Appendix 3.5.5 Base Year O&D Tables

Hourly O&D Tables in Base Year (Passenger Car)

(Vehicle)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	1636	1608	449	455	291	62	117	66	240	5	43	25	70	42	46	22	15	12	4	82	132	37	31	1	5	16	0	5535.	12896.
2	3470	4324	954	662	941	1251	1210	252	648	210	499	131	824	43	50	50	15	114	8	710	133	338	1408	128	79	15	1	18408.	12922.
3	834	939	983	664	700	437	234	224	176	10	198	124	251	106	87	25	22	1	27	170	7	7	34	5	15	3	3	6296.	8346.
4	949	336	973	852	233	288	127	226	125	3	43	278	22	127	91	8	52	29	0	396	4	38	0	1	179	4	1	5385.	6273.
5	882	909	1859	439	435	191	357	110	106	64	356	91	0	34	10	9	19	0	2	182	61	69	28	12	553	25	3	6666.	6672.
6	648	837	625	251	230	636	305	84	109	18	493	39	28	17	7	6	13	1	8	27	119	4	0	2	4	15	0	4126.	4369.
7	242	952	188	197	253	270	212	43	99	110	591	46	278	12	15	8	1	31	2	226	20	17	81	2	26	4	1	3825.	3976.
8	906	365	537	388	174	43	48	1105	483	7	48	31	19	102	372	27	37	7	13	13	8	32	101	9	3	30	4	4822.	3153.
9	2078	361	608	326	104	45	86	370	128	17	40	31	91	60	41	187	30	82	15	72	56	19	95	16	7	46	5	5006.	2073.
10	122	482	138	83	404	73	224	34	75	178	153	102	28	9	9	18	7	3	3	296	121	129	552	40	9	8	0	3351.	825.
11	139	604	359	120	485	766	712	41	133	46	1171	71	692	37	11	15	0	4	0	18	137	13	555	28	10	3	1	6083.	4150.
12	74	253	310	583	1696	282	121	41	40	47	412	675	440	205	53	76	5	42	100	450	11	6	432	64	11	11	25	6451.	1916.
13	0	1	1	0	0	0	1	0	0	0	3	0	73	1	0	0	0	0	0	10	0	0	0	0	0	0	0	90.	3516.
14	82	25	62	50	14	4	7	122	27	2	16	73	84	334	263	63	7	3	105	25	0	24	0	0	6	6	14	1396.	1621.
15	115	36	126	123	15	1	9	139	20	3	21	51	0	170	137	109	0	2	19	10	0	5	51	1	0	6	7	1274.	1503.
16	170	97	77	22	10	1	7	88	95	7	14	45	0	70	167	110	3	27	9	37	82	127	0	2	1	4	12	1272.	851.
17	68	20	14	23	8	9	1	23	28	1	0	0	0	6	0	1	10	6	1	0	0	0	0	0	2	0	2	225.	285.
18	59	58	3	44	4	0	19	18	111	1	3	29	7	28	7	49	35	108	2	13	4	0	140	10	1	4	1	756.	503.
19	10	5	25	46	42	0	4	23	6	1	0	18	0	149	28	7	1	3	222	228	5	6	12	3	4	2	2	848.	889.
20	138	88	232	835	342	8	35	21	16	11	1	53	424	18	3	33	0	1	331	1232	44	7	73	10	7	0	79	4044.	4521.
21	182	152	19	8	6	62	9	55	199	1	3	0	5	0	0	12	0	4	1	0	179	139	154	8	0	0	1	1188.	1632.
22	46	129	9	7	59	17	38	24	143	33	27	3	0	5	51	3	0	0	6	60	303	13	560	25	9	1	1	1580.	1088.
23	79	92	32	28	103	22	55	9	8	2	54	4	45	0	13	0	0	12	1	74	86	43	0	0	29	21	1	813.	6657.
24	33	72	17	42	62	25	35	9	21	6	36	5	118	0	3	1	0	9	4	70	105	23	0	0	17	17	1	731.	364.
25	37	4	24	0	44	1	1	0	6	0	2	2	39	3	1	0	1	0	2	4	0	1	125	6	0	6	0	302.	980.
26	90	272	28	8	11	12	3	24	21	2	1	1	6	8	25	33	3	1	2	1	16	1	188	12	3	0	0	763.	243.
27	5	3	14	30	6	3	2	2	10	0	1	2	0	31	7	10	5	0	2	115	1	2	29	0	1	0	0	271.	165.
																												91391.	91391.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	2169	2735	794	983	860	244	343	510	884	71	120	119	0	37	58	66	21	37	6	302	122	28	34	16	29	38	4	10544.	6557.
2	1421	3776	856	584	714	1184	1241	348	626	558	625	388	3	25	26	74	15	54	5	690	75	98	135	84	69	129	5	14250.	13961.
3	557	1498	884	830	1206	907	251	347	205	166	382	534	3	44	46	43	16	3	20	262	8	7	19	19	16	18	4	5095.	5679.
4	352	283	650	727	168	373	246	269	237	55	142	186	0	29	40	6	21	33	19	315	3	8	19	26	0	17	9	4132.	5039.
5	479	591	907	360	351	339	383	211	133	484	308	332	0	21	22	8	5	4	41	103	6	67	49	56	204	34	6	5656.	4520.
6	92	331	207	135	172	339	110	54	59	30	153	243	0	3	1	1	7	0	0	8	1	6	10	10	3	13	2	2077.	4383.
7	131	1345	283	364	187	303	156	34	62	200	731	115	2	5	4	7	1	14	4	102	9	17	14	17	1	3	2	4022.	4209.
8	109	159	144	127	65	119	41	1036	452	42	60	32	0	76	111	71	22	8	13	13	19	14	6	7	0	22	2	2770.	3753.
9	277	303	270	103	82	65	125	256	110	56	99	34	0	13	7	70	12	66	6	12	35	18	5	14	1	18	5	2053.	3935.
10	11	73	10	3	47	16	48	4	22	153	59	52	0	2	3	7	1	1	1	10	1	60	2	5	0	2	0	593.	3349.
11	78	318	86	117	155	312	463	24	45	163	1008	398	1	8	8	14	0	3	0	1	3	45	25	17	3	1	1	3296.	5215.
12	22	83	85	186	106	40	120	25	13	77	57	583	0	65	7	42	0	23	15	47	0	7	8	11	2	1	3	1625.	4884.
13	71	264	116	35	0	24	106	23	141	24	395	378	63	53	0	0	0	5	0	366	8	0	39	102	35	31	0	2449.	83.
14	45	31	54	64	8	18	10	92	75	7	20	154	1	287	102	61	7	33	128	32	0	7	0	0	4	6	18	1252.	1290.
15	52	38	84	80	4	16	31	334	57	3	23	104	0	285	117	128	0	3	30	2	0	13	4	2	1	20	6	1433.	758.
16	31	43	31	9	10	6	6	21	180	15	13	66	0	54	95	95	1	33	6	11	10	3	0	1	0	19	9	768.	1032.
17	32	17	3	17	6	8	1	9	41	7	0	2	0	6	0	3	8	28	1	0	0	0	0	0	1	3	6	202.	173.
18	15	108	1	33	2	1	30	15	123	3	5	45	0	15	14	82	23	93	2	3	3	0	12	8	0	3	1	610.	571.
19	4	7	20	0	2	12	3	11	15	4	0	86	0	90	12	8	1	2	190	285	1	12	3	4	2	2	2	776.	709.
20	139	343	175	187	145	74	153	6	62	250	15	388	9	32	9	31	0	10	196	1059	0	39	35	47	4	1	100	3508.	3808.
21	126	254	12	5	52	168	33	9	83	156	235	1	0	0	0	71	0	3	5	162	155	262	75	91	0	24	1	2010.	701.
22	91	330	7	31	75	2	15	44	103	258	31	2	0	24	7	128	0	0	4	13	110	11	37	20	3	1	7	1339.	1236.
23	23	668	35	0	27	0	243	50	122	474	505	367	0	0	39	0	0	124	7	120	132	488	0	0	106	194	15	3737.	598.
24	2	37	5	1	16	2	8	6	22	36	26	37	0	0	1	3	0	8	3	16	7	22	0	0	4	12	0	268.	602.
25	13	31	12	57	8	2	16	3	13	9	9	20	0	5	0	1	2	1	4	6	0	6	45	27	0	8	1	289.	476.
26	18	74	1	1	9	23	5	7	39	10	2	6	0	7	23	22	1	6	2	0	0	2	22	18	1	0	0	294.	545.
27	0	2	1	0	3	0	1	5	7	0	2	15	0	12	6	10	3	1	3	68	1	1	1	0	0	0	0	140.	301.
																												78187.	78187.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	1778	1395	784	533	633	147	215	317	361	17	69	46	0	10	20	14	35	19	31	81	78	56	1	5	45	15	4	6713.	6670.
2	1617	2549	830	380	850	462	916	339	337	254	348	308	0	1	4	6	8	83	10	139	107	171	0	87	74	36	5	10220.	8626.
3	676	912	1282	851	1245	463	357	494	263	14	197	140	2	11	13	20	17	9	43	117	16	13	0	0	189	2	5	7315.	6949.
4	360	314	855	386	233	105	107	135	74	3	5	335	0	19	3	4	4	2	0	127	0	3	0	0	67	2	1	3055.	3131.
5	465	522	1148	265	564	177	370	210	123	175	122	152	0	18	3	4	8	5	9	97	24	66	0	14	21	13	6	4582.	5434.
6	195	471	233	58	209	180	141	46	40	41	100	31	3	1	0	0	0	0	0	6	6	6	0	2	4	8	0	1781.	2472.
7	234	847	232	105	270	158	255	44	78	393	433	113	0	0	3	0	0	43	1	40	12	21	0	1	13	5	1	3301.	3584.
8	413	180	502	144	130	82	54	615	252	17	30	19	0	95	27	15	125	16	71	21	5	18	0	6	13	15	10	2859.	2682.
9	393	305	291	72	102	39	99	150	74	35	21	11	0	1	1	6	26	142	11	11	27	26	0	9	5	32	6	1897.	2022.
10	77	292	141	44	313	37	421	32	34	54	13	25	0	1	0	0	0	1	1	1	7	65	0	3	1	2	0	1445.	1159.
11	63	185	168	28	182	100	384	33	27	43	394	58	0	0	0	2	0	0	0	0	6	22	0	12	1	0	1	1699.	1809.
12	24	88	122	75	419	50	87	25	23	37	43	237	1	0	0	0	0	24	12	49	1	1	1	7	6	2	8	1320.	1466.
13	8	12	13	1	7	3	12	1	0	0	0	1	43	0	0	0	0	0	0	40	1	0	0	0	2	0	0	144.	85.
14	13	1	19	1	16	3	6	57	2	1	1	0	0	0	0	0	0	0	6	0	0	0	0	0	5	1	2	138.	169.
15	17	3	11	6	13	0	2	19	1	2	3	1	0	0	0	0	0	0	18	1	0	1	0	0	0	6	2	98.	85.
16	15	6	19	9	7	1	1	11	6	0	2	0	0	0	0	0	0	5	4	0	0	1	0	0	1	10	0	98.	90.
17	46	10	15	4	9	0	0	69	32	0	0	0	0	0	0	1	6	21	0	0	0	0	0	0	1	4	3	219.	247.
18	13	56	7	2	5	0	27	7	110	1	1	16	0	0	0	3	12	0	3	1	0	0	0	4	0	2	0	270.	383.
19	15	5	22	39	46	1	8	73	2	1	0	12	0	4	5	4	0	5	49	40	5	2	0	4	4	1	2	350.	326.
20	35	41	116	81	129	7	20	48	16	3	0	52	33	0	0	0	0	1	43	200	3	16	0	9	7	2	51	912.	1061.
21	41	81	33	3	30	39	30	34	31	8	11	2	1	0	0	0	0	0	5	17	10	172	0	68	12	0	0	595.	542.
22	73	224	17	6	39	11	35	33	42	53	9	2	0	0	2	0	0	0	4	10	168	0	0	17	2	1	2	732.	693.
23	6	9	7	1	3	3	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	34.	2.
24	26	33	12	18	27	6	33	7	8	3	3	4	0	0	0	0	0	7	2	3	46	17	0	0	29	14	1	309.	326.
25	33	12	35	0	17	9	8	7	0	1	1	4	2	3	4	1	1	0	6	8	2	22	0	56	0	2	1	334.	498.
26	30	68	26	12	24	2	5	49	58	3	0	2	0	2	7	10	2	2	1	1	0	1	0	23	2	0	0	330.	175.
27	6	4	9	11	8	9	7	5	18	0	1	4	0	3	3	0	3	0	2	51	0	2	0	1	3	0	0	149.	111.
																												50797.	50797.

Hourly O&D Tables in Base Year (Taxi)

(Vehicle)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	772	608	209	61	140	84	13	81	47	1	15	1	0	23	52	2	40	5	2	26	1	6	0	0	0	2	0	2196.	4033.
2	1221	1934	359	207	266	544	473	115	149	45	331	10	46	8	49	8	41	32	5	57	36	50	82	4	0	6	0	6285.	6080.
3	326	490	314	136	373	140	37	73	33	0	48	46	0	6	63	0	27	1	1	30	9	1	0	0	0	1	0	2146.	2740.
4	169	423	284	358	136	54	35	157	21	0	21	17	0	36	58	34	12	25	2	1	29	2	0	0	15	0	0	1879.	1373.
5	208	455	696	239	332	24	19	33	12	11	30	31	31	21	0	0	9	1	0	7	1	9	0	0	0	1	0	2049.	2812.
6	112	658	149	21	76	271	71	16	20	3	131	7	0	16	3	0	4	0	0	4	7	1	0	1	0	0	0	1571.	1367.
7	39	360	12	17	26	28	79	4	33	11	105	7	114	0	3	0	0	11	0	10	0	1	0	0	0	0	0	860.	1226.
8	572	133	301	130	67	3	13	746	240	2	41	20	8	56	170	32	14	3	8	1	10	8	96	0	0	24	0	2778.	1901.
9	250	253	136	74	78	17	32	317	81	8	43	1	10	32	116	64	15	36	2	8	11	50	0	2	0	3	0	1627.	992.
10	20	76	11	1	13	8	59	7	9	87	72	169	0	13	8	0	0	4	0	50	1	16	0	16	0	0	0	640.	206.
11	34	190	23	33	94	134	152	27	36	15	147	44	294	45	4	0	0	4	0	0	2	2	70	6	0	0	0	1360.	1149.
12	76	101	104	34	143	9	4	19	39	7	133	401	10	0	30	0	0	19	0	101	0	0	0	0	3	0	25	1248.	824.
13	1	0	3	0	0	0	1	0	0	0	8	1	17	0	0	0	0	0	0	7	0	0	0	0	0	0	0	33.	687.
14	58	4	3	39	4	38	3	43	21	5	0	0	0	204	14	0	0	0	35	0	0	0	0	0	0	0	0	469.	661.
15	72	10	44	9	3	1	4	74	43	0	12	3	0	5	0	145	1	1	0	1	4	0	0	0	0	0	0	432.	750.
16	5	25	0	29	10	0	0	24	65	0	0	0	0	0	168	0	14	26	0	0	13	0	0	0	0	0	0	389.	305.
17	31	7	13	6	3	4	0	5	8	0	0	0	0	0	2	3	4	2	0	0	2	0	0	0	0	0	1	91.	194.
18	9	22	4	25	2	0	19	13	33	1	3	3	0	0	1	15	2	75	0	0	1	0	0	2	0	2	0	230.	239.
19	2	13	10	47	13	3	2	24	3	0	0	0	0	186	0	0	0	0	155	423	0	0	0	0	0	2	0	881.	219.
20	25	70	34	2	22	0	2	1	3	1	0	56	157	10	2	0	0	0	9	508	0	0	0	0	3	0	6	931.	1253.
21	2	57	6	0	1	0	5	3	26	2	4	0	0	0	7	2	1	1	0	0	166	74	506	4	0	0	0	869.	536.
22	19	35	0	0	1	0	8	14	19	6	3	0	0	0	0	0	0	0	0	0	105	0	375	3	0	0	0	578.	594.
23	0	144	0	0	0	0	0	59	0	0	2	0	0	0	0	0	0	0	0	0	144	371	0	0	0	0	0	720.	1129.
24	1	1	0	0	0	0	0	0	1	3	10	0	0	0	0	0	0	2	0	0	3	3	0	0	0	1	0	25.	38.
25	6	0	0	0	3	0	0	4	0	0	0	2	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	20.	21.
26	5	10	5	1	4	3	0	3	8	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	41.	40.
27	0	1	0	4	2	2	0	1	1	0	0	1	0	0	0	0	2	0	0	14	0	0	0	0	0	0	0	28.	32.
																												30401.	30401.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	1023	1119	319	141	214	45	39	174	188	28	39	59	1	24	61	12	28	10	2	16	2	8	0	1	3	6	0	3562.	2743.
2	746	1543	310	513	272	511	378	161	279	89	141	89	0	4	16	50	7	27	15	49	55	22	202	1	0	9	1	5488.	6081.
3	233	610	252	302	370	328	64	183	59	38	86	114	1	3	36	0	15	4	0	39	7	0	0	0	0	6	1	2678.	1822.
4	42	93	102	331	76	41	43	98	40	2	17	70	0	40	6	26	5	33	33	7	0	0	0	0	0	1	0	1107.	2212.
5	112	203	380	241	318	123	71	89	73	35	59	135	0	9	6	11	4	3	30	21	1	2	0	1	18	21	3	1954.	1477.
6	38	402	31	36	46	117	7	1	13	6	21	31	0	42	1	0	5	0	2	0	0	0	0	0	0	15	3	805.	1420.
7	34	833	78	144	37	121	90	14	37	75	151	7	1	3	4	0	0	23	2	13	7	8	0	0	0	0	2	1671.	1125.
8	151	65	96	163	21	27	21	623	344	17	45	20	0	42	77	38	7	8	23	1	3	12	84	0	2	14	0	1899.	2045.
9	169	185	97	38	12	22	27	357	80	12	36	36	0	26	30	58	8	30	3	4	27	20	0	2	0	8	1	1288.	1673.
10	2	21	0	0	3	5	19	2	6	86	17	3	0	5	0	0	0	1	0	1	5	18	0	3	0	0	1	195.	741.
11	11	318	32	22	36	153	131	28	35	76	146	57	8	0	9	0	0	3	0	0	6	15	6	10	0	0	1	1142.	1156.
12	1	6	11	14	30	13	16	10	1	145	39	395	1	0	2	0	0	3	0	56	0	0	0	0	2	0	0	746.	1224.
13	0	136	0	0	24	0	169	10	11	0	289	10	17	0	0	0	0	0	0	154	0	0	0	0	0	0	1	820.	36.
14	60	9	5	41	6	15	0	79	43	38	31	0	0	199	6	0	0	0	182	4	0	0	0	0	0	0	0	648.	456.
15	83	73	47	53	0	3	6	175	155	12	7	27	0	25	0	188	3	1	0	2	9	0	0	0	0	0	0	869.	427.
16	6	2	0	51	0	0	0	9	101	0	0	0	0	0	158	0	3	16	0	0	2	0	0	0	0	0	0	348.	426.
17	27	22	10	6	3	2	0	5	21	0	0	0	0	0	1	32	4	2	0	0	2	0	0	0	0	1	0	130.	54.
18	7	38	2	15	1	0	15	1	20	5	6	16	0	0	1	20	2	74	0	0	1	0	0	2	0	1	2	220.	242.
19	2	5	1	2	0	0	1	9	2	0	0	0	0	35	0	0	0	0	151	5	0	0	0	0	0	0	0	219.	867.
20	26	48	7	2	7	10	17	1	9	43	0	100	7	0	1	0	0	0	414	494	0	0	0	0	5	0	0	1235.	883.
21	3	58	0	92	1	2	0	9	27	1	1	0	0	0	4	13	2	1	0	0	163	103	141	3	0	0	24	624.	863.
22	4	48	1	2	0	0	1	10	120	31	3	0	0	0	0	0	0	0	0	0	73	0	364	3	0	0	0	660.	579.
23	0	211	0	0	0	0	0	93	0	0	16	0	0	0	0	0	0	0	0	0	496	368	0	0	0	0	0	1184.	797.
24	0	4	0	0	0	2	0	0	3	16	6	0	0	0	0	0	0	2	0	0	4	3	0	0	0	0	0	40.	28.
25	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	9.	30.
26	6	19	1	0	1	0	0	2	3	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0	0	0	36.	82.
27	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	1	0	0	6	0	0	0	0	0	0	0	19.	28.
																												29537.	29537.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	1576	738	886	270	238	78	54	336	187	6	17	7	0	6	90	2	46	22	22	12	39	20	0	0	0	4	2	4658.	4425.
2	934	1521	717	222	476	929	444	109	263	145	203	45	0	6	0	2	6	28	7	14	59	110	0	26	0	42	0	6306.	5913.
3	492	665	1303	490	790	245	214	204	141	3	44	35	0	9	21	0	5	6	3	19	10	3	0	1	0	4	0	4707.	5182.
4	144	270	498	337	152	52	207	182	42	1	6	2	0	8	11	0	7	3	4	1	5	4	0	0	4	0	1	1844.	1946.
5	207	475	732	212	460	278	119	107	65	13	21	103	4	5	2	0	2	2	6	84	4	55	0	0	0	2	0	2852.	2861.
6	61	679	260	42	160	218	96	25	29	52	73	16	0	1	2	0	1	0	0	1	8	6	0	1	0	0	0	1631.	1918.
7	126	729	266	75	78	81	165	39	132	49	239	33	0	0	12	0	0	12	3	6	4	6	0	1	0	2	0	1837.	1652.
8	318	141	371	117	82	23	28	418	435	2	7	16	1	53	121	3	35	6	92	0	20	16	0	2	0	13	8	2716.	2521.
9	324	289	146	71	74	11	100	404	118	8	14	2	0	1	116	6	30	78	6	3	13	35	0	3	0	2	5	1859.	1772.
10	12	44	15	2	9	11	73	4	5	18	22	1	0	0	1	0	2	0	0	0	2	71	1	1	0	0	0	293.	380.
11	32	157	34	8	80	64	183	25	13	62	48	80	0	3	7	0	0	1	0	0	3	10	0	6	0	0	0	817.	624.
12	6	43	53	10	289	14	6	3	3	1	26	128	2	0	4	0	1	1	2	24	0	0	0	0	1	0	1	518.	503.
13	1	0	1	0	0	0	3	0	1	0	0	2	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0	10.	9.
14	16	2	6	44	0	0	5	71	1	0	0	0	0	0	53	0	0	0	0	0	0	0	0	0	0	0	0	198.	131.
15	65	3	22	14	5	4	6	139	100	0	7	3	0	37	0	0	12	1	0	12	6	0	0	0	0	0	0	418.	483.
16	2	2	0	0	2	0	0	2	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	14.	13.
17	35	4	5	7	2	1	0	34	34	1	0	1	0	0	17	0	0	2	0	0	0	0	0	0	0	0	0	143.	148.
18	19	17	4	3	2	0	9	3	69	0	1	1	0	0	1	0	2	0	1	1	0	0	0	1	0	0	0	134.	160.
19	0	1	4	8	3	0	2	9	1	0	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	31.	140.
20	6	23	36	7	42	2	19	5	10	0	0	24	1	2	27	0	0	1	0	72	0	0	0	0	2	0	7	276.	259.
21	8	26	13	0	1	0	11	12	32	2	2	0	0	0	8	0	0	0	0	0	0	55	0	17	0	0	0	151.	239.
22	21	78	4	0	6	0	5	10	41	15	3	0	0	0	0	0	0	0	0	0	59	0	0	2	0	0	0	263.	397.
23	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.	1.
24	0	4	1	0	0	0	1	2	1	1	2	0	0	0	0	0	0	1	0	0	17	2	0	0	0	3	0	35.	62.
25	0	0	0	0	1	0	0	1	2	0	0	1	1	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4.	8.
26	8	1	5	1	7	4	0	6	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	43.	77.
27	0	1	0	6	2	1	0	1	11	0	0	1	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	30.	24.
																												31033.	31033.

Hourly O&D Tables in Base Year (Light Bus)

(Vehicle)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	39	0	3	31	0	8	0	1	36	30	4	0	0	4	0	3	36	11	0	9	7	21	0	1	0	4	0	227.	232.
2	0	41	6	0	30	17	0	0	1	35	5	9	13	23	0	0	11	7	0	27	46	25	0	0	0	0	0	287.	282.
3	1	26	6	78	5	11	2	0	0	0	8	16	0	5	52	0	44	3	0	0	0	0	0	0	0	0	0	247.	201.
4	11	3	48	211	0	0	0	0	0	0	0	56	0	34	27	4	27	3	0	2	6	0	0	0	0	0	0	446.	325.
5	0	38	5	0	96	9	0	10	4	0	62	8	0	10	4	0	0	0	0	15	2	0	0	0	0	0	0	261.	307.
6	81	3	0	0	2	57	0	0	0	0	4	0	0	6	0	0	0	0	0	1	0	0	0	0	0	0	0	154.	256.
7	2	1	2	0	0	0	212	2	0	0	0	6	1	0	0	0	1	0	0	0	2	0	0	0	0	0	0	129.	164.
8	0	0	4	0	1	0	2	114	17	0	0	0	0	0	14	0	29	20	0	0	0	0	0	0	0	2	0	193.	208.
9	50	3	0	0	13	0	0	13	28	1	0	0	0	2	100	1	2	1	0	0	27	12	0	0	0	6	0	259.	422.
10	5	53	0	2	1	4	0	0	0	4	1	0	2	0	2	0	0	0	0	0	37	0	7	45	0	0	0	163.	107.
11	12	53	4	0	4	19	3	0	0	1	8	1	5	3	1	0	32	0	0	12	0	0	6	27	3	0	0	194.	154.
12	0	2	29	0	122	0	1	0	0	0	1	18	0	0	0	0	1	0	4	9	0	0	0	0	14	0	1	222.	149.
13	0	6	0	0	0	0	4	0	0	3	5	0	6	0	0	0	0	0	0	2	0	0	1	23	1	0	0	34.	46.
14	1	0	8	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	12.	78.
15	0	0	19	8	0	0	0	22	246	3	0	0	0	0	0	3	0	0	0	4	10	0	0	0	0	19	0	332.	243.
16	2	0	0	0	0	0	0	0	1	0	0	4	0	0	3	6	0	0	0	1	0	0	0	0	0	0	0	13.	23.
17	1	0	37	40	0	0	0	35	6	0	1	1	0	0	0	0	6	12	11	3	0	0	0	0	1	6	3	144.	224.
18	2	3	1	4	0	0	0	18	2	0	0	0	0	0	0	0	8	0	4	0	0	0	0	0	0	1	0	43.	54.
19	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	11	6	52	22	0	0	0	0	2	0	2	100.	98.
20	10	11	12	8	32	3	0	0	0	0	26	9	2	0	9	4	3	0	21	66	0	0	0	0	5	0	4	228.	155.
21	12	23	0	0	0	28	0	0	26	1	0	0	0	0	13	0	0	0	0	0	4	12	2	11	0	0	0	132.	160.
22	0	21	0	0	0	0	0	0	52	0	0	0	0	1	0	0	0	0	0	0	12	0	9	1	0	0	0	87.	72.
23	0	0	0	1	0	0	0	0	0	7	8	0	1	0	0	0	0	0	0	0	2	0	8	4	1	0	0	28.	26.
24	1	1	0	2	1	0	37	0	0	45	30	0	13	0	0	0	1	0	0	1	11	1	4	0	5	0	1	152.	103.
25	0	0	0	0	0	0	0	1	0	0	3	34	1	0	0	0	1	0	3	5	0	0	0	1	0	0	29	80.	57.
26	2	0	0	0	0	0	0	3	1	0	0	0	0	0	8	0	4	1	0	4	0	0	0	0	0	0	0	31.	38.
27	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	0	2	2	0	0	0	0	0	0	0	8.	40.
																												4214.	4214.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	29	0	1	39	4	3	1	0	29	11	9	0	0	5	44	2	19	14	0	7	12	0	0	0	0	1	0	226.	206.
2	0	35	20	1	64	5	1	9	1	53	65	3	0	1	30	0	33	6	0	5	20	18	1	3	0	0	0	356.	257.
3	1	1	6	79	3	0	21	3	0	1	8	29	0	6	2	0	36	2	0	7	0	0	0	0	0	0	0	202.	144.
4	48	3	65	190	0	0	0	0	0	20	0	0	0	0	5	0	26	3	0	8	0	0	4	4	0	0	0	376.	450.
5	0	29	1	0	83	8	0	3	4	5	8	53	0	3	1	0	0	0	0	15	0	6	0	1	9	0	0	220.	199.
6	8	5	1	0	6	33	0	0	0	4	4	1	0	0	0	0	0	0	0	2	11	0	0	3	0	0	0	78.	60.
7	0	0	6	0	0	0	76	4	0	0	6	9	4	0	0	0	1	0	0	0	0	0	0	1	0	0	1	208.	129.
8	1	0	0	0	1	0	4	48	16	0	0	0	0	0	16	0	27	18	0	0	0	0	0	0	0	3	0	246.	125.
9	49	19	0	0	12	0	0	12	24	0	0	1	0	20	101	1	4	2	0	0	30	60	0	0	0	3	0	337.	307.
10	4	41	2	0	0	0	1	0	1	4	1	0	2	0	2	0	0	0	0	0	32	0	6	38	0	0	0	134.	147.
11	5	41	0	0	1	8	0	0	0	1	8	1	4	0	0	0	21	0	0	10	0	0	5	24	3	0	0	132.	148.
12	0	0	14	66	8	0	16	0	0	0	1	16	0	0	0	0	1	0	4	8	0	0	0	6	30	0	1	165.	157.
13	0	7	0	0	0	0	6	0	0	2	4	0	6	0	0	0	0	0	0	2	0	0	1	12	1	0	0	39.	32.
14	4	2	3	20	0	1	0	0	12	0	1	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	49.	60.
15	61	3	8	29	0	0	0	20	144	1	1	0	0	0	0	3	0	0	0	10	18	0	0	0	0	18	0	316.	218.
16	2	0	0	2	0	0	0	0	1	0	0	0	0	0	3	6	0	0	0	1	0	0	0	0	0	0	0	15.	17.
17	5	2	13	16	0	4	0	10	4	0	1	1	0	0	0	0	6	16	10	3	0	0	0	0	2	7	3	97.	207.
18	17	5	1	3	0	0	0	8	1	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	1	0	39.	64.
19	2	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	10	7	46	19	0	0	0	0	3	0	2	93.	85.
20	1	7	3	6	16	2	0	0	0	0	19	8	2	0	3	5	3	4	19	58	0	0	0	1	4	1	4	162.	164.
21	11	35	0	0	1	0	2	0	40	1	0	0	0	0	8	0	0	0	0	0	4	10	2	10	0	0	0	124.	151.
22	9	22	0	0	2	0	1	0	24	0	0	0	0	5	0	0	0	0	0	0	20	0	0	1	0	0	0	74.	99.
23	1	0	0	0	0	0	0	0	0	6	5	0	1	0	0	0	0	0	0	0	2	0	8	4	2	0	0	29.	22.
24	2	0	0	0	0	0	0	0	0	38	24	0	12	0	0	0	1	0	0	2	10	1	6	0	12	0	1	107.	104.
25	0	0	0	0	0	0	0	0	1	0	3	30	1	0	0	0	3	0	3	4	0	0	1	3	0	0	25	76.	60.
26	8	0	0	0	0	0	0	6	5	0	0	0	0	0	3	0	1	1	0	1	0	0	0	0	0	0	0	23.	34.
27	40	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	3	0	2	2	0	0	0	1	3	0	0	52.	37.
																												3777.	3777.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	1	0	0	9	0	7	0	0	8	3	7	0	0	0	0	0	0	4	0	4	5	13	0	1	0	2	0	63.	225.
2	0	22	0	0	1	1	0	0	0	34	39	0	8	5	0	0	7	0	0	24	31	17	0	0	0	0	0	189.	205.
3	0	0	2	55	0	2	23	0	0	2	0	10	0	1	0	0	14	2	0	2	10	0	0	0	0	0	0	123.	109.
4	36	0	41	132	0	0	0	0	0	0	2	37	0	24	16	2	6	6	0	2	0	0	0	0	0	0	0	304.	253.
5	0	23	0	0	59	4	0	1	0	0	11	5	0	4	1	0	0	0	0	10	1	3	0	0	0	0	0	122.	162.
6	46	1	0	0	1	21	0	0	0	0	2	1	0	2	0	0	0	0	0	1	0	0	0	0	0	0	0	75.	72.
7	2	1	1	0	0	0	71	1	0	4	0	7	1	0	0	0	1	0	0	0	4	2	0	0	0	0	0	97.	152.
8	0	0	0	0	1	0	1	43	18	0	0	0	0	0	10	0	4	8	0	0	0	0	0	0	0	4	0	89.	84.
9	32	0	0	0	10	0	0	13	16	5	0	0	0	2	202	0	2	4	0	0	38	34	0	0	1	4	0	355.	228.
10	0	40	0	6	5	1	0	0	0	4	0	0	1	0	1	0	0	0	0	0	0	0	5	26	0	0	0	89.	83.
11	8	54	1	0	2	9	4	0	0	0	4	0	3	1	1	0	17	0	0	0	0	0	2	18	1	0	0	125.	87.
12	0	0	8	0	63	0	3	0	0	0	0	10	0	0	0	0	0	0	1	7	0	0	0	0	20	0	0	112.	98.
13	0	0	0	0	0	0	4	0	0	1	3	0	4	0	0	0	0	0	0	0	0	0	1	8	1	0	0	22.	29.
14	4	0	4	0	1	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	21.	39.
15	33	5	25	7	0	0	0	7	125	0	0	0	0	0	0	1	0	0	0	2	6	0	0	0	0	3	0	224.	243.
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	0	0	0	1	0	0	0	0	0	0	0	4.	9.
17	34	34	24	19	0	0	0	4	2	0	0	0	0	0	0	0	4	34	5	1	0	4	0	0	1	0	2	164.	73.
18	13	0	0	8	0	0	0	3	2	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	0	0	34.	58.
19	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	5	0	28	12	0	0	0	0	1	0	1	48.	48.
20	7	0	3	2	14	2	0	0	1	0	0	7	0	0	2	4	1	0	12	38	0	0	0	0	3	0	2	98.	108.
21	8	13	0	0	0	25	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	5	1	6	0	0	0	63.	107.
22	0	51	0	0	0	0	0	0	46	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	62.	67.
23	0	0	0	5	0	0	0	0	0	5	2	0	1	0	0	0	0	0	0	0	1	0	4	2	0	0	0	20.	15.
24	0	1	0	10	5	0	45	0	0	26	16	0	0	0	0	0	0	0	0	0	6	0	2	0	4	0	1	124.	64.
25	0	0	0	0	0	0	0	1	0	0	1	20	1	0	0	0	3	0	1	2	0	0	0	7	0	0	17	53.	35.
26	1	0	0	0	0	0	0	9	1	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	15.	13.
27	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	2	0	1	5	0	0	0	0	3	0	0	8.	23.
																												2693.	2693.

Hourly O&D Tables in Base Year (Heavy Bus)

(Vehicle)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	0	3	0	74	2	9	3	4	21	40	23	11	0	0	18	7	6	6	29	105	5	63	1	3	0	1	1	435.	909.
2	25	0	59	58	60	21	1	52	0	0	56	13	14	0	104	70	0	5	0	2	6	30	0	0	0	0	2	578.	454.
3	0	0	2	0	0	204	19	1	8	25	32	13	0	8	23	0	0	3	0	3	3	14	0	1	0	1	0	360.	324.
4	45	16	0	0	0	0	7	0	0	0	7	0	0	16	7	3	0	10	0	23	0	0	0	0	0	0	0	134.	172.
5	8	115	0	0	0	103	5	2	9	6	6	47	0	0	14	0	0	0	0	6	0	0	0	1	108	2	0	432.	111.
6	45	60	116	0	3	0	0	0	0	1	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	229.	409.
7	1	1	4	1	3	0	0	3	0	0	98	32	0	0	1	0	0	0	0	0	0	0	17	14	18	2	0	197.	178.
8	1	1	1	0	1	0	11	204	1	0	1	0	0	74	66	15	7	24	2	2	0	2	0	0	0	2	0	415.	634.
9	51	0	20	0	38	0	0	0	0	8	0	0	4	0	28	5	4	5	0	18	1	4	0	1	0	40	91	308.	319.
10	103	0	1	0	0	0	0	0	3	4	3	0	2	0	0	1	0	0	0	0	23	23	0	2	1	0	0	166.	95.
11	12	63	16	2	8	11	65	1	2	3	18	0	5	0	0	10	0	0	0	0	2	24	0	4	1	0	0	247.	244.
12	54	2	50	0	0	0	36	5	1	0	0	4	0	0	0	0	0	0	0	4	0	0	1	3	7	0	0	167.	135.
13	0	39	0	0	0	11	0	0	2	2	5	0	6	0	0	0	0	0	0	2	0	0	0	0	1	0	0	68.	34.
14	0	0	0	0	0	16	0	103	0	0	0	0	0	70	10	0	0	0	0	0	0	0	0	0	1	0	0	199.	177.
15	139	49	25	3	1	1	2	62	91	0	0	0	0	6	0	4	0	0	0	3	15	0	0	0	0	0	0	421.	291.
16	57	61	0	0	0	0	0	10	6	1	2	0	0	0	3	0	0	0	0	0	0	0	0	1	0	0	0	141.	216.
17	7	2	0	0	0	0	0	14	4	0	0	0	0	0	0	0	0	44	2	0	0	0	0	0	0	44	10	131.	87.
18	4	3	3	10	0	0	0	16	4	0	0	0	0	0	0	0	29	0	0	0	0	0	0	1	0	1	0	71.	94.
19	25	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	3	0	8	0	0	0	0	0	0	0	3	43.	73.
20	126	10	18	23	1	1	0	20	5	0	0	4	2	0	5	0	0	0	0	62	0	0	0	0	7	0	0	284.	237.
21	14	2	4	0	0	0	6	0	3	1	0	0	0	0	11	0	0	0	0	0	2	15	4	14	0	0	0	76.	90.
22	162	25	3	0	0	16	0	61	7	1	2	0	0	0	0	0	0	0	0	0	15	0	3	2	0	0	2	299.	182.
23	2	0	0	0	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	4	3	0	0	1	0	0	13.	27.
24	2	0	0	0	0	16	2	0	1	2	4	3	0	0	0	1	0	0	0	0	16	2	0	0	2	0	0	50.	51.
25	2	2	4	0	4	0	17	0	0	1	1	7	1	0	0	0	0	0	0	7	0	0	1	2	0	1	0	49.	146.
26	4	0	0	0	0	0	2	74	42	0	0	0	0	0	0	0	0	1	29	0	0	0	0	1	0	0	0	162.	94.
27	0	0	0	1	0	0	0	2	100	0	0	0	0	0	0	0	10	0	3	0	0	1	0	1	0	0	0	118.	109.
																												5803.	5803.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	0	1	0	64	2	6	3	8	29	60	15	6	0	0	41	10	10	10	95	85	7	79	1	1	0	1	0	534.	785.
2	23	0	34	18	55	9	20	31	1	0	65	13	12	0	86	82	4	5	0	2	2	36	0	0	1	0	0	497.	413.
3	0	0	2	0	0	98	51	2	13	41	31	11	0	0	43	0	0	3	0	1	2	8	0	0	22	0	0	318.	261.
4	42	3	0	0	0	0	5	0	0	0	12	0	0	0	3	0	0	10	0	21	0	0	0	0	0	0	2	98.	131.
5	6	71	0	0	0	70	60	3	6	5	11	0	0	0	15	0	0	0	0	1	0	0	0	0	136	0	0	344.	242.
6	35	4	33	0	7	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	82.	191.
7	1	12	47	7	34	0	0	9	0	0	36	34	0	0	1	0	0	0	0	0	7	0	2	1	15	3	4	209.	265.
8	1	0	1	0	1	0	11	143	1	0	2	1	0	75	54	19	5	20	0	3	0	10	0	0	0	62	1	412.	483.
9	26	0	13	0	32	0	0	12	0	6	2	0	3	0	26	6	4	5	1	11	2	3	0	2	0	38	77	268.	251.
10	59	1	9	0	2	1	0	0	8	4	3	0	2	0	0	1	0	0	0	0	11	11	0	2	1	0	0	113.	127.
11	42	93	34	3	1	0	58	1	0	3	16	0	5	0	0	11	0	0	0	0	3	13	0	4	1	0	0	277.	198.
12	33	3	1	0	65	1	30	0	0	0	0	4	0	0	0	0	0	0	0	4	0	0	1	3	7	0	0	152.	64.
13	0	54	0	0	0	0	0	0	2	2	5	0	4	0	0	0	0	0	0	2	0	0	0	0	1	0	0	72.	31.
14	0	0	4	8	0	5	0	78	0	0	0	0	0	64	10	0	0	0	0	0	0	0	0	0	0	0	0	169.	149.
15	136	37	8	2	2	1	2	50	24	0	0	0	0	8	0	4	0	0	0	4	8	0	0	0	0	0	0	286.	306.
16	50	85	0	2	0	0	0	13	5	1	3	0	0	0	4	0	0	0	0	0	0	0	0	1	0	0	0	164.	134.
17	7	2	0	0	0	0	0	14	4	0	0	0	0	0	0	0	0	27	2	0	0	0	0	0	0	27	9	92.	94.
18	4	3	3	6	0	0	0	14	3	0	0	0	0	0	0	0	30	0	0	0	0	0	0	1	0	1	0	65.	82.
19	20	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	8	0	0	0	0	0	0	0	3	35.	140.
20	102	14	57	21	4	0	0	9	6	0	0	4	2	0	5	0	0	0	0	58	0	0	0	0	7	0	0	289.	199.
21	17	2	7	0	0	0	0	0	3	1	0	0	0	0	17	0	0	0	0	0	2	15	4	13	0	0	0	81.	75.
22	146	27	15	0	0	0	0	61	18	1	3	0	0	0	0	0	0	0	0	0	15	0	3	2	0	0	2	295.	279.
23	4	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	6	3	0	0	1	0	0	26.	12.
24	34	0	1	0	1	0	2	0	1	3	4	2	0	0	0	1	0	1	1	0	13	2	0	0	2	1	1	60.	34.
25	1	0	0	0	34	0	16	0	0	1	1	7	1	0	0	0	0	0	0	7	0	0	1	2	0	0	0	71.	194.
26	2	0	2	0	2	0	3	33	37	0	0	0	0	0	0	0	30	1	30	0	0	0	0	1	0	0	0	141.	133.
27	2	1	0	0	0	0	1	0	92	0	0	0	0	0	0	0	9	0	3	0	0	1	0	1	0	0	0	110.	97.
																												5290.	5290.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	0	4	0	59	1	6	2	6	17	29	11	18	0	0	37	6	4	9	80	65	6	65	2	1	9	1	1	439.	596.
2	17	0	27	4	47	10	9	30	1	0	47	16	13	0	59	75	3	0	0	2	3	28	0	0	0	0	2	393.	297.
3	0	0	0	0	0	91	47	2	8	36	13	7	0	7	18	0	0	0	0	6	3	8	0	1	0	1	0	245.	251.
4	26	2	0	0	0	0	5	0	0	0	9	0	0	14	6	3	0	2	0	15	0	0	0	0	0	0	0	82.	67.
5	4	57	0	0	0	46	41	0	7	25	4	19	0	0	8	0	0	0	0	7	0	0	0	1	90	2	0	311.	121.
6	44	9	45	0	5	0	0	0	0	1	0	0	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	128.	163.
7	1	9	60	5	22	0	0	8	0	0	23	22	0	0	2	0	0	0	0	0	0	0	2	1	12	3	1	170.	225.
8	1	1	1	0	0	0	21	139	1	0	0	0	0	57	42	15	2	14	0	4	0	2	0	0	0	1	0	291.	445.
9	37	3	16	0	23	0	0	12	0	11	0	0	3	0	17	4	2	6	0	11	1	5	0	0	0	26	69	246.	231.
10	53	0	9	0	0	0	0	0	7	2	1	0	2	0	0	1	0	0	0	0	0	12	0	2	0	0	0	89.	111.
11	8	66	23	2	6	1	38	1	3	1	14	0	3	0	0	8	0	0	0	0	1	1	0	1	0	0	0	177.	126.
12	25	2	45	0	0	0	26	8	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	2	5	0	0	127.	93.
13	0	50	0	0	0	1	0	0	2	2	3	0	4	0	0	0	0	0	0	0	12	0	0	0	1	0	0	75.	65.
14	0	0	0	0	0	6	0	75	0	0	0	0	0	46	12	0	0	0	0	0	0	0	0	0	0	0	0	143.	135.
15	117	36	10	1	2	1	2	32	69	0	0	0	0	8	0	5	0	0	0	4	12	0	0	0	0	0	0	305.	229.
16	4	5	0	0	0	0	0	6	7	1	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	26.	117.
17	2	1	0	0	0	0	0	2	3	0	0	0	0	0	0	0	0	57	1	0	0	0	0	0	0	0	6	71.	65.
18	3	0	0	1	0	0	0	5	8	0	0	0	0	0	0	0	47	0	0	0	0	0	0	0	0	0	0	64.	28.
19	14	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0	6	0	0	0	0	0	0	0	1	27.	88.
20	95	21	0	14	1	1	1	13	4	0	0	2	0	0	4	0	0	0	0	36	0	0	0	0	5	0	0	199.	155.
21	13	1	3	0	0	0	15	0	2	0	1	0	39	0	8	0	0	0	0	0	0	9	3	5	0	0	0	103.	59.
22	105	27	9	0	0	0	0	48	10	1	1	0	0	0	0	0	0	0	0	0	9	0	2	1	0	0	0	213.	133.
23	2	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	8.	9.
24	3	0	0	0	0	0	2	0	1	2	1	2	0	0	0	0	0	0	0	0	5	1	0	0	2	1	0	23.	23.
25	0	3	3	0	14	0	11	0	0	0	0	5	1	0	0	0	0	0	0	5	0	0	0	2	0	0	0	44.	124.
26	3	0	0	0	0	0	15	47	28	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	95.	35.
27	0	0	0	1	0	0	0	1	48	0	0	0	0	0	0	0	6	0	1	0	0	0	0	0	0	0	0	57.	80.
																												4141.	4141.

Hourly O&D Tables in Base Year (Light Truck)

(Vehicle)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	662	353	296	108	84	29	71	72	31	5	10	13	0	21	16	1	6	9	6	5	7	11	3	2	2	6	5	1837.	2529.
2	670	712	256	37	159	278	358	53	87	54	52	57	3	11	6	10	5	1	3	14	13	58	20	62	8	10	2	2459.	2293.
3	250	261	457	168	165	83	70	90	25	4	31	74	1	17	14	8	24	9	8	11	4	5	0	4	9	0	2	1795.	1983.
4	142	65	192	204	88	49	21	81	18	1	8	138	0	41	19	9	67	3	0	60	0	7	0	0	35	0	1	1229.	1196.
5	237	117	274	114	177	69	55	30	14	25	18	114	11	10	4	4	1	2	2	60	3	14	3	7	41	3	1	1330.	1412.
6	65	130	54	25	72	94	65	10	20	12	41	25	0	3	1	0	4	2	0	4	6	2	0	0	2	1	0	638.	915.
7	73	205	35	35	52	97	71	6	11	204	106	27	29	3	0	0	0	1	0	19	4	17	1	20	4	2	1	2013.	1238.
8	152	47	187	90	42	12	7	477	107	7	7	21	1	146	58	40	14	31	18	22	6	15	2	2	5	7	16	1531.	1246.
9	148	74	95	26	18	14	13	80	28	14	7	7	1	5	13	10	7	56	6	1	18	31	0	11	3	12	17	713.	677.
10	20	66	9	13	45	17	211	4	10	6	8	0	1	1	0	1	0	0	0	0	7	6	1	4	0	0	0	430.	364.
11	11	35	22	3	32	74	158	3	20	30	10	4	1	5	1	0	0	0	0	0	0	5	16	34	3	0	0	453.	329.
12	11	31	38	151	321	16	15	7	1	0	0	50	0	3	5	4	0	0	0	10	0	0	0	0	6	0	1	680.	360.
13	3	3	6	1	4	1	20	1	2	1	1	0	10	2	1	0	0	0	2	5	0	0	0	0	1	0	0	64.	72.
14	34	12	22	26	5	3	4	90	7	0	7	7	2	34	27	11	1	28	20	5	1	2	1	3	2	35	8	397.	429.
15	22	5	21	21	6	1	4	62	16	0	4	7	1	60	5	29	0	46	30	5	0	6	1	1	1	46	4	404.	239.
16	2	9	8	16	6	2	0	24	11	1	0	2	0	11	18	8	0	15	2	1	0	3	0	2	3	28	3	174.	166.
17	6	4	30	70	1	3	0	12	8	0	0	0	0	1	0	0	2	14	4	1	1	0	0	0	6	15	1	179.	135.
18	3	1	7	1	3	1	1	13	34	0	0	0	0	8	11	5	4	0	0	0	0	0	0	2	0	1	0	95.	120.
19	1	4	5	5	7	0	1	7	6	0	0	0	0	19	13	2	4	0	14	10	3	3	0	0	6	7	0	120.	153.
20	15	16	30	49	50	11	10	13	9	0	0	0	3	5	3	3	1	0	10	76	0	0	0	3	6	0	19	341.	304.
21	14	15	8	4	1	17	7	9	60	0	0	10	5	2	0	0	1	0	2	0	2	2	3	12	0	0	0	188.	92.
22	16	70	2	2	7	4	14	12	101	3	0	0	0	2	7	4	0	0	2	0	2	0	4	1	0	0	0	253.	194.
23	23	17	1	0	7	1	15	6	0	2	1	0	0	1	3	0	0	0	0	0	3	4	0	0	2	0	0	90.	58.
24	3	13	3	4	16	6	30	2	11	1	6	0	0	1	1	1	0	2	0	2	12	1	0	0	5	1	0	127.	179.
25	18	2	11	0	21	1	3	11	10	4	2	6	1	0	0	3	5	0	6	6	0	0	3	3	0	0	1	119.	150.
26	24	21	11	13	11	9	4	41	18	0	3	0	0	11	11	11	8	1	18	0	0	0	0	1	0	0	0	213.	274.
27	4	3	3	20	5	3	0	10	14	0	0	1	0	7	3	2	1	0	0	19	0	0	0	0	1	0	0	96.	82.
																												17409.	17409.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	802	591	379	199	169	38	89	140	142	14	10	20	2	36	21	2	6	9	1	18	12	13	23	1	15	25	3	2780.	2729.
2	669	832	189	50	286	163	397	77	113	158	48	58	5	15	6	15	3	1	4	88	17	78	29	40	16	25	5	3387.	2677.
3	267	205	555	225	300	112	59	146	54	18	54	111	9	33	16	8	45	9	7	39	6	6	2	6	23	5	4	2320.	2167.
4	163	43	342	247	114	12	64	97	25	31	4	62	1	47	23	22	91	3	8	77	2	5	0	9	0	8	20	1444.	1437.
5	170	93	365	110	195	94	49	53	27	68	30	478	23	16	13	10	1	4	6	104	3	11	9	35	46	13	13	1930.	1891.
6	64	110	38	29	124	69	42	9	22	25	57	23	5	3	1	2	2	1	0	9	3	5	1	6	1	5	2	658.	800.
7	89	355	36	48	147	97	63	6	22	194	235	33	21	3	4	0	0	1	1	21	12	9	6	15	11	4	0	1442.	1258.
8	131	61	146	91	48	13	11	605	136	7	11	15	1	174	75	59	18	35	17	24	11	11	4	1	12	21	15	1733.	1769.
9	138	73	85	25	31	11	15	128	32	12	25	1	2	9	19	16	11	74	9	6	15	20	0	26	7	22	21	803.	894.
10	9	47	3	1	63	40	139	6	21	8	16	0	1	0	0	1	0	0	0	0	16	15	1	4	0	0	0	391.	554.
11	17	43	16	10	38	60	138	6	12	6	10	0	1	5	2	0	0	0	0	0	0	14	3	5	3	0	0	388.	547.
12	5	46	53	131	222	34	43	19	2	0	0	62	0	7	5	4	0	0	0	12	0	0	0	0	6	0	1	455.	889.
13	1	3	1	0	3	0	15	3	3	1	1	0	12	2	1	0	0	0	2	5	0	0	0	0	1	0	0	52.	94.
14	20	12	21	46	8	3	5	135	10	1	4	3	2	42	46	16	1	30	22	6	1	2	1	1	0	17	8	472.	558.
15	26	4	31	32	3	4	1	90	27	0	1	10	1	59	6	30	0	66	28	4	0	6	2	0	0	66	6	491.	370.
16	2	8	8	13	8	0	0	46	18	1	0	4	0	16	29	10	0	16	2	3	0	2	0	2	3	48	2	240.	235.
17	6	3	41	95	1	4	0	18	12	0	0	0	0	1	0	0	2	15	5	1	1	0	0	0	8	16	1	230.	215.
18	9	1	9	3	2	1	1	28	67	0	0	0	0	14	25	8	7	0	0	0	0	0	0	1	0	1	0	181.	268.
19	8	3	10	0	2	0	0	18	6	0	0	0	3	24	22	2	5	0	18	12	2	2	0	0	7	5	0	148.	188.
20	5	5	22	48	42	3	25	17	2	0	0	12	5	6	4	3	1	0	12	90	0	0	0	3	7	0	24	336.	556.
21	14	14	2	0	10	12	4	9	29	3	0	0	0	1	0	0	1	0	2	0	2	2	3	25	0	0	0	223.	122.
22	35	75	3	8	19	6	13	26	52	2	1	0	0	2	6	2	0	0	2	0	2	0	5	1	0	0	0	264.	207.
23	8	13	1	0	7	0	14	8	0	1	12	0	0	1	3	0	0	0	0	0	3	5	0	0	6	0	0	82.	91.
24	6	23	2	0	31	0	39	2	16	4	25	0	0	2	1	2	0	3	0	6	15	1	0	0	24	2	0	204.	160.
25	8	4	8	22	14	2	4	9	3	0	3	6	1	2	1	6	6	0	7	7	0	0	3	11	0	0	1	128.	197.
26	40	26	8	3	13	1	3	58	15	0	0	0	0	28	29	14	24	2	35	0	0	0	0	1	0	0	0	289.	283.
27	7	1	3	1	2	1	1	20	28	0	0	1	0	10	5	3	1	0	0	24	0	0	0	0	1	0	0	108.	123.
																												21279.	21279.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	973	660	440	243	193	53	115	123	132	5	32	17	1	40	22	6	7	10	18	7	22	30	5	3	14	30	8	3211.	3376.
2	889	1014	244	59	220	235	496	85	119	37	107	73	9	16	12	13	6	10	5	39	25	85	23	67	16	28	5	3937.	3420.
3	369	339	669	275	333	142	109	182	75	11	44	79	3	27	17	11	43	13	11	56	7	7	2	4	26	4	3	2862.	2705.
4	201	78	379	293	120	68	47	152	34	2	21	143	0	68	27	20	75	12	0	75	1	11	0	0	45	1	4	1777.	1656.
5	189	135	361	146	238	95	107	86	28	41	38	129	5	18	7	12	9	5	5	56	6	31	1	16	17	11	3	1745.	2035.
6	82	124	66	38	113	95	80	18	25	29	63	40	6	4	2	0	7	1	2	3	9	9	0	3	2	2	1	824.	1060.
7	99	372	38	43	84	104	73	9	19	102	219	48	88	4	3	0	0	1	1	32	5	6	4	5	7	5	2	1393.	1682.
8	121	54	202	101	56	21	8	661	171	12	16	25	4	219	59	76	10	49	44	24	10	21	5	2	10	9	27	2077.	2083.
9	147	102	99	31	34	18	23	127	40	19	21	9	1	9	26	24	15	89	14	4	23	35	1	13	3	15	32	964.	1087.
10	34	110	19	32	86	28	174	7	16	8	14	0	2	1	1	1	0	0	0	1	5	4	2	5	2	0	0	552.	320.
11	15	73	25	11	50	71	225	8	33	32	16	1	3	8	2	0	0	0	0	0	0	5	6	15	6	0	0	605.	652.
12	15	39	41	60	266	33	73	18	2	0	1	82	5	4	10	5	2	0	0	16	0	0	1	1	10	0	1	671.	751.
13	4	5	11	5	9	6	16	5	3	2	1	1	16	2	1	0	1	0	4	9	3	3	0	1	3	0	0	113.	171.
14	40	16	32	36	10	3	7	201	12	0	11	13	4	48	67	20	1	24	29	7	1	2	1	3	5	37	11	644.	635.
15	20	9	22	19	13	3	6	93	37	0	4	12	1	65	7	58	0	55	44	12	0	13	2	0	3	3	6	531.	420.
16	6	10	10	21	10	2	0	37	30	1	0	5	0	14	28	12	0	14	6	3	0	4	0	2	6	34	6	257.	291.
17	7	7	33	75	4	6	0	33	17	0	0	2	1	2	0	0	2	12	9	4	5	0	0	0	8	24	1	251.	238.
18	4	6	8	8	4	1	1	26	65	0	0	0	0	6	15	5	2	0	8	0	3	3	0	3	0	3	3	176.	358.
19	1	7	8	15	15	1	3	29	11	0	0	0	5	28	35	4	5	36	22	13	3	2	0	0	10	7	0	264.	267.
20	30	31	31	47	77	23	18	40	14	3	0	18	9	7	4	1	4	0	13	112	1	3	1	10	10	0	28	533.	524.
21	13	31	5	3	17	17	17	16	44	3	0	0	1	1	0	0	5	4	2	4	4	3	6	17	6	1	0	227.	161.
22	19	102	4	6	10	5	11	9	71	2	2	0	1	2	12	5	0	8	2	1	3	0	5	1	1	0	2	279.	289.
23	31	26	5	1	12	3	10	6	1	2	2	1	0	1	5	0	0	0	0	1	6	5	0	0	2	0	0	120.	72.
24	8	23	6	7	31	8	17	1	17	5	5	1	1	1	1	2	0	4	0	5	17	1	0	0	5	1	0	166.	187.
25	22	10	15	0	21	4	13	21	11	8	6	10	3	1	0	3	6	0	10	10	1	3	7	15	0	0	1	297.	218.
26	30	32	20	20	19	11	8	71	29	0	0	0	0	9	12	11	12	3	19	0	1	0	0	1	0	0	0	308.	214.
27	4	5	8	21	11	4	0	18	31	0	0	4	0	10	6	3	1	12	0	30	0	3	0	5	3	0	0	174.	143.
																												24897.	24897.

Hourly O&D Tables in Base Year (Heavy Truck)

(Vehicle)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	16	3	6	5	9	0	2	1	0	0	0	5	0	2	0	0	0	0	0	0	0	3	0	0	0	1	0	57.	82.
2	3	7	7	8	2	6	9	0	2	0	0	0	0	4	0	0	0	0	0	0	0	7	1	0	0	4	0	60.	58.
3	15	2	0	3	1	0	3	0	0	0	0	0	0	1	0	0	12	0	0	0	0	0	0	0	0	1	6	42.	82.
4	5	3	5	4	3	0	1	0	0	0	0	0	0	35	6	0	19	0	0	2	0	0	0	1	0	1	0	87.	132.
5	3	0	3	8	11	1	13	2	0	0	1	1	0	2	0	0	0	0	2	1	1	2	0	1	1	6	0	59.	115.
6	0	2	0	0	0	2	23	0	2	0	1	0	0	2	0	0	0	0	0	0	1	0	0	0	0	0	0	33.	33.
7	3	4	1	1	42	4	43	0	0	15	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	115.	127.
8	2	0	8	0	0	0	0	3	0	0	0	0	0	11	3	0	0	0	8	0	0	11	1	0	0	3	0	49.	61.
9	1	6	0	0	0	5	0	0	0	0	0	0	0	4	0	0	0	125	0	0	0	0	0	2	0	0	0	144.	35.
10	10	10	10	20	18	10	16	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	98.	17.
11	0	2	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	22.	17.
12	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	14.	24.
13	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.	2.
14	4	2	4	7	0	0	0	3	2	0	0	0	0	4	2	1	0	0	2	0	0	0	0	1	0	2	2	36.	96.
15	0	0	8	16	0	0	0	3	0	0	0	0	0	4	0	1	0	0	1	4	0	0	0	0	0	0	0	37.	15.
16	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2.	2.
17	0	0	8	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	21.	33.
18	0	0	0	0	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	22.	127.
19	0	0	0	12	0	0	0	0	0	0	0	0	0	2	1	0	1	0	4	2	0	0	0	0	1	0	0	23.	31.
20	1	0	1	1	1	0	0	2	1	0	0	1	0	1	2	0	0	0	2	16	0	0	0	0	2	0	3	35.	34.
21	0	0	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	14.	6.
22	1	2	0	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	7.	24.
23	6	2	0	0	4	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	15.	4.
24	8	2	10	20	19	4	14	0	2	0	14	0	0	0	0	0	0	2	0	0	3	0	0	0	1	0	0	99.	25.
25	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	1	0	0	0	7.	6.
26	4	11	1	0	0	0	0	22	2	0	0	0	0	21	0	0	0	0	0	0	0	0	0	0	0	0	0	61.	19.
27	0	0	0	16	0	0	0	3	1	0	0	0	0	2	0	0	0	0	0	5	0	0	0	0	0	0	0	26.	13.
																												1190.	1190.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	36	3	6	6	8	0	1	11	1	1	0	0	0	2	0	0	0	0	0	0	0	1	7	1	0	5	18	107.	88.
2	1	7	9	6	5	2	14	0	1	0	0	0	0	3	9	0	0	0	0	0	0	2	2	16	0	3	9	87.	59.
3	2	1	0	5	8	0	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	38.	136.
4	6	1	3	4	7	0	0	3	0	0	0	0	0	17	24	0	35	0	22	1	0	0	0	0	0	1	24	149.	137.
5	1	2	3	7	12	0	5	1	0	61	0	0	0	2	0	0	0	0	1	1	0	0	0	22	1	4	1	124.	143.
6	0	0	0	0	1	2	20	0	1	43	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	87.	22.
7	1	22	4	4	75	17	57	0	0	21	3	0	0	0	0	0	0	0	0	0	0	0	0	20	1	1	0	226.	116.
8	20	0	23	0	0	0	0	5	0	0	0	0	0	14	3	0	0	0	0	0	0	0	5	0	0	7	2	79.	43.
9	0	1	0	0	0	0	1	0	0	0	0	0	0	1	0	4	0	21	0	0	0	4	0	1	0	2	0	33.	10.
10	0	0	0	0	3	0	17	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22.	128.
11	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	0	0	0	22.	20.
12	0	0	0	0	0	0	0	0	0	0	0	14	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	16.	16.
13	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.	2.
14	4	4	7	41	1	0	0	3	2	0	0	0	0	6	2	1	0	0	2	1	0	0	0	0	0	2	2	76.	156.
15	0	8	23	23	0	0	0	2	0	0	0	0	0	7	0	1	0	0	1	7	0	0	0	0	0	0	0	72.	42.
16	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	2.	2.
17	0	0	14	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	36.	51.
18	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4.	28.
19	0	0	0	0	0	0	0	4	0	0	0	0	0	3	1	0	1	0	4	3	0	0	0	0	1	0	0	15.	34.
20	0	0	0	2	1	0	0	0	0	0	0	2	0	0	2	0	0	0	2	18	0	0	0	0	2	0	6	35.	40.
21	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	0	0	0	6.	5.
22	1	5	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	10.	8.
23	0	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	6.	16.
24	0	0	0	17	11	0	0	0	2	0	17	0	0	0	0	0	0	6	0	0	4	0	0	0	1	0	0	58.	106.
25	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	1	2	0	0	0	1	0	0	0	7.	7.
26	0	2	0	1	5	0	0	15	0	0	0	0	0	143	0	0	0	0	0	0	0	0	0	0	0	0	0	166.	25.
27	16	0	46	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	6	0	0	0	0	0	0	0	70.	62.
																												1554.	1554.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	153	21	40	26	17	0	9	24	0	0	0	2	0	0	40	16	0	1	0	2	0	4	0	1	0	2	26	384.	403.
2	27	72	27	3	16	23	89	4	6	3	2	0	1	2	14	10	1	0	4	0	11	28	5	15	0	59	12	434.	291.
3	20	7	9	21	18	4	5	19	0	0	1	0	0	6	0	0	37	3	9	3	0	0	0	0	0	0	24	186.	249.
4	46	4	39	25	41	0	1	30	2	2	0	0	0	42	40	0	43	4	9	17	1	2	0	7	0	2	0	387.	432.
5	14	0	14	48	54	7	35	15	2	7	1	0	0	13	2	4	0	0	9	8	1	10	1	7	8	6	7	274.	347.
6	0	7	0	0	5	8	40	0	4	12	3	0	0	0	0	0	1	0	0	0	3	14	0	0	0	2	0	99.	180.
7	3	38	1	0	27	26	71	0	2	25	7	1	0	0	0	0	0	0	0	2	0	6	0	1	10	1	0	221.	362.
8	18	6	19	24	5	1	0	41	9	1	0	0	1	6	48	2	5	21	8	3	0	3	4	0	0	1	10	236.	243.
9	4	16	4	2	2	16	4	2	6	3	0	0	0	2	5	2	1	14	0	0	7	2	0	10	0	3	1	107.	82.
10	0	8	2	4	33	30	27	0	1	6	10	0	2	0	0	0	0	0	0	1	2	1	1	5	2	0	0	125.	93.
11	0	1	0	0	0	2	33	0	1	13	14	0	1	0	0	0	0	0	0	0	0	2	12	27	5	0	0	111.	65.
12	0	0	0	0	0	0	3	0	0	0	0	74	0	6	1	0	1	0	0	14	0	0	1	0	10	0	0	110.	106.
13	0	0	0	0	0	0	3	0	0	2	1	0	14	0	0	0	0	0	2	8	0	0	0	0	1	0	0	31.	29.
14	0	3	4	26	5	2	1	9	4	0	0	3	0	18	3	3	0	0	13	0	0	0	0	2	1	20	11	128.	181.
15	38	5	30	62	0	0	0	29	2	0	0	1	0	3	0	9	1	15	6	2	0	0	0	0	0	22	2	221.	197.
16	6	3	0	5	1	0	0	2	2	0	0	0	0	6	8	2	0	2	1	0	0	0	0	1	0	74	1	114.	75.
17	2	1	38	84	0	0	0	7	1	0	0	0	0	0	2	0	2	19	7	4	1	0	0	0	5	40	1	213.	176.
18	0	0	2	2	0	0	0	6	7	0	0	0	0	0	6	2	6	0	6	0	0	1	0	1	0	2	0	41.	106.
19	0	2	5	33	3	0	0	8	5	0	0	0	0	13	6	1	7	19	20	13	1	1	0	0	10	2	0	149.	161.
20	0	0	1	8	17	1	6	8	4	6	0	14	8	6	2	2	4	0	13	100	0	6	0	12	7	0	25	248.	213.
21	0	6	5	0	5	0	0	0	2	1	0	0	0	0	0	0	1	0	2	0	2	3	5	16	0	0	0	50.	53.
22	9	17	0	0	6	3	2	3	3	2	2	0	1	0	0	0	0	1	2	1	3	0	5	1	0	0	1	62.	90.
23	16	19	0	0	12	19	10	4	1	1	4	1	0	4	0	0	0	0	0	1	5	5	0	0	3	0	0	104.	36.
24	2	11	2	5	43	34	21	0	3	5	13	0	0	0	0	1	0	1	0	2	16	1	0	0	4	0	0	164.	121.
25	0	0	4	1	9	0	7	2	0	2	5	10	1	1	1	0	5	0	10	7	0	0	2	4	0	0	1	72.	66.
26	12	31	7	13	25	4	5	27	13	0	0	0	0	45	17	23	22	2	40	0	0	0	0	1	0	0	0	287.	336.
27	33	13	6	40	3	0	0	13	2	0	0	0	0	11	2	1	1	0	0	25	0	1	0	0	1	0	0	152.	122.
																												4710.	4710.

Hourly O&D Tables in Base Year (Motor cycle)

(Vehicle)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	417	1414	332	67	105	43	35	266	48	3	55	30	56	0	74	13	10	9	22	6	113	6	0	1	0	0	0	3164.	5254.
2	1950	2790	555	166	559	147	687	459	307	275	106	26	69	0	0	4	15	45	0	15	126	82	322	43	5	0	0	8762.	8284.
3	323	433	545	378	868	320	90	348	33	0	50	66	146	0	0	0	7	6	5	141	11	0	0	0	2	0	0	4250.	6531.
4	1065	186	532	200	170	43	86	44	8	1	7	48	12	416	57	105	3	18	13	7	8	0	0	0	1	0	0	3015.	2358.
5	498	408	1131	77	306	191	103	9	5	7	35	93	32	263	295	42	0	1	0	44	0	5	0	0	4	0	0	3539.	4200.
6	147	471	782	88	152	280	149	35	10	16	61	21	2	0	0	0	0	0	0	3	3	43	0	0	1	0	0	2364.	2174.
7	155	426	53	26	238	333	286	19	98	14	80	1	18	0	0	0	0	9	0	0	0	6	40	3	0	0	0	1805.	2021.
8	2476	371	1376	266	66	269	34	1347	450	5	12	11	0	0	339	15	49	8	14	1	16	25	62	4	0	1	1	7418.	1631.
9	977	384	341	101	48	37	62	583	48	7	26	23	200	0	0	40	30	25	0	70	323	8	124	6	0	0	0	3327.	2403.
10	86	235	34	9	98	69	160	19	47	97	53	8	33	0	0	0	1	0	0	0	3	62	840	16	0	0	0	1869.	531.
11	118	183	309	16	186	148	216	16	17	20	581	139	213	0	0	2	0	0	0	12	22	20	185	12	0	0	0	2405.	1832.
12	85	113	229	126	549	267	39	11	5	0	317	331	69	0	0	0	0	18	10	253	0	0	0	4	2	0	0	2622.	1187.
13	3	4	24	0	14	6	1	0	5	0	5	1	41	0	0	0	0	0	0	20	0	0	0	1	0	0	0	125.	1344.
14	9	0	0	253	73	0	0	0	0	0	6	2	0	0	155	88	0	0	0	0	0	0	0	0	0	0	0	486.	679.
15	0	0	100	368	259	0	0	0	0	0	258	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	985.	920.
16	42	14	24	270	226	0	0	77	57	0	81	0	0	0	0	0	28	30	0	0	34	0	0	0	0	0	0	873.	364.
17	400	49	57	16	7	10	0	59	66	1	0	0	0	0	0	23	7	110	2	0	0	0	0	4	0	1	6	818.	205.
18	76	37	20	65	6	0	30	18	52	0	0	111	0	0	0	22	70	126	40	0	0	0	0	1	0	1	0	664.	411.
19	125	0	29	29	1	0	0	4	0	0	0	19	0	0	0	0	4	1	333	288	2	1	0	0	0	0	0	836.	689.
20	21	33	142	4	173	1	0	1	3	0	30	72	407	0	0	0	0	0	36	892	18	0	0	0	2	0	9	1834.	1772.
21	36	36	18	33	1	0	0	16	29	0	1	0	0	0	0	10	0	0	9	3	144	323	215	1	0	6	0	775.	1223.
22	25	126	0	0	84	24	38	29	19	13	7	0	0	0	0	0	0	0	5	0	97	70	601	23	1	0	1	1151.	766.
23	0	159	0	0	0	0	31	73	88	69	68	0	0	0	0	0	0	0	0	0	292	210	0	0	44	8	0	1042.	2651.
24	16	11	0	0	0	0	5	6	5	4	13	0	10	0	0	0	1	1	0	0	12	14	0	0	4	1	0	114.	121.
25	0	4	4	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	58	2	0	0	0	80.	66.
26	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4.	12.
27	0	0	1	0	0	0	0	2	1	0	0	0	0	0	0	0	1	0	0	13	0	1	0	0	0	0	0	19.	17.
																												54246.	54246.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	1118	1469	273	330	222	77	86	1090	594	35	72	51	3	4	0	31	225	55	40	67	22	16	0	6	0	0	0	5485.	4151.
2	966	3375	442	307	274	352	215	281	311	243	192	71	4	0	0	15	49	37	0	25	61	62	159	30	2	0	0	6521.	7154.
3	410	715	433	499	754	762	86	636	73	23	208	136	21	0	15	31	36	13	24	153	6	0	0	0	2	0	0	5009.	3397.
4	58	69	220	170	65	57	31	102	36	7	14	106	0	150	66	179	7	52	17	4	19	0	0	0	0	0	0	1411.	2391.
5	155	435	936	223	263	115	170	78	20	57	113	290	11	100	223	256	9	3	1	87	6	42	0	0	4	0	0	3527.	2476.
6	32	46	119	29	153	130	90	114	17	42	56	182	6	0	0	0	7	0	0	1	0	16	0	0	0	0	0	1076.	1983.
7	70	605	44	63	166	242	141	21	112	84	119	26	1	0	0	0	0	16	0	0	0	25	16	3	0	0	0	1785.	1061.
8	339	335	479	51	8	23	21	1286	743	13	12	7	0	0	0	88	79	21	7	1	10	10	36	3	0	0	2	3573.	4419.
9	286	286	90	23	5	9	31	291	37	29	19	2	5	0	0	44	46	65	0	6	6	3	67	6	0	0	2	1358.	2713.
10	9	63	0	3	9	19	18	8	9	76	16	0	0	0	0	0	1	0	0	0	0	14	53	3	0	0	0	297.	1399.
11	89	91	59	16	86	109	101	14	15	39	454	151	4	5	140	47	0	0	0	10	3	36	86	9	0	0	0	1566.	1687.
12	22	21	23	43	90	21	1	4	5	3	19	415	1	2	0	0	0	73	16	57	0	0	0	0	0	0	0	877.	1724.
13	99	46	109	7	23	7	18	0	147	26	116	54	32	0	0	0	0	0	0	317	0	0	0	14	0	0	0	1065.	105.
14	0	0	0	349	118	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	467.	590.
15	108	0	0	33	303	0	0	265	0	0	0	0	0	257	0	0	0	0	0	0	0	0	0	0	0	0	0	766.	447.
16	34	3	0	196	95	0	0	14	31	0	5	0	0	72	0	0	11	26	0	0	8	0	0	0	0	0	0	495.	671.
17	26	17	6	2	0	0	0	38	36	1	0	0	0	0	0	18	5	24	3	0	0	0	0	1	0	0	1	176.	567.
18	10	54	10	17	1	0	8	12	46	0	0	20	0	0	0	45	79	98	1	0	0	0	0	1	0	0	0	402.	500.
19	56	0	3	8	0	0	0	16	0	0	0	8	0	0	0	0	2	15	260	28	9	5	0	0	0	0	0	410.	596.
20	3	10	65	5	56	2	0	1	52	0	6	198	16	0	0	0	0	0	226	686	2	0	0	0	0	0	10	1345.	1486.
21	211	109	46	16	0	3	0	12	257	2	13	0	0	0	0	0	0	0	3	24	113	76	228	10	0	0	0	1144.	607.
22	11	58	0	0	6	23	5	19	4	34	6	0	0	0	0	27	0	0	1	0	174	55	164	11	0	0	1	569.	350.
23	0	303	0	0	0	0	56	114	165	655	127	0	0	0	0	0	0	0	0	0	168	469	0	0	45	10	0	2112.	949.
24	1	9	0	0	0	0	3	4	7	13	10	3	1	0	0	0	5	3	0	0	1	18	0	0	2	0	0	79.	101.
25	0	5	1	1	3	1	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0	1	34	3	0	0	0	55.	55.
26	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0	8	1	0	0	0	12.	10.
27	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	5	0	0	8	0	2	0	0	0	0	0	17.	16.
																												42003.	42005.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	1283	1282	844	363	286	155	119	599	384	23	123	59	11	0	4	1	37	43	158	12	43	12	0	2	1	0	0	6140.	5770.
2	1153	2344	837	184	309	307	191	233	313	179	47	87	2	0	0	3	3	19	0	9	52	161	0	59	9	0	0	6575.	6642.
3	879	1021	1576	1386	1030	533	90	858	158	12	66	76	23	0	0	0	13	47	31	75	3	0	0	0	7	1	0	7647.	7583.
4	266	145	1146	666	193	82	38	157	64	2	3	63	0	77	0	0	12	103	39	6	15	0	0	0	2	5	0	3063.	3301.
5	349	434	1279	248	434	129	133	37	16	19	59	179	10	0	0	0	0	0	2	42	4	23	0	0	14	0	0	3400.	2999.
6	116	326	357	90	122	134	99	38	19	27	39	99	8	0	0	0	0	0	0	0	5	82	0	0	4	0	0	1441.	1758.
7	107	214	55	38	151	161	66	10	67	62	20	1	0	0	0	0	0	6	0	0	4	15	0	5	0	0	0	982.	870.
8	675	248	955	160	35	16	13	857	651	12	3	2	0	0	0	0	13	39	119	0	4	34	0	3	0	8	0	3892.	3770.
9	455	300	208	77	17	25	44	476	30	17	14	12	0	0	0	7	106	23	0	0	0	10	0	10	0	0	4	2835.	1923.
10	17	68	20	2	17	16	36	7	26	40	4	1	0	0	0	0	1	0	0	0	2	36	0	2	0	0	0	275.	464.
11	100	38	52	3	64	39	16	3	19	8	9	58	0	0	0	0	0	0	0	0	13	19	0	1	0	0	0	441.	467.
12	46	67	70	43	159	79	1	2	7	1	34	316	0	0	0	0	0	32	2	30	0	0	0	0	2	0	0	931.	1027.
13	16	1	35	0	7	11	0	0	0	0	3	0	5	0	0	0	0	0	0	15	0	0	0	0	0	0	0	80.	69.
14	63	0	0	53	22	0	0	0	0	0	13	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	165.	77.
15	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.	4.
16	0	2	0	0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9.	11.
17	9	4	12	15	0	0	0	3	117	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	162.	174.
18	21	24	44	92	0	0	6	27	19	0	0	21	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	258.	316.
19	150	0	38	48	3	0	0	65	0	0	0	3	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	298.	352.
20	21	14	67	3	32	0	0	0	0	0	0	36	8	0	0	0	0	0	2	84	0	0	0	0	1	0	3	272.	380.
21	47	26	4	17	4	6	3	3	0	2	9	0	0	0	0	0	0	0	0	0	6	101	4	18	0	0	0	249.	280.
22	14	274	0	0	25	69	8	27	11	56	9	0	0	0	0	0	0	0	0	0	105	0	0	7	3	0	0	506.	487.
23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4.	4.
24	3	2	0	0	0	0	3	3	10	2	1	0	0	0	0	0	0	2	0	0	18	8	0	0	8	6	0	65.	123.
25	3	8	6	2	10	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3	0	6	0	8	0	1	0	52.	33.
26	0	0	5	11	0	0	0	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	0	0	48.	21.
27	0	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	8.	7.
																												38800.	38800.

Daily O&D Tables in Base Year

(10 Vehicles)

Passenger Car

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	3769	3332	1559	1223	1310	316	464	664	880	49	157	113	14	35
2	3779	5998	1763	904	1737	1947	2052	530	846	608	834	626	166	18
3	1335	2069	2474	2718	2456	1086	683	865	513	74	463	405	54	52
4	861	645	1732	994	463	334	267	369	212	20	59	465	4	64
5	1050	1179	2446	612	1093	388	755	416	255	431	335	416	0	42
6	423	1066	513	183	426	477	318	105	102	77	301	129	10	6
7	455	1923	457	313	531	373	489	88	161	657	1017	221	56	4
8	862	383	939	342	258	175	107	1497	628	41	75	44	4	192
9	1116	442	659	209	206	90	210	386	175	75	74	32	18	17
10	149	577	252	86	429	62	732	43	75	166	69	75	6	4
11	150	504	337	103	439	404	884	52	82	134	1155	225	139	8
12	59	214	279	290	1029	147	165	55	48	91	167	683	90	61
13	34	100	55	12	11	10	51	8	42	7	179	115	101	16
14	50	16	58	31	30	11	14	141	31	4	11	61	13	153
15	65	23	68	55	25	5	11	158	23	5	16	43	0	120
16	67	42	55	19	16	4	5	41	82	6	10	30	0	30
17	92	25	29	16	28	4	1	116	64	2	0	1	0	3
18	37	132	13	33	9	0	55	15	232	3	4	44	1	10
19	27	11	46	70	81	5	14	123	5	3	0	48	0	63
20	124	185	281	350	314	35	96	81	47	62	5	209	140	14
21	139	234	59	8	64	108	56	36	113	72	88	6	3	0
22	151	476	31	17	96	21	67	38	125	167	26	4	0	8
23	33	233	28	7	37	9	87	17	38	143	162	112	9	0
24	48	77	24	37	60	15	61	15	23	16	20	18	24	0
25	63	31	63	17	38	15	18	12	18	7	5	10	9	7
26	70	183	47	21	43	12	10	84	107	8	1	5	1	7
27	10	7	17	23	15	15	12	10	33	0	2	11	0	13

	15	16	17	18	19	20	21	22	23	24	25	26	27	ROWTOTAL	COLTOTAL
1	58	52	66	40	31	204	185	104	18	13	80	43	7	14806.	15017.
2	24	42	20	169	19	567	217	365	322	187	253	98	10	24001.	20309.
3	54	49	36	15	79	296	29	24	13	7	305	5	10	15171.	14243.
4	38	10	23	19	6	343	2	15	6	8	141	9	4	7113.	7681.
5	12	10	19	9	27	320	52	138	20	41	205	36	12	10220.	12224.
6	2	2	5	0	2	17	30	12	3	7	8	19	1	4263.	6068.
7	9	4	1	78	3	139	26	41	23	7	26	20	3	7124.	7684.
8	134	50	310	26	113	39	15	39	32	10	19	36	17	6232.	5969.
9	12	68	51	359	22	35	61	50	21	22	10	65	12	6597.	4967.
10	2	6	2	1	2	44	35	146	111	14	3	5	0	3127.	2990.
11	5	10	0	2	0	4	38	81	119	30	4	1	2	4874.	5235.
12	13	28	1	53	43	181	4	6	90	23	9	6	18	3851.	4151.
13	0	0	0	2	0	175	4	0	12	31	11	3	0	979.	862.
14	83	31	4	8	69	15	0	7	0	0	10	6	11	866.	946.
15	63	60	0	1	35	4	0	8	11	1	0	13	6	819.	662.
16	62	31	1	23	10	11	19	28	0	1	2	22	5	642.	623.
17	0	3	14	43	1	0	0	0	0	0	2	7	6	451.	499.
18	6	30	33	50	6	5	2	0	32	11	0	5	1	761.	975.
19	17	10	1	9	178	194	9	10	3	8	8	3	4	954.	905.
20	3	9	0	5	193	678	14	35	22	30	14	2	126	3294.	3713.
21	0	24	0	2	10	75	96	374	53	136	19	4	1	1782.	1388.
22	15	39	0	0	9	32	357	6	125	38	12	2	6	1866.	1677.
23	14	0	0	40	2	51	57	155	0	0	37	62	5	1337.	1115.
24	1	1	0	15	5	24	127	38	0	0	14	29	2	716.	768.
25	6	2	2	0	8	15	3	21	39	97	0	7	2	515.	1121.
26	23	27	6	5	3	2	3	2	44	44	4	0	0	760.	500.
27	6	5	6	0	4	123	1	4	6	2	3	0	0	329.	268.
														121500.	121500.

Taxi

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	3092	2649	1617	505	490	161	105	629	378	19	43	30	0	22
2	2029	3389	1362	566	929	1813	989	253	553	278	447	104	9	13
3	953	1391	2326	936	1504	505	384	410	263	13	109	102	0	17
4	290	563	919	734	304	110	197	365	84	2	19	28	0	33
5	421	945	1475	454	930	336	224	212	133	34	59	219	13	15
6	133	1386	306	85	296	453	177	45	56	89	154	37	0	17
7	228	1539	303	172	147	174	318	53	238	107	282	59	23	1
8	691	281	708	370	157	47	56	1710	887	9	33	37	3	112
9	642	589	300	145	143	20	181	815	237	18	43	14	2	16
10	26	95	27	4	28	21	139	9	12	73	56	36	0	4
11	64	396	71	27	163	183	375	56	38	129	153	172	61	14
12	26	94	113	28	353	29	16	12	13	47	80	412	6	0
13	3	41	2	0	7	0	56	3	5	0	86	7	9	0
14	50	7	12	94	3	12	9	151	19	9	9	0	0	101
15	148	29	60	41	9	8	16	266	222	4	16	14	0	70
16	6	11	0	21	5	0	0	11	53	0	0	0	0	0
17	73	15	14	15	5	3	0	59	65	2	0	2	0	0
18	26	41	8	15	4	0	23	8	128	2	4	7	0	0
19	1	6	9	23	8	1	4	23	3	0	0	3	0	48
20	23	33	73	13	77	6	37	9	20	15	0	81	35	5
21	15	72	33	28	2	1	19	23	67	4	4	0	0	0
22	40	150	7	1	10	0	10	22	142	36	5	0	0	0
23	0	92	0	0	0	0	0	40	0	2	5	0	0	0
24	0	8	2	0	0	1	2	3	3	7	7	0	0	0
25	1	0	0	1	2	0	0	2	3	0	0	3	2	0
26	18	9	10	2	12	7	0	11	16	0	0	0	0	0
27	0	2	0	11	4	2	0	2	19	0	0	5	0	0

	15	16	17	18	19	20	21	22	23	24	25	26	27	ROWTOTAL	COLTOTAL
1	179	7	93	41	34	30	66	37	0	0	1	9	3	9284.	9002.
2	15	20	22	61	17	49	122	200	77	41	0	74	0	13430.	12913.
3	58	0	18	8	8	49	19	5	0	2	0	9	0	9089.	9747.
4	32	14	16	20	17	4	14	7	0	0	10	0	3	3789.	4191.
5	5	3	6	4	9	148	7	94	0	0	5	10	1	5762.	5583.
6	4	0	6	0	1	2	15	10	0	3	0	5	1	3278.	3901.
7	22	0	0	27	6	16	9	13	0	2	0	3	0	3742.	3337.
8	259	20	63	10	162	1	20	32	44	3	1	31	14	5661.	5202.
9	226	40	55	144	11	8	32	74	0	6	0	6	9	3784.	3661.
10	3	0	3	1	0	10	5	127	2	6	0	0	0	674.	899.
11	15	0	0	3	0	0	7	22	16	14	0	0	0	1979.	1616.
12	13	0	2	6	3	77	0	0	0	0	3	0	7	1340.	1372.
13	0	0	0	0	0	49	0	0	0	0	2	0	0	271.	163.
14	93	0	0	0	62	1	0	0	0	0	0	0	0	632.	488.
15	0	45	21	2	0	21	14	0	0	0	0	0	0	1046.	1081.
16	81	0	4	10	0	0	1	0	0	0	0	0	0	205.	209.
17	29	7	2	4	0	0	1	0	0	0	0	0	1	297.	314.
18	3	5	4	37	2	2	1	0	0	3	0	1	0	337.	387.
19	0	0	0	2	77	87	0	0	0	0	0	0	0	295.	539.
20	29	0	0	2	126	371	0	0	0	0	5	0	17	1017.	946.
21	16	4	1	1	0	0	42	144	144	30	0	0	0	680.	766.
22	0	0	0	0	0	0	141	0	184	5	0	0	0	753.	955.
23	0	0	0	0	0	0	278	185	0	0	0	0	0	502.	467.
24	0	0	0	3	0	0	30	5	0	0	0	5	0	76.	120.
25	0	0	0	0	0	5	0	0	0	0	0	0	0	15.	27.
26	0	0	0	1	0	0	0	0	0	6	0	0	0	91.	153.
27	0	0	1	0	0	16	0	0	0	0	0	0	0	62.	56.
														68095.	68095.

Light Bus

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	18	0	1	33	0	14	0	0	29	9	15	0	0	2
2	0	56	7	0	27	7	0	3	1	80	80	1	16	13
3	1	6	8	132	2	6	46	1	0	4	2	28	0	4
4	77	3	102	321	0	0	0	0	0	6	3	73	0	45
5	0	55	1	0	143	11	0	5	2	2	33	26	0	10
6	96	4	0	0	4	57	0	0	0	2	5	2	0	5
7	4	2	4	0	0	0	165	3	0	7	2	15	7	0
8	0	0	1	0	2	0	3	109	38	0	0	0	0	0
9	78	6	0	0	23	0	0	31	40	9	0	0	0	10
10	2	90	1	10	9	2	0	0	0	9	1	0	3	0
11	17	114	2	0	4	21	8	0	0	1	11	1	7	2
12	0	0	23	20	133	0	10	0	0	0	1	25	0	0
13	0	2	0	0	0	0	9	0	0	3	7	0	10	0
14	8	2	9	6	2	0	0	0	19	0	0	0	0	0
15	74	9	48	22	0	0	0	22	302	1	0	0	0	0
16	1	0	0	0	0	0	0	0	1	0	0	0	0	0
17	59	58	52	45	0	0	0	13	5	0	1	1	0	0
18	27	2	1	15	0	0	0	11	4	0	0	0	0	0
19	1	0	0	0	0	0	0	0	0	0	0	4	0	0
20	24	4	8	7	35	8	0	0	2	0	11	16	1	0
21	19	37	0	0	0	48	1	0	17	1	0	0	0	0
22	3	29	0	0	1	0	0	0	95	0	0	0	0	2
23	0	0	0	9	0	0	0	0	0	12	6	0	2	0
24	1	2	0	17	9	0	83	0	0	64	40	0	20	0
25	0	0	0	0	0	0	0	2	0	0	3	49	2	0
26	4	0	0	0	0	0	0	19	4	0	0	0	0	0
27	12	0	0	0	0	0	2	0	0	0	0	0	0	0

	15	16	17	18	19	20	21	22	23	24	25	26	27	ROWTOTAL	COLTOTAL
1	13	1	13	13	0	12	13	26	0	2	0	4	0	217.	516.
2	9	0	24	3	0	47	67	39	0	1	0	0	0	481.	479.
3	11	0	43	5	0	5	17	0	0	0	0	0	0	319.	266.
4	36	4	23	12	0	6	0	0	1	1	0	0	0	712.	637.
5	3	0	0	0	0	24	2	6	0	0	0	0	0	323.	394.
6	0	0	0	0	0	2	4	0	0	0	0	0	0	180.	171.
7	0	0	2	0	0	0	7	3	0	0	0	0	0	222.	327.
8	24	0	24	21	0	0	0	0	0	0	0	8	0	230.	219.
9	390	1	5	8	0	0	78	61	0	0	2	9	0	751.	559.
10	2	0	0	0	0	0	17	0	12	64	0	0	0	223.	209.
11	2	0	41	0	0	5	0	0	6	43	3	0	0	288.	221.
12	0	0	1	0	4	16	0	0	0	0	49	0	1	283.	241.
13	0	0	0	0	0	1	0	0	2	20	2	0	0	56.	68.
14	0	0	0	0	0	0	0	7	0	0	0	0	0	52.	93.
15	0	3	0	0	0	7	17	0	0	0	0	14	0	529.	522.
16	3	6	0	0	0	2	0	0	0	0	0	0	0	13.	24.
17	0	0	20	64	14	3	0	0	0	0	2	3	5	335.	231.
18	0	0	16	0	1	0	0	0	0	0	0	1	0	78.	130.
19	0	0	14	3	71	30	0	0	0	0	3	0	3	129.	126.
20	8	9	3	0	30	94	0	0	0	0	7	0	5	257.	265.
21	13	0	0	0	0	0	2	14	3	15	0	0	0	170.	256.
22	0	0	0	0	0	0	14	0	0	1	0	0	0	145.	157.
23	0	0	0	0	0	0	3	0	11	5	1	0	0	49.	40.
24	0	0	1	0	0	1	15	1	5	0	12	0	2	273.	165.
25	0	0	5	0	3	7	0	0	0	13	0	0	62	126.	87.
26	9	0	1	1	0	1	0	0	0	0	0	0	0	39.	39.
27	0	0	5	0	3	3	0	0	0	0	6	0	0	31.	58.
														6500.	6500.

Daily O&D Tables in Base Year

(10 Vehicles)

Heavy Bus

	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	ROWTOTAL	COLTOTAL
1	0	7	0	124	3	13	5	12	39	70	26	31	0	0	72	14	10	18	156	145	12	135	4	2	14	2	2	916.	1323.
2	38	0	63	23	100	22	30	65	2	0	102	31	26	0	136	153	6	3	0	4	6	59	0	0	0	0	3	862.	667.
3	0	0	1	0	0	209	91	4	18	77	29	17	0	12	45	0	0	2	0	7	6	17	0	2	7	2	0	541.	525.
4	61	7	0	0	0	0	10	0	0	0	19	0	0	24	12	5	0	8	0	34	0	0	0	0	0	0	1	180.	206.
5	9	131	0	0	0	132	81	1	14	41	11	38	0	0	19	0	0	0	0	12	0	0	0	2	199	3	0	673.	220.
6	117	27	101	0	10	0	0	0	0	2	0	0	0	6	2	0	0	0	0	0	0	0	0	0	0	0	0	265.	388.
7	2	17	106	20	44	0	0	25	0	0	64	50	0	0	4	0	0	0	0	0	2	0	7	5	26	6	2	360.	456.
8	2	2	2	0	1	0	22	295	2	0	1	0	0	124	93	31	6	32	0	7	0	6	0	0	0	21	1	648.	946.
9	74	5	32	0	50	0	0	22	0	20	0	0	6	0	39	9	5	12	0	26	2	3	0	1	0	59	146	515.	451.
10	119	0	17	0	1	0	0	0	13	5	3	0	6	0	0	2	0	0	0	0	8	26	0	4	1	0	0	201.	227.
11	27	141	45	4	11	4	88	2	5	3	30	0	7	0	0	17	0	0	0	0	1	10	0	4	1	0	0	402.	303.
12	59	6	79	0	20	0	56	13	0	0	0	5	0	0	0	0	0	0	0	5	0	0	1	3	11	0	0	258.	394.
13	0	100	0	0	0	4	0	0	4	4	7	0	9	0	0	0	0	0	0	1	18	0	0	0	2	0	0	149.	214.
14	0	0	1	2	0	14	0	164	0	0	0	0	0	103	23	0	0	0	0	0	0	0	0	0	0	0	0	507.	285.
15	250	76	23	2	4	2	4	85	120	0	0	0	0	16	0	10	0	0	0	8	24	0	0	0	0	0	0	635.	481.
16	32	45	0	1	0	0	0	15	13	2	1	0	0	0	6	0	0	0	0	0	0	0	0	1	0	0	0	116.	242.
17	5	3	0	0	0	0	0	10	7	0	0	0	0	0	0	0	0	104	2	0	0	0	0	0	0	17	14	163.	145.
18	7	2	2	5	0	0	0	15	14	0	0	0	0	0	0	0	88	0	0	0	0	0	0	1	0	1	0	133.	180.
19	32	0	0	0	0	0	0	1	9	0	0	0	0	0	0	0	2	0	13	0	0	0	0	0	0	0	2	61.	190.
20	200	38	31	32	3	2	2	26	9	0	0	5	1	0	12	0	0	0	0	85	0	0	0	0	11	0	0	447.	343.
21	28	3	7	0	0	0	24	0	5	1	2	0	59	0	19	0	0	0	0	0	1	21	7	20	0	0	0	197.	130.
22	236	56	39	0	0	3	0	103	22	2	3	0	0	0	0	0	0	0	0	0	21	0	3	1	0	0	1	672.	292.
23	3	0	0	0	0	0	3	0	0	0	0	1	0	0	0	0	0	0	0	0	7	5	0	0	1	0	0	22.	25.
24	12	0	0	0	0	3	1	0	2	4	4	9	0	0	0	1	0	0	0	0	20	3	0	0	4	2	0	62.	59.
25	1	5	3	0	32	0	35	0	0	1	1	11	2	0	0	0	0	0	0	11	0	0	1	4	0	0	0	99.	277.
26	6	0	1	0	1	0	24	56	62	0	0	0	0	0	0	0	25	1	15	0	0	0	0	4	0	0	0	225.	113.
27	1	0	0	2	0	0	0	1	121	0	0	0	0	0	0	0	14	0	3	0	0	1	0	1	0	0	0	145.	172.
																												9057.	9057.

Light Truck

	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	ROWTOTAL	COLTOTAL
1	1726	1166	785	419	336	51	201	227	232	12	50	32	5	71	40	9	11	18	27	16	36	68	14	5	24	50	13	5666.	6021.
2	1571	1802	427	104	424	451	801	152	217	110	174	130	15	29	20	25	10	14	9	81	42	153	45	118	29	48	9	7073.	6016.
3	643	585	1288	484	586	248	183	315	126	21	84	158	7	51	31	19	78	23	19	92	12	12	3	8	45	7	6	5034.	4806.
4	357	134	499	522	219	114	90	257	58	12	32	245	0	217	48	36	141	18	2	139	2	18	0	3	76	4	12	3149.	2918.
5	341	239	636	259	425	174	175	146	50	82	52	350	16	32	14	20	13	9	9	117	10	50	5	31	46	20	8	3329.	3683.
6	246	231	114	67	209	172	137	30	45	50	113	68	10	7	3	1	11	2	3	8	55	14	0	6	3	6	2	1471.	1897.
7	179	665	71	79	271	193	168	16	35	241	396	75	134	7	5	0	0	2	2	55	11	14	8	15	14	9	3	2572.	2964.
8	238	97	362	186	101	36	26	1196	300	20	27	43	6	386	172	131	50	85	70	43	18	36	9	3	19	20	45	3715.	3677.
9	275	179	182	56	57	31	39	228	70	33	24	14	2	14	44	40	26	157	23	8	40	61	1	25	7	30	54	1722.	1914.
10	54	180	29	47	148	54	326	12	31	15	26	0	3	2	1	2	0	0	0	1	13	11	3	9	3	0	0	970.	683.
11	28	121	44	19	87	132	386	14	53	50	27	1	5	14	4	0	0	0	0	0	0	12	12	39	20	0	0	1048.	1082.
12	25	74	81	153	473	59	126	32	4	0	1	143	7	8	17	5	3	0	0	28	0	0	1	1	17	0	3	1265.	1370.
13	6	8	17	7	14	9	31	8	5	3	5	1	28	4	2	0	1	0	7	15	4	4	0	1	5	0	0	185.	279.
14	71	20	55	69	17	6	12	338	21	0	22	20	7	86	122	35	2	48	51	13	2	4	2	5	7	66	19	1116.	1137.
15	40	15	41	40	19	6	9	172	63	0	12	21	2	148	13	95	0	105	76	19	0	21	4	0	4	32	10	967.	740.
16	9	18	18	36	18	3	0	70	49	2	0	9	0	26	51	21	0	37	7	5	0	7	0	3	10	67	7	463.	507.
17	23	11	64	147	6	10	0	52	29	0	0	3	1	3	0	0	4	24	15	6	7	0	0	0	15	41	2	453.	422.
18	9	9	15	12	7	2	2	47	117	0	0	0	0	14	32	10	7	0	13	0	4	4	0	5	0	5	4	358.	623.
19	4	11	15	22	23	1	4	47	18	0	0	0	8	50	58	7	15	50	39	24	5	4	0	0	17	13	0	435.	462.
20	46	48	56	90	130	35	35	63	22	4	0	28	15	13	7	3	6	0	26	196	1	4	1	15	17	0	50	911.	957.
21	32	50	15	5	28	35	26	27	82	6	0	0	1	2	0	0	7	0	4	6	7	5	10	31	6	1	0	392.	377.
22	40	180	7	11	21	10	23	23	135	4	3	0	1	6	18	8	0	0	4	2	5	0	9	2	1	0	3	518.	501.
23	50	43	7	1	30	4	21	12	1	2	8	1	0	2	8	0	0	0	0	1	10	9	0	0	5	0	0	206.	138.
24	14	41	10	11	56	12	41	2	31	9	16	1	1	2	2	2	0	7	0	9	31	2	0	0	15	2	0	317.	343.
25	37	16	25	7	38	6	20	34	18	6	10	17	5	2	0	7	11	0	17	27	1	4	11	26	0	0	2	337.	394.
26	59	57	32	31	33	17	13	124	48	0	0	0	0	23	28	22	22	8	41	0	1	0	0	2	0	0	0	556.	417.
27	8	8	23	34	17	4	0	33	56	0	0	4	0	18	10	5	2	17	0	53	0	6	0	0	5	0	0	293.	252.
																												44482.	44482.

Heavy Truck

	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	ROWTOTAL	COLTOTAL
1	222	30	57	38	27	0	13	36	0	0	0	5	0	1	34	23	0	1	0	3	0	6	2	2	0	4	41	564.	592.
2	38	101	61	7	24	33	127	5	9	4	3	0	1	4	22	14	1	0	5	0	15	40	8	25	0	82	19	628.	425.
3	31	10	12	31	26	5	7	26	0	0	1	0	0	8	0	0	60	4	12	4	0	0	0	0	0	0	34	271.	398.
4	65	7	55	36	59	0	2	20	3	3	0	0	0	69	63	0	127	3	19	24	1	3	0	10	0	3	7	589.	655.
5	20	1	21	69	79	10	52	31	3	28	4	0	0	17	3	5	0	0	13	11	2	14	1	26	11	11	10	423.	538.
6	0	10	0	0	7	12	65	0	6	39	4	0	0	0	0	0	1	0	0	0	4	19	0	6	0	3	0	166.	257.
7	3	59	3	1	68	41	122	0	3	43	11	1	0	0	0	0	0	0	0	3	0	8	0	7	14	2	0	391.	553.
8	31	8	34	33	7	1	0	58	12	1	0	0	1	15	67	3	7	29	12	4	0	6	7	0	0	4	14	354.	353.
9	6	23	5	3	3	23	6	3	4	4	0	0	0	4	8	3	1	51	0	0	10	4	0	14	0	5	1	185.	221.
10	2	13	5	9	49	43	31	0	1	5	18	0	3	0	0	0	0	0	0	1	3	1	1	7	3	0	0	195.	168.
11	0	2	0	0	0	3	46	0	1	18	19	0	1	0	0	0	0	0	0	0	0	3	16	46	7	0	0	162.	94.
12	0	0	0	0	0	0	4	0	0	0	0	107	0	8	1	0	1	0	0	20	0	0	1	0	14	0	0	156.	123.
13	0	0	0	0	0	0	4	0	0	3	1	0	20	0	0	0	0	0	3	11	0	0	0	0	1	0	0	43.	39.
14	2	6	8	49	7	3	1	16	6	0	0	4	0	25	5	5	0	0	19	0	0	0	0	3	1	26	16	302.	323.
15	52	9	36	94	0	0	0	41	3	0	0	1	0	7	0	13	1	26	9	6	0	0	0	0	0	30	3	331.	282.
16	8	6	0	7	1	0	0	3	1	0	0	0	0	9	11	3	0	3	1	0	0	0	0	1	0	101	1	136.	108.
17	3	1	58	122	0	0	0	10	1	0	0	0	0	0	1	0	3	26	10	5	1	0	0	0	7	56	1	303.	264.
18	0	0	3	3	0	0	0	8	15	0	0	0	0	0	8	3	8	0	5	0	0	1	0	2	0	3	0	42.	179.
19	0	3	7	47	4	0	0	12	7	0	0	0	0	19	5	1	10	26	29	19	1	1	0	0	14	3	0	212.	233.
20	0	0	2	12	24	1	8	11	6	8	0	20	11	6	4	3	5	0	19	145	0	8	0	16	11	0	37	357.	309.
21	0	8	9	0	7	0	0	0	3	4	0	0	0	0	0	0	1	0	3	0	3	4	7	24	0	0	0	73.	75.
22	13	25	0	0	9	4	3	4	4	3	3	0	1	0	0	0	0	1	3	1	4	0	7	1	0	0	1	87.	127.
23	23	27	0	0	18	26	14	6	1	1	5	1	0	5	0	0	0	0	0	1	7	3	0	0	3	0	0	145.	53.
24	4	15	5	16	66	47	31	0	5	7	26	0	0	0	0	1	0	4	0	3	24	1	0	0	6	0	0	261.	187.
25	0	0	5	2	13	0	10	3	0	3	7	14	1	1	1	0	7	0	14	11	0	0	3	6	0	0	1	102.	93.
26	17	45	10	18	36	3	7	46	18	0	0	0	0	100	23	31	30	3	54	5	0	0	0	1	0	0	0	452.	333.
27	50	28	22	58	4	0	0	18	3	0	0	0	0	16	3	1	1	0	0	37	0	1	0	0	1	0	0	233.	186.
																												7103.	7103.

Motorcycle

Daily O&D Tables in Base Year

(10 Vehicles)

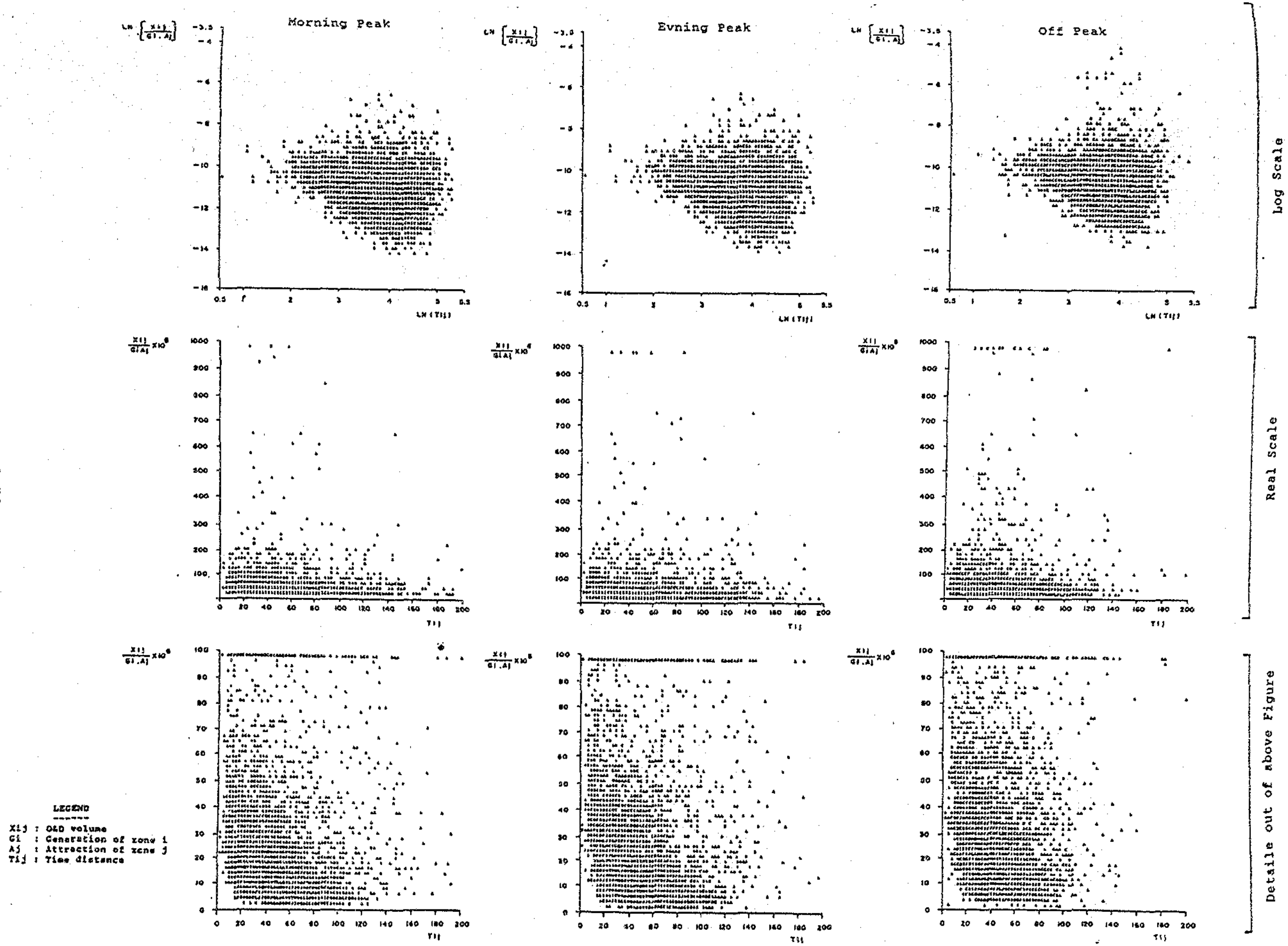
	1	2	3	4	5	6	7	8	9
1	2164	2484	1302	606	477	243	195	1603	710
2	2249	4460	1383	378	723	562	162	493	581
3	1424	1770	3383	1764	1401	1018	160	1428	243
4	565	255	1732	997	310	138	74	253	99
5	633	800	2247	430	731	235	353	76	29
6	197	427	678	149	242	277	151	93	33
7	338	558	111	76	302	356	189	24	144
8	1515	512	1718	286	63	82	38	1916	1199
9	900	571	356	132	34	40	81	852	62
10	43	158	20	5	45	41	86	15	34
11	186	116	149	12	150	115	95	12	34
12	87	120	144	151	353	168	9	6	12
13	52	16	72	2	19	18	6	0	45
14	81	9	0	207	80	0	0	0	0
15	32	0	20	84	83	0	0	80	0
16	19	6	5	113	74	0	0	20	30
17	99	30	30	24	1	2	0	27	142
18	47	56	67	143	1	0	15	44	50
19	246	0	45	74	3	0	0	94	0
20	34	29	139	6	95	1	0	1	16
21	134	75	23	35	6	9	3	11	81
22	27	279	0	0	52	106	20	46	20
23	0	123	0	0	0	0	23	49	67
24	6	8	0	0	0	0	6	6	17
25	1	13	9	3	17	8	0	0	0
26	0	0	7	15	0	0	0	34	0
27	0	0	0	0	0	0	0	1	7

	10	11	12	13	14	15	16	17	18
1	42	300	102	38	1	20	13	106	77
2	377	136	145	18	0	0	9	20	46
3	33	162	154	66	0	5	6	30	69
4	5	10	126	2	223	31	75	19	159
5	44	121	349	21	83	126	55	3	1
6	53	82	188	11	0	0	0	2	0
7	112	79	9	4	0	0	0	0	15
8	21	10	7	0	0	68	29	51	61
9	33	28	22	42	0	0	31	162	57
10	97	31	3	7	0	0	0	2	0
11	27	265	153	44	2	42	15	0	0
12	2	133	661	14	1	0	0	0	69
13	8	51	16	25	0	0	0	0	0
14	0	18	21	0	0	31	18	0	0
15	0	52	0	0	77	0	0	0	0
16	0	18	0	0	32	0	0	7	14
17	3	0	0	0	0	0	10	3	39
18	0	0	60	0	0	0	18	38	55
19	0	0	10	0	0	0	0	1	5
20	0	6	123	97	0	0	0	0	0
21	3	16	0	0	0	0	10	0	0
22	49	15	0	0	0	0	0	0	0
23	210	52	0	0	0	0	0	0	0
24	7	7	1	4	0	0	0	2	4
25	0	0	3	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	3	0

	19	20	21	22	23	24	25	26	27
1	231	38	88	22	0	5	1	0	0
2	0	24	114	254	112	98	14	0	0
3	50	176	12	0	0	0	11	1	0
4	61	11	28	0	0	0	3	7	0
5	2	92	7	45	0	0	21	0	0
6	0	1	7	97	0	0	6	0	0
7	0	0	5	29	12	8	0	0	0
8	167	1	12	54	23	6	0	11	1
9	0	16	66	16	45	17	0	0	6
10	0	0	3	66	184	7	0	0	0
11	0	5	23	35	63	6	0	0	0
12	10	109	0	0	0	1	3	0	0
13	0	120	0	0	0	6	0	0	0
14	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	9	0	0	0	0	0	0
17	1	0	0	0	0	2	0	0	2
18	8	0	0	0	0	3	0	0	0
19	145	69	3	2	0	0	0	0	0
20	77	502	4	0	0	0	3	0	9
21	2	8	71	205	117	28	0	0	0
22	1	0	224	31	165	17	4	0	1
23	0	0	114	183	0	0	22	5	0
24	0	0	27	19	0	0	12	8	0
25	0	3	0	9	22	12	0	5	0
26	0	0	0	0	3	8	1	0	0
27	0	9	0	1	0	0	0	0	0

	ROWTOTAL	COLTOTAL
1	10752.	10946.
2	12656.	12840.
3	12755.	13644.
4	5193.	5680.
5	6394.	5662.
6	2736.	3421.
7	2233.	1906.
8	7852.	7184.
9	3571.	3696.
10	827.	1156.
11	2552.	1482.
12	2055.	2152.
13	654.	395.
14	463.	419.
15	428.	323.
16	337.	289.
17	435.	468.
18	605.	661.
19	697.	755.
20	1142.	1184.
21	837.	806.
22	1091.	1072.
23	848.	750.
24	134.	221.
25	101.	101.
26	68.	33.
27	20.	19.
	76265.	76265.

Appendix 3.6.1 Travel Impedance and Trip Volume Relationship


Morning Peak
Evning Peak
Off Peak
Log Scale
Real Scale
Detaile out of above Figure
LN [Xij / (Gi.Aj)]
LN (Tij)
Xij / (Gi.Aj) x10^8
Tij
LEGEND
Xij : O&D volume
Gi : Generation of zone i
Aj : Attraction of zone j
Tij : Time distance

Appendix 4.2.1 Hourly O&D Tables (Base Case)

Hourly O&D Tables in Base Year

(Passenger Car Equivaren

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	3191	2789	1018	849	555	206	322	273	421	110	151	87	87	96	160	44	131	56	77	340	181	229	26	31	7	35	7	11377.	23298.
2	5685	7405	1693	1064	1628	3081	2341	608	936	406	1000	229	931	105	320	215	86	172	16	825	282	576	1563	201	87	81	7	30503.	23869.
3	1520	1853	1843	1136	1379	1154	400	450	255	67	331	298	278	156	296	33	167	22	37	241	19	42	34	11	24	9	20	12075.	15234.
4	1564	879	1642	1751	493	395	202	862	164	4	87	521	24	435	259	79	159	84	4	314	33	47	0	4	228	7	2	10083.	10436.
5	1324	3820	2994	716	1144	551	430	223	156	112	417	385	64	130	101	21	29	3	10	273	71	57	31	24	825	49	4	11935.	11522.
6	859	1799	998	313	414	1121	521	115	154	36	674	75	28	56	13	4	32	3	8	37	135	13	0	2	6	16	0	7426.	8113.
7	395	1580	262	245	484	359	679	66	158	366	1016	153	420	15	20	8	2	44	2	255	27	36	124	51	68	13	2	6850.	7658.
8	2036	503	1276	646	298	126	99	3194	956	17	98	83	29	485	815	130	132	206	66	30	27	91	206	12	8	75	20	11544.	8575.
9	2812	757	915	438	281	93	141	866	280	56	91	33	144	107	371	276	67	493	23	130	186	124	117	37	10	154	213	9214.	6313.
10	427	766	192	149	524	163	617	53	208	301	245	260	42	23	13	21	7	7	1	343	230	210	710	133	11	8	0	5548.	3874.
11	249	1067	278	162	663	1044	1206	80	194	132	1473	141	1022	78	17	34	48	8	0	38	147	72	674	156	19	3	1	9107.	6648.
12	291	407	628	790	2431	354	235	80	81	54	565	1262	461	208	86	80	6	63	107	626	11	8	434	51	85	11	50	9479.	4031.
13	5	86	14	1	6	25	28	1	7	8	31	1	135	3	1	0	0	0	2	32	0	0	1	19	5	0	0	411.	4604.
14	181	46	109	259	36	76	24	476	62	7	24	80	66	715	356	92	8	11	164	30	1	27	1	6	8	44	28	2647.	3523.
15	540	153	307	275	72	5	21	441	636	6	82	61	1	257	142	289	1	49	52	38	90	11	52	2	1	78	11	3631.	3625.
16	207	268	89	101	65	3	7	169	190	10	32	51	0	84	356	126	19	71	11	39	100	130	0	6	3	32	15	2284.	1844.
17	190	43	142	187	24	18	1	107	77	1	1	1	0	9	2	8	26	152	27	5	1	0	0	1	32	116	31	1174.	1236.
18	95	95	24	107	10	1	43	103	248	2	6	53	7	36	19	72	126	200	15	13	5	0	140	19	1	10	1	1453.	1620.
19	87	21	44	128	62	3	7	54	26	1	0	34	3	344	44	5	27	11	542	720	8	9	12	2	17	9	11	2229.	1686.
20	461	213	395	949	494	25	47	82	44	12	43	154	655	55	36	25	5	1	394	2202	47	7	73	53	64	0	123	6599.	7160.
21	249	263	68	17	15	141	34	70	335	10	7	0	5	1	49	14	3	5	5	1	370	286	640	75	0	0	1	2706.	2881.
22	428	334	17	9	87	58	67	181	361	45	36	3	0	8	58	7	0	0	9	60	468	25	1035	38	9	2	5	3349.	2515.
23	122	276	33	29	120	23	79	86	23	25	80	6	46	1	16	0	0	12	9	74	287	437	22	6	43	22	2	1360.	6299.
24	65	94	45	98	127	75	160	12	42	85	145	11	140	1	4	4	1	18	4	73	176	34	6	0	43	21	2	1486.	924.
25	65	11	44	0	81	2	43	16	16	2	11	75	34	5	1	3	13	0	15	43	0	1	140	23	2	0	44	694.	1568.
26	141	331	47	22	36	24	11	292	145	2	1	1	6	72	48	34	79	9	81	7	16	1	189	15	2	0	0	1602.	760.
27	9	7	17	96	13	8	3	23	238	0	1	4	0	34	10	12	34	0	11	165	1	4	29	2	2	0	0	723.	599.
																												168229.	168229.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	4254	4643	1535	1562	1295	358	495	1055	1414	265	225	217	4	109	289	124	146	93	319	436	173	221	77	22	47	85	53	19443.	14891.
2	3394	6546	1583	1227	1536	1928	2106	708	1059	323	1044	576	33	48	295	310	91	107	23	841	185	311	386	173	87	171	34	25725.	24955.
3	909	2407	1805	1558	2002	1571	523	787	355	303	610	840	16	89	192	55	195	27	38	375	25	28	22	23	85	29	3	14676.	11273.
4	741	446	1132	1606	375	454	372	482	305	129	189	333	1	144	155	82	242	39	125	358	8	13	25	41	6	25	96	8003.	10268.
5	802	1245	1700	752	1081	622	668	382	254	766	450	1271	13	72	111	56	16	10	79	271	13	36	58	139	557	73	24	11496.	9390.
6	277	1044	371	201	394	450	224	83	100	180	244	329	6	31	5	3	15	1	3	20	22	15	11	67	4	32	6	4185.	7415.
7	269	2668	428	584	656	590	604	81	139	532	1220	225	29	10	14	7	2	28	7	135	42	39	36	85	47	16	3	8512.	7732.
8	495	322	525	378	137	162	105	2833	1067	67	122	68	1	483	403	211	124	122	54	44	35	59	107	8	14	209	30	8285.	9526.
9	749	630	489	168	200	99	172	710	260	96	164	70	9	79	260	160	54	248	20	46	115	164	17	40	8	138	189	5354.	7882.
10	153	214	34	5	125	64	252	12	64	273	101	55	8	7	6	10	1	2	1	11	93	118	20	73	2	2	0	1706.	5646.
11	216	521	195	160	249	545	865	61	94	255	1281	513	29	14	44	45	31	6	0	18	14	107	55	125	11	1	1	5858.	7828.
12	201	144	173	425	520	92	265	52	17	213	107	1131	1	72	17	46	1	40	23	146	0	7	10	17	69	1	5	3725.	7669.
13	89	524	137	36	29	36	237	35	182	37	910	398	125	55	1	0	0	5	2	577	8	0	40	122	30	11	0	3666.	345.
14	129	62	110	359	46	47	15	472	148	34	54	157	3	659	179	80	8	53	326	45	1	18	1	1	4	26	32	3069.	3147.
15	551	211	236	272	28	25	32	773	494	15	32	139	1	447	120	349	3	70	61	49	53	25	6	2	1	113	10	4120.	2673.
16	154	231	39	109	35	6	6	105	310	58	20	70	0	86	287	113	6	69	8	15	13	5	0	4	3	67	12	1790.	2089.
17	65	51	124	192	10	14	1	84	94	7	1	3	0	7	1	26	23	127	26	5	3	0	0	0	14	85	31	1008.	1227.
18	66	159	21	69	5	2	47	90	233	8	11	63	0	29	44	86	110	179	1	3	4	0	12	16	0	9	1	1270.	1493.
19	69	15	31	3	4	12	3	55	23	4	0	93	2	151	37	10	25	15	491	342	5	15	2	4	16	7	11	1448.	2327.
20	385	451	338	296	336	68	334	43	94	296	45	551	31	22	34	31	5	10	666	1985	0	29	25	51	42	2	159	6156.	6206.
21	234	398	36	94	64	185	30	28	248	204	238	8	0	1	51	68	3	4	7	166	338	620	262	163	0	24	1	3285.	3123.
22	459	567	42	41	104	12	30	211	341	297	31	2	0	33	13	130	0	0	6	13	256	20	418	31	3	1	6	3067.	2681.
23	41	932	36	0	42	0	273	165	151	597	562	369	1	1	42	0	0	124	6	320	640	926	12	6	123	196	15	5381.	1629.
24	41	65	5	48	77	4	51	5	49	116	145	44	17	2	2	7	2	38	4	25	78	34	6	0	53	15	4	951.	2291.
25	23	35	20	85	96	4	34	12	17	11	18	78	5	1	1	1	13	1	18	43	0	7	58	50	0	8	39	732.	1227.
26	79	123	14	7	40	24	14	183	142	10	2	4	0	393	58	36	80	10	100	1	0	1	33	22	1	0	0	1364.	2345.
27	111	5	120	1	4	1	4	25	228	0	2	28	0	28	11	13	29	1	11	116	1	3	1	4	5	0	0	752.	769.
																												135107.	135107.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	4828	3033	2298	1296	1146	323	434	987	782	95	170	120	5	56	303	74	100	84	265	249	164	373	70	15	78	62	41	17331.	17799.
2	3690	5610	2012	694	1720	2096	2103	544	776	519	418	471	51	35	176	204	39	123	22	212	279	542	56	224	91	254	44	23415.	20421.
3	1712	2074	3461	1917	2541	1134	827	1033	517	108	324	299	9	73	88	31	179	45	85	224	54	40	2	7	216	12	64	17086.	17134.
4	965	497	1958	1369	635	237	275	557	166	10	54	435	0	283	177	33	305	59	22	283	12	23	0	18	116	8	6	8702.	8787.
5	956	1331	2454	771	1535	580	786	442	236	303	213	456	10	78	34	26	19	12	37	288	38	183	4	50	249	46	27	11166.	12054.
6	559	1302	608	151	520	554	432	95	106	155	249	107	31	15	5	0	11	1	2	11	29	66	0	6	7	15	1	5019.	6541.
7	485	2053	564	234	572	431	798	100	236	620	140	352	92	4	22	0	1	56	5	84	28	54	8	12	71	21	5	7648.	8586.
8	999	425	1269	445	284	130	114	2659	994	36	53	60	8	498	453	130	213	167	242	61	26	73	15	9	22	47	70	9502.	9473.
9	1056	780	606	190	278	111	233	791	268	102	49	24	7	19	488	51	99	363	31	41	140	147	1	51	5	117	191	6243.	6142.
10	237	538	201	96	402	164	712	35	76	110	77	36	14	2	3	3	1	1	1	5	19	170	13	65	9	2	0	2962.	2511.
11	155	638	283	51	335	261	953	56	84	170	529	142	17	12	10	19	25	1	0	0	13	46	38	130	22	0	1	3993.	3649.
12	104	183	334	158	963	111	218	63	29	38	73	699	8	20	17	5	6	31	15	143	1	1	5	12	82	2	12	3332.	3440.
13	25	233	29	6	17	12	65	6	8	14	17	4	110	2	1	0	1	0	9	74	29	3	1	12	13	0	0	551.	533.
14	84	37	73	153	43	25	21	513	38	1	17	24	4	190	150	28	1	24	69	7	1	6	1	8	13	89	41	1651.	1745.
15	489	110	162	203	34	5	20	389	468	2	16	19	1	144	7	94	14	104	75	61	40	14	2	0	3	66	14	2543.	2279.
16	47	36	29	43	22	3	1	67	64	3	2	5	0	25	57	20	0	24	21	4	0	5	0	5	7	230	7	721.	853.
17	145	78	186	328	15	7	0	162	115	1	0	3	1	3	19	1	20	253	37	16	8	0	0	0	23	129	22	1571.	1352.
18	66	64	32	49	11	1	38	71	280	1	2	21	0	6	31	13	143	0	28	2	3	6	0	12	0	10	3	912.	1488.
19	72	19	52	153	72	2	13	142	38	1	0	15	5	66	57	11	37	90	177	104	11	8	0	4	41	14	6	1210.	1451.
20	265	141	201	188	316	40	73	140	60	21	0	147	66	19	40	12	16	2	107	776	6	34	1	49	53	1	152	2944.	2906.
21	112	177	74	9	61	83	89	43	116	21	18	2	84	1	32	0	8	4	12	31	20	281	27	172	16	2	0	1481.	1396.
22	359	546	44	10	75	36	58	145	269	86	22	2	4	2	13	3	0	7	11	14	277	0	22	26	8	1	7	2049.	2048.
23	81	83	12	5	48	34	39	16	4	13	14	5	1	11	5	0	0	0	0	4	27	23	4	2	7	0	0	465.	204.
24	45	90	24	52	175	100	174	11	37	65	69	9	12	1	1	8	0	13	3	14	169	26	2	0	45	21	2	1165.	2020.
25	35	30	66	3	92	15	62	35	31	13	22	82	13	7	7	4	22	0	41	54	3	16	12	97	0	2	30	804.	1216.
26	105	180	69	69	113	28	58	309	188	3	0	2	0	124	68	79	70	10	121	1	1	1	0	35	2	0	0	1636.	1150.
27	93	43	33	140	29	16	8	60	166	0	1	9	0	41	14	6	22	13	6	151	0	8	0	2	13	0	0	872.	789.
																												136969.	136969.

Hourly O&D Tables in 1991 (Base case)

(Passenger Car Equivarent)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	4069	3554	1317	1032	498	352	283	335	517	129	178	104	202	116	196	52	158	67	85	411	215	249	40	11	9	38	8	14225.	31692.
2	7775	10048	2322	1449	2189	2708	3143	791	1265	540	1328	312	1157	131	410	272	115	236	20	1134	358	761	1494	273	116	50	7	40808.	32720.
3	2116	3543	2635	1552	1903	1455	543	627	349	86	436	409	338	210	370	44	209	29	50	337	23	58	44	14	33	10	22	16645.	21030.
4	2344	1331	2470	2537	736	578	302	648	252	6	125	730	43	614	344	109	279	124	6	798	41	69	0	5	351	9	2	14896.	14221.
5	1748	2364	3899	940	1480	697	545	283	200	151	518	506	56	140	139	28	37	4	10	366	83	122	38	30	1045	67	6	15540.	15795.
6	1170	2479	1381	443	591	1501	701	166	313	51	911	106	35	70	16	8	32	4	10	49	175	20	0	3	9	21	0	10274.	10940.
7	348	2196	359	343	668	500	869	88	222	520	1348	200	553	19	25	11	2	63	2	366	37	50	157	82	103	19	2	9369.	10439.
8	2717	655	1704	646	382	160	129	4247	1277	32	137	84	38	666	1036	172	172	143	60	37	34	114	240	15	10	97	29	13231.	11664.
9	4010	1059	1310	635	391	122	202	1253	387	77	128	46	188	152	461	346	90	592	33	203	250	180	150	51	16	199	266	12535.	8665.
10	561	1113	368	157	787	199	382	76	183	432	338	370	59	32	21	28	10	10	4	331	306	308	942	174	18	31	0	7837.	2557.
11	372	1607	630	257	1044	1497	1743	120	306	194	2215	330	1433	134	37	30	52	11	0	57	226	103	902	210	26	4	2	13452.	9110.
12	384	600	897	1033	3210	500	304	106	107	66	776	1657	598	278	106	102	7	86	141	320	15	5	558	69	109	15	68	12617.	5459.
13	7	112	21	1	11	30	40	1	7	10	37	1	176	3	1	0	0	0	3	40	0	0	1	25	5	0	0	532.	6034.
14	246	63	143	224	50	117	19	646	84	9	35	114	83	979	463	126	12	47	326	42	2	35	2	8	11	64	40	3890.	4805.
15	674	181	396	374	99	5	26	589	826	5	112	81	1	349	175	363	1	79	72	46	60	15	59	2	1	112	15	4718.	4635.
16	398	346	116	145	92	3	8	233	264	11	46	70	0	114	457	161	29	98	15	51	132	165	0	7	3	50	19	3033.	3116.
17	271	62	180	258	17	25	1	144	206	1	1	1	0	13	3	10	36	207	32	5	4	0	0	1	15	149	42	1584.	1612.
18	127	142	31	161	11	1	61	140	355	3	8	75	9	53	28	90	162	353	19	20	6	0	177	25	1	12	1	1970.	2126.
19	118	27	59	173	83	4	9	74	33	1	0	30	4	471	58	13	34	13	748	989	12	11	15	3	21	11	13	3023.	3260.
20	576	389	529	1252	444	36	63	110	57	15	51	205	850	72	56	33	6	1	536	2969	60	9	86	16	55	0	164	8740.	9852.
21	389	398	89	37	31	186	58	110	515	11	33	0	6	1	60	33	2	6	6	1	470	398	930	102	0	0	2	3832.	3817.
22	510	493	20	12	133	84	104	273	561	64	47	4	0	10	79	10	0	0	14	95	652	36	1325	53	12	1	5	4597.	3384.
23	178	412	49	47	198	34	114	130	41	37	119	8	81	1	32	0	0	31	2	122	406	624	16	8	66	36	2	2778.	8030.
24	86	133	53	122	177	102	198	15	55	113	190	12	177	1	5	4	1	23	5	104	227	45	6	0	56	28	2	1928.	-1237.
25	92	11	60	0	126	2	55	22	22	2	12	94	41	6	1	4	15	0	18	54	0	1	180	29	0	8	56	915.	2090.
26	151	465	62	29	36	31	12	370	177	3	1	1	8	87	63	46	106	10	112	8	22	1	233	19	3	0	0	2095.	1011.
27	11	7	32	130	18	11	3	27	304	0	1	5	0	45	13	15	41	0	13	229	1	5	35	2	2	0	0	940.	773.
																												228004.	228004.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	5379	6445	2182	2470	1703	498	700	1395	2060	360	339	293	4	144	364	169	190	126	252	539	258	254	103	30	66	111	58	26492.	18770.
2	4328	8832	2186	1678	2009	2651	2907	913	1526	1358	1589	821	43	60	368	409	119	148	30	1111	279	474	559	233	123	242	36	35234.	33435.
3	1190	3246	2524	2315	2615	2132	713	1056	511	423	967	1170	25	126	240	72	246	38	52	504	34	35	31	30	105	38	9	20469.	15439.
4	936	605	1551	2308	490	615	517	625	431	168	288	442	1	254	192	116	322	146	167	482	12	17	38	55	0	38	123	10919.	15171.
5	1032	1529	2314	1140	1409	849	897	498	360	1043	670	1755	38	102	170	79	20	13	105	372	17	138	93	180	740	105	33	15701.	12288.
6	345	1384	485	301	523	453	296	108	134	232	377	474	9	79	5	3	31	1	3	25	30	19	16	80	5	43	7	5660.	10123.
7	344	3537	568	845	829	784	771	106	199	761	1788	308	39	13	19	8	2	58	9	171	62	62	53	105	69	22	3	12535.	10481.
8	641	434	725	552	184	225	136	3795	1572	98	185	97	1	670	541	298	162	162	71	61	52	90	153	11	21	260	40	11237.	12592.
9	957	862	691	261	264	137	344	942	369	148	257	97	9	109	342	233	76	346	26	66	162	230	30	54	12	177	238	7339.	12069.
10	173	278	44	7	170	94	351	16	90	388	145	68	10	9	8	11	1	3	1	13	133	186	29	93	3	2	0	2326.	7925.
11	265	1186	261	215	316	744	1149	80	127	352	1910	673	38	18	59	60	36	8	0	21	23	152	84	163	13	1	1	7555.	11555.
12	117	195	241	630	703	131	353	69	22	299	164	1536	1	100	22	63	1	57	29	194	0	9	14	22	85	1	6	5064.	10348.
13	105	848	171	66	39	32	374	44	328	49	1271	506	163	68	1	0	0	7	3	745	10	0	66	154	34	15	0	4799.	457.
14	163	87	149	482	64	63	21	633	210	53	89	310	5	908	335	108	12	83	440	59	2	25	2	2	5	38	44	4192.	4218.
15	674	251	289	345	38	31	41	986	641	20	49	175	1	600	153	440	4	105	80	71	63	36	8	3	1	158	13	5276.	3467.
16	181	302	51	153	46	8	9	143	347	24	30	88	0	115	363	144	7	86	12	15	18	7	0	4	4	98	13	2312.	2782.
17	112	74	150	259	13	21	1	112	138	11	1	4	0	9	1	39	33	172	33	5	4	0	0	0	19	110	42	1362.	1593.
18	83	321	27	108	6	2	65	123	334	11	17	88	0	41	64	127	144	220	3	4	6	0	21	20	0	10	1	1736.	2025.
19	89	18	62	4	4	27	3	71	31	5	0	122	3	210	51	13	34	31	668	470	7	23	6	5	20	9	15	1959.	3081.
20	461	633	451	471	328	122	336	57	138	458	59	735	39	40	42	61	6	15	914	2693	0	47	44	73	54	2	224	8473.	8225.
21	276	510	47	121	80	235	62	37	333	281	354	10	0	1	62	112	4	5	9	207	430	591	361	217	0	19	1	4340.	2913.
22	538	741	55	61	132	17	41	280	471	418	45	3	0	43	18	164	0	0	8	16	355	33	585	41	4	1	7	4077.	3668.
23	47	1105	47	0	49	0	350	202	190	785	744	465	1	1	48	0	0	156	9	141	850	1179	16	8	157	347	28	6815.	2439.
24	79	91	10	49	99	5	72	11	66	152	189	59	22	3	2	8	2	35	5	32	105	47	6	0	70	20	4	1243.	1683.
25	31	47	27	121	131	5	67	16	24	14	22	101	5	8	1	9	18	1	22	53	0	9	83	66	0	11	48	940.	1624.
26	97	167	16	8	50	31	19	238	178	14	3	8	0	449	80	48	100	13	140	1	0	1	39	30	1	0	0	1731.	1778.
27	128	5	135	1	4	1	6	36	299	0	3	38	0	34	16	18	33	1	11	155	1	4	1	4	14	9	0	950.	984.
																												310133.	310133.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	6142	4072	3067	1769	1492	410	560	1284	1069	111	225	153	7	76	364	81	124	105	327	301	210	326	11	17	100	82	89	22574.	23246.
2	4964	7753	2789	1009	2317	2851	2811	730	1106	712	1141	651	66	42	311	259	51	173	35	318	359	747	45	306	123	313	53	31935.	27932.
3	2293	2899	4856	2789	3394	1526	1121	1423	750	140	455	410	11	95	108	41	228	58	106	316	67	50	2	9	293	15	76	23534.	23575.
4	1292	1002	2802	1948	858	341	394	776	249	11	78	398	0	368	218	46	376	81	41	388	17	31	0	18	170	12	7	12160.	12303.
5	1259	1778	3316	1054	1988	745	1001	594	321	407	293	617	16	98	44	31	33	14	45	402	45	337	4	64	316	59	33	14804.	16015.
6	736	1761	837	222	691	762	565	125	148	208	353	149	14	22	7	0	15	1	2	15	33	83	0	7	8	18	2	6783.	8773.
7	627	2774	769	331	739	573	1013	237	336	456	1213	329	131	5	28	0	1	76	6	112	37	69	13	17	99	30	7	10320.	11469.
8	1301	570	1741	613	381	174	158	3562	1438	49	69	77	8	716	590	182	274	225	322	83	32	97	16	10	30	62	95	12895.	12772.
9	1445	1127	869	292	380	144	332	1128	402	145	75	33	10	23	609	70	141	521	44	56	179	207	2	68	12	149	244	8697.	8672.
10	299	750	276	133	548	182	1012	47	108	159	102	35	14	2	3	3	1	1	1	5	25	246	16	79	9	2	0	4064.	3419.
11	217	880	397	74	464	380	1323	93	122	251	770	305	21	21	14	21	28	2	0	0	17	69	45	171	24	0	1	5600.	5139.
12	126	248	440	225	1299	155	294	82	38	51	107	904	10	21	24	8	6	40	19	183	1	1	5	14	95	3	13	4412.	4592.
13	18	153	44	8	24	18	62	6	9	16	21	4	145	2	1	0	1	0	10	91	38	5	1	15	13	0	0	705.	690.
14	115	38	104	207	57	32	30	707	51	1	27	33	7	250	206	37	2	37	88	10	2	10	2	10	17	120	50	2251.	2331.
15	586	134	197	243	66	11	25	496	617	3	24	26	1	208	10	125	18	136	103	53	50	20	3	0	4	75	16	3230.	2878.
16	53	47	38	56	20	3	1	93	90	3	2	7	0	34	75	28	0	33	15	7	0	7	0	5	9	278	8	920.	1097.
17	177	99	232	408	18	9	0	212	170	2	0	3	1	2	23	1	26	336	44	19	11	0	0	0	30	149	29	2001.	1705.
18	82	115	41	63	13	1	52	91	410	1	2	29	0	8	42	16	188	0	37	2	4	7	0	16	0	12	4	1231.	2021.
19	101	23	64	193	93	2	16	186	46	1	0	20	6	87	75	14	41	115	223	136	14	10	0	5	45	16	6	1538.	1836.
20	354	199	280	264	426	54	200	194	84	26	0	181	83	27	51	13	18	2	138	1001	6	45	1	64	63	1	202	3877.	3831.
21	152	229	98	10	78	109	108	56	164	25	31	2	105	1	42	0	11	6	15	28	27	373	32	221	22	1	0	1936.	1804.
22	442	767	58	12	94	47	76	190	381	126	37	2	4	2	29	7	0	9	13	18	370	0	24	34	10	1	9	2742.	2736.
23	97	92	16	11	64	55	43	17	4	16	14	5	1	11	8	0	0	0	0	4	34	35	4	2	9	0	0	532.	243.
24	60	116	30	66	217	119	211	13	51	40	90	10	14	1	1	4	0	15	3	17	222	37	2	0	58	29	2	1472.	1324.
25	76	40	88	3	131	19	82	48	32	15	22	97	13	6	8	5	25	0	51	60	3	23	15	130	0	3	38	1036.	1580.
26	133	229	18	87	139	33	68	404	253	4	0	3	0	145	81	98	85	12	142	1	1	1	0	44	3	0	0	2054.	1630.
27	99	47	38	173	36	17	11	78	222	0	1	11	0	52	16	7	25	19	6	205	0	10	0	1	18	0	0	1092.	983.
																												184395.	184395.

Morning Peak

Hourly O&D Tables in 2001 (Base case)

(Passenger Car Equivarent)

	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	ROWTOTAL	COLTOTAL
1	5139	4559	1782	1312	891	321	385	457	649	165	222	127	108	154	229	68	199	90	116	541	258	250	49	18	12	51	15	13264.	49920.
2	11902	13419	3676	2269	3382	3933	4734	1169	1936	741	1970	459	1619	199	513	261	171	272	32	1772	494	1075	2599	416	186	82	13	61534.	51772.
3	3526	4025	4445	2465	3050	2122	838	1057	604	114	679	637	650	346	519	70	299	47	89	559	34	87	74	23	65	16	33	26265.	33792.
4	4592	2542	4720	4384	1349	1064	542	1274	512	12	213	1229	102	959	510	153	454	219	10	1574	56	125	0	6	708	16	4	27328.	22179.
5	2548	3233	5485	1317	2082	956	730	416	284	212	659	731	75	229	193	35	48	6	14	542	106	165	56	45	2344	80	7	21536.	35003.
6	1908	3893	2258	794	1009	2214	1026	302	360	86	1430	160	46	110	23	11	43	7	16	77	249	27	0	6	13	32	0	16138.	16498.
7	970	3639	634	596	1049	744	1299	143	384	436	2110	304	403	35	49	17	5	110	4	631	52	83	247	113	188	44	4	15093.	16424.
8	3692	924	2326	1162	543	221	171	5746	1797	34	176	121	57	930	1340	222	226	200	116	66	47	153	301	22	17	131	47	20792.	17681.
9	7213	1820	2260	1096	594	185	322	3055	669	121	199	78	256	231	634	456	146	796	62	329	351	288	228	79	25	289	160	21172.	13710.
10	859	2069	320	328	1469	287	1471	145	311	749	582	595	91	55	33	47	18	18	8	982	488	467	1521	250	29	20	0	13036.	4017.
11	842	3285	1325	564	3084	2580	3251	282	619	362	4375	479	2389	287	58	83	73	25	0	118	436	145	1598	326	47	8	3	25568.	14748.
12	588	1021	2473	1438	4694	850	470	176	179	83	1237	2425	885	463	138	156	11	140	209	1143	23	7	915	119	148	25	106	19002.	8440.
13	10	131	32	2	14	38	58	3	10	13	52	3	234	6	2	0	0	0	4	60	0	0	1	29	7	0	0	707.	9001.
14	413	105	235	347	79	184	30	949	139	14	53	194	119	1538	495	184	18	78	341	78	3	53	3	11	18	105	64	6066.	7395.
15	879	254	548	512	144	10	39	795	1072	9	154	127	2	509	234	488	3	118	105	90	77	24	75	4	2	167	34	6464.	6285.
16	575	497	185	203	132	6	14	348	405	20	56	112	0	156	618	214	46	138	19	79	188	218	0	12	6	73	33	4352.	2905.
17	410	92	253	359	27	37	2	191	151	3	3	3	0	20	3	10	50	278	52	9	6	0	0	1	27	190	55	2231.	2361.
18	200	248	51	261	19	2	99	185	543	4	14	125	14	97	42	111	252	317	35	36	8	0	376	39	2	33	2	2979.	3106.
19	163	45	30	268	132	5	16	330	34	3	0	45	6	725	84	16	30	17	1212	1483	17	20	19	4	32	20	21	4554.	3453.
20	838	639	834	1883	961	54	88	171	104	20	83	305	1210	104	80	64	12	2	868	4532	78	22	123	26	85	0	252	13168.	15841.
21	803	798	159	56	37	293	99	237	1066	30	37	8	8	2	84	32	5	10	11	2	390	649	1475	144	0	0	5	6634.	5686.
22	858	885	39	23	356	126	195	435	956	120	88	7	0	32	138	18	0	0	11	175	1117	56	1991	96	24	2	11	7671.	5164.
23	369	832	114	135	527	68	216	236	95	65	266	19	218	2	37	0	0	60	5	317	662	1052	20	8	155	85	6	5589.	12231.
24	133	328	88	183	281	127	279	30	98	155	264	31	241	2	8	7	3	42	10	185	311	76	10	0	82	47	5	2884.	1877.
25	160	30	106	0	205	4	64	37	40	4	23	126	55	13	3	7	24	0	28	82	0	2	269	44	0	14	69	1397.	3242.
26	322	766	103	52	60	47	21	491	273	4	2	2	13	123	97	72	127	16	161	11	33	2	341	32	4	0	0	3277.	1520.
27	33	14	39	187	29	17	7	42	400	0	2	7	0	74	21	24	57	0	19	376	3	10	50	4	4	0	0	1407.	1139.
																												355350.	355350.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	6929	10151	3737	5030	2498	822	1265	1949	3728	575	720	446	8	245	509	263	282	191	346	817	551	430	303	51	122	196	63	42277.	24351.
2	5642	13286	3561	3863	2892	4273	4711	1263	2692	2404	3158	1398	52	110	470	583	162	251	52	1613	510	815	1049	384	213	402	57	55944.	50249.
3	1610	5173	4157	4396	3652	3519	1130	1437	864	738	2016	1920	36	207	337	113	241	58	78	776	76	62	73	56	155	64	17	33059.	24714.
4	1207	929	2371	3914	715	1006	837	859	745	282	551	630	3	385	350	159	449	231	203	725	22	31	84	84	0	63	162	16898.	28239.
5	1367	2240	3626	2183	1904	1323	1349	677	595	1749	1269	2780	58	168	233	117	33	21	167	568	27	257	244	268	1053	178	53	24546.	17352.
6	461	2025	754	596	733	959	450	149	224	318	698	822	13	135	10	6	33	2	4	37	37	32	39	98	8	65	12	8720.	16070.
7	454	5236	855	1543	1117	1151	1116	140	315	1257	3307	472	60	21	30	14	5	94	14	343	109	122	120	149	135	45	7	18121.	16630.
8	845	666	1150	1023	283	400	317	5120	2682	202	405	143	2	1008	765	445	335	240	115	104	111	171	252	20	32	356	58	17070.	17268.
9	1250	1322	1176	535	357	328	424	1343	645	287	526	165	14	169	647	357	105	554	45	95	294	406	71	91	20	253	318	11202.	18319.
10	208	405	62	12	253	147	537	26	140	637	260	88	13	13	10	20	3	4	3	19	201	298	49	125	4	4	0	3539.	13490.
11	340	1700	383	362	426	1165	1770	110	211	587	3549	986	50	30	45	80	45	14	0	33	46	245	177	216	32	2	2	12636.	21751.
12	144	309	381	1043	1016	194	544	103	40	499	349	2234	2	172	39	100	3	93	63	290	0	18	37	32	116	2	10	7813.	16015.
13	116	841	224	163	48	42	515	66	304	78	3086	736	215	94	2	0	0	10	4	1053	12	0	180	218	42	25	0	7070.	640.
14	229	130	234	724	87	91	36	900	359	95	203	327	4	1445	350	152	20	143	683	88	3	43	3	3	9	62	70	6497.	6430.
15	799	338	618	510	51	46	59	1294	890	35	105	221	2	840	305	610	5	163	119	55	79	64	13	4	3	240	21	7268.	4806.
16	214	379	80	209	64	11	12	193	527	41	58	134	0	169	485	192	8	112	14	36	31	14	0	7	7	149	22	3258.	4022.
17	145	305	214	394	18	43	2	145	231	19	3	6	0	15	2	59	45	260	55	9	7	0	0	0	32	152	56	2007.	2245.
18	104	348	43	202	10	4	114	174	333	22	34	134	0	69	59	166	197	281	7	6	7	0	62	34	0	17	2	2649.	3095.
19	127	29	75	7	8	24	6	103	59	9	0	184	4	328	74	18	49	31	996	760	12	53	8	8	32	15	22	3031.	4649.
20	585	990	701	973	467	193	575	98	285	888	119	1061	64	67	74	60	12	29	1390	4182	0	95	131	135	42	5	359	13580.	12389.
21	345	678	70	157	107	338	59	51	475	467	638	18	0	2	93	155	6	6	16	249	546	940	567	301	0	28	2	6353.	4659.
22	745	1055	81	113	182	25	72	405	726	694	88	3	0	63	28	222	0	0	12	23	582	46	915	68	6	2	12	6172.	4065.
23	64	1423	72	0	72	0	544	239	283	1244	1280	734	3	2	62	0	0	233	11	180	1243	1773	20	10	226	352	25	20096.	4576.
24	91	130	20	68	141	7	120	14	105	331	278	98	25	5	4	16	4	49	8	46	150	84	8	0	101	32	7	1840.	2519.
25	38	62	40	204	167	9	91	26	38	22	42	119	9	14	3	13	29	2	33	82	0	13	179	98	0	16	59	1427.	2436.
26	142	249	28	13	77	48	29	327	274	26	5	14	0	951	118	73	128	21	213	3	0	2	100	54	2	0	0	2495.	2731.
27	180	10	155	2	7	2	8	57	399	0	6	66	0	63	26	29	47	2	19	247	3	9	2	7	15	0	0	1341.	1435.
																												327129.	327129.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	8067	5906	4455	2758	2069	589	831	1875	1615	130	367	223	10	128	468	115	180	149	464	434	309	490	17	26	142	123	122	31860.	33530.
2	7193	12097	4565	1958	3487	4431	4316	1090	1865	1139	2083	1064	82	73	275	317	70	366	61	532	523	1207	64	434	202	434	67	49985.	43682.
3	3358	4769	7882	4888	5040	2349	1704	2133	1319	188	840	658	17	156	163	67	308	93	167	516	95	89	4	13	470	21	96	37402.	37388.
4	1929	1874	4848	3386	1327	585	634	1238	508	21	131	946	0	500	303	70	497	123	52	634	26	59	0	26	295	16	13	20033.	20689.
5	1758	2590	4987	1692	2679	1092	1434	859	524	639	511	891	32	154	64	51	42	34	60	621	68	372	6	96	390	84	45	21755.	23600.
6	1029	2676	1319	420	1022	1108	815	193	250	327	624	238	34	34	12	0	33	2	4	13	48	117	0	13	15	27	2	10365.	13445.
7	907	4274	1194	601	1074	860	1452	192	583	1428	2160	509	205	9	49	0	1	119	30	181	56	110	29	27	169	53	12	16244.	17770.
8	1726	857	2582	968	541	261	215	4895	2336	92	131	133	13	1087	759	259	403	303	466	135	57	158	20	17	69	92	130	18660.	18507.
9	2145	1890	1522	614	592	231	546	1806	749	247	160	56	11	39	827	100	205	842	76	92	252	361	3	99	23	215	342	14045.	14130.
10	424	1269	489	251	854	256	1670	82	190	296	181	57	19	4	7	6	3	2	2	7	19	441	35	107	12	5	0	6698.	5641.
11	349	1524	739	166	841	682	3406	149	241	475	1670	361	37	33	38	31	38	3	0	0	32	130	60	239	39	0	3	10232.	9446.
12	182	411	661	369	1904	242	450	135	72	88	190	1202	16	36	32	12	9	62	30	281	2	2	7	22	128	4	19	6568.	6957.
13	29	191	61	13	38	35	86	12	12	31	39	8	173	4	2	0	2	0	13	124	41	8	3	18	20	0	0	933.	932.
14	179	58	160	304	86	41	45	1045	72	3	51	52	11	355	304	56	3	62	130	19	3	15	3	16	36	163	69	3330.	3433.
15	682	176	260	296	70	17	38	662	821	4	43	36	2	304	14	173	21	192	151	85	76	35	6	0	7	91	24	4286.	3932.
16	79	67	63	78	39	6	2	137	120	6	5	11	0	48	98	38	0	44	15	9	0	12	0	7	15	337	12	1252.	1532.
17	239	146	323	550	31	16	0	311	249	3	0	5	2	4	28	2	41	446	66	30	14	0	0	0	42	198	39	2782.	2361.
18	113	188	67	111	22	2	79	143	649	2	6	43	0	15	58	21	226	0	49	4	6	11	0	21	0	20	7	1862.	3005.
19	126	34	97	281	143	4	27	274	68	3	0	31	10	125	110	19	67	170	307	206	20	15	0	8	66	24	11	2245.	2637.
20	490	320	656	448	657	88	131	303	143	35	0	272	116	41	78	20	39	4	212	1512	9	75	2	88	99	2	299	5949.	5954.
21	317	340	143	30	123	139	156	94	362	36	38	4	132	2	88	0	16	9	33	46	36	602	44	313	33	2	0	2917.	2652.
22	842	1249	95	28	163	75	135	392	645	239	58	6	6	6	32	13	0	13	34	33	594	0	32	61	19	3	13	6431.	6470.
23	143	141	30	19	86	79	63	22	5	27	25	7	3	12	10	0	4	0	0	3	42	33	12	6	13	0	0	785.	357.
24	88	170	55	105	301	136	394	33	83	115	127	18	19	2	2	5	6	30	4	24	301	65	6	0	85	46	5	2098.	1948.
25	116	63	138	3	173	33	107	78	53	23	35	136	32	11	12	9	41	0	64	98	6	43	26	203	0	4	43	1538.	2386.
26	200	348	141	131	192	49	96	562	387	6	0	3	0	181	107	118	100	19	172	2	3	2	0	70	4	0	0	2892.	1566.
27	121	64	57	231	57	30	38	103	310	0	3	17	0	68	24	10	38	30	11	201	0	16	0	3	23	0	0	1534.	1373.
																												282721.	282721.

Hourly O&D Tables in 2011 (Base case)

(Passenger Car Equivarent)

Morning Peak

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	4450	5807	2270	1634	1107	314	443	562	826	212	271	150	112	193
2	17749	23265	5711	3462	5083	5548	6945	1681	2850	1149	2930	475	2263	290
3	5700	6216	7266	3830	4456	3149	1278	1672	995	147	-1056	540	609	567
4	8715	4900	8886	7626	2444	1913	1017	2384	960	32	376	2106	226	1640
5	3615	4437	7532	1788	2630	1237	941	574	396	249	857	555	100	320
6	3094	6031	3680	1353	1688	3223	1531	526	587	141	2204	338	61	162
7	1534	5719	1033	539	1678	1105	1993	228	620	1351	2287	467	1207	53
8	5035	1264	3154	1533	731	397	222	7652	2468	47	232	161	75	2272
9	12037	2947	3707	1776	959	384	504	3266	1101	195	312	122	359	408
10	1460	3584	811	555	2576	447	2402	243	539	1263	930	553	144	101
11	1702	6464	2702	1056	3995	4531	4081	567	1160	861	8058	975	3989	557
12	937	1710	2365	1955	6778	1440	690	280	308	106	1721	3510	1323	682
13	15	170	42	3	17	45	74	3	12	14	68	3	301	8
14	652	165	368	532	121	272	43	1438	215	21	80	306	168	2377
15	1173	349	760	649	202	11	51	1051	1468	12	204	178	3	665
16	837	714	272	290	192	9	21	469	585	29	78	170	0	220
17	586	130	350	492	37	51	3	261	213	3	4	4	0	28
18	306	396	80	361	37	3	150	278	850	6	21	193	19	152
19	340	66	132	393	185	4	21	158	79	3	0	61	7	1078
20	1201	635	1249	2788	1399	70	119	338	149	37	116	665	1711	145
21	1603	1540	279	110	55	458	161	468	2170	44	66	0	10	4
22	1410	1485	66	39	433	185	315	718	1628	196	136	11	0	37
23	721	1583	215	291	1200	130	464	444	211	139	555	38	467	3
24	300	333	138	277	403	171	404	44	152	228	379	30	335	3
25	244	30	164	0	323	6	92	54	62	6	30	183	70	19
26	493	1160	158	79	91	64	30	723	410	6	3	2	19	185
27	34	31	59	376	43	24	10	61	587	0	3	9	0	107

	15	16	17	18	19	20	21	22	23	24	25	26	27	ROWTOTAL	COLTOTAL
1	258	80	232	112	152	729	314	439	60	23	14	64	20	22959.	77807.
2	473	445	334	542	46	2729	642	1455	3509	571	274	118	18	90897.	81271.
3	749	108	420	71	149	926	47	123	121	36	83	23	54	41293.	53550.
4	796	252	772	375	19	2899	88	213	0	10	1308	29	6	49953.	34165.
5	246	48	60	7	20	776	128	207	73	59	1828	109	10	29235.	35753.
6	30	25	119	12	24	127	358	37	0	9	19	47	0	25309.	25175.
7	70	27	8	176	6	1015	73	123	374	147	289	69	6	23745.	26044.
8	1665	274	274	262	157	95	62	195	377	27	23	130	61	27795.	25964.
9	941	628	221	1197	102	551	530	423	352	118	41	463	564	34130.	21601.
10	50	76	28	30	13	1724	752	767	2460	400	45	33	0	22490.	6347.
11	113	150	152	47	0	243	798	244	2862	576	87	13	6	47809.	23977.
12	185	233	14	294	303	1586	36	8	1515	195	197	41	247	28461.	13945.
13	3	0	0	0	5	79	0	0	1	38	9	0	0	915.	13565.
14	976	266	24	327	535	118	5	74	4	16	27	160	94	9164.	11276.
15	382	420	3	158	141	127	100	30	88	5	3	223	32	8647.	8719.
16	401	288	82	182	26	114	356	283	0	16	8	102	45	6091.	3980.
17	4	11	65	375	72	13	8	0	0	1	37	256	71	3074.	3437.
18	60	338	365	390	44	53	10	0	413	50	3	36	3	4420.	4515.
19	114	23	68	24	1646	2209	23	27	27	6	46	26	29	6708.	5169.
20	104	58	18	3	1303	6899	106	16	154	37	122	0	365	19475.	24970.
21	162	58	9	17	20	3	744	1027	2357	225	0	0	10	11604.	8566.
22	211	28	0	0	55	303	1799	85	3143	152	43	3	17	12500.	7930.
23	53	0	0	132	21	656	1234	2021	38	35	335	186	13	11145.	18870.
24	11	9	4	62	25	290	412	104	14	0	323	70	7	6201.	2875.
25	3	10	33	0	43	128	0	3	390	64	0	21	100	2077.	4960.
26	132	101	174	23	245	17	48	3	405	45	6	0	0	4705.	2274.
27	39	34	76	0	28	564	3	14	66	6	4	0	0	2060.	1658.
														550873.	550873.

Evning Peak

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	8739	15646	6353	10158	3619	1338	2117	2741	6411	990	1443	791	12	391
2	7348	19585	5787	7738	4115	6738	7330	1792	4479	4329	4178	2186	78	173
3	2082	8034	6643	8316	5039	5711	1791	1936	1421	1275	6008	3147	53	318
4	1524	1406	3581	6758	943	1595	1367	1130	1206	458	1053	496	3	571
5	1819	3274	5570	4102	2505	2132	2142	922	961	2888	2357	4194	61	260
6	571	2890	1175	1147	973	1429	476	210	357	479	1330	1409	18	212
7	562	7538	1308	2765	1498	1714	1682	191	495	3035	6071	696	81	32
8	1075	978	1779	1437	407	684	340	6861	4418	353	798	368	3	1548
9	1637	1946	1956	993	509	364	676	1857	3086	498	983	283	17	260
10	266	579	93	22	342	326	818	37	219	1054	449	112	18	20
11	425	2619	593	581	555	1771	2680	155	331	940	6475	1467	65	44
12	187	460	580	1775	1409	283	830	143	82	826	701	3251	3	270
13	123	1158	298	358	62	54	726	50	414	115	3326	1056	279	125
14	298	151	365	1201	137	137	54	1278	597	163	401	495	12	2253
15	917	443	602	783	69	61	92	1646	1345	54	204	288	3	1232
16	333	467	117	331	82	15	18	247	764	64	105	198	0	240
17	173	146	302	633	23	76	3	179	356	30	7	8	0	21
18	138	536	66	378	12	7	167	243	853	39	66	195	0	109
19	152	40	123	32	12	34	9	163	97	15	0	271	5	510
20	793	1537	1097	1687	683	292	938	143	412	1588	258	1350	96	105
21	413	866	95	335	127	464	77	66	715	745	1098	28	0	3
22	965	1444	116	193	333	36	104	535	1099	1137	161	4	0	49
23	78	1807	113	0	96	0	801	296	417	1535	2145	1145	5	3
24	103	173	32	113	185	10	175	17	155	358	468	156	32	7
25	50	88	60	342	229	13	128	37	58	34	73	177	13	21
26	175	351	41	24	104	68	43	415	433	42	7	22	0	793
27	199	13	224	3	10	3	13	72	410	0	10	91	0	89

	15	16	17	18	19	20	21	22	23	24	25	26	27	ROWTOTAL	COLTOTAL
1	711	403	409	309	522	1215	1088	728	371	81	154	320	127	67229.	31035.
2	642	865	218	388	78	2339	889	1399	1880	590	324	624	86	88278.	74037.
3	473	170	477	92	117	1152	129	103	135	83	236	100	35	53065.	39068.
4	335	324	608	359	291	1039	63	52	164	122	0	99	228	25995.	52682.
5	337	169	45	30	246	821	38	432	505	402	1557	284	76	38156.	24008.
6	13	9	47	3	5	51	44	67	73	131	12	98	17	13426.	25236.
7	42	21	7	144	21	338	170	200	203	216	197	69	10	28293.	25698.
8	1062	657	328	375	164	148	309	286	451	30	47	546	82	25714.	23381.
9	627	522	149	687	65	139	542	702	149	142	29	401	453	17892.	29777.
10	13	30	3	6	3	25	292	459	93	180	6	6	0	5371.	22334.
11	116	110	61	20	0	46	79	373	330	307	30	3	3	19939.	40177.
12	56	154	5	149	61	462	0	39	73	47	166	3	13	21978.	24584.
13	3	0	0	14	4	1456	15	0	349	290	51	38	0	10404.	877.
14	488	220	29	230	1034	127	6	72	5	5	13	97	101	9987.	9629.
15	350	102	6	235	160	135	145	100	18	5	3	340	28	9936.	6564.
16	621	258	9	145	19	33	53	21	0	9	10	217	30	4296.	5725.
17	3	87	63	349	79	13	12	0	0	0	47	213	75	2938.	3116.
18	144	330	381	355	10	9	12	0	138	54	0	27	3	4089.	4673.
19	101	25	69	49	1510	1226	21	98	16	13	50	22	31	4653.	6940.
20	105	68	17	49	3128	6534	0	172	272	215	128	8	532	21608.	18350.
21	120	205	8	8	22	315	677	1523	997	401	0	42	3	9250.	7436.
22	36	293	0	0	18	33	920	70	1670	100	9	3	17	9287.	9740.
23	74	0	0	331	16	235	1825	2706	34	14	305	492	32	14904.	8492.
24	5	20	5	70	12	63	220	128	14	0	135	45	9	2709.	3667.
25	3	22	39	3	44	112	0	24	346	140	0	33	78	2157.	3572.
26	154	101	170	30	297	4	0	3	205	80	3	0	0	3564.	4120.
27	34	40	61	2	24	325	5	14	3	10	20	0	0	2875.	2058.
														507032.	507032.

Off Peak

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	10498	8492	6571	4564	2816	801	1156	2298	2440	220	584	313	13	186
2	10498	19037	7482	3632	5260	6861	6464	1674	3111	1523	3836	2743	125	114
3	4926	7808	12872	8620	7574	3720	2621	3257	2271	104	1528	1038	36	245
4	3028	3388	8408	5924	2096	961	1045	1995	932	36	239	1423	0	773
5	2417	3852	7547	2732	3671	1568	2060	1222	838	585	865	1273	10	228
6	1448	4075	2123	751	1494	1635	1196	293	411	522	1101	392	36	52
7	1307	6562	1877	2074	1588	2310	3203	293	971	3326	3856	790	296	16
8	2333	1271	3850	1531	758	375	307	6830	3746	127	331	174	18	1601
9	3251	3098	2582	1137	933	366	463	2879	1332	425	309	89	15	67
10	639	3110	840	460	1353	406	2740	130	337	503	342	88	30	6
11	581	2757	1372	338	1456	1310	4403	260	458	921	3385	578	40	54
12	360	647	1063	578	3758	376	653	200	120	837	323	1727	31	55
13	39	271	86	18	52	33	116	17	17	30	39	10	204	6
14	254	90	261	487	126	62	67	1527	122	2	86	87	17	533
15	120	235	342	420	91	21	48	851	1193	5	48	51	3	614
16	102	94	92	110	53	4	3	185	150	8	4	16	0	68
17	318	206	452	798	41	23	0	433	378	6	0	7	2	6
18	159	289	103	173	29	3	219	309	1051	3	11	64	0	23
19	174	49	142	442	206	6	39	348	111	3	0	43	13	191
20	709	322	743	733	982	134	334	470	247	57	0	403	157	65
21	312	518	321	32	160	325	330	151	451	57	68	4	164	3
22	981	2055	167	47	257	118	232	469	1146	417	98	10	10	10
23	188	203	46	31	132	127	97	30	7	44	43	10	5	17
24	116	260	81	163	410	193	417	31	127	173	184	27	25	3
25	183	96	313	4	254	46	156	115	88	37	58	200	31	16
26	367	428	304	205	341	68	129	771	597	9	0	4	0	243
27	150	68	62	341	78	41	25	137	471	0	5	34	0	94

	15	16	17	18	19	20	21	22	23	24	25	26	27	ROWTOTAL	COLTOTAL
1	564	159	235	216	657	652	433	747	34	33	204	162	157	65213.	65915.
2	393	474	99	409	92	895	772	2009	89	653	309	641	92	78677.	68571.
3	338	104	430	146	268	837	142	247	6	20	720	32	159	60051.	59805.
4	437	116	725	154	79	1041	63	103	0	39	489	25	23	33564.	35334.
5	84	73	57	36	86	965	94	591	9	135	571	116	61	32159.	34887.
6	36	0	34	3	6	36	70	188	0	19	23	39	3	15965.	20686.
7	68	0	2	186	15	286	85	180	28	40	253	77	17	25703.	27614.
8	993	366	547	439	671	210	74	247	25	25	72	128	172	27111.	27115.
9	1045	153	304	1355	124	157	410	629	6	153	39	335	518	22772.	22163.
10	10	10	4	3	3	11	61	763	40	166	30	8	0	11082.	9277.
11	43	50	61	4	0	0	56	233	105	412	67	0	5	18853.	27258.
12	45	19	12	94	43	429	3	3	8	33	191	6	25	9848.	10590.
13	3	0	2	0	17	161	52	12	4	34	27	0	0	1239.	1282.
14	419	82	5	94	197	31	5	22	4	23	38	225	92	4941.	5109.
15	17	220	27	257	201	121	103	50	4	0	9	111	29	5701.	5451.
16	123	51	0	60	36	11	0	27	0	10	31	642	16	1704.	2182.
17	38	3	54	609	97	44	29	0	0	0	60	250	49	3893.	3294.
18	80	27	306	0	72	6	9	18	0	30	0	28	10	3822.	4523.
19	148	28	93	254	442	308	29	23	0	11	94	33	15	3284.	3839.
20	113	31	40	6	314	2349	13	128	3	130	152	3	425	5163.	5304.
21	136	0	32	16	35	72	50	953	64	639	50	3	0	4428.	3937.
22	48	20	0	31	40	57	929	0	45	87	30	5	19	7318.	7315.
23	13	0	0	0	0	7	61	52	23	9	21	0	0	1166.	537.
24	3	7	0	43	6	35	412	101	11	0	121	63	6	2995.	2891.
25	16	13	57	0	94	153	9	71	41	392	0	6	55	2288.	3413.
26	137	163	131	27	239	3	3	3	0	95	6	0	0	4045.	2737.
27	31	14	47	41	15	437	0	25	0	3	30	0	0	2167.	1952.
														[illegible]	[illegible]

Appendix 4.2.2 Hourly O&D Table in 1991, 2001 and 2011

Hourly O&D Tables in 1991 (With Project case)

(Passenger Car Equivarent)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	4041	3556	1212	1035	495	250	281	335	514	121	178	102	102	115	206	50	152	67	87	407	216	254	40	11	9	28	8	14180.	31639.
2	7722	10040	2314	1447	2398	2637	3142	788	1267	343	1315	322	1159	133	414	267	119	237	20	1131	355	762	1890	272	216	50	7	40735.	32702.
3	2102	2540	3617	1541	1899	1449	342	625	350	44	434	407	336	207	402	44	213	29	51	337	23	56	46	14	33	10	22	16421.	20962.
4	2343	1320	2462	2517	730	577	297	680	245	5	124	731	42	599	378	107	277	123	6	795	41	68	0	5	355	8	2	14441.	14171.
5	1742	3355	3887	930	1479	697	546	283	200	149	510	504	55	178	162	27	37	6	10	361	83	121	38	30	1045	61	6	15500.	15789.
6	1168	2480	1376	667	588	1497	693	166	214	51	914	104	35	70	16	8	32	6	10	49	173	20	0	3	9	21	0	10148.	10801.
7	548	2196	358	343	666	496	886	86	222	519	1347	158	553	19	25	21	2	63	2	363	37	50	159	81	101	17	2	9351.	10421.
8	2699	653	1692	840	380	162	128	4214	1260	22	127	84	38	657	1231	169	172	143	80	37	34	114	242	15	10	98	29	15225.	12636.
9	4005	1093	1302	627	393	125	202	1239	387	79	127	46	189	150	505	342	88	591	33	187	247	179	149	51	14	196	262	12203.	8667.
10	556	1118	264	196	779	194	883	74	162	431	339	371	57	32	22	28	10	10	4	526	310	302	945	167	14	11	0	7809.	2551.
11	368	1609	612	263	1036	1495	1744	119	302	156	2207	229	1435	133	29	50	52	11	0	52	226	105	505	208	26	4	2	13422.	9074.
12	383	596	887	1025	3221	500	304	104	107	65	771	1657	537	279	117	102	7	87	140	817	15	5	557	70	109	15	68	12605.	5448.
13	7	110	21	1	11	30	40	1	7	8	37	1	176	3	1	0	0	0	3	40	0	0	1	25	5	0	0	528.	6031.
14	246	63	143	218	51	112	19	636	84	9	35	109	83	965	504	121	12	46	222	42	2	35	2	8	11	62	40	3880.	4775.
15	739	194	435	416	212	6	31	673	881	5	123	90	2	377	211	383	1	77	79	70	69	17	63	3	2	127	16	5192.	5030.
16	390	351	116	141	92	3	8	231	261	11	41	68	0	111	487	154	29	96	14	51	130	164	0	7	3	47	19	2025.	2110.
17	370	62	187	256	17	25	1	144	106	1	1	1	0	12	1	10	36	203	32	5	4	0	0	1	15	148	42	1542.	1606.
18	125	141	31	154	11	1	62	138	353	2	8	74	9	53	30	50	168	353	19	20	6	0	177	26	1	12	1	1965.	2117.
19	131	37	59	171	83	4	9	74	33	1	0	30	4	467	63	12	32	12	741	989	12	11	15	3	21	11	13	3018.	2252.
20	581	288	524	1238	649	36	62	105	57	15	49	204	849	71	59	34	8	1	535	2958	60	9	86	16	55	0	162	8713.	9853.
21	289	397	19	27	31	186	55	109	513	11	16	0	6	1	61	22	2	6	6	1	469	399	938	106	0	0	2	3632.	3829.
22	537	500	20	12	130	78	103	354	531	69	50	4	0	10	93	10	0	0	14	94	658	37	1318	52	12	1	5	4581.	3386.
23	178	408	49	47	198	34	118	130	41	37	118	8	79	1	24	0	0	21	2	122	404	626	16	8	66	36	2	2773.	8046.
24	86	123	51	122	170	99	199	15	55	113	189	12	176	1	5	4	1	23	5	104	232	45	6	0	56	28	2	1924.	2234.
25	91	11	40	0	126	3	51	22	22	3	12	96	41	6	1	4	15	0	18	58	0	1	180	31	0	8	56	914.	2093.
26	191	464	62	29	36	31	12	364	184	2	1	1	8	85	71	46	102	10	106	8	22	1	232	19	3	0	0	2090.	999.
27	11	7	22	138	18	11	3	27	306	0	1	5	0	65	13	15	41	0	13	229	1	5	25	2	2	0	0	938.	768.
																												227990.	227990.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	5354	6435	3187	2462	1697	497	701	1384	2041	354	340	293	4	144	394	163	189	125	248	538	252	252	103	30	65	151	56	26419.	18718.
2	4315	8812	2178	1877	2006	2855	2900	904	1527	1346	1590	818	43	60	387	398	119	149	16	1108	270	658	560	334	224	237	36	35151.	33613.
3	2190	3247	3512	2301	2412	3153	703	1051	306	423	968	1166	25	126	257	71	248	38	52	504	34	35	31	30	205	38	9	20639.	15429.
4	932	602	1541	2288	431	614	514	624	430	171	288	442	1	253	214	115	325	145	145	481	12	17	38	54	0	38	123	10898.	15183.
5	1028	1526	2303	1161	1417	843	896	496	359	1041	664	1751	36	102	183	73	30	13	105	372	17	136	93	277	737	105	33	15672.	12282.
6	343	1385	482	300	524	657	394	108	134	232	375	474	9	75	5	3	21	1	3	25	30	19	16	77	5	43	7	5642.	10112.
7	344	3539	561	845	826	782	766	104	196	756	1774	309	39	13	23	8	2	60	9	170	58	62	52	105	72	22	3	11500.	10464.
8	641	434	722	550	183	224	134	3741	1566	98	184	97	1	670	615	292	162	163	71	61	52	90	150	11	21	260	40	11231.	12578.
9	961	863	690	262	256	137	244	933	367	146	354	96	9	107	365	226	76	345	36	62	158	222	30	56	12	178	234	7313.	11069.
10	169	378	42	7	170	94	348	16	89	389	145	68	10	9	8	11	1	2	1	13	127	192	29	92	2	2	0	2314.	7909.
11	363	1189	261	213	315	730	1152	80	127	350	1198	670	38	18	64	58	36	8	0	19	21	151	85	160	13	1	1	7929.	11537.
12	115	194	241	619	700	132	357	69	22	298	168	1525	1	101	23	62	1	57	29	195	0	9	14	22	86	1	6	5047.	10327.
13	104	649	170	65	39	33	374	44	227	49	1268	504	161	66	1	0	0	7	3	743	10	0	69	152	34	15	0	4786.	454.
14	163	87	168	486	63	41	21	621	210	51	90	209	5	895	268	105	12	80	434	59	2	26	2	2	5	36	44	4184.	4221.
15	703	373	330	428	45	34	46	1089	701	25	60	150	3	638	185	480	4	109	48	77	66	40	9	3	1	172	14	5811.	3796.
16	177	302	51	140	47	8	9	140	388	24	31	87	0	111	377	137	7	26	12	19	18	7	0	4	4	97	13	2301.	2767.
17	108	74	150	258	13	21	1	112	137	11	1	4	0	9	1	38	33	172	33	5	4	0	0	0	19	107	42	1353.	1592.
18	79	222	27	107	6	3	65	120	327	11	18	85	0	40	72	116	143	220	3	4	6	0	19	20	0	10	1	1723.	2029.
19	88	18	42	4	4	17	3	71	31	5	0	123	3	205	54	13	32	24	665	470	7	23	6	5	19	9	13	1952.	3078.
20	458	624	453	463	317	121	337	57	137	458	58	730	39	39	54	41	6	15	913	2685	0	47	44	72	54	2	223	8447.	6206.
21	276	507	67	120	80	237	44	37	326	283	352	10	0	1	67	122	4	5	5	200	425	587	358	219	0	59	1	4327.	3874.
22	529	740	57	61	132	17	41	380	471	419	45	3	0	44	19	162	0	0	8	16	357	31	580	42	4	1	7	4066.	3659.
23	47	1105	46	0	49	0	348	197	188	790	740	467	1	1	51	0	0	155	5	141	841	1184	14	8	155	245	18	6801.	2430.
24	80	92	10	49	102	5	72	11	66	151	191	59	32	3	2	8	2	35	5	32	102	47	6	0	70	20	4	1245.	1673.
25	31	47	27	120	131	5	67	16	24	14	23	101	5	8	1	9	18	1	22	53	0	9	84	66	0	11	50	943.	1622.
26	97	166	16	8	53	31	19	237	175	14	3	8	0	445	87	47	98	13	145	1	0	1	39	30	1	0	0	1736.	1781.
27	126	5	135	1	4	1	4	36	297	0	5	38	0	38	17	18	33	1	11	153	1	4	1	4	24	0	0	947.	978.
																												210179.	210179.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	6122	4059	2060	1771	1495	410	559	1281	1063	109	225	151	7	76	387	82	124	103	325	297	211	326	11	17	100	82	87	22548.	23210.
2	4958	7745	2776	1009	2319	2850	3811	725	1105	715	1136	649	66	42	318	255	51	173	35	315	358	748	46	308	122	313	51	31901.	27889.
3	3289	2902	4549	2785	3389	1524	1114	1413	746	140	454	408	11	99	313	42	228	58	106	317	67	50	2	8	291	15	76	23495.	23535.
4	1288	995	2800	1969	856	336	390	774	247	10	74	596	0	361	366	45	369	81	41	388	16	31	0	18	174	21	7	13143.	12297.
5	1260	1773	3310	1057	1985	743	1000	591	320	407	293	613	15	98	49	31	23	14	45	402	45	236	4	64	316	59	33	14786.	15991.
6	733	1757	833	323	691	755	563	125	148	208	551	147	14	22	7	0	15	1	2	15	33	83	0	7	8	18	1	6760.	8755.
7	628	2774	766	331	741	575	1008	127	336	855	1208	228	133	5	30	0	1	76	6	112	37	69	13	19	97	30	7	10312.	11465.
8	1298	570	1732	614	382	174	158	3547	1419	49	69	77	8	705	657	179	274	213	321	83	33	97	16	10	30	62	91	12867.	12770.
9	1428	1109	868	390	377	144	328	1118	399	146	75	33	10	23	652	70	141	516	64	56	173	205	2	76	12	147	240	8642.	8671.
10	300	748	375	133	545	182	1006	47	108	159	109	35	16	3	3	3	1	1	1	5	25	250	16	79	9	2	0	4058.	3418.
11	223	868	392	73	457	378	1346	79	124	252	761	204	26	19	14	21	27	2	0	0	18	65	43	172	23	0	1	5582.	5118.
12	126	248	460	225	1298	154	291	62	38	51	106	901	10	21	24	6	6	40	19	181	1	1	5	14	97	3	13	6405.	4579.
13	28	252	44	9	24	18	62	6	9	16	21	4	145	2	1	0	1	0	20	91	38	5	1	15	13	0	0	703.	689.
14	117	38	102	206	57	31	30	700	51	1	27	32	7	246	222	37	2	36	87	10	2	10	2	10	17	120	50	2250.	2321.
15	631	141	324	264	53	13	32	577	660	3	28	29	2	331	13	132	18	151	106	64	59	23	3	0	5	80	19	3541.	3133.
16	53	47	38	56	28	3	1	90	69	3	2	7	0	34	79	26	0	33	15	5	0	7	0	5	9	278	8	914.	1092.
17	179	98	324	406	18	9	0	212	171	2	0	3	1	2	23	1	26	337	43	17	11	0	0	0	28	147	27	1994.	1694.
18	82	115	41	63	13	1	52	91	406	1	2	29	0	8	45	16	183	0	35	2	4	7	0	14	0	12	4	1326.	2017.
19	101	33	64	193	93	2	16	186	46	1	0	20	4	85	80	14	41	115	219	136	14	20	0	5	45	16	6	1537.	1824.
20	348	303	279	264	422	54	100	194	83	36	0	183	83	27	54	53	18	2	138	1000	6	45	1	64	62	1	196	3866.	3833.
21	150	328	98	10	76	109	108	56	164	35	21	2	59	1	47	0	12	8	15	28	27	373	32	219	22	1	0	1928.	1809.
22	428	768	60	12	94	67	76	192	380	125	27	3	4	2	21	7	0	9	13	18	369	0	24	34	10	1	9	2729.	2738.
23	95	91	16	11	64	55	43	17	4	16	14	5	1	21	9	0	0	0	0	4	32	24	4	2	9	0	0	527.	242.
24	57	116	30	66	217	113	210	13	51	79	91	10	14	1	1	4	0	19	3	17	226	37	2	0	58	29	2	1470.	1334.
25	76	40	88	3	128	19	32	48	32	15	23	97	13	8	9	5	25	0	51	60	3	23	15	129	0	3	38	1033.	1579.
26	133	229	88	46	124	33	66	401	251	4	0	3	0	148	92	97	64	12	138	1	1	1	0	44	3	0	0	2051.	1430.
27	99	47	34	169	34	17	11	78	221	0	1	11	0	52	17	7	25	19	6	207	0	10	0	1	18	0	0	1090.	966.
																												184398.	184398.

Hourly O&D Tables in 2001 (With Project case)

(Passenger Car Equivarent)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	5121	4547	1782	1313	890	321	385	455	639	166	219	124	108	153	241	65	195	88	122	535	257	345	49	18	12	51	15	18216.	49858.
2	11898	15397	3658	3262	3365	3930	4732	1158	1929	740	1967	455	1613	396	530	357	170	369	32	1770	490	1072	2591	415	186	82	12	61416.	51690.
3	3513	4016	4428	3457	3040	2112	837	1056	599	114	676	633	448	345	568	70	297	47	89	558	34	87	74	34	55	14	33	36222.	33730.
4	4576	2520	4692	4347	1344	1059	541	1260	512	12	215	1235	102	953	563	153	453	219	10	1569	56	125	0	6	708	16	4	27258.	22129.
5	2340	3215	5463	1307	2000	946	729	414	283	315	662	724	75	227	318	35	49	6	14	542	106	165	55	45	1365	80	7	21487.	34948.
6	1900	3889	2255	793	1003	2208	1026	302	359	86	1429	160	46	107	24	11	63	7	16	77	349	27	0	6	13	32	0	16088.	16467.
7	969	3630	632	595	1048	744	1297	142	384	834	2102	302	804	33	64	17	5	111	4	629	52	83	246	115	191	36	4	15073.	16469.
8	3476	918	2312	1137	542	222	170	5672	1775	34	176	121	56	922	1473	220	225	197	116	66	47	153	298	32	17	132	47	20746.	17436.
9	7196	1814	2260	1092	586	185	321	2034	660	119	198	76	255	251	697	456	148	790	62	319	347	290	226	80	25	287	353	21127.	13695.
10	855	2074	519	327	1468	285	1473	144	311	738	579	595	91	59	37	67	16	18	8	980	484	447	1518	259	29	20	0	13421.	6004.
11	842	3278	1326	565	3087	2579	3244	282	612	357	4267	476	2388	285	66	81	73	25	0	116	435	152	1599	320	47	8	3	25511.	14726.
12	589	1021	1468	1431	4690	653	469	175	177	83	1135	2413	880	442	152	154	11	140	209	1140	23	7	915	120	151	24	106	18978.	8412.
13	10	129	32	2	14	38	58	2	10	13	53	2	233	6	2	0	0	0	4	60	0	0	1	29	7	0	0	704.	3983.
14	413	104	233	340	79	184	30	929	137	14	53	189	118	1520	763	177	18	76	338	72	3	52	2	11	18	103	62	6038.	7378.
15	345	263	616	568	159	10	42	927	1169	9	171	141	2	556	275	506	2	126	112	100	86	27	80	5	3	180	26	7110.	4992.
16	558	506	186	199	131	6	14	344	400	20	57	109	0	151	653	205	45	134	19	79	185	217	0	11	6	72	33	4361.	2894.
17	411	92	256	356	27	37	3	189	146	2	1	1	0	20	4	10	47	277	52	9	6	0	0	1	25	190	58	2219.	2349.
18	300	247	51	241	19	2	100	187	543	4	14	124	14	96	48	110	350	317	31	36	8	0	275	39	2	23	2	2983.	3055.
19	166	45	90	269	128	5	14	108	52	3	0	45	6	717	91	16	52	19	1110	1483	27	20	19	4	32	20	21	4550.	1456.
20	825	443	829	1378	958	54	88	165	93	20	78	303	1208	104	101	45	10	3	845	4524	78	13	112	27	85	0	251	13139.	13807.
21	797	404	160	55	37	292	99	236	1053	30	37	0	8	3	86	32	5	10	11	2	590	651	1475	145	0	0	5	6622.	5678.
22	848	886	39	33	253	132	190	426	950	121	87	7	0	21	154	18	0	0	31	175	1117	56	1993	94	25	2	11	7659.	9165.
23	368	830	114	135	524	68	336	234	96	85	260	18	318	2	41	0	0	59	5	316	662	1049	20	8	156	86	6	5576.	22216.
24	134	218	81	179	262	127	280	30	98	158	265	21	242	2	9	7	3	42	10	184	311	73	10	0	82	47	5	2880.	1885.
25	161	20	106	0	205	4	64	37	39	4	22	128	55	12	2	7	24	0	28	82	0	2	270	44	0	14	69	1399.	3248.
26	322	762	103	52	60	47	21	488	269	4	2	2	13	122	107	71	131	16	159	11	33	2	341	32	4	0	0	3173.	1519.
27	22	14	39	187	29	17	7	42	400	0	2	7	0	74	23	24	57	0	19	375	2	10	49	4	4	0	0	1407.	1233.
																												355363.	355363.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	6913	10182	3770	5008	2497	822	1260	1928	3705	569	721	485	8	244	560	258	280	191	338	810	550	427	205	51	122	196	82	42181.	26357.
2	5635	13284	3552	3845	2873	4271	4712	1245	2679	2487	3134	1394	52	108	506	574	165	249	51	1611	510	815	1040	375	214	400	57	55838.	50127.
3	1610	5173	4161	4386	3537	3505	1124	1432	861	735	2010	1915	36	205	373	111	339	60	78	775	76	62	74	54	153	64	17	33006.	34691.
4	1204	929	2376	3895	710	1003	832	852	742	283	553	627	3	374	276	159	447	235	203	718	22	31	84	85	0	63	157	16262.	28192.
5	1366	2231	3613	2177	1899	1318	1380	675	592	1742	1266	2773	58	164	256	113	32	21	165	570	27	256	242	268	1053	177	52	24486.	17310.
6	456	2014	752	593	732	960	448	150	224	313	697	822	13	135	10	6	33	2	6	37	37	32	40	98	8	65	12	8693.	16046.
7	453	5223	856	1539	1116	1156	1111	137	313	1255	3300	468	59	21	34	14	5	94	14	243	109	118	110	148	133	45	7	18081.	16604.
8	844	664	1142	1015	281	400	218	5067	2658	199	403	162	3	1002	846	440	233	240	115	103	108	168	255	20	32	353	58	27025.	17246.
9	1254	1318	1173	530	348	226	421	1330	638	281	525	163	14	166	483	350	104	556	46	94	287	401	70	92	19	254	316	11656.	18293.
10	210	402	40	12	252	143	537	36	137	637	361	88	13	13	13	20	2	4	2	19	201	294	69	125	4	4	0	3528.	13461.
11	338	1648	380	357	426	1161	1769	110	208	587	3543	986	48	30	93	77	43	14	0	32	46	251	177	212	22	2	2	12602.	21719.
12	144	307	375	1039	1017	194	543	103	40	497	346	2231	2	165	41	100	3	93	43	290	0	18	37	32	116	2	10	7798.	15990.
13	127	839	324	164	48	42	512	65	303	77	2081	734	215	92	2	0	0	10	4	1052	12	0	181	218	42	24	0	7059.	638.
14	328	131	236	728	86	91	37	888	360	94	203	325	8	1414	390	150	20	140	675	88	3	45	3	3	9	61	70	6486.	6438.
15	849	358	461	587	57	51	89	1432	971	42	135	261	3	974	243	648	6	175	129	121	81	73	14	4	2	262	23	7991.	5265.
16	207	379	80	207	64	11	12	190	523	41	58	134	0	162	505	186	8	111	14	26	31	14	0	7	7	148	21	3146.	4008.
17	145	105	214	391	18	43	2	146	221	19	3	6	0	15	2	60	45	251	55	9	7	0	0	0	30	148	56	1991.	2237.
18	103	347	43	200	10	6	112	173	530	24	32	134	0	68	108	164	155	282	7	6	7	0	62	35	0	17	2	2665.	3101.
19	117	29	76	7	8	24	6	103	61	9	0	184	4	323	82	16	49	31	991	754	12	53	9	8	32	15	22	3026.	4627.
20	584	988	696	962	470	193	574	94	241	890	127	1052	64	66	89	60	12	29	1384	4174	6	92	133	135	82	5	359	13545.	12358.
21	334	675	73	157	108	337	59	50	474	463	638	16	0	2	97	155	6	6	16	249	545	975	569	305	0	28	2	6341.	4640.
22	748	1053	79	113	182	25	72	401	716	696	88	3	0	65	30	219	0	0	12	33	577	46	914	68	6	2	12	6150.	6050.
23	64	1418	72	0	72	0	545	237	282	1239	1282	733	3	3	65	0	0	233	11	180	1241	1768	20	10	227	351	25	10080.	4576.
24	91	129	20	61	148	7	121	14	105	232	279	99	25	5	4	14	4	49	8	46	148	85	8	0	101	32	7	1842.	2512.
25	38	62	40	204	167	9	91	26	38	33	42	135	9	14	2	15	29	7	33	82	0	25	178	99	0	16	59	1427.	2431.
26	142	249	28	13	77	48	29	326	272	26	5	14	0	547	128	70	130	21	212	3	0	2	100	54	2	0	0	2498.	2734.
27	163	10	159	3	7	3	8	56	399	0	6	66	0	62	28	29	47	2	19	243	3	9	3	7	15	0	0	1344.	1627.
																												327138.	327138.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	8054	5908	4447	2757	2062	587	831	1670	1601	152	367	218	10	126	477	115	180	146	462	426	308	484	17	24	142	123	117	31811.	32485.
2	7174	12081	4562	1959	3488	4427	4310	1089	1459	1186	2079	1061	82	72	289	334	70	266	61	534	522	1202	64	454	203	434	67	49929.	43660.
3	3355	4763	7872	4883	5034	2346	1703	2130	1313	188	839	659	17	154	174	67	306	92	167	516	93	89	4	13	470	21	93	37361.	37368.
4	1924	1873	4841	3373	1324	583	637	1233	506	21	123	943	0	496	339	71	485	118	52	631	27	59	0	26	295	16	13	20009.	20670.
5	1757	2585	4986	1688	2672	1084	1439	860	523	635	513	891	22	146	70	51	42	24	60	614	68	369	6	96	386	64	45	22716.	23569.
6	1024	2678	1314	419	1020	1110	809	192	249	327	625	337	24	32	10	0	23	2	4	33	51	115	0	13	15	27	2	10365.	13423.
7	908	4274	1188	601	1079	857	1450	190	577	1410	2157	507	204	9	55	0	1	119	10	181	54	121	19	27	173	53	12	16226.	17739.
8	1722	855	2581	966	339	261	213	4844	2320	82	130	122	13	1071	833	254	404	300	463	134	51	159	20	17	49	92	128	18623.	18483.
9	2136	1888	1520	611	590	231	544	1795	738	243	159	56	11	39	888	99	204	830	75	88	242	359	3	99	33	216	336	14023.	14112.
10	415	1268	489	251	854	356	1667	82	188	296	183	57	19	4	7	6	3	2	2	7	39	447	25	106	12	5	0	6689.	5626.
11	349	1506	737	166	839	677	2396	148	240	474	1666	341	27	33	38	29	40	3	0	0	32	131	59	240	37	0	3	10201.	9441.
12	171	410	667	369	1896	242	446	135	73	87	150	1203	16	35	34	12	9	62	30	281	2	2	7	22	130	4	19	6556.	6947.
13	29	189	61	13	38	25	85	12	12	21	27	8	173	4	2	0	3	0	13	124	41	8	3	19	20	0	0	929.	926.
14	179	56	160	300	86	41	43	1034	70	2	51	52	11	346	328	55	1	61	137	19	3	15	3	16	26	162	69	3330.	3422.
15	725	189	280	326	74	19	41	741	893	6	48	40	2	344	17	182	23	314	160	113	88	37	4	0	8	101	25	4702.	4256.
16	79	67	63	78	39	6	2	137	120	4	5	11	0	48	103	34	0	44	19	9	0	12	0	7	15	336	12	1250.	1524.
17	339	143	319	544	31	16	0	314	288	3	0	5	2	4	30	2	41	442	64	30	14	0	0	0	42	196	39	2768.	2349.
18	112	188	67	110	22	2	79	143	644	2	6	43	0	14	61	21	227	0	49	4	6	12	0	21	0	20	7	1859.	3000.
19	126	34	97	276	142	4	27	271	68	2	0	31	10	122	116	19	64	170	309	204	20	15	0	8	64	24	11	2236.	2621.
20	486	328	456	446	656	88	151	300	142	35	0	272	116	41	92	20	29	4	207	1502	9	75	2	88	97	2	298	5942.	5945.
21	217	340	143	20	112	160	154	93	260	36	38	4	117	2	97	0	16	9	23	46	36	602	63	307	33	2	0	3910.	2649.
22	649	1269	97	28	162	75	135	383	634	239	54	6	6	6	35	12	0	13	26	33	597	0	12	62	19	3	13	4465.	4460.
23	136	137	30	18	86	79	63	32	5	25	35	7	3	12	11	0	0	0	0	5	42	33	12	6	13	0	0	769.	355.
24	85	171	55	105	289	136	293	22	82	119	119	13	19	2	2	5	0	30	6	24	296	65	6	0	85	46	5	2093.	2544.
25	116	65	138	3	175	33	107	78	53	23	35	135	22	11	13	9	41	0	64	98	6	43	26	202	0	4	43	1542.	2384.
26	197	149	141	131	193	69	96	560	382	6	0	3	0	181	118	117	100	19	171	2	2	2	0	70	4	0	0	2493.	1969.
27	121	64	57	227	57	30	18	103	313	0	3	17	0	68	35	10	36	30	11	297	0	16	0	2	33	0	0	1527.	1357.
																												[illegible]	[illegible]

Hourly O&D Tables in 2011 (With Project case)

(Passenger Car Equivarent)

Morning Peak

	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	ROWTOTAL	COLTOTAL
1	6425	5785	3275	1636	1107	387	484	559	814	212	267	145	112	175	374	77	226	111	160	723	312	434	60	23	14	64	20	22902.	77725.
2	17742	23187	3690	3456	5047	3591	6948	1666	2835	1145	2930	671	2248	287	705	440	232	540	46	2731	635	1452	3487	574	273	118	17	90695.	81064.
3	5690	6251	7251	3816	4824	3142	1278	1676	985	166	1053	972	605	547	628	107	418	71	149	924	67	123	123	38	83	23	54	41244.	53517.
4	8697	4877	8855	7574	2433	1973	1018	2260	960	22	381	2113	225	1640	884	252	768	379	19	2591	66	213	0	10	1310	29	6	49877.	34122.
5	3616	4412	7509	1779	2605	1224	938	572	395	290	865	943	100	319	281	48	62	7	20	775	127	207	77	59	1829	108	10	29176.	39079.
6	3088	6019	3683	1356	1675	1213	1533	530	584	140	2213	238	61	158	32	15	129	13	24	117	255	37	0	9	19	47	0	25278.	25171.
7	1592	5768	1033	939	1672	1109	1390	227	621	1346	3289	463	1205	51	93	27	8	178	6	1014	72	123	371	172	294	56	6	23725.	26046.
8	5010	1254	3136	1525	726	296	221	7541	2434	47	232	160	74	1264	1846	271	372	258	158	95	62	196	370	28	23	179	61	27739.	25875.
9	12009	2950	3697	1772	945	266	504	3228	1085	190	311	117	357	408	1043	630	221	1188	102	535	522	426	347	120	41	466	552	34052.	31547.
10	1457	3598	915	555	2579	447	2416	242	539	1247	929	934	145	103	57	76	24	31	13	1724	745	770	2454	415	49	33	0	22529.	6319.
11	1704	6447	2699	1102	3983	4540	6068	568	1145	655	8060	968	3988	554	129	146	152	47	0	244	792	259	2836	568	87	13	6	67758.	24005.
12	937	1714	3365	1946	6754	1446	688	279	302	108	1722	3458	1316	685	206	230	14	193	304	1582	36	8	1513	198	201	39	147	26421.	12387.
13	15	168	42	3	17	65	74	3	13	28	68	3	301	8	3	0	0	0	5	79	0	0	1	38	9	0	0	813.	13536.
14	651	162	364	522	131	273	43	1404	211	21	60	300	167	2358	1076	257	26	118	524	115	5	74	3	16	27	159	91	9164.	11283.
15	1260	359	853	765	224	11	54	1225	1599	12	226	158	3	750	332	841	3	169	153	139	110	34	94	7	4	244	34	9503.	9629.
16	823	731	272	283	188	9	21	485	577	29	79	165	0	212	852	275	60	176	26	115	253	282	0	16	8	101	45	6073.	3963.
17	587	137	352	484	37	50	3	256	203	3	1	1	0	28	5	11	62	372	71	12	8	0	0	1	34	258	75	3041.	3414.
18	307	396	80	361	37	3	154	283	853	6	21	193	19	151	69	138	363	391	47	58	10	0	412	58	3	36	3	4242.	4501.
19	244	66	131	391	168	6	21	156	76	3	0	61	7	1069	125	23	70	27	1648	2210	23	28	27	6	46	28	29	6709.	5192.
20	1196	636	1244	2788	1349	71	137	230	133	37	109	462	1714	145	132	59	14	3	1302	6893	107	18	151	38	121	0	344	19443.	24937.
21	1588	1548	282	108	55	458	161	466	2142	48	67	0	10	4	164	58	9	17	20	3	742	1025	3345	228	0	0	10	11558.	8528.
22	1394	1492	66	39	430	194	309	705	1623	199	137	11	0	35	239	29	0	0	56	305	1801	85	3142	150	42	3	17	12503.	7933.
23	723	1574	216	293	1192	130	465	438	213	138	545	35	466	3	60	0	0	131	11	656	1225	2016	37	15	337	191	13	11123.	18804.
24	201	331	125	272	404	173	406	44	152	234	384	30	327	3	12	9	4	62	16	288	410	103	14	0	123	71	7	4205.	2905.
25	248	30	165	0	323	6	92	54	60	6	30	186	69	18	3	10	33	0	43	129	0	3	391	64	0	21	100	2084.	4989.
26	497	1155	158	79	91	64	30	717	404	6	3	2	13	183	147	100	179	23	241	17	40	3	485	45	6	0	0	4702.	2287.
27	34	21	59	278	43	24	10	61	589	0	3	5	0	109	32	34	75	0	28	563	3	14	64	6	6	0	0	2065.	1647.
																												550905.	550905.

Evning Peak

	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	ROWTOTAL	COLTOTAL
1	8740	15646	6332	10112	3616	1336	2109	2718	6374	977	1447	792	12	391	783	394	405	309	507	1210	1088	721	375	81	295	321	123	67114.	31136.
2	7360	19579	5773	7692	4080	6740	7350	1766	4458	4236	6126	3381	79	170	696	857	221	388	77	3344	897	1401	1574	580	325	623	87	88160.	73928.
3	2086	8038	6618	3288	5013	5688	1781	1929	1415	1270	4001	3136	53	318	522	270	472	95	118	2151	131	104	137	84	232	101	25	52976.	39035.
4	1525	1405	3599	6713	972	1591	1260	1123	1200	457	1051	891	3	557	369	222	405	368	388	1030	43	52	164	124	0	98	221	25931.	52489.
5	1823	3157	5552	4083	2492	2123	2125	921	962	2882	2353	4179	81	253	369	164	43	30	244	821	38	431	505	404	1555	283	76	38049.	23905.
6	562	2873	1175	1140	974	1427	671	212	357	472	1329	1411	18	213	13	9	47	3	6	51	44	47	76	132	12	98	17	13189.	25200.
7	561	7523	1309	2762	1494	1724	1672	388	495	2025	6065	692	80	32	47	21	7	164	21	336	173	194	204	217	193	68	10	28260.	25667.
8	1071	971	1769	1816	398	658	340	6789	4365	247	791	265	3	1546	1174	651	326	374	164	145	203	279	457	30	46	542	82	21602.	23359.
9	1649	1954	1947	980	497	361	671	1642	1072	487	992	279	17	256	676	513	147	888	66	139	536	693	148	142	27	395	650	17815.	29704.
10	372	574	90	22	341	320	817	37	215	1054	448	112	18	20	18	30	3	6	3	25	297	452	95	181	6	6	0	5362.	22285.
11	425	2399	585	568	552	1767	2682	154	324	942	6478	1470	62	44	124	107	58	20	0	44	80	381	332	301	30	3	3	19935.	40130.
12	188	456	571	1759	1609	389	826	144	62	823	697	3254	3	258	58	154	5	149	62	463	0	29	74	47	166	3	13	21942.	24556.
13	123	1152	298	361	62	54	725	89	414	114	3324	1053	279	123	3	0	0	14	5	1457	15	0	353	291	51	36	0	10396.	875.
14	300	194	364	1204	126	136	55	1264	599	162	401	496	12	2211	543	218	29	226	1006	125	6	77	5	5	13	95	101	9977.	9716.
15	977	466	661	896	73	68	97	1005	1461	66	241	317	4	1353	295	851	7	252	173	159	149	114	19	5	3	370	31	10913.	7196.
16	217	463	117	326	82	15	18	243	757	64	104	198	0	231	650	251	9	143	19	33	53	21	0	9	10	216	28	4277.	5718.
17	176	145	301	626	23	76	3	179	356	30	7	8	0	31	3	49	63	375	79	13	12	0	0	0	43	209	74	2910.	3098.
18	141	539	65	373	12	7	184	242	853	43	63	196	0	110	155	231	280	358	10	9	12	0	140	56	0	27	3	4109.	4682.
19	157	40	124	13	12	34	9	143	102	15	0	276	5	501	113	22	69	48	1498	1213	20	100	19	12	47	23	31	4650.	6854.
20	794	1538	1091	1859	687	293	930	137	405	1391	353	1537	96	103	128	89	17	49	2108	6523	0	167	277	216	128	8	536	21562.	18355.
21	401	855	100	336	128	463	77	65	713	744	1100	24	0	3	127	207	8	8	22	315	677	1515	1002	404	0	42	3	9242.	7469.
22	970	1438	114	193	233	36	105	532	1079	1129	161	4	0	91	39	291	0	0	17	33	911	70	1671	99	9	3	17	9245.	9715.
23	78	1797	113	0	95	0	801	394	416	1921	3144	1139	5	3	76	0	0	331	15	235	1858	2656	14	14	305	487	31	14888.	8526.
24	104	172	32	101	193	10	175	17	154	358	470	257	32	7	5	20	5	70	12	62	221	130	14	0	135	45	9	2720.	3665.
25	50	88	60	340	227	13	128	37	58	34	75	175	13	21	3	22	39	3	44	112	0	24	342	141	0	23	79	2151.	3554.
26	376	350	41	23	104	68	43	413	428	62	7	22	0	789	171	96	172	30	295	4	0	3	206	80	3	0	0	3566.	4125.
27	305	11	230	3	10	3	12	72	610	0	10	92	0	89	36	39	62	3	25	323	5	14	3	10	20	0	0	1889.	2050.
																												507020.	507020.

Off Peak

	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	ROWTOTAL	COLTOTAL
1	10470	8494	6963	4566	2804	799	1155	2286	2436	224	563	305	13	183	599	157	235	310	660	642	427	736	24	33	204	162	151	45121.	45862.
2	10468	19028	7487	3640	5254	6853	6451	1667	3098	1917	3840	1741	124	113	399	467	99	410	92	899	770	1995	88	648	312	644	92	74596.	68582.
3	4925	7800	12879	8620	7568	3713	2621	3256	2258	303	1532	1044	24	243	251	105	428	145	369	835	137	186	6	20	709	32	155	60024.	59841.
4	3020	3385	8410	5698	2050	963	1046	1987	930	36	240	1419	0	771	487	119	708	187	79	1038	45	102	0	38	490	24	23	33535.	35315.
5	2412	3846	7544	2726	3657	1552	2065	1223	822	975	872	1275	30	216	91	73	57	34	87	955	94	585	9	134	571	116	61	32082.	34838.
6	1440	4083	2113	752	1495	1643	1185	290	411	521	1104	391	35	50	14	0	34	3	6	37	74	183	0	19	23	39	3	25953.	20663.
7	1306	6558	1871	1074	1594	1307	2194	288	962	2307	3863	786	291	14	76	0	3	187	15	286	82	182	28	40	259	76	17	25665.	27534.
8	2323	1270	3850	1530	753	375	305	6758	3722	127	121	172	18	1583	1083	361	550	438	674	206	73	248	25	24	72	128	169	27059.	27038.
9	3240	3101	2583	1132	931	368	860	2859	1313	415	307	90	15	67	1334	152	303	1339	123	151	389	624	4	150	39	137	511	22737.	23120.
10	626	2113	843	460	1355	408	2732	129	334	501	344	88	30	6	10	10	4	3	3	11	61	769	40	162	20	8	0	11070.	9223.
11	584	2745	1372	339	1456	1201	4378	255	456	318	3351	578	39	55	47	46	69	6	0	0	56	233	103	408	64	0	5	18804.	17300.
12	245	664	1073	578	2742	376	647	199	121	136	324	1730	21	54	47	19	12	94	43	426	3	3	8	12	194	6	35	9520.	10593.
13	37	270	86	18	52	33	113	17	17	35	36	10	203	6	3	0	3	0	17	161	52	12	4	25	27	0	0	1231.	1262.
14	253	89	243	481	126	62	64	1504	118	3	88	88	16	519	447	80	5	92	196	30	5	22	4	23	38	223	93	4912.	5100.
15	874	254	369	454	97	23	52	951	1295	8	76	59	3	466	19	233	30	285	225	161	118	53	4	0	11	124	30	6264.	5867.
16	104	95	93	120	54	8	3	186	181	6	8	16	0	68	129	45	0	60	26	11	0	18	0	10	21	439	16	1709.	3173.
17	315	302	444	792	41	23	0	436	377	4	0	7	3	6	41	3	56	608	94	44	18	0	0	0	60	247	48	3867.	3286.
18	260	390	103	170	29	3	120	211	1042	3	11	64	0	32	86	18	309	0	72	6	9	18	0	30	0	28	10	2822.	4510.
19	174	50	142	433	204	6	39	382	111	3	0	43	13	186	155	28	87	255	446	305	28	33	0	11	91	33	15	3262.	3850.
20	708	538	747	732	984	134	236	467	244	57	0	404	156	66	134	31	40	6	304	2329	13	127	3	129	150	3	429	9169.	9282.
21	309	520	221	33	158	217	226	148	451	57	68	6	158	3	149	0	22	16	35	73	49	956	62	431	50	3	0	4420.	3927.
22	999	2064	169	47	259	119	223	457	1127	417	99	10	9	10	53	19	0	31	40	57	936	0	46	96	30	5	19	7331.	7282.
23	181	195	45	29	130	128	95	28	7	41	43	9	5	18	14	0	0	0	0	7	61	67	33	9	20	0	0	1132.	532.
24	112	341	81	163	407	192	414	31	125	177	188	27	23	3	3	7	0	43	6	35	405	101	11	0	121	62	6	2986.	3861.
25	162	99	216	4	258	48	158	117	88	37	58	203	31	16	17	13	58	0	94	153	9	71	40	292	0	6	60	2308.	3612.
26	364	901	207	204	264	68	129	770	591	9	0	4	0	264	150	162	132	27	239	3	3	3	0	94	6	0	0	4094.	2745.
27	131	47	82	334	76	41	35	136	473	0	5	24	0	94	31	14	45	41	15	421	0	25	0	3	30	0	0	2153.	1938.
																												438126.	438126.

Appendix 4.6.1 Vehicle Operating Cost

Vehicle Operating Costs

Eight vehicle types were selected for the caculation of vehicle operating costs following the precedent of the JICA Feasibility Study on the Second Stage Expressway System in the Greater Bangkok, 1983, except that the category of taxis replaced the category of light buses. Representative vehicle makes were selected as the same as those by the aforementioned JICA study. The cost items were:

- fuel
- oil
- tyres
- maintenance (parts)
- maintenance (labor)
- overhead
- capital costs (depreciation and interest)

Except for the last item methods used in the JICA Study were applied with updating of prices at spring 1986 levels.

For capital costs methods used by STTR were applied. Depreciation was calculated on a straight-line basis and interest was calculated at 12% on the declining undepreciated balance. For motorcycles and cars part of depreciation was considered to be age-related instead of usage in terms of total kilometers. Interest rates for motorcycles and cars was set at 6% per annum and for pickups 8% instead of applying the full 12% sine a large portion of these vehicles are not business related. Basic assumptions for each vehicle type are shown in Table A.4.11.1.1.

As pointed out in the STTR Internal Working Paper No. 6, the effect of low congestion speed on the annual vehicle usage was considered important and the assumed relationship is shown in Table A.4.11.1.2.

Fuel and oil consumption data shown in the JICA Study, which were taken from actual experiments in similar conditions in Japan, were combined with spring 1986 prices to produce fuel and oil costs. Other costs were similarly adjusted from the JICA Study tables and STTR tables.

The resulting vehicle operating costs for each vehicle type are shown in Table A.4.11.1.3 through Table A.4.11.1.10 Crew costs not included as they are included in time values.

Table A.4.11.1.1 VOC Basic Data

Item	Motorcycle	Car	Taxi	Pick-Up	Medium Bus	Heavy Bus	Medium Truck	Heavy Truck
Manufacturer	Suzuki	Corolla	Corolla	Nissan	Isuzu	Hino	Hino FB 172	Hino IL 176
Engine C.C.	100	1300	1300	1800	3300	6900	6500	6500
Market price (000 Baht)	25.5	213.0	269.0	150.0	290.0	1065.0	445.0	810.0
Economic cost (000Baht)	17.1	165.7	144.9	118.8	243.0	924.4	370.9	620.4
Excluding tyres (000 Baht)	16.8	162.6	141.7	116.6	234.0	906.4	360.9	490.4
Use depreciation %	80	66	100	100	100	100	100	100
Use life (000 kms)	80	160	200	225	350	480	400	600
Use depreciation/000 kms	165	619	709	482	669	1893	892	981
Benchmark speed (k/h)	30	30	30	30	25	20	30	25
Annual use at benchmark (000 kms)	10	12	100	25	75	60	55	61
Age depriciation/00 kms at benchmark (Baht)	41	333	-	-	-	-	-	-
Annual economic interest (Baht)	515	4677	8690	4810	14470	55630	22130	30409
Interest/000 kms at benchmark (Baht)	52	390	87	192	193	694	402	596
Life at benchmark (years)	8	13.3	2	9	4.7	8	7.3	9.8

Table A.4.11.1.2 Annual Distances by Journey Speed (000 kms)

Average Speed (k/h)	Motor-cycle	Car	Taxi	Pick-Up	Medium Bus	Heavy Bus	Trucks
5	5.0	6.0	24.1	10.0	17.4	23.7	16.5
10	6.0	7.2	43.9	14.1	33.6	42.2	28.6
15	7.0	8.4	61.0	17.5	48.9	61.8	37.8
20	8.0	9.6	75.6	20.0	63.0	80.0	45.1
25	9.0	10.8	88.0	22.5	75.0	97.3	50.9
30	10.0	12.0	100.0	25.0	88.8	113.9	55.0
35	11.0	13.2	108.6	26.5	101.1	129.8	60.0
40	12.0	14.4	117.5	28.0	111.9	144.6	63.3
45	13.0	15.6	125.1	29.5	123.0	158.5	66.0
50	14.0	16.8	132.0	31.0	123.6	172.2	68.6
55	15.0	18.0	138.3	32.5	123.6	172.2	71.0
60	16.0	18.0	143.9	34.0	123.6	172.2	73.1
65	16.0	18.0	149.2	35.5	123.6	172.2	75.0
70	16.0	18.0	154.1	37.0	123.6	172.2	76.4
75	16.0	18.0	158.4	38.5	123.6	172.2	78.0
80	16.0	18.0	162.4	40.0	123.6	172.2	79.2
85	16.0	18.0	162.4	40.0	-	-	-
90	16.0	18.0	162.4	40.0	-	-	-

Table A.4.11.1.3 Motorcycle VOC (Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Depreciaton (use)	Maintenance (parts)	Maintenance (labour)	Interest and age depre-ciation	Vehicle Operating Cost
5	440	28	16	165	8	17	186	860
10	406	24	16	165	8	17	155	791
15	328	19	16	165	7	17	133	685
20	280	16	16	165	7	17	116	617
25	245	15	16	165	7	17	103	568
30	219	15	16	165	7	19	93	522
35	205	15	16	165	7	19	85	513
40	194	15	17	165	6	20	78	495
45	185	16	18	165	6	21	71	482
50	182	16	18	165	6	22	66	475
55	177	18	19	165	6	23	62	470
60	175	18	19	165	7	24	57	465
65	174	19	20	165	8	25	57	468
70	172	21	20	165	8	25	57	468
75	173	22	21	165	8	26	57	472
80	179	23	22	165	8	26	57	480
85	184	23	23	165	8	26	57	486
90	191	24	25	165	8	26	57	496

Table A.4.11.1.4 Private Car VOC
(Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Dipreciation (use)	Maintenance (parts)	Maintenance (labour)	Interest and age depreciation	Vehicle Operating Cost
5	1121	80	70	619	80	43	1446	3459
10	1023	60	70	619	75	43	1265	3095
15	828	48	70	619	79	44	1033	2721
20	706	42	70	619	87	44	903	2471
25	618	34	70	619	92	45	804	2282
30	553	34	70	619	97	46	723	2142
35	516	34	70	619	97	47	657	2040
40	488	34	71	619	93	48	602	1955
45	467	38	72	619	89	50	557	1892
50	459	40	73	619	89	52	517	1849
55	447	42	74	619	92	55	482	1811
60	441	46	75	619	93	58	482	1814
65	441	50	77	619	94	61	482	1824
70	435	54	79	619	95	63	482	1827
75	441	56	82	619	96	64	482	1840
80	453	58	85	619	97	65	482	1859
85	465	60	90	619	98	66	482	1880
90	482	64	95	619	100	68	482	1910

Table A.4.11.1.5 Taxi VOC
(Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Dipreciation (use)	Maintenance (parts)	Maintenance (labour)	Interest and age depreciation	Vehicle Operating Cost
5	1121	80	70	709	80	32	361	2453
10	1023	60	70	709	75	32	198	2167
15	828	48	70	709	79	33	143	1910
20	706	42	70	709	87	33	115	1762
25	618	34	70	709	92	34	99	1656
30	553	34	70	709	97	35	87	1585
35	516	34	70	709	97	35	80	1541
40	488	34	71	709	93	36	74	1505
45	467	38	72	709	89	37	69	1481
50	459	40	73	709	89	39	66	1475
55	447	42	74	709	92	42	63	1469
60	441	46	75	709	93	44	60	1468
65	441	50	77	709	93	45	58	1474
70	435	54	79	709	95	46	56	1474
75	441	56	82	709	96	48	55	1487
80	453	58	85	709	97	49	54	1505
85	465	60	90	709	98	50	53	1525
90	482	64	95	709	100	51	52	1553

Table A.4.11.1.6 Pick-up VOC
(Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Dipreciation (use)	Maintenance (parts)	Maintenance (labour)	Interest and age depreciation	Vehicle Operating Cost
5	1315	80	57	462	72	52	480	2518
10	1201	66	62	462	66	52	343	2252
15	971	52	64	462	63	52	274	1938
20	828	44	66	462	60	53	240	1753
25	725	40	67	462	59	55	213	1621
30	648	40	68	462	58	57	192	1525
35	605	40	69	462	57	59	181	1473
40	573	40	70	462	56	61	171	1433
45	548	41	71	462	56	63	163	1404
50	538	42	72	462	56	65	155	1390
55	524	44	73	462	56	67	148	1374
60	517	46	74	462	56	68	141	1364
65	517	49	76	462	55	70	135	1364
70	511	53	78	462	55	73	130	1362
75	517	57	81	462	55	75	125	1372
80	531	62	85	462	54	78	120	1392
85	545	67	90	462	54	80	120	1418
90	566	72	95	462	54	82	120	1451

Table A.4.11.1.7 Midum Bus VOC
(Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Dipreciation (use)	Maintenance (parts)	Maintenance (labour)	Overheads	Interest age depre ciation	Vehicle Operating Cost
5	1946	115	130	669	303	146	470	832	4611
10	1784	100	140	669	256	146	243	431	3778
15	1459	90	142	669	256	147	167	296	3226
20	1234	81	143	669	249	149	130	230	2885
25	1070	76	144	669	242	151	109	193	2654
30	944	76	145	669	235	155	92	163	2479
35	867	76	146	669	229	164	61	143	2375
40	802	76	148	669	223	168	73	129	2288
45	765	78	150	669	219	178	66	118	2242
50	730	82	152	669	220	186	62	109	2210
55	714	86	155	669	221	194	62	109	2210
60	698	90	158	669	222	202	62	109	2210
65	714	95	162	669	227	210	62	109	2248
70	747	100	166	669	232	220	62	109	2305
75	783	105	171	669	238	232	62	109	2369
80	856	110	180	669	245	246	62	109	2477

Table A.4.11.1.3 Heavy Bus VOC
(Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Dipreciation (use)	Maintenance (parts)	Maintenance (labour)	Overheads	Interest age depre ciation	Vehicle Operating Cost
5	3242	115	220	1893	542	233	1917	2343	10505
10	2972	100	240	1893	543	233	1077	1316	8374
15	2432	90	250	1893	544	233	735	899	7076
20	2058	81	255	1893	545	233	568	694	6327
25	1783	76	257	1893	546	241	467	571	5834
30	1573	76	258	1893	548	248	399	487	5482
35	1446	76	259	1893	550	258	351	428	5261
40	1338	76	261	1893	555	269	314	384	5090
45	1274	78	263	1893	561	282	287	350	4988
50	1216	82	266	1893	566	297	267	322	4906
55	1189	86	269	1893	572	310	264	322	4905
60	1163	90	273	1893	579	326	264	322	4910
65	1144	95	277	1893	582	342	264	322	4919
70	1244	100	282	1893	585	360	264	322	5050
75	1303	105	292	1893	588	378	264	322	5145
80	1409	110	305	1893	591	397	264	322	5291

Table A.4.11.1.9 Medium Truck VOC
(Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Dipreciation (use)	Maintenance (parts)	Maintenance (labour)	Overheads	Interest age depre ciation	Vehicle Operating Cost
5	1804	120	220	982	367	145	757	1340	5645
10	1672	100	240	982	350	145	436	773	4608
15	1408	90	250	982	346	145	330	585	4045
20	1216	83	260	982	340	146	277	490	3704
25	1114	83	262	982	332	150	245	434	3512
30	990	83	264	982	338	154	227	402	3360
35	938	83	266	982	344	159	208	369	3259
40	877	83	269	982	355	164	197	349	3186
45	849	85	272	982	370	174	189	335	3166
50	822	87	275	982	375	184	182	322	3139
55	811	90	279	982	382	194	176	311	3136
60	811	93	283	982	385	204	171	302	3141
65	837	87	288	982	386	214	167	295	3175
70	863	102	293	982	395	224	163	289	3211
75	922	107	299	982	385	235	160	283	3283
80	1028	112	305	982	385	246	158	279	3405

Table A.4.11.1.10 Heavy Truck VOC
(Baht per 000 km)

Speed k/h	Fuel	Oil	Tyres	Dipreciation (use)	Maintenance (parts)	Maintenance (labour)	Overheads	Interest age depre ciation	Vehicle Operating Cost
5	2345	120	378	981	424	234	1040	1841	7363
10	2174	100	413	981	405	234	599	1062	5968
15	1830	90	430	981	399	234	453	804	5221
20	1581	83	447	981	393	235	381	673	4774
25	1448	83	450	981	384	242	337	596	4521
30	1288	83	454	981	391	249	312	552	4310
35	1219	83	457	981	389	257	286	507	4188
40	1140	83	462	981	410	265	271	480	4092
45	1104	85	468	981	428	285	260	460	4071
50	1070	87	473	981	434	298	250	442	4035
55	1054	90	480	981	442	314	242	427	4030
60	1054	93	486	981	445	330	235	415	4039
65	1087	97	495	981	445	346	229	405	4085
70	1121	102	504	981	445	362	224	397	4136
75	1199	107	514	981	445	380	220	389	4235
80	1338	112	524	981	445	398	217	383	4398

Appendix 4.6.2 Time Values Per Vehicle

Time Values Per Vehicle

Value of time losting while travelling has been estimated for trips of business purposes and trips of all other purposes separately. For the former average wage of crew and passengers differentiated by vehicle type were used but for the latter a same value was used for all vehicle types. The former could be considered reflecting the economic productivity of different types of person. However, the worth of non-productive time of a high wage earner should not be considered any more valuable than a low wage earner. The latter, therefore, is sometimes called the equity value.

Wages of drivers and assistants were estimated from the results of labor force survey carried out in 1984 by NSO and are shown in Table A.4.6.2.1Percentages of business trips were assumed for each vehicle type based on the JICA Second Stage Expressway Study. Business trips by cars were assumed to be done with professional drivers and business trips by pickups with 50% professional drivers. The equity value of time was assumed to be 25% of average wage Baht 5.25 per hour. Estimates and assumptions used are summarized in Table A.4.6.2.2.

Table A.4.6.2.1 Wages of Vehicle Crew

Vehicle Type	Monthly Wage Cost Bt.	Hours/ Month	Cost/ Vehicle Hour Bt.
Motorcycles	3000	240	12.5
Cars	3000	185	16.2
Taxis	6350	280	22.7
Pick-Ups	4000	250	16.0
Buses	7500	200	37.5
Trucks	6000	220	27.3

Source: Special Report, SES Detailed Design.

Note: Hours include non-driving time

Table A.4.6.2.2 Time Values, 1986

Vehicle Type	Vehicle Occupancy	Business Trip %	Business Pass. Wage (Baht/Hr)	Calculation	Time Value Per Veh. Hour (Baht/Hr)
Motorcycle	1.2	15	12.5	(0.15 x 12.5 + 0.85 x 5.25) x 1.2	7.5
Cars	2.0 driver + business pass.	15	48.0	0.15 x (16.2 + 48.0) + 0.85 x 2.0 x 5.25	18.5
Taxis	driver + 1.1 passengers	15	48.0	(1.0 x 22.7) + 1.1 x (0.15 x 48.0 + 0.85 x 5.25)	35.5
Pickups	driver + 1.5 passengers	see note	48.0	(0.5 x 16.0 + 0.5 x 5.25) + 1.5 x (0.1 x 21.0 + 0.4 x 48.0 + 0.5 x 5.25)	34.4
Buses	crew + 37.7 passengers	4	21.0	(1.0 x 37.5) + 37.7 x (0.04 x 21.0 + 0.96 x 5.25)	259.3
Trucks	crew	100	-		

Note: Pickup drivers 50% business, 50% non-business, Pickup passenger 10% assistant, 40% business, 50% non-business

Source: Special Report, SES Detailed Design

Appendix 5.3.1 Compressive Strength Test of Existing Krungthep Bridge

Compressive Strength Test
(Schimdit Hammer NR-3)

No. 1 (Exterior, Upstream)				Date : May 15, 1986			
Location : Bangkok Side PC				Angle : 90 degree			
R - Value							
1	53	6	57	11	52	16	49
2	53	7	56	12	51	17	54
3	55	8	55	13	51	18	51
4	52	9	55	14	50.5	19	50
5	54	10	57	15	51	20	50
R mean = 52.5				Range : 46.5 to 58.5			
Nos of Data within Range n = 20				Total Ri = 1,..+n = 1,056.5			
R average = Total R/n = 52.8							
Compressive Strength : Fc = 520 kgf/cm^2							

No. 2				Date : May 15, 1986			
Location : Bangkok Side PC				Angle : 90 degree			
R - Value							
1	51	6	50	11	51	16	50
2	47	7	51	12	51	17	53
3	55	8	54	13	48	18	49
4	54	9	52	14	56	19	50
5	53	10	53	15	51	20	51
R mean = 51				Range : 45 to 57			
Nos of Data within Range n = 20				Total Ri = 1,..+n = 1,030			
R average = Total R/n = 51.5							
Compressive Strength : Fc = 505 kgf/cm^2							

No. 3				Date : May 15, 1986			
Location : Bangkok Side PC				Angle : 90 degree			
R - Value							
1	50	6	47	11	49	16	50
2	41	7	48	12	54	17	48
3	52	8	47	13	51	18	50
4	45	9	47	14	51	19	51
5	51	10	49	15	52	20	49
R mean = 49.5				Range : 43.5 to 55.5			
Nos of Data within Range n = 20				Total Ri = 1,..+n = 988			
R average = Total R/n = 49.4							
Compressive Strength : Fc = 450 kgf/cm^2							

No. 4				Date : May 15, 1986			
Location : Bangkok Side PC				Angle : 90 degree			
R - Value							
1	50	6	50	11	52	16	55
2	48	7	50	12	52	17	46
3	50	8	56	13	44	18	51
4	49	9	47	14	54	19	52
5	54	10	50	15	50	20	48
R mean = 50				Range : 44 to 56			
Nos of Data within Range n =				Total Ri = 1,..+n = 1,008			
R average = Total R/n = 50.4							
Compressive Strength : Fc = 465 kgf/cm^2							

No. 5 (Exterior, Downstream)				Date : May 15, 1986			
Location : Bangkok Side PC				Angle : 90 degree			
R - Value							
1	50	6	49	11	49	16	50
2	53	7	50	12	53	17	50
3	55	8	53	13	52	18	52
4	52	9	52	14	55	19	52
5	53	10	50	15	52	20	57
R mean = 52				Range : 45 to 58			
Nos of Data within Range n = 20				Total Ri = 1,..+n = 1,039			
R average = Total R/n = 51.95							
Compressive Strength : Fc = 496 kgf/cm^2							

No. Wall				Date : May 15, 1986			
Location : Bangkok Side Pier				Angle : 0 degree			
R - Value							
1	36	6	36	11	38	16	32
2	37	7	35	12	34	17	38
3	34	8	36	13	42	18	37
4	39	9	42	14	40	19	35
5	32	10	38	~~15~~	44	20	36
R mean = 36.5				Range : 30.5 to 42.5			
Nos of Data within Range n = 19				Total Ri = 1,..+n = 697			
R average = Total R/n = 36.7							
Compressive Strength : Fc = 295 kgf/cm^2							

Allowable Stress = 295/3 = 98 kgf/cm^2, Say 95 kgf/cm^2

No. 1' (Exterior, Downstream)				Date : May 15, 1986			
Location : Thonburi Side PC				Angle : 90 degree			
R - Value							
1	52	6	52	11	52	16	51
2	52	7	50	12	51	17	56
3	50	8	44	13	55	18	45
~~4~~	44	9	51	14	53	19	55
5	54	10	52	15	47	20	48
R mean = 51.5				Range : 45.5 to 57.5			
Nos of Data within Range n = 19				Total Ri = 1,..+n = 970			
R average = Total R/n = 51.0							
Compressive Strength : Fc = 495 kgf/cm^2							

No. 2'				Date : May 15, 1986			
Location : Thonburi Side PC				Angle : 90 degree			
R - Value							
~~1~~	55	6	51	11	50	~~16~~	54
2	47	7	49	12	43	17	51
3	48	8	49	13	48	18	38
4	52	9	42	14	45	19	48
5	42	10	45	15	45	20	50
R mean = 47.5				Range : 41.5 t0 53.5			
Nos of Data within Range n = 18				Total Ri = 1,..+n = 843			
R average = Total R/n = 46.8							
Compressive Strength : Fc = 405 kgf/cm^2							

Allowable Stress = 405/3 = 135 kgf/cm^2, SAy 135 kgf/cm^2

No. 3'				Date : May 15, 1986			
Location : Thonburi Side PC				Angle : 90 degree			
R - Value							
1	41	6	51	11	44	16	51
2	49	7	51	12	53	17	52
3	45	8	50	13	56	18	55
4	43	9	52	14	51	19	47
5	51	10	48	15	50	20	53
R mean = 51				Range : 45 to 57			
Nos of Data within Range n = 20				Total Ri = 1,..+n = 993			
R average = Total R/n = 49.6							
Compressive Strength : Fc = 450 kgf/cm^2							

No. 4'				Date : May 15, 1986			
Location : Thonburi Side PC				Angle : 90 degree			
R - Value							
1	55	6	48	11	56	16	54
2	51	7	54	12	53	17	56
~~3~~	43	~~8~~	42	~~13~~	47	18	54
4	54	~~9~~	47	14	52	19	55
5	52	10	55	15	54	20	53
R mean = 53.5				Range : 47.5 to 59.5			
Nos of Data within Range n = 16				Total Ri = 1,..+n = 856			
R average = Total R/n = 53.5							
Compressive Strength : Fc = 520 kgf/cm^2							

No. 5'				Date : May 15, 1986			
Location : Thonburi Side				Angle : 90 degree			
R - Value							
1	52	6	53	11	53	16	52
2	46	7	53	12	53	17	53
3	52	8	45	13	51	18	51
4	49	9	51	14	50	19	46
5	45	10	47	15	53	20	52
R mean = 51				Range : 45 to 57			
Nos of Data within Range n = 20				Total Ri = 1,..+n = 1,007			
R average = Total R/n = 50.3							
Compressive Strength : Fc = 470 kgf/cm^2							

No. Wall				Date : May 15, 1986			
Location : Thonburi Side Pier				Angle : 0 degree			
R - Value							
1	36	6	44	11	45	~~16~~	47
2	38	7	43	12	40	17	45
3	35	8	40	13	40	18	40
4	39	9	38	14	40	19	44
5	35	~~10~~	50	15	42	20	42
R mean = 40				Range : 34 to 46			
Nos of Data within Range n = 18				Total Ri = 1,..+n = 726			
R average = Total R/n = 40.3							
Compressive Strength : Fc = 350 kgf/cm^2							

No. Pier Column				Date : May 16, 1986			
Location : Bascule Pier				Angle : 0 degree			
R - Value							
~~1~~	49	~~6~~	47	11	45	16	37
2	38	7	39	12	41	~~17~~	48
3	37	8	39	13	39	18	39
4	39	9	36	14	44	19	39
5	38	10	41	15	44	20	45
R mean = 39				Range : 33 to 45			
Nos of Data within Range n = 17				Total Ri = 1,..+n = 678			
R average = Total R/n = 39.8							
Compressive Strength : Fc = 345 kgf/cm^2							

No. Pier Column				Date : May 16, 1986			
Location : Bascule Pier				Angle : 0 degree			
R - Value							
1	47	6	54	~~11~~	42	16	44
2	50	7	44	12	50	17	50
3	40	8	47	13	48	18	46
4	50	9	51	14	48	~~19~~	27
5	44	10	49	15	52	20	50
R mean = 48.5				Range : 42.5 to 56.5			
Nos of Data within Range n = 18				Total Ri = 1,..+n = 865			
R average = Total R/n = 48.0							
Compressive Strength : Fc = 495 kgf/cm^2							

No. 1 (Exterior, Upstream)				Date : May 16, 1986			
Location : Thonburi Side(Innerspan)				Angle : 90 degree			
R - Value							
1	54	6	54	11	48	16	59
2	56	7	52	12	54	17	52
3	54	8	54	13	53	18	57
4	55	9	54	14	51	19	50
5	58	10	53	15	52	20	56
R mean = 54				Range : 48 to 60			
Nos of Data within Range n = 20				Total Ri = 1,..+n = 1,076			
R average = Total R/n = 53.8							
Compressive Strength : Fc = 525 kgf/cm^2							

No. 2 (Interior, Upstream)				Date : May 16, 1986			
Location : Thonburi Side(Innerspan)				Angle : 90 degree			
R - Value							
~~1~~	39	~~6~~	32	11	55	16	49
2	50	7	50	12	46	17	50
3	49	8	50	13	52	18	49
4	53	9	47	14	50	19	53
5	47	10	49	15	50	20	51
R mean = 50				Range : 44 to 56			
Nos of Data within Range n = 48				Total Ri = 1,..+n = 900			
R average = Total R/n = 50.0							
Compressive Strength : Fc = 460 kgf/cm^2							

No. Wall				Date : May 16, 1986			
Location : Thonburi Side Pier (in River)				Angle : 0 degree			
R - Value							
~~1~~	34	6	41	~~11~~	34	~~16~~	34
2	39	7	42	~~12~~	48	17	46
~~3~~	35	8	40	13	41	18	36
4	47	9	41	14	47	19	47
5	43	10	42	15	45	~~20~~	49
R mean = 41.5				Range : 35.5 to 47.5			
Nos of Data within Range n = 14				Total Ri = 1,..+$_n$ = 597			
R average = Total R/n = 42.6							
Compressive Strength : Fc = 390 kgf/cm^2							

Appendix 5.3.2 Alkalinity Test by 1% Phenolpthalein of Existing Krungthep Bridge.

Alkalinity Test by 1% Phenolphthalein

No.	Date	Location	Depth of Concrete Neutralized
1	16 May '86	Bangkok Side PC-T,Exterior,Upstream	6 mm
2	ditto	Bangkok Side PC-T,Interior	5.5mm
3	ditto	Bangkok Side PC-T,Interior	5 mm
4	ditto	Bangkok Side PC-T,Interior	5 mm
5	ditto	Bangkok Side PC-T,Exterior,Downstream	5.5mm
6	ditto	Bier Wall, Bangkok Side	10.0mm
7	ditto	Bascule Bridge Pier	10.5mm
8	ditto	ditto	18.0mm
9	ditto	Thonburi Side PC-T,Exterior,Upstream	9.0mm
10	ditto	Thonburi Side PC-T, Interior	9.0mm
11	ditto	Thonburi Side PC-T, Interior	5.0mm
12	ditto	Thonburi Side PC-T, Interior	5.0mm
13	ditto	Thonburi Side PC-T,Exterior,Downstream	5.0mm
14	ditto	Pier Wall, Thonburi Side	16.0mm
15	ditto	Pier Wall, Thonburi Side Off-Shore	18.0mm

Calculation of Constants k/R^2

(1) PC T-Beam.

No.	x (cm)	k/R^2 ($= 30/x^2$)
1	0.6	83.3
2	0.55	99.2
3	0.5	120.0
4	0.5	120.0
5	0.55	99.2
9	0.9	37.0
10	0.9	37.0
11	0.5	120.0
12	0.5	120.0
13	1.0	30.0
	Total	865.7

k/R^2(Average) $\approx$ 86.5

(Expected Residual Life as far as neutralization of concrete being concerned : T.

$$T = \frac{k}{R^2} \left\{ D^2 - d^2 \right\} = 86.5 \times (3.0^2 - 1.0^2)$$

$= 690$ years)

(2) Substructure

No.	x (cm)	k/R^2 (= $30/x^2$)
6	1.0	30.0
7	1.05	27.2
8	1.8	9.3
14	1.6	11.7
15	1.8	9.3
	Total	87.5

k/R^2 (average) = 17.5

(Expected Residual Life as far as neutralization of concrete being concerned : T

T = 17.5 (3.0^2 - 1.8^2) = 100 years)

Appendix 5.4.1 Stresses in Steel Truss Girder of Existing Krungthep Bridge.

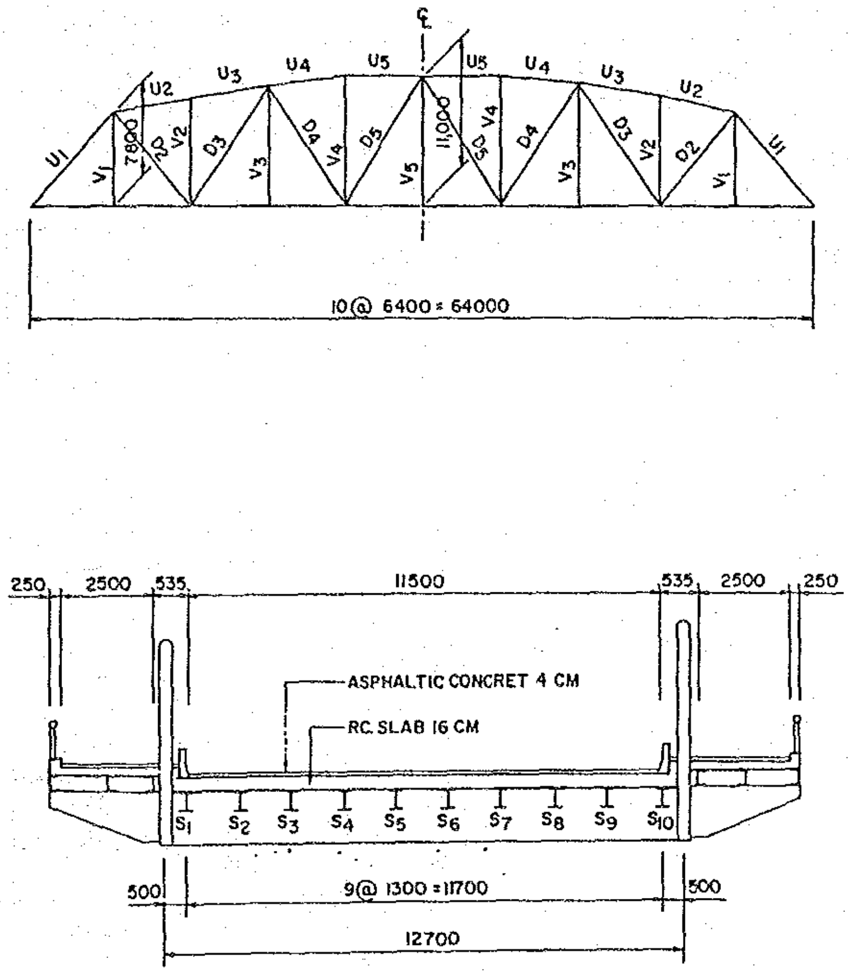
Superstructure

(i) Stresses in Steel Truss Girder

Structural calculation was made based on the service load design method (allowable stress design) for the three different live loads as specified in BSI, JRA and AASHTO, respectively.

The longitudinal and cross sections of the existing steel truss girder are as shown below, and the results of structural calculation are shown in Tables A.5.3.3.1 to A.5.3.3.3.

The results show that the existing steel truss girder has an enough capacity to carry either TL-20 or HS-20.



Steel Truss Girder

Table A.5.3.3.1 SUMMARY OF STRESS IN STEEEL TRUSS GIRDER (SPAN = 64.0m)

BSI Standard : HB-45 units &HA

Footpath = 3,485 K Pa (0.355 t.f/m^2)

		Dead Load Stress		Live Load Stress		Total Stress	Allowable Stress	Stress Excess
		Stress before Rehabili.	Add. Stress by Rehabili.	Footpath	Carriageway			
Carriageway Stringer		288*	38	-	2,131	2,457	±1,400*	75.5%
Footpath Stringer		211*	422	598	-	1,231	±1,400*	-
Inter-mediate Diaphragm	σc	-393*	-52	-	-1,187	-1,632	-1,400*	16.6%
	σt	452*	60	-	1,365	1,877	1,400*	34.1%
End Dia-phragm	σc	-265*	-35	-	-1,287	-1,587	-1,400*	13.4%
	σt	304*	40	-	1,415	1,819	1,400*	29.9%
Main Truss Upper Chord	U1	-621*	-40	-65	-444	-1,170	-1,139 *	2.7%
	U2	-723*	-44	-73	-502	-1,342	-1,309 *	2.5%
	U3	-719*	-44	-72	-496	-1,331	-1313 *	1.4%
	U4	-756*	-49	-80	-535	-1,420	-1,295 *	9.7%
	U5	-754*	-49	-80	-532	-1,415	-1,296 *	9.2%
Main Truss Lower Chord	L1	700*	43	70	477	1,290	1,400 *	-
	L2	700*	43	70	477	1,200	1,400 *	-
	L3	821*	55	91	609	1,576	1,400 *	12.6%
	L4	821*	55	91	609	1,576	1,400 *	12.6%
	L5	108*	60	99	651	1,718	1,400 *	22.7%
Main Truss Diagonal Member	D2	837*	49	84	626	1,596	1,400 *	14.0%
	D3	-516*	-32	-67	-550	-1,165	-931 *	25.1%
	D4	433*	20	82	748	1,283	1,400 *	-
	D5	-125*	-7	-67	-690	-889	-876 *	1.5%
Main Truss Vercial Member	V1	584*	34	60	884	1,562	1,400 *	11.6%
	V2	202*	12	20	143	377	1,400 *	-
	V3	584*	34	60	884	1,562	1,400 *	11.6%
	V4	258*	15	27	176	476	1,400 *	-
	V5	584*	34	60	884	1,562	1,400 *	11.6%

Note: 1) The minus sign (-) shows the stress in compression.

2) The figures with symbol * are extracted from the previous study report (1982 March, by JICA).

Table A.5.3.3.2 STUMMARY OF STRESS IN STEEEL TRUSS GIRDER (SPAN = 64.0m)
JRA Standard : TL-20
Footpath = 3,430 K.Pa(0.350 t.f/m^2)

		Dead Load Stress		Live Load Stress		Total Stress	Allowable Stress	Stress Excess
		Stress before Rehabili.	Add. Stress by Rehabili.	Footpath	Carriageway			
Carriageway stringer		288 *	38	-	904	1,230	±1,400 *	
Footpath stringer		211 *	422	590	-	1,223	±1,400 *	
Inter-mediate Diaphragm	σc	-393 *	- 52	-	-681	-1,126	-1,400 *	
	σt	452 *	60	-	786	1,298	1,400 *	
End Dia-phragm	σc	-256 *	- 35	-	-922	-1,222	-1,400 *	
	σt	304 *	40	-	1,056	1,400	1,400 *	
Main Truss Upper Chord	U1	-621 *	- 40	- 64	-146	-871	-1,139 *	
	U2	-723 *	- 44	- 72	-161	-1,000	-1,309 *	
	U3	-719 *	- 44	- 71	-159	- 993	-1,313 *	Nil
	U4	-756 *	- 49	- 79	-176	-1,060	-1,295 *	
	U5	-754 *	- 49	- 79	-176	-1,050	-1,296 *	
Main Truss Lower Chord	L1	700 *	43	69	155	967	1,400 *	
	L2	700 *	43	69	155	967	1,400 *	
	L3	821 *	55	88	197	1,161	1,400 *	
	L4	821 *	55	88	197	1,161	1,400 *	
	L5	908 *	60	98	219	1,285	1,400 *	
Main Truss Diagonal Member	D2	837 *	49	82	209	1,171	1,400 *	
	D3	-516 *	- 32	- 66	-170	- 784	- 931 *	
	D4	433 *	20	81	210	744	1,400 *	
	D5	-125 *	- 7	- 66	-177	- 375	- 876 *	
Main Truss Vercial Member	V1	584 *	34	59	191	868	1,400 *	
	V2	202 *	12	20	52	286	1,400 *	
	V3	584 *	34	59	191	868	1,400 *	
	V4	258 *	15	26	65	364	1,400 *	
	V5	584 *	34	59	191	868	1,400 *	

Notea : 1) The minus sigh (-) shows the stress in compression.
2) The figures with symbol * are extracted from the previous study report (1982 March, by JICA)

Table A.5.3.3.3 SUMMARY OF STRESS IN STEEL TRUSS GIRDER (SPAN = 64.0m)

AASHTO Standard : HS-20

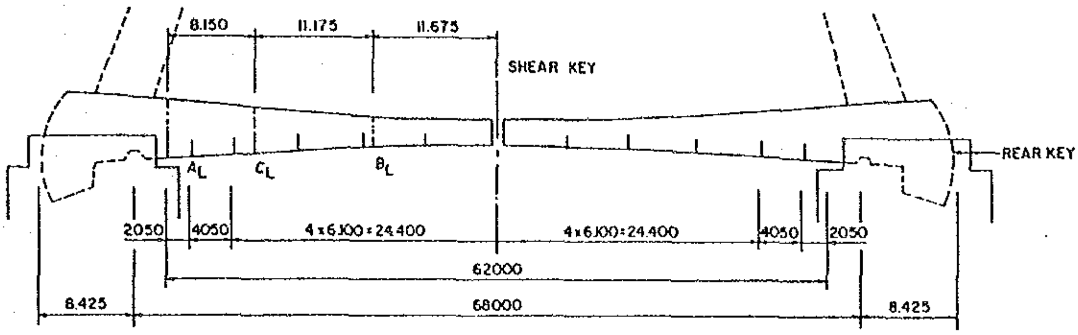
Footpath = 1,980 k.Pa (0.202 t.f/m^2)

		Dead Load Stress		Live Load Stress		Total Stress	Allowable Stress	Stress Excess
		Stress before Rehabili.	Add. Stress by Rehabili.	Footpath	Carriageway			
Carriageway Stringer		288*	38	-	790	1,116	±1,400*	
Footpath Stringer		211*	422	598	-	1,231	±1,400*	
Inter-mediate Diaphragm	σc	-393*	-52	-	-564	-1,009	-1,400*	
	σt	452*	60	-	651	1,163	1,400*	
End Dia-phragm	σc	-265*	-35	-	-658	-985	-1,400*	
	σt	304*	40	-	754	1,098	1,400*	
Main Truss Upper Chord	U1	-621*	-40	-37	-148	-846	-1,139*	
	U2	-723*	-44	-41	-164	-972	-1,309*	Nil
	U3	-719*	-44	-41	-163	-967	-1,313*	
	U4	-756*	-49	-46	-182	-1,033	-1,295*	
	U5	-754*	-45	-49	-45	-1,028	-1,296*	
Main Truss Lower Chord	L1	700*	43	40	160	943	1,400*	
	L2	700*	43	40	160	943	1,400*	
	L3	821*	55	58	203	1,130	1,400*	
	L4	821*	55	58	203	1,130	1,400*	
	L5	908*	60	56	224	1,248	1,400*	
Main Truss Diagonal Member	D2	837*	49	47	216	1,149	1,400*	
	D3	-516*	-32	-38	-180	-766	-931*	
	D4	433*	20	47	232	732	1,400*	
	D5	-125*	-7	-38	-203	-373	-876*	
Main Truss Vercial Member	V1	584*	34	34	248	900	1,400*	
	V2	202*	12	11	47	272	1,400*	
	V3	584*	34	34	248	900	1,400*	
	V4	258	15	15	60	348	1,400*	
	V5	584*	34	34	248	900	1,400*	

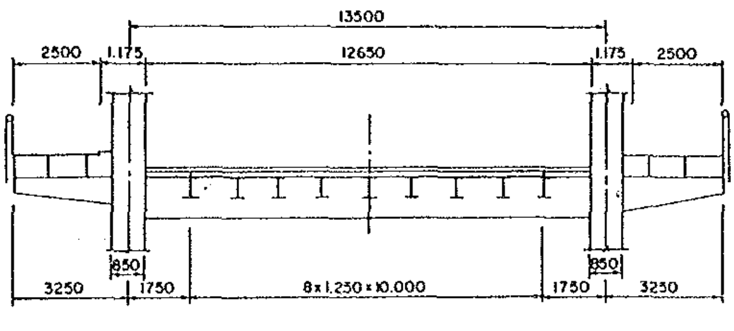
Notes : 1) The minus sign (-) shows the stress in compression.
2) The figures with symbol * are extracted from the previous study report (1982 March, by JICA)

(ii) <u>Stresses in Bascule Bridge</u>

The longitudinal and cross sections of the existing steel bascule bridge are shown below, and the results of structural calculation are as shown in Tables A.5.3.3.4 to A.5.3.3.6 for the standard of BSI, JRA and AASHTO, respectively.



SIDE VIEW



CROSS SECTION

Bascule Bridge

Table A.5.3.3.4 . SUMMARY OF STRESS IN BASCULE BRIDGE (Span - 68.0m)

BSI Standard : HB-45 units & HA

Footpath Loading = 4.715kPa(0.480t.f/m^2)

kg.f/cm^2

			Dead Load Stress		Live Load Stress		Total Stress	Allowable Stress	Stress Excess
			Stress before Rehabili.	Add. Stress by Rehabili.	Footpath	Carriageway			
Carriageway Stringer			126 *	-	-	1,905	2,031	1,400*	45.1 %
Dia-phragm	σ_c		-262 *	-	-	-1,243	-1,505	-1,400*	7.5 %
	σ_t		322 *	-	-	1,529	1,851	1,400*	32.2 %
Main Girder	Section B_L	σ_t	364 *	-	82	734	1,180	1,400*	-
		σ_c	-366 *	-	-82	-736	1,184	-1,142*	3.2 %
		τ_w	83 *	-	17	167	267	800*	-
	Section C_L	σ_t	530 *	-	135	817	1,482	1,400*	5.9 %
		σ_c	-536 *	-	-132	-798	-1,466	-1,162*	26.2 %
		τ_w	118 *	-	24	133	275	800*	-
	Section A_L	σ_t	640 *	-	177	877	1,694	1,400*	21.0 %
		σ_c	-646 *	-	-172	-853	-1,671	-1,132*	47.6 %
		τ_w	89 *	-	25	112	226	800*	-

Notes : 1) The minus sighn (-) shows the stress in compression.

2) The figures with symbol * are extracted from the previous study report (1982 March, by JICA).

Table A.5.3.3.5 SUMMARY OF STRESS IN BASCULE BRIDGE (SPAN =68.0m)

JRA Standard : TL 20

Footpath Loading = 3.432 K.pa (or 0.350 tf/m²)

kgf/cm²

			Dead Load Stress		Live Load Stress		Total Stress	Allowable Stress	Stress Excess
			Stress before Rehabili.	Add. Stress by Rehabili.	Footpath	Carriageway			
Carriageway Stringer			126*	–	–	862	988	1,400 *	–
Dia-phragm		σ_c	-262*	–	–	-709	-971	-1,400 *	–
Dia-phragm		σ_t	322*	–	–	818	1,140	1,400 *	–
Main Girder	Section B_L	σ_t	364*	–	60	118	542	1,400 *	–
Main Girder	Section B_L	σ_c	-366*	–	-60	-119	-545	-1,142 *	–
Main Girder	Section B_L	τ_w	83*	–	13	31	127	800 *	–
Main Girder	Section C_L	σ_t	530*	–	99	240	869	1,400 *	–
Main Girder	Section C_L	σ_c	-536*	–	-96	-234	-866	-1,162 *	–
Main Girder	Section C_L	τ_w	118*	–	18	41	177	800 *	–
Main Girder	Section A_L	σ_t	640*	–	129	305	1,074	1,400 *	–
Main Girder	Section A_L	σ_c	-646*	–	-126	-297	-1,069	-1,132 *	–
Main Girder	Section A_L	τ_w	89*	–	19	42	150	800 *	–

Notes : 1) The minus sign (-) shows the compressive stress.
2) The figures with symbol * are extracted from the previous study report (1982 March, by JICA).

Table A.5.3.3.6 SUMMARY OF STRESS IN BASCULE BRIDGE (SPAN = 68.0m)

AASHTO : HS-20
Footpath Loading = 2.544 K.pa
(or 0.259 tf/m^2)

kgf/cm^2

			Dead Load Stress		*Live Load Stress*		Total Stress	Allowable Stress	Stress Excess
			Stress before Rehabili.	Add. Stress by Rehabili.	Footpath	Carriageway			
Carriageway Stringer			126*	-	-	753	879	1,400 *	-
Dia-phragm		σ_c	-262*	-	-	-579	-841	-1,400 *	-
		σ_t	322*	-	-	668	990	1,400 *	-
Main Girder	Section B_L	σ_t	364*	-	44	198	606	1,400 *	-
		σ_c	-366*	-	-44	-198	-564	-1,142 *	-
		τ_w	83*	-	9	37	129	800 *	-
	Section C_L	σ_t	530*	-	73	259	862	1,400 *	-
		σ_c	-536*	-	-71	-253	-860	-1,162 *	-
		τ_w	118*	-	13	43	174	800 *	-
	Section A_L	σ_t	640*	-	95	315	1,050	1,400 *	-
		σ_c	-646*	-	-93	-306	-1,045	-1,132 *	-
		τ_w	89*	-	14	42	145	800 *	-

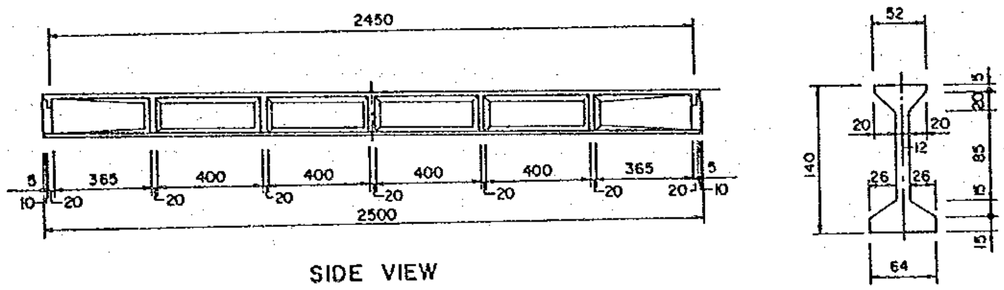
Notes : 1) The minus sign (-) shows the compressive stress.
2) The figures with symbol * are extracted from the previous study report (1982 March, by JICA)

(iii) Stresses in PC Composite Beam

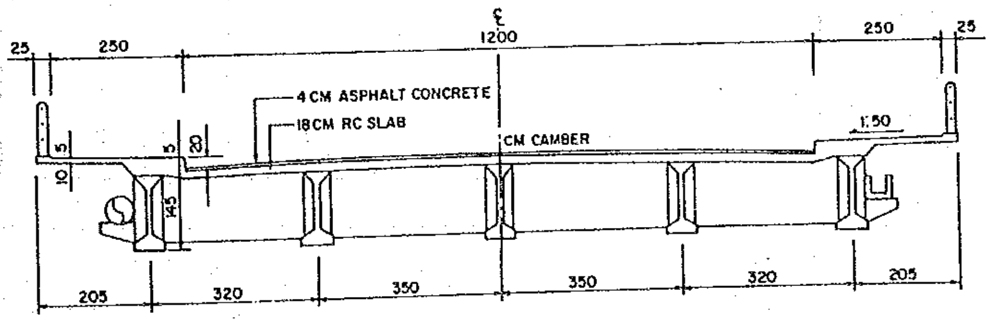
The longitudinal and cross sections of the existing PC composite beams are shown below:

The results of stress calculation on the main beam shown in Table A.5.3.3.7.

The results show that the existing PC composite beams have an enough capacity to carry either TL-20 or HS-20 while HB-45 unit is not applicable.



SIDE VIEW



CROSS SECTION

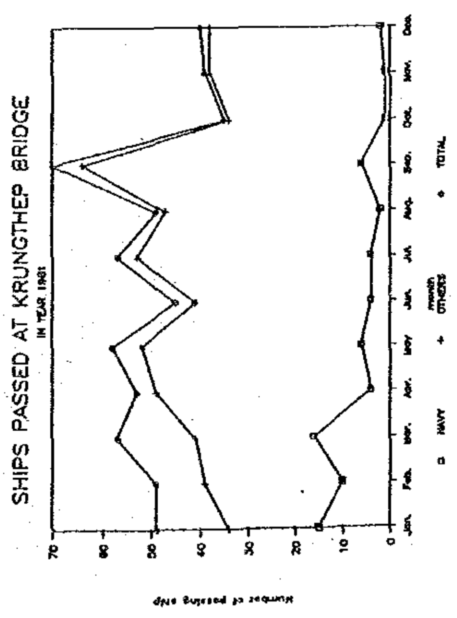
PC Composite Beam

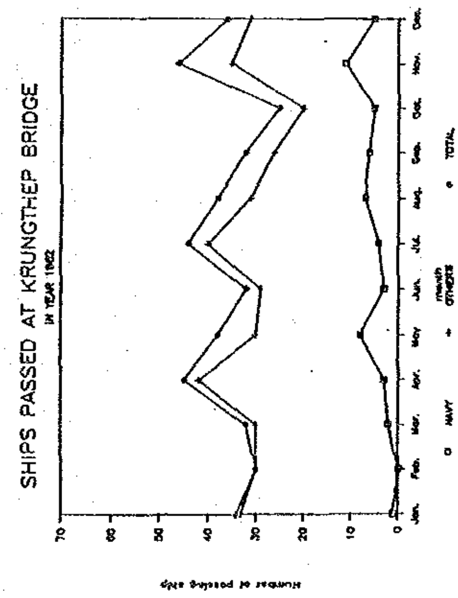
Table A.5.3.3.7 SUMMARY OF STRESS IN PC COMPOSIT BEAM
(Span = 24.5m)

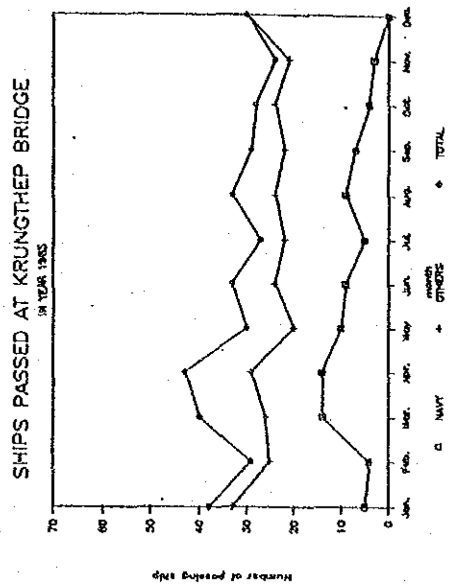
	Bending Moment(t.f.m)	Axial Force(t.f)	Stress (kg.f/cm^2) Top Fiber	Bottom Fiber
1. Prestress (9 cables)	124.5 *	220.0 *	46.4	-149.3
2. Dead Weight of T-Beam	72.6 *	-	-63.9	50.2
3. Weight of Diaphragm	27.0 *	-	-23.8	18.7
4. Prestress (7 cables)	84.8 *	164.5 *	27.4	-106.0
5. Roadway Slab (18cm)	113.1	-	-98.0	75.4
6. Pavement (4cm)	17.3	-	-1.5	7.7
7. Subtotal (7=1+2+...+6)	-	-	-113.4	-103.3
8. Live Load BSI: HB-45unit	542.2	-	-47.7	-241.3
JRA: TL-20	209.4	-	-18.4	93.2
AASHTO: HS-20	166.5	-	-14.6	74.1
9. TOTAL BSI: HB-45unit	-	-	-161.1	138.0
JRA: TL-20	-	-	-131.8	-10.1
AASHTO HS-20	-	-	-128.0	-29.2
Allowable Stress	-	-	-135.0	0

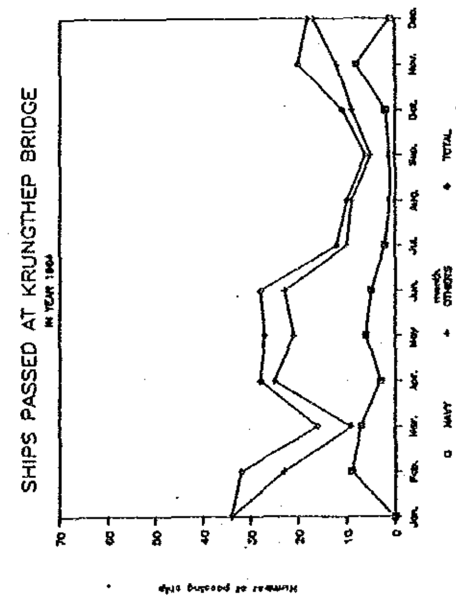
Notes: 1) The minus sign(-) of stress shows that in compression.
2) The figures with symbol * are extracted from the previous study report (march 1982, by JICA).

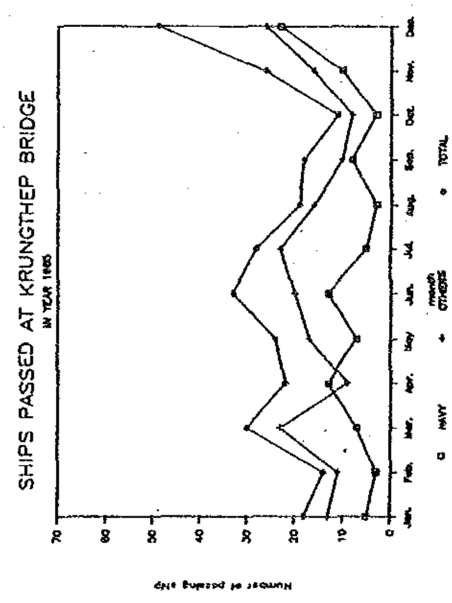
Appendix 6.2.1 Ships Passed at Krungthep Bridge

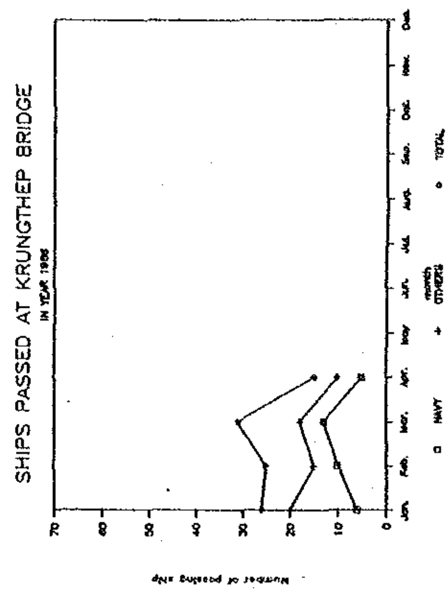

SHIPS PASSED AT KRUNGTHEP BRIDGE
IN YEAR 1981
Number of passing ship
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
month
NAVY
OTHERS
TOTAL


SHIPS PASSED AT KRUNGTHEP BRIDGE
IN YEAR 1982
Number of passing ship
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
month
NAVY
OTHERS
TOTAL


SHIPS PASSED AT KRUNGTHEP BRIDGE
IN YEAR 1983
Number of passing ship
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
month
NAVY
OTHERS
TOTAL


SHIPS PASSED AT KRUNGTHEP BRIDGE
IN YEAR 1984
Number of passing ship
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
month
NAVY
OTHERS
TOTAL


SHIPS PASSED AT KRUNGTHEP BRIDGE
IN YEAR 1985
Number of passing ship
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
month
NAVY
OTHERS
TOTAL


SHIPS PASSED AT KRUNGTHEP BRIDGE
IN YEAR 1986
Number of passing ship
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
month
NAVY
OTHERS
TOTAL

Appendix 6.4.1 Compensation Cost for River Facilities

Compensation Costs for River Facilities

1) Bangkok Dock

As reported already in the Progress Report (I) May 1986, the compensation cost of the Bangkok Dock was estimated at about Baht 500 million with the following breakdown:

(a) Construction of New Dock

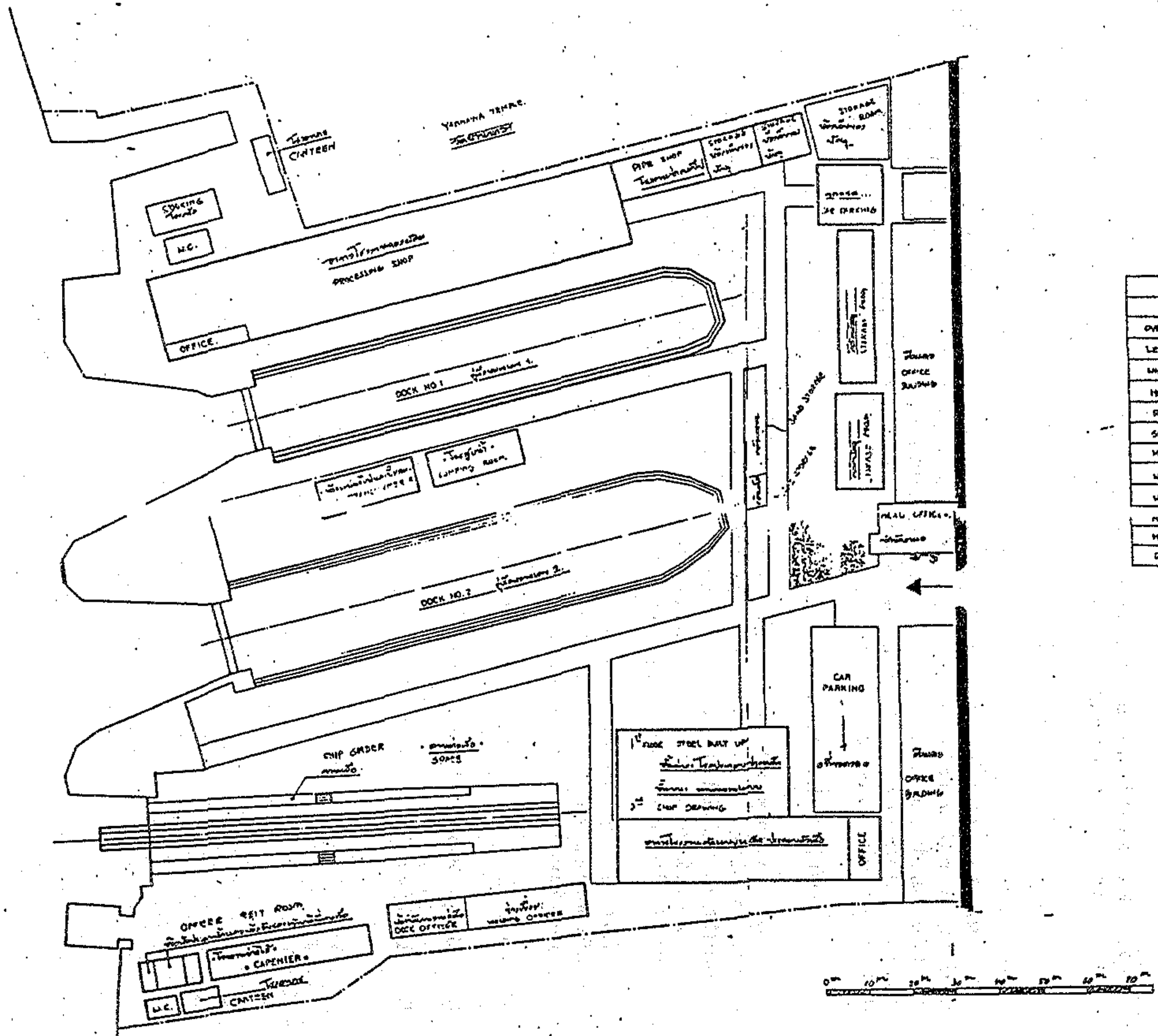
i)	New dock construcion cost M Baht 360	Baht	360	million
ii)	Land acquisition cost in downstream	Baht	20	million
iii)	Infrastractures for Dock operation	Baht	45	million
(b)	Dismantling of Bangkok Dock and leveling works	Baht	75	million
	Total	Baht	500	million

While the land value of the prime river front property along New Road was estited at the minimum about Baht 525 million based on the unit land price of Baht 60,000 per square wah. for 35,000 sq.m. However, this unit price will be reviewed later when the detailed evaluation is required.

2) Other River Facilities

As discussed in Chapter 6, the Study Team has investigated other river facilities which are located upstream of the Krungthep bridge but downstream of the Sathorn bridge and compensation costs for their removal were approximately estimated at Baht 85 million as shown below:

A.	Harin Ship Building Co., Ltd. Removal of 2-slipways only, headquaters will remain as it is.	Baht	40	million
B.	B.L.L. Shipyard Co., Ltd.	Baht	30	million
C.	Show Wanakit Co., Ltd.	Baht	10	million
D.	Others,	Baht	5	million



DETAILS	DOCK NO. 1		DOCK NO. 2	
DETAILS	FT.	M.	FT.	M.
OVER ALL LENGTH.	356'	108.5	376'	114
LENGTH AT THE BOTTOM.	327'-6"	99.8	352'-9"	107.5
WIDTH AT ENTRANCE.	45'	13.7	52'-2"	15.9
HEIGHT AT SILL ABOVE BOTTOM OF DOCK.	4'-2"	1.3	3'-9"	1.1
DEPTH OF SILL AT HIGH WATER ORDINARY.				
SPRING TIDE.	15'-10"	4.8	17'-2"	5.2
MAXIMUM WIDTH OF SHIP USING DOCK.	42'-1"	12.8	50'	15.2
WIDTH OF DOCK FLOOR.	50'-7"	15.4	56'	17
WIDTH AT UPPER EDGE.	65'-9"	19.4	72'-7"	22.1
HEIGHT FROM FLOOR TO UPPER EDGE.	24'-4	7.4	25'-9"	7.8
HEIGHT AT ENTRANCE AT CENTER LINE	23'-2"	7.1	22'	6.7
DEPTH AT ENTRANCE AT LOWEST TIDE.	6'-6"	2.0	7'-10"	2.4

THE BANGKOK DOCK CO.,LTD.

• SHOWING LAY-OUT PLAN •

SCALE. 1:500

DRAWING NO.

DATE 25/3/06

DRAWN BY.

CHECK

Appendix 8.3.1 Movable Bridge Mechanisms

Movable Bridge Mechanisms

There are three principal types of movable bridge, bascule, swing, and lift type. The following describes characteristic features of each type.

1) Bascule Type

- Two types of bascule girders are usually used, such as single-leaf and double-leaf (same as Krungthep bridge) girders. In case of double-leaf girders, the longest spans constructed to date is 96.8 meters over the Bay of Cadiz, Spain. Large double-leaf girders have large deflection at the center key.

- The size of substructure is normally large in order to provide chambers accommodating counter weights. Elimination of the chamber is possible, such as in the case of Bang Pakong bridge, but results in aesthetically poor appearance. Such large submerged structure causes a high degree of river flow disturbance.

- The center key must be released and re-fixed at every opening operation. Together with the joint, this requires frequent maintenance.

- The operation of this type requires double of power needed for the swing type. The length of time required for the opening and the closing operations is relatively small. Three kinds of mechanism are available, gear with electric power, gear with diesel power, and hydraulic system.

2) Swing Type

- The largest of this type constructed to date is the one in the Suez canal with the total (both sides of the rotating center) length of 158.4 meters.

- When open, the girder is parallel to the navigation course, exposed to the direct collision with the vessel.

- The time required for opening and closing operations is longer than that for the bascule type, 30 to 40 minutes at a time.

- Maintenance costs are lower than the others.

3) Lift Type

- The largest of this type constructed to date is the one in the James river in the U.S.A. with the total length of 126.6 meters.
- Heavy towers containing counter weights calls for the highest construction cost among the three types.
- It limits the height of vessel.
- The time required for the opening and closing operations is shortest among the three, 15 to 20 minutes at a time.
- Mainteance costs are at the same level as the bascule type.

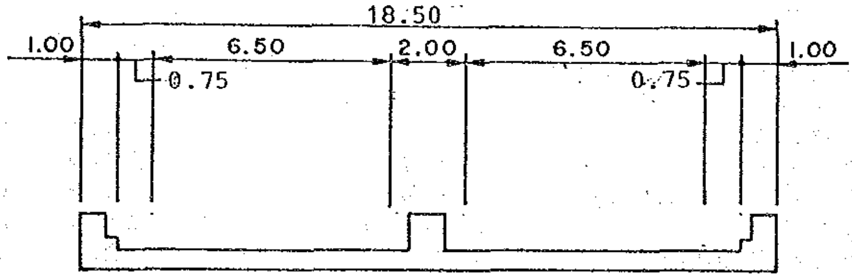
Appendix 8.4.1 Preliminary Cost Estimate

Standard Cross Sections of New Bridges

Referring to the Geometric Design Standards of AASHTO, JRA and DOH, the Study Team determined the standard cross sections of the New Krungthep bridge as follows:

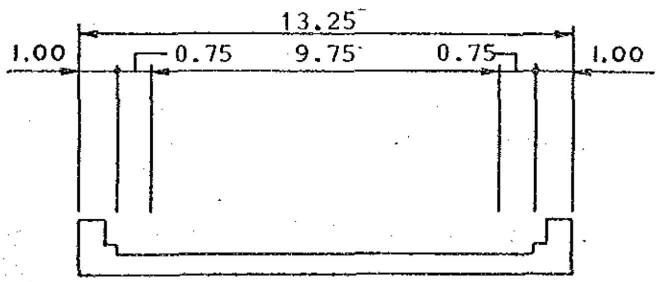
1) Twoway 4-lane bridge

- Carriage way	2 x 2 x 3.25	=	13.0	m
- Medium strip			2.0	m
- Side strip	2 x 0.75	=	1.5	m
- Curb to hand hail	2 x 1.0	=	2.0	m



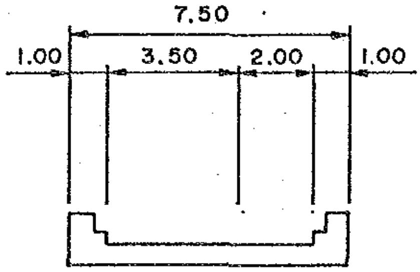
2) Oneway 3-lane bridge

- Carriage way	3 x 3.25	=	9.75	m
- Side strip	2 x 0.75	=	1.5	m
- Curb to Hand Rail	2 x 1.0	=	2.0	m



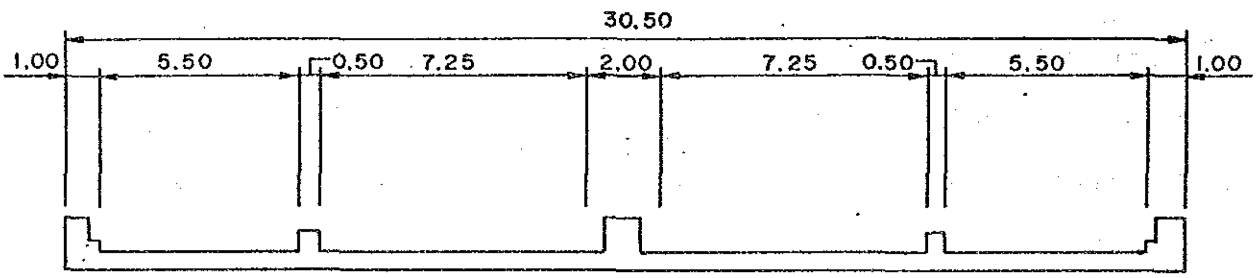
3) Rampway

- Carriage way	1 x 3.5	=	3.50	m
- Side strip	1 x 2.0	=	2.0	m
- Curb to Hand Rail	2 x 1.0	=	2.0	m

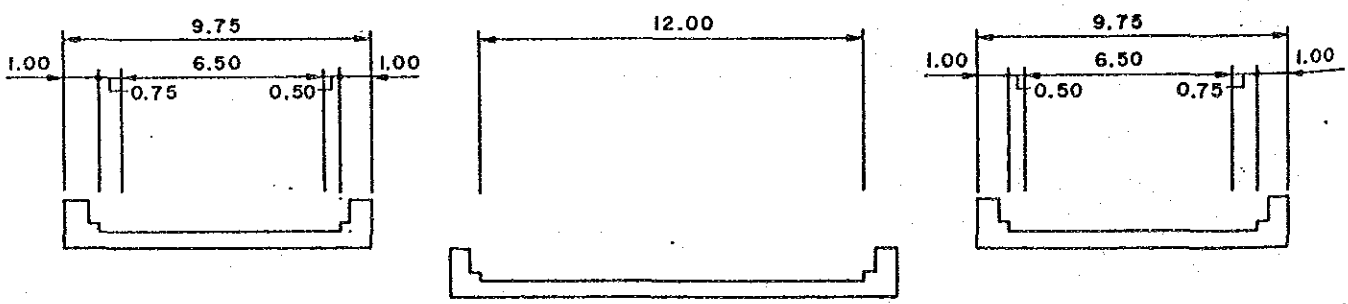


4) Twoway 4-lane with Rampways

- Medium strip			2.0	m
- Main carriage way	2 x 7.25	=	14.5	m
- Side separation strip	2 x 0.5	=	1.0	m
- Rampway	2 x 5.5	=	11.0	m
- Curb to Hand Rail	2 x 1.0	=	2.0	m



5) Separately idependent 2-2 lanes bridges



Girder Depth

The girder depth is to decided in preliminary design to be commenced in the middle of November 1986. The Study Team roughly estimated the relationship between the girder depth and the bridge span by type of bridge as follows:

1) PC girder by incremental launching method for Alternative D

$d/L = 0.06 - 0.05$

$L = 80$ m $d = 4.8 - 4.0$ m

Where L = Span Length (m)
d = Girder Depth (m)

2) Movable bridge for Alternative E

Bascule type $d/L = 0.070$

$L = 85$ m $d = 5.95$ m .....E-1 and E-3

Swing type $d/L = 0.035$

$L = 80$ m $d = 2.8$ m E-2

3) Steel Box girder in side spans of Alternative E

$d/L = 0.05$

$L = 65$ m $d = 3.25$ m

4) PC Box girder by balanced cantilever election method.

$d/L = 0.0165$ at crown

$d/L = 0.06$ at pier

$L = 220$ m $d = 2.2$ m

Construction Methods

1) General Construction Methods

The requirements for the new bridge, necessitate the following general construction methods:

Alternative D

Foundation works	:	Cast in situ concrete pile method such as reverse circulation drill method.
Temporary cofferedam	:	Not required specially
Superstructures	:	Main bridge over the river can be constructed with PC continuous box girder by the incremental launching method.

The PC continuous box girder is selected based on the reasons listed below:

a) PC girder with uniform girder depth is cheaper than steel box girder, which can keep NC of 7.5 m in main bridge spans.

b) The segment casting yard is available in the adjacent land in the Bangkok side.

Alternavtive E

Plan E-1 and E-2 can be constructed by the following general methods:

Foundation works	:	Cast in situ concrete pile method such as reverse circulation drill method.
Temporary cofferdam	:	In case of plan E-1, interlocked steel pipe type cofferdams are required for the construction of central two piers to support the bascule chambers.
Superstructures	:	In case of plan E-1, in addition to the main movable bascule girders, the main side spans will be constructed by steel box girders.
Superstructures	:	In case of E-2, the main movable bridge is constructed with cable stayed steel girders of double span length of main navigational channel span of about 70 m.

The plan E-3 which includes separate new bridges in both up and down stream sides is discussed in the succeeding Section.

Alternative G

The following are general methods for this type of bridge:

Foundation	:	Either types of concrete pile casted in situ or open caisson.
Temporary cofferdam	:	In case of open caisson, the locations of main piers are situated close to each bank, so that double sheet pile type cofferdam filled with sand is applicable. In the case of concrete pile casted in situ, it is not required.
Superstructure	:	PC box type by ballanced cantilever erection method is generally applicable. The effect of variable girder depth to NC is negligible due to the high piers.

2) Special Construction Method for Plan E-3

According to the request on the channel length of 60 m by Pilot Division of HD, the distance between the new separated bridges in up and down stream sides shall be kept in about 60 m applying a special construction method called "Close Construction", which allow it to be constructed closely to the existing structure within 20 m.

The plan is shown in Fig. A.8.4.1.1 The "Close Construction" is generally not recommended in order to keep the foundation base of the existing structure safe. However, the Study Team tried to make the advantages clear as summarized below:

Foundation works	:	Bored steel pipe pile foundation is suitable, due to minimum disturbance to the existing foundation.

Temporary cofferdam	:	In addition to the interlocked steel pipe pile type cofferdam for large c hamber type pier, another independent large scale steel piles shall be driven in between the existing and new sub-structure to prevent the failure of existing foundation caused by new structure's construction. After completion of new substructure, this steel piles shall be demolished to avoid ill effects to the scouring action.
Superstructure	:	Same as the plan E-1.

3) Construction Periods

The key factor in determining the construction period of a bridge project is the concrete volume in the field, not in the factory, because the capacity of the batcher plant is the dominant factor.

In the case of Nonthaburi & Pathumthani Bridges Project, the construction period was 24 months with placing concrete of 26,000 cub.m.

The Wat Sai Steel Cable Stayed Bridge Project, it takes 36 months with the concrete volume of 32,000 cub.m in the field, and the Bangkok Approach Bridges Project, it takes 30 months for the placing of concrete of 31,000 cub.m in the site.

Therefore, it can be said that the maximum concrete volume per month is about 1,000 cub.m per one batcher plant.

The construction periods of each Alternative could be estimated by the above concept as below:

Alternative	Concrete Volume	Construction Periods
D	25,000 cub.m	24 months
E	20,000 cub.m	24 months
G	75,000 cub.m	36 months

The above concrete volumes were approximately estimated by counting the volume to be placed in the site only. In the case of the Alternative G, two (s) batcher plants shall be operated from both Bangkok and Thonburi sides unless otherwise devided into two packaged projects.

In the case of Alternative E, cofferdam works in the river and steel fabrication works in the factory were taken into consideration.

Land Acquisition and Other Compensation

1) Land Acquisition

Land acquisition has been a big problem for the Government as elsewhere in the world. The legal basis for the Government to acquire the right of way for public infrastructure projects has been strengthened in recent years but the enforcement sometimes still is very difficult. Therefore, the degree of difficulty in land acquisition was assessed for the evaluation of each alternative as shown in main volume.

2) Compensation for Moving River Facilities

At the moment there is no legal grounds to impose private operators of shipyards, slipways and jetties to move downstream so that a low fixed bridge could be built. Properties within the right of way could be expropriated by law, at least in principle, and the Bangkok Dock, which is a government enterprise, could be moved by a cabinet decision upon request by PWD. Private operators, however, can not be forced to move for the sake of a public infrastructure project located in distance unless a new law be enacted. Under such circumstances negotiations with the private operators could be easily prolonged.

Project Costs

Preliminary construction cost estimates were first presented in Table 7.3.1 in page 7-15 of the Progress Report (II). Further refinements were made reflecting subsequent considerations.

1 Construction Costs

1) Bridge Cost Estitmate

Taking into account more detailed considerations PC box girder by launching method of the Alternative D, steel box girder for side spans of the Alternative E and bascule type bridge of Alternative E, bridge construction costs were re-estimated as shown below:

a.	PC Box girder by balanced cantilevered method with high piers	Baht 50,000	per sq.m
b.	PC Box girder by launching method with low piers	Baht 45,000	per sq.m
c.	Approach PC bridge to the high main bridge	Baht 25,000	per sq.m
d.	Approach PC bridge to the low main bridge	Baht 20,000	per sq.m
e.	Approach ramp RC bridge	Baht 12,000	per sq.m
f.	Movable swing steel bridge	Baht 115,000	per sq.m
g.	Movable bascule steel bridge	Baht 125,000	per sq.m
h.	Middle span main steel box girder	Baht 70,000	per sq.m

2) Other Cost Estimates

Other unit costs such as those for road works, miscellaneous work, contigency and engineering were kept unchanged at the level reported in the Progress Report (II). However, costs for asphalt pavement for bridge surface and concrete pavement for road surface were newly added.

3) Costs for Scouring Protection

Placing of stones on the river bed is an effective protection method against scouring. The cost for the work was estimated at 30 to 50 million Baht even in the case of Alternatives D or E. However, this work could be avoided by designing substructures while neglecting the supporting power of soil above the scour level. Therefore, in this cost estimation, the protection cost against scouring was ignored considering that it could be included in the miscellaneous works cost.

4) Cost of Strengthening the Existing Bridge

In case of the plan D-3, the cost of strengthening the existing bridge was calculated as summarized below:

- Dismantling of structural members and reinforcing of steel truss bridge		Baht 86 million
- Reinforcing of bascule bridge		Baht 4 million
- Dismantling of PC approach bridge		Baht 3 million
	Total	Baht 93 million

The cost of reconstructing PC approach bridge was estimated with the proposed plan.

2. Compensation Cost

1) Land Acquisition and Building Removal

Based on the results of the building conditions survey, the Study Team calculated the lands area to be acquired and counted the number of buildings by floor spaces.

It is not possible to avoid either of the two Chinese Shrines at the foot of the Krungthep bridge on the Thonburi side except in the cases of the plan G-1, and E-2.

2) Compensation Cost for River Facilities

For the case of Alternative D, the Study Team estimated compensation costs for moving the river facilities including Bangkok Dock as follows:

- Compensation cost for Bangkok Dock	Baht 500 million
- Compensation cost for other river facilities such as Harin 2 slipway, BLL slipway Shaw Wanakit and others	Baht 85 million
- Revenue by selling the land of the existing Bangkok Dock	Baht 525 million

The Study Team interviewed the General Manager of Supakarn condominium project to confirm the unit land price of the existing Bangkok Dock site. Mr. Somphot Piyaoui said, if the land can be sold, price would be between the maximum of Baht 80,000 per sq.wa and the minimum of Baht 60,000 per sq.wa, seeing the Dock from his office. His lowest estimate of Baht 60,000 per sq.wa was just the same with that estimated by the Study Team.

It is likely, therefore that the sale of the land of the existing Bangkok Dock would more than compensate the cost of moving it downstream. However, such a sale may take place only several years or longer after the moving, whereas the moving must be preceeded by the preparation and the construction at the new site. This gap in time can not be determined. Thus, for the sake of keeping the estimates conservative the amount only realizable by the sale of the existing site was not included in the financial and economic evaluation in this Report.

3. Traffic Loss

In the case of Alternative E, two (2) kinds of movable bridge were examined of their operating costs. Their operating costs and economic losses while bridge opening operations were estimated based on the general information and the data obtained from PWD and were reported in the reported in the Progress Report (II) as shown in the next page.

Preliminary cost estimates were calculated for the following items for relevant alternatives.

- Loss to traffic due to opening of movable bridge
- Loss to traffic during construction period

For the above items computer simulation runs were carried out for the target year of 1991 against a network without the Krungthep bridge. The difference in the total cost of vehicle operation and time value during a half hour period in off-peak hours between the cases of with and without the bridge was taken as the loss to traffic per day. The difference in the total cost for a two year period was taken as the loss to traffic. Estimates are shown in Table below.

Estimation of Loss Due to Closure of Existing Bridge, 1991

		Total Veh.-hrs. (Veh.-Hr/Hr)	(Baht/Hr)	Total Cost (Baht/Hr)
Morning Peak	with Bridge	99072	7867418	
	without Bridge	99574	7884609	
	A. Difference	502	17191	48466
Off-peak	with Bridge	57612	6001414	
	without Bridge	59352	6016112	
	B. Difference	1740	14698	118924

Total closure for 1 year

(5 x A + 15 x B) x 365 — 740 million

(VOC only 112 million)

Half hour closure every day during off-peak

VOC only	2.68
Time	19.02
Total	21.70 million

Note: Value of time 62.3 Baht/Hr/PCU (peak hour)
59.9 Baht/Hr/PCU (off-peak)

Cost of vehicle operation and time values were developed in terms of economic cost.

Appendix 9.2.1 Wind Probability

PROBABILITY ANALYSIS OF WIND VELOCITY

Annual Maximum Wind Velocity Records

Year	Velocity (knot)	Direction
1951	27	S
2	56	E
3	43	ENE
4	40	WSW
5	43	NW
6	45	NNW
7	51	SW
8	44	SSW
9	52	E
1960	35	ESE
1	48	ENE
2	52	ESE
3	41	W
4	40	SE
5	41	S
6	40	W
7	42	NNW
8	37	ESE
9	36	WSW

Year	Velocity (knot)	Direction
1970	41	N
1	33	WSW
2	42	W
3	25	W
4	27	NW
5	40	NE
6	32	SE
7	28	SW
8	32	NE
9	36	SW
1980	42	WSW
1	32	WSW
2	40	SW
3	38	ESE
4	35	NNE
5	32	W

Probability analysis was made by the Study Team using a) Gumbel's method,b) Order Probability method and c) Gumbel-Weibulls' method. The results are summarized below:

Return Period (Year)	Maximum Wind Velocity (knot)		
	a)Gumbel	b)Order Probability	c)Gumbel-Weibull
5	45.3	45.6	45.1
10	50.1	49.6	49.0
30	57.4	54.8	54.2
50	60.8	56.9	56.3
100	65.3	59.7	58.9

The maximum value for 100 year probability was obtained by Gumbel's method (above a)). Hence, the design wind velocity Vd is determined as:

V_{100} = 65.3 knots = 120.9 km/h = 75.2 mph, say 80 mph

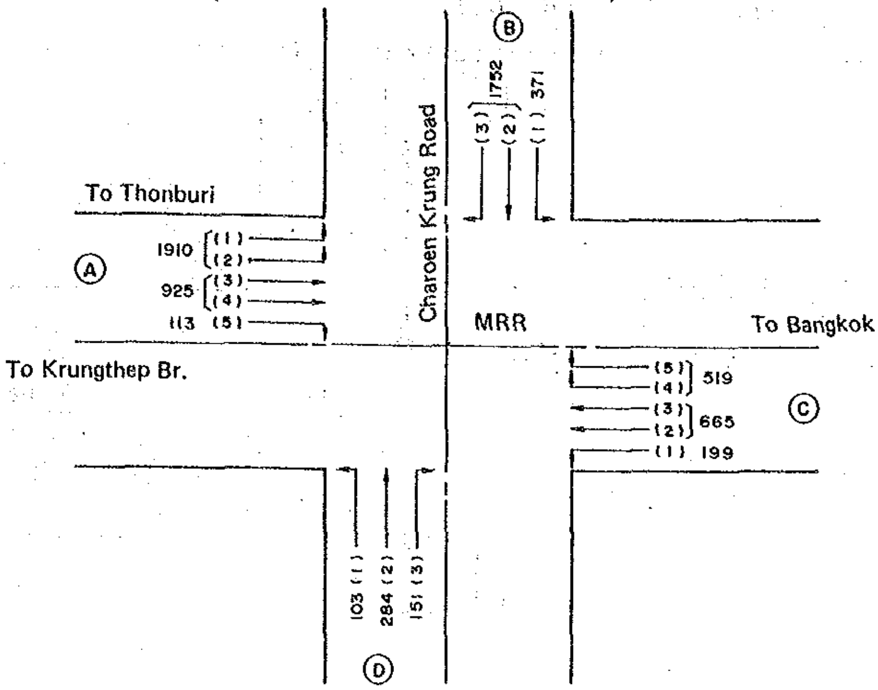
V_D = 80 mph (equivalent to 130 km/h) --- same as Sathorn Br.

Appendix 9.4.1 Caculation of Saturation Degree for Examination of Intersection Type

Traffic Saturation Degree of Intersections

Intersection"A" in 2001

a) Forecasted Traffic Volume (PCU/H)



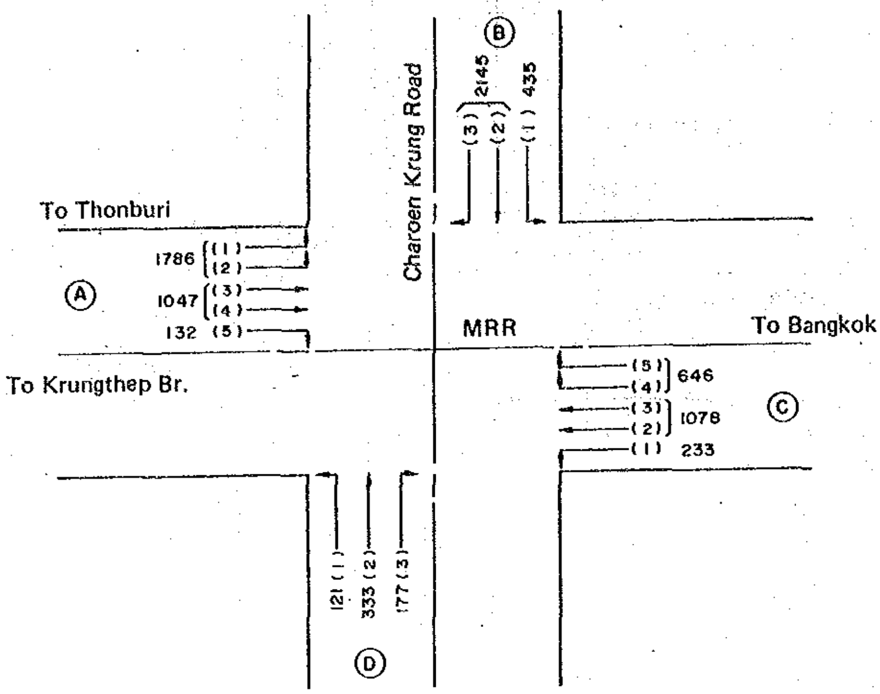
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree
A ①	(1)	2000	955	0.48	
	(2)	2000	955	0.48	
	(3)	2200	463	0.21	
	(4)	2200	463	0.21	
②	(5)	2000	113	0.06	
B ③	(1)	2000	371	0.19	
	(2)	2000	876	0.44	
	(3)	2000	876	0.44	
C ①	(1)	2000	199	0.10	Phase1 0.48
	(2)	2200	333	0.15	Phase2 0.13
	(3)	2200	333	0.15	Phase3 0.44
②	(4)	2000	260	0.13	Phase4 0.13
	(5)	2000	260	0.13	
					1.18
D ④	(1)	2000	103	0.05	
	(2)	2200	284	0.13	
	(3)	2000	151	0.08	
Total					1.18 > 1.0

Intersection "A" in 2011

a) Forecasted Traffic Volume (PCU/H)



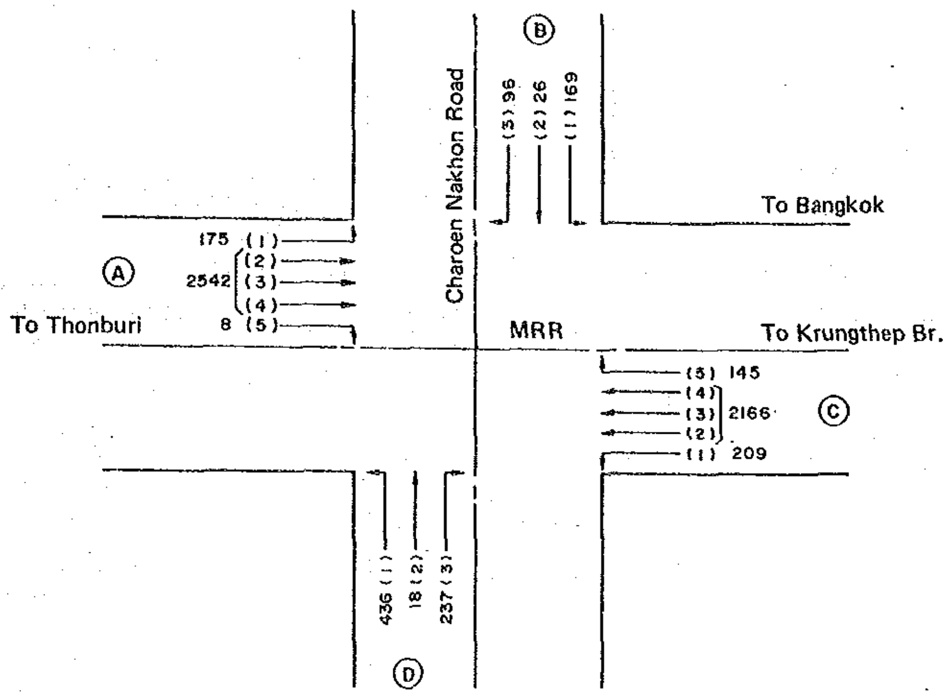
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity (A) V/H	Future Traffic Volume (B) V/H	Saturation Degree B/A	Maximum Saturation Degree	
A ①	(1)	2000	893	0.45		
	(2)	2000	893	0.45		
	(3)	2200	524	0.24		
	(4)	2200	524	0.24		
②	(5)	2000	132	0.07		
B ③	(1)	1930	435	0.23		
	(2)	2000	1073	0.55		
	(3)	2000	1073	0.55		
C ①	(1)	2000	233	0.12	Phase1	0.45
	(2)	2200	539	0.25	Phase1	0.16
	(3)	2200	539	0.25	Phase3	0.55
②	(4)	2000	323	0.16	Phase4	0.15
	(5)	2000	323	0.16		
						1.31
D ④	(1)	2000	121	0.06		
	(2)	2200	333	0.15		
	(3)	2000	177	0.09		
Total					1.31 > 1.0	

Intersection "B" in 2001

a) Forecasted Traffic Volume (PCU/H)



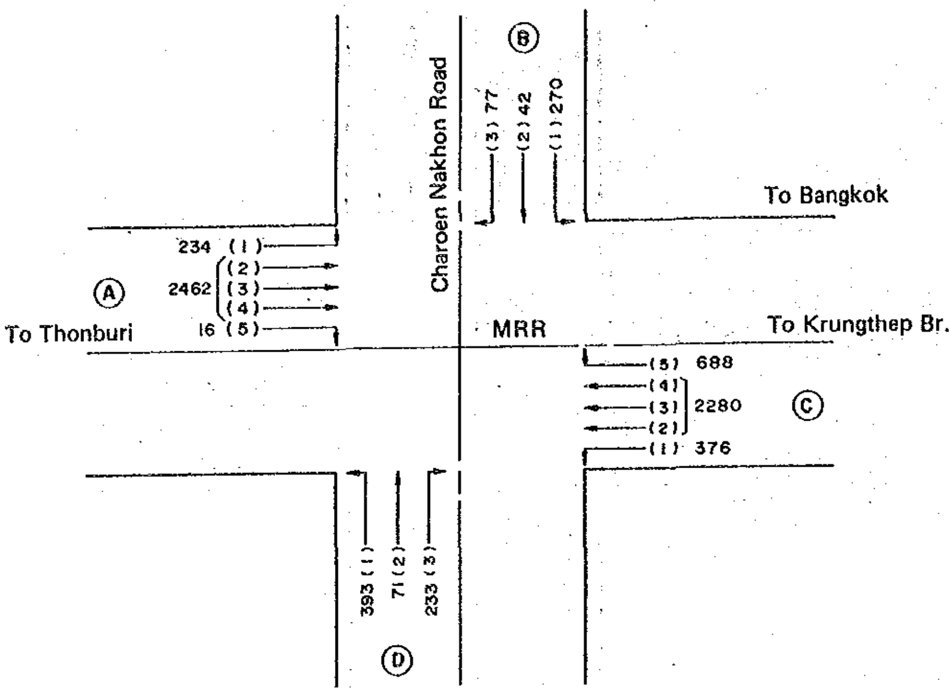
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree	
A ①	(1)	2000	175	0.09		
	(2)	2200	847	0.39		
	(3)	2200	847	0.39		
	(4)	2200	847	0.39		
②	(5)	2000	8	0.01		
B ③	(1)	2000	169	0.08		
	(2)	2200	26	0.01		
	(3)	2000	96	0.05		
C ①	(1)	2000	209	0.10	Phase1	0.39
	(2)	2200	722	0.33	Phase2	0.07
	(3)	2200	722	0.33	Phase3	0.08
	(4)	2200	722	0.33	Phase4	0.22
②	(5)	2000	145	0.07		0.76
D ④	(1)	2000	436	0.22		
	(2)	2200	18	0.01		
	(3)	2000	237	0.12		
Total					0.76 < 1.0	

Intersection"B" in 2011

a) Forecasted Traffic Volume (PCU/H)



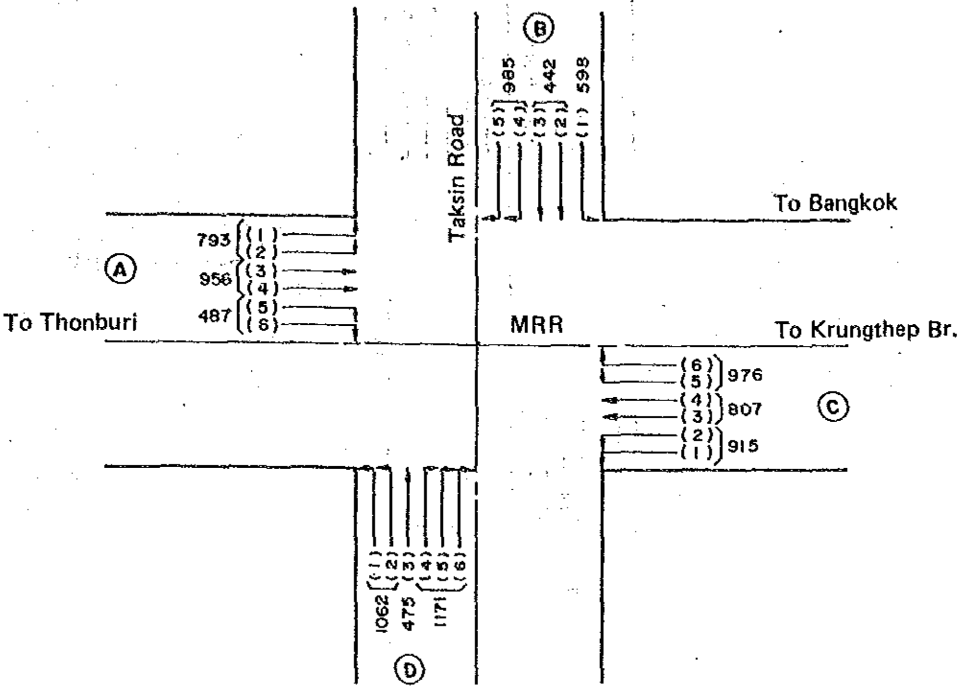
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree
A	① (1)	2000	234	0.12	
	① (2)	2200	821	0.37	
	① (3)	2200	821	0.37	
	① (4)	2200	821	0.37	
	② (5)	2000	16	0.01	
B	③ (1)	2000	270	0.14	
	③ (2)	2200	42	0.02	
	④ (3)	2000	77	0.04	
C	① (1)	2000	376	0.19	Phase1 0.37
	① (2)	2200	760	0.35	Phase2 0.34
	① (3)	2200	760	0.35	Phase3 0.20
	① (4)	2200	760	0.35	Phase4 0.14
	② (5)	2000	688	0.34	
					1.05
D	③ (1)	2000	393	0.20	
	③ (2)	2200	71	0.03	
	④ (3)	2000	233	0.14	
Total					1.05 > 1.0

Intersection "C" in 2001

a) Forecasted Traffic Volume (PCU/H)



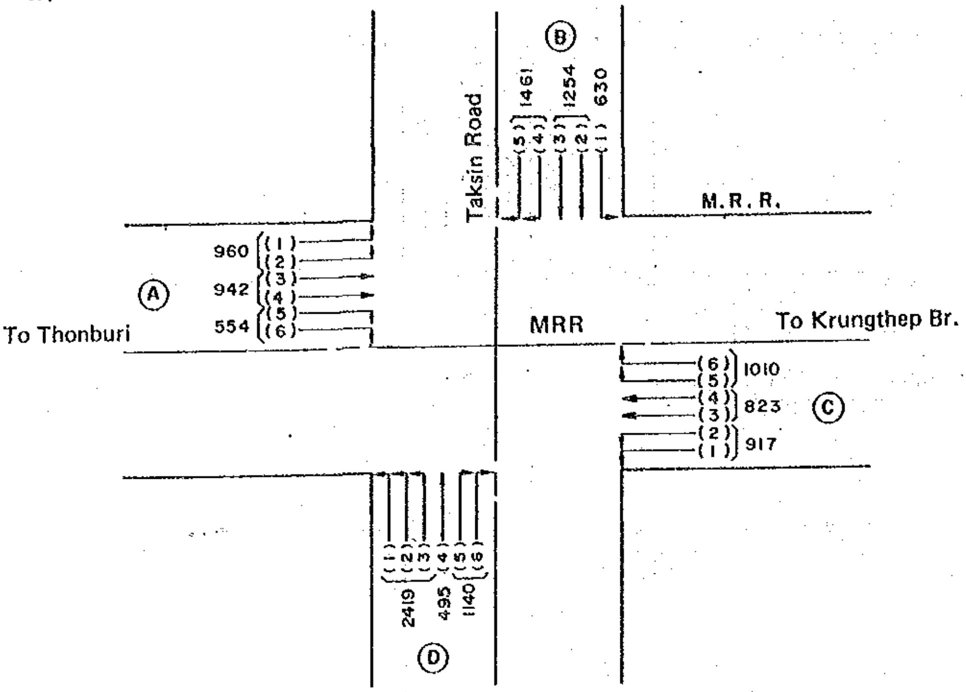
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree
A ①	(1)	2000	397	0.20	
	(2)	2000	397	0.20	
	(3)	2200	478	0.22	
	(4)	2200	478	0.22	
	(5)	2000	244	0.12	
	(6)	2000	244	0.12	
B ③	(1)	2000	299	0.15	
	(2)	2000	299	0.15	
	(3)	2200	442	0.20	
④	(4)	2000	493	0.25	
	(5)	2000	493	0.25	
C ②	(1)	2000	458	0.23	Phase1 0.22
	(2)	2000	458	0.23	Phase2 0.25
	(3)	2200	404	0.18	Phase3 0.22
	(4)	2200	404	0.18	Phase4 0.27
	(5)	2000	488	0.25	
	(6)	2000	488	0.25	0.96
D ④	(1)	2000	531	0.27	
	(2)	2000	531	0.27	
③	(3)	2200	475	0.22	
	(4)	2200	390	0.20	
	(5)	2000	390	0.20	
	(6)	2000	390	0.20	
Total					0.96 < 1.0

Intersection "C" in 2011

a) Forecasted Traffic Volume (PCH/H)



b) Calculation of Traffic Saturation Degree

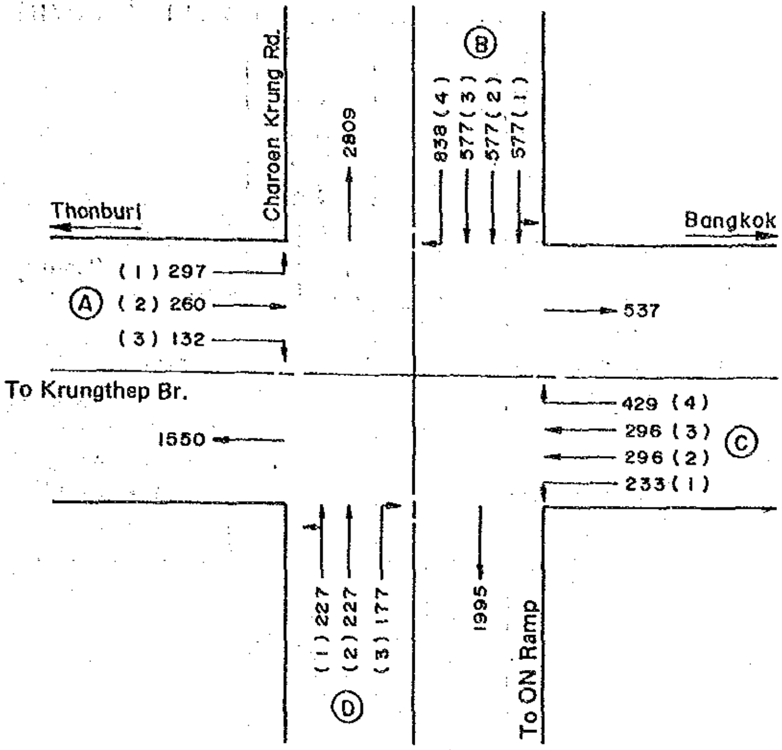
Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree
A	① (1)	2000	480	0.24	
	(2)	2000	480	0.24	
	(3)	2200	471	0.21	
	(4)	2200	471	0.21	
	② (5)	2000	277	0.14	
	(6)	2000	277	0.14	
B	③ (1)	2000	630	0.32	
	(2)	2200	627	0.29	
	(3)	2200	627	0.29	
	④ (4)	2000	731	0.37	
	(5)	2000	731	0.37	
C	① (1)	2000	459	0.23	Phase1 0.24
	(2)	2000	459	0.23	Phase2 0.25
	(3)	2200	412	0.19	Phase3 0.40
	(4)	2200	412	0.19	Phase4 0.37
	② (5)	2000	505	0.25	
	(6)	2000	505	0.25	1.26
D	③ (1)	2000	806	0.40	
	(2)	2000	806	0.40	
	(3)	2000	806	0.40	
	(4)	2200	495	0.23	
	④ (5)	2000	570	0.23	
	(6)	2000	570	0.23	
Total					1.26 > 1.0

Appendix 9.4.2 Calculation of Saturation Degree for Examination of At-Grade Intersection (A, B and C Intersection).

"A" Intersection

a) Forecasted Traffic Volume in 2011 (PCU/H)



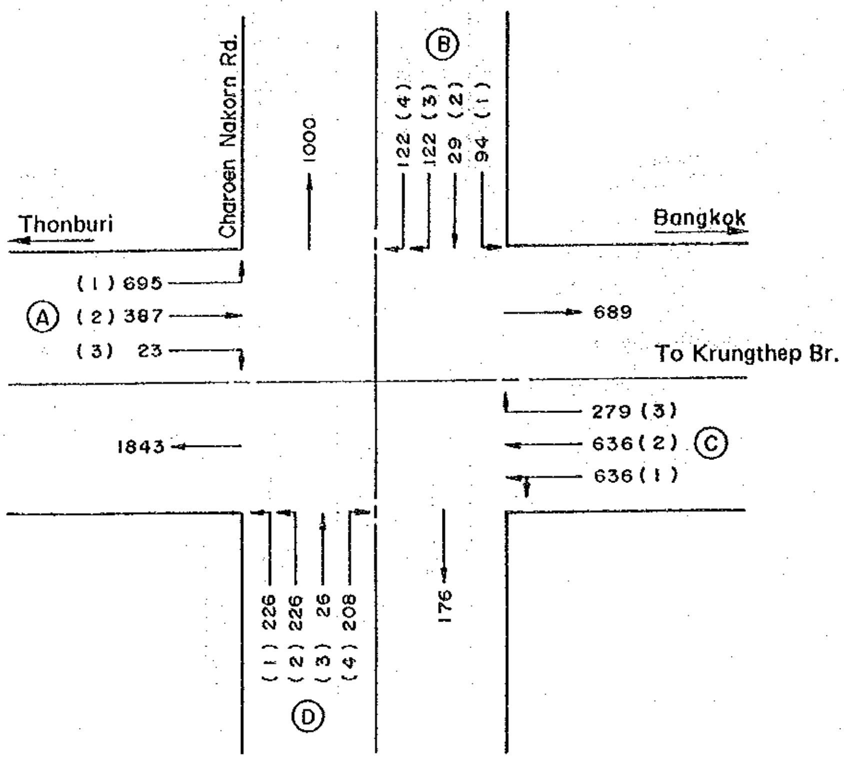
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree	
A	(1)	2000	297	Free		
	(2)	2200	260	0.12		
	(3)	2000	132	0.06		
B	(1)	2105	577	0.27		
	(2)	2105	577	0.27		
	(3)	2105	577	0.27		
	(4)	2000	838	0.42		
C	(1)	2000	233	0.11	Phase1	0.12
	(2)	2200	296	0.13	Phase2	0.21
	(3)	2200	296	0.13	Phase3	0.42
	(4)	2000	429	0.21	Phase4	0.11
D	(1)	2035	227	0.11		0.86
	(2)	2035	227	0.11		
	(3)	2000	177	0.09		
Total					0.86 < 0.90	

"B" Intersection

a) Forecasted Traffic Volume in 2011 (PCU/H)



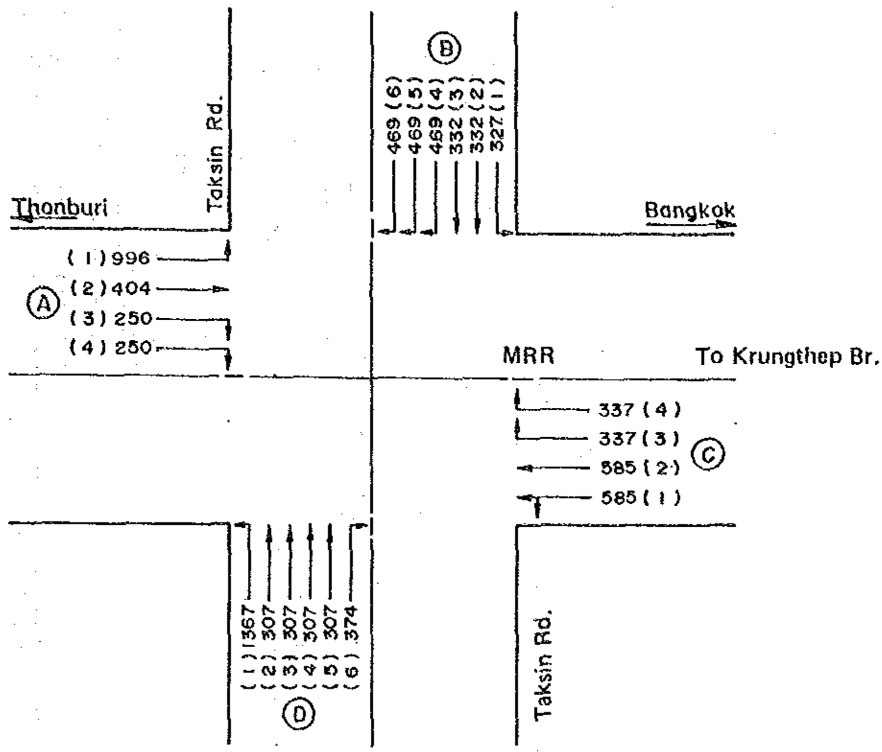
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree	
A	(1)	2000	695	Free		
	(2)	2200	387	0.18		
	(3)	2000	23	0.01		
B	(1)	2000	94	0.05		
	(2)	2200	29	0.01		
	(3)	2000	122	0.06		
	(4)	2000	122	0.06		
C	(1)	2145	636	0.30	Phase1	0.30
	(2)	2145	636	0.30	Phase2	0.14
	(3)	2000	279	0.14	Phase3	0.11
D	(1)	2000	226	0.11	Phase4	0.10
	(2)	2000	226	0.11		0.65
	(3)	2200	26	0.01		
	(4)	2000	208	0.10		
Total					0.65 < 0.90	

"C" Intersection

a) Forecasted Traffic Volume in 2011 (PCU/H)



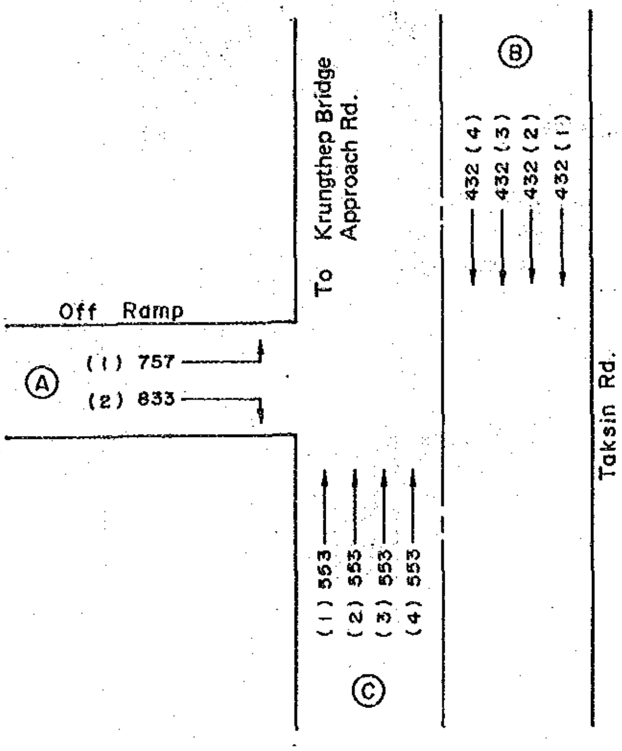
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree	
A	(1)	2000	996	Free		
	(2)	2200	404	0.18		
	(3)	2000	250	0.13		
	(4)	2000	250	0.13		
B	(1)	2000	327	0.16		
	(2)	2200	332	0.15		
	(3)	2200	332	0.15		
	(4)	2000	469	0.23		
	(5)	2000	469	0.23		
	(6)	2000	469	0.23		
C	(1)	2035	585	0.29	Phase1	0.29
	(2)	2035	585	0.29	Phase2	0.17
	(3)	2000	337	0.17	Phase3	0.14
	(4)	2000	337	0.17	Phase4	0.23
D	(1)	2000	1367	Free		0.83
	(2)	2200	307	0.14		
	(3)	2200	307	0.14		
	(4)	2200	307	0.14		
	(5)	2200	307	0.14		
	(6)	2000	374	0.19		
Total						0.83 < 0.90

"C-1" Intersection

a) Forecasted Traffic Volume in 2011 (PCU/H)



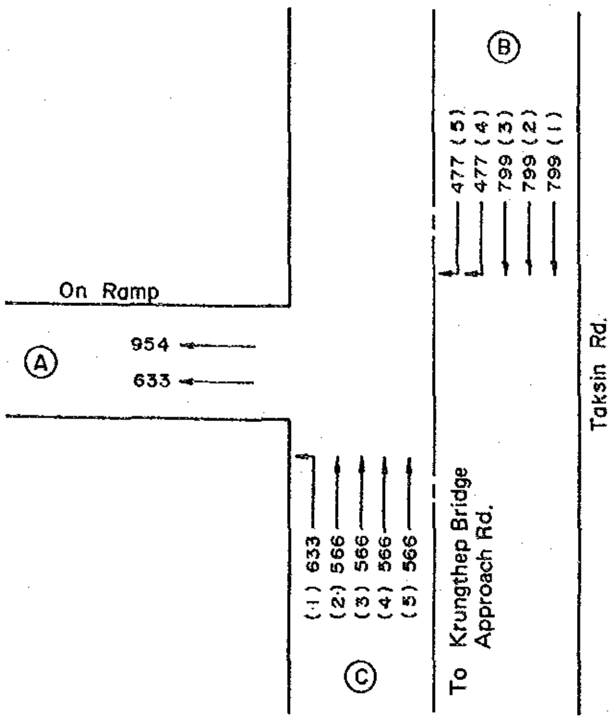
b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree
A	(1)	2000	757	0.38	
	(2)	2000	833	0.42	
B	(1)	2200	432	0.20	Phase1 0.42
	(2)	2200	432	0.20	Phase2 0.25
	(3)	2200	432	0.20	
	(4)	2200	432	0.20	0.67
C	(1)	2200	553	0.25	
	(2)	2200	553	0.25	
	(3)	2200	553	0.25	
	(4)	2200	553	0.25	
Total					0.67 < 0.90

"C-2" Intersection

a) Forecasted Traffic Volume in 2011 (PCU/H)

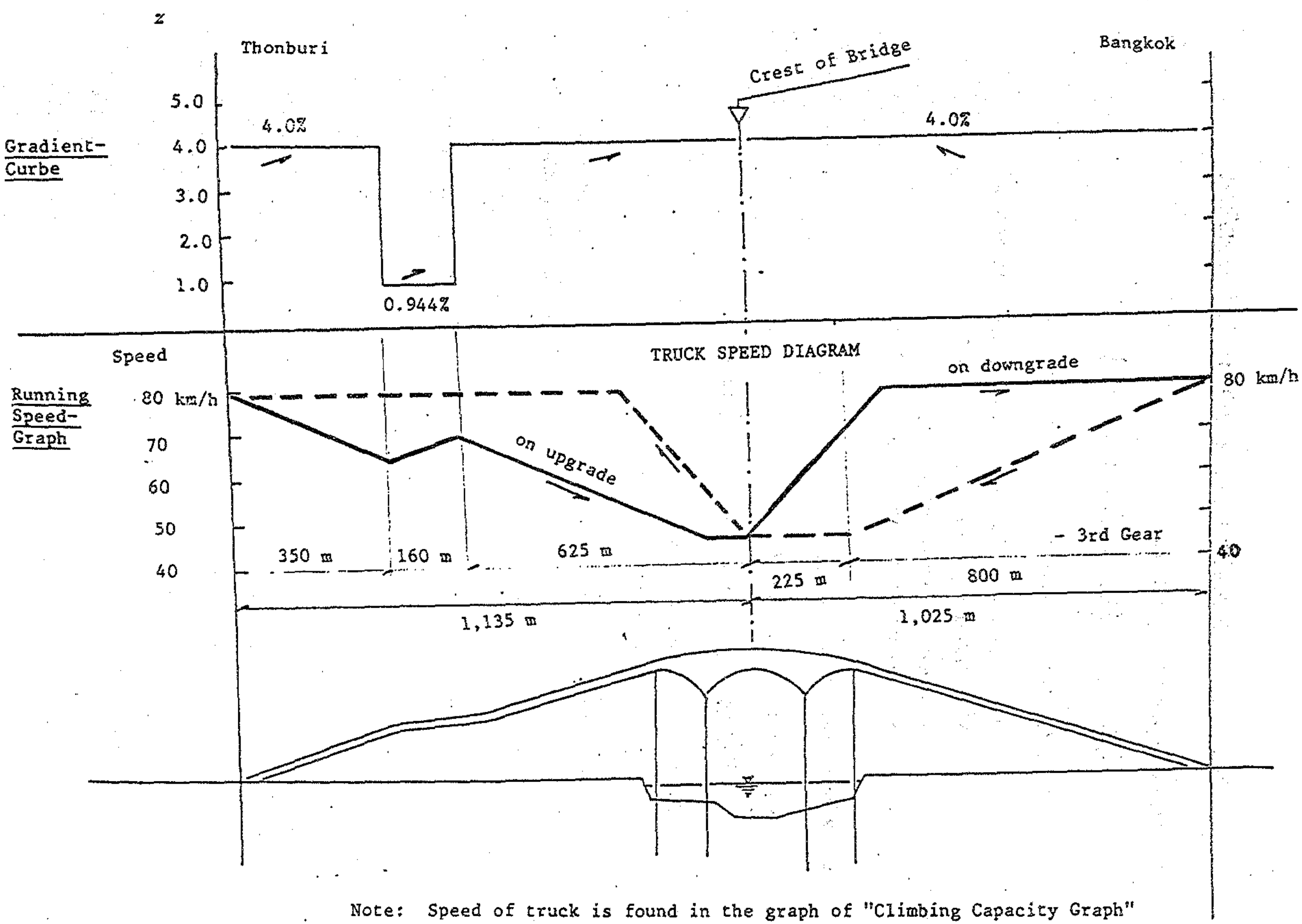


b) Calculation of Traffic Saturation Degree

Capacity and saturation degree

Section		Capacity(A) V/H	Future Traffic Volume(B) V/H	Saturation Degree B/A	Maximum Saturation Degree
B	(1)	2200	799	0.36	
	(2)	2200	799	0.36	
	(3)	2200	799	0.36	
	(4)	2000	477	0.24	
	(5)	2000	477	0.24	
C	(1)	2000	633	Free	Phase1 0.36
	(2)	2200	566	0.26	Phase2 0.26
	(3)	2200	566	0.26	
	(4)	2200	566	0.26	0.62
	(5)	2200	566	0.26	
Total					0.62 < 0.90

Appendix 9.4.3 Running Speed of Truck on upgrade of 4.0%



Note: Speed of truck is found in the graph of "Climbing Capacity Graph" of Road Design Manual issued by Japan Road Association in 1983.

Theoretical Possibility to Climb with Speed of 45 km/hour

A. Engine power (T) by 3rd gear

$$T = \frac{270}{V} \cdot H \cdot E \left\{ 1.2 - 1.3 \left(\frac{v}{V} - 0.6\right)^2 \right\}$$

$= \underline{54.2 \text{ kg/ton}}$ (power per loading ton)

where, H : Engine horse power per loading ton: 13 PS/ton
E : Efficiency of engine power, 0.7*
v : Running speed, 45 km/hour
V : Maximum speed by 3rd gear, 45 km/hour

B. Running resistance (R) on 4.0% grade

$$R = 10 + 10\, i + 0.0015\, v^2$$

$= \underline{53.2 \text{ kg/ton}}$ (power per loading ton)

where, i : Gradient %, 4.0
v : Running speed, 45 km/hour

Based on the above calculation, the engine power (T) by 3rd gear (54.2 kg/ton) exceeds the running resistance (R) on 4.0% grade (53.2 kg/ton): $T > R$.

Note:
1. The efficiency of engine power for 3rd gear is adopted at 0.7 considering the conditions of trucks is Thailand.
2. Engine hourse power per loading ton in Japan:
   11 ton truck, 13.2 - 15.0 PS/ton
   8 ton truck, 13.1 - 13.4 PS/ton
   6 ton truck, 12.0 - 14.4 PS/ton
   4 ton truck, 16.8 - 18.2 PS/ton
3. 1.0 PS = 75 kgf.m/s

Appendix 9.4.4 Examination of the Distance among Intersections "C", "C-1" and "C-2"

Examination of the Distance among Intersections

Distances among intersections were examined from the following points:

- The layout of three (3) intersections which consist of the Taksin Intersection is shown in sheet No. 1/47 in Drawing Volume, the distance from C-1 to C being 215 m, and from C to C-2 165 m, respectively;
- The detailed layout of the At-Grade Intersection "C" is shown in sheet No. 19/47 in Drawing Volume, there are clearly shown the number of lane by directions and the length of storage lanes for right turning within the total length of 100 m toward C-1 from C, and toward C-2 from C respectively. The scale of above intersection was determined based on the storage lane-length required, with its details are shown hereinafter; and
- On the other hand, the examination on weaving length required on the Taksin road was neglected because the effect of traffic from/into ramps is to be controlled by signals as same as the case of the road without ramps.

Details of the Storage Length required

The traffic data by directions at the C-intersection has been indicated in Appendix 9.4.2, and using these traffic volumes the length of storage lane required at morning peak period were examined by the following formulas:

$$L = 1.5 \times N \times S$$

where, L : Length of storage lane required
N : Number of cars flowing during a cycle time from Green signal to the next Green signal
S : Length occupied by a car in the storage lane, 7.0 m

$$N = qc / 3600$$

where, q : Traffic volume per hour per lane at morning peak
C : Cycle time of the Green required

$C \geqq 0.9\ T\ /\ (0.9 - R)$

where, T : Clearance loss time estimated, 10 sec.

R : Saturation flow rate estimated, 0.65

The cycle time is, therefore, calculated to be about 40 sec, the storage lane lengths required based on these formulas are less than the actual distances as shown in the Table below, therefore, no trouble in traffic flows at these intersections will happen.

Table Storage Lane Length Required

Flow	Traffic by Direction	Number of Lane	q (PCU/h)	N (NOS)	1.5xS (m)	L (m)	Distance (m)
B	L: 327	1	327	4	10.5	42	< 165
	C: 664	2	332	4	10.5	42	
	R: 1,407	3	469	5	10.5	53	
D	L: 1,367	1	1,367	15	10.5	158*	< 215
	C: 1,228	4	307	4	10.5	42	
	R: 374	1	374	4	10.5	42	
E	L: -	-	-	-			< 215
	C: 1,848	4	462	5	10.5	53	
	R: -	-	-	-			
H	L: 633	1	633	7	10.5	74	< 165
	C: 2,264	3	754	8	10.5	84	
	R: -	-	-	-			
F	L: 757	2	379	4	10.5	42	< 70
	C: -						
	R: 833	2	417	5	10.5	53	

Note

L: Left turning traffic flow

C: Straight traffic flow

R: Right turning traffic flow

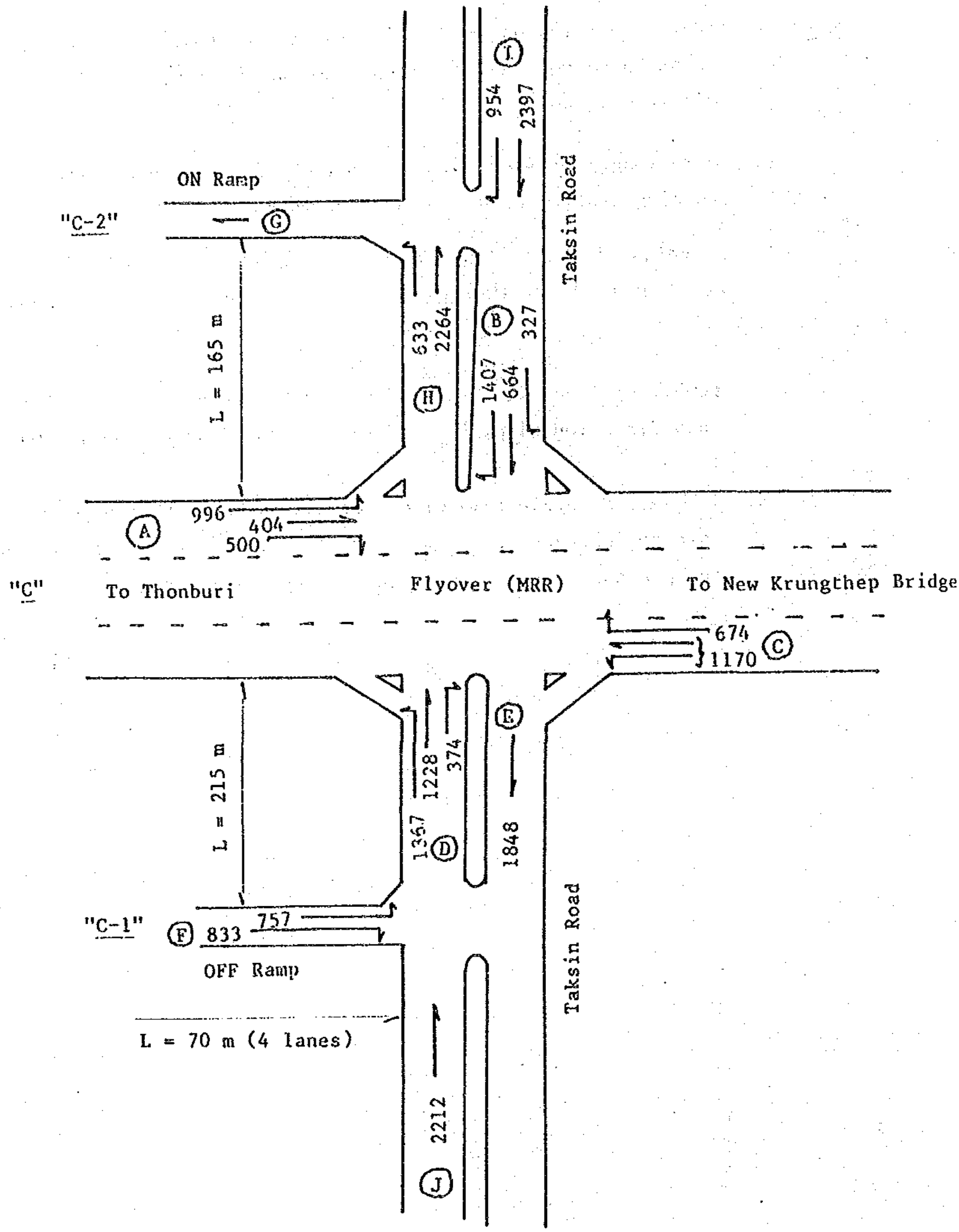
Note: 1. Traffic volumes on the Taksin road shown above are already accumulated volumes of inflow from the Off Ramp of C-1 or the Middle Ring Road.

*2. More longer or full Green cycle time will be given to the left turning traffic at D-flow by channelization.

3. A sketch of these flows is attached in the next page, however, other details are the subjects to the future Detailed Design.

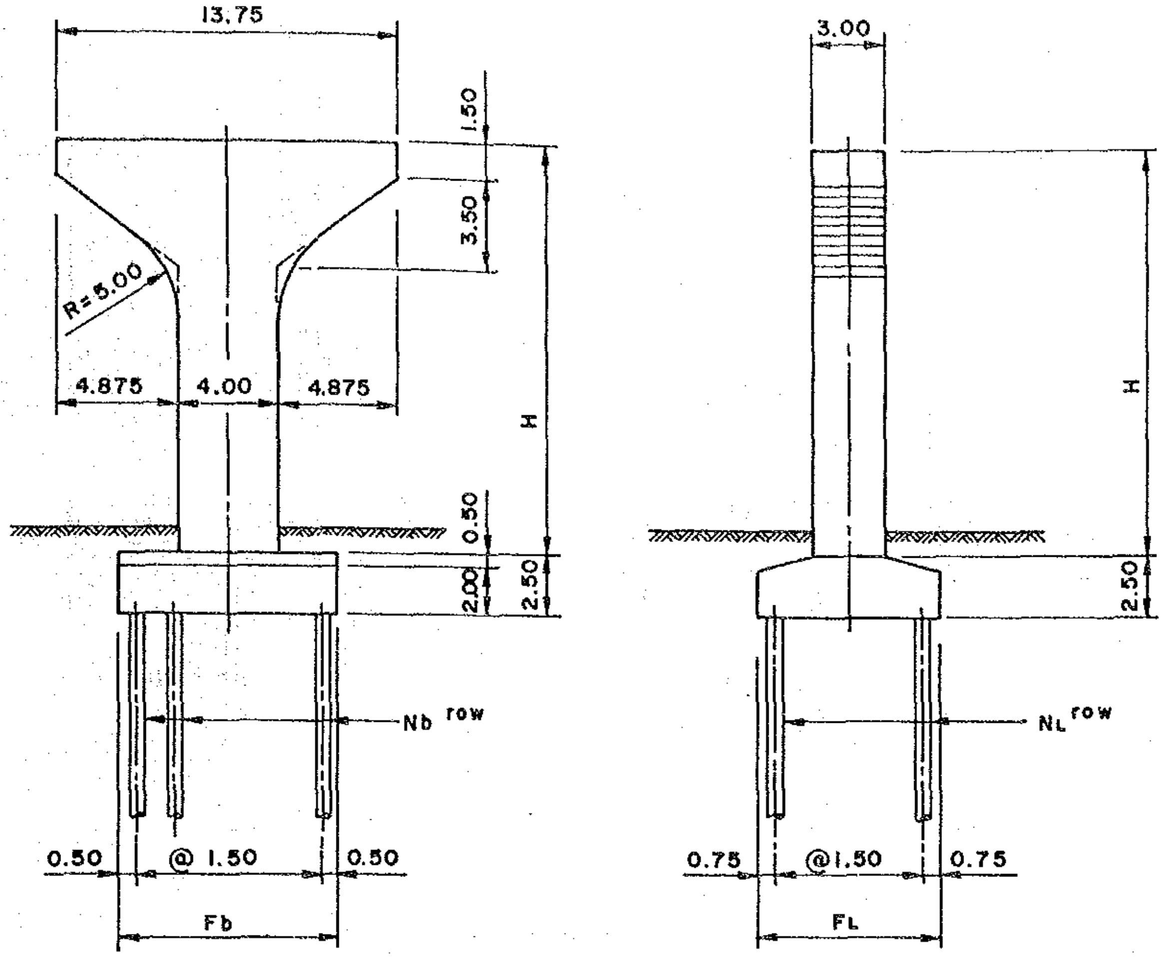
4. Number of lanes for straging on the OFF Rump is 2 lanes for each direction with 70 m length from the edge of Taksin road.

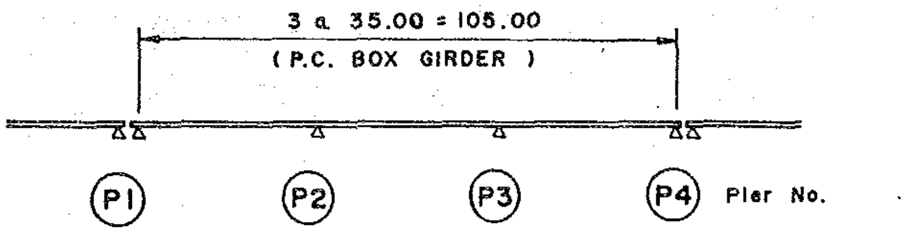
5. A theorized cycle time of 40 sec discussed in this paper may be able to increase up to max. 90 sec, if required, provided that the present intersection plan is kept as proposed.



Turning Movement (2011)
(Morning Peak Hour)

Appendix 9.5.1 Relationship Between Height of Pier and Number of Pile

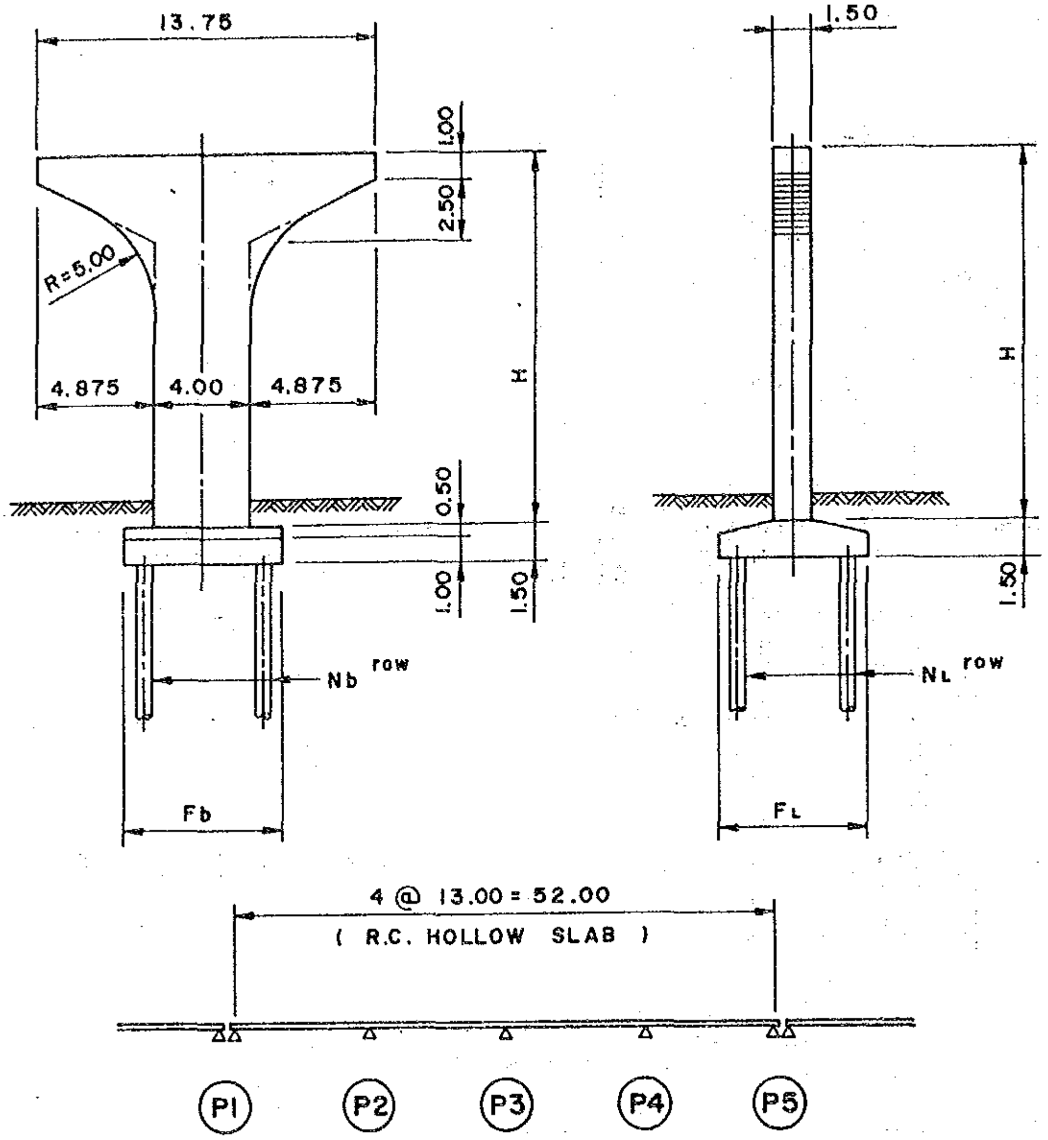




NOTE : N = NOS OF PILE

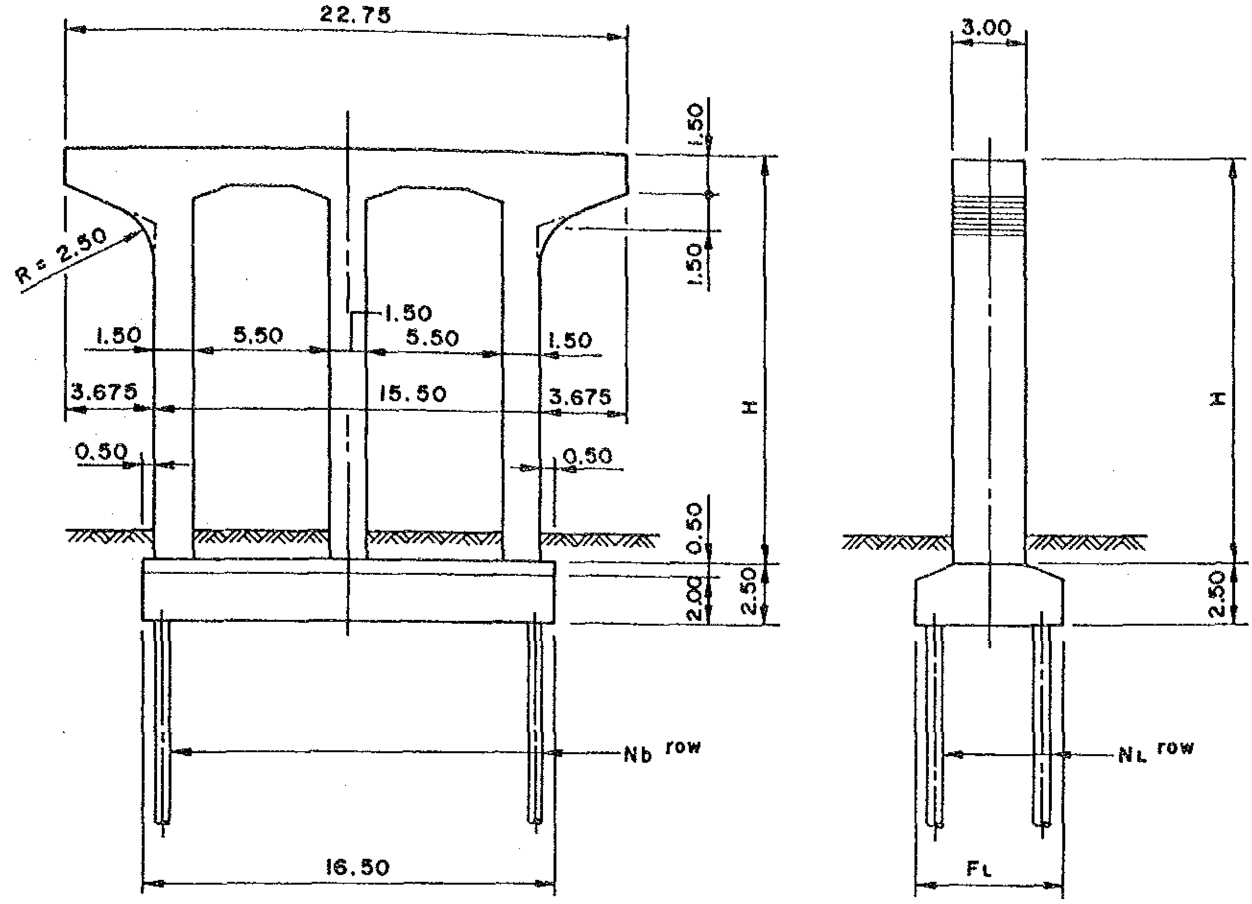
Pier NO.	Pier Height (m) — 10, 15, 20, 25, 30			
P1, P4	Fb x FL (m)	7.50 x 6.00	7.50 x 7.50	9.00 x 7.50
	Nb x NL (row)	5 x 4	5 x 5	6 x 5
	N	20	25	30
P2, P3	Fb x FL	7.50 x 7.50	9.00 x 7.50	9.00 x 9.00
	Nb x NL	5 x 5	6 x 5	6 x 6
	N	25	30	36

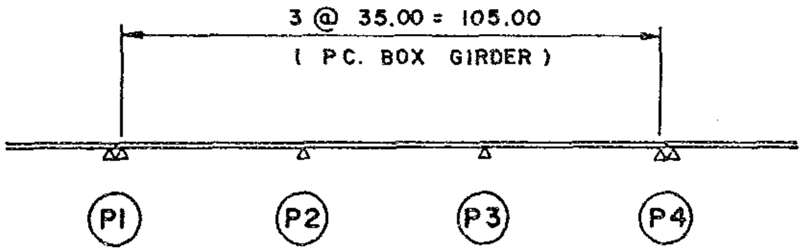
PIERS FOR PC BOX GIRDER



Pier No. \ Pier Height (m)		5	10	15
P1, P5	Fb x FL (m)	6.00 x 3.00	6.00 x 4.50	6.00 x 4.50
	Nb x NL (row)	4 x 2	4 x 3	4 x 3
	N	8	10	12
P2, P3, P4	Fb x FL		6.00 x 4.50	6.00 x 4.50
	Nb x NL		4 x 3	4 x 3
	N		10	12

PIERS FOR RC. HOLLOW SLAB





NOTE : N = NOS OF PILE.

Pier Height (m): 10, 15, 20, 25

Pier No.					
P1, P4	16.50 x FL (m)	16.50 x 4.50	16.50x4.50	16.50 x 6.00	16.50 x 6.00
	Nb x NL (row)	10 x 3	11 x 3	9 x 4	10 x 4
	N	30	33	36	40

Pier No.					
P2 P3	16.50 x FL	16.50 x 6.00	16.50 x 6.00	16.50 x 6.00	16.50x6.00
	Nb x NL	9 x 4	10 x 4	11 x 4	10 x 5
	N	36	40	44	50

PIERS NEAR INTERCHANGES

Appendix 9.7.1 Data on Cost Estimates

Table A 9.7.1 Results of Averaged Market Prince Levels Survey

Item \ Contractors		A	B	C	D	E	F	G	Lowest Price	Average Price	Rounded Price
1. Labour Costs	a) Common labour	140	108	75	80	70	140	70	70	97.6	100
Unit: Baht per day	b) Skilled labour	240	132	130	140	150	250	100	100	163.1	160
	c) Car driver	200	250	120	130	120	150	90	90	151.4	150
	d) Operater	240	360	175	200	120	250	100	100	206.4	210
	e) Foreman	600	360	175	200	200	500	120	120	307.9	310
	f) Expert worker	260	360	155	250	150	500	100	100	253.6	250
2. Material Costs	a) Portland cement	1,630	1,669	1,730	1,630	1,603	-	1,457	1,457	1,619.8	1,620
Unit of cement & steel	b) Rapid hardening cement	1,760	2,158	1,500	1,750	1,706	-	1,571	1,500	1,740.8	1,740
: Baht per ton	c) Sand	140	250	128	150	130	-	150	128	158.0	160
	d) Crushed aggregate	170	250	180	185	175	-	180	170	190.0	190
Unit of aggregate,	e) Concrete(180 kg/sq.cm)	1,050	1,000	1,030	1,050	1,035	-	1,045	1,000	1,035.0	1,040
concrete & wood	f) Concrete(240 kg/sq.cm)	1,100	1,085	1,100	1,150	1,125	-	1,135	1,085	1,115.8	1,120
: Baht per cu.m	g) PC concrete(300 kg/sq.cm)	1,200	1,175	1,200	1,230	1,210	-	1,220	1,175	1,205.8	1,210
	h) PC concrete(350 kg/sq.cm)	1,250	1,255	1,270	1,300	1,290	-	1,300	1,250	1,277.5	1,280
	i) Round bar	7,800	9,100	10,200	10,000	10,340	7,450	9,740	7,450	9,232.9	9,230
	j) Deformed bar	7,900	8,940	10,000	11,120	10,160	7,650	9,960	7,650	9,390.0	9,390
	k) PC wire	21,000	21,500	21,500	22,300	21,500	-	21,500	21,000	21,550.0	21,550
	l) PC strand	21,000	21,500	21,500	22,300	21,500	-	21,500	21,000	21,550.0	21,550
	m) PC bar	-	-	10,900	10,950	10,860	-	-	10,860	10,903.3	10,900
	n) U.I.H shaped steel	9,600	10,000	10,700	11,000	11,000	9,400	10,000	9,400	10,242.8	10,240
	o) Steel pipe	13,000	14,000	12,600	13,000	13,000	9,000	14,000	9,000	12,657.1	12,660
	p) Wood for formworks	4,900	1,500	5,000	4,550	4,790	-	4,410	1,500	4,191.7	4,190
	q) Wood for scafolding	5,100	1,500	5,500	4,550	5,295	-	4,940	1,500	4,480.8	4,480
3. Fuel Costs	a) Gasoline	8.20	9.50	9.50	9.50	9.50	-	8.20	8.20	9.06	9.10
Unit: Baht per litre	b) Diesel fuel	6.10	6.50	6.50	6.50	6.30	-	6.30	6.10	6.36	6.40
	c) Mechanical oil	27.30	25.00	-	-	-	-	26.10	25.00	26.13	26.10
4. Machine Costs	a) Bulldozer 15 ton	6,000	4,000	5,000	5,300	5,200	-	4,800	4,000	5,050.0	5,050
Unit: Baht per day	b) Wheel loader 1.4 cu.m	4,300	3,600	4,500	4,500	4,000	-	4,000	3,600	4,150.0	4,150
	c) Excavator 0.6 cu.m	4,500	2,500	4,500	5,000	4,400	-	3,700	2,500	4,100.0	4,100
	d) Dump truck 8 ton	2,000	1,300	1,500	1,800	1,600	-	2,200	1,300	1,733.3	1,730
	e) Wheel crane 25 ton	5,000	4,000	6,000	6,500	7,000	-	5,000	4,000	5,583.3	5,580

Source: The Study Team

Table A 9.7.2 Analysis of Market Prices of Construction Equipment

Machine \ Price Source	Contractors Price in BKK Baht/day	Rental Charge in BKK Baht/8hrs.	Japanese Depreciation Cost Average Charge Baht/day	Japanese Depreciation Cost Charge in Operation Baht/8hours
Bulldozer 15 ton	5,050	4,800	4,982	3,848
Wheel loader 1.4 cu.m	4,150	3,600	3,646	2,769
Excavater 0.6 cu.m	4,100	4,000	4,787	3,692
Dump truck 8 ton	1,730	1,500	1,764	1,365
Wheel crane 25 ton	5,580	7,000	8,463	5,538

Note: 1. Japanese depreciation cost is based on "Depreciation Table 1984" issued by Japan Construction Machanization Association.

2. Average daily machine charge

$$= P \times \left(\frac{D + M}{Y} + C\right) \times \frac{1}{H} \times 6 \text{ hours}$$

3. Houry charge in operation

$$= P \times \frac{1/2\ D + M}{Y} \times \frac{1}{H}$$

where: P = Present machine price
D = Depreciation cost ratio
M = Maintenance cost ratio at site and head office
Y = Life year of machine
C = Control and managing cost ratio per year
H = Standard operation hours per year

Table A 9.7.3 Custom Duty and Business Tax

Imported Goods	Custom Duty Rate of Duty 1 CIF x %	Custom Duty Unit Bht.	Business Tax Rate of Standard Profit %	Business Tax Rate of Busines Tax %	Business Tax Rate of Tax %
Portland cement	10	Ton 80	-	-	-
(Cement clinker)	-	-	11.0	1.5	1.8
(Petroleum crude)	25	-	-	-	-
Petroleum	-	L 0.01	Value*	9.0	19.4
Diesel	-	L 0.01	Value*	6	12.9
Lubricant oil	30	L 0.86	Value*	5.0	14.0
Asphalt	-	100kgs 1.0	11.0	5.0	6.0
(Soap)	-	-	11.0	9.0	10.8
(Explosive,Blasting)	30	-	11.0	9.0	14.0
**Wood	10	-	13.5	9.0	12.1
(Pig iron,cast iron)	6	kg 0.2	6.5	1.5	1.8
Angles & shapes	-	kg 0.4	11.0	9.0	10.8
Sheets&plates of iron or steel	-	-	11.0	9.0	10.8
**Bars of iron or steel	8	kg 0.75	5.5	9.0	11.1
Steel wire	25	kg 0.90	11.0	9.0	14.1
Machinally	30	-	16.0	9.0	14.6
**(Passenger car)	80	-	Value*	40.0	155.2
Works trucks	15	-	11.0	5.0	6.9
(Ships&vessels,more than 250ton)	30	-	-	-	-

Source: Custom Tariff of Thailand (Feb.1986)

Note:
1. Value in the above tabel means market price of properties (rate of profit: 100% or more)
2. Duty amount is calculated by CIF x Rate(%) or duty (Baht)
3. Wood, Bar or Rod of iron and passenger car are belong to the import banned items unless otherwise special licence or tax be made.

Table A 9.7.4 foreign & Local Component

Related Items	Foreign Portion	Local Portion
Saw mill,wood	2%	98%
Limestone,Rock	14%	86%
Gravel, Sand quarring	5%	95%
Petroleum refineres, Diesel,Gasolin, and Asphalt	89%	11%
Cement	5%	95%
Concrete	2%	98%
Iron & steel (pigiron ingot, shaped section)	69%	31%
Secondary steel product (angle bar, wire,tube pipe, PC tendon)	28%	72%
Stucturl metal product (bridge, tanks,building)	45%	55%
Special industrial machinery & appliances	40%	60%
Moto vehicle assembly	42%	58%
Electricity	7%	93%
Land transport	5%	95%
Ocean & water transport	4-6%	96-94%

Source: NESDB

Table A 9.7.5 Market Prices and Cost Components

Items	Average of Market Price	Cost Comonents Foreign	Local Net	Local Tax	Economic Cost Ratio
a) Labour costs (Baht per day)					
Common labour	100	-	100.0	-	100
Skilled labour(carpenter etc.)	160	-	160.0	-	100.0
Car driver(dum truck etc.)	150	-	150.0	-	100.0
Operater(bulldozer etc.)	210	-	199.0	11.0	94.8
Foreman	310	-	294.0	16.0	94.8
Expert worker(mechanics etc.)	250	-	237.0	13.0	94.8
2) Material Costs (Baht)					
Portland cement per ton	1,620	81.0	1,531	8.0	99.5
Rapid hardening cement (t)	1,740	87.0	1,644	9	99.5
Sand per cu.m	160	8.0	152	-	100.0
Crushed aggregate per cu.m	190	27	163	-	100.0
Concrete(180kg/sq.m) per cu.m	1,040	21	1,019	-	100.0
Concrete(240kg/sq.m) per cu.m	1,120	22	1,098	-	100.0
Concrete(300kg/sq.m) per cu.m	1,210	24	1,186	-	100.0
Concrete(350kg/sq.m) per cu.m	1,280	26	1,254	-	100.0
Interlocking block each	3.50	0.07	3.12	0.31	91.0
Concrete block 0.4x0.4 each	8.00	0.16	7.12	0.72	91.0
Curb & Gutter per m.	135.00	2.70	120.2	12.10	91.0
Curb stone per m.	42.00	0.80	37.40	3.80	91.0
RC pile 0.22x0.22 per m.	477.00	77.10	384.40	15.50	96.8
PC pile O 0.60 per m.	1,000	20	890	90	91.0
Round bar per ton	9,230	6,369	1,645	1,216	86.8
Deformed bar per ton	9,390	6,479	1,674	1,237	86.8
PC wire per ton	21,550	6,034	13,159	2,359	89.1
PC strand per ton	21,550	6,034	13,159	2,359	89.1
PC bar per ton	10,900	7,521	1,942	1,437	86.8
U.I.H shaped steel per ton	10,240	7,066	1,824	1,350	86.8
Steel pipe per ton	12,660	3,545	8,732	383.0	97.0
Wood for formworks (cu.m)	4,190	84	4,106	-	100.0
Wood for scafolding (cu.m)	4,480	90	4,390	-	100.0
Asphalt concrete per ton	1,200*	120	1,000	80	93.3
Steel bridge structure (t)	36,500*	14,600	19,923	1,977	94.6
Cast iron structure (t)	225,000*	155,250	57,640	12,110	94.6
3) Fuel Costs (Baht per litres)					
Gasoline	9.10	6.80	1.0	1.30	85.7
Diesel fuel	6.40	4.80	0.7	0.90	85.9
Mechanical oil	26.10	19.50	2.8	3.80	85.4
4) Machine Costs (Baht per day)					
Bulldozer (15 ton)	5,050	2,778	1,033	1,239	75.5
Wheel loader (1.4 cu.m)	4,150	2,283	849	1,018	75.5
Excavator (0.6 cu.m)	4,100	2,255	839	1,006	75.5
Dump truck (8 ton)	1,730	727	844.0	159.0	90.8
Wheel crane (25 ton)	5,580	3,069	1,142	1,369	75.5

Note: r),s),t) these prices obtained from the recent contract documents

Appendix 9.7.2 New Krungthep Bridge Construction Project
Financial/Economic Construction Cost

Table A.9.7.6 (1) New Krungthep Bridge Construction Project

Financial/Economic Construction Cost Table

(New Krungthep Bridge Main & Approach)

Item No.	Work Item	Unit	Quantity	Financial Unit Price	Component (%) F	Component (%) L	Component (%) Tax	Financial Amount	Economic Amount
	1. Main Bridge Work	m	442.0						
B-5	Cast-in-place RC pile 2.0 m dia	m	4,256	23,922	45.7	54.3	10.3	101,812,032	91,325,000
B-3	Precast PC pile 60 cm dia	m	4,374	1,559	22.5	77.5	13.3	6,819,066	5,912,000
B-2	Bridge Excavation	cu.m	1,922	251	51.0	49.0	16.3	482,422	403,000
B-7	Concrete of Pile cap P29 & P30	cu.m	5,514	2,104	24.6	75.4	5.9	11,601,456	10,916,000
B-6	Concrete of Substructure	cu.m	4,608	1,508	11.3	88.7	3.3	6,948,864	6,719,000
B-8	Formwork for Substructure	sq.m	5,090	551	58.1	41.9	9.8	2,804,590	2,529,000
B-9	Re-bar for Substructure	ton	1,861	12,577	62.0	38.0	12.6	23,405,797	20,456,000
B-10	Stone Pitching against Scouring	cu.m	25,514	403	35.2	64.8	6.7	10,282,142	9,593,000
B-11	Precast Curtain Wall of P29 & P30	sq.m	592	1,372	37.8	62.2	5.5	812,224	767,000
B-12	PC Concrete for Main Bridge	cu.m	13,888	3,730	35.6	64.4	10.3	51,802,240	46,466,000
B-15	Re-bar for Superstructure	ton	1,607	13,115	61.8	38.2	12.7	21,075,805	18,399,000
B-16	PC Tendon for Main Bridge	ton	1,266	51,151	20.7	79.3	8.0	64,757,166	59,576,000
B-24	Guardrail, Double Leaf	m	442	653	27.1	72.9	3.1	288,626	279,000
B-25	Expansion Joint, Rubber	m	36	9,220	65.8	34.2	12.8	331,920	289,000
B-27	Bearing, Cast iron	ton	60	130,567	67.6	32.4	12.7	7,834,020	6,839,000
B-29	Concrete curb & Railing	m	884	1,816	22.8	77.2	4.9	1,605,344	1,526,000
B-30	Concrete Median Strip	m	442	609	31.8	68.2	8.2	269,178	247,000
R-8	Bridge Wearing Course	sq.m	6,851	197	20.3	79.7	8.6	1,349,647	1,233,000
	Sub total				39.2	60.8	9.8	314,282,539	283,474,000
	2. Approach Bridge	m	787 + 635 = 1,422						
B-3	Precast PC pile 60 cm dia	m	35,555	1,559	22.5	77.5	13.3	55,430,245	48,058,000
B-2	Bridge Excavation	cu.m	17,074	251	51.0	49.0	16.3	4,285,574	3,587,000
B-6	Concrete of Substructure	cu.m	19,348	1,508	11.3	88.7	3.3	29,176,784	28,213,000
B-8	Formwork for Substructure	sq.m	19,826	551	58.1	41.9	9.8	10,924,126	9,853,000
B-9	Re-bar for Substtructure	ton	3,088	12,577	62.0	38.0	12.6	38,837,776	33,944,000
B-13	PC Concrete for PC Box Bridge	cu.m	18,309	5,030	40.1	59.9	12.4	92,094,270	80,674,000
B-14	RC Concrete for Hollowed Bridge	cu.m	3,874	4,272	38.2	61.8	10.1	16,549,728	14,878,000
B-15	Re-bar for Superstructure	ton	2,851	13,115	61.8	38.2	12.7	37,390,865	32,642,000
B-17	PC Tendon for PC Box Bridge	ton	1,731	54,242	21.8	78.2	8.5	93,892,902	85,912,000
B-24	Guardrail, double Leaf	m	1,420	653	27.1	72.9	3.1	927,260	898,000
B-25	Expansion Joint, Rubber	m	330	9,220	65.8	34.2	12.8	3,042,600	2,653,000
B-28	Bearing, Neoprene	Each	322	11,671	69.6	30.4	12.2	3,758,062	3,299,000
B-29	Concrete Curb & Railing	m	2,840	1,816	22.8	77.2	4.9	5,157,440	4,904,000
B-30	Concrete Median Strip	m	1,420	609	31.8	68.2	8.2	864,780	793,000
R-8	Bridge Wearing Course	sq.m	25,604	197	20.3	79.7	8.6	5,043,988	4,610,000
	Subtotal				35.7	64.3	10.7	397,376,400	354,918,000

Continued to 3. Interchange & Access Road...

Table A 9.7.6 (2) New Krungthep Bridge Construction Project

Financial/Economic Construction Cost Table

(New Krungthep Bridge Main & Approach)

Item No.	Work Item	Unit	Quantity	Financial Unit Price	Component (%) F	L	Tax	Financial Amount	Economic Amount
	3. Interchange & Access Road	m	126 + 229 = 355						
B-3	Precast PC Pile 60 cm dia	m	9,326	1,559	22.5	77.5	13.3	14,539,234	12,605,000
B-4	Precast RC Pile 2 x 22 sq.cm	m	9,600	856	32.6	67.4	11.3	8,217,600	7,289,000
B-1	Structure Excavation	cu.m	4,589	197	44.2	55.8	17.8	904,033	743,000
R-3	Embankment, Sand	cu.m	13,500	283	46.8	53.2	12.0	3,820,500	3,362,000
B-6	Concrete of Substructure	cu.m	1,357	1,508	11.3	88.7	3.3	2,046,356	1,978,000
B-20	RC Concrete for Road Structure	cu.m	3,623	1,477	10.6	89.4	2.9	5,351,171	5,195,000
B-8	Formwork for Substructure	sq.m	14,613	551	58.1	41.9	9.8	8,051,763	7,262,000
B-9	Re-bar for Substructure	ton	846	12,577	62.0	38.0	12.6	10,640,142	9,299,000
B-13	PC Concrete for PC Box Bridge	cu.m	1,704	5,030	40.1	59.9	12.4	8,571,120	7,508,000
B-17	PC Tendon for PC Box Bridge	ton	160	54,242	21.8	78.2	8.5	8,678,720	7,941,000
B-14	RC Concrete for Hollowed Bridge	cu.m	1,060	4,272	38.2	61.8	10.1	4,528,320	4,070,000
B-15	Re-bar of Superstructure	ton	415	13,115	61.8	38.2	12.7	5,442,725	4,751,000
B-25	Expansion Joint, Rubber	m	49	9,220	65.8	34.2	12.8	451,780	393,000
B-28	Bearing, Neoprene	Each	62	11,671	69.6	30.4	12.2	723,602	635,000
B-29	Concrete Curb & Railing	m	1,350	1,816	22.8	77.2	4.9	2,451,600	2,331,000
R-8	Bridge Wearing Course	sq.m	4,471	197	20.3	79.7	8.6	880,787	805,000
B-21	Heightening Girder of Exist.Bridge	sq.m	1,253	4,389	45.8	54.2	11.4	5,499,417	4,872,000
B-22	Widening of Exist. Bridge	sq.m	1,008	8,721	30.3	69.7	10.7	8,790,768	7,850,000
R-7	Frontage/Rampway Pavement	sq.m	11,492	448	16.5	83.5	4.5	5,148,416	4,916,000
R-9	Sidewalk Block	sq.m	12,840	201	12.9	87.1	10.0	2,580,840	2,322,000
R-10	Island Block	sq.m	16,675	193	30.1	69.9	8.8	3,218,275	2,935,000
R-11	Curb & Gutter	m	3,024	409	21.3	78.7	7.6	1,236,816	1,142,000
R-12	Curb Stone	m	4,118	111	15.3	84.7	7.7	457,098	421,000
R-19	Drainage Pipe O 0.60	m	520	3,514	8.3	91.7	2.0	1,827,280	1,790,000
R-20	Drainage Ditch U-0.5 x 0.5	m	948	1,746	8.6	91.4	2.0	1,655,208	1,622,000
R-22	Drainage manhole	Each	40	12,453	14.4	85.6	3.2	498,120	482,000
R-23	Traffic Signs	Each	5	33,354	28.0	72.0	2.9	166,770	161,000
R-24	Lane Marking	sq.m	2,235	70.0	67.7	32.3	13.1	156,450	135,000
R-25	Traffic Signals	Each	9	208,535	27.8	72.2	2.9	1,876,815	1,822,000
R-26	Bridge Lighting Pole	Each	155	28,806	30.8	69.2	5.3	4,464,930	4,228,000
R-2	Removal of Existings	cu.m	3,750	824	44.2	55.8	17.3	3,090,000	2,555,000
	Subtotal				34.6	65.4	10.0	125,966,656	113,421,000
	Itemized Cost Total (1 + 2 + 3)				36.8	63.2	10.2	837,625,595	751,813,000
T-1	4. Temporary Works	L.S	1		47.2	52.8	15.5	233,000,000	196,885,000
	Direct Cost Total				39.1	60.9	8.9	1,070,625,595	948,698,000
H-1	5. Over Head	L.S	1	-	45.5	54.5	35.6	314,448,750	202,504,000
	Total Construction Cost		about		40.5	59.5	16.9	1,385,074,345	1,151,202,000
	Physical Contingency	%	7.5		40.5	59.5	16.9	114,925,655	95,503,000
	Total				40.5	59.5	16.9	1,500,000,000	1,246,705,000

Table A 9.7.7 Land Acquisition and Compensation for New Krungthep Bridge

(Unit: Baht, October 1986 prices)

Location & Area	Financial Cost	Component (%) F	L	Tax	Economic Cost
1) Land Acquisition					
Thonburi Side West of Taksin Road (1,623.5 sq.wah)	76,710,375	-	100	4.8	73,057,500
Near Chinese Shrine (299.5 sq.wah)	6,289,500	-	100	4.8	5,990,000
Bangkok Side Near Customs Training Center (414.3 sq.wah)	10,874,062	-	100	4.8	10,356,250
Along Charoen Krung Road (1,064.8 sq.wah)	44,719,500	-	100	4.8	42,590,000
South of River Side Road (582.3 sq.wah)	21,397,687	-	100	4.8	20,378,750
Contingency (about 15%)	23,008,876	-	100	1.7	22,627,500
Subtotal	183,000,000	-	100	4.2	175,000,000
2) Building&Housing Compensation					
Thonburi Side West of Taksin Rd.(1,534 sq.m)	5,489,925	-	100	4.8	5,228,500
Near Shrine (456 sq.m)	1,436,400	-	100	4.8	1,368,000
Bangkok Side Near Training Center (1,094 sq.m)	3,843,000	-	100	4.8	3,660,000
South of River Side Rd. (1,348 sq.m)	4,668,195	-	100	4.8	4,445,900
Along Charoen Krung Rd. (7,754 sq.m)	28,348,950	-	100	4.8	26,999,000
Contingency (about 25%)	8,213,530	-	100	4.8	8,298,600
Subtotal	52,000,000	-	100	4.0	50,000,000
Total	235,000,000	-	100	4.1	225,000,000

Table A 9.7.8 Annual Maintenance Cost for Cement Concrete Surface Road

(Unit: Baht, October 1986 prices)

Work Items	Financial Cost	Component (%) F	L	Tax	Economic Cost
Estimate per 10 km for a year					
1) Daily maintenance Slope grass cutting & transportation	170,460	14.5	85.5	4.8	162,360
2) Seasonal maintenance after flood period Drainage work & lane marking	89,620	30.6	69.4	8.3	82,220
Total per 10 km	260,080	20.0	80.0	6.0	244,580
Total per km	26,008	20.0	80.0	6.0	24,458

Table A 9.7.9 Annual Maintenance Cost for Viaduct or Bridge

(Unit: Baht, October 1986 prices)

Work Items	Financial Cost	Component (%) F	L	Tax	Economic Cost
Estimate per 1.0 km elevated road for a year					
1) Daily Inspection	105,660	23.4	76.6	7.2	98,100
2) Annual Maintenance					
Repair of pavement	11,600	27.5	72.5	9.3	10,520
Repair of lighting pole, Concrete curb & railing, median strip, and guard rail	20,858	26.6	73.4	4.9	19,828
Replace of expansion joint	32,428	67.5	32.5	12.1	28,488
3) Electricity Charge	29,500	7.0	83.0	10.0	27,000
Total per km	200,046	27.7	72.3	8.1	183,936

Table A 9.7.10 Annual Maintenance Cost for Main PC River Crossing Bridge

(Unit: Baht, October 1986 prices)

Work Items	Financial Cost	Component (%) F	L	Tax	Economic Cost
Estimate per 1.0 km main bridge for a year					
1) Annual Maintenance Cost of Viaduct Road (Table A 9.7.9)	200,046	27.7	72.3	8.1	183,936
2) Additional Maintenance					
Periodical inspection	50,000	-	100.0	2.6	48,700
Repair of bearing, girder concrete surface, pier curtain wall	186,835	40.4	59.6	7.2	170,922
Stone pitching	63,267	33.7	66.3	6.6	59,073
Total per km	500,148	33.2	66.8	7.5	403,558

Appendix 9.8.1 Cost and Benefit Stream of New Krungthep Bridge

ECONOMIC EVALUATION

New Krungthep Bridge Project (Basic Case)

Discount Rate (%) = 12.0

UNIT : million Baht

YEAR	COST	BENEFIT	DISCOUNTED COST	DISCOUNTED BENEFIT
0	0.	0.	0.	0.
1	266.	0.	238.	0.
2	444.	0.	354.	0.
3	449.	0.	320.	0.
4	447.	0.	284.	0.
5	1.	144.	0.	82.
6	1.	228.	0.	116.
7	1.	312.	0.	141.
8	1.	397.	0.	160.
9	1.	481.	0.	173.
10	1.	565.	0.	182.
11	1.	650.	0.	187.
12	1.	734.	0.	188.
13	1.	818.	0.	187.
14	1.	903.	0.	185.
15	1.	987.	0.	180.
16	1.	900.	0.	147.
17	1.	814.	0.	119.
18	1.	727.	0.	95.
19	1.	640.	0.	74.
20	1.	554.	0.	57.
21	1.	467.	0.	43.
22	1.	381.	0.	31.
23	1.	294.	0.	22.
24	1.	207.	0.	14.
25	-910.	121.	-54.	7.

NET PRESENT VALUE = 1247.
B/C RATIO = 2.09

IRR= 20.71

ECONOMIC EVALUATION

New Krungthep Bridge Project (Cost up 15%)

Discount Rate (%) = 12.0

UNIT : million Baht

			DISCOUNTED	
YEAR	COST	BENEFIT	COST	BENEFIT
0	0.	0.	0.	0.
1	306.	0.	273.	0.
2	511.	0.	407.	0.
3	516.	0.	367.	0.
4	514.	0.	327.	0.
5	1.	144.	0.	82.
6	1.	228.	0.	116.
7	1.	312.	0.	141.
8	1.	397.	0.	160.
9	1.	481.	0.	173.
10	1.	565.	0.	182.
11	1.	650.	0.	187.
12	1.	734.	0.	188.
13	1.	818.	0.	187.
14	1.	903.	0.	185.
15	1.	987.	0.	180.
16	1.	900.	0.	147.
17	1.	814.	0.	119.
18	1.	727.	0.	95.
19	1.	640.	0.	74.
20	1.	554.	0.	57.
21	1.	467.	0.	43.
22	1.	381.	0.	31.
23	1.	294.	0.	22.
24	1.	207.	0.	14.
25	-1046.	121.	-62.	7.

NET PRESENT VALUE = 1075.
B/C RATIO = 1.82

IRR= 18.86

ECONOMIC EVALUATION

New Krungthep Bridge Project (Benefit less 15%)

Discount Rate (%) = 12.0

UNIT : million Baht

			DISCOUNTED	
YEAR	COST	BENEFIT	COST	BENEFIT
0	0.	0.	0.	0.
1	266.	0.	238.	0.
2	444.	0.	354.	0.
3	449.	0.	320.	0.
4	447.	0.	284.	0.
5	1.	122.	0.	69.
6	1.	194.	0.	98.
7	1.	265.	0.	120.
8	1.	337.	0.	136.
9	1.	409.	0.	147.
10	1.	480.	0.	155.
11	1.	553.	0.	159.
12	1.	624.	0.	160.
13	1.	695.	0.	159.
14	1.	768.	0.	157.
15	1.	839.	0.	153.
16	1.	765.	0.	125.
17	1.	692.	0.	101.
18	1.	618.	0.	80.
19	1.	544.	0.	63.
20	1.	471.	0.	49.
21	1.	397.	0.	37.
22	1.	324.	0.	27.
23	1.	250.	0.	18.
24	1.	176.	0.	12.
25	-910.	103.	-54.	6.

NET PRESENT VALUE = 888.
B/C RATIO = 1.78

IRR= 18.57