

Table 5.A1: Maximum Permissible Site Discharge (PSD) and Minimum Site Storage Requirement (SSR) Values in Accordance with The Five Regions in Peninsular Malaysia

Terrain / Slope Condition	PSD (l/s/ha)					SSR (m³/ha)				
	Impervious Area (as a Percentage of Project Area)									
	25%	40%	50%	75%	90%	25%	40%	50%	75%	90%
REGION 1 - WEST COAST										
Lowlying	63.4	64.2	64.5	65.2	65.5	322.2	363.0	394.2	478.3	540.4
Mild	76.7	77.5	77.9	78.7	79.1	306.6	340.0	367.2	448.5	504.7
Steep	87.7	88.6	89.1	90.1	90.5	294.0	327.0	350.5	426.7	478.8
REGION 2 - EAST COAST										
Lowlying	53.0	53.6	53.9	54.5	54.7	276.6	350.4	410.7	609.1	768.8
Mild	61.1	61.8	62.2	62.8	63.1	257.6	321.7	373.9	546.1	678.7
Steep	67.4	68.2	68.6	69.3	69.6	243.5	302.6	351.0	509.9	625.9
REGION 3 - NORTHERN										
Lowlying	54.8	55.4	55.7	56.3	56.5	311.1	353.3	389.7	493.3	564.4
Mild	68.0	68.8	69.2	69.9	70.2	295.5	328.3	360.3	454.0	521.6
Steep	77.3	78.2	78.6	79.5	79.8	284.8	316.2	341.8	430.3	492.6
REGION 4 - HIGHLAND										
Lowlying	42.6	43.1	43.4	43.8	44.0	227.8	285.7	331.4	460.5	546.6
Mild	49.6	50.2	50.5	51.0	51.2	212.3	266.0	307.3	428.2	509.2
Steep	55.0	55.6	56.0	56.5	56.8	202.1	252.3	291.0	405.5	484.1
REGION 5 - SOUTHERN										
Lowlying	61.1	61.9	62.2	62.8	63.1	315.0	362.0	398.4	501.0	572.7
Mild	74.8	75.7	76.1	76.9	77.2	298.5	340.9	372.6	465.9	532.3
Steep	83.4	84.3	84.8	85.7	86.1	288.5	323.3	352.5	442.8	505.0

Table 5.A2: Maximum Permissible Site Discharge (PSD), Minimum Site Storage Requirement (SSR) and Inlet Values in Accordance with The Major Towns in Peninsular Malaysia

Terrain / Slope Condition	PSD (l/s/ha)					SSR (m ³ /ha)					Inlet (l/s/ha)				
						Impervious Area (as a Percentage of Project Area)									
	25%	40%	50%	75%	90%	25%	40%	50%	75%	90%	25%	40%	50%	75%	90%
BATUPAHAT															
Low-lying	45.1	45.6	45.9	46.3	46.6	249.2	293.7	331.1	437.3	502.6	107.0	125.0	137.0	166.0	184.0
Mild	55.6	56.2	56.6	57.1	57.4	234.7	273.8	304.7	403.7	468.4	127.0	146.0	158.0	189.0	208.0
Steep	62.3	63.0	63.4	64.0	64.3	225.6	261.8	291.3	383.5	447.1	140.0	159.0	172.0	204.0	224.0
JOHOR BAHRU															
Low-lying	61.1	61.9	62.2	62.8	63.1	315.0	362.0	398.4	501.0	572.7	138.0	157.0	170.0	200.0	221.0
Mild	74.8	75.7	76.1	76.9	77.2	298.5	340.9	372.6	465.9	532.3	163.0	184.0	200.0	231.0	252.0
Steep	83.4	84.3	84.8	85.7	86.1	288.5	323.3	352.5	442.8	505.0	181.0	200.0	215.0	250.0	271.0
SEGAMAT															
Low-lying	41.4	41.9	42.1	42.5	42.7	294.3	326.6	356.0	454.9	521.2	110.0	130.0	140.0	170.0	190.0
Mild	48.6	49.1	49.4	49.9	50.1	289.2	321.1	350.0	431.6	497.4	140.0	150.0	170.0	200.0	220.0
Steep	54.2	54.8	55.1	55.7	55.9	280.2	310.5	332.9	415.1	479.1	150.0	170.0	180.0	220.0	240.0
MELAKA															
Low-lying	57.9	58.5	58.9	59.5	59.7	296.1	349.2	388.4	487.4	547.3	130.0	150.0	170.0	200.0	220.0
Mild	71.4	72.2	72.6	73.4	73.7	272.3	318.6	355.5	453.1	512.4	130.0	150.0	170.0	200.0	220.0
Steep	78.3	79.2	79.6	80.4	80.8	262.9	306.5	339.7	436.4	505.4	170.0	190.0	200.0	240.0	260.0
KUALA PILAH															
Low-lying	35.7	36.1	36.3	36.7	36.8	225.2	262.3	289.8	373.1	429.6	90.0	110.0	120.0	140.0	160.0
Mild	44.6	45.2	45.4	45.9	46.1	214.5	247.5	273.5	349.2	402.1	110.0	130.0	140.0	170.0	180.0
Steep	50.6	51.2	51.5	52.0	52.2	207.6	238.0	263.7	335.2	385.6	120.0	140.0	150.0	180.0	200.0
SEREMBAN															
Low-lying	32.5	32.9	33.1	33.4	33.5	223.2	256.3	278.6	365.5	424.9	80.0	100.0	110.0	140.0	150.0
Mild	39.8	40.3	40.5	40.9	41.1	214.4	245.7	267.8	343.2	398.6	100.0	120.0	130.0	160.0	180.0
Steep	45.8	46.4	46.6	47.1	47.3	209.1	237.2	259.2	326.5	380.3	110.0	130.0	140.0	170.0	190.0
KUALA LUMPUR															
Low-lying	60.4	61.0	61.4	62.0	62.3	305.2	346.7	377.9	466.1	529.7	130.0	150.0	160.0	190.0	210.0
Mild	71.2	72.0	72.4	73.1	73.4	292.6	327.9	358.0	439.6	497.8	160.0	173.0	190.0	220.0	240.0
Steep	81.7	82.6	83.0	83.9	84.3	280.6	312.6	340.5	418.0	471.6	170.0	190.0	210.0	240.0	260.0
KUALA KUBU BAHRU															
Low-lying	42.6	43.1	43.4	43.8	44.0	227.8	285.7	331.4	460.5	546.6	100.0	120.0	130.0	160.0	170.0
Mild	49.6	50.2	50.5	51.0	51.2	212.3	266.0	307.3	428.2	509.2	120.0	140.0	150.0	180.0	200.0
Steep	55.0	55.6	56.0	56.5	56.8	202.1	252.3	291.0	405.5	484.1	130.0	150.0	160.0	190.0	210.0
RAUB															
Low-lying	39.7	40.2	40.4	40.8	41.0	252.4	318.6	371.3	523.0	624.0	110.0	120.0	140.0	160.0	180.0
Mild	46.6	47.2	47.4	47.9	48.1	232.3	295.6	342.6	484.8	579.5	120.0	140.0	150.0	180.0	200.0
Steep	52.0	52.6	52.9	53.4	53.6	217.7	279.7	323.4	457.8	549.1	130.0	150.0	160.0	190.0	210.0
CAMERON HIGHLAND															
Low-lying	34.1	34.5	34.7	35.1	35.2	192.8	237.7	269.9	358.0	415.0	83.0	100.0	110.0	136.0	150.0
Mild	42.4	42.9	43.1	43.6	43.7	180.1	219.2	250.2	334.8	388.1	100.0	116.0	130.0	155.0	172.0
Steep	47.4	47.9	48.2	48.7	48.9	173.4	208.9	239.1	321.1	374.1	108.0	126.0	140.0	167.0	180.0
KUANTAN															
Low-lying	61.6	62.3	62.6	63.3	63.6	322.5	383.7	430.0	547.2	615.7	148.0	170.0	180.0	212.0	230.0
Mild	72.9	73.7	74.1	74.9	75.2	301.8	356.3	397.9	513.7	584.0	170.0	193.0	210.0	234.0	259.0
Steep	79.8	80.7	81.2	82.0	82.4	289.9	340.1	380.4	493.7	563.6	188.0	208.0	220.0	255.0	280.0
TELUK INTAN															
Low-lying	46.5	47.1	47.4	47.8	48.0	331.5	375.8	412.9	526.1	597.6	130.0	150.0	160.0	200.0	210.0
Mild	57.0	57.7	58.0	58.6	58.9	319.0	355.6	388.7	492.0	562.8	160.0	180.0	190.0	220.0	240.0
Steep	64.9	65.6	66.0	66.7	67.0	309.7	342.3	373.1	468.3	537.4	170.0	190.0	210.0	240.0	260.0
IPOH															
Low-lying	63.4	64.2	64.5	65.2	65.5	322.2	363.0	394.2	478.3	540.4	130.0	150.0	170.0	200.0	220.0
Mild	76.7	77.5	77.9	78.7	79.1	306.6	340.0	367.2	448.5	504.7	160.0	180.0	200.0	230.0	250.0
Steep	87.7	88.6	89.1	90.1	90.5	294.0	327.0	350.5	426.7	478.8	160.0	200.0	220.0	250.0	270.0
KUALA KANGSAR															
Low-lying	47.2	47.7	48.0	48.5	48.7	283.3	335.0	365.0	465.0	540.0	120.0	130.0	150.0	180.0	190.0
Mild	60.8	61.5	61.8	62.5	62.8	267.0	302.8	340.0	424.0	486.0	140.0	160.0	170.0	200.0	220.0
Steep	74.4	75.2	75.7	76.5	76.8	251.3	290.0	318.0	413.0	488.0	150.0	170.0	190.0	220.0	240.0
KUALA TERENGGANU															
Low-lying	53.0	53.6	53.9	54.5	54.7	276.6	350.4	410.7	609.1	768.8	130.0	140.0	160.0	190.0	210.0
Mild	61.1	61.8	62.2	62.8	63.1	257.6	321.7	373.9	546.1	678.7	140.0	160.0	170.0	210.0	230.0
Steep	67.4	68.2	68.6	69.3	69.6	243.5	302.6	351.0	509.9	625.9	150.0	170.0	190.0	220.0	240.0
KOTA BAHRU															
Low-lying	60.8	61.5	61.8	62.5	62.8	335.1	399.8	448.3	571.1	645.5	150.0	170.0	180.0	210.0	230.0
Mild	72.1	72.9	73.3	74.0	74.4	311.3	367.1	414.0	535.3	608.9	170.0	190.0	210.0	240.0	260.0
Steep	79.2	80.1	80.5	81.3	81.7	298.9	351.6	393.1	513.2	586.4	190.0	210.0	220.0	260.0	280.0
ALOR SETAR															
Low-lying	54.8	55.4	55.7	56.3	56.5	311.1	353.3	389.7	493.3	564.4	130.0	150.0	160.0	190.0	210.0
Mild	68.0	68.8	69.2	69.9	70.2	295.5	328.3	360.3	454.0	521.6	150.0	180.0	190.0	220.0	240.0
Steep	77.3	78.2	78.6	79.5	79.8	284.8	316.2	341.8	430.3	492.6	170.0	190.0	210.0	240.0	260.0

Table 5.A3: OSD Volume, Inlet Size and Outlet Size for Five Different Regions in Peninsular Malaysia

Region 1

Project Area (ha)	Impervious Area (as Percentage of Project Area)														
	25%			40%			50%			75%			90%		
	Volume (m ³)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m ³)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m ³)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m ³)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m ³)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)
TERRAIN : LOWLYING, SLOPE 1 : 2000 TO 1 : 5000															
0.1	32	129	62	36	138	62	39	147	62	48	160	62	54	167	62
0.2	64	182	87	73	195	87	79	208	87	96	226	87	108	237	87
0.4	129	257	124	145	276	124	158	294	124	192	319	124	216	335	124
0.6	193	315	151	218	339	151	236	350	151	288	391	151	324	410	151
0.8	258	364	175	290	391	175	315	416	175	384	451	175	432	474	175
1	322	407	195	363	437	195	394	465	195	480	500.00	195	540	529	195
2	770	422	276	870	479	276	950	505	276	1190	553	276	1360	576	276
3	1155	517	339	1305	586	339	1425	618	339	1785	677	339	2040	705	339
4	1540	597	391	1740	677	391	1900	714	391	2380	782	391	2720	814	391
5	1925	668	437	2175	757	437	2375	798	437	2975	874	437	3400	910	437
TERRAIN : MILD, SLOPE 1 : 875 TO 1 : 1999															
0.1	31	143	69	34	151	69	37	160	69	45	171	70	51	178	70
0.2	61	202	97	68	214	97	74	226	97	90	242	98	101	252	98
0.4	122	286	137	136	303	137	148	319	137	180	342	139	202	357	139
0.6	183	350	168	204	371	168	222	391	168	270	419	170	303	437	170
0.8	244	404	194	272	428	194	296	451	194	360	484	197	404	505	197
1	305	451	217	340	479	217	370	505	217	450	541	220	505	564	220
2	740	451	307	840	505	307	910	529	307	1140	597	311	1300	618	311
3	1110	553	376	1260	618	376	1365	648	376	1710	731	381	1950	757	381
4	1480	638	434	1680	714	434	1820	749	434	2280	845	440	2600	874	440
5	1850	714	485	2100	798	485	2275	837	485	2850	944	492	3250	977	492
TERRAIN : STEEP, SLOPE 1 : 100 TO 1 : 874															
0.1	30	143	73	32.5	160	73	35	167	74	43	178	74	48	185	74
0.2	59	202	103	65	226	103	70	237	105	86	252	105	96	262	105
0.4	118	286	146	130	319	146	140	335	148	172	357	148	192	371	148
0.6	177	350	179	195	391	179	210	410	181	258	437	181	288	454	181
0.8	236	404	207	260	451	207	280	474	209	344	505	209	384	525	209
1	295	451	231	325	505	231	350	529	234	430	564	234	480	586	234
2	710	505	327	810	553	327	870	576	331	1080	638	331	1230	658	331
3	1065	618	401	1215	677	401	1305	705	405	1620	782	405	1845	806	405
4	1420	714	463	1620	782	463	1740	814	468	2160	903	468	2460	931	468
5	1775	798	517	2025	874	517	2175	910	523	2700	1010	523	3075	1041	523

Region 3

Project Area (ha)	Impervious Area (as Percentage of Project Area)														
	25%			40%			50%			75%			90%		
	Volume (m3)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m3)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m3)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m3)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)	Volume (m3)	Inlet & Overflow Dia. (mm)	Outlet Dia. (mm)
TERRAIN : LOWLYING, SLOPE 1 : 2000 TO 1 : 5000															
0.1	32	129	58	36	138	58	39	143	59	49.5	156	59	57	164	59
0.2	63	182	81	71	195	81	78	202	83	96	226	83	113	231	83
0.4	126	257	115	142	276	115	156	286	117	192	319	117	226	327	117
0.6	189	315	141	213	339	141	234	350	144	288	391	144	339	401	144
0.8	252	364	163	284	391	163	312	404	166	384	451	166	452	463	166
1	315	407	182	355	437	182	390	451	185	495	492	185	565	517	185
2	740	422	257	850	479	257	960	505	262	1250	553	262	1450	597	262
3	1110	517	315	1275	586	315	1440	618	321	1875	677	321	2175	731	321
4	1480	597	364	1700	677	364	1920	714	371	2500	782	371	2900	845	371
5	1850	668	407	2125	757	407	2400	798	415	3125	874	415	3625	944	415
TERRAIN : MILD, SLOPE 1 : 875 TO 1 : 1999															
0.1	30	138	65	33	151	65	36	156	65	46	167	65	53	175	66
0.2	60	195	92	66	214	92	72	220	92	91	237	92	105	247	93
0.4	120	276	130	132	303	130	144	311	130	182	335	130	210	350	132
0.6	180	339	159	198	371	159	216	381	159	273	410	159	315	428	161
0.8	240	391	183	264	428	183	288	440	183	364	474	183	420	495	186
1	260	437	205	325	479	205	375	492	205	545	529	205	680	553	208
2	710	451	290	820	505	290	910	529	290	1180	597	290	1370	618	294
3	1065	553	355	1230	618	355	1365	648	355	1770	731	355	2055	757	360
4	1420	638	410	1640	714	410	1820	749	410	2360	845	410	2740	874	416
5	1775	714	458	2050	798	458	2275	837	458	2950	944	458	3425	977	465
TERRAIN : STEEP, SLOPE 1 : 100 TO 1 : 874															
0.1	29	147	69	31.5	156	69	34.5	164	70	43	175	70	49.5	182	70
0.2	57	208	97	63	220	97	69	231	98	86	247	98	99	257	98
0.4	114	294	137	126	311	137	138	327	139	172	350	139	198	364	139
0.6	171	360	168	189	381	168	207	401	170	258	428	170	297	446	170
0.8	228	416	194	252	440	194	276	463	197	344	495	197	396	515	197
1	285	465	217	315	492	217	345	517	220	430	553	220	495	576	220
2	690	505	307	790	553	307	870	576	311	1130	638	311	1310	658	311
3	1035	618	376	1185	677	376	1305	705	381	1695	782	381	1965	806	381
4	1380	714	434	1580	782	434	1740	814	440	2260	903	440	2620	931	440
5	1725	798	485	1975	874	485	2175	910	492	2825	1010	492	3275	1041	492

Table 5.A4: Discharge and Pipe Diameter Relationship

Terrain: Lowlying

Discharge (m ³ /s)	Pipe Diameter (mm)
0.01	236
0.02	247
0.04	270
0.06	292
0.08	315
0.1	338
0.12	361
0.16	406
0.22	474
0.24	497
0.28	542
0.32	587
0.36	633
0.42	701
0.48	769
0.52	814
0.56	860
0.62	928
0.66	973
0.72	1041
0.78	1109
0.82	1154

Terrain: Steep

Discharge (m ³ /s)	Pipe Diameter (mm)
0.01	259
0.02	269
0.04	288
0.06	307
0.08	326
0.1	345
0.12	364
0.16	402
0.22	459
0.24	478
0.28	516
0.32	554
0.36	592
0.42	649
0.48	707
0.52	745
0.56	783
0.62	840
0.66	878
0.72	935
0.78	992
0.82	1030

Terrain: Mild

Discharge (m ³ /s)	Pipe Diameter (mm)
0.01	250
0.02	261
0.04	282
0.06	303
0.08	325
0.1	346
0.12	367
0.16	410
0.22	474
0.24	495
0.28	538
0.32	581
0.36	623
0.42	687
0.48	751
0.52	794
0.56	836
0.62	900
0.66	943
0.72	1007
0.78	1071
0.82	1114