表 2.3.1 地下水位の一覧表

River	Bank	Borehole No.	Station (km)	Elevation DPWH MLLW	Condition of Drilling Area, By Land or Offshore		Water Table Level (GL-m)	Water Table Elevation (m)
Pasig	left	BHPL-01	6.40	13.382	By Land		3.55	9.832
		BHPL-02	6.45	9.310		Off Shore	1.77	7.540
	island	BHPL-03	3.15	11.981	By Land		1.90	10.081
		BHPL-04	3.20	12.114	By Land		1.30	10.814
		BHPL-05	3.25	12.218	By Land		1.43	10.788
		BHPL-06	3.30	12.105	By Land		2.40	9.705
	left	BHUP-01	11.55	13.010	By Land		2.28	10.730
		BHUP-02	12.03	13.660	By Land		2.30	11.360
		BHUP-03	13.90	7.490		Off Shore	1.52	5.970
		BHUP-04	15.35	7.590		Off Shore	1.80	5.790
		BHUP-05	15.50	7.420		Off Shore	1.20	6.220
		BHUP-06	15.83	8.730		Off Shore	1.50	7.230
		BHUP-07	16.20	9.290		Off Shore	0.73	8.560
		BHUP-22	10.25	13.265	By Land		2.65	10.615
	right	BHUP-08	10.95	8.590		Off Shore	2.30	6.290
		BHUP-09	11.00	7.910		Off Shore	2.80	5.110
		BHUP-10	11.05	8.520		Off Shore	0.00	8.520
		BHUP-11	11.15	9.000		Off Shore	0.00	9.000
		BHUP-12	11.25	11.493	By Land		1.10	10.393
		BHUP-13	13.80	14.089	By Land		3.47	10.619
		BHUP-14	13.98	14.148	By Land		2.78	11.368
		BHUP-15	14.35	15.056	By Land		3.75	11.306
		BHUP-16	14.48	15.385	By Land		4.30	11.085
		BHUP-17	14.63	8.300		Off Shore	0.00	8.300
		BHUP-18	14.98	14.175	By Land		2.25	11.925
		BHUP-19	15.05	16.180	By Land		4.09	12.090
		BHUP-20	15.48	14.559	By Land		2.60	11.959
		BHUP-21	16.55	14.646	By Land		3.77	10.876
Marikina	left	BHLM-01	1.00	12.898	By Land		2.65	10.248
		BHLM-02	1.10	13.035	By Land		1.46	11.575
		BHLM-03	1.50	14.737	By Land		2.50	12.237
		BHLM-04	4.00	12.582	By Land		0.90	11.682
		BHLM-05	4.30	13.241	By Land		1.01	12.231
		BHLM-06	4.60	13.093	By Land		1.71	11.383
	right	BHLM-07	3.00	11.592	By Land		3.55	8.042
		BHLM-08	3.10	13.288	By Land		2.60	10.688
		BHLM-09	3.30	13.298	By Land		2.25	11.048
Marikina add	left	BHLM-10	1.05	12.941	By Land		1.50	11.441
		BHLM-11	1.15	13.097	By Land		0.75	12.347
		BHLM-12	1.20	13.112	By Land		0.80	12.312
		BHLM-13	3.85	12.060	By Land		2.65	9.410
		BHLM-14	4.05	12.796	By Land		1.00	11.796
		BHLM-15	4.10	13.041	By Land		1.20	11.841
		BHLM-16	4.20	13.243	By Land		1.30	11.943
		BHLM-17	4.40	13.235	By Land		0.80	12.435
		BHLM-18	4.50	13.077	By Land		1.05	12.027
		BHLM-19	4.55	13.000	By Land		1.10	11.900
		BHLM-20	4.65	13.029	By Land		1.20	11.829
	right	BHLM-21	2.85	12.270	By Land		0.00	12.270
		BHLM-22	2.90	11.710	By Land		0.00	11.710
		BHLM-23	3.05	13.577	By Land		1.30	12.277
		BHLM-24	3.15	13.320	By Land		1.45	11.870
		BHLM-25	3.20	13.283	By Land		1.00	12.283
		BHLM-26	3.35	13.222	By Land		1.15	12.072
		BHLM-27	3.50	12.480	By Land		0.80	11.680
		BHLM-28	3.55	12.550	By Land		0.50	12.050
		BHLM-29	3.60	12.010	By Land		0.61	11.400

表 2.3.2 浚渫土安定処理試験の結果概要表

sample (station No.)			S-5 (0+400)							S-15 (1+300)						S-25 (2+200)					
stabilizer			Lime				Cement			Lime			Cement			Lime			Cement		
	weight	kg/m³	50	100	150	300	50	100	150	50	100	150	50	100	150	50	100	150	50	100	150
soil type			clay							sandy clay						sandy clay					
natural condition	unit weight	g/cm³	1.380							1.540						1.310					
	moisture content	%	69							54						37					
	fine particle content	%	67							24						23					
cure 1day	qc	kN/m²	17	101	186	1,149	85	1,065	2,045	152	220	422	253	1,369	6,354	85	152	608	625	2,298	3,600
			0	101	237	1,082	101	1,098	2,721	169	101	439	896	1,352	4,445	101	152	676	862	3,194	3,650
			17	101	270	1,267	152	777	2,265	101	220	304	558	1,149	6,084	51	101	676	558	2,890	4,698
		average	11	101	231	1,166	113	980	2,343	141	180	389	569	1,290	5,627	79	135	653	682	2,794	3,983
	unit weight	g/cm³	1.450	1.450	1.530	1.580	1.415	1.525	1.515	1.630	1.625	1.655	1.605	1.680	1.590	1.630	1.650	1.725	1.640	1.695	1.760
			1.480	1.500	1.520	1.610	1.490	1.510	1.555	1.670	1.615	1.630	1.695	1.670	1.630	1.675	1.650	1.680	1.650	1.720	1.755
			1.375	1.485	1.510	1.575	1.490	1.475	1.525	1.600	1.610	1.650	1.640	1.675	1.665	1.650	1.625	1.700	1.660	1.690	1.720
		average	1.435	1.478	1.520	1.588	1.465	1.503	1.532	1.633	1.617	1.645	1.647	1.675	1.628	1.652	1.642	1.702	1.650	1.702	1.745
	moisture content	%	74	69	62	50	69	50	39	45	43	45	47	45	46	45	43	37	46	41	40
			77	68	61	50	68	37	38	45	44	44	45	44	46	45	44	37	46	42	41
			74	67	61	49	50	39	33	46	43	43	45	44	44	47	44	37	47	41	41
		average	75	68	61	49	62	42	37	45	43	44	46	44	45	46	44	37	46	41	41
cure 3day	qc	kN/m²	51	186	237	1,386	186	1,589	2,501	152	220	389	439	1,791	9,058	118	152	946	490	2,366	6,641
			85	68	186	946	203	1,403	3,042	118	270	676	659	3,481	7,571	152	118	879	879	2,636	5,881
		average	68	127	211	1,166	194	1,496	2,771	135	245	532	549	2,636	8,314	135	135	913	684	2,501	6,261
	unit weight	g/cm³	1.455	1.465	1.510	1.550	1.460	1.520	1.535	1.635	1.675	1.640	1.640	1.600	1.620	1.610	1.650	1.680	1.580	1.740	1.750
			1.420	1.495	1.515	1.580	1.480	1.520	1.535	1.615	1.610	1.670	1.650	1.650	1.655	1.610	1.645	1.690	1.605	1.695	1.750
		average	1.438	1.480	1.513	1.565	1.470	1.520	1.535	1.625	1.643	1.655	1.645	1.625	1.638	1.610	1.648	1.685	1.593	1.718	1.750
	moisture content	%	76	71	62	49	72	67	64	45	43	44	46	44	43	47	43	39	49	42	41
			75	71	63	49	72	67	64	47	43	44	45	44	43	48	44	38	49	43	41
		average	76	71	62	49	72	67	64	46	43	44	45	44	43	48	44	39	49	42	41
cure 7day	qc	kN/m²	152	85	237	1,420	237	1,538	3,971	203	321	676	1,200	3,211	10,106	169	152	913	811	4,005	6,050
			34	118	186	1,555	203	1,622	3,718	220	338	693	845	2,907	10,883	186	186	963	811	4,732	4,259
		average	93	101	211	1,487	220	1,580	3,845	211	330	684	1,022	3,059	10,494	177	169	938	811	4,368	5,154
	unit weight	g/cm³	1.425	1.470	1.500	1.580	1.470	1.525	1.500	1.625	1.680	1.625	1.625	1.680	1.650	1.610	1.630	1.680	1.635	1.740	1.755
			1.410	1.440	1.505	1.570	1.490	1.520	1.495	1.630	1.640	1.660	1.660	1.725	1.690	1.675	1.655	1.695	1.650	1.725	1.690
		average	1.418	1.455	1.503	1.575	1.480	1.523	1.498	1.628	1.660	1.643	1.643	1.703	1.670	1.643	1.643	1.688	1.643	1.733	1.723
	moisture content	%	79	76	66	49	75	74	71	46	43	43	45	42	43	45	44	39	47	42	38
			81	77	68	48	76	71	69	45	44	45	45	43	43	47	45	38	47	39	40
		average	80	76	67	48	75	72	70	46	44	44	45	43	43	46	45	39	47	40	39
necessary condition (qc=400kN/m²)	cure 1day	kg/m³	178				67			153			39			126			44		
	cure 3day	kg/m³	180				58			127			47			118			43		
	cure 7day	kg/m³	173				57			110			35			116			45		

sample			S-34 (3+000)							S-45 (4+000)							S-55 (5+000)						
stabilizer			Lime				Cement			Lime			Cement			No Mix	Lime			Cement			No Mix
	weight	kg/m³	50	100	150	300	50	100	150	50	100	150	50	100	150	0	50	100	150	50	100	150	0
soil type			sludge							sand							sand						
natural condition	unit weight	g/cm³	1.570							1.870							1.800						
	moisture content	%	54							26							33						
	fine particle content	%	94							16							18						
cure 1day	qc	kN/m²	152	186	253	1,758	169	2,467	4,495	5,847	8,044	8,315	4,630	9,058	15,209	2,434	2,873	2,248	1,082	2,822	8,399	11,559	1,504
			135	220	287	1,318	85	2,197	4,428	4,157	8,112	7,909	7,976	7,976	13,012	1,622	4,157	2,839	2,738	3,177	5,509	9,531	1,859
			186	152	321	1,251	118	1,741	4,495	6,760	8,889	4,292	5,577	6,827	12,843	2,434	3,650	4,123	2,400	3,785	7,841	9,430	1,605
		average	158	186	287	1,284	124	2,135	4,473	5,588	8,348	6,839	6,061	7,954	13,688	2,163	3,560	3,070	2,073	3,262	7,250	10,173	1,656
	unit weight	g/cm³	1.725	1.570	1.600	1.730	1.490	1.650	1.720	1.895	1.845	1.835	1.770	1.800	1.880	–	1.800	1.785	1.790	1.775	1.815	1.880	–
			1.640	1.620	1.570	1.710	1.560	1.600	1.680	1.815	1.785	1.845	1.860	1.880	1.955	–	1.820	1.860	1.800	1.825	1.850	1.810	–
			1.670	1.565	1.590	1.710	1.580	1.650	1.700	1.890	1.820	1.770	1.790	1.870	1.945	–	1.830	1.805	1.780	1.815	1.835	1.770	–
		average	1.678	1.585	1.587	1.717	1.543	1.633	1.700	1.867	1.817	1.817	1.807	1.850	1.927	–	1.817	1.817	1.790	1.805	1.833	1.820	–
	moisture content	%	38	32	41	37	54	43	43	28	24	25	22	21	24	–	29	29	31	35	32	30	–
			36	37	38	37	55	44	42	28	24	25	22	21	23	–	28	29	29	33	36	33	–
			37	35	38	37	55	45	43	28	24	26	21	21	23	–	31	28	30	33	33	31	–
		average	37	35	39	37	54	44	43	28	24	25	22	21	23	–	29	28	30	34	34	31	–
cure 3day	qc	kN/m²	85	186	389	1,521	135	3,684	7,537	6,219	9,497	4,799	6,456	10,309	13,452	–	5,306	5,239	2,670	5,543	9,971	11,086	–
			135	152	237	1,436	152	1,893	5,678	7,132	10,376	8,990	6,692	10,816	14,364	–	4,259	4,208	2,805	4,056	9,227	7,706	–
		average	110	169	313	1,479	144	2,788	6,608	6,675	9,937	6,895	6,574	10,562	13,908	–	4,783	4,723	2,738	4,799	9,599	9,396	–
	unit weight	g/cm³	1.640	1.590	1.620	1.760	1.590	1.680	1.675	1.850	1.840	1.710	1.840	1.810	1.885	–	1.860	1.800	1.745	1.830	1.905	1.810	–
			1.660	1.590	1.630	1.760	1.560	1.665	1.680	1.875	1.790	1.810	1.800	1.870	1.895	–	1.870	1.820	1.810	1.830	1.820	1.850	–
		average	1.650	1.590	1.625	1.760	1.575	1.673	1.678	1.863	1.815	1.760	1.820	1.840	1.890	–	1.865	1.810	1.778	1.830	1.863	1.830	–
	moisture content	%	45	48	44	40	55	45	45	28	24	26	24	20	24	–	30	28	31	33	32	30	–
			45	47	44	39	54	45	44	27	24	25	26	21	24	–	29	29	31	31	32	34	–
		average	45	47	44	39	55	45	45	27	24	25	25	21	24	–	29	29	31	32	32	32	–
cure 7day	qc	kN/m²	304	101	321	1,758	186	3,616	6,895	9,227	10,038	10,985	4,461	10,647	14,702	–	4,225	5,543	4,225	5,137	10,917	14,026	–
			135	186	439	2,028	152	3,616	7,165	6,819	11,086	4,225	5,644	11,525	15,209	–	6,726	5,678	3,616	4,495	11,593	12,674	–
		average	220	144	380	1,893	169	3,616	7,030	8,023	10,562	7,605	5,053	11,086	14,956	–	5,475	5,611	3,921	4,816	11,255	13,350	–
	unit weight	g/cm³	1.650	1.565	1.605	1.770	1.590	1.770	1.620	1.870	1.840	1.790	1.790	1.850	1.940	–	1.830	1.835	1.700	1.820	1.740	1.850	–
			1.595	1.580	1.640	1.760	1.590	1.680	1.730	1.910	1.800	1.670	1.800	1.850	1.930	–	1.795	1.820	1.760	1.865	1.810	1.800	–
		average	1.623	1.573	1.623	1.765	1.590	1.725	1.675	1.890	1.820	1.730	1.795	1.850	1.935	–	1.813	1.828	1.730	1.843	1.775	1.825	–
	moisture content	%	35	31	32	38	54	45	44	27	26	25	26	21	24	–	30	29	27	33	32	30	–
			34	35	28	37	55	48	43	27	25	25	24	20	23	–	28	28	29	33	32	31	–
		average	35	33	30	38	55	47	43	27	25	25	25	20	23	–	29	29	28	33	32	30	–
necessary condition (qc=400kN/m²)	cure 1day	kg/m³	167				57			0			0			–	0			0			–
	cure 3day	kg/m³	162				55			0			0			–	0			0			–
	cure 7day	kg/m³	152				54			0			0			–	0			0			–

表 3.3.1 計画排水量 (パッシグ川) (1/5)

SERIAL NO.	STATION	from CAD	Design Peak Discharge											Existing Outlet Size	Required Outlet Size	Proposed Outlet Size	Remarks
			A	Time of Concentration						R_{25}	Runoff Coeff.	DISCHARGE					
				Inlet Time	Drain Flow Time					Tc	25-Year Rainfall Int.	C	Q_{25}				
				Ti	Ld	Hd	Sd	Vd	Td								
			ha	min	m	m	-	m/s	min	min	mm/hr		m^3/s	mm	mm	mm	
RIGHT BANK																	
DR HSP4	3+216	2447	0.24	7.0	26	0.3	0.01154	2.1	0.2	7.2	224.1	0.35	0.05	300	610	910	
DR 35.1	3+658	664	0.07	7.0	19	0.2	0.01053	2.1	0.2	7.2	224.6	0.65	0.03	75	300	300	
DR 36.3	5+061	19663	1.97	7.0	321	0.4	0.00125	1.5	3.6	10.6	198.1	0.74	0.80	900x660	910	910	
DR 36.9	5+150	3168	0.32	7.0	48	0.2	0.00417	2.1	0.4	7.4	222.5	0.80	0.16	400	800x800	800x800	
DR 36.15	5+192	3885	0.39	7.0	49	0.2	0.00408	2.1	0.4	7.4	222.4	0.80	0.19	1570x800	610	1570x800	
DR 36.20	5+296	2827	0.28	7.0	49	0.3	0.00612	2.1	0.4	7.4	222.4	0.80	0.14	500x470	800x800	800x800	
DR 36.21	5+327	2063	0.21	7.0	53	0.3	0.00566	2.1	0.4	7.4	222.1	0.80	0.10	400x530	800x800	800x800	
DR 36.23	5+350	2230	0.22	7.0	55	0.3	0.00545	2.1	0.4	7.4	221.9	0.80	0.11	400x600	800x800	800x800	
DR 36.24	5+352	3288	0.33	7.0	75	0.3	0.00400	2.1	0.6	7.6	220.5	0.80	0.16	430x700	800x800	800x800	
DR 37.4	5+562	5096	0.51	7.0	74	0.1	0.00135	1.5	0.8	7.8	218.5	0.65	0.20	400x300	610	910	
DR 40	6+342	16732	1.67	7.0	292	0.7	0.00240	1.5	3.2	10.2	200.2	0.65	0.60	610	760	910	
DR 42	6+413	11041	1.10	7.0	290	1.5	0.00517	2.1	2.3	9.3	206.8	0.65	0.41	600x690	610	910	
DR 43	6+421	2911	0.29	7.0	88	0.5	0.00568	2.1	0.7	7.7	219.6	0.65	0.12	540	610	910	
DR 44	6+455	7627	0.76	7.0	286	1.5	0.00524	2.1	2.3	9.3	207.0	0.65	0.29	610	610	910	
DR 44.1	6+479	7449	0.74	7.0	273	1.5	0.00549	2.1	2.2	9.2	207.8	0.65	0.28	700	610	910	
DR 44.2	6+494	8953	0.90	7.0	182	0.8	0.00440	2.1	1.4	8.4	213.3	0.69	0.37	600	610	910	
DR68	8+242	23256	2.33	7.0	200	0.5	0.00250	1.5	2.2	9.2	207.3	0.65	0.87	600	910	910	
DR69	8+350	22407	2.24	7.0	247	0.6	0.00243	1.5	2.7	9.7	203.6	0.65	0.82	600	910	910	
DR70	8+436	14330	1.43	7.0	159	0.6	0.00377	2.1	1.3	8.3	214.8	0.65	0.56	500	760	910	
DR70A	8+487	9607	0.96	7.0	182	0.6	0.00330	2.1	1.4	8.4	213.3	0.65	0.37	400	610	910	
DR70A.2	8+528	1288	0.13	7.0	30	0.3	0.01000	2.1	0.2	7.2	223.8	0.65	0.05	400	610	910	
DR70C	8+653	4599	0.46	7.0	52	0.4	0.00769	2.1	0.4	7.4	222.2	0.65	0.18	300	610	910	
DR71	8+686	5365	0.54	7.0	67	0.4	0.00597	2.1	0.5	7.5	221.1	0.65	0.21	300	610	910	
DR74A	8+776	2857	0.29	7.0	140	0.3	0.00214	1.5	1.6	8.6	212.4	0.69	0.12	700	760	910	
DR74A.2	8+805	4641	0.46	7.0	144	0.3	0.00208	1.5	1.6	8.6	212.1	0.80	0.22	400	610	910	
DR75	8+838	10758	1.08	7.0	163	0.3	0.00184	1.5	1.8	8.8	210.4	0.77	0.48	600	760	910	
DR76A	8+874	3069	0.31	7.0	130	0.3	0.00231	1.5	1.4	8.4	213.3	0.80	0.15	700	760	910	
DR76A.2	8+903	474	0.05	7.0	20	0.2	0.01000	2.1	0.2	7.2	224.5	0.80	0.02	300	610	910	
DR77A	8+914	4676	0.47	7.0	171	0.2	0.00117	1.5	1.9	8.9	209.8	0.80	0.22	700	760	910	
DR78	8+957	4408	0.44	7.0	154	0.2	0.00130	1.5	1.7	8.7	211.2	0.80	0.21	600	610	910	
DR79A	8+977	2303	0.23	7.0	71	0.2	0.00282	1.5	0.8	7.8	218.8	0.80	0.11	450	610	910	
DR79A.5	8+993	1210	0.12	7.0	40	0.1	0.00250	1.5	0.4	7.4	221.9	0.80	0.06	300	610	910	
DR80	9+009	4334	0.43	7.0	105	0.3	0.00286	1.5	1.2	8.2	215.6	0.80	0.21	600	610	910	
DR81	9+046	2022	0.20	7.0	54	0.1	0.00185	1.5	0.6	7.6	220.5	0.80	0.10	250x280	610	910	
DR83.1	9+129	7252	0.73	7.0	89	0.2	0.00225	1.5	1.0	8.0	217.1	0.80	0.35	300x260	610	910	

表 3.3.1 計画排水量 (パッシグ川) (2/5)

SERIAL NO.	STATION	from CAD	Design Peak Discharge											Existing Outlet Size	Required Outlet Size	Proposed Outlet Size	Remarks
			A	Time of Concentration						R_{25}	Runoff Coeff.	DISCHARGE					
				Inlet Time	Drain Flow Time				Tc	25-Year	C	Q_{25}					
				Ti	Ld	Hd	Sd	Vd	Td	Rainfall Int.							
			ha	min	m	m	-	m/s	min	min	mm/hr		m^3/s	mm	mm	mm	
DR83.4	9+149	4924	0.49	7.0	131	0.2	0.00153	1.5	1.5	8.5	213.2	0.65	0.19	300	610	910	
DR83.5	9+193	5807	0.58	7.0	124	0.3	0.00242	1.5	1.4	8.4	213.9	0.65	0.22	400	610	910	
DR83.18	9+243	4515	0.45	7.0	122	0.2	0.00164	1.5	1.4	8.4	214.1	0.65	0.17	1700x700	610	2@910	
DR83.21	9+266	4537	0.45	7.0	111	0.2	0.00180	1.5	1.2	8.2	215.1	0.65	0.18	410	610	910	
DR83.23	9+289	3500	0.35	7.0	109	0.2	0.00183	1.5	1.2	8.2	215.2	0.65	0.14	400	610	910	
DR83.27	9+310	3564	0.36	7.0	101	0.2	0.00198	1.5	1.1	8.1	216.0	0.65	0.14	200	610	910	
DR83.29	9+327	543	0.05	7.0	20	0.1	0.00250	1.5	0.2	7.2	223.9	0.80	0.03	80	610	910	
DR83.36	9+429	2327	0.23	7.0	72	0.3	0.00417	2.1	0.6	7.6	220.7	0.80	0.11	300	610	910	
DR83.46	9+455	2138	0.21	7.0	65	0.3	0.00462	2.1	0.5	7.5	221.2	0.80	0.11	300	610	910	
DR85	9+482	2238	0.22	7.0	61	0.3	0.00492	2.1	0.5	7.5	221.5	0.80	0.11	300	610	910	
DR86	9+498	2001	0.20	7.0	63	0.3	0.00476	2.1	0.5	7.5	221.4	0.80	0.10	300	610	910	
DR90	9+544	3119	0.31	7.0	77	0.3	0.00390	2.1	0.6	7.6	220.4	0.80	0.15	620	610	910	
DR90.2	9+564	2403	0.24	7.0	69	0.3	0.00435	2.1	0.5	7.5	220.9	0.80	0.12	250	610	910	
DR92A	9+589	1567	0.16	7.0	63	0.3	0.00476	2.1	0.5	7.5	221.4	0.80	0.08	610	610	910	
DR92A.5	9+601	817	0.08	7.0	49	0.2	0.00408	2.1	0.4	7.4	222.4	0.80	0.04	210	610	910	
DR93	9+608	929	0.09	7.0	44	0.2	0.00455	2.1	0.3	7.3	222.7	0.80	0.05	200	610	910	
DR95	9+637	1645	0.16	7.0	37	0.2	0.00541	2.1	0.3	7.3	223.3	0.80	0.08	300	610	910	
DR97	9+664	1618	0.16	7.0	50	0.2	0.00400	2.1	0.4	7.4	222.3	0.80	0.08	610	610	910	
DR98	9+678	1203	0.12	7.0	30	0.1	0.00333	2.1	0.2	7.2	223.8	0.80	0.06	250	610	910	
DR98.7	9+697	1407	0.14	7.0	34	0.2	0.00588	2.1	0.3	7.3	223.5	0.80	0.07	140	610	910	
DR99.1	9+771	1699	0.17	7.0	27	0.1	0.00370	2.1	0.2	7.2	224.0	0.65	0.07	100	610	910	
DR99.9	9+781	655	0.07	7.0	15	0.1	0.00333	2.1	0.1	7.1	224.9	0.65	0.03	80	610	910	
DR100	9+831	935	0.09	7.0	35	0.2	0.00571	2.1	0.3	7.3	223.4	0.65	0.04	450	610	910	
DR102.1	9+891	1201	0.12	7.0	24	0.1	0.00417	2.1	0.2	7.2	224.2	0.65	0.05	450	610	910	
DR102.6	9+895	5946	0.59	7.0	22	0.1	0.00455	2.1	0.2	7.2	224.4	0.71	0.26	100	610	910	
DR 117.2	10+977	6291	0.63	7.0	104	0.2	0.00192	1.5	1.2	8.2	215.7	0.80	0.30	600x600	610	910	
DR 117.3	11+006	2599	0.26	7.0	109	0.2	0.00183	1.5	1.2	8.2	215.2	0.65	0.10	500x300	610	910	
DR 117.5	11+046	2518	0.25	7.0	97	0.2	0.00206	1.5	1.1	8.1	216.3	0.65	0.10	800x700	610	910	
DR 117.6	11+048	3991	0.40	7.0	118	0.2	0.00169	1.5	1.3	8.3	214.4	0.72	0.17	500x500	610	910	
DR 117.9	11+138	5393	0.54	7.0	118	0.7	0.00593	2.1	0.9	7.9	217.5	0.65	0.21	500	610	910	
DR 117.10	11+176	4035	0.40	7.0	98	0.3	0.00306	2.1	0.8	7.8	218.9	0.65	0.16	500	610	910	
DR 117.12	11+232	4691	0.47	7.0	91	0.4	0.00440	2.1	0.7	7.7	219.4	0.65	0.19	400	610	910	
DR 117B.6	11+615	570	0.06	7.0	25	0.1	0.00400	2.1	0.2	7.2	224.1	0.35	0.01	100	300	300	

表 3.3.1 計画排水量 (パッシグ川) (3/5)

SERIAL NO.	STATION	from CAD	Design Peak Discharge											Existing Outlet Size	Required Outlet Size	Proposed Outlet Size	Remarks
			A	Time of Concentration						R_{25}	Runoff Coeff.	DISCHARGE					
				Inlet Time	Drain Flow Time				Tc	25-Year Rainfall Int.	C	Q_{25}					
				Ti	Ld	Hd	Sd	Vd	Td								
			ha	min	m	m	-	m/s	min	min	mm/hr		m^3/s	mm	mm	mm	
DR 117B.13	11+638	448	0.04	7.0	27	0.1	0.00370	2.1	0.2	7.2	224.0	0.35	0.01	100	300	300	
DR 117C.8	11+793	348	0.03	7.0	23	0.1	0.00435	2.1	0.2	7.2	224.3	0.80	0.02	200	610	910	
DR 170.1	13+604	11277	1.13	7.0	247	0.4	0.00162	1.5	2.7	9.7	203.6	0.71	0.45	500	760	910	
DR 171	13+630	26303	2.63	7.0	224	0.4	0.00179	1.5	2.5	9.5	205.4	0.66	0.99	600	910	910	
DR 172	13+707	6598	0.66	7.0	101	1.0	0.00990	2.1	0.8	7.8	218.7	0.67	0.27	300	610	910	
DR 172.6	13+733	2377	0.24	7.0	115	1.0	0.00870	2.1	0.9	7.9	217.7	0.76	0.11	500	610	910	
DR 173A	13+776	64014	6.40	7.0	485	1.0	0.00206	1.5	5.4	12.4	187.3	0.78	2.60	600	1370	2@910	
DR 173A.2	13+784	3848	0.38	7.0	159	1.0	0.00629	2.1	1.3	8.3	214.8	0.80	0.18	500	610	910	
DR 173A.25	13+858	7596	0.76	7.0	130	2.0	0.01538	2.1	1.0	8.0	216.7	0.80	0.37	300	610	910	
DR 174	13+882	4318	0.43	7.0	90	2.0	0.02222	2.1	0.7	7.7	219.5	0.80	0.21	300	610	910	
DR 174.9	13+917	3444	0.34	7.0	65	2.0	0.03077	2.1	0.5	7.5	221.2	0.80	0.17	300	610	910	
DR 174C.1	13+955	3154	0.32	7.0	80	2.0	0.02500	2.1	0.6	7.6	220.2	0.80	0.15	500	610	910	
DR 174C.3	13+969	411	0.04	7.0	23	2.0	0.08696	2.1	0.2	7.2	224.3	0.80	0.02	200	610	910	
DR 174C.7	14+028	5871	0.59	7.0	116	2.0	0.01724	2.1	0.9	7.9	217.7	0.80	0.28	100	610	910	
DR 174C.14	14+093	10143	1.01	7.0	95	2.0	0.02105	2.1	0.8	7.8	219.1	0.80	0.49	250	760	910	
DR 174E	14+110	9235	0.92	7.0	157	2.0	0.01274	2.1	1.2	8.2	214.9	0.80	0.44	500	760	910	
DR 174E.12	14+161	3317	0.33	7.0	54	0.5	0.00926	2.1	0.4	7.4	222.0	0.80	0.16	200	610	910	
DR 174E.28	14+233	1920	0.19	7.0	29	0.2	0.00690	2.1	0.2	7.2	223.8	0.80	0.10	100	610	910	
DR 175	14+285	19600	1.96	7.0	177	2.0	0.01130	2.1	1.4	8.4	213.7	0.80	0.93	500	910	910	
DR 177	14+319	8097	0.81	7.0	89	0.5	0.00562	2.1	0.7	7.7	219.5	0.80	0.40	500	610	910	
DR 177.2	14+351	2627	0.26	7.0	83	0.5	0.00602	2.1	0.7	7.7	220.0	0.77	0.12	200	610	910	
DR 178	14+382	3202	0.32	7.0	87	0.5	0.00575	2.1	0.7	7.7	219.7	0.77	0.15	350	800x800	800x800	
DR 185	14+849	21561	2.16	7.0	207	3.0	0.01449	2.1	1.6	8.6	211.8	0.80	1.01	450	910	910	
DR 189	14+899	2551	0.26	7.0	91	3.0	0.03297	2.1	0.7	7.7	219.4	0.80	0.12	300	610	910	
DR 190	14+916	8143	0.81	7.0	205	3.0	0.01463	2.1	1.6	8.6	211.9	0.80	0.38	460	610	910	
DR 191	14+924	6705	0.67	7.0	128	3.0	0.02344	2.1	1.0	8.0	216.9	0.80	0.32	450	610	910	
DR 193A	15+012	2791	0.28	7.0	79	0.5	0.00633	2.1	0.6	7.6	220.2	0.80	0.14	460	610	910	
DR 193B	15+020	9089	0.91	7.0	146	3.0	0.02055	2.1	1.2	8.2	215.7	0.80	0.44	500	760	910	
DR 193B.1	15+023	13234	1.32	7.0	261	3.0	0.01149	2.1	2.1	9.1	208.5	0.80	0.61	700	760	910	COMBINED
DR 193C	15+025	101799	10.18	7.0	605	3.0	0.00496	2.1	4.8	11.8	190.6	0.78	4.22	1560x1600	1350x1350	1600x1600	
DR 193C.1	15+041	32349	3.23	7.0	233	3.0	0.01288	2.1	1.8	8.8	210.2	0.80	1.51	1200	1070	1220	
DR 245.8	16+789	8509	0.85	7.0	108	3.0	0.02778	2.1	0.9	7.9	218.2	0.65	0.34	800	610	910	
DR 245.9	16+798	6742	0.67	7.0	150	3.0	0.02000	2.1	1.2	8.2	215.4	0.65	0.26	600	610	910	

表 3.3.1 計画排水量 (パッシグ川) (4/5)

SERIAL NO.	STATION	from CAD	Design Peak Discharge											Existing Outlet Size	Required Outlet Size	Proposed Outlet Size	Remarks
			A	Time of Concentration						R_{25}	Runoff Coeff.	DISCHARGE					
				Inlet Time	Drain Flow Time				Tc	25-Year	C	Q_{25}					
				Ti	Ld	Hd	Sd	Vd	Td								
			ha	min	m	m	-	m/s	min	min	mm/hr		m^3/s	mm	mm	mm	
LEFT BANK																	
DL 35.5	2+424	7529	0.75	7.0	58	0.2	0.00345	2.1	0.5	7.5	221.7	0.35	0.16	300	610	910	
DL 37.3	2+539	8173	0.82	7.0	121	0.2	0.00165	1.5	1.3	8.3	214.1	0.35	0.17	700x250	610	910	
DL 37.6	2+552	3131	0.31	7.0	126	0.9	0.00714	2.1	1.0	8.0	217.0	0.65	0.12	700	610	910	
ML 37.10	2+595	1850	0.19	7.0	94	0.9	0.00957	2.1	0.7	7.7	219.2	0.65	0.07	700	610	910	COMBINED
DL 37.11	2+605	2432	0.24	7.0	131	0.9	0.00687	2.1	1.0	8.0	216.7	0.65	0.10	550x1000	610	910	
DL 37.12	2+608	4843	0.48	7.0	126	0.9	0.00714	2.1	1.0	8.0	217.0	0.65	0.19	800	610	910	
DL 40	2+858	1426	0.14	7.0	38	0.2	0.00526	2.1	0.3	7.3	223.2	0.80	0.07	300	610	910	
DL 41	2+877	2358	0.24	7.0	63	0.2	0.00317	2.1	0.5	7.5	221.4	0.80	0.12	400	610	910	
DL 41.1	2+888	1116	0.11	7.0	35	0.2	0.00571	2.1	0.3	7.3	223.4	0.80	0.06	100	610	910	
DL 42	2+898	738	0.07	7.0	35	0.2	0.00571	2.1	0.3	7.3	223.4	0.80	0.04	300	610	910	
DL 46	2+932	2847	0.28	7.0	86	0.2	0.00233	1.5	1.0	8.0	217.4	0.80	0.14	700	610	910	
DL 48	2+946	1772	0.18	7.0	89	0.2	0.00225	1.5	1.0	8.0	217.1	0.80	0.09	600	610	910	
DL 48.2	2+955	407	0.04	7.0	40	0.2	0.00500	2.1	0.3	7.3	223.0	0.80	0.02	300	610	910	
DL 50	2+960	595	0.06	7.0	40	0.2	0.00500	2.1	0.3	7.3	223.0	0.80	0.03	300	610	910	
DL 51	2+978	973	0.10	7.0	38	0.2	0.00526	2.1	0.3	7.3	223.2	0.80	0.05	300	610	910	
DL 52	2+991	370	0.04	7.0	40	0.2	0.00500	2.1	0.3	7.3	223.0	0.80	0.02	300	610	910	
DL 53	2+998	460	0.05	7.0	52	0.2	0.00385	2.1	0.4	7.4	222.2	0.80	0.02	700	610	910	
DL 54	2+998	500	0.05	7.0	34	0.2	0.00588	2.1	0.3	7.3	223.5	0.80	0.02	400	610	910	
DL 56	3+007	2203	0.22	7.0	69	0.2	0.00290	1.5	0.8	7.8	219.0	0.80	0.11	700	610	910	
DL 57	3+026	116	0.01	7.0	10	0.2	0.02000	2.1	0.1	7.1	225.3	0.80	0.01	300	610	910	
DL 58	3+031	246	0.02	7.0	12	0.2	0.01667	2.1	0.1	7.1	225.1	0.80	0.01	300	610	910	
DL 59	3+048	331	0.03	7.0	25	0.2	0.00800	2.1	0.2	7.2	224.1	0.80	0.02	300	610	910	
DL 59.1	3+053	534	0.05	7.0	30	0.2	0.00667	2.1	0.2	7.2	223.8	0.80	0.03	300	610	910	
DL 59.2	3+063	405	0.04	7.0	32	0.2	0.00625	2.1	0.3	7.3	223.6	0.80	0.02	200	610	910	
DL 62A.6	6+159	6307	0.63	7.0	115	0.7	0.00609	2.1	0.9	7.9	217.7	0.50	0.19	900	610	910	
DL 62A.10	6+247	10948	1.09	7.0	273	0.2	0.00073	1.0	4.6	11.6	192.1	0.65	0.38	100	300	300	
DL 97.2	11+512	1835	0.18	7.0	42	0.3	0.00714	2.1	0.3	7.3	222.9	0.35	0.04	300	610	910	
DL 97.6	11+550	1854	0.19	7.0	46	0.3	0.00652	2.1	0.4	7.4	222.6	0.35	0.04	200	610	910	
DL 97.8	11+581	2257	0.23	7.0	49	0.3	0.00612	2.1	0.4	7.4	222.4	0.35	0.05	300	610	910	
DL 97.10	11+618	1036	0.10	7.0	50	0.3	0.00600	2.1	0.4	7.4	222.3	0.35	0.02	50x100	300	300	
DL 113.12	13+845	11645	1.16	7.0	269	3.0	0.01115	2.1	2.1	9.1	208.0	0.75	0.50	300	760	910	
DL 113.19	13+886	4929	0.49	7.0	63	0.2	0.00317	2.1	0.5	7.5	221.4	0.55	0.17	100	610	910	
DL 113.26	13+924	1118	0.11	7.0	61	0.2	0.00328	2.1	0.5	7.5	221.5	0.35	0.02	300	610	910	
DL 113.27	13+936	6390	0.64	7.0	137	3.0	0.02190	2.1	1.1	8.1	216.3	0.69	0.26	500	610	910	
DL 113A	13+947	988	0.10	7.0	52	0.2	0.00385	2.1	0.4	7.4	222.2	0.35	0.02	300	610	910	
DL 113B.4	13+974	2414	0.24	7.0	73	0.2	0.00274	1.5	0.8	7.8	218.6	0.35	0.05	300	610	910	

表 3.3.1 計画排水量 (パッシグ川) (5/5)

SERIAL NO.	STATION	from CAD	Design Peak Discharge											Existing Outlet Size	Required Outlet Size	Proposed Outlet Size	Remarks
			A	Time of Concentration						Tc	R_{25} 25-Year Rainfall Int.	Runoff Coeff. C	DISCHARGE Q_{25}				
				Inlet Time	Drain Flow Time												
				Ti	Ld	Hd	Sd	Vd	Td								
			ha	min	m	m	-	m/s	min	min	mm/hr		m^3/s	mm	mm	mm	
DL 113B.9	13+997	8209	0.82	7.0	200	3.0	0.01500	2.1	1.6	8.6	212.2	0.71	0.34	500	610	910	
DL 113B.10	14+002	1410	0.14	7.0	55	0.2	0.00364	2.1	0.4	7.4	221.9	0.35	0.03	300	610	910	
DL 113B.12	14+023	1107	0.11	7.0	53	0.2	0.00377	2.1	0.4	7.4	222.1	0.35	0.02	300	610	910	
DL 113C	14+033	728	0.07	7.0	48	0.2	0.00417	2.1	0.4	7.4	222.5	0.35	0.02	300	610	910	
DL 113D	14+044	14410	1.44	7.0	209	3.0	0.01435	2.1	1.7	8.7	211.6	0.75	0.63	500	760	910	
DL 113E	14+076	19158	1.92	7.0	304	3.0	0.00987	2.1	2.4	9.4	206.0	0.77	0.85	500	910	910	
DL 113F	14+080	274	0.03	7.0	29	0.1	0.00345	2.1	0.2	7.2	223.8	0.35	0.01	100	610	910	
DL 113F.3	14+116	2319	0.23	7.0	48	0.3	0.00625	2.1	0.4	7.4	222.5	0.38	0.05	200	610	910	
DL 113F.17	14+176	1998	0.20	7.0	32	0.3	0.00938	2.1	0.3	7.3	223.6	0.40	0.05	300	610	910	
ML 113F.20	14+195	341	0.03	7.0	30	0.3	0.01000	2.1	0.2	7.2	223.8	0.40	0.01	400	610	910	COMBINED
DL 113F.28	14+228	1480	0.15	7.0	22	0.3	0.01364	2.1	0.2	7.2	224.4	0.44	0.04	200	610	910	
DL 113F.38	14+260	670	0.07	7.0	19	0.1	0.00526	2.1	0.2	7.2	224.6	0.52	0.02	250	610	910	
DL126	15+358	9174	0.92	7.0	242	0.7	0.00289	1.5	2.7	9.7	204.0	0.76	0.39	910	910	910	
DL128	15+402	14253	1.43	7.0	235	0.7	0.00298	1.5	2.6	9.6	204.5	0.72	0.58	900	910	910	
DL129	15+455	14189	1.42	7.0	256	1.0	0.00391	2.1	2.0	9.0	208.8	0.71	0.58	900	910	910	
DL130	15+483	21835	2.18	7.0	224	1.0	0.00446	2.1	1.8	8.8	210.7	0.66	0.84	850	910	910	
DL131	15+522	24388	2.44	7.0	256	1.0	0.00391	2.1	2.0	9.0	208.8	0.66	0.93	900	910	910	
DL133A	15+779	26455	2.65	7.0	220	1.2	0.00545	2.1	1.7	8.7	211.0	0.67	1.04	900	910	910	
DL133B	15+829	27083	2.71	7.0	213	1.0	0.00469	2.1	1.7	8.7	211.4	0.67	1.06	730	910	910	
DL133C.4	15+966	19412	1.94	7.0	223	1.0	0.00448	2.1	1.8	8.8	210.8	0.74	0.84	1000	1070	1070	
DL133C.5	16+030	2156	0.22	7.0	57	0.7	0.01228	2.1	0.5	7.5	221.8	0.35	0.05	200	610	910	
DL134	16+124	37651	3.77	7.0	227	1.0	0.00441	2.1	1.8	8.8	210.5	0.74	1.63	700x700	1070	1070	
DL134.5, DL135	16+203	60802	6.08	7.0	314	1.0	0.00318	2.1	2.5	9.5	205.4	0.78	2.72	900, 1000	1070, 1070	1070, 1070	
DL135.4	16+230	3358	0.34	7.0	85	0.4	0.00471	2.1	0.7	7.7	219.8	0.63	0.13	200	610	910	
DL135.11	16+281	2553	0.26	7.0	34	0.2	0.00588	2.1	0.3	7.3	223.5	0.62	0.10	100	460	460	
DL135.22	16+309	1946	0.19	7.0	29	0.2	0.00517	2.1	0.2	7.2	223.8	0.67	0.08	100	460	460	
DL135.31	16+331	1960	0.20	7.0	30	0.2	0.00667	2.1	0.2	7.2	223.8	0.67	0.08	50	460	460	
DL135.33	16+348	10452	1.05	7.0	177	1.4	0.00791	2.1	1.4	8.4	213.7	0.79	0.49	500	760	910	
DL136	16+362	22262	2.23	7.0	182	1.5	0.00824	2.1	1.4	8.4	213.3	0.78	1.03	900	910	910	
DL136.7	16+409	3075	0.31	7.0	23	0.2	0.00870	2.1	0.2	7.2	224.3	0.63	0.12	100	460	460	
DL136.8	16+460	7850	0.79	7.0	130	0.8	0.00615	2.1	1.0	8.0	216.7	0.68	0.32	200	610	910	
DL137	16+498	3269	0.33	7.0	52	0.3	0.00577	2.1	0.4	7.4	222.2	0.62	0.13	300	610	910	
DL138	16+510	2441	0.24	7.0	57	0.3	0.00526	2.1	0.5	7.5	221.8	0.65	0.10	500	610	910	
DL138.1	16+516	5996	0.60	7.0	127	2.0	0.01575	2.1	1.0	8.0	216.9	0.69	0.25	500x400	610	910	
DL139	16+535	53493	5.35	7.0	412	2.0	0.00485	2.1	3.3	10.3	200.0	0.79	2.35	1000	1220	1220	
DL139A	16+549	37438	3.74	7.0	368	2.0	0.00543	2.1	2.9	9.9	202.4	0.76	1.61	900	1070	1070	

表 3.3.2 各樋門の計画排水量（マリキナ川下流）

OUTFALL DESIGNATION	STATION	Design Peak Discharge								
		A	Time of Concentration				Tc	R_{25} 25-Year Rainfall Int.	Runoff Coeff. C	DISCHARGE Q_{25}
			Inlet Time	Drain Flow Time						
			Ti	Ld	Vd	Td				
		ha	min	m	m/s	min	min	mm/hr		m^3/s
MSL-1	1+104	10.96	7.0	410	1.2	5.7	12.7	185.7	0.80	4.52
MLS-2	1+323	18.57	7.0	830	1.2	11.5	18.5	160.7	0.69	5.72
MLS-3	3+945	13.56	7.0	160	1.2	2.2	9.2	207.3	0.80	6.25
MLS-4	4+221	18.84	7.0	450	1.2	6.3	13.3	182.8	0.76	7.27
MSL-5	4+406	2.73	7.0	262	1.2	3.6	10.6	197.6	0.65	0.97
MSL-6	4+503	10.09	7.0	500	1.2	6.9	13.9	179.4	0.65	3.27
MSR-1	-	-	-	-	-	-	-	-	-	-
MSR-2	3+157	11.09	7.0	65	1.2	0.9	7.9	217.8	0.70	4.70
MSR-3	3+255	40.57	7.0	1237	1.2	17.2	24.2	143.8	0.57	9.24
MSR-4	3+438	13.77	7.0	111	1.2	1.5	8.5	212.6	0.59	4.80

*MSR-1 become unnecessary in detail design stage, hence design discharge is not shown

表 3.3.3 コレクターパイプの計画排水量及び断面諸元（マリキナ川下流）

DRAIN DESIGNATION			Estimating Catchment Design Flows													Proposed Dimension (RCP)								Evaluation
			Catchment Area (A)	Length of Drain (Ld)	Time of Concentration					R_{25}	R_{10}	Runoff Coeff.	Discharge	Total Discharge	Existing Outlet Dimension (m)	Dimension	Slope	Flow Area	Wetted Perimeter	Hydraulic Radius	Rougness parameter	Velocity	Discharge	
					Inlet Time	Drain Flow Time (Td)			Tc															
			Partial Ap	Partial Ld	Ti	Ld	Vd	Td		25-Year Rainfall Int.	10-Year Rainfall Int.	C	Q_{25}	Sum Q_{25}		ϕ	I	A	S	R	n	V	Q	**Evaluation**
			ha	m	min	m	m/s	min	min	mm/hr	mm/hr		m^3/s	m^3/s		m		m^2	m	m		m/s	m^3/s	
	Sluiceway	Exisiting Outlet New Manhole																						
RCP	-	MEL3.1	0.1568	28.00	7.0	45.0	1.0	0.8	7.8	219.2	188.9	0.80	0.08	0.08	W0.41xH0.49	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	
	-	MEL3.2	0.1464	28.00	7.0	28.0	1.0	0.5	7.5	221.7	191.1	0.80	0.07	0.15	W0.47xH0.49	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	**OK**
	-	MEL3.3	0.0376	32.00	7.0	32.0	1.0	0.5	7.5	221.1	190.6	0.80	0.02	0.17	0.85 x 0.85	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	**OK**
	-	MEL3.4	0.0754	27.00	7.0	27.0	1.0	0.5	7.5	221.8	191.2	0.80	0.04	0.20	0.45	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	**OK**
	-	MEL3.5	0.1067	23.00	7.0	23.0	1.0	0.4	7.4	222.4	191.8	0.80	0.05	0.26	0.45	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	**OK**
	-	MEL4	0.1177	40.00	7.0	40.0	1.0	0.7	7.7	219.9	189.5	0.80	0.06	0.31	0.47	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	**OK**
	-	MEL4.1	0.0512	30.00	7.0	30.0	1.2	0.4	7.4	222.1	191.5	0.80	0.03	0.34	0.50	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	**OK**
	705(MSL1)	MEL4.2												**0.34**										
RCP	-	MEL5.2	1.2024	223.00	7.0	223.0	1.2	3.1	10.1	201.2	173.1	0.80	0.54	0.54	0.47	0.91	3.5	0.65	2.86	0.23	0.013	1.70	1.10	**OK**
	-	MEL5.1	1.0603	200.00	7.0	200.0	1.2	2.8	9.8	203.4	175.0	0.80	0.48	1.02	0.47	0.91	3.5	0.65	2.86	0.23	0.013	1.70	1.10	**OK**
	-	MEL5.1	0.3739	243.00	7.0	243.0	1.2	3.4	10.4	199.3	171.5	0.80	0.17	1.18	0.45	1.07	3.0	0.90	3.36	0.27	0.013	1.75	1.57	**OK**
	705(MSL1)	MEL4.2												**1.18**										
RCP	-	MEL11.41	0.1321	64.50	7.0	64.5	1.2	0.9	7.9	217.9	187.8	0.80	0.06	0.06	W0.28xH0.24	0.91	3.5	0.65	2.86	0.23	0.013	1.70	1.10	**OK**
	-	MEL12A	0.0951	74.40	7.0	74.4	1.2	1.0	8.0	216.7	186.7	0.80	0.05	0.11	0.45	0.91	3.5	0.65	2.86	0.23	0.013	1.70	1.10	**OK**
	-	MEL12A.1	0.0390	30.00	7.0	30.0	1.2	0.4	7.4	222.1	191.5	0.80	0.02	0.13	0.10	0.91	3.5	0.65	2.86	0.23	0.013	1.70	1.10	**OK**
	746.01(MSL3)	MEL12A.2												**0.13**										
RCP	-	MEL12A.4	0.5483	124.00	7.0	124.0	1.2	1.7	8.7	211.1	181.8	0.80	0.26	0.26	0.45	0.91	3.5	0.65	2.86	0.23	0.013	1.70	1.10	**OK**
	-	MEL12A.3	0.4564	99.00	7.0	99.0	1.2	1.4	8.4	213.9	184.3	0.80	0.22	0.47	0.30	0.91	3.5	0.65	2.86	0.23	0.013	1.70	1.10	**OK**
	746.01(MSL3)	MEL12A.2												**0.47**										
RCP	-	MEL12A.5	0.2397	123.00	7.0	123.0	1.2	1.7	8.7	211.2	181.9	0.76	0.11	0.11	W0.49xH0.43	0.91	2.5	0.65	2.86	0.23	0.013	1.43	0.93	**OK**
	-	MEL12A.6	0.1822	130.00	7.0	130.0	1.2	1.8	8.8	210.5	181.3	0.76	0.08	0.19	0.45	0.91	2.5	0.65	2.86	0.23	0.013	1.43	0.93	**OK**
	-	MEL12A.7	0.5074	168.00	7.0	168.0	1.2	2.3	9.3	206.5	177.8	0.76	0.22	0.41	0.75	0.91	2.5	0.65	2.86	0.23	0.013	1.43	0.93	**OK**
	-	MEL12A.8	0.5532	138.00	7.0	138.0	1.2	1.9	8.9	209.6	180.5	0.76	0.24	0.65	0.75	0.91	2.5	0.65	2.86	0.23	0.013	1.43	0.93	**OK**
	-	MEL12A.9	0.1832	133.00	7.0	133.0	1.2	1.8	8.8	210.2	181.0	0.76	0.08	0.74	0.70	0.91	2.5	0.65	2.86	0.23	0.013	1.43	0.93	**OK**
	-	MEL12B	0.5359	135.00	7.0	135.0	1.2	1.9	8.9	210.0	180.8	0.76	0.24	0.97	0.70	0.91	3.0	0.65	2.86	0.23	0.013	1.57	1.02	**OK**
	749(MSL4)	MEL12B.2												**0.97**										
RCP	-	MEL14	0.2441	25.00	7.0	25.0	1.2	0.3	7.3	222.8	192.1	0.65	0.10	0.10	0.90	0.91	1.5	0.65	2.86	0.23	0.013	1.11	0.72	**OK**
	763(MSL6)	MEL13.1												**0.10**										

表 3.3.4 ボックスカルバート及びU字溝の計画排水量及び断面諸元（マリキナ川下流）

DRAIN DESIGNATION			CADからの面積情報	Estimating Catchment Design Flows														Proposed Dimension (U-ditch or Box Culvert)									Evaluation
				Catchment Area (A)	Length of Drain (Ld)	Time of Concentration				Tc	R_{25}	R_{10}	Runoff Coeff.	Discharge	Total Discharge	Discharge	Total Discharge	Existing Outlet Dimension (m)	Dimension		Slope	Flow Area	Wetted Perimeter	Hydraulic Radius	Rougness parameter	Velocity	Discharge	Evaluation
				Partial	Partial	Inlet Time	Drain Flow Time (Td)				25-Year Rainfall Int.	10-Year Rainfall Int.	C	Q_{25}	Sum Q_{25}	Q_{10}	Sum Q_{10}		W	H	I	A	S	R	n	V	Q	
			m2	Ap ha	Ld m	Ti min	Ld m	Vd m/s	Td min	min	mm/hr	mm/hr		m^3/s	m^3/s	m^3/s	m^3/s		m	m		m^2	m	m		m/s	m^3/s	
	Sluiceway	Exisiting Outlet New Manhole																									
Box		MEL12C.12	2,684	0.2684	136.00	7.0	136.0	1.2	1.9	8.9	209.8	180.7	0.76	0.12	0.12	-	-	430x600	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
Culvert		MEL12C.11	1,157	0.1157	138.00	7.0	138.0	1.2	1.9	8.9	209.6	180.5	0.76	0.05	0.17	-	-	450x600	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.10	1,528	0.1528	111.00	7.0	111.0	1.2	1.5	8.5	212.6	183.1	0.76	0.07	0.24	-	-	500.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.9	1,291	0.1291	139.00	7.0	139.0	1.2	1.9	8.9	209.5	180.4	0.76	0.06	0.30	-	-	450.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.8	2,761	0.2761	142.00	7.0	142.0	1.2	2.0	9.0	209.2	180.2	0.76	0.12	0.42	-	-	450.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.7	2,635	0.2635	134.00	7.0	134.0	1.2	1.9	8.9	210.1	180.9	0.76	0.12	0.53	-	-	300.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.6	1,305	0.1305	138.00	7.0	138.0	1.2	1.9	8.9	209.6	180.5	0.76	0.06	0.59	-	-	300.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.5	1,289	0.1289	139.00	7.0	139.0	1.2	1.9	8.9	209.5	180.4	0.76	0.06	0.65	-	-	450.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.4	1,083	0.1083	53.00	7.0	53.0	1.2	0.7	7.7	219.3	189.0	0.76	0.05	0.70	-	-	200.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.3	1,423	0.1423	114.00	7.0	114.0	1.2	1.6	8.6	212.2	182.8	0.76	0.06	0.76	-	-	450.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.2	1,206	0.1206	132.00	7.0	132.0	1.2	1.8	8.8	210.3	181.1	0.76	0.05	0.82	-	-	450.00	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
		MEL12C.1	16,468	1.6468	262.00	7.0	262.0	1.2	3.6	10.6	197.6	170.0	0.76	0.69	1.50	-	-	900.00	0.90	0.90	3.0	0.81	2.70	0.30	0.013	1.89	1.53	**OK**
		MEL12C	125,345	12.5345	661.00	7.0	661.0	1.2	9.2	16.2	169.5	145.6	0.76	4.49	5.99	-	-	1800 x 1500	1.80	1.50	3.0	2.70	4.80	0.56	0.013	2.87	7.75	**OK**
	749(MSL4)	MEL12B.2													**5.99**		-										
Box	-	MER7.6	387	0.0387	190.00	7.0	190.0	1.2	2.6	9.6	204.3	175.9	0.70	0.02	0.02	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
Culvert	-	MER7.7	1,135	0.1135	64.00	7.0	64.0	1.2	0.9	7.9	218.0	187.8	0.70	0.05	0.06	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.8	1,031	0.1031	140.00	7.0	140.0	1.2	1.9	8.9	209.4	180.3	0.70	0.04	0.11	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.9	1,415	0.1415	62.00	7.0	62.0	1.2	0.9	7.9	218.2	188.0	0.70	0.06	0.17	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.10	1,072	0.1072	155.00	7.0	155.0	1.2	2.2	9.2	207.9	179.0	0.70	0.04	0.21	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.11	1,231	0.1231	60.00	7.0	60.0	1.2	0.8	7.8	218.4	188.2	0.70	0.05	0.26	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.12	1,148	0.1148	184.00	7.0	184.0	1.2	2.6	9.6	204.9	176.4	0.70	0.05	0.31	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.13	1,010	0.1010	61.00	7.0	61.0	1.2	0.8	7.8	218.3	188.1	0.70	0.04	0.35	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.14	1,277	0.1277	171.00	7.0	171.0	1.2	2.4	9.4	206.2	177.5	0.70	0.05	0.40	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.15	1,284	0.1284	195.00	7.0	195.0	1.2	2.7	9.7	203.9	175.5	0.70	0.05	0.45	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.16	2,224	0.2224	180.00	7.0	180.0	1.2	2.5	9.5	205.3	176.8	0.70	0.09	0.54	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.17	2,648	0.2648	186.00	7.0	186.0	1.2	2.6	9.6	204.7	176.2	0.70	0.11	0.65	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	815(MSR2)	MER7.18													**0.65**												
Box	-	MER7.33	892	0.0892	39.00	7.0	39.0	1.2	0.5	7.5	221.0	190.5	0.70	0.04	0.04	-	-	0.40	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
Culvert	-	MER7.32	873	0.0873	39.00	7.0	39.0	1.2	0.5	7.5	221.0	190.5	0.70	0.04	0.08	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.31	935	0.0935	40.00	7.0	40.0	1.2	0.6	7.6	220.9	190.4	0.70	0.04	0.12	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.30	923	0.0923	41.00	7.0	41.0	1.2	0.6	7.6	220.7	190.3	0.70	0.04	0.16	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.29	848	0.0848	43.00	7.0	43.0	1.2	0.6	7.6	220.5	190.1	0.70	0.04	0.19	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.28	759	0.0759	46.00	7.0	46.0	1.2	0.6	7.6	220.1	189.7	0.70	0.03	0.22	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.27	895	0.0895	46.00	7.0	46.0	1.2	0.6	7.6	220.1	189.7	0.70	0.04	0.26	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.26	827	0.0827	46.00	7.0	46.0	1.2	0.6	7.6	220.1	189.7	0.70	0.04	0.30	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.25	937	0.0937	46.00	7.0	46.0	1.2	0.6	7.6	220.1	189.7	0.70	0.04	0.34	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.24	1,048	0.1048	35.00	7.0	35.0	1.2	0.5	7.5	221.5	190.9	0.70	0.05	0.38	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.23	1,117	0.1117	48.00	7.0	48.0	1.2	0.7	7.7	219.9	189.5	0.70	0.05	0.43	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.22	805	0.0805	22.00	7.0	22.0	1.2	0.3	7.3	223.1	192.4	0.70	0.03	0.47	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.21	1,231	0.1231	51.00	7.0	51.0	1.2	0.7	7.7	219.5	189.2	0.70	0.05	0.52	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.20	1,235	0.1235	53.00	7.0	53.0	1.2	0.7	7.7	219.3	189.0	0.70	0.05	0.57	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	-	MER7.19	1,328	0.1328	52.00	7.0	52.0	1.2	0.7	7.7	219.4	189.1	0.70	0.06	0.63	-	-	0.45	0.90	0.90	2.5	0.81	2.70	0.30	0.013	1.72	1.40	**OK**
	815(MSR2)	MER7.18													0.63												
U-Ditch	-	MMR8A.2.4	693	0.0693	174.00	7.0	174.0	1.2	2.4	9.4	205.9	177.3	0.59	-	-	0.02	0.02	-	0.30	0.30	5.0	0.07	0.90	0.08	0.013	1.01	0.07	**OK**
	-		3,721	0.3721	160.00	7.0	160.0	1.2	2.2	9.2	207.3	178.5	0.59	-	-	0.11	0.13	-	0.55	0.55	5.0	0.24	1.65	0.15	0.013	1.51	0.37	**OK**
	-	MMR8A.2.3	6,803	0.6803	140.00	7.0	140.0	1.2	1.9	8.9	209.4	180.3	0.59	-	-	0.20	0.33	-	0.55	0.55	5.0	0.24	1.65	0.15	0.013	1.51	0.37	**OK**
	-		8,304	0.8304	120.00	7.0	120.0	1.2	1.7	8.7	211.6	182.2	0.59	-	-	0.25	0.58	-	0.80	0.80	4.0	0.51	2.40	0.21	0.013	1.74	0.89	**OK**
	-	MMR8A.2.2	8,500	0.8500	100.00	7.0	100.0	1.2	1.4	8.4	213.8	184.2	0.59	-	-	0.26	0.83	-	0.80	0.80	4.0	0.51	2.40	0.21	0.013	1.74	0.89	**OK**
	-		8,681	0.8681	80.00	7.0	80.0	1.2	1.1	8.1	216.1	186.2	0.59	-	-	0.26	1.10	-	1.00	1.00	3.0	0.80	3.00	0.27	0.013	1.75	1.40	**OK**
	-		8,846	0.8846	60.00	7.0	60.0	1.2	0.8	7.8	218.4	188.2	0.59	-	-	0.27	1.37	-	1.00	1.00	3.0	0.80	3.00	0.27	0.013	1.75	1.40	**OK**
	-	MMR8A.2.1	9,010	0.9010	40.00	7.0	40.0	1.2	0.6	7.6	220.9	190.4	0.59	-	-	0.28	1.65	-	1.20	1.20	2.5	1.15	3.60	0.32	0.013	1.80	2.07	**OK**
	-		9,260	0.9260	20.00	7.0	20.0	1.2	0.3	7.3	223.4	192.6	0.59	-	-	0.29	1.95	-	1.20	1.20	2.5	1.15	3.60	0.32	0.013	1.80	2.07	**OK**
	799.03(MSR4)		63,818														1.95										
U-Ditch	-	MMR8A.1.1	7,063	0.7063	165.00	7.0	165.0	1.2	2.3	9.3	206.8	178.1	0.59	-	-	0.21	0.21	-	0.65	0.65	5.0	0.34	1.95	0.17	0.013	1.69	0.57	**OK**
	-		9,272	0.9272	140.00	7.0	140.0	1.2	1.9	8.9	209.4	180.3	0.59	-	-	0.27	0.48	-	0.65	0.65	5.0	0.34	1.95	0.17	0.013	1.69	0.57	**OK**
	-	MMR8A.1.2	9,673	0.9673	120.00	7.0	120.0	1.2	1.7	8.7	211.6	182.2	0.59	-	-	0.29	0.77	-	0.90	0.90	3.5	0.65	2.70	0.24	0.013	1.76	1.14	**OK**
	-		10,601	1.0601	100.00	7.0	100.0	1.2	1.4	8.4	213.8	184.2	0.59	-	-	0.32	1.09	-	0.90	0.90	3.5	0.65	2.70	0.24	0.013	1.76	1.14	**OK**
	-	MMR8A.1.3	9,540	0.9540	80.00	7.0	80.0	1.2	1.1	8.1	216.1	186.2	0.59	-	-	0.29	1.38	-	1.10	1.10	2.6	0.97	3.30	0.29	0.013	1.73	1.68	**OK**
	-		9,467	0.9467	60.00	7.0	60.0	1.2	0.8	7.8	218.4	188.2	0.59	-	-	0.29	1.67	-	1.10	1.10	2.6	0.97	3.30	0.29	0.013	1.73	1.68	**OK**
	-	MMR8A.1.4	9,277	0.9277	40.00	7.0	40.0	1.2	0.6	7.6	220.9	190.4	0.59	-	-	0.29	1.96	-	1.30	1.30	2.0	1.35	3.90	0.35	0.013	1.70	2.30	**OK**
	-		9,390	0.9390	20.00	7.0	20.0	1.2	0.3	7.3	223.4	192.6	0.59	-	-	0.30	2.26	-	1.30	1.30	2.0	1.35	3.90	0.35	0.013	1.70	2.30	**OK**
	799.03(MSR4)		67,220														2.26										

表 3.3.5 ゲート形式比較表

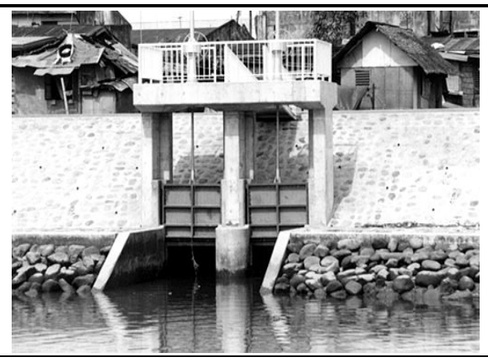
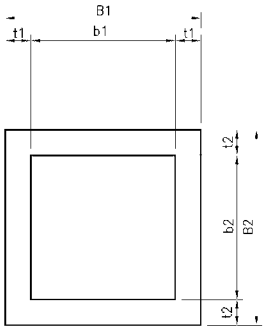
	Type 1: Flap Gate		Type 2: Slide Gate	
Photo				
General	・With the hinge attached on the upper portion of the gate, the gate opens or closes automatically by the moment caused by the difference in water level between inside and outside of the sluiceway.		・The gate is opened or closed manually by vertical sliding movement. ・The difference in water level between inside and outside of the sluiceway does not matter in operating the gate.	
Operation	・It opens or closes automatically; hence, the operation is immediate.	◎	・This type needs to be operated by someone with an operation manual. ・In case of 1.0×1.0 slide gate, it takes approximately 10 minutes to close the gate.	○
Maintenance	・In order to keep in good working condition, it is recommended to be monitored periodically so that small branches and garbage are not left behind or in front of the flap gate.	○	・Periodic checking is recommended to this type (for example, 2 times in rainy season, 1 time in dry season and after natural disasters)	○
Water-tightness	・The force caused by the higher outside hydraulic head presses the rubber seal of the flap gate to the frame. Water-tightness is enough if the gate inlet and outlet are clean and well maintained.	○	・Laterally, the force caused by the higher outside hydraulic head presses the rubber seal of the shutter to the frame. ・Vertically, the rubber seal attached to the shutter is pressed by the weight of the shutter against the bottom slab. ・Because of the above, water-tightness is assured if the gate inlet and outlet are clean and well maintained.	◎
Economy	・Estimated Cost for 10 Unit in Philippines' peso is as below. Total running cost become lower than type 2 5 years later after installation. Installation Cost Gate (Imported) 13,000,000 Screen 400,000 Total 13,400,000 Annual Operational Cost The Cost of Labor 1,890,000 Total Running Cost for 5 years 22,850,000	1	・Estimated Cost for 10 Unit in Philippines' peso is as below. Total running cost become higher than type 1 5 years later after installation. Installation Cost Gate 2,000,000 Mechanical Equipment 500,000 Upper Structure 2,600,000 Housing for Maintenance Persons 1,800,000 Total 6,900,000 Annual Operational Cost The Cost of Labor, Electrical and Water 3,250,000 Total Running Cost for 5 years 23,150,000	2
Evaluation	・Compared with Type 2, this type would be superior due to its operation aspect. ・Total running cost is lower than Type 2.	◎	・This type is manually operated ・The installation cost is lower than Type 1.	○

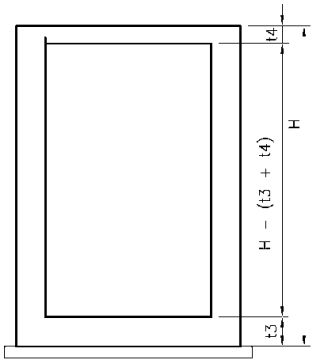
表 4.1.1 マンホール諸元

Case		b_1 (mm)	b_2 (mm)	H (mm)	B_1 (mm)	B_2 (mm)	Side wall						Bottom Slab						Top Slab					
							t_1,t_2 (mm)	d_1,d_2 (mm)	Reinforcing Bar				t_3 (mm)	d_3 (mm)	Reinforcing Bar				t_4 (mm)	d_4 (mm)	Reinforcing Bar			
									Horizontal		Vertical				Back and Forth		Left and Right				Back and Forth		Left and Right	
									Exterior	Interior	Exterior	Interior			Bottom Long.	Top Long.	Bottom Long.	Top Long.			Bottom Long.	Top Long.	Bottom Long.	Top Long.
No Top Slab																								
1 -	1	1500	700	0 - 2000	2000	1200	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	-	-	-	-	-	-
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-
	3			2500 - 3000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-
	4			3000 - 3500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-
	5			3500 - 4000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-
	6			4000 - 4500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-
2 -	1	2000	700	0 - 2000	2500	1200	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	-	-	-	-	-	-
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-
	3			2500 - 3000	"	"	"	"	D16@250	D16@250	"	"	"	"	"	"	"	"	-	-	-	-	-	-
	4			3000 - 3500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-
	5			3500 - 4000	2600	1300	300	"	"	"	"	"	300	"	"	"	"	"	-	-	-	-	-	-
With Top Slab																								
3 -	1	1500	1500	0 - 2000	2000	2000	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	150	70	D12@125	-	D12@125	-
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-
	3			2500 - 3000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-
	4			3000 - 3500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-
	5			3500 - 4000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-
4 -	1	1500	2300	0 - 2000	2000	2800	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	150	70	D12@125	-	D12@125	-
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-
	3			2500 - 3000	"	"	"	"	"	"	D16@250	"	"	"	D16@250	"	D16@250	"	"	"	"	-	"	-
	4			3000 - 3500	2100	2900	300	"	D16@250	"	"	"	300	"	"	"	"	"	"	"	"	-	"	-
	5			3500 - 4000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-
5		1500	3500	3000 - 3500	2100	4100	300	90	D16@250	D12@250	D20@250	D12@250	300	90	D20@250	D12@250	D20@250	D12@250	150	70	D12@125	-	D12@125	-
6		1500	3200	4000 - 4200	2200	3900	350	90	D16@250	D12@250	D20@250	D12@250	350	90	D20@250	D12@250	D20@250	D12@250	150	70	D12@125	-	D12@125	-

PLAN



Cross Section



Note:
- B_i : Outside Width
- b_i : Inside Width
- t_i : Member Thickness
- d_i : Thickness of Cover Concrete (Surface to Center of Reinforcing Bar)

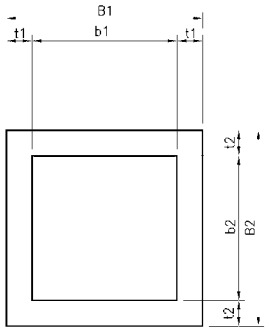
Tb 4.1

表 4.1.2 接続桝諸元

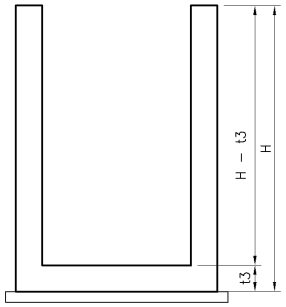
Case	b_1 (mm)	b_2 (mm)	H (mm)	B_1 (mm)	B_2 (mm)	Side wall					Bottom Slab				
						t_1,t_2 (mm)	d_1,d_2 (mm)	Rainforcing Bar			t3 (mm)	t_3 (mm)	d_3 (mm)	Rainforcing Bar	
								Horizontal	Vertical					Back and Forth	Left and Right
1- 1	900	900	0 - 1500	1200	1200	150	75	D12@250	D12@250	0	200	200	90	D12@250	D12@250
2			1500 - 2000	"	"	"	"	"	"	0	200	"	"	"	"
3			2000 - 2500	"	"	"	"	"	"	0	200	"	"	"	"

Note: B_i : Outside Width
b_i : Inside Width
t_i : Member Tickness
d_i : Thickness of Cover Concrete
(Surface to Center of Rainforcing Bar)

PLAN



Cross Section



Tb 4.2

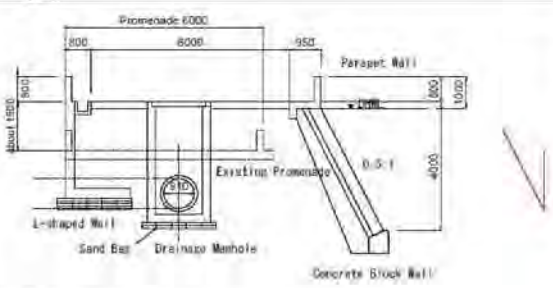
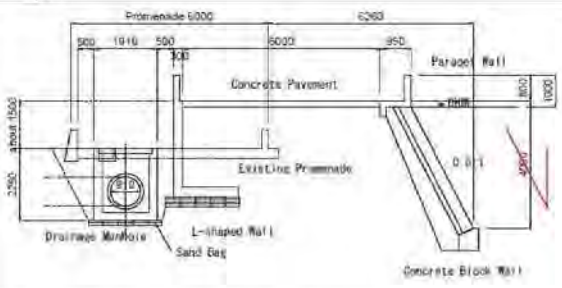
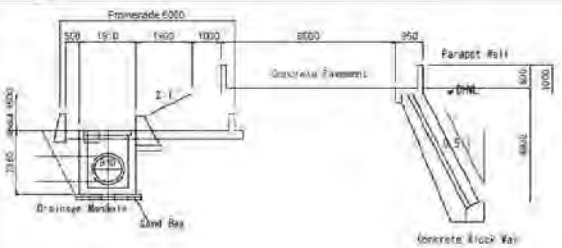
表 4.1.3 フラップゲート材料の比較検討

Item	Type 1: Stainless Steel Flap Gate		Type 2: Fiberglass Reinforced Polyester (FRP) Flap Gate		Type 3: Aluminum Steel Flap Gate	
Photos						
Material Specification	▪ Frame, Cover and Hinge Link – Stainless Steel ▪ Fastener – Stainless Steel ▪ Seal – Neoprene Rubber ▪ Maximum Design Depth O 4.00 m		▪ Flap (leaf) ,Frame– Fiberglass Reinforced Polyester (FRP) material. ▪ Hinge Link, Fastener – Stainless Steel ▪ Seal – Neoprene Rubber ▪ Maximum Design Depth O 3.00 m		▪ Frame, Cover, and Hinge Link – Aluminum Alloy ▪ Fastener – Stainless Steel ▪ Seal – Neoprene Rubber ▪ Maximum Design Depth O3.00 m	
Strength	This material is extremely durable.	◎	This material is durable.	○	This material is durable.	○
Weight	The flap gate is quite heavy. It weighs 130 kg.	○	The FRP flap gate is lightweight. It weighs 68 kg.	◎	Aluminum steel flap gate is lightweight. It weighs 90 kg.	◎
Economy	Material Cost Including Installation • Gate(Imported) PhP624,000.00	△	Material Cost Including Installation • Gate(Imported) PhP310,000.00	○	Material Cost Including Installation • Gate(Imported) PhP364,000.00	○
Susceptibility to Theft	Stainless Steel has a very high value in the scrap metal industry so it is susceptible to theft.	△	Fiberglass has no value in the scrap metal industry so it is less susceptible to theft.	○	Aluminum Steel has a very high value in the scrap metal industry so it is susceptible to theft.	△
Corrosion Resistance	Stainless steel is a maintenance free material because it has high resistance to corrosion.	◎	Fiberglass is a maintenance free material because it has high resistance to corrosion.	◎	Aluminum is nearly maintenance free because it has an average resistance to corrosion.	○
Evaluation	• The cost is the highest among the three types of material. It is almost twice as much as the material cost of type 2. • It has a very high value in scrap metal industry compared to type 2 so it is susceptible to theft. • This material has a high corrosion resistance factor. It is maintenance free.		• The material cost is the lowest among the three types of material. • It does not have any value in the scrap metal industry compared to the two other types of material so it is not susceptible to theft. • This material has a high corrosion resistance factor. It is maintenance free.		• The material cost is lower than type 1 but it is higher than type 2. • It has a very high value in scrap metal industry compared to type 2 so it is susceptible to theft. • This material has an average corrosion resistance factor. It is nearly maintenance free.	
	△		◎		○	

Legend:
◎ *- Best (Highly recommended)*
○ *- Better (No problem)*
△ *- Good (but with some problems)*

表 4.2.1 【第一次】 堤防及び排水施設形状比較表(マリキナ川下流)

STA 4+200 (ロサリオ橋近くの3工区)

評価		1案		2案		3案
断面計画						
流下面積	◎	護岸は最も河川中心から遠い。河川面積を満足する。	○	護岸は、河川中心から遠い。河川面積を満足する。	○	護岸は最も川側に近い。しかし河川面積は満足する。
道路機能	△	軽車両は通行できるが、マンホールにより妨げられる。	○	通過車両は、軽車両に限定される。	○	通過車両は、軽車両に限定される。
通行	×	居住者は、移動したり連絡したりが出来ない。	○	居住者は、容易に移動したり連絡することが可能であるが、自由ではない。	○	居住者は、容易に移動したり連絡することが可能であるが、自由ではない。
建設	×	多くの構造物は建設を困難にするし、工期が長い。集水パイプの設置は壁のため不可能である。	△	多くの構造物は建設を困難にするし、工期が長い。	◎	簡単な構造物であり、工期は比較的短い。
景観	×	家屋の前に2.30m高さの擁壁があり、景観が悪い。	△	家屋の前に2.30m高さの擁壁があり、景観が悪い。	◎	低い重量式擁壁と植生斜面は景観を良くする。
環境	◎	環境は特に悪くない。車輌による騒音は防ぐことができる。	◎	環境は特に悪くない。車輌による騒音は防ぐことができる。	○	環境は特に悪くない。車輌による騒音は防ぐことができる。
将来計画	△	道路の拡幅は不可能であるが、舗装の変更は可能である。	○	道路の拡幅は不可能であるが、舗装の変更は可能である。	◎	拡張及び舗装タイプの変更は可能である。
工事費	△	高価	△	高価	○	低コスト
評価		6		4		1

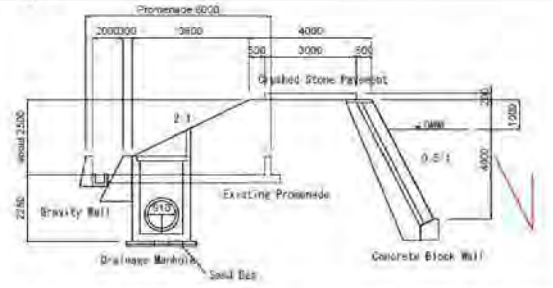
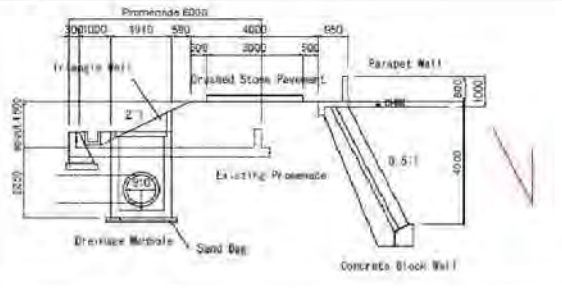
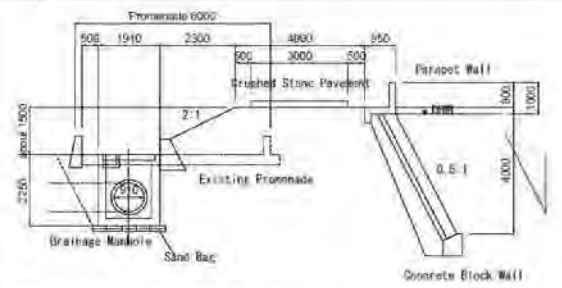
評価		4案		5案		6案
断面計画						
流下面積	○	護岸は、河川中心から遠い。河川面積を満足する。	○	護岸は、河川中心から遠い。河川面積を満足する。	○	護岸は、河川中心から遠い。河川面積を満足する。
道路機能	△	道路機能は、維持管理用車両に限定される。	△	道路機能は、維持管理用車両に限定される。	△	道路機能は、維持管理用車両に限定される。
通行	×	居住者は、移動したり通行したりが出来ない。移動したり連絡したりが出来ない。維持管理用道路へのアクセスは、不可能である。	△	居住者が移動したり連絡したりすることが、非常に困難である。	○	居住者は、容易に移動したり連絡することが可能であるが、自由ではない。
建設	△	大型の重力式擁壁の下に、集水パイプを作るのは非常に困難である。	○	単純構造物は、建設を容易にするし、工期は短い。	◎	単純構造物は、建設を容易にするし、工期は最も短い。
景観	△	30m間隔のくぼんだマンホールは景観を悪くする。	△	30m間隔のくぼんだマンホールは景観を悪くする。	◎	低い重量式擁壁と植生斜面は景観を良くする。
環境	△	環境は特に悪くない。車輌による騒音は防ぐことができる。しかし車両の騒音は居住家屋に達する。砕石からのダストが発生する。	△	環境は特に悪くない。車輌による騒音は防ぐことができる。しかし車両の騒音は居住家屋に達する。砕石からのダストが発生する。	△	車両からの騒音は、居住家屋に達するし、砕石からのダストが発生する。
将来計画	△	もり大型の擁壁が建設されるとすると、舗装タイプの変更が可能になる。	△	道路の拡張と改良は、非常に困難である。	○	もり大型の擁壁が建設されるとすると、舗装タイプの変更が可能になる。
工事費	○	比較的低コスト	○	比較的低コスト	◎	最も低コスト
評価		5		3		2

表 4.2.2 【最終】 堤防及び排水施設形状比較表(マリキナ川下流)

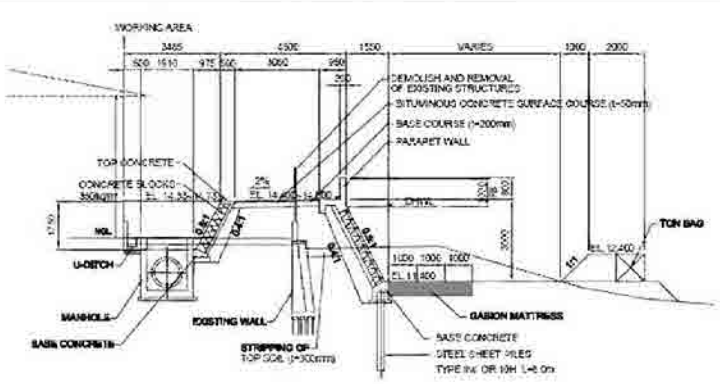
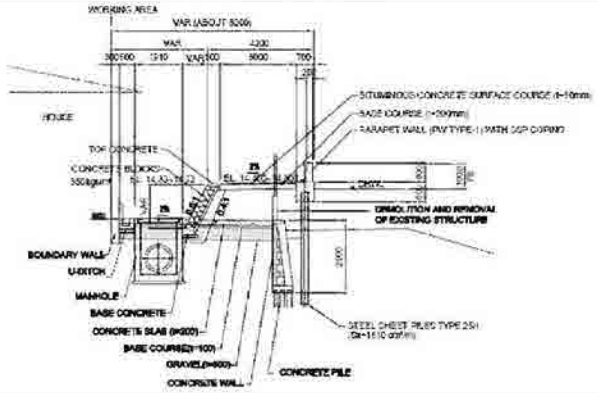
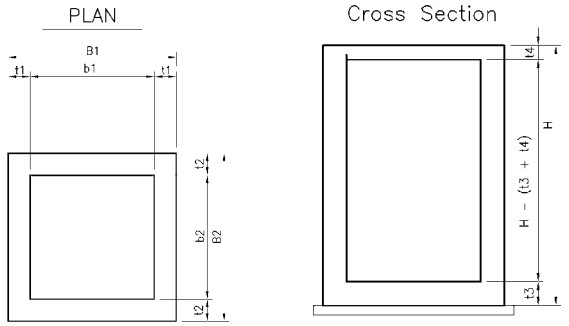
評価		IDEA-1: コンクリートブロック積み擁壁		IDEA-2: 鋼矢板	
構造断面			
一般説明		堤防構造は鋼矢板を用いたコンクリートブロック積み擁壁であり、鋼矢板は擁壁を支え洗掘を防ぐ。 擁壁構造物の建設期間、仮堤防が水の上昇から保護するために設けられる。		護岸構造物は、笠木コンクリートを持つ鋼矢板である。	
洪水の流下面積		△	斜の構造物が川に張り出し、それが川の流下面積を低減することになる。	○	鋼矢板による垂直壁が用いられることから、横断流下面積はやや1案より大きくなる。
洪水に対する防御力		△	構造物そのものは堅固であるが、表面にでこぼこが発生した場合ブロックが壊れ易くなる。 クリープ比は、2案より良い。	○	洪水で流速が遅いため、捨石の移動は洪水でもめったに起こらない。 鋼矢板は洪水に対して非常に堅固であるが、堤防への水の浸透が起きる。
強度性能		△	多くの部材、特に目地の部分が弱点になりやすい。	○	シンプルで強い構造であるが、笠木の部分でのたわみは大きくなる。
施工性		△	部材の数が多いため建設期間が長くなる。しかしすべての工事が同時期に行うことが可能である。 擁壁の建設期間を通して、現場は土のうで出来た仮堤とポンプの稼動により保護されなくてはならない。洪水の期間の建設は避けなくてはならないため、建設期間が長くなる。	○	鋼矢板の打設工事は、川の増水に関係なく高い足場上で行うことが出来る。 鋼矢板の打設作業は短く、建設期間を低減することができる。
美観		○	コンクリートブロック積み擁壁の美観は、2案より優れる。	△	垂直壁は、美観が劣る。
社会環境		△	コンクリートブロックの設置に必要な機械は、小規模なものである。 鋼矢板の打込みは、2案と同様の機械が使われる。	○	鋼矢板の打設は、反環境工事を必要としない。
維持管理		△	多くの部材の構造物となるため、多くの維持管理工事が必要となる。	○	川側の護岸はシンプルで強固である。それは維持管理の手間を低減することが出来る。
将来計画		△	フェリーや他の川船のターミナル施設の建設が、少し難しい。	○	フェリーや他の川船のターミナル施設の建設が、1案より容易である。
工事費	数量と工事費	△	項目 / 数量 / 単価 (PHP) / 工事費 (PHP) コンクリートブロック積み擁壁－1 / 10m / / 761,487 鋼矢板他 / 10m / / 1,046,448 盛土 / 10m / / 76,729 コンクリートブロック積み擁壁－2 / 10m / / 558,276	○	項目 / 数量 / 単価 (PHP) / 工事費 (PHP) 鋼矢板他 / 10m / / 1,549,896 盛土 / 10m / / 76,729 コンクリートブロック積み擁壁－2 / 10m / / 558,276
	m当り単価		合計 / / / 2,442,940		合計 / / / 2,184,901
判定	評価	2		1	工事費は安い。護岸構造物はシンプルで、それが建設の容易さと建設期間の短縮となる。

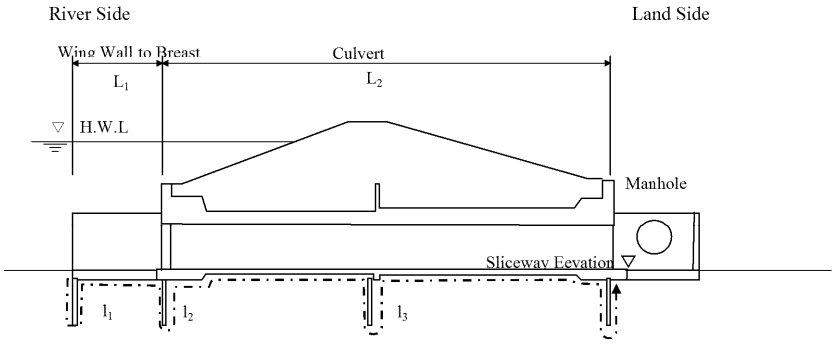
表 4.2.3 マンホール諸元 (マリキナ川下流)

Case		b_1 (mm)	b_2 (mm)	H (mm)	B_1 (mm)	B_2 (mm)	Side wall						Bottom Slab						Top Slab						Remarks
							t_1,t_2 (mm)	d_1,d_2 (mm)	Reinforcing Bar				t_3 (mm)	d_3 (mm)	Reinforcing Bar				t_4 (mm)	d_4 (mm)	Reinforcing Bar				
									Horizontal		Vertical				Transverse		Longitudinal				Transverse		Longitudinal		
									Exterior	Interior	Exterior	Interior			Bottom Long.	Top Long.	Bottom Long.	Top Long.			Bottom Long.	Top Long.	Bottom Long.	Top Long.	
No Top Slab																									
1 -	1	1500	700	0 - 2000	2000	1200	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	-	-	-	-	-	-	
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
	3			2500 - 3000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
	4			3000 - 3500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
	5			3500 - 4000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
	6			4000 - 4500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
2 -	1	2000	700	0 - 2000	2500	1200	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	-	-	-	-	-	-	
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
	3			2500 - 3000	"	"	"	"	D16@250	D16@250	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
	4			3000 - 3500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	-	-	-	-	-	
	5			3500 - 4000	2600	1300	300	"	"	"	"	"	300	"	"	"	"	"	-	-	-	-	-	-	
With Top Slab																									
3 -	1	1500	1500	0 - 2000	2000	2000	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	150	70	D12@125	-	D12@125	-	
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-	
	3			2500 - 3000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-	
	4			3000 - 3500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-	
	5			3500 - 4000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-	
4 -	1	1500	2300	0 - 2000	2000	2800	250	90	D12@250	D12@250	D12@250	D12@250	250	90	D12@250	D12@250	D12@250	D12@250	150	70	D12@125	-	D12@125	-	
	2			2000 - 2500	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-	
	3			2500 - 3000	"	"	"	"	"	"	D16@250	"	"	"	D16@250	"	D16@250	"	"	"	"	-	"	-	
	4			3000 - 3500	2100	2900	300	"	D16@250	"	"	"	300	"	"	"	"	"	"	"	"	-	"	-	
	5			3500 - 4000	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	-	"	-	
Behind Sluiceway																									
5-	1	2000	2500	2000 - 2500	2500	3000	250	90	D12@250	D12@250	D16@250	D12@250	250	90	D16@250	D12@250	D16@250	D12@250	150	70	D12@125	-	D12@125	-	MSL5,MSR4
	2			2500 - 3000	"	"	"	"	"	"	"	"	250	"	"	"	"	"	"	"	"	-	"	-	MSL1,MSR2
6		2000	3000	2500 - 3000	2500	3500	250	90	D16@250	D12@250	D20@250	D12@250	250	90	D20@250	D12@250	D20@250	D12@250	150	70	D12@125	-	D12@125	-	MSL6
7		2000	3600	2000 - 2500	2500	4100	250	90	D12@250	D12@250	D16@250	D12@250	250	90	D16@250	D12@250	D16@250	D12@250	150	70	D12@125	-	D12@125	-	MSL3
8		2500	2600	3000 - 3500	3100	3200	300	90	D16@250	D12@250	D16@250	D12@250	300	90	D16@250	D12@250	D16@250	D12@250	200	100	D12@125	-	D12@125	-	MSL2,MSL4
9		1500	6100	3000 - 3200	2100	6700	250	90	D16@250	D12@250	D20@250	D12@250	250	90	D20@250	D12@250	D20@250	D12@250	150	70	D12@125	-	D12@125	-	MSR3



Note:
- B_i : Outside Width
- b_i : Inside Width
- t_i : Member Thickness
- d_i : Thickness of Cover Concrete (Surface to Center of Reinforcing Bar)

表 4.2.4 浸透経路長の計算



Water Difference ⊿H

	STA	River Side	Land Side	Water Diffrence	Remarks
MSL1	1+104	14.159	12.200	1.959	Full Flow in Culvert
MSL2	1+323	14.184	12.700	1.484	〃
MSL3	3+945	14.474	12.300	2.174	〃
MSL4	4+221	14.506	12.790	1.716	〃
MSL5	4+406	14.526	12.230	2.296	〃
MSL6	4+503	14.536	12.400	2.136	〃
MSR2	3+157	14.387	12.460	1.927	〃
MSR3	3+255	14.398	12.570	1.828	〃
MSR4	3+338	14.407	12.590	1.817	〃

Horizontal Creep Distance L

	Wing Wall to Breast Wall L_1	Culvert Section L_2	Total L	Remarks
MSL1	6.00	5.70	11.70	
MSL2	5.90	5.00	10.90	
MSL3	5.30	5.70	11.00	
MSL4	6.10	5.70	11.80	
MSL5	5.20	5.70	10.90	
MSL6	5.30	5.70	11.00	
MSR2	5.90	5.70	11.60	
MSR3	6.20	5.70	11.90	
MSR4	6.00	5.70	11.70	

Required vertical creep distance is calculated as fllows;

$$C \leq \frac{L/3 + \sum l}{\Delta H}$$

Vertical Creep Distance Σl and Creep Distance at Each SSP

	C	Σl	Creep Length l_1	Creep Length l_2	Creep Distance l_3	Creep Distance l_4	Total Length of SSP	Reqired SSP Length, l	Evaluation	Remarks
MSL1	7.0	9.81	0.00	3.03	0.00	2.24	5.27	5.00	OK	Embeded Lengh in As1
MSL2	7.0	6.75	0.00	4.00	0.00	2.00	6.00	3.40	OK	
MSL3	7.0	11.55	-	-	-	-	-	5.80	OK	Embeded in Ac2
MSL4	8.5	10.65	-	-	-	-	-	5.40	OK	Embeded in Ac2
MSL5	8.5	15.88	-	-	-	-	-	8.00	OK	Embeded in Ac2
MSL6	8.5	14.49	-	-	-	-	-	7.30	OK	Embedied in Ac2
MSR2	7.0	9.62	0.00	3.02	0.00	2.26	5.28	4.90	OK	Embeded Lengh in As1
MSR3	8.5	11.57	-	-	-	-	-	5.80	OK	Embeding in Ac2
MSR4	8.5	11.54	0.00	6.59	0.00	2.00	8.59	5.80	OK	

Note: l_i is the SSP length from underside of bottom slab.

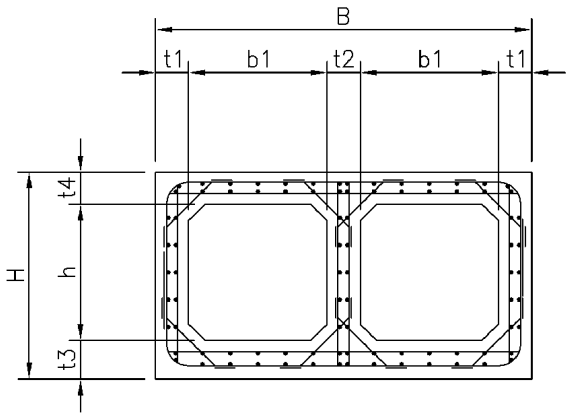
表 4.2.5 ボックスカルバート諸元（樋門函体）

	b_1 (mm)	b_2 (mm)	H (m)	B_1 (mm)	B_2 (mm)	Side wall						Bottom Slab							Top Slab					
						t_1,t_2 (mm)	d_1 (mm)	Rainforcing Bar				t_3 (mm)	d_3 (mm)	d_4 (mm)	Rainforcing Bar				t_4 (mm)	d_5 (mm)	Rainforcing Bar			
								Horizontal		Vertical					Longditudial		Transverse				Longditudial		Transverse	
								Extrior	Interior	Extrior	Interior				Bottom	Top	Bottom	Top			Bottom	Top	Bottom	Top
MSL-1	1400	1400	1.85	2100	2150	350	90	D12@250	D12@250	D12@250	D12@250	400	90	115	D12@250	D12@250	D12@250	D12@250	350	90	D12@250	D12@250	D12@250	D12@250
MSL-2	1500	1500	1.21	2200	2250	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
MSL-3	2@1200	1200	2.25	3300	1850	300	"	"	"	"	"	350	"	"	"	"	"	"	300	"	"	"	"	"
MSL-4	1600	1600	1.66	2300	2350	350	"	"	"	"	"	400	"	"	"	"	"	"	350	"	"	"	"	"
MSL-5	1000	1000	2.27	1600	1650	300	"	"	"	"	"	350	"	"	"	"	"	"	300	"	"	"	"	"
MSL-6	1200	1200	2.10	1800	1850	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"	"
MSR-2	1400	1400	1.89	2100	2150	350	90	D12@250	D12@250	D12@250	D12@250	400	90	115	D12@250	D12@250	D16@250	D16@250	350	90	D12@250	D12@250	D12@250	D12@250
MSR-3	2000	1600	1.78	2700	2350	"	"	"	"	D16@250	"	"	"	"	D16@250	D16@250	"	"	"	"	D16@250	D16@250	"	"
MSR-4	1500	1500	1.76	2200	2250	"	"	"	"	D12@250	"	"	"	"	D12@250	D12@250	D12@250	D12@250	350	"	D12@250	D12@250	"	"

Note: d_i : Thickness of Cover Concrete (Center to Suface)
H: Height of Embankment

Tb 4.8

Double



Single

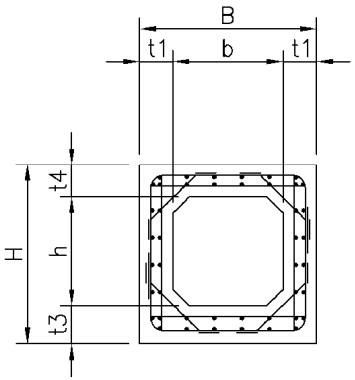
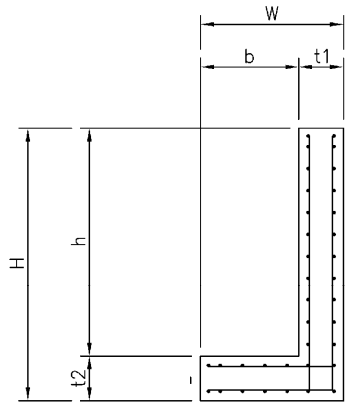


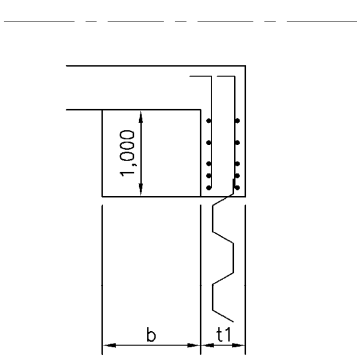
表 4.2.6 胸壁諸元

	Side	H (mm)	B_1 (mm)	h (mm)	b (mm)	Vertical Wall						Bottom Slab						
						t_1 (mm)	d_1 (mm)	Rainforcing Bar				t_3 (mm)	d_3 (mm)	d_4 (mm)	Rainforcing Bar			
								Horizontal		Vertical					Longditudial		Transverse	
								Extrior	Interior	Extrior	Interior				Bottom	Top	Bottom	Top
MSL-1	River	4300	1600	3600	1000	600	90	D12@250	D12@250	D12@250	D12@250	700	90	115	D12@250	D12@250	D12@250	D12@250
	Land	2900	1500	2400	1000	500	"	"	"	"	"	500	"	"	"	"	"	
MSL-2	River	3900	1600	3200	1000	600	"	"	"	"	"	700	"	"	"	"	"	"
	Land	3200	1500	2700	1000	500	"	"	"	"	"	500	"	"	"	"	"	
MSL-3	River	4350	1500	3700	900	600	"	"	"	"	"	650	"	"	"	"	"	"
	Land	2700	1400	2200	900	500	"	"	"	"	"	500	"	"	"	"	"	
MSL-4	River	4310	1700	3610	1100	600	"	"	"	"	"	700	"	"	"	"	"	"
	Land	3100	1600	2600	1100	500	"	"	"	"	"	500	"	"	"	"	"	
MSL-5	River	4220	1400	3570	800	600	"	"	"	"	"	650	"	"	"	"	"	"
	Land	2500	1300	2000	800	500	"	"	"	"	"	500	"	"	"	"	"	
MSL-6	River	4250	1500	3600	900	600	"	"	"	"	"	650	"	"	"	"	"	"
	Land	2700	1400	2200	900	500	"	"	"	"	"	500	"	"	"	"	"	"
MSR-2	River	4340	1600	3640	1000	600	90	D12@250	D12@250	D12@250	D12@250	700	90	115	D12@250	D12@250	D12@250	D12@250
	Land	2900	1600	2400	1100	500	"	"	"	"	"	500	"	"	"	"	"	"
MSR-3	River	4380	1700	3730	1100	600	"	D16@250	"	"	"	650	"	"	"	"	"	"
	Land	3100	1600	2600	1100	500	"	"	"	"	"	500	"	"	"	"	"	"
MSR-4	River	4310	1600	3610	1000	600	"	D12@250	"	"	"	700	"	"	"	"	"	"
	Land	3000	1500	2500	1000	500	"	"	"	"	"	500	"	"	"	"	"	"

Cross Section



PLAN



Tb 4.9

表 4.2.7 翼壁諸元

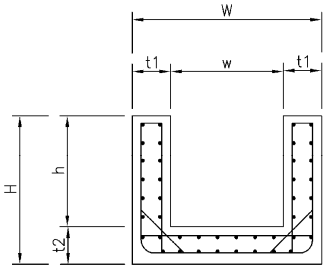
・U-shaped Section

	H (mm)	W (mm)	h (mm)	w (mm)	Vertical Wall						Bottom Slab						
					t_1 (mm)	d_1 (mm)	Rainforcing Bar				t_3 (mm)	d_3 (mm)	d_4 (mm)	Rainforcing Bar			
							Horizontal		Vertical					Longditudial		Transverse	
							Extrior	Interior	Extrior	Interior				Bottom	Top	Bottom	Top
MSL-1	2300	2800	1800	2000	400	90	D12@250	D12@250	D16@250	D12@250	500	90	115	D16@250	D12@250	D12@250	D12@250
MSL-2	1450	2700	1100	2100	300	"	"	"	"	"	350	"	"	"	"	"	"
MSL-3	1500	4300	1000	3500	400	"	"	"	"	"	500	"	"	"	"	"	"
MSL-4	1700	3000	1300	2200	400	"	"	"	"	"	400	"	"	"	"	"	"
MSL-5	1350	2200	1000	1600	300	"	"	"	"	"	350	"	"	"	"	"	"
MSL-6	1900	2500	1500	1800	350	"	"	"	D16@250	"	400	"	"	"	"	D16@250	"
MSR-2	1450	2700	1100	2000	350	"	D12@250	D12@250	D12@250	D12@250	350	"	"	D12@250	D12@250	D12@250	D12@250
MSR-3	850	3200	500	2600	300	"	"	"	"	"	350	"	"	"	"	"	"
MSR-4	1600	2800	1200	2100	350	"	"	"	"	"	400	"	"	"	"	"	"

・L - type Section

	H (m)	W (m)	h (m)	w (m)	Vertical Wall						Bottom Slab						
					t_1 (mm)	d_1 (mm)	Rainforcing Bar				t_3 (mm)	d_3 (mm)	d_4 (mm)	Rainforcing Bar			
							Horizontal		Vertical					Longditudial		Transverse	
							Extrior	Interior	Extrior	Interior				Bottom	Top	Bottom	Top
MSL-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSL-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSL-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSL-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSL-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSL-6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSR-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSR-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MSR-4	1320	1500	820	1000	500	90	D12@250	D12@250	D12@250	D12@250	500	90	115	D12@250	D12@250	D12@250	D12@250

U-shaped Section



L - type Section

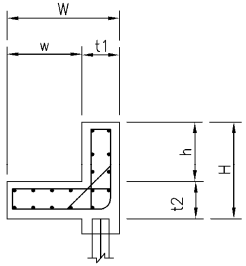


表 5.1.1 テクニカルスコーピングの結果

ECC APPLICATION SCREENING FORM FOR NON-FOOD MANUFACTURING PROJECTS
(For Non-ECPs in ECAs required an EIS; classified under Project Types F, and N.1 in Annex 2-1b of the Rev Procedural Manual for DAO 2003-30)

Control No:_____
☐ 1st ☐2nd ☐3rd ___ th Screening

Date Submitted for Screening:_____
Form of Submission:___ Hard ___ Digital
Project Title: DISPOSAL SITE for PHRCIP Phase III
Project Location: _____
Project Proponent: _____
Address: _____
Contact No._____ Fax No. _____ Contact Person: _____
EIS Consultant: _____
Address: _____
Contact No._____ Fax: _____ Contact Person: _____
Project Classification & Type: _____
Project Classification Code *(Refer to RPM for DAO 2003-30)* : _____
Project Size based on Classification: _____

Checklist of Documentary Requirements

	Acceptable?		Screening Officers' Remarks
	Yes	No	
• Environmental Impact Statement (EIS)[1]			
• Proof of Compatibility with the existing Land Use Plan			
• Proof of Authority over the Project Site			
• Accountability Statements of Preparers & Proponent (see Annexes 2-21 & 2-22 of Revised Procedural Manual for DAO 2003-30)			
• Photographs or plates of the project site, impact areas and affected areas and communities			
• Duly Accomplished Project Environmental Monitoring & Audit Prioritization Scheme (PEMAPS) Questionnaire (see Annex 2-7d of Revised Procedural Manual for DAO 2003-30)			

ACTION TAKEN: (Please check to indicate corresponding action taken)

☐ Document accepted; please submit _ copies
EIARC Needed? ( ) Yes ( ) No Expertise Needed: _____
Processing Fee: PhP _____ *(Pay at EMB Cashier)* Review Fund: Based on WFP *(Pay to the duly authorized 3rd Party Review Fund Manager)*

☐ Document not accepted

O R # _____
Date _____

NOTED BY:

_____
Screening Officer
Division

_____
Section/Division Chief

EMB Regional Office
Screening Office

Date: _____

[1] *Please refer to attached checklist of EIS Contents*

ECC APPLICATION SCREENING FORM FOR NON-FOOD MANUFACTURING PROJECTS
(For Non-ECPs in ECAs required an EIS; classified under Project Types F, and N.1 in Annex 2-1b of the Revised Procedural Manual for DAO 2003-30)

Control No._____
☐ 1st ☐2nd ☐3rd ___ th Screening

Checklist of EIS Contents

Executive Summary (maximum of 5 pages)

Contents	Page #	Acceptable?	REMARKS
Project Fact Sheet PD Summary (1 page)			
Process Documentation of the conduct of EIA (1 page) *(EIA Team, EIA Study Schedule & Area, EIA Methodology, Public Participation)*			
Summary of Baseline Characterization Key Environmental Impacts and Management & Monitoring Plan, and EMF & EGF Commitments (if applicable)			

I. Project Description

Items to be Described	Specific Data Requirement	Page #	Acceptable?	REMARKS
1) Project Location and Area	a) Map showing sitio, barangay, municipality, province, region boundaries, vicinity, proposed buffers surrounding the area and Primary & secondary impact areas			
	b) Geographic coordinates (shape file data) of project area (use WGS 84 datum - GPS setting)			
	c) Rationale for selection primary & secondary impact areas			
	d) Discuss the accessibility of the project site/area			
2) Project Rationale	• Cite and focus on the need for the project based on national and regional/local economic development in terms of contribution to sustainable development agenda or current development thrusts. • Describe the justification for the Project with particular reference made to the economic and social benefits, including employment and associate economic development, which the project may provide. The status of the project should be discussed in a regional and national context.			
3) Project Alternatives	a) Cite criteria used in determining preliminary options for facility siting, development design, process/technology selection, resource utilization including discussion of the consequences of not proceeding with the project: • Contextualize site selection in terms of vulnerability/susceptibility to Liquefaction, Ground Shaking, Ground Rupture, Earthquake induced Landslides, Volcanic eruptions, rain-induced landslide, storm surge, tsunami, and flooding as well as extreme climatologic conditions (data can be obtained from NDRRMC and NAMRIA as well as mandated agencies) • Discuss the alternatives (type and location) considered and nominated during the course of selecting the best option for which the EIS is prepared; • Description of the bases upon which the alternatives were rejected in favor of the preferred option; • Description of the significant differences in environmental impacts among the alternatives considered. Siting: Alternative project locations including factors significant to the selection such as perception of affected communities with regards to project, ancestral domain issues, land classification, etc. Discuss other options on the siting of major components of the project within the project area. Technology Selection/Operation Processes: Discuss project's advantage over alternative technologies, operation processes and engineering design. Discuss alternative measures for the prevention of the occurrence of major impacts. Resources: Discuss the alternatives considered in the course of selecting the resource to be tapped for power generation and how the decisions were made in favor of the preferred resource. Discuss the sustainability of the raw materials to be tapped and transportation plan of raw materials			
	b) Reasons for selecting the preferred options delineated in terms of technical, commercial, social and natural environmental aspects			

ECC APPLICATION SCREENING FORM FOR NON-FOOD MANUFACTURING PROJECTS
(For Non-ECPs in ECAs required an EIS; classified under Project Types F, and N.1 in Annex 2-1b of the Revised Procedural Manual for DAO 2003-30)

Control No:
☐ 1st ☐2nd ☐3rd ___ th Screening

	c.)After the determination, please indicate a summary of the comparative environmental impacts of each alternative			
4) Project Components	• Identification of Major components (including technical details such as specifications, capacity, number, etc.) • Specify the operations and process			
	• Identification of other Support Facilities (i.e. energy/power generating facility, water supply system) • Identification of materials/product handling facilities, infrastructure requirements (transport—road/rail/ship, energy, water supply and storage, stormwater drainage, Sewerage, Telecommunications, accommodation and other infrastructure).			
	• Identification of Pollution control devices and corresponding facility being served or connected Identification of waste management facilities and devices to address solid waste materials (domestic and hazardous and chemicals) air emissions, solid waste disposal, and wastewater			
	• General layout of facilities; • Footprint or proposed layout of project facilities (if any) • Maps should be provided showing the precise location of the project area, and in particular, the location and boundaries of project area, location and footprint of project components, and location of all proposed buffers. • When applicable contextualize using the PAGASA 2020 and 2050 projected rainfall/temperature data.			
5) Process/ Technology	Indicative process flow-sheets showing material balances for the processing plant, and the anticipated rates of inputs, along with similar data on products, wastes and recycle streams			
	Power & water supply system			
	• Waste Management Systems (e.g. wastewater treatment facility, baghouse filter, desulfurizer, other air pollution control devices, etc.)			
6) Project Size	Daily/Monthly/Annual production rate (refer to annex 2-1b)			
	Total Project Area in sq.m. or hectares			
7) Development Plan, Description of Project Phases and Corresponding Timeframes	Phases to be described in terms of identifying specific activities (w/ special attention on those with significant environmental impacts as well as climate change adaptation options relevant to the project and project activities) and corresponding projected implementation timeframes: • ***Pre-construction*** (e.g. planning, acquisition of rights to use land etc.) • ***Construction*** (e.g.land/site clearing, temporary housing, transport of materials, health and other services for the workforce) • ***Operation*** (projected period of start-up/commissioning/full operation of various project components) include discussion on the operation of various components (as identified above) in terms of material/product handling, infrastructure requirements (transport—road/rail/ship, energy, water supply and storage, stormwater drainage, sewerage, telecommunications, accommodation and other infrastructure), waste management (character and quantities of waste materials, air emissions, Solid waste disposal, wastewater) • ***Abandonment*** Final Rehabilitation/ Decommissioning Plan, to include Land/soil restoration and procedures & projected schedule. The land use suitability of the various land disturbance types should also be described. The proposed decommissioning plan in terms of the following: • Procedures for the decommissioning of the project components; • Transport/disposal of equipment and other materials used in the plant's operation; • Alternatives for the future use of abandoned area; • Consistency with long term zoning and land use development plan of the municipality; • Rehabilitation plans, if any Decommissioning plan to include land restoration, procedures, and proposed schedule			

ECC APPLICATION SCREENING FORM FOR NON-FOOD MANUFACTURING PROJECTS
(For Non-ECPs in ECAs required an EIS; classified under Project Types F, and N.1 in Annex 2-1b of the Revised Procedural Manual for DAO 2003-30)

Control No: _____
☐ 1st ☐2nd ☐3rd ___ th Screening

8) Manpower	Tabulate the following per project phase: • manpower requirements; • expertise/skills needed; • nature & estimated number of jobs available for men, women, and indigenous peoples (if sited in IP ancestral land); preferred scheme for sourcing locally from host and neighboring LGUs			
9) Indicative Project Investment Cost (Philippine Peso)				

General Contents	Specific Content Requirement	Page #	Acceptable?	REMARKS
II. Key Environmental Impacts and Management/Monitoring Plan	See attached checklist of contents When applicable include appropriate climate change adaptation measures/options (embedded in each sector).			
III. Impact Management Plan	Limit to mos. significant impacts per project phase and per environmental component arising from key environmental aspects (See Annex 2-17 of RPM for DAO 2003-30)			
IV. Social Development Framework (SDP) and IEC Framework	SDP (if applicable) • Community development or livelihood programs/activities, projected beneficiaries, partner institutions, timeframe of implementation as well as source and amount allotted per activity/component (See Annex 2-18 of RPM for DAO 2003-30)			
V. Environmental Compliance Monitoring	IEC (if applicable) Target sector, key messages, scheme/strategy/methods, information medium, timelines and frequency, cost (See Annex 2-19 of RPM for DAO 2003-30)			
	Self Monitoring Plan Use Annex 2-20 of RPM for DAO 2003-30 as template			
	Multi-Sectoral Monitoring Framework (if applicable) • Tabulate the list of stakeholder-members of the MMT, basis of selection, proposed role, and scope of MMT responsibilities and activities, etc. (See Annex 3-4 of the RPM for DAO 2003-30)			
	Environmental Guarantee and Monitoring Fund Commitments (if applicable) • Present a propose amount of EMF (based on a draft AWFP in Annex 3-4 and consistent with guidelines in Annex 3-5 of RPM for DAO 2003-30); and • Present a proposed amount of EGF and the basis for the estimate following the guidelines in annex 3-6 of RPM for DAO 2003-30			
VI. Emergency Response Policy and Generic Guidelines	The safety policy and generic guidelines should be consistent with the regulatory requirements. Emergency Preparedness should also consider natural hazards to the infrastructures and facilities.			
VII. Abandonment /Decommissioning /Rehabilitation Policy and	Statement on Proponent's policies and generic procedures for Rehabilitation/ Decommissioning/Abandonment to be submitted as post-ECC within a timeframe specified in the ECC.			
VIII. Institutional Plan for EMP Implementation	Discuss the organizational scheme of the proponent including line of command and reporting procedures as well as manpower complement and relationships with other operating departments.			

Checklist of EIS Contents

Key Environmental Impacts and Management/Monitoring Plan

List of Key Impacts	Baseline Data Parameter Requirements	Required Assessment Methodology/Approach	✓ for *completeness during procedural screening, page numbers should be provided upon submission of the EIS*								Remarks
			Baseline Conditions		Impact Analysis		Mgmt. Plan		Monitoring Plan		
During scoping: Unless otherwise specified as agreed during scoping, all items listed are required. Write specific instructions (if any) on the blanks/spaces provided			Page	✓	Page	✓	Page	✓	Page	✓	
I. Land											
1.1 Land Use and Classification											
1.1.1 Change/Inconsistency in land use	Description & Map showing the project area in relation to existing land use.	Assessment of the compatibility of the proposed project in relation to land use and / or the coastal resource management plan of the LGU if any.									
1.1.2 Encroachment in Environmentally Critical Areas (ECAs)	Identify ECA where the project is located or near the project area. Identify areas vulnerable/susceptible to natural hazards where the project is located or near the project area (include map/s)										
1.1.3 Possible tenurial / land issue	Identify areas under CARP or with CADC / CADT where the project is located or near the project area.										
1.2 Geology/Geomorphology											
1.2.1 Change in surface landform/ topography/ terrain/slope	Slope and Elevation/Topographic Map;										
1.2.2Change in sub-surface/ underground geomorphology	Regional/General Geological Map										
1.2.3 Inducement of subsidence, liquefaction, landslides, mud / debris flow, etc.	Geological Maps as needed; hazard maps (NAMRIA, NDRRMC, MGB, PHIVOLCS, PAGASA)	Include discussions on impacts/effects of natural hazard on the project.									
1.3 Pedology											
1.3.1 Soil erosion / Loss of topsoil/overburden	Summary of Soil Investigation Report on soil type and quality; Erodibility potential; Bank stability;										
1.4 Terrestrial Ecology											
1.4.1 Vegetation removal and loss of habitat	• Flora and fauna species inventory or survey report; • Historical occurrences of pest infestation, forest/grass fire and/or similar incidences	Quadrat sampling for flora; Use of mist nets, traps, transect walk for fauna									
1.4.2 Threat to existence and/or loss of important local species	Summary of endemicity / conservation status										
1.4.3Threat to abundance, frequency and distribution of important species	• Summary of abundance, frequency and distribution • Economic importance and uses of significant flora and fauna										

Control No:
☐ 1st ☐ 2nd ☐ 3rd ___ th Screening

Project Name: _____

Tb 5.5

List of Key Impacts	Baseline Data Parameter Requirements	Required Assessment Methodology/Approach	✓ for completeness during procedural screening, page numbers should be provided upon submission of the EIS								Remarks
			Baseline Conditions		Impact Analysis		Mgmt. Plan		Monitoring Plan		
During scoping: Unless otherwise specified as agreed during scoping, all items listed are required. Write specific instructions (if any) on the blanks/spaces provided			Page	✓	Page	✓	Page	✓	Page	✓	
1.4.4 Hindrance to wildlife access	Sampling / survey map in relation to the project site										
2. THE WATER											
2.1. Hydrology/Hydrogeology											
✓ 2.1.1 Change in drainage morphology / Inducement of flooding/ Reduction in stream volumetric flow	Drainage map; historical flooding/drought occurrences, stream flow measurements/estimates; Delineation of watershed /sub-watersheds/ floodplain; and identification of aquifers if any	Discuss possible impacts of the project on the occurrence of flooding and vice versa. Consider extreme weather conditions and the PAGASA 2020 and 2050 climate projections									
✓ 2.1.2 Change in stream, lake water depth	Regional hydrogeological map										
2.1.3 Depletion of water resources / competition in water use	Identification of current / projected water use in the area and adjacent areas Spring and well inventory and location map; depth of water table ; Analysis/estimation of water availability taking into consideration the PAGASA 2020 and 2050 climate projections	For project with significant water requirement, conduct water balance / budget analysis									
2.2 Oceanography		NOT APPLICABLE									
2.2.1 Change/disruption in circulation pattern	Predicted tides; 24-hour tidal cycles; Surface current system										
2.2.2 Change in bathymetry	Bathymetric map;	USLE / similar modeling when applicable									
2.3 Water Quality											
2.3.1 degradation of groundwater quality	Physico-Chemical characterization of water : * ☑ pH ☑ BOD5 ☐ COD ☑ DO ☑ Oil and grease ☐ TSS ☑ Heavy Metals : _____ ☐ fecal / total coliform	Use DENR standard methods and procedures for sampling and analysis. upstream & downstream of proj site									
2.3.2 degradation of surface water quality		For project with coastal/marine structures and /or significant marine / coastal discharges, conduct circulation / plume modeling (include worst case scenario of failure of WWTF) * include sediment analysis; dredged matl									
2.3.3 degradation of coastal/marine water quality		For project with significant heavy metals discharges, conduct sediment transport modeling									

Tb 5.6

Control No: ☐ 1st ☐ 2nd ☐ 3rd ___ th Screening

Project Name: _____

List of Key Impacts	Baseline Data Parameter Requirements	Required Assessment Methodology/Approach	✓ for completeness during procedural screening; page numbers should be provided upon submission of the EIS								Remarks
			Baseline Conditions		Impact Analysis		Mgmt. Plan		Monitoring Plan		
During scoping: Unless otherwise specified as agreed during scoping, all items listed are required. Write specific instructions (if any) on the blanks/spaces provided			Page	✓	Page	✓	Page	✓	Page	✓	
	☐ others: _____ sampling site map										
2.4 Freshwater Ecology											
2.4.1 Threat to existence and/or loss species of important local and habitat	• Summary of endemicity / conservation status • Abundance of ecologically and economically important species (fishes, benthos, planktons); • Presence of pollution indicator species; sampling site map										
2.4.2 Threat to abundance, frequency and distribution of species											
2.5 Marine Ecology		NOT APPLICABLE									
2.5.1 Threat to existence and/or loss of important local species and habitat	• Abundance/densities/distribution of ecologically and economically important species (mangroves, fishes, benthos, planktons, coral reefs, algae, seaweeds, sea grasses); • Presence of pollution indicator species; • Historical occurrences of red-tide, fish kill or any related event • marine resource map sampling site map	Quadrat, transect, line intercept, spot dive, manta tow, marine resource characterization (e.g. municipal and commercial fisheries data)									
2.5.2 Threat to abundance, frequency and distribution											
3.0 THE AIR											
3.1 Meteorology/Climatology											
3.1.1 Change in the local climate e.g. local temperature	Monthly average rainfall and temperature of the area; Climatological normals/extremes; Wind rose diagrams; Frequency of Tropical cyclones	In the assessment, consider the PAGASA climate change projections for 2020 and 2050.									
3.1.2 Contribution in terms of greenhouse gas emissions	Data on Greenhouse gasses (i.e. carbon dioxide, methane, nitrous oxide, etc.); Calculation of projected GHG emission	Discuss the project's contribution in terms of greenhouse gas emissions (applicable for power and landfill and possible for mining and dam).									
3.2 Air Quality (& Noise)											
3.2.1 Degradation of air quality	characterization of ambient air quality: ☒ TSP ☐ PM10 ☒ SOx ☒ NOx	Use DENR standard methods and procedures for sampling and analysis. if applicable air dispersion modeling (include worst case scenario of failure of APCD).									

Control No:
☐ 1st ☐ 2nd ☐ 3rd ____ th Screening

Project Name: _____

Tb 5.7

List of Key Impacts	Baseline Data Parameter Requirements	Required Assessment Methodology/Approach	✓ for completeness during procedural screening; page numbers should be provided upon submission of the EIS								Remarks
			Baseline Conditions		Impact Analysis		Mgmt. Plan		Monitoring Plan		
During scoping: Unless otherwise specified as agreed during scoping, all items listed are required. Write specific instructions (if any) on the blanks/spaces provided			Page	✓	Page	✓	Page	✓	Page	✓	
	☐ Trace Metals : _____ ☐ others: _____ (for sampling methods refer to Clean Air Act) sampling site map	Heavy metals (baseline and modeling) apply to selected chemical industries									
3.2.2 Increase in ambient noise level	Characterization of ambient noise level sampling site map	Use DENR standard methods and procedures for sampling and measurement. if applicable noise attenuation modeling (applicable if there is source capable of generating 200 dB or more).									
4.0 THE PEOPLE											
4.1 Displacement of settler/s Displacement / disturbance of properties Change/conflict in land ownership Change/conflict Right of way	Demographic data of impact area: - Number of households and household size - Land area, - Population, - Population density /growth - gender and age profile, - literacy rate, profile of educational attainment,	✓ Discuss how the project would affect existing properties in the area in terms of relocation and devaluation									
4.2 In-migration proliferation of informal settlers	settlements map Census of population / property that will be displaced / disturbed Housing ownership profile / availability of housing/ number of informal settlers	✓ Discuss the in-migration patterns as a result of project implementation									
4.3 Cultural/Lifestyle change (especially on Indigenous People, if there's any)	Demographic data on Indigenous People (if any) and existing Culture/Lifestyle that may be significantly affected	Discuss the impacts on IPs and Culture/Lifestyle (N/A)									
4.4 Threat to delivery of basic services /resource competition	Availability of public services in terms of: • Water supply • Power supply • Communications /transportation • health resources (Government and Private) • peace and order / crime	Discuss how the project would affect the delivery of basic services and may result to resource competition in the area									
4.5 Threat to public health and safety		✓ Discuss the project implementation's									

Control No: ☐ 1st ☐ 2nd ☐ 3rd ___ th Screening

Tb 5.8

List of Key Impacts	Baseline Data Parameter Requirements	Required Assessment Methodology/Approach	✓ for *completeness during procedural screening; page numbers should be provided upon submission of the EIS*								Remarks
			Baseline Conditions		Impact Analysis		Mgmt. Plan		Monitoring Plan		
During scoping: Unless otherwise specified as agreed during scoping, all items listed are required. Write specific instructions (if any) on the blanks/spaces provided			Page	✓	Page	✓	Page	✓	Page	✓	
	• education facilities • recreational facilities / sports facilities statistical data / information related to public services: • literacy rate, profile of educational attainment • Morbidity and mortality rates (infants and adults - 5-year trend) • Common diseases in the area including endemic diseases; • Environmental Health and Sanitation Profile; • Crime rate • Food security	threat to public health vis-à-vis the baseline health conditions in the area Analysis of diseases that may be affected by climate change.									
4.6 Generation of Local Benefits from the project Enhancement of employment and livelihood opportunities Increased business opportunities and associated economic activities Increased revenue of LGUs	Socioeconomic data: • Main sources of Income • Employment rate/ profile • sources of livelihood • commercial establishments and activities • banking and financial institutions										
4.7 Traffic congestion	Road network/ systems Existing Transportation/traffic situation	Traffic impact assessment if applicable (including capacity of road system in terms of load/count)									

Control No.:
☐ 1st ☐ 2nd ☐ 3rd ____ th Screening

Tb 5.9

III. Environmental Risk Assessment

Type of Risks	Scope of Assessment	Report/Output Required	✓ for completeness during procedural screening; page numbers should be provided upon submission of the EIS						REMARKS
			ERA		ERP		Monitoring Plan		
During scoping: Check (✓) required/applicable items; items with ✓ are automatically required; write specific instruction (if any) on the blanks provided			Page	✓	Page	✓	Page	✓	
Safety Risks ☐ Fire ☐ Explosion ☐ Release of toxic substances	- Identify conditions, events and circumstances which could be significant in bringing about identified safety risks - Description & assessment of the possible accident scenarios - Assessment of whether the project location is projected to have extreme climate events for 2020 &or 2050 that could contribute to the triggering identified scenarios Description of the hazards, both immediate (acute effects) and delayed (chronic effects) for man and the environment posed by the release of toxic substance, as applicable	ERA REQUIREMENT ☐ Quantitative Risk Assessment(QRA) Specific Instructions : ☑ Descriptive/Qualitative Risk Assessment Specific Instructions : ☑ EMERGENCY PLAN : Specific Instructions : ***Refer to annex 2-7e for the decision criteria the outline***						
☐ Physical Risks (Failure of Structure wh could endanger life, property and/or the environment)	- Identify conditions, events and "trigger" which could be significant in bringing about identified physical risks - Description & assessment of the possible accident scenarios - Assessment of whether the project location is projected to have extreme climate events for 2020 &or 2050 that could contribute to the triggering identified scenarios - Description of the hazards both immediate (acute effects) and delayed (chronic effects) for man and the environment posed by the failure of structure, as applicable								

Noted By:	Signature
Review Committee Members	
1. RAMON P. CRUZ EBRON	
2. JAKE TIU	
3. SUSAN SOCAMO-ONG	
4	
5	
6	
Resource Person	
1	

	Signature
EMB Representatives	
1. Florence L. Gonzales	
2. Jaja J. Mariano	
3.	
Project Proponent:	
RODRIGO I. DELA PEYES	
Project Preparer/Consultant	
ELSIE MONSANTO	
JOSE PAULO E. DEVANADERA	

Control No.
☐ 1st ☐ 2nd ☐ 3rd ___ th Screening

Project Name: _____

Tb 5.10

表 5.1.2 パブリックスコーピングの結果

EIA Module	Issues/Suggestions Raised by Stakeholder	Proponent's Response
1. Project Description	Our house is just beside the 45-hectare proposed disposal site. It was mentioned that the area will be backfilled to 2.2m. This is much higher than the elevation of other areas in Napindan. We do not want to suffer the same as Purok 6.	The disposal site will be provided with internal drainage trenches. The circumferential dike that will enclose the property will also be provided with drainage to catch the runoff from the disposal site and convey to Labasan Creek. The drainage facilities could also catch water from neighboring communities. Water from Labasan Creek will be pumped out to Laguna Lake by the pumping station in Labasan. We will monitor the effectiveness of the drainage system during the construction stage. We
2. Land	During the construction phase, the silted materials to be dredged would come with salvageable materials such as plastics, bottles, steel and other foreign materials. There is an opportunity to recycle these materials. We should be able to control entry in the disposal site. Priority should be given to	The entire site will be fenced; entry will be controlled as gates will be provided. We shall discuss and decide on what to do with the recovered materials.
3. Water	Please provide us copy of the results of analysis of the materials to be dredged from Marikina River and the design cross-section of the drainage system.	Noted. We will provide you copy of the test results and the design. The PMRCIP will start in 2013 whereas the circumferential road will start in 2014. Please make sure there is no conflict with the design of KOICA (?). Also, please look at the acquisition cost. JICA might be paying less compared to the other project

EIA Module	Issues/Suggestions Raised by Stakeholder	Proponent's Response
	Backfill material is one million cubic meters. I hope your design of the drainage channel is precise. During the monsoon rains in August, the channel has less than one foot clearance, it almost overflowed. The backfill might trigger flooding in Napindan.	The drainage will be designed and we will see the result after construction. We will adjust the design during construction as necessary. We must understand that no structure has been able to contain floods that are greater than its design capacity. Extraordinary rains such as that brought by Ondoy and the recent monsoon rains were way greater than the design capacity of the existing flood control systems. The flood control systems are
	Phase III is now being discussed but Phase I is not yet finished, complete the river walls first. Why is it that the river walls in Pasig are much higher than the river walls in Taguig? If you would look at the parapet walls, the height of walls in Taguig is much less.	For clarification, Phase I was not construction stage. It was the detailed design stage. On question 2, were you referring to the area near the National Steel Corporation? The flood design level for Napindan River is 13.8meters. It will be raised by one meter; one meter is the freeboard. The height of river wall is designed relative to the elevation. The slope of water, Coincides with the slope of the river channel, hence the freeboard
4. Air	Will DPWH use dust collector in the construction site? When the dredged materials are dry, dust might be generated. I hope RA 7849 will not be violated.	There is no plan to provide dust collectors as it is not practical. As an alternative, DPWH will provide water trucks that will go around and sprinkle just enough water around the site to prevent generation of dust during dry days. During wet days, the area will be drained by the internal drainage trenches and circumferential

EIA Module	Issues/Suggestions Raised by Stakeholder	Proponent's Response
5. People	Some portions of the 45-hectares are still being farmed. Does the government have alternative livelihood plan for the affected farmers?	There are rules in the Agrarian Reform law with respect to tenancy. Land owners will reap the yield from their land. Tenants are those who are recognized by the legal landowners as tenants. If a tenant has to be given compensation for losses, it should be proven that he is in fact a tenant. The topsoil will be returned back after completion of backfilling. The land can still be used for agriculture, although there could be alteration in the type of plants that it could support. It may not be good for rice anymore but could support
	What livelihood assistance can be provided to those who will be affected? Can they be employed during the construction? The construction will take three years, so the affected farmers will have no income for three years.	It is possible to hire them during construction. There is also a requirement to employ residents however potential employment would depend on the skills and capability of a person. We will study the options. (Suggestion from Reynaldo Flores, Barangay Chairman, Barangay Ibayo-Tipas – if livelihood assistance is not included in the DPWH budget,
	DPWHwill need manpower during construction. Will local residents be given priority in hiring? There are many residents in the barangay who need job.	Our law mandates that residents in the locality where a project is proposed to be located should be given priority in hiring. This will be during the construction stage. Hiring would depend on the manpower and skills requirement of the project.
6. Others	Are the owners of land inside the property where you propose to build access roads and drainage ditches agreeable to your plan? Are they willing to give the land required for the	We are in the process of identifying the legal landowners. We intend to meet with all land owners to explain the project plan and to obtain entry permits.

EIA Module	Issues/Suggestions Raised by Stakeholder	Proponent's Response
	Regarding the owners of land that will be affected, the DPWH has experienced this during the construction of the C6 road. All barangays they went to were barricaded. I hope that for this 45- hectare land that will be used as disposal site, DPWH will start to communicate with the owners immediately to avoid the same problem as that of the C6 road construction. Coordinate and consult with the farmers' association and the neighborhood associations as early as possible to avoid	

表 5.1.3 環境管理計画（EMP）

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
I. PRE-CONSTRUCTION PHASE						
Preparatory activities for site clearance/ Access to sites	A1. The People	Land ownership conflict	Proper identification of legal owners; coordination with barangay and municipal LGUs. The DPWH has initiated the identification of the owners to secure their permission to backfill the site as planned. The DPWH will start the project construction activities and land filling once permission from the legal owners is obtained. Coordination with the legal owners shall be undertaken prior to the construction activities to decide on the plan of action for the removal of obstructions. The DPWH does not intend to acquire any property. Ownership of the land will remain with the original title holders during and after completion of the project.	DPWH	20	Official list of legal owners; Certified true copy of titles or ownership document/included in scope and cost of design phase
	A2. The People	Anxiety among stakeholders	IEC, public briefing, project consultations, public participation in decision-making	DPWH	100	Included in scope and cost of design phase
Site clearing and demolition of obstructions	B1 Land	Generation of solid wastes	Reuse, recycling, proper disposal of residuals	DPWH/ LGU	Part of the Project Cost	Built-in management measures included in the design and construction plan

Tb 5.15

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
II. CONSTRUCTION PHASE						
Backfilling and embankment	A1 The Land Land Use	Permanent change in land use from existing land use	No management measure recommended. The change is consistent with the zoning plan of Taguig City that classifies the proposed backfill site as socialized housing zone. When filled, the site will be on higher elevation and appropriate for settlement, supporting the City's plan to immediately address the increasing demand for housing.	Not applicable	Not applicable	Not applicable
Clearing and grubbing Backfilling and embankment Construction of jetty	A2 The Land ECA	Encroachment in Environmentally Critical Areas (ECAs) The entire project site and peripheral areas are ECAs due to high vulnerability to flood hazard. The proposed backfill site and access roads will be elevated and will be less susceptible to flooding. Other low-lying areas however will remain susceptible to flooding	The backfill site will be provided with drainage trenches and circumferential ditches so as not to add on to the flooding problem of peripheral areas. The DPWH may increase the capacity of the Labasan Pumping Station as the need arises. With or without the project, flooding is a perennial problem in the area. Immediate implementation of Taguig City's Strategic Concept Plan may help resolve this perennial flooding problem. Computations show that the project will not contribute to the flooding problem.	DPWH	Part of the Project Cost	Included in design and construction plan
Clearing and grubbing Backfilling and embankment Construction of jetty	A3 The Land, Geology, Geomorphology, Geohazards	Impact of natural hazard (seismic, liquefaction, flooding) on the project	Contractor shall have and Emergency Preparedness Plan for unforeseen circumstances; emergency plan for flood events shall be considered in the construction planning; insurance for equipment and workers shall be considered.	Contractor	Part of the Project Cost	Included in the contract conditions and contractor's liability

Tb 5.16

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
Clearing and grubbing ground preparation removal of topsoil for site development temporary laydown areas access road and jetty construction	A4 The Land Pedology	Soil erosion/loss of topsoil .	A temporary sand basin or settling pond will be provided at the base of main discharge outlet of the backfill area to contain soil erosion and help prevent sedimentation of receiving creek. The sand basin will be maintained during the whole period of backfilling. Proper construction methods and adherence to plans and specifications on clearing and grubbing, mixing, fill and compaction methods; temporary jetty construction method; proper stockpiling and perimeter maintenance; earth moving and construction equipment; slope; and drainage. Provision of temporary cover on exposed areas that are not worked on for long periods during windy and rainy days to prevent soil movement. Regulated sprinkling of the worksite on windy days. Ground preparation and clearing can be conducted progressively to minimize the total area of soil cover and land that will be disturbed at any one time, where	Contractor	Part of the Project Cost	Included in the contract conditions and contractor's liability
Clearing and grubbing; ground preparation; removal of topsoil for site development; temporary laydown areas ; access road and jetty; and construction activities	A5 The Land Pedology	Soil contamination due to accidental fuel or oil spills from vehicles and equipment may occur during the construction phase of the project Improper disposal of construction and domestic wastes may contaminate the soil at the immediate and adjacent areas of backfill particularly near the construction camp sites.	Engage heavy equipment operators that have DOLE-accreditation and adequate safety training. This may help ensure safe operation and reduce contamination risks. An emergency containment and clean-up program shall be developed by the contractor to handle any occurrences of fuel or oil spills. Waste oils, lubricants, and chemicals shall be placed in designated storage tanks. Disposal of these wastes will be managed in accordance with the project's waste management plan that will be developed before the construction. Monitoring of compliance by the Contractor to DOLE DO 13 and applicable Rules of the Occupational Safety and Health Standards (OSHS)	Contractor/ DPWH	Part of the Project Cost	Included in contract conditions and contractor's environment, health and safety plan Included in construction management plan

Tb 5.17

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
Clearing and grubbing removal of topsoil for site development	A6 The Land Terrestrial /Ecology	Loss of habitat, threat to existence and/or loss of important local species, threat to abundance, frequency, and distribution of important species,	It seems unlikely that the construction and future operation of the proposed backfill area will have major adverse or undesirable effects on the terrestrial ecology within, surrounding and adjacent terrestrial communities. Few measures may be undertaken to maintain the integrity of the terrestrial environment within and around the proposed backfill site. The trees should be maintained within the periphery of the project site which will serve as buffer zones for	Contractor/ DPWH	Not applicable	Consider in the project design/project construction plan
	B The Water					
Clearing and grubbing Removal of top soil Filling and embankment Construction of ditches and auxiliary facilities	B1 Hydrology/ hydrogeology	Minimal potential impacts: Change in drainage morphology/ inducement of flooding/reduction in stream volumetric flow	Built-in management measures: The run-off from the northern and eastern residential areas will be drained through a ditch along the board that will be connected to the Labasan Creek on the west and to the drainage canal on the south that also flows toward Labasan Creek. During high flows, water from Labasan Creek shall be pumped out to Laguna Lake through the Labasan Pumping Station. In order to contain the run-off from the backfill site and from the northern and eastern residential areas, a surrounding ditch is planned that would drain into the southern and western existing channels through a temporary control sluice gate.	Contractor	Part of the Project Cost	Incorporate in the construction plan

Tb 5.18

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
Clearing and grubbing Removal of top soil Filling and embankment Construction of ditches and auxiliary facilities	B2 Water Quality Degradation of groundwater quality and surface water quality	Gasoline, fuel and lubricants from heavy equipment may be accidentally spilled on the ground during vehicle maintenance and in the event of accidental toppling down of equipment. The spills may eventually find their way to the shallow groundwater table and contaminate the groundwater. Increase in turbidity, suspended solids and bacterial contamination of Napindan River and the waterways around the backfill site	Built-in measures: Installation and maintenance of sufficient number of portable toilets at the construction site Contained water at the periphery ditch shall be monitored daily in terms of pH for possible generation of alkaline water from admixture Preparation of Health, Safety and Environmental Management Plan. Prevention of fuel and oil spills and management of accidental spills will be addressed by the Contractor's Environmental Management Plan. For the stripped vegetation during clearing and grubbing, several options will be considered. The larger wastes (e.g. tree trunks, branches) may be recovered for other uses, the hyacinths may be harvested. The residual may be composted (windrows or similar process). The expected volume is large so this can be done by stages. With optimum conditions, the wastes could turn into compost within 60 days. Silt traps will be provided around the backfill site	Contractor	Part of the Project Cost	Incorporated in design and construction plan
Clearing and grubbing Removal of top soil Filling and embankment Construction of ditches and auxiliary facilities Construction of access road and jetty	B3 Degradation of surface water quality	Increase in groundwater and surface water pH	The drain water from the backfill site shall be monitored daily for pH for the possibility of generating very alkaline wastewater due to pre-mixing admixture. If necessary, generated wastewater will undergo neutralization first prior to discharge to the receiving creeks.	Contractor	Part of the Project Cost	Incorporated in the construction plan

Tb 5.19

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
Clearing and grubbing Removal of top soil Filling and embankment Construction of ditches and auxiliary facilities Construction of access road and jetty			Survey of buried facilities such as water pipes should be undertaken to pinpoint the exact location and detailed description of buried facilities. Proper excavation techniques to avoid damages on the facilities will be planned. Proper handling of silt and spoils, decantation, or provision of filters at the effluent discharge points. Prohibit throwing solid and liquid waste into the rivers or waterways Continue the water quality monitoring of Napindan River and Labasan Creek	Contractor/ DPWH MMT	Part of the Project Cost	Incorporated in construction plan Incorporated in the PRUMS monitoring plan
Clearing and grubbing Removal of top soil Filling and embankment Construction of ditches and auxiliary facilities Construction of access road and jetty	B4 Aquatic Ecology	Loss of habitat and threat to abundance, frequency and distribution of species	Proper planning and management, prevention of siltation, implementation and monitoring of proper waste management, proper method of stockpiling, backfilling and transport to avoid soil deposition or rivers/waterways.	Contractor	Part of the Project Cost	Incorporated in construction plan.
	C The Air					
Earthmoving activities Use of equipment that utilize fossil fuel	C1 Climate/ Meteorology	Contribution in terms of greenhouse gas emissions	Reduce equipment idling time Improvement in equipment maintenance Driving training on proper practices to reduce fuel consumption of equipment Implement electricity conservation strategies Use newer equipment as far as possible	Contractor	Part of the Project Cost	Incorporate in construction plan

Tb 5.20

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
Clearing and grubbing Removal of top soil Filling and embankment Construction of ditches and auxiliary facilities Construction of access road and jetty	C2 Air quality	Generation of dust and other air pollutants	Provision of temporary cover/screen where works are ongoing, particularly at the direction where the wind is blowing. Proper housekeeping Provision of cover on stockpile of loose sand, soil and similar materials, particularly during sunny and windy days Ensure a dust filter to be installed and effective in the equipment to lessen air pollutants. Minimize the idling time of the equipment. Regular water sprinkling using tank lorries especially during dry weather.	Contractor	Part of the Project Cost	Include in construction contact provisions
Clearing and grubbing Removal of top soil Filling and embankment Construction of ditches and auxiliary facilities Construction of access road and jetty	C3 Noise	Increase in ambient noise levels	Vehicles and equipment should be installed with muffler to minimize noise. Proper scheduling of construction activities; avoid or minimize movement of major noise producers near noise-sensitive receptor areas during the early mornings and late nights. Regulate speed. Implement speed limits within and around the construction site and along access road to the sites. Prohibit the use of horns within and around the construction sites and access roads. Use of horn should be limited to emergencies.	Contractor	Part of the Project Cost	Bidding documents and specifications
Operation of noise-producing heavy equipment	C4 Noise (Excessive noise)	Potential impact on workers	Limit exposure of workers to activities that may produce excessive noise through work scheduling Regular noise monitoring	Contractor	Part of the Project Cost	Manpower deployment plan

Tb 5.21

Project Phase/Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarante/Financial Arrangements
Demolition of obstructions	D1 The People	Displacement of informal settlers at the backfill site	DPWH will not acquire any land for the backfilling activities. Landowners within the proposed 45-ha area will be negotiated and acquired consent to backfill their properties. The landowners as beneficiaries of the backfilling project shall take responsibility in clearing their lots of informal occupants before the start of backfilling. The landowners may seek support from the LGUs Urban Poor Affairs Office for possible accommodation of some occupants in the City's relocation site.	Land owners DPWH/ LGU	250	Agrement between DPWH and and land owners
	D2 The People	Temporary displacement of legal owners	Legal owners are the direct beneficiaries of the backfilling project and are willing to relocate while construction is in progress.	DPWH/LGU	Not applicable	Agreement with legal owners
	D3 The People	Temporary displacement of market vendors	The DPWH shall closely coordinate with the City Government and Barangay Officials for identification of areas where the market vendors can transfer. The DPWH shall coordinate with the City's Urban Poor Affairs Office for possible assistance (e.g. in transferring the stall materials) during the transfer of the market vendors.	DPWH/Barangay LGU	20	Agreement with vendors and Barangay LGU
	D4 The People	Displacement of farmers	The landowners as beneficiaries of the backfilling project shall take responsibility in negotiating their tenants before the start of backfilling. The farmers shall be given time to harvest their standing crops. They may also be absorbed as laborers or skilled workers during the project construction stage. They may be given priority for employment during the project construction stage.	DPWH/LGU/ Barangay LGU	Not applicable Part of the Project Cost	Agreement with Barangay LGUs
	D5 The People	Employment Opportunities for Local Residents	Hiring of qualified residents for skilled and unskilled positions.	Contractor/ DPWH	Part of the Project Cost	Part of contract conditions
	D6 The People	Disruption of traffic flow at the barangay access road	Preparation of traffic management plan in coordination with the Barangay LGUs. Assign a traffic officer during the entire period of project implementation. Provide sufficient warning and traffic signs in strategic locations.	Contractor/ DPWH	Part of the Project Cost	Part of contract conditions

Tb 5.22

Project Phase / Environmental Aspect (Project Activity Which Will Likely Impact the Environmental Component)	Environmental Component Likely to be Affected	Potential Impact	Options for Prevention or Mitigation* or Enhancement	Responsible Entity	Cost PhP (1,000)	Guarantee / Financial Arrangements
II. OPERATION PHASE AND ABANDONMENT PHASE						
Presence of the backfilled area	A1 The Land	Susceptibility to subsidence	Limit use to light structures until site has become stable	Landowners/ LGU	none	Agreement with owners
Presence of backfilled area	A2 The Land	Increase value of property	Improve aesthetics by tree-planting	Landowners /LGU	none	Agreement with owners
Presence of backfilled area	A4. The Air	Increase in GHG due to loss of canopy	Some portions of the project site may be converted into patches of woodlands by planting fruit trees or fast growing species. The canopies of these trees may serve as the sinks from the gaseous emissions/ pollutants which may ameliorate or abate the impact.	Landowners /LGUs	none	Agreement with owners

Tb 5.23

Tb 5.24

表 5.1.4 環境モニタリング計画（EMoP）

Key Environmental Aspects per Project Phase	Potential Impacts Per Envit'l Sector	Parameter to be Monitored	Sampling & Measurement Plan			Lead Person	Annual Estimated Cost	EQPL MANAGEMENT SCHEME					
			Method	Frequency	Location			EQPL RANGE			MANAGEMENT MEASURE		
								ALERT	ACTION	LIMIT	ALERT	ACTION	LIMIT
I. PRE-CONSTRUCTION PHASE	Please refer to the reports of baseline monitoring conducted for groundwater quality, surface water quality, air quality, noise, traffic and social surveys included in this EIA Report.												
II. CONSTRUCTION PHASE													
Solid Waste	Solid waste generation from dismantled structures and from the dredged materials and clearing & grubbing	Volume generated; recycled, reused, composted, residual	Weighing ; bulk estimate	once	Backfill site, jetty site	Contractor's PCO	2000/site x 2 sites =2,000						
Water Quality	Siltation	Total Suspended Solids (TSS)	Grab sampling; RA9275 lab analysis method	monthly	Napindan River (C6) bridge	PRUMS team	P500/sample * 2 bottles/ station/wk * 52 wks/yr = P52,000						
Water Quality	Alkalinity	pH	In-situ pH electrode	Once a day	East & west discharge points	Contractor's PCO	P250/day x2x250days=125,000						
Water Quality	Degradation of water quality	pH, BOD_5, DO, Oil and Grease, Heavy Metals	Grab sampling; RA9275 lab method	monthly	Napindan River (C6 bridge); Labasan Creek	PRUMS	50000/mo x 12mo =600000						
Groundwater Quality	Degradation of groundwater quality	pH, Oil and Grease, Heavy Metals	Grab sampling; RA9275 lab method	monthly	4 sites; baseline sampling sites	Contractor's PCO	48000/mo x 12mo =576000						

Tb 5.25

Key Environmental Aspects per Project Phase	Potential Impacts Per Envit'l Sector	Parameter to be Monitored	Sampling & Measurement Plan			Lead Person	Annual Estimated Cost	EQPL MANAGEMENT SCHEME					
			Method	Fre-quency	Location			EQPL RANGE			MANAGEMENT MEASURE		
								ALERT	ACTION	LIMIT	ALERT	ACTION	LIMIT
Air Quality	Dust generation	TSP	24-hr sampling using high volume air sampler	monthly	Baseline air quality sampling sites	Contractor's PCO	30000/mox 12mo= 360000						
Ambient Noise	Increase in noise level	Noise levels	Observation	daily	Construction site	Contractor's PCO	-						
People	Displacement and relocation	Number of affected households provided with relocation or transfer assistance	Actual count/interview	Monthly	Area relocated, conditions at relocation site; type of assistance provided	PMO	-						
People	Loss of livelihood	Number of farmers and households affected; Affected residents accommodated as skilled/unskilled worker during construction stage; Alternative livelihood of affected residents generated as a result of the project	Actual count/interview	Monthly	At site or at residence	PMO	-						
III. CLOSURE AND OPERATION PHASE	Monitoring activities will cease after the turn-over of the improved lots to their respective owners.												

Tb 5.26

表 5.5.1 住民移転計画の実施スケジュール

		Responsible Organization	yyyy.mm.dd	Action
A	Detailed design and other consulting services of Phase III Project	DPWH	2012.12.20 2013.01.31	Draft Final Report to DPWH from JICA Study Team Final Report
B	Census survey, Socio-economic study, and Revision of RAP	DPWH	2012.12.20	Final Report to DPWH from JICA Study Team
D	Construction supervision consultant to be assigned	DPWH	2013.02.15	Arrive in Manila
E	Construction work for PMRCIP Phase III	DPWH	2013.09.01	Start
			2016	Finish
1	Preparation of RAP	DPWH	2012.04.23	Start
			2013.7.4th week	RAP authorization by DPWH Submission to JICA
			2013.08.2nd week?	JICA returns comments
2	Verification of eligibility of PAFs for NHA resettlement	DPWH/LIAC/NHA **(LIAC includes PRRC)**	2013.1.7	Master list submission from DPWH to LIAC and NHA
			- 2013.06.30	Pre-qualification results out from NHA. Usual validity of the list is 6 months.
	Mid-Term Election		**2013.5.13**	**45-days moratorium of major public activities before and after the election, as well as 45-days transition period of governance after the election will be observed.**
	PRE-RESETTLEMENT PHASE			
3	Coordination and implementation of the 3 consecutive Open Dialogue with attendance of LIAC = Finalization of Resettlement Action Plan	DPWH/LIAC	2013.06.14	Start preparation
			2013.06.14	ESSO monitoring starts
			2013.07.1st week	1st meeting
			2013.07.2nd week	2nd meeting
			2013.07.3rd week	3rd meeting

		Responsible Organization	yyyy.mm.dd	Action
		LIAC	2013.07.3rd week	Issuance of 30-days notice for demolition and clearance
		DPWH	2013.7.4th week	RAP authorization by DPWH Submission to JICA
4	Grievance redress regarding the eligibility decision	DPWH/LIAC	2013.07.1st week	Start
5	Decision of PAFs regarding the choice or acceptance of compensation, resettlement and/or assistances	PAF/ DPWH/LIAC	2013.07.1st week	Start DPWH-PMO will record the addresses of relocatees for monitoring.
6	Preparation of necessary documents and funding by PAFs and LGUs for demolition, relocation, and financial assistance		2013.08.31	Finish
	PHYSICAL RESETTLEMENT PHASE			
7	Resettlement Activities Monitoring at Project Site	DPWH/LIAC	2013.08.01	Start
8	Voluntary demolition by PAFs Payment of compensation before physical relocation, resettlement	PAF DPWH/LIAC	2013.08.01	Start
9	Demolition of structures by DPWH/City Engineering Dept. with the attendance of the affected settler(s) and LIAC members	PAF DPWH/LIAC	2013.09.01	Start DPWH, in coordination with other related institution, provide man power and equipment to clear and level the site of demolition
10	Demolition of structures Payment of compensation, resettlement	PAF DPWH/LIAC	2013.09.30	Finish
11	After demolition and clearing the affected area, the Barangay Police patrols/monitor the cleared area to prevent the returnees	DPWH/LGU/ Barangay	2013.08.01	Start (turn-over of responsibility will be done lot by lot)
			2013.09.30	Finish
	POST-RESETTLEMENT PHASE			
15	Monitoring at resettled locations	DPWH/PRRC/ NHA	2013.08.01	Start
			2017.12.31	End (1 yr after the project completion)

		Responsible Organization	yyyy.mm.dd	Action
16	Livelihood rehabilitation program to be provided or introduced based on the monitoring results	Funded by : DPWH Coordinated by : NHA Operated by : Various	2013.08.01	Start (Customary continues for 2 yrs after resettlement. Later the period, receiving LGU shall be the responsible institution for assistance)

表 5.5.2 用地買収の手順

		Responsible Organization	Action
A	Detailed design and other consulting services of Phase III Project	DPWH	Draft Final Report to DPWH from JICA Study Team Final Report
B	Construction supervision consultant to be assigned	DPWH	Arrive in Manila
C	Construction work for PMRCIP Phase III	DPWH	Start
			Finish
1	Parcellary survey	DPWH	Start
			Finish
			Approval of survey report
2	Subdivision plan	DPWH	Start of Preparation of Subdivision Plan
		Lot owner/DPWH	Start confirmation with lot owner
		DPWH/ DENR/LMB	Start approval procedure with DENR and Land Management Bureau (LMB)
			Approval of subdivision plan by DENR and LMB
5	Relocation of public utilities	DPWH	Start preparation of Utility Relocation Plan
		Utility owner/ DPWH	Negotiate with utility company (cooperative) to relocate utility
		Utility owner/ DPWH	Pay utility company (cooperative) to relocate
		Utility owner	Relocate utility
6	Negotiation of value (Donation) (Bureau of Internal Revenue zonal value) (Valuation by Appraisal Committee)	Land owner/ DPWH	Start the following procedure Request land owner to donate property Start making offer based on BIR zonal value If necessary, request Appraisal Committee to recommend valuation. Obtain value of property and improvements from Appraisal Committee

		Responsible Organization	Action
	(Independent Appraisal)		If necessary, conduct appraisal using independent land appraiser Make offer to land owner Agree with land owner regarding the value
7	Deed of absolute sale (DAS)	DPWH	Prepare deed of absolute sale
		DPWH	Review of the deed
		DPWH	Approval of the deed
8	Transfer of title/tax declaration	Land owner/ DPWH	Start preparation of necessary documents, pay taxes and mortgage
		Notary public	Notarize deed of absolute sale
			Within 30 days of notarization, transfer title/tax declaration
			Start payment of full amount less taxed and mortgage paid
			Finish payment of full amount less taxed and mortgage paid
9	Clearing of structures, improvements, and trees	DPWH	Start
		DPWH/DENR	Request and obtain permit to cut trees
		DPWH	Finish

表 6.2.1 施工上の障害物 (パッシグ川)

	LOCATION/ STATION (Approx.)	STRUCTURE	OWNER/ COMPANY NAME	EXISTING CONDITION	REMARKS
R	0+830	Low Electrical Lines	MERALCO	Operating	To L 0+850
L	0+850	ditto	ditto	ditto	To R 0+830
R	0+850~1+000	Moored Sips	Unknown	Used	
R	1+400	Low Electrical Lines	MERALCO	Operating	To L 1+470
R	1+400~1+750	Moored Ships	Unknown	Used	
R	1+450	Low Electrical Lines	MERALCO	Operating	To L 1+470
L	1+470	ditto	ditto	ditto	To R 1+400
L	1+470	ditto	ditto	ditto	To R 1+450
R	1+480	Low Electrical Lines	MERALCO	Operating	To L 1+510
L	1+510	ditto	ditto	ditto	To R 1+480
L	1+560	Ferry Station	PRRC	Non-Operating	
R	1+760	High Electrical Lines	MERALCO	Operating	To L 1+760
L	1+760	ditto	ditto	ditto	To R 1+760
L	1+950	Wood Piles		Not Used	
L	2+220	Wood Piles		Not Used	
L	2+320	Ferry Station	PRRC	Non-Operating	
R	2+370	Boat Station		Non-Operating	
L	2+850	Moored Tag Boats		Used	
R	3+090	Many Huts		Inhabited	Under Ayala Bridge
C	3+140	CG Station		Operating	North side of the Island
L	3+270	Abandoned Ship		Abandoned	
C	3+290	Jetty			North side of the Island
C	3+320	Buoy		In Service	
L	3+420	High Electrical Lines	MERALCO	Operating	To R 3+430
R	3+430	ditto	ditto	ditto	To L 3+420
C	3+570	Buoy		In Service	East top of the Island
C	3+680	Buoy		In Service	Middle of the river
L	3+630~3+780	Moored Sips	Unknown	Used	
R	3+850	CG Station		Operating	
R	4+130	CG Station		Operating	
L	4+150	CG Station		Operating	
R	4+190	CG Station		Operating	
L	4+280	CG Station		Operating	
L	4+380	Jetty		Used	
R	4+400	CG Station		Operating	
L	4+420	CG Station		Operating	
L	4+700	Many Wood Piles		Not Used	
R	5+100	Stone Wall		Broken	
R	5+200	3 Concrete Steps		Not Used	
L	5+225	Jetty		Not Used	
L	5+430~6+130	Company Jetties		Operating	
R	5+550~5+630	Many Ships		Used	
R	5+640	Two Abandoned Ships		Abandoned	
R	5+680~5+730	Many Passenger Boats		Not Used	
R	6+070	Ferry Station	PRRC	Non-Operating	
R	6+100	CG Station		Operating	
R	6+290	High Electrical Lines	MERALCO	Operating	To L 6+290 Between Pipeline and Railway Bridges
L	6+290	ditto	ditto	ditto	To R 6+290
R	6+550~6+730	Many Ships		Used	
R	7+150~7+250	Jetties		Operating	
L	7+240	Cable		Operating	To R 7+270
R	7+270	ditto		ditto	No L 7+240
L	7+280	Boat Station		Operating	
R	7+320	Boat Station		Operating	
R	7+590	Boat Station		Operating	
L	7+900~8+000	Jetties		Operating	
R	8+150	Wood Piles		Non-Operating	
L	8+380	Jetty	Planter's Product Inc.	Operating	
R	8+580	Wood Jetty		Not Used	
R	8+650	Concrete Jetty		Not Used	
R	8+810	Low Electrical Lines	MERALCO	Operating	To L 8+860
L	8+860	ditto	ditto	ditto	To R 8+810
L	8+850	Boat Station		Operating	
L	8+870	Boat Station		Operating	

L	8+900	Ferry Station	PRRC	Non-Operating	
R	8+920	Wood Piles		Not Used	
L	8+950	Wood Piles		Not Used	
R	8+960	Boat Station		Operating	
R	9+010	Boat Station		Operating	
R	9+110	Boat Station		Not Used	
R	9+150	Jetty		Not Used	
R	9+420	Wood Piles		Not Used	
R	9+720	Abandoned Boats		Abandoned	
R	9+800	Ferry Station	PRRC	Non-Operating	
L	9+900	Jetty	Toyo	Operating	
L	9+900	H-beam fenders	Toyo	Operating	
R	9+950	Low Electrical Lines	MERALCO	Operating	To L 9+950 Along the east side of Lambingan Bridge
L	9+950	ditto	ditto	Operating	To R 9+950
L	10+070	Buoy		Operating	No Concern
L	10+100~10+230	7 H Beam Piles		Un known	
R	10+150	Jetty		Operating	
R	10+270	Jetty		Operating	
L	10+300	Jetty		Operating	
L	10+400	Concrete Terrace		Used	
L	10+450	Concrete Terrace		Used	
L	10+530	Jetty		Operating	
R	10+610	Low Electrical Lines	MERALCO	Operating	To L 10+640
L	10+640	ditto	ditto	ditto	To R 10+610
R	10+750	Buoy		In Service	
L	10+850	Boat Club Wharf		Operating	
R	10+950~11+250	Jetties	Sea Oil Corporation	Operating	With 4 submerged piping
R	11+680~11+790	Public Terrace		Used	
L	11+760	Jetty		Non-Operating	
R	11+820	Jetty		Operating	
R	11+950	Ferry Station	PRRC	Non-Operating	
L	12+020~12+170	Jetties	Manila Cordage Corp.	Operating	
L	12+230	Jetty		Non-Operating	
L	12.270	2 Piles		Not used	
L	12+960	Boat Station	Unknown	Operating	
R	12+960	Boat Station	Unknown	Operating	
R	13+030	Low Electrical Lines	MERALCO	Operating	To L 13+030
L	13+030	ditto	ditto	ditto	To L 13+030
R	13+040	Ferry Station	PRRC	Non-Operating	
L	13+050~12+130	Public Terrace		Used	
R	13+260	High Electrical Lines	MERALCO	Operating	To L 13+260
R	13+260	ditto	ditto	ditto	To L 13+320
L	13+260	ditto	ditto	ditto	To R 13+260
L	13+320	ditto	ditto	ditto	To R 13+260
L	13+480	2 Wood Piles		Not Used	
L	13+610	Jetty		Non-Oereating	
L	13+745	Boat Station		Operating	
R	13+750	Boat Station		Operating	
L	13+770	High Electrical Lines	MERALCO	Operating	To R 13+780 EL＝+32.3
R	13+780	ditto	ditto	ditto	To L 13+770 EL＝+23.6
R	13+810	A Hut		Occupied	
R	13+930	Boat Station		Not Used	
L	14+030	2 Wood Piles		Not Used	
R	14+180	High Electrical Lines	MERALCO	Operating	To L 14+210
L	14+210	ditto	ditto	ditto	To R 14+180
R	14+290	Low Electrical Lines	MERALCO	Operating	To L 14+290
L	14+290	ditto	ditto	ditto	To R 14+290
R	14+300	Low Electrical Lines	MERALCO	Operating	To L 14+310
L	14+310	ditto	ditto	ditto	To R 14+300
L	14+310	High Electrical Lines	MERALCO	Operating	To R 14+370 EL=+33.9
R	14+370	ditto	ditto	ditto	To L 14+310 EL=+43.0
R	14+380	High Electrical Lines	MERALCO	Operating	To L 14+380 EL=+25.8

L	14+380	ditto	ditto	ditto	To R 14+380 EL=+29.5
R	14+570	Block Wall		Not Used	
L	14+570~14+610	Public Terrace		Used	
L	14+620	Ferry Station	PRRC	Non-Operating	No Concern
L	14+640~14+690	Public Terrace		Used	
R	14+680	Piles		Not Used	
L	14+730~14+790	Public Terrace		Used	
R	14+76 ~14+800	Public Terrace		Used	
L	14+770	Low Electrical Lines	MERALCO	Operating	To R 14+780
R	14+780	ditto	ditto	ditto	To L 14+770
R	14+890	Boat Station		Operating	
L	14+900~15+020	Public Terrace		Used	
R	15+000~15+200	Jetty		Operating	
R	15+010	High Electrical Lines	MERALCO	Operating	To L 15+030 EL=+26.3
L	15+030	ditto	ditto	ditto	To R 15+010 EL=+25.4
L	15+070~5+140	Public Terrace		Used	
R	15+200~15+350	Pile Fenders		Operating	
L	15+260	Boat Station		Operating	
R	15+420	Boat Station		Operating	
L	15+530	2 Wood Piles		Not Used	
R	15+560~16+470	Public Terrace		Used	Very long terrace
R	15+650	Pile-up		Occupied	
R	15+700	Pile-up		Occupied	
R	15+750	Pile-up		Occupied	
R	15+860	Pile-up		Occupied	
L	16+010	Block Wall		Not Used	
R	16+120	Boat Station		Operating	
L	16+150	Boat Station		Operating	
R	16+300	Pile-up		Occupied	
R	16+350	Pile-up		Occupied	
L	19+430	Water Pipe Line	MWSS	Operating	OD1500, Depth Unknown
L	16+480	Huts		Inhabited	
R	16+530~16+750	Jetties		Operating	
R	16+660	High Electrical Lines	MERALCO	Operating	To L 16+660 EL=+27.9
L	16+660	ditto	ditto	ditto	To R 16+660 EL=+23.5
R	16+770~16+840	Jetties		Operating	

表 6.2.2 施工上の障害物（マリキナ川下流）

	LOCATION/ STATION (Approx.)	STRUCTURE	OWNER/ COMPANY NAME	EXISTING CONDITION	REMARKS
L	0+300	Muck Unloading Ship		Operating	Sometimes
R	0+350	5 Wood Fenders		Operating	
RL	1+550	Water Pipeline	MWSS	Operating	OD1800, Depth Unknown
R	1+560	Jetty & Intake Pipe		Operating	
R	1+700	Jetty		Operating	
R	1+800	Jetty		Non-Operating	
R	1+950	Jetty		Non-Operating	
R	2+200	LPG Company Jetty		Operating	Dredging work is carried out privately to keep water depth. Large vessel navigation is difficult upstream.
R	2+600	Steel Walkway		Not Used	
RL	3+067	Water Pipeline	MWSS	Operating	OD1050, Depth is around EL1.0m
R	Adjacent to Rosario Bridge Pasig City (4+230)	Cable Lower than the Bridge		Operating	
L	4+230	ditto		ditto	
RL	4+263	Water Pipeline	MWSS	Operating	OD750, Depth is around EL12.0m
R	4+900	Cable		Operating	
L	4+900	ditto		ditto	

表 6.2.3 橋梁桁下高

RIVER	STATION	BRIDGE NAME	MAX. HEIGHT	REMARKS
Pasig	0+705	Delpan	EL+15.930	
Pasig	1+800	Jones	EL+14.790	
Pasig	2+165	MacArthur	EL+14.470	
Pasig	2+200	LRT	EL+16.6	
Pasig	2+400	Quezon	EL+18.170	
Pasig	3+092	Ayala	EL+16.410	
Pasig	5+010	Nagtahan	EL+16.500	
Pasig	6+250	MWSS Pipeline	EL+15.5	
Pasig	6+300	PNR Railway	EL+16.5	
Pasig	6+320	Zamora, Pandacan	EL+20.050	
Pasig	9+940	MWSS Pipeline, Lambingan	EL+17.206	
Pasig	9+950	Lambingan	EL+16.750	
Pasig	12+776	Makati-Mandaluyong	EL+16.270	
Pasig	13+500	New Bridge	EL+18.2	
Pasig	14+400	Guadalupe	EL+20.900	
Pasig	16+850	C-5	EL+22.100	
Lower Marikina	0+556	Sta. Rosa	EL+17.051	
Lower Marikina	1+250	Vargas	EL+18.936	
Lower Marikina	3+220	Alfonso Sandoval	EL+18.075	
Lower Marikina	4+230	Rosario	EL+18.874	
Napindan	Lower	Lower Flap Gate	EL+17.11	Ba=17.45m
Napindan		(Pedestrian Footbridge)	EL+20.11	
Napindan		Upper Flap Gate	EL+16.65	
Napindan	to	New Bridge (under Construction)	EL+17.00	Not published yet. It is said to be planned more than EL+17.00.
Napindan		Bambang (San Joaquin)	EL+16.86	
Napindan		Kalawaan	EL+16.27	
Napindan	Upper	C6	EL+17.18	

Note: This table shows the highest elevation of bridge girder; re-survey is strongly recommend, when necessary.

表 6.3.1 各月における必要設備一覧

Marikina Equipmentfor Major Works (Total)

				per Unit Qntty		Whole Work Days		Calender Month																																				
Main Work	Item	Remarks	unit	per	Equipment	Total V	Equipment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Sum
Marikina Bank (3Banks in Total)	0.1c.m. Backhoe U Ditches		m	25	1	1,906	76																															3	1						4
	Sub Total 0.1c.m. Backhoe							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	3	1	0	0	0	0	0	4
Marikina Bridge Pier Protection	0.45c.m. Backhoe		pier	1	10	8	80								1			1												1					1									4
Marikina Bridge Pier Protection	0.45c.m. Backhoe		pier	1	10	8	80								1			1												1					1									4
Marikina Sluiceway	0.45c.m. Backhoe Sluiceway Fabrication		unit	1	30	9	270																	3	3	3	3	3																15
Marikina Bank (3Banks in Total)	0.45c.m. Backhoe Tree & Glass Removal		s.m.	100	1	19,061	191		7																																			7
Marikina Disposal Area	0.45c.m Backhoe Peripheral Ditch		m	100	1	1,600	16		1																																			1
	Sub Total 0.45c.m. Backhoe							0	8	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3	3	3	3	3	0	2	0	0	0	0	2	0	0	0	0	0	0	0	0	31
Marikina Sand Dredge	1.0c.m. Backhoe		c.m.	825	4	314,000	1,522			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4												92
Marikina Sand Dredge	1.0c.m. Backhoe	for unloading	c.m.	825	2	314,000	761			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2												46
Marikina Clay Dredge	1.0c.m. Backhoe	for dredging on barge	c.m.	900	4	656,000	2,916				4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	8	8	8	8	8	8	8	8	8	8	8	8	8			176
Marikina Clay Dredge	1.0c.m. Backhoe	for unloading	c.m.	900	2	656,000	1,458				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4			88
Marikina Bank (3Banks in Total)	1.0c.m. Backhoe Bridge SSP Preparation		m	20	2	60	6					2	2	2																														6
Marikina Clay Dredge	1.0c.m. Backhoe Pre-Mix		c.m.	900	4	656,000	2,916				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	9	9	9	9	9	9	9	9	9	9	9	9	9			225
Marikina Bank (3Banks in Total)	1.0c.m. Backhoe Promnade Demolish		m	10	2	1,906	381								1	3																												4
Marikina Bank (3Banks in Total)	1.0c.m. BackhoeRoad Extension		m	15	2	250	33		1																																			1
	Sub Total 1.0c.m. Backhoe							0	1	6	18	20	20	20	19	21	18	18	18	18	18	18	18	18	18	18	18	18	27	27	27	27	21	21	21	21	21	21	21	21	21	0	0	638
Marikina Sand Dredge	10t Dump Track		c.m.	825	8	314,000	3,045			8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8												184
Marikina Clay Dredge	10t Dump Track	for final transport	c.m.	900	5	656,000	3,644				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10	10	10	10	10			220
Marikina Clay Dredge	10t Dump Track (Sealed Type)		c.m.	900	8	656,000	5,831				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	16	16	16	16	16	16	16	16	16	16	16	16	16			352
Marikina Bank (3Banks in Total)	10t Dump Truck Promnade Demolish		m	10	6	1,906	1,144								3	9																												12
Marikina Bank (3Banks in Total)	10t Dump Truck Tree & Glass Removal		s.m.	100	0.5	19,060	95		4																																			4
	Sub Total 10t Dump Track							0	4	8	21	21	21	21	24	30	21	21	21	21	21	21	21	21	21	21	21	21	34	34	34	34	26	26	26	26	26	26	26	26	26	0	0	772
Marikina Bank (3Banks in Total)	15t Bull Dozer Bank Embankment		c.m.	690	1	38,120	55													1	1	1	1																					4
	Sub Total 15t Bull Dozer							0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Marikina Sand Dredge	20t Bull Dozer	for land backfill	c.m.	825	1	314,000	381			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1												23
Marikina Clay Dredge	20t Bull Dozer	for embankment	c.m.	900	1	656,000	729				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2			44
	Sub Total 20t Bull Dozer							0	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	2	2	2	2	2	2	2	2	2	0	0	67
Marikina Bank (3Banks in Total)	20t Tire Compactor Bank Embankment		c.m.	1,330	1	38,120	29													1	1	1	1																					4
	Sub Total 20t Tire Compactor							0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4
Marikina Disposal Area	10t Tank Lorry for Water Spray										1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			31
	Sub Tota 10t Tank Lorr							0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	31
Marikina Bank (3Banks in Total)	4t/truck Manhole and Conduit		m	30	10	1,906	635									1	4	5	5	2																								17
Marikina Bank (3Banks in Total)	4t/truck Parapet Concrete		m	50	1	1,906	38														1	1	1																					3
Marikina Sluiceway	4t/truck Sluiceway Fabrication		unit	1	30	9	270																	3	3	3	3	3																15
Marikina Bank (3Banks in Total)	4t/truck SSP Coping		m	25	6	1,906	457							2	3																													5
Marikina Bank (3Banks in Total)	4t/truck U Ditches		m	25	1	1,906	76																															3	1						4
	Sub Total 4t/truck							0	0	0	0	0	0	2	3	1	4	5	5	2	1	1	1	3	3	3	3	3	0	0	0	0	0	0	0	0	3	1	0	0	0	0	0	44
Marikina Bridge Pier Protection	2t Mini Crane		pier	1	10	8	80								1			1												1					1									4
	Sub Total 2t Mini Crane							0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	4
Marikina Bridge Pier Protection	25t Truck Crane		pier	1	10	8	80								1			1												1					1									4
Marikina Disposal Area	25t Truck Crane Access Concrete Bridge		pcs.	1	20	1	20		1																																			1
Marikina Bank (3Banks in Total)	25t Truck Crane Bridge SSP Preparation		m	20	1	60	3					1	1	1																														3
Marikina Bank (3Banks in Total)	25t Truck Crane General SSP Piling		m	18	2	1,846	205					2	2	2																														6
Marikina Sluiceway	25t Truck Crane Sluiceway Fabrication		unit	1	30	9	270																	3	3	3	3	3																15
	Sub Total 25t Truck Crane							0	1	0	0	3	3	3	1	0	0	1	0	0	0	0	0	3	3	3	3	3	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	29
Marikina Temprary Jetty	50t Crawler Crane	2fleeet*30day work	jetty	1	60	1	60		2																																			2
	Sub Total 50t Crawler Crane							0	2	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	2
Marikina Temprary Jetty	300DWT Barge		jetty	1	60	1	60		2																																			2
Marikina Bridge Pier Protection	300DWT Barge		pier	1	10	8	80								1			1												1					1									4
	Sub Total 300DWT Barge							0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	6
Marikina Sand Dredge	1000DWT Barge	825c.m./day	c.m.	825	2	314,000	761			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2												46
Marikina Clay Dredge	1000DWT Barge	900c.m./day	c.m.	900	2	656,000	1,458				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4			88
	Sub Total 1000DWT Barge							0	0	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	6	6	6	6	4	4	4	4	4	4	4	4	4	0	0	134
Marikina Sand Dredge	16PS Watch Boat		c.m.	825	2	314,000	761			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2												46
Marikina Clay Dredge	16PS Watch Boat		c.m.	900	2	656,000	1,458				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4			88
Marikina Temprary Jetty	16PS Watch Boat		jetty	1	60	1	60		1																																			1
Marikina Bridge Pier Protection	16PS Watch Boat		pier	1	10	8	80								1			1												1					1									4
	Sub Total 16PS Watch Boat							0	1	2	4	4	4	4	5	4	4	5	4	4	4	4	4	4	4	4	4	4	6	7	6	6	4	4	5	4	4	4	4	4	4	0	0	139
Marikina Sand Dredge	200PS Anchor Boat		c.m.	825	1	314,000	381			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1												23
Marikina Clay Dredge	200PS Anchor Boat		c.m.	900	1	656,000	729				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2			44
Marikina Temprary Jetty	200PS Anchor Boat		jetty	1	30	1	30		1																																			1
Marikina Bridge Pier Protection	200PS Anchor Boat		pier	1	10	8	80								1			1												1					1									4
	Sub Total 200PS Anchor Boat							0	1	1	2	2	2	2	3	2	2	3	2	2	2	2	2	2	2	2	2	2	3	4	3	3	2	2	3	2	2	2	2	2	2	0	0	72
Marikina Sand Dredge	500PS Tug Boat		c.m.	825	3	314,000	1,142			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3												69
Marikina Clay Dredge	500PS Tug Boat		c.m.	900	3	656,000	2,187				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	6	6	6	6	6	6	6	6	6	6	6	6	6			132
Marikina Temprary Jetty	500PS Tug Boat		jetty	1	30	1	30		1																																			1
Marikina Bridge Pier Protection	500PS Tug Boat		pier	1	10	8	80								1			1												1					1									4
	Sub Total 500PS Tug Boat							0	1	3	6	6	6	6	7	6	6	7	6	6	6	6	6	6	6	6	6	6	9	10	9	9	6	6	7	6	6	6	6	6	6	0	0	206
Marikina Bank (3Banks in Total)	15kW Vivro Hammer Bridge SSP Piling		m	1.5	1	60	40					1	1	1																														3
Marikina Sluiceway	15kW Vivro Hammer SSP Piling		unit	1	1	9	9																	1	1	1	1	1																5
	Sub Total 15kW Vivro Hammer							0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8
Marikina Temprary Jetty	40kW Vivro Hammer	20piece/day	pcs.	9	1	54	6		2																																			2
Marikina Bank (3Banks in Total)	40kW Vivro Hammer General SSP Piling		m	18	1	1,846	103					1	1	1																														3
	Sub Total 40kW Vivro Hammer							0	2	0	0	1	1	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	5
Marikina Bank (3Banks in Total)	3B Pump long term	9site*2unit*900days	m	200	18,000	1,906	171,540				18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18				540
	Sub Total 3B Pump							0	0	0	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	0	0	0	540
Marikina Bank (3Banks in Total)	6B Pump long term	9site*900days	m	200	9,000	1,906	85,770				9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				270
Marikina Bank (3Banks in Total)	6B Pump short term	9site*30days	m	200	300	1,906	2,859								3	6																												9
	Sub Total 6B Pump							0	0	0	9	9	9	9	12	15	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	0	0	0	279
Marikina Clay Dredge	Pre-Mix Pant 70cm/h		c.m.	900	1	656,000	729				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3			75
	Sub Total Pre-Mix Pant 70cm/h							0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	75
Marikina Bank (3Banks in Total)	50kVA Generator	9site*900days	m	200	9,000	1,906	85,770				9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9				270
	Sub Total 50kVA Generator							0	0	0	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	0	0	0	270
Marikina Temprary Jetty	125KVA Generator	20piece/day	pcs.	9	1	54	6		2																																			2
Marikina Bank (3Banks in Total)	125KVA Generator Bridge SSP Piling		m	1.5	1	60	40					1	1	1																														3
Marikina Sluiceway	125kVA Generator for SSP Piling		unit	1	1	9	9																	1	1	1	1	1																5
Marikina Bank (3Banks in Total)	125KVA Generator General SSP Piling		m	18	1	1,846	103					1	1	1																														3
	Sub Total 125KVA Generator							0	2	0	0	2	2	2	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
Marikina Clay Dredge	300KVA Generator Pre-Mix		c.m.	900	1	656,000	729				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3			75
	Sub Total 300KVA Generator							0	0	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	75

Pasig Equipmentfor Major Works (Total)

				per Unit Qntty		Whole Work Days		Calender Month																																				
Main Work	Item	Remarks	unit	per	Equipment	Total V	Equipment	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Sum
Pasig Drainage Work	0.45c.m. Backhoe		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
Pasig Parapet Wall	0.45c.m. Backhoe		m	8	1	4,569	571							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		29
	Sub Total 0.45c.m. Backhoe							0	0	0	0	0	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	0	84
Pasig Parapet Wall	4t/truck	Re-Bar Worker	m	8	1	4,569	571							1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		29
Pasig Drainage Work	4t/truck on land		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 4t/truck							0	0	0	0	0	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	1	1	0	84
Pasig SSP SSP Piling	50t Crawler Crane		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig Drainage Work	50t Crawler Crane		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 50t Crawler Crane							0	0	0	1	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	73
Pasig SSP SSP Piling	300DWT Barge		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig Drainage Work	300DWT Barge		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 300DWT Barge							0	0	0	1	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	73
Pasig SSP SSP Piling	16PS Watch Boat		m	12.6	2	4,569	725				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2																36
Pasig Drainage Work	16PS Watch Boat		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 16PS Watch Boat							0	0	0	2	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	91
Pasig SSP SSP Piling	200PS Anchor Boat		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig Drainage Work	200PS Anchor Boat		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 200PS Anchor Boat							0	0	0	1	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	73
Pasig SSP SSP Piling	500PS Tag Boat		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig Drainage Work	500PS Tag Boat		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 500PS Tag Boat							0	0	0	1	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	73
Pasig SSP SSP Piling	90kW Vivro Hammer		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
	Sub Total 90kW Vivro Hammer							0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
Pasig SSP SSP Piling	Water Jet		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
	Sub Total Water Jet							0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18
Pasig Drainage Work	20cm/h Concrete Mixer		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 20cm/h Concrete Mixer							0	0	0	0	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	55
Pasig Drainage Work	3B pump on land		m	50	2	100*4,569	9,138						8	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16				440
	Sub Total 3B pump							0	0	0	0	0	8	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	0	0	0	440
Pasig Drainage Work	4B pump		m	51	0.50	48*4,569	2,194						2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4				110
	Sub Total 4B pump							0	0	0	0	0	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	0	0	0	110
Pasig Drainage Work	6B pump		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
Pasig Drainage Work	6B pump on land		m	50	1	50*4,569	4,569						4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8				220
	Sub Total 6B pump							0	0	0	0	0	5	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	0	0	0	275
Pasig Drainage Work	50kVA Generator		m	50	1	50*4,569	4,569						4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8				220
	Sub Total 50kVA Generator							0	0	0	0	0	4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	0	0	0	220
Pasig Drainage Work	125KVA Generator		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2				55
	Sub Total 125kVA Generator							0	0	0	0	0	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	0	0	0	55
Pasig SSP SSP Piling	400KVA Generator		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
	Sub Total 400kVA Generator							0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18

表 6.3.2 各月における必要設備一覧（工種内訳）

Marikina Equipment for Major Works (Work Break Down)

Main Work	Item	Remarks	unit	per Unit Qntty per	per Unit Qntty Equipment	Whole Work Days Total V	Whole Work Days Equipment	Calender Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Sum
Marikina Sand Dredge	1000DWT Barge	825c.m./day	c.m.	825	2	314,000	761			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2												46
Marikina Sand Dredge	1.0c.m. Backhoe		c.m.	825	4	314,000	1,522			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4												92
Marikina Sand Dredge	500PS Tug Boat		c.m.	825	3	314,000	1,142			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3												69
Marikina Sand Dredge	200PS Anchor Boat		c.m.	825	1	314,000	381			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1												23
Marikina Sand Dredge	16PS Watch Boat		c.m.	825	2	314,000	761			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2												46
Marikina Sand Dredge	1.0c.m. Backhoe	for unloading	c.m.	825	2	314,000	761			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2												46
Marikina Sand Dredge	10t Dump Track		c.m.	825	8	314,000	3,045			8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8												184
Marikina Sand Dredge	20t Bull Dozer	for land backfill	c.m.	825	1	314,000	381			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1												23
Marikina Clay Dredge	1000DWT Barge	900c.m./day	c.m.	900	2	656,000	1,458				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4		88
Marikina Clay Dredge	1.0c.m. Backhoe	for dredging on barge	c.m.	900	4	656,000	2,916				4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	8	8	8	8	8	8	8	8	8	8	8	8		176
Marikina Clay Dredge	500PS Tug Boat		c.m.	900	3	656,000	2,187				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	6	6	6	6	6	6	6	6	6	6	6	6		132
Marikina Clay Dredge	200PS Anchor Boat		c.m.	900	1	656,000	729				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2		44
Marikina Clay Dredge	16PS Watch Boat		c.m.	900	2	656,000	1,458				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4		88
Marikina Clay Dredge	1.0c.m. Backhoe	for unloading	c.m.	900	2	656,000	1,458				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4		88
Marikina Clay Dredge	10t Dump Track (Sealed Type)		c.m.	900	8	656,000	5,831				8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	16	16	16	16	16	16	16	16	16	16	16	16		352
Marikina Clay Dredge	Pre-Mix Pant 70cm/h		c.m.	900	1	656,000	729				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3		75
Marikina Clay Dredge	1.0c.m. Backhoe Pre-Mix		c.m.	900	4	656,000	2,916				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	9	9	9	9	9	9	9	9	9	9	9	9		225
Marikina Clay Dredge	300KVA Generator Pre-Mix		c.m.	900	1	656,000	729				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3		75
Marikina Clay Dredge	10t Dump Track	for final transport	c.m.	900	5	656,000	3,644				5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	10	10	10	10	10	10	10	10	10	10	10	10		220
Marikina Clay Dredge	20t Bull Dozer	for embankment	c.m.	900	1	656,000	729				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2		44
Marikina Temprary Jetty	50t Crawler Crane	2fleeet*30day work	jetty	1	60	1	60	2																																		2
Marikina Temprary Jetty	40kW Vivro Hammer	20piece/day	pcs.	9	1	54	6	2																																		2
Marikina Temprary Jetty	125KVA Generator	20piece/day	pcs.	9	1	54	6	2																																		2
Marikina Temprary Jetty	300DWT Barge		jetty	1	60	1	60	2																																		2
Marikina Temprary Jetty	500PS Tug Boat		jetty	1	30	1	30	1																																		1
Marikina Temprary Jetty	200PS Anchor Boat		jetty	1	30	1	30	1																																		1
Marikina Temprary Jetty	16PS Watch Boat		jetty	1	60	1	60	1																																		1
Marikina Disposal Area	0.45m3 Backhoe Peripheral Ditch		m	100	1	1,600	16	1																																		1
Marikina Disposal Area	25t Truck Crane Access Concrete Bridge		pcs.	1	20	1	20	1																																		1
Marikina Disposal Area	10t Tank Lorry for Water Spray		pcs.	1,725	1						1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		31
Marikina Bridge Pier Protection	300DWT Barge		pier	1	10	8	80								1			1												1					1								4
Marikina Bridge Pier Protection	2t Mini Crane		pier	1	10	8	80								1			1												1					1								4
Marikina Bridge Pier Protection	0.45c.m. Backhoe		pier	1	10	8	80								1			1												1					1								4
Marikina Bridge Pier Protection	500PS Tug Boat		pier	1	10	8	80								1			1												1					1								4
Marikina Bridge Pier Protection	200PS Anchor Boat		pier	1	10	8	80								1			1												1					1								4
Marikina Bridge Pier Protection	16PS Watch Boat		pier	1	10	8	80								1			1												1					1								4
Marikina Bridge Pier Protection	25t Truck Crane		pier	1	10	8	80								1			1												1					1								4
Marikina Bridge Pier Protection	0.45c.m. Backhoe		pier	1	10	8	80								1			1												1					1								4
Marikina Bank (3Banks in Total)	0.45c.m. Backhoe Tree & Glass Removal		s.m.	100	1	19,061	191	7																																		7
Marikina Bank (3Banks in Total)	10t Dump Truck Tree & Glass Removal		s.m.	100	0.5	19,060	95	4																																		4
Marikina Bank (3Banks in Total)	1.0c.m. BackhoeRoad Extension		m	15	2	250	33	1																																		1
Marikina Bank (3Banks in Total)	40kW Vivro Hammer General SSP Piling		m	18	1	1,846	103						1	1	1																											3
Marikina Bank (3Banks in Total)	25t Truck Crane General SSP Piling		m	18	2	1,846	205						2	2	2																											6
Marikina Bank (3Banks in Total)	125KVA Generator General SSP Piling		m	18	1	1,846	103						1	1	1																											3
Marikina Bank (3Banks in Total)	15kW Vivro Hammer Bridge SSP Piling		m	1.5	1	60	40						1	1	1																											3
Marikina Bank (3Banks in Total)	125KVA Generator Bridge SSP Piling		m	1.5	1	60	40						1	1	1																											3
Marikina Bank (3Banks in Total)	1.0c.m. Backhoe Bridge SSP Preparation		m	20	2	60	6						2	2	2																											6
Marikina Bank (3Banks in Total)	25t Truck Crane Bridge SSP Preparation		m	20	1	60	3						1	1	1																											3
Marikina Bank (3Banks in Total)	4t/truck SSP Coping		m	25	6	1,906	457								2	3																											5
Marikina Bank (3Banks in Total)	1.0c.m. Backhoe Promnade Demolish		m	10	2	1,906	381									1	3																									4
Marikina Bank (3Banks in Total)	10t Dump Truck Promnade Demolish		m	10	6	1,906	1,144									3	9																									12
Marikina Bank (3Banks in Total)	4t/truck Manhole and Conduit		m	30	10	1,906	635										1	4	5	5	2																					17
Marikina Bank (3Banks in Total)	15t Bull Dozer Bank Embankment		c.m.	690	1	38,120	55														1	1	1																			4
Marikina Bank (3Banks in Total)	20t Tire Compactor Bank Embankment		c.m.	1,330	1	38,120	29														1	1	1	1																		4
Marikina Bank (3Banks in Total)	4t/truck Parapet Concrete		m	50	1	1,906	38															1	1	1																		3
Marikina Bank (3Banks in Total)	0.1c.m. Backhoe U Ditches		m	25	1	1,906	76																														3	1					4
Marikina Bank (3Banks in Total)	4t/truck U Ditches		m	25	1	1,906	76																														3	1					4
Marikina Bank (3Banks in Total)	Drain 6B Pump long term	9site*900days	m	200	9,000	1,906	85,770				9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9		270
Marikina Bank (3Banks in Total)	Drain 6B Pump short term	9site*30days	m	200	300	1,906	2,859								3	6																											9
Marikina Bank (3Banks in Total)	Drain 3B Pump long term	9site*2unit*900days	m	200	18,000	1,906	171,540				18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18		540
Marikina Bank (3Banks in Total)	Drain Generator 50kVA	9site*900days	m	200	9,000	1,906	85,770				9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9		270
Marikina Sluiceway	15kW Vivro Hammer SSP Piling		unit	1	1	9	9																		1	1	1	1														5
Marikina Sluiceway	125kVA Generator for SSP Piling		unit	1	1	9	9																		1	1	1	1	1													5
Marikina Sluiceway	0.45c.m. Backhoe Sluiceway Fabrication		unit	1	30	9	270																		3	3	3	3	3													15
Marikina Sluiceway	25t Truck Crane Sluiceway Fabrication		unit	1	30	9	270																		3	3	3	3	3													15
Marikina Sluiceway	4t/truck Sluiceway Fabrication		unit	1	30	9	270																		3	3	3	3	3													15

Pasig Equipment for Major Works (Work Break Down)

Main Work	Item	Remarks	unit	per Unit Qntty per	per Unit Qntty Equipment	Whole Work Days Total V	Whole Work Days Equipment	Calender Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	Sum
Pasig SSP SSP Piling	90kW Vivro Hammer		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig SSP SSP Piling	400KVA Generator		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig SSP SSP Piling	Water Jet		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig SSP SSP Piling	50t Crawler Crane		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig SSP SSP Piling	300DWT Barge		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig SSP SSP Piling	500PS Tag Boat		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig SSP SSP Piling	200PS Anchor Boat		m	12.6	1	4,569	363				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1																18
Pasig SSP SSP Piling	16PS Watch Boat		m	12.6	2	4,569	725				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2																36
Pasig Drainage Work	50t Crawler Crane		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	300DWT Barge		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	500PS Tag Boat		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	200PS Anchor Boat		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	16PS Watch Boat		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	20cm/h Concrete Mixer		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	125KVA Generator		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	6B pump		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	4B pump		m	51	0.50	48*4,569	2,194						2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4		110
Pasig Drainage Work	4t/truck on land		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	0.45c.m. Backhoe		m	50	0.25	48*4,569	1,097						1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		55
Pasig Drainage Work	6B pump on land		m	50	1	50*4,569	4,569						4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		220
Pasig Drainage Work	3B pump on land		m	50	2	100*4,569	9,138						8	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16		440
Pasig Drainage Work	50kVA Drain Generator		m	50	1	50*4,569	4,569						4	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		220
Pasig Parapet Wall	4t/truck	Re-Bar Worker	m	8	1	4,569	571								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29
Pasig Parapet Wall	0.45c.m. Backhoe		m	8	1	4,569	571								1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29

参考資料 **- 1**

パッシグ・マリキナ川流域洪水対策
委員会設立合意書

MEMORANDUM OF AGREEMENT
FOR
CREATION OF FLOOD MITIGATION COMMITTEE
FOR
THE PASIG-MARIKINA RIVER BASIN

KNOW ALL MEN BY THESE PRESENTS:

This MEMORANDUM OF AGREEMENT made and entered into this day of JAN 2 4 2013, at CITY OF MANILA, by and among:

The **DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS**, a government line agency represented herein by Honorable **ROGELIO L. SINGSON**, in his capacity as Secretary with principal office address at Bonifacio Drive, Port Area, Manila, hereinafter referred to as the "**DPWH**";

- and -

The **METROPOLITAN MANILA DEVELOPMENT AUTHORITY**, represented herein by Honorable **FRANCIS N. TOLENTINO**, in his capacity as Chairman, with office address at MMDA Building, EDSA cor. Orense Street, Guadalupe, Makati City, hereinafter referred to as the "**MMDA**";

- and -

The **PASIG RIVER REHABILITATION COMMISION**, represented herein by Honorable **REGINA PAZ L. LOPEZ**, in her capacity as Chairperson, with office address at 5/F Triumph Building, 1610 Quezon Avenue, Quezon City, hereinafter referred to as the "**PRRC**";

- and -

The **CITY GOVERNMENT OF MANILA**, represented herein by the City Mayor, Honorable **ALFREDO S. LIM** with office address at Manila City Hall Building, Villegas Street, Ermita, Manila;

- and -

The **CITY GOVERNMENT OF MANDALUYONG**, represented herein by the City Mayor, Honorable **BENJAMIN C. ABALOS, Jr.**, with office address at Executive Building, City Government Complex, Maysilo Circle, Plainview, Mandaluyong City ;

- and -

ROGELIO L. SINGSON, Secretary, DPWH
FRANCIS N. TOLENTINO, Chairman, MMDA
REGINA PAZ L. LOPEZ, Chairperson, PRRC
ALFREDO S. LIM, Mayor, Manila City
BENJAMIN C. ABALOS, JR., Mayor, Mandaluyong City
JEJOMAR ERWIN S. BINAY, JR., Mayor, Makati City
ROBERT C. NAZEBIO, Mayor, Pasig City
HERBERT M. BAUTISTA, Mayor, Quezon City
DEL R. DE GUZMAN, Mayor, Marikina City
GUIA G. GOMEZ, Mayor, San Juan City

WIN2V11635

ANNEX-1.1

The **CITY GOVERNMENT OF MAKATI,** represented herein by the City Mayor, Honorable **JEJOMAR ERWIN S. BINAY, Jr.**, with office address at New Building, Makati City Hall, J.P. Rizal Street, Barangay Poblacion, Makati City;

- and -

The **CITY GOVERNMENT OF PASIG,** represented herein by the City Mayor, Honorable **ROBERT C. EUSEBIO**, with office address at Caruncho Avenue, Barangay San Nicolas, Pasig City;

- and -

The **CITY GOVERNMENT OF QUEZON**, represented herein by the City Mayor, Honorable **HERBERT M. BAUTISTA**, with office address at High Rise Building, Quezon City Hall, Elliptical Road, Diliman Central, Quezon City;

- and -

The **CITY GOVERNMENT OF MARIKINA**, represented herein by the City Mayor, Honorable **DEL R. DE GUZMAN**, with office address at Marikina City Hall, Shoe Ave., Brgy. Sta Elena, Marikina City;

- and -

The **CITY GOVERNMENT OF SAN JUAN**, represented herein by the City Mayor, Honorable **GUIA G. GOMEZ**, with office address at N. Domingo Street, San Juan City;

WITNESSETH THAT:

WHEREAS, the Pasig-Marikina River which is the main natural drainage of the National Capital Region with a total catchment area of 621 km^2 runs through the center of Metro Manila and merges into the Manila Bay, contributes largely to the flooding in the Region brought about by riverbank overflow of floodwaters, thereby, hampering its socio-economic development;

WHEREAS, to cope with such flooding problems, the DPWH conducted a Master Plan for flood control and drainage improvement in Metro Manila and a Feasibility Study (F/S) on the channel improvement of the Pasig-Marikina River in 1988-1990, under a technical assistance from the Japan International Cooperation Agency (JICA), called "The Study on Flood Control and Drainage Project in Metro Manila";

WHEREAS, based on the updating/review of the F/S for the river channel improvement project through the Special Assistance for Project Formation (SAPROF) of JICA in 1998, the **Pasig-Marikina River Channel Improvement Project (PMRCIP)** was proposed for the implementation in the following four phases under the Japanese Official Development Assistance (ODA):

- Phase I – Detailed Engineering Design for the whole PMRCIP;
- Phase II – River Improvement Works from Manila Bay to Confluence Point

with Napindan Channel;

- Phase III – River Improvement Works from Confluence Point with Napindan Channel to Diversion Point of Mangahan Floodway;
- Phase IV – River Improvement Works from Diversion Point of Mangahan Floodway to Marikina Bridge;

WHEREAS, the primary objective of the PMRCIP is to mitigate flood damages in Metro Manila caused by the channel overflow of the Pasig-Marikina River by providing appropriate and necessary countermeasures and thereby facilitating urban development and enhancing sustainable environment along the river;

WHEREAS, Phase I of detailed design for whole project was carried out from 2000 to 2002;

WHEREAS, the 1st stage of construction works component of the PMRCIP also referred to as Phase II commenced in July 2009 that involved a total of 13.1 km river channel improvement on the identified priority critical sections/areas along the Pasig River stretching from Delpan Bridge up to the immediate vicinity of Napindan Hydraulic Control Structure (NHCS), is being undertaken by the DPWH through financial assistance from Japanese ODA and scheduled to be completed within 2012;

WHEREAS, upon commencement of the construction works component of the aforementioned Phase II, Metro Manila and surrounding areas, especially those within the immediate vicinity of the Pasig-Marikina River have suffered from serious floods due to channel overflow of floodwaters, particularly during the onslaught of Typhoons "Ondoy" and "Pepeng" which occurred in September and October 2009, respectively;

WHEREAS, the Government of the Philippines (GOP) gives high priority to flood risk management and has been making utmost effort to cope with the flooding problems as emphasized under the five-year Philippine Development Plan (PDP) for 2011-2016;

WHEREAS, the DPWH undertook a preparatory study for the next Phase III of the PMRCIP with technical assistance from JICA which started from September 2010 and completed in October 2011, to review/examine the existing plan of the PMRCIP considering the present river conditions and taking into account the recent river basin development, recent flood damage conditions, impacts of climate change to flood risk and formulation of appropriate design criteria, to support the formulation of an ODA Loan Project for the Phase III construction, including the necessary non-structural measures, such as urban planning and monitoring, information campaign and publicity to the local communities, etc., as well as to validate/examine additional construction works components originally proposed under the Phase II;

WHEREAS, in the course of said preparatory study for the Phase III, it has been confirmed the necessity of immediate implementation of the next Phase III. Moreover, it is recognized that non-structural measures in and/around the areas to be protected by the PMRCIP are indispensable to achieve alleviation of flood damages, especially by floods beyond the design scale, together with the creation of the **Flood**

ROGELIO L. SINGSON Secretary DPWH
FRANCISCO TOLENTINO Chairman MMDA
REGINA PAZ L. LOPEZ Chairperson PRRC
ALFREDO S. LIM Mayor Manila City
BENJAMIN C. ABALOS, JR. Mayor Mandaluyong City
JEJOMAR ERWIN S. BINAY, JR. Mayor Makati City
ROBERT S. EUSEBIO Mayor Pasig City
HERBERT M. BAUTISTA Mayor Quezon City
DEL R. DE GUZMAN Mayor Marikina City
GUIA G. GOMEZ Mayor San Juan City

Mitigation Committee, hereinafter referred to as the "**FMC**";

WHEREAS, the creation and/or setting up of a FMC is significantly important for proper coordination among the agencies and Local Government Units (LGUs) concerned in monitoring flood-related activities in both structural and non-structural measures within the Pasig-Marikina River Basin;

WHEREAS, the DPWH, MMDA and PRRC have already agreed to the creation of FMC in the Memorandum of Agreement for Implementation of Phase III of the Project dated January 27, 2012;

WHEREAS, it is necessary for the DPWH, MMDA, PRRC and the concerned city governments of Manila, Makati, Mandaluyong, Pasig, Quezon, Marikina and San Juan to create a Flood Mitigation Committee (FMC), to act as the coordination body in handling issues relating to project implementation as well as Operation and Maintenance (O&M) and controlling land encroachment and disorderly land development, including the issuance of requests to the responsible agency/agencies on the necessary measures to be taken whenever flood disasters occur;

WHEREAS, the FMC shall make every effort for prompt realization of the flood disaster mitigation/prevention through action taken in advance such as construction of flood control structures that eliminate flood risks, land-use regulations that do not permit any settlement in river area, and for post-disaster recovery for the restoration and improvement where appropriate, of facilities, while Local Disaster Risk Reduction and Management Council (LDRRMC) shall have basically management functions for during-disaster under the Republic Act No. 10121 known as the "Philippine Disaster Risk Reduction and Management Act of 2010";

WHEREAS, the FMC shall have, but not limited to, the following functions, roles and responsibilities:

- Facilitate and assist in the PMRCIP implementation including the Phase IV for improvement of upper Marikina River up to Marikina Bridge;
- Facilitate and assist in monitoring the O&M activities for the completed facilities;
- Facilitate and assist in the introduction and operation of non-structural measures;
- Facilitate and assist in the resettlement and acquisition of Right-of-Way (ROW) activities for the project implementation;
- Monitor, coordinate and take necessary actions for illegal activities such as encroachment, disorderly land development along the rivers in the Pasig-Marikina River Basin;
- Set-up a "Query Window" for the Project;
- Act as grievance and redress committee on ROW acquisition and other matters;

JULIA A. GONZALEZ Mayor San Juan City
DEVANADERA DE GUZMAN Mayor Marikina City
HERBERT M. BAUTISTA Mayor Quezon City
ROBERTO C. EUSEBIO Mayor Pasig City
JEJOMAR ERWIN S. BINAY, JR. Mayor Makati City
BENJAMIN C. ABALOS, JR. Mayor Mandaluyong City
ALFREDO S. LIM Mayor Manila City
REGINA PAZ L. LOPEZ Chairperson PRRC
FRANCIS N. TOLENTINO Chairman MMDA
ROGELIO L. SINGSON Secretary DPWH

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- Enhance/strengthen the publicity and awareness on the flood mitigation activities;

- Convene meeting once every three (3) months or as necessary;

WHEREAS, the FMC shall be composed of chairperson, co-chairperson, standing members, observer members and secretariat with the following roles and responsibilities:

- The DPWH shall act as Chairperson of the FMC in the planning, design and construction of the PMRCIP, and MMDA shall take the chairmanship for the O&M;

- Standing members of FMC shall compose of PRRC and concerned LGUs (cities of Manila, Mandaluyong, Makati, Pasig, Quezon, Marikina and San Juan) which are directly related to the target stretch of the project;

- Observer Members related to the Pasig-Marikina River Basin shall participate in the FMC meetings as required and provide information, comments and solutions depending on the issues relating to the any observer member;

- Secretariat shall be established in the DPWH-Project Management Office - Major Flood Control Projects Cluster I (DPWH-PMO-MFCP I) until the Phase IV (Improvement of Upper Marikina River) of the Project be completed; afterward the role and responsibility of Secretariat shall be taken over by the MMDA-Flood Control and Sewerage Management Office;

WHEREAS, Observer Members shall consist of:

- Agencies concerned in flood risk management as well as river basin development such as Department of Environment and Natural Resources (DENR), Office of Civil Defense (OCD), National Economic Development Authority (NEDA), Housing and Urban Development Coordinating Council (HUDCC), Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA);

- LGUs administratively related to the upper Marikina River such as San Mateo, Antipolo, Tanay and Rodriguez;

- LGUs and agencies administratively related to the Mangahan Floodway and Napindan Channel such as Cainta, Taytay, Pateros, Taguig and Laguna Lake Development Authority (LLDA);

WHEREAS, operational expenses of the FMC shall be required for holding meetings, activities of the Secretariat and Query Window. Fund shall be allocated from the DPWH budget for flood control and from the MMDA's budget for O&M activities for flood control and drainage;

NOW, THEREFORE, for and in consideration of the foregoing premises, a collaborative and concerted effort needs to be implemented through this Memorandum of Agreement by and among the concerned entities and, in

ROGELIO L. SINGSON, Secretary, DPWH
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JEJOMAR ERWIN SABINAY, JR., Mayor, Makati City
ROBERT C. ESEBIO, Mayor, Pasig City
HERBERT M. BAUTISTA, Mayor, Quezon City
DENNIS DE GUZMAN, Mayor, Marikina City
GUILA G. GOMEZ, Mayor, San Juan City

consideration thereof, the parties hereby agree to jointly cooperate to ensure that the measures required as mentioned above are executed, as follows:

A. DPWH shall:

(1) Provide funds and undertake all the necessary measures for proper and efficient implementation of the PMRCIP including implementation of the Resettlement Action Plan (RAP) especially resettlement of Project Affected Families (PAF) through compensation as stated thereat, as well as, acquisition of the necessary ROW for the PMRCIP in coordination with the concerned agencies/offices and/or LGUs;

(2) Conduct information dissemination to the beneficiary communities on the benefits of the PMRCIP in coordination with the concerned LGUs;

(3) Coordinate with the concerned agencies/offices and/or LGUs by providing the necessary support/assistance for relocation of the affected Informal Settlers who opted for relocation instead of compensation;

(4) Provide quarterly updates to the MMDA, PRRC, LGUs and concerned agencies/offices on the status of the PMRCIP;

(5) Conduct training on O&M to the MMDA, whenever necessary;

(6) Conduct training on the introduction of non-structural measures to the concerned LGUs;

(7) Turnover of the completed phased-Project after its acceptance to the MMDA for proper O&M;

(8) Provide technical assistance to the MMDA in the rehabilitation of the project structures/facilities, in case major repairs are necessary;

(9) Coordinate with concerned agencies/offices with regards to their respective policies, plans and programs for conformity with the design plans and programs of the Project;

(10) Be responsible in securing the necessary supports to the PMRCIP from the concerned LGUs;

B. MMDA shall:

(1) Be responsible for the O&M of the PMRCIP after its turnover by the DPWH, thus, undertake all the necessary measures to ensure its proper and efficient O&M including securing the required budget, competent personnel and materials/equipment for the purpose, in coordination with the concerned LGUs;

(2) Construct secondary drainage systems that will complement the major works of the flood control project in coordination with concerned LGUs;

(3) Introduce and carry out the necessary non-structural measures;

ROGELIO L. SINGSON, Secretary, DPWH
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JEJOMAR ERWIN S. BINAY, JR., Mayor, Makati City
ROBERT C. ERESEBIO, Mayor, Pasig City
HERBERT M. BAUTISTA, Mayor, Quezon City
DEL R. DE GUZMAN, Mayor, Marikina City
GUIA F. GOMEZ, Mayor, San Juan City

C. **PRRC shall:**

(1) Be responsible for the relocation, housing and resettlement of qualified Informal Settlers and other unauthorized and/or unlawful occupants along both banks of Pasig River in coordination with the concerned Local Inter-Agency Committee (LIAC);

(2) Provide assistance whenever needed and provide necessary information on the Commission's policies, plans and programs pertaining to Pasig River to ensure smooth implementation of the PMRCIP;

D. **LGUs - Manila, Makati, Mandaluyong, Pasig, Quezon, Marikina and San Juan shall:**

(1) Maintain/preserve the ROW limit required for the PMRCIP and areas designated as river floodway area:

a) Prohibition of entry of informal settlers, especially on areas designated as river limit;

b) Suspension of issuance/renewal of business permits or revocation of building/occupancy permits within the areas of the PMRCIP as mentioned above through ordinances;

c) Inclusion of designated river as the required floodway width in the revision of the zoning plan of the respective city government;

(2) Construct secondary drainage systems that will complement the major works of the flood control project in coordination with the MMDA;

(3) Introduce and operate non-structural measures arranged for the respective city government territory;

This Memorandum of Agreement shall take effect upon signing by the parties hereto.

IN WITNESS WHEREOF, the parties have hereto affixed their respective signatures at the place and on the date written above.

GUIA G. GOMEZ
Mayor
San Juan City

DEL R. DE GUZMAN
Mayor
Marikina City

HERBERT M. BAUTISTA
Mayor
Quezon City

ROBERTO C. EUSEBIO
Mayor
Pasig City

JEJOMAR ERWIN S. BINAY, JR.
Mayor
Makati City

BENJAMIN C. ABALOS, JR.
Mayor
Mandaluyong City

ALFREDO S. LIM
Mayor
Manila City

REGINA PAZ L. LOPEZ
Chairperson
PRRC

FRANCIS N. TOLENTINO
Chairman
MMDA

ROGELIO L. SINGSON
Secretary
DPWH

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FOR DPWH:

ROGELIO L. SINGSON
Secretary

FOR MMDA:

FRANCIS N. TOLENTINO
Chairman

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FOR PRRC:

REGINA PAZ L. LOPEZ
Chairperson

FOR THE CITY GOVERNMENTS:

ALFREDO S. LIM
Mayor, City of Manila

BENJAMIN C. ABALOS, JR.
Mayor, City of Mandaluyong

Attested:

RAFAELITO M. GARAYBLAS
Secretary to the Mayor, City of Manila

JEJOMAR ERWIN S. BINAY, JR.
Mayor, City of Makati

ROBERT C. EUSEBIO
Mayor, City of Pasig

HERBERT M. BAUTISTA
Mayor, Quezon City

DEL R. DE GUZMAN
Mayor, Marikina City

GUIA G. GOMEZ
Mayor, City of San Juan

SIGNED IN THE PRESENCE OF:

REYNALDO G. TAGUDANDO
Regional Director
National Capital Region
DPWH
(Witness)

PATRICK B. GATAN
Project Director
PMO-Major Flood Control Projects,
Cluster I, DPWH
(Witness)

MAXIMA M. QUIAMBAO
Director III, Flood Control and Sewerage
Management Office, MMDA
(Witness)

EUGENIA L. LAGMAY, Ph.D.
Executive Director, PRRC
(Witness)

ARMANDO L. ANDRES
City Engineer, City of Manila
(Witness)

CRISANTO W. ROXAS
City Engineer, City of Mandaluyong
(Witness)

MARIO V. BADILLO
OIC-City Engineer, City of Makati
(Witness)

JOSENAR F. CAPARAS
Chief, PHRU and Special Projects
Office, City of Pasig
(Witness)

JOSELITO B. CABUNGCAL
City Engineer, City of Quezon
(Witness)

KENNEDY SUEÑO
City Engineer, City of Marikina
(Witness)

DANILO S. MERCADO
City Engineer, City of San Juan
(Witness)

ACKNOWLEDGEMENT

REPUBLIC OF THE PHILIPPINES)
City of CITY OF MANILA) S.S.

x----------x

BEFORE ME, A NOTARY PUBLIC for and in the city of CITY OF MANILA, Philippines, personally appeared the following persons, both known to me and to me known to be the same persons who executed the foregoing instrument consisting of ten (10) pages including this page where the Acknowledgement is written, and acknowledged to me that the same is their free act and voluntary deed and the free act and voluntary deed of the entity herein represented.

Name	CTC Number	Place and Date of Issue
ROGELIO L. SINGSON	06988386	Makati City; January 11, 2012
FRANCIS N. TOLENTINO	22227460	Tagaytay City; January 2, 2012
REGINA PAZ LOPEZ	03246371	Quezon City; January 12, 2012
ALFREDO S. LIM	00888888	MANILA CITY, JANUARY 2, 2012
BENJAMIN C. ABALOS, JR.	0985315	Mandaluyong, Feb. 3, 2012
JEJOMAR ERWIN S. BINAY, JR.	22011112	Makati City, Jan. 11, 2013
ROBERT C. EUSEBIO	01695605	PASIG CITY, JAN 2, 2013
HERBERT M. BAUTISTA	00005120	QUEZON CITY, JAN. 3, 2012
DEL R. DE GUZMAN	05059881	Marikina Jan 25/2012
GUIA G. GOMEZ	27780000	San Juan City Jan. 06, 2012

WITNESS MY HAND AND SEAL this JAN 24 2013 day of _____, 20_____.

Ronald e ching
ATTY. RONALD SEGUNDINO C. CHING
NOTARY PUBLIC
NOTARY PUBLIC CITY OF MANILA
ADM NO. 2013-009/UNTIL DEC. 31, 2014
ROLL NO. 54899
IBP NO. 876386 NOV. 12, 2012/MANILA
PTR NO. 1111540-1-2-13/MANILA
MCLE COMPLIANCE NO. III-0016-300

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