APPENDIX 17-1
ANALYSIS ON REMAINING LIFE AND COSTS

TABLE 1

PCC Reconstruction by Lane

Lane	Traffic Loading Class	CBR = / K = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Heavy Loaded Lane	B	x =	18.5	19.6	14.4	14.8	15.2	15.7	16.1
		D =	25.0	25.0	23.0	23.0	23.0	23.0	23.0
		C1 =	2006	2006	1912	1912	1912	1912	1912
		C2 =	2222	2199	2246	2242	2204	2199	2173
	C	x =	18.9	19.9	20.8	21.2	21.5	22.1	22.4
		D =	28.0	28.0	28.0	28.0	28.0	28.0	28.0
		C1 =	2147	2147	2147	2147	2147	2147	2147
		C2 =	2369	2345	2325	2309	2307	2292	2290
	D	x =	17.5	18.4	19.2	14.3	14.6	15.1	15.3
		D =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1 =	2240	2240	2240	2147	2147	2147	2147
		C2 =	2500	2472	2448	2518	2515	2470	2467
	E	x =	21.0	21.9	14.9	15.2	15.5	15.9	16.2
		D =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1 =	2381	2381	2240	2240	2240	2240	2240
		C2 =	2551	2545	2619	2574	2570	2565	2535
	F	x =	15.9	16.7	17.3	17.6	17.9	18.3	18.6
		D =	33.0	33.0	33.0	33.0	33.0	33.0	33.0
		C1 =	2381	2381	2381	2381	2381	2381	2381
		C2 =	2723	2686	2654	2651	2649	2623	2621
	G	x =	17.1	17.9	18.5	14.3	14.6	15.0	15.2
		D =	35.0	35.0	35.0	33.0	33.0	33.0	33.0
		C1 =	2475	2475	2475	2381	2381	2381	2381
		C2 =	2758	2751	2722	2789	2785	2780	2732
	H	x =	14.6	15.3	15.8	12.1	12.3	12.6	12.9
		D =	35.0	35.0	35.0	33.0	33.0	33.0	33.0
		C1 =	2475	2475	2475	2381	2381	2381	2381
		C2 =	2894	2837	2829	2968	2947	2941	2923
	I	x =	12.7	13.3	13.9	14.1	14.3	14.7	14.9
		D =	35.0	35.0	35.0	35.0	35.0	35.0	35.0
		C1 =	2475	2475	2475	2475	2475	2475	2475
		C2 =	3057	2982	2959	2914	2898	2893	2889
	J	x =	11.3	11.8	12.3	12.6	12.8	13.1	13.3
		D =	35.0	35.0	35.0	35.0	35.0	35.0	35.0
		C1 =	2475	2475	2475	2475	2475	2475	2475
		C2 =	3181	3147	3064	3060	3056	2986	2983

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 2

PCC Reconstruction by Lane

Lane	Traffic Loading Class	CBR = / K = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Light Loaded Lane (xp=1)	A	xp =	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		x' =	20.1	21.4	22.5	23.0	23.5	14.2	14.5
		D' =	23.0	23.0	23.0	23.0	23.0	20.0	20.0
		C1' =	1416	1416	1416	1416	1416	1276	1276
		C2' =	1387	1371	1357	1347	1345	1393	1382
	B	xp =	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		x' =	17.9	19.0	13.9	14.3	14.7	15.2	15.6
		D' =	25.0	25.0	23.0	23.0	23.0	23.0	23.0
		C1' =	1510	1510	1416	1416	1416	1416	1416
		C2' =	1527	1504	1563	1525	1521	1493	1491
	C	xp =	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		x' =	18.3	19.3	20.2	20.6	20.9	21.5	21.8
		D' =	28.0	28.0	28.0	28.0	28.0	28.0	28.0
		C1' =	1651	1651	1651	1651	1651	1651	1651
		C2' =	1638	1617	1598	1596	1594	1579	1577
	D	xp =	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		x' =	17.0	17.8	18.6	13.9	14.2	14.6	14.8
		D' =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1' =	1744	1744	1744	1651	1651	1651	1651
		C2' =	1774	1747	1723	1804	1770	1756	1752
	E	xp =	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		x' =	20.4	21.3	14.4	14.7	15.0	15.4	15.7
		D' =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1' =	1885	1885	1744	1744	1744	1744	1744
		C2' =	1807	1788	1851	1847	1815	1811	1809
	F	xp =	1.0	1.0	1.0	1.0	1.0	1.0	1.0
		x' =	15.4	16.2	16.8	17.1	17.4	17.8	18.1
		D' =	33.0	33.0	33.0	33.0	33.0	33.0	33.0
		C1' =	1885	1885	1885	1885	1885	1885	1885
		C2' =	1948	1915	1910	1884	1882	1879	1857

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 3

PCC Reconstruction by Lane

Lane	Traffic Loading Class	CBR = / K = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Light Loaded Lane (xp=2)	A	xp =	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		x' =	19.5	20.8	21.9	22.4	22.9	13.7	14.1
		D' =	23.0	23.0	23.0	23.0	23.0	20.0	20.0
		C1' =	1416	1416	1416	1416	1416	1276	1276
		C2' =	1225	1209	1195	1185	1183	1239	1215
	B	xp =	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		x' =	17.4	18.4	13.5	13.9	14.2	14.7	15.1
		D' =	25.0	25.0	23.0	23.0	23.0	23.0	23.0
		C1' =	1510	1510	1416	1416	1416	1416	1416
		C2' =	1338	1317	1373	1361	1335	1331	1308
	C	xp =	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		x' =	17.8	18.7	19.6	20.0	20.3	20.9	21.2
		D' =	28.0	28.0	28.0	28.0	28.0	28.0	28.0
		C1' =	1651	1651	1651	1651	1651	1651	1651
		C2' =	1449	1427	1409	1407	1393	1390	1378
	D	xp =	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		x' =	16.4	17.3	18.0	13.4	13.7	14.1	14.4
		D' =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1' =	1744	1744	1744	1651	1651	1651	1651
		C2' =	1553	1528	1507	1583	1570	1539	1536
	E	xp =	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		x' =	19.8	20.7	14.0	14.3	14.5	14.9	15.2
		D' =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1' =	1885	1885	1744	1744	1744	1744	1744
		C2' =	1591	1572	1649	1618	1615	1611	1585
	F	xp =	2.0	2.0	2.0	2.0	2.0	2.0	2.0
		x' =	14.9	15.6	16.3	16.6	16.9	17.3	17.5
		D' =	33.0	33.0	33.0	33.0	33.0	33.0	33.0
		C1' =	1885	1885	1885	1885	1885	1885	1885
		C2' =	1732	1699	1670	1668	1666	1642	1640

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 4

PCC Reconstruction by Lane

Lane	Traffic Loading Class	CBR = / K = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Light Loaded Lane (xp=3)	A	xp =	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		x' =	19.0	20.2	21.3	21.8	22.3	13.3	13.6
		D' =	23.0	23.0	23.0	23.0	23.0	20.0	20.0
		C1' =	1416	1416	1416	1416	1416	1276	1276
		C2' =	1083	1059	1046	1044	1042	1090	1086
	B	xp =	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		x' =	16.8	17.9	13.0	13.4	13.8	14.3	14.6
		D' =	25.0	25.0	23.0	23.0	23.0	23.0	23.0
		C1' =	1510	1510	1416	1416	1416	1416	1416
		C2' =	1187	1166	1200	1196	1193	1169	1167
	C	xp =	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		x' =	17.2	18.2	19.0	19.4	19.8	20.3	20.6
		D' =	28.0	28.0	28.0	28.0	28.0	28.0	28.0
		C1' =	1651	1651	1651	1651	1651	1651	1651
		C2' =	1269	1249	1233	1230	1228	1215	1213
	D	xp =	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		x' =	15.9	16.8	17.5	13.0	13.2	13.6	13.9
		D' =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1' =	1744	1744	1744	1651	1651	1651	1651
		C2' =	1378	1354	1332	1408	1378	1373	1370
	E	xp =	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		x' =	19.3	20.1	13.5	13.8	14.1	14.4	14.7
		D' =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1' =	1885	1885	1744	1744	1744	1744	1744
		C2' =	1390	1373	1446	1443	1416	1412	1410
	F	xp =	3.0	3.0	3.0	3.0	3.0	3.0	3.0
		x' =	14.4	15.2	15.8	16.1	16.3	16.7	17.0
		D' =	33.0	33.0	33.0	33.0	33.0	33.0	33.0
		C1' =	1885	1885	1885	1885	1885	1885	1885
		C2' =	1517	1487	1482	1459	1457	1454	1452

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 5

PCC Reconstruction by Lane

Lane	Traffic Laoding Class	CBR = / k = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Light Loaded Lane (xp=4)	A	xp =	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		x' =	18.4	19.6	20.7	21.2	21.7	12.8	13.2
		D' =	23.0	23.0	23.0	23.0	23.0	20.0	20.0
		C1' =	1416	1416	1416	1416	1416	1276	1276
		C2' =	950	935	923	921	920	978	957
	B	xp =	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		x' =	16.3	17.3	12.6	13.0	13.3	13.8	14.1
		D' =	25.0	25.0	23.0	23.0	23.0	23.0	23.0
		C1' =	1510	1510	1416	1416	1416	1416	1416
		C2' =	1041	1022	1075	1072	1049	1045	1026
	C	xp =	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		x' =	16.7	17.6	18.4	18.8	19.2	19.7	20.0
		D' =	28.0	28.0	28.0	28.0	28.0	28.0	28.0
		C1' =	1651	1651	1651	1651	1651	1651	1651
		C2' =	1125	1105	1089	1086	1074	1071	1061
	D	xp =	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		x' =	15.4	16.3	17.0	12.5	12.8	13.2	13.5
		D' =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1' =	1744	1744	1744	1651	1651	1651	1651
		C2' =	1208	1185	1180	1236	1232	1205	1203
	E	xp =	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		x' =	18.7	19.5	13.1	13.3	13.6	14.0	14.2
		D' =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1' =	1885	1885	1744	1744	1744	1744	1744
		C2' =	1226	1209	1269	1266	1263	1260	1237
	F	xp =	4.0	4.0	4.0	4.0	4.0	4.0	4.0
		x' =	14.0	14.7	15.3	15.6	15.8	16.2	16.5
		D' =	33.0	33.0	33.0	33.0	33.0	33.0	33.0
		C1' =	1885	1885	1885	1885	1885	1885	1885
		C2' =	1352	1323	1297	1295	1293	1272	1270

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 6

PCC Reconstruction by Lane

Lane	Traffic Loading Class	CBR = K = Mr =	3 130 4000	4 170 5000	6 210 6000	8 230 7000	10 250 8000	15 290 12000	20 300 15000
Light Loaded Lane (xp=5)	A	xp =	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		x' =	17.9	19.0	20.1	20.6	21.0	12.4	12.7
		D' =	23.0	23.0	23.0	23.0	23.0	20.0	20.0
		C1' =	1416	1416	1416	1416	1416	1276	1276
		C2' =	842	820	816	814	813	862	860
	B	xp =	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		x' =	15.8	16.8	12.2	12.5	12.9	13.4	13.7
		D' =	25.0	25.0	23.0	23.0	23.0	23.0	23.0
		C1' =	1510	1510	1416	1416	1416	1416	1416
		C2' =	926	908	947	944	941	920	918
	C	xp =	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		x' =	16.2	17.1	17.9	18.3	18.6	19.1	19.4
		D' =	28.0	28.0	28.0	28.0	28.0	28.0	28.0
		C1' =	1651	1651	1651	1651	1651	1651	1651
		C2' =	986	968	963	951	949	937	935
	D	xp =	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		x' =	15.0	15.7	16.4	12.1	12.4	12.8	13.0
		D' =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1' =	1744	1744	1744	1651	1651	1651	1651
		C2' =	1075	1053	1034	1086	1083	1079	1057
	E	xp =	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		x' =	18.1	19.0	12.6	12.9	13.2	13.5	13.8
		D' =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1' =	1885	1885	1744	1744	1744	1744	1744
		C2' =	1071	1065	1136	1133	1109	1106	1103
	F	xp =	5.0	5.0	5.0	5.0	5.0	5.0	5.0
		x' =	13.5	14.2	14.8	15.1	15.3	15.7	15.9
		D' =	33.0	33.0	33.0	33.0	33.0	33.0	33.0
		C1' =	1885	1885	1885	1885	1885	1885	1885
		C2' =	1186	1159	1154	1134	1132	1129	1127

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1': Initial Construction Cost (pesos/meter/lane)
C2,C2': Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 7

PCC Reconstruction by Lane

Lane	Traffic Laoding Class	CBR = / K = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Both Lane (xp=1, at Light Loaded Lane)	I/E	x =	12.7	13.3	13.9	14.1	14.3	14.7	14.9
		D =	35.0	35.0	35.0	35.0	35.0	35.0	35.0
		C1 =	2475	2475	2475	2475	2475	2475	2475
		C2+C2' =	4864	4770	4810	4761	4713	4704	4698
	G/D	x =	17.1	17.9	18.5	14.3	14.6	15.0	15.2
		D =	35.0	35.0	35.0	33.0	33.0	33.0	33.0
		C1 =	2475	2475	2475	2381	2381	2381	2381
		C2+C2' =	4532	4498	4445	4593	4555	4536	4484
	E/D	x =	21.0	21.9	14.9	15.2	15.5	15.9	16.2
		D =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1 =	2381	2381	2240	2240	2240	2240	2240
		C2+C2' =	4325	4292	4342	4378	4340	4321	4287
	D/C	x =	17.5	18.4	19.2	14.3	14.6	15.1	15.3
		D =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1 =	2240	2240	2240	2147	2147	2147	2147
		C2+C2' =	4138	4089	4046	4114	4109	4049	4044

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 8

PCC Reconstruction by Lane

Lane	Traffic Laoding Class	CBR = / k = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Both Lane (xp=2, at Light Loaded Lane)	I/E	x =	12.7	13.3	13.9	14.1	14.3	14.7	14.9
		D =	35.0	35.0	35.0	35.0	35.0	35.0	35.0
		C1 =	2475	2475	2475	2475	2475	2475	2475
		C2+C2' =	4648	4554	4608	4532	4513	4504	4474
	G/D	x =	17.1	17.9	18.5	14.3	14.6	15.0	15.2
		D =	35.0	35.0	35.0	33.0	33.0	33.0	33.0
		C1 =	2475	2475	2475	2381	2381	2381	2381
		C2+C2' =	4311	4279	4229	4372	4355	4319	4268
	E/D	x =	21.0	21.9	14.9	15.2	15.5	15.9	16.2
		D =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1 =	2381	2381	2240	2240	2240	2240	2240
		C2+C2' =	4104	4073	4126	4157	4140	4104	4071
	D/C	x =	17.5	18.4	19.2	14.3	14.6	15.1	15.3
		D =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1 =	2240	2240	2240	2147	2147	2147	2147
		C2+C2' =	3949	3899	3857	3925	3908	3860	3845

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 9

PCC Reconstruction by Lane

Lane	Traffic Loading Class	CBR = / K = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Both Lane (xp=3, at Light Loaded Lane)	I/E	x =	12.7	13.3	13.9	14.1	14.3	14.7	14.9
		D =	35.0	35.0	35.0	35.0	35.0	35.0	35.0
		C1 =	2475	2475	2475	2475	2475	2475	2475
		C2+C2' =	4447	4355	4405	4357	4314	4305	4299
	G/D	x =	17.1	17.9	18.5	14.3	14.6	15.0	15.2
		D =	35.0	35.0	35.0	33.0	33.0	33.0	33.0
		C1 =	2475	2475	2475	2381	2381	2381	2381
		C2+C2' =	4136	4105	4054	4197	4163	4153	4102
	E/D	x =	21.0	21.9	14.9	15.2	15.5	15.9	16.2
		D =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1 =	2381	2381	2240	2240	2240	2240	2240
		C2+C2' =	3929	3899	3951	3982	3948	3938	3905
	D/C	x =	17.5	18.4	19.2	14.3	14.6	15.1	15.3
		D =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1 =	2240	2240	2240	2147	2147	2147	2147
		C2+C2' =	3769	3721	3681	3748	3743	3685	3680

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1': Initial Construction Cost (pesos/meter/lane)
C2,C2': Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 10

PCC Reconstruction by Lane

Lane	Traffic Laoding Class		CBR =	3	4	6	8	10	15	20
			K =	130	170	210	230	250	280	300
			Mr =	4000	5000	6000	7000	8000	12000	15000
Both Lane (xp=4, at Light Loaded Lane)	I/E		x =	12.7	13.3	13.9	14.1	14.3	14.7	14.9
			D =	35.0	35.0	35.0	35.0	35.0	35.0	35.0
			C1 =	2475	2475	2475	2475	2475	2475	2475
			C2+C2' =	4283	4191	4228	4180	4161	4153	4126
	G/D		x =	17.1	17.9	18.5	14.3	14.6	15.0	15.2
			D =	35.0	35.0	35.0	33.0	33.0	33.0	33.0
			C1 =	2475	2475	2475	2381	2381	2381	2381
			C2+C2' =	3966	3936	3902	4025	4017	3985	3935
	E/D		x =	21.0	21.9	14.9	15.2	15.5	15.9	16.2
			D =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
			C1 =	2381	2381	2240	2240	2240	2240	2240
			C2+C2' =	3759	3730	3799	3810	3802	3770	3738
	D/C		x =	17.5	18.4	19.2	14.3	14.6	15.1	15.3
			D =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
			C1 =	2240	2240	2240	2147	2147	2147	2147
			C2+C2' =	3625	3577	3537	3604	3589	3541	3528

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

TABLE 11

PCC Reconstruction by Lane

Lane	Traffic Loading Class	CBR = / K = / Mr =	3 / 130 / 4000	4 / 170 / 5000	6 / 210 / 6000	8 / 230 / 7000	10 / 250 / 8000	15 / 280 / 12000	20 / 300 / 15000
Both Lane (xp=5, at Light Loaded Lane)	I/E	x =	12.7	13.3	13.9	14.1	14.3	14.7	14.9
		D =	35.0	35.0	35.0	35.0	35.0	35.0	35.0
		C1 =	2475	2475	2475	2475	2475	2475	2475
		C2+C2' =	4128	4047	4095	4047	4007	3999	3992
	G/D	x =	17.1	17.9	18.5	14.3	14.6	15.0	15.2
		D =	35.0	35.0	35.0	33.0	33.0	33.0	33.0
		C1 =	2475	2475	2475	2381	2381	2381	2381
		C2+C2' =	3833	3804	3756	3875	3868	3859	3789
	E/D	x =	21.0	21.9	14.9	15.2	15.5	15.9	16.2
		D =	33.0	33.0	30.0	30.0	30.0	30.0	30.0
		C1 =	2381	2381	2240	2240	2240	2240	2240
		C2+C2' =	3626	3598	3653	3660	3653	3644	3592
	D/C	x =	17.5	18.4	19.2	14.3	14.6	15.1	15.3
		D =	30.0	30.0	30.0	28.0	28.0	28.0	28.0
		C1 =	2240	2240	2240	2147	2147	2147	2147
		C2+C2' =	3486	3440	3411	3469	3464	3407	3402

Analysis Period : 25 years
x ,x' : Initial Performance Period (years)
D ,D' : Thickness of Slab (cm)
C1,C1' : Initial Construction Cost (pesos/meter/lane)
C2,C2' : Total Discounted Cost including Maintenance Cost (pesos/meter/lane)
xp : Period until Rehabilitation is needed (years)

APPENDICES FOR CHAPTER 21

APPENDIX 21-1

UNIT COST ANALYSIS OF MAJOR PAY ITEMS

Item	107	B o r r o w
	108	Aggregate Subbase
	200-1	Mechanically Stabilized Base Course
	200-2	Crushed Aggregate Base Course
	205	Bituminous Plant Mix Base Course
	310	Bituminous Concrete Surface Course
	316	Portland Cement Concrete Pavement
	405-A	Class A Concrete
	405-B	Class B Concrete
	509	Perforated PVC Pipe (Under Drain)
	SPL-1	Masonry Side Ditch (MSD-1)
	SPL-3	Concrete Side Ditch (CSD-1)

TABLE 1

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN - PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 107 NAME OF ITEM B O R R O W

QUANTITY : 3,090 m^3

UNIT PRICE: ₱88.20/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Equipment							
1 - Bulldozer, 21t, 200 HP	6.0	days	5,600.00	23,520.00	5,040.00	5,040.00	33,600.00
8 - Dumptrucks, 11t, 190 HP	6.5	days	1,904.00	69,305.60	14,851.20	14,851.20	99,008.00
1 - Wheel Loader, 1.24 m^3, 80 HP	6.5	days	2,464.00	11,211.20	2,402.40	2,402.40	16,016.00
1 - Sheepsfoot Roller, 5-8t	5.0	days	2,072.00	7,252.00	1,554.00	1,554.00	10,360.00
1 - Bulldozer, 11t, 110 HP	5.0	days	4,312.00	15,092.00	3,234.00	3,234.00	21,560.00
1 - Tire Roller, 15t, 106 HP	5.0	days	1,792.00	6,272.00	1,344.00	1,344.00	8,960.00
2 - Grader, Motorized, 110 HP	3.0	days	3,024.00	12,700.80	2,721.60	2,721.60	18,144.00
1 - Water Truck, 6000 lit.	1.0	days	4,536.00	3,175.20	680.40	680.40	4,536.00
Sub-Total				148,528.80	31,827.60	31,827.60	212,184.00
2. Labor							
1 - Foreman	10	days	140.40	-	1,221.48	182.52	1,404.00
4 - Unskilled Laborer	10	days	66.80	-	2,538.40	133.60	2,672.00
Sub-Total				-	3,759.88	316.12	4,076.00

21-1 (1)

Table 1 (cont'd)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN - PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 107 NAME OF ITEM B O R R O W

QUANTITY : 3,090 m^3

UNIT PRICE: ₱88.20/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
3. Misc. (5% of 1 + 2)				7,426.44	1,779.37	1,607.19	10,813.00
Total (1 + 2 + 3)				155,955.24	37,366.85	33,750.91	227,073.00
Unit Cost		m^3		50.47	12.10	10.93	73.50
4. Overhead and Profit: 20%		m^3		10.09	2.42	2.19	14.70
Total Unit Cost		m^3		60.56	14.52	13.12	88.20
%				69%	16%	15%	100%

21-1 (2)

TABLE 2

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 108 NAME OF ITEM AGGREGATE SUBBASE (t = 20 cm)

QUANTITY : 563 m^3

UNIT PRICE: ₱208.55/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Material							
Screened Aggregate	563	m^3	88.45	31,372.33	11,453.39	6,971.63	49,797.35
2. Equipment							
6 - Dumptrucks, 11t, 190 HP (Haul Distance = 5 km)	15	hrs.	238.00	14,994.00	3,213.00	3,213.00	21,420.00
1 - Grader, 10t, 110 HP	15	hrs.	378.00	3,969.00	850.50	850.50	5,670.00
1 - Vibro Roller, 12t, 175 HP	15	hrs.	525.00	5,512.50	1,181.25	1,181.25	7,875.00
1 - Tire Roller, 15t, 106 HP	15	hrs.	224.00	2,352.00	504.00	504.00	3,360.00
2 - Vibratory Tamper, 80 kg, 3 HP	12	hrs.	70.00	1,176.00	252.00	252.00	1,680.00
1 - Water Truck, 6000 lit. 140 HP	3	hrs.	567.00	1,190.70	255.15	255.15	1,701.00
Sub-Total				29,194.20	6,255.90	6,255.90	41,706.00

Table 2 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 108 NAME OF ITEM AGGREGATE SUBBASE (t = 20 cm)

QUANTITY : 563 m^3

UNIT PRICE: ₱208.55/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
3. Labor							
1 - Foreman	17	hrs.	17.55	-	259.56	38.79	298.35
1 - Asst. Foreman	17	hrs.	16.50	-	244.03	36.47	280.50
2 - Skilled Laborer	17	hrs.	14.00	-	414.12	61.88	476.00
5 - Unskilled Laborer	15	hrs.	8.35	-	594.94	31.31	626.25
Sub-Total				-	1,512.65	168.45	1,681.10
4. Misc. (5% of 1 + 2 + 3)				3,028.34	961.10	669.81	4,659.25
Total (1 + 2 + 3 + 4)				63,594.87	20,183.04	14,065.79	97,843.70
Unit Cost		m^3		112.97	35.85	24.98	173.80
5. Overhead and Profit: 20%		m^3		22.59	7.17	4.99	34.75
Total Unit Cost		m^3		135.56	43.02	29.97	208.55
%				65%	21%	14%	100%

TABLE 3

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 200-1 NAME OF ITEM MECHANICALLY STABILIZED BASE COURSE (THICKNESS = 20 CM)

QUANTITY : 335 m^3

UNIT PRICE: ₱334.36/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Material							
Crushed Stone	335	m^3	146.70	30,961.03	11,303.24	6,880.23	49,144.50
2. Equipment							
10 - Dumptruck, 11t, 190 HP (Hauling Distance = 15 km)	10	hrs.	238.00	16,660.00	3,570.00	3,570.00	23,800.00
1 - Grader, 10t, 110 HP	10	hrs.	378.00	2,646.00	567.00	567.00	3,780.00
1 - Vibro Roller, 12 t, 175 HP	10	hrs.	525.00	3,675.00	787.50	787.50	5,250.00
1 - Tire Roller, 15 t, 106 HP	10	hrs.	224.00	1,568.00	336.00	336.00	2,240.00
1 - Water Truck, 6000 lit. 40 HP	5	hrs.	567.00	1,984.50	425.25	425.25	2,835.00
Sub-Total				26,533.50	5,685.75	5,685.75	37,905.00

Table 3 (cont'd)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 200-1 NAME OF ITEM MECHANICALLY STABILIZED BASE COURSE (THICKNESS = 20 CM)

QUANTITY : 335 m^3

UNIT PRICE: ₱334.36/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
3. Labor							
1 - Foreman	12	hrs.	17.55	-	183.22	27.38	210.60
2 - Skilled Laborer	12	hrs.	14.00	-	292.32	43.68	336.00
13 - Unskilled Laborer	12	hrs.	8.35	-	1,237.47	65.13	1,302.60
Sub-Total					1,713.01	136.19	1,849.20
4. Misc. (5% of 1+2+3)				2,874.73	935.10	635.11	4,444.94
Total (1+2+3+4)				60,369.26	19,637.10	13,337.28	93,343.64
Unit Cost		m^3		180.21	58.62	39.81	278.64
5. Overhead and Profit: 20%		m^3		36.04	11.72	7.96	55.72
Total Unit Cost		m^3		216.25	70.34	47.77	334.36
%				65%	21%	14%	100%

TABLE 4

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN-PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 200-2 NAME OF ITEM CRUSHED AGGREGATE BASE COURSE QUANTITY : 940 m^3

UNIT PRICE: ₱276.65/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Material							
Crushed Gravel	940	m^3	108.75	65,424.00	21,467.25	15,333.75	102,225.00
2. Equipment							
1 - Wheel Loader, 1.62 m^3, 100 HP	15	hrs.	378.00	3,969.00	850.50	850.50	5,670.00
19 - Dumptruck, 11t, 190 HP	16	hrs.	238.00	50,646.40	10,852.80	10,852.80	72,352.00
1 - Motor Grader, 10t, 110 HP	18	hrs.	378.00	4,762.80	1,020.60	1,020.60	6,804.00
1 - Vibratory Roller, 12t, 175 HP	18	hrs.	525.00	6,615.00	1,417.50	1,417.50	9,450.00
1 - Tire Roller, 10-15t	18	hrs.	224.00	2,822.40	604.80	604.80	4,032.00
1 - Water Truck, 1000 USG	9	hrs.	364.00	2,293.20	491.40	491.40	3,276.00
Sub-Total				71,108.80	15,237.60	15,237.60	101,584.00
3. Labor							
1 - Foreman	20	hrs.	17.55	-	305.37	45.63	351.00
2 - Skilled Laborer	20	hrs.	14.00	-	487.20	72.80	560.00
10 - Unskilled Laborer	20	hrs.	8.35	-	1,586.50	83.50	1,670.00
Sub-Total				-	2,379.07	201.93	2,581.00

Table 4 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN - PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 200-2 NAME OF ITEM CRUSHED AGGREGATE BASE COURSE

QUANTITY : 940 m^3

UNIT PRICE: ₱276.65/m^3

DESCRIPTION	QUANTITY/ NO OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
4. Misc. (5% of 1 + 2 + 3)				6,826.64	1,954.20	1,538.66	10,319.50
Total (1 + 2 + 3 + 4)				143,359.44	41,038.12	32,311.94	216,709.50
Unit Cost		m^3		152.51	43.66	34.38	230.55
5. Overhead and Profit: 20%		m^3		30.50	8273	6.87	46.10
Total Unit Cost		m^3		183.01	52.39	41.25	276.65
%				66%	19%	15%	100%

TABLE 5

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 205 NAME OF ITEM BITUMINOUS PLANT-MIX BASE COURSE (THICKNESS = 10 CM)

QUANTITY : 3,350.0 m^2

UNIT PRICE: ₱190.75/m^2

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Material							
Bituminous/Aggregate Material	335	m^3	1,322.15	283,468.96	31,004.42	128,446.87	442,920.25
2. Equipment							
13 - Dumptruck, 6.1 m^3, 190 HP (Haul Distance = 15 km)	15	hrs.	238.00	32,487.00	6,961.50	6,961.50	46,410.00
1 - Asphalt Finisher, 3.1 m	11	hrs.	420.00	3,234.00	693.00	693.00	4,620.00
1 - Macadam Roller, 12t, 105 HP	11	hrs.	266.00	2,048.20	438.90	438.90	2,926.00
1 - Tire Roller, 15t, 106 HP	11	hrs.	224.00	1,724.80	369.60	369.60	2,464.00
1 - Tandem Roller, 8t, 105 HP	11	hrs.	259.00	1,994.30	427.35	427.35	2,849.00
2 - Vibratory Tamper, 80 kg, 3 HP	11	hrs.	70.00	1,078.00	231.00	231.00	1,540.00
Sub-Total				42,566.30	9,121.35	9,121.35	60,809.00

Table 5 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 205 NAME OF ITEM BITUMINOUS PLANT-MIX BASE COURSE (THICKNESS = 10 CM)

QUANTITY : 3,350.0 m^2

UNIT PRICE: ₱190.75/m^2

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
3. Labor							
1 - Foreman	20	hrs.	17.55	-	305.37	45.63	351.00
5 - Skilled Laborer	20	hrs.	14.00	-	1,218.00	182.00	1,400.00
10 - Unskilled Laborer	20	hrs.	8.35	-	1,586.50	83.50	1,670.00
Sub-Total				-	3,109.87	311.13	3,421.00
4. Misc. (5% of 1 + 2 + 3)				16,301.76	2,161.78	6,893.97	25,357.51
Total (1 + 2 + 3 + 4)				342,337.02	45,397.42	144,773.32	532,507.76
Unit Cost		m^2		102.19	13.55	43.22	158.96
5. Overhead and Profit: 20%		m^2		20.44	2.71	8.64	31.79
Total Unit Cost		m^2		122.63	16.26	51.86	190.75
%				64%	9%	27%	100%

TABLE 6

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN - PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 310 NAME OF ITEM BITUMINOUS CONCRETE SURFACE COURSE (THICKNESS = 10 cm)

QUANTITY : 800 m.t.

UNIT PRICE: P1,061.95/m.t.

DESCRIPTION	QUANTITY/ NO OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Material							
Asphalt Concrete Pen 85 - 100 (Ready Mix)	800	T	751.50	402,804.00	60,120.00	138,276.00	601,200.00
2. Equipment							
6 - Dumptruck, 11t, 190 HP (Hauling Distance = 15 km)	23	hr.	238.00	22,990.00	4,926.60	4,926.60	32,844.00
1 - Asphalt Finisher, 3.1 m	30	hr.	420.00	8,820.00	1,890.00	1,890.00	12,600.00
1 - Macadam Roller, 10-12t, 105 HP	30	hr.	266.00	5,586.00	1,197.00	1,197.00	7,980.00
1 - Tired Roller, 10-15t	30	hr.	224.00	4,704.00	1,008.00	1,008.00	6,720.00
1 - Tandem Roller, 6-8t, 105 HP	30	hr.	259.00	5,439.00	1,165.50	1,165.50	7,770.00
Sub-Total				47,539.80	10,187.10	10,187.10	67,914.00

Table 6 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 310 NAME OF ITEM BITUMINOUS CONCRETE SURFACE COURSE (THICKNESS = 10 cm) QUANTITY : 800 m.t.

UNIT PRICE: ₱1,061.95/m.t.

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
3. Labor							
1 - Foreman	30	hr.	17.55	-	458.06	68.44	526.50
5 - Skilled Laborer	30	hr.	14.00	-	1,827.00	273.00	2,100.00
10 - Unskilled Laborer	30	hr.	8.35	-	2,379.75	125.25	2,505.00
Sub-Total				-	4,664.81	466.69	5,131.50
4. Misc. (5% of 1 + 2 + 3)				22,517.20	3,748.60	7,446.50	33,712.30
Total (1 + 2 + 3 + 4)				472,861.00	78,720.51	156,376.29	707,957.80
Unit Cost		m.t.		591.08	98.40	195.47	884.95
5. Overhead and Profit: 20%		m.t.		118.22	19.68	39.10	177.00
Total Unit Cost		m.t.		709.30	118.08	234.57	1,061.95
%				67%	11%	22%	100%

TABLE 7

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN - PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 316 NAME OF ITEM PORTLAND CEMENT CONCRETE PAVEMENT (25 cm THICK, CLASS "A")

QUANTITY : 420 m^3

UNIT PRICE: ₱1,196.70/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Materials							
Concrete Class "A", delivered	420.00	m^3	795.75	200,529.00	83,553.75	50,132.25	334,215.00
Form Lumber (2" x 10" x 10')	4,000.00	bd.ft.	6.50	6,500.00	15,860.00	3,640.00	26,000.00
Steel Reinforcement (10 mm)	403.00	kg.	9.50	2,679.95	459.42	689.13	3,828.50
Curing Compound	117.00	kg.	4.00	313.56	46.80	107.64	468.00
Sealing Material	0.25	ton	5,660.00	948.05	141.50	325.45	1,415.00
Sub-Total				210,970.56	100,061.47	54,894.47	365,926.50
2. Equipment							
3 - Conc. Vibrator with Engine, 145 kgs, 3 HP	24.00	hrs.	160.70	8,099.28	1,735.56	1,735.56	11,570.40
1 - Concrete Saw, 180 kg. 5 HP	24.00	hrs.	113.75	1,911.00	409.50	409.50	2,730.00
1 - Water Truck, 6000 lit.	24.00	hrs.	567.00	9,525.60	2,041.20	2,041.20	13,608.00
Sub-Total				19,535.88	4,186.26	4,186.26	27,908.40

Table 7 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN - PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 316 NAME OF ITEM : PORTLAND CEMENT CONCRETE PAVEMENT (25 cm THICK, CLASS "A")

QUANTITY : 420 m^3

UNIT PRICE: ₱1,196.70/m^3

DESCRIPTION	QUANTITY/ NO OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
3. Labor							
2 - Foreman	24	hrs.	17.55	-	732.54	109.46	842.00
2 - Carpenters	24	hrs.	14.00	-	584.64	87.36	672.00
1 - Mason	24	hrs.	14.00	-	292.32	43.68	336.00
3 - Skilled Laborer	24	hrs.	14.00	-	876.96	131.04	1,008.00
11 - Unskilled Laborer	24	hrs.	8.35	-	2,094.18	110.22	2,204.40
Sub-Total				-	4,580.64	481.76	5,062.40
4. Misc. (5% of 1 + 2 + 3)				11,525.30	5,441.43	2,978.13	19,944.90
Total (1 + 2 + 3 + 4)				242,031.78	114,269.80	62,540.62	418,842.20
Unit Cost		m^3		576.27	272.07	148.91	997.25
5. Overhead and Profit: 20%		m^3		115.26	54.41	29.78	199.45
Total Unit Cost		m^3		691.53	326.48	178.69	1,196.70
%				58%	27%	15%	100%

TABLE 8

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN-PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO 405-A NAME OF ITEM CLASS A CONCRETE

QUANTITY : 63.75 m^3

UNIT PRICE: ₱1,967.50/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Materials							
Concrete Class "A", delivered	63.77	m^3	795.75				50,741.85
1/2" Plywood (1.22 m x 2.44 m)	85.00	each	210.00				17,850.00
Form Lumber	1,580.00	bd.ft.	6.50				10,270.00
C.W. Nails	29.00	kgs.	15.00				435.00
Sub-Total							79,296.85
2. Labor							
1 - Foreman	22.00	days	140.40				3,088.80
1 - Skilled Laborer	22.00	days	112.00				2,464.00
10 - Unskilled Laborers	22.00	days	66.80				14,696.00
Sub-Total							20,248.80
3. Misc. (5% of 1 + 2)							4,977.30
Total (1 + 2 + 3)							104,522.95
Unit Cost		m^3					1,639.60
4. Overhead and Profit: 20%		m^3					327.90
Total Unit Cost		m^3					1,967.50

TABLE 9

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN - PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 405-B NAME OF ITEM CLASS B CONCRETE

QUANTITY : 63.75 m^3

UNIT PRICE: ₱1,928.40/m^3

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Materials							
Concrete Class "B", delivered	63.75	m^3	764.90				48,762.40
1/2" Plywood (1.22 m x 2.44 m)	85.00	each	210.00				17,850.00
Form Lumber	1,580.00	bd.ft.	6.50				10,270.00
C.W. Nails	29.00	kgs.	15.00				435.00
Sub-Total							77,317.40
2. Labor							
1 - Foreman	22.00	days	140.40				3,088.80
1 - Skilled Laborer	22.00	days	112.00				2,464.00
10 - Unskilled Laborer	22.00	days	66.80				14,696.00
Sub-Total							20,248.80
3. Misc. (5% of 1 + 2)							4,878.30
Total (1 + 2 + 3)							102,444.50
Unit Cost		m^3					1,607.00
4. Overhead and Profit: 20%		m^3					321.40
Total Unit Cost		m^3					1,928.40

TABLE 10

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN-PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 509 NAME OF ITEM PERFORATED PVC PIPE (UNDERDRAIN)

QUANTITY : 100 LM

UNIT PRICE : ₱512.68/LM

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Materials							
Fine Aggregate	3.00	m^3	79.95	151.11	55.16	33.58	239.85
Coarse Aggregate	40.00	m^3	88.45	2,228.94	813.74	495.32	3,538.00
0.20 m Ø PVC Pipe perforated	100.00	LM	250.00	6,250.00	15,250.00	3,500.00	25,000.00
Sub-Total 1				8,630.05	16,118.90	4,028.90	28,777.85
2. Equipment							
Backhoe, 0.08 m^3, 21.3 HP (Hydraulic, Crawler, Mounted)	8.00	hrs.	147.00	823.20	176.40	176.40	1,176.00
1 Dumptruck, 6.1 m^3, 190 HP (Haul Distance = 15 kms)	21.00	hrs.	238.00	3,498.60	749.70	749.70	4,998.00
Sub-Total 2				4,321.80	926.10	926.10	6,174.00
3. Labor							
1 Foreman	15.50	days	140.40	-	1,893.29	282.91	2,176.20
1 Skilled Laborer	14.50	days	112.00	-	1,412.88	211.12	1,624.00
2 Laborers	14.50	days	66.80	-	1,840.34	96.86	1,937.20
Sub-Total 3				-	5,146.51	590.89	5,737.40

Table 10 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. 509 NAME OF ITEM REPORTED PVC PIPE (UNDERDRAIN) QUANTITY : 100 LM

UNIT PRICE: ₱512.68/LM

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
4. Miscellaneous (5% of 1+2+3)				647.59	1,109.58	277.29	2,034.46
Total (1+2+3+4)				13,599.44	23,301.09	5,823.18	42,723.71
Unit Cost		LM		135.99	233.01	58.23	427.23
5. Overhead and Profit: 20%		LM		27.20	46.60	11.65	85.45
Total Unit Cost		LM		163.19	279.61	69.88	512.68
%				32%	54%	14%	100%

TABLE 11

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN-PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. SPL-1 NAME OF ITEM SIDE DITCH (MSD-1) QUANTITY : 500 LM

UNIT PRICE: ₱292.12/LM

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Materials							
Boulders	135.00	m^3	116.00				15,660.00
Cement	1,063.00	bags	48.50				51,555.50
Sand	40.50	m^3	79.95				3,238.00
Sub-Total 1							70,453.50
2. Equipment							
1 Dumptruck, 6.1 m^3, 190 HP (Haul Distance = 15 kms)	71.00	hrs.	238.00				16,898.00
1 1/2 - 2 Bagger Mixer	32.00	hrs.	32.25				1,032.00
Backhoe 0.08 m^3, 21.3 HP (Hydraulic, Crawler Mounted)	54.00	hrs.	147.00				7,938.00
Sub-Total 2							25,868.00
3. Labor							
1 Foreman	30.00	days	140.40				4,212.00
1 Skilled Laborers	30.00	days	112.00				3,360.00
6 Laborers	30.00	days	66.80				12,024.00
Sub-Total 3							19,596.00

Table 11 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN-PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. SPL-1 NAME OF ITEM SIDE DITCH (MSD-1) QUANTITY : 500 LM

UNIT PRICE: ₱292.12/LM

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
4. Miscellaneous (5% of 1+2+3)							5,795.88
Total (1+2+3+4)							121,713.38
Unit Cost		LM					243.43
5. Overhead and Profit: 20%		LM					48.69
Total Unit Cost		LM					292.12

TABLE 12

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT THE PAN-PHILIPPINE HIGHWAY (PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. SPL-3 NAME OF ITEM CONCRETE SIDE DITCH (CSD-1) QUANTITY : 500 LM

UNIT PRICE: ₱384.14/LM

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
1. Materials							
Concrete Class A delivered	85.02	m^3	795.75				67,655.75
Form Lumber	3,174.00	bf	6.50				20,631.00
C.W. Nails	57.00	kgs.	15.00				855.00
Gravel Base	20.00	m^3	88.45				1,769.00
Sub-Total 1							90,910.75
2. Equipment							
1 Backhoe 0.08 m^3, 21.3 HP (Hydraulic, Crawler Mounted)	60.00	hrs.	147.00				8,820.00
1 Dumptruck, 6.1 m^3, 190 HP	76.00	hrs.	238.00				18,088.00
1 Tamper	11.00	days	560.00				6,160.00
Sub-Total							33,068.00
3. Labor							
1 Foreman	33.50	days	140.40				4,703.40
1 Skilled Laborer	26.00	days	112.00				2,912.00
12 Laborers	26.00	days	66.80				20,841.60
Sub-Total 3							28,457.00

Table 12 (cont'd.)

NAME OF PROJECT : THE FEASIBILITY STUDY FOR THE ROAD IMPROVEMENT
THE PAN-PHILIPPINE HIGHWAY
(PHILIPPINES - JAPAN FRIENDSHIP HIGHWAY)

ITEM NO. SPL-3 NAME OF ITEM CONCRETE SIDE DITCH (CSD-1) QUANTITY : 500 LM

UNIT PRICE: ₱384.14/LM

DESCRIPTION	QUANTITY/ NO. OF DAYS	UNIT	UNIT RATE/ DAILY RATE	COMPONENTS			FINANCIAL COST
				FOREIGN	LOCAL	TAX	
4. Miscellaneous (5% of 1+2+3)							7,621.79
Total (1+2+3+4)							160,057.54
Unit Cost		LM					320.12
5. Overhead and Profit: 20%		LM					64.02
Total Unit Cost		LM					384.14

APPENDIX 21-2
CONSTRUCTION COST

TABLE 1 CONSTRUCTION COST

PROJECT NAME : Widening of Sta.Rita - Plaridel Section
KM. STA. : 39+000 - 40+500
LENGTH : 1.50 km.

(November 1986 Prices)

ITEM NO.	D E S C R I P T I O N	UNIT	UNIT COST (Peso)	QUANTITY	C O S T (1,000 Pesos) FOREIGN	LOCAL	T A X	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	7,963.00	256.47	77.72	54.40	388.59
107	Borrow	Cu.M.	88.20	2,400.00	146.06	33.87	31.75	211.68
108	Aggregate Subbase	Cu.M.	208.55	3,360.00	455.47	147.15	98.10	700.73
316	P.C.C.Pavement (35cm)	Sq.M.	418.84	10,800.00	2,623.61	1,221.34	678.52	4,523.47
405	Class B Concrete	Cu.M.	1,928.40	82.00	91.71	42.69	23.72	158.13
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	1,000.00	217.98	181.65	54.49	454.12
413	R.C.Pipe Culvert (910mm)	Li.M.	1,184.75	66.00	37.53	31.28	9.38	78.19
	Lined Ditch	Li.M.	511.70	2,000.00	491.23	409.36	122.81	1,023.40
508	Pavement Marking	Li.M.	4.35	9,000.00	25.84	7.44	5.87	39.15
510	Guide Signs	each	2,172.10	12.00	17.20	4.95	3.91	26.07
	Miscellaneous	L.S.			436.31	215.74	108.30	760.35
	Sub-Total				4,799.43	2,373.19	1,191.26	8,363.89
	Contingency (10%)				479.94	237.32	119.13	836.39
	T O T A L				5,279.37	2,610.51	1,310.39	9,200.27
					(57.4%)	(28.4%)	(14.2%)	(100.0%)

TABLE 2 CONSTRUCTION COST

PROJECT NAME : Plaridel By-pass
KM. STA. : 40+500 - 45+000
LENGTH : 4.56 kms.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
100	Clearing and Grubbing	Ha.	18,702.85	8.42	91.34	45.67	20.47	157.48
102	Stripping	Cu.M.	38.85	16,840.00	418.71	143.93	91.59	654.23
105	Roadway and Drainage Excavation	Cu.M.	48.80	25,320.00	815.51	247.12	172.99	1,235.62
106	Excavation for Structure	Cu.M.	64.20	1,800.00	71.65	27.73	16.18	115.56
107	Borrow	Cu.M.	88.20	87,100.00	5,300.73	1,229.16	1,152.33	7,682.22
108	Aggregate Subbase	Cu.M.	208.55	20,080.00	2,721.99	879.41	586.28	4,187.68
200	Aggregate Base Course	Cu.M.	276.65	2,220.00	405.35	116.69	92.12	614.16
316	P.C.C.Pavement (6.7m, 35cm)	Sq.M.	418.84	29,010.00	7,047.32	3,280.65	1,822.58	12,150.55
405	R.C.Deck Girder (15mx1)	Li.M.	65,000.00	15.00	526.50	312.00	136.50	975.00
	P.C.Girder (40mx4)	Li.M.	70,000.00	175.00	7,105.00	3,307.50	1,837.50	12,250.00
	Steel I-Beam (40mx4)	Li.M.	134,000.00	160.00	13,936.00	4,288.00	3,216.00	21,440.00
413	R.C.Box Culvert (3.0x3.0)	Li.M.	13,600.00	72.00	470.02	391.68	117.50	979.20
	- do.- (2-4.0x3.0)	Li.M.	37,173.33	22.00	392.55	327.13	98.14	817.81
	R.C.Pipe Culvert (910mm)	Li.M.	1,184.75	160.00	90.99	75.82	22.75	189.56
	- do.- (1,200mm)	Li.M.	1,579.70	90.00	68.24	56.87	17.06	142.17
500	Grouted Riprap	Cu.M.	676.65	1,200.00	341.03	381.63	89.32	811.98
	River Embankment	Cu.M.	1,928.40	750.00	838.85	390.50	216.95	1,446.30
502	Curb and Gutter	Li.M.	298.15	450.00	53.67	63.06	17.44	134.17
508	Pavement Marking	Li.M.	4.35	16,800.00	48.23	13.89	10.96	73.08
	Miscellaneous	L.S.			2,037.18	778.92	486.73	3,302.84
	Sub-Total				42,780.86	16,357.36	10,221.39	69,359.62
	Contingency (10%)				4,278.09	1,635.74	1,022.14	6,935.96
	TOTAL				47,058.95	17,993.10	11,243.53	76,295.58
					(61.7%)	(23.6%)	(14.7%)	(100.0%)

TABLE 3 CONSTRUCTION COST

PROJECT NAME : Improvement of San. Ildefonso Urban Section
KM. STA. : 65+700 - 66+700
LENGTH : 1.00 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	2,686.00	86.51	26.22	18.35	131.08
106	Excavation for Structure	Cu.M.	64.20	1,905.00	75.83	29.35	17.12	122.30
108	Aggregate Subbase	Cu.M.	208.55	1,200.00	162.67	52.55	35.04	250.26
118	Removal of Existing AC Pavement	Sq.M.	41.75	3,600.00	103.71	24.05	22.55	150.30
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	5,966.00	952.41	443.36	246.31	1,642.08
405	Class B Concrete	Cu.M.	1,928.40	17.00	19.01	8.85	4.92	32.78
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	448.00	97.65	81.38	24.41	203.45
413	R.C.Pipe Culvert (750mm)	Li.M.	536.15	448.00	115.29	96.08	28.82	240.20
502	Curb and Gutter	Li.M.	298.15	920.00	109.72	128.92	35.66	274.30
503	Concrete Sidewalk	Sq.M.	168.30	874.00	82.37	42.66	22.06	147.09
505	Inlet Type A (610mm)	each	4,973.30	12.00	32.82	17.90	8.95	59.68
	Inlet Type B (610mm)	each	3,483.00	12.00	22.99	12.54	6.27	41.80
	Inlet Type C (750mm)	each	5,716.05	12.00	37.73	20.58	10.29	68.59
	Inlet Type D (750mm)	each	3,929.00	12.00	25.93	14.14	7.07	47.15
508	Pavement Marking	Li.M.	4.35	2,400.00	6.89	1.98	1.57	10.44
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			194.01	100.30	49.13	343.45
	Sub-Total				2,134.15	1,103.35	540.48	3,777.98
	Contingency (10%)				213.41	110.33	54.05	377.80
	TOTAL				2,347.56	1,213.68	594.53	4,155.77
					(56.5%)	(29.2%)	(14.3%)	(100.0%)

TABLE 4 CONSTRUCTION COST

PROJECT NAME : Plaridel Intersection
KM. STA. : 41+700

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	320.00	10.31	3.12	2.19	15.62
108	Aggregate Subbase	Cu.M.	208.55	149.00	20.20	6.53	4.35	31.07
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	745.00	118.93	55.36	30.76	205.05
508	Pavement Marking	Li.M.	4.35	660.00	1.89	0.55	0.43	2.87
510	Guide Post	each	2,172.10	6.00	7.04	4.17	1.82	13.03
517	Traffic Signal (4-leg)	L.S.			642.60	234.60	142.80	1,020.00
518	Double Arrow	each	580.00	8.00	3.06	0.88	0.70	4.64
	Triple Arrow	each	650.00	4.00	1.72	0.49	0.39	2.60
	Miscellaneous	L.S.			80.57	30.57	18.34	129.49
	Sub-Total				886.32	336.28	201.78	1,424.38
	Contingency (10%)				88.63	33.63	20.18	142.44
	TOTAL				974.95	369.90	221.96	1,566.81
					(62.2%)	(23.6%)	(14.2%)	(100.0%)

TABLE 5 CONSTRUCTION COST

PROJECT NAME : Baliuag Intersection
KM. STA. : 54+500

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
104	Removal of Miscellaneous Struct.	Cu.M.	114.22	549.00	43.27	10.03	9.41	62.71
105	Roadway and Drainage Excavation	Cu.M.	48.80	472.00	15.20	4.61	3.22	23.03
108	Aggregate Subbase	Cu.M.	208.55	239.00	32.40	10.47	6.98	49.84
316	P.C.C.Pavement (35cm)	Sq.M.	418.84	253.00	61.46	28.61	15.89	105.97
502	Concrete Curb and Gutter	L.M.	298.15	588.00	70.12	82.40	22.79	175.31
508	Pavement Marking	Li.M.	4.35	584.00	1.68	0.48	0.38	2.54
510	Guide Post	each	2,172.10	6.00	7.04	4.17	1.82	13.03
518	Single Arrow	each	320.00	11.00	2.32	0.67	0.53	3.52
	Double Arrow	each	580.00	2.00	0.77	0.22	0.17	1.16
	Miscellaneous	L.S.			23.43	14.17	6.12	43.71
	Sub-Total				257.68	155.82	67.32	480.83
	Contingency (10%)				25.77	15.58	6.73	48.08
	TOTAL				283.45	171.40	74.05	528.91
					(53.6%)	(32.4%)	(14.0%)	(100.0%)

TABLE 6 CONSTRUCTION COST

PROJECT NAME : Improvement of Capan Urban Section
KM. STA. : 92+700 - 93+800
LENGTH : 1.10 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	2,970.00	95.66	28.99	20.29	144.94
106	Excavation for Structure	Cu.M.	64.20	4,514.00	179.68	69.55	40.57	289.80
108	Aggregate Subbase	Cu.M.	208.55	1,320.00	178.94	57.81	38.54	275.29
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	5,940.00	948.26	441.43	245.24	1,634.93
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	2,088.00	455.14	379.28	113.78	948.20
413	R.C.Pipe Culvert (910mm)	Li.M.	1,184.75	16.00	9.10	7.58	2.27	18.96
502	Curb and Gutter	Li.M.	298.15	2,200.00	262.37	308.29	85.27	655.93
503	Concrete Sidewalk	Sq.M.	168.30	2,970.00	279.92	144.96	74.98	499.85
505	Inlet Type A (610mm)	each	4,973.30	56.00	153.18	83.55	41.78	278.50
	Inlet Type B (610mm)	each	3,483.00	56.00	107.28	58.51	29.26	195.05
508	Pavement Marking	Li.M.	4.35	2,640.00	7.58	2.18	1.72	11.48
510	Guide Signs	each	2,172.10	8.00	11.47	3.30	2.61	17.38
	Miscellaneous	L.S.			268.86	158.54	69.63	497.03
	Sub-Total				2,957.41	1,743.98	765.94	5,467.33
	Contingency (10%)				295.74	174.40	76.59	546.73
	TOTAL				3,253.15	1,918.38	842.54	6,014.06
					(54.1%)	(31.9%)	(14.0%)	(100.0%)

TABLE 7 CONSTRUCTION COST

PROJECT NAME : Improvement of Sta. Rosa Urban Section
KM. STA. : 106+800 - 107+900
LENGTH : 1.10 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	2,970.00	95.66	28.99	20.29	144.94
106	Excavation for Structure	Cu.M.	64.20	4,746.00	188.91	73.13	42.66	304.69
108	Aggregate Subbase	Cu.M.	208.55	1,190.00	161.31	52.12	34.74	248.17
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	5,940.00	948.26	441.43	245.24	1,634.93
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	2,144.00	467.34	389.45	116.84	973.63
413	R.C.Pipe Culvert (910mm)	Li.M.	1,184.75	16.00	9.10	7.58	2.27	18.96
502	Curb and Gutter	Li.M.	298.15	2,200.00	262.37	308.29	85.27	655.93
503	Concrete Sidewalk	Sq.M.	168.30	4,006.00	377.56	195.52	101.13	674.21
505	Inlet Type A (610mm)	each	4,973.30	56.00	153.18	83.55	41.78	278.50
	Inlet Type B (610mm)	each	3,483.00	56.00	107.28	58.51	29.26	195.05
508	Pavement Marking	Li.M.	4.35	2,640.00	7.58	2.18	1.72	11.48
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			278.71	164.32	72.32	515.35
	Sub-Total				3,065.86	1,807.55	795.47	5,668.38
	Contingency (10%)				306.59	180.76	79.55	566.89
	TOTAL				3,372.45	1,988.31	875.02	6,235.77
					(54.1%)	(31.9%)	(14.0%)	(100.0%)

TABLE 8 CONSTRUCTION COST

PROJECT NAME : Improvement of Cabanatuan Urban Section (Shoulder & Sidewalk)
KM. STA. : 112+500 - 117+000
LENGTH : 4.50 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	12,917.00	416.03	126.07	88.25	630.35
106	Excavation for Structure	Cu.M.	64.20	19,925.00	793.09	307.00	179.09	1,279.19
107	Borrow	Cu.M.	88.20	1,020.00	62.08	14.39	13.49	89.96
108	Aggregate Subbase	Cu.M.	208.55	5,400.00	732.01	236.50	157.66	1,126.17
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	24,300.00	3,879.23	1,805.85	1,003.25	6,688.33
405	Class B Concrete	Cu.M.	1,928.40	163.00	182.31	84.87	47.15	314.33
405	R.C.Deck Girder (widening)	Li.M.	60,000.00	15.00	486.00	288.00	126.00	900.00
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	4,600.00	1,002.70	835.58	250.67	2,088.95
413	R.C.Pipe Culvert (750mm)	Li.M.	536.15	3,500.00	900.73	750.61	225.18	1,876.53
502	Curb and Gutter	Li.M.	298.15	7,200.00	858.67	1,008.94	279.07	2,146.68
503	Concrete Sidewalk	Sq.M.	168.30	10,800.00	1,017.88	527.12	272.65	1,817.64
505	Inlet Type A (610mm)	each	4,973.30	122.00	333.71	182.02	91.01	606.74
	Inlet Type B (610mm)	each	3,483.00	122.00	233.71	127.48	63.74	424.93
	Inlet Type C (750mm)	each	5,716.05	100.00	314.38	171.48	85.74	571.61
	Inlet Type D (750mm)	each	3,929.00	100.00	216.10	117.87	58.94	392.90
508	Pavement Marking	Li.M.	4.35	21,000.00	60.29	17.36	13.70	91.35
510	Guide Signs	each	2,172.10	20.00	28.67	8.25	6.52	43.44
	Miscellaneous	L.S.			1,151.76	660.94	296.21	2,108.91
	Sub-Total				12,669.35	7,270.33	3,258.32	23,198.00
	Contingency (10%)				1,266.94	727.03	325.83	2,319.80
	TOTAL				13,936.29	7,997.36	3,584.15	25,517.80
					(54.6%)	(31.3%)	(14.1%)	(100.0%)

TABLE 9 CONSTRUCTION COST

PROJECT NAME : Cabanatuan By-pass
KM. STA. : 111+600 - 117+700
LENGTH : 7.134 kms.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
100	Clearing and Grubbing	Ha.	18,702.85	21.12	229.10	114.55	51.35	395.00
102	Stripping	Cu.M.	38.85	28,160.00	700.17	240.68	153.16	1,094.02
105	Roadway and Drainage Excavation	Cu.M.	48.80	42,240.00	1,360.47	412.26	288.58	2,061.31
106	Excavation for Structure	Cu.M.	64.20	1,300.00	51.75	20.03	11.68	83.46
107	Borrow	Cu.M.	88.20	136,700.00	8,319.29	1,929.11	1,808.54	12,056.94
108	Aggregate Subbase	Cu.M.	208.55	31,100.00	4,215.84	1,362.04	908.03	6,485.91
200	Aggregate Base Course	Cu.M.	276.65	1,780.00	325.01	93.56	73.87	492.44
316	P.C.C.Pavement (6.7m, 35cm)	Sq.M.	418.84	48,970.00	11,896.14	5,537.86	3,076.59	20,510.59
405	R.C.Deck Girder (20mx1)	Li.M.	65,000.00	20.00	702.00	416.00	182.00	1,300.00
	P.C.Girder (25mx3)	Li.M.	70,000.00	75.00	3,045.00	1,417.50	787.50	5,250.00
413	R.C.Box Culvert (4.0x3.0)	Li.M.	13,600.00	60.00	391.68	326.40	97.92	816.00
	R.C.Pipe Culvert (910mm)	Li.M.	1,184.75	342.00	194.49	162.07	48.62	405.18
500	Grouted Riprap	Cu.M.	676.65	270.00	76.73	85.87	20.10	182.70
502	Curb and Gutter	Li.M.	298.15	710.00	84.67	99.49	27.52	211.69
508	Pavement Marking	Li.M.	4.35	24,650.00	70.77	20.37	16.08	107.23
	Miscellaneous	L.S.			1,583.16	611.89	377.58	2,572.62
	Sub-Total				33,246.26	12,849.70	7,929.12	54,025.09
	Contingency (10%)				3,324.63	1,284.97	792.91	5,402.51
	TOTAL				36,570.89	14,134.67	8,722.03	59,427.59
					(61.5%)	(23.8%)	(14.7%)	(100.0%)

TABLE 10 CONSTRUCTION COST

PROJECT NAME : Capan Intersection
KM. STA. : 93+900

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
104	Removal of Miscellaneous Struct.	Cu.M.	114.22	27.45	2.16	0.50	0.47	3.14
105	Roadway and Drainage Excavation	Cu.M.	48.80	60.00	1.93	0.59	0.41	2.93
108	Aggregate Subbase	Cu.M.	208.55	14.40	1.95	0.63	0.42	3.00
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	150.00	23.95	11.15	6.19	41.29
502	Concrete Curb and Gutter	L.M.	298.15	25.00	2.98	3.50	0.97	7.45
503	Concrete Sidewalk	Sq.M.	168.30	40.00	3.77	1.95	1.01	6.73
508	Pavement Marking	Li.M.	4.35	910.00	2.61	0.75	0.59	3.96
510	Guide Post	each	2,172.10	4.00	4.69	2.78	1.22	8.69
517	Traffic Signal (4-leg)	L.S.			642.60	234.60	142.80	1,020.00
518	Single Arrow	each	320.00	4.00	0.84	0.24	0.19	1.28
	Double Arrow	each	580.00	15.00	5.74	1.65	1.31	8.70
	Miscellaneous	L.S.			69.32	25.83	15.56	110.72
	Sub-Total				762.56	284.18	171.14	1,217.88
	Contingency (10%)				76.26	28.42	17.11	121.79
	TOTAL				838.82	312.60	188.25	1,339.67
					(62.6%)	(23.3%)	(14.1%)	(100.0%)

TABLE 11 CONSTRUCTION COST

PROJECT NAME : Sta.Rosa Intersection
KM. STA. : 107+500

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	365.50	11.77	3.57	2.50	17.84
108	Aggregate Subbase	Cu.M.	208.55	170.00	23.04	7.45	4.96	35.45
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	850.00	135.69	63.17	35.09	233.95
508	Pavement Marking	Li.M.	4.35	600.00	1.72	0.50	0.39	2.61
517	Traffic Signal (4-leg)	L.S.			642.60	234.60	142.80	1,020.00
518	Double Arrow	each	580.00	6.00	2.30	0.66	0.52	3.48
	Triple Arrow	each	650.00	4.00	1.72	0.49	0.39	2.60
	Miscellaneous	L.S.			81.88	31.04	18.67	131.59
	Sub-Total				900.73	341.47	205.32	1,447.53
	Contingency (10%)				90.07	34.15	20.53	144.75
	TOTAL				990.80	375.62	225.86	1,592.28
					(62.2%)	(23.6%)	(14.2%)	(100.0%)

TABLE 12 CONSTRUCTION COST

PROJECT NAME : Cabanatuan Intersection (Mabini St.)
KM. STA. : 115+700

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	154.00	4.96	1.50	1.05	7.52
108	Aggregate Subbase	Cu.M.	208.55	154.00	20.88	6.74	4.50	32.12
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	178.00	28.42	13.23	7.35	48.99
502	Concrete Curb and Gutter	L.M.	298.15	80.00	9.54	11.21	3.10	23.85
503	Concrete Sidewalk	Sq.M.	168.30	80.00	7.54	3.90	2.02	13.46
508	Pavement Marking	Li.M.	4.35	480.00	1.38	0.40	0.31	2.09
510	Guide Post	each	2,172.10	4.00	4.69	2.78	1.22	8.69
517	Traffic Signal (4-leg)	L.S.			642.60	234.60	142.80	1,020.00
518	Double Arrow	each	580.00	8.00	3.06	0.88	0.70	4.64
	Triple Arrow	each	650.00	4.00	1.72	0.49	0.39	2.60
	Miscellaneous	L.S.			72.48	27.57	16.34	116.40
	Sub-Total				797.26	303.32	179.78	1,280.35
	Contingency (10%)				79.73	30.33	17.98	128.04
	TOTAL				876.98	333.65	197.75	1,408.39
					(62.3%)	(23.7%)	(14.0%)	(100.0%)

TABLE 13 CONSTRUCTION COST

PROJECT NAME : Cabanatuan Intersection (Del Pilar St.)
KM. STA. : 116+600

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	434.00	13.98	4.24	2.97	21.18
108	Aggregate Subbase	Cu.M.	208.55	202.00	27.38	8.85	5.90	42.13
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	1,010.00	161.24	75.06	41.70	277.99
502	Concrete Curb and Gutter	L.M.	298.15	25.00	2.98	3.50	0.97	7.45
503	Concrete Sidewalk	Sq.M.	168.30	25.00	2.36	1.22	0.63	4.21
508	Pavement Marking	Li.M.	4.35	696.00	2.00	0.58	0.45	3.03
510	Guide Post	each	2,172.10	4.00	4.69	2.78	1.22	8.69
517	Traffic Signal (4-leg)	L.S.			642.60	234.60	142.80	1,020.00
518	Double Arrow	each	580.00	8.00	3.06	0.88	0.70	4.64
	Triple Arrow	each	650.00	4.00	1.72	0.49	0.39	2.60
	Miscellaneous	L.S.			86.20	33.22	19.77	139.19
	Sub-Total				948.20	365.41	217.49	1,531.11
	Contingency (10%)				94.82	36.54	21.75	153.11
	TOTAL				1,043.02	401.96	239.24	1,684.22
					(61.9%)	(23.9%)	(14.2%)	(100.0%)

TABLE 14 CONSTRUCTION COST

PROJECT NAME : Improvement of Talavera Urban Section
KM. STA. : 215+700 - 216+700
LENGTH : 1.00 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	2,700.00	86.96	26.35	18.45	131.76
106	Excavation for Structure	Cu.M.	64.20	3,786.00	150.70	58.33	34.03	243.06
108	Aggregate Subbase	Cu.M.	208.55	1,080.00	146.40	47.30	31.53	225.23
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	5,400.00	862.05	401.30	222.94	1,486.30
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	1,952.00	425.49	354.58	106.37	886.44
502	Curb and Cutter	Li.M.	298.15	2,000.00	238.52	280.26	77.52	596.30
503	Concrete Sidewalk	Sq.M.	168.30	2,653.00	250.04	129.48	66.97	446.50
505	Inlet Type A (610mm)	each	4,973.30	48.00	131.30	71.62	35.81	238.72
	Inlet Type B (610mm)	each	3,483.00	48.00	91.95	50.16	25.08	167.18
508	Pavement Marking	Li.M.	4.35	2,400.00	6.89	1.98	1.57	10.44
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			239.89	142.38	62.22	444.50
	Sub-Total				2,638.79	1,566.22	684.45	4,889.47
	Contingency (10%)				263.88	156.62	68.44	488.95
	TOTAL				2,902.67	1,722.85	752.89	5,378.41
					(54.0%)	(32.0%)	(14.0%)	

TABLE 15 CONSTRUCTION COST

PROJECT NAME : *Improvement of San Jose Urban Section*
KM. STA. : 112+500 - 117+000
LENGTH : 4.50 kms.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	8,694.00	280.02	84.85	59.40	424.27
106	Excavation for Structure	Cu.M.	64.20	15,089.00	600.60	232.49	135.62	968.71
107	Borrow	Cu.M.	88.20	460.00	27.99	6.49	6.09	40.57
108	Aggregate Subbase	Cu.M.	208.55	3,628.00	491.80	158.89	105.93	756.62
118	Removal of Existing AC.Pavement	Cu.M.	41.75	2,000.00	57.62	13.36	12.53	83.50
316	P.C.C.Pavement (25cm)	Sq.M.	299.18	18,140.00	3,147.73	1,465.32	814.07	5,427.13
405	Class B Concrete	Cu.M.	1,928.40	325.00	363.50	169.22	94.01	626.73
405	R.C.Deck Girder	Li.M.	65,000.00	10.00	351.00	208.00	91.00	650.00
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	3,414.00	744.18	620.15	186.04	1,550.37
413	R.C.Pipe Culvert (750mm)	Li.M.	536.15	3,414.00	878.60	732.17	219.65	1,830.42
502	Curb and Gutter	Li.M.	298.15	3,100.00	369.71	434.40	120.15	924.27
503	Concrete Sidewalk	Sq.M.	168.30	4,302.00	405.45	209.97	108.60	724.03
505	Inlet Type A (610mm)	each	4,973.30	86.00	235.24	128.31	64.16	427.70
	Inlet Type B (610mm)	each	3,483.00	86.00	164.75	89.86	44.93	299.54
	Inlet Type C (750mm)	each	5,716.05	86.00	270.37	147.47	73.74	491.58
	Inlet Type D (750mm)	each	3,929.00	86.00	185.84	101.37	50.68	337.89
508	Pavement Marking	Li.M.	4.35	8,400.00	24.12	6.94	5.48	36.54
510	Guide Signs	each	2,172.10	10.00	14.34	4.13	3.26	21.72
	Miscellaneous	L.S.			861.28	481.34	219.53	1,562.16
	Sub-Total				9,474.13	5,294.74	2,414.87	17,183.74
	Contingency (10%)				947.41	529.47	241.49	1,718.37
	TOTAL				10,421.55	5,824.21	2,656.35	18,902.11
					(55.1%)	(30.9%)	(14.0%)	(100.0%)

TABLE 16 CONSTRUCTION COST

PROJECT NAME : San Jose Intersection
KM. STA. : 159+500

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
108	Aggregate Subbase	Cu.M.	208.55	115.00	15.59	5.04	3.36	23.98
118	Repreparation of AC Pavement	Sq.M.	41.75	575.00	0.00	0.00	0.00	0.00
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	575.00	91.79	42.73	23.74	158.26
508	Pavement Marking	Li.M.	4.35	600.00	1.72	0.50	0.39	2.61
517	Traffic Signal (5-leg)	L.S.			756.13	276.05	168.03	1,200.20
518	Double Arrow	each	580.00	8.00	3.06	0.88	0.70	4.64
	Triple Arrow	each	650.00	6.00	2.57	0.74	0.59	3.90
	Miscellaneous	L.S.			87.09	32.59	19.68	139.36
	Sub-Total				957.95	358.53	216.48	1,532.96
	Contingency (10%)				95.80	35.85	21.65	153.30
	TOTAL				1,053.75	394.38	238.13	1,686.25
					(62.5%)	(23.4%)	(14.1%)	(100.0%)

TABLE 17 CONSTRUCTION COST

PROJECT NAME : Widening of Calamba - Sto.Tomas Section
KM. STA. : 52+000 - 61+000
LENGTH : 10.0 kms.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	51,400.00	1,655.49	501.66	351.16	2,508.32
106	Excavation for Structure	Cu.M.	64.20	780.00	31.05	12.02	7.01	50.08
107	Borrow	Cu.M.	88.20	25,700.00	1,564.05	362.68	340.01	2,266.74
108	Aggregate Subbase	Cu.M.	208.55	15,600.00	2,114.70	683.21	455.47	3,253.38
316	P.C.C.Pavement (33cm)	Sq.M.	394.91	72,000.00	16,491.44	7,677.05	4,265.03	28,433.52
405	R.C.Deck Girder (Widening)	Li.M.	65,000.00	16.00	561.60	332.80	145.60	1,040.00
	P.C.Girder (Widening)	Li.M.	70,000.00	48.00	1,948.80	907.20	504.00	3,360.00
	R.C.Pipe Culvert (610mm)	Li.M.	454.12	6,500.00	1,416.85	1,180.71	354.21	2,951.78
	- do.- (910mm)	Li.M.	1,184.75	300.00	170.60	142.17	42.65	355.43
	Lined Ditch	Li.M.	511.70	9,500.00	2,333.35	1,944.46	583.34	4,861.15
508	Pavement Marking	Li.M.	4.35	60,000.00	172.26	49.59	39.15	261.00
510	Guide Signs	each	2,172.10	30.00	43.01	12.38	9.77	65.16
	Miscellaneous	L.S.			1,425.16	690.30	354.87	2,470.33
	Sub-Total				29,928.37	14,496.23	7,452.29	51,876.88
	Contingency (10%)				2,992.84	1,449.62	745.23	5,187.69
	TOTAL				32,921.20	15,945.85	8,197.51	57,064.57
					(57.7%)	(28.0%)	(14.3%)	(100.0%)

TABLE 18 CONSTRUCTION COST

PROJECT NAME : Improvement of Alaminos Urban Section
KM. STA. : 215+700 - 216+700
LENGTH : 1.00 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
106	Excavation for Structure	Cu.M.	64.20	570.00	22.69	8.78	5.12	36.59
108	Aggregate Subbase	Cu.M.	208.55	440.00	59.65	19.27	12.85	91.76
118	Removal of Existing AC Pavement	Sq.M.	41.75	3,300.00	95.06	22.04	20.67	137.78
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	4,050.00	646.54	300.97	167.21	1,114.72
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	400.00	87.19	72.66	21.80	181.65
502	Curb and Gutter	Li.M.	298.15	500.00	59.63	70.07	19.38	149.08
503	Concrete Sidewalk	Sq.M.	168.30	750.00	70.69	36.61	18.93	126.23
505	Inlet Type A (610mm)	each	4,973.30	10.00	27.35	14.92	7.46	49.73
	Inlet Type B (610mm)	each	3,483.00	10.00	19.16	10.45	5.22	34.83
508	Pavement Marking	Li.M.	4.35	3,600.00	10.34	2.98	2.35	15.66
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			110.69	56.12	28.29	195.11
	Sub-Total				1,217.58	617.34	311.24	2,146.16
	Contingency (10%)				121.76	61.73	31.12	214.62
	TOTAL				1,339.34	679.08	342.36	2,360.78
					(56.7%)	(28.8%)	(14.5%)	(100.0%)

TABLE 19 CONSTRUCTION COST

PROJECT NAME : Sto.Tomas Intersection I
KM. STA. : 60+000

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
104	Removal of Miscellaneous Struct.	Cu.M.	114.22	160.00	12.61	2.92	2.74	18.28
105	Roadway and Drainage Excavation	Cu.M.	48.80	188.00	6.06	1.83	1.28	9.17
108	Aggregate Subbase	Cu.M.	208.55	88.00	11.93	3.85	2.57	18.35
316	P.C.C.Pavement (33cm)	Sq.M.	394.91	101.00	23.13	10.77	5.98	39.89
502	Concrete Curb and Gutter	L.M.	298.15	176.00	20.99	24.66	6.82	52.47
508	Pavement Marking	Li.M.	4.35	608.00	1.75	0.50	0.40	2.64
510	Guide Post	each	2,172.10	6.00	7.04	4.17	1.82	13.03
517	Traffic Signal (3-leg)	L.S.			505.70	184.62	112.38	802.70
518	Single Arrow	each	320.00	8.00	1.69	0.49	0.38	2.56
	Double Arrow	each	580.00	2.00	0.77	0.22	0.17	1.16
	Miscellaneous	L.S.			59.17	28.40	13.46	96.03
	Sub-Total				650.82	257.45	148.01	1,056.29
	Contingency (10%)				65.08	25.75	14.80	105.63
	TOTAL				715.90	283.20	162.81	1,161.91
					(61.6%)	(24.4%)	(14.0%)	(100.0%)

TABLE 20 CONSTRUCTION COST

PROJECT NAME : Sto.Tomas Intersection
KM. STA. : 61+000

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
104	Removal of Miscellaneous Struct.	Cu.M.	114.22	178.00	14.03	3.25	3.05	20.33
105	Roadway and Drainage Excavation	Cu.M.	48.80	240.00	7.73	2.34	1.64	11.71
107	Borrow	Cu.M.	88.20	144.00	8.76	2.03	1.91	12.70
108	Aggregate Subbase	Cu.M.	208.55	76.00	10.30	3.33	2.22	15.85
316	P.C.C.Pavement (33cm)	Sq.M.	394.91	286.00	65.51	30.49	16.94	112.94
502	Concrete Curb and Gutter	L.M.	298.15	320.00	38.16	44.84	12.40	95.41
508	Pavement Marking	Li.M.	4.35	960.00	2.76	0.79	0.63	4.18
510	Guide Post	each	2,172.10	8.00	9.38	5.56	2.43	17.38
517	Traffic Signal (4-leg)	L.S.			642.60	234.60	142.80	1,020.00
518	Single Arrow	each	320.00	6.00	1.27	0.36	0.29	1.92
	Double Arrow	each	580.00	9.00	3.45	0.99	0.78	5.22
	Miscellaneous	L.S.			80.39	32.86	18.51	131.76
	Sub-Total				884.34	361.46	203.60	1,449.40
	Contingency (10%)				88.43	36.15	20.36	144.94
	TOTAL				972.78	397.61	223.96	1,594.34
					(61.0%)	(24.9%)	(14.1%)	(100.0%)

TABLE 21 CONSTRUCTION COST

PROJECT NAME : Improvement of Tiaong Urban Section
KM. STA. : 94+600 - 95+800
LENGTH : 1.20 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	603.00	19.42	5.89	4.12	29.43
106	Excavation for Structure	Cu.M.	64.20	1,767.10	70.34	27.23	15.88	113.45
108	Aggregate Subbase	Cu.M.	208.55	440.00	59.65	19.27	12.85	91.76
118	Removal of Existing AC Pavement	Sq.M.	41.75	1,147.00	33.04	7.66	7.18	47.89
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	1,340.00	213.92	99.58	55.32	368.82
405	Class B Concrete	Cu.M.	1,928.40	82.00	91.71	42.69	23.72	158.13
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	900.00	196.18	163.48	49.04	408.71
502	Curb and Gutter	Li.M.	298.15	240.00	28.62	33.63	9.30	71.56
503	Concrete Sidewalk	Sq.M.	168.30	1,215.00	114.51	59.30	30.67	204.48
505	Inlet Type A (610mm)	each	4,973.30	23.00	62.91	34.32	17.16	114.39
	Inlet Type B (610mm)	each	3,483.00	23.00	44.06	24.03	12.02	80.11
508	Pavement Marking	Li.M.	4.36	2,600.00	7.48	2.15	1.70	11.34
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			95.04	52.17	24.09	171.31
	Sub-Total				1,045.49	573.89	265.02	1,884.39
	Contingency (10%)				104.55	57.39	26.50	188.44
	TOTAL				1,150.04	631.27	291.52	2,072.83
					(55.5%)	(30.5%)	(14.0%)	(100.0%)

TABLE 22 CONSTRUCTION COST

PROJECT NAME : Improvement of Candelaria Urban Section
KM. STA. : 107+000 - 108+000
LENGTH : 1.00 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	1,327.00	42.74	12.95	9.07	64.76
106	Excavation for Structure	Cu.M.	64.20	1,699.00	67.63	26.18	15.27	109.08
108	Aggregate Subbase	Cu.M.	208.55	590.00	79.98	25.84	17.23	123.04
118	Removal of Existing AC Pavement	Sq.M.	41.75	1,588.00	45.75	10.61	9.94	66.30
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	2,949.00	470.78	219.15	121.75	811.68
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	875.00	190.73	158.94	47.68	397.36
502	Curb and Gutter	Li.M.	298.15	875.00	104.35	122.61	33.91	260.88
503	Concrete Sidewalk	Sq.M.	168.30	1,182.00	111.40	57.69	29.84	198.93
505	Inlet Type A (610mm)	each	4,973.30	22.00	60.18	32.82	16.41	109.41
	Inlet Type B (610mm)	each	3,483.00	22.00	42.14	22.99	11.49	76.63
508	Pavement Marking	Li.M.	4.36	400.00	1.15	0.33	0.26	1.74
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			122.54	69.26	31.48	223.28
	Sub-Total				1,347.97	761.86	346.30	2,456.13
	Contingency (10%)				134.80	76.19	34.63	245.61
	TOTAL				1,482.77	838.04	380.93	2,701.74
					(54.9%)	(31.0%)	(14.1%)	(100.0%)

TABLE 23 CONSTRUCTION COST

PROJECT NAME : Improvement of Sariaya Urban Section
KM. STA. : 120+000 - 121+000
LENGTH : 1.00 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	1,253.00	40.36	12.23	8.56	61.15
106	Excavation for Structure	Cu.M.	64.20	1,323.56	52.68	20.39	11.90	84.97
108	Aggregate Subbase	Cu.M.	208.55	557.00	75.51	24.39	16.26	116.16
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	2,848.00	454.65	211.65	117.58	783.88
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	680.00	148.22	123.52	37.06	308.80
502	Curb and Gutter	Li.M.	298.15	635.00	75.73	88.98	24.61	189.33
503	Concrete Sidewalk	Sq.M.	168.30	576.00	54.29	28.11	14.54	96.94
505	Inlet Type A (610mm)	each	4,973.30	18.00	49.24	26.86	13.43	89.52
	Inlet Type B (610mm)	each	3,483.00	18.00	34.48	18.81	9.40	62.69
508	Pavement Marking	Li.M.	4.35	2,496.00	7.17	2.06	1.63	10.86
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			100.09	55.95	25.69	181.73
	Sub-Total				1,101.02	615.43	282.62	1,999.07
	Contingency (10%)				110.10	61.54	28.26	199.91
	TOTAL				1,211.12	676.98	310.88	2,198.98
					(55.1%)	(30.8%)	(14.1%)	(100.0%)

TABLE 24 CONSTRUCTION COST

PROJECT NAME : Improvement of Pagbilao Urban Section
KM. STA. : 140+000 - 140+400, 140+620 ~ 141+500
LENGTH : 1.28 kms.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	1,026.00	33.05	10.01	7.01	50.07
106	Excavation for Structure	Cu.M.	64.20	731.00	29.10	11.26	6.57	46.93
107	Borrow	Cu.M.	88.20	1,430.00	87.03	20.18	18.92	126.13
108	Aggregate Subbase	Cu.M.	208.55	456.00	61.81	19.97	13.31	95.10
118	Removal of Existing AC Pavement	Sq.M.	41.75	741.00	21.35	4.95	4.64	30.94
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	2,280.00	363.98	169.44	94.13	627.55
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	375.00	81.74	68.12	20.44	170.30
502	Curb and Gutter	Li.M.	298.15	815.00	97.20	114.21	31.59	242.99
503	Concrete Sidewalk	Sq.M.	168.30	1,223.00	115.27	59.69	30.87	205.83
505	Inlet Type A (610mm)	each	4,973.30	10.00	27.35	14.92	7.46	49.73
	Inlet Type B (610mm)	each	3,483.00	10.00	19.16	10.45	5.22	34.83
508	Pavement Marking	Li.M.	4.35	3,072.00	8.82	2.54	2.00	13.36
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			95.44	50.82	24.41	170.68
	Sub-Total				1,049.89	559.04	268.54	1,877.46
	Contingency (10%)				104.99	55.90	26.85	187.75
	TOTAL				1,154.87	614.94	295.39	2,065.21
					(55.9%)	(29.8%)	(14.3%)	(100.0%)

TABLE 25 CONSTRUCTION COST

PROJECT NAME : Improvement of Gumaca Urban Section
KM. STA. : 195+500 - 196+400, 196+760 - 197+000
LENGTH : 1.14 kms.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	1,800.00	57.97	17.57	12.30	87.84
106	Excavation for Structure	Cu.M.	64.20	2,960.00	117.82	45.61	26.60	190.03
108	Aggregate Subbase	Cu.M.	208.55	800.00	108.45	35.04	23.36	166.84
118	Removal of Existing AC Pavement	Sq.M.	41.75	312.00	8.99	2.08	1.95	13.03
316	P.C.C.Pavement (23cm)	Sq.M.	275.24	1,672.00	266.92	124.25	69.03	460.20
413	R.C.Pipe Culvert (610mm)	Li.M.	454.12	1,520.00	331.33	276.10	82.83	690.26
502	Curb and Gutter	Li.M.	298.15	1,600.00	190.82	224.21	62.02	477.04
503	Concrete Sidewalk	Sq.M.	168.30	2,400.00	226.20	117.14	60.59	403.92
505	Inlet Type A (610mm)	each	4,973.30	40.00	109.41	59.68	29.84	198.93
	Inlet Type B (610mm)	each	3,483.00	40.00	76.63	41.80	20.90	139.32
508	Pavement Marking	Li.M.	4.35	2,400.00	6.89	1.98	1.57	10.44
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			151.00	94.79	39.29	285.09
	Sub-Total				1,661.01	1,042.73	432.23	3,135.97
	Contingency (10%)				166.10	104.27	43.22	313.60
	TOTAL				1,827.12	1,147.00	475.45	3,449.57
					(53.0%)	(33.2%)	(13.8%)	(100.0%)

TABLE 26 CONSTRUCTION COST

PROJECT NAME : Improvement of Lopez Urban Section
KM. STA. : 215+700 - 216+700
LENGTH : 1.00 km.

(November 1986 Prices)

ITEM NO.	DESCRIPTION	UNIT	UNIT COST (Peso)	QUANTITY	COST (1,000 Pesos) FOREIGN	LOCAL	TAX	TOTAL
105	Roadway and Drainage Excavation	Cu.M.	48.80	917.00	29.53	8.95	6.26	44.75
106	Excavation for Structure	Cu.M.	64.20	2,174.00	86.53	33.50	19.54	139.57
107	Borrow	Cu.M.	88.20	50.00	3.04	0.71	0.66	4.41
108	Aggregate Subbase	Cu.M.	208.55	408.00	55.31	17.87	11.91	85.09
118	Removal of Existing AC Pavement	Sq.M.	41.75	735.00	21.17	4.91	4.60	30.69
316	P.C.C. Pavement (23cm)	Sq.M.	275.24	2,038.00	325.34	151.45	84.14	560.94
405	Class B Concrete	Cu.M.	1,928.40	34.00	38.03	17.70	9.83	65.57
413	R.C. Pipe Culvert (610mm)	Li.M.	454.12	1,120.00	244.13	203.45	61.03	508.61
502	Curb and Cutter	Li.M.	298.15	1,120.00	133.57	156.95	43.41	333.93
503	Concrete Sidewalk	Sq.M.	168.30	1,008.00	95.00	49.20	25.45	169.65
505	Inlet Type A (610mm)	each	4,973.30	28.00	76.59	41.78	20.89	139.25
	Inlet Type B (610mm)	each	3,483.00	28.00	53.64	29.26	14.63	97.52
508	Pavement Marking	Li.M.	4.35	2,400.00	6.89	1.98	1.57	10.44
510	Guide Signs	each	2,172.10	6.00	8.60	2.48	1.95	13.03
	Miscellaneous	L.S.			117.74	72.02	30.59	220.34
	Sub-Total				1,295.13	792.19	336.47	2,423.79
	Contingency (10%)				129.51	79.22	33.65	242.38
	TOTAL				1,424.64	871.40	370.12	2,666.17
					(53.4%)	(32.7%)	(13.9%)	(100.0%)

TABLE 27
TRAFFIC SIGNAL INSTALLATION COST
- 3-LEG INTERSECTION -

November 1986 Prices

Item	Unit	Unit Price	Quantity	Cost (1,000 ₱)			
				F	L	T	Total
Controller	set	225,000	1	157.50	33.75	33.75	225.00
Signal Head	each	10,000	6	42.00	9.00	9.00	60.00
Signal Head for Pedestrian	each	10,000	6	42.00	9.00	9.00	60.00
Long Pole	each	50,000	3	105.00	22.50	22.50	150.00
Short Pole for Pedestrian	each	8,000	6	33.60	7.20	7.20	48.00
Cables	Lump Sum	21,700	-	15.19	3.26	3.26	21.70
Civil Works	Lump Sum	238,000	-	119.00	90.44	28.56	238.00
Sub-Total				514.29	175.15	113.27	802.70
Contingency (10%)				51.43	17.52	11.33	80.27
TOTAL				565.72	192.67	124.60	882.97
				(64%)	(22%)	14	(100%)

TABLE 28

TRAFFIC SIGNAL INSTALLATION COST

- 4-LEG INTERSECTION -

November 1986 Prices

Item	Unit	Unit Price	Quantity	Cost (1,000 ₱)			
				F	L	T	Total
Controller	set	225,000	1	157.50	33.75	33.75	225.00
Signal Head	each	10,000	8	56.00	12.00	12.00	80.00
Signal Head for Pedestrian	each	10,000	8	56.00	12.00	12.00	80.00
Long Pole	each	50,000	4	140.00	30.00	30.00	200.00
Short Pole for Pedestrian	each	8,000	8	44.80	9.60	9.60	64.00
Cables	Lump Sum	31,000	-	21.70	4.65	4.65	31.00
Civil Work	Lump Sum	340,000	-	170.00	129.20	40.80	340.00
Sub-Total				646.00	231.20	142.80	1,020.00
Contingency (10%)				64.60	23.12	14.28	102.00
TOTAL				710.60	254.32	157.08	1,122.00
				(63%)	(23%)	(14%)	(100%)

TABLE 29

TRAFFIC SIGNAL INSTALLATION COST

- 5-LEG INTERSECTION -

November 1986 Prices

I t e m	Unit	Unit Price	Quantity	Cost (1,000 ₱)			
				F	L	T	Total
Controller	set	225,000	1	157.50	33.75	33.75	225.00
Signal Head	each	10,000	10	70.00	15.00	15.00	100.00
Signal Head for Pedestrian	each	10,000	10	70.00	15.00	15.00	100.00
Long Pole	each	50,000	5	175.00	37.50	37.50	250.00
Short Pole for Pedestrian	each	8,000	10	56.00	12.00	12.00	80.00
Cables	Lump Sum	37,200	-	26.04	5.58	5.58	37.20
Civil Works	Lump Sum	408,000	-	204.00	155.04	48.96	408.00
Sub-Total				758.54	273.87	167.79	1,200.20
Contingency (10%)				75.85	27.39	16.78	120.02
T O T A L				834.39	301.26	184.57	1,320.22
				(63%)	(23%)	(14%)	(100%)

APPENDIX 21-3

ANALYSIS OF SAVINGS IN TRAVEL TIME COST

A. TYPICAL CROSS SECTION

B. ROAD CAPACITY

C. INTERRELATIONSHIP CURVE (V/C-TRAVEL SPEED)

A) Typical Cross Section

The cross sections of the Pan-Philippine Highway with an average of 6.7 m carriageway width along the full stretch of the Study are divided into eight typical types based on geographical and cross sectional condition and land use along the Highway. Three of these types are located in rural area and five are located in urban area.

Rural Sections (R1-R3)

The rural sections of the Highway from an almost homogeneous cross sections, but the shoulder width on both sides varries in accordance with geographical situation, such as, 2.0 m in flat, 1.25 m in rolling, and 0.75 m in mountainous terrains respectively.

Urban Section

U1

This type of cross section is very oftenly observed in urban areas of north study section. This is subdivided into two categories: the sections within the center business district (CBD) and the sections within the suburban area. The narrow shoulder width of 2.0 m in CBD and busy street section which have a great number of pedestrians brings about heavy roadside friction.

U2

This cross section is very common in urban areas of south study section. The shoulder width of 1.0 m, which is the narrowest among the typical cross sections, brings about a severe conflict between vehicles and pedestrians.

U3, U4

This cross section is observed in urban areas of north study section with sidewalk and shoulder width ranging from 2.0 to 2.5 m. This cross section enjoy a comparatively smooth traffic due to wider shoulder, except in market areas and its vicinity where car parking, loading/unloading jeepneys and random crossing of pedestrian disturb the favorable traffic environment.

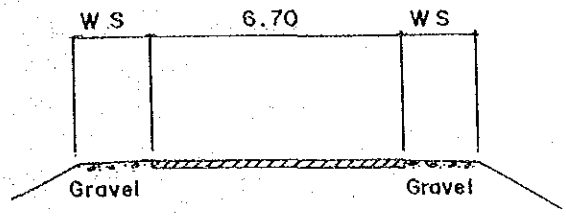
U5

This cross section is the only section which has a center median strip and the widest shoulder among others. However, in some portion partial lack of center median strip and unpavement of shoulder are observed.

FIGURE - 1 Typical Cross Section

Rural Section

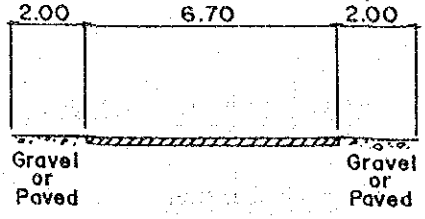
Type - 1~3 (R1~R3)



TYPE	GEOGRAPHICAL CONDITION	SHOULDER WIDTH (WS)	REFERENCED SECTION	
			NORTHERN SECTION	SOUTHERN SECTION
1 (R1)	Flat	2.0	N-1, N-4~6, N-8~12, N-15, N-17, N-21, N-22, N-24, N-25, N-27	S-1~4, S-6, S-7, S-9, S-11, S-13~16, S-19, S-21, S-23, S-24
2 (R2)	Rolling	1.25	N-30 (58 km)	S-18
3 (R3)	Mountainous	0.75	N-30 (16 km)	

Urban Section

Type - 1 (U1)



REFERENCED SECTION

Northern Section

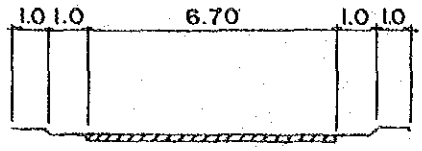
Sta. Rosa (N-16)
Cabanatuan (N-19-20)
Talavera (N-23)
Muñoz (N-26)
Aritao (N-31)

Southern Section

San Pablo (S-5)

FIGURE 1 (CONT'D.)

Type - 2 (U2)

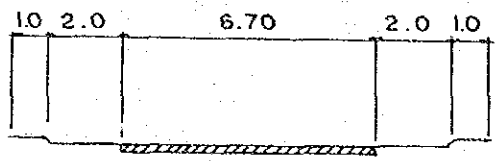


REFERENCED SECTION

Southern Section

Tiaong	(S - 8)
Candelaria	(S - 10)
Sariaya	(S - 12)
Pagbilao	(S - 17)
Gumaca	(S - 20)
Lopez	(S - 22)

Type - 3 (U3)

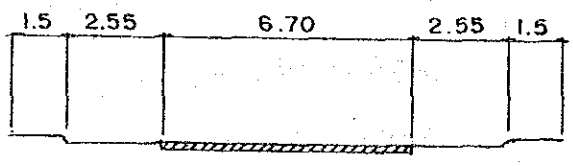


REFERENCED SECTION

Northern Section

San Ildefonso	(N - 7)
Gapan	(N - 13, 14)

Type - 4 (U4)

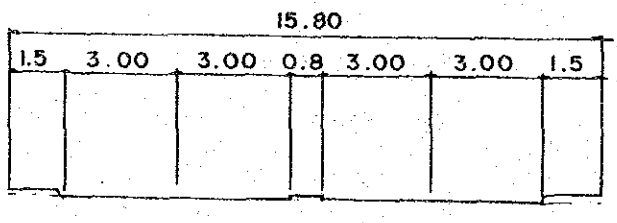


REFERENCED SECTION

Northern Section

Plaridel	(N - 2, 3)

Type - 5 (U5)



REFERENCED SECTION

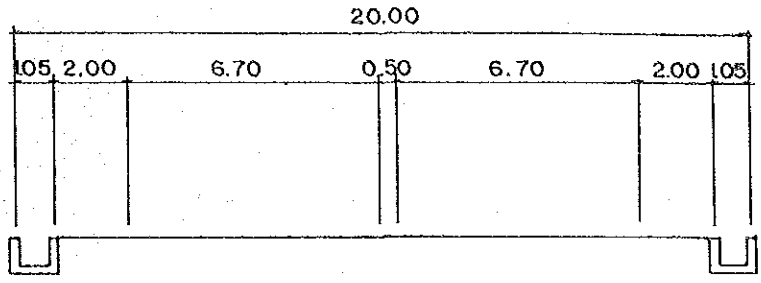
Northern Section

San Jose	(N - 28, 29)

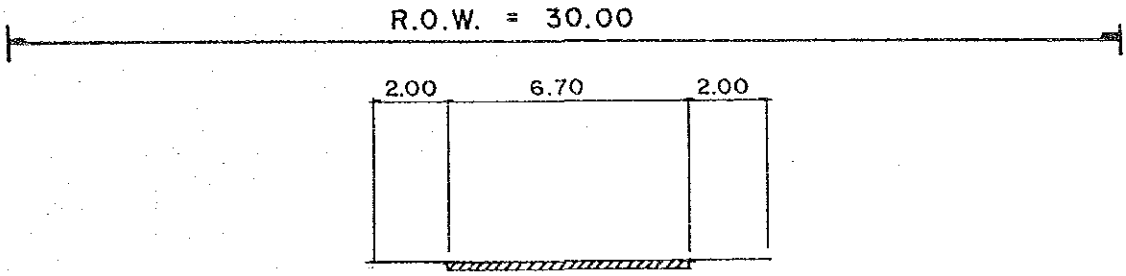
FIGURE 1 (CONT'D.)

IMPROVED SECTION (I1)

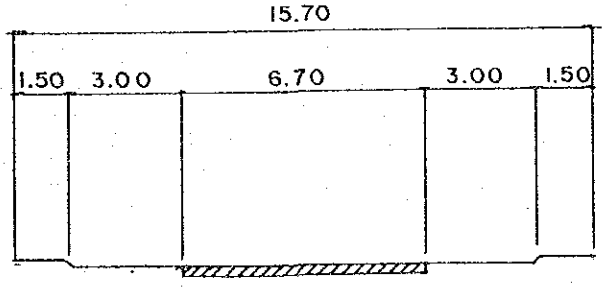
4 - Lanes Road



By Pass (I2)



Improvement of Shoulder / Sidewalk (I3)



B) Road Capacity

The road capacity by typical cross section are calculated in accordance with the methodology of "Highway Capacity Manual" (HCM). The introduction of HCM Methodology is as follows:

Methodology by H.C.M.

$$Rc = 2800 \times fd \times fw \times fhw$$

Where:

RC = road capacity in vehicle per hour
fd = adjustment factor for directional distribution of traffic
fw = adjustment factor for narrow lanes and restricted shoulder width
f_{hv} = adjustment factor for the presence of heavy vehicles in the traffic stream, computed as:
$fhw = 1/(\Sigma PiEi)$

Where:

Pi = proportion of vehicle-i in the traffic stream, expressed as a decimal
1 = car, jeepney, bus, truck, and tricycle
Ei = passenger-car equivalent for vehicle-i

The "fw" factor is calculated based on the space allocation of each typical cross section, while "fhv" factor is based on vehicle composition by type obtained from the Roadside Traffic Survey conducted for this Study. (refer to Table - 1). The Passenger Car Equivalent Factor (PCEF), however, are established based on the specific movement of vehicles, such as, frequent stop operation and slow moving as in the case of jeepney and tricycle. The overall list of road capacities is shown in Table - 2 .

TABLE -1 VEHICLE COMPONENT BY ROAD TYPE

ROAD TYPE	VEHICLE COMPONENT				HEAVY VEHICLE ADJUSTMENT FACTOR (fHV)
	CAR / TRICYCLE	JEEPNEY	BUS	TRUCK	
R – 1	0.55	0.14	0.10	0.21	0.72
R – 2	0.32	0.17	0.17	0.34	0.53 1/
R – 3	0.32	0.17	0.17	0.34	0.35 1/
R–1 (C.B.D.) R–2 ~ R–5	0.72	0.12	0.04	0.12	0.82
R–1(Suburban)	0.59	0.14	0.06	0.21	0.74
Passenger Car Equivalent Factor	1.0	1.5	1.8	2.1	Flat

1/ = fg x fHV

where fg = Adjustment for Passenger car on Grades

fHV = Adjustment for Heavy Vehicle

TABLE - 2 ROAD CAPACITY BY TYPICAL SECTION

(unit: vph)

ROAD TYPE	TYPICAL SECTION	IDEAL CAPACITY	ADJUSTMENT FACTOR			SERVICE FLOW RATE
			fd	fw	fHV	
Rural Road	R – 1	2.800	0.97	0.93	0.72	1.800
	R – 2	2.800	0.97	0.85	0.53	1.200
	R – 3	2.800	0.97	0.75	0.35	700
Urban Road	U – 1 (C.B.D.)	2.800	0.97	0.93	0.82	2.000
	U – 1 (Suburban)	2.800	0.97	0.93	0.74	1.800
	U – 2	2.800	0.97	0.75	0.82	1.600
	U – 3	2.800	0.97	0.93	0.82	2.000
	U – 4	2.800	0.97	0.93	0.82	2.000
	U – 5	2.800	0.97	0.93	0.82	2.000
Improvement Measure	I – 2	2.800	0.97	0.93	0.74	1.800
	I – 3	2.800	0.97	1.00	0.82	2.200

ROAD TYPE	TYPICAL SECTION	IDEAL CAPACITY	ADJUSTMENT FACTOR				SERVICE FLOW RATE
			fw	fHV	fe	fp	
Improvement Measure	I – 1	8.000	0.95	0.86	0.80	1.00	5.200

Note) I–1 = Widenning to 4 Lanes Road

I–2 = Construction of By-pass

I–3 = Improvement of Shoulder / Sidewalk

C) Interrelationship Curve (V/C-Travel Speed)

Two kinds of travel speed surveys were carried out in the Study. One was done along the full stretch of the study area (north study section - 200 km, south study section - 179 km) involving only a few survey runs in order to analyze the overall trend of vehicle travelling speeds. The other was the detailed travel speed survey involving numerous survey runs in order to analyze vehicle travel speeds under various traffic flow situations, such as, different traffic volumes, different time periods and different section characteristics.

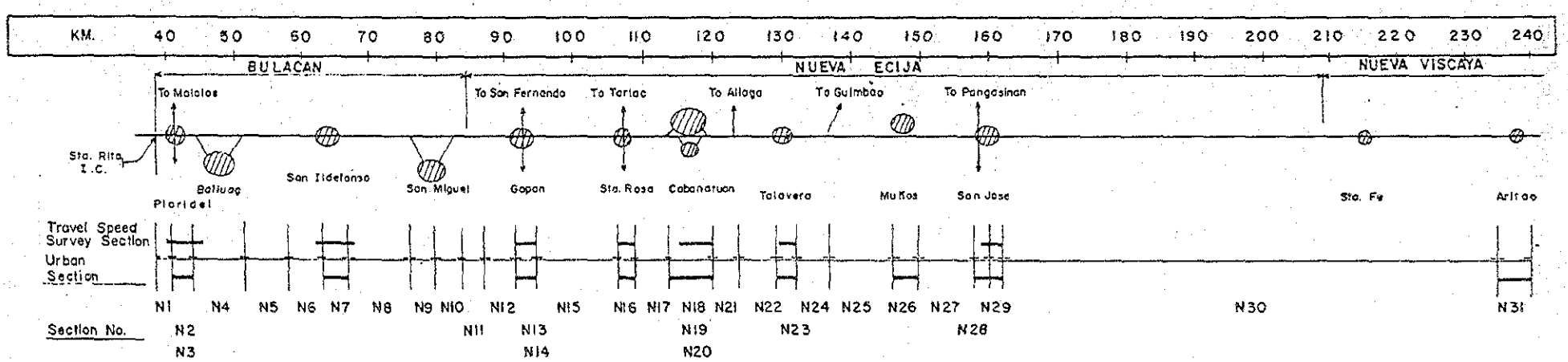
On the basis of the above detailed data obtained, the interrelationship between volume-capacity ratios and travel speeds were derived and illustrated graphically. This was compared with the reference curves given in "Highway Planning Manual" of MPWH and analyzed. On this basis, interrelationship curves were finally established by typical cross section.

The results for section R1 of rural road and Sections U4 and U5 of urban road show clear trends as illustrated in Figure - 3. . On the other hand, the results for U1 section in center business district (CBD) and U2, U3 sections of urban road are not clear in terms of interrelationship between two factors.

From the above mentioned results of analysis, it can be noted that in addition to road cross sectional factors, the roadside friction factor, such as, land use along the Highway, loading/unloading of public utility vehicles and movements of pedestrians also affects greatly the vehicle travel specially in those sections with narrow shoulder width of cross section, such as sections U1 (CBD), U2 and U3.

FIGURE- 2 Location of the Study Sections

North - Section



South - Section

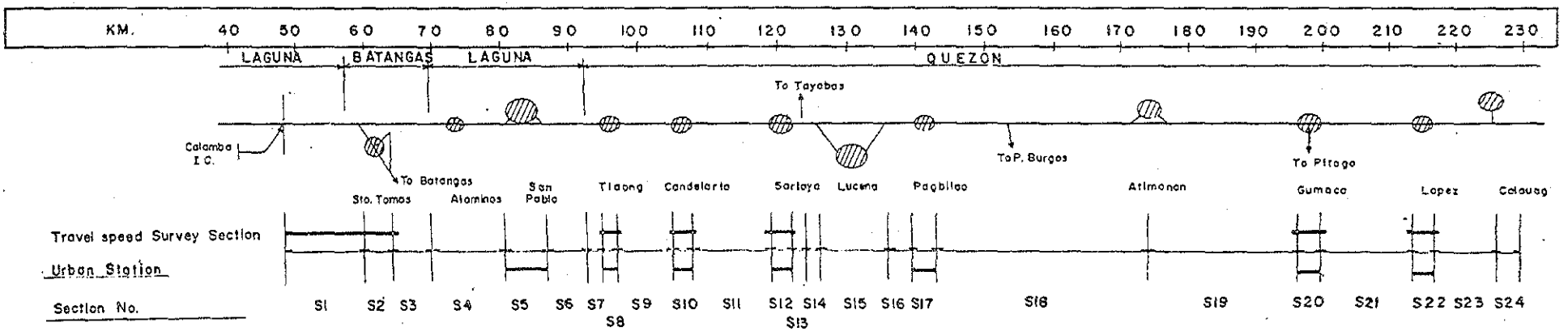
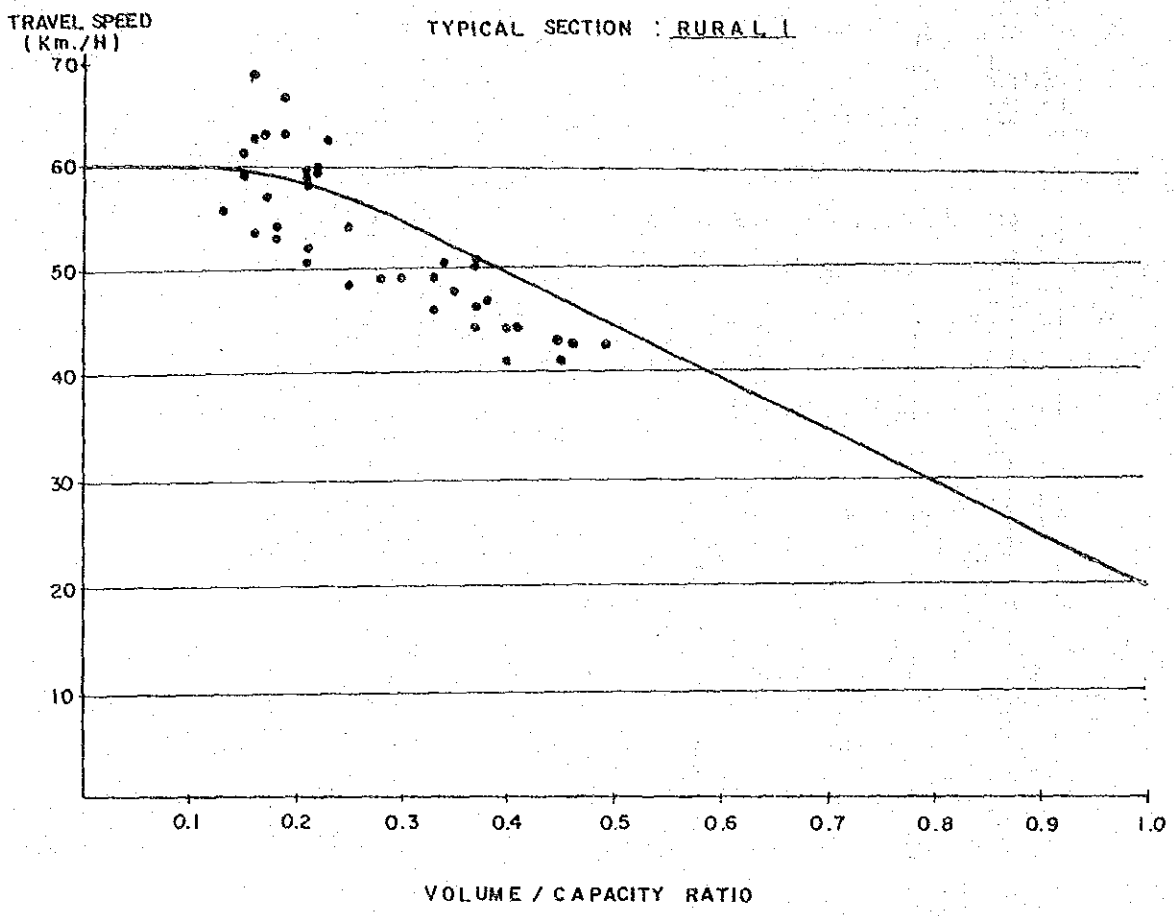
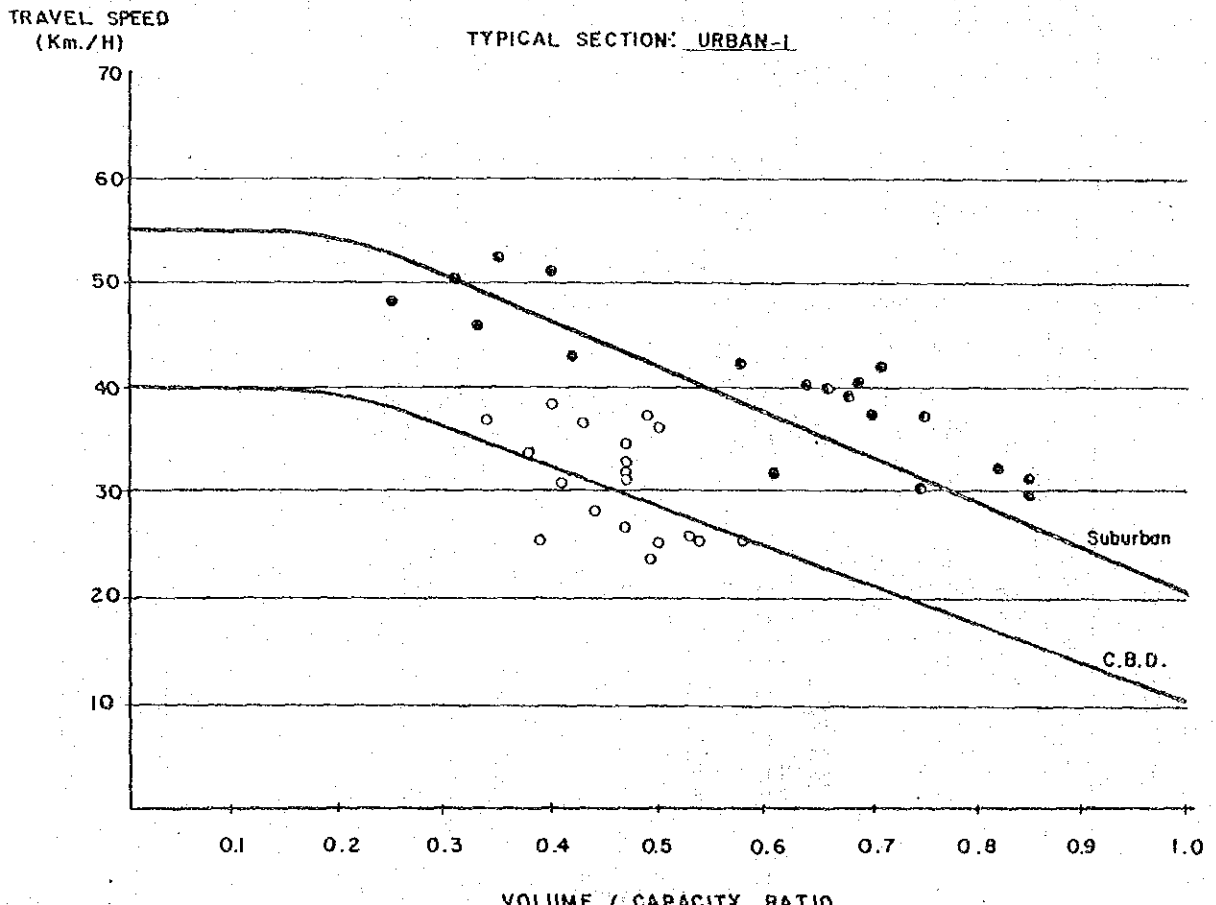


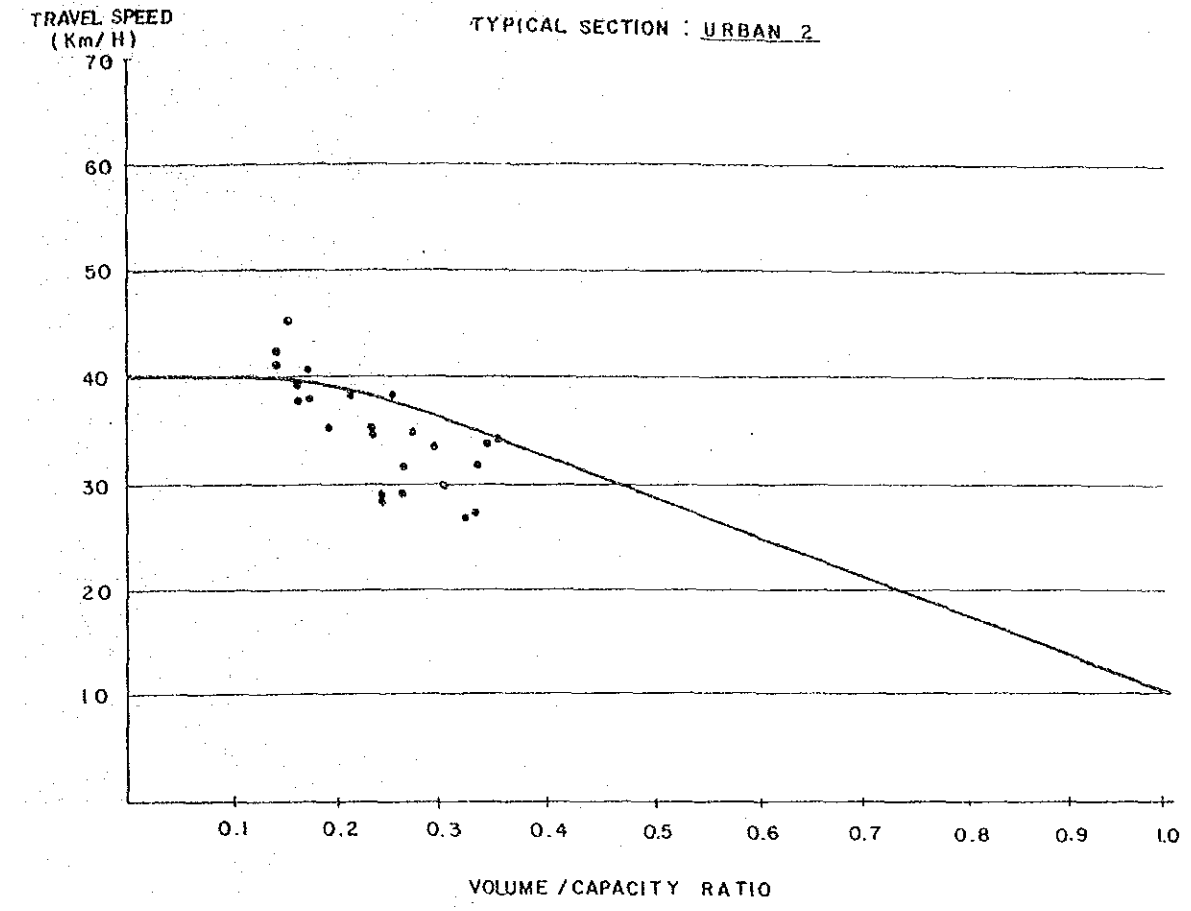
FIGURE - 3 INTERRELATION CURVES BY TYPICAL CROSS SECTION





Note : Center Business District(CBD)

FIGURE 3 (CONT'D.)



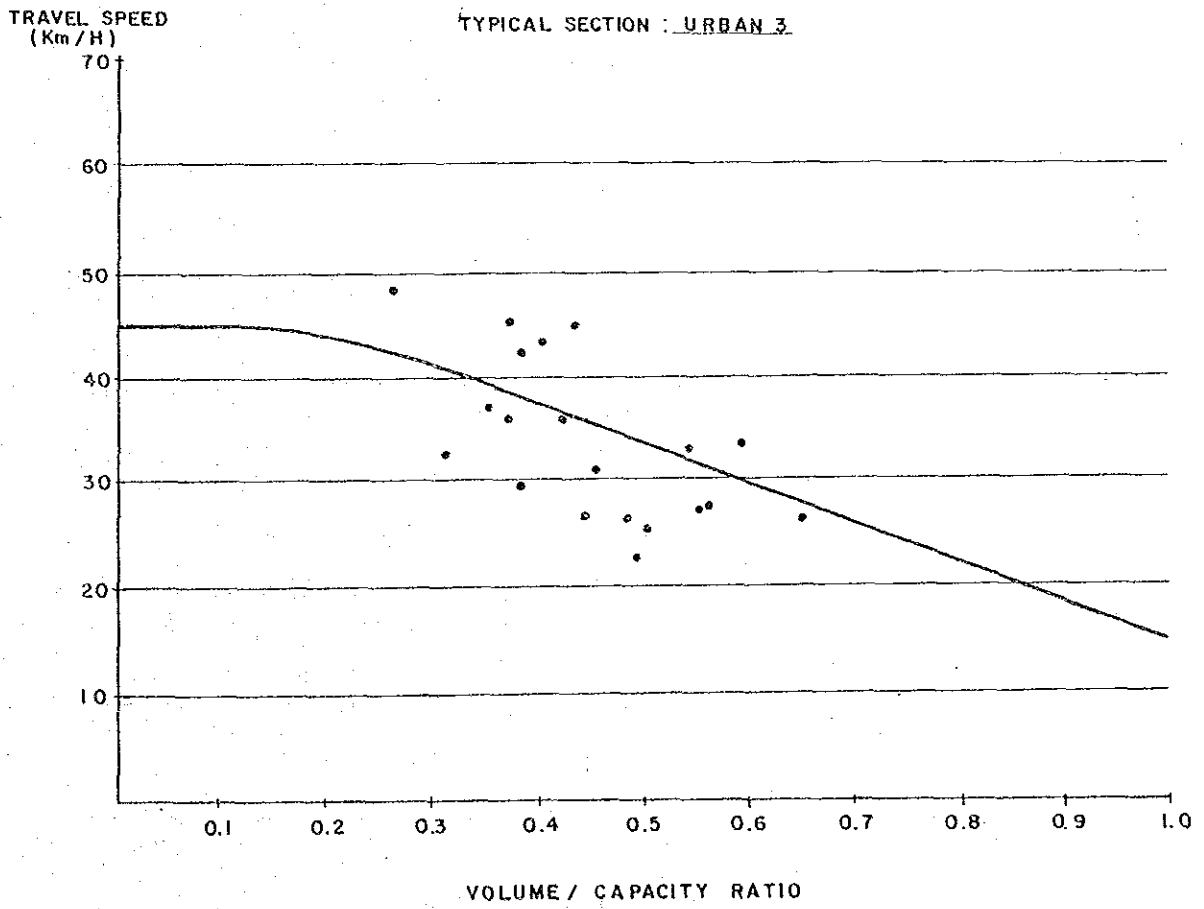
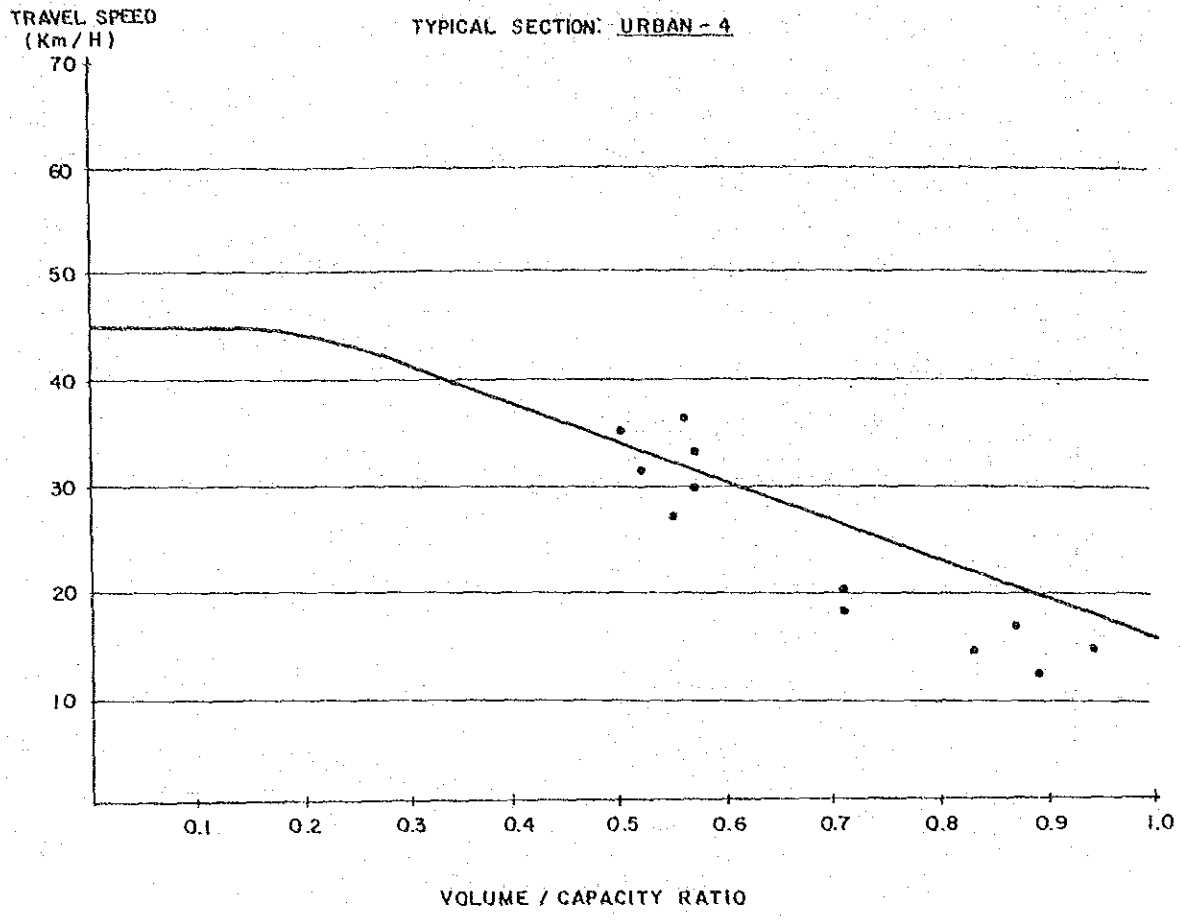
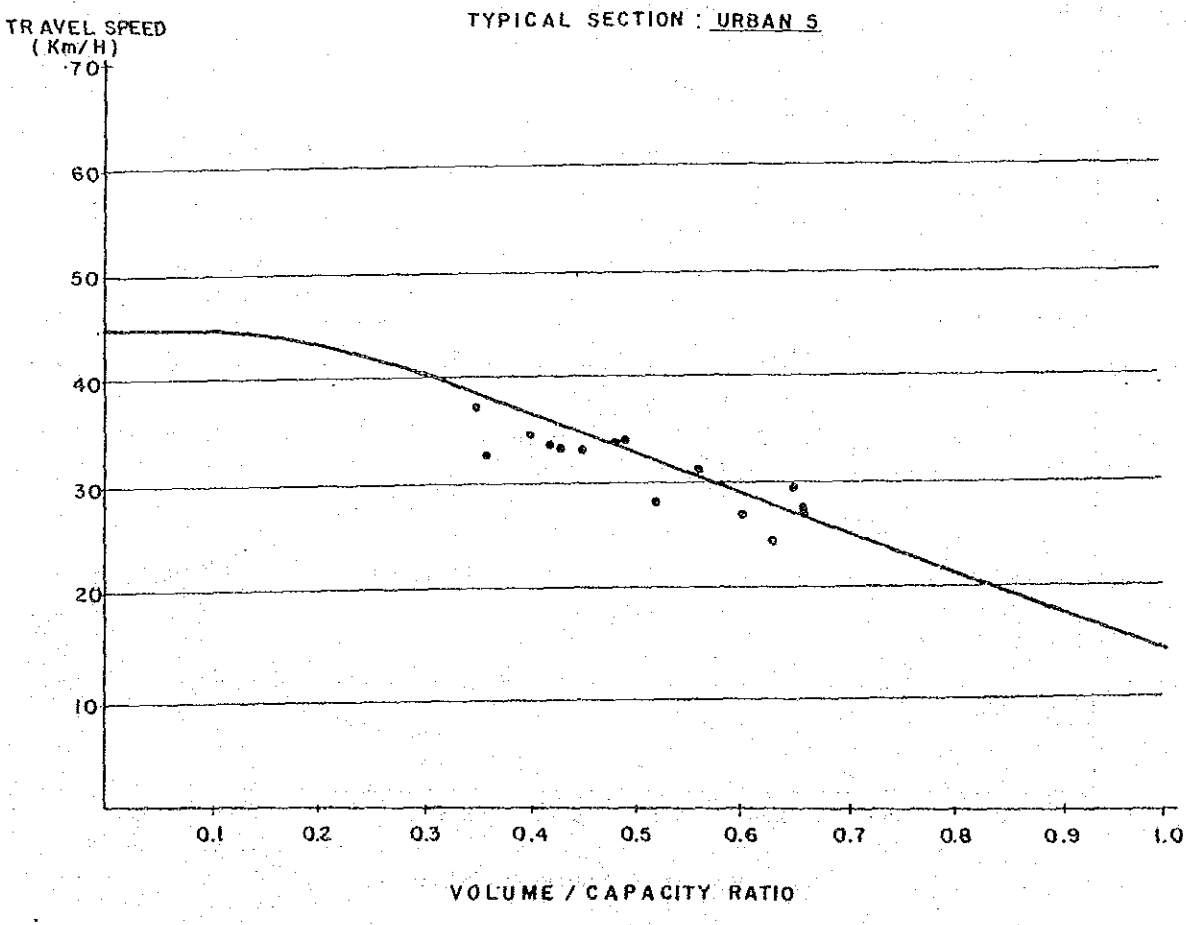


FIGURE 3 (CONT'D.)

TYPICAL SECTION: URBAN - 4



TYPICAL SECTION : URBAN 5



As for travel speeds by vehicle type, the classified travel speeds of car base were set based on the study conducted by Ministry Public Works in 1977.

TABLE - 3 CLASSIFIED TRAVEL SPEED OF CAR BASE

V/C	Comparable Travel Speeds of Car Base				
	Car	Jeepney	Bus	Truck	Tricycle
0.0～0.3	1.00	0.80	1.00	0.80	0.60
0.3～0.7	1.00	0.90	1.00	0.90	0.70
0.7～	1.00	1.00	1.00	1.00	0.80

TABLE - 4 Travel Speeds By Vehicle Type

Sample No.	V/C	Comparable Speeds of Car Base			
		Car	Jeepney	Bus	Truck
1	0.0 ≀ 0.3	1.00	0.75	1.04	0.84
2		1.00	-	0.99	0.76
3		1.00	-	1.12	0.84
4		1.00	-	0.99	0.73
5		1.00	-	0.93	0.72
6		1.00	-	1.00	-
7		1.00	-	-	0.90
Average	-	1.00	0.75	1.01	0.80
8	0.3 ≀ 0.7	1.00	0.91	-	0.98
9		1.00	0.89	-	0.78
10		1.00	0.98	-	0.90
11		1.00	-	-	0.85
Average	-	1.00	0.93	-	0.88
12	0.7 ≀ 1.2	1.00	0.98	0.98	1.02
13		1.00	1.05	1.07	-
14		1.00	1.02	1.12	1.12
Average	-	1.00	1.02	1.06	1.07

Source : Highway Planning Manual (MPWH)