

## Annex 1 Parameters for the Route 158 Piliyandala - Moratuwa

**TABLE 5 DESIGN PARAMETERS FOR THE ROUTE 158 PILIYANDALA – MORATUWA**

Route Number	158
Route Name	Mor-Pil
Route Type	UCT*
Route Class	H*
Bus Size Specified(Seats)	40*
From National Fare Policy Report	
Monthly Fixed Cost(Rs.)	25,988*
Variable Cost Oper km(Rs.)	18.04*
Variable Cost >9 hours per hour(Rs.)	102.19*
From Route Survey	
Demand	
Demand 2 way(Average) per Day(Passengers)	6700**
Traffic Day(hrs)	15**
Fare	
Maximum Fare	6.00**
Route Type Adjustment Factor(To be Observed)	1.4
Route	
Round Trip Kms	14**
One-Way Travel Time(mts.)	25**
Average Round Trip Travel Time(mts.)	70**
Supply	
Number of buses in route	17
Average Number of Seats per Bus	25
Average days operated per month	23
Constants	
Legal Overload factor	25%
Elasticity of Demand	-0.05
Value of Wait Time(Rs. per Hour)	30
Value of Stand Time(Rs. per Hour)	15
Equivalent Demand days per month	30
Crew Work Norm(for OT calculation)(hours)	9
Optimum Number of Days per Bus per Month	22
Marginal Saving of Non Operation of a Bus(Rs. per Day)	500

\* National Fare Policy Report

\*\* Transportation Engineering Division, University of Moratuwa

## Annex 2 Results of Calculations for the Route 158

TABLE 6 CALCULATION RESULTS FOR THE ROUTE 158

per Bus Round Trips per Month	Average Headway (mts)	Rs per Month per Routes(000s)			Overload Load Factor	Hrs per Bus per Day	AVU kms per Day	Trips per Day per Bus	Supply Pax per Day(with legal OL)	Bus Trips per Day
		ECP(total)	ECO	FRO						
35	45.38	3,336	601	2,730	4.14	1.8	21	1.5	1,617	20
40	39.71	2,908	622	2,751	3.63	2.0	24	1.7	1,848	23
45	35.29	2,576	644	2,768	3.22	2.3	27	2.0	2,079	26
50	31.76	2,310	665	2,781	2.90	2.5	30	2.2	2,310	28
55	28.88	2,092	686	2,792	2.64	2.8	33	2.4	2,541	31
60	26.47	1,911	708	2,801	2.42	3.0	37	2.6	2,772	34
70	22.69	1,626	751	2,815	2.07	3.6	43	3.0	3,234	40
75	21.18	1,512	772	2,821	1.93	3.8	46	3.3	3,465	43
80	19.85	1,412	794	2,826	1.81	4.1	49	3.5	3,696	45
85	18.69	1,324	815	2,831	1.71	4.3	52	3.7	3,927	48
90	17.65	1,246	837	2,834	1.61	4.6	55	3.9	4,158	51
95	16.72	1,176	858	2,838	1.53	4.8	58	4.1	4,389	54
100	15.88	1,113	880	2,841	1.45	5.1	61	4.3	4,620	57
105	15.13	1,056	901	2,844	1.38	5.3	64	4.6	4,851	60
110	14.44	1,004	923	2,847	1.32	5.6	67	4.8	5,082	62
115	13.81	957	944	2,849	1.26	5.8	70	5.0	5,313	65
120	13.24	913	966	2,851	1.21	6.1	73	5.2	5,543	68
125	12.71	873	987	2,853	1.16	6.3	76	5.4	5,774	71
130	12.22	836	1,009	2,855	1.12	6.6	79	5.7	6,005	74
135	11.76	802	1,030	2,857	1.07	6.8	82	5.9	6,236	77
140	11.34	771	1,052	2,858	1.04	7.1	85	6.1	6,467	79
145	10.95	741	1,073	2,860	1.00	7.4	88	6.3	6,698	82
150	10.59	714	1,094	2,861	0.97	7.6	91	6.5	6,929	85
160	9.93	664	1,137	2,864	0.91	8.1	97	7.0	7,391	91
170	9.34	620	1,180	2,866	0.85	8.6	103	7.4	7,853	96
180	8.82	581	1,223	2,868	0.81	9.1	110	7.8	8,315	102
190	8.36	546	1,266	2,870	0.76	9.6	116	8.3	8,777	108
200	7.94	514	1,309	2,871	0.73	10.1	122	8.7	9,239	113
210	7.56	486	1,352	2,873	0.69	10.7	128	9.1	9,701	119
220	7.22	460	1,395	2,874	0.66	11.2	134	9.6	10,163	125
230	6.91	436	1,438	2,875	0.63	11.7	140	10.0	10,625	130
240	6.62	414	1,481	2,876	0.60	12.2	146	10.4	11,087	136
250	6.35	394	1,524	2,877	0.58	12.7	152	10.9	11,549	142
275	5.78	351	1,632	2,879	0.53	13.9	167	12.0	12,704	156
300	5.29	315	1,739	2,881	0.48	15.2	183	13.0	13,859	170
325	4.89	284	1,847	2,883	0.45	16.5	198	14.1	15,014	184
350	4.54	258	1,954	2,884	0.41	17.8	213	15.2	16,168	198
400	3.97	215	2,169	2,886	0.36	20.3	243	17.4	18,478	227
450	3.53	182	2,384	2,888	0.32	22.8	274	19.6	20,788	255
500	3.18	160	2,599	2,889	0.29	25.4	304	21.7	23,098	283
600	2.65	133	3,029	2,891	0.24	30.4	365	26.1	27,717	340
700	2.27	114	3,459	2,892	0.21	35.5	426	30.4	32,337	397

---

## References

Litman Todd, “*Evaluating Public Transit Benefits and Costs*”, 16 May 2002, 2.

Huisman Dennis, “*Integrated and Dynamic Vehicle and Crew Scheduling*”, Rotterdam, Tinbergen Institute, 2004.

Sitarski Edward, “Blocking and Runcutting”, 1997, 4. [http://www.schedule-masters.org/Html/blocking\\_and\\_runcutting.html](http://www.schedule-masters.org/Html/blocking_and_runcutting.html)

Freling Richard, Paixão José M. Pinto, Wagelmans Albert., “*Models and Algorithms for Vehicle Scheduling*”, Rotterdam, Tinbergen Institute, 2003.

Bertsekas D, “*Linear Network Optimization: Algorithms and Codes*”, Cambridge, MIT Press, 1991.

Wren Anthony, Gualda Nicolau, “*Integrated Scheduling of Buses and Drivers*”, Brasil, Universidade De São Paulo, 1997.

Friberg Christian, Haase Knut, “*An Exact Algorithm for the Vehicle and Crew Scheduling Problem*”, Germany, 1996.

Caprara Alberto, Fischetti Matteo, Toth Paolo, Vigo Daniele, “*Modeling and Solving Crew Rostering Problem*”, Italy, University of Bologna, 1995.

Shrivastava Prabhat, Dhingra S.L, Gundaliya P.J., “*Application of Genetic Algorithm for Scheduling and Schedule Coordination Problem*”, Journal of Advance Transportation, Winter 2002, 23-41.

Newell G.F. “*Dispatching Policies for a Transportation Route*”, Transportation Science 5, 1971, 91 – 105

Kumarage Amal, Diandas John, et al, “*Formulation of Fares Policy for Bus Transport Service*”, Ministry of Transport, 2001