

Appendix 36 Corridor and Intersection Improvement Drawings

The figures below show the alignment drawings for all corridor improvement projects, as described in Chapter 22. Following are larger drawings of the sample intersection improvements, also discussed in Chapter 22.



Figure A36.1 Proposed Corridor Improvements A2 from Dehiwala to Ratmalana

A36-2



Figure A36.2 Proposed Corridor Improvements A0 from Borella to Battaramulla Part I

A36-3



Figure A36.3 Proposed Corridor Improvements A0 from Borella to Battaramulla Part I

A36-4



Figure A36.4 Proposed Geometric Improvements to Rajaggiya Intersection

A36-5



Figure A36.5 Original Hill Street Intersection

A36-6

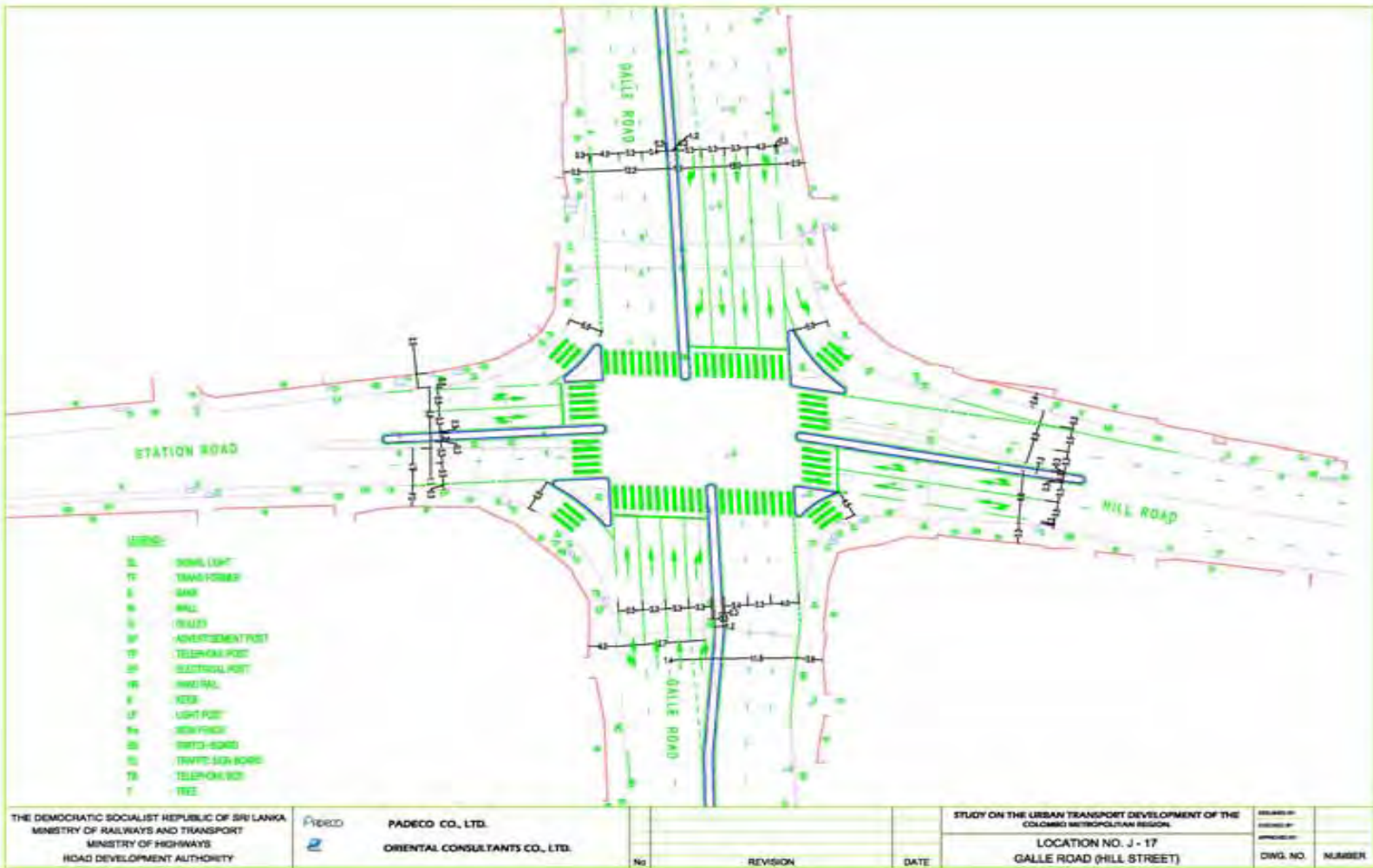


Figure A36.6 Proposed Geometric Improvements to Hill Street Intersection

A36-7



Figure A36.7 Original York Street Intersection

A36-8



Figure A36.8 Proposed Geometric Improvements to York Street Intersection

A36-9

Appendix 37 EIRR and NPV Calculation Tables

Table A37.1 EIRR and NPV for ATC System

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Benefits	Results
	Capital Costs	O&M Costs	Total Costs (A)	Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0		0.0	0.0	0.0
2008	0.0		0.0	0.0	0.0
2009	646.5		646.5	0.0	(646.5)
2010	646.5		646.5	0.0	(646.5)
2011		56.7	56.7	722.0	665.3
2012		56.7	56.7	722.0	665.3
2013		56.7	56.7	722.0	665.3
2014		56.7	56.7	722.0	665.3
2015		56.7	56.7	722.0	665.3
2016		56.7	56.7	722.0	665.3
2017		56.7	56.7	722.0	665.3
2018		56.7	56.7	722.0	665.3
2019		56.7	56.7	722.0	665.3
2020		56.7	56.7	722.0	665.3

EIRR = 41.30% NPV = Rs.1,904.2 million

Table A37.2 EIRR and NPV for Orugodawatta Flyover

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs				Benefits	Results
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs	Total Costs (A)	Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0	0.0	62.0	62.0	0.0	(62.0)
2008	0.0	0.0	62.0	62.0	0.0	(62.0)
2009	0.0	0.0	62.0	62.0	0.0	(62.0)
2010	0.0	0.0	62.0	62.0	0.0	(62.0)
2011	482.5	0.0		482.5	0.0	(482.5)
2012	482.5	0.0		482.5	0.0	(482.5)
2013	0.0	2.9		2.9	106.6	103.7
2014	0.0	2.9		2.9	154.2	151.3
2015	0.0	2.9		2.9	201.8	198.9
2016	0.0	2.9		2.9	249.3	246.5
2017	0.0	2.9		2.9	296.9	294.1
2018	0.0	2.9		2.9	344.5	341.6
2019	0.0	2.9		2.9	392.1	389.2
2020	0.0	2.9		2.9	439.7	436.8
2021	0.0	2.9		2.9	487.3	484.4
2022	0.0	2.9		2.9	534.8	532.0
2023	0.0	2.9		2.9	582.4	579.6
2024	0.0	2.9		2.9	630.0	627.1
2025	0.0	2.9		2.9	677.6	674.7
2026	0.0	2.9		2.9	725.2	722.3
2027	0.0	2.9		2.9	772.8	769.9
2028	0.0	2.9		2.9	820.3	817.5
2029	(418.2)	2.9		(415.3)	867.9	1283.2

EIRR = 19.38% NPV = Rs.631.3 million

Table A37.3 EIRR and NPV for Borella-Kanata Flyover

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Total Costs (A)	Benefits	Results
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs		Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0	0.0	270.4	270.4	0.0	(270.4)
2008	0.0	0.0	270.4	270.4	0.0	(270.4)
2009	0.0	0.0	270.4	270.4	0.0	(270.4)
2010	0.0	0.0	270.4	270.4	0.0	(270.4)
2011	2197.0	0.0		2197.0	0.0	(2197.0)
2012	2197.0	0.0		2197.0	0.0	(2197.0)
2013	0.0	21.5		21.5	499.0	477.5
2014	0.0	21.5		21.5	577.1	555.6
2015	0.0	21.5		21.5	655.2	633.7
2016	0.0	21.5		21.5	733.2	711.7
2017	0.0	21.5		21.5	811.3	789.8
2018	0.0	21.5		21.5	889.4	867.9
2019	0.0	21.5		21.5	967.5	946.0
2020	0.0	21.5		21.5	1045.6	1024.1
2021	0.0	21.5		21.5	1123.7	1102.1
2022	0.0	21.5		21.5	1201.7	1180.2
2023	0.0	21.5		21.5	1279.8	1258.3
2024	0.0	21.5		21.5	1357.9	1336.4
2025	0.0	21.5		21.5	1436.0	1414.5
2026	0.0	21.5		21.5	1514.1	1492.5
2027	0.0	21.5		21.5	1592.1	1570.6
2028	0.0	21.5		21.5	1670.2	1648.7
2029	(1904.0)	21.5		(1882.5)	1748.3	3630.8

EIRR = 12.74% NPV = Rs.212.8 million

Table A37.4 EIRR and NPV for Kohuwala Flyover

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Total Costs (A)	Benefits	Results
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs		Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0	0.0	165.2	165.2	0.0	(165.2)
2008	0.0	0.0	165.2	165.2	0.0	(165.2)
2009	0.0	0.0	165.2	165.2	0.0	(165.2)
2010	0.0	0.0	165.2	165.2	0.0	(165.2)
2011	117.7	0.0		117.7	0.0	(117.7)
2012	117.7	0.0		117.7	0.0	(117.7)
2013	0.0	0.2		0.2	239.5	239.3
2014	0.0	0.2		0.2	270.3	270.1
2015	0.0	0.2		0.2	301.1	300.9
2016	0.0	0.2		0.2	331.9	331.7
2017	0.0	0.2		0.2	362.7	362.5
2018	0.0	0.2		0.2	393.5	393.3
2019	0.0	0.2		0.2	424.3	424.1
2020	0.0	0.2		0.2	455.1	454.9
2021	0.0	0.2		0.2	486.0	485.8
2022	0.0	0.2		0.2	516.8	516.6
2023	0.0	0.2		0.2	547.6	547.4
2024	0.0	0.2		0.2	578.4	578.2
2025	0.0	0.2		0.2	609.2	609.0
2026	0.0	0.2		0.2	640.0	639.8
2027	0.0	0.2		0.2	670.8	670.6
2028	0.0	0.2		0.2	701.6	701.4
2029	(102.0)	0.2		(101.9)	732.4	834.3

EIRR = 21.75% NPV = Rs.846.6 million

Table A37.5 EIRR and NPV for Armour Street Flyover

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Total Costs (A)	Results	
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs		Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0	0.0	321.6	321.6	0.0	(321.6)
2008	0.0	0.0	321.6	321.6	0.0	(321.6)
2009	0.0	0.0	321.6	321.6	0.0	(321.6)
2010	0.0	0.0	321.6	321.6	0.0	(321.6)
2011	232.4	0.0		232.4	0.0	(232.4)
2012	232.4	0.0		232.4	0.0	(232.4)
2013	0.0	1.4		1.4	463.2	461.8
2014	0.0	1.4		1.4	509.6	508.2
2015	0.0	1.4		1.4	556.1	554.7
2016	0.0	1.4		1.4	602.5	601.1
2017	0.0	1.4		1.4	649.0	647.5
2018	0.0	1.4		1.4	695.4	694.0
2019	0.0	1.4		1.4	741.9	740.4
2020	0.0	1.4		1.4	788.3	786.9
2021	0.0	1.4		1.4	834.8	833.3
2022	0.0	1.4		1.4	881.2	879.8
2023	0.0	1.4		1.4	927.6	926.2
2024	0.0	1.4		1.4	974.1	972.7
2025	0.0	1.4		1.4	1020.5	1019.1
2026	0.0	1.4		1.4	1067.0	1065.5
2027	0.0	1.4		1.4	1113.4	1112.0
2028	0.0	1.4		1.4	1159.9	1158.4
2029	(201.4)	1.4		-200.0	1206.3	1406.3

EIRR = 20.61% NPV = Rs.1, 364.5 million

Table A37.6 EIRR and NPV for Kelaniya Flyover

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Total Costs (A)	Results	
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs		Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0	0.0	143.4	143.4	0.0	(143.4)
2008	0.0	0.0	143.4	143.4	0.0	(143.4)
2009	0.0	0.0	143.4	143.4	0.0	(143.4)
2010	0.0	0.0	143.4	143.4	0.0	(143.4)
2011	327.0	0.0		327.0	0.0	(327.0)
2012	327.0	0.0		327.0	0.0	(327.0)
2013	0.0	1.3		1.3	229.6	228.3
2014	0.0	1.3		1.3	243.8	242.5
2015	0.0	1.3		1.3	258.1	256.8
2016	0.0	1.3		1.3	272.3	271.0
2017	0.0	1.3		1.3	286.6	285.3
2018	0.0	1.3		1.3	300.8	299.5
2019	0.0	1.3		1.3	315.1	313.8
2020	0.0	1.3		1.3	329.3	328.0
2021	0.0	1.3		1.3	343.6	342.2
2022	0.0	1.3		1.3	357.8	356.5
2023	0.0	1.3		1.3	372.0	370.7
2024	0.0	1.3		1.3	386.3	385.0
2025	0.0	1.3		1.3	400.5	399.2
2026	0.0	1.3		1.3	414.8	413.5
2027	0.0	1.3		1.3	429.0	427.7
2028	0.0	1.3		1.3	443.3	442.0
2029	(283.4)	1.3		(282.1)	457.5	739.6

EIRR = 16.31% NPV = Rs.336.9 million

Table A37.7 EIRR and NPV for Rajagiriya Flyover

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Results		
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs	Total Costs (A)	Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0	0.0	145.4	145.4	0.0	(145.4)
2008	0.0	0.0	145.4	145.4	0.0	(145.4)
2009	0.0	0.0	145.4	145.4	0.0	(145.4)
2010	0.0	0.0	145.4	145.4	0.0	(145.4)
2011	409.2	0.0		409.2	0.0	(409.2)
2012	409.2	0.0		409.2	0.0	(409.2)
2013	0.0	3.3		3.3	53.6	50.3
2014	0.0	3.3		3.3	67.5	64.1
2015	0.0	3.3		3.3	81.4	78.0
2016	0.0	3.3		3.3	95.2	91.9
2017	0.0	3.3		3.3	109.1	105.8
2018	0.0	3.3		3.3	123.0	119.6
2019	0.0	3.3		3.3	136.9	133.5
2020	0.0	3.3		3.3	150.7	147.4
2021	0.0	3.3		3.3	164.6	161.3
2022	0.0	3.3		3.3	178.5	175.1
2023	0.0	3.3		3.3	192.4	189.0
2024	0.0	3.3		3.3	206.2	202.9
2025	0.0	3.3		3.3	220.1	216.8
2026	0.0	3.3		3.3	234.0	230.6
2027	0.0	3.3		3.3	247.9	244.5
2028	0.0	3.3		3.3	261.7	258.4
2029	(354.6)	3.3		-351.3	275.6	626.9

EIRR = 6.35% NPV = Rs.-401.6 million

Table A37.8 EIRR and NPV for A2 Corridor Improvement

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Results		
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs	Total Costs (A)	Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0			0.0	0.0	0.0
2008	0.0			0.0	0.0	0.0
2009	74.9			74.9	0.0	(74.9)
2010	0.0			0.0	12.1	0.0
2011	0.0			0.0	12.7	0.0
2012	0.0			0.0	13.2	13.2
2013	0.0			0.0	13.8	13.8
2014	0.0			0.0	14.4	14.4
2015	0.0			0.0	14.9	14.9
2016	0.0			0.0	15.5	15.5
2017	0.0			0.0	16.1	16.1
2018	0.0			0.0	16.7	16.7
2019	0.0			0.0	17.2	17.2
2020	0.0			0.0	17.8	17.8
2021	0.0			0.0	18.4	18.4
2022	0.0			0.0	18.9	18.9
2023	0.0			0.0	19.5	19.5
2024	0.0			0.0	20.1	20.1
2025	0.0			0.0	20.7	20.7
2026	(11.2)			(11.2)	21.2	32.5

EIRR = 14.27% NPV = Rs.9.9 million

Table A37.9 EIRR and NPV for A0 Corridor Improvement

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Results		
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs	Total Costs (A)	Time Savings Benefits (B)	Net Benefit (B-A)
2007	0.0			0.0	0.0	0.0
2008	0.0			0.0	0.0	0.0
2009	118.1			118.1	0.0	(118.1)
2010	0.0			0.0	19.2	0.0
2011	0.0			0.0	19.9	0.0
2012	0.0			0.0	20.7	20.7
2013	0.0			0.0	21.4	21.4
2014	0.0			0.0	22.1	22.1
2015	0.0			0.0	22.8	22.8
2016	0.0			0.0	23.5	23.5
2017	0.0			0.0	24.3	24.3
2018	0.0			0.0	25.0	25.0
2019	0.0			0.0	25.7	25.7
2020	0.0			0.0	26.4	26.4
2021	0.0			0.0	27.1	27.1
2022	0.0			0.0	27.9	27.9
2023	0.0			0.0	28.6	28.6
2024	0.0			0.0	29.3	29.3
2025	0.0			0.0	30.0	30.0
2026	(17.7)			(17.7)	30.7	48.5

EIRR = 13.70% NPV = Rs.11.5 million

Table A37.10 EIRR and NPV for Road Widening Program II

(Constant 2006 economic prices, domestic price numeraire, Rs millions)

Year	Costs			Benefits			Results	
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs	Total Costs (A)	VOC Savings	Time Savings	Total Benefits (B)	Net Benefit (B-A)
2007	0.0	0.0	769.9	769.9	0.0	0.0	0.0	(769.9)
2008	0.0	0.0	769.9	769.9	0.0	0.0	0.0	(769.9)
2009	0.0	0.0	769.9	769.9	0.0	0.0	0.0	(769.9)
2010	0.0	0.0	769.9	769.9	0.0	0.0	0.0	(769.9)
2011	411.5	0.0		411.5	0.0	0.0	0.0	(411.5)
2012	411.5	0.0		411.5	0.0	0.0	0.0	(411.5)
2013	0.0	3.4		3.4	282.2	149.6	431.8	428.3
2014	0.0	3.4		3.4	286.6	168.0	454.6	451.1
2015	0.0	3.4		3.4	291.0	186.3	477.3	473.9
2016	0.0	3.4		3.4	295.4	204.7	500.1	496.7
2017	0.0	3.4		3.4	299.8	223.1	522.9	519.4
2018	0.0	3.4		3.4	304.2	241.4	545.6	542.2
2019	0.0	3.4		3.4	308.6	259.8	568.4	565.0
2020	0.0	3.4		3.4	313.0	278.2	591.2	587.7
2021	0.0	3.4		3.4	317.4	296.5	614.0	610.5
2022	0.0	3.4		3.4	321.8	314.9	636.7	633.3
2023	0.0	172.5		172.5	326.2	333.3	659.5	487.0
2024	0.0	3.4		3.4	330.6	351.6	682.3	678.8
2025	0.0	3.4		3.4	335.0	370.0	705.0	701.6
2026	0.0	3.4		3.4	489.9	523.5	1013.3	1009.9
2027	0.0	3.4		3.4	644.7	676.9	1321.7	1318.2
2028	0.0	3.4		3.4	799.6	830.4	1630.0	1626.5
2029	(356.6)	3.4		(353.2)	954.4	983.9	1938.3	2291.5

EIRR= 9.90% NPV at 12% = -549.8 million

Table A37.11 EIRR and NPV for B152 and B425 Road Widening

(Constant 2006 economic prices, domestic price numeraire, Rs. millions)

Year	Costs			Total Costs (A)	Benefits		Total Benefits (B)	Results Net Benefit (B-A)
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs		VOC Savings	Time Savings		
2007	0.0	0.0	408.7	408.7	0.0	0.0	0.0	(408.7)
2008	0.0	0.0	408.7	408.7	0.0	0.0	0.0	(408.7)
2009	0.0	0.0	408.7	408.7	0.0	0.0	0.0	(408.7)
2010	0.0	0.0	408.7	408.7	0.0	0.0	0.0	(408.7)
2011	469.6	0.0		469.6	0.0	0.0	0.0	(469.6)
2012	469.6	0.0		469.6	0.0	0.0	0.0	(469.6)
2013	0.0	1.7		1.7	98.3	34.4	132.6	131.0
2014	0.0	1.7		1.7	125.0	35.2	160.2	158.5
2015	0.0	1.7		1.7	151.7	35.9	187.7	186.0
2016	0.0	1.7		1.7	178.5	50.7	229.2	227.6
2017	0.0	1.7		1.7	205.2	65.5	270.8	269.1
2018	0.0	1.7		1.7	232.0	80.3	312.3	310.6
2019	0.0	1.7		1.7	258.7	95.1	353.8	352.2
2020	0.0	1.7		1.7	285.5	109.9	395.4	393.7
2021	0.0	1.7		1.7	312.2	124.7	436.9	435.2
2022	0.0	1.7		1.7	338.9	139.5	478.4	476.8
2023	0.0	82.1		82.1	365.7	154.3	520.0	437.9
2024	0.0	1.7		1.7	392.4	169.1	561.5	559.8
2025	0.0	1.7		1.7	419.2	183.9	603.0	601.4
2026	0.0	1.7		1.7	290.6	252.2	542.9	541.2
2027	0.0	1.7		1.7	162.1	320.6	482.7	481.0
2028	0.0	1.7		1.7	33.6	389.0	422.5	420.8
2029	(407.0)	1.7		-405.3	-95.0	457.3	362.3	767.7

EIRR= 7.94% NPV at 12% = -608.1 million

Table A37.12 EIRR and NPV for Koskadwila-Thalawatugoda-Pannipitiya-Tumbowila Road Widening

(Constant 2006 economic prices, domestic price numeraire, Rs. millions)

Year	Costs			Total Costs (A)	Benefits		Total Benefits (B)	Results Net Benefit (B-A)
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs		VOC Savings	Time Savings		
2007	0.0	0.0	361.2	361.2	0.0	0.0	0.0	(361.2)
2008	0.0	0.0	361.2	361.2	0.0	0.0	0.0	(361.2)
2009	0.0	0.0	361.2	361.2	0.0	0.0	0.0	(361.2)
2010	0.0	0.0	361.2	361.2	0.0	0.0	0.0	(361.2)
2011	232.2	0.0		232.2	0.0	0.0	0.0	(232.2)
2012	232.2	0.0		232.2	0.0	0.0	0.0	(232.2)
2013	0.0	1.8		1.8	218.3	115.4	333.7	331.9
2014	0.0	1.8		1.8	233.7	159.7	393.4	391.6
2015	0.0	1.8		1.8	249.1	204.0	453.1	451.3
2016	0.0	1.8		1.8	264.5	248.2	512.8	511.0
2017	0.0	1.8		1.8	280.0	292.5	572.5	570.7
2018	0.0	1.8		1.8	295.4	336.8	632.2	630.4
2019	0.0	1.8		1.8	310.8	381.1	691.9	690.1
2020	0.0	1.8		1.8	326.2	425.4	751.6	749.8
2021	0.0	1.8		1.8	341.7	469.6	811.3	809.6
2022	0.0	1.8		1.8	357.1	513.9	871.0	869.3
2023	0.0	90.5		90.5	372.5	558.2	930.7	840.3
2024	0.0	1.8		1.8	387.9	602.5	990.4	988.7
2025	0.0	1.8		1.8	403.4	646.8	1050.1	1048.4
2026	0.0	1.8		1.8	379.5	691.0	1070.5	1068.7
2027	0.0	1.8		1.8	355.6	735.3	1090.9	1089.1
2028	0.0	1.8		1.8	331.7	779.6	1111.3	1109.5
2029	(201.2)	1.8		(199.4)	307.8	823.9	1131.6	1331.1

EIRR= 17.88% NPV at 12% = 990.8 million

Table A37.13 EIRR and NPV for Marine Drive

(Constant 2006 economic prices, domestic price numeraire, Rs. millions)

Year	Costs			Total Costs (A)	Benefits	Results
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs		Time Savings (B)	Net Benefit (B-A)
2007	0.0	0.0	803.3	803.3	0.0	(803.3)
2008	0.0	0.0	803.3	803.3	0.0	(803.3)
2009	0.0	0.0	803.3	803.3	0.0	(803.3)
2010	0.0	0.0	803.3	803.3	0.0	(803.3)
2011	101.4	0.0		101.4	0.0	(101.4)
2012	101.4	0.0		101.4	0.0	(101.4)
2013	0.0	2.1		2.1	222.6	220.6
2014	0.0	2.1		2.1	244.1	242.1
2015	0.0	2.1		2.1	265.6	263.6
2016	0.0	2.1		2.1	287.1	285.1
2017	0.0	2.1		2.1	308.6	306.6
2018	0.0	2.1		2.1	330.1	328.1
2019	0.0	2.1		2.1	351.6	349.5
2020	0.0	2.1		2.1	373.1	371.0
2021	0.0	2.1		2.1	319.5	317.4
2022	0.0	2.1		2.1	265.9	263.8
2023	0.0	17.0		17.0	212.3	195.3
2024	0.0	2.1		2.1	158.7	156.6
2025	0.0	2.1		2.1	105.1	103.0
2026	0.0	2.1		2.1	84.5	82.4
2027	0.0	2.1		2.1	63.8	61.8
2028	0.0	2.1		2.1	43.2	41.2
2029	(87.9)	2.1		-85.9	22.6	108.4

EIRR= 0.75% NPV at 12% = -1,648.5 million

Table A37.14 EIRR and NPV for All Project Implementation Program I

(Constant 2006 economic prices, domestic price numeraire, Rs. millions)

Year	Costs			Total Costs (A)	VOC Savings	Benefits	Results
	Capital Costs	O&M Costs	Land Acquisition & Compensation Costs			Time Savings	Total Benefits (B)
2007	0.0	0.0	3023.5	3023.5	0.0	0.0	(3023.5)
2008	0.0	0.0	3023.5	3023.5	0.0	0.0	(3023.5)
2009	1975.5	0.0	3023.5	4999.0	0.0	0.0	(4999.0)
2010	1975.5	0.0	3023.5	4999.0	0.0	31.3	(4967.6)
2011	4734.8	56.7		4791.4	0.0	754.6	(4036.8)
2012	4734.8	56.7		4791.4	0.0	755.9	(4035.5)
2013	0.0	93.3		93.3	530.5	1065.6	1502.9
2014	0.0	93.3		93.3	536.5	1120.0	1563.2
2015	0.0	93.3		93.3	542.4	1174.4	1623.6
2016	0.0	93.3		93.3	548.4	1228.8	1684.0
2017	0.0	93.3		93.3	554.4	1283.2	1744.3
2018	0.0	93.3		93.3	560.4	1337.6	1804.7
2019	0.0	93.3		93.3	566.3	1392.0	1865.1
2020	0.0	93.3		93.3	572.3	1446.4	1925.4
2021	0.0	36.5		36.5	578.3	708.9	1250.6
2022	0.0	36.5		36.5	584.3	693.3	1241.0
2023	0.0	202.1		202.1	590.2	677.7	1065.9
2024	0.0	36.5		36.5	596.2	662.2	1258.4
2025	0.0	36.5		36.5	422.9	646.6	1069.5
2026	0.0	36.5		36.5	22.2	631.0	616.7
2027	0.0	36.5		36.5	-378.5	562.2	147.1
2028	0.0	36.5		36.5	-779.2	545.4	-270.4
2029	(5815.5)	36.5		-5779.0	-1179.9	528.5	5127.6

EIRR= 0.39% NPV at 12% = -10,636.7 million

Appendix 38 List of Proposed ATC Signal Locations

Table A38.1 Proposed ATC Signal Locations (Existing Signals)

Code	Location	Agency	CCTV Camera
001	Galle Road-Dharmapala MW	CMC	003
002	Galle Road-Bullers Road	CMC	010
003	Galle Road-Dickmons Road	CMC	
004	Galle Road-Bambalapitiya Flats-PED	CMC	
005	Galle Road-Opposite: Savoy-PED	CMC	
006	Galle Road-W A De Silva MW	CMC	011
007	R A De Mel MW-Dharmapala MW	CMC	
008	R A De Mel MW-St. Anthony's MW	CMC	
009	R A De Mel MW-Bauddhaloka	CMC	
010	R A De Mel MW-Vajira Road	CMC	
011	R A De Mel MW-Dickmons Road	CMC	
012	Malay Street-Justice Akbar MW	CMC	
013	Slave Island Junction	CMC	002
014	Union Place-Dawson Street	CMC	
015	Union Place-Darly Road	CMC	
016	Lipton Circus	CMC	009
017	Dharmapala MW-Park Street	CMC	
018	Sir Earnest De Silva MW-Dharmapala MW	CMC	
019	Sir Earnest De Silva MW-Dharmapala MW	CMC	
020	CWW Kannangara MW-Independence Ave	CMC	
021	Horton Place-Ananda Kumaraswamy MW	CMC	
022	CWW Kannangara MW-FR Senanayaka MW	CMC	
023	Horton Place-Wijerama MW	CMC	
024	Bauddhaloka MW-Kynsey Road	RDA	
025	Bauddhaloka MW-D S Senanayake MW	RDA	
026	DS Senanayaka MW-Horton Place	RDA	
027	Horton Place-Kynsy Road	CMC	
028	Ward Place-Kynsy Road	CMC	
029	Kynsey Road-Norris Canal Road	CMC	
030	Maradana Road-Ananda Rajakaruna MW	CMC	
031	Maradana Road-Borella Cross Road	CMC	

Code	Location	Agency	CCTV Camera
032	Borella Junction	RDA	016
033	Ananda Rajakaruna MW-Danister De Silva MW	RDA	
034	Danister De Silva MW-Dematagoda Road	RDA	
035	Danister De Silva MW-Sri Dhammarama Road	RDA	015
036	Danister De Silva MW-Sri Saddamma MW	RDA	
037	Sri Sangaraja MW-Jayantha Weerasekera MW	CMC	
038	Maradana Road-T B Jayah MW	CMC	008
039	Maradana Road-Symonds Road	CMC	
040	Maradana Road-Ananda MW	CMC	
041	Reid Avenue-Stanley Wijesundara MW	CMC	
042	Bauddhaloka MW-Maitland Place	CMC	
043	Bauddhaloka MW-Jawatta Road	CMC	
044	Bauddhaloka MW-Stanley Wijesundera MW	CMC	
045	Havelock Road-Vajira Road	CMC	
046	Havelock Road-Thimbitigasyaya Road	CMC	
047	Dickmons Road-Havelock Road	CMC	
048	Kirillopone Avenue-High level Road	RDA	019
049	Polhengoda Road-Vijeya Kumaratunge MW	RDA	
050	Park Road-Polhengoda Road	RDA	
051	Elvitigala MW-Narahenpita Road	RDA	018
052	Elvitigala MW-Kirimandala MW	RDA	
053	Elvitigala MW-Thimbirigasyaya Road	RDA	
054	Olcott MW-Saunders Place	RDA	005
055	Olcott MW-Mihindu MW	RDA	
056	Olcott MW-E W Bastian MW	RDA	
057	Maradana Road-Sri Sangaraja MW	CMC	
058	Sri Sangaraja MW-Grandpass Road	CMC	
059	Jethawana Junction	CMC	006
060	Sirimawo Bandaranayake MW-near the stadium	CMC	
061	Ingurukade Junction	CMC	
062	Danister De Silva MW-New Kelani Bridge Road	RDA	
063	Sirimawo Bandaranayake MW-Madampitiya Road	CMC	
064	Aluth MW Road-St. James Street	CMC	
065	George R De Silva MW-Srimath Ramanathan MW	CMC	

Code	Location	Agency	CCTV Camera
066	Danister De Silva MW-Stage Road	RDA	014
067	T B Jayah MW-Arnold Ratnayaka MW	CMC	
068	Deans Road-Norris Canal Road	CMC	
069	Bauddhaloka MW-Torrionton Avenue	CMC	
070	Opp Castle Street Hospital-Parliament Road	CMC	
071	Opp CEB-Chittampalam A Gardiner MW	CMC	
072	Thurstan Road-Indian High Commission Residence	CMC	
073	York Street-Laksala	CMC	
074	Galle Road-St. Peters Road	CMC	
075	St. Pauls School-Bambalapitiya	CMC	
076	York Street-Opp Gringlays Bank	CMC	
077	Galle Road-St.Lawrance Road	CMC	
078	Rajasingha-Ped Cross.	RDA	
079	Wesley College Ped. Cross (BLP-1)	RDA	
080	Cycle Baxar Ped. Cross (BLP-1)	RDA	
081	RMV.Ped. Cross (BLP-11)	RDA	
083	Bodhiraja-Olcott MW	RDA	
084	2nd Cross Street-Olcott MW	RDA	
085	Kirulapone	RDA	
086	Nugegoda	RDA	
087	Sri Jayawardenepura-Bauddhaloka	CMC	017

Table A38.2 Proposed ATC Signal Locations (New Signals)

Code	Location	Agency	CCTV Camera
001	Lotus Road-York Street	CMC	
002	Galle Face-MM Markar	CMC	
003	Sangaraja-Panchikawatta	CMC	007
004	Ananda Coomaraswamy-Ernest De Silva	CMC	
005	Albert Crescent-Cambridge Place	CMC	
006	Baudohaloka-Havelock	CMC	
007	Baudohaloka-Wijerama	CMC	
008	Sri Jayawardenepura-Nawala	CMC	
009	Negombo Road-Friendship Bridge	RDA	013
010	Kandy Road-New Kelani Brdige	RDA	
011	Nawala-Narahenpita	RDA	
012	Nawala-Manchanayake	RDA	
013	Pagoda-Manchanayake	RDA	
014	Nawala-Pagoda	RDA	
015	Pagoda-Kotte	RDA	
016	Duplication Road-Lorensz Road	CMC	
017	W A Silva-Peterson Lane	CMC	
018	Havelock Road-W A Silva	CMC	

Note: Location of CCTV cameras 001, 004, 012 is not ATC signal intersection.

Appendix 39 Summary for Pre Feasibility Study Results

Pre-FS projects in this section are:

Table A39.1 Road Extension and Widening Pre-FS Projects

Project Code	Project Name	Scheme	Section and Length
Road-7	Marine Drive Extension	New-4 lanes	2 km Bambalapitiya to Kollupitiya
		New-4 lanes	1.75 km Ramakrishna Road to Dehiwala
		Widening-4 lanes	Approach roads
Road-14	B152/B425 Widening	Widening-2 lanes	Mattakkuliya Bridge to Uswetakeyyawa Bridge (5.2 km on B152)
		Widening-2 lanes	Tudella Junction to Pamunugama Bridge (5.8 km)
		Widening-2 lanes	Eppamulla-Pamunugama Road (2.8 km)
Road-20	Nugegoda-Katiya Junction-Pepiliyana Road Widening	Widening-2 lanes	Nugegoda Intersection to Katiya Handiya (0.8 km)
		Widening-2 lanes	Katiya Handiya to High Level Road (0.5km)
		Widening-2 lanes incl. a bridge	Gamsaba Junction to Bridge location along Dehiwala Road (0.8 km)
Road-21	Thalawatugoda-Pannipitiya Road Widening	Widening-4 lanes	Thalawatugoda Junction to Pannipitiya Flyover (3.2km)
RWP-2	Thalawatugoda-Koskadwila Road Widening	Widening-2 lanes	Thalawatugoda Junction to Koskadwila Junction (4.2km)
RWP-4	Pannipitiya-Tumbowil Road Widening	Widening-2 lanes	Pannipitiya Junction to Tumbowil Junction (7.2km)

Table A39.2 Grade Separation Pre-FS Projects

Project Code	Project Name	Scheme	Location
Road-6	Orugodawatte Flyover (Baseline Road)	Flyover	Orugodawatte (Baseline Road-Avissawella Road)
	Borella-Kanata Flyover (Baseline Road)	Interchange	Borella-Kanata Junction (Baseline Road-Ward Place, Horton Place, and Baudhdhaloka Mawatha)
Road-7	Dehiwala Flyover	Flyover	Dehiwala Junction (Galle Road-Station Road)
Road -15	Kohuwala Flyover	Flyover	Kohuwala Junction (Dutugemunu Street-S. des S Jayasihgha Mawatha)
Road -17	Armour Street Flyover	Interchange	Armour Street Junction in Panchikawatte area (George R. de Silva Mw-Jethawana Road)
	Kelaniya Railway Flyover	Flyover	Railway Crossing (Kandy Road-SLR Main Line)
Road 43	Rajagiriya Flyover	Interchange	Rajagiriya- Welikada Junction (Sri Jayewardenepura Mw.-Nawala Road)

Table A39.3 ATC and Intersection Improvements for Pre-FS Projects

Project Code	Type of Improvement	Location
TM-2*	Area Traffic Control System Project	A total of 120 intersections in Colombo and its immediate vicinity
TM-6	Corridor Traffic Management Improvement	A2 & A0

*: Includes cost for Project TM-1, which is subsumed under TM-2.

Table A39.4 Pre-FS Result for Marine Drive Extension

Project Code:	Road-7																																																																																																																																																																							
Project Name:	Marine Drive Extension																																																																																																																																																																							
Project Description:	Extension of Marine Drive (2km to the north and 1.75km to the south) will alleviate congestion on Galle Road by providing a viable alternative route along the coastline.																																																																																																																																																																							
Objectives:	A project to extend Marine Drive also has the objective of reducing traffic on Galle Road. Presently, Marine Drive is not doing this task well, which seems due to two reasons: (1) access from Galle Road to Marine Drive is poor and (2) the current length of Marine Drive is insufficient to attract trips of sufficient distance.																																																																																																																																																																							
Implementation Agency:	Road Development Authority / CMC																																																																																																																																																																							
Implementation Schedule:	<table border="1"> <thead> <tr> <th colspan="20">Project Implementation Schedule</th> </tr> <tr> <th></th> <th colspan="4">Year 1</th> <th colspan="4">Year 2</th> <th colspan="4">Year 3</th> <th colspan="4">Year 4</th> <th colspan="4">Year 5</th> </tr> </thead> <tbody> <tr> <td>Land Acquisition</td> <td>█</td><td>█</td><td>█</td><td>█</td> <td>█</td><td>█</td><td>█</td><td>█</td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <td>Loan Agreement Negotiations</td> <td></td><td></td><td></td><td></td> <td>█</td><td>█</td><td>█</td><td>█</td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <td>Procurement of Consultants</td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td>█</td><td>█</td><td>█</td><td>█</td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <td>Detail Design</td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td>█</td><td>█</td><td>█</td><td>█</td> <td></td><td></td><td></td><td></td> </tr> <tr> <td>Procurement of Contractor</td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> </tr> <tr> <td>Construction Supervision</td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td> <td>█</td><td>█</td><td>█</td><td>█</td> <td>█</td><td>█</td><td>█</td><td>█</td> </tr> </tbody> </table> <p>Unexpected Project Extension █</p>	Project Implementation Schedule																					Year 1				Year 2				Year 3				Year 4				Year 5				Land Acquisition	█	█	█	█	█	█	█	█													Loan Agreement Negotiations					█	█	█	█													Procurement of Consultants									█	█	█	█									Detail Design													█	█	█	█					Procurement of Contractor																					Construction Supervision													█	█	█	█	█	█	█	█
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Anticipated Costs:	<p>Total Project Cost: US \$ 33.54 Million</p> <p>Direct construction costs US \$ 2.10 million</p> <p>Engineering services expenses US \$ 0.15 million</p> <p>Land acquisition US \$ 26.37 million</p> <p>Compensation cost US \$ 4.92 million</p> <p>Total US \$ 33.54 million</p>																																																																																																																																																																							
Economic Analysis:	EIRR = 0.75%, NPV = Rs. -1,648.5 million																																																																																																																																																																							
Impacts on Land Acquisition/Resettlement:	Highly significant: The number of affected properties along the northern section (38) is smaller than that of southern section (100). In addition the property values in the area are also rather high. This is particularly true for properties between Bambalapitiya and Kollupitiya where land values are extremely high.																																																																																																																																																																							
Impacts on the Natural Environment:	Not significant but following issues on construction stage should be mitigated. Degradation of Air Quality and Increased Noise and Vibration: Demolition of existing structures will discharge dust into the air and create health problems for local residents. Solid Waste: Solid waste from construction activities and demolition will be an issue, although the municipality already has a solid waste disposal problem in operation.																																																																																																																																																																							
Impacts on the Social Environment:	Moderately significant: The households appear to be well established and they will be much reluctant to be resettled, hence during the pre-construction stage there will be many social issues to handle while surveying and negotiating with land owners.																																																																																																																																																																							
Recommendation:	Not feasible due to low return in economic aspects. Some type of value-capture scheme would be necessary, where land owners would relinquish a certain portion of their land based on future increases in property prices owing to development.																																																																																																																																																																							

Table A39.5 Pre-FS Result for B152/B425 Widening


Project Code:	Road-14																																																																																																																																																											
Project Name:	B152/B425 Widening																																																																																																																																																											
Project Description:	This improvement is to extend from Mattakkuliya Bridge along B152 to Uswetakeyyawa-Bopitiya Road for 5.2km, from Uswetakeyyawa-Bopitiya Road (which is being improved by ADB) to the B425 Junction along the Eppamulla-Panunugama Road for 2.82km, and then along the entirety of B425 to A3 for 5.7 km, for a total distance of about 13.7km. This work will consist of an overlay and the widening of the existing substandard two-lane road facility to a standard two-lane road facility.																																																																																																																																																											
Objectives:	To increase the connectivity of the coastal industrialized area of Gampaha District with Colombo Port, and to provide an alternative route for local traffic accessing Colombo from coastal Gampaha and thereby reduce the amount of traffic crossing the Friendship Bridge.																																																																																																																																																											
Implementation Agency:	Road Development Authority																																																																																																																																																											
Implementation Schedule:	<table border="1"> <thead> <tr> <th colspan="13">Project Implementation Schedule</th> </tr> <tr> <th></th> <th colspan="3">Year 1</th> <th colspan="3">Year 2</th> <th colspan="3">Year 3</th> <th colspan="3">Year 4</th> <th colspan="3">Year 5</th> </tr> </thead> <tbody> <tr> <td>Land Acquisition</td> <td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Loan Agreement Negotiations</td> <td></td><td></td><td>■</td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Procurement of Consultants</td> <td></td><td></td><td></td><td>■</td><td>■</td><td>■</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Detail Design</td> <td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Procurement of Contractor</td> <td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>Construction Supervision</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td> </tr> <tr> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td> </tr> </tbody> </table> <p>Unexpected Project Extension </p>	Project Implementation Schedule														Year 1			Year 2			Year 3			Year 4			Year 5			Land Acquisition	■	■	■	■	■	■												Loan Agreement Negotiations			■															Procurement of Consultants				■	■	■												Detail Design					■	■	■	■										Procurement of Contractor							■	■	■									Construction Supervision										■	■	■	■	■	■	■	■																		■
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Anticipated Costs:	<p>Total Project Cost: US \$ 26.37 million</p> <p>Direct construction costs US \$ 9.77 million</p> <p>Engineering services expenses US \$ 0.68 million</p> <p>Land acquisition US \$ 4.36 million</p> <p>Compensation cost US \$ 11.56 million</p> <p>Total US \$ 26.37 million</p>																																																																																																																																																											
Economic Analysis:	EIRR = 7.94%, NPV = Rs. -608.1million																																																																																																																																																											
Impacts on Land Acquisition/Resettlement:	Highly significant: There are 99 affected structures along B152, although most will be only partially damaged. For B425, About 250 one-story house properties will be affected.																																																																																																																																																											
Impacts on the Natural Environment:	Not significant but following issues on construction stage should be mitigated. Road Blockage: Construction related activities will require road blocks and traffic diversions which will cause delays and inconvenience road users. Utility Relocation: Existing utility infrastructure such as telephone and power lines, as well as some water supply lines, will need to be relocated. This will cause short-term but significant inconvenience to the community.																																																																																																																																																											
Impacts on the Social Environment:	Not significant: Between Tudella Junction and Pamunugama Bridge, the road traverses open space, as well as large properties of about thirty perches each. Because of the low number of structures affected, there should be low resistance to land acquisition during the pre-construction phase.																																																																																																																																																											
Recommendation:	It is substantially below the threshold of 12%, and not viable. Widening of B152 and B425 is important for the improvement of access to the Port and people and businesses north of the Kelani River, and alleviation of congestion on Negombo Road. However, as the cost of construction and land acquisition is high, change of alignment should be considered.																																																																																																																																																											

Table A39.6 Pre-FS Result for Nugegoda-Katiya Junction-Pepiliyana Road Widening

Project Code:	Road-20																																																
Project Name:	Nugegoda-Katiya Junction-Pepiliyana Road Widening																																																
Project Description:	<ul style="list-style-type: none"> Nugegoda Intersection to Katiya Handiya along Old Kesbewa Road (0.8km): Standard two-lane road with a 1.5m cycle lane on either side. Katiya Handiya to High Level Road (Gamsaba Junction) along Subaddrama Road (0.5km): Standard two-lane road with a 1.5m cycle lane on either side. Gamsaba Junction to Bridge location along Dehiwala Road (0.8km): Standard two lane road with a 1.5m cycle lane on either side. Bridge Improvement at Udyana Mawatha. 																																																
Objectives:	<ul style="list-style-type: none"> Reduction in travel time and fuel use Improvement of connectivity to the domestic airport at Ratmalana Bypass facility for private vehicles traveling in north- south direction using local road network 																																																
Implementation Agency:	Road Development Authority																																																
Implementation Schedule:	<table border="1"> <thead> <tr> <th colspan="6">Project Implementation Schedule</th> </tr> <tr> <th></th> <th>Year 1</th> <th>Year 2</th> <th>Year 3</th> <th>Year 4</th> <th>Year 5</th> </tr> </thead> <tbody> <tr> <td>Land Acquisition</td> <td>■</td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Loan Agreement Negotiations</td> <td></td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Procurement of Consultants</td> <td></td> <td>■</td> <td>■</td> <td></td> <td></td> </tr> <tr> <td>Detail Design</td> <td></td> <td>■</td> <td>■</td> <td>■</td> <td></td> </tr> <tr> <td>Procurement of Contractor</td> <td></td> <td></td> <td>■</td> <td>■</td> <td>■</td> </tr> <tr> <td>Construction Supervision</td> <td></td> <td></td> <td></td> <td>■</td> <td>■</td> </tr> </tbody> </table> <p>Unexpected Project Extension ■</p>	Project Implementation Schedule							Year 1	Year 2	Year 3	Year 4	Year 5	Land Acquisition	■	■				Loan Agreement Negotiations		■				Procurement of Consultants		■	■			Detail Design		■	■	■		Procurement of Contractor			■	■	■	Construction Supervision				■	■
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Detail Design		■	■	■																																													
Procurement of Contractor			■	■	■																																												
Construction Supervision				■	■																																												
Anticipated Costs:	<p>Total Project Cost: US \$ 14.34 million</p> <p>Direct construction costs US \$ 0.93 million</p> <p>Engineering services expenses US \$ 0.07 million</p> <p>Land acquisition US \$ 7.53 million</p> <p>Compensation cost US \$ 5.81 million</p> <p>Total US \$ 14.34 million</p>																																																
Economic Analysis:	<p>EIRR = ---%, NPV = Rs. ---- million</p> <p>The Nugegoda-Katiya Junction-Pepiliyana Road Widening project's VOT reduction was quite small. This means that the widening of the Nugegoda-Pedpiliyana Road can be foregone without there being any adverse impacts in VOT terms as well.</p>																																																
Impacts on Land Acquisition/Resettlement:	Highly significant: 163 properties will be affected. A large Buddhist Temple and the Nugegoda Court Complex are situated along this road. Some residences will get their properties damaged. From Nugegoda Gamsabha Junction to Bailey Bridge at Dehiwala Road, some residences will be affected.																																																
Impacts on the Natural Environment:	Not significant: Temporary worker camps will have wastewater and solid waste disposal issues. Construction, excavation, and dredging can also create runoff which will pollute surface water in the canals.																																																
Impacts on the Social Environment:	Not significant: Construction related activities will require road blocks and traffic diversions which will cause delays and inconvenience road users.																																																
Recommendation:	Not feasible due to low return in economic aspects.																																																

Table A39.7 Pre-FS Result for Thalawatugoda-Pannipitiya Road Widening

Project Code:	Road-21																																																																																																																																																											
Project Name:	Thalawatugoda-Pannipitiya Road Widening																																																																																																																																																											
Project Description:	Talawatugoda to Pannipitiya-3.5km (This section traverse through different terrain condition and sub-grade soil conditions.) Design details available with RDA and right-of-way is 22.0m Road is designed as a 4-lane asphalt paved road (3.5m lane width) with a centre median of 1.2m. 2.4m sidewalk and 1.0m side drains are accommodated in the design.																																																																																																																																																											
Objectives:	Reduction in travel time Improvement of accessibility to the Administrative Capital from High Level Road Reduction in congestion on High Level Road up to Pannipitiya Development of residential and recreational activities around Talawatugoda																																																																																																																																																											
Implementation Agency:	Road Development Authority																																																																																																																																																											
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Anticipated Costs:	<p>Total Project Cost: US \$ 11.68 million (For Thalawathugoda – Pannipitiya 3.5km Only)</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 2.05 million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.14 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 3.99 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 5.5 million</td> </tr> <tr> <td>Total</td> <td>US \$ 11.68 million</td> </tr> </table>	Direct construction costs	US \$ 2.05 million	Engineering services expenses	US \$ 0.14 million	Land acquisition	US \$ 3.99 million	Compensation cost	US \$ 5.5 million	Total	US \$ 11.68 million																																																																																																																																																	
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Economic Analysis:	EIRR =17.50%, NPV = Rs. 940.4 million (Result for a project packaged with other widening projects (RWP-2 and RWP-4))																																																																																																																																																											
Impacts on Land Acquisition/Resettlement	Highly significant: RDA prepared a land acquisition plan and the type and number of partially and fully damaged houses along both sections. Total affected property is 165.																																																																																																																																																											
Impacts on the Natural Environment:	Not significant: Site clearing activities will affect air quality due to dust and particulate emissions during excavation, dredging, and vehicle movements. This area has more vegetation than most areas in Colombo District, but it is from home gardens.																																																																																																																																																											
Impacts on the Social Environment:	Not significant: Construction related activities will require road blocks and traffic diversions which will cause delays and inconvenience road users.																																																																																																																																																											
Recommendation:	Economically viable. It could be implemented. It is also attractive as it would improve a national road as well as provincial roads (RWP-2 and RWP-4), which are important for local traffic and as feeder and collector roads.																																																																																																																																																											

Table A39.8 Pre-FS Result for Thalawatugoda-Koskadwila Road Widening

Project Code:	Road-WP 2																							
Project Name:	Thalawatugoda-Koskadwila Road Widening																							
Project Description:	<p>The road connecting Pittakotte-Thalawathugoda-Hokandara-Kokadawila Road is the responsibility of the Western Provincial Road Development Authority (WPRDA) and is considered to be an alternate route between Nugegoda and Kaduwela bypassing Battaramulla and Malabe. This road starts at Pittakotte on (B120) and ends at Koskadawila (B263) and intersects B47 at Thalawathugoda. Improvements to this road will provide motorists with an alternate route, since Battaramulla – Malabe – Kaduwela Road is often congested. The total length of the project road is 8.4 km.</p> <p>This project includes increasing the right-of-way (ROW) from 10m to 13m (i.e. existing 5.0 m carriageway will be improved to a standard width of 7.0 m). It will also incorporate redefining cross sections with lane markings. Presently, this road is a substandard two-lane structure that passes through rural areas.</p>																							
Benefits:	<ul style="list-style-type: none"> • Reduce traffic congestion • Regularize traffic on the main roads. • Reduce vehicle operating costs • Reduce travel times • Reduce number of accidents 																							
Implementation Agency:	WPRDA																							
Implementation Schedule:	<table border="1"> <thead> <tr> <th></th> <th>Year - 1</th> <th>Year - 2</th> <th>Year - 3</th> <th>Year - 4</th> <th>Year - 5</th> </tr> </thead> <tbody> <tr> <td>Pre-Contract Assistance</td> <td>■</td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Construction</td> <td></td> <td>■</td> <td>■</td> <td>■</td> <td></td> </tr> </tbody> </table>							Year - 1	Year - 2	Year - 3	Year - 4	Year - 5	Pre-Contract Assistance	■	■				Construction		■	■	■	
	Year - 1	Year - 2	Year - 3	Year - 4	Year - 5																			
Pre-Contract Assistance	■	■																						
Construction		■	■	■																				
Anticipated Costs:	<p>Total Project Cost: US \$ 2.54 million</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 1.04million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.07 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 0.83 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 0.60 million</td> </tr> <tr> <td>Total</td> <td>US \$ 2.54 million</td> </tr> </table>						Direct construction costs	US \$ 1.04million	Engineering services expenses	US \$ 0.07 million	Land acquisition	US \$ 0.83 million	Compensation cost	US \$ 0.60 million	Total	US \$ 2.54 million								
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Engineering services expenses	US \$ 0.07 million																							
Land acquisition	US \$ 0.83 million																							
Compensation cost	US \$ 0.60 million																							
Total	US \$ 2.54 million																							
Economic Analysis:	EIRR =17.50%, NPV = Rs. 940.4 million (Result for a project packaged with other widening projects (Road-21 and RWP-4))																							
Impacts on Land Acquisition/Resettlement:	Not significant: Number of houses partially demolished is 18 and number of boundary walls to be removed is 133.																							
Impacts on the Natural Environment:	Not significant: Site clearing activities will affect air quality due to dust and particulate emissions during excavation, dredging, and vehicle movements. This area has more vegetation than most areas in Colombo District, but it is from home gardens.																							
Impacts on the Social Environment:	Not significant: Existing utility infrastructure such as telephone and power lines, as well as some water supply lines, will need to be relocated. This will cause short-term but significant inconvenience to the community.																							
Recommendation:	<p>Economically viable. It could be implemented.</p> <p>This scheme is also attractive as it would improve a national road (Road-21) as well as provincial roads (RWP-4), which are important for local traffic and as feeder and collector roads</p>																							

Table A39.9 Pre-FS Result for Pannipitiya-Tumbowil Road Widening

Project Code:	Road-WP 4																							
Project Name:	Pannipitiya-Tumbowil Road Widening																							
Project Description:	Pannipitiya-Moralatiya-Tumbowila Road is the responsibility of the Western Provincial Road Development Authority (WPRDA) and is considered to be an alternate route between Moratuwa to Battaramulla bypassing Piliyandala and Maharagama. This road starts at Moratuwa to Battaramulla bypassing Piliyandala and Maharagama (B-47) and ends at Suwarapola (B-295) and intersects A-04 at Morakettiya and B-84 at Bokundara. The total length of the project road is 7.4 km.																							
	This project includes increasing the right-of-way (ROW) from 10m to 13m (i.e. existing 5.0 m carriageway will be improved to a standard width of 7.0 m). It will also incorporate redefining cross sections with lane markings. Presently, this road is a substandard two-lane structure that passes through rural areas.																							
Objectives:	<ul style="list-style-type: none"> • Reduce traffic congestion • Regularize traffic on the main roads • Reduce vehicle operating costs • Reduce travel times • Reduce number of accidents 																							
Implementation Agency:	WPRDA																							
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	Year - 1	Year - 2	Year - 3	Year - 4	Year - 5																			
Pre-Contract Assistance																								
Construction																								
Anticipated Costs:	<p>Total Project Cost: US \$ 4.99 million</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 1.72million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.12 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 1.45 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 1.69 million</td> </tr> <tr> <td>Total</td> <td>US \$ 4.99 million</td> </tr> </table>						Direct construction costs	US \$ 1.72million	Engineering services expenses	US \$ 0.12 million	Land acquisition	US \$ 1.45 million	Compensation cost	US \$ 1.69 million	Total	US \$ 4.99 million								
Direct construction costs	US \$ 1.72million																							
Engineering services expenses	US \$ 0.12 million																							
Land acquisition	US \$ 1.45 million																							
Compensation cost	US \$ 1.69 million																							
Total	US \$ 4.99 million																							
Economic Analysis:	EIRR =17.50%, NPV = Rs. 940.4 million (Result for a project packaged with other widening projects (Road-21 and RWP-2))																							
Impacts on Land Acquisition/Resettlement:	Not significant: Number of houses partially affected is 51 and number of boundary walls to be removed is 256.																							
Impacts on the Natural Environment:	Not significant: Site clearing activities will affect air quality due to dust and particulate emissions during excavation, dredging, and vehicle movements. This area has more vegetation than most areas in Colombo District, but it is from home gardens.																							
Impacts on the Social Environment:	Not significant: Existing utility infrastructure such as telephone and power lines, as well as some water supply lines, will need to be relocated. This will cause short-term but significant inconvenience to the community.																							
Recommendation:	<p>Economically viable. It could be implemented.</p> <p>This scheme is also attractive as it would improve a national road (Road-21) as well as provincial roads (RWP-2), which are important for local traffic and as feeder and collector roads.</p>																							

Table A39.10 Pre-FS Result for Orugodawatta Flyover (Baseline Road)

Project Code:	Road-6																																																															
Project Name:	Orugodawatta Flyover (Baseline Road)																																																															
Project Description:	<p>Orugodawatte Intersection is located on the northern section of Baseline Road and intersects with an important radial road that leads to/from the center of Colombo. The design overview for the flyover is as follows:</p> <ul style="list-style-type: none"> • The flyover will be a four-lane carriageway and will be located on Baseline Road crossing over Orugodawatte Intersection; and • The alignment of the flyover will be set so as to avoid a sacred Bo tree located near the intersection. That is, the width of the flyover shall be adjusted to ensure that the tree is not cut down. 																																																															
Objectives:	<ul style="list-style-type: none"> • To secure free-flow speeds for through traffic at busy junctions on existing sections 																																																															
Implementation Agency:	Road Development Authority																																																															
Anticipated Costs:	<p>Total Project Cost: US \$ 13.03 million</p> <p>Flyover construction at Orugodawatta Intersection</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 9.93 million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.69 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 1.37 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 1.04 million</td> </tr> <tr> <td>Total</td> <td>US \$ 13.03 million</td> </tr> </table>	Direct construction costs	US \$ 9.93 million	Engineering services expenses	US \$ 0.69 million	Land acquisition	US \$ 1.37 million	Compensation cost	US \$ 1.04 million	Total	US \$ 13.03 million																																																					
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Economic Analysis:	EIRR = 19.38%, NPV = Rs. 631.3 million																																																															
Impacts on Land Acquisition/Resettlement:	Not significant: Construction of the flyover will require approximately an area six meters wide and 350 meters long on each side of the alignment for service roads. 32 properties will be affected. The area is a highly developed area with minimal natural habitats or vegetation, except for the Bo tree near the junction. The flyover alignment will encroach on the canopy of the tree.																																																															
Impacts on the Natural Environment:	Not significant: Site clearing activities will affect air quality due to dust and particulate emissions during excavation, dredging, and vehicle movements. Noise and vibration generated from construction activities will also affect the area. Toxic emissions from asphalt plants and particulate matter from concrete mixing plants will also pose an environmental and health hazard.																																																															
Impacts on the Social Environment:	Not significant: Construction workers might have conflicts with local communities, although as there are few residential facilities in the area, this is not a large concern.																																																															
Recommendation:	Highly feasible in both economically and environmentally.																																																															

Table A39.11 Pre-FS Result for Borella-Kanata Flyover (Baseline Road)

Project Code:	Road-6																																																															
Project Name:	Borella-Kanata Flyover (Baseline Road)																																																															
Project Description:	<p>This proposed section is also located on Baseline Road, south of Orugodawatte Intersection. The flyover is designed to cross over three highly congested intersections: Borella, D.S. Senanayake, and Kanatta. The design overview is as follows:</p> <ul style="list-style-type: none"> The flyover will consist of a four-lane carriageway, with two two-lane access roads to be constructed on either side in order to access the at-grade crossing; The alignment of the flyover is designed as close to the existing Baseline Road as possible in order to minimize land acquisition; and To prevent impacts on the cemetery adjacent to Kanatta Intersection, the flyover is extended to the south. 																																																															
Objectives:	<ul style="list-style-type: none"> To secure free-flow speeds for through traffic at busy junctions on existing sections 																																																															
Implementation Agency:	Road Development Authority																																																															
Anticipated Costs:	<p>Total Project Cost: US \$ 58.38 million</p> <p>Flyover construction at Borella Crossing to Bauddaloka Mawatha Intersection, four lane capacity, approximately 1.7km</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 44.72 million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 3.14 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 3.9 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 6.62 million</td> </tr> <tr> <td>Total</td> <td>US \$ 58.38 million</td> </tr> </table>	Direct construction costs	US \$ 44.72 million	Engineering services expenses	US \$ 3.14 million	Land acquisition	US \$ 3.9 million	Compensation cost	US \$ 6.62 million	Total	US \$ 58.38 million																																																					
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Economic Analysis:	EIRR = 12.74%, NPV = Rs. 212.8 million																																																															
Impacts on Land Acquisition/Resettlement:	Highly Significant: Construction of the flyover will require approximately an area six meters wide and 350 meters long on each side of the alignment for service roads. The Study Team conducted an affected property inventory and the result was 188 properties affected.																																																															
Impacts on the Natural Environment:	Not significant: The area is a highly developed area with minimal natural habitats or vegetation. However, the three large Acacia trees in the roundabout near the cemetery junction have been there for many years and serve as a significant landmark. Construction of the flyover will require pruning the tree branches.																																																															
Impacts on the Social Environment:	Moderately significant: Construction related activities will require road blocks and traffic diversions which will cause delays and inconvenience road users. This is of great concern since this is a central location with key developments like the cemetery, two schools, and the hospital.																																																															
Recommendation:	Economically and environmentally feasible. This flyover's EIRR slightly exceeds 12% and could therefore become unviable. If this project is to be implemented, its costs should be carefully monitored and controlled.																																																															

Table A39.12 Pre-FS Result for Kohuwala Flyover


Project Code:	Road-15																																																																																																																																																											
Project Name:	Kohuwala Flyover																																																																																																																																																											
Project Description:	<p>The Kohuwala Flyover is the only Pre-FS flyover located on a Class B road. The design overview for this project is as follows:</p> <ul style="list-style-type: none"> • The flyover will consist of a two-lane carriageway with two one-lane access roads on either side and will be located on Colombo-Horana Road; • The flyover's alignment is designed along the existing road to minimize land acquisition; • The flyover's vertical grade adheres to the existing grades at both ends of the flyover; and • Land acquisition is necessary on either side of the flyover and ramps. 																																																																																																																																																											
Objectives:	<ul style="list-style-type: none"> • To secure free-flow speeds for through traffic at busy junctions on existing sections 																																																																																																																																																											
Implementation Agency:	Road Development Authority																																																																																																																																																											
Anticipated Costs:	<p>Total Project Cost: US \$ 9.05 million</p> <p>Flyover Construction Cost at Kohuwala Intersection</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 2.44 million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.18 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 4.04 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 2.39 million</td> </tr> </table>	Direct construction costs	US \$ 2.44 million	Engineering services expenses	US \$ 0.18 million	Land acquisition	US \$ 4.04 million	Compensation cost	US \$ 2.39 million																																																																																																																																																			
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Economic Analysis:	EIRR = 21.75%, NPV = Rs. 846.6 million																																																																																																																																																											
Impacts on Land Acquisition/Resettlement:	Moderately Significant: Construction of the flyover will require approximately an area six meters wide and 350 meters long on each side of the alignment for service roads. The Study Team conducted inventory survey on the affected properties and the result showed that 75 properties will be affected.																																																																																																																																																											
Impacts on the Natural Environment:	Not significant: The area is a highly developed area with minimal natural habitats or vegetation and therefore, there will be no impact on natural vegetation, bio-diversity, or rare and endangered species.																																																																																																																																																											
Impacts on the Social Environment:	Moderately significant: Construction related activities will require road blocks and traffic diversions which will cause delays and inconvenience road users. This is of great concern during peak periods as traffic is already quite heavy. Existing utility infrastructure such as telephone and power lines, as well as some water supply lines, will need to be relocated.																																																																																																																																																											
Recommendation:	Highly feasible in both economically and environmentally.																																																																																																																																																											

Table A39.13 Pre-FS Result for Armour Street Flyover

Project Code:	Road-17																																																								
Project Name:	Armour Street Flyover																																																								
Project Description:	<p>This flyover will be located on A1 Road, which is the most important route to connect Colombo and Kandy. The design overview for the flyover is as follows:</p> <ul style="list-style-type: none"> • The main traffic flows are from south to east and as a result it is recommended that the flyover turn right from Sri Sumanatissa Road onto Central Road heading east; • The flyover will consist of a two-lane carriageway • The flyover's alignment will pass over an existing traffic island and a flyover pier will be built there; and • Passage from the intersecting road south of the intersection will become impossible as the ramp of the flyover will be located there. 																																																								
Objectives:	<ul style="list-style-type: none"> • To secure free-flow speeds for through traffic at busy junctions on existing sections 																																																								
Implementation Agency:	Road Development Authority																																																								
Anticipated Costs:	<p>Total Project Cost: US \$ 30.46 million</p> <p>Flyover Construction Cost at Armour Street Intersection</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 4.78 million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.33 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 8.10 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 4.43 million</td> </tr> <tr> <td>Total</td> <td>US \$ 17.64 million</td> </tr> </table>	Direct construction costs	US \$ 4.78 million	Engineering services expenses	US \$ 0.33 million	Land acquisition	US \$ 8.10 million	Compensation cost	US \$ 4.43 million	Total	US \$ 17.64 million																																														
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Economic Analysis:	EIRR = 20.61%, NPV = Rs. 1364.5 million																																																								
Impacts on Land Acquisition/Resettlement:	Highly significant: Affected properties will be 126. Land acquisition is unnecessary for the section of the flyover on Sri Sumanatissa Road, but will be necessary for the south side of Central Road to ensure a sufficient right-of-way.																																																								
Impacts on the Natural Environment:	Not significant: The area is a highly developed area with minimal natural habitation or vegetation and therefore, there will be no impact on ecological aspects of the environment.																																																								
Impacts on the Social Environment:	Not significant: As Panchikawatte Junction is already heavily congested, further blocking the roads for construction activities will cause greater road congestion. Temporary on-site workers will only be a minor nuisance factor since it is already full of commuters from various parts of the country.																																																								
Recommendation:	Economically highly feasible and environmentally feasible.																																																								

Table A39.14 Pre-FS Result for Kelaniya Railway Flyover


Project Code:	Road-17																																																															
Project Name:	Kelaniya Railway Flyover																																																															
Project Description:	<p>This flyover will be located on A1 Road and will cross the existing railway. The road and railway do not cross at a 90-degree angle. The design overview is as follows.</p> <ul style="list-style-type: none"> • The flyover will consist of a two-lane carriageway with two one-lane access roads; • Due to the skewed crossing, the flyover will be designed as two separate structures for the two opposing traffic flows; • The vertical alignment has taken into consideration the area where the number of railway tracks is increased; and • Land acquisition is necessary for both sides of the flyover. 																																																															
Objectives:	<ul style="list-style-type: none"> • To secure free-flow speeds for through traffic at busy junctions on existing sections 																																																															
Implementation Agency:	Road Development Authority																																																															
Anticipated Costs:	<p>Total Project Cost: US \$ 12.82 million</p> <p>Flyover Construction Cost at Kelaniya Railway Crossing</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 6.76 million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.47 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 3.27 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 2.32 million</td> </tr> <tr> <td>Total</td> <td>US \$ 12.82 million</td> </tr> </table>	Direct construction costs	US \$ 6.76 million	Engineering services expenses	US \$ 0.47 million	Land acquisition	US \$ 3.27 million	Compensation cost	US \$ 2.32 million	Total	US \$ 12.82 million																																																					
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						■																																																										
Economic Analysis:	EIRR = 16.31%, NPV = Rs. 336.9 million																																																															
Impacts on Land Acquisition/Resettlement:	Moderately Significant: 77 properties will be affected for land acquisition. About 80% of the development is commercial, although beyond the junction there is a Buddhist Temple and school for priests. There are squatters living along the railway right-of-way.																																																															
Impacts on the Natural Environment:	Not significant: Remaining natural habitats and vegetation is rather limited and therefore, there will be minimal impact on the ecological aspects of the environment.																																																															
Impacts on the Social Environment:	Not significant: Worker safety is an issue due to the proximity of the railway. Existing utility infrastructure such as telephone and power lines, as well as some water supply lines, will need to be relocated. This will cause short-term but significant inconvenience to the community.																																																															
Recommendation:	Economically feasible. Environmentally highly feasible.																																																															

Table A39.15 Pre-FS Result for Rajagiriya Flyover

Project Code:	Road-43																																				
Project Name:	Rajagiriya Flyover																																				
Project Description:	<p>Rajagiriya Intersection is located on a small curve on A0 Road, which is one of Colombo's most important arterial roads as it leads to the country's Parliament.</p> <ul style="list-style-type: none"> The flyover, which will consist of a four-lane carriageway, will be located on A0 Road and cross over Rajagiriya Intersection; The alignment of the flyover is set to run along the existing road as much as possible in order to avoid a sacred Bo tree and Welikada Plaza; and It is recommended that traffic operations of the two intersecting roads from the south be changed to ensure smoother traffic flows: one would be converted to a one-way street from a two-way street and the other to a two-way street from a one-way street. 																																				
Objectives:	<ul style="list-style-type: none"> To secure free-flow speeds for through traffic at busy junctions on existing sections 																																				
Implementation Agency:	RDA																																				
Anticipated Costs:	<p>Total Project Cost: US \$ 14.60 million</p> <table> <tr> <td>Direct construction costs</td> <td>US \$ 8.35 million</td> </tr> <tr> <td>Engineering services expenses</td> <td>US \$ 0.58 million</td> </tr> <tr> <td>Land acquisition</td> <td>US \$ 4.04 million</td> </tr> <tr> <td>Compensation cost</td> <td>US \$ 1.62 million</td> </tr> <tr> <td>Total</td> <td>US \$ 14.60 million</td> </tr> </table>	Direct construction costs	US \$ 8.35 million	Engineering services expenses	US \$ 0.58 million	Land acquisition	US \$ 4.04 million	Compensation cost	US \$ 1.62 million	Total	US \$ 14.60 million																										
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Implementation Schedule:	<table border="1"> <thead> <tr> <th></th> <th>Year - 1</th> <th>Year - 2</th> <th>Year - 3</th> <th>Year - 4</th> <th>Year - 5</th> </tr> </thead> <tbody> <tr> <td>Feasibility Study</td> <td>■</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Basic Design</td> <td></td> <td>■</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Detailed Design</td> <td></td> <td></td> <td>■</td> <td></td> <td></td> </tr> <tr> <td>Pre-Contract Assistance</td> <td></td> <td></td> <td></td> <td>■</td> <td></td> </tr> <tr> <td>Construction</td> <td></td> <td></td> <td></td> <td>■</td> <td>■</td> </tr> </tbody> </table>		Year - 1	Year - 2	Year - 3	Year - 4	Year - 5	Feasibility Study	■					Basic Design		■				Detailed Design			■			Pre-Contract Assistance				■		Construction				■	■
	Year - 1	Year - 2	Year - 3	Year - 4	Year - 5																																
Feasibility Study	■																																				
Basic Design		■																																			
Detailed Design			■																																		
Pre-Contract Assistance				■																																	
Construction				■	■																																
Economic Analysis:	EIRR = 6.35%, NPV = Rs. -401.6 million																																				
Impacts on Land Acquisition/Resettlement:	Moderately Significant: 56 properties will be affected There is no vegetation of any kind at the intersection, except for some greenery in the children's park adjacent to the intersection. Rajagiriya Intersection is highly commercialized.																																				
Impacts on the Natural Environment:	Not significant: The area is a highly developed area with minimal natural habitation or vegetation and therefore, there will be no impact on the ecological aspects of the environment. The alignment of the flyover might encroach on the elderly facility and therefore attention should be paid to minimize impacts on the facility and the Bo tree.																																				
Impacts on the Social Environment:	Not significant: Rajagiriya Junction is an extremely congested intersection due to heavy traffic flows along Parliament Road. Therefore, during construction there will be severe road blocks. It is envisaged that there will be an increase in traffic due to the improvements and unless proper measures are taken.																																				
Recommendation:	Not Feasible due to low economic return. It is recommended that traffic congestion will be handled via signalization and geometric improvements, which is feasible.																																				

Table A39.16 Pre-FS Result for Area Traffic Control System Project

Project Code:	TM-2																											
Project Name:	Area Traffic Control System Project																											
Project Description:	<p>The project will introduce an area traffic control (ATC) system to Colombo. The system consists of the following equipment and soft components:</p> <ul style="list-style-type: none"> • Central computer system 1 set • Control software 1 set • Control center facilities 1 set • Local controller and accessories 120 units • Intersection turning movement count survey • Signal design and timing calculation • Geometric Improvement of intersections • Training of CMC staff on traffic engineering and Traffic Police on signal system 																											
Objectives:	<p>The objectives of area traffic control (ATC) system are to realize smooth and safe traffic and prevent congestion where possible. To attain these goals, an ATC system maximizes intersection capacity and creates balanced and predictable traffic conditions.</p>	<pre> graph TD WPC[Western Provincial Council (Executing Agency)] --> PMU[Project Management Unit (within WPC)] PMU --> PD[Project Director] PD --> DPC[Deputy Project Director Survey, design & construction] PD --> DPO[Deputy Project Director Operations & Maintenance] PD --> DPA[Deputy Project Director Administration & Accounts] DPC --> SHSD[Section Head Survey & Design] DPO --> SHSO[Section Head System Operations] DPO --> SHM[Section Head Maintenance] DPA --> SHAd[Section Head Administration] </pre>																										
Implementation Agency:	A Project Management Unit will be setup in Western Provincial Council to implement the project. PMU staff will be manned by CMC, Traffic Police and possibly RDA in addition to WPC staff.																											
Anticipated Costs:	Geometric improvement works:	3.742 million US\$																										
	ATC System:	13.545 million US\$																										
	Technical assistance:	2.934 million US\$																										
	Total project cost:	20.221 million US\$																										
Implementation Schedule:	<table border="1"> <thead> <tr> <th>No.</th> <th>Items</th> <th>Year 1</th> <th>Year 2</th> <th>Year 3</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Site survey</td> <td>█</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>Detailed design</td> <td>█</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>Contractor selection</td> <td></td> <td>█</td> <td></td> </tr> <tr> <td>4</td> <td>Construction</td> <td></td> <td>█</td> <td>█</td> </tr> </tbody> </table>	No.	Items	Year 1	Year 2	Year 3	1	Site survey	█			2	Detailed design	█			3	Contractor selection		█		4	Construction		█	█		
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1	Site survey	█																										
2	Detailed design	█																										
3	Contractor selection		█																									
4	Construction		█	█																								
Economic Analysis:	EIRR = 41.30%, NPV = Rs. 1904.2 million																											
Impacts on Land Acquisition/Resettlement:	No land acquisition is required																											
Impacts on the Natural Environment:	No Impact																											
Impacts on the Social Environment:	Minor disturbance to traffic during construction work is expected																											
Recommendation:	Highly Feasible. This project can start immediately depending on the availability of funds.																											

Appendix 40 Time Savings Estimation for the Kelani Railway Flyover

To estimate time savings of the Kelani Railway Flyover, an empirical approach was taken and delay at each gate closure was calculated. The estimation procedure adopted is shown below.

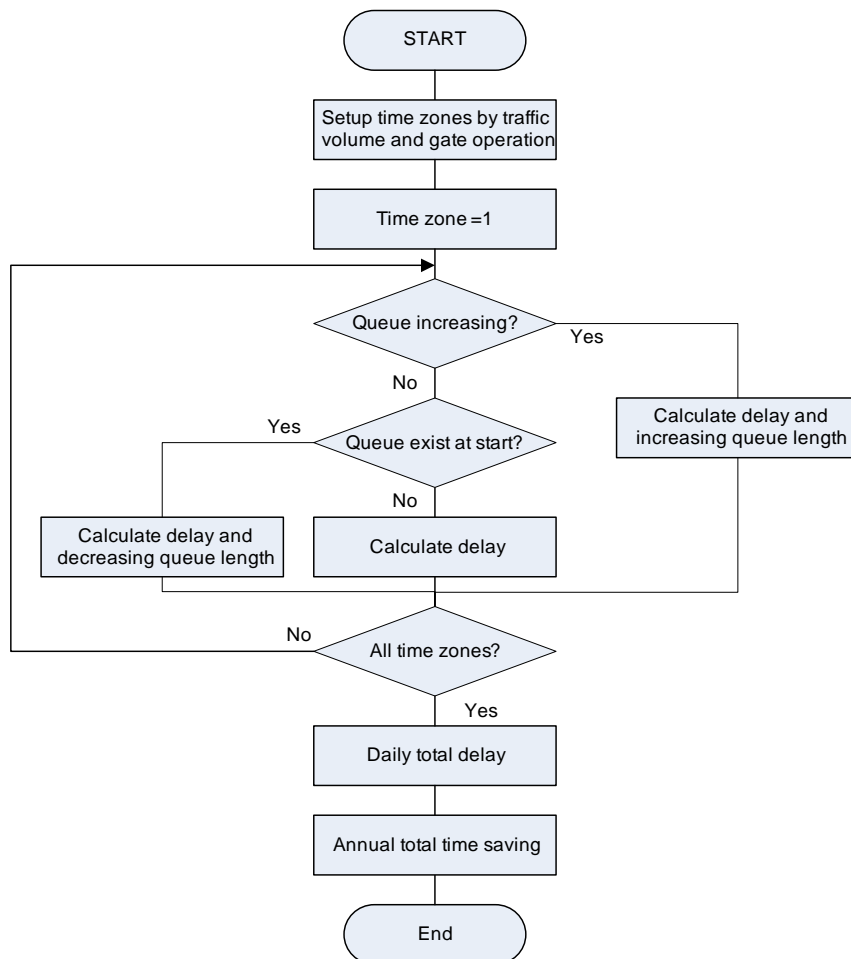


Figure A40.1 Process to Estimate Time Savings for Kelani Railway Flyover

A day was divided into several time groups based on the traffic volume that passes the railway crossing and the frequency of gate operations. It was assumed that gate operations are cyclical with a fixed closed and open time within one time zone. However, different time zones have different closed and open times. The delay caused by the gate's closure during each time zone was estimated through three different cases described below. It is noted that in the first two cases, total and average delays are different between cycles even though gate operations are cyclical due to the carryover of the queue.

- Arriving traffic is larger than discharging traffic, so a queue develops with time (see Figure A40.2);
- Arriving traffic is smaller than discharging traffic, but there is a carryover from a previous gate closure; and

- Arriving traffic is smaller than discharging traffic and there is no queue at the start of time zone.

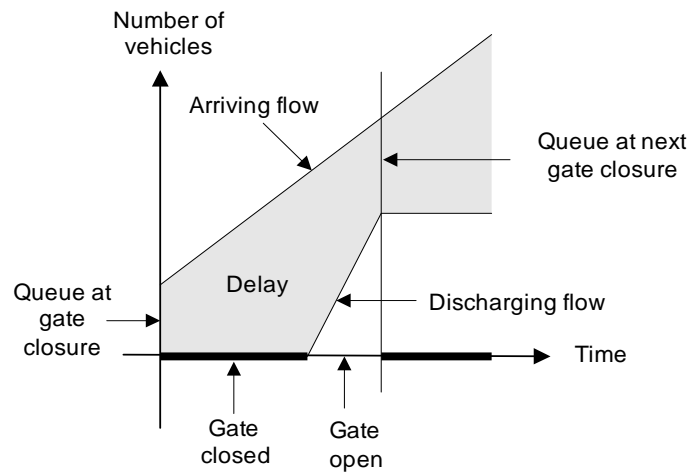


Figure A40.2 Gate Operations and Increasing Queue