1000	1000	5.0	2.6
RD- 119	U-Channel	8.00	210	17.5	127	0.80	2.26		1000	1000	5.0	2.6
RD- 120	U-Channel	8.00	30	17.9	126	0.80	2.24		1000	1000	10.0	3.7
3.2 North Zone												
RD- 201	U-Channel	0.50	340	14.7	135	0.80	0.15		600	600	1.5	1.0
RD- 202	U-Channel	1.00	290	18.8	124	0.80	0.28		800	800	1.5	1.2
RD- 203	U-Channel	1.00	210	21.7	117	0.80	0.26		800	800	10.0	3.2
RD- 204	U-Channel	5.00	190	12.6	142	0.80	1.58		1000	1000	3.0	2.0
RD- 205	U-Channel	10.00	190	15.3	134	0.80	2.97		1000	1000	3.0	2.0
RD- 206	U-Channel	1.00	180	12.5	142	0.80	0.32		600	600	2.0	1.2
RD- 207	U-Channel	2.00	190	15.1	134	0.80	0.60		800	800	2.0	1.4
RD- 208	U-Channel	2.00	140	17.1	128	0.80	0.57		800	800	10.0	3.2
RD- 209	U-Channel	0.50	210	12.9	141	0.80	0.16		400	400	3.0	1.1
RD- 210	U-Channel	1.00	260	16.5	130	0.80	0.29		400	400	9.0	1.9
RD- 211	U-Channel	4.00	290	14.0	137	0.80	1.22		800	800	7.0	2.7
RD- 212	U-Channel	8.00	200	16.8	129	0.80	2.30		1000	1000	6.0	2.9
RD- 213	U-Channel	12.00	300	21.0	119	0.80	3.16		1200	1200	4.0	2.6
RD- 214	U-Channel	12.00	30	21.4	118	0.80	3.14		1200	1200	10.0	4.2
RD- 215	U-Channel	0.50	270	13.8	138	0.80	0.15		600	600	2.0	1.2
RD- 216	U-Channel	1.00	360	18.8	124	0.80	0.28		600	600	2.0	1.2
RD- 217	U-Channel	1.00	60	19.6	122	0.80	0.27		600	600	2.0	1.2
RD- 218	U-Channel	5.30	190	12.6	142	0.80	1.67		1000	1000	3.0	2.0
RD- 219	U-Channel	5.30	70	13.6	139	0.80	1.63		1000	1000	10.0	3.7
RD- 220	U-Channel	1.60	260	13.6	139	0.80	0.49		600	600	3.0	1.4
RD- 221	U-Channel	2.60	220	16.7	130	0.80	0.75		800	800	2.0	1.4
RD- 222	U-Channel	7.10	50	17.4	128	0.80	2.01		1000	1000	10.0	3.7
RD- 223	U-Channel	1.50	300	14.2	137	0.80	0.46		600	600	3.0	1.4
RD- 224	U-Channel	3.00	290	14.0	137	0.80	0.92		800	800	3.0	1.7
RD- 225	U-Channel	7.0	260	13.6	139	0.80	2.16		1000	1000	5.0	2.6
RD- 226	U-Channel	7.00	70	14.6	136	0.80	2.11		1000	1000	5.0	2.6
RD- 227	U-Channel	3.00	320	14.4	136	0.80	0.91		800	800	3.0	1.7
RD- 228	U-Channel	6.00	280	18.3	125	0.80	1.67		1000	1000	5.0	2.6
RD- 229	U-Channel	6.00	40	18.9	124	0.80	1.65		1000	1000	10.0	3.7
RD- 230	U-Channel	1.00	100	17.9	126	0.80	0.28		400	400	9.0	1.9

(Continued)

Table III-1-11 Hydraulic Design for Drainage Facilities in Phase 1 (Alternative Plan) (4/4)

Parameters / Pipe No	Type of Drainage	Accumulated Drainage Area (ha)	Pipe Length in Subject Area (m)	Concentration Time (min)	Rain Fall (mm/hr)	Rueff Coefficient (-)	Peak Flow (m3/sec)	Dimensions: Diameter of Pipe (mm)	Dimensions: Width of Channel (mm)	Dimensions: Depth of Channel (mm)	Hydraulic Gradient (1/1000)	Velocity (m/sec)
4. High Grade Residential Zone												
HH- 101	HCP	1.90	240	13.3	140	0.80	0.59	800			3.0	1.4
HH- 102	HCP	1.20	320	14.4	136	0.80	0.36	800			2.0	1.2
HH- 103	HCP	3.10	80	15.6	133	0.80	0.91	1000			2.0	1.4
HH- 201	HCP	0.40	120	11.7	145	0.80	0.13	400			5.0	1.2
HH- 202	HCP	0.40	170	12.4	143	0.80	0.13	400			5.0	1.2
HH- 203	HCP	1.10	130	14.2	137	0.80	0.33	600			4.0	1.4
HH- 204	HCP	0.50	120	11.7	145	0.80	0.16	600			3.0	1.2
HH- 205	HCP	1.90	90	15.4	133	0.80	0.56	800			3.0	1.4
HH- 206	HCP	0.50	100	11.4	146	0.80	0.16	600			3.0	1.2
HH- 207	HCP	1.40	150	12.1	144	0.80	0.45	800			3.0	1.4
HH- 208	HCP	2.40	100	13.5	139	0.80	0.74	1000			2.0	1.4
HH- 209	HCP	4.60	50	19.6	122	0.80	1.25	1000			3.0	1.7
HH- 210	HCP	0.30	165	12.3	143	0.80	0.10	400			3.0	0.9
HH- 211	HCP	4.90	70	20.6	120	0.80	1.30	1200			10.0	3.4
HH- 301	HCP	0.80	115	11.6	146	0.80	0.26	600			3.0	1.2
HH- 302	HCP	0.80	90	11.3	147	0.80	0.26	600			3.0	1.2
HH- 303	HCP	2.90	225	14.7	135	0.80	0.87	1000			3.0	1.7
HH- 304	HCP	2.90	120	16.4	130	0.80	0.84	1000			10.0	3.1
HH- 401	HCP	0.50	160	12.2	143	0.80	0.16	600			3.0	1.2
HH- 402	HCP	0.80	230	13.2	140	0.80	0.25	600			3.0	1.2
HH- 403	HCP	2.60	240	16.5	130	0.80	0.75	800			11.0	2.8
HH- 404	HCP	1.30	200	12.8	141	0.80	0.41	600			5.0	1.5
HH- 405	HCP	0.70	85	11.2	147	0.80	0.23	600			3.0	1.2
HH- 406	HCP	4.60	30	16.9	129	0.80	1.32	1200			10.0	3.4
HH- 501	HCP	0.80	100	11.4	146	0.80	0.26	600			3.0	1.2
HH- 502	HCP	1.60	160	13.6	139	0.80	0.49	800			3.0	1.4
HH- 503	HCP	1.40	160	12.2	143	0.80	0.45	800			3.0	1.4
HH- 504	HCP	3.80	65	14.5	136	0.80	1.15	800			3.0	1.4
HH- 505	HCP	0.80	220	13.1	141	0.80	0.25	800			3.0	1.4
HH- 506	HCP	4.60	120	16.2	131	0.80	1.34	1000			10.0	3.1
HH- 601	HCP	3.20	240	13.3	140	0.80	0.99	1000			5.0	2.2
HH- 602	HCP	6.40	280	17.2	128	0.80	1.82	1200			5.0	2.4
HH- 603	HCP	6.40	210	20.1	121	0.80	1.72	1200			5.0	2.4

Table III-1-12 Development Cost of Phase 1 of HHTP Project (Alternative Plan)

(USD Million)

Project	Development Cost								
	Total			Infrastructure			Building		
	Total	Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion	Total	Foreign Portion	Local Portion
1.External Infrastructures									
1.1 Road	58.02	8.70	49.32	58.02	8.70	49.32	-	-	-
(1) Bus Terminal	0.37	0.06	0.31	0.37	0.06	0.31	-	-	-
(2) Main Road	57.65	8.65	49.01	57.65	8.65	49.01	-	-	-
1.2 Water Supply Facilities	83.99	52.86	31.13	83.99	52.86	31.13	-	-	-
1.3 Sewerage Facilities	31.42	10.54	20.87	31.42	10.54	20.87	-	-	-
1.4 Drainage Facilities	3.90	1.35	2.54	3.90	1.35	2.54	-	-	-
1.5 Power Supply Facilities	44.44	28.92	15.53	44.44	28.92	15.53	-	-	-
1.6 Telecommunication Facilities	43.32	41.59	1.73	43.32	41.59	1.73	-	-	-
Sub-Total	265.09	143.96	121.13	265.09	143.96	121.13	-	-	-
2.Public Zones									
2.1 R&D Zone (Institute Sub-Zone)	15.29	6.39	8.91	15.29	6.39	8.91	-	-	-
2.2 Center Area (Infrastructure)	0.89	0.23	0.66	0.89	0.23	0.66	-	-	-
2.3 Center Area (Building)	44.73	13.42	31.31	-	-	-	44.73	13.42	31.31
(1) National Software Center	8.14	2.44	5.70	-	-	-	8.14	2.44	5.70
(2) High-Tech Park Center	9.43	2.83	6.60	-	-	-	9.43	2.83	6.60
(3) Technopartnership Center	13.77	4.13	9.64	-	-	-	13.77	4.13	9.64
(4) Technical Institute	6.84	2.05	4.79	-	-	-	6.84	2.05	4.79
(5) OJT Training Center	6.55	1.96	4.58	-	-	-	6.55	1.96	4.58
2.4 Park, Green Area	12.97	5.15	7.82	12.97	5.15	7.82	-	-	-
Sub-Total	73.89	25.19	48.71	29.16	11.77	17.40	44.73	13.42	31.31
3.Self-financing Zone									
3.1 High-Tech Industrial Zone	29.68	12.22	17.46	29.68	12.22	17.46	-	-	-
3.2 R&D Zone (Software Park)	2.75	1.15	1.60	2.75	1.15	1.60	-	-	-
3.3 High Grade Residential Zone	125.83	38.79	87.04	10.08	4.07	6.01	115.75	34.72	81.02
3.4 Urban/Business Zone	60.56	18.53	42.03	2.90	1.23	1.67	57.66	17.30	40.36
Sub-Total	218.82	70.69	148.13	45.41	18.67	26.75	173.40	52.02	121.38
Total	557.80	239.83	317.97	339.66	174.39	165.27	218.14	65.44	152.70

Note: /1 Engineering service cost and physical contingency are included.
2/ Price escalation is not included.

Table III-2-1 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan 1: R&D Zone)

(1) R&D Zone

	R&D Area of Phase 1 of HHTP (ha) (a)	Nos. of Residents in R&D Area of Phase 1 of HHTP (household) (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
I.R&D Institute and Others						
1 Residential Land	8.1	78	20862.1	7000	168.4	546.0
2 Agriculture Land						
(1) Paddy Fields	17.9	-	13879.3	-	248.9	-
(2) Cassava Fields	25.1	-	13879.3	-	349.0	-
(3) Others	25.6	-	8362.1	-	214.2	-
3 Forestry Land	21.5	-	8362.1	-	179.4	-
4 Public Land	8.4	-	20862.1	-	174.8	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.0	-	8362.1	-	0.0	-
Sub-Total	106.6	78	-	-	1334.7	546.0
II.Software Park Area						
1 Residential Land	0.0	0	20862.1	7000	0.0	0.0
2 Agriculture Land						
(1) Paddy Fields	0.0	-	13879.3	-	0.0	-
(2) Cassava Fields	15.0	-	13879.3	-	208.2	-
(3) Others	0.0	-	8362.1	-	0.0	-
3 Forestry Land	0.0	-	8362.1	-	0.0	-
4 Public Land	0.0	-	20862.1	-	0.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.0	-	8362.1	-	0.0	-
Sub-Total	15.0	0	-	-	208.2	0.0
Total	121.6	78.0	-	-	1,542.9	546.0

Table III-2-2 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: Center Area)

(2) HHTP Center Area

	Center Area of Phase 1of HHTP (ha)	Nos. of Residents in Center Area of Phase 1 of HHTP (household)	Compensation Cost per Area (USD/ha)	Relocation Cost/ Household (USD/household)	Compensation Cost (1000USD)	Relocation Cost (1000USD)
	(a)	(b)	(c)	(d)	(a)X(c)	(b)X(d)
I.Technical Institute						
1 Residential Land	0.6	11	20862.1	7000	12.5	77.0
2 Agriculture Land						
(1) Paddy Fields	0.0	-	13879.3	-	0.0	-
(2) Cassava Fields	0.0	-	13879.3	-	0.0	-
(3) Others	0.5	-	8362.1	-	4.5	-
3 Forestry Land	2.5	-	8362.1	-	20.9	-
4 Public Land	0.4	-	20862.1	-	8.3	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.7	-	8362.1	-	5.9	-
Sub-Total	4.7	11	-	-	52.1	77.0
II.High-Tech Park Center						
1 Residential Land	0.4	12	20862.1	7000	8.3	84.0
2 Agriculture Land						
(1) Paddy Fields	0.0	-	13879.3	-	0.0	-
(2) Cassava Fields	0.5	-	13879.3	-	6.9	-
(3) Others	0.2	-	8362.1	-	1.7	-
3 Forestry Land	4.5	-	8362.1	-	37.6	-
4 Public Land	0.0	-	20862.1	-	0.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.5	-	8362.1	-	4.2	-
Sub-Total	6.1	12	-	-	58.8	84.0
III.OJT Technical Support Center						
1 Residential Land	0.1	5	20862.1	7000	2.1	35.0
2 Agriculture Land						
(1) Paddy Fields	0.0	-	13879.3	-	0.0	-
(2) Cassava Fields	0.4	-	13879.3	-	5.6	-
(3) Others	0.5	-	8362.1	-	4.2	-
3 Forestry Land	0.0	-	8362.1	-	0.0	-
4 Public Land	0.0	-	20862.1	-	0.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.4	-	8362.1	-	3.3	-
Sub-Total	1.4	5	-	-	15.2	35.0
Total	12.2	28	-	-	126.0	196.0

Table III-2-3 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: High-Tech Industrial Zone)

(3) High-Tech Industrial Zone

	High-Tech Industrial Zone Area of Phase 1 of HHTP (ha) (a)	Nos. of Residents in High-Tech Industrial Zone Area of Phase 1 of HHTP (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
I. High-Tech Industrial Zone 1						
1 Residential Land	0.9	49	20862.1	7000	18.1	343.0
2 Agriculture Land						
(1) Paddy Fields	13.8	-	13879.3	-	191.9	-
(2) Cassava Fields	32.0	-	13879.3	-	444.0	-
(3) Others	9.3	-	8362.1	-	78.1	-
3 Forestry Land	3.1	-	8362.1	-	25.7	-
4 Public Land	0.0	-	20862.1	-	0.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.0	-	8362.1	-	0.0	-
Sub-Total	59.1	49	-	-	757.8	343.0
II. High-Tech Industrial Zone 2						
1 Residential Land	0.1	18	20862.1	7000	2.1	126.0
2 Agriculture Land						
(1) Paddy Fields	0.6	-	13879.3	-	8.3	-
(2) Cassava Fields	8.5	-	13879.3	-	118.0	-
(3) Others	0.0	-	8362.1	-	0.0	-
3 Forestry Land	0.0	-	8362.1	-	0.0	-
4 Public Land	0.0	-	20862.1	-	0.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	2.7	-	8362.1	-	22.6	-
Sub-Total	11.9	18	-	-	151.0	126.0
Total	71.0	67	-	-	908.8	469.0

Table III-2-4 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: Urban/Business Zone)

(4) Urban/Business Zone

	Urban/ Business Zone of Phase 1 of HHTP (ha) (a)	Nos. of Residents in Urban/Business Zone of Phase 1 of HHTP (household) (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
1 Residential Land	0.3	14	20862.1	7000	6.0	98.0
2 Agriculture Land						
(1) Paddy Fields	12.4	-	13879.3	-	172.0	-
(2) Cassava Fields	5.3	-	13879.3	-	74.1	-
(3) Others	0.0	-	8362.1	-	0.0	-
3 Forestry Land	7.5	-	8362.1	-	62.6	-
4 Public Land	0.2	-	20862.1	-	4.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.0	-	8362.1	-	0.0	-
Total	25.7	14	-	-	318.8	98.0

Table III-2-5 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: High Grade Residential Zone with Golf Course)

(5) High Grade Residential Zone with Golf Course

	Golf Course Area of Phase 1 of HHTP (ha) (a)	Nos. of Residents in High Grade Residential Zone Area of Phase 1 of HHTP (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
1 Residential Land	2.2	1	20862.1	7000	45.2	7.0
2 Agriculture Land						
(1) Paddy Fields	5.5	-	13879.3	-	76.5	-
(2) Cassava Fields	5.4	-	13879.3	-	75.2	-
(3) Others	0.0	-	8362.1	-	0.0	-
3 Forestry Land	49.1	-	8362.1	-	410.3	-
4 Public Land	13.4	-	20862.1	-	280.4	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.0	-	8362.1	-	0.0	-
Total	75.6	1	-	-	887.6	7.0

Table III-2-6 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: New Town Zone)

(6) New Town Zone

	New Town Area of Phase 1 of HHTP (ha) (a)	Nos. of Residents in New Town Area of Phase 1 of HHTP (household) (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
1 Residential Land	3.7	240	20862.1	7000	76.5	1680.0
2 Agriculture Land						
(1) Paddy Fields	10.2	-	13879.3	-	141.0	-
(2) Cassava Fields	20.1	-	13879.3	-	278.5	-
(3) Others	16.1	-	8362.1	-	135.0	-
3 Forestry Land	0.5	-	8362.1	-	4.1	-
4 Public Land	0.1	-	20862.1	-	1.5	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	23.7	-	8362.1	-	198.3	-
Total	74.3	240	-	-	834.8	1680.0

Table III-2-7 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: Skeleton Road of HHTP)

(7) Skeleton Road of HHTP

	Road Area of Phase 1 of HHTP (ha) (a)	Nos. of Residents in Road Area of Phase 1 of HHTP (household) (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
1 Residential Land	0.6	18	20862.1	7000	11.8	126.0
2 Agriculture Land						
(1) Paddy Fields	10.8	-	13879.3	-	149.5	-
(2) Cassava Fields	13.5	-	13879.3	-	187.2	-
(3) Others	1.6	-	8362.1	-	13.5	-
3 Forestry Land	2.8	-	8362.1	-	23.8	-
4 Public Land	1.2	-	20862.1	-	24.6	-
5 Fish Pond/Reservoir	0.5	-	4051.7	-	2.2	-
6 Green Area	18.8	-	8362.1	-	157.2	-
Total	49.8	18	-	-	569.7	126.0

Table III-2-8 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: Others)

(8) Others (Central Park, Tan Xa Lake, etc.)

	Central Park Area of Phase 1 of HHTP (ha) (a)	Nos. of Residents in Central Park Area of Phase 1 of HHTP (household) (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
1 Residential Land	13.6	222	20862.1	7000	282.9	1554.0
2 Agriculture Land						
(1) Paddy Fields	42.5	-	13879.3	-	589.5	-
(2) Cassava Fields	21.9	-	13879.3	-	304.1	-
(3) Others	12.2	-	8362.1	-	101.8	-
3 Forestry Land	7.1	-	8362.1	-	59.6	-
4 Public Land	7.4	-	20862.1	-	154.1	-
5 Fish Pond/Reservoir	122.4	-	4051.7	-	495.9	-
6 Green Area	137.0	-	8362.1	-	1145.5	-
Total	364.0	222	-	-	3133.3	1554.0

Table III-2-9 Setting Compensation Cost for Land and Relocation Cost for Residents
(Basic Plan: Total Area of Phase 1 of HHTP)

(9) Total Area of Phase 1 of HHTP

	Land Area of Phase1 of HHTP (ha)	Nos. of Residents in Phase1 of HHTP (household)	Relocation Cost/ Household (USD/ household)	Compensation Cost (1000USD)	Relocation Cost (1000USD)
	(a)	(b)	(c)		(b)X(c)
1 R&D Zone	121.6	78	7000	1542.9	546.0
2 Center Area	12.2	28	7000	126.0	196.0
3 High-Tech Industrial Zone	71.0	67	7000	908.8	469.0
4 Urban / Business Zone	25.7	14	7000	318.8	98.0
5 High Grade Residential Zone	75.6	1	7000	887.6	7.0
6 New Town Zone	74.3	240	7000	834.8	1680.0
7 Skeleton Road of HHTP	49.8	18	7000	569.7	126.0
8 Others (Central Park, Tan Xa Lake, etc.)	364.0	222	7000	3133.3	1554.0
Total	794.2	668	7000	8321.9	4676.0

Table III-2-10 Setting Compensation Cost for Land and Relocation Cost for Residents
(Alternative Plan: High-Tech Industrial Zone)

(3) High-Tech Industrial Zone

	High-Tech Industrial Park Zone of Phase 1 of HHTP (ha) (a)	Nos. of Residents in High-Tech Industrial Park Zone of Phase 1 of HHTP (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
I. High-Tech Industrial Zone 1						
1 Residential Land	0.9	49	20862.1	7000	18.1	343.0
2 Agriculture Land						
(1) Paddy Fields	13.8	-	13879.3	-	191.9	-
(2) Cassava Fields	32.0	-	13879.3	-	444.0	-
(3) Others	9.3	-	8362.1	-	78.1	-
3 Forestry Land	3.1	-	8362.1	-	25.7	-
4 Public Land	0.0	-	20862.1	-	0.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.0	-	8362.1	-	0.0	-
Sub-Total	59.1	49	-	-	757.8	343.0
II. High-Tech Industrial Zone 2						
1 Residential Land	0.1	18	20862.1	7000	2.1	126.0
2 Agriculture Land						
(1) Paddy Fields	0.6	-	13879.3	-	8.3	-
(2) Cassava Fields	8.5	-	13879.3	-	118.0	-
(3) Others	0.0	-	8362.1	-	0.0	-
3 Forestry Land	0.0	-	8362.1	-	0.0	-
4 Public Land	0.0	-	20862.1	-	0.0	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	2.7	-	8362.1	-	22.6	-
Sub-Total	11.9	18	-	-	151.0	126.0
III. New Town (in Basic Plan)						
1 Residential Land	3.5	240	20862.1	7000	72.3	1680.0
2 Agriculture Land						
(1) Paddy Fields	9.6	-	13879.3	-	133.2	-
(2) Cassava Fields	19.0	-	13879.3	-	263.1	-
(3) Others	15.3	-	8362.1	-	127.5	-
3 Forestry Land	0.5	-	8362.1	-	3.9	-
4 Public Land	0.1	-	20862.1	-	1.4	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	22.4	-	8362.1	-	187.3	-
Sub-Total	70.2	240	-	-	788.7	1680.0
Total	141.2	307.0	-	-	1,697.5	2,149.0

Table III-2-11 Setting Compensation Cost for Land and Relocation Cost for Residents
(Alternative Zone: High Grade Residential Zone)

(5) High Grade Residential Zone

	High Grade Residential Zone Area of Phase 1 of HHTP (ha) (a)	Nos. of Residents in High Grade Residential Zone Area of Phase 1 of HHTP (b)	Compensation Cost per Area (USD/ha) (c)	Relocation Cost/ Household (USD/ household) (d)	Compensation Cost (1000USD) (a)X(c)	Relocation Cost (1000USD) (b)X(d)
1 Residential Land	2.2	1	20862.1	7000	45.2	7.0
2 Agriculture Land						
(1) Paddy Fields	5.5	-	13879.3	-	76.5	-
(2) Cassava Fields	5.4	-	13879.3	-	75.2	-
(3) Others	0.0	-	8362.1	-	0.0	-
3 Forestry Land	49.1	-	8362.1	-	410.3	-
4 Public Land	13.4	-	20862.1	-	280.4	-
5 Fish Pond/Reservoir	0.0	-	4051.7	-	0.0	-
6 Green Area	0.0	-	8362.1	-	0.0	-
Total	75.6	1	-	-	887.6	7.0

Table III-2-12 Setting Compensation Cost for Land and Relocation Cost for Residents
(Alternative Plan: Total Area of Phase 1 of HHTP)

(9) Total Area of Phase 1 of HHTP

	Land Area of Phase 1 of HHTP (ha)	Nos. of Residents in Phase 1 of HHTP (household)	Relocation Cost/ Household (USD/ household)	Compensation Cost (1000USD)	Relocation Cost (1000USD)
	(a)	(b)	(c)		(b)X(c)
1 R&D Zone	121.6	78	7000	1542.9	546.0
2 Center Area	12.2	28	7000	126.0	196.0
3 High-Tech Industrial Zone	141.2	307	7000	1697.5	2149.0
4 Urban / Business Area	25.7	14	7000	318.8	98.0
5 High Grade Residential Zone	75.6	1	7000	887.6	7.0
7 Skeleton Road of HHTP	46.8	18	7000	535.4	126.0
8 Others (Central Park, Tan Xa Lake, etc.)	371.0	222	7000	3193.6	1554.0
Total	794.1	668	7000	8301.8	4676.0

Table III-2-13 Selling & Leasing Prices of Industrial Estates in Vietnam

Name of GIE, EPZ	Region	Distance from Major City (km)	Total Area (ha)	Factory lot Area (ha)	Factory Lot Lease Period (year)	Factory Lot Selling Price (USD/m2)	Factory Lot Lease Price (USD/m2/y)
Dong Anh I.E.	North	25km(Hanoi)	200~300	-	-	-	2~2.5
Noi Bai (Soc Son) EPZ	North	45km(Hanoi)	100	-	-	115	-
Thang Long North I.E.	North	5km(Hanoi)	128(Phase 1)	87	-	100~120	-
Nomura-Haiphong I.Z.	North	5km(Hai Phong)	153	123	50	-	2.2
Phu Thai I.E.	North	20km(Hai Phong)	More than 50	-	20~50	-	1.5~2
Da Nang EPZ	Central	(Da Nang)	120	70	50	42	-
Tan Thuan EPZ	South	4km(Ho Chi Minh)	300	-	50	-	2.16
Linh Trung EPZ	South	16km(Ho Chi Minh)	60	40	-	-	2.2
Can Tho EPZ	South	170km(Ho Chi Minh)	150(Phase 1)	57	-	-	1.125~1.3
Amata I. P.	South	30km(Ho Chi Minh)	700	-	-	60~65	-
Bien Hoa Industrial Zone II	South	40km(Ho Chi Minh)	236	162	-	90	1.8
Ho Chi Minh High-Tech Park	South	15km(Ho Chi Minh)	300	220	-	-	around 3.0
Long Binh Techno Park	South	30km(Bien Hoa)	100(Phase 1)	72	50	65	-

Table III-2-14 Selling and Leasing Prices of Industrial Estates located in and around Metropolitan Area in Other Asian Countries

(1995 price)

Name of GIE, EPZ	Country	Distance from Major City (km)	Total Area (ha)	Factory Lot Area (ha)	Factory lot Sales Price (USD/m2)	Factory lot Lease Price (USD/m2/y)
East Jakarta I.P.	Indonesia	40km(Jakarta)	320	306	60~65	-
MM2100 I.P.	Indonesia	30km(Jakarta)	500	307	65~80	-
Bukit Indah City (SBI Area)	Indonesia	65km(Jakarta)	1,300	1,300	55	5~5.5
Karawang Int'l Industrial City	Indonesia	6km(Karawang)	1,200	296	53~57	0.5
Pasir Gudang Tambahan	Malaysia	36km(Johor Baru)	-	383	-	4.3~5.2
Masjid Tanah I.E.	Malaysia	32km(Malacca)	-	71	-	2.4
Pulau Indah I.P.	Malaysia	43km(Kuala Lumpur)	-	1,680	-	6.8
Selat Kelang Utara Peringkit III	Malaysia	47km(Kuala Lumpur)	-	418	-	5.6
Holy Angel I.E.	Philippines	80km(Metro Manila)	52	32	-	2.4
Luisita Industrial Park	Philippines	120km(Metro Manila)	120	-	-	2.4
First Cavite I.E.	Philippines	30km(Makati)	272	-	65	-
Gateway Business Park	Philippines	38km(Metro Manila)	120	-	100	-
Canlubang I.E.- Terelay Phase	Philippines	40km(International Airport)	170	-	56	-
Laguna International I.E.	Philippines	25km(Makati)	117	-	64	-
Kranji	Singapore	25km(Changi Airport)	101	97	-	13~22
Sungei Kadut	Singapore	28km(Changi Airport)	226	-	-	13~15
Woodland East	Singapore	24km(Changi Airport)	193	133	-	13~17
Kallang Basin	Singapore	22km(Changi Airport)	74	-	-	56~62
Loyang	Singapore	2.5km(Changi Airport)	119	-	-	16~23
Siam Cement Industrial Land	Thailand	86km(Bangkok)	277	-	59.7	-
Bangpakong I.P	Thailand	57km(Bangkok)	260	-	72.5	-
Dallian I.E (PhaseII)	China	30km(Dallian)	200	140	85	-
Qingdao I.E	China	3km(Qingdao)	660	-	37	-

Source:ASEAN CENTRE, Tokyo

Table III-2-15 Financial Cost and Benefit Flow and FIRR (Basic Plan: Case 1:High-Tech Industrial Park)

Sales Price of Factory Lot
45.00 US$/m2
FIRR= 14.47%

(at 1997 constant price)

	Land Rent (1,000 US$)	Compensation Cost (1,000 US$)	Relocation Cost (1,000 US$)	Construction Cost of Utilities F.C (1,000 US$)	Construction Cost of Utilities L.C (1,000 US$)	Cost Total (1,000 US$)	Factory Lot Sales Revenue (1,000 US$)	Revenue Total (1,000 US$)	Balance (1,000 US$)
1,997						0		0	0
1,998						0		0	0
1,999	266	909	469	798	199	2,641		0	-2,641
2,000	266			485	1,925	2,676		0	-2,676
2,001	266			6,186	6,366	12,818	1,386	1,386	-11,432
2,002	266					266	9,702	9,702	9,436
2,003	266					266	8,316	8,316	8,050
2,004	266					266	5,544	5,544	5,278
2,005	266					266	2,772	2,772	2,506
2,006	266					266		0	-266
2,007	266					266		0	-266
2,008	266					266		0	-266
2,009	266					266		0	-266
2,010	266					266		0	-266
2,011	266					266		0	-266
2,012	266					266		0	-266
2,013	266					266		0	-266
2,014	266					266		0	-266
2,015	266					266		0	-266
2,016	266					266		0	-266
2,017	266					266		0	-266
2,018	266					266		0	-266
2,019	266					266		0	-266
2,020	266					266		0	-266
2,021	266			1,849	1,811	3,926		0	-3,926
2,022	266					266		0	-266
2,023	266					266		0	-266
2,024	266					266		0	-266
2,025	266					266		0	-266
2,026	266					266		0	-266
2,027	266					266		0	-266
2,028	266					266		0	-266
2,029	266					266		0	-266
2,030	266					266		0	-266
2,031	266			2,963	1,518	4,747		0	-4,747
2,032	266					266		0	-266
2,033	266					266		0	-266
2,034	266					266		0	-266
2,035	266					266		0	-266
2,036	266					266		0	-266
2,037	266					266		0	-266
2,038	266					266		0	-266
2,039	266					266		0	-266
2,040	266					266		0	-266
2,041	266			1,849	1,811	3,926		0	-3,926
2,042	266					266		0	-266
2,043	266					266		0	-266
2,044	266					266		0	-266
2,045	266					266		0	-266
2,046	266					266		0	-266
2,047	266					266		0	-266
2,048	266					266		0	-266
Total	13,313	909	469	14,130	13,630	42,450	27,720	27,720	-14,730

FIRR= 14.47%

Table III-2-16 Financial Cost and Benefit Flow and FIRR (Basic Plan:Case 2: High-Tech Industrial Park)

Sales Price of Factory Lot
45.00 US$/m2
FIRR= 20.59%

(at 1997 constant price)

	Land Rent (1,000 US$)	Compensation Cost (1,000 US$)	Relocation Cost (1,000 US$)	Construction Cost of Utilities F.C.(1,000 US$)	Construction Cost of Utilities L.C.(1,000 US$)	Cost Total (1,000 US$)	Factory Lot Sales Revenue (1,000 US$)	Revenue Total (1,000 US$)	Balance (1,000 US$)
1,997						0		0	0
1,998						0		0	0
1,999	71	909	469	798	199	2,446		0	-2,446
2,000	71			485	1,925	2,481		0	-2,481
2,001	71			6,186	6,366	12,623	1,386	1,386	-11,237
2,002	71					71	9,702	9,702	9,631
2,003	71					71	8,316	8,316	8,245
2,004	71					71	5,544	5,544	5,473
2,005	71					71	2,772	2,772	2,701
2,006	71					71	0	0	-71
2,007	71					71	0	0	-71
2,008	71					71		0	-71
2,009	71					71		0	-71
2,010	71					71		0	-71
2,011	71					71		0	-71
2,012	71					71		0	-71
2,013	71					71		0	-71
2,014	71					71		0	-71
2,015	71					71		0	-71
2,016	71					71		0	-71
2,017	71					71		0	-71
2,018	71					71		0	-71
2,019	71					71		0	-71
2,020	71					71		0	-71
2,021	71			1,849	1,811	3,731		0	-3,731
2,022	71					71		0	-71
2,023	71					71		0	-71
2,024	71					71		0	-71
2,025	71					71		0	-71
2,026	71					71		0	-71
2,027	71					71		0	-71
2,028	71					71		0	-71
2,029	71					71		0	-71
2,030	71					71		0	-71
2,031	71			2,963	1,518	4,552		0	-4,552
2,032	71					71		0	-71
2,033	71					71		0	-71
2,034	71					71		0	-71
2,035	71					71		0	-71
2,036	71					71		0	-71
2,037	71					71		0	-71
2,038	71					71		0	-71
2,039	71					71		0	-71
2,040	71					71		0	-71
2,041	71			1,849	1,811	3,731		0	-3,731
2,042	71					71		0	-71
2,043	71					71		0	-71
2,044	71					71		0	-71
2,045	71					71		0	-71
2,046	71					71		0	-71
2,047	71					71		0	-71
2,048	71					71		0	-71
Total	3,550	909	469	14,130	13,630	32,688	27,720	27,720	-4,968

FIRR= 20.59%

Table III-2-17 Financial Cost and Benefit Flow and FIRR (Basic Plan:Case 1: 4 Zones Total)

FIRR= 14.41%

(at 1997 constant price)

	Land Rent (1,000 US$)	Compensation Cost (1,000 US$)	Relocation Cost (1,000 US$)	Construction Cost of Utilities/Housing FC (1,000 US$)	Construction Cost of Utilities/Housing LC (1,000 US$)	Cost Total (1,000 US$)	Revenue of R&D Zone(Software Park) (1,000 US$)	Revenue of Hi-Tech Industrial Zone (1,000 US$)	Revenue of Urban/ Business Zone (1,000 US$)	Revenue of Hi-Grade Residence (1,000 US$)	Revenue Total (1,000 US$)	Balance (1,000 US$)
1,997	0	0	0	0	0	0	0	0	0	0	0	0
1,998	0	0	0	0	0	0	0	0	0	0	0	0
1,999	323	1,117	469	936	233	3,078	0	0	0	0	0	-3,078
2,000	702	1,206	105	7,572	3,741	13,326	0	0	0	0	0	-13,326
2,001	702			7,310	8,251	16,264	338	1,386	0	0	1,724	-14,540
2,002	702			29,966	59,587	90,255	1,013	9,702	624	549	11,888	-78,368
2,003	702			11,350	30,732	43,184	675	8,316	4,992	4,392	18,375	-24,809
2,004	702			0	0	702	675	5,544	8,736	7,686	22,641	21,939
2,005	702			0	0	702	675	2,772	11,232	9,882	24,561	23,859
2,006	702			0	0	702	675	0	12,480	10,980	24,135	23,433
2,007	702			0	0	702	675	0	12,480	10,980	24,135	23,433
2,008	702			0	0	702	675	0	12,480	10,980	24,135	23,433
2,009	702			0	0	702	675	0	12,480	10,980	24,135	23,433
2,010	702			0	0	702	675	0	12,480	10,980	24,135	23,433
2,011	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,012	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,013	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,014	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,015	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,016	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,017	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,018	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,019	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,020	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,021	702			2,060	2,074	4,837	0	0	12,480	10,980	23,460	18,623
2,022	702			1,205	1,540	3,447	0	0	12,480	10,980	23,460	20,013
2,023	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,024	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,025	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,026	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,027	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,028	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,029	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,030	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,031	702			3,438	1,803	5,944	0	0	12,480	10,980	23,460	17,516
2,032	702			1,639	987	3,328	0	0	12,480	10,980	23,460	20,132
2,033	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,034	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,035	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,036	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,037	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,038	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,039	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,040	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,041	702			2,060	2,074	4,837	0	0	12,480	10,980	23,460	18,623
2,042	702			1,205	1,540	3,447	0	0	12,480	10,980	23,460	20,013
2,043	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,044	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,045	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,046	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,047	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,048	702			0	0	702	0	0	12,480	10,980	23,460	22,758
2,049	380			0	0	380			12,480	10,980	23,460	23,080
Total	35,119	2,323	574	69,142	112,562	219,721	6,750	27,720	574,704	505,629	1,114,803	895,082

FIRR= 14.41%

Table III-2-18 Financial Cost and Benefit Flow and FIRR (Basic Plan:Case 2: 4 Zones Total)

FIRR= 14.93%

(at 1992 constant price)

	Land Rent (1,000 US$)	Compensation Cost (1,000 US$)	Relocation Cost (1,000 US$)	Construction Cost of Utilities/Housing F.C (1,000 US$)	Construction Cost of Utilities/Housing L.C (1,000 US$)	Cost Total (1,000 US$)	Revenue of R&D Farm(Software Park) (1,000 US$)	Revenue of Hi-Tech Industrial Town (1,000 US$)	Revenue of Urban Business Town (1,000 US$)	Revenue of Hi-Grade Residence (1,000 US$)	Revenue Total (1,000 US$)	Balance (1,000 US$)
1,997	0	0	0	0	0	0	0	0	0	0	0	0
1,998	0	0	0	0	0	0	0	0	0	0	0	0
1,999	86	1,117	469	936	233	2,841	0	0	0	0	0	-2,841
2,000	187	1,206	105	7,572	3,741	12,811	0	0	0	0	0	-12,811
2,001	187			7,319	8,251	15,749	358	1,386	0	0	1,724	-14,025
2,002	187			29,966	59,587	89,740	1,013	9,702	624	549	11,888	-77,853
2,003	187			11,750	30,732	42,669	675	8,316	4,992	4,392	18,375	-24,294
2,004	187			0	0	187	675	5,544	8,736	7,686	22,641	22,454
2,005	187			0	0	187	675	2,772	11,232	9,882	24,561	24,374
2,006	187			0	0	187	675	0	12,480	10,980	24,135	23,948
2,007	187			0	0	187	675	0	12,480	10,980	24,135	23,948
2,008	187			0	0	187	675	0	12,480	10,980	24,135	23,948
2,009	187			0	0	187	675	0	12,480	10,980	24,135	23,948
2,010	187			0	0	187	675	0	12,480	10,980	24,135	23,948
2,011	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,012	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,013	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,014	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,015	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,016	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,017	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,018	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,019	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,020	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,021	187			2,060	2,074	4,322	0	0	12,480	10,980	23,460	19,138
2,022	187			1,205	1,540	2,932	0	0	12,480	10,980	23,460	20,528
2,023	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,024	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,025	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,026	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,027	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,028	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,029	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,030	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,031	187			3,438	1,803	5,429	0	0	12,480	10,980	23,460	18,031
2,032	187			1,639	987	2,813	0	0	12,480	10,980	23,460	20,647
2,033	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,034	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,035	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,036	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,037	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,038	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,039	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,040	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,041	187			2,060	2,074	4,322	0	0	12,480	10,980	23,460	19,138
2,042	187			1,205	1,540	2,932	0	0	12,480	10,980	23,460	20,528
2,043	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,044	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,045	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,046	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,047	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,048	187			0	0	187	0	0	12,480	10,980	23,460	23,273
2,049	101			0	0	101			12,480	10,980	23,460	23,359
Total	9,365	2,323	574	69,142	112,562	193,967	8,750	27,720	574,704	505,629	1,114,803	920,836

FIRR= 14.93%

Table III-2-19 Financial Cost and Benefit Flow and FIRR (Basic Plan:Case 1: 7 Zones Total)

FIRR= 9.34%

(at 1992 constant price)

	Land Acq. (1,000 US$)	Compensation Cost (1,000 US$)	Relocation Cost (1,000 US$)	Construction Cost of Utilities/Housing F.C (1,000 US$)	Construction Cost of Utilities/Housing L.C (1,000 US$)	Cost Total (1,000 US$)	Revenue of R&D Zone (Industry) (1,000 US$)	Revenue of R&D Zone(Software Park) (1,000 US$)	Revenue of HDTV Game Area (1,000 US$)	Revenue of Hi-Tech Industrial Zone (1,000 US$)	Revenue of Urban/ Business Zone (1,000 US$)	Revenue of New Town (1,000 US$)	Revenue of Hi-Tech Settlement (1,000 US$)	Revenue Total (1,000 US$)	Balance (1,000 US$)
1,997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,999	986	3,287	2,695	11,646	2,916	21,548	0	0	0	0	0	0	0	0	-21,549
2,000	1,427	1,332	301	7,809	4,250	15,119	0	0	0	0	0	0	0	0	-15,119
2,001	1,427			19,558	26,378	47,363	0	338	0	1,386	0	0	0	1,724	-45,639
2,002	1,427			40,212	105,962	147,601	0	1,013	0	9,702	624	8,511	549	20,398	-127,202
2,003	1,427			21,996	77,107	100,530	0	675	0	8,316	4,992	59,575	4,392	77,950	-22,579
2,004	1,427			10,318	47,329	59,074	0	675	0	5,544	8,736	51,065	7,686	73,706	14,632
2,005	1,427			0	0	1,427	0	675	0	2,772	11,232	34,043	9,882	58,604	57,178
2,006	1,427			0	0	1,427	0	675	0	0	12,480	17,022	10,980	41,157	39,730
2,007	1,427			0	0	1,427	0	675	0	0	12,480	0	10,980	24,135	22,709
2,008	1,427			0	0	1,427	0	675	0	0	12,480	0	10,980	24,135	22,709
2,009	1,427			0	0	1,427	0	675	0	0	12,480	0	10,980	24,135	22,709
2,010	1,427			0	0	1,427	0	675	0	0	12,480	0	10,980	24,135	22,709
2,011	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,012	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,013	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,014	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,015	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,016	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,017	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,018	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,019	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,020	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,021	1,427			3,235	3,533	8,195	0	0	0	0	12,480	0	10,980	23,460	15,266
2,022	1,427			1,205	1,540	4,172	0	0	0	0	12,480	0	10,980	23,460	19,289
2,023	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,024	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,025	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,026	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,027	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,028	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,029	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,030	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,031	1,427			6,078	3,388	10,893	0	0	0	0	12,480	0	10,980	23,460	12,568
2,032	1,427			1,539	987	4,053	0	0	0	0	12,480	0	10,980	23,460	19,408
2,033	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,034	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,035	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,036	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,037	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,038	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,039	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,040	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,041	1,427			3,235	3,533	8,195	0	0	0	0	12,480	0	10,980	23,460	15,266
2,042	1,427			1,205	1,540	4,172	0	0	0	0	12,480	0	10,980	23,460	19,289
2,043	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,044	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,045	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,046	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,047	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,048	1,427			0	0	1,427	0	0	0	0	12,480	0	10,980	23,460	22,034
2,049	441			0	0	441			0		12,480		10,980	23,460	23,019
Total	71,325	4,619	2,996	128,156	278,663	485,559	0	6,750	0	27,720	574,704	170,215	505,629	1,285,018	799,459

FIRR= 9.34%

Table III-2-20 Financial Cost and Benefit Flow and FIRR (Basic Plan:Case 2: 7 Zones Total)

FIRR= 9.96%

(at 1997 constant price)

	Land Cost (1,000 US$)	Compensation Cost (1,000 US$)	Relocation Cost (1,000 US$)	Construction Cost of Urbanization/Housing F.C (1,000 US$)	Construction Cost of Urbanization/Housing L.C (1,000 US$)	Cost Total (1,000 US$)	Revenue of R&D Zone(Industry) (1,000 US$)	Revenue of R&D Zone(Software Park) (1,000 US$)	Revenue of IT Center Area (1,000 US$)	Revenue of High Tech Industrial Zone (1,000 US$)	Revenue of Cultural/ Business Zone (1,000 US$)	Revenue of New Town (1,000 US$)	Revenue of the Green Residence (1,000 US$)	Revenue Total (1,000 US$)	Balance (1,000 US$)
1,997	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,998	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1,999	263	3,287	2,695	11,666	2,916	20,826	0	0	0	0	0	0	0	0	-20,826
2,000	380	1,332	301	7,809	4,250	14,073	0	0	0	0	0	0	0	0	-14,073
2,001	380			19,558	26,378	44,316	0	338	0	1,386	0	0	0	1,724	-44,593
2,002	380			40,212	105,962	146,554	0	1,013	0	9,702	624	8,511	549	20,398	-126,156
2,003	380			21,996	77,107	99,483	0	675	0	8,316	4,992	59,575	4,392	77,950	-21,533
2,004	380			10,318	47,329	58,027	0	675	0	5,544	8,736	51,065	7,686	73,706	15,678
2,005	380			0	0	380	0	675	0	2,772	11,232	34,043	9,882	58,604	58,224
2,006	380			0	0	380	0	675	0	0	12,480	17,022	10,980	41,157	40,776
2,007	380			0	0	380	0	675	0	0	12,480	0	10,980	24,135	23,755
2,008	380			0	0	380	0	675	0	0	12,480	0	10,980	24,135	23,755
2,009	380			0	0	380	0	675	0	0	12,480	0	10,980	24,135	23,755
2,010	380			0	0	380	0	675	0	0	12,480	0	10,980	24,135	23,755
2,011	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,012	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,013	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,014	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,015	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,016	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,017	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,018	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,019	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,020	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,021	380			3,235	3,533	7,148	0	0	0	0	12,480	0	10,980	23,460	16,312
2,022	380			1,205	1,540	3,125	0	0	0	0	12,480	0	10,980	23,460	20,335
2,023	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,024	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,025	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,026	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,027	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,028	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,029	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,030	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,031	380			6,078	3,348	9,846	0	0	0	0	12,480	0	10,980	23,460	13,614
2,032	380			1,819	987	3,006	0	0	0	0	12,480	0	10,980	23,460	20,454
2,033	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,034	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,035	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,036	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,037	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,038	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,039	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,040	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,041	380			3,235	3,533	7,148	0	0	0	0	12,480	0	10,980	23,460	16,312
2,042	380			1,205	1,540	3,125	0	0	0	0	12,480	0	10,980	23,460	20,335
2,043	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,044	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,045	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,046	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,047	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,048	380			0	0	380	0	0	0	0	12,480	0	10,980	23,460	23,080
2,049	118			0	0	118			0		12,480		10,980	23,460	23,342
Total	19,020	4,619	2,996	128,156	278,463	433,254	0	6,750	0	27,720	574,704	170,215	505,829	1,285,018	851,764

FIRR= 9.96%

Table III-2-21 Sources and Uses-of-Funds Statements (Basic Plan:Case 1: High-Tech Industrial Zone)

(Unit : 1000 US$)

Sales Price of Factory Lot	45.00 US$/m2		Land Rent:		0.3750 US$/m2/year													FIRR= 14.47%																
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
(1)Total Revenue	0.0	0.0	0.0	0.0	1,541.9	11,084.4	9,739.5	6,680.6	5,430.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land Rent Cost	0.0	0.0	282.5	290.9	299.7	308.7	317.9	327.5	337.3	347.4	357.8	368.6	379.6	391.0	402.7	414.8	427.3	440.1	453.3	466.9	480.9	495.3	510.2	525.5	541.2	557.5	574.2	591.4	609.2	627.4	646.3	665.6	685.6	706.2
Compensation Cost			964.1																															
Relocation Cost			497.6																															
Construction Cost F.C.	0.0	0.0	900.2	514.7	6,693.9	0.0																			2,974.0									
Construction Cost L.C.	0.0	0.0	211.1	2,103.5	7,165.0	0.0																			3,681.4									
(2)Total Cost	0.0	0.0	2,785.5	2,909.1	14,160.6	308.7	317.9	327.5	337.3	347.4	357.8	368.6	379.6	391.0	402.7	414.8	427.3	440.1	453.3	466.9	480.9	495.3	510.2	525.5	7,196.6	557.5	574.2	591.4	609.2	627.4	646.3	665.6	685.6	706.2
Balance	0.0	0.0	-2,785.5	-2,909.1	-12,618.7	10,775.8	9,439.6	6,353.2	5,093.2	-347.4	-357.8	-368.6	-379.6	-391.0	-402.7	-414.8	-427.3	-440.1	-453.3	-466.9	-480.9	-495.3	-510.2	-525.5	-7,196.6	-557.5	-574.2	-591.4	-609.2	-627.4	-646.3	-665.6	-685.6	-706.2
Cash Inflow																																		
Balance	0.0	0.0	-2,785.5	-2,909.1	-12,618.7	10,775.8	9,439.6	6,353.2	5,093.2	-347.4	-357.8	-368.6	-379.6	-391.0	-402.7	-414.8	-427.3	-440.1	-453.3	-466.9	-480.9	-495.3	-510.2	-525.5	-7,196.6	-557.5	-574.2	-591.4	-609.2	-627.4	-646.3	-665.6	-685.6	-706.2
Own Finance of J/V Partner (FDI) (30% of Const. Cost)	0.0	0.0	312.4	824.8	4,158.3	0.0																												
External Soft Loan ((70%X60%) of Const. Cost)	0.0	0.0	437.4	1,099.6	5,821.6	0.0																												
Private Bank Loan ((70%X40%) of Const. Cost)	0.0	0.0	291.6	733.1	3,881.1	0.0																												
Own Finance of SOE	0.0	0.0	1,744.2	290.9	299.7	308.7	317.9	327.5	337.3	347.4	357.8	368.6	379.6	391.0	402.7	414.8	427.3	440.1	453.3	466.9	480.9	495.3	510.2	525.5	541.2	557.5	574.2	591.4	609.2	627.4	646.3	665.6	685.6	706.2
Cash Outflow																																		
Repayment of External Soft Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	-490.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of Private Bank Loan	0.0	0.0	0.0	0.0	0.0	-700.8	-700.8	-700.8	-700.8	-700.8	-700.8	-700.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest of External Soft Loan	0.0	0.0	0.0	-13.1	-46.1	-220.8	-220.8	-220.8	-220.8	-220.8	-220.8	-220.8	-220.8	-206.0	-191.3	-176.6	-161.9	-147.2	-132.5	-117.7	-103.0	-88.3	-73.6	-58.9	-44.2	-29.4	-14.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest of Private Bank Loan	0.0	0.0	0.0	-76.2	-92.2	-441.5	-378.4	-315.4	-252.3	-189.2	-126.1	-63.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cashflow	0.0	0.0	0.0	0.0	1,403.5	9,721.3	8,457.5	5,443.7	4,256.6	-1,110.8	-1,047.7	-984.6	-711.3	-696.6	-681.9	-667.2	-652.5	-637.7	-623.0	-608.3	-593.6	-578.9	-564.2	-549.4	-7,190.1	-520.0	-505.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cumulative Net Cashflow	0.0	0.0	0.0	0.0	1,403.5	11,124.9	19,582.3	25,026.0	29,282.6	28,171.8	27,124.1	26,139.4	25,428.1	24,731.5	24,049.6	23,382.4	20,730.0	20,092.2	19,469.2	18,860.9	18,267.3	17,688.4	17,124.3	16,574.8	9,384.7	8,864.7	8,359.4	8,359.4	8,359.4	8,359.4	8,359.4	8,359.4	8,359.4	8,359.4

Table III-2-22 Sources and Uses-of-Funds Statements (Basic Plan:Case 1: 4 Zones Total)

Sales Price of Software Park Lot: 65.00 US$/m2 | Sales Price of Industrial Park Lot: 45.00 US$/m2 | Lease Price of O/B Office: 20.00 US$/m2/month | Lease Price of Detached House in H-G Residence: 50,000 US$/Unit/year | FERR= 16.41% | (Unit : 1000 US$)

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
(1)Total Revenue	0.0	0.0	0.0	0.0	1,917.3	13,581.3	21,560.1	27,282.8	30,395.5	30,676.8	31,503.0	32,353.6	33,227.1	34,124.2	34,065.5	34,985.2	35,929.8	36,899.9	37,896.2	38,919.4	39,970.3	41,049.4	42,157.8	43,296.0	44,465.0	45,665.6	46,898.6	48,164.8	49,465.3	50,800.8	52,172.5	53,581.1	55,027.8	56,513.6
Land Rent Cost	0.0	0.0	342.1	767.5	790.5	814.2	838.7	863.8	889.7	916.4	943.9	972.3	1,001.4	1,031.5	1,062.4	1,094.3	1,127.1	1,160.9	1,195.7	1,231.6	1,268.6	1,306.6	1,345.8	1,386.2	1,427.8	1,470.6	1,514.7	1,560.2	1,607.0	1,655.2	1,704.8	1,756.0	1,808.7	1,862.9
Compensation Cost			1,155.0	1,318.3																														
Relocation Cost			497.6	114.7																														
Construction Cost F.C.	0.0	0.0	975.6	8,035.4	7,912.8	33,084.9	15,232.6	0.0																	3,314.2	1,976.9								
Construction Cost L.C.	0.0	0.0	247.7	4,087.5	9,266.6	69,077.7	36,695.6	0.0																	4,215.5	3,724.4								
(2)Total Cost	0.0	0.0	3,246.0	14,323.4	17,990.0	102,976.8	50,766.7	863.8	889.7	916.4	943.9	972.3	1,001.4	1,031.5	1,062.4	1,094.3	1,127.1	1,160.9	1,195.7	1,231.6	1,268.6	1,306.6	1,345.8	1,386.2	8,957.5	6,672.0	1,514.7	1,560.2	1,607.0	1,655.2	1,704.8	1,756.0	1,808.7	1,862.9
Balance	0.0	0.0	-3,246.0	-14,323.4	-16,072.7	-89,395.5	-29,206.6	26,419.0	29,505.8	29,759.3	30,559.1	31,381.3	32,225.7	33,092.8	33,003.1	33,890.9	34,802.7	35,739.0	36,700.5	37,687.8	38,701.7	39,742.8	40,812.0	41,909.8	35,507.5	38,993.6	45,383.8	46,604.6	47,858.3	49,145.6	50,467.6	51,825.1	53,219.1	54,650.6
Cash Inflow																																		
Balance	0.0	0.0	-3,246.0	-14,323.4	-16,072.7	-89,395.5	-29,206.6	26,419.0	29,505.8	29,759.3	30,559.1	31,381.3	32,225.7	33,092.8	33,003.1	33,890.9	34,802.7	35,739.0	36,700.5	37,687.8	38,701.7	39,742.8	40,812.0	41,909.8	35,507.5	38,993.6	45,383.8	46,604.6	47,858.3	49,145.6	50,467.6	51,825.1	53,219.1	54,650.6
Own Finance of J/V Partner(FDI) (30% of Const. Cost)	0.0	0.0	366.4	3,663.0	5,159.8	30,668.8	14,978.4	0.0																										
External Soft Loan ((70%X60%) of Const. Cost)	0.0	0.0	512.9	5,091.6	7,223.8	42,908.3	20,969.8	0.0																										
Private Bank Loan ((70%X40%) of Const. Cost)	0.0	0.0	342.0	3,394.4	4,815.9	28,605.5	13,979.8	0.0																										
Own Finance of SOE	0.0	0.0	2,024.7	2,200.5	790.5	814.2	838.7	863.8	889.7	916.4	943.9	972.3	1,001.4	1,031.5	1,062.4	1,094.3	1,127.1	1,160.9	1,195.7	1,231.6	1,268.6	1,306.6	1,345.8	1,386.2	1,427.8	1,470.6	1,514.7	1,560.2	1,607.0	1,655.2	1,704.8	1,756.0	1,808.7	1,862.9
Cash Outflow																																		
Repayment of External Soft Loan	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	-5,113.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Repayment of Private Bank Loan	0.0	0.0	0.0	0.0	0.0	-7,305.4	-7,305.4	-7,305.4	-7,305.4	-7,305.4	-7,305.4	-7,305.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest of External Soft Loan	0.0	0.0	0.0	-15.6	-168.1	-384.9	-1,672.1	-2,301.2	-2,301.2	-2,301.2	-2,301.2	-2,301.2	-2,301.2	-2,147.6	-1,994.4	-1,841.0	-1,687.5	-1,534.1	-1,380.7	-1,227.3	-1,073.9	-920.4	-767.1	-613.7	-460.2	-306.8	-153.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest of Private Bank Loan	0.0	0.0	0.0	-30.8	-338.3	-769.7	-3,686.9	-5,287.4	-5,429.9	-5,973.5	-5,315.0	-659.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Cashflow	0.0	0.0	0.0	0.0	1,412.9	5,121.4	9,895.9	14,388.8	18,159.0	19,095.8	20,581.5	22,089.5	25,812.2	26,862.7	26,957.3	28,030.5	29,128.5	30,253.0	31,401.8	32,576.4	33,782.6	35,015.2	36,277.0	37,568.6	31,561.3	35,043.7	41,631.4	46,164.8	49,465.3	50,800.8	52,172.5	53,581.1	55,027.8	56,513.6
Cumulative Net Cashflow	0.0	0.0	0.0	0.0	1,412.9	6,534.3	16,430.2	30,819.0	48,978.0	68,073.8	88,655.3	110,744.8	136,556.9	163,419.6	190,377.0	218,407.5	247,536.0	277,788.0	309,189.8	341,766.2	375,550.8	410,566.0	446,843.9	484,411.6	515,772.9	550,816.6	592,447.9	638,612.6	688,078.0	740,878.9	793,051.3	846,632.5	901,660.3	958,173.8

Table III-2-23 Current GDP (Agriculture Production) in Phase 1 of HHTP

Commune	Area by Commune in HHTP (1,800ha) Site (ha)	Area in the Phase 1 of HHTP (800 ha) Site (ha)	Area by Land Use						Estimate of Current GDP in the Phase 1 of HHTP Site (million VND) /1
			Residential Land (ha)	Agriculture Land (ha) (1)	Forestry Land (ha) (2)	Public Land (ha)	Fish Pond / Reservoir (ha)	Army Quarters (ha)	
Tan Xa	582	391 100.0%	19 4.9%	103 26.4%	111 28.5%	157 40.3%	0 0.0%	0.1 0.0%	3946.8
Thach Hoa	458	458 100.0%	33 7.2%	226 49.3%	66 14.4%	19 4.1%	41 9.0%	73 15.9%	5372.8
Ha Bang	242	48 100.0%	0 0.0%	44 91.7%	0 0.0%	4 8.3%	0 0.0%	0 0.0%	809.6
Binh Yen	458	48 100.0%	5 10.4%	22 45.8%	21 43.8%	0 0.0%	0 0.0%	0 0.0%	791.2
Co Dong	167	0 100.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0
Total	1,907	945 100.0%	57 6.0%	395 41.8%	198 21.0%	180 19.1%	41 4.3%	73 7.7%	10920.4

/1:GDP/ha of Thach That District (18.4 million VND)X((1)+(2))

Source of current land use data: Socio-Economic Survey Report conducted by NISTPASS, May, 1997

Table III-2-24 Estimate of GDP (Agriculture Production) in Phase 1 of HHTP

	Estimate of GDP in the 1st Phase of HHTP (1,000 US$) /1	Estimate of Cumulative GDP in the 1st Phase of HHTP (1,000 US$)
1997	892	892
1998	935	1,827
1999	979	2,806
2000	1,026	3,833
2001	1,076	4,908
2002	1,127	6,035
2003	1,181	7,217
2004	1,238	8,455
2005	1,297	9,752
2006	1,360	11,112
2007	1,425	12,536
2008	1,493	14,029
2009	1,565	15,594
2010	1,640	17,234
2011	1,718	18,952
2012	1,801	20,753
2013	1,887	22,640
2014	1,978	24,617
2015	2,072	26,690
2016	2,172	28,861
2017	2,276	31,137
2018	2,385	33,522
2019	2,499	36,022
2020	2,619	38,641
2021	2,745	41,386
2022	2,876	44,262
2023	3,014	47,277
2024	3,159	50,436
2025	3,310	53,746
2026	3,469	57,215

/1:The growth rate of GDP is assumed to be 1.048 based on the growth rate of GDP in agriculture sector in Vietnam during the past 10 years.

Table III-2-25 Estimate of Industrial Production in Phase 1 of High-Tech Industrial Zone in 2005 in Basic Plan

(at 1997 price)

ISIC Code	Japanese Industrial Code	Products Description	Estimated Nos. of Enterprises in HHTP (Phase 1)	Lot Area/ Factory (ha/enterprise)	Development Area (ha)	Estimated Nos. of Employees /1 (Persons)	Industrial Productivity per Nos. of Employees /2 (USD/person)	Estimate of Industrial Production in Phase 1 of High-Tech Industrial Zone (million USD)
242	206	Pharmaceuticals	1	4.62	4.62	338	239,645	81.0
331	323	Medical Equipment, etc.	2	1.48	2.96	495	44,444	22.0
242	205	Detergents, Surfactans, Paints, etc.	1	2.95	2.95	204	122,549	25.0
300	298	Office Equip., Air-Conditioners, etc.	2	1.77	3.54	546	56,777	31.0
322	304	Communications Equipment,CD,CD-ROM	4	1.26	5.04	1,182	39,763	47.0
291	297	Industrial Electrical Machinery/Equip.	1	1.54	1.54	248	32,258	8.0
319	309	Other Electrical/Electronic Products	4	2.14	8.56	1,068	30,899	33.0
331	329	Other Precision Instruments	1	1.12	1.12	225	40,000	9.0
312/319	308	Electronic Parts/Devices, etc.	3	0.96	2.88	684	16,082	11.0
332	325	Optical Equipment & Lenses	1	1.26	1.26	276	18,116	5.0
333	327	Watches/Clocks & Parts	1	1.20	1.20	266	18,797	5.0
300 323 331	305 306	Computers, X Ray Equip. VTR, etc.	2	1.43	2.86	660	63,636	42.0
293	302	Electrical Home Appliance	1	1.74	1.74	311	35,370	11.0
343	311	Motor Vehicles & Parts, etc.	2	2.91	5.82	654	22,936	15.0
292	296	Special Industrial Machinery	2	2.12	4.24	390	38,462	15.0
291	299	Other General Machinery/Equip.	1	1.46	1.46	188	26,596	5.0
281/289	294	Metal Processing Machinery/Equip.	3	2.04	6.12	621	27,375	17.0
261	251	Glass and Glass Products	1	3.69	3.69	278	43,165	12.0
			33		**61.60**	**8,634**		**394.0**

/1 Refer to section 6.1.5

/2 Source: Industrial Statistics in Japan

Table III-2-26 Estimate of Industrial Production in Phase 1 of High-Tech Industrial Zone in 2007 in Alternative Plan

(at 1997 price)

ISIC Code	Japanese Industrial Code	Products Description	Estimated Nos. of Enterprises in HHTP (Phase 1)	Lot Area/ Factory (ha/enterprise)	Development Area (ha)	Estimated Nos. of Employees /1 (Persons)	Industrial Productivity per Nos. of Employees /2 (USD/person)	Estimate of Industrial Production in Phase 1 of High-Tech Industrial Zone (million USD)
242	206	Pharmaceuticals	1	4.62	4.62	338	239,645	81.0
331	323	Medical Equipment, etc.	3	1.48	4.44	743	44,444	33.0
242	205	Detergents, Surfactans, Paints, etc.	1	2.95	2.95	204	122,549	25.0
300	298	Office Equip., Air-Conditioners, etc.	3	1.77	5.31	819	56,777	46.5
322	304	Communications Equipment,CD,CD-ROM	6	1.26	7.56	1,773	39,763	70.5
291	297	Industrial Electrical Macinery/Equip.	3	1.54	4.62	744	32,258	24.0
319	309	Other Electrical/Electronic Products	7	2.14	14.98	1,869	30,899	57.8
331	329	Other Precision Instruments	2	1.12	2.24	450	40,000	18.0
312/319	308	Electronic Parts/Devices, etc.	4	2.88	11.52	2,736	16,082	44.0
332	325	Optical Equipment & Lenses	3	1.26	3.78	828	18,116	15.0
333	327	Watches/Clocks & Parts	1	1.20	1.20	266	18,797	5.0
300 323 331	305 306	Computers, X Ray Equip. VTR, etc.	3	2.86	8.58	1,980	63,636	126.0
293	302	Electrical Home Appliance	2	3.48	6.96	1,244	35,370	44.0
343	311	Motor Vehicles & Parts, etc.	4	2.91	11.64	1,308	22,936	30.0
292	296	Special Industrial Macinery	3	2.12	6.36	585	38,462	22.5
291	299	Other General Macinery/Equip.	3	1.46	4.38	564	26,596	15.0
281/289	294	Metal Processing Macinery/Equip.	5	2.04	10.20	1,035	27,375	28.3
261	251	Glass and Glass Products	1	3.69	3.69	278	43,165	12.0
			55		**115.03**	**17,764**		**697.6**

/1 Refer to section 6.1.5

/2 Source: Industrial Statistics in Japan

Table III-2-27 Economic Cost and Benefit Flow and EIRR (Basic Plan: HHTP)

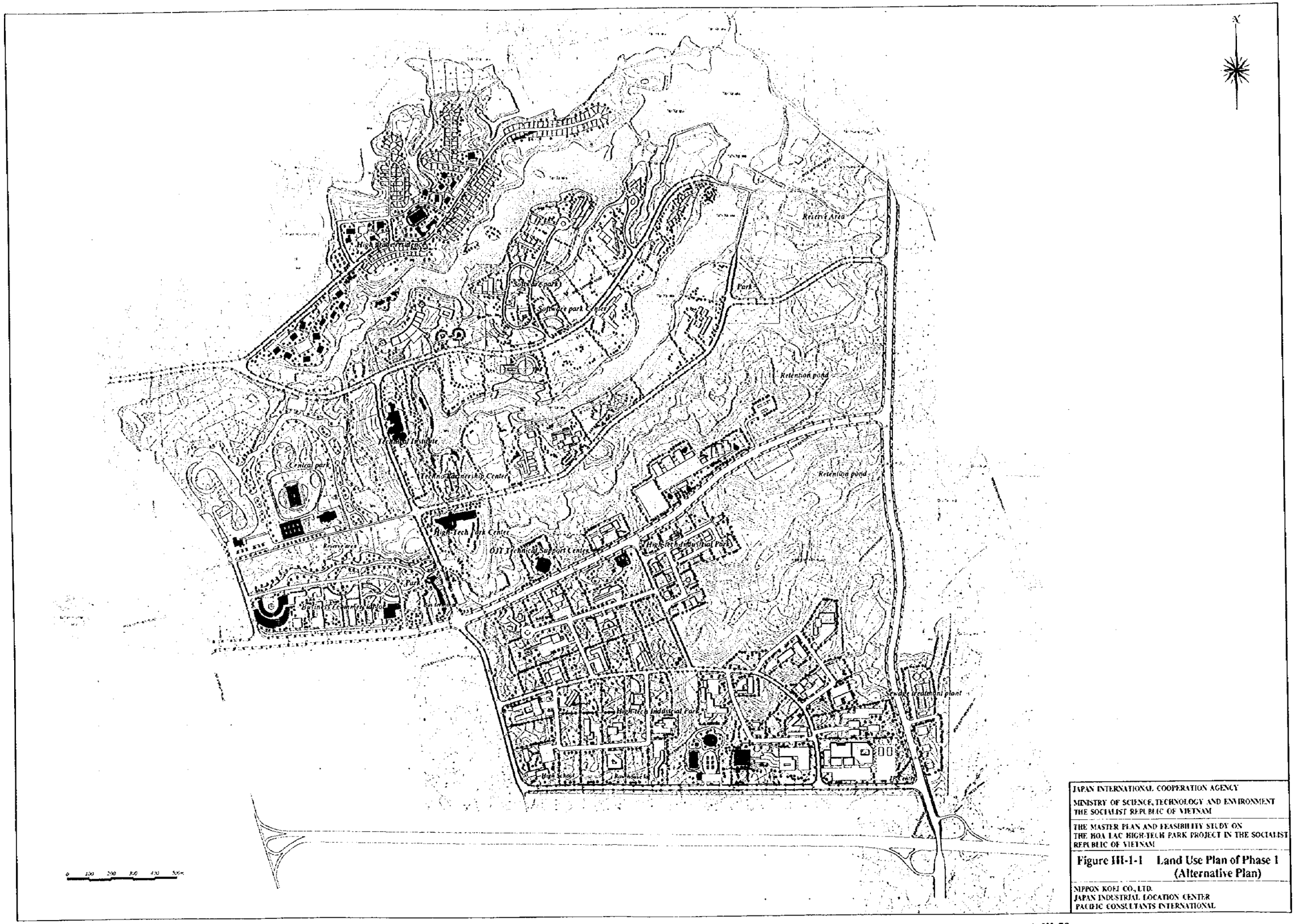
(at 1997 constant price)

	Cost of Internal Infrastructure of Phase 1 of HHTP (1,000 USD)	Cost of External Infrastructure of HHTP (1,000 USD)	Cost of Factory Building by Investors (1,000 USD)	Investment Cost of Machinery and Equipment by Investors (1,000 USD)	Total Cost (1,000 USD)	Estimate of High-Tech Industrial Production in the Phase 1 of HHTP (1,000 USD)	Estimate of Agriculture Production in the Phase 1 of HHTP (1,000 USD)	Total Benefit (1,000 USD)	Balance (1,000 USD)
1997					0		892	-892	-892
1998					0		935	-935	-935
1999	15,091				15,091		979	-979	-16,070
2000	13,207	12,218			25,425		1,026	-1,026	-26,451
2001	70,749	171,976	12,320	43,170	298,215		1,076	-1,076	-299,291
2002	146,173	242,422	86,240	302,190	777,025	157,600	1,127	156,473	-620,552
2003	99,102	5,991	73,920	259,020	438,033	275,800	1,181	274,619	-163,414
2004	57,647		49,280	172,680	279,607	354,600	1,238	353,362	73,755
2005			24,640	86,340	110,980	394,000	1,297	392,703	281,723
2006					0	427,282	1,360	425,922	425,922
2007					0	463,375	1,425	461,950	461,950
2008					0	502,517	1,493	501,024	501,024
2009					0	544,966	1,565	543,401	543,401
2010					0	591,000	1,640	589,360	589,360
2011				43,170	43,170	625,795	1,718	624,077	580,907
2012				302,190	302,190	662,639	1,801	660,838	358,648
2013				259,020	259,020	701,651	1,887	699,764	440,744
2014				172,680	172,680	742,961	1,978	740,984	568,304
2015				86,340	86,340	786,703	2,072	784,631	698,291
2016					0	833,020	2,172	830,848	830,848
2017					0	882,064	2,276	879,788	879,788
2018					0	933,995	2,385	931,610	931,610
2019					0	988,984	2,499	986,485	986,485
2020					0	1,047,211	2,619	1,044,591	1,044,591
2021	12,312	25,892	12,320	43,170	93,694	1,082,060	2,745	1,079,315	985,621
2022	2,747	48,502	86,240	302,190	439,679	1,118,068	2,876	1,115,192	675,513
2023		11,910	73,920	259,020	344,850	1,155,276	3,014	1,152,261	807,411
2024			49,280	172,680	221,960	1,193,721	3,159	1,190,562	968,602
2025			24,640	86,340	110,980	1,233,445	3,310	1,230,135	1,119,155
2026					0	1,274,492	3,469	1,271,023	1,271,023
	417,028	518,911	492,800	2,590,200	4,018,939	18,973,225	57,215	18,916,010	14,897,071
								EIRR=	**25.9%**

Table III-2-28 Economic Cost and Benefit Flow and EIRR (Alternative Plan: HHTP)

(at 1997 constant price)

	Cost of Internal Infrastructure of Phase 1 of HHTP (1,000 USD)	Cost of External Infrastructure of HHTP (1,000 USD)	Cost of Factory Building by Investors (1,000 USD)	Investment Cost of Machinery and Equipment by Investors (1,000 USD)	Total Cost (1,000 USD)	Estimate of High-Tech Industrial Production in the Phase 1 of HHTP (1,000 USD)	Estimate of Agriculture Production in the Phase 1 of HHTP (1,000 USD)	Total Benefit (1,000 USD)	Balance (1,000 USd)
1997					0		892	-892	-892
1998					0		935	-935	-935
1999	3,492				3,492		979	-979	-4,471
2000	16,470	12,233			28,703		1,026	-1,026	-29,729
2001	67,265	175,447	23,000	88,820	354,532		1,076	-1,076	-355,608
2002	119,934	233,754	115,000	444,100	912,788	209,280	1,127	208,153	-704,635
2003	54,256		92,000	355,280	501,536	348,800	1,181	347,619	-153,917
2004			69,000	266,460	335,460	453,440	1,238	452,202	116,742
2005			69,000	266,460	335,460	558,080	1,297	556,783	221,323
2006			46,000	177,640	223,640	627,840	1,360	626,480	402,840
2007			46,000	177,640	223,640	697,600	1,425	696,175	472,535
2008					0	756,528	1,493	755,034	755,034
2009					0	820,433	1,565	818,868	818,868
2010					0	889,736	1,640	888,096	888,096
2011				88,820	88,820	942,119	1,718	940,401	851,581
2012				444,100	444,100	997,586	1,801	995,786	551,686
2013				355,280	355,280	1,056,319	1,887	1,054,432	699,152
2014				266,460	266,460	1,118,510	1,978	1,116,532	850,072
2015				266,460	266,460	1,184,362	2,072	1,182,290	915,830
2016				177,640	177,640	1,254,091	2,172	1,251,920	1,074,280
2017				177,640	177,640	1,327,926	2,276	1,325,650	1,148,010
2018					0	1,406,107	2,385	1,403,722	1,403,722
2019					0	1,488,892	2,499	1,486,392	1,486,392
2020					0	1,576,550	2,619	1,573,931	1,573,931
2021	9,798	29,051	23,000	88,820	150,669	1,629,014	2,745	1,626,270	1,475,601
2022	3,120	54,385	115,000	444,100	616,605	1,683,225	2,876	1,680,348	1,063,743
2023			92,000	355,280	447,280	1,739,239	3,014	1,736,225	1,288,945
2024			69,000	266,460	335,460	1,797,118	3,159	1,793,959	1,458,499
2025			69,000	266,460	335,460	1,856,922	3,310	1,853,612	1,518,152
2026			46,000	177,640	223,640	1,918,717	3,469	1,915,248	1,691,608
	274,335	504,870	874,000	5,151,560	6,804,765	28,338,434	57,215	28,281,219	21,476,454
								EIRR=	**28.0%**



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MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT
THE SOCIALIST REPUBLIC OF VIETNAM

THE MASTER PLAN AND FEASIBILITY STUDY ON
THE HOA LAC HIGH-TECH PARK PROJECT IN THE SOCIALIST REPUBLIC OF VIETNAM

Figure III-1-1 Land Use Plan of Phase 1 (Alternative Plan)

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Figure III-1-2 Layout Plan of Water Supply Facilities (Alternative Plan)

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HI-GRADE HOUSING ZONE
R&D ZONE
HKTP CENTER ZONE
HI-TECH INDUSTRY ZONE
CENTRAL PARK
URBAN/BUSINESS ZONE
HI-TECH INDUSTRY ZONE
Sewage Treatment Plant
Main or sub-main pipe with 200mm diameter and over.
Branch pipe with 150mm diameter and under.
Trunk Sewer (to be developed as the extenal facilities).
Line Numbering
HI-123 / HCP-D1000
Nominal diameter of pipe
D:Diameter of sewer
Type of sewer
VP :Polyvinyl chloride pipe
HPC:Hume concrete pipe
Sewer ID number
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THE MASTER PLAN AND FEASIBILITY STUDY ON THE HOA LAC HIGH TECH PARK PROJECT IN THE SOCIALIST REPUBLIC OF VIETNAM
Figure III-1-3 Layout Plan of Sewerage Facilities (Alternative Plan)
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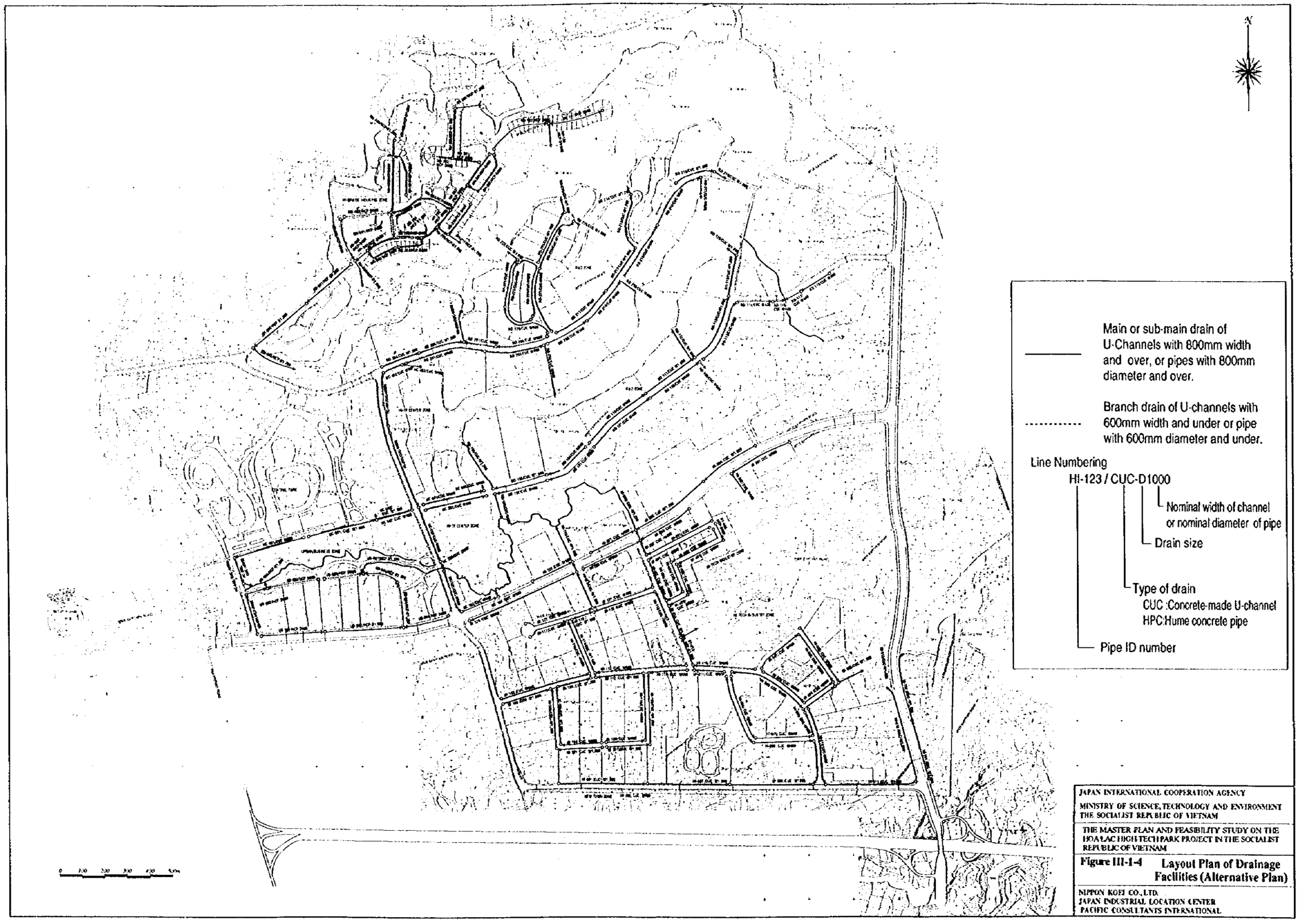

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THE MASTER PLAN AND FEASIBILITY STUDY ON THE HOA LAC HIGH TECH PARK PROJECT IN THE SOCIALIST REPUBLIC OF VIETNAM

Figure III-1-4 Layout Plan of Drainage Facilities (Alternative Plan)

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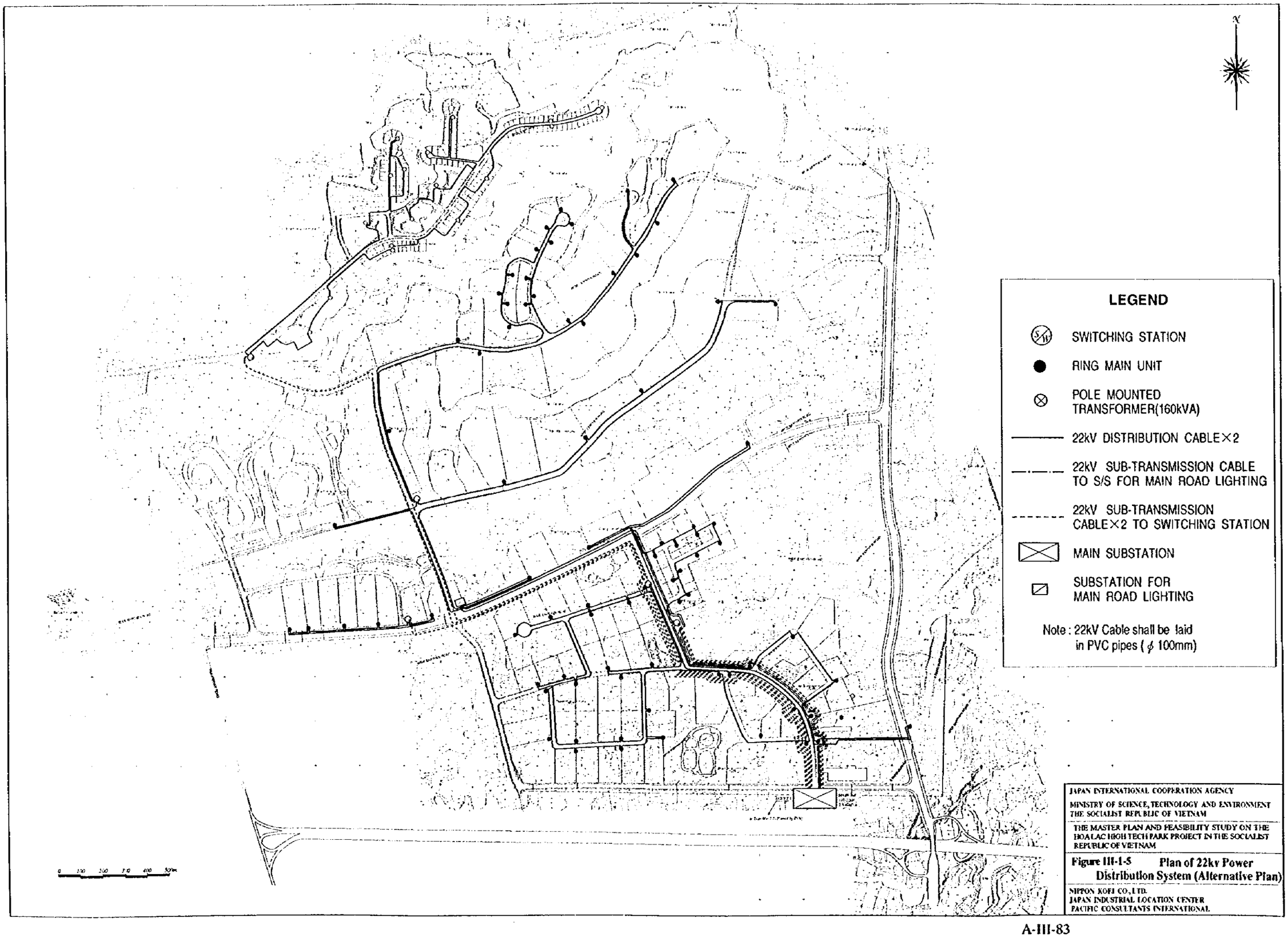
N
LEGEND
SWITCHING STATION
RING MAIN UNIT
POLE MOUNTED TRANSFORMER(160kVA)
22kV DISTRIBUTION CABLE×2
22kV SUB-TRANSMISSION CABLE TO S/S FOR MAIN ROAD LIGHTING
22kV SUB-TRANSMISSION CABLE×2 TO SWITCHING STATION
MAIN SUBSTATION
SUBSTATION FOR MAIN ROAD LIGHTING
Note : 22kV Cable shall be laid in PVC pipes (ϕ 100mm)
0 100 200 300 400 500m
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THE MASTER PLAN AND FEASIBILITY STUDY ON THE HOA LAC HIGH TECH PARK PROJECT IN THE SOCIALIST REPUBLIC OF VIETNAM
Figure III-1-5 Plan of 22kv Power Distribution System (Alternative Plan)
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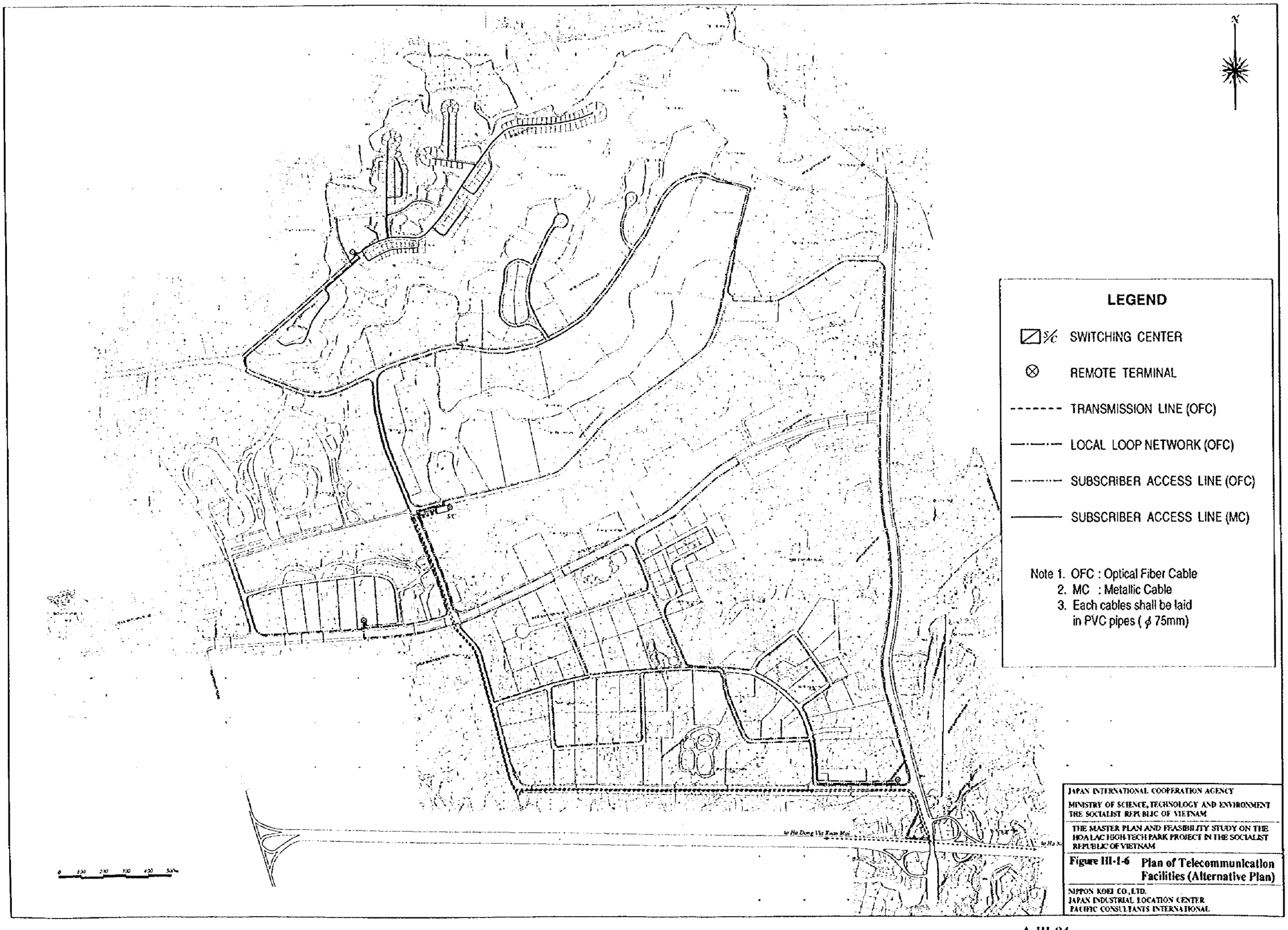
PACIFIC CONSULTANTS INTERNATIONAL


N
LEGEND
SWITCHING CENTER
REMOTE TERMINAL
TRANSMISSION LINE (OFC)
LOCAL LOOP NETWORK (OFC)
SUBSCRIBER ACCESS LINE (OFC)
SUBSCRIBER ACCESS LINE (MC)
Note 1. OFC : Optical Fiber Cable
2. MC : Metallic Cable
3. Each cables shall be laid in PVC pipes (ϕ 75mm)
to Ha Dong Via Xuan Mai
to Ha N.
0 100 200 300 400 500m
JAPAN INTERNATIONAL COOPERATION AGENCY
MINISTRY OF SCIENCE, TECHNOLOGY AND ENVIRONMENT THE SOCIALIST REPUBLIC OF VIETNAM
THE MASTER PLAN AND FEASIBILITY STUDY ON THE HOA LAC HIGH-TECH PARK PROJECT IN THE SOCIALIST REPUBLIC OF VIETNAM
Figure III-1-6 Plan of Telecommunication Facilities (Alternative Plan)
NIPPON KOEI CO.,LTD.
JAPAN INDUSTRIAL LOCATION CENTER
PACIFIC CONSULTANTS INTERNATIONAL

APPENDIX IV TECHNICAL MATERIALS

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APPENDIX IV TECHNICAL MATERIALS

IV.1 Location, Topography and Geology of HHTP Site by Investigation

IV.1.1 Introduction

JICA Study Team has carried out geotechnical investigation in Hoa Lac High-Tech Park located in Hoa Lac, Thach That, Ha Tay province by submitting the drilling work to the local surveyor.

To ensure the completion of the task within one month of time, the Survey or carried out the field work with 4 truck-mounted drilling rigs from 09 August 1997 to 19 August 1997 with the following amounts:

Summary table of field works implemented

No.	BH No.	Depth (m)			Samples tested		SPT
		In soil	In rock	Total	Soil	Rock	
1	BH1	28.0	22.0	50.0	17	6	9
2	BH2	41.0	9.0	50.0	27	2	14
3	BH3	11.0	19.0	30.0	7	2	8
4	BH4	26.6	3.4	30.0	17	2	9
5	BH5	20.0	10.0	30.0	13	2	7
6	BH6	14.2	15.8	30.0	9	-	10
7	BH7	15.4	14.6	30.0	11	4	5
8	BH8	13.4	16.6	30.0	10	3	5
9	BH9	15.0	15.0	30.0	10	4	6
10	BH10	19.2	10.8	30.0	12	0	9
Total		203.8	136.2	340.0	133	25	82

The positioning of the drilling points were carried out on the basis of the locations of the points determined by JICA Study Team on the 1:5,000 scale map. Due to the difficult field condition, some points have been moved to other locations as approved by JICA Study Team.

The laboratory tests of soil, rock and water samples were carried out at the laboratory of the Survey and Exploration Enterprise according to JIS and equivalent standards, with Eng. Nguyen Quy Vu in charge.

IV.1.2 Outline of the Location, Topography and Geology of the Investigation Area

(1) Location

The investigation boreholes were arranged scatteredly in the area of Hoa Lac High-Tech Park, located in Hoa Lac, Thach That, Ha Tay province (refer to Figure IV-1-1).

(2) Topography

The relief of the investigation area is of gentle, low hill topography dotted with man made ponds and reservoirs. There is still practically no infrastructure. The transportation of exploration equipment to the drilling site was relatively difficult.

(3) Outlines of Geological Setting of the Area

According to the 1:200,000 scale geological map compiled by the General Department of Geology in 1974, the geological setting of the Hoa Lac High-Tech Park area belongs to the Hanoi depression. Here are present the following geologic formations:

1) Proterozoic group, Song Hong complex (PR-sh)

Consists of biotite schist, with garnet, sillimanite, graphite, migmatite amphibolite. The thickness of the complex is >2,000 m.

2) Upper Permian – Lower Triassic Gioc Cun suite (P_2-T_1gc)

Consists of coal bearing shale, sandstone, limestone, porphyritic basalt and rhyolitic tuff, with a thickness of 900 – 1,000 m.

3) Lower Triassic, Muong Huy suite (T_1mh)

Consists of conglomerate, sandstone, shale, basic extrusive rocks, calcareous tuff, with thickness 500 – 800 m.

4) Middle Triassic, Ladinian stage, Cot Bai suite (T_2lcb)

Consists of sandstone, shale, thin bedded limestone, intercalated with some lenses of calcareous tuff, with thickness about 450 – 500 m.

5) Quaternary sediments

Consist of clay, sand, mixed with some gravel, distributed as thin layers in the valleys and in the south and SE of the area.

IV.1.3 Field Works

(1) Drilling

The locations of boreholes are enumerated from BH1 to BH10 (according to the location plan of the boreholes provided by JICA Study Team). The boreholes were drilled by UKB-500, UGB-50 drilling rigs, rotary drilling method with coring and clay mud circulation.

The depth of the boreholes were as follows:

BH1, BH2:	50 m/BH
The remaining boreholes:	30 m/BH
The staring borehole diameter was	130 mm
The end diameter was:	110 mm
The total depth of the boreholes was	340 m

(2) Sampling and Tests

The undisturbed and samples were collected from boreholes at various depth. The interval of the undisturbed sample is 1.0 to 2.0 m, depending on the distribution and thickness of the soil layers in the boreholes. The undisturbed samples had a diameter of $\phi 110 - \phi 91$ mm. The samples when collected were wrapped in paraffin, retained in the field 1 – 2 days, then were transported immediately to the laboratory. During the field work the core samples and samples from SPT were also collected. These samples were stored according to the general standard.

Water samples were also collected from 5 locations, of which:

3 samples from were BH3, BH4, BH7 and 3 samples ere from the reservoirs: MS1: Tan Xa reservoir and MS2: Ha Bang reservoir.

Total number of samples collected:

Soil and rock samples	133 samples
Rock samples:	25 samples
Water samples:	5 samples

(3) Standard Penetration Tests (SPT)

SPT were carried out in all boreholes. The tests were carried out at interval of about 3 m. The standard penetration tests were carried out according to JIS-A-1219 standard. The SPT equipment has the following parameters:

Split core barrel:

- Outer diameter: 51 mm
- Inner diameter: 35 mm
- Length: 635 mm
- Hammer: 63.5 kg
- Dropping height: 75 cm

IV.1.4 Laboratory Tests

All undisturbed soil samples collected from the boreholes were delivered to t he laboratory for testing. The undisturbed samples were subjected to the following tests:

- Grain size distribution test: 133 tests
- Atterberg limits test: 133 tests
- Density test: 133 tests
- Specific gravity test: 133 tests
- Triaxial test: 23 tests
- Consolidation test; 10 tests
- Rock physico-mechanical tests;: 25 samples
- Water chemical analysis: 5 samples

The tests were carried out according to JIS standard.

IV.1.5 Geotechnical Conditions

From the results of the drilling at 10 points in the site of the Hoa Lac High-Tech Park, the laboratory tests of soil samples together with SPT in the field, it is possible to distinguish the following soil layers from the surface downward as follows:

(1) Layer 1 (CL): Yellow grey, red brown stiff silty clay, mixed with lateritic clods.

This layer has limited distribution, only met in BH9, just on the surface, with a thickness of 4.2 m. One SPT was carried out in this layer, giving N value = 15.

(2) Layer 2 (SM): Brown, greyish brown, yellow brown stiff to very stiff silty clay, containing lateritic gravel.

This layer occurs directly on the surface at the locations of BH1, BH2, BH4, BH5, and BH8 with thickness from 3.0 m (BH8) to 6.5 m (BH1), in average 5.0 m.

The mean N value of 6 SPT in the layer is 16.

(3) Layer 3 (MH): Yellow brown, faint brown, light grey stiff, in some places very stiff clay mixed with quartz gravel.

This layer is distributed nearly every where in the investigation area, under layer 1 and layer 2 or right on the surface, with a thickness from 4.5 m (BH3) to 16.9 m (BH1), in average 8.0 m.

The N value from 27 SPT is from 6 to 30, in average 14.

(4) Layer 4 (CL): light grey, white grey, very stiff, in some places hard or stiff slity clay.

This layer has limited distribution in BH4, BH5, BH7 and BH8, underlying layer 3, with thickness varying from 4.6 m (BH8) to 8.0 m (BH7), in average 6.0 m.

From 9 SPT, the average N value is 19.

(5) Layer 5 (SM): Brown red very stiff to hard sandy clay with yellow grey, white grey veins, containing quartz gravel and laterite clods.

This layer is present only at BH6, with a thickness of 3.0 m, in the form of a lens.

The N value in SPT is 28.

(6) Layer 6 (MH): Faint brown, yellow brown, stiff clay mixed with quartz gravel and residual weathered rock fragments.

This layer only exists in BH6, under layer 5, with a thickness of 4.4 m.

The N value in SPT is 12.

(7) Layer 7 (SC-GC): Yellow grey, white grey, hard, in some places very stiff sandy clay, containing gravel, in some places quartz cobbles and boulders.

This layer has deep and limited distribution in BH5, BH7, BH9 and BH10, with a thickness varying from 3.5 m (BH5) to 8.6 m (BH10), in average 5.7 m.

9 SPT were carried out in this layer giving average N value of 30.

(8) Layer 8 (ML): Grey, yellow grey, hard, in some places very stiff clay, silty clay, mixed with boulders and rubbles of weathered shale.

This layer has an unstable thickness and has limited occurrence in BH3 (6.5 m thick), BH2 (22.7 m).

10 SPT were carried out in this layer, giving N value varying from 18 to 48, in average 30.

(9) Layer 9: Bed rock

The bed rock consists of:

- Black grey, thin bedded, coal bearing shale, strongly to moderately weathered, strongly fractured, easily separated along bedding plane. As the sample was broken when collected. The SPT gave N values >50.
- Black grey, blue grey, thick bedded limestone, slightly weathered, strongly fractured, with small cavities formed by groundwater dissolution. The limestone layer was met only in BH1.
- Black grey, basic extrusive rock, moderately weathered, strongly fractured.

IV.1.6 Hydrogeological Characteristics

(1) Surface Water

Due to the topographic characteristics of the investigation area which consists of low hill ranges extending in W-E direction, in the narrow valleys separating them there are small streams flowing generally in W-E direction.

To create water sources for cultivation, the local people have build some dams across the streams and valleys, forming man made reservoirs.

The water levels in the reservoirs usually varies seasonally: in the dry season it is usually very low, but in the rainy season in rise very high causing local floods.

(2) Groundwater

The result of investigation shows that in general groundwater occurs widely in the area in the layers near the surface with small productivity, with water level varying seasonally and related with the surface water and rainfall.

Also during the course of investigation, we have discovered a limestone layer with good water bearing capacity. But as the task of the investigation was limited, we could not investigated further.

In general, both the surface and groundwater in the investigation area has no aggressiveness to the concrete structures. The results of chemical analysis of water samples are shown in Table IV-1-1 to Table IV-1-5.

IV.1.7 Conclusion

(1) Geotechnical Conditions

Based on the result of the investigation at 10 points within the Hoa Lac High-Tech Park area, Thach That District, Ha Tay Province as shown in Figure IV-1-2 to Figure IV-1-18, the following soil layers have been preliminarily differentiated:

1) Soil layers in alluvial sediments

- Layer 1 (CL): has limited distribution, with thickness 4.2 m.
- Layer 2 (SM): Stiff to very stiff silty clay, in average 5.0 m thick, with mean N value in SPT of 16.
- Layer 3 (MH): Stiff, in some places very stiff clay, distributed widely with average thickness of 8.0 m. The N value in SPT is in average 14.
- Layer 4 (CL): Very stiff, in some places hard or stiff silty clay, with limited distribution, with average thickness 6.0 m. The average N value in SPT is 19.
- Layer 5 (SM): Stiff sandy clay, present as a lens in BH6, with a thickness of 3.0 m. The N value in SPT is 28.

2) Soil layers in eluvial formations

- Layer 6 (MH): Stiff clay, also existing as a lens in BH6, with a thickness of 4.4 m, with N value in SPT of 12.
- Layer 7 (SC-GC): Hard sandy clay, with limited distribution with an average thickness of 5.7 m, with N value in SPT of 30.
- Layer 8 (ML): Hard clay, silty clay with limited distribution, with thickness 6.5 22.7 m. The N value in SPT is in average 30.

3) Bed rock

The bed rock consists mainly of black grey, thin bedded, coal bearing shale, strongly weathered. Besides, there are also limestone and basic extrusive rocks in some places.

(2) Hydrogeological Conditions

- The surface water and groundwater documentation hydraulic relationship and interact to each other. The water level varies seasonally. In the

rainy season it causes local flood, affecting the transportation and construction.

- The limestone layer has high water bearing capacity, investigation should be invested to this aquifer for exploitation and utilization.
- The groundwater and surface water are not aggressive to various kinds of concrete.

IV.1.8 Ground Water Exploitation Test

(1) Objects and Methodology

The ground water exploitation test was performed by a subcontractor of the JICA Study Team, being aimed to determine the potential yield of the groundwater in the Study Area and to obtain analysis data of extracted water. A series of the test took place at the Study Area between the end of February and the middle of March, as shown in Figure IV-1-19.

A number of ground electrical resistivity survey, as shown in Figure IV-1-20, was conducted over the Study Area in advance to identify possible intake points. As a result of ground electrical resistivity survey, selected three (3) points, K-1, K-2 and K-3 in the Study Area, as shown below, were the subject to pumping test, using the drilled hole of 110 mm at the lower and 147 mm at the upper in diameter with 100 m in depth.

POSITION OF GEOPHYSICAL VERTICAL ELECTRICAL SOUNDING - GROUND WATER EXPLORATION DRILLING

HANOI IN HIGH - TECH PARK

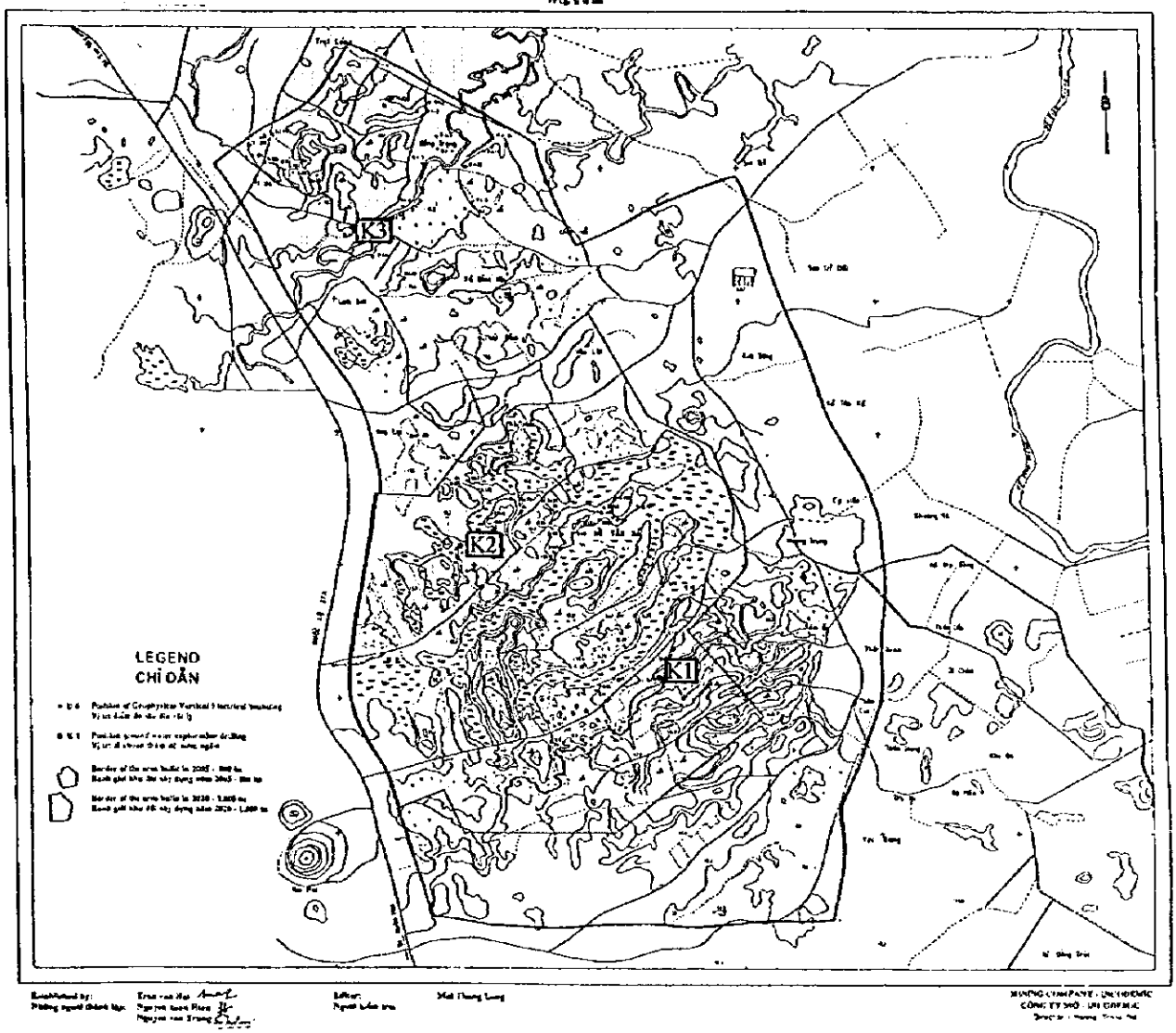
LOCATION: TANXA LAKE - THACHTHAT - HATAY

SCALE 1:16,000

VỊ TRÍ ĐIỂM ĐO SÂU ĐỊA VẬT LÝ - KHOAN THĂM DÒ NƯỚC NGẦM

KHU CÔNG NGHỆ CAO

ĐỊA ĐIỂM: HỒ TÂN XÃ - THẠCH THẤT - HÀ TÂY



Location of Ground Water Exploitation Test

(2) Test Results

The stratum examined and the results of continuous pumping, and water level recover test at three (3) points are shown in the Figure IV-1-21 and Figure IV-1-22 and IV-1-23. Based on this results, groundwater reserves in the Study Area have been identified like 470 m^3/day at K-1, no water at K-2 and 80 m^3/day at K-3.

The result of water qualities analysis for groundwater is shown below. All of water qualities are regarded to be not beyond the drinking water standard in Vietnam. However, relatively high-concentration of iron (Fe) and manganese (Mn) are measured.

Analysis Result of Ground Water

No.	Items	Unit	Analysis values
1	Temperature	°C	26
2	pH		8.2
3	Iron (Fe^{2+})	mg/l	0.16
4	Total iron (T-Fe)	mg/l	0.19
5	Manganese (Mn^{2+})	mg/l	0.06
6	Total manganese (T-Mn)	mg/l	-
7	Ammonia nitrogen (NH_4-N)	mg/l	not detectable
8	Nitrate nitrogen (NO_3-N)	mg/l	0.4
9	Nitrite nitrogen (NO_2-N)	mg/l	0.2
10	Calcium (as $CaCO_3$)	mg/l	-
11	Carbonate (CO_3^{2-})	mg/l	31
12	Alkalinity (as $CaCO_3$)	mg/l	150
13	Total hardness (as $CaCO_3$)	mg/l	154
14	Phosphorous (PO_4^{3-})	mg/l	0.2
15	Sulfate (SO_4^{2-})	mg/l	8
16	Conductivity	micro-S/cm	104
17	Total dissolved solid (TDS)	mg/l	0.23
18	COD	mg/l	1.1
19	Turbidity	mg/l	8

Source : JICA Study Team

(3) Implication of Test Results

From the results of pumping tests, the only K-1 points in the Study Area gave realistic possibility to use groundwater. Estimated possible yield of groundwater in the Study Area is limited to some 2,800 m^3/day assuming the installation of six (6) wells, on the condition that more detail pumping tests take place at the actual well drilling points.

As per water ground water quality, the limitation of Iron (Fe) and Manganese (Mn) for industrial use is deemed to be 0.05 mg/l and Turbidity is also expected to be less than 3 degree, considering not to cause problems in water use process. Thus, adequate facilities should be provided for the water utilization in the Study Area to remove Iron, Manganese and Turbidity in ground water.

IV.2 Technical Materials for Infrastructure Development Plan

IV.2.1 Technical Materials for Infrastructure Development Plan in Overall HHTP

(1) External Water Supply Facilities

The external water supply facilities, which are commonly used for the HHTP area and the Hanoi National University area, comprise water intake system, water treatment plant and water conveyance system and conveyance pipes to be laid between Da Chong and Hoa Lac, and water reservoirs inside the HHTP area. The water intake system and the water treatment plant will be constructed in Da Chong located adjacent to the Da River and require the site area of about 6 ha. Water taken from the Da River will be treated by the water treatment plant which is shown in Figure IV-2-1, employing sedimentation process after coagulation and rapid sand filtration process. The water conveyance system will consist of transfer pumps and conveyance pipes. The conveyance pipes will be installed from Da Chong to Hoa Lac Town along the national road No. 422 through the southern side of the Xuan Hai Lake and the Dong Mo Lake. The inside area of HHTP will be covered by water conveyance pipes to be installed around trunk roads, as shown in Figure 6-3-3 of Volume II.

The main specifications of the external water supply facilities at the final development phase are summarized as follows and the hydraulic profile of water conveyance system is shown in Figure IV-2-2.

(2) External Sewerage Facilities

(a) Sewage generation and development phasing

Waste water will be generated in the developed area through industrial and research activities, living life, etc. The sewerage facilities will apply the separated collection system which is of high-effectiveness in terms of water environment preservation. The waste water will be collected and treated by sewerage system before being discharged into public water bodies. From the viewpoint of economical enforcement of sewerage development, a common external sewerage which covers not only the HHTP area but also the Hanoi National University area is recommended in the Study.

The design basis of the external sewerage facilities for the two (2) development zones is set as follows based on the total water demand of 68,000 m^3/day at the final development phase in 2020:

- Daily average wastewater (DAWW):

  = Daily average water demand = 68,000 m^3/day

- Daily maximum wastewater (DMWW):

  = DAWW x (1 + groundwater infiltration ratio, 20 %)

  x (daily peak factor, 1.2) = 97,920 m^3/ day

- Hourly maximum wastewater (HMWW):

  = DMWW x (hourly peak factor, 2.5) x 1/24 = 10,200 m^3/h

The external sewerage facilities will be developed in the following stepwise manner in line with the wastewater discharge at respective phase.

Development Phasing of External Sewerage Facilities

Items	Phase		
	2005	2010	2020
Daily Max. Wastewater (m^3/day)	33,100	62,100	97,920
Sewage Treatment Capacity (m^3/day)	20,000 x 2 trains (Total 40,000)	20,000 x 4 trains (Total 80,000)	20,000 x 5 trains (Total 100,000)

In terms of influent waste water qualities, BOD (Biochemical Oxygen Demand) and SS (Suspended Solids) are assumed as 300 mg/l for design condition, considering the activity categories taking place in the respective

development zone. In the event that sewer contains hazardous or toxic substances, either higher concentrations than the specified limitation, tenant enterprises are obligated to provide their own pretreatment.

The external sewage treatment plant will treat waste water to meet the effluent limitation of the Level-B specified by the Vietnamese Government as shown in Table IV-2-1, i.e. less than 50 mg/l of BOD and less than 100 mg/l of SS. Treated waste water will be discharged into the Tich River through the tributary running in the HHTP area. In order to save water consumption in the area, some 10 % of treated water is planned to be reused for irrigation for green-keeping and other purposes, after being treated by water reclamation system.

(b) Outline of external sewerage facilities

The external sewerage facilities, which are commonly used for the HHTP and the Hanoi National University area apply the treatment process as shown in Figure IV-2-3, and comprise trunk sewage pipe system, sewage treatment plant, treated water discharge system and water reuse plant. The site of sewage treatment plant will require the lot area of some 22 ha at the final development phase. While the plant site will be located southeast the inside of the initial development area of HHTP, it will be expanded beyond the boundary of the initial development area afterward the second phases. The sewage treatment plant will apply oxidation ditch process, behind the reasons such as : (i) strong durability against low temperature weather in the early months of the year, (ii) easier operation and maintenance, and (iii) the necessity to meet the removal of Ammonia in waste water specified by the Government Standard.

(3) External Drainage Facilities

Storm water in the HHTP area is drained to the Tich River running east of the HHTP boundary through its tributary streams and the Tan Xa Lake. The land elevation level of most land in HHTP is beyond 10 m + MSL, except for the low-lying land for rice paddy use. If the return period is assumed 100 years, the water stage of the Tich River is not beyond 10 m + MSL even at the flood time as shown in Figure IV-2-4, so that the HHTP area is rarely exposed against flooding risk.

Retention ponds with sufficient storage volume will be provided in the HHTP area, not to cause the increase of peak flow along the downstream of discharge

waterways at the time of heavy rain. Together, storm water ditches along trunk roads will be developed as external drainage facilities.

IV.2.2 Technical Materials for Infrastructure Development Plan of Phase 1 in HHTP

(1) Land Grading Plan

1) Land elevation plan

The experienced flood level of the Tich River flowing 2 km east of the park is observed at Mean Sea Level (MSL) +8.0m, +8.5, +9.5 m, and +10.0 m as the return period of 5 years, 10 years, 50 years and 100 years respectively. Although the large earth work will be avoided due to the environmental conservation and cost reduction, part of the HHTP site should be raised by the land filling in order not to cause the flood problems. R&D Zone, High-Tech Industrial Zone, etc. will be raised higher than MSL +10.0 m and internal road be constructed MSL +8.5 m to cope with the 100 years and 10 years return period flood respectively.

2) Earth work volume

A filling earth work will be necessary in a part of the High-Tech Industrial Zone in terms of average filling height of 1.9 m. Total filling volume is estimated at 690,000m3 and highest filling height will be 4.6m to raise the existing MSL+5.4 m land to MSL+10.0 m. 740,000 m^3 filling material is available from the neighboring hill area where MSL+20.2m hill top will be cut to MSL+16.0m. Figure 7-6-1 of Volume II shows the land grading plan of the High-Tech Industrial Zone. The cut and filling volume distribution is shown in Figure IV-2-5 and Figure IV-2-6.

The main road connecting the High-Tech Industrial Zone with the interchange of the highway will also require the filling earth work. The highest filling height of the main road will be seen where the existing MSL+5.0m land is designed to be MSL+8.5m making 3.5m height filling.

3) Estimate of settlement

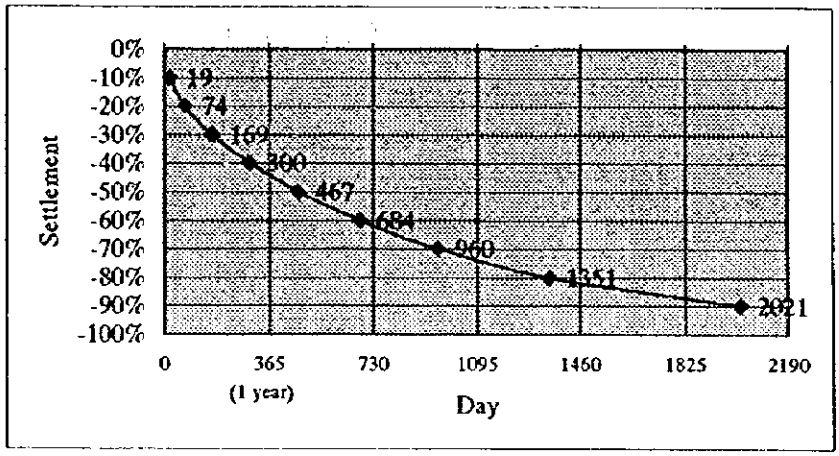
Consolidation settlement at the highest filling area is predicted as shown in Table IV-2-2. The maximum settlement is estimated at 24 cm and 1.3 years and 5.5 years are forecasted to reach the 50% and 90% settlement. The rapid settlement will be happened within the period of half year after the completion of filling work, then the residual settlement will be continued. 7 cm at 6 months,

11cm at 1 year, 15 cm at 2 years, and 18 cm at 3 years of settlement will be observed after the completion of the filling work.

To cope with the consolidation settlement, extra filling with approximately 40,000 m3 shall be made and appropriate period, i.e. the half year shall be reserved after the completion of earth filling before the start of utility construction.

	High-Tech Industrial Zone (at the maximum filling Area)	Main Road (at the maximum filling Area)
Consolidation Settlement	11 – 24 cm	10 – 20 cm
Settlement Period	1.3 years: 50% settlement 5.5 years: 90% settlement	1.3 years: 50% settlement 5.5 years: 90% settlement

Residual Settlement Lapse Graph



4) Design of foundation

According to the result of the core boring tests conducted by the Study Team, base rock with N value of more than 50 is expected around 20 m deep from the surface. A silty clay with 10 N value is sandwiched by surface and the base rock. Detailed geological condition of HHTP is presented in section IV.1.

Low rise factory as well as residential house will be built on the surface in terms of the spread foundation on the surface with 10 N value. Medium and high rise buildings, however, will require 20 m long pile foundation to reach the base rock. The base rock will be observed at 28 m deep from the surface in the

Urban/Business Zone, so the longer pile foundation will be necessary for the medium and high rise business and commercial building.

(2) Road Plan

1) Road type

Following 7 types of internal road will be constructed to cope with the different requirement by various kind of land use in HHTP such as R&D Zone, High-Tech Industrial Zone, Residential Zone, Urban/Business Zone, etc. Road length of the internal road and the external road will amount to 19.8 km and 13.7 km respectively as shown below. Road distribution plan is presented in Figure 7-6-2 of Volume II and standard section design by type is shown in Figure IV-2-7 to Figure IV-2-9.

(Unit: m)

		Type by ROW							
		50m	26m	22m	20m	14m	12m	7.5m	Total
I	Internal Road								
	1 R&D Zone		4,450			1,400			5,850
	2 Center Area								0
	3 High-Tech Industrial Zone		200		3,225				3,425
	4 Urban/Business Zone								0
	5 High Grade Residential Zone			950		450	1,350		2,750
	6 New Town Zone			1,820		2,990		3,000	7,810
	7 Sub-total	0	4,650	2,770	3,225	4,840	1,350	3,000	19,835
II	External Road	6,360	6,460			850/1			13,670
III	Others	Expansion of Hanoi-Hoa Lac Highway (L=28.27km, W=12m35.5m), etc.							
IV	Total	6,360	11,110	2,770	3,225	5,690	1,350	3,000	33,505

Note: /1 Back yard road in Urban/business area
/2 Service road to the apartment in residential area is not included.

2) Pavement design

The traffic volume generated from HHTP is forecasted to be 65,000 vehicles per day in 2020, of which 1,300 lorries and 600 buses as the heavy vehicles are included. The pavement thickness is calculated on the basis of the heavy vehicle traffic and design CBR (California Bearing Ratio) of base course of the road. With the assumption of 5% CBR, the pavement thickness by road type is designed in Table IV-2-3 in detail.

To satisfy the total pavement thickness of 49 cm, 41 cm, and 35 cm as shown above, pavement structure composing surface and binder layer, base course, and sub-base course are designed as illustrated below. Detailed design method of the pavement structure is shown in Table IV-2-4.

(3) Water Supply Facilities

1) Design conditions

The water supply facilities for the Phase 1 are comprised of distribution pumps, elevated tanks and water distribution pipes. As mentioned before, the demand projection of water supply for the Phase 1 is as follows:

Demand Projection of Water Supply for the Phase 1

Functional Zones	Demands for Water Supply (m^3/day)
1. R&D Zone	2,040
2. Center Area	40
3. High-Tech Industrial Zone	6,700
4. Urban/Business Zone	260
5. High Grade Residential Zone	350
6. New Town Zone	2,360
7. Others	1,250
Total	13,000

2) Outlines of Water Supply Facilities for Phase 1

The hydraulic design results, the layout plan and the main specifications of the water supply facilities for the Phase 1 are shown in Table IV-2-5 and Table IV-2-6 and the table below, respectively:

Main Specifications of the Water Supply Facilities for the Phase 1

Items	Specifications
1. High-Tech Industrial Zone	
Distribution pumps	8.0 m^3/min x 75 kw x 4 sets (including 1 standby)
Distribution pipes	DIP 100 - 500mmDia x Total 5920mLength
2. New Town Zone	
Distribution pumps	5.3 m^3/min x 50 kw x 3 sets (including 1 standby) (The pumps are commonly used for the New Town Zone and the Urban/Business Zone)
Distribution pipes	DIP 100 - 400mmDia x Total 4160mLength VP 50 - 75mmDia x Total 7560mLength
3. Urban/Business Zone	
Distribution pipes	DIP 100mmDia x Total 1860mLength
4. Center Zone	DIP 100 - 200mmDia x Total 620mLength
5. R & D Zone	
Distribution pumps	4.9 m^3/min x 50 kw x 3 sets (including 1 standby) (The pumps are commonly used for the R&D Zone, Center Area and High Grade Residential Zone)
Elevated tanks	100m^3 x 1 set, 120m^3 x 1 set (The 100m^3 elevated tank is commonly used for R&D Zone and Center Area)
Distribution pipes	DIP 100 - 300mmDia x Total 8530mLength
6. High Grade Residential Zone	
Elevated tank	50m^3 x 1 set
Distribution pipes	DIP 100 - 200mmDia x Total 3820mLength

(4) Sewerage Facilities

The hydraulic design results, the layout plan and the main specifications of the sewerage facilities for the Phase 1 are shown in Table IV-2-7, Table IV-2-8 and the table below, respectively:

Main Specifications of Sewerage facilities for the Phase 1

Items	Specifications
1. High-Tech Industrial Zone	
Sewers	HCP 200 - 600mmDia x Total 3830mLength
2. New Town Zone	
Sewers	HCP 200 - 600mmDia x Total 6980mLength VP 150mmDia x Total 1980mLength
3. Urban/Business Zone	
Sewers	HCP 200mmDia x Total 2040mLength
4. Center Area	
Sewers	HCP 200mmDia x Total 1250mLength
5. R&D Zone	
Sewers	HCP 200 - 500mmDia x Total 5840mLength
6. High Grade Residential Zone	
Relay pump	Submersible type x Total 4 sets (including 2 standby)
Sewers	HCP 200 - 300mmDia x Total 2200mLength VP 150mmDia x Total 1520mLength

(5) Drainage Facilities

The hydraulic design results, the layout plan and the main specifications of the drainage facilities for Phase 1 are shown in Table IV-2-9 to Table IV-2-13 and the following table:

Main Specifications of the Drainage Facilities

Items	Specifications
1. High-Tech Industry Zone	
Drains	U-Channel 400 - 1400mmWidth x Total 12940mLength
2. New Town Zone	
Drains	HCP 400 - 2200mmDia x Total 1290mLength
3. Urban/Business Zone	
Drains	HCP 600 - 1200mmDia x Total 2010mLength
4. Center Area	
Drains	U-Channel 400 - 1000mmWidth x Total 3380mLength
5. R&D Zone	
Drains	U-Channel 300 - 1200mmWidth x Total 10350mLength
6. High Grade Residential Zone	
Drains	HCP 600 - 1200mmDia x Total 2970mLength

(6) Guidelines for Facility Layout

Facility layout

Floor area ratio (FAR) and building coverage ratio (BCR) should be not exceed the designate percentage. The standard of existing construction density by the Ministry of Construction is shown in Table IV-2-14. The following table shows preferable BCR and FAR for the HHTP suggested by the Study Team.

Preferable Maximum Building Coverage Ratio (BCR) and Floor Area Ratio (FAR) for HHTP by the Study Team

Lot Area (m^2)		~ 1ha	1ha ~ 5ha	5ha ~
R&D Zone	BCR	50%	40%	30%
	FAR	300%	200%	100%
High-Tech Industrial Zone	BCR	60%	50%	40%
	FAR	300%	200%	100
Urban/Business Zone	BCR	80%	70%	60%
	FAR	500%	400%	300%

Source: JICA Study Team