Road Development Authority

NATIONAL ROAD MASTER PLAN
2021 - 2030

MAIN REPORT




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1. Introduction

1.1. Background

Sri Lanka is a lower-middle-income country with a GDP per capita of 3,682 (2020) and a total population of 21.8 million. The road sector provides for the majority of the country's transport demand, carrying approximately 95% of passenger traffic (in 2012), and 97% of freight. The deterioration of the rail sector has also resulted in the rail network carrying only 5% of passenger traffic and 2% of freight. Water modes carry just 1% of all internal freight. This prominence of the road sector is largely due to the significant share of national resources allocated to the road network over the past decades.

Sri Lanka owns a very well spread-out road network of about 119,000km. The current road density of Sri Lanka is 1.7 km of roads per square kilometer, a very high number when compared to its regional peers. Sri Lanka's road network is classified into National, Provincial, Pradeshiya Saba, Local Authority roads and roads built under numerous development projects (e.g. under major irrigation schemes and hydro power complexes) according to their functionality and administrative responsibility. The 12,380km of National roads comprising of class "A" roads (trunk roads), class "B" roads (main roads), and Expressways (E) are administered by the central government through the Road Development Authority (RDA) as the executing agency. However, Local Authorities of Sri Lanka are responsible for administration of the majority, nearly 56%, of the road network. Nine provincial councils are responsible for the administration and management of Provincial roads. Thus, the Provincial Councils and Local Authorities manage the vast majority of the road network and this portion of the network is predominantly in regional areas and provides access to more than 80% of the population of Sri Lanka.

The national policy framework highlights "high priority to upgrade and develop road and rail infrastructure to provide comfortable, efficient and environment friendly transportation to the general public while ensuring economic growth" as the policy with regard to the land transport sector as and development of road network is one of the main strategies.

To be in line with this national policy, it is significant to enhance accessibility to regional growth centers to central business areas and other service facilities, island wide creating employment opportunities, enhancing the quality of life of the people and ensuring overall economic development. To carry out this task efficiently and accurately with the limited government budget allocation, it is necessary to perform scientific analysis of the road network and provide factual justifications in requesting funding for maintenance and enhancement of the road network. Therefore, a sustainable long-term program of operation, maintenance and development that delivers value for money while optimizing Road Asset Management cost is essential. The National Road Master Plan provides a long- term program for National road maintenance/ improvements and it will play a vital role by identifying investment priorities based on scientific analysis.

In 2004-2005, the first Road Sector Master Plan was attempted with the assistance of international consultants. However, due to many drawbacks in this Master Plan it was not implemented. Subsequently in 2007, the RDA Planning Division prepared the National Road Master Plan 2007-2017 with the assistance of the Asian Development Bank (ADB). The NRMP 2007- 2017 document was prepared for the development and maintenance management of the National Road network under the jurisdiction of the Road Development Authority.

It has so far been utilized to implement a majority of projects from 2007 to 2017. However, mandatory changes to the NRMP 2007 – 2017 were made after taking into account the socio- economic and political environment during the period.

With the large investment carried out for road sector especially for National roads in the past, access and mobility of the road network has improved considerably facilitating development of other sectors. However, there are some issues which need urgent attention to increase the efficiency of the road network.

1.2. Road Development Authority

The Road Development Authority (RDA), was incorporated as a statutory body under the Ministry of Highways by the RDA Act No.73 of 1981. The functions of the RDA were expanded in 1986 when it became the successor to the Department of Highways. Since then, the RDA is responsible for the maintenance, development and upgrading of the National Road network of Sri Lanka. The current National Road Master Plan (2021-2030) has been prepared as a plan to fulfill this requirement.

Vision of RDA: Sustainably Developed Sri Lanka

Mission of RDA*:* As the premier national organization of the road sector, to provide an adequate and efficient network of national highways, to ensure mobility and accessibility at an acceptable level of safety and comfort, in an environment friendly manner, for the movement of people and goods paving way for the socio-economic development of the nation.

1.3. Overview of Demand for Road Transport

As discussed in the Background above demand for Road Transport is increasing rapidly with the growth in the vehicle fleet due to non-availability of other competitive transport modes.

It is evident that Rail based transport modes or water transport have not development in par with the economic development occurred during the past few decades.

The vehicle population according to the department of motor traffic in Sri Lanka from 2014 to 2019 is shown in the following table.

Table 1:1: Vehicle Population in Sri Lanka

Vehicle Type	2014	2015	2016	2017	2018	2019	Modal Share for 2019
Motor Cars	566,874	672,502	717,674	756,856	837,636	875,864	11%
Motor Tricycle	929,495	1,059,042	1,115,987	1,139,524	1,159,158	1,175,077	15%
Motor Cycles	2,988,612	3,359,501	3,699,630	4,044,010	4,383,182	4,668,074	58%
Buses	97,279	101,419	104,104	107,435	110,392	112,005	1%
Dual purpose vehicles	325,545	365,001	391,888	408,630	425,895	439,020	5%
Motor Lorries	334,769	341,911	349,474	352,275	361,294	375,500	5%
Land Vehicles-Tractors	333,362	343,339	353,624	362,445	369,948	375,601	5%
Land Vehicles-Trailers	57,298	59,426	63,088	75,947	78,841	72,108	1%
Quadricycle/Motor Home						1,975	0%
Total	**5,633,234**	**6,302,141**	**6,795,469**	**7,247,122**	**7,726,346**	**8,095,224**	**100%**

However, it is a matter of fact that out of the total number of vehicles indicated in the table 1-1 considerable numbers of vehicles are not at operational status by now. At present, there is no proper system to deduct the number of vehicles that are not in active vehicle fleet from the vehicle population.
Therefore, in all our analysis and planning processes we consider that the active vehicle fleet of the country comprised of the number of vehicles with valid revenue licenses and those are tabulated in the table 1- 2. According to that, the active vehicle fleet in Sri Lanka is rapidly increasing from 3,755,356 in 2014 to 5,602,330 in 2019 which shows 49% increase with respect to the number of vehicles in 2014. It is clearly observed that around 85% of the vehicle population comprise of private vehicles (motor cycles, three wheelers and private cars) where motor cycles have the highest share of 54% among the vehicle population. This undoubtedly proves that owning of private vehicles has been drastically increased with respect to the decline of public transport facilities.

Table 1:2: Active motor vehicle fleet in Sri Lanka

Vehicle Type	2014	2015	2016	2017	2018	2019	Percentage in 2019
Omni busses	12,967	20,803	19,883	20,488	54,189	22399	0%
Private coaches	32,094	30,833	32,320	36,581		37112	1%
Dual purpose vehicles	294,375	336,542	357,125	377,680	363,553	401444	7%
Private cars	410,917	540,806	573,920	620,133	582,575	726711	13%
Land vehicles	92,979	100,433	108,849	110,726	108,176	114298	2%
Goods transport vehicles	211,662	219,619	221,260	236,186	219,052	231935	4%
Motor cycles	1,885,065	2,227,120	2,437,105	2,624,917	2,729,762	3023304	54%
Three wheelers	810,814	932,016	978,977	1,009,921	971,954	1041190	19%
Others	4,483	13,119	7,875	4,261	1,895	3937	0%
Total	**3,755,356**	**4,421,291**	**4,737,314**	**5,040,893**	**5,031,156**	**5,602,330**	**100.00%**

Due to the increment of private vehicle ownership, the demand for road space has been increased in the recent past causing more and more congestion on roads. Every year a colossal sum of public funds are being used for widening & improvement of existing roads. Therefore, it is apparent that the time has arrived to enhance the public transport facilities while discouraging private vehicle usage by introducing bus lanes, bicycle lanes and pedestrian friendly walkways in the road planning. Hence, the implementation of such interventions as remedies would help to minimize the passengers who tend to divert himself/herself being a public transport captive rider to private vehicle owned choice rider.

Status of the Western Province

Being the capital of Western province Colombo city has about seven major entry points which bring the traffic to the city. Table 1-4 shows the vehicle flows at CMC entry points which has been recorded during the first quarter of the year 2019. This indicates that around 89% of the vehicles are private vehicles which comprise of motor cycles, three wheelers and cars. Among those vehicles only 2.4% of the total vehicles are buses which carry more passengers when compared to the numbers carrying by private vehicles into the city.

Table 1:3: Province wise active vehicle population

Province	2014	2015	2016	2017	2018	2019
Western	1,398,377	1,595,719	1,688,341	1,763,267	1,557,983	1,883,982
Central	305,477	344,011	380,734	411,923	443,113	469,437
Southern	467,561	575,869	613,133	640,745	678,133	698,502
Northern	165,742	199,328	219,985	237,689	272,285	294,367
Eastern	240,009	286,234	322,916	348,632	374,799	402,539
North western	517,531	592,936	639,229	675,181	718,283	756,646
North Central	250,614	311,700	338,036	357,739	375,447	398,077
Uva	161,479	203,798	230,082	243,017	254,149	286,898
Sabaragamuwa	248,566	311,296	304,858	362,700	356,964	411,882
All island	**3,755,356**	**4,421,291**	**4,737,314**	**5,040,893**	**5,031,156**	**5,602,330**

Table 1:4: Vehicle composition of CMC entry points

Vehicle Type	Motor cycle	Three Wheel	Car	Van	Medium Bus	Large Bus
Percentage (%)	24.5	29.7	34.6	3.4	0.6	1.8

Table 1-5 illustrates that the majority of the active vehicles are registered under Western Province of the Sri Lanka. It indicates that the demand for road usage is higher in the western province than in the other parts of the country. However, scarcity of the land is considered as one of the major problems in the Western Province as it has already reached the highest road density in the country. Therefore, it is evident that widening & improvement of existing road network would not be a viable solution for ever increasing transport demand.

Table 1:5: Province wise percentage vehicle population

Province	2015	2016	2017	2018	2019	2020
Western	36%	36%	35%	31%	34%	32%
Central	8%	8%	8%	9%	8%	9%
Southern	13%	13%	13%	13%	12%	13%
Northern	5%	5%	5%	5%	5%	5%
Eastern	6%	7%	7%	7%	7%	7%
North Western	13%	13%	13%	14%	14%	13%
North Central	7%	7%	7%	7%	7%	7%
Uva	5%	5%	5%	5%	5%	5%
Sabaragamuwa	7%	6%	7%	7%	7%	7%

Further, table 1-5 shows that active vehicle fleet in the western province has been decreased over recent past. However, according to the percentages shown in table 1-6, it indicates that private vehicles (Private cars and motor cycles) have been increased despite the fact that active vehicle percentage in Western Province being decreased. Therefore, it is very well understood that the road space is highly occupied by the private vehicles than the public transport vehicles.

Table 1:6: Vehicle composition of Western Province

Vehicle Type	2015	2016	2017	2018	2019	2020
Omni Buses	0.55%	0.51%	0.41%	0.41%	0.53%	0.45%
Private Coaches	1.00%	0.97%	0.97%	0.96%	0.96%	0.86%
Dual Purpose Vehicles	9.27%	8.85%	8.69%	8.40%	8.32%	8.38%
Private Cars	20.91%	20.53%	18.20%	19.06%	21.94%	22.26%
Land Vehicles	0.94%	0.94%	0.73%	0.72%	0.82%	0.77%
Goods Transport Vehicles	5.94%	5.69%	5.25%	5.13%	5.07%	4.97%
Motor Cycles	42.09%	43.39%	46.43%	46.92%	45.01%	45.35%
Three wheelers	19.25%	19.06%	19.31%	18.37%	17.25%	16.85%
Others	0.05%	0.05%	0.03%	0.03%	0.11%	0.12%

However, the demand for transportation is ever increasing and supply of adequate road infrastructure facilities to cater future demand is challenging. Every effort has been taken to address the expected challenges and to cater for the future demand when compiling this master plan.

1.4. Purpose of the National Road Master Plan (NRMP)

The National Road Master Plan (NRMP) is underpinned by a sectoral policy to enable the road sector to respond to economic and social needs coherent with the country's macro-economic environment. The NRMP identifies investment priorities in the road sector over a ten year period, paying particular attention to the availability of resources. It provides a physical plan for maintenance, rehabilitation, improvement of the existing network, new road construction, and sets out funding requirement for National Highways.

The availability of a Master Plan is very important in the implementation of projects in priority basis and do away with the project centric approach which will reduce the impact of investment to the economy of the country.

The RDA has a distinct responsibility for the development, maintenance and proper management of the national road network in the country. Accordingly, preparation of new Master Plan is timely for RDA.

With Sri Lanka committing to the UN 2030 agenda for sustainable development in 2015, all government organizations are required to ensure the achievement of Sustainable Development Goals by 2030. The NRMP will play a crucial role by identifying critical national requirements accurately, while keeping in line with the national objectives aimed at achieving 6.5% or higher GDP growth rate, per capita income exceeding USD 6500, unemployment rate below 4%, maintaining budget deficit below 4% of GDP and inflation rate below 5% during 2020-2025 and to the overall social-economic prosperity of the country.

1.5. Development of National Road Master Plan

In 2018, the National Road Master Plan 2018-2027 (NRMP) was developed by the Planning Division of RDA in order to prepare the road maintenance, rehabilitation and improvement plan for the existing national road network of Sri Lanka for the next ten years. A scientific and systematic approach was followed to develop a precise NRMP with the support of three consultants (two foreign and one local consultant) for traffic demand modelling and HDM4 (Highway Development & Management) as well as great support of internal staff. The entire process of preparing the NRMP was a 2-3 year direct effort of the

internal staff of the Planning Division, RDA. The modules developed for traffic demand modelling and economical evaluation are based on two software packages.

JICA STRADA 3.5 package was used for traffic demand modelling and macro simulation of the future years' traffic on the road network. STRADA has been used by the Planning Division since 2011 with a dedicated staff for its operations and development. STRADA model consists of three steps of the conventional four-step modeling process and all the national roads, expressways in Sri Lanka and some significant local roads are included in its road network. At the time when the NRMP was conducted, the STRADA model was used to forecast traffic for many of the significant national road projects as well as expressway projects. The process of the traffic forecasting with STRADA in the NRMP is described as below,

- The road network of the model was updated with the development projects which had already been completed and had been fallen into ongoing and committed road projects.
- The present and future traffic demand of the western province was replaced with the traffic demand estimated by two comprehensive studies called JICA CoMTrans (2013) and Megapolis Plan (2016). Here Traffic Analysis Zones (TAZs) of the RDA model in the Western Province was changed to the more finer CoMTrans zoning structure.
- The New Demand model for present and future years was developed with an individual foreign consultancy.
- As a part of the above point 3, a national level roadside OD survey was conducted in all the provincial boundaries of the country to capture the present year OD demand moving from Divisional Secretariate Division (DSD) level.
- Demand among Intra-provincial TAZs for present and future years were forecasted using linear models which were developed using the secondary socio-economic data of the country.
- Origin and Destination (OD) demand for the present year was simulated and then validated against the actual manual classified counts.
- Finally, the future OD matrices were simulated and then the resulted link traffic volumes were provided to HDM4 as input.

HDM4 package was used to identify the road sections that need to rehabilitate and improve with the optimization objective of the economic rate of return in the respective year. The maintenance objective is to keep the road condition and quality for the road pavements consistently at the pre-defined standards by rehabilitating and improving the road sections at the right time. So the HDM4 resulting road sections need to improve and IRR values indicate as a quantifiable measurement for rational decision making.

After obtaining results from HDM4, the output road sections were further verified with the top regional officers (provincial directors and chief engineers) of the respective divisions. The output road lists of HDM4 was further evaluated and amended with the relevant adjustments as per the experience of those officers. Following such a lengthy process, the final road list for the NRMP was established for the next ten-year maintenance budget and the plan.

Development of the National Road Master Plan 2021-2030 was considered under two aspects, the existing national road network improvement and Development of National Highway Network (continuations and new proposals).

With respect to the existing national road network, the objective of development of this master plan is to identify the most economically worth road sections that are needed to rehabilitate and improve in the next 10 years. This 10 year Master Plan (2021-2030) for existing national road network has been developed from the prioritized interventions identified under NRMP analysis for 2018-2027 using life cycle economic

analysis using HDM-4 software which require detailed inventory and traffic data for each and every road sections of the existing network.

In this process all the ongoing and committed road sections are directly considered in the JICA STRADA model. Diverted traffic for those new road links is evaluated by the model in the respective future year. Thus, HDM4 indirectly calculated the benefits of traffic release in such ongoing or committed road sections.

There are some significant roads/road sections, localize improvements which have been taken for implementation after the time of NRMP analysis which were not committed at the analysis of NRMP was conducted. Some of such projects are presently at ongoing stage. However, the NRMP has not considered the impact of such projects since there were no reliable data at the analysis stage. However, revision of NRMP analysis with adding such projects into the network will not show any significant changes in the earlier results of the HDM4 outputs. It could be explained by the equilibrium theories. When there is any capacity increase in the roads, the vehicle operating speed increases. Then the traffic moves in other routes will divert to the improved road sections to reduce their travel time. Finally, when the entire road network comes to equilibrium by travel time (generalized cost), there is only a small traffic release which is insignificant to revise the entire NRMP analysis.

With respect to development of road network, all ongoing projects have been considered under continuation and new proposals are mainly focused on bridge widening /reconstruction, road safety improvement, relieve traffic congestion, climate resilience improvement, expressway connectivity improvement and expansion of Expressway /high mobility network aspects based on the economic and social needs of the country.

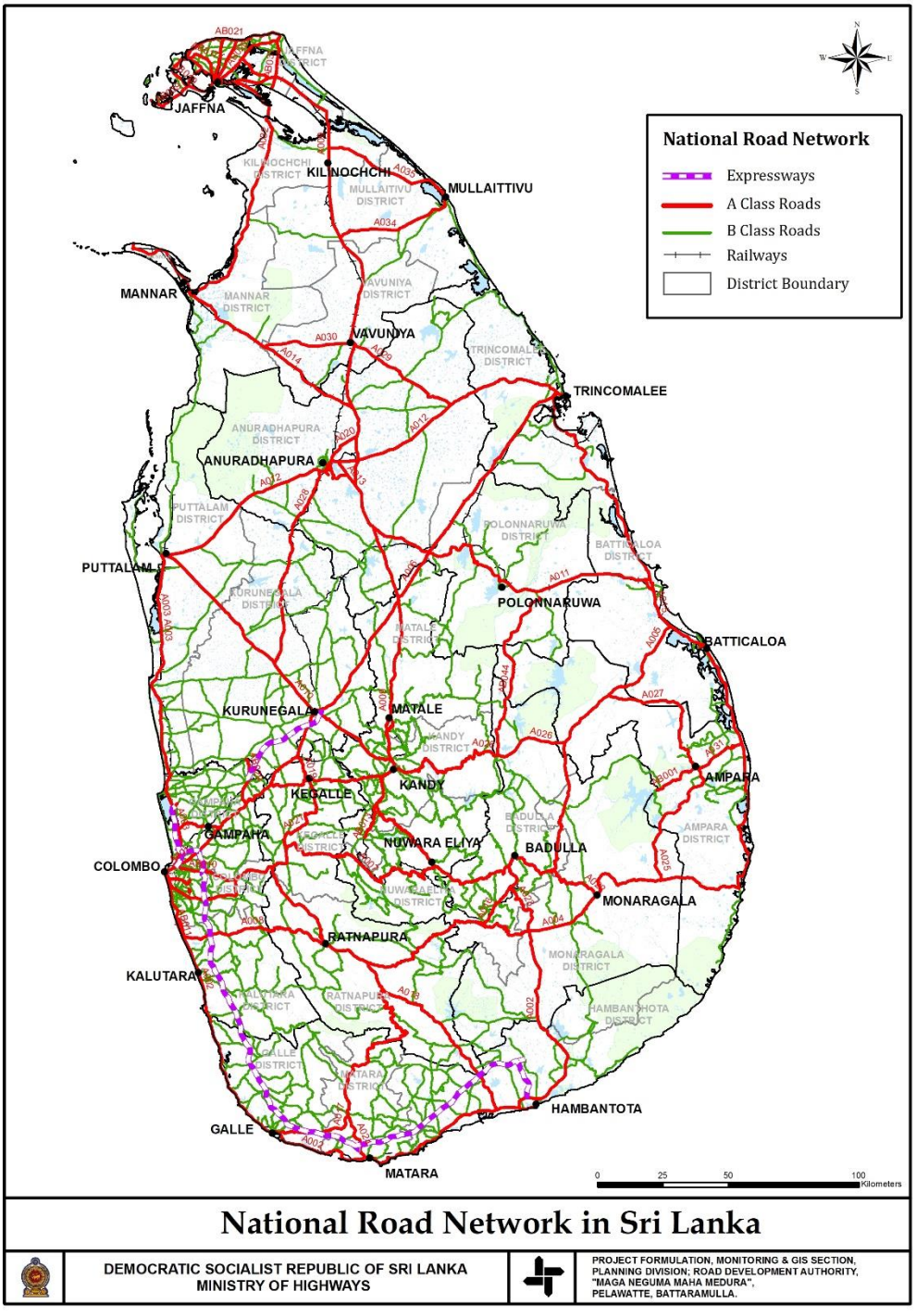
This report compiles lists of prioritized interventions to be done for the existing National Road network consisting of Trunk Roads (“A” Class) , Main Roads(“B” Class) and Expressways (“ E” Class). This document further presents the integral nature of road development, giving special emphasis to road safety, traffic management, network connectivity improvement and climate resilience improvement. Great effort has also been given to the streamlining and prioritizing of investment, coherent with the National policy framework. The road infrastructure development and facilitation projects identified to cater planned socio-economic development needs of the country are compiled in different chapters of this document, according to their appropriate functionalities.

2. Current Status of the National Road Network

2.1. National Road Network

2.2.1 Network Characteristics

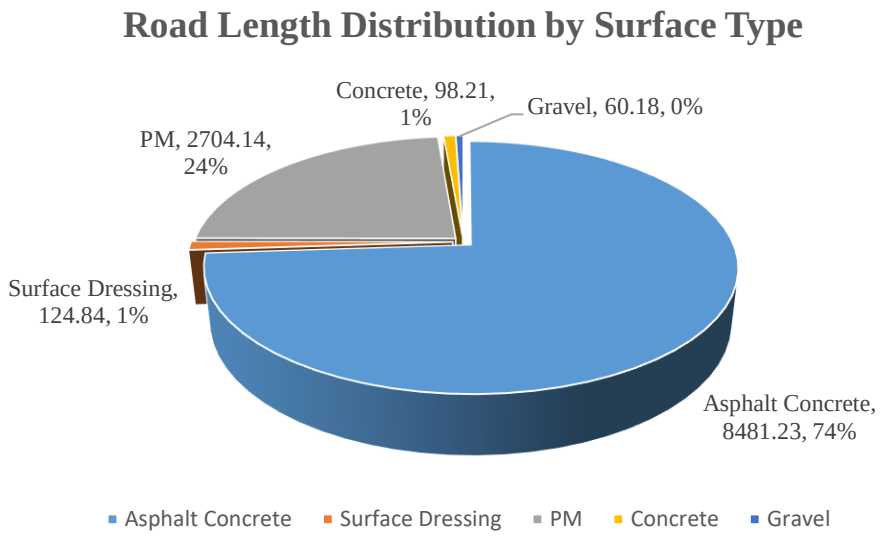
Although the National Road network, comprises of 4217km Class A roads (Trunk Roads) and 8007km Class B roads (Main Roads) and 272km Expressways, this chapter focuses only on A and B class roads.



Map 2:1 National Road Network

2.2.2 Physical Characteristics

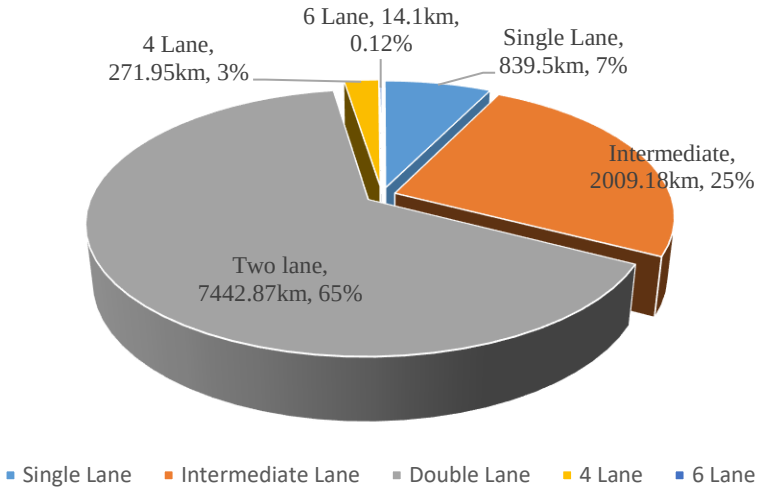
It appears that the national road network comprises of different types of pavements including Asphalt Concrete, Surface Dressing (DBST &SBST), Cement Concrete, and Gravel as shown in Figure 1. Among pavement types, the Flexible pavement, which comprises of Asphalt Concrete represent the most dominant type having a 74 percent share, followed by Penetration Macadam (PM) having 24 percent. The shares of the Cement Concrete pavement, surface dressing and gravel are very low having 1 percent each.



Source: RDA Planning Division

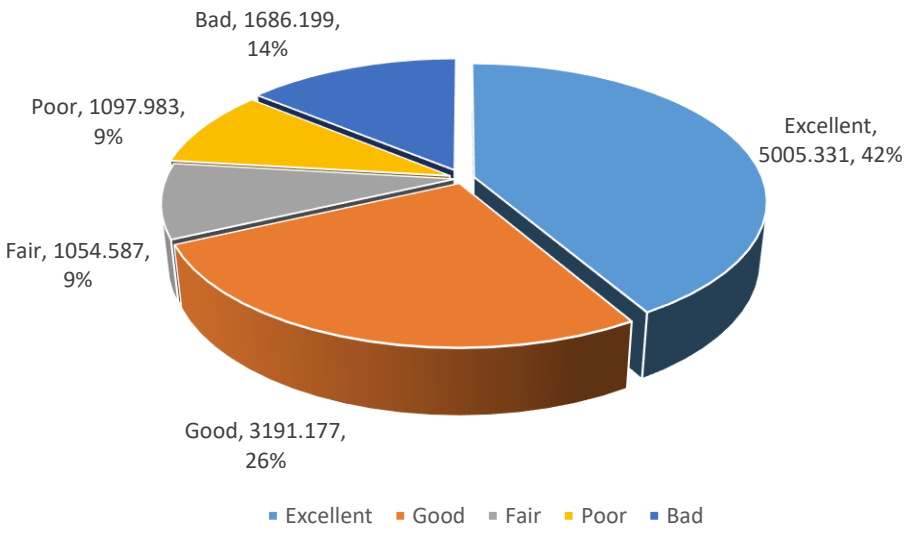
Figure 2-1: Road Length Distribution by Surface Type

When considering road width, 63 percent of the national road network is double lane and 27 percent is of intermediate width. Only 2 percent of the network is four lane and only few km of the network is 6 lane.



Source: RDA Planning Division

Figure 2-2: Road Length Distribution by Road Width



Roughness Class:

Excellent IRI < 3 m/km

Good IRI 3 to 5.5 m/km

Fair IRI 5.5 to 7.0 m/km

Poor IRI 7.0 to 10 m/km

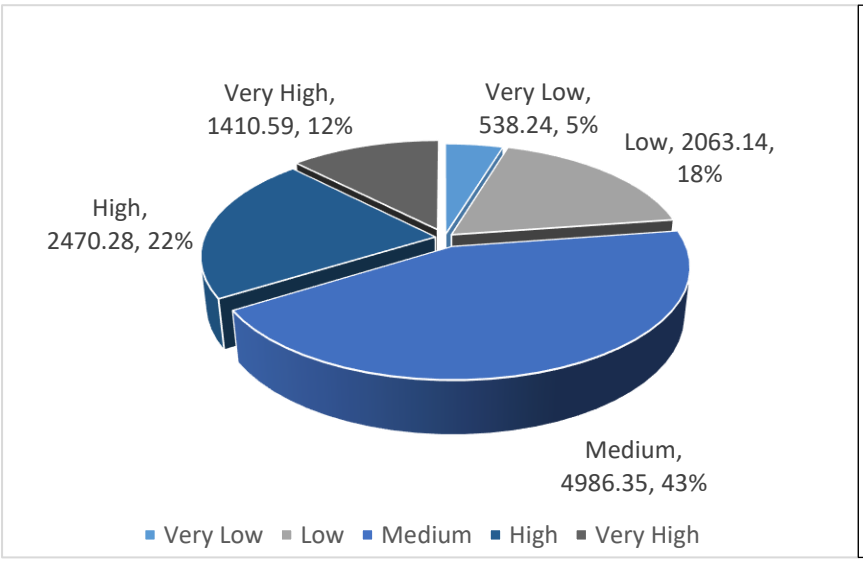
Bad IRI > 10 m/km

Source: RDA Planning Division

Figure 2-3: Road Length Distribution by Roughness

2.2.3 Traffic Demand Distribution

It appears that about a one third (34 percent) of the road links in Sri Lanka carry high to very high volume of traffic, as shown in figure 2-4. The medium traffic intensity group represents the single largest group, as far as traffic volume intensity in the road network is concerned. 77 percent of the roads carry either Medium to Very High traffic while Very Low to Low traffic categories are being served by the remaining 23 percent of the roads. It is therefore apparent that most of the road links in Sri Lanka carry a reasonably high volume of traffic.



Traffic Class:

Very Low < 750 vpd

Low 750 to 2,500 vpd

Medium 2,500 to 10,000 vpd

High 10,000 to 20,000 vpd

Very High > 20,000 vpd

Source: RDA Planning Division

Figure 2-4: Road Length Distribution by Traffic

2.2. Expressway /High Mobility Network

The importance of improving transport infrastructure, which is essential to achieve sustained high economic growth and raise living standards of the people, has been well recognized and hence, it continues to remain an integral part of the overall development drive. Road development continues to be a key policy priority of the government, in recognition of the need to improve the road network to support growing economic activity and reduce regional disparities.

During the last two decades, traffic volume and use of heavy vehicles has increased rapidly. Also, high speed motor vehicles resulted due to the technological advancements in the past decades, necessitated good road geometries for safe and fast mobility. Under these circumstances, it was realized that rehabilitation of the existing road network to cope with future transportation needs at an acceptable level of service to the satisfaction of the users, is a difficult task. This was mainly due to their poor alignments and widths that cannot be rectified without resorting to large scale land acquisition and demolition of buildings, and relocating utility services. Also, it was understood that the existing trunk road system will not be adequate to cater to the increasing traffic demand, as some of the main roads have already reached their capacity, while many others are due to reach the capacity within a short period of time. Thus, to provide infrastructure facilities for better mobility, the government has embarked on planning a high mobility road network for Sri Lanka. Furthermore, need of connecting all parts of the country, mainly with the Western Province through high mobility network has been recognized.

Sri Lanka has identified an expressway network to augment the national highway network providing its people with a high mobility transport infrastructure. The six expressways and two elevated highways which already have been identified as components of the Expressway/high mobility network of the country are at different stages of implementation.

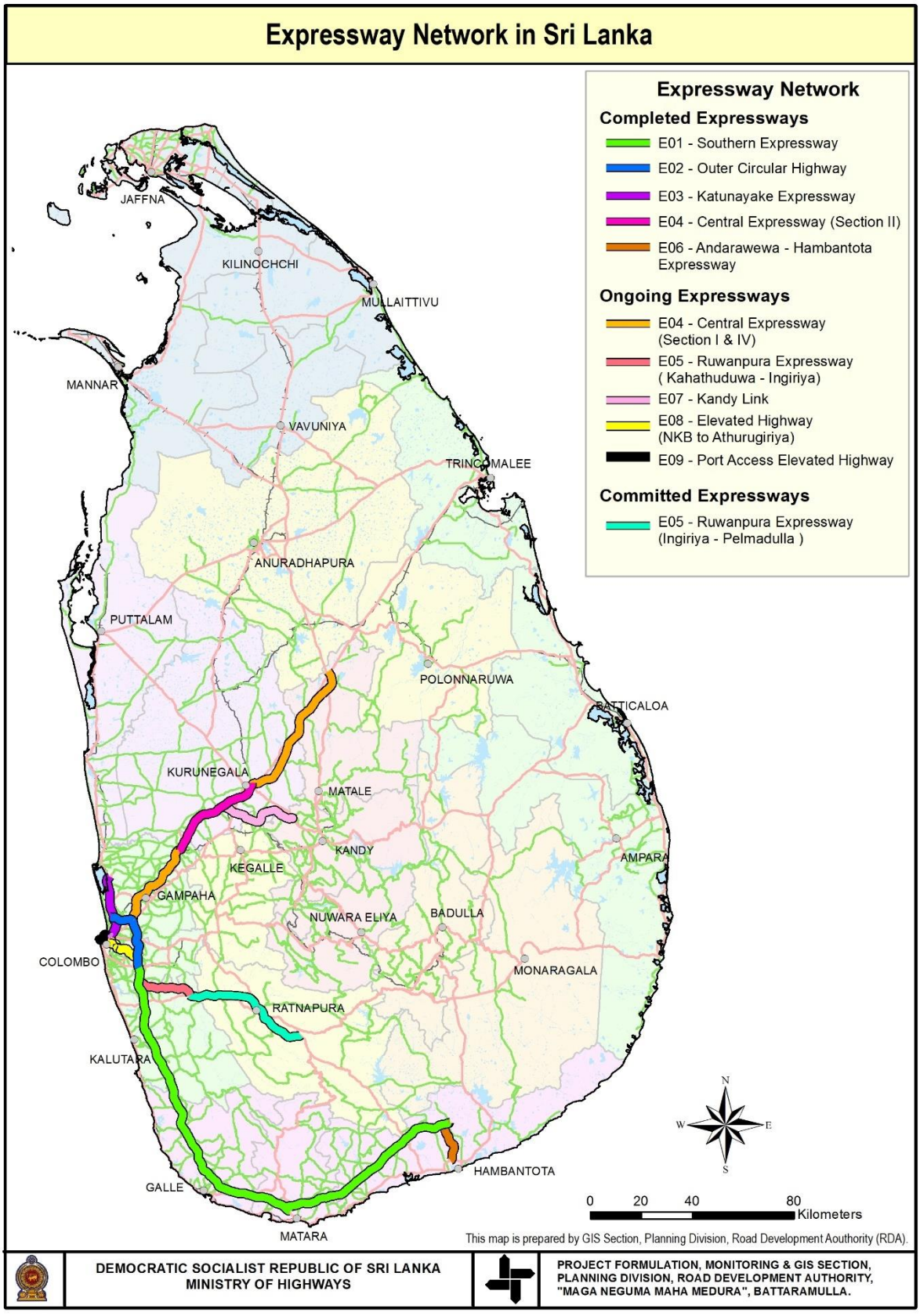
Already completed and ongoing components of the Expressway/high mobility Network of the country,

- Southern Expressway (E01)
- Outer Circular Highway (E02)
- Colombo - Katunayake Expressway (E03)
- Andarawewa to Hambantota Expressway (E06)
- Central Expressway (Kadawatha to Dambulla(E04) with Pothuhera-Galagedara Link(E07))
- Ruwanpura Expressway(E05)
- Elevated Port Access Road(E08)
- Elevated Highway from NKB to Athurugiriya(E09)

Southern Expressway (E01) from Kottawa to Mattala, Outer Circular Highway (E02), Colombo - Katunayake Expressway (E03) and Andarawewa - Hambantota Expressway (E06) are in operation. Central Expressway, Ruwanpura Expressway and Elevated Highways are ongoing.

Table 2:1:Details of Expressways in operation

Expressway Name	Sections				Length (km)
	Start Interchange	Chainage	End Interchange	Chainage	
Southern Expressway (E01)	Kottawa	0+000	Kahathuduwa	5+930	5.9
	Kahathuduwa	5+930	Gelanigama	13+675	7.7
	Gelanigama	13+675	Dodangoda	34+787	21.1
	Dodangoda	34+787	Welipenna	46+000	11.2
	Welipenna	46+000	Kurundugahahetekma	67+575	21.6
	Kurundugahahetekma	67+575	Baddegama	79+775	12.2
	Baddegama	79+775	Pinnaduwa	95+275	15.5
	Pinnaduwa	95+275	Imaduwa	107+500	12.2
	Imaduwa	107+500	Kokmaduwa	115+200	7.7
	Kokmaduwa	115+200	Godagama-Palatuwa	124+806	9.6
	Godagama-Palatuwa	124+806	Kapuduwa	130+700	5.9
	Kapuduwa	130+700	Aparekka	135+781	11
	Aparekka	135+781	Beliatta	151+249	15.5
	Beliatta	151+249	Bedigama	158+256	7
	Bedigama	158+256	Kasagala	163+456	5.2
	Kasagala	163+456	Angunukolapelessa	172+595	9.1
	Angunukolapelessa	172+595	Barawakumbuka	179+700	7.1
	Barawakumbuka	179+700	Sooriyawewa	190+000	10.3
	Sooriyawewa	190+000	Andarawewa	196+256	6.26
Total Length				**200.45 km**	
Outer Circular Highway (E02)	Kottawa	0+000	Athurugiriya	5+200	5.2
	Athurugiriya	5+200	Kothalawala	9+900	4.7
	Kothalawala	9+900	Kaduwela	11+680	1.8
	Kaduwela	11+680	Kadawatha	19+230	7.6
	Kadawatha	19+230	Kadawatha System	19+792	0.6
	Kadawatha	19+792	Kerawalapitiya	27+887	8.1
Total Length				**28.87 km**	
Katunayake Expressway (E03)	New Kelani Bridge	0+000	Peliyagoda	1+820	1.8
	Peliyagoda	1+820	Kerawalapitiya	8+467	6.6
	Peliyagoda	8+467	Ja-Ela IC	15+770	7.3
	Ja-Ela	15+770	Katunayake	24+420	8.7
	Katunayake	24+420	Katunayake End	25+800	1.3
Total Length				**25.8 km**	
Andarawewa - Hambantota Expressway (E06)	Andarawewa System		Hambantota		16.6
Total Length				**16.6km**	



Map 2:2 Expressway Network

2.3. Identified Issues in the Existing Network

2.3.1 Road Inventory

Roads managed by Department of Highways have been handed over to the Road Development Authority in 1986 and as a result of formulation of provincial councils in 1988 , C & D class roads have been handed over to the newly formed provincial councils,. At that time there was no physical verification done to check the lengths or the road infrastructure components.

Subsequently, action has been taken by the Planning Division to correct/ modify road lengths and other relevant data with field validations. In this process, deduction of double counting, addition of omitted sections is to be done. Demarcation of the roads belonging to different Executive Engineers regions are being done to enhance the efficiency of network management. On the completion of this process, expected inventory data can be documented.

Inventory Issues

At present, the RDA has published the road list for National roads in the country, which consist of 756 numbers of class 'A' and class 'B' roads having a length of 12,224.7 km in length (gazetted lengths). At present complete road inventory is not available for the entire national network of country.

Some common issues prevailing in the current road list are indicated below.

- Significant length differences exist between gazetted road length and measured road length in some roads. This is due to the lack of accurate measuring equipment available in early days of RDA. At present actual road lengths were measured using MFNSV equipment.
- There are some set of small roads which are included with one route number in the road list. This set of road sections have been gazetted as a one road with total road length. Each and every road link cannot be identified separately due to the lack of information available in the RDA. There are 12 road clusters that can be identified under this category.
- There are impassable road sections in some locations, which are maintained by external parties such as Airport authority, SL Army, Department of wild life etc. Due to this reason no inventory data can be collected for these sections.
- Some road sections are overlapping between two roads. These sections duplicate the road inventory which needs to be corrected in future.
- Due to insufficient data available in the gazettes, start and end point of some road sections cannot be identified.

The identified issues within the road list are given in the Annex-1 of this report. It is recommended to study each and every road in the future to solve these issues and to be re-gazetted with new road names and numbers if necessary.

2.3.2 Road Side Drainage System

Draining out of storm water from the road surface and the road side is very important to retain the strength of underlying layers of road structure to withstand the impact of moving loads. Therefore, maintaining road side drains and lead away drains are very important. It is evident that most of the lead away drains are blocked by residents of the adjoining lands resulting stagnation of water leading to damaging the road surface / road sides. As a result, colossal sum of funds is utilized for the repair and maintenance of damaged roads. There are several reasons and causes for lack of attention in maintaining drainage systems. Non-availability of proper authority/institution to regulate these drainage systems can

be considered as one of the main reasons. Furthermore, due attention is not given to make sure the functionality of the drainage system and necessary improvements when implementing road projects.
In addition to above, due to restrictions or non-availability of land due to urbanization and township development, the allocation of adequate space provision for drainage systems proves to be an increasingly difficult task.

It is proposed to prepare plans of roadside drainage and lead away drains of existing road and identify the total drainage requirement. There can be acquisition of land away from the road for the construction of lead away drains and RDA need to encourage local authorities to carry out the task or RDA Act need to provide the authority for RDA officials to take action.

2.3.3 Overloading of Road Network

Overloading on roads is a serious issue in many developing countries of the world. One of the primary functions of a road pavement is load distribution and the pavement design must account for the expected life time traffic loads. The traffic loads are calculated based on the accepted legal axle load limits. These legal axle load limits and gross vehicle weight limits are overlooked and violated by the transporters. Newly constructed roads experience accelerated loading conditions resulting fast deterioration of road pavement much before their design life is over. This results in premature failure of roads. Damage to roads as a result of overloading leads to higher maintenance and repair costs and shortens the life of a road demanding additional funds.

RDA has a system of data collection as a regular survey programme to measure traffic loads for different road corridors. Under the regular survey program axle loads are measured using portable weighing machines. Vehicles are stopped for weighing on sample basis. According to the data collected in recent years, loading levels are shown in figure2-5 below.

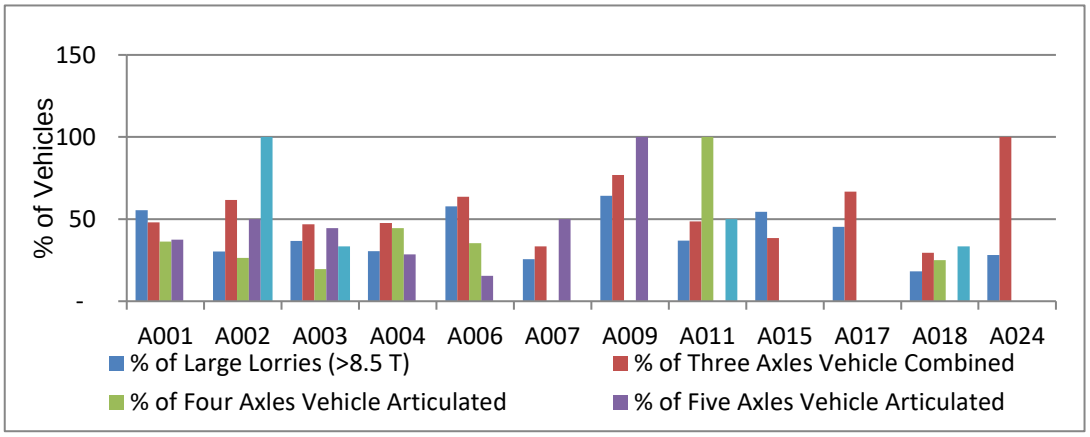


Figure 2-5: Percentage of Overload Vehicles by Category

Pavement structural design requires a quantification of all expected loads that a pavement will encounter over its design life. Under the Equivalent Standard Axel Load (ESAL) method, all loads (including multi-axle loads) are converted to an equivalent number of 8160 kg single axle loads, which is then used for design. A "load equivalency factor" represents the equivalent number of ESAL for the given weight-axle combination. As a rule-of-thumb, the load equivalency of a particular load (and also the pavement damage imparted by a particular load) is roughly related to the load to the power of four. For example, a 16,000 kg (16 T) single axle load will cause about 16 times the damage caused by 8160 kg (8.16 T) single axle load.

The general 4th power relationship between ESAL for a 2-axle vehicle and the standard axle loads is:

$$ESAL = (FAW/6.6)\ ^4 + (RAW/8.16)^4$$

Where FAW = front axle weight and RAW = rear axle weight in tonnes

Table below shows some typical load equivalencies (note that spreading a load out over two closely spaced axles reduces the number of ESAL).

Table 2:2: Example of Load Equivalencies

Load	Number of ESAL
8160 kg 2-tyred front axle	2.34
8160 kg 4-tyred single axle	1.00
1000 kg 4-tyred single axle	0.0002
14000 kg 4-tyred single axle	8.70
8160 kg 8-tyred tandem axle	0.09
14000 kg 8-tyred tandem axle	0.76

Overloading of an axle therefore has severe effect on the pavement. Since a pavement is designed for the cumulative repetition of equivalent axle loads likely to be imposed, the effect of increase in ESAL because of uncontrolled overloading would be reduction in the life of the pavement. i.e. the pavement would fail earlier than it is designed for. Figure 2-6 illustrates this point. The damage caused by overloading grows exponentially as the load increases.

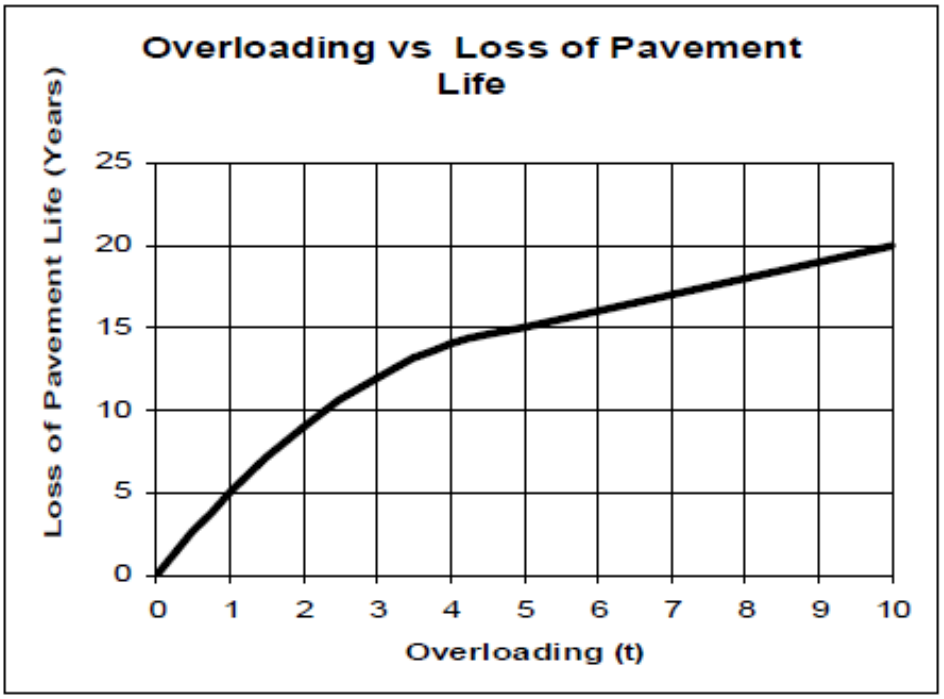


Figure 2-6: Loss of Pavement Life with Overloading

At present pavements are designed for average ESA which account for overloading at the time of axle load survey. But it has been observed that the percentage of overloading and overloading level is increasing. This will result in early failure of road pavement before the design life and increase cost of maintenance of road if actions are not taken to control overloading.

2.3.4 Operational Problems on Highways

It has been observed that the encroachment on the National Road Right of Way is a regular phenomenon. People with lack of moral values construct shops and establish business on the roadside government land and thereby enjoy illegal benefits. These encroachments are the constant reasons for obstructions and interruption for the through traffic movement on the roads. These affect safety of road users including pedestrian and motorized traffic. These encroachments have considerable adverse impacts on the operational efficiency of the traffic moving on the roads.

The factors that constrain operational efficiency include: houses and shops located on the edge of national highways; plying of non-motorized transport on the main carriageways; stopping of vehicles, loading-unloading or parking on the carriageway or shoulder; absence of protected pedestrian crossings and foot over-bridges; and a lack of enforcement of traffic rules and regulations. All these contribute to congestion resulting delays to traffic movement. This situation deprives expected economic growth expected from road infrastructure development, which involve large investment.

Some of the main reasons behind such congestion:

- Presence of non-motorized transport (NMT) which are plying on the carriageway creating hindrance to through traffic due to non-availability of separate lanes.
- Buses stopping on the carriage-ways for dropping and picking up passengers, blocking almost 60 % of the road as there are no bus bays or wider roads with sufficient space.
- Trucks stop on the road shoulder for loading and unloading of goods.
- Vehicles are parked on the shoulder or very close to the road pavement.
- A large number of pedestrians moving on the road specially due to non-availability of proper foot paths/foot walks.

It was further observed that even where the carriageway has been widened to 4-lanes, the outer 2 lanes of the carriageway is used for parking, and for loading/ unloading of goods.

It is important to note that most of the encroachments referred to above are unauthorized. Most of these structures when built initially on the edge of shoulders on private land and did not interfere directly with the traffic. But when these structures are used for commercial purposes, townships start developing around them. As a result, local traffic is generated and pedestrian activities increase manifold on particular stretches of the road along the shops creating hazardous situation for all road users.

Thus, in order to overcome the problem of congestion created by encroachment on the shoulders and carriageways, it would be essential to provide dedicated lanes for buses, trucks and NMTs together with well-designed spaces for their loading/unloading, ensure strict enforcement of traffic rules and regulation and provisions for well-located passenger shelters for bus passengers.

It is proposed to develop updated right of way plan along the road and mark boundaries so that encroachments can be easily detected. In this respect, Local authorities need to act with responsibility.

To control the impact of already developed townships, local authorities should be encouraged to develop off road parking facilities and ban parking along the road.

In order to get rid of encroachment on roadside Government lands, there are Acts, Laws and rules, which are quite adequate. But the enforcement of these rules, and regulations by the relevant authorities, has been very weak. This aspect needs to be addressed.

2.3.5 Road Safety

Annually, 1.3 million* people die in road accidents worldwide, with another 20 to 50 million* people are injured. Road accidents, the ninth leading cause of death are expected to grow to be the fifth leading cause by 2030. Ninety percent of the road accidents are reported to be occurred in low and middle-income countries. According to the World Health Organization (WHO), injuries due to road accidents are the leading cause of death in the 15-29 age group. Further, in most countries, road traffic crashes cost 3 percent of the gross domestic product. Road accidents are a social problem, and it is the combined responsibility of the infrastructure providers, police, the motor traffic department, the public, pedestrians, drivers and cyclists to reduce the incidences and severity of these accidents.
Following table 2-2 shows the statistics of accidents happened in Sri Lanka during the period from 2014 to 2019.

Table 2:3: Accident statistics of Sri Lanka during last five years

Type of Accident	2014	2015	2016	2017	2018	2019
Fatal Accidents	2,261	2,601	2,824	2,924	2,949	2,641
Grievous	7,072	8,187	8,518	8,144	12,264	10,691
Non-Grievous	12,782	13,595	13,961	13,592	8,475	7,693
Damages Only	13,854	13,726	13,675	13,072	12,064	9,713

There are many risk factors contributing towards road accidents. They include speeding of vehicles, driving under the influence of liquor, failure to obey traffic rules, drivers attitudes, poor weather conditions, poor infrastructure facilities, vehicle conditions, driving without a license, failure to wear seat belts, using mobile phones while driving, fatigue and lack of concentration.
Even poor road discipline is often cited as a cause, there are many poor policies that do little to arrest the situation that is estimated to cost the economy over 3,000 lives and at least Rs 40 billion per year both of which are unsustainable for economic and social development.

The high vehicle taxes that prevent people from being able to buy safer vehicles, allowing import of vehicles of poor safety standard, inadequate attention on safety in road design and lack of investment on improving safety underline the status quo.

Inadequate attention on road safety keeps fatalities from road accidents increasing. Even in the design stage roads are designed as per the safety standards, during implementation most of the time fund limitations are overcome compromising safety. Especially safety of pedestrians.

Every day, the increasing number of deaths of children and youth in road crashes show that Sri Lanka needs to look at the road safety issues more critically. It must take measures to strengthen policies and laws with regard to road safety, especially to ensure the safety of vulnerable road users such as children and youth.
Therefore, road traffic safety refers to methods and measures for reducing the risk of a person using the road network for being killed or seriously injured. 3E approach (Engineering, Enforcement and Education) can use to improve the safety of road users as follows.

Education – Educate all potential road users, Campaigns
Engineering – Vehicle safety, Road Infrastructure safety, Road geometric design
Enforcement – Enforce traffic rules and therefore discipline drivers that violate these rules

2.3.6 Traffic Management

At present traffic congestion has become a serious issue, which leads to number of negative consequences including higher travel times, loss of productivity, increase in vehicle operating cost, environmental pollution etc. Rapid increase of number of vehicles is the main contributing factor for road congestion. However, there are several other reasons such as driver behavior, deficiencies in road geometry; model mix and mechanical soundness of the vehicles contribute to this situation.
Main reasons for traffic congestion and related issues:

(i) Lack of Network capacity (Bottlenecks)

Issues	Remedial measures
Not maintaining a uniform lane width along the national highway	Providing proper designs according to standards and co-ordinate with other relevant organization.
Road side parking within the restricted area of a junction	
Illegal constructions, erecting of advertisements boards on road sides	
Unplanned city developments by local municipalities	
Locations of bus halts/ bus bays closer to the junctions.	
Three-wheeler parking along the national road	
Not widening of narrow bridges	
Not providing slip lane at junctions.	

(ii) Higher number of access roads on road sections.

Issues	Remedial measures
Higher number of access roads/ by roads joint to main road with in short distance along the main road	Provide center median Provide by pass Control access
No proper center median facility provided	

(iii) Inadequate pedestrian facility

Issues	Remedial measures
Insufficient walkway width	

Obstacles on walkway	Providing good quality walkway as per standards with safety Follow rules and regulations for use of walkway
Street vendors are doing their businesses on walkway	
Poor quality of walkway	

(iv) Driver behavior

Issues	**Remedial measures**
Driver not follow traffic regulations	Training / awareness programs. Providing dedicated lanes.
Drunken drivers	
Inadequate traffic signs and road marking regulations and policies	

(v) Road infrastructure condition

Issues	**Remedial measures**
Poor maintenance	Follow proper maintenance procedure. Adequate fund allocation. Strengthen the (RMTF) Road Maintenance Trust Fund. Use of new surfacing techniques (e.g.: Super pave asphalt binder treatment)
Damage to road surface	
Inadequate traffic signs and road markings Poor attention on road infrastructure components and road furniture	

(vi) Junction treatments

Issues	**Remedial measures**
Not providing proper junction treatment to cater present and future traffic demand.	Advance traffic management system (ATMS). Application of driver's merit system. High penalties and etc.
Not applying of (ICT) Information and Communication Technology traffic management at junctions.	
Inadequate police enforcement	

3. Review of Previous NRMP

3.1. Overview

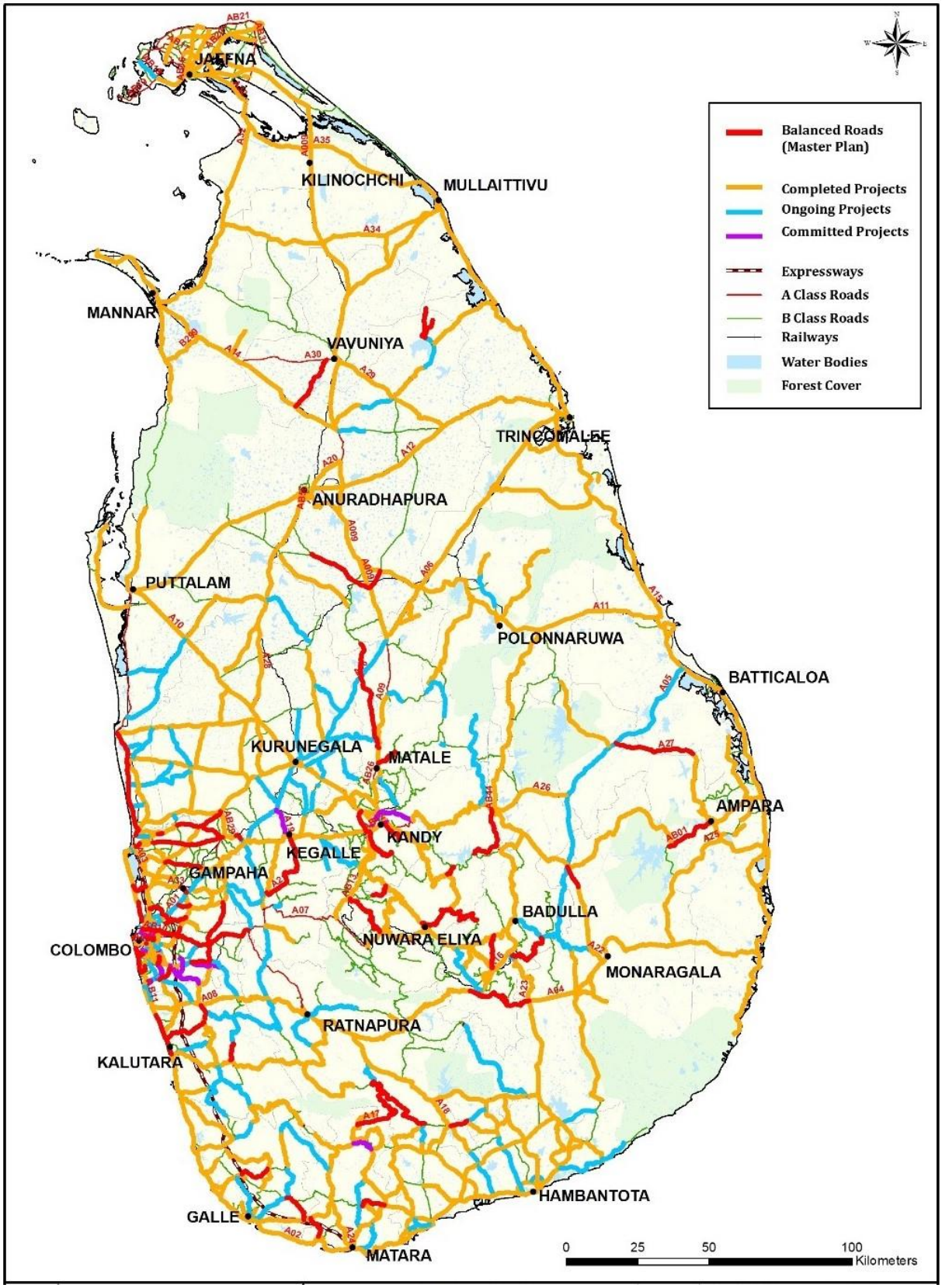
National Road Master Plan (NRMP) was prepared in 2007 for the period of 2007 to 2017 by the Planning Division of RDA with the assistance of an individual international consultant provided by ADB. With the investment during this period majority of the roads in the national network have been improved or rehabilitated.

Road network improvement carried out under the NRMP 2007 – 2017 is illustrated in
Map 3:*1.*The planned expenditure during 2007-2017 was Rs. 683.17 billion and actual expenditure was Rs. 1,229.51 bn. This has shown excess of 80% when compared with the planned figure. About 34 percent of the investment in road rehabilitation was financed by the government's own resources. These efforts and investments contributed to an overall improvement of the National road network, increasing the proportion of roads in Excellent, good and fair condition from 48 percent to 74 percent.
Performance of each program, such as construction of expressways, development of highways, reduction of traffic congestion and bridge rehabilitation and reconstruction are discussed in this chapter.

3.1.1 Network Level Performance of NRMP (2007-2017)

Significant achievements have been made for improvement of network level performance under this NRMP in all key areas, i.e.:

- Operation & Maintenance of National Road Network
- Widening & Improvement of National Roads
- Infrastructure for Reduction of Traffic Congestion
- Expressways Development



Map 3:1 Road Network Development during 2007-2017

3.1.2 Achievements on Maintenance of National Road Network

For maintenance works, funds are allocated under the mandate on "Road Maintenance Trust fund" under the Highway development program in the Budget Estimate. In addition to that, the funds allocated under "Widening and improvement of roads" also can be considered as maintenance works when the funds are used for minor improvement works of National roads. Efforts were made, as depicted in Table 3:1 by physical achievements, to ensure adequate maintenance of the road network. During the 10-year period of the NRMP (2007-2017) Routine Maintenance of the whole National road network was carried out without any disruption. In addition, considerable length of Periodic Maintenance works, such as sand sealing and overlays were conducted in 6,871 and 7,440 km of roads respectively.

Table 3:1: Physical Achievement of Road Maintenance during NRMP (2007-2017) length in km

Year	***Maintenance activity***		
	Road (A&B class) length Maintained - km	***Length of sand Sealed -km***	***Length of Overlay - km***
2007	11,874	516	329.91
2008	11,891	596	93.09
2009	11,922	900	205.77
2010	12,019	870	1,129.93
2011	12,019	1,191	1,001.11
2012	12,165	567	365.18
2013	12,169	595	454.93
2014	12,208	601	1,325.28
2015	12,210	272	1,567.04
2016	12,210	652	233.62
2017	12,210	111	734.32
Total		**6,871**	**7,440.18**

The planned expenditure and the actual expenditure for routine and periodic maintenance with reference to NRMP (2007-2017) are given in Table 3-2. It appears that against planned expenditure of Rs. 127,295.64 million, the actual expenditure was Rs. 179,684.87 million, with an overall 41% increase of investment during this period. However, the increase in expenditure has not been attributed to maintenance activities. Although actual expenditure for rehabilitation and improvement was increased by 108.8%, the actual expenditure for maintenance activities have been decreased by almost a quarter. It is therefore evident that despite the fact that overall expenditure is 41% higher than the planned budget, a significant amount of money was shifted from the maintenance funds to rehabilitation and improvement works, which resulted overall reduction of maintenance funds by 24.4%. This can be considered as a major impediment happened without considering the negative implications on existing road assets.

Table 3:2: Expenditures of Road Maintenance Activities for NRMP (2007-2017)

Year	***Planned (Million LKR)***			***Actual (Million LKR)***		
	Rehab	***Maintenance***	***Total***	***W&IMP***	***Maintenance***	***Total***
2007	5,920.27	4,500.00	10,420.27	4,581.82	3,409.85	7,991.67
2008	8,326.24	4,718.58	13,044.82	6,053.20	3,103.45	9,156.65
2009	5,450.76	4,968.99	10,419.75	5,449.31	3,049.07	8,498.39
2010	8,877.20	5,224.09	14,101.29	8,877.00	6,392.59	15,269.58
2011	5,080.90	5,445.70	10,526.60	14,894.12	7,800.36	22,694.48
2012	6,476.10	5,738.71	12,214.81	16,675.33	5,961.23	22,636.56
2013	4,311.90	6,090.71	10,402.61	22,109.27	5,149.50	27,258.77
2014	3,964.10	6,457.40	10,421.50	14,425.32	3,725.43	18,150.75
2015	4,024.95	6,830.74	10,855.69	17,270.03	4,259.80	21,529.83
2016	5,331.95	7,219.49	12,551.45	10,887.60	2,497.00	13,384.60
2017	4,722.32	7,614.55	12,336.86	9,274.98	3,638.60	12,913.58
Total	**62,486.69**	**64,808.96**	**127,295.65**	**130,497.98**	**48,986.88**	**179,484.86**
Composition (%)	**49.1%**	**50.9%**	**100.0%**	**72.7%**	**27.3%**	**100.0%**
Difference (%)				**108.8%**	**-24.4%**	**41.0%**

The comparison of the planned and the actual road maintenance expenditure and their trends are illustrated in Table 3-3 and Figure 3-1. Three distinct trends become apparent, as demonstrated by (i) lower overall expenditure in the first three years ranging from 18.4 to 29.8 percent, (ii) completely different trends in the middle 6 years, which show significant increase in overall expenditure with compared to planned expenditure ranging from 8.3 to 162.0 percent and (iii) finally, during the last few years planned and actual expenditures were more or less balanced. There was a net increase of 41% in actual expenditure compared to planned expenditure during 10-year period covered by NRMP (2007-2017).

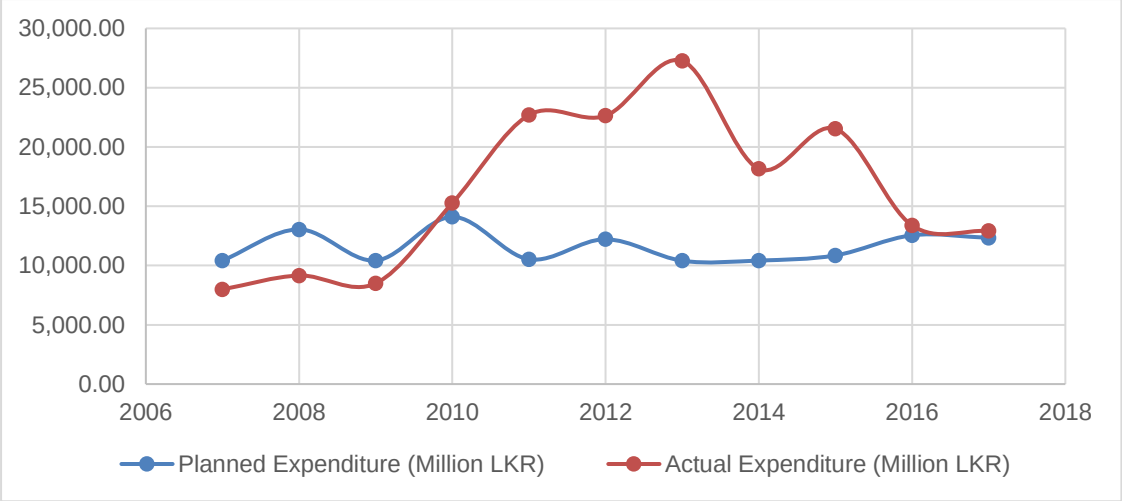


Figure 3-1: Trends of Planned and Actual Expenditure of NRMP (2007-2017)

3.1.3 Achievements on Widening of National Roads

Under this program there were 3 categories of improvement works such as 6-Lane widening, 4-lane widening and 2-lane widening have been identified and physical performance, as depicted are as follows.

6-Lane Roads

It was planned to improve/ construct 22.4 km of roads during the period. But none of the 6 lane widening projects identified in the plan has not been taken up during the period, as demonstrated in Table 3-4.

4-Lane Roads

There were 481.2 km of road sections have been identified for the 4-lane improvement. But at the end of the plan period only 55.47 km has been improved and 49.36 km of improvement works were ongoing at the end of 2017. Out of the total length identified, 83.18 km has been widened to 2-lane standards due the difficulty in getting required lands. Accordingly, balance of 293.13 km are remaining from the identified list. As per the details provided in the NRMP 2007-2017 there were 103.8 km of 4-lane roads at the year 2007 in the National road network. As per the road inventory survey there are 257.35 km of roads are 4 lanes at the end 2017. Accordingly, around 98 km of roads have been made to 4-lane out of the identified list.

2-Lane Roads

It was planned to improve 2,380.58 km of roads to proper 2-lane width during this period, as shown in Table 3-4. As at the end of 2017 out of identified list of roads, 1,344.36 km of road sections have been improved to 2-lane standard and 311.03 km of road sections were under improvement by 2017. Accordingly, around 744.5 km of road sections are remaining from the identified list. When we consider total network, there were 4098.9km of road sections of 2-lane standard by the year 2007. As per road Inventory survey 2017, there were 7,534.84 km of 2 lane roads in the network. This is due to the taking up of roads for improvement outside the planned list. This was necessitated at that time with the end of civil disturbance in 2009 and it was mandatory to take up roads mainly from Northern and Eastern areas.

Table 3:3: Summary of widening of Roads

Development	***6 Lane***	***4 Lane***	***2 Lane***
Planned/km	22.4	481.2	2,380.6
Completed/km	0.0	55.4	1,344.4
Ongoing at end 2017/km	0.0	49.4	311.0
Balance from Planned/km	22.4	376.4	725.2
Progress w.r.t to Planned length	0%	21.8%	69.5%
Other roads taken/km	14.6	41.5	5,629

Table3-3 clearly shows that more than 5,600km of roads which were not planned have been attended during the period considered.

Natural Disaster Affected Road Rehabilitation

As per the projects under the Budget Estimate of Government, funds allocated under "Highway Development" and "Natural Disaster affected road Rehabilitation "have been used for these improvements. Accordingly, comparison of planned expenditure for the period of the NRMP 2007 -2017 and actual expenditure is given in Table 3-5 below. It is evident from the table that actual expenditure for road rehabilitation due to natural disaster is actually five times more than that planed expenditure.

Table 3:4: Planned vs Actual Expenditures for Natural Disaster Affected Road Rehabilitation

Expenditure (Rs. Mn)	**Year**										
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Planned Expenditure	15.21	17.17	17.32	13.63	17.00	21.29	21.76	21.68	25.66	27.09	17.22
Actual Expenditure	15.52	20.60	26.99	32.86	41.01	66.31	49.17	64.28	72.61	43.65	67.77

Widening of Roads

The total investment carried out for the development of highways is Rs 500.79 Bn instead of 215.04 Bn planned expenditure, representing a 132.9 percent increase in actual expenditure. Despite the fact that a significant portion of the planned widening was not carried out during the period actual expenditure was increased significantly, as shown in the Table 3-5.

Table 3:5: Expenditures for Widening of Roads in Billion LKR

Year	***Planned (Billion LKR)***	***Actual (Billion LKR)***	***Difference (%)***
2007	15.21	15.52	2.0%
2008	17.17	20.60	20.0%
2009	17.32	26.99	55.8%
2010	13.63	32.86	141.1%
2011	17.00	41.01	141.2%
2012	21.29	66.31	211.5%
2013	21.76	49.17	126.0%
2014	21.68	64.28	196.5%
2015	25.66	72.61	183.0%
2016	27.09	43.65	61.1%
2017	17.22	67.77	293.6%
Total	**215.04**	**500.79**	**132.9%**

3.1.4 Improvement of Infrastructure for Reduction of Traffic Congestion

Under the reduction of traffic congestion following 4 groups of sub-programs have been considered; improvement of junctions, installation of signal light systems, construction of bypass roads and construction of flyovers.

Improvement of Junctions

There were 33 junctions identified in the NRMP for improvement. According to the available information, 9 junctions have been improved. (see Table 3-6). However, there are records that many other junctions have been improved during the period as a part of implementation of donor-funded projects.

Installation of Traffic Signal Light Systems

Out of 33 junctions identified for signalization, 24 junctions have been installed with signal Light indicating about 73% progress, as shown in Table 3-6.

Construction of Bypass Roads

The NRMP consists of 25 items of bypasses, under passes and new or improvement of non-RDA roads. Only 5 Items has been implemented during the 10-year period, as shown in Table 3-6.

Construction of Flyovers

It has been identified that 20 Junctions are to be provided with Flyovers as a measure to reduction of congestion taking place at those locations. Only 6 locations have been provided with flyover during this period, as depicted in Table 3-6. This means about 70% of the planned Flyovers were not implemented considering several other factors as well.

Table 3:6: Physical Numbers of Development for Traffic Congestion Reduction

Development	***Planned Nos***	***Completed Nos***	***Difference (%)***
Junction Improvements	33	9	-72.7%
Signalization	33	24	-27.3%
Bypass	25	5	-80.0%
Flyovers	20	6	-70.0%
Bridge Improvement	261	583	123.4%

However, determination of junction treatment has not been arrived according to scientific analysis at that time due to unavailability of data and proper demand analysis tools. Now it is evident that most of the junctions that have been planned with flyovers are either not required or not feasible technically or economically.

Although the number of structural units actually constructed for reduction of traffic congestion was far less than planned units, except improvement of bridges, overall actual expenditure was Million LKR 82,136.36 as against planned expenditure of Million LKR of 44,526.95 indicating 84.5% budget overrun, as shown in the Table 3-8.

Table 3:7: Expenditure for Traffic Congestion Reduction in Million LKR

Year	***Planned (Million LKR)***	***Actual (Million LKR)***	***Difference (%)***
2007	4,500.74	1,639.49	-63.6%
2008	4,183.15	10,040.53	140.0%
2009	4,626.24	16,391.57	254.3%
2010	5,374.04	3,722.46	-30.7%
2011	5,093.14	1,890.03	-62.9%
2012	4,948.64	2,026.49	-59.0%
2013	4,982.00	5,654.57	13.5%
2014	5,535.00	8,753.72	58.2%
2015	2,659.00	8,669.19	226.0%
2016	1,675.00	11,329.00	576.4%
2017	950	12,019.31	1165.2%
Total	**44,526.95**	**82,136.36**	**84.5%**

3.1.5 Achievements on Expressways Development

It was planned to complete 281.1 km of expressways during this period, which include Southern Expressway, Colombo Katunayake Expressway, Outer Circular Highway and Colombo Kandy Expressway (Later renamed as Central Expressway). And also to commence preliminary works related to expansion of expressway network including extension of Southern Expressway.

During the period 170km of expressways including Southern Expressway, Colombo Katunayake Expressway, Outer Circular Highway section from Kottawa to Kadawatha were completed. Construction

of Outer Circular Highway section from Kadawatha to Kerawalapitiya, extension of Southern Expressway and Central expressway are in progress.

The comparison of planned and actual expenditure in different years for Expressways development is shown in the Table 3-9. Although the actual length of Expressways development is reduced by 37.9%, overall expenditure has been increased by 44%.

Table 3:8: Expenditures for Development of Expressways during 2007-2017

Year	***Planned (Billion LKR)***	***Actual (Billion LKR)***	***Difference (%)***
2007	13.9	9.08	-34.7%
2008	22.98	15.74	-31.5%
2009	29.29	23.25	-20.6%
2010	25.32	24.71	-2.4%
2011	30.34	27.1	-10.7%
2012	27.97	35.99	28.7%
2013	22	35.84	62.9%
2014	24	23.71	-1.2%
2015	20	45.24	126.2%
2016	22	49.36	124.4%
2017	13.8	72.17	423.0%
Total	**251.6**	**362.18**	**44.0%**

Only Land acquisition works of Southern Expressway Extension has been planned to commence within this period. However, it has been advanced even without following accepted land acquisition process and project preparatory activities resulting commencement of the construction work in year 2016.
The Colombo Kandy expressway has been planned to complete within the period of the NRMP 2007-2017. However, due to some unavoidable reasons Colombo-Kandy Alternative Highway could not proceed as planned. Subsequently it has gone through major changes in alignment and commenced in the year 2017 under the name Central Expressway. At the same time, it has planned to carryout studies to look into the possibilities of extending high mobility network to connect northern area through Padeniya – Vavuniya. However, those plans have been changed with the alignment change of Central expressway.

3.1.6 Achievements on Bridge Rehabilitation and Reconstruction

Under the Bridge Rehabilitation and Reconstruction program it has indicated that 261 bridges including 80 bridges under improvement at the time of preparation of the NRMP, to be taken up for improvement. No bridge list has been identified separately in the plan. Numbers of bridges completed as per the records available are given in the Table 3-10. Accordingly, 949 bridges have been completed during the period including some Non-RDA bridges constructed under the UK Steel bridge project.

Table 3:9: Number of Bridges Improved During 2007-2017

Year	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*Total*
Number of Bridges Completed	0	68	120	91	90	78	79	72	133	119	99	949

3.1.7 Utilization of Budget for National Road Master Plan

According to the Government Budget Estimate fund allocated for bridges and flyovers are under "Construction of Bridges and Flyovers". At the same time improvement of junctions, signalization of junctions and construction of some of bridges also taken under the Budget program "Highway Development". As such it is very difficult to separately identify actual expenditure for all these sub programs. A comparison of planed expenditure under NRMP 2007-2017 and the expenditure under the program "Reduction of traffic congestion" are given in the Table 3-11 and Table 3-12 below. It appears that there are significant budget overruns for actual construction in comparison to planned budgets, where the actual expenditure is LKR 1,229.51 Billion when compared to planned budget of LKR 683.71 Billion, i.e. overall increase of 79.8%. Although the cost implication was very high the number of infrastructure components added to the national network was well below the expected targets as a result of allocated funds been utilized for Non RDA works.

Table 3:10: Details of Planned and Actual Expenditure for Reduction of traffic congestion in Mn LKR

Expenditure (Rs. Mn)	***Year***										
	2007	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***	***2016***	***2017***
Construction of flyovers	370.56	506.62	587.56	1,623.78	3,208.64	3,048.64	3,780	4,600	1,750	750	250
Improvement of junctions	-	20	40	80	80	80	80	80	80	80	40
Installation of signal light systems	-	30	60	120	120	120	120	120	120	120	60
Construction of bypasses	30	197	250	377	520	600	452	185	159	175	50
Sub Total	*400.56*	*753.62*	*937.56*	*2,200.78*	*3,928.64*	*3,848.64*	*4,432*	*4,985*	*2,109*	*1,125*	*400*
Bridge Rehabilitation and Reconstruction	4,100.18	3,429.53	3,688.68	3173.26	1164.50	1100	550	550	550	550	550
Sub Total	*4,100.18*	*3,429.53*	*3,688.68*	*3,173.26*	*1,164.50*	*1100*	*550*	*550*	*550*	*550*	*550*
Total planned expenditure	*4,500.74*	*4,193.15*	*4,626.24*	*5,374.04*	*5,093.14*	*4,948.64*	*4,982*	*5,535*	*2,659*	*1,675*	*950*
Actual expenditure	*1,639.49*	*10,040.53*	*16,391.57*	*3,722.46*	*1,890.03*	*2,026.49*	*5,654.57*	*8,753.72*	*8,669.19*	*11,329*	*12,019.31*

Table 3:11: Total Planned and Actual Expenditures for NRMP (2007-2017) in Billion LKR

Attribute	Planned (Bn LKR)	Actual (Bn LKR)	Difference (%)
Total 10-year expenditure	683.71	1,229.51	79.8%

3.2. Lessons Learned

The key lessons learnt from NRMP (2007-2017) were rather mixed, as outlined below:

1. Despite progress being made in improving high density connectivity throughout the country, which is the highest in South Asia during the period of NRMP (2007-2017), the road sector of Sri Lanka is still facing many challenges and problems, which include but not limited to:
    - The efficiency of the National Road Network is poor because of limited road capacity and variable standards, reduction of effectiveness of highways due to too many access provisions, uncontrolled roadside development making widening difficult, and lack of participation of private sector, etc.;
    - The riding quality, standard and Level of Service (LOS) of Provincial Roads Network are poor because of differed road maintenance due to lack of funds and low institutional capacity;
2. There is no doubt that significant progress has been made during NRMP (2007-2017) in improving riding quality of the road networks. However, riding quality in terms of road roughness is not satisfactory. As expected overall riding quality of Expressways is the best with 2.0 IRI m/km, followed by National and Provincial roads having IRI 6.3 and 6.7 IRI m/km. It is therefore apparent that overall riding quality of the road network, National and Provincial roads in particular are not very satisfactory. The overall conditions of roughness for Paved and Unpaved roads, which are 6.7 and 13.0 m/km, seems very high and unsatisfactory and needs urgent action for improvement.
3. During the NRMP (2007-2017), Government of Sri Lanka assigned high priority in rehabilitation and improvement of road network, as demonstrated by the actual expenditure, which is LKR 1,229.51 billion as against planned LKR 683.17 by exceeding by 80% for the period. Due to these efforts and higher investments, the proportion of roads in excellent, good and fair contribution increased from 48 percent to 74 percent demonstrating success of the NRMP.
4. Although actual expenditure for rehabilitation and improvement was increased by 108.8%, the actual expenditure for maintenance activities was decreased by almost a quarter due to shifting of a significant amount maintenance fund to rehabilitation and improvement works. This resulted in overall reduction of maintenance funds by 24.4%, thereby undermining the efforts to preserve the road asset at satisfactory level as per international standards.
5. Despite the fact that physical implementation of different infrastructure component like widening, construction of Expressways and different infrastructures related to reduction of congestion falls well below planned targets, overall actual expenditure during the period of NRMP (2007-2017) the actual expenditure was increased by almost 80 percent, representing inherent weaknesses in project

formulation, detailed design, procurement and implementation process of highway infrastructure projects;

6. While actual physical implementation of some of the infrastructure components was significantly lower than the planned numbers, some of the components has shown considerable progress (i.e. in total 583 bridges were improved against 261 planned), representing a remarkable success in NRMP (2007-2017).

7. Although overall institutional capacity for road asset management has improved significantly during NRMP (2007-2017), there are still some structural and institutional challenges hampering the growth of the road sector, which include overreliance on construction without adequate provisions for maintenance, lack of competitive bidding process in road maintenance contract; and reliance on input-based contracting for civil works;

8. The actual annual needs for maintenance of road networks was approximately LKR 234,837.93 million, where as average annual budget allocation for road maintenance was LKR 162,570.07 million indicating a shortfall of 31%. However, only limited application of the potential of road user charges, such as tolls were employed during NRMP (2007-2017) which is not adequate to meet the growing funding gaps for road maintenance and new development needs;

9. It is evident that significant progress has been made by RDA in developing institutional capacity for road asset management during NRMP (2007-2017). However, relatively little progress has been achieved in commercialization of the road asset management for long term sustainability. Since the Government of Sri Lanka closed the practice of construction and maintenance of roads using state-owned organizations, and as a result an active private sector contracting industry developed. However, as of to date Sri Lanka's road sector has been operated on the bases of input-based civil works contracts, resulting in significant time and cost overruns. This is very clear that significant percentage of projects has demonstrated defects appearing shortly after the end of the contractual defect liability periods, which demands urgent remedial measures to be undertaken without further delay.

10. During the review of NRMP (2007-2017) reviled that most of the programmes detailed under budgetary allocations have not achieved expected results due to the above mentioned factors & reasons. Under this context it is very important to develop a fully functional automated Sri Lanka Road Asset Management System (SLRAMS), which has the full capabilities for managing all components of an Integrated Asset Management for the maintenance, upgrading and operation of physical assets of road networks in a cost-effective manner;

4. Legal & Regulatory Frameworks

4.1. Legal Background & Regulations

4.1.1 Legal - Legislative Frame Work

With the establishment of RDA in 1981, the powers, duties and functions carried out by the then Department of Highways have been transferred to RDA. Accordingly, the under mentioned enactments provide the legal back ground for RDA.

a. **Principal Enactments;**

i. Road Development Authority Act No. 73 of 1981.
ii. Road Development Authority (Special Provisions) Act No. 5 of 1985.
iii. National Thoroughfares Act No. 40 of 2008.

The under mentioned Acts also give certain powers to RDA officials.

- Government Quarters (Recovery of Possession) Act No. 07 of 1969.
  Chairman RDA is empowered to recover the possession of government quarters from the unauthorized occupants under a court order.

- State Lands (Recovery of Possession) Act No. 07 of 1979.
  Director General RDA is one of the competent authority to take over the possession of State Land from unauthorized occupants under a court order.

b. **Regulations;**

i. Motor Traffic (Amendment) Act, No. 8 of 2009.

ii. Gazette Extraordinary No. 1912/2 dated 24th April 2015, National Thoroughfares (Colombo-Katunayake User Fee National Highway) Regulations No. 01 of 2015.

iii. Gazette Extraordinary No. 1924/8 dated 20th July 2015, National Thoroughfares (User Fee National Highway) Regulations No. 02 of 2015.

4.1.2 Environmental and Social Safeguard

In development of any sector, economic, social and environmental change is inherent. To gain long-term benefits of the development and to ensure sustainability it is important to enhance present situation or to avoid adverse impacts to the greatest possible extent.

The National Environment Act has introduced an Environmental Impact Assessment (EIA) as a part of the strategy to achieve sustainable development. EIA is a simple and straightforward process of initially predicting the potential impacts of development activities on the natural and social environment, and then suggesting measures to prevent, mitigate or minimize negative impacts and to enhance positive impacts. The legal

framework for the EIA process in Sri Lanka has been laid down in the National Environmental Act (NEA) of 1988.

It is important that an EIA is not merely a part of the approval process, but a tool aims at facilitating sustainable development.

When does an EIA required?

a) Any project that falls within the coastal zone as defined by the Coast Conservation Act No. 57 of 1981 (section 16) and amendments of 1988 and 2011 (section 12)

   (This applies to projects that come within the "Coastal Zone". The "Coastal Zone" comprises of the area lying within a limit of 300 meters land ward of the mean high water line and a limit of 2 km seawards of the mean low water line. Under the Act, identification of projects that require EIA is left to the discretion of the Director, Coast Conservation Department.)

b) For Prescribed Projects as listed in the gazette No 772/22 of 24th June 1993, 859/14 of 23rd February 1995, 1104/22 of 5th November 1999 and 1108/1 of 29th November 1999.

   PART I : 31 Projects and Undertakings if located wholly or partly outside the coastal zone (Infrastructure + Large Scale Development Projects).

   PART II : Projects if located partly or within an Environmental Sensitive Area. (i.e.: 20 Industries + All Part 1 projects)

   The National Environmental Act stipulates that approval for all prescribed projects must be granted by a Project Approving Agency (PAA). Project approving agencies are listed in the Gazette Extra Ordinary No. 859/14 of 23rd February 1995 and Gazette Extra Ordinary No. 1373/6 of 29th December 2004. A single Project Approving Agency is established as responsible for administrating the EIA process for a project. When there is more than one PAA is involved the appropriate PAA is decided by the Central Environmental Authority (CEA).

c) Any project to be established within one mile of the boundary of any National Reserve. The Fauna and Flora (Protection) Ordinance 1937, (Amendment) Act 1993.
   According to this Act, any development activity of any description what so ever proposed to be established within one mile from the boundary of any National Reserve, is required to be subject to EIA, and written approval should be obtained from the Director General, Department of Wild Life Conservation prior to implementation of such projects.)

Sometimes, it is mandatory to carry out Environment impact assessments to obtain foreign funding assistance as requested by the foreign funding agencies.

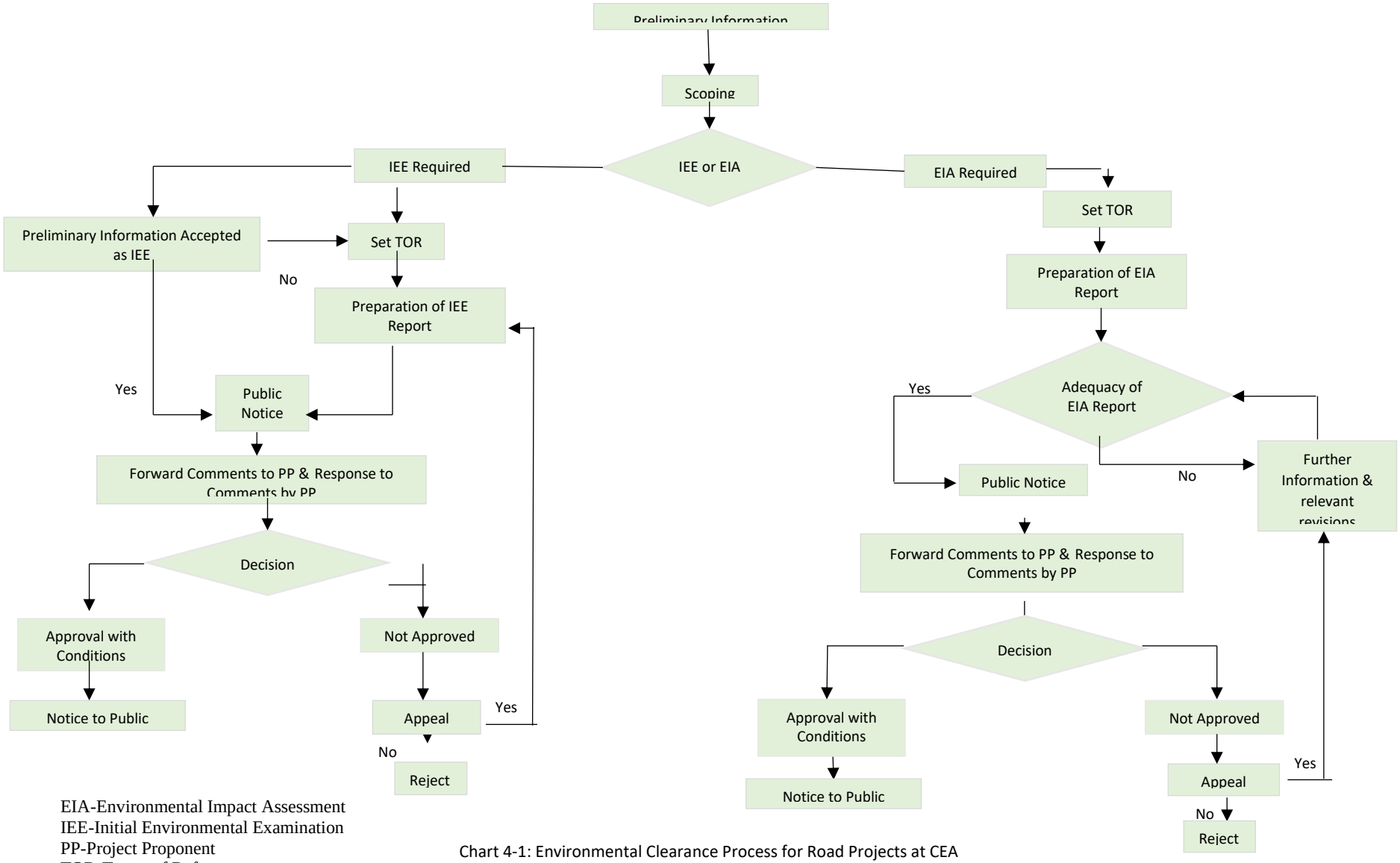
Environmental Safeguard

The project proponent needs to submit some preliminary information about the project to the CEA, in order to initiate the EIA / IEE process. The project proponents are advised to submit preliminary information to the CEA at a very early stage in the project cycle. This preliminary information could be submitted through a Basic Information Questionnaire.
The National Environmental Act has identified two levels in the EIA process. If the environmental impacts of the project are not very significant then the project proponent may be asked to do an Initial Environmental Examination (IEE), which is a relatively short and simple study. However, if the potential impacts appear to be more significant, the project proponent may be asked to do an Environmental Impact Assessment (EIA) which is a more detailed and comprehensive study of environmental impacts.

EIA / IEE process involves 6 major steps and the step wise process has been defined in the EIA regulations which have been published in the Gazette No. 772/22 of 24.06.1993.

6 major Steps in the EIA / IEE process are;

1. Screening (Determining whether an EIA / IEE is required for a project).
2. Scoping (Determining the scope of the EIA / IEE study and issuing of Terms of Reference (ToR) - Usually CEA call stakeholder meeting comprised of relevant agencies/organizations involve in a particular project to obtain their respective concerns and compile the ToR.
3. Preparation of the EIA / IEE report.
4. Review of the EIA / IEE report - The review involves both public and technical review.
5. EIA / IEE Decision- Granting approval with terms and conditions or rejection with reasons.
6. Post approval monitoring.



EIA-Environmental Impact Assessment
IEE-Initial Environmental Examination
PP-Project Proponent
TOR-Terms of Referance

Chart 4-1: Environmental Clearance Process for Road Projects at CEA

Social Safeguard

For new road constructions and widening of roads additional lands are required and the ownership of these lands shall be public, government or private.

Generally, land acquisition creates inconvenience for people due to involuntary shifting and resettlement. Hence, specific procedures are to be followed in accordance with the legislative requirements specified in National Involuntary Resettlement Policy (NIRP), Land Acquisition Act (LAA) and Donor Agency Guidelines, to ensure the social safeguard aspects of these affected parties.

Due consideration to be given to the following;

- Making the necessary documentation in advance before commencement of the projects.
- Implementation of what is stated in the above documents during the construction period.
- Following up matters in the post- construction period.

These procedures and relevant time schedules are very important in providing information to donor agencies when taking funding decisions.

Pre-Construction stage

In brief, following documents need to be prepared prior to the commencement of the project.

7 Resettlement Action Plan (RAP)
8 Social Impact Assessment Report (SIAR)
9 Due Diligence Report (DDR)
10 Preliminary Cost Report for Resettlement
11 Project Performance Management System (PPMS)
12 Checklist for above documents

Key Milestones in making these documents are as follows.

- Pre-Plan, Boundaries marked on the ground and approved Tenements list, Typical Cross Sections are required from the respective Project as prerequisites for conducting the complete Household Survey, Field Reconnaissance etc.
  In consultation with a sample Household and Stake Holders, Initial Poverty and Social Assessment (IPSA) is carried out in order to make the Terms of Reference (TOR).
- Public Awareness, Focus Group Discussion and Stake Holder Meetings are convened for awareness and consultation among the Stake Holders.
- Involvement with Divisional Secretary (DS), Grama Niladhari (GN), Valuation Department and Survey Department and other related Govt. Organizations.
- Preparation of Questionnaires for Household Survey, Govt. and Non Govt. properties in consultation with the respective Project Management Unit (PMU).
- Decided Mode of Payment for Compensation perhaps with Cabinet Papers if so, required for making the policy of Compensation, for finalization of the Entitlement Matrix to be included in the RAP.
- Proposed Income Restoration Program (IRP) with Livelihood Restoration to be included in the RAP.
- Data entry and analysis, finalization of facts and figures in consultation with the respective Project Management Unit (PMU).

- Compiling the Draft Reports, Submission to the respective Project Management Unit (PMU) for their comments. Gap Analysis to be carried-out to cover any difference between local Policy Guidelines and Donor Guide lines and get it approved.
- Incorporation of PMU comments.
- Compiled Draft reports are sent to the Donor through PMU. Any comments after clarifications interchanged among them (if so required) would be incorporated to make the Final Reports.
- Final Reports are sent through PMU to Donor.
- Approval by the Donor.
- Final Reports are sent through PMU to Donor, Central Environmental Authority (CEA) and Ministry of Lands.
- Final Report of RAP is disclosed through RDA and Donor's web sites and copies are displayed at respective DS Offices for general public.
- Start of implementation of IRP and RAP through the respective PMU after a kick-off meeting held with the parties involved.
- Notices and Publications in the Gazette based on Land Acquisition Act to start land Acquisition.

Responsibility of ESD division in this process

- Preparation of Social Safeguard Documents
- Reviewing of Social Safeguard Documents prepared by other outside Consultants
- Other activities such as preparation of Terms of reference (TOR) for specific tasks, preparation of relevant documents for Consultant selection including calling Expressions of Interest

Generally, reviewing is based on the approved Entitlement Matrix, Terms of References (Resettlement Framework (RF)) and Gender Action Plan) and the Household Survey carried out by such outside Consultants. The following activities are involved in this process;

- Compiling the Draft Reports incorporating the PMU comments, if any.
- Gap Analysis to cover any difference between local Policy Guidelines and Donor Guide lines and get it approved.
- Compiled Draft reports are sent to the Donor through PMU. Any comments after clarifications interchanged among them (if so required) would be incorporated to make the Final Reports.
- Submitting Final Reports and obtaining approvals from the Donors.
- Submitting Final Reports Central Environmental Authority (CEA) and Ministry of Lands.
- implementation of IRP and RAP through the respective PMU
- Notices and Publications in the Gazette based on Land Acquisition Act.

Construction stage

Key Milestones are as follows.

- Internal and External Monitoring and Evaluation to monitor the process of implantation of measures recommended in above reports in particular RAP including Budget, Schedule, Delivery of Entitlements, Grievances and Benefits.
- Social Audit Reports on RAP Implementation, Report on Grievance Redressing and Status.

- For solving the issues in compensation, Land Acquisition &Resettlement Committee (LARC), Super LARC, Grievance Redress Committee (GRC) are to be convened.
  I. LARC comprises with DS (Chairman), Resettlement Officer (RO)/Resettlement Assistant (RA)/ Project Engineer from the respective PMU, Representatives from Valuation Dept. and Survey Dept., Land Owner and (GN if required).
  II. Super LARC comprises with Secretary (Chairman), relevant Officer/s from the Ministry, Resettlement Officer (RO)/Resettlement Assistant (RA)/Project Engineer from the respective PMU, Representatives from Valuation Dept. and Survey Dept. and Land Owner.
  III. GRC comprises with DS (Chairman), Resettlement Officer (RO)/Resettlement Assistant (RA)/ Project Engineer from the respective PMU, Representatives from the village (Ex. Leader-Samatha Mandalaya, Chief Priest), Land Owner, Project Manager (PM) or a representative from the Contractor, representative/s from relevant government organizations Ex. GSMB and (GN if required).
- Monitoring and Solving Public Complaints.
- Review Monitoring and Preparation of Progress Reports.
- Preparation of the Resettlement Completion Report.

Post Construction stage

ü Any Monitoring activity required in Post Construction stage as a part of the Project Performance Management System (PPMS).

Checklist on environment approval is given in Annex -2 of this report.

4.1.3 Motor Traffic Regulations

The law relating to motor vehicles and their registration and use on highways are regulate by the Motor traffic act. The motor traffic regulations published in 1983 in the Gazette Extraordinary no.248 of June 3, 2013 amended time to time and last amendment was made by regulation published in Gazette Extraordinary No.1847/32 of January 29, 2014. (Annex-3)

4.1.4 Natural Disaster Mitigation

People living in rolling & hilly areas of the country have experienced various landslide disasters during the past few decades. Since majority of recent landslides have been induced by human interventions. Obtaining concurrence of NBRO for any construction activity in landslide prone areas has been mandatory to minimize the landslide disaster risk and to increase the safety of life and property from future slope instabilities.

Kandy, Matale, Nuwara Eliya, Badulla, Kegalle, Ratnapura, Kalutara, Galle, Matara, and Hambantota have been declared as landslide prone districts by NBRO. Therefore, all construction take place within those ten (10) districts need to obtain NBRO's clearance. However, exemptions may apply to certain areas located within the Kalutara, Galle, Matara and Hambantota districts and Mahiyangana, Embilipitiya, Dambulla and Galewela Local Authorities depending on the characteristics of the terrain.

4.2. Guiding Policies

4.2.1 National Physical Planning Policy and Plan

The main objective of the National Physical Planning Policy is to provide all development agencies in Sri Lanka with a broad national level guiding framework for the planning and execution of development activities, which will directly impact upon the physical environment of the island and its territorial waters, and to establish facilities, amenities and service related infrastructure incidental to the development of the physical environment. In order to address to the need for a planned physical development throughout the island, a National Physical Planning Policy was first formulated in 2007 and it was made a statute in 2011.

The National Physical Planning Policy consists of four main components:

1. Conservation of the 'Critical' and the 'Unique': Adequate sensitivity towards unique environmental settings, water resources, natural ecosystems and cultural landscapes in all development activities, adequate measures taken for the conservation and assurance of their sustainability.

2. Promotion of the 'Livability' for 'Human' and other living beings: Selection of the environments that are most appropriate for human habitation in terms of favorable climatic conditions, safety from disasters, availability of essential services and resources to fulfill basic needs, in the planning of human settlements.

3. Optimization of the 'Utility' of the 'Available': More attention to optimize the utility of the available resources and infrastructure, rather than endeavoring into entirely new ventures in future development activities, considering the economic constraints and fulfilling Sustainable Development Goals.

4. Exploration of the 'Potentials' and the 'Enhancement' of the use. Due consideration given to exploit the potentials of the locations with human resource: where populations with various skills and education levels are available; other resources: ii such as natural reserves and scenic settings; and in-built potentials: such as areas with competitive advantage for diversified developments.

The National Physical Plan derived out of that policy and known to all development agencies has been updated and published in 2019 by the National Physical Planning Department. The National Physical Plan is an overall national level guiding framework and it indicates approximate spatial extents, earmarked to accommodate identified physical developments. Since the publication of the revised National Physical Planning Policy and the Plan in 2019, some significant conditions such as Covid - 19 Pandemic, new predictions of IPCC[1] of the United Nations due to climate change with the potential to affect Sri Lanka etc have surfaced requiring a review and an update. Accordingly the Department of National Physical Planning is in the process of updating the National Physical Planning Policy and Plan – 2050. During this process, development targets of the Government , Ongoing National Level Projects and Programmes and International Conventions / Agreements have been considered.

International Conventions and Agreements

Sri Lanka has been party to many international treaties and conventions. Among them, the United Nations (UN) pioneered treaties take the lead. The most prominent is the Sustainable Development Goals that all UN member states are bound to achieve by 2030. The Paris Agreement under the United

Nations Framework Convention on Climate Change (UNFCCC) on mitigating greenhouse gas emissions (2017) also has a direct implication on the physical planning of Sri Lanka.

The Main Features of the Proposed National Physical Plan – 2050 includes the following:

a. The conservation Central Environmental Sensitive Area.
b. The conservation of Coastal Environmental Sensitive Area.
c. The Conservation of Protected Area Network covering the forests, water bodies, archaeological reserves, agriculture areas, etc.
d. Economic Corridors dedicated to the connecting of raw material regions, production areas and markets.
e. Settlement Hierarchy of Multi-dimensional Commercial Cities, National Cities, Connecting Cities and Cluster Cities.

The proposed spatial structure in the Updated Draft National Physical Planning Policy and Plan – 2050 (December 2021) is shown in map 4-1.

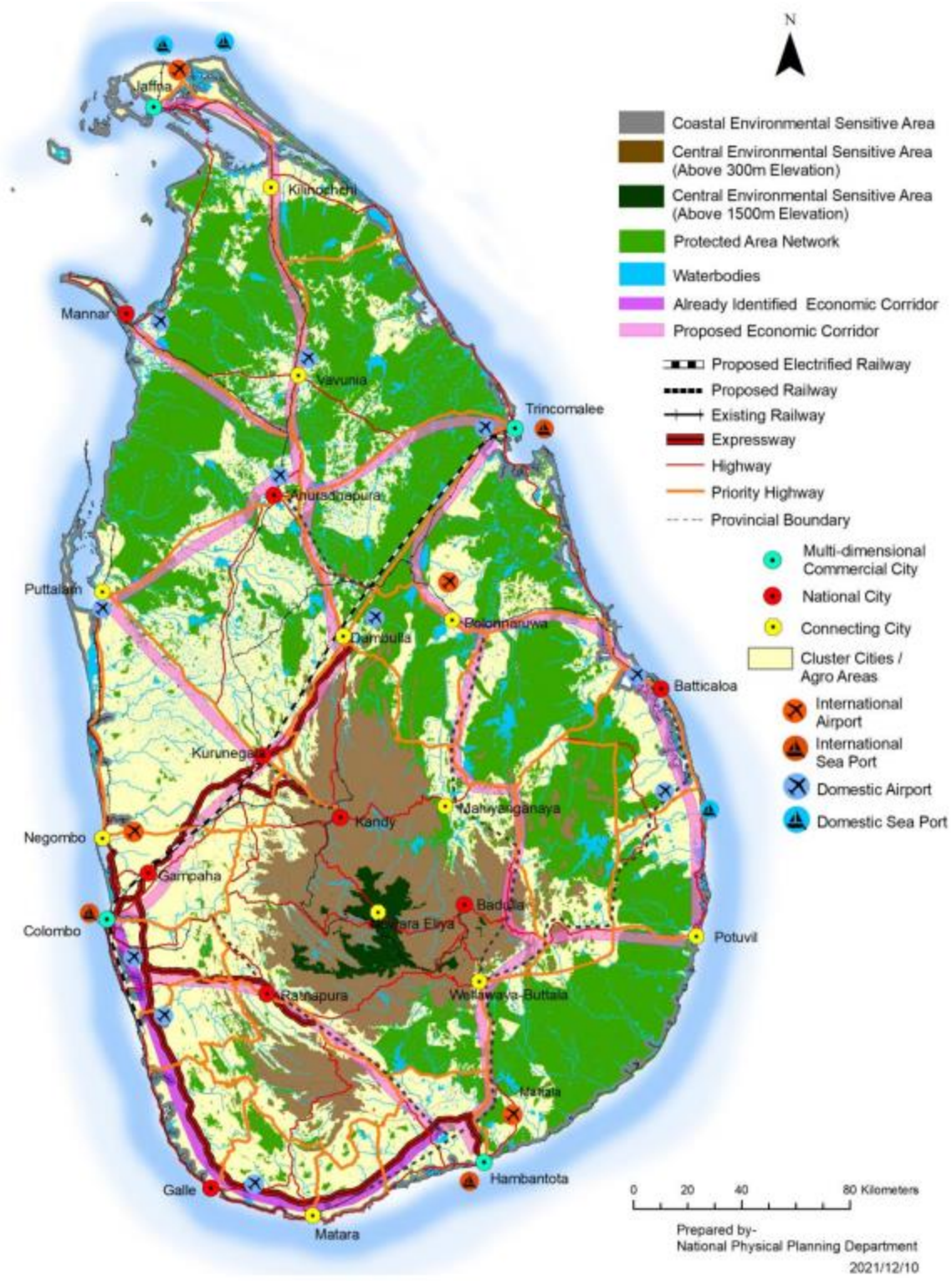
The Updated Draft National Physical Planning Policy and Plan – 2050 (NPP-2050) , has identified 10 "C" Shaped Economic Development Corridors as listed below;

- Colombo - Dambulla - Anuradhapura - Jaffna
- Jaffna - Medawachchiya - Mannr
- Mannar - Anuradhapura - Puttalam
- Colombo - Kurunegala - Puttalam
- Colombo - Ratnapura - Hambantota
- Colombo - Kurunegala - Dambulla - Anurdhapura - Trincomalee
- Jaffna - Anuradhapura - Trincomalee
- Trincomalee - Manampitiya - Batticloa - Potuvil - Hambantota
- Hambantota - Monaragala - Potuvil
- Trincomalee - Manampitiya - Monaragala - Hambantota

Initially, these corridors are to be mapped out along existing roads to minimize costly and time-consuming land acquisitions and also to reduce the cost of construction of corridor to the level of an expressway. Further it specifies that development of theses corridors to expressways should be considered in medium or long term.

Table 4:1-Road Transportation sector Development Strategy of the National Physical Plan – 2050

Policy	**Strategy**
Improve integrated modes	• Allow multi modal transport facility
Improve public transport	• Prioritize public transport on roads • Improve safety modes • Improve energy efficiency • Improve the assets Restructure
Promote a planned road transport system	• Integrate road-rail modes • Review of Master Plans • Preparation and adaptation of future development • Modification to the sector • Updating of legal regulations and planning guidelines • Logistic Management



Map 4:1 Proposed spatial structure of Sr Lanka- 2050

(Source: Updated Draft National Physical Plan 2050)

5. Master Plan Development

5.1 Plan for Existing National Network

5.1.1 Methodology of Identifying Plan for Existing National Road Network

As the amount of investment in maintaining and developing road network in a country is huge compared to other sectors, allocating funds for road infrastructure development should be properly planned. Specially, when preparing a long-term plan for an existing road network, it is extremely important to allocate funds in the most beneficial manner among the road sections in the network. In view of the above, the selection of candidate roads/sections should be scientifically analyzed so that the analysis should answer a number of important questions such as:

- Was the proposed construction or maintenance program/strategy economically justified?
- What was the alternative construction or maintenance program that yielded the highest benefits to society?
- What was the economic benefit of spending money on maintenance, compared with spending it on new roads or improvements to the existing alignments?
- Was it more economical to construct a strong, expensive pavement initially, thereby permitting the use of larger, more economical vehicles and reducing future road maintenance outlays, or to follow a stage construction strategy economizing on initial costs, restricting vehicle axle loads, and paying more for maintenance, with the intent of upgrading the road later on when traffic growth warrants it?
- How to define priorities among roads to be included in a proposed work program?
- How much should be spent to maintain paved roads, and how much to maintain and upgrade earth and gravel roads?
- Does it matter much if certain road maintenance expenditures were deferred during years of financial stringency?
- What combination of maintenance strategies yielded the lowest overall economic costs for a specified level of maintenance funding?

Fourth Highway Development and Management Model (HDM-4), is a capable software system for giving analysis out puts for answering above questions. HDM-4 serves as the primary tool for the analysis, planning, management and appraisal of road maintenance, improvements and investment decisions.

The HDM-4 model is basically used for three main analyses. They are Project analysis, programme analysis and Strategy analysis.

Project analysis is performed as a basis for feasibility studies, in which a road project is evaluated in terms of its economic viability.

The programme analysis is performed for the entire network for identifying the candidate road sections for maintenance and improvement with or without budget constraints.

The strategy analysis is performed on the entire road network for long term budget planning or for optimising the maintenance strategies. Here the whole network is subdivided into several networks according to the key attributes that influence the pavement performance.

The work programme (Year 2021-2030) was developed based on the different analyses performed for the entire national road network by using HDM-4 software.

In order to perform these network analyses, a comprehensive preparatory work was required in terms of collecting network parameters, developments of systems for data processing, provision of related infrastructure facilities (IT and other), data processing and analyzing the data to get the output. In order to achieve these requisites planning division had to acquire specific skills and training to staff, and share expert's knowledge on certain matters. This is a long procedure, which has to be followed for years.

As such, the approach of work programme (Year 2021-2030) development can be basically considered under following two phases as the achievements in first phase are directly related to the second phase.

1) Preparatory work
2) HDM-4 analysis

5.1.2 Preparatory Work

Background

RDA s' normal practice was the traditional method of forecasting the budget from year to year based on the experience of the managing officers. There was no systematic way of managing the road assets.

As a part of the restructuring process of RDA started in the year 2004 supported by ADB, the planning division of RDA was equipped with an Asset Information Management System (AIMS) for pavement assets consisting of the HIMS (database and HDM-4 Information Management System) and the HDM-4 decision support tool.

In order to manage and to obtain output from the AMIS, RDA commenced collecting road network parameters of the entire national network. Planning division organized a Visual Road Condition Survey programme (VRCS) to collect road condition data of the national network island wide through the provincial technical staff. Province wise annual training progrmmes were organized and conducted by the planning division. A Guideline to carryout visual road condition surveys, a database for data entering and equipment for measuring lengths were distributed. The provincial technical staffs engaged in data collection were given some incentives. Planning division collected all the data and prepared them to be uploaded to the HIMS system.

Road roughness data were collected by the planning division using two vehicle mounted bump indicators covering part of the network annually. Pavement structural data were assumed base on the type and the traffic condition of the pavement sections. The Benkelman Beam Deflection data collected on some pavement sections by the Research and development division, RDA were also used to represent the structural conditions of pavement sections. Traffic data on each road section in the network were derived based on the assumed projections to the Average Daily Traffic (ADT) counts collected using Automated Traffic Counters (ATC) by the planning division. Pavement history data were collected through the past records and the evidence from the experienced officers.

The previous master plan (2007-2017) was developed based on the HDM-4 (version 1.3) analyses carried out from the network file given as an output of AMIS system in which whole network data collected have been stored. Apart from these analyses, transport planning analysis was carried out for inter-zonal traffic on a defined core network. Transport planning software, STRADA 3, supplied by JICA was used for building the model at that time,

a) Automated Road Condition Data Collection

In 2010, RDA purchased two very expensive, sophisticated machines (Falling Weight Deflectometer (FWD) and Multi Function Network Survey Vehicle (MFNSV)) under the World Bank Funded Road Sector Assistant Project to automate the data collection process of the national network.

Figure 5-1: Falling Weight Deflectometer (FWD) machine

The structural condition of a road pavement is one of the key input parameter to HDM-4 software. The FWD testing machine is used to evaluate the structural condition of the road pavement. In comparison with BBD method, FWD method is far better in accuracy, detection efficiency, ease of operation and other aspects. The FWD testing machine consists of a circular plate, which is operated under dynamic loading and seven numbers of seismometers (sensors) to measure the pavement deflections.

Figure 5-2: Multi-Function Network Survey Vehicle (MFNSV)

MFNSV is equipped with highly sensitive laser attachment (with 6 nos. point lasers), five digital cameras for taking pictures(images) of the road pavement & the panoramic view, a GPS, a device for capturing Geometric data (GYPSITRAC) and a Distance Measuring Instrument (for location referencing of data).

The respective field officers of the Planning Division have been given the initial training on operation and maintenance of the machine by the supplier when the machine was purchased. The annual maintenance work

of these machines are carried out with our field officers by a foreign expert nominated by the supplier according to the signed contract agreement.

b) Processing and analyzing of road condition data

The data collected from the laser attachment of the MFNSV have been processed at the office to get the required input parameters of HDM-4 such as roughness, texture and geometry data. However, the data collected from the five digital cameras have been further analyzed at the office using special software to extract inventory and condition parameters such as cracked area, potholes, edge breaks, area of raveling, road width, number of lanes etc. this work was performed under a client server environment.

c) Development of a centralized system

RDA collected network data over a period from the year 2010 and simultaneously taken action to store these collected data in a way that it is readily available and usable whole RDA purposes as well as national context by developing a web based integrated road asset management system (Sri Lanka Road Asset Management System-SLRAMS)in the year 2014/2015.

5.1.3 Traffic Demand Analysis and Modeling

Traffic Data Collection and Evaluation

Traffic data plays a vital role in road network planning and development activities. Customarily, Average Daily Traffic (ADT), Annual Average Daily Traffic (AADT), Manual Classified Count (MCC), Turning Movement Count (TMC), Cumulative Number of Standard Axles (CNSA), Queue Lengths and Pedestrian Counts are the types of traffic data that are surveyed by the Data Collection and Evaluation Unit of Planning Division, RDA.

Maintaining an up to date traffic database of the national highways is important for making traffic estimates, evaluations and demand forecasts during national scale development and policy making. The quality and

accuracy of data is assured as the data is utilized as one of the primary inputs when forecasting traffic demands for national scale transport projects with very high investments and to carry out detailed pavement designs.

A set of routine surveys on national roads covering the entire network are conducted annually. The data collected through these surveys are also used as inputs for the analysis and modelling software such as STRADA, GIS, HDM4 and Vissim during the studies carried out by the Planning Division. About 200 permanent locations have been identified for routine surveys of ADT and MCC and another 28 locations have been identified for Axle Load surveys. Additionally, Turning Movement (Junction traffic) surveys, Origin-Destination surveys, Pedestrian Surveys, Parking survey etc. are carried out on demand.

In addition to the routine surveys series of traffic surveys, origin destination surveys etc. at selected locations have been carried out for the preparation of master plan. These locations are represented in the Map 5-1.

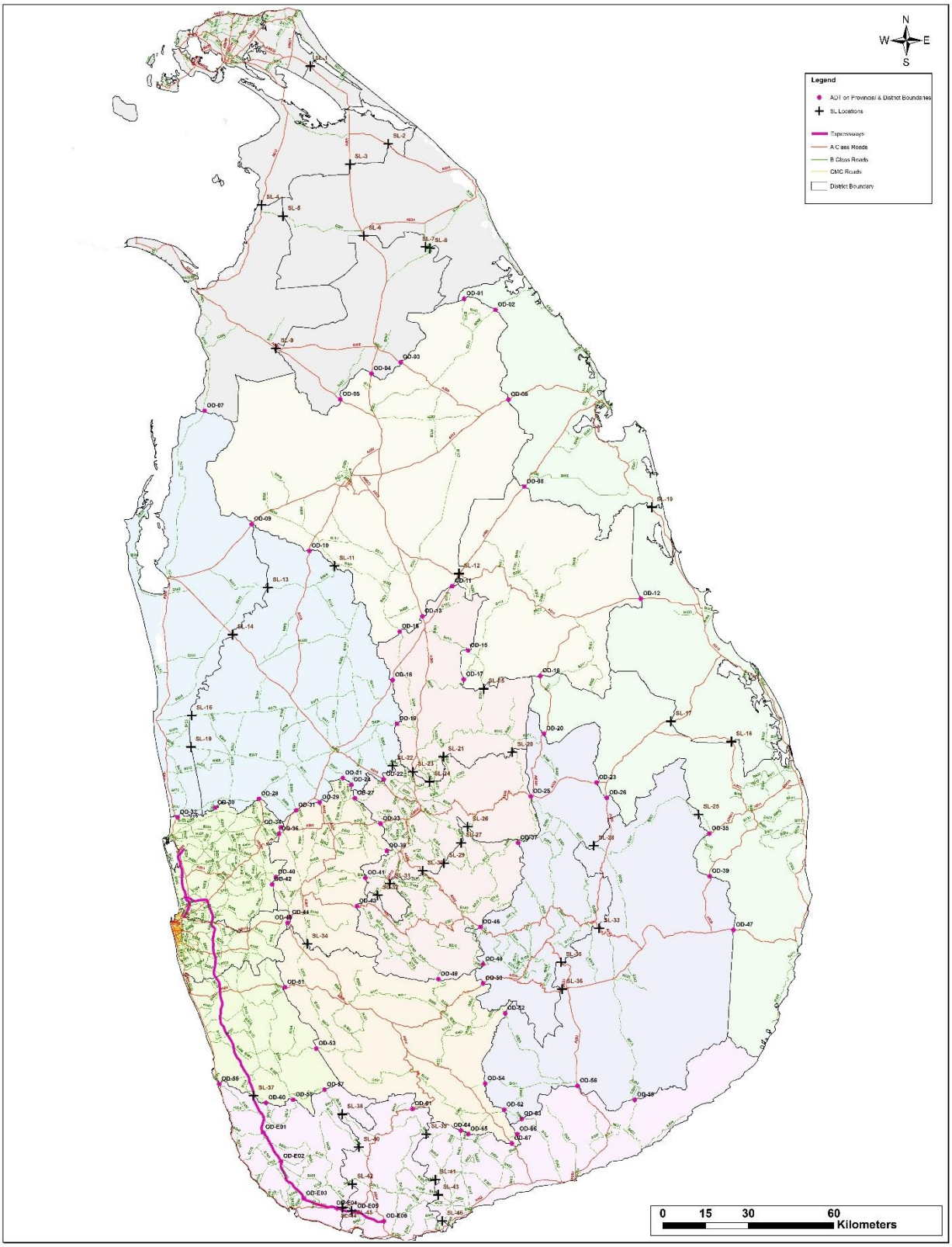
Study Area and Zoning system

The study area & zoning system is shown in Figure 5- 3 where the detailed list is provided in Table -3 of Annex -4. The Zoning system is established referring the Traffic Analysis Zone (TAZ) of CoMTrans for the Western Province and DSD for other 8 Provinces except for Kandy and Harispattuwa DSDs. These two DSD zones are further divided into a total of 14 TAZs. Finally, the study area of Island has been divided into 749 TAZs.

Road Network

The road networks represent all expressways, A, AB & B class roads and some significant roads in the study area that have an impact to the study.

Currently, there are a considerable number of road projects, ranging from rehabilitation to new construction project. It is assumed that such projects will have been completed and operate their respective planned years.



Map 5:1- Origin-Destination & Screen Line Survey locations

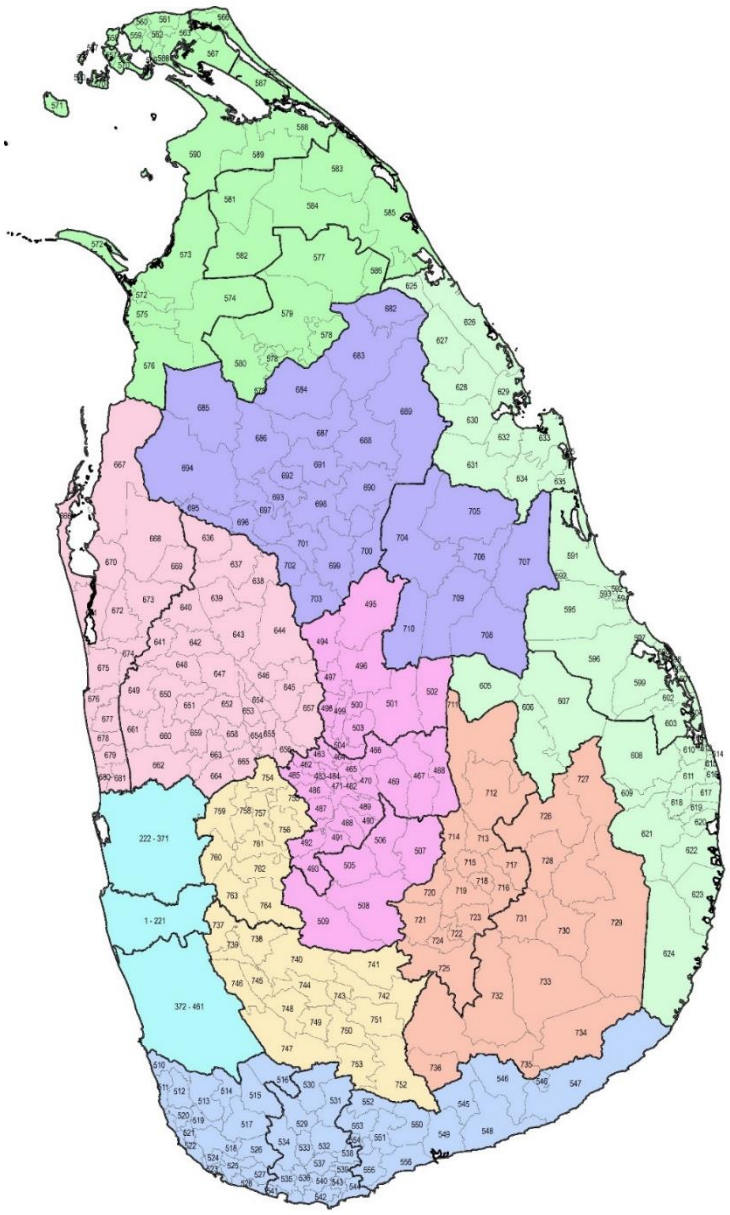


Figure 5-3: Zoning (whole country)

Traffic Demand in Origin-Destination (OD) Matrix

2017 OD Matrix

ComTrans OD table of year 2013 was revised by using Manual Classified Count data, which were on major crossroads within the Western Province.

Other provinces demand was estimated by using Manual Classified Counts surveys, which were carried out in the first quarter of the year 2017.

Future OD Matrices

The future OD Matrices were developed for years 2020, 2025 & 2030 with total trip generations and attractions been forecasted based on growth factors of 4% and 3.5% for period of 2018 – 2025 and 2025 – 2030 respectively. The Fratar method was used to develop the final future OD matrices for 2020, 2025 and 2030. The decision to use growth factors for trip generation and trip attraction was due to unavailability of reliable

socio economic projections for the future year and therefore assumptions made will be subjective.

Estimation Using JICA - STRADA Traffic Demand Forecasting

The traffic on the National Highway and other roads were forecasted using the JICA STADA traffic model (Version 3.5) which was developed by RDA for National Road Network. STRADA stands for "**S**ystem for **Tra**ffic **D**emand **A**nalysis". JICA developed it for its technical assistance program in the transport sector in 1997 and frequently updated model.

Traffic Assignment

"User Equilibrium Assignment" is used as the assignment method. Based on the Wardrop's first principle of equal travel time for traffic assignment, the program is built on the mathematical problem of optimization with the Frank – Wolfe algorithm.

The daily OD matrix between zones are loaded into the network and loading is based on equilibrium assignment with the generalized cost function as follows;

$$Generalized\ \ Cost = Travel\ Time + Toll * \frac{1}{Value\ \ Of\ \ Time}$$

Relationships between traffic flow and speed can be expressed by relationships between congestion and travel time obtained from the following BPR formula. In the BPR formula, the value of constant of "β" and "α" are different according to the road classifications, Roadside conditions etc.

$$t = t_0\left\{1+\alpha\left(\frac{x}{C_p}\right)^{\beta}\right\}$$

t = Congested travel time at flow x veh./hr. (hr)

t_0 = Free flow Travel time (hr)

x = Traffic flow volume (PCU/day)

C_p = Maximum capacity (PCU/day)

If traffic volume assigned to the toll road, following BPR formula is used.

$$t = t_0\left\{1+\alpha\left(\frac{x}{C_p}\right)^{\beta}\right\}+\frac{\xi}{\omega}$$

Where,

ξ: toll (Rs)

ω: value of time (Rs/hour)

Speed Congestion Characteristics of Network

The characteristics of the links in terms of free flow speed and congestion were defined based on BPR curve and parameters are used according to the functional classification of the road and free flow speed (design

speed). Figure 5-4 shows different types of BPR curves have been considered and Table 1 shows the parameter values of BPR curves.

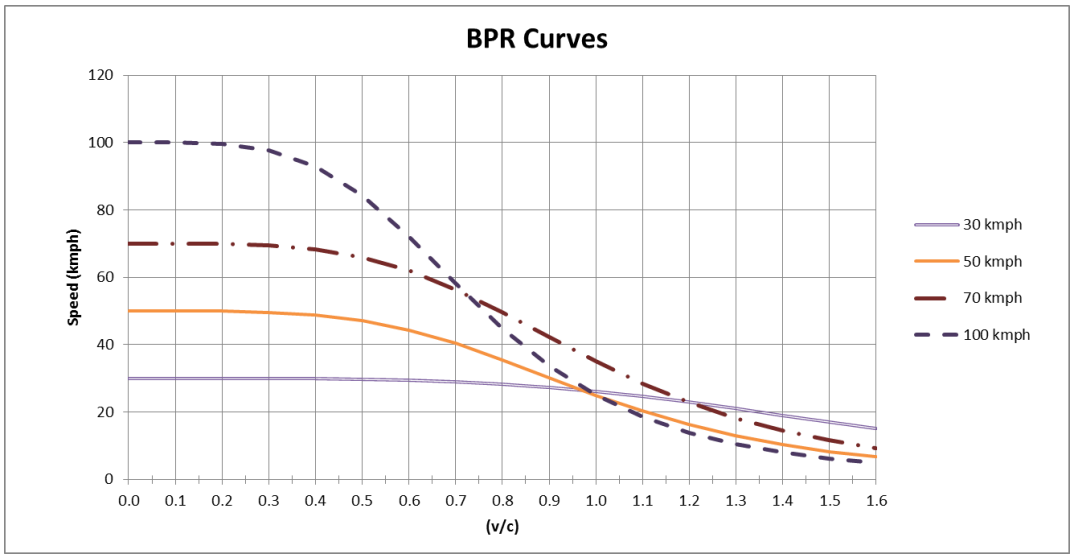


Figure 5-4: BPR Curve by Road Classification & Design Speed

Table 5:1: Parameters of BPR Curve

Road Class	Free Flow Speed (kmph)	Alpha (α)	Beta (β)
C and D Class	**30**	0.15	4.0
A and B Class (Urban)	**50**	1	4
A and B Class (Rural)	**70**	1	4.0
Expressway	**100**	3.0	4.0

Model Calibration

The JICA STRADA model available at RDA has been calibrated to the project level and further calibration was done to update the model for the whole country. The volume calibration was conducted as part of the exercise.

Volume Calibration

Traffic counts data were collected to represent all districts for the calibration of the model where 253 locations been considered. Sources were a collection of traffic data from Traffic database of Planning Division, Road Development Authority. Some of traffic data collection was within the range year 2015 and 2017, 4% annual growth was applied to extrapolate them to the base year (2017).

Observed traffic volumes and model volumes after calibration for the base year (2017) are shown in table – 1 of Annex-4.

The validation of traffic assignment model was carried out comparing assignment result (model traffic flow)

against observed daily traffic flows at the year 2017. The traditional NCHRP 255 curve is used to understand the fitness level between model volume and observed volumes. The most of the high volume points are below the standard curve as shown in the figure 5-5, hence the model flows to be acceptable according to the principle of NCHRP 255 curve.

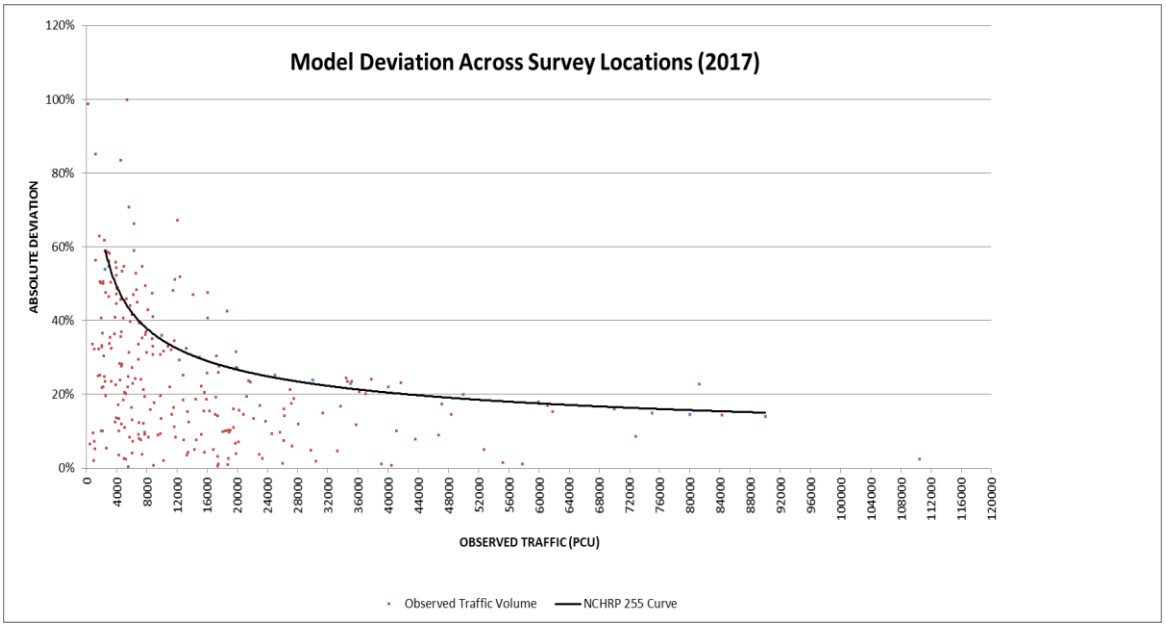


Figure 5-5: Model Deviation across Survey Locations for 2017

5.1.4 Data Preparation and Processing

Location Referencing System of LRMS Module of the SLRAMS

Location referencing is used to assign a unique address to each location on the road network so that the physical location of any road attribute can be identified easily.

Network Elements

The network elements that are considered in the location referencing method of SRAMS are shown in the Figure 5-6 below. According to this, a Road is broken into number of Links (node-node) and a Link is in turn broken into number of smaller Segments (LRP-LRP).

Definitions of Road Network Elements

The following definitions for network elements will be followed in SRAMS.

Road: Sequential length of the road network identified and gazetted as road.

Link: Part of road broken down based on the provincial boundary as per the jurisdiction limits maintained by the RDA.

Node: Nodes are used to mark start and ends of the Links

Location Reference Points (LRPs): LRPs are prominent structures along the road, such as km stones, intersections, bridges, culverts, boundaries, religious structures, concrete posts, sign posts, and bench marks. These LRPs are used as reference while collecting the data. LRPs are defined by distance from the start of the road. The spatial locations of LRP should have GPS coordinates.

Segment: A Segment is part of a road joining two LRPs of the same Link.

Network: Network is a collection of Links grouped together for performing various analyses.

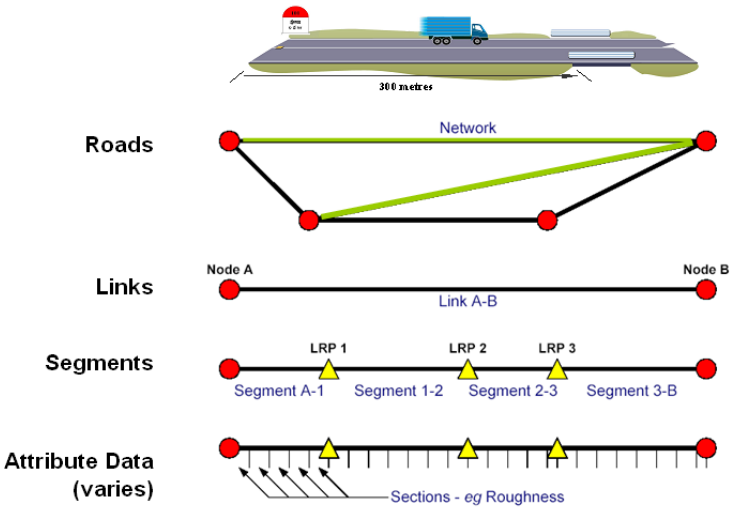


Figure 5-6: Location Referencing for SRAMS

Note: The term “sections” is reserved typically for referring to sections of uniform road attributes such as roughness section, resurfacing sections, rating section etc. (ex: homogeneous section). A section would be defined in terms of its start and end position expressed as an offset from the road start.

Preparation of Location referencing data for LRMS MODULE OF THE SLRAMS

Network elements such as Road list, Link list, Node list, Administrative Boundaries list etc. of the National Road network to suit the LRMS Module of the SLRAMS was prepared.

RIS Module of the SLRAMS

The Road Information System (RIS) will form the core of the SLRAMS to provide various types of information to other sub-systems of SLRAMS. The physical attributes length, width, surface type, terrain and pavement condition data such as raveling, cracking, potholes, roughness, projects related information will be stored in

the RIS. This information will be shared to other sub-systems of SLRAMS as per the specific needs for performing other analyses.

Processing, analyzing and Uploading data to the RIS Module of the SLRAMS

Road Inventory

The images taken from the three asset cameras of the Multi-Function Network Survey Vehicle (MFNSV) was analyzed at the office to extract the road inventory parameters such as carriage way width, number of lanes, surface type, shoulder type, shoulder width etc. These data were then post processed to prepare them to be uploaded to the system.

Road Condition (functional & structural)

Road Roughness

The data collected from the laser profile of the Multi-Function Network Survey Vehicle (MFNSV) is post processed at the office to obtain the road roughness data and uploaded to the system after preparing them to the required formats.

Road pavement condition

The images taken from the two pavement cameras of the Multi-Function Network Survey Vehicle (MFNSV) was analyzed at the office to extract the road condition parameters such as cracking, raveling, potholing and edge breaks.

Pavement Deflection Data

The deflection data collected from the Falling Weight Deflectometer were uploaded to the system after preparing them to the required formats.

Traffic Data

The traffic data such as Average Daily Traffic (ADT), growth rates, vehicle compositions for each traffic links obtained from the JICA STRADA model were uploaded to the system.

Road Geometric Data

The road geometric data was obtained from the GIPSITRAC Device of the Multi-Function Network Survey Vehicle (MFNSV) was post processed at the office to obtain the road geometric data and uploaded to the system after preparing them to the required formats.

Project Information & Pavement History data

Project Information & Pavement History data such as project status, project scope, year of completion etc. compiled by the Planning Division were uploaded to the system after preparing them to the required formats.

Data validation and storing in the RIS MODULE OF THE SLRAMS

There is a validation process built in RIS to check if the data provided are within a reasonable range. After uploading all the data mentioned above to the system data validation was performed. Then, they are stored in the RIS to be shared to other sub-systems of SLRAMS as per the specific needs for performing other analyses.

Data processing in the SLRAMS

Processing RIS Module

The RIS module of the SLRAMS was used to prepare the Network Characteristics summary reports/charts given below.

- Road length distribution by surface type
- Road length distribution by width class
- Road length distribution by traffic
- Road length distribution by condition class
- Road length distribution by roughness class
- Average roughness distribution by province
- Average condition distribution by province

Some of them are included in the chapter 2 of this document.

Processing PMS Module

The Pavement Management System (PMS) was used for the following.

- to determine the homogeneous sections and their representative data,
- assigning default values to some parameters of the sections where there are no changes
- to prepare the input files for HDM-4 analyses, both strategy and programme analysis network files

The HDM-4 analysis for the NRMP (Year 2021-2030) was performed basically from the network data collected through FWD & MFNSV with other data as mentioned above and processed through the SLRAMS Pavement Management System. The PMS processing were carried out to prepare the HDM-4 input file for programme analyses as well as strategy analyses.

Other data needed for hdm-4 analyses

Vehicle Fleet

The basic information regarding the types of vehicles accommodate in the countries vehicle fleet has to be defined in order to analyze the road sections for the economic evaluations. Numerous types of vehicles are operated in the country so that some of simplification was required depending on the purpose of travel and axel configuration. 11 types of vehicle categories are identified and the detail on each type is illustrated in the following table.

Table 5:2: Vehicle Fleet

Code	*Selected Category*	*HDM-4 Base Vehicle Type*	*HDM-4 Description*
MCL	Motor Cycle	Motorcycle	motorcycle or scooter
TWL	Three Wheeler	Car Small	small passenger cars
CAR	Car, SUV, Cab, Small Van	Car Medium	medium passenger cars
VAN	Van(10 -16 Seats)	Bus Light	light bus (approximately < 3.5 tonnes)
MBU	Medium Bus(16 - 40 seats)	Bus Medium	medium bus (3.5 - 8.0 tonnes)
LBU	Large Bus(56 seats)	Bus Heavy	multi-axle or large two-axle bus
LGV	Small Lorries	Truck Light	small two-axle rigid truck (approx. < 3.5 tonnes)
MG1	Medium Good Vehicle(2-axle, 6 wheels, < 8.5 Tons)	Truck Medium	medium two-axle rigid truck (> 3.5 tonnes)
MG2	Heavy Good Vehicle(2-axle, 6 wheels, > 8.5 Tons)	Truck Medium	medium two-axle rigid truck (> 3.5 tonnes)
HG3	Lorry(Large 3-axle, 10 wheels)	Truck Heavy	multi-axle rigid truck
ART	Heavy Good Vehicle(Articulated truck with trailer)	Truck Articulated	articulated truck or truck with drawbar trailer

The vehicle fleet data mainly includes economic prices and some physical characteristics of a unit with other necessary calibration data. Physical characteristics includes PCSE (Passenger Car Space Equivalents) values, number of wheels and axels, annual km's, annual working hours, operating weight etc. other than that the data on economic price of a new vehicle, fuel price, tire price, crew wages, passenger time cost, cargo cost also required for the analysis. The economic prices of new vehicles and tire prices were evaluated based on the available data from the SL customs of annual imports to the country in year 2016. The physical and economic data used in HDM-4 studies which was collected from field surveys, studies and other sources were presented in the Annex 5 of this report.

Unit Cost of Maintenance and Improvements

Tentative cost estimation was done for every maintenance and improvement standards for each surface type including Concrete and Gravel surfaces before the analysis. The cost estimation was done based on the 2018 HSR rates with predefine working norms which was already developed by the RDA. The HSR rates were derived on market price for the country and include NBT (Nations Building Tax) of 2%. In order to evaluate the economic cost, this market price has to be converted by deducting NBT and multiply by a factor which is called SCF (Standard Conversion Factor). This SCF factor was taken as 0.976 based on the economic study done by RDA from 2011 Central Bank data. Then this economic cost converted to a financial cost with inclusive of VAT (15%), NBT (2%) and overhead +profit (15%). The evaluated unit cost of maintenance and improvement standards are illustrated in Annex 6 of this report. The discount rate for the economic analysis is taken as 12%.

5.1.5 Analysis Work Using Hdm-4

General Approach

The 10-year plan for existing national network was developed using life cycle economic analysis using HDM-4 software, which require detailed inventory and traffic data for each and every road sections of the existing network. The different competing candidate projects then were prioritized using economic indicator of NPV (Net Present Value) which is a very good economic indicator of the amount of return attained from the money spend to that particular investment. This NPV/CAP ratio can be used in prioritization of a long list of work programs of candidate road sections into a one-year or multi-year work program under a constraint budget. A financial model was developed using RONET software for the master plan. Different innovative alternative financing options, including PPP were explored and it was discussed in the later part in this report.

In order to develop a 10-year road maintenance and improvement program for main road network of Sri Lanka, both life cycles cost strategic and program analysis were undertaken using HDM-4 model for the 20 years evaluation period. The model simulates total life cycle conditions and costs for the entire network under RDA for a series of improvement or maintenance strategies, and develops road works program using economic principles. The primary cost set for the life cycle analysis includes the costs of road construction, maintenance, vehicle operating costs, travel time costs etc. The costs of construction related traffic delays, accidents and environmental pollution were also included in the life cycle cost analysis.

After carrying out life cycle cost-benefit analyses for an evaluation period of 20 years, a multiyear year rolling program for different types of road networks was developed. The alternative candidate maintenance and improvement options were prioritised using NPV. A brief description of the methodology for the development of the master plan is outlined below.

In order to determining the best solution for existing network, following activities were undertaken in the preparation of NRMP (2021-2030).

- Development of different decision matrices for segmentation of the highway network so that a number of homogenous sections can be developed on the basis of road type, pavement type, AADT and other parameters as deemed appropriate for analysis in the HDM-4 model;
- Identification of the appropriate intervention criteria for network development and maintenance requirements by analyzing the road network by using the updated inventory and condition data of the network;
- Development of appropriate Do Minimum and Do Something different alternatives of road maintenance, improvement and new development options;
- Development of optimum maintenance and development strategies using Strategic Analysis of HDM4;
- Assessment of Funding Level;
- Conduct program analysis to determine network improvement and maintenance requirements using updated interventions by employing Life Cycle Cost Analysis of HDM-4;
- Prioritization of the improvement and maintenances requirements based on the output and development of works program under budgetary constraints using HDM-4;
- Preparation of 10-year work plan for development, improvement and maintenance of road network based on the prioritized list of projects and the other social and economic requirements;

The details of the work performed on those activities are discussed in the following sections in this report.

5.1.6 Development of Road Intervention Criteria and Standards

In order to develop multiyear works program for existing National Highway Network, different appropriate intervention criteria for road maintenance and improvement were adopted. The purpose is to obtain optimum work strategies and programs using Strategic and Program Analyses of HDM-4. Intervention Criteria for all types of road pavements including Flexible, Rigid and Unsealed roads in the existing National Highway Network were developed. Flexible pavements include Asphalt Concrete (AC), Surface Treated such as DBST or SBST (ST) and Penetration Macadam (PM) surface roads. Rigid pavements are concrete roads whereas unsealed roads mainly Gravel roads. In this connection, key work intervention criteria used in the analysis, are ;

- Routine Maintenance
- Periodic Maintenance (Overlay)
- Road Improvement (Capacity Improvement and Structural Improvement)

a. Intervention Criteria for Flexible Pavement

(i) Periodic Maintenance Criteria

Intervention criteria for maintenance of flexible pavement were developed considering mainly two factors, i.e. AADT and Roughness. It is mandatory to conduct routine maintenance annually for all types of roads irrespective of traffic volume or condition. If the roughness of the road is in satisfactory level depending on the traffic volume, routine maintenance was selected as the only intervention. The basic practice in the country for periodic maintenance of already Asphalt roads are to provide AC overlay of thickness that depends on the existing traffic volume. The decision has been taken by the RDA higher management not to use any surface treatment methods (DBST/SBST surfacing) other than the upgrading of unsealed roads due to construction difficulties arising in particular areas in the country. Therefore, those types of interventions were omitted for flexible pavements in preparing NRMP. It was proposed to trigger periodic maintenance activities for low volume roads having AADT less than 5,000 if the roughness is exceeded 3.5 and medium volume roads having AADT more than 5,000 but less than 20,000 if the roughness level exceeded IRI 3.0 m/km. On the other hand, Periodic maintenance activities for high volume roads having AADT more than 20,000 were trigged if road roughness exceeded IRI 2.5 m/km. The intervention criteria for Flexible Pavements for National roads for various AADT and roughness level are illustrated in Annex -5, Table 5-A.

Since it is essential to adopt relatively higher maintenance standards for Expressways, for ensuring better user comfort and service standards, a lower roughness threshold, i.e. periodic maintenance interventions were triggered if roughness exceeded IRI 1.7 m/km irrespective of AADT. The works intervention criteria for Expressways are demonstrated in Annex-5, Table 5-B.

Here for periodic maintenance of flexible pavements, assumed overlay thickness is used for the purpose of the cost estimation with the traffic volume. It is recommended using Polymer Modified Asphalt (PMA) for the AC overlay of High traffic volume roads since it has higher strength resulting lesser thickness of overlay in the design. The other roads normal Hot Mix Asphalt (HMA) overlay was assumed.

(ii) Improvement (Strengthening and Reconstruction) Criteria

If the condition of the roads is deteriorated beyond certain level, for instance roughness more than IRI 8.0 m/km, when normal period maintenance would not suffice, road Strengthening was proposed by increasing the structural capacity of the pavement. If the condition of road is deteriorated such that the roughness increases more than IRI 10.5 m/km, normal road works no longer feasible and complete reconstruction of the road was adopted with improved geometry. The criteria for road improvement (Strengthening and Reconstruction) are depicted in Annex-5, Table 5-C & Table 5-D for both National Roads and Expressways.

(iii) Improvement (Widening) Criteria

The improvement criteria for road widening were adopted considering Volume-Capacity ratio. For low volume roads which has AADT less than 5,000 Peak Period Volume-Capacity ratio of 0.8 was adopted. For roads which has AADT greater than 5,000 Daily Average Volume-Capacity ratio of 0.8 was adopted as a triggering parameter.

Efforts were made to keep sufficient road space by widening the existing roads mainly in 3 categories namely Partial Widening, 1 Lane Addition and 2 Lane Addition. In Partial Widening the existing road was widen by adding 2m of Asphalt pavement. 3.65m of single lane was added and 7.3m of 2 lanes was added in the other two categories.

The main purpose of road widening is not to reduce the Volume-Capacity Ratio less than 0.8 for the entire road network and hence to maintain almost a free flow condition. The improvement criteria for road widening depending on the AADT volume are shown in Annex-5, Table 5-E.

b. Periodic Maintenance Intervention Criteria for Rigid Pavement

The intervention criteria for Rigid pavement were developed considering a combination of two parameters, i.e. one related to road Surface Distresses (Spalling, Faulting, Rutting and Roughness) and other related to the severity of the damage in terms of percentage of damaged area. The periodic maintenance intervention criteria for rigid pavement are shown in Annex-5, Table 5-F.

(i) Works Intervention Criteria for Unsealed Roads

The periodic maintenance and upgrading criteria for unsealed roads were developed and applied for the preparation of NRMP (2021-2030), as described below.

(ii) Periodic Maintenance of Unsealed Roads

Works intervention criteria for unsealed roads are developed using scheduled and responsive criteria. The scheduled criterion for Gravel Resurfacing shall not exceed more than 3 years. The responsive criteria for Spot Re-gravelling are Gravel thickness is less than 100mm and maximum material is less

than 100 m^3/km/year. Gravel priming and Grading is done within the maximum of 3 years during the analysis period.

(iii) Improvement (Upgrading) Criteria of Unsealed Roads

An improvement criterion was adopted for upgrading of Unseal roads into paved roads is on the basis of traffic volume, i.e. AADT. If AADT of an Unseal had become more than 1,000 Vehicle per day, the road was converted into a paved road with a 15 mm SBST construction. If the traffic volume becomes more than 3,000 the road was converted to a DBST road with the surfacing thickness of 25mm. The intervention criteria for unsealed pavement are shown in Annex-5, table 5-G.

5.1.7 Development of Optimum Road Works Strategy for National Road Network

In order to find out the optimum road improvement and maintenance strategy for existing National Network, a number of options starting from Very High Standard to Very Low Standard were selected for HDM-4 Strategy Analysis. The IRI (International Roughness Index) value is the most suitable parameter in terms of riding comfort of the road user and therefore it was selected as base intervention trigger level for HDM-4 Strategy Analysis. Another important parameter was volume over capacity (V/C) ratio which reflects level of service (LOS) intended to provide for the road user. Based on these two main parameters, several strategy options were evaluated in the strategy analysis for preparation of NRMP. Those 4 options were illustrated hereunder:

- Option 1 (Intervention Level – Very High): IRI (m/km) >= 2.5 and V/C Ratio >= 0.8
- Option 2 (Intervention Level – High): IRI (m/km) >= 2.5 and V/C Ratio >= 0.9
- Option 3 (Intervention Level – Medium): IRI (m/km) >= 3.0 and V/C Ratio >= 0.9
- Option 4 (Intervention Level – Low): For AADT < 5,000, IRI (m/km) >= 3.5, For AADT >= 5,000, IRI (m/km) >= 3.0 and V/C Ratio >= 0.9

The undiscounted total investment cost comparison of different alterative road improvement and maintenance options for National Road Network were shown in Table 5-3.

Table 5:3 Comparison of Results of Different Alternative Road Improvement and Maintenance Strategies using HDM-4

Alternative Intervention Options	Undiscounted Total Investment Cost for 2020 to 2029	% Change with respect to Very Low Standard
Option 1 (Intervention Level – Very High): IRI (m/km) >= 2.5 and V/C Ratio >= 0.8: Life Cycle Cost Analysis for 10 years	767,556.24	5.81%
Option 2 (Intervention Level – High): IRI (m/km) >= 2.5 and V/C Ratio >= 0.9 Life Cycle Cost Analysis for 10 years	736,032.04	1.77%
Option 3 (Intervention Level – Medium): IRI (m/km) >= 3.0 and V/C Ratio >= 0.9 Life Cycle Cost Analysis for 10 years	732,480.25	1.30%
Option 4 (Intervention Level – Low): For AADT < 5,000, IRI (m/km) >= 3.5, For AADT >= 5,000, IRI (m/km) >= 3.0 and V/C Ratio >= 0.9 Life Cycle Cost Analysis for 10 years	722,972.96	0%

As expected, the higher the standard considered for road improvement and maintenance, the higher will be the total investment costs. The highest total cost for 10 years with the Option 1, which is very high standard alternative being only 5.8% increase when compared with the lowest standard total cost in Option 4. Since the difference in alternative options was in very much insubstantial and the total amount of investment to be made for 10-year period is very much in the grasp of the national budget, the Option 1 scenario is selected for the development of multiyear rolling program for NRMP (2021-2030).

5.1.8 Identification of Development Requirements of Existing National Network

Having identified the preferred road maintenance and improvement strategy, a 20-year life cycle analysis for existing network was performed using HDM-4 Program Analysis. Two analyses were done separately for the National network and the Expressway network. The analysis gives the optimum work program for each road segment in the network for the next 20 years. Because of the homogeneous sectioning method and the 20-year analysis period the results were more accurate and definite with all the economic indicators such as NPV for each candidate road segments. the ongoing and committed project (as at the end of 2017) in the existing network was excluded from the current network file for the programme analysis in HDM-4. List of ongoing and committed road projects are given in Annex - 8 of this report.

The undiscounted summary of road maintenance and improvement programs for National Roads and Expressways are given in Annex 5, Table 5-H and Table 4-I respectively. In the detailed programs all components of works are disaggregated in terms of Routine Maintenance, Periodic Maintenance, Improvement (Strengthening and Reconstruction) and Widening. The results for homogeneous sections were presented in terms of both section km's and undiscounted expenditures. The total summary and detailed undiscounted expenditures, combining both National Roads and Expressways are presented in -Table 5-4. This table gives output from the analysis 2018-2027, thus expenditure values this table was not updated.

Table 5:4: Undiscounted Annual Expenditures of NRMP (2018-2027)

Year	National Roads Sub-total (Rs. Mn)	Expressways Sub-total (Rs. Mn)	Total for NRMP (Rs. Mn)	Annual % Distribution
2018	231,723.74	1,424.58	233,148.32	45.4%
2019	21,503.43	11.46	21,514.89	4.2%
2020	31,989.94	1,436.43	33,426.37	6.5%
2021	31,060.25	548.02	31,608.27	6.2%
2022	31,118.57	2,520.31	33,638.88	6.5%
2023	25,095.96	461.94	25,557.90	5.0%
2024	35,009.89	1,189.11	36,199.00	7.0%
2025	27,668.27	2,182.30	29,850.57	5.8%
2026	33,563.98	410.84	33,974.82	6.6%
2027	34,054.28	794.51	34,848.79	6.8%
Total	**502,788.31**	**10,979.50**	**513,767.81**	**100.0%**
%	97.9%	2.1%	100.0%	

It appears from the results that in total (undiscounted) Rs. 513.8 Billion will be required for implementation of road improvement and maintenance works for National Roads and Expressways in 10 years. Out of which share of National Roads and Expressways are 98% and 2% respectively. Again, due to huge backlog of differed maintenance program, about 45% of the total work needs to be implemented in the first year while the remaining 55% will be distributed roughly in 9 years, as depicted in Table 5-4. It is therefore apparent that the successful implementation of NRMP (2021-2030) relatively a large investment should be spent in the first year to clear of existing backlog of differed road maintenance and improvement works.

According to the analysis there is no requirement to increase the capacity of the existing Expressway network within next 20 years based on the available traffic demand analysis. Most of the share (41.7%) of the total budget is allocated to periodic maintenance which is mostly overlay within next 10 years for the National network. This is obvious due to recent development to the national network in last 5 years. The routine maintenance requirement is 14.9% of the total budget. For the improvement it is 15.5% and for the widening it is about 27.8% from the total 10 years budget.

For the Expressway network 81.2% of total budget is allocated for AC overlay of STDP section. Only 17.4% is required to AC overlay of OCH section. There is only routine maintenance allocation is need for CKE section within next 20 years.

Budget Optimization

According to the initial budget estimate of the existing National network and the Expressway network, the total 10-year budget requirement was around Rs. 427.7 Billion and Rs. 10.8 Billion respectively for the improvement works. The analysis is then further elaborated in finding out what will happen to the existing network when the budget is constrained. HDM-4 has a facility to conduct budget optimization analyse to derive the average network IRI variation sensitive to the investment made. Further Three budget optimization analysis was conduct for 90%, 80% and 70% constrained budget. The average IRI variation of the 20 years analysis period for National network and Expressway network is given in the Annex- 5 figure 5-A & figure 5-B. The average IRI of the network after 10 years depending on the budget constrain is given in the following figure.

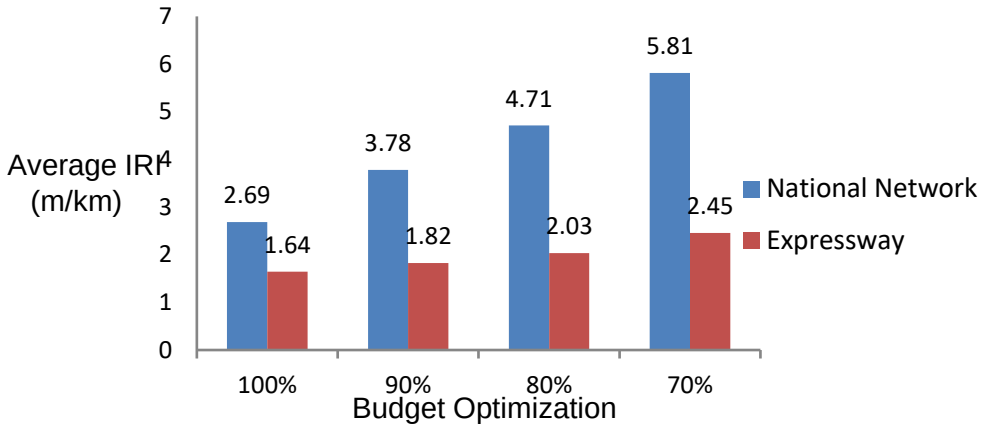


Figure 5-7: Annual Average Network IRI Value (weighted by length) after 10 years

It was observed from the analysis the annual average network IRI for the 20-year period for National network is below 2.8 m/km for the unconstrained budget and for Expressway network is below 1.9 m/km which is very

much acceptable in terms of the network performance. If the budget is constrained by 90% for the National network beyond 2019 the average network IRI is above 3.1 m/km and for Expressway network beyond 2029 it is above 2.0 m/km. When the budget is further curtailed the network, performance is getting lower in terms of the roughness which affects the road user costs.

Therefore, from the budget optimization it was evident that the proper allocation of required budget is very much essential for the National and Expressway network to perform the expected outcome which is beneficial to the country.

5.1.9 Investment Plan for Existing National Road Network

After performing the 20 years life cycle program analysis using HDM-4 the initial work program was developed for 10 years period starting from 2018 to 2027. This work program consists of sections identified for maintenance improvement and widening within next 10 years with tentative cost breakdown. The individual road segments in the work program are prioritized using NPV and NPV/CAP ratios. These economic indicators were derived from the initial run of HDM-4 analysis for every road section in the network.

The originally developed HDM-4 work program is then revised due on the following reasons when identifying the investment plan for the net 10 year for existing national network.

- According to the analysis, it was observed that almost 45% of total 10-year budget is required for national road network in the first year. Then the decision was taken to distribute some of initial work programs of road sections evenly to other successive years without any major changes in the network performance. These will release initial budget allocations to the road sector without any disturbance to the other government sectors.

- Most of the road sections in the original work programs being very short in length and not very useful for implementation from the practical point of view. It was observed that some of adjacent sections have the corresponding intervention in several successive years. It was therefore necessary to merge the smaller sections into relatively larger sections with same treatment in implementable manner in order to successfully produce the work programs.

- Some of existing Non-AC road sections (ex. Penetration Macadam, SBST and DBST) are treated with AC overlay in the original work program which is not very suitable to deliver as output as it is. Therefor to address this Non-AC sections in the work program more methodically some of the revised treatment methods are required.

- There are number of committed road projects selected based on the other social and political criteria's in the national road network which is not reflected in the HDM-4 analysis. So that the manual prioritization is the best solution to address those road sections to develop the final work program.

Therefore, the necessity was arisen to revised the initial work programs for periodic maintenance, improvement and widening produced by the HDM-4 software. The originally derived routine maintenance program was not revised since the main objective of the analysis is to obtain the annual budget maintenance requirement for the network. The improvement and widening work programs were revised by the consultation with some of expert officials in the RDA. After preparation of the original work program, it was presented to the RDA management

as well as regional official by organising a number of workshops and consultative meetings to solicit their views and verify the different interventions generated as per HDM-4 output from the analysis. Most of the committed road sections were identified in this exercise and the data was used in preparation of final work program. Based on the social criteria the year of implementation was revised in some of road sections without affecting the network performance which is expected in next 10 years. Decision was taken not to revise the program generated for the Expressway network since the analysis was conducted based on more precise and updated data gathered from the data collection surveys. For Concrete road sections, no provisions were made in the revised program for periodic maintenance.

The summary of the final work program, which were prepared in consultation with RDA officials, are presented in following Table.

Table 5:5: Summary of the revised work program of NRMP (2021-2030)

Year	Widening & rehabilitation Sub-total (Rs. Mn)	Maintenance Sub-total (Rs. Mn)	Total for National Network (Rs. Mn)	Annual % Distribution
2021	248,431.39	19,932.57	268,363.96	35.4%
2022	68,628.62	7,061.28	75,689.90	10.0%
2023	80,842.72	6,796.95	87,639.67	11.5%
2024	53,227.06	7,839.56	61,066.62	8.0%
2025	59,716.55	7,684.57	67,401.12	8.9%
2026	32,674.36	7,910.04	40,584.40	5.3%
2027	43,120.38	8,609.56	51,729.94	6.8%
2028	41,357.36	8,203.75	49,561.11	6.5%
2029	25,562.86	9,109.57	34,672.43	4.6%
2030	12,896.52	9,383.39	22,279.91	2.9%
Total	**666,457.82**	**92,531.23**	**758,989.05**	**100.00%**
%	**88%**	**12%**	**100%**	

The annual summary of number of km's and total cost of each road improvement and widening interventions for National highway network is presented in the Annex 5, Table 5-J of this report. Based on the revised program, the first-year budget allocation has been reduced to 35.4% from the original program distribution of 45.4%. There is a significant reduction in periodic maintenance allocations because of the rearrangement of the AC overlay of non-AC roads in initial work program. The dominant cost allocation of the revised work program is Reconstruction intervention which is 42.3% of total 10 years budget. For routine maintenance 12% of total allocations is require for 10 years period while for widening it is 11.2%.

Final Work Programs

The final work program for the 10 years period has categorized mainly in to 5 sections in order to assist the identification of the projects roads to be implemented for the national network. Each category of candidate roads is prioritized based on the initially calculated NPV from the HDM-4 analysis. The purpose of this prioritization is to select the most appropriate road segment from the list of roads with budget limitations. Those 5 categories are,

1. **Roads to be widening to 4-lane and Multi lane -**

   This list consists of Existing 2 lane, 4 lane and Multi lane Asphalted Concrete or Surface treated roads which has to be wide to 4 lane or Multi lane to improve the capacity. The cost estimation is done without considering the land acquisition cost.

2. **Roads to be widening to 2-lane and Intermediate lane -**

   The list includes Narrow AC roads which has to be widened to 2 lane road or Intermediate lane road depending on the traffic demand with sufficient Hard shoulder and other required facility. Here also the cost estimation is done without considering the land acquisition cost.

3. **Roads to be improved to 2-lane and Intermediate lane -**

   The AC roads which has the sufficient road width but needs some surface improvements included in this list. The intervention type is denoted as 'AC Strength'. Also, other non-AC roads such as Surface Treated (DBST/SBST), Penetration Macadam and Gravel roads which identified to be surface improved or capacity improved are indicated in this list. Some of road sections may not require land acquisition for the improvement and therefore the tentative cost estimation is based on the assumption that the available ROW is sufficient for the improvement to be taken place.

4. **Roads to be AC overlayed –**

   The existing AC or Surface treated roads which need to be AC overlayed are indicated in this list. The cost estimation is based on the assumed thickness and the actual thickness required has to be analysed based on a proper pavement design to cater the traffic demand.

5. **Expressway Sections to be AC overlayed –**

   This list consists of the Expressway sections which have to be AC overlayed in each year of Master plan period. Depending on the existing traffic demand proper pavement design has to be done to decide the overlay thickness required.

Special notation system was developed to clearly indicate the definite work intervention types for each particular road sections. This helps to identify the number of lanes proposed and type of cross section adopted after construction. The notation system which was adopted is illustrated in the Figure 5-C of Annex 5. The final summary of revised work programs for each 5 categories and the prioritized road list for each consecutive year are presented in the table 5-K of Annex 5 of this report.

The detailed Work interventions which are prioritized based on NPV for each year is presented in the Investment Plan.

In the case of practical issues in implementing proposed work intervention given in this master plan, due to land acquisition and resettlement or environment/disaster aspects, appropriate alternative options/solutions can be considered after proper investigations and analysis.

5.1.10 Ongoing Major Projects

i. New Kelani Bridge Construction Project

The project is initiated with the aim of mitigating traffic congestion by construction of a new 6-lane bridge across Kelani river close to the existing new Kelani bridge as a high mobility link to improve efficiency of the road network in Colombo city.

With the opening of Colombo-Katunayake expressway traffic entering to Colombo city through the existing new Kelani bridge has been considerably increased. In order to relieve traffic congestion by increasing capacity at this location, requirement of an additional bridge was identified. The Japan International Cooperation Agency (JICA).

ii. Badulla Chenkaladi Road Improvement Project

Rehabilitation and improvement of Peradeniya-Badulla-Chenkaladi (A005) Road from Badulla to Chenkaladi (almost 147 km) except major bridges and last 4 km section at the Chenkaladi end is in progress under Saudi fund for Development (SFD) and OPEC fund for International Development (OFID) funding and expected to be completed by end of 2021.

iii. Reconstruction of 25 Bridges on National Highways funded by Kuwait Fund for Arab Economic Development (KFAED)

This project commenced in 2015 and implement under 3 packages. Reconstruction of 8 bridges under package 1 completed in 2020. Construction work of Package 2 and Package 3 commenced in 2020 and in progress.

considered as one of the Colombo's' great attractions it was decided to provide this connection by an underground tunnel. This connection would provide much needed road connection to the Port City, Relevant traffic studies and designs are being caring out.

5.1.11 Prioritization of Bridges for Reconstruction/Widening

Bridge construction is one of the key components when improving high mobility of national road network. During the past two decades the sectorial development policy of the government was to rehabilitate the existing roads, road structures etc. to provide enhanced transport facilities to the people. During the period, several bridge construction projects were undertaken in addition to the new road construction projects which are aiming to improve the transport system of the country with efficient mobility.

Some of the existing bridges are presently in structurally weak condition while some having inadequate capacity to cater to the present demand. Due to the weak & narrow condition of these bridges it is required to restrict the movement of heavy vehicles, long containers with heavy loads and industrial and construction equipment across these bridges resulting negative effects to the economy of the country to a substantial degree.

Since annual budgetary allocation is insufficient to carry out reconstruction and maintenance of the all the existing bridges, prioritizing of existing bridges are essential to carry out construction works. To overcome this difficulty, the capacity development on bridge management in Sri Lanka was established in RDA through

a technical assistance project funded by JICA as a grant aid. The project has been completed in February 2018. Under this project, the web base Bridge Database System (BDS) is established and the bridge inventory and condition data of the national road network are feeding into the Bridge Database System.

The details in the BDS are used in Bridge Repair & Maintenance System (BRMS) for the analyzing purposes. Using the BRMS following output can be obtained.

1. Preparation of list of bridges for repair based on structural soundness.
2. Preparation of list of bridges for reconstruction based on structural soundness, importance & functional obsoleteness.
3. Preparation of budgetary requirement for repair / reconstruction of bridges for the following year

These output of the BRMS are used for the RDA planning purposes in National Road Master Plan 2021-2030. List of bridges identified for widening and reconstruction are given in Appendix A (A-2).

5.1.12 Alleviation of Traffic Congestion in Colombo Metropolitan Area

Colombo is the commercial capital of Sri Lanka and most of the country's economic activities are concentrated in the Colombo Metropolitan area which consists of the Colombo Municipal Council (CMC) and adjacent area. Traffic condition in Colombo Metropolitan Region has been deteriorating rapidly mainly due to the remarkable increase in the number of motor vehicles in recent years. The number of registered vehicles is increasing every year and most of these vehicles are to be used in Western Province.

Advanced Traffic Management System

In Colombo Metropolitan area (CMA), at many locations intersection capacities are not adequate and geometries are not facilitating smooth flow of traffic. The traffic control devices such as signals are independently installed or not available. Introduction of an Area Traffic Control (ATC) system to CMA to efficient management of road traffic was proposed by the Study on the Urban Transport Development of the Colombo Metropolitan Region (CMR) undertaken by Japan International Cooperation Agency (JICA). Later, the Government of Republic of Korea provided technical assistance for development of advanced traffic management system (ATMS) for the CMR. Under this project 156 junction improvements and 79 locations for installation of pelican crossings have been identified covering approximately 200km of road length and the basic design already completed. From this, 133 junction improvements (including one pelican crossing) have been prioritized for implementation under Phase 1 and detailed design has been completed.

5.1.13 Prioritization of Town Improvements

The number of vehicles has increased rapidly over the recent past and this trend is continuing. This situation resulted traffic congestion in several roads and junctions within townships and suburbs. There are many identified reasons for traffic congestion, high volume of vehicles, lack of proper traffic planning, in discipline driver behaviors, accidents, usage of not road worthy vehicles, improper parking, insufficient parking facilities, misuse of road infrastructure facilities including illegal vendors on roads and pedestrian jaywalking. These factors might be different from location to location. It is required to carry out proper studies and determine suitable solutions and it is important to identify the most critical towns in order to find countermeasures.

In general, such locations were identified using Maps, Google data and the images obtained from the multi-function network survey vehicle. When selecting towns to be improved under this master plan, the towns connecting upcoming expressway projects have not been considered.

When preparing the priority list for town improvements several factors have been analyzed. Traffic Volume, Junction Control type (channelized, roundabout, signal controlled etc.), City order (provincial, district, important etc.), Road Connectivity ("A" class, "B" class etc.) and the Vehicle Capacity Ratio were some of them. Future Traffic Volume and road capacity requirements were determined using the JICA STRADA Traffic Demand Modelling software.

Methodology adopted

An initial survey has been carried out to find how weightages to be distributed among the selected factors. These weightages were used to prepare the priority list. Relevant time frames have been established considering the fund requirements and other relevant factors. Town improvement may be introduction of a total traffic management system or a bypass to the town. Priority list for town improvement is given in the Investment Plan.

Following list of already identified bypass roads are at different stages of implementation.

- Warakapola
- Kurunegala
- Battaramulla
- Katugastota
- Ratnapura
- Kochchikade
- Meerigama
- Horana
- Ragama
- Avissawella
- Pilimathalawa

5.1.14 Prioritization of Junction Improvements

Road junctions are locations where vehicular traffic going in different directions. Junctions should be designed in a proper manner in order to prevent accidents. Geometric design, total length, turning radius and traffic volume are some of the factors to be considered in junction design. The major objectives of prioritization of junction improvement are to improve the vehicular flow without congestion and to overcome the accidents.

Junctions that need to be improved were identified from the National Road Network Map, Google Map and the video obtained from the multi-function network survey vehicle and several discussions had with relevant Executive Engineers and Chief Engineers. Junction improvements which are proposed to be developed from the upcoming projects were neglected.

The major factors considered when prioritizing the junction improvements are Traffic Volume, Present treatment and Road Class ("A" class, "B" class etc.). Traffic Volume data were obtained by JICA STRADA Traffic Demand Modelling software. Factors like Chainages, Road Class and Present Treatments are obtained from multi function network survey vehicle.

Initially, a survey was carried out to find how weightages to be distributed among the selected factors. Survey sheets were circulated and survey summary was used to select the weightages and ranges. Proposed year for junction improvement were decided from the results obtained from prioritization. Prioritized list of junction improvements are given in the Investment Plan.

5.1.15 Road Safety Improvement

Every day, the increasing number of deaths in road crashes shows that Sri Lanka needs to look at the road safety issues more critically. High road crash fatality and injury rates on Sri Lanka's roads are undermining the economic growth and progress made over the past decade on reducing poverty and boosting prosperity. Available data indicate an average of 38,000 crashes annually which result in around 3,000 fatalities and 8,000 serious injuries. When comparing the accident statistics, Sri Lanka has the worst road fatality rate among its immediate neighbors in the South Asia region. Sustainable Development Goal 3 (SDG 3) of the 2030 Agenda for Sustainable Development regarding "Good Health and Well-being", focus on various aspects of healthy life and healthy lifestyle and reduction of road injuries and deaths is one of its targets.

Under this plan road safety improvement has been planned to implemented addressing critical road safety problems on the national road network. Under this ten main road safety problems have been recognized and critical locations that require road safety interventions have been identified through safety audits.

Table 5:6 Critical Safety Problems and Proposed Treatment.

Road Safety Problem	Description	Proposed Treatment
1. Cross Sectional Problems	1.1 Sudden narrowing of the road due to narrow bridges, side obstacles, embankment failure etc. 1.3 Sudden narrow shoulder section due to obstacle, embankment, hill, erosion, etc.	Developing the national roads to have a uniform cross section Clearing bottlenecks to improve mobility
2. Alignment Problems	2.1 Poor visibility due to horizontal curve	Improvement of visibility to reduce traffic accidents.
3. Hazardous road side conditions	3.1 Deep Embankment with narrow shoulder 3.2 Deep Embankment with curve section 3.3 Deep Embankment with high road gradient	Prevention of accidents by fixing guard rails at necessary locations/ segments. Providing retaining walls or protection walls. Display of essential warning signboards

Road Safety Problem	Description	Proposed Treatment
4. Minor Access Connect to main road	4.1 Merging with steep gradient. 4.2 Merging with bad alignment. 4.3 Visual obstruction due to structures etc.	Improving visibility for both minor access road users and main road users by clearing obstructions. Using thermoplastic applications and islands for channelization. Display of warning sign boards.
5. Problems of Intersections	5.1 No traffic controlling method 5.2 Partially channelization, foot walk, Island	Development of critical intersections to have standard and uniform road infrastructure and characteristics.
6. Poor quality of pedestrian infrastructure	6.1 Crossing not properly visible 6.2 Bad sign & marking, No standing area	Implementing necessary corrections to improve the safety of pedestrians (site specific)
7. High pedestrian areas	7.1 Requirement of Underpass/ Overpass 7.2 Lack of walkways and walkability. 7.3 Hazardous road safety conditions near school zones/ hospitals/ industrial zones/ town areas.	Development of pedestrian facilities as safe, comfortable and inclusive infrastructure. Providing underpasses to suitable locations with high pedestrian demand. Development of road safety near school zones/ hospitals/ industrial zones/ town areas.
8. Problems related to bus transport	8.1 Bad positioning of bus bays 8.2 No bus bays/ no standing areas.	Implementing necessary corrections (site specific)
9. High Speeding Problems	9.1 Due to straight road. 9.2 Comfortable road surface without side obstacles	Implementing necessary safety interventions such as center medians, road studs and speed breakers to avoid head on collisions.
10. Hazardous Road Work Areas	10.1 Lack of/ Inadequate road safety measures followed during construction.	Ensuring the compliance to guidelines and instructions of RDA

Identified list of locations for road safety improvement under above mentioned safety problems are available with Director (Infrastructure, Road Safety & Traffic Management),RDA.

5.1.16 Climate Resilience Improvement

Sri Lanka is affected by various natural hazards including weather related events such as cyclones, heavy rains and subsequent flooding and landslides. at present hydro-meteorologically induced landslides and flooding have become a frequent natural hazard in Sri Lanka. Day today life of people is highly disturbed and destructed due to landslide occurrence in central highland while flooding in low lying areas of the country, mainly during monsoons and also sometimes by unexpected extreme weather conditions. Climate change is one of the least explored challenges to safer mobility of roads. Since 2003, occurrence of landslides has been increased and the central highland of the country is highly disturbed and destructed due to landslide occurrence.

About 20% of the land area (spread out covering 12 districts) of the country which is mountainous considered to be vulnerable to landslides. During the past decade, Badulla, Nuwara Eliya, Kegalle, Ratnapura, Matale, Kandy, Kalutara, Galle, Matara districts were mostly affected by landslides. Most of the landslides occur in places where steep slopes have been cut for houses, plantations and roads. About 30% of the total population is living in mountainous areas and with the increase of population land use patterns have been changed. The yearly monsoons, associated flooding and landslides cause the most damages in terms of economic impact and human casualties. Thus, landslides risk reduction is an integral part of road development.

Funding assistance for landslide mitigation has been extended to road sector with ongoing JICA funded Landslide Disaster Protection Project and World Bank funded Climate Resilient Improvement Project. These two projects will be completed by 2020 and 2021 respectively. With the view of continuing climate resilience improvement on national road network

Sri Lanka has two distinct monsoon seasons which are usually followed by flooding due to extreme rainfall. The Southwest-monsoon in May-September affects southern and Sabaragamuwa provinces the most, while during the Northeast monsoon (in December-February), eastern, northern and northcentral provinces are most prone to flooding. providing climate resilient road infrastructures is important, not only for sustainable mobility but also for road safety. Identified list of locations for climate resilience improvement of national roads is given in Annex 9.

5.2 Development of National Network

Ongoing Feasibility Studies

- Feasibility Study for extension of Marine Drive from Dehiwala to Panadura
- Feasibility Study of proposed three flyovers at Alawwa, Muttetugala and Slave Island.
- Feasibility Study to reduce the Traffic Delay on Peliyagoda-Puttalam (A003) Road within Kochchikade Town Area.

Committed Major Projects

- **`Kandy Tunnel connecting William Gopallawa Mawatha and Tennekubura.**
  The tunneling option has been identified as one of the best solutions to address the traffic congestion problem in the Kandy city. A tunnel from Tennekumbura (on A026, in the East) to William Gopallawa Mawatha (AB42, in the West) has been proposed and feasibility study has been completed.

Taking over Non RDA Roads to National Road Network

The Road Development Authority has the responsibility of developing /improving the national road network to cater the demand for road transport connecting important economic centers, ongoing and planned developments throughout the country. it is very vital to develop the road network ensuring adequate level of service to promote efficient transportation of people and goods.

In view of that, strategically important road links (Non-RDA roads) of the road network shall be taken over to the national road network as per the National Thoroughfares Act, No. 40 of 2008, Part III clause 8 after improvement or prior to improvement with relevant approvals.

Under chapter 7 of this report some road sections have been identified as missing links of the road network which can be improved to enhance efficiency of the National road network. Also, there are critical road sections which support disaster relief services and other emergency requirements and it is important to find alternative connections to bypass such sections. Non-RDA roads identified to support these mechanisms shall be considered for taking over.

New connectivity

Network analysis carried out by Planning Division identifies some new connectivity to the National road network in the view of enhancing connectivity, access or reliving traffic congestion. Public request also may direct for studies on new links.

Studies to identify an alternate highway to link Kandy and Badulla at a lower contour without crossing high altitudes of the hill country has been carried out but environment clearance has not yet been obtained.

5.2.1 Expansion of Expressway/High Mobility Network

It is evident that presently operational Expressway network has immensely contributed in Economic Development of the country while enhancing the living standards of people by way of travel time savings, vehicle operating cost reduction etc.

The Followings are the key features of High Mobility corridor;

- Normally connects major cities and towns, administration, social and economic activities such as education and health, commerce and trade, manufacturing, private and public services, and important transport junctions such as ports, rail stations.
- Highest traffic volume corridors and considerable amount of commercial traffic.
- Serving the moderate to longest trip lengths.
- High Level of Service (LOS)

Thus, all present economic and growth centers are connected with this high mobility network. In future, considering the economic benefits it can be extend for corridors where new developments with strong prediction of large volume of traffic generation having considerably large portion of commercial vehicles.

Expressways /High Mobility Links considered under this NRMP are;

- Central Expressway from Kadawatha to Dambulla with the expressway link from Pothuhera to Galagedara
- Ruwanpura Expressway from Kahathuduwa to Pelmadulla.
- Port Access Elevated Highway.
- New Kelani Bridge to Athurugiyriya Elevated Highway via Rajagiriya.
- Koswatta-Ratmalana Elevated Highway.
- Extension of Colombo-Katunayake Expressway up to Kochchikade.

Central Expressway (from Kadawatha to Kurunegala) is under construction and Kurunagala - Dambulla section and Pothuhera - Galagedara section is at land acquisition stage. construction of Ruwanpura Expressway from Kahathuduwa to Ingiriya is in progress and the feasibility study for Ruwanpura Expressway will be revisited and construction will be commenced accordingly for the section beyond Ingiriya. Feasibility Study to be done for the extension of Colombo-Katunayake Expressway up to Kochchikade.

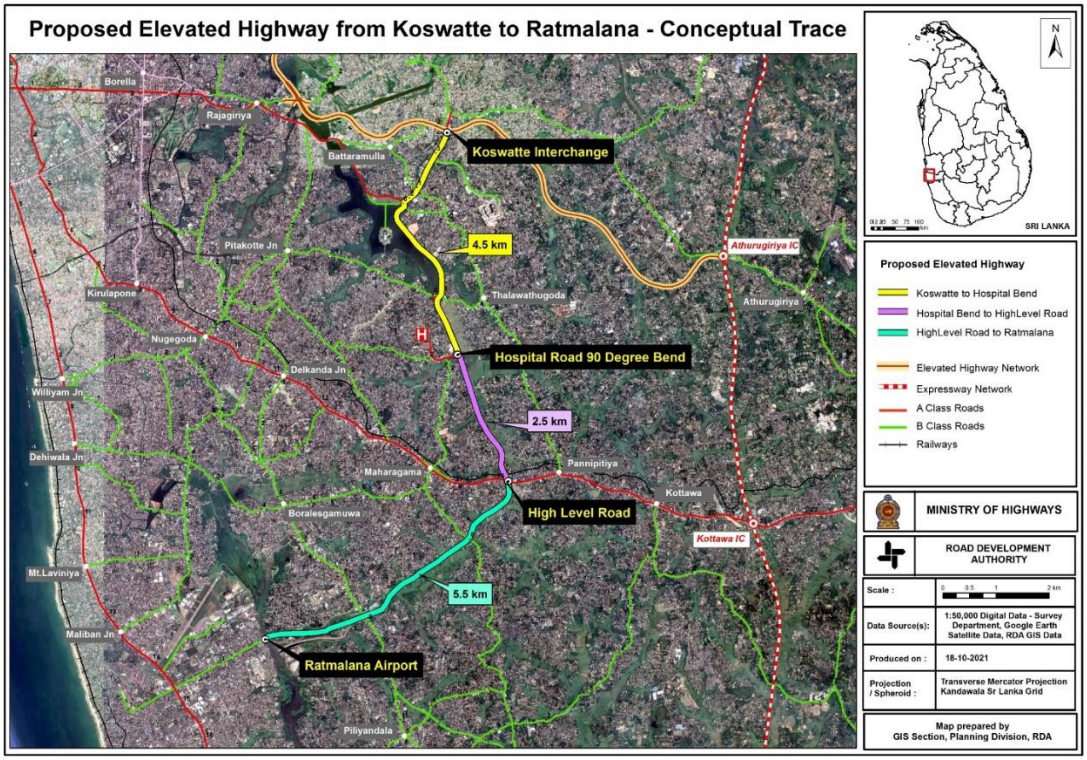
Elevated Port Access road has been proposed from Ingurukade Junction to Galle face along the port access road and construction has been started with ADB financial assistance. This elevated road will provide a direct link to the city center and the port from the Colombo- Katunayake Expressway extending the expressway network into the city via the New Kelani Bridge. The project will help alleviate traffic congestion in Colombo's densely populated areas, improve last mile connectivity between the expressway network and Colombo's international port, and provide better logistics services for freight operations facilitating regional trade.

In the intention of connecting southern part of Colombo and northern parts of Colombo by connecting marine drive to the elevated port access road has been identified. With the view of ensuring aesthetic at Gale face Green area a tunnel has been proposed as Marine Drive extension to connect the Port Access Highway.

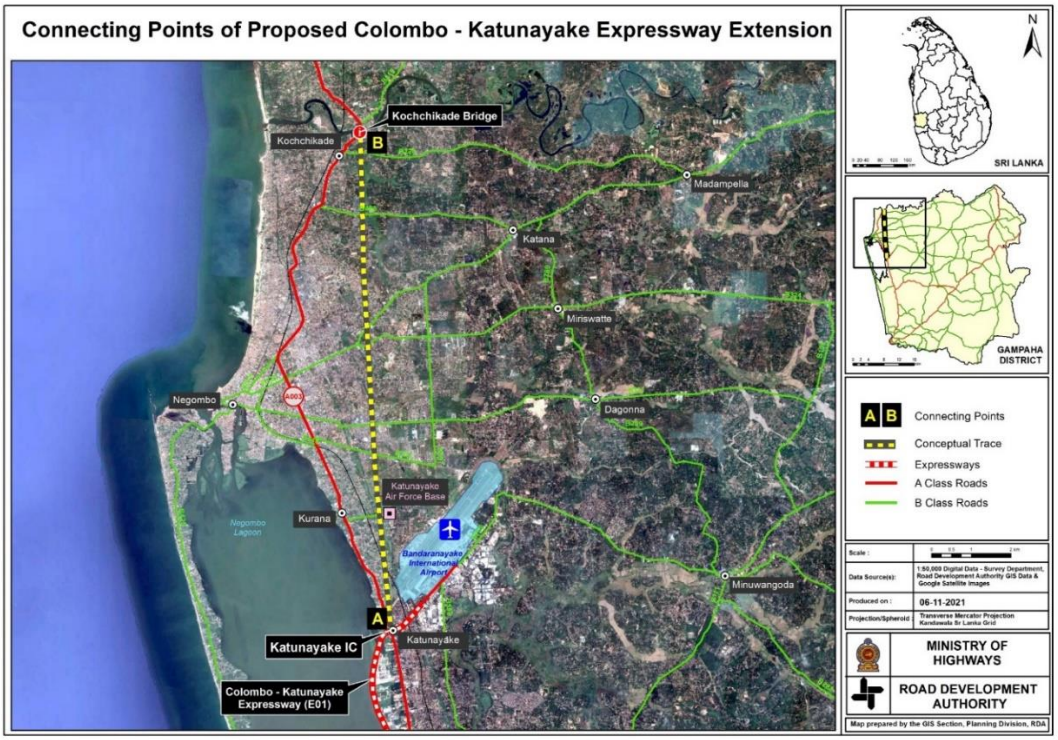
The Elevated highway has been proposed from New Kelani Bridge to Athurugiriya via Rajagiriya connecting Colombo -Katunayake Expressway and Outer Circular Highway through the New Kelani Bridge. Feasibility study has been completed and Environmental clearance process is ongoing for Rajagiriya to Athurugiriya. Feasibility Studies to be done for the proposed Koswatta-Ratmalana Elevated Highway and Extension of Colombo-Katunayake Expressway up to Kochchikade.

Further, congested city areas on interprovincial national highways can be considered for provision of limited access sections. This facilitate uninterrupted through traffic while providing access for local traffic. At present, very few kilometers of national roads in city areas (Kalutara & Thambuthegama) have been developed as limited access road sections and operates successfully.

the updated Draft National Physical Plan - 2050 has identified several economic corridors and these economic corridors will be considered in future expansion of the expressway network



Map 5:2: Proposed Koswatta-Ratmalana Elevated Highway



Map 5:3: Proposed Extension of Colombo-Katunayake Expressway

6. Recommendation and Way Forward

6.1. Asset Management System

Institutionalizing of Assets Management Practices for RDA

The highway network in the country is one of the largest and most visible publicly owned assets. It is used daily by the majority of the travelling public for commuting, business, social and leisure activities. As such, it is fundamental to the economic, social and environmental well-being of local communities and to the economic prosperity of the nation as a whole. National roads are part of the strategic road network. Road Development Authority is responsible for the management of this strategic road network which comprises Expressways and trunk roads. A well-maintained highway asset makes a vital contribution in meeting the strategic objectives of the organization such as safety reliability and comfort. Increasing traffic growth has brought widespread recognition of the importance of highway maintenance at both local and strategic level where the high value placed on it by users.

Like any other physical asset, road infrastructure needs to be regularly taken care of, maintained, upgraded, renewed and preserved to the demanding levels of quality service that the public are expecting. If the corrective actions are taken timely in an appropriate way, the service life of the asset can be prolonged efficiently. Chronic underfunding subjects to lack of maintenance and can very quickly jeopardize this huge asset, which has been built at great expense. If a road is damaged beyond the normal maintenance requirements, the repair cost will be very higher and there may be even permanent or irreversible partial loss of the important asset. Therefore, a sustainable long-term programme that delivers value for the money and optimizes the cost for development and maintenance of road network is required.

Road Development Authority (RDA) being the premier road agency in Sri-Lanka has identified the necessity of managing the national road network through an effective asset management system. In view of that, the planning division of RDA has taken step by step approach for nearly a decade back for its road asset management activities.

Road Assets Management-Definitions and Basic Concepts

Road Assets

All the existing and proposed assets within the legally reserved road corridor are considered as road assets. Physical assets such as road pavements, bridges, slopes, shoulders, drainage structures (Culverts, side drains, etc), Traffic Control Systems. Road signs and markings and other associated infrastructure (Toll gates) are different types of road assets.

Road Assets Management

Road Asset Management is “a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on both engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost”

The primary goal of Road Asset Management is to think, plan and act on the basis of long-term decisions aiming at optimizing maintenance while keeping costs at a minimum and contributing to other political objectives while modernizing the network.

General functions of a Road Asset Management System

- Define the road network.
- Define the road assets on the network (e.g. bridge, pavement).
- Locate each asset on the network.
- Provide the current condition of the assets.
- Estimate the value of the asset.
- Predict future demand of traffic and service needs.
- Apply policies and standards (e.g. maintenance standards and costs).
- Include budget information.
- Define a strategy.
- Use of performance models to derive the programme.
- Apply project selection criteria (Ranking/project and network).
- Implement the RAM Plan.
- Project monitoring and review (Budget/Policy/Data/Condition).

Road Asset Management is Beneficial for Several Reasons:

- Commonly used existing separate systems can be integrated into one system.
- Efficient management of the organization through a common system.
- Getting sound knowledge leads to better decisions.
- Assists in budget justification within the frame work.
- Provides access to accurate data and state-of-the-art information technology.
- Contributing to simpler and fairer prioritization.
- Ensuring that you get the best value out of the money spent on infrastructure.
- Obtaining better and safer roads for every rupee spent.
- Improves the credibility of the decision-making process.
- Improves the ability to defer lobbying pressures from special interest groups.
- Provides the ability to query databases to a wide range of staff.
- Enables front line staff to become more involved in the decision-making process.
- Provides opportunities to improve the technical and business knowledge of staff.
- Performance monitoring by using performance indicators.
- Preserving the asset for future generations.

Approach to Road Asset Management in RDA

In order to manage the RDA road network successfully, it is vital to have ready access to pertinent accurate network data. Data are required for the daily operational activities of the Road Development Authority, for routine and periodic maintenance, and for long term and strategic planning purposes. Furthermore, consultants and contractors alike need access to this data to monitor and assess project progress.

The planning division of RDA has taken step by step approach and gradually progressing the road asset management activities for RDA starting from the year 2004 onwards. The details are given in the Chapter 5 of this report under Master Plan Development.

However, milestones of this approach are summarized below.

- In 2004, Asset Information Management System (AIMS) for pavement assets consisting of the HIMS database (desktop version) and the HDM-4 decision support tool was purchased under the restructuring process of RDA supported by ADB.

- From2005-2010-Manage the AIMS with limited data. Road condition data through visual surveys.

- In 2010, RDA purchased Multi-function Network data collection vehicle (MFNSV) and falling weight Deflectometer (FWD) equipment for the automation of road data collection under World Bank funding. Set up a small unit as Data Processing Unit under the Planning Division.

- In 2014/2015, RDA realized the requirement of comprehensive data base system and with the support of World Bank fund the old AIMS system was upgraded to a web based integrated Road Asset Management System with all road related assets, such as pavement, bridge, slope, roadside furniture etc. included in separate modules. The system is named as Sri Lanka Road Asset Management System (SLRAMS).

- In 2018, the SLRAMS is used to generate the network data input files for the different analyses performed in HDM-4 software for the development of NRMP (2021-2030) road improvement and maintenance programme.

System Implementation

Based on discussions had with of all divisions of RDA who are responsible in asset management and consultation and the issues found with the existing system, the detailed SLRAMS framework was developed under a consultancy contract arranged through the Road Sector Assistance project funded by World Bank and the various modules (sub systems) have been included in the system as shown in Figure below.

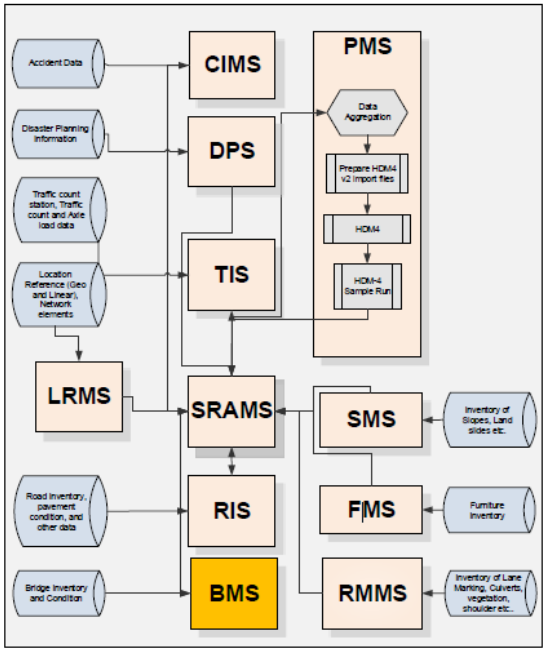


Figure 6-1: SLRAMS framework

The modules included in the system:

1. Road Information System (RIS);
2. Location Reference Management System (LRMS);
3. Pavement Management System (PMS);
4. Bridge Management System (BMS);
5. Routine Maintenance Management System (RMMS);
6. Traffic Information system (TIS);
7. Crash Information Management System (CIMS);
8. Furniture Management System (FMS);
9. Slope Management System (SMS);
10. Disaster Planning System (DPS).
11. System Administration (Admin) Module
12. GIS Module

Brief description of each module are as follows;

1. Road Information System (RIS)

The Road Information System forms the core of SLRAMS. The road network information (such as roads, links and nodes), their physical attributes (length, width, material type, terrain etc), condition (paved surface condition) and pavement (strength and composition) etc. are stored in the RIS. Year on year data can be loaded in this system.

The following functionality is included in the RIS:

i. Define road network (roads, nodes, links and LRPs);
ii. Import inventory, condition, pavement type and other data;
iii. View and edit data;
iv. View data in embedded GIS;
v. Prepare thematic maps;
vi. Include various summary reports - tables / graphics.

2. Location Reference Management System (LRMS);

The location referencing system is the set of procedures used to determine and retain a record of specific points or events on the road network. This will include the location referencing method(s) used together with other aspects of linear referencing such as storing maintaining and retrieving data for future use.

3. Pavement Management System (PMS)

PMS is meant for determining the homogeneous sections, preparation of representative data, assigning default data and constants and preparation of the input files for HDM4.

The following functionality is included in the PMS:

i. Define homogeneous sectioning criteria;
ii. Determine homogeneous sections;
iii. Prepare and transfer representative data;
iv. Assign default values and constants;
v. Prepare HDM4 v2 input data;

vi. Export HDM4 v2 files (SECTIONS, TRAFFIC and CALIBRATION ITEMS);
vii. Import HDM4 v2 analysis / output file back in to SLRAMS;
viii. Include various reports - tables / graphics.

4. Routine Maintenance Management System (RMMS)

RMMS stores the defects information of the culverts, drains, road marking, vegetation, speed breakers, median and others. The asset repair details such as maintenance and unit rates can be stored in this system. The work monitoring (or progress) is included in this sub system.

The following functionality is included in the RMMS:

i. Define location data (linear and spatial);
ii. Provide web access to enable basic querying of data and recording of maintenance defects;
iii. View and edit data;
iv. Determine and prioritize maintenance works;
v. Enter work completion;
vi. Include various reports - tables / graphic

5. Traffic Information System (TIS)

Traffic Information System will store the traffic location details, their spatial coordinates, traffic count data and summarized information. The summarized traffic data will be provided to RIS and PMS systems from this system.

RDA's current vehicle classification system is included in the TIS. The bulk loading facility is used for loading the traffic and STRADA data. The source data will be in Excel formats.

The following facilities are included in the TIS:

1. Define traffic count location information (linear and spatial);
2. Import classified traffic volume count and other related data;
3. View and edit data;
4. Include various reports - tables / graphics.

6. Crash Information Management System (CIMS)

CIMS stores road accident data, including type of road, accident location, severity of accident, vehicles / objects / passengers involved, causes of accident, driver behavior characteristics etc. Most of this data will be obtained from the Police department.

Output of CIMS is used to:

1. Identify black spots and accident-prone links;
2. Input for road safety audits;
3. Input for geometric design and network planning.

7 Disaster Planning System (DPS)

This system allows recording information related to natural disasters such as flooding, landslides and river/sea erosion etc.

Output of DPS is used to:

1. Identify disaster prone links;
2. Input for road safety audits;

8 Slope Management System (SMS)

Slope management system has the facility to include the following key data:

1. Topographic and geological data;
2. Hydraulic characteristic;
3. Vulnerable links;
4. Retaining walls;
5. Slope mitigation information;
6. Historical hazard information;
7. Historical maintenance information;
8. Process/Calculate Slope Scores.

9 Furniture Management System (FMS)

FMS stores road furniture inventory data, which includes information about assets owned by RDA within road reserve.

The following functionality is included in the FMS:

1. Define furniture location data (linear and spatial);
2. Import inventory data;
3. View and edit data;
4. Include various reports - tables / graphics.

10 Bridge Management System (BMS)

BMS stores all the bridge inventory and the bridge maintenance programme for reconstruction, rehabilitation and repair. The maintenance needs and prioritization is determined through the Bridge Management System developed by a JICA Grant and is now functioning as the Bridge Assessment Unit of RDA.

The following functionality is included in the BMS:

1. Define bridge location data (linear and spatial);
2. Import inventory;
3. View and edit data;
4. View the prioritized bridge maintenance programme;
5. Prepare thematic maps; Include various reports - tables / graphics.

Way Forward- Institutionalizing the System

The system was established in placing great importance having a systematic data and analysis base for management of the National road network and with a view of institutionalizing of Asset Management with in RDA. When fully operationalized the developed SLRAMS, RDA not only in earmarking the budgets for road network maintenance on the basis of current and future predicted condition but also have in placed the updated and current information to the internal and the external stakeholders.

In 2015, the National road network had 50% of poor and bad condition roads. With large investment started since then it was able to reduce the poor and bad condition roads to less than 30%. In future cost of maintenance is to be increased with the requirement of periodic maintenance of National road as well as Expressways. To request increase in funding there should be a systematic assessment of network and should be able to show the value for money. The SLRAMS is a sophisticated network monitoring program through the collection of accurate pavement condition, pavement strength, traffic, and socio economic data which are the key parameters necessary for road asset management. Therefore, the SLRAM should be up and running for the purpose.

We believe that the institutionalizing of Asset management in RDA is not that easy with the management without making them aware the value of asset management. And also implementation of fully operationalized asset management system cannot be done at once in a short period of time. To make the SLRAMS operationalized there should be dedicated adequate staff and they have to work at least 3-5 years to make the system operational which can be produce some reasonable output which will be appreciated by the management and system users.

In view of that a step by step programme has been identified as outlined below.

Identification of a separate group of staff with in the planning division and provincial staff to be fully engaged with following tasks are the first step towards this.

- Preparation of Data Collection Guidelines & Protocols.
- Initial training to the key group and secondly training of provincial Staff.
- Giving access to the system initially for the technical staff in RDA and gradually to others.
- Data collection either directly through available equipment or out sourced
- Complete all the tables in the RIS with data. (Road network, Road Link, administrative boundaries, road condition, roughness, FWD deflection data, pavement history, project completion etc.)
- Data processing, uploading to the system.
- Data analysis and preparation of output projects and programme.
- Identify the gaps in the system with the organization practice and fulfill the requirement.
- System IT management.

Awareness and Training of Staff

We strongly believe the appropriate and sufficient training (and technology transfer) is a very critical factor for the success and sustainability of the SLRAMS. The training to include a variety of training modes, including on-the-job training, formal training sessions and workshops. Some of training has been given to selected staff and it is necessary to allow them to engage in the work. There are additional staff also required in some area.

Awareness with the management of RDA is very important in implementation of the system. In this awareness it is required to educate them the benefit of setting up of the system and time, human resources and funding required for the setting up and the maintenance of the system.

IT System Development

Software has been developed and handed over to RDA and it was hosted in ICTA server. The system is a web-based system and it is necessary to have an uninterrupted internet access as well as a hosting facility with sufficient bandwidth and necessary security measures to use the system efficiently.

With view of this development and to keep the identified key group of officers continuously in delivering the task, RDA proposed to include them under a Project Management Unit. In the World Bank funded Network

Connectivity Improvement and Asset Management (NCIAMP), there is a funding component included in the loan to apply for payments of cost involved in establishing/Upgrading an asset management unit within the RDA that would be responsible for planning and implementation of asset management contracts and the implementation of the asset management system in RDA.

Accordingly, the Project Director (NCIAMP) has requested the approval for the required carder positions from the Management Service Department and the approval has been given for part of the cadre positions recently. The key group of staff have not yet been appointed.

Asset Management as a whole
Other assets can be included in the asset management

Road Development Authority (RDA) being the premier road agency in Sri-Lanka has been tasked with the management of the national road network. As such RDA has to primarily include the major road assets such as pavements, bridges and other appurtenances (road signs, markings, drains, shoulders, medians, signal posts, islands etc) in the asset management System. This part is covered by the SLRAMS.

Secondly, following other assets types other than the major assets are also to be included in an Asset Management System. As the financial and human resources are scarce and they too needed to achieve the performance objectives of the road network, they must be managed carefully.

- Human resources (personnel and knowledge).
- Equipment and materials.
- Other items of value such as rights-of-way, buildings, data, computer systems, methods, technologies, etc.

In some countries (e.g.Australia and United Kingdom) the introduction of asset management principles is a legislative requirement for the Road Administrative Authority. Recently, India also legalized the same for some regions.

6.2. Safety Improvement of the National Highway Network

Growth in urbanization and number of vehicles in many developing countries has led to increased traffic congestion in urban centers and increases in traffic accidents on road networks. It also tends to make severe deterioration in driving conditions and significant increases in the hazardous points and makes competition between different classes of road users of the road system. Therefore, simple safety measures will lead to a significant reduction of accidents and improve the safety of all road users.

Segregation of motorized and non – motorized traffic

This is a good way to improve the road safety. It reduces or eliminates conflicts and suitable treatments as follows.

Table 6:1: Segregation of motorized and non – motorized traffic

Item	Components	Criteria/Requirements	Outputs and Outcomes
Pedestrian only zone / Cyclist	Clear walking zone	Obstruction free with no utility ducts, utility poles, electric, water or telecom boxes, trees, signage etc. Minimum clearance height of 2.4m.	Ensure smooth, comfortable, conflict free movement for cyclists/ pedestrians.

Item	Components	Criteria/Requirements	Outputs and Outcomes
	Separation	Raised foot walk or provision of fence.	Improve safety of pedestrians and cyclists
	Walking zone width	Minimum width of 2m	
	Intersections	- fencing to minimum 50m -75m length from the junction - Pedestrian phase has to be included at signal control intersections - Central refuge with 1.8m wide - Small kerb radii to reduce the vehicle speed	
	Smaller Kerb turning radius	By roads 3m 12.5m for intersections	Shortening crossing distances, increase pedestrian safety for drivers, decrease vehicle turning speed.
	Continuous pavements	- Minimize curb cuts Even surface and elevations (Color, Texture)	Improve safety of pedestrians and cyclists
Universal Accessibility	Kerb Ramps	At all intersections, mid – block and pedestrian crossings	Facilitate people using wheel chairs, strollers, walkers, crutches, bicycle and pedestrians who have trouble stepping up and down high Krebs
	Tactile paving & Auditory signals	Guidance given by the edge of the footway/around obstacles	Provide guidance for persons with vision impairment
Pedestrian crossings	Pedestrian flyovers, Pedestrian underpasses, Pelican crossings	Flyovers - if width of the road > 90m,speed of vehicles > 50 Km/h and high traffic volume roads Minimal widths should be between 4.2 and 4.8 m, but underpass width should be increased if the underpass is longer than 60 feet. With disable facilities Give the shortest possible path	Improve pedestrian safety and reduce disturbance for the traffic flow

Pedestrian/Cyclist only zone

Sidewalks play a vital role in cities. As passage for pedestrian movement and access, they enhance connectivity and promote walking. As public spaces, sidewalks serve as the front steps to the city, activating streets socially and economically.

Safe, accessible, and well-maintained sidewalks are a fundamental and necessary investment for cities, and have been found to enhance general public health and maximize social capital. Main principles of a walking zones are mobility, ecology and safety comfort.

Figure 6-2: Unsafe and obstructed walking zones

Following are the factors for a safe pedestrian walkway;

Minimum width of the walkway
Clear walking zone
Maximum Kerb height
Kerb height and slip road treatment
Continuous pavements
Raised foot walk or fencing

Clear walking zone

Providing a clear zone makes pedestrian/cyclist friendly environment. No utility poles, electric, water or telecom boxes, trees, utility ducts, signboards, or any kind of obstruction shall be placed within the walking zone. Clear height for the pedestrian with no obstructions should be provided with 2.4m. Separation

Figure 6-3: Obstructions on walking zone

Maximum Kerb height

Maximum height of a pavement (Kerb, walking surfaces, paving) shall not exceed 150mm (6") and foot paths and bus stop surfaces should be mat finished.

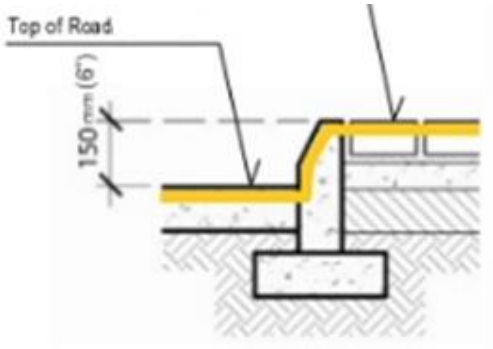


Figure 6-4: Maximum Kerb height

Dead width or frontage zone

Attractive windows and hawkers in shopping areas or entries and steps leading up to buildings create momentary stoppages of curious pedestrians or users of the building. These window watchers take up about 0.5 to 1.0m of additional space, which must be provided in order to ensure conflict free movement of all pedestrians.

In busy areas like bus stops, railway stations, recreational areas, the width of sidewalks should be suitably increased to account for accumulation of pedestrians.

Planting / furniture zone

Planting zones create pedestrian friendly walking zone and benches (Pedestrian resting furniture) should be designed properly to access by universal pedestrians.

Providing fences

Pedestrian fencing, or guard rail, may be used on the side of a road or within the median to restrict pedestrian access to the carriageway, reducing conflict between motorized vehicles and pedestrians, help to prevent motorists from parking on the footpath. Fencing is often used to direct pedestrians to a preferred formal crossing point and to discourage pedestrians from making dangerous crossing movements where visibility may be limited.

Figure 6-5: Pedestrian jay walking and unsafe walkways in no fencing walkway

Width of the walking zone

The pedestrian through zone is the primary, accessible pathway that runs parallel to the street. The through zone ensures that pedestrians have a safe and adequate place to walk and should be 2m wide in residential areas and 2.5–4m wide in towns/commercial areas.

1.5 m not enough

1.8m or more is need for two people to cross each other comfortably

Figure 6-6: Comfortable width of walkway

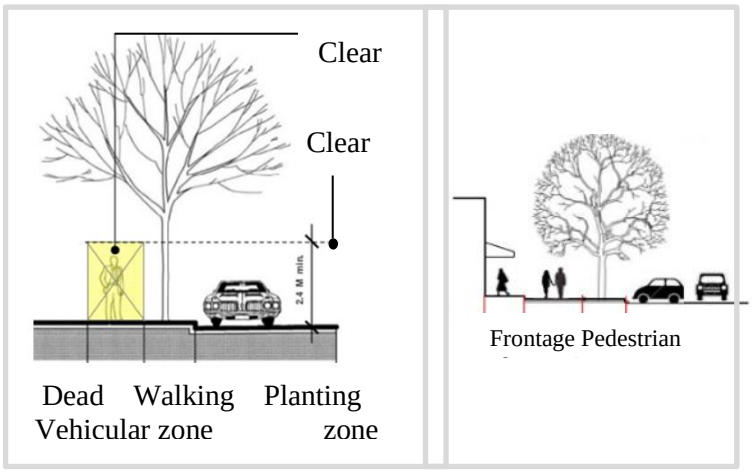


Figure 6-7: Elements for a safe walking zone

Safety at road Intersections

Intersections in particular must accommodate the needs of different user groups so that they may interact safely with one another and focusing following factors are affects the safety at road intersections.

- Improve the sight distance at intersections
- Increase awareness of intersections
- Increase visibility of intersections and traffic control devices
- Improve the operations of intersections
- Improve the design of intersections to reduce the conflicts
- Fencing minimum 50-75m length from the junction
- Provision of pedestrian phase to the signal control intersections
- Provisions for Pedestrians with Disabilities

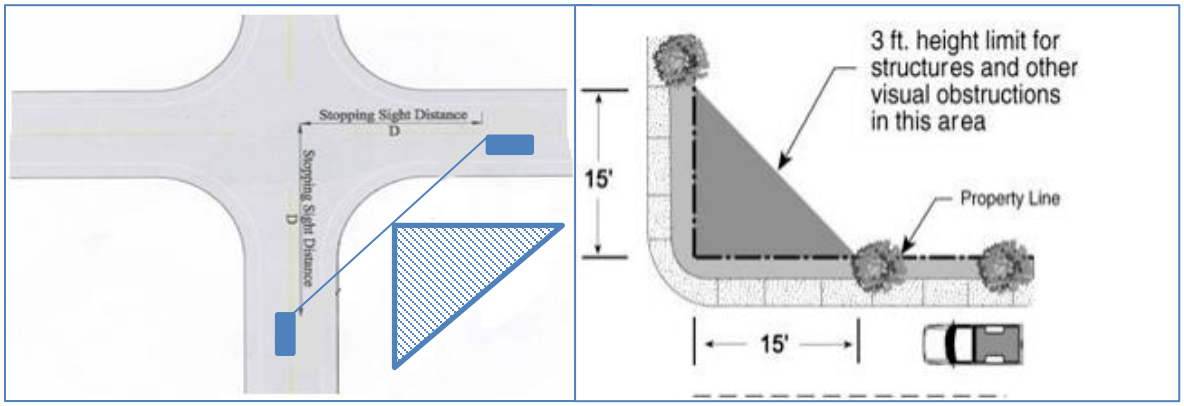


Figure 6-8: Intersection sight distance

Sight distance at road intersections

Adequate sight distance for drivers at stop or yield controlled approaches to intersections has long been recognized as among the most important factors contributing to overall safety at unsignalized intersections.

Sight distance improvements can often be achieved at relatively low cost by clearing sight triangles to restore sight distance obstructed vegetation, utility poles, signs, parked/turning vehicles, natural or artificial objects and improving the roadway geometry. Figure 6-8 shows the restrictions of sight distances at intersections.

Improve the awareness and visibility of traffic control devices at road intersections.

The visibility of intersections and thus the ability of approaching drivers to perceive them can be enhanced by installing proper regulatory and warning signs at intersections. Such improvements may include stop signs, warning signs, stop ahead signs, pavement markings, post mounted delineators etc.

Providing lighting at the road intersections may reduce night time crashes.

Rumble strips can be installed on intersections approaches to call attention to the presence of the intersection and to the traffic control in use at the intersections.

Many stop signs at controlled intersections are not readily visible to approaching drivers due to geometric conditions, presence of vegetation, or other objects (such as tall vehicles) that can limit the view of the regular stop signs. Intersection crashes may occur because approaching drivers may be unaware of the presence of the

stop sign at the intersection. The visibility of stop signs and, thus, the ability of approaching drivers to perceive them, can be enhanced by providing supplementary stop signs suspended over the roadway.

Pedestrian Refuge Areas

Pedestrian refuge islands are protected areas where people may safely pause or wait while crossing a street. Pedestrian refuge islands are particularly helpful as resting areas for seniors, persons with disabilities, children, and others who may be less able to cross the street in one stage. At signalized intersections, they allow slow moving pedestrians to cross in two phases. At unsignalized locations, they simplify the act of finding a gap in traffic to cross since vehicles from only one direction must be reckoned with at a time.

Figure 6-9: Refuge islands with landscaped medians

Smaller Kerb radius

The length of a corner radius greatly affects the overall operation and safety of users at an intersection.
Smaller turning radius increases pedestrian safety by shortening crossing distance
Increasing pedestrian visibility for drivers
Decreasing vehicle turning speed and making drivers look out for pedestrians while taking the turn.
Essential guidelines;
Kerb radii should be as follows
1.5m or less for roads less than 30m width
3.0m for most intersections
4.5m for industrial streets with a lot of truck traffic

Continuous pavement
Sidewalks and cycle lanes should be regarded as a transportation system which is connected and continuous.

Avoid sidewalk interruptions by minimizing kerb cuts (minimizing the number of driveways that crosses the sidewalk in order to support pedestrian safety and a continuous sidewalk.
Maintain an even surface and elevation of the pavement from surrounding road level.
Remove all obstructions from sidewalks.
Consistency of design elements, color and texture, help provide visual continuity and calm traffic, even at crossings.
At entry points to the properties introduced raised driveway details where pedestrians and cycle lanes continue at their same level, but the motorized vehicles have to move over a gentle ramp to enter the property.

Universal Accessibility

Universal accessibility is required for all sidewalks, crossings, parks, public spaces and amenities for people using wheelchairs, walkers, handcarts, bicycles, aged people, visually or hearing impaired and pedestrians with temporary mobility impairment or injury.

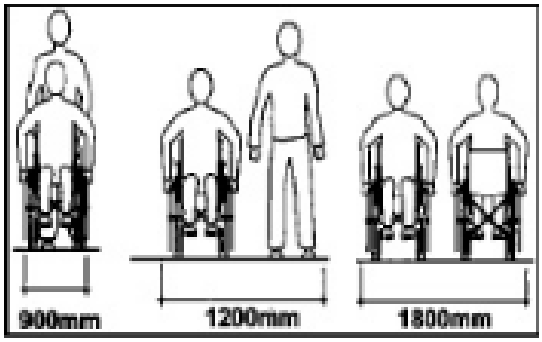


Figure 6-10: Widths need for wheelchairs

Kerb ramps

Provide pedestrian access between the sidewalk and roadway for people using wheelchairs, walkers, handcarts, bicycles and pedestrians who have trouble stepping up and down high kerbs. Kerb ramps must be installed at all intersections and midblock locations where pedestrian crossings exist.

Standards kerb ramps are cut back into the footpath (flush with roadway) at a gradient not greater than 1:12 providing transition in three directions. The width of the kerb ramp should not be less than 1.2m.

Tactile warning steps to be provided on the kerb side edge of the slope to prevent vision impairment people walk in to the road.

The ramps should be faired smooth into the road.

Tactile paving & Auditory signals

Providing raised foot walks, tactile paving (guidance given by the edge of the footway/around the obstacles). Auditory signals provide guidance to vision impairment people to cross the road at intersections. It helps to determine the distance to cross, the direction of crossing, and whether there are islands.

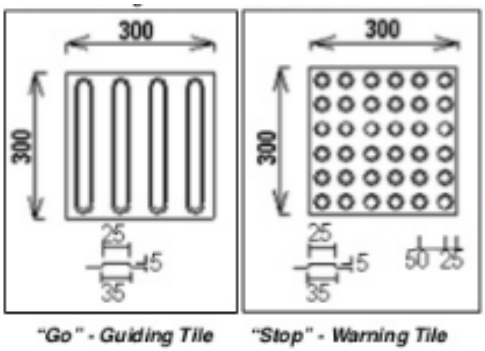


Figure 6-11: Tactile paving

Pedestrian crossings

Marked and designated crossings are an essential part of the pedestrian realm that enables safe, convenient pedestrian travel across roadways.

Pedestrian must be given the shortest possible direct route to cross the street, the most preferred crossing for them is at grade.

Mid-block crossings must be provided for people to cross the street safely between bus stop locations, active land use on opposite sides of the street.

Pedestrian flyovers are necessary for roads with high speed of vehicle movement and the vehicle volume is high.

Minimum width of pedestrian underpasses should between 4.2 and 4.8m. But if the length of the underpass is varying with the width of the underpass.

Pelican crossings give the shortest possible path for crossing. Pelican crossing is the only crossing which has a flashing amber light as part of its sequence. If a pedestrian is waiting at the crossing and it looks as though they have pressed the button then you can anticipate that the traffic lights may change soon. Pelican crossings may be in a straight line or staggered.

Special sign arrangements may provide for school zone areas, in front of hospitals etc.

During this Master Plan period pedestrian underpasses or overpasses will be provided as appropriately at locations with heavy pedestrian volumes such as Junctions, Schools, Hospitals etc.

Improve the safety at Hazardous /Blackspot Locations

There is an urgent need to reduce the number and severity of road accidents by implementing remedial measures at hazardous locations in the national road network as follows.

Essential components of these programs include

(i) Identification of potentially hazardous locations
(ii) Joint investigation with relevant police officials
(iii) On-site investigations
(iv) Design studies
(v) Programming & Prioritizing
(vi) Implementation of improvements
(vii) Monitoring and evaluation.

A. Hazardous Location Identification

It is highly necessary to identify the hazardous location after safety audit for the existing road network and newly constructed road in operational stage.

B. Blackspot Location Identification

It is highly necessary to accident data analyses in the national road network to identify the blackspot and then design to eliminate that situation.

Table 6:2: Safety Improvements at Hazardous locations

Item	Components	Criteria/Requirements	Outputs and Outcomes
Sharp bends	Warning signs, advisory speed signs, road markings, guide posts	The use of retro-reflective materials for better perceptibility at night is strongly recommended, Chevron signs	Reduce the accident rate and improve the safety of vehicle movement
	Curve widening		Drivers have a tendency to follow outer edge of the pavement to have better visibility and large radius curved path. Necessitates extra width of the road.
	Mirrors	Angle traffic mirrors, All weather mirrors	Risk of accidents can be minimized especially in bad weather conditions and at night.
Deep embankments	Safety barriers, delineators	Designed to absorb the energy of a crash by deflecting, minimum of 20m long to dissipate the energy	Drivers can be protected from running into dangerous area
Overtaking sight distances not available	Restricting the possibilities of overtaking	Proper marking	Prevention of all dangerous overtaking maneuvers
Hazardous intersections	Building roundabouts instead of intersections, signalization		Avoid large differences in speed and direction, Reduce accidents
Slow moving traffic/Heavy vehicles	Climbing lane/Relegate slow traffic to a suitable parallel link if existing or providing.	If no parallel road is present nor can be built, hard shoulders may be constructed to accommodate the slow traffic.	Avoid the presence on a road of vehicles running at largely varying speeds.
Structures narrow locations	Signs and Markings	Chevron, Delineators	
By roads connectivity points	Traffic mirrors	Angle traffic mirrors, All weather mirrors	Improve the visibility

Sharp bends

In sharp bends centre and edge delineation treatments help drivers judge their position on the road, and provide advice about conditions ahead.

Warning signs and advisory speed signs

Warning signs inform drivers of the nature of a hazard they are approaching. Advisory signs, including advisory speed signs, tell drivers how to navigate the hazard safely. For example, hazardous bend signs placed on the approach to the bend can inform the driver of how the road alignment changes. Hazardous bend signs can be mounted above an advisory speed limit sign, which states a safe speed for the bend.

Continuous centre lines can be used to discourage overtaking or accidental ‘drifting' from the lane. Edge lines help drivers judge the alignment of the road ahead and can reduce run-off-road crashes.

Retro-reflective pavement markers or road studs ('cats eyes') are usually used in conjunction with painted line marking to warn drivers of changes in alignment in the road ahead. RRPM's are particularly helpful in darkness or during wet weather when line marking becomes difficult to see.

Guide posts assist the road user by indicating the alignment of the road ahead, especially at horizontal and vertical curves. Guide posts are usually about one meter high and set about one meter from the edge of the road. They can be equipped with reflectors, or painted with reflective paint, and so are especially useful at night. They should not constitute a roadside hazard, and so should be constructed of lightweight, frangible, durable material.

‘Chevrons' can be installed along the outside of a bend to provide drivers with a better view of the bend as they approach it, and to assist them in positioning the vehicle during the bend.

Curve widening

On horizontal curves, especially when they are not of very large radius, it is a common practice to widen the pavement slightly more than the normal width. This is doing to avoid off tracking of vehicles.

Providing Mirrors

Mirrors place at sharp bends to prevent unexpected accidents by eliminating blind spots.

Deep Embankments

Side slope improvement will reduce the likelihood of a vehicle rollover in run-off road/loss of control crashes and may also reduce the severity of these types of crashes. Generally flatter side slopes are safer. A side slope is considered to be traversable if an errant vehicle can recover and return to the roadway while keeping all wheels in contact with the ground. If the slope cannot be made traversable and clear of hazards, it should be protected with the use of safety barriers, delineators etc.

Safety barriers

Safety fences and barriers are used to protect drivers and passengers of vehicles from, severe accidents. Different types of barriers are available to protect vehicles rolling off from the steep slopes such as flexible barrier systems, semi rigid barrier systems, rigid safety barriers and delineators.

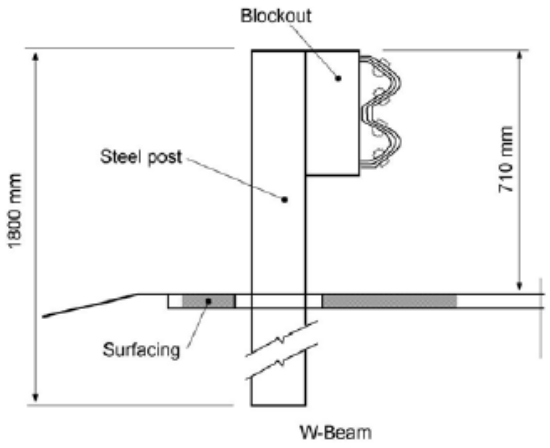


Figure 6-12: W beam barrier system

Overtaking sight distances not available

The overtaking sight distance is the minimum distance open to the vision of the driver of a vehicle intending to overtake the slow vehicle ahead safely against the traffic in the opposite direction. If this length is not available the lengths have to be restricted for overtaking by double lines or by combination lines.

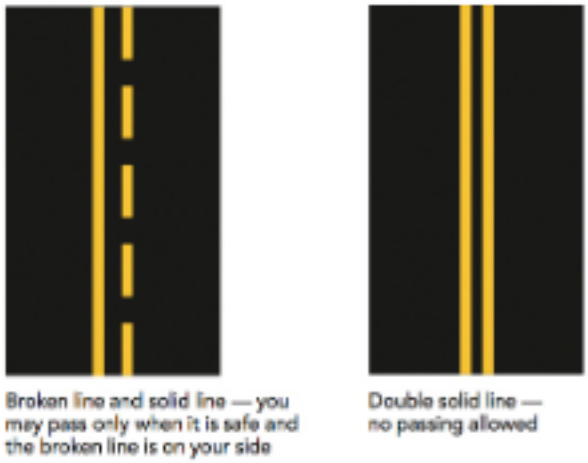


Figure 6-13: Double line and single line

Hazardous Intersections

Clear warning/alarm is required at intersections to inform road users that there is an intersection present and to provide information about the types of maneuvers that may occur. In the worst case situation, road users may not realize that an intersection is present, and collide with other vehicles or road users, often at high speeds. Poor information also results in late braking behavior by road users who are required to stop, or wish to make turns. Improvements to intersection can be made by making adjustments to, or installing new traffic islands, street lighting, line marking and signs, roundabouts etc.

Line marking and warning signs - used to give drivers advance notice of an upcoming intersection.
Median islands (or splitter islands)- used on the approaches to intersections to improve the prominence of intersections (including by the provision of additional signs on median islands), and provide an additional benefit as they channelize traffic and may provide pedestrian protection if designed well.

Improving street lighting.

The best way of stopping conflicting intersection movements is placing the intersecting roads at different levels, or grade separating them. This can be done with overpasses or interchanges.

A roundabout is a one-way roadway around a circular central island. Entry to roundabouts is controlled by 'give-way' markings and signs. Vehicles already on the roundabout typically have right-of way. Roundabouts cause little delay in low to medium traffic flows, and require less maintenance than signalized intersections.

Most crashes happen at intersections. Traffic signals are a way to stop conflicting flows of traffic entering the intersection at the same time and can reduce crash risk. Signals can be set to change according to fixed times, or they can be activated according to traffic demands. It is also possible to link a network of signalized intersections together to provide control of the road network as a whole.

Slow moving traffic/Heavy vehicles

Large vehicles can present problems for other traffic on hilly terrain and may lead to risky passing behavior with limited sight distances. Climbing lanes provide additional capacity on uphill grades to allow faster traffic to pass slower traffic without the increased risk of making the passing maneuver in the opposing traffic lane. Climbing lanes of varying lengths and spacing, depending on the truck volumes, overall traffic levels, shoulder widths, and right of way availability.

Structure narrow locations

Some sections of roads widths are varying due to the structures, acquiring difficulties etc. Therefore before entering to those locations drivers are warned by information signs, delineators, chevron etc.

By road connectivity points

At by road connectivity points the safety can improve by providing proper lane markings (give way, stop lines), signages etc or in narrow roads mirrors can provide to prevent collisions.

Roadside hazardous

Crashes between vehicles, which leave the road, and roadside hazards are a major safety problem.

Roadside hazards can include as trees, rock outcrops, street furniture such as signs and electricity poles, stalls set up too close to the road and open drains. Where possible, roadside hazards should be removed. Trees provide benefits (including shade for pedestrians and reduced soil erosion) but large trees and poles (more than 100mm in diameter) that are close to the edge of the road can be a serious hazard.

Road Shoulder

Minimum width of 2m shoulder should provide along the road and it should be well maintained. Therefore it can use in any emergency situations, breakdown of a vehicle etc. and can improve the safety and flow of traffic by avoiding obstructions.

Road signs and markings

Reflectivity, size of letters, material use should be according to the gazette and guidelines. They should be properly maintained.

Implementation of road safety program

Conducting of awareness programs to deliver the safety tips for pedestrians and drivers.

Road, traffic and accident data collection /Black spot analysis

This measure is a condition for proper monitoring of road safety and for implementing the countermeasures for identified locations.

Traffic calming

This is applied to local streets with the aim of lowering traffic speeds and volumes, and sometimes, preventing particular types of vehicle travelling through an area. These aims are achieved by treating an area rather than a single section of road. Traffic calming treatments cause drivers to change their driving pattern. Usually they have to reduce their speed but sometimes drivers are exposed to something undesirable (e.g. rumbling, or delays) which encourages them to choose a different route.

There is a wide range of traffic calming treatments available. These include roundabouts, kerb build-outs, speed humps, raised tables, entry treatments, speed cushions, modified intersections and many others.

Protecting Lives aimed at Vision Zero or the pursuit of the complete elimination of transport fatalities by 2030 is another policy intervention identified in sustainable Sri Lanka-vision & strategic path. Under this an allocation of 5% of all transport sector capital investment should be allocated for transport safety improvements from 2020.

6.3. Development of Financial Model for Road Master Plan

Development of additional innovative financing mechanisms for road construction and maintenance management, which remains under funded, is prerequisite for sustainable development of the road transport sector. A brief on development of appropriate financial model for NRMP (2018-27) is outlined below.

Development of Financial Model Using RoNET

After determining budgetary requirements for implementation of updated National Road Master Plan for road maintenance, improvement and new development using Life Cycle cost analysis for 2018-2027, efforts were made to develop appropriate financial mechanisms for the implementation of projects considering the suitability for PPP methodology, loan funding through bilateral and multilateral funding and local funding.

In this connection, a financial model was developed using RONET software tool to determine Optimum and Do Minimum financing required for implementation of the Road Master Plan. The relative impacts on

government budget were analyzed using different financing mechanism, such as: (i) Government budget, (ii) Local funds (iii) Funding from development partners, and (iv) different Road User Charges, such as, fuel levy, road tolls, vehicle license renewal fee, over loading fine, and (v) other road tariffs, or a combination thereof.

A brief description of development of the financial model using RONET for NRMP (2018-27) is outlined in the following sections.

Determination of Optimum and Do Minimum Financing Required for Implementation of The Road Master Plan

To determine the Optimum and Do-Minimum financing required for implementation of the NRMP (2018-27), a RONET model, which determines the proper allocation of expenditures among recurrent maintenance, periodic maintenance, and rehabilitation road works and the funding gap was developed. RONET includes a series of analytical tools designed to evaluate the road network and road sector of a country at a macro-level by evaluating a series of representative road classes, which can be characterized, for example, as (i) functional classification, (ii) surface type, (iii) traffic level, (iv) road condition, (v) terrain, (vi) climate, and (vii) geographical region. In order to develop the RONET model, requisite data were collected from SLRAMS. The Road User Revenues Module of RONET, estimates the level of road user charges required (e.g. fuel levy) to meet road maintenance expenditures under different budget scenarios.

a. Determination of Optimum and Do Minimum Road Maintenance Cost

The financial model, RONET has the capability to assess the consequences of different road works budget scenarios that represent different levels of road works expenditures over time, that for example are labeled Optimal +2, Optimal +1, Optimal, Optimal -1, Optimal -2, Optimal -3, Do Minimum, Do Nothing, and Custom. The consequences are presented on the road works requirements, financial cost, road condition, asset value, and so on. A brief description of the different modeling scenarios of RONET is given below:

- Optimal: RONET evaluates the performance of the road class under the different standards and calculates the corresponding stream of road agency costs (rehabilitation and maintenance), road user costs and total society costs (sum of road agency and user costs) over the evaluation period. RONET then computes the present value of the total society costs for each standard, at the input discount rate, and determines the optimal standard for the road class, which is the one that yields the lowest present value of total society costs;
- Optimal +1: for each road class RONET applies, if possible, a standard that is one level higher than the optimal standard in terms of road agency expenditures;
- Optimal +2: for each road class RONET applies, if possible, a standard that is two levels higher than the optimal standard in terms of road agency expenditures;
- Optimal -1: for each road class RONET applies, if possible, a standard that is one level lower than the optimal standard in terms of road agency expenditures;
- Optimal -2: for each road class RONET applies, if possible, a standard that is two levels lower than the optimal standard in terms of road agency expenditures.
- Optimal -3: for each road class RONET applies, if possible, a standard that is three levels lower than the optimal standard in terms of road agency expenditures.

- Do Minimum: RONET applies the Do Minimum Standard on all road classes
- Do Nothing: RONET applies the Do Nothing Standard on all road classes
- Custom: The user defines which standard to apply on each road class as a function of the network type and traffic category of the road class.

The optimal -1, optimal -2, optima l-3, Do Minimum and Do Nothing budget scenarios represent network budget constraints, while optimal +1 and optimal +2 represent scenarios of over spending in relation to the optimal scenario to show the consequences of over spending resources.

The RONET outputs for optimization on annual road agency costs for road maintenance and rehabilitation requirements for years 1 to 5 are shown in Table 8 1. It appears that the costs the optimal +1 and the optimal +2 solutions are significantly, i.e. 41.7% and 294.1% respectively higher, while the Do Nothing and the Custom solutions are -100.0% and -311.6% lower than that of optimal solution. The other options are very close, i.e. within 1.6% to 4.9% of the optimal solution. Therefore, the optimal solution seems to be very stable and close to most of the potential options.

Table 6:3 **:** *Annual Road Agency Costs for Road Maintenance and Rehabilitation (Million LKR) Requirements for Years 1-5*

	Annual Costs Years 1-5, Million LKR/year				
Scenario	Rehabilitation	Periodic Maintenance.	Recurrent Maintenance.	Road Agency	% Change w.r.t Optimal
Optimal +2	173,955.2	35,814.3	1,962.3	211,731.8	294.1%
Optimal +1	58,358.5	15,547.6	2,248.4	76,154.5	41.7%
Optimal	51,736.0	590.8	1,399.7	53,726.5	0.0%
Optimal -1	51,558.7	1,882.4	1,465.4	54,906.5	2.2%
Optimal -2	51,558.7	3,298.5	1,492.5	56,349.8	4.9%
Optimal -3	51,558.7	1,689.1	1,432.5	54,680.3	1.8%
Do Minimum	51,558.7	0.0	1,298.3	52,857.0	-1.6%
Do Nothing	0.0	0.0	0.0	0.0	-100.0%
Custom	151,999.9	66,809.1	2,345.0	221,154.0	311.6%

The annualized funding requirements for years 1 to 5 under Optimal Scenario for different road works in Sri Lanka is depicted in Table 6-4. It may be mentioned here that the RONET only optimize Routine Maintenance, Periodic Maintenance and Rehabilitation using road condition, i.e. Roughness, while road Investment Expenditures, i.e. new construction, upgrading and widening are direct user input, which are included in the optimization algorithm. It appears from the table 6-4 that out of annual requirement of budget of LKR 235 Billion, only 22% is for road maintenance and rehabilitation and the biggest share of the expenditure is attributed to new road construction and improvement accounting for 75% of the total expenditure. It appears that road improvement works, such as new construction, upgrading and widening, which are more capital incentive, are being assigned more priorities over road maintenance and rehabilitation works.

Table 6:4 : Annualized Funding Requirements for Years 1-5 under Optimal Scenario

Work Type	Condition/Work Type	Total (Million LKR/year)	% of Total
Routine Maintenance	Very Good, Good and Fair Roads	925.94	0.4%
	Poor and Very Poor Roads	473.72	0.2%
Expenditures	Subtotal	1,399.66	0.6%
Periodic Maintenance	Very Good, Good and Fair Roads	585.35	0.2%
	Poor and Very Poor Roads	5.43	0.0%
Expenditures	Subtotal	590.78	0.3%
Rehabilitation	Very Good, Good and Fair Roads	0.00	0.0%
Expenditures	Poor and Very Poor Roads	51,736.01	22.0%
	Subtotal	51,736.01	22.0%
Investment Expenditures	New Construction	106,898.54	45.5%
	Upgrading	23,536.50	10.0%
	Widening	42,236.56	18.0%
	Subtotal	172,671.60	73.5%
Administration and Other	Administration	8,439.88	3.6%
Expenditures	Road Safety	0.00	0.0%
	Subtotal	8,439.88	3.6%
Total Expenditures	**Total**	**234,837.93**	100.0%

b. Comparison of Needs for Road Construction and Maintenance and Road User Charge Revenues

The Road User Charges levied on Gasoline and Diesel, which are designated under the Road Maintenance Trust Fund (RMTF), are only LKR 1.50 and LKR 0.50 respectively, as depicted in Table. As at 10th May 2018, the price of a liter of Gasoline is LKR 137 ($0.88) and that of Diesel is LKR 109 ($0.70). Therefore, the Road User Charges levied from the Gasoline and Diesel are only 1.09% and 0.05% respectively. It appears that the Road User Charges levied from the fuel are insufficient for annual road maintenances needs of Sri Lanka.

Table 6:5 : Unit Road User Charges Revenues from Fuel Levy in Sri Lanka

Fuel Type	Unit Fuel Levy Assigned to the Road Sector				Annual Fuel Levy (million LKR/yr)
	Road Maintenance Trust Fund (LKR/liter)	Urban Road Entities (LKR/liter)	Other Road Entities (LKR/liter)	Total Road Sector (LKR/liter)	
Diesel	0.50	0.00	0.00	0.50	1,827.81
Gasoline	1.00	0.00	0.00	1.00	2,026.52
Total	**1.50**			**1.50**	**3,854.33**

The annual Road User Charges revenues from different type of charges are given in table 6-6, and are also illustrated in figure 6-14. It appears that the charge derived from License & Inspection is the main source of

revenue representing about 23.01% of the total revenue, which contributions from other User Charges are relatively small. The total contribution from the fuel level comprising Diesel and Gasoline, is 24.78%, which is totally inadequate to meet the road maintenance needs. As at the present moment, a part from the government budget, the fuel levy, which appears to be grossly inadequate, was the main funding source of Road Maintenance Trust Fund (RMTF).

Table 6:6 : Annual Road User Charges Revenue of Sri Lanka

Type of User Charge	User Charge (Mn LKR/yr)	Percentage
Diesel Consumption	2,217.56	7.2%
Gasoline Consumption	5,413.69	17.58%
New Vehicle Registration	2,816.66	9.14%
License & Inspection	7,088.04	23.01%
Insurance & Other	6,283.49	20.4%
Road Tolls	6,983.47	22.67%
Total (Mn LKR/yr)	**30,802.91**	**100.0%**

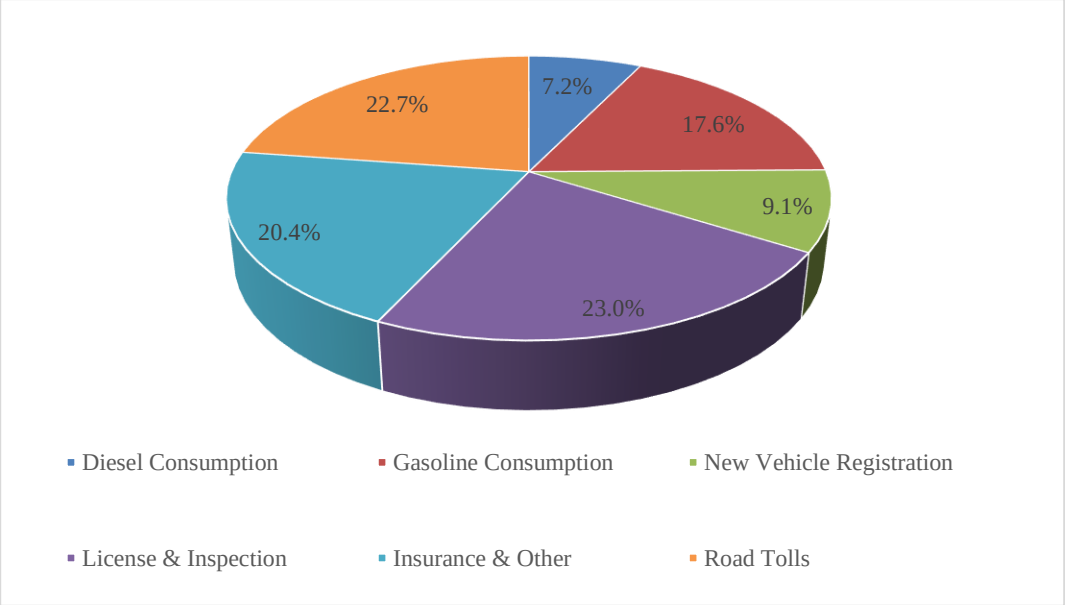


Figure 6-14: Distribution of User Charges from Different Sources in Sri Lanka

The comparison of the annual revenues and funding requirements for road construction and maintenance in Sri Lanka is illustrated in table 6-7. It appears that the actual revenue and estimated needs being Billion LKR 162.85 and 234.84 respectively, the finding gap is huge, i.e. Billion LKR 71.99 per year, which is about 31% of the estimated needs. It is therefore imperative to explore alternative financing options to bridge the gap and ensure sustainability for construction and maintenance management of road networks in Sri Lanka.

The Road Maintenance Trust Fund (RMTF) was introduced early 2006 with a view to ensuring reliable funding for road maintenance and, eventually, also for construction. At present RMTF is not functioning and NRMP

2021- 2030, proposed to continue to the financing of routine and periodic road maintenance. The operation of the fund is dependent on earmarked tax proceeds from the sale of gasoline and diesel. Such allocations replace budgetary allocations directly given to the Ministry of Highways. The allocations to the fund are linked to the sale of gasoline and diesel. Policy decision has to be taken based on a suitable formula/methodology which will be adequate to meet the road maintenance requirements of the National Highway Network.

Table 6:7: Comparison of Annual Revenues and Funding Requirements for Road Sector in Sri Lanka.

Actual Revenue (Million LKR/year)	Estimated Needs (Million LKR/year)	Gap (Million LKR/year)	Gap (%)
30,802.91	**234,837.93**	**204,035.02**	**87%**

Sources of Additional Funding for Road Sector

In order to bridge the gap for additional funding for road, which is in the order of 31% of the actual needs, a number of potential funding sources are envisaged, as follows:

- Government Budget;
- Loan from Development Partners;
- Local Funding; and
- Road User Charging (Government or PPP)

It is neither desirable nor sustainable to rely on direct 'Government financing for road development and maintenance management. Again, the prospective of securing additional funding from the Local Government or development partners for road improvement and maintenance management far beyond existing financing levels, seems to be not very promising. It is therefore imperative to explore different potential additional sources of revenue for implementation of the National Road Master Plan using Road User Charging. To this end, at first the potentials for increase of revenue from the traditional sources, such as: (i) Taxes on Vehicle Fuel, (ii) Direct Usage Charges for heavy vehicles, (iii) Tolls, (iv) Charges on the purchase of new vehicles, and (v) Enterprise taxes, etc. were investigated.

At the present moment revenues levied on fuel, i.e. gasoline and petrol are LKR 7,631 Million, which is only 24.78% of the total Road User Charge. Even if the fuel levy is increased by two hundred percent, which would be highly controversial having adverse impacts on road passenger and freight transportation, it will be possible to generate nearly 40% of the required funds. It is therefore apparent that it might not be possible to generate sufficient additional revenue from the traditional sources. In this connection, a number of innovative user-based financing options for road development and maintenance management in Sri Lanka were investigated. In line with pay-for-use philosophy a number of variant user charges were explored:

It is obvious that only limited application of the potential of road user charges, such as tolls would not be able to meet the growing funding gaps for road maintenance and new development needs in Sri Lanka. Therefore, other innovative user charging concepts under a Public-Private-Partnership (PPP) framework were also investigated. In the context of road infrastructure, PPPs refer largely to contractual arrangements between the public and private sectors, whereby the private sector provides building, rehabilitation or maintenance works

in exchange for operating rights over a relatively long period of time (often referred to as concessions). At the end of this period, the asset is transferred back to the public authorities. The above model is typically classified under the 'Build and/or Rehabilitate, Operate, Maintain and Transfer' PPP model and its related variants.

In this connection efforts were made in adopting appropriate PPP model for road maintenance and development management. The pursuance of developing an appropriate PPP model was directed mainly in two directions – first leveraging various sources of revenue for the private sector while enhancing value for money in a given financial capacity of the Government of Sri Lanka. The second direction pertains to combining plain PPP models with enhanced risk-sharing mechanisms and extended responsibilities to create win-win situations. To this end, a number of alternative PPP model were explored as follows:

- Operations, Maintenance and Transfer (OMT) contracts;
- combining revenue streams of Build Operate and Transfer, BOT (toll) and BOT (annuity) for developers;
- hybrid models combining viability gap funding (VGF) with annuity payments, using co-financing from the development partners;
- Item Rate Contracts (IRCs) and BOT (annuity) models for road upgrading and maintenance, etc. and
- Design, Build, Maintain, Operate, and Transfer (DBMOT) Contract in combination with Output and Performance-Based Contract (OPBC).

The pros and cons of possible scenarios for generating funds for the Master Plan were identified based on appropriate analysis and consultation with relevant officials of Sri Lanka, the experience of best international practices using benchmarking on best practices, to gain from experience of other successful situations and to show up recommendations and alternatives on different types of road financing.

Development of Appropriate PPP Model for Improvement, New Development and Road Maintenance

a. Development of Appropriate PPP Model Greenfield and Brownfield Projects

The development of appropriate PPP models for Greenfield and Brownfield projects related to new road construction and improvement have been widely applied across a wide range of projects in several countries, including India, and the experience of them is also widely varying. The experience/success of PPP projects in road construction and improvement depends upon a variety of factors related to the host government (political/ governance systems) to economic conditions to legal and financial framework to the occurrence of natural disaster events. Further, preparedness of the private sector including their response/ responsiveness to a PPP initiative also matters. It is also important to harness the benefits of a Performance-based Contract (PBC) through a PPP initiative by sharing risks and responsibilities of road development and maintenance management in Sri Lanka. A PBC is defined as "a type of contract in which payment for the deliverable is explicitly linked to the Contracting Entity's successfully meeting or exceeding certain clearly defined performance indicators" (Stankavich, Qureshi, & Queiroz, 2005).

Much of the private sector participation in road development has been coming forth in the India, which has implemented the highest number of PPP projects in the road sector in the world, under the BOT model with the variants of, as follows (Nathathiga, 2006):

- Engineering, Procurement and Construction (EPC) model, which is the first model in India that induced private sector strengths and is suitable for greenfield projects. After a brief break, the model is getting revived again;
- BOT – Toll model, is a very popular concession and many variants of the model have also emerged. It is suitable for both greenfield and brown field projects.
- BOT – Annuity model is new addition to the current development models in road sector. It is suitable for both operation and maintenance projects;
- BOT – Toll/Annuity hybrid model, as the name suggests, is a combination of toll and annuity concession. It is suitable for highway junctions, intersections and furniture development.

However, the traditional PPP models in road sector have been facing a lot of problems related to structural issues and behavioral issues confronting the sector, which include but not limited to:

- Declining participation of private sector due to crowding out of reputed developers and aggressive bidding due to irrational exuberance;
- Default in Financial Close for weakening lenders base, stringent norms of lenders for disbursement of funds;
- Delay in Financial Close for delay during Development Period and delay in fulfilment of Conditions Precedent
- Delay & default during Construction due to non-availability of Right of Way (RoW), and non-availability approvals for ROB, environmental clearance;
- Arbitrations and litigations arising out by default in granting ROW by the authority and change of scope, issuance of COD, etc. and
- Inefficient transfer of commercial risk, as Private developer do not have control over either future traffic or alignment design related to network management, reduction in transit time, and risks related to toll leakage, cash management, etc.

In order to encourage participation of private sector in PPP initiative in the road sector, need arises for new form of PPP contracting where commercial risk transfer is balanced with respect to exogenous factors prevalent in the road sector of a developing country. Road agencies are therefore, are exploring new models of PPP contracting in order to address existing issues. New models being considered includes[1]:

(i) Modified Annuity (Grant + Annuity+ Toll)

(ii) Hybrid PPP (Interest free loan + Toll)

(iii) BOT model where construction is financed by authority

(iv) BOT Toll with funded EPC for structures

Salient features of the new PPP models in the road sector are discussed below:

(i) Modified Annuity (Grant + Annuity+ Toll)

It is a concessionaire where the concerned authority to pay part of construction cost as capital grant during construction and balance as annuity payment. There is a provision for separate payment for O&M as a percentage of project cost. O&M is delinked to annuity payment and subject to adherence to performance standard. It is recommended for stretches where BOT Toll in its traditional form is unviable due to high project cost and the absence of commensurate revenue streams. The potential benefits of the model are hereunder:

- Reduced funding requirement for Authority vis-à-vis EPC mode
- Reduced debt requirement and cost of borrowings for private sector (up to 50-75 bps) as compared to BOT-Annuity
- Improved quality of construction due to long-term concession tenure
- Improved operations and maintenance as the payments are performance linked

(ii) **Hybrid PPP (Interest free loan + Toll)**

It is a concessionaire to construct, toll & manage the road. The authority is to pay part of the construction cost as interest free loan during construction. The concessionaire makes repayment of interest free loan after a predetermined traffic in terms of Passenger Car Unit (PCU) Level. The bidding parameter is the amount of interest free loan. The potential benefits of the model are, inter alia, as follows:

- Project is jointly funded by the authority and the concessionaire
- Repayment is after stabilization of cash flows
- Reduced debt requirement and cost of borrowings for private sector (up to 50-75 bps) as compared to BOT-Toll

(iii) BOT model where construction is financed by authority

It is same as BOT (Toll) model but construction is financed by authority separately as per payment terms similar to EPC projects. In this model the same concessionaire undertakes construction, O&M and tolling activity and the annual concession fee is paid by the concessionaire in lieu of tolling throughout the concession period. The potential benefits of the model are, as follows:

- Immediate availability of ROW;
- Project financing risk is not with the concessionaire - financing at a lower cost;
- Balanced construction risk;
- Timely completion of the project - Better management of cost and time overruns; and
- Reduction of residual default and abandonment risk

(iv) BOT Toll with funded EPC for structures

It is a model, which is suitable for critical and complex project infrastructures like tunnels, bridges etc. in a BOT Toll stretch developed on EPC basis by the same developer. The authority funds the critical and complex project infrastructures separately. It is highly likely that such bundling will improve the viability of the project. The EPC payment and the milestones for critical structures are predetermined in the concessionary contract. The key benefits of the model are, as hereunder:

- Better availability of capital to finance the project and a better managed cost of finance;
- Balanced construction risk in the complex structure; and
- Timely completion of the project - better management of cost and time overruns

It appears that the new PPP models for road sectors not only reduce some of problems and risks of the private entrepreneurs but also ensure better management of operation and maintenance of the infrastructures. Considering effectiveness of the PPP models in sharing investment costs and risks between the government and the private sector, it is recommended undertaking at least about a half of the new road construction, upgrading and widening project, which constitute about 73.5% of the annual budget. This means about 40% of the development and improvement projects in the road sector, which is similar to the existing proportion of PPP projects in the road sector of India, will be implemented using an appropriate and hybrid PPP model, as deemed appropriate by a feasibility analysis. This will not only reduce the 31% annual funding gap but also ensure sustainability by sharing the investment costs and risks between the public and the private sector of Sri Lanka. Sri Lanka has over two decades of successful experience in implementing full-fledged PPPs in the ports and power sectors. Therefore, it expected that if it is possible to develop sufficient capacity in the road sector, there will be no problem of implementing new hybrid PPP models, which are relatively private sector friendly and less initial capital intensive, within the road sector.

In order to ensure accountability and value for money, all the new PPP models are also performance-based road contracts (OPRC), which can be conveniently implemented under the life-cycle asset management approach of Design, Build, Maintain, Operate, and Transfer (DBMOT) methodology, as the recommended approach by the World Bank for Sri Lanka.

b. Development of Appropriate PPP Model for Road Maintenance Management

Over a decade ago, before the cessation of conflict, all capital works were carried out through state-owned organizations. However, as a part of commercialization of the road sector, Government of Sri Lanka (GoSL) started the process of separation of owner and supplier of services. Although routine, periodic and emergency maintenance works of National road network are still being carried out by RDA using own labor force, who constitute about 58 percent of the total employees, the rehabilitation of roads and the construction of the new roads are today carried out through domestic and international private contractors.

To date, the rehabilitation, improvement and the construction of the new roads, which constitute 95.5% of the total annual expenditure in the road sector, are undertaken on the bases of input-based civil works contracts. Under the contract, which is a FIDIC Type Contract, the Employer; signs the contract, pays the Contracting Entity. The Contractor constructs the works in accordance with the detailed design and specifications. The Engineer (Supervision Consultant); supervises the Contractors work, issues instructions, certifies payments. The Contractor is paid, usually monthly, based on the amount of work carried out. This is measured and agreed jointly by the Supervision Consultant and the Contractor using the rates in the Bill of Quantities. A Defects

Liability Period is stipulated in the Contract, usually of 12 months. During this period any defects in the works which become apparent must be remedied by the Contractor before release of the retention money, commonly 5% of the contract price.

The input-based civil works contracts for road maintenance project are considered as insufficient, since the amount of maintenance work to be carried out is budget driven instead of as-need. In addition, since it is time consuming and tedious to deal with the large amount of work orders, significant cost and time overruns resulting from input-based contracts. Long and complicated procedures are required to be gone through from the time of defect identification or receiving complaints to issuance of work order resulting to the substandard quality of works. More importantly, since work is carried out using public funding, there is little scope to shift the risk and monetary burden of maintaining road to private sector.

In order to overcome the problem, a Management, Operation and Maintenance (MOM) form of PPP contract may be adopted. It is a hybrid PPP and Performance-based Contract (PBC), which is designed to cater for all maintenance works representing 22% of the budget. A comparison of the Input-based and MOM contract is illustrated in table 6-8. The proposed hybrid PPP and PBC road maintenance contract is expected not only to help in bridging the budgetary gap by injecting required investment from private sector but also aims to improve the efficiency, performance and cost-effectiveness of road maintenance project through involving private sector resources, sharing risks and enhancing cooperation between the public and the private sector. It will be very effective in ensuring uninterrupted supply of road maintenance funds for provincial and rural roads, where the rehabilitation and maintenance are addressed through separate input-based contracts on the availability of funding and most often these functions have suffered from inadequate and timely availability of funding. Moreover, if it is possible to undertake at least about a half of the new road construction and improvement projects under a hybrid PPP and PBC form of contact, such as DBMOT, and all Routine and Periodic Maintenance works under a MOM contract, it will not only cater for all existing funding gap but also provide extra money so that the government can divert scarce resources to other sectors, which are vital for social and economic development of Sri Lanka. It will also promote commercialization of the road sector of Sri Lanka by separating owner and supplier of services.

Table 6:8: Comparison of Input-based and PPP Performance-based Road Maintenance Contract[8]

Item	**Input-based**	**PPP (MOM)**
Form of contract	Maintenance term contract	Management, operation & maintenance contract
Terms of payment	Schedule of rates	Lump sum
Payment mechanism	Work-based (payment according to amount of work done)	Performance-based (reduction of monthly sum if performance standard not reached)
Maintenance	Maintenance is not usually combined with construction (rehabilitation or improvement) works under Input-based contracts. This is because they require a completely different set of specifications, conditions of contract and bill of quantities. This would make a combined contract large and cumbersome to administer.	The Contracting Entity carries out Routine Maintenance ensure the asset always meets the specified Service Level Criteria. He does this by following his own procedures for scheduling and performing any work needed. The Monitoring Consultant observes the condition of the road and notes non-compliances with the Service Level Criteria.
Specification	Method specification	Performance specification
Design for Rehabilitation and Improvement	The Contractor is provided with a design, carried out usually by a third party or the	The Contracting Entity is provided with a Conceptual Design and design guides / standards to be followed and is required to carry

Item	Input-based	PPP (MOM)
	employer himself, which prescribes in detail what is to be constructed.	out the detailed design by the client as per recommendations of the Monitoring Consultants recommendation.
Construction for Rehabilitation and Improvement	The Contractor carries out his construction activities under the constant observation of the Supervision Consultants experienced staff.	The Contracting Entity carries out construction activities in accordance with his own standards and plans, which are all approved by the employer on the recommendation of the Monitoring Consultants.
Quality control	Full time supervision	Inspections & monthly audits
Road defects inspection	By staff of the Department	By the contractor
Time to carry out maintenance work	On receiving work order from the client	Immediately after identification of defects
Duties of client	Estimation, measurement, issuance of work orders, road inspections, full time supervision, programming of maintenance works	Audits and ad hoc Inspections
Duties of contractor	Maintenance work according to work orders	Road inspections, operation of call receiving center and electronic maintenance management center, planning and programming of works, general road maintenance
Documentation	Work orders (by client)	Work program, report of finished work (by the contractor) Inspection records & site audit checklists (by client)

[8] Ng, S.T., Wong, Y.M.W, and Kumaraswamy, M.M. (2005) Experience on a PPP-based High-Speed Road Maintenance Project in Hong Kong

7. Suggestions

7.1. Prioritization of Railway Level Crossings at "A" & "B" Class Roads

Location of railway crossings on important major road links result vast economic losses. Road accidents, traffic congestion and traffic delays can be cited as few examples. It is needed to reduce the accident rate and delays due to the gate closures at railway level crossings located on major "A" and "B" class road links. As a solution grade separation through flyovers can be implemented. Non- grade separated Railway Crossings at "A" & "B" class roads were prioritized as to improve the road safety and to improve the mobility of the highway network.

Railway crossings of "A" class and "B" class roads were listed from the National Road Network map, Railway Network map and Google map. Chainages, Present treatment, Location names were identified from the videos taken by the multi-function network survey vehicle. Existing underpasses and overpasses were removed from the list as the present treatment is reasonable.

The major factors considered when prioritizing the non-grade separated railway crossings are Traffic Volume, Railway Volume, Road Class, Province, Townships and Number of accidents occurred. Traffic Volumes were obtained from JICA STRADA Traffic Demand Modelling software. Railway Volumes were obtained from Sri Lanka Railways and Number of Accidents were obtained from Sri Lanka Police Accident Database. Road Class, Province and Township data were obtained from National Road Network map.

Initially, a survey was carried out to find how weightages to be distributed among the selected factors. Survey sheets were circulated and survey summary was used to select the weightages and ranges. The railway prioritization list for "A" class and "B" class roads were finalized by the results obtained from the weighted average method. Below shows the identified "A" class and "B" class railway crossings which to be improved under the Master Plan 2021-2030.

List of prioritized railway level crossings are given in the Executive Summary& Investment Plan.

7.2. Development of Missing Links

Network improvement is one of the major objectives when it comes to road investment projects and can be considered as the most important aspect as well. Improvements considered in general are; increasing the road capacities by road widening, resurfacing, improving bottlenecks and improving road geometry so that higher design speeds can be achieved.

The key measures are to check whether the improvements will have an impact on increasing the mobility and connectivity between the nodes. Sri Lanka has different classes of roads. They are Expressways, A class roads, B class roads which comes under RDA while C class roads and D class roads come under provincial authorities. There are unclassified roads which comes under local authorizes. These roads have different capacities to carry vehicles.

The capacity improvement requirement for National Roads have been identified by running the traffic model and HDM.4. Some of the capacity improvement identified require large-scale land acquisition demolishing of properties

During the network study for the traffic modeling it was identified that there are missing links of the National road network. And also observed there are road links used by motorist at present avoid the congested links of National road network. Part of these roads have been identified and taken in to the traffic model for more accurate traffic forecasting of National road network.

Improvement of these roads will increase the efficiency of the National road network. Some of these roads have been studied under the ADB funded Expressway connectivity Project. List of roads that are priority for improvements is given in the following table.

Table 7:1: Priority Non RDA Roads to be improved

No	Route ID	Road Name	Length/ km
1	Non RDA	Hokandara-Thalawathugoda	2.86
2	Non RDA	Hokandara-Kottawa	2.46
3	Non RDA	Mattegoda - Polgasowita	5.21
4	Non RDA	Madinnagoda Road	2.64
5	Non RDA	Kottawa - Malabe	6.84
6	Non RDA	Pannipitiya-Digana Junction	2.10
7	Non RDA	Athurugiriya-Kottawa	5.80
8	Non RDA	Ambatale Jn-CINEC Junction (Extension to Chandrika Bandaranayake mw)	4.28
9	Non RDA	Kahathuduwa-Jambugasmulla	2.81
10	Non RDA	Japan Friendship Road	2.08
11	Non RDA	Mahabage- Kerawalapitiya Road	4.2
12	Non RDA	Pitipana - Thalagala road	6.8

7.3. Policy on Facilities for Public Transport

Sri Lanka's motor vehicle fleet has become unsustainable for its current road network capacity especially in urban areas. At 200 vehicles per 1000 people and with 2/3rd of the fleet still two and three wheelers and the 8 per cent p.a. growth in new registrations is likely to continue even in spite of the high taxes.

The growth in private vehicles without offering high quality public transport options has created a dangerous cocktail leading to urban congestion which has inflicted unsustainable economic loss on all urban centers with the Western Province losing approximately 12 per cent of its GDP for mobility and a do nothing scenario predicting this to increase to over 20 per cent by 2020. Door to door travel speeds for urban commutes have dropped to less than 17 km per hour with public transport recording 12 km per hour. It is beginning to be serious in other provincial towns as well.

As such it is clear that facilitating both rail and road based public transport should be given the highest priority in road infrastructure development especially in urban areas. In this respect the RDA will coordinate with the relevant agencies to provide bus priority lanes, bus priority measures, bus stops, bus bays and facilities for bus

passengers to access stops as well as providing drop off points adjacent to major bus stops bus terminals and rail stations. It shall adopt a policy of providing priority for high occupancy vehicles including buses and vans in a bid to encourage better utilization of road space. It shall also consider lower tariff for such vehicles on toll roads in a bid to increase vehicle occupancy and discourage low occupancy vehicles. It shall provide priority for buses and other high occupancy vehicles in traffic signal control by using appropriate technological interventions.

Road space is currently poorly managed with ad hoc parking of vehicles in urban areas, making, walking and using bicycles difficult and unsafe. This also impedes the movements of buses as well. Relevant steps would be taken to progressively restrain on-street parking on national highways running through urban and municipal areas, and converting such spaces for improving bus movements, walkability and cycling.

Urban population is increasing in Sri Lanka as well following the trends world over. Quality urban life is essential to make urban areas attractive for investment, tourism, trade, employment and residence. Many Sri Lankan cities suffer from growing traffic congestion, poor urban transport options, poor walkability, noise and access to open spaces. Inability to have economically competitive cities and livable cities in Sri Lanka is considered a major obstacle for national development. Therefore, future Road designs shall take into account the facilitation of public transport intervention, provision of public space and aesthetics to improve livability of the urban population.

7.4. Transport Demand Management

While providing both accessibility and mobility for the transportation of people and goods, the national road network directly influences the efficiency and productivity of human resources, as well as patterns of economic growth and social development.

Even though, majority of the local transport needs are met primarily by road transportation at the current scenario, the potential to cater for the increasing demand of road usage would be hindered due to the scarcity of land to carry out further widening and improvement activities. The effectiveness of road widening is observed to be reduced by roadside parking and causes traffic congestion and underutilization of the road infrastructure within metropolitan areas.

Therefore, policy measures should be introduced to address parking management techniques that encourage people to either shift from private vehicles into more sustainable public transport options or enter the urban areas during times of less traffic demand of the day. Parallel to the appearance of improved public transport alternatives, policies should be adopted that require private vehicle users to compensate for road usage during peak traffic in urban areas.

Live monitoring and controlling of road infrastructure and traffic alongside with Sri Lanka Traffic Police and an introduction of tariff systems such as electronic road pricing for most demanding roads in metro areas should be incorporated to the RDA’s scope of work to be done in coordination with other relevant agencies.

7.5. Rural Connectivity Improvement

As we are aware that the majority of the Sri Lankan population is living in rural areas where the level of public infrastructure facilities are low. Poor road connectivity creates constraints for rural population in terms of access to other social infrastructures such as markets, medical clinics and education. Majority of people still live in peaceful environment in rural areas and mainly engage in environmental friendly agriculture activity

and expending healthy life. Improvement of rural roads facilitate rural people to reach urban markets and their social needs. This also will help to control migration of people from rural to urban areas.

Most of the rural people do not have reliable accesses to the road network or motorized accesses. Most of the infrastructure improvements often focus on paved highways and major vehicular bridges serving for the vehicular traffic. However, most of the rural population do not possess access to the basic services and opportunities.

Investment in rural transport improvements would help to alleviate poverty by improving access to markets, medical clinics, and opportunities for education. Unfortunately, many programs prioritize paved roads with poor infrastructure capacity to link feeder roads and rural paths, leaving a significant portion of the rural population without proper access.

- A typical rural household spends relatively more hours on travelling.
- The majority of the trips undertaken are on foot.
- The travel time is excessively long despite the short distances travelled.
- Women carry a disproportional amount of the travel and transport burden and predominantly through head loading (water and goods transportation are carried by women and girls.)
- Animal attacks and drowning are also a constant risk for many communities.

Rivers and streams isolate and inhibit many rural communities. Many of the poorest people are faced with the disadvantage of having no direct access to basic amenities or an adequate infrastructure system necessary to reach them.

RDA Planning Division collect details on locations for bridges on Non-RDA roads as well potential locations for rural bridge to improve regional/ rural infrastructure facilities and connectivity to local centers in order to study and identify appropriate locations for new bridges. Those locations will be investigated, evaluated for suitability and prioritized considering benefits for such isolated communities and villages.

ANNEXES

ANNEX-1

Inventry Issues

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
1	Southern Expressway	124.800	#N/A	
2	Outer Circular Highway	19.245	#N/A	
3	Colombo-Katunayake Expressway	25.800	#N/A	
4	Kollupitiya - Sri Jayewardenepura	7.120	7.092	
5	Colombo - Kandy	115.850	115.603	
6	Colombo - Galle - Hambantota - Wellawaya	317.780	318.482	246kmp taken as 246+000
7	Peliyagoda - Puttalam	126.310	126.884	End at RB (AA010 & B379)
8	Colombo - Ratnapura - Wellawaya - Batticaloa	430.570	425.595	Need to verify End location and (368kmp 370kmp). A004 to be end at A015 by extending the A004 with first section of bar road(B046)
9	Peradeniya - Badulla - Chenkaladi	275.640	271.694	
10	Ambepussa - Kurunegala - Trincomalee	198.710	198.741	
11	Avissawella - Hatton - Nuwara Eliya	118.700	115.958	
12	Panadura - Nambapana - Ratnapura	67.770	67.426	
13	Kandy - Jaffna	321.000	320.775	End at Thuraiappa Stadium
14	Katugastota - Kurunegala - Puttlam	124.580	124.385	
15	Maradankadawela Habarana Tirikkondiadimadu	129.360	128.420	
16	Puttalam - Trincomalee	176.990	179.754	
17	Galkulama - Anuradhapura	16.640	16.538	
18	Medawachchiya - Mannar - Talaimannar	113.840	114.461	
19	Batticaloa - Tirikkondiadimadu - Trincomalee	130.860	131.830	Strat from Kachcheriya Batticaloa (near port)
20	Beragala - Hali-Ela	40.390	38.250	
21	Galle - Deniyaya - Madampe	143.930	142.444	
22	Pelmadulla - Embilipitiya - Nonagama	87.690	84.570	
23	Polgahawela -Kegalle	11.670	11.802	
24	Anuradhapura - Rambewa	14.480	14.466	Start from AA012
25	Kegalle - Bulathkohupitiya - Karawanella	42.120	41.577	
26	Passara - Moneragala	34.110	32.851	
27	Wellawaya - Ella - Kumbalwela	30.570	30.191	Start from A004 & AB043 Junction
28	Matara - Akuressa	20.110	19.980	
29	Siyambalanduwa - Damana - Ampara	57.120	57.375	
30	Kandy - Mahiyangana - Padiyatalawa	105.230	101.837	
31	Ampara - Uhana - MahaOya	57.920	57.900	
32	Padeniya - Anuradhapura	80.520	80.498	
33	Vavuniya - Horowopotana	46.020	46.048	
34	Vavuniya - Parayanalankulam	35.800	35.570	
35	Karativu - Ampara	24.140	22.464	
36	Navakkuli - Kerativu - Mannar	98.370	104.454	
37	Ja-Ela - Ekala - Gampaha - Yakkala	17.020	18.124	Road Overlap with B288 - (Gampaha Bus Stand jn to Hospital Jn) . Gampaha flyover road section to be taken over as a new road.
38	Mankulam - Mullaitivu	49.250	48.998	
39	Paranthan - Kachchai - Mullaitivu	52.130	52.370	
40	Ampara - Inginiyagala	19.790	19.277	End Location should be Inginiyagala RB. (Kilometer Posts need to be corrected) B350 Should end at this RB
41	Anuradhapura New Town Roads	12.660	12.066	List of Roads
42	Approach Road to Gampola Bridge	0.480	0.331	
43	Approach Road to Kaduwela Bridge	0.770	0.769	
44	Approach Road to Sri Jayewardenepura Hospital	2.460	1.217	
45	Avissawella Town Road	0.060	0.135	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
46	Balangoda By Pass	1.130	0.911	
47	Bandarawela By Pass	0.510	0.492	
48	Canada Friend-ship Road	2.400	1.949	
49	Colombo - Hanwella Low Level Road	24.940	26.658	Start from Totalaga Jn
50	Galle Road New Deviation (Cross Junc. to Egoda Uyana)	6.980	6.823	
51	Galle - Marine Drive	1.220	1.160	
52	Gampola - Nawalapitiya	17.540	16.656	
53	Hospital - Esplanade road, Ratnapura	1.660	0.538	Need to verify start and End Location
54	Inner ring Road	3.800	3.790	
55	Jaffna - Kankesanturai	18.500	18.500	one road section can't survey
56	Jaffna - Manipay - Karainagar	27.210	27.452	
57	Jaffna - Palali	17.300	17.300	Road Closed from 13.305km (army camp palali) to AB021
58	Jaffna - Pannai - Kayts	19.310	20.449	
59	Jaffna - Point Pedro	33.790	33.896	Starting from B165 & End at end locaton of AB021
60	Jaffna - Ponnalai - Point Pedro	55.380	55.380	one road section can't survey
61	Jail Road, Hambantota	0.430	0.429	
62	Kalattawa - Matale Junction	6.440	6.335	
63	Link Road -- Dambulla	1.000	0.997	Not surveyed
64	Lion Pillar - Sri Maha Bodhi Road	1.210	1.210	Last Section closed.
65	Matale - Udupihilla	6.030	5.513	
66	Old Colombo - Galle Road, Panadura	1.900	1.892	
67	Old Colombo - Puttalam Road, Ja Ela	0.950	0.950	Not surveyed (Start from rukmanidevi Statu at Ja-Ela)
68	Pasyala - Giriulla	19.310	19.231	
69	Poonakary - Sangupiddy	8.850	8.850	Can't find
70	Puloly - Kodikamam - Kachchai	18.910	19.148	
71	Puttur - Meesalai	13.680	13.611	
72	Samanturai village Road	1.850	1.741	
73	Sea Street, Galle	0.160	0.160	Can't find
74	Section A - B NEW TOWN ROAD, Ratnapura	1.850	1.746	
75	Thalapitiya road, Galle	0.980	0.768	
76	Upper Gampola Road	2.570	2.275	
77	Valachchenai - Nasavantivu - Nawaladi	5.120	5.120	(Part of AB038)+B185+B184 roads should be combined as a one road (Full road Can't Survey)
78	Valukkairaru - Pungudutivu - Kurikadduwan	24.540	24.540	Can't survey full road
79	Wattala Deviation	0.640	0.713	
80	Weligama By Pass	4.180	4.063	
81	Getambe Kandy By Pass	3.800	3.765	
82	Wellawaya By Pass	1.150	1.149	
83	Mahiyangana - Dimbulagala - Dalukkane	72.600	72.414	
84	Avissawela By pass	0.880	0.928	
85	Approach Road to Independence Memorial	1.610	1.610	Not surveyed
86	Bauddhaloka Mawatha (Buller's Road)	2.770	2.770	Not surveyed
87	Central Road	0.600	0.600	Not surveyed
88	Cotta Road up to City Limit	1.370	1.370	Not surveyed
89	Danister De Silva Mawatha (Baseline Road)	2.560	2.560	Not surveyed
90	D.R.Wijewardana Mawatha (McCallum Road)	1.900	1.900	Not surveyed
91	D.S.Senanayake Mawatha (Kanatta Road)	0.530	0.530	Not surveyed
92	Elvitigala Mawatha (Narahenpita Road - Kanatta Junc.)	1.880	1.880	Not surveyed
93	Fifth Cross Street	0.320	0.320	Not surveyed
94	Gas Work street	0.340	0.340	Not surveyed
95	George R De Silva Mawatha (Skinners's Road)	1.090	1.090	Not surveyed

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
96	Havelock Road - Maya Avenue Junction to Pamankada Bridge	1.130	1.130	Not surveyed
97	Jayantha Weerasekara Mawatha (Drieberg's avenue)	0.770	0.770	Not surveyed
98	Layards Broadway road - Barber Street to Prince of Wales Avenue	0.260	0.260	Not surveyed
99	Lotus Road	0.930	0.930	Not surveyed
100	Maha Vidyala Mawatha (Barber Street)	0.530	0.530	Not surveyed
101	Main Street from Lotus road to Reclamation road	0.230	0.230	Not surveyed
102	Maligawatta Road - Jayantha Weerasekera Mw. to Sri Saddhamma Mw.	0.270	0.270	Not surveyed
103	Maradana Road	2.590	2.590	Not surveyed
104	N.H.M.Abdul Cader Mawatha (Reclamation road)	0.510	0.510	Not surveyed
105	Pamankada Road	0.320	0.320	Not surveyed
106	Panchikawatta Road - Maradana Road to Janaytha Weerasekara Mw.	0.140	0.140	Not surveyed
107	Part Sri Ramanathan Mw. - (K'boam St. to Skinnders's rd. junc.)	0.310	0.310	Not surveyed
108	Prince of Wales Avenue	2.250	2.250	Not surveyed
109	Railway Road	0.320	0.320	Not surveyed
110	Sea Beach Road	0.450	0.450	Not surveyed
111	Sri Dharmarama Mawatha (Albion Road)	0.480	0.480	Not surveyed
112	Sri Saddharma Mawatha (Ingram Road)	0.880	0.880	Not surveyed
113	Sri Sangaraja Mawatha (Skinner's Road [South])	0.930	0.930	Not surveyed
114	Sri Sumanatissa Mawatha (Armour Street)	0.660	0.660	Not surveyed
115	St. Anthony's Mawatha (Kochchikade Road)	0.340	0.340	Not surveyed
116	W.A. de Silva Mawatha (High Street)	0.920	0.920	Not surveyed
117	Akkaraipattu - Warapathanchenai	20.920	18.901	
118	Akkaraipattu - Sagamam	18.504	18.428	
119	Akuressa - Kamburupitiya	13.270	13.143	
120	Akuressa - Ketanwila	5.630	7.209	
121	Aladeniya - Iriyagama	9.650	9.533	
122	Alakolanga - Pottepitiya	9.250	8.641	
123	Alawatugoda - Ankumbura - Keppetigala	14.790	12.391	Road Should End at Kithul golla junction. B264 also End at Kithulogolla Jn
124	Alawwa - Dampelessa	14.640	14.644	
125	Alawwa - Maharagama	14.630	14.719	
126	Allai Kantale	41.030	41.387	
127	Allan Avenue, Dehiwela	1.960	1.945	
128	Aluthgama - Wigoda	8.050	7.967	
129	Alvai - Nelliady - Tunnalai	8.530	8.250	
130	Ambalangoda - Elpitiya - Pitigala	29.360	26.844	End Location Pitigala Jn
131	Ambatenne - Bokkawela - Arambekade	19.900	19.072	
132	Ampara Air Port Road	4.830	5.538	
133	Ampara Town Roads	30.570	30.570	List of Roads
134	Ampilanthurai - Veeramunai	26.380	26.946	
135	Anamaduwa - Uswewa - Galgamuwa	39.020	38.955	
136	Ananda Avenue	0.240	0.240	Can't find
137	Andalla - Tissa	6.630	6.454	
138	Anderson Avenue	0.110	0.110	Can't find
139	Approach Road to Admiralty Building	28.320	28.320	List of Roads
140	Approach Road to Aerodrome Ratmalana	2.930	2.930	Not surveyed
141	Approach Road to Laxapana Power House	11.540	11.428	
142	Approach Road to Midford Power House	0.970	0.970	Not surveyed
143	Approach Roads to Railway Stations	17.680	17.680	List of Roads
144	Approach Road to Wilpattu Sanctuary	7.740	7.756	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
145	Approach Roads to University Buildings	19.310	19.310	List of Roads
146	Approach Roads to Public Buildings	21.540	21.540	List of Roads
147	Arasady - Malkampiddy	5.230	5.174	
148	Attidiya - Mt.Lavinia	2.410	1.985	
149	Avarangal - Thondamanaru	6.030	5.901	
150	Ayagama - Kukulegama	16.890	16.191	
151	Badalkumbura - Buttala - Sella Kataragama	56.320	55.922	
152	Badulla - Karametiya - Andaulpotha	48.100	47.415	
153	Baladaksha Mawatha, Galle	0.560	0.523	
154	Balangoda - Bowatte - Kaltota	28.960	28.381	One section Overlap with B593 (Rajawaka Jn 14kmp to Kasal Jn)
155	Balangoda - Rassagala - Uwella	13.260	14.103	B039, B391 and B477 need to be combined as a one road
156	Balapitiya - Watugedera	3.220	3.417	
157	Bandaranaika Mawatha, Galle	0.560	1.091	
158	Bandarawela - Liyangahawela - Poonagala	21.560	20.316	
159	Bandarawela - Uva Hihglands - Ettampitiya	16.490	16.113	
160	Bandarawela - Welimada	21.720	20.187	
161	Bangadeniya - Andigama - Anamaduwa	38.210	38.175	
162	Bar Road - Batticaloa	4.670	4.759	
163	Battaramulla - Pannipitiya	7.290	7.400	
164	Batukotuwa - Medirigiriya	8.690	8.608	
165	Bazaar Street, Ambalangoda	1.690	1.400	
166	Bazaar Street, Gampaha	0.050	0.130	
167	Bazzar Street and Edingburgh Street	0.630	0.630	Not surveyed
168	Bazzar Street, Vavuniya	2.090	2.020	
169	Beach Road Mullaitivu	0.870	0.852	
170	Beliatta - Walasmulla	15.690	14.280	Road should be End at Walasmulla Junction. B485 need to be continue up to Walasmulla Jn
171	Bentara - Uragaha - Elpitiya	26.950	26.550	
172	Bibile - Medagama - Nakkala	33.790	33.031	
173	Bibile - Uraniya - Mahiyangana	39.580	38.547	
174	Biyanwila - Ganemulla	8.050	8.045	
175	Bo Tree Road	2.010	1.852	
176	Bogahawewa - Pulmuddai	27.760	27.669	
177	Boossa - Hegoda	1.610	2.413	
178	Borella - Rajagiriya (CMC Limits to Filling Station - Rajagiriya)	1.300	1.300	Road start from CMC limit(Ayrweda Bridge) and End at Rajagiriya Filling station
179	Botale - Mirigama	5.630	5.644	
180	Bowatenna Access Road	2.410	2.409	
181	Bowatte - Padiwela	6.440	6.181	
182	Boyagama - Mandandawala	2.090	2.040	Need to verify end location
183	Bulathkohupitiya - Dedugala	12.470	11.982	
184	Ingiriya - Halwatura - Egaloya	8.850	9.007	
185	Buwelikada - Lewella	1.300	1.341	End at the Lewella Bridge
186	By pass road via Asgiriya	0.980	1.644	
187	Carolina - Norton - Wanarajah	23.730	23.490	
188	Cemetery Road (Gampaha)	0.260	0.260	Not surveyed & not maintain by RDA
189	Chadayantalawa - Uhana	11.260	12.361	
190	Chavakachcheri - Kachchai	6.440	5.763	
191	Chavakachcheri - Puloly	19.310	18.873	
192	Chavakachcheri - Thannankilappu	3.620	3.415	
193	Chavalakadai - Chadayantalawa	8.050	7.846	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
194	Chilaw Road, Negombo	1.260	1.211	
195	Chilaw - Wariyapola	50.640	51.218	
196	Chundikuli - Colombouthurai	2.560	2.531	End location at Junction on Nadumkulam road
197	Chunnakam Power Station Road	0.160	0.272	
198	Circular Road Kurunegala	9.840	6.446	
199	Circular Road, Tangalle	1.450	1.121	
200	Colombo - Horana	28.010	28.347	
201	Cross Road - Medawachchiya	0.480	0.387	
202	Dambagahapitiya - Pinnagolla - Arawa - Meegahakiula	13.320	13.142	
203	Dambokka - Katupitiya	8.850	8.512	
204	Dandagamuwa - Udawela	13.270	13.094	
205	Danikittawa - Ambanpola	22.330	22.372	
206	Danowita - Mirigama	8.610	8.055	
207	Daulagala - Watadeniya	7.450	6.914	
208	Deegawapi Temple Road	6.440	5.763	
209	Dehiowita - Deraniyagala - Noori	27.960	27.886	End at Y-Junction near the Noori Tea Factory
210	Dehiwela - Maharagama	7.640	7.519	
211	Delgoda - Dompe - Giridara	12.070	11.984	
212	Dematagoda - Wellampitiya	1.930	2.369	
213	Demodera - Spring Valley - Badulla	21.320	21.254	
214	Denegama - Mulatiyana	11.260	12.010	
215	Deniyaya - Viharahena	8.040	7.929	
216	Dickwella - Jangulla - Talpitigala	24.140	23.448	
217	Dikwella - Beliatte	13.270	12.812	
218	Diyatalawa - Aluthwela North	2.810	1.958	Start from SL Army Academy road jn, End location 2nd kmp (Exact road end to be idenified)
219	Diyatalawa - Aluthwela South	1.960	1.951	Start from Diyatalawa Polo ground Jn, End location 2nd kmP (Exact road end to be idenified)
220	Diyatalawa - Mirahawatta	6.440	5.678	Up to the bridge over Badulu oya Branch (End Location)
221	Diyatalawa - Welanhinna - Walagahawela	5.630	5.480	
222	Dodanduwa - Gonapinuwala	3.860	3.898	
223	Dondra Light House Road	1.250	1.227	Start From AA002
224	Dunagaha - Nilpanagoda	5.790	5.752	
225	Edmand Mawatha, Galle	4.020	3.474	
226	Eheliyagoda - Dehiowita	16.780	16.451	
227	Ekala - Kotadeniyawa	26.950	27.290	
228	Elahera - Giritale	39.420	40.210	
229	Ella - Passara	27.550	26.803	
230	Elpitiya - Avittawa - Lewwanduwa	27.560	27.085	
231	Embilipitiya - Panamure - Bulutota	38.620	37.817	Road name need to Change as (Ebilipitiya - Panamura - Sooriyakanda)
232	Embilmeegama - Daulagala - Penideniya	11.260	11.071	
233	Eppawala - Timbiriwewa	15.690	11.378	
234	Eriyagama - Penideniya	0.930	1.024	End at AA005
235	Erukkalampuddy - Causeway	0.800	0.633	End at end of the causeway section
236	Etulkotte - Mirihana - Kohuwela	5.950	5.668	
237	Gadaladeniya - Paranapattiya	5.230	5.177	
238	Galagedara - Rambukkana	18.500	18.716	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
239	Galagedera - Horana	19.050	18.617	
240	Galagoda - Weligepola	7.240	6.103	B124, B223 and B351 Need to be take as a one road
241	Galaha - Pupuressa - Delpitiya (Section 2)	28.960	27.538	
242	Galgamuwa - Nikawewa	24.540	24.742	
243	Galigomuwa - Ruwanwella	22.530	21.584	Road name need to change as Galigomuwa - Warawala
244	Galle - Baddegama	19.310	18.527	End at near the river after passing Baddegama bus stand on B153
245	Galle - Udugama	36.600	34.923	
246	Galle - Wakwella	6.840	7.950	
247	Galmadu - Muwangala - Hingurana	7.640	7.033	
248	Gampola - Craighead	15.930	15.219	
249	Ganewelpola - Dachchahalmillewa	45.860	46.074	
250	Gangodawila - Boralesgamuwa	2.610	2.642	Start from Kattiya Jn on B389
251	Geli Oya - Embekke	4.230	4.196	
252	Gevilipitiya - Hettimulla	15.370	15.089	
253	Ginoya - Bolawatte - Dankotuwa	4.700	4.545	
254	Gintota Plywood Factory Road	4.510	4.320	
255	Gonadeniya - Udugama	4.020	4.452	
256	Gravets Road	5.710	5.710	List of Roads
257	Hakmana - Beliatte - Tangalle	19.310	18.754	
258	Hakmana - Meella - Talahaganwaduwa	11.260	11.120	
259	Halpatota - Kurundugahahetekma	16.490	15.821	
260	Halwatura Estate Road	1.000	1.010	End at 1kmp
261	Hanwella Junction Road	0.800	0.862	
262	Hanwella - Pugoda - Weke - Urapola	24.140	24.328	
263	Haputale - Dambetenne	9.320	9.026	
264	Harangala - Kalapitiya - Kumbaloluwa	23.390	16.775	Start from Harangala Junction on B506 & B491 (B506 & B148 Need to be combine as a one road)
265	Hatton - Maskeliya - Dalhousie	32.970	32.032	
266	Hedeniya - Pujapitiya	8.050	7.571	
267	Hendala - Hunupitiya	4.020	3.751	Overlap with A003.The road to be split in to two roads. 1. From Elakanda to (Hedala Jn-1) on A003 (Length 2.630km), 2.(Hendala Jn-2) to Hunupitiya Jn (Length1.036km)
268	Mattakkuliya Uswetakeiyawa Pinwattha	7.660	7.449	End at Church Rd Jn
269	Hikkaduwa - Baddegama - Nilhena	14.880	15.381	
270	Hindagala - Naranwita - Gampola	15.780	13.089	
271	Hingurakgoda - Yoda Ela	5.630	5.358	
272	Hiniduma - Opatha - Pitabeddera	31.380	30.113	End at Hiniduma Jn (Bus stop)
273	Horana - Anguruwatota - Aluthgama	54.140	53.751	
274	Horawela - Pelawatte - Pitigala	25.740	25.652	
275	Ibbagamuwa - Kumbukgete - Madagalla	34.190	34.735	
276	Idangoda - Ayagama	13.680	13.597	
277	Imbulgoda - Weliweriya	4.420	4.447	
278	Inamaluwa - Sigiriya	9.170	8.857	
279	Ingiriya - Halwatura	2.960	3.359	
280	Jaffna Junction - Sri Maha Bodhi	2.410	1.361	Road end at near the Ruins
281	Kachcheri Beach Fort Road	3.620	3.467	Need to verify end location
282	Kadahapola - Rambawewa	18.710	18.916	
283	Kadawalagedara - Vitikuliya	13.840	14.026	
284	Kadawata - Ragama - Welisara	8.050	7.929	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
285	Kadawatha - Mawaramandiya	3.540	3.495	
286	Kadduwan - Mallakam - Chankanai	11.260	11.260	One road section is closed.
287	Kadduwan - Myliddy	3.720	3.720	Not surveyed
288	Kadugannawa - Gampola	17.300	16.945	
289	Kadugannawa - Pottepitiya	8.450	7.309	
290	Kaduwela - Athurugiriya	9.250	9.448	
291	Kahambiliyagoda - Suriyagoda	0.400	0.400	Not surveyed
292	Kahawa - Batapola	8.370	8.348	
293	Kahawatte - Ela-Bemmullegedara	12.230	12.207	
294	Kakkapalliya - Thambagalla	6.840	6.839	
295	Kalagedihena - Veyangoda	4.100	4.030	
296	Kalalpitiya - Ukuwala - Elkaduwa	13.470	13.208	
297	Kalawana - Depdene - Rakwana	46.660	45.886	
298	Kalawewa - Avukana	4.680	4.514	
299	Kaleliya - Pallewela - Medagampitiya	10.220	10.227	
300	Kalkudah Road	5.630	5.657	(One section of AB038)+B185+B184 roads should be combinedas a one road
301	Kalkudah - Valachchenai	4.420	4.182	(One section of AB038)+B185+B184 roads should be combinedas a one road
302	Kalmunai Sea View Road	1.210	1.084	
303	Kalmunai - Chavalakadai	4.380	4.371	
304	Kaluaggala - Labugama	13.998	13.909	
305	Kalugala - Polpitiya - Laxapana	11.260	11.475	
306	Kalugamuwa - Wilakatupotha	21.110	21.181	
307	Kalutara - Nagoda	5.740	5.654	
308	Kandasamykovil - Kaluthaipiddy	3.380	4.250	
309	Kandasamykovil - Nachchimarkovil	2.430	2.430	Not surveyed
310	Kandaswamy Mawatha	1.210	1.147	
311	Kandy - Kirimetiya	16.090	14.946	
312	Kantale Perathuveli Road	2.250	3.062	
313	Karainagar Circular Road	6.770	7.076	
314	Karaiyoor Reclamation	3.060	1.573	
315	Karandupona - Rambukkana	8.850	8.871	
316	Karappikade Extension Road	0.400	0.400	
317	Karuwalagaswewa - Miyallewa	19.310	19.276	
318	Kataragama - Sella-Kataragama	5.050	5.075	
319	Katpaha - Pulliar Kovil Road	1.610	1.698	Need to verify End location
320	Katubedde - Kospelena	1.820	1.816	
321	Katugastota - Madawala - Bambarella	34.890	33.673	
322	Katugastota - Medawela	10.300	9.345	
323	Katukurunda - Neboda	16.490	16.631	Road End at B157
324	Katunayake - Veyangoda	22.320	22.245	
325	Kebithigollewa Extension Road	1.850	1.904	
326	Kebithigollewa New Town Road	0.970	0.994	
327	Kebithigollewa - Padaviya	33.790	31.355	End Location should be Padawiya RB)
328	Kekirawa - Ganewelpola	6.950	6.948	
329	Kekirawa - Talawa	37.410	37.618	
330	Kelaniya - Mudungoda	27.760	28.455	
331	Kelaniya - Wedamulla (Waragoda)	3.220	3.302	
332	Kesbewa - Kindelpitiya - Bandaragama	11.780	12.052	
333	Ketapola - Omatta - Thotupola	1.610	1.275	End at C-Class road jn (Road need to be study considering the connectivity)

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
334	Kibissa - Digampathana	6.030	6.711	
335	King George Avenue	0.480	0.475	
336	Kiribathgoda - Hunupitiya	3.590	2.612	
337	Kiribathgoda - Oil Refinery, Sapugaskande	5.070	4.982	
338	Kiriella - Nedurana - Eheliyagoda	14.080	14.513	
339	Kirimetitenna - Galgoda	5.630	5.668	B124, B223 and B351 Need to be take as a one road
340	Kirimetiya - Yala	17.170	17.011	
341	Kirindiwita - Assennawatte	12.870	12.530	
342	Kirindiwita - Ganemulla	2.820	2.974	
343	Kiriyankalli - Andigama	13.680	13.835	
344	Kochchikade - Halpe	9.460	9.202	
345	Kohuwela - Dehiwela	2.740	2.398	
346	Kokkuvil - Vaddukoddai	8.450	8.604	
347	Kolonnawa - Angoda	3.220	6.375	Road Should be end at Angoda Jn
348	Kolonnawa - Yakbedde	2.410	2.613	
349	Kong Tree Road	0.530	0.532	
350	Korakahawewa - Sri Maha Bodhi	4.830	4.341	End at Pokunu thuna Jn
351	Koralawella - Egoda-Uyana	5.840	6.224	
352	Koslande - Poonagala	11.550	11.594	
353	Kotadeniyawa - Mirigama	8.050	8.138	
354	Kottawa - Batemulla	13.680	12.952	
355	Kottawa - Talagala	15.480	15.340	
356	Kotte - Bope	28.800	27.983	
357	Kudapaduwa - Kammalturai	3.010	3.187	
358	Kudugala - Wattegama	12.070	11.617	MFNSV survey parth correct (2015)
359	Kuliyapitiya - Hettipola	15.690	15.668	
360	Kuliyapitiya - Padiwela	11.260	11.260	
361	Kurana Road	0.880	0.880	End at Airport Entrence
362	Kurana - Taladuwa	1.850	1.877	
363	Kurunegala - Narammala - Madampe	64.360	64.604	
364	Labuduwa - Wandurambe - Sandarawela	22.120	21.527	
365	Lady Macallums Drive	5.630	5.609	One section overlap with B331. Need to split in to two roads in future
366	Lake Road, No.1, Batticaloa	0.900	0.925	
367	Lewaya Road	3.540	3.601	
368	Lindula to end of Agras Road	22.240	21.860	
369	Lowland - Panaliya	1.800	1.784	
370	Mabima - Sapugaskanda	3.220	3.224	
371	Madampe - Chettiyar Street	0.310	0.292	Start at AA003, End at B247 Rd Jn
372	Madawala - Rajawella	8.210	8.220	
373	Madulkelle - Kabaragala - Kandenuwara	20.920	20.562	
374	Mahakeliya - Katupotha	12.870	12.161	
375	Main Access to Gam Udawa 87	6.390	6.225	
376	Main Road to Vettappalai	3.620	3.447	
377	Main Street, Negombo	0.430	1.710	End at Negombo Courts comlpex, Infront of the ground. (EE Negambo Comment : This Road Locate at Jaela, End at Near the bridge)
378	Makola - Udupila	8.850	8.621	
379	Malabe - Kaduwela	5.630	5.558	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
380	Mallawapitiya - Rambodagalla - Keppetigala	34.590	36.419	Road Should End at Kithul golla junction. B264 also End at Kithulogolla Jn
381	Malwala - Carney	14.480	14.761	End at Sripada Footpath. MFNSV survey 2015
382	Malwattha - Chadayantalawa	5.630	5.873	
383	Mampe - Kottawa	6.230	6.155	
384	Manipay - Kaithady	13.680	14.140	
385	Mankulam - Vellankulam	37.810	39.869	
386	Mannar Market Street - Sebastian Hospital	2.330	1.948	
387	Maradagahamulla - Badalgama	7.640	7.454	
388	Marawila - Udubaddawa	19.870	19.573	
389	Maskeliya - Upcot	8.705	8.732	
390	Matale - Illukkumbura-Pallegama	46.800	46.160	Last Section (Pallegama) Can't access due to kalu ganga reservoir project
391	Matara - Hakmana	24.140	22.617	
392	Mathagal - Pandatherippu - Sambiliturai	6.610	6.895	
393	Maviddapuram - Keeramalai	2.940	2.787	
394	Mawanella - Aranayake - Horawela	14.450	14.010	
395	Mawanella - Hemmaththagama - Singhapitiya	25.800	25.698	
396	Mawathagama - Barandara	8.250	8.305	
397	Mawathagama - Muwankanda	8.850	8.501	
398	Medawachchiya - Horowopotana	37.810	37.505	
399	Medawachchiya - Kebitigollewa	25.740	25.423	
400	Meddewatte - Kekanadure - Yatiyana	14.640	14.516	
401	Meepe - Ingiriya	18.090	18.090	
402	Middeniya - Panamure	13.270	12.087	
403	Minneriya - Hingurakgoda (Airport Road)	8.850	8.924	
404	Minuwangoda - Gampaha - Miriswatte	13.270	14.028	Need to split in to two road sections 1. Minuwangoda - Gampaha Bus stand jn 2. Hospital jn to Miriswatta Jn
405	Minuwangoda - Miriswatte - Katana	12.630	12.063	
406	Mirigama - Nalla	8.210	8.210	
407	Mirihana - Udahamulla - Nawinna	3.380	3.475	
408	Miriswatte - Waturugama	10.060	10.263	
409	Moneragala Town Road	0.450	0.450	
410	Moragaswewa - Ilukwewa	10.060	9.963	Road need to extend to meet Inamaluwa Sigiriya Road and later it will be gazetted as one road.
411	Moratuwa - Piliyandala	4.830	5.065	
412	Puliyankulam-Mullaittivu	42.680	42.665	
413	Mullaitivu - Kokkilai	36.200	35.466	
414	Munai Street, Batticaloa	0.430	0.452	
415	Murunkan - Chilawathurai	15.290	15.683	
416	Muttetugala - Hiripitiya	18.500	18.479	
417	Nadukudai Road	2.410	2.229	
418	Nagoda - Gallassa Colony Road	3.700	3.397	
419	Nagoda - Gonadeniya	3.620	3.587	
420	Nagoda - Kalawellawa - Bellapitiya	55.510	56.203	
421	Nallur - Oddumadam	2.410	2.363	
422	Nanu Oya - Hendeniya	2.410	2.607	
423	Narahenpita - Nawala - Nugegoda	3.220	3.143	
424	Narammala - Dankotuwa	45.250	44.520	
425	Narandeniya - Hakmana	11.670	11.931	
426	Nartupana - Warakagoda	3.220	3.210	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
427	Nattarampotha - Yakgahapitiya	2.830	2.774	
428	Naula - Elahera - Pallegama - Hettipola	64.370	61.431	Added new road due to moragaha kanda and kalu ganga reservoir project. New Length to be gazetted
429	Naval Camp Road	0.800	0.800	Can't find
430	Navanturai - Oddumadam	1.210	1.120	
431	Navinna - Boralesgamuwa	2.410	1.955	
432	Nawalapitiya - Dimbula	31.180	29.698	
433	Nawalapitiya - Dolosbage	19.710	18.721	
434	Nawalapitiya - Ginigathena	12.070	12.004	
435	Nayapamulla - Unanwitiya - Nagoda	12.070	12.318	
436	Negombo - Aluthepola	14.670	13.110	
437	Negombo - Giriulla	37.810	36.548	
438	Negombo - Kadirana	3.620	3.171	
439	Negombo - Mirigama	30.570	30.386	
440	Nelukkulam - Neriyakulam	21.720	21.615	
441	Nikaweratiya - Moragollagama - Siyambalangamuwa	48.510	48.623	
442	Nilaweli Salt Office Road	1.640	0.654	
443	Norton - Maskeliya	16.800	16.450	
444	Norwood - Bogowantalawa - Campion	16.890	16.269	End at Campion Estate Tea factory.
445	Norwood - Upcot	12.710	12.219	Road End at Upcot Town MFNSV survey 2016
446	Nuwara Eliya Town Road	2.410	2.410	List of Roads
447	Nuwara Eliya - Uda Pussellawa	46.001	44.926	
448	Oddamavadi - Vahaneri	9.250	9.517	End at the Bridge (10/1)
449	Oddusudan - Nedunkerny	10.860	10.649	
450	Old Bazaar Road, Maharagama	0.800	0.749	
451	Old Kandy Road	0.690	0.661	Not Maintain by RDA (Gampaha CE)
452	Old Road, Kattankudy	7.670	7.401	
453	Old Tangalle Road, Matara	2.410	2.410	End Location need to verify
454	Olugantota - Pinnawala - Bogowantalawa	35.140	33.258	
455	ORR's Hill Road	3.380	3.426	
456	Outer Circular Road (Nochchiyagama)	9.780	8.962	Road End at end of tarred section near Jethawanaramaya Dagaba
457	Padaviya - Galkulama	14.670	16.540	Should Stat from Padawiya RB, end at Galkulama Jn
458	Padaviya - Parakrama Pura (Bandaranayake Mawatha)	10.060	8.906	End at Parakramapura Jn, Near the bridge
459	Padiruppu - Vellaveli	6.030	6.055	
460	Pagoda - Pitakotte	1.610	1.544	
461	Palapathwela - Galewela	28.160	30.493	
462	Palathoppu - Seruwila Road	7.820	7.612	End at Seruvila Temple Jn
463	Palavi - Kalladi	7.240	7.311	
464	Palavi - Kalpitiya	40.230	40.386	
465	Pallang Oya - Inginiyagala	12.870	15.131	End location should be Inginiyagala RB on AB001
466	Pallebedde - Medaganoya - Weligepola	12.470	12.486	B124, B223 and B351 Need to be take as a one road
467	Pallimunai Road	1.290	1.403	Road end at the jn of beach front road
468	Palugama - Boralande - Haputale	26.550	26.616	
469	Panagoda - Henpita	6.440	6.539	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
470	Panama - Kumbukkana	17.700	15.324	Road should be end at Entrance to the Kumana Bird park
471	Pannala - Kuliyapitiya	16.250	16.276	
472	Paranthan - Poonakary	25.740	25.802	
473	Parussella - Panapitiya	5.120	5.106	
474	Passara - Hingurukaduwa - Pelwatte	30.170	29.216	
475	Passara - Madulsima - Metigahatenna	29.930	29.142	End at Bo Tree
476	Pasyala - Attanagalla	6.840	6.674	
477	Pattanwila - Makola	1.800	1.593	
478	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	53.180	52.233	
479	Peradeniya - Deltota - Rikiligaskada	52.130	50.264	
480	Peradeniya - Halloluwa - Katugastota	10.610	9.892	
481	Perkar Road	2.410	2.235	
482	Piliyandala - Maharagama	7.370	7.340	
483	Pitakotte - Talawatugoda	4.230	4.068	
484	Pitiyagedera - Wattegama - Iriyagastenne	5.150	5.067	
485	Point Pedro East Coast Road	3.940	4.690	Start at AB020 & AB021 Jn (Infront of the point pedro Jetty)
486	Point Pedro - Maruthankerny	28.960	29.163	Road should be Stat from AB020 at Kiramakodu Jn & End At B402 (Point Pedro to Kiramakodu jn belongs to AB020)
487	Police Station Circular Road, Badulla	1.290	1.290	Not surveyed
488	Poonewa - Kidavaramkulama	3.220	3.220	Not surveyed
489	Potuvil - Panama	17.700	16.890	Road End at Panama Jn RHS B355
490	Power House Road - Thirugnanasampauthar	1.610	1.663	
491	Prison Road, Tangalle	0.230	0.248	
492	Pujapitiya - Alawatugoda	8.050	7.670	
493	Puliyadi - Irakkamam Madu	10.860	10.879	End at 4way Jn (Water Tank) near the Madu Church
494	Puttalam - Marichchikadai	65.970	65.970	Graval section start after 31km
495	Puttur - Kantharoday	12.470	12.744	
496	Radaella Short Cut Road	3.380	3.244	
497	Ragama - Kandana	4.550	3.513	Actual Road Length is 2.9km(EE Office) Rest of the part belongs to PRDA (Kandana - Ganemulla)
498	Rakwana - Bulutota	1.130	1.000	B383 Rakwana Hospital road End at Hospital gate.
499	Rambukkana - Katupitiya	9.810	9.917	
500	Rambukkana - Mawanella	16.890	16.531	
501	Ranatunga Mawatha	0.110	0.356	
502	Ranna - Udayala - Weeraketiya	15.690	15.433	
503	Ratmalana - Borupona	1.930	4.166	
504	Ratmalana - Mirihana	8.050	7.740	
505	Ratnapura - Palawela - Karawita	22.530	20.365	
506	Ratnapura - Wewelwatte	27.997	26.658	B039, B391 and B477 need to be combined as a one road
507	Rattota - Gammaduwa	11.260	11.552	End at Gammaduwa Bridge
508	Ridigama - Liniwehera	2.010	2.022	
509	Roads to Kataragama Planning Scheme	14.480	14.480	List of Roads
510	Roads to Saltern & Town Roads	8.880	8.880	List of Roads
511	Roehampton - Diyatalawa - Bandarawela	9.895	9.582	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
512	Sacred City Road, Nochchiyagama	17.680	17.680	List of Roads
513	Sandilipay - Senthankulam	7.720	7.980	
514	Sangilithoppu - Chemmny	3.430	3.351	
515	Seeduwa - Udugampola	11.620	12.569	
516	Siyambalape - Galwalkada	4.420	3.349	Start from 1km away from present siyambalape Jn on samurdhi mawatha
517	Soranapattu - Thalayadi	7.480	7.268	
518	South Coast Road (Thallady - Arrippu - Marrichchkadai)	46.660	47.953	
519	Sri Ariyavilasa Road, Horana	0.500	0.511	
520	Sri Somananda Mawatha, Horana	0.850	0.725	
521	Stony Cliff - Kotagala	6.310	6.546	
522	St. Joseph's Street, Negombo	2.820	1.840	Road End at B425
523	Talduwa - Meewitigammana	18.900	17.978	
524	Talgodapitiya - Yatawatte - Dombawala	29.360	26.275	
525	Tangalle - Weeraketiya	14.480	13.743	
526	Tawalama - Neluwa - Batuwangala	9.650	9.422	
527	Tawalantenne - Talawakela	33.360	32.487	
528	Tennekumbura - Rikiligaskada - Ragala	72.670	70.010	
529	Thavadi - Suthumalai	2.620	2.765	
530	Thihagoda - Kamburupitiya - Mawarala - Kotapola	67.580	65.063	
531	Thihariya - Warapalana	5.390	5.379	
532	Thoandamanaru - Vallai - Tunnalai	12.870	12.898	
533	Thondamanaru - Udupiddy	2.700	2.704	
534	Thoppu - Madampe	26.950	26.629	
535	Thumpalai - Valalai	4.830	4.830	Road Closed at army camp(Palali)
536	Tiruwanaketiya - Agalawatte	67.980	66.917	
537	Tissa - Kirinde	13.110	13.054	End at the jn with access road to Kirinda temple.
538	Tonigala - Kalawewa - Galewela	45.780	45.033	
539	Trincomalee - Pulmoddai	55.110	55.631	
540	Tudella - Pamunugama - Talahena - Negombo	20.110	20.458	
541	Tummodera - Puwakpitiya	9.650	9.303	
542	Udawalawe - Tanamalwila	35.400	35.476	
543	Udawela - Kumbukgahamulla	1.930	1.777	
544	Udugama - Hiniduma	11.260	11.003	
545	Udugampola - Divulapitiya	14.880	15.091	
546	Ulapane - Pussellawa	22.530	20.958	
547	Uraliyagara - Panirendawa - Villattewa	14.480	13.846	
548	Urani Road	3.220	2.511	Road end at Airport Gate
549	Urapola - Waturugama	7.080	7.160	
550	Urugodawatte - Ambatale	8.050	7.672	Start From Baseline road
551	Vaddukoddai - Moolai	2.820	2.716	
552	Vallai - Telippalai - Araly	27.430	27.430	Road need to be splite in to two section as part of the road close for palai Airport (Can't Survey Full road)
553	Vallai-udupiddy - Velvettiturai	5.630	5.507	
554	Varapathanchenai - Deegawapi	7.640	5.281	
555	Veeragoda Central Camp Road	16.090	16.271	
556	Velani - Kayts	6.770	7.038	
557	Velikulam - Mamaduwa	8.050	8.103	End Location need to confirm
558	Veyangoda - Banduragoda	8.620	8.636	
559	Veyangoda - Kaleliya	7.450	7.485	
560	Veyangoda - Ruwanwella	32.180	32.163	
561	Vijitha Road	0.240	0.121	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
562	Vilgam Vihara Road	4.180	3.947	
563	Villu Road	0.900	0.871	
564	Wadduwa - Morontuduwa	5.280	5.260	
565	Walasmulla - Weeraketiya	8.050	7.765	
566	Walgama - Aturugiriya	1.770	1.205	
567	Walgama - Diyagama	7.060	7.084	
568	Walpola - Mailawalana	9.250	9.320	
569	Wandurambe - Ethumale - Yakkatuwa	36.200	36.189	
570	Wandurambe - Kottawa	9.730	9.725	
571	Warakapola - Kandalama	10.860	10.071	
572	Warakapola - Ruwanwella	22.530	22.067	Road name need to change as (Warakapola - Anguruwella)
573	Waskaduwa - Bandaragama	12.070	12.169	
574	Wattala - Hekitta	1.560	1.504	
575	Wattala - Mahara	7.240	7.167	
576	Wattegama - Kandenuwara - Wariyapola	30.650	30.337	
577	Wattegama - Matale	13.000	12.572	
578	Weeraketiya - Middeniya	12.870	12.430	
579	Weerawila - Tissa - Kataragama	23.890	23.626	
580	Weligama - Kananke	9.650	9.775	
581	Weligama - Telijjawila	11.260	11.017	
582	Weligepola - Handagiriya	10.060	11.728	
583	Welihena - Katana	5.020	5.035	
584	Welikada - Kohilawatta	6.030	6.250	
585	Welikada - Nawala	2.570	2.730	
586	Welimada - Kirklees	17.830	17.465	
587	Weliweriya - Kirindiwela	12.870	12.862	
588	Wennappuwa - Kirimetiyana	5.630	5.259	
589	Weragantota - Randenigala	22.200	25.203	
590	Bulugolla - Dombemada - Wahawa	13.640	13.635	
591	Weweldeniya - Mirigama	6.440	6.310	
592	Wewelwatte - Agarsland - Uwella	9.490	9.450	B039, B391 and B477 need to be combined as a one road
593	Wilakatupotha - Ganewattha - Kumbukgete	21.690	21.814	
594	Yakkala - Radawana	12.870	12.716	
595	Yakkalamulla - Ketanwila	14.480	12.211	
596	Yatadolawatta Road	2.820	2.745	
597	Yatiyantota - Poonagala - Meenagala	24.140	23.550	
598	Sammanthurai - Malkampiddi - Deegawapiya	14.900	14.498	
599	Handungamuwa - Hettipola - Hasalaka	45.050	43.443	
600	Walasmulla - Katuwana - Middeniya	26.150	24.988	Road should be end at Walasmulla Jnction
601	Embilipitiya - Middeniya	14.480	16.508	
602	Atugala Road, Kurunegala	1.700	1.983	
603	Polonnaruwa - Tambala - Sungawila - Somawathiya	42.680	37.488	End at Somawathya Entrance Gate
604	Roads within President's pavilion Kandy	0.750	0.750	Need to keep in low level of road list
605	Atabage - Ulapane Road	7.500	7.435	
606	Kotmale Dam Crest- Harangala Road	1.400	3.812	Start from Gate of kotmale dam
607	Kandehandiya - Adikarigama - Randenigala - Loggal Oya	54.400	54.566	
608	Moragahamula - Victoriya Damtop	8.400	7.859	
609	Victoriya Damtop - Adikarigama	2.300	2.302	
610	Edandawela - Kahahengama	2.000	1.867	
611	Thanamalwila - Hambegamuwa(Thanamalwila - Bodagama)	5.500	5.067	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
612	51st Mile post - Ulhitiyawa	8.040	8.637	
613	Barrier Junction - Girandura Kotte	7.000	7.167	
614	Kirinda - Palatupana - Yala	29.000	12.521	Start from Kirinda Yala Rd JN & End at Yala Entrance Gate (The balance section within the yala park, last section need to remove from gazete)
615	Tissa - Akurugoda	1.100	1.056	
616	Andarawewa - Balaluwewa(Jeya Mawatha)	52.750	50.973	
617	Manampitiya - Aralaganwila - Maduru oya	33.000	32.872	End at maduru oya Bridge. Road to be extend to maoya on A005 road in future
618	Makandura - Badalgama	4.500	4.605	
619	Maharagama - Pamunuwa - Thalapathpitiya	2.400	2.319	Start from Bazar street Maharagama, pamunugama road Jn
620	Phala Eriyagama - Penideniya	0.860	0.861	
621	Nawalapitiya - Harangala	11.520	8.935	End at Harangala Jn on B148 & B491. (B506 & B148 Need to be combine as a one road)
622	Rendapola - Ambewela	8.240	7.969	
623	Welimade - Borelanda - Ohiya - Horton Plains	32.470	31.478	
624	Kuttampokuna - Galpalama	3.220	2.958	
625	Kesbewa - Kosgashandiya	1.700	1.403	Start Location Need to be change (Start from Piliyandala Bypass)
626	Keerthibandrapura - Naranthalawa	4.420	4.015	
627	Blackpool Ambewela Pattipola Horton Plains	28.160	27.016	
628	Kumbukkana Okkampitiya maligawila	15.200	14.899	
629	Internal Roads in ith Sacred City Mahiyangana	2.350	2.350	List of Roads
630	Road Parallel to halpanu Ela	1.100	1.104	Start from 4way jn, Nandana Mawatha LHS & Sri Bharatheendra mawath RHS
631	Etalai - Talawila (Jubily Mawatha)	4.700	4.182	
632	Dehiattakandiya - Aralaganwila	21.100	20.746	
633	Sangaraja Mawatha - Kandy	1.758	1.692	Start from A001 infront of queens hotel clock tower end. End at B195 Ratu Bokkuwa Jn
634	Yatinuwara Veediya - Kandy	0.600	0.558	
635	Kande Veediya - Kandy	0.114	0.142	
636	Mosque Road - Kandy	0.380	0.391	Start from Wales Park jn and End at Clock tower jn
637	Buttala - Helagama - Okkampitiya	9.000	8.891	
638	Elpitiya By Pass	0.580	0.583	
639	Beach Road Matara(Matara By Pass)	2.400	2.393	
640	Dikwella - Wewurukannala	1.870	1.868	
641	Baddegama - Halpatota	1.650	1.204	Road starting from the riverside junction(Near Bus Stand) of B128 and End at dunwatta jn
642	Bibile - Pitakumbura - Namal Oya - Inginiyagala	60.250	59.966	
643	Bodagma - Hambegamuwa - Kaltota	48.200	45.129	
644	Polonnaruwa - New Town Road	3.600	3.391	
645	Udahamulla - Thalapathpitiya	2.060	2.056	
646	Parliament Drive	0.720	0.718	Start from AB015, End at AB015 LHS
647	Approach Road to Sri Jayawardenepura Parliament	0.430	0.430	Start from B531 LHS & RHS
648	Pelawatta Access Road	0.830	0.864	
649	Nawala - Pagoda Link Road	0.270	0.269	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
650	Nilwala By pass	1.830	1.830	Can't find
651	Kamburupitiya - Kirinda	9.200	8.934	
652	Barigama - Halloluwa	5.760	5.693	
653	Kahatagasdigiliya - Rathmalgahaweewa - Kivulekade	24.320	24.231	
654	Nelundeniya - Alawwa	8.200	7.800	
655	Nelundeniya - Tuntota - Galapitamada	14.000	13.316	
656	Thampalakamam - Kinniya	15.600	14.935	
657	Lady Manning Drive	1.000	1.149	
658	Liyods Avenu	0.420	0.439	End Location need to confirm
659	Moragolla - Bellana	9.830	9.856	
660	Approach Road to National Food Stores, Rathmalana(Kaldemulla Rd)	1.370	1.353	
661	New Nuga Road	1.300	1.145	
662	Kawdana Attidiya	2.500	2.495	
663	Ranna Angunakolapelessa Vatiya	16.140	16.139	
664	Embilipitiya - Moraketiya - Kiriibbanara - Uda Mauara	16.820	16.826	
665	Dharmashoka Mawatha	2.760	2.602	
666	Luvi Peris Mawatha	0.860	0.821	
667	Polonnaruwa - Hingurakgoda	13.650	12.807	
668	Old Kesbewa Road	0.850	0.839	Nugegoda Supermarket Jn to Kattiya Jn (up to B389)
669	Ragama Karagahamuna (Ragama to Thewattha section)	2.000	2.335	
670	Access road to Getabaru Temple	1.700	1.700	Not Surveyed
671	Madatugama Pubbogama Andiyagala	13.260	13.275	
672	Circular Road - Devinuwara	0.425	0.415	Start From A002 & End at Light house road (B107)
673	Kosgoda Uragaha Road	6.000	5.943	
674	Sinhasana Road	0.820	0.814	
675	Council Avenue , Dehiwala	0.140	0.134	
676	Dambulla Kandalama	0.800	0.800	Not Surveyed
677	Mirijjawila Sooriyawewa	23.300	23.324	
678	Sooriyawewa Padalangala	12.000	12.004	
679	Otappuwa Ihalawewa	13.800	13.805	
680	Walasmulla By Pass	0.365	0.361	
681	Nakulugamuwa Kudawella Moraketiara	3.900	3.815	
682	Weligaththa Lunugamwehera	23.600	23.527	
683	Hurigaswewa Kalankuttioya Siyambalangamuwa	14.120	14.128	
684	Access to Gampaha Railway Station (Queen Mary's Road)	1.160	0.949	
685	Mudungoda Gampaha (Orutota Road)	5.150	5.103	
686	Approach Road to College of Education - Addalaichenai	1.150	0.402	Need to verify Start, End locations
687	Addalachenai Alankulam	9.750	10.568	
688	Akkaraipattu Deegavapi Ambalatharu	23.000	22.935	End at Ambalantharu 4-way JN
689	Flood ProtectionRoad, Akkaraipattu	2.130	2.176	End Location need to varify
690	Kulavadi Central Camp	5.230	5.214	
691	By Pass Road to Pallikkudiyiruppu village on Akkaraipattu Varapathanchenai Road	1.340	1.347	
692	Belaganwewa Hembarawa Wilgamuwa	11.630	12.217	
693	Dorape Hiyare	8.600	8.247	
694	Polonnaruwa - New Town - Kaduruwela (Nidahas Swarna Jayanthoi Mawatha)	4.609	4.616	
695	Nikatupitiya Junction to Mapakadawewa Junction	8.320	8.168	
696	Welimada By Pass	0.084	0.079	New bridge over Uma Oya

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
697	Gomburuoya - Balapokuna	8.500	7.971	
698	Mawanella By Pass	1.900	1.829	
699	Lathpandura Molkawa	11.780	11.686	End at Molkawa Jn
700	Kaluwamodara Kandevihara	1.086	1.217	
701	Park Road Matale	0.330	0.330	
702	Sooriyawewa Hathporuwa Moraketiya	13.600	14.112	
703	Dedugala Dolosbage	12.409	12.409	Narrow road section beyond 10.070km (Can't Survey full road)
704	Hidellana Karapincha (Approach Road to Tea Research Institute -Law Country Region)	4.100	4.075	
705	Udayagiri Rajamahavihara Road	1.100	1.162	
706	Uyanwatta Polgolla Dam	0.600	0.603	
707	Hettimulla Deewala Ussapitiya	12.600	12.824	B592 Need to remove from road list (Still not handover to RDA, Maintain by PRD) (Comment by CE)
708	Pambahinna Kumbalgama Rajawaka Kapugala	28.420	28.420	One section Overlap with B038 (Rajawaka Jn 14kmp(B038) to Kasal Jn)
709	Galle Port Access	5.200	4.721	
710	Hunnadeniya Rathmale Radampola Walasgala	12.300	12.300	Not Surveyed
711	Uswetakeiyawa Epamulla Pamunugama	8.050	8.030	
712	Kandawala Katunayake	4.500	4.612	
713	Seeduwa Katunayake	3.900	4.009	
714	Mabopitiya Degalaeriya	3.710	3.710	Not Surveyed
715	Meepitiya Ekiriyagala Paragammana	5.100	5.086	
716	Kegalle Siyambalapitiya Dewalegama	4.400	4.398	
717	Morontota Arandara	8.300	8.192	
718	Magmmana Kurupettha Daigala Gurugalla	12.000	12.000	Not Surveyed
719	Paragammana Dikella Atugoda Wanduradeniya	14.600	14.468	
720	Alawathura Yatapana Kotiyakumbura	6.150	6.313	Nedd to verify
721	Katuwana - Rukmalpitiya - Hulankanda - Heegoda	9.000	8.906	
722	Bengamuwa - Molokgamuwa - Galdola	9.500	9.345	
723	Weera Maddumabandara Mawatha	0.140	0.148	
724	Hiripitiya - Galtemwewa	14.900	14.853	
725	Melsiripura - Rambe	12.700	22.726	Aftre 12.7km PRDA road, need to takeover up to Rambe
726	Thitthawella - Gonagama	15.270	15.227	
727	Ramboda - Pusulpitiya	2.380	2.380	Not Surveyed
728	Kothmale New Town Road	1.050	1.050	Not Surveyed
729	Battuluoya - Udappuwa - Andimunai	9.230	9.230	can't reach road End
730	Dambulla - Bakamuna - Kalagahawela	32.480	32.155	
731	Nochchiyagama - Kukulkatuwa	19.530	19.544	
732	Minneriya - Gal Oya	14.540	14.543	
733	Mollipothana - Soorangal	14.000	13.997	
734	Sardhapura - Kanniya	5.000	5.161	
735	Kanniya - Illuppaikulam	4.000	4.051	
736	Atabage - Dunukeulla	7.620	7.620	Not Surveyed
737	Hungama - Thalawa - Middeniya	25.370	25.300	
738	Medamulana - Gonadeniya - Debokkawa	11.720	11.672	
739	Thalawa - Dambarella - Hingura	6.600	6.614	Need to verify the end location (Road to be continued up to AA018 in future)
740	Ambakolawewa - Morayaya - Gonadeniya	4.230	4.214	
741	Polonmaruwa - Beliatta	6.600	6.555	
742	Dammulla - Weeraketiya	10.100	10.053	

No.	ROAD NAME	Gazeted Length (km)	Mesured Length (km)	Remarks
743	Tangalle - Kadurupokuna - Beliatta	8.760	8.720	
744	Walasmulla - Julampitiya	13.100	13.115	
745	Beliatta - Kirinda	13.870	13.847	
746	Hambantota - Gonnoruwa - Meegahajandura	30.300	29.435	Start At AA002 road Jn
747	Sapugaskanda Oil Refinery Junction - Biyagama Free Trade Zone (Samurdhi Mawatha)	6.770	6.793	
748	Access Road to Ja-Ela Interchange	2.570	2.502	
749	Access Road to Peliyagoda Interchange	2.100	1.902	
750	Access Road to Matara	1.340	1.340	Not Surveyed
751	Akuressa By pass	1.760	1.760	Not Surveyed
752	Pelena-Polwatta-Denipitiya	2.100	2.100	Not Surveyed
753	Sri Maha Bodhi Access	3.100	3.091	
754	Piliyandala By Pass	2.865	2.829	
755	Nainamadama-Iranawila-Chilaw	31.660	31.603	
756	Kadawatha By pass	1.800	1.800	Not Surveyed
757	Access road to Defence Headquarters Pelawatta (From Denzil Kobbekaduwa Mawatha, Koswatta to Defence Headquarters Pelawatta)	1.255	#N/A	Not Surveyed
758	Kegalle Bypass	4.400	#N/A	Not Surveyed
759	Kelanimulla-Angoda-Koswatta	4.567	#N/A	Not Surveyed

ANNEX-2

Checklist to Assess the Progress of Environmental Safeguard Compliance of Road Development Projects

Part I: Environmental Approval Process

	Description	Yes	No	Non Relevant	Affective Date	Remarks
2.1	Submission of Basic Information Questionnaire (BIQ) to CEA. This mainly consists of description of the project.					
2.2	CEA is categorized the project as follow • Non – Prescribed Project (If non prescribed, please answer 2.2.1) • Prescribed Project (If prescribed, please answer 2.2.2)					
2.2.1	**Non prescribed project**					
2.2.1.1	Pay Administrative payment of CEA					
2.2.1.2	Field inspection of CEA at the project site					
2.2.1.3	Consents from relevant stakeholders obtained					
2.2.1.4	Conditional approval of CEA granted (If yes, go to Part II)					
2.2.2	**Prescribed Project**					
2.2.2.1	Scoping meeting held at the CEA					
2.2.2.2	Assessment is determined based on the severity of impacts from the project. That is either (a) Initial Environmental Examination (IEE) (Please note that, later CEA can recommend to upgrade the IEE to an EIA based on the severity of the impacts of the project) (b) Environmental Impact Assessment (EIA)					
2.2.2.3	TOR issued from for the CEA as per the assessment (either for IEE or EIA)					
2.2.2.4	EIA/IEE to be carried out through ESDD if management request from ESDD as per the emergency of the project (If no, answer question 2.2.2.5) (If yes, answer question 2.2.2.9)					
2.2.2.5	Study shall be done by the Project Division through the consultant (out sourcing) Next, Draft final EIA/IEE report submitted to ESDD for review					
2.2.2.6	Comments if available, is issued by the ESDD					
2.2.2.7	Revised draft final EIA/IEE report submitted to ESDD by in cooperating the comments					
2.2.2.8	If ESDD recommend the report					
2.2.2.9	Submission of draft final report to CEA					
2.2.2.10	Draft final EIA/IEE report accepted					

	Description	Yes	No	Non Relevant	Affective Date	Remarks
	(If CEA issued comments, go to the question 2.2.2.7) (If accept by the CEA, answer the question 2.2.2.11)					
2.2.2.11	Submission required number of copies to CEA					
2.2.2.12	First TEC held at the CEA (for stake holders)					
2.2.2.13	Comments of TEC received from CEA					
2.2.2.14	Draft final report revised as per the TEC comments and compilation of the Final Report					
2.2.2.15	Submission of Final report to ESDD					
2.2.2.16	ESDD approved the report as final (If yes, answer the question 2.2.2.17. If no, please go back to 2.2.2.14)					
2.2.2.17	Submission of final report to CEA					
2.2.2.18	CEA accepts the report as Final (If yes, please answer 2.2.2.19 If no, please go back to 2.2.2.14)					
2.2.2.19	Translation of the EIA report to Sinhala and Tamil Languages *					* Not relevant to IEE
2.2.2.20	Submission of required number of copies of English, Sinhala and Tamil EIA reports to CEA (Submission of copies in Sinhala and Tamil language is not relevant to IEE)					
2.2.2.21	Opening of the EIA report for public comments*					* Not relevant to IEE
2.2.2.22	Second TEC held at CEA					
2.2.2.23	Submission of public comments and comments of TEC by CEA again					* Public comments are not relevant to IEE
2.2.2.24	RDA responds to public and TEC comments*					* Public comments are not relevant to IEE
2.2.2.25	CEA accepted RDA response					
2.2.2.26	Conditional approval granted by the CEA for the project (if yes please go to Part II)					

Part II: Compliance with the conditions laid down in the environmental approval and other environmental safeguards considerations

(a) Pre-construction phase

	Condition to be complied/consideration to be addressed	Yes	No	Not relevant	Remarks
1.1	**General**				
a	Incorporating EMP and Environmental Monitoring Plan (EMoP) into the tender documents				
b	Recruitment of staff required for environment and social safeguards compliance monitoring for PMU, Supervision Consultant and Contractor				
c	Intimating the date of commencement of construction activities to CEA				
d	Obtaining appropriate insurance coverage to cover all kind of damages for affected parties during the construction period of the project.				
e	Prior approval from the Department of Archaeology before commencing project activities				
f	Prior approval from the Forest Department if the project area traverses through an area under their jurisdiction				
g	Prior approval from the Department of Wildlife Conservation (DWLC) if the project area traverses through an area under their jurisdiction				
h	Prior approval shall be obtained from Agrarian Department If the project activities involve in reclamation of paddy lands				
i	Prior approval from Coastal Conservation Department if the project area interfere with the coastal zone				
j	Prior approval from Marine Environmental Pollution Control Authority if the project activities go to the coastal and marine areas				
1.2	**Hydrology, drainage and irrigation aspects**				
a	Hydrology and drainage study conducted				
b	Hydrology and drainage study approved by Irrigation Department and Sri Lanka Land				

	Reclamation and Development Corporation (SLLRDC).				
c	Recommendations of Department of Irrigation, Provincial Irrigation Department, Department of Agrarian Development and/or Famers Organization incorporated/considered in the detail designs.				
d	Setting up the baseline status of the water quality of water bodies within the project area prior to construction activities of the project and submission the report to CEA via ESDD				
1.3	**Sociological aspects**				
a	Conducting awareness programs for stakeholders and general public about the project and its impacts				
b	Conducting a comprehensive survey covering the entire project area for identifying the buildings, houses, other structures to be removed due to project and lands/other properties to be acquired prior to start any construction work of the project				
c	Preparation of project specific entitlement matrix based on the NIRP in order to determine the entitlements of the affected persons				
d	Purchase/ acquired resettlement sites for the affected persons				
e	Develop the resettlement sites in order to resettle the affected persons				
f	Consultation of relevant stakeholder agencies for relocating utility facilities (e.g., if the existing water supply lines are required to change, it should be done with the consultation of NWS&DB)				
g	Giving prior notice for the public about the disruption of the utility supplies before shifting				
h	Establishment of Grievance Redress Mechanism (GRM) under the guidance of ESDD				
1.4	**Air quality, Noise and vibration**				
a	Preparation of traffic management plan for the affected area in consultation with the police and other relevant institutions				

b	Conducting appropriate mathematical noise model for estimating noise levels at the noise sensitive receptors in the project impact area and to determine locations of noise barriers for lifetime of the expressway				
c	Conducting the pre-condition survey (crack survey) covering structures within the corridor stipulated by CEA/GSMB or Supervision Consultant				
d	Preparation of blasting plan				
e	Conducting test blasting				
1.5	**Extraction, handling, transportation and storage of construction material**				
a	Conducting a detailed study to identify potential locations for extraction of construction materials (gravel, sand, rocks) in a sustainable manner and the submission of the report to CEA				
b	Obtaining valid licenses; Industrial Mining License (IML) from GSMB and Environmental Protection License (EPL) from CEA for all blasting, mining and borrow pits operation				
c	Preparation of restoration plans for respective sites				
d	Consultation of appropriate traffic authorities for selecting material and equipment transportation routes				
e	Obtaining approval for operation of asphalt plants, crusher plants and concrete batching plants from CEA				
1.6	**Disposal of unsuitable material**				
a	Identification waste disposal sites for spoil and unsuitable materials together with their capacities and approval should be obtained from the CEA/Local Authority/SLLRDC prior to disposal				
1.7	**Biological and ecological aspects**				
a	Establish animal crossing structures in consultation with the Forest Department, Department of Wildlife Conservation and ESDD and incorporation such structures into detail design				

b	Initiation of identification of suitable roadside species and establishing plant nurseries or identification of sources for obtaining suitable species				
1.8	**Land use**				
a	Developing land use zoning plans for interchanges in consultation with the UDA				
1.9	**Miscellaneous**				
a	Prior approval from CEA should be taken for establishing vehicle-service stations				
b	Prior approval of the relevant authorities such as Local Authorities for Setting up of labour camps, yards and material storage sites etc…				
1.10	**Environment Management and Monitoring**				
a	Preparation of Environmental Management Action Plan (EMAP) based on the EMP and EMoP given in the IEE/EIA or contract documents and submission to CEA through ESDD				
b	Establishing baseline status of environmental parameters on surface and ground water quality and ground water level, air quality, noise and vibration as recommended in EMAP before commencement of construction activities.				
c	Conducting ecological survey to identify existing status of ecological environment and its behaviour before commencement of construction activities				
d	Establishment of environmental and social safeguards compliance monitoring committee consisting of ESDD, Project Management Unit, Supervision Consultant and Contractor.				

(b) Construction Phase

	Condition to be complied/consideration to be addressed	**Yes**	**No**	**Not relevant**	**Remarks**
2.1	**General**				
a	Maintaining the staff arrangement for environment and social safeguards compliance throughout the project				

b	Informing Department of Archaeology through ESDD if an artefact found within the project area during the construction stage				
2.2	**Geology**				
a	Adequate consultation with NBRO and other relevant organizations with respect to slope stability, ground subsidence etc… and incorporation of their comments and suggestions (If found feasible) to the project				
b	Proper attention on hazardous conditions due to adverse weather events and implementing adequate measures to mitigate the relevant impacts				
2.3	**Hydrology, Drainage and irrigation aspects**				
a	Adequate consultation of relevant authorities and incorporating their comments and suggestions (If found feasible) to the project				
b	Proper attention on hazardous conditions due to adverse weather events and implementing adequate measures to mitigate the relevant impacts				
2.4	**Sociological aspects**				
a	Maintaining Public Complain Register and recording all complaints received relevant to the project				
b	Submission of progress of attending the complaints to the PMU and ESDD through monthly progress reports				
c	Reference to the GRM if complaints cannot be resolved at the client level				
2.5	**Extraction, handling, transportation and storage of construction material**				
a	Renewal of the licenses obtained for all blasting, mining and borrow pits operation				
b	Renewal of the licenses obtained for operation of asphalt plants, crusher plants and concrete batching plants				
c	Obtaining relevant valid licenses if new sites are required for material extraction during construction phase				

2.6	**Disposal of unsuitable material**				
a	Obtaining relevant approvals if new sites are required for disposal of material during construction phase				
b	Restoration of disposal sites which are already completed and obtaining a letter of completion from the relevant land owner				
c	Frequently monitor and maintain records on disposal of waste/spoil/unsuitable material/construction wastes etc. to ensure that they are disposed only in approved disposal sites and in compliance with the conditions laid down by the relevant authorities				
2.7	**Biological and ecological aspects**				
a	Minimizing clearing of vegetation as much as possible.				
b	Conducting replanting program of plants to compensate trees cut as recommended in the EMP/EMAP				
c	Informing Forest Department and Department of Wildlife Conservation through ESDD if rare/critically endangered/possibly extinct/extinct species found within the project area				
d	Monitoring effectiveness of animal crossing structures established with the assistance of ESDD				
2.8	**Environment Management and Monitoring**				
a	Implementing of the EMAP under the supervision of the Supervision Consultant				
b	Conducting periodic monitoring of environmental parameters (surface and ground water quality and ground water level, air quality, noise, vibration, fauna and flora) as recommended in EMAP				
2.9	**Miscellaneous**				
a	Renewal of the approval obtained for vehicle-service stations and obtaining the licenses if new stations are required				
b	Renewal of the approvals obtained for Setting up of labour camps, yards and material storage sites				

	etc… and obtaining new approvals if new sites are required				
2.10	**Reporting**				
a	Preparation and submission of monthly and bi annual progress reports on environment and social safeguards compliance to ESDD and CEA (if required)				

(c) Post Construction Phase

	Condition to be complied/consideration to be addressed	**Yes**	**No**	**Not relevant**	**Remarks**
a	Restoration of all sites used for the project to the status as agreed with the land owner or as instructed in the relevant license/approval				
b	Obtaining letter of completion for all restored sites from particular land owner or authority				
c	Submission of a list of trees planted, their locations and species to RDA for further maintenance				
d	Conducting monitoring of environmental parameters (surface and ground water quality and ground water level, air quality, noise, vibration, fauna and flora) as recommended in EMAP				
e	Submission of completion report on the GRM to RDA				
f	Submission of a completion report on environment and social safeguards compliance to ESDD				

ANNEX-3

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The Gazette of the Democratic Socialist Republic of Sri Lanka

EXTRAORDINARY

අංක 1847/32 - 2014 ජනවාරි මස 29 වැනි බදාදා - 2014.01.29

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(Published by Authority)

PART I : SECTION (I) — GENERAL

Government Notifications

L.D.B 24/51 (vi).

THE MOTOR TRAFFIC ACT (CHAPTER 203)

REGULATIONS made by the Minister of Transport under Section 237 read with Section 19 of the Motor Traffic Act, (Chapter 203).

KUMARA WELGAMA,
Minister of Transport.

Colombo,
21st January, 2014.

Regulation

1. The Motor Traffic (Construction of Vehicles) Regulations 1983 published in the *Gazette Extraoridnary* No. 248 of June, 3, 1983, as amended from time to time and last amended by regulation published in *Gazette Extraodinary* No. 1805/34 of April 11, 2013 are hereby further amended by the repeal of regulation 2 and substitution therefore of the following :-

"2. (1) The dimensions of any motor vehicle shall not exceed the dimensions specified in Column II below in respect of motor vehicles of the class or description specified in the corresponding entry in Column I :-

LENGTH, WIDTH AND HEIGHT

Column I *Class or description of motor vehicles*	*Column II* *millimeters*
(*a*) Overall width of the motor vehicle (other than a motor coach)	2,500
(*b*) Overall width of the motor coach	2,600
(*c*) Height of motor vehicle (other than a double decked motor coach)	3,800
(*d*) Height of a double decked motor coach	4,600
(*e*) Overall length of motor vehicle with two axles other than a motor coach	10,000
(*f*) Overall length of motor vehicle with more than two axles	11,000
(*g*) Overall length of motor coach (other than a heavy motor coach)	12,000
(*h*) Overall length of an articulated vehicle	16,000
(*i*) Overall length of combination vehicle with one trailer	17,000
(*j*) Overall length of a heavy motor coach	24,000

SCHEDULE (*Contd.*)

(2) The height of any motor vehicle shall not exceed One Hundred and Sixty Five per cent (165%) of the width.

(3) (*a*) the axle load of the any motor vehicle shall not exceed the axle load specified in Column II below, in respect of motor vehicles of the class or description specified in the corresponding entry in Column I :-

AXLE LOAD OF A VEHICLE

	Column I *Class or description of motor vehicles*	*Column II* *Kilogrammes*
(i)	Two wheeled single axle	6,000
(ii)	Four wheeled single axle	10,000
(iii)	Four wheeled dual axle	10,000
(iv)	Eight wheeled dual axle or any two consecutive axles with 8 wheels where the axle centers are not more than 2.45 metres apart	16,500
(v)	Twelve wheeled triple axle or any three consecutive axles with 12 wheels where the centers of the extreme axles are not more than 3.66 metres apart	22,000

(*b*) The Gross Vehicle Weight of any motor vehicle shall not exceed the Gross Vehicle Weight specified in Column II below in respect of motor vehicles of the description specified in the corresponding entry in Column I :-

GROSS VEHICLE WEIGHT

	Column I *Description of motor vehicles*	*Column II* *Kilogrammes*
(i)	Motor vehicle with a four wheeled rear axle	15,275
(ii)	Motor vehicle with an eight wheeled dual rear axle	21,300
(iii)	Articulated or combination vehicle with two wheeled front axle and two wheeled rear axle for driving unit and four wheeled axle for trailer	19,900
(iv)	Articulated or combination vehicle with two wheeled front axle and four-wheeled rear axle for driving unit and a four wheeled axle for trailer	23,500
(v)	Articulated or combination vehicle with two wheeled front axle and four wheeled rear axle for driving unit and eight wheeled dual axle for trailer	29,800
(vi)	Articulated or combination vehicle with two wheeled front axle and eight wheeled dual rear axle for driving unit and four wheeled axle for trailer	30,400
(vii)	Articulated or combination vehicle with two wheeled front axle and four wheeled rear axle for driving unit and twelve wheeled triple axle for trailer	33,900
(viii)	Articulated or combination vehicle with two wheeled front axle and eight wheeled dual rear axle for driving unit and eight wheeled dual axle for trailer	36,700
(ix)	Articulated or combination vehicle with two wheeled front axle and four wheeled dual rear axle for driving unit and twelve wheeled triple axle for trailer	31,200
(x)	Articulated or combination vehicle with two wheeled front axle and eight wheeled dual rear axle for driving unit and twelve wheeled triple axle for trailer	42,500"

(2) The regulations published in *Gazette Extraordinary* No. 1380/14 of February 16, 2005 and No. 1726/12 of October 5, 2011 are hereby rescined.

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ANNEX-4

ANNEX-4

Table 1 - Observed Vs Modeled Volumes at Survey Locations

Distirct	Link	Traffic in PCU per day 2017		Distirct	Link	Traffic in PCU per day 2017	
		Actual	Model			Actual	Model
Colombo	A000-080	48,406	41,373	N'Eliya	A007-100	7,775	7,030
Colombo	A000-120	84,310	96,298	N'Eliya	A007-120	5,283	6,341
Colombo	A001-160A	110,540	113,050	Kalutara	A008-010F	21,537	26,618
Gampaha	A001-260C	37,078	29,647	Kalutara	A008-110	7,606	8,527
Gampaha	A001-360	37,844	28,738	Ratnapura	A008-140A	9,910	8,581
Kegalle	A001-390	33,275	34,793	Kandy	A009-070B	26,058	26,392
Kandy	A001-520	34,438	26,016	Kandy	A009-100	13,383	13,844
Kandy	A001-600B	23,049	19,154	Matale	A009-190	13,269	17,564
Colombo	A002-190	55,270	56,007	Anuradhapur	A009-250	7,836	10,665
Colombo	A002-220	81,329	62,836	Anuradhapur	A009-300	8,733	12,870
Kalutara	A002-280B	61,192	50,813	Anuradhapur	A009-370	7,871	11,753
Kalutara	A002-310A	18,088	19,869	Vavuniya	A009-420	6,721	9,745
Galle	A002-380	13,443	15,485	Kilinochchi	A009-440	12,348	8,744
Galle	A002-390A	15,586	13,172	Jaffna	A009-460	8,961	9,022
Galle	A002-470	18,775	16,846	Jaffna	A009-470	7,418	10,034
Matara	A002-590A	19,774	21,104	Jaffna	A009-530	11,367	9,723
Matara	A002-640B	27,050	21,297	Kandy	A010-030	19,155	17,208
Hambantota	A002-770B	19,902	20,650	Kurunegala	A010-080	13,622	15,319
Monaragala	A002-880	9,877	11,811	Puttalam	A010-240A	7,768	7,019
Gampaha	A003-070A	72,877	66,675	Polonnaruwa	A011-040	12,843	16,074
Gampaha	A003-130	52,760	50,184	Polonnaruwa	A011-100B	21,315	17,197
Gampaha	A003-220	39,130	39,526	Polonnaruwa	A011-110	8,221	11,752
Puttalam	A003-260	27,558	22,389	Batticaloa	A011-120	6,930	8,967
Puttalam	A003-340A	16,117	22,664	Anuradhapur	A012-220	3,936	4,824
Colombo	A004-280	57,812	57,186	Anuradhapur	A013-020A	8,271	8,957
Colombo	A004-360A	61,850	52,416	Mannar	A014-080	5,701	9,726
Colombo	A004-450	29,818	28,368	Trincomalee	A015-150	12,137	3,992
Colombo	A004-470B	20,836	17,809	Badulla	A016-030	6,225	9,151
Ratnapura	A004-500	18,439	20,273	Badulla	A016-070	11,842	12,829
Badulla	A004-640	1,751	2,850	Galle	A017-010C	6,108	6,359
Monaragala	A004-660	7,752	9,252	Matara	A017-030	4,674	5,965
Monaragala	A004-680	10,277	10,473	Ratnapura	A018-010A	15,947	12,981
Monaragala	A004-700	6,349	10,092	Ratnapura	A018-020	14,574	13,471
Ampara	A004-740	5,323	7,767	Ratnapura	A018-030	11,108	8,675
Batticaloa	A004-810	16,359	13,831	Kurunegala	A019-030A	7,282	5,531
Batticaloa	A004-880	12,976	13,965	Kegalle	A021-020B	3,972	5,844
Kandy	A005-070	19,508	16,385	Badulla	A022-010	2,055	1,375
Kandy	A005-130	7,794	8,496	Badulla	A023-010	4,733	6,062
Badulla	A005-270	3,315	4,093	Matara	A024-020	9,499	10,343
Badulla	A005-320	3,866	4,350	Monaragala	A025-010	2,839	4,500
Batticaloa	A005-400	4,948	2,939	Ampara	A027-070	8,841	5,210
Kurunegala	A006-010B	17,280	22,516	Anuradhapur	A028-040	11,705	15,742
Kurunegala	A006-010B	17,645	22,516	Kurunegala	A028-090	14,182	20,854
Kurunegala	A006-130A	18,893	18,428	Vavuniya	A029-030	3,034	1,379
Kurunegala	A006-130B	20,167	18,756	Anuradhapur	A029-040	2,054	1,379
Matale	A006-160B	22,945	22,103	Vavuniya	A030-030	4,582	759
Matale	A006-210	11,660	12,961	Ampara	A031-040	7,563	5,953
Polonnaruwa	A006-220	13,543	12,961	Gampaha	A033-020B	17,409	19,877
Polonnaruwa	A006-230A	7,437	7,709	Gampaha	A033-110A	24,662	26,938
Polonnaruwa	A006-230A	4,984	7,709	Mullaitivu	A034-010	3,083	4,125
Trincomalee	A006-240	6,311	10,488	Mullaitivu	A035-010	5,465	12
Trincomalee	A006-270B	10,834	14,404	Ampara	AB01-010	6,083	5,296
Ratnapura	A007-030	19,557	17,424	Ampara	AB01-020	1,706	1,155

Table 2 - Observed Vs Modeled Volumes at Survey Locations (Cont.....)

Distirct	Link	Traffic in PCU per day 2017		Distirct	Link	Traffic in PCU per day 2017	
		Actual	Model			Actual	Model
Gampaha	AB04-010	43,649	40,257	Monaragala	B202-010	5,597	5,583
Colombo	AB10-040A	31,380	36,053	Colombo	B204-010	23,385	22,773
Colombo	AB10-040B	35,841	31,628	Gampaha	B208-010B	18,758	18,606
Colombo	AB11-010A	47,189	39,004	Colombo	B216-010A	25,719	23,254
Kandy	AB13-060	9,024	10,625	Colombo	B216-010E	19,832	25,227
Colombo	AB15-030	40,512	40,818	Kalutara	B224-010E	5,766	5,288
Colombo	AB15-040A	41,725	32,123	Colombo	B229-020	33,686	28,047
Jaffna	AB19-030	3,742	5,099	Colombo	B232-020B	27,583	22,407
Jaffna	AB24-010	6,124	3,577	Colombo	B240-030B	19,905	26,186
Jaffna	AB31-030	2,351	3,064	Kurunegala	B243-010	11,548	17,111
Jaffna	AB39-030	2,220	3,343	Kurunegala	B244-010	4,775	2,232
Jaffna	AB42-030B	26,232	28,162	Kurunegala	B247-050	18,668	26,616
Polonnaruwa	AB44-060	7,954	10,885	Galle	B248-030	5,099	6,142
Ampara	B001-020A	7,332	4,468	Colombo	B263-010C	46,768	42,601
Batticaloa	B018-020A	1,979	2,784	Kurunegala	B272-020	11,795	5,771
Ratnapura	B034-010	1,802	2,712	Matara	B275-010	17,075	14,598
Ratnapura	B038-010B	22,243	19,251	Kegalle	B278-010B	12,881	10,499
Badulla	B044-020A	6,215	5,772	Kegalle	B279-010	2,452	3,966
Colombo	B047-020	35,235	43,480	Ratnapura	B286-020	1,902	947
Hambantota	B054-010A	10,241	7,003	Polonnaruwa	B287-010	8,874	6,150
Badulla	B057-010	4,031	6,214	Gampaha	B288-040	20,258	17,105
Gampaha	B058-010I	18,915	17,092	Colombo	B295-020	26,331	30,044
Kurunegala	B065-010	3,300	2,232	Mullaitivu	B296-010	1,227	537
Kalutara	B068-030	4,119	6,126	Kurunegala	B300-010	6,999	6,148
Kurunegala	B079-020	8,743	5,681	Kurunegala	B308-020	28,158	24,794
Colombo	B084-150B	16,846	17,668	Kurunegala	B308-050	15,695	18,896
Colombo	B084-150F	11,587	13,477	Kurunegala	B308-060	15,263	11,895
Kandy	B091-020	3,009	1,320	Kalutara	B310-010	4,009	5,798
Colombo	B094-040	27,309	28,928	Gampaha	B322-050	15,997	20,097
Colombo	B094-050B	30,444	29,926	Gampaha	B324-040	14,543	17,251
Hambantota	B101-020B	6,131	7,800	Gampaha	B324-070B	17,504	17,681
Hambantota	B101-020B	7,253	7,800	N'Eliya	B328-020	1,066	1,143
Kegalle	B110-010	4,910	4,006	N'Eliya	B332-050	5,860	8,439
Galle	B114-020A	2,188	1,971	Batticaloa	B333-010	2,498	3,084
Colombo	B120-010	27,180	22,443	Mullaitivu	B334-010	1,223	182
Colombo	B123-020D	9,829	10,731	Batticaloa	B337-010A	1,832	2,293
Kandy	B125-010	6,046	5,053	Ratnapura	B339-010	945	856
Galle	B128-050A	9,813	6,795	Kurunegala	B356-010	12,458	18,918
Kegalle	B136-010	1,068	1,412	Kandy	B364-020	3,824	5,381
Hambantota	B141-020B	11,276	7,661	Colombo	B368-020	41,187	37,076
Matara	B142-010	8,047	10,562	Jaffna	B371-020A	1,015	1,035
Hambantota	B142-020	6,167	7,575	Puttalam	B379-010	238	473
Galle	B143-030	6,532	8,117	Gampaha	B382-010B	14,371	15,082
Gampaha	B146-030	17,187	20,487	Kegalle	B384-020A	2,494	1,028
N'Eliya	B149-010A	6,910	4,596	Hambantota	B387-010B	2,021	1,818
Gampaha	B152-010	34,623	26,487	N'Eliya	B406-010	510	477
Galle	B153-030	6,654	9,868	Kurunegala	B409-020	7,423	3,373
Galle	B156-020	2,094	2,551	Matale	B409-030	4,360	4,940
Kalutara	B157-020	15,697	16,362	Hambantota	B410-010A	4,706	4,147
Kalutara	B157-100G	8,478	7,136	Kandy	B413-020	4,532	5,615
Gampaha	B168-010B	23,806	26,814	Matara	B415-020	4,002	3,462
Colombo	B174-010A	21,821	16,735	Puttalam	B419-040	15,251	16,644
Matale	B180-020	2,622	3,135	Ratnapura	B421-010	7,032	7,585

Table 2 - Observed Vs Modeled Volumes at Survey Locations (Cont…..)

Distirct	Link	Traffic in PCU per day 2017	
		Actual	Model
Matale	B423-060	2,264	1,768
Trincomalee	B424-090A	16,096	8,441
Kurunegala	B432-030	4,552	6,632
Colombo	B435-040	36,215	28,728
Colombo	B435-060B	26,226	30,402
Gampaha	B445-020B	17,448	16,922
Gampaha	B445-030	17,520	22,063
Gampaha	B445-070	5,515	6,727
Kalutara	B449-010A	5,249	5,373
Galle	B454-010	4,649	2,930
Gampaha	B456-010	4,617	6,262
Kegalle	B457-010B	4,220	3,497
Matale	B461-010	872	580
Kandy	B462-020	4,311	4,463
Hambantota	B463-010A	5,051	4,495
Matara	B465-010A	2,130	2,907
Kurunegala	B475-020	2,400	2,995
Hambantota	B485-010B	2,652	2,794
N'Eliya	B492-020	5,014	4,887
Polonnaruwa	B502-020	4,178	6,215
Kandy	B506-010	3,935	1,744
Ampara	B517-010	2,582	1,354
Monaragala	B528-010	1,127	1,069
Matara	B536-020	3,214	4,834
Kandy	B537-010	5,713	7,502
Kegalle	B539-010	4,039	1,929
Trincomalee	B541-010A	6,632	3,138
Hambantota	B548-010A	5,633	7,026
Ratnapura	B549-010	6,947	6,323
Hambantota	B562-010B	3,057	1,277
Hambantota	B563-020	5,830	8,149
Kurunegala	B568-010	1,615	1,211
Kalutara	B584-010	2,965	1,587
Hambantota	B587-010	3,146	4,257
Gampaha	B597-020	7,006	4,257
Matale	B615-020	4,303	4,730
Polonnaruwa	B617-010	2,243	3,365
Matara	B636-010	4,427	5,682
Puttalam	B640-010	3,111	4,923
Galle	EXSTDP-05	17,461	17,550
Matara	EXSTDP-09	8,890	11,816

Table 3 – Traffic Analysis Zones

TAZ		DSD			District		Province	
Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
1	Sammanthranapura	1	Colombo	11003	D1	Colombo	P1	Western
2	Mattakkuliya							
3	Modara							
4	Madampitiya							
5	Mahawatta							
6	Aluthmawatha							
7	Lunupokuna							
8	Bloemendhal							
9	Kotahena East							
10	Kotahena West							
11	Kochchikade North							
12	Jinthupitiya							
13	Masangasweediya							
14	New Bazaar							
15	Grandpass South							
16	Grandpass North							
17	Nawagampura							
18	Maligawatta East							
19	Khettarama							
20	Aluthkade East							
21	Aluthkade West							
22	Kochchikade South							
23	Pettah							
24	Fort							
25	Galle Face							
26	Slave Island							
27	Hunupitiya							
28	Suduwella							
29	Keselwatta							
30	Panchikawatta							
31	Maligawatta West							
32	Maligakanda							
33	Maradana							
34	Ibbanwala							
35	Wekanda							
36	Wadulla	2	Kolonnawa	11006				
37	Halmulla							
38	Orugodawatta							
39	Kuda Buthgamuwa							
40	Ambathale							
41	Kotikawatta East							
42	Wellampitiya							
43	Kolonnawa							
44	Singhapura							
45	Mulleriyawa South							
46	Maligagodella							
47	Welivita	3	Kaduwela	11009				
48	Raggahawatta							
49	Kaduwela							
50	Pahala Bomiriya							

TAZ		DSD			District		Province	
Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
51	Ihala Bomiriya							
52	Nawagamuwa							
53	Thalahena North							
54	Malabe North							
55	Thunadahena							
56	Korathota							
57	Nawagamuwa South							
58	Ranala							
59	Dedigamuwa							
60	Shanthalokagama							
61	Malabe West							
62	Thalangama North B							
63	Muttettugoda							
64	Thalangama North A							
65	Walpola	3	Kaduwela	11009				
66	Kalapaluwawa							
67	Subhoothipura							
68	Udumulla							
69	Battaramulla North							
70	Batapotha							
71	Pothuarawa							
72	Hokandara North							
73	Athurugiriya							
74	Thaldiyawala							
75	Hokandara East							
76	Evarihena				D1	Colombo	P1	Western
77	Kumaragewatta							
78	Aruppitiya							
79	Rajamalwatta							
80	Jalthara							
81	Meegasmulla							
82	Meegoda North							
83	Habarakada Watta							
84	Homagama West							
85	Galavilawatta North							
86	Homagama Town							
87	Pitipana Town	4	Homagama	11012				
88	Kurunduwatta							
89	Mawathgama							
90	Niyandagala							
91	Kithulhena							
92	Diyagama East							
93	Kirigampamunuwa							
94	Undurugoda							
95	Bollathawa							
96	Manakada							
97	Weralupitiya							
98	Avissawella	5	Seethawaka	11015				
99	Eswatta South							
100	Ihala Kosgama North							

TAZ		DSD			District		Province	
Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
101	Akaravita	5	Seethawaka	11015	D1	Colombo	P1	Western
102	Kiriwandala South							
103	Puwakpitiya South							
104	Kadugoda North							
105	Walawwatta							
106	Niripola							
107	Weragolla South							
108	Koodaluvila							
109	Pinnawala North	6	Padukka	11018				
110	Waga East							
111	Halpe							
112	Pitumpe South							
113	Padukka							
114	Angamuwa							
115	Madulawa South							
116	Mirihana South	7	Maharagama	11021				
117	Thalawathugoda West							
118	Kottawa East							
119	Rukmale West							
120	Depanama							
121	Polwatta							
122	Thalapathpitiya							
123	Pathiragoda							
124	Dambahena							
125	Pannipitiya North							
126	Kottawa West							
127	Malapalla West							
128	Maharagama Town							
129	Godigamuwa South							
130	Wattegedara							
131	Navinna							
132	Wijerama							
133	Jambugasmulla							
134	Obsekarapura	8	Sri Jayawardanapura Kotte	11024				
135	Welikada East							
136	Nawala West							
137	Koswatta							
138	Ethulkotte West							
139	Pitakotte East							
140	Pitakotte							
141	Nugegoda West							
142	Pagoda East							
143	Gangodavila South							
144	Kollupitiya	9	Thimbirigasyaya	11027				
145	Bambalapitiya							
146	Kurunduwatta 1							
147	Kurunduwatta 2							
148	Kurunduwatta 3							
149	Kurunduwatta 4							
150	Kuppiyawatta West							

TAZ	DSD	District	Province

Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
151	Kuppiyawatta East							
152	Dematagoda							
153	Wanathamulla							
154	Borella North							
155	Borella South							
156	Gothamipura							
157	Narahenpita							
158	Thimbirigasyaya 1							
159	Thimbirigasyaya 2	9	Thimbirigasyaya	11027				
160	Milagiriya							
161	Havelock Town							
162	Kirula							
163	Kirulapone							
164	Wellawatta North							
165	Wellawatta South							
166	Pamankada West							
167	Pamankada East							
168	Sri Saranankara							
169	Dutugemunu							
170	Kalubovila							
171	Galwala	10	Dehiwala	11030				
172	Udyanaya							
173	Malwatta							
174	Kawdana East							
175	Mount Lavinia				D1	Colombo	P1	Western
176	Kawdana West							
177	Wathumulla							
178	Attidiya North							
179	Attidiya South	11	Ratmalana	11031				
180	Piriwena							
181	Wedikanda							
182	Rathmalana West							
183	Kandawala							
184	Angulana North							
185	Kaldemulla							
186	Thelawala North							
187	Lakshapathiya North							
188	Uyana South							
189	Rawathawatta South							
190	Kuduwamulla							
191	Katubedda							
192	Kadalana	12	Moratuwa	11033				
193	Uswatta							
194	Indibedda West							
195	Moratumulla East							
196	Villorawatta East							
197	Koralawella North							
198	Katukurunda North							
199	Egoda Uyana North							
200	Pepiliyana West	13	Kesbewa	11036				

TAZ	DSD	District	Province

Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
201	Boralesgamuwa West A	13	Kesbewa	11036	D1	Colombo	P1	Western
202	Rattanapitiya							
203	Werahera North							
204	Neelammahara							
205	Vishwakalawa							
206	Niwanthidiya							
207	Erewwala West							
208	Rathmaldeniya							
209	Mahalwarawa							
210	Pelenwatta East							
211	Paligedara							
212	Bokundara							
213	Wewala West							
214	Mavittara North							
215	Kolamunna							
216	Batakettara North							
217	Kesbewa North							
218	Makandana East							
219	Batakettara South							
220	Halpita							
221	Jamburaliya							
222	Kammalthura	14	Negombo	12003	D2	Gampaha		
223	Pallansena North							
224	Kochchikade							
225	Pallansena South							
226	Daluwakotuwa							
227	Palangathure							
228	Ettukala							
229	Daluwakotuwa East							
230	Kattuwa							
231	Dalupatha East							
232	Wella Weediya							
233	Periyamulla							
234	Angurukaramulla							
235	Munnakkaraya North							
236	Doowa							
237	Thaladoowa							
238	Bolawalana							
239	Kurana West							
240	Thalahena							
241	Muruthana	15	Katana	12006				
242	Welihena North							
243	Welihena South							
244	Ihala Kandawala							
245	Andiambalama West							
246	Evariwatta							
247	Air Force Camp							
248	Katunayaka North							
249	Walanagoda							
250	Liyanagemulla North							

TAZ		DSD			District		Province	
Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
251	Raddolugama North A	15	Katana	12006	D2	Gampaha	P1	Western
252	Seeduwa							
253	Dambaduraya							
254	Ambalammulla							
255	Andimulla	16	Divulapitiya	12009				
256	Godigamuwa West							
257	Polwatta							
258	Diklanda							
259	Kudagammana							
260	Nalla	17	Mirigama	12012				
261	Pirisyala							
262	Bothale Pahalagama North							
263	Purana Meerigama							
264	Thawalampitiya							
265	Halugama Pahala							
266	Thilinagama							
267	Indiparape							
268	Uduulla							
269	Gaspe							
270	Kal/ Pallewela							
271	Borukgamuwa West							
272	Pallewela							
273	Uthuwanbogahawatta							
274	Galgamuwa West							
275	Nilpanagoda South	18	Minuwa-goda	12015				
276	Galkanda							
277	Minuwangoda East							
278	Medemulla South							
279	Yatiyana							
280	Minuwangoda West							
281	Balabowa							
282	Pethiyagoda North							
283	Wattegedara							
284	Galloluwa East							
285	Mathammana							
286	Dombawala							
287	Pamunugama	19	Wattala	12018				
288	Mangulpokuna							
289	Pattiyawala							
290	Horapethuduwa							
291	Palliyawatta North							
292	Mabola							
293	Evariwatta							
294	Mahawatta	20	Ja-Ela	12021				
295	Dandugama							
296	Thudella West							
297	Bandigoda							
298	Wewala							
299	Hapugoda West							
300	Batuwatta West							

TAZ		DSD			District		Province	
Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
301	Walpola East	20	Ja-Ela	12021	D2	Gampaha	P1	Western
302	Jayasrigama							
303	Thewatta							
304	Makevita North	21	Gampaha	12024				
305	Pahalagama							
306	Ihalagama West							
307	Gampaha Aluthgama North							
308	Karanayakamulla							
309	Aluthgama Bogamuwa North							
310	Weediyawatta							
311	Keselwathugoda North							
312	Bendiyamulla North							
313	Medagama IV							
314	Oruthota South							
315	Horagolla North							
316	Midellavita							
317	Moragoda 1							
318	Bendiyamulla East							
319	Yakkala West							
320	Henarathgoda							
321	Mahena							
322	Mudungoda North							
323	Ihala Imbulgoda South							
324	Embaraluwa North 2							
325	Weliweriya West							
326	Eluwapitiya West	22	Attanagalla	12027				
327	Hiripitiya West							
328	Udammita							
329	Magalegoda							
330	Ranpokunagama A Zone							
331	Thihariya North							
332	Mudagamuwa							
333	Pitiyegedara							
334	Godagama West							
335	Deenapamunuwa West							
336	Maryland Colony	23	Dompe	12030				
337	Bandaranayakapura West							
338	Diyawala North							
339	Udagama							
340	Parakadamulla							
341	Mandawala South							
342	Pepiliyawala							
343	Dekatana							
344	Dompe							
345	Kimbulgoda	24	Mahara	12033				
346	Yongammulla							
347	Aramangoda North							
348	Aramangoda							
349	Kirikitta West							
350	Webada South							

TAZ		DSD			District		Province	
Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
351	Kirillawala North	24	Mahara	12033	D2	Gampaha	P1	Western
352	Sooriyapaluwa North							
353	Sooriyapaluwa East							
354	Pahala Karagahamuna West							
355	Pinnameda West							
356	Welegoda	25	Kelaniya	12036				
357	Eriyawetiya							
358	Kiribathgoda							
359	Thalawathuhenpita South							
360	Wanawasala West							
361	Dippitigoda							
362	Pattiya East							
363	Meegahawatta							
364	Wedamulla							
365	Polhena							
366	Pahala Biyanvila East	26	Biyagama	12039				
367	Kammalwatta							
368	Makola South Pahala							
369	Gonawala East							
370	Heiyanthuduwa West							
371	Gonawala Central							
372	Horethuduwa North	27	Panadura	13003	D3	Kalutara		
373	Gorakana							
374	Paratta West							
375	Paratta							
376	Henamulla							
377	Walana North							
378	Walana							
379	Udahamulla							
380	Malamulla West							
381	Sagara Place							
382	Walapala Pattiya							
383	Walapala							
384	Eluvila							
385	Moravinna							
386	Narampitiya							
387	Thalpitiya North							
388	Wadduwa West							
389	Molligoda							
390	Kidelpitiya West	28	Bandaragama	13006				
391	Newdawa							
392	Aluthgama							
393	Kothalawala							
394	Veedagama East							
395	Alubomulla East							
396	Kuda Aruggoda East							
397	Miriswatta							
398	Pamunugama							
399	Kolamediriya North							
400	Kotigamgoda	29	Horana	13009				

TAZ	DSD	District	Province

Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
401	Thalagala East	29	Horana	13009	D3	Kalutara	P1	Western
402	Olaboduwa North							
403	Godigamuwa East							
404	Kuda Uduwa							
405	Batuvita North							
406	Meemana							
407	Kirigalahena							
408	Munagama East							
409	Gal Edandugoda							
410	Munagama West							
411	Horana South							
412	Halthotiyawatta							
413	Wewala East							
414	Menerigama	30	Ingiriya	13010				
415	Kekuladola							
416	Ihala Naragala	31	Bulathsinhala	13012				
417	Amaragedara North							
418	Galahena							
419	Ilimba	32	Madurawala	13015				
420	Hallankanda							
421	Gungamuwa	33	Millaniya	13018				
422	Deldorawatta							
423	Kennanthudawa							
424	Galpatha West							
425	Mestiya	34	Kalutara	13021				
426	Pohoddaramulla West							
427	Ariyagama							
428	Pothupitiya South							
429	Kuda Waskaduwa West							
430	Mahawaskaduwa South							
431	Thekkawatta							
432	Kalutara North							
433	Thotupala							
434	Akkaragoda							
435	Kalamulla North							
436	Nagoda West							
437	Kuda Payagala North	35	Beruwala	13024				
438	Mehimulla							
439	Mahagammedda							
440	Diyalagoda							
441	Kapugoda							
442	Idiriligoda							
443	Akkaragoda							
444	Paranakade							
445	Kankanamgoda							
446	Pinhena							
447	Hettimulla							
448	Koholana North	36	Dodangoda	13027				
449	Pelapitiyagoda							
450	Dodangoda East - North							

TAZ	DSD	District	Province

Seq.	Name	Seq.	Name	Code	Seq.	Name	Seq.	Name
451	Iddagoda West	37	Mathugama	13030	D3	Kalutara	P1	Western
452	Bopitiya East							
453	Naravila							
454	Henpita							
455	Girikola	38	Agalawatta	13033				
456	Pinnagoda							
457	Kosgulana	39	Palindanuwara	13036				
458	Ilukpatha							
459	Batahena							
460	Pannila South	40	Walallavita	13039				
461	Meegahathenna							

TAZ Seq.	DSD			District		Province	
	Seq.	Name	Code	Seq.	Name	Seq.	Name
462	41	Thumpane	21003	D4	Kandy	P2	Central
463	42	Poojapitiya	21006				
464	43	Akurana	21009				
465	44	Pathadumbara	21012				
466	45	Panvila	21015				
467	46	Udadumbara	21018				
468	47	Minipe	21021				
469	48	Medadumbara	21024				
470	49	Kundasale	21027				
471	50	Kandy Four Gravets & Gangawata Korale	21030				
472							
473							
474							
475							
476							
477							
478							
479							
480							
481							
482							
483	51	HaRODISpattuwa	21033				
484							
485	52	Hatharaliyadda	21034				
486	53	Yatinuwara	21036				
487	54	Udunuwara	21039				
488	55	Doluwa	21042				
489	56	Pathahewaheta	21045				
490	57	Delthota	21048				
491	58	Udapalatha	21051				
492	59	Ganga Ihala Korale	21054				
493	60	Pasbage Korale	21057				
494	61	Galewela	22003	D5	Matale		
495	62	Dambulla	22006				
496	63	Naula	22009				
497	64	Pallepola	22012				
498	65	Yatawatta	22015				
499	66	Matale	22018				
500	67	Ambanganga Korale	22021				

TAZ Seq.	DSD			District		Province	
	Seq.	Name	Code	Seq.	Name	Seq.	Name
501	68	Laggala-Pallegama	22024	D5	Matale	P2	Central
502	69	Wilgamuwa	22027				
503	70	Rattota	22030				
504	71	Ukuwela	22033				
505	72	Kothmale	23003	D6	Nuwara Eliya		
506	73	Hanguranketha	23006				
507	74	Walapane	23009				
508	75	Nuwara Eliya	23012				
509	76	Ambagamuwa	23015				
510	77	Benthota	31003	D7	Galle	P3	Southern
511	78	Balapitiya	31006				
512	79	Karandeniya	31009				
513	80	Elpitiya	31012				
514	81	Niyagama	31015				
515	82	Thawalama	31018				
516	83	Neluwa	31021				
517	84	Nagoda	31024				
518	85	Baddegama	31027				
519	86	Welivitiya-Divithura	31030				
520	87	Ambalangoda	31033				
521	88	Gonapeenuwala	31034				
522	89	Hikkaduwa	31036				
523	90	Galle Four Gravets	31039				
524	91	Bope-Poddala	31042				
525	92	Akmeemana	31045				
526	93	Yakkalamulla	31048				
527	94	Imaduwa	31051				
528	95	Habaraduwa	31054				
529	96	Pitabeddara	32003	D8	Matara		
530	97	Kotapola	32006				
531	98	Pasgoda	32009				
532	99	Mulatiyana	32012				
533	100	Athuraliya	32015				
534	101	Akuressa	32018				
535	102	Welipitiya	32021				
536	103	Malimbada	32024				
537	104	Kamburupitiya	32027				
538	105	Hakmana	32030				
539	106	Kirinda Puhulwella	32033				
540	107	Thihagoda	32036				
541	108	Weligama	32039				
542	109	Matara Four Gravets	32042				
543	110	Devinuwara	32045				
544	111	Dickwella	32048				
545	112	Sooriyawewa	33003	D9	Hambantota		
546	113	Lunugamvehera	33006				
547	114	Thissamaharama	33009				
548	115	Hambantota	33012				
549	116	Ambalantota	33015				
550	117	Angunakolapelessa	33018				

TAZ Seq.	DSD			District		Province	
	Seq.	Name	Code	Seq.	Name	Seq.	Name
551	118	Weeraketiya	33021	D9	Hambantota	P3	Southern
552	119	Katuwana	33024				
553	120	Walasmulla	33025				
554	121	Okewela	33027				
555	122	Beliatta	33030				
556	123	Tangalle	33033				
557	124	Island North (Kayts)	41003	D10	Jaffnai	P4	Northern
558	125	Karainagar	41004				
559	126	Valikamam West (Chankanai)	41006				
560	127	Valikamam South -West (Sandilipay)	41009				
561	128	Valikamam North	41012				
562	129	Valikamam South (Uduvil)	41015				
563	130	Valikamam East (Kopay)	41018				
564	131	Vadamaradchi South-west	41021				
565	132	Vadamaradchi East	41024				
566	133	Vadamaradchi North (Pointpedro)	41027				
567	134	Thenmaradchi (Chavakachcheri)	41030				
568	135	Nallur	41033				
569	136	Jaffna	41036				
570	137	Island South (Velanai)	41039				
571	138	Delf	41042				
572	139	Mannar Town	42003	D11	Mannar		
573	140	Manthai West	42006				
574	141	Madhu	42009				
575	142	Nanaddan	42012				
576	143	Musalai	42015				
577	144	Vavuniya North	43003	D12	Vavuniya		
578	145	Vavuniya South	43006				
579	146	Vavuniya	43009				
580	147	Vengalacheddikulam	43012				
581	148	Thunukkai	44003	D13	Mulativu		
582	149	Manthai East	44006				
583	150	Puthukudiyiruppu	44009				
584	151	Oddusuddan	44012				
585	152	Maritimepattu	44015				
586	153	Welioya	44018				
587	154	Pachchilaipalli	45003	D14	Kilinochchi		
588	155	Kandavalai	45006				
589	156	Karachchi	45009				
590	157	Poonakary	45012				
591	158	Koralai Pattu North (Vaharai)	51003	D15	Batticaloa	P5	Eastern
592	159	Koralai Pattu Central	51004				
593	160	Koralai Pattu West (Oddamavadi)	51006				
594	161	Koralai Pattu (Valachchenai)	51009				
595	162	Koralai Pattu South (Kiran)	51010				
596	163	Eravur Pattu	51012				
597	164	Eravur Town	51015				
598	165	Manmunai North	51018				
599	166	Manmunai West	51021				
600	167	Kattankudy	51024				

TAZ Seq.	DSD			District		Province	
	Seq	Name	Code	Seq.	Name	Seq.	Name
601	168	Manmunai Pattu (Araipattai)	51027	D15	Batticaloa	P5	Eastern
602	169	Manmunai South-West	51030				
603	170	Porativu Pattu	51033				
604	171	Manmunai South & Eruvil Pattu	51036				
605	172	Dehiattakandiya	52003	D16	Ampara		
606	173	Padiyathalawa	52006				
607	174	Mahaoya	52009				
608	175	Uhana	52012				
609	176	Ampara	52015				
610	177	Navithanveli	52016				
611	178	Samanthurai	52018				
612	179	Kalmunai Tamil Division	52021				
613	180	Kalmunai	52024				
614	181	Sainthamarathu	52025				
615	182	Karaitheevu	52027				
616	183	Ninthavur	52030				
617	184	Addalachchenai	52033				
618	185	Irakkamam	52034				
619	186	Akkaraipattu	52036				
620	187	Alayadiwembu	52039				
621	188	Damana	52042				
622	189	Thirukkovil	52045				
623	190	Pothuvil	52048				
624	191	Lahugala	52051				
625	192	Padavi Sri Pura	53003	D17	Trincomalee		
626	193	Kuchchaveli	53006				
627	194	Gomarankadawala	53009				
628	195	Morawewa	53012				
629	196	Trincomalee Town and Gravets	53015				
630	197	Thambalagamuwa	53018				
631	198	Kanthale	53021				
632	199	Kinniya	53024				
633	200	Muttur	53027				
634	201	Seruvila	53030				
635	202	Verugal/ Echchilampattai	53033				
636	203	Giribawa	61003	D18	Kurunegala	P6	North West
637	204	Galgamuwa	61006				
638	205	Ehetuwewa	61009				
639	206	Ambanpola	61012				
640	207	Kotavehera	61015				
641	208	Rasnayakapura	61018				
642	209	Nikaweratiya	61021				
643	210	Maho	61024				
644	211	Polpithigama	61027				
645	212	Ibbagamuwa	61030				
646	213	Ganewatta	61033				
647	214	Wariyapola	61036				
648	215	Kobeigane	61039				
649	216	Bingiriya	61042				
650	217	Panduwasnuwara West	61045				

TAZ Seq.	DSD			District		Province	
	Seq	Name	Code	Seq.	Name	Seq.	Name
651	218	Panduwasnuwara East	61048	D18	Kurunegala	P6	North West
652	219	Bamunakotuwa	61049				
653	220	Maspotha	61051				
654	221	Kurunegala	61054				
655	222	Mallawapitiya	61057				
656	223	Mawathagama	61060				
657	224	Rideegama	61063				
658	225	Weerambugedara	61066				
659	226	Kuliyapitiya East	61069				
660	227	Kuliyapitiya West	61072				
661	228	Udubaddawa	61075				
662	229	Pannala	61078				
663	230	Narammala	61081				
664	231	Alawwa	61084				
665	232	Polgahawela	61087				
666	233	Kalpitiya	62003	D19	Puttalam		
667	234	Vanathavilluwa	62006				
668	235	Karuwalagaswewa	62009				
669	236	Nawagattegama	62012				
670	237	Puttalam	62015				
671	238	Mundel	62018				
672	239	Mahakumbukkadawala	62021				
673	240	Anamaduwa	62024				
674	241	Pallama	62027				
675	242	Arachchikattuwa	62030				
676	243	Chilaw	62033				
677	244	Madampe	62036				
678	245	Mahawewa	62039				
679	246	Nattandiya	62042				
680	247	Wennappuwa	62045				
681	248	Dankotuwa	62048				
682	249	Padaviya	71003	D20	Anuradhapura	P7	North Central
683	250	Kebithigollewa	71006				
684	251	Medawachchiya	71009				
685	252	Mahavilachchiya	71012				
686	253	Nuwaragam Palatha Central	71015				
687	254	Rambewa	71018				
688	255	Kahatagasdigiliya	71021				
689	256	Horowpothana	71024				
690	257	Galenbindunuwewa	71027				
691	258	Mihinthale	71030				
692	259	Nuwaragam Palatha East	71033				
693	260	Nachchadoowa	71036				
694	261	Nochchiyagama	71039				
695	262	Rajanganaya	71042				
696	263	Thambuttegama	71045				
697	264	Thalawa	71048				
698	265	Thirappane	71051				
699	266	Kekirawa	71054				
700	267	Palugaswewa	71057				

TAZ Seq.	DSD			District		Province	
	Seq.	Name	Code	Seq.	Name	Seq.	Name
701	268	Ipalogama	71060	D20	Anuradhapura	P7	North Central
702	269	Galnewa	71063				
703	270	Palagala	71066				
704	271	Hingurakgoda	72003	D21	Polonnaruwa		
705	272	Medirigiriya	72006				
706	273	Lankapura	72009				
707	274	Welikanda	72010				
708	275	Dimbulagala	72012				
709	276	Thamankaduwa	72015				
710	277	Elahera	72018				
711	278	Mahiyanganaya	81003	D22	Badulla	P8	Uva
712	279	Rideemaliyadda	81006				
713	280	Meegahakivula	81009				
714	281	Kandaketiya	81012				
715	282	Soranathota	81015				
716	283	Passara	81018				
717	284	Lunugala	81019				
718	285	Badulla	81021				
719	286	Hali-Ela	81024				
720	287	Paranagama	81027				
721	288	Welimada	81030				
722	289	Bandarawela	81033				
723	290	Ella	81036				
724	291	Haputale	81039				
725	292	Haldummulla	81042				
726	293	Bibile	82003	D23	Monaragala		
727	294	Madulla	82006				
728	295	Medagama	82009				
729	296	Siyambalanduwa	82012				
730	297	Moneragala	82015				
731	298	Badalkumbura	82018				
732	299	Wellawaya	82021				
733	300	Buttala	82024				
734	301	Katharagama	82027				
735	302	Thanamalvila	82030				
736	303	Sevanagala	82033				
737	304	Eheliyagoda	91003	D24	Ratnapura	P9	Sabaragamuwa
738	305	Kuruvita	91006				
739	306	Kiriella	91009				
740	307	Ratnapura	91012				
741	308	Imbulpe	91015				
742	309	Balangoda	91018				
743	310	Opanayaka	91021				
744	311	Pelmadulla	91024				
745	312	Elapatha	91027				
746	313	Ayagama	91030				
747	314	Kalawana	91033				
748	315	Nivithigala	91036				
749	316	Kahawatta	91039				
750	317	Godakawela	91042				

TAZ Seq.	DSD			District		Province	
	Seq.	Name	Code	Seq.	Name	Seq.	Name
751	318	Weligepola	91045	D24	Ratnapura	P9	Sabaragamuwa
752	319	Embilipitiya	91048				
753	320	Kolonna	91051				
754	321	Rambukkana	92003	D25	Kegalle		
755	322	Mawanella	92006				
756	323	Aranayaka	92009				
757	324	Kegalle	92012				
758	325	Galigamuwa	92015				
759	326	Warakapola	92018				
760	327	Ruwanwella	92021				
761	328	Bulathkohupitiya	92024				
762	329	Yatiyanthota	92027				
763	330	Dehiovita	92030				
764	331	Deraniyagala	92033				

ANNEX-5

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Annex 5: Works Intervention Criteria and Works Plans for Master Plan

Table 5-A:Road Maintenance Intervention Criteria for Flexible Pavement for National Roads of Road Master Plan of Sri Lanka (2020-2029)

Roughness Range (IRI)	AADT Range (Vehicle/day)	Roughness Range (IRI)	AADT Range (Vehicle/day)		Roughness Range (IRI)	AADT Range (Vehicle/day)	
	<= 5,000		5,001-10,000	10,001 to 20,000		20,001-65,000	>65,000
≤ 3.5	Only Routine	≤ 3.0	Only Routine	Only Routine	≤ 2.5	Only Routine	Only Routine
3.5 to 4.0	40 mm Overlay with HMA	3.0 to 4.0	50 mm Overlay with HMA	60 mm Overlay with HMA	2.5 to 4.0	70 mm Overlay with PMA	80 mm Overlay with PMA
4.0 to 5.5	50 mm Overlay with HMA	4.0 to 5.5	60 mm Overlay with HMA	70 mm Overlay with HMA	4.0 to 5.5	80 mm Overlay with PMA	100 mm Overlay with PMA
5.5 to 8.0	60 mm Overlay with HMA	5.5 to 8.0	70 mm Overlay with HMA	80 mm Overlay with HMA	5.5 to 8.0	100 mm Overlay with PMA	125 mm Overlay with PMA

Table 5-B:Road Maintenance Intervention Criteria for Flexible Pavement for Expressways of Road Master Plan of Sri Lanka (2020-2029)

Roughness Range (IRI)	AADT Range (Vehicle/day)		Roughness Range (IRI)	AADT Range (Vehicle/day)	
	<= 10,000	10,001 to 20,000		20,001-65,000	>65,000
≤ 1.7	Only Routine	Only Routine	≤ 1.7	Only Routine	Only Routine
1.7 to 3.0	50 mm Overlay with HMA	60 mm Overlay with HMA	1.7 to 3.0	70 mm Overlay with PMA	80 mm Overlay with PMA
3.0 to 5.5	60 mm Overlay with HMA	70 mm Overlay with HMA	3.0 to 5.5	80 mm Overlay with PMA	100 mm Overlay with PMA
5.5 to 8.0	70 mm Overlay with HMA	80 mm Overlay with HMA	5.5 to 8.0	100 mm Overlay with PMA	125 mm Overlay with PMA

HMA – Hot Mix Asphalt
PMA – Polymer Modified Asphalt

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Table 5-C: Road Improvement (Strengthening and Reconstruction) Intervention Criteria for Flexible Pavement for National Roads of Road Master Plan of Sri Lanka (2020-2029)

Roughness Range (IRI)	AADT Range (Vehicle/day)		AADT Range (Vehicle/day)	Roughness Range (IRI)	AADT Range (Vehicle/day)		Roughness Range (IRI)	AADT Range (Vehicle/day)	
	<=1,000	1,001-3,000	3,001 to 5000		5,001-10,000	10,001 to 20,000		20,001-65,000	>65,000
8.0 to 10.5	Strength. with 40 mm HMA	Strength. with 50 mm HMA	Strength. with 60 mm HMA	8.0 to 10.5	Strength. With 80 mm HMA	Strength. with 100 mm HMA	8.0 to 10.5	Strength. with 125 mm PMA	Strength. with 150 mm PMA
> 10.5	Recon. with 40 mm HMA	Recon. with 50 mm HMA	Recon. with 60 mm HMA	> 10.5	Recon. with 80 mm HMA	Recon. with 100 mm HMA	> 10.5	Recon. with 125 mm PMA	Recon. with 150 mm PMA

Table 5-D: Road Improvement (Strengthening and Reconstruction) Intervention Criteria for Flexible Pavement for Expressway of Road Master Plan of Sri Lanka (2020-2029)

Roughness Range (IRI)	AADT Range (Vehicle/day)		Roughness Range (IRI)	AADT Range (Vehicle/day)	
	<= 10,000	10,001 to 20,000		20,001-65,000	>65,000
8.0 to 10.5	Strength. With 80 mm HMA	Strength. with 100 mm HMA	8.0 to 10.5	Strength. with 125 mm PMA	Strength. with 150 mm PMA
> 10.5	Recon. with 80 mm HMA	Recon. with 100 mm HMA	> 10.5	Recon. with 125 mm PMA	Recon. with 150 mm PMA

HMA – Hot Mix Asphalt
PMA – Polymer Modified Asphalt

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Table 5-E: ***Road Improvement (Widening) Intervention Criteria for Flexible Pavement for National Roads of Road Master Plan of Sri Lanka (2020-2029)***

Peak Period Volume Capacity Ratio	**Traffic Range (MT AADT)**		**Daily Average Volume Capacity Ratio**	**Traffic Range (MT AADT)**			
	<=3,000	**3,001-5,000**		**5,001-10,000**	**10,001 to 20,000**	**20,001-65,000**	**>65,000**
> 0.8	**Existing Surface**	**Existing Surface**	**> 0.8**	**Existing Surface**	**Existing Surface**	**Existing Surface**	**Existing Surface**
	Partial Widening (1 m on both sides total 2 m) and Rehab of Existing Surface with 40 mm HMA	Add 1 Lane (3.65 m) and Rehab of Existing Surface 50 mm Overlay with HMA material		Add 1 Lane (3.65 m) and Rehab of Existing Surface 70 mm Overlay with HMA material	Add 2 Lanes (7.3 m) and Rehab of Existing Surface 100 mm Overlay with HMA material	Add 2 Lanes (7.3 m) and Rehab of Existing Surface 125 mm Overlay with PMA material	Add 2 Lanes (7.3 m) and Rehab of Existing Surface 150 mm Overlay with PMA material
	Widening Section	**Widening Section**		**Widening Section**	**Widening Section**	**Widening Section**	**Widening Section**
	Includes 200 mm Dense Graded Aggregate Base and 225 mm Granular subbase/recycled subbase	Includes 150 mm Dense Graded Aggregate Base and 250 mm Granular subbase		Includes 200 mm Dense Graded Aggregate Base and 250 mm Granular subbase	Includes 200 mm Dense Graded Aggregate Base and 250 mm Granular subbase	Includes 225 mm Dense Graded Aggregate Base and 250 mm Granular subbase	Includes 250 mm Dense Graded Aggregate Base and 275 mm Granular subbase
	Surface with 40mm HMA	50 mm Overlay with HMA		70 mm Overlay with HMA	100mm Overlay with HMA (Includes 50mm wearing course and 50 mm Binder course with HMA)	125mm Overlay with PMA(Includes 50mm wearing course and 75 mm Binder course with PMA)	150mm Overlay with PMA(Includes 50mm wearing course and 50 mm Binder course and 75mm Bitumen Bound Base with PMA)

HMA – Hot Mix Asphalt
PMA – Polymer Modified Asphalt

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Table 5-F: ***Road Maintenance Intervention Criteria for Rigid (Concrete) Pavement for National Roads of Road Master Plan of Sri Lanka (2020-2029)***

Parameter 1	Parameter 2	Maintenance Intervention
Spalling	**Damage Area**	
0.6 to 1.1%	>25%	Spall Repair
> 1.1%	1 to 15%	Individual Slab Replacement
>1.1%	>15%	Bonded Overlay
Faulting	**Damage Area**	
Faulting	>50%	Diamond Grinding and Full Depth Repair
>25.4 mm	1 to 25%	Diamond Grinding
>25.4 mm	>25%	Diamond Grinding and thin Bonded Overlay
Rutting	**Damage Area**	
6.35 to 25.4 mm	>25%	Diamond Grinding
>25.4 mm	1 to 10%	Diamond Grinding and thin Bonded Overlay
>25.4 mm	>10%	Bonded Overlay
Roughness	**Damage Area**	
IRI > 4.9	> 50%	Diamond Grinding

Table 4-G: ***Road Upgrading Criteria for Conversion of Unsealed Roads into Paved Roads for Road Master Plan of Sri Lanka (2020-2029)***

Parameter	**Traffic Range (MT AADT)**	
AADT	1,001-3,000	> 3,000
Intervention	15 mm SBSD	25 mm DBSD

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Table 5-H: Undiscounted Road Maintenance and Improvement works in Km's and Expenditure (Rs. Mn) for National Network of Road Master Plan of Sri Lanka (2018-2027)

Year	Routine Maintenance		Periodic Maintenance		Improvement		Partial Widening		Add 1 Lane		Add 2 Lane		Total		Annual Percentage Distribution
	Km	Cost (Rs.Mn)	Km	Cost (Rs.Mn)	Km	Cost (Rs.Mn)	Km	Cost (Rs.Mn)	Km	Cost (Rs.Mn)	Km	Cost (Rs.Mn)	Km	Cost (Rs.Mn)	
2018	9,373.23	16,193.88	5006.83	50726.46	1946.87	76765.64	18.77	877.16	284.11	20391.57	404.02	66769.03	17,033.83	231,723.74	**46.1%**
2019	9,373.23	5,729.42	1468.81	14360.48	15.14	435.95	7.58	354.18	8.83	623.4			10,873.59	21,503.43	**4.3%**
2020	9,368.69	5,510.78	2306.82	25143.38	4.55	79.08	11.38	531.67	5.7	402.39	1.95	322.64	11,699.09	31,989.94	**6.4%**
2021	9,368.69	6,356.74	1922.61	16966.05			3.78	176.69	19.25	1402.15	37.16	6158.62	11,351.49	31,060.25	**6.2%**
2022	9,368.69	6,233.73	1940.48	19472.14					11.38	803.58	27.73	4609.12	11,348.28	31,118.57	**6.2%**
2023	9,368.69	6,417.79	1255.45	13442.92					2.32	164.01	30.44	5071.24	10,656.90	25,095.96	**5.0%**
2024	9,368.69	6,986.50	1860.62	19054.66					5.44	400.05	51.64	8568.68	11,286.39	35,009.89	**7.0%**
2025	9,368.69	6,653.23	1405.21	15055.52			7.7	359.84	25.14	1775.69	23.07	3823.99	10,829.81	27,668.27	**5.5%**
2026	9,368.69	7,388.72	1727.81	17840.74			16.56	773.88	0.13	9.18	45.54	7551.46	11,158.73	33,563.98	**6.7%**
2027	9,330.95	7,611.35	1693.51	17848.77	37.74	656	3.48	162.63	29.14	2161.34	33.67	5614.19	11,128.49	34,054.28	**6.8%**
Total	**93,658.24**	**75,082.14**	**20,588.15**	**209,911.12**	**2,004.30**	**77,936.67**	**69.25**	**3,236.05**	**391.44**	**28,133.36**	**655.22**	**108,488.97**	**117,366.60**	**502,788.31**	**100.00%**
%	**79.8%**	**14.9%**	**17.5%**	**41.7%**	**1.7%**	**15.5%**	**0.1%**	**0.6%**	**0.3%**	**5.6%**	**0.6%**	**21.6%**	**100.0%**	**100.0%**	

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Table 5-I: Undiscounted Road Maintenance and Improvement works in Km's and Expenditure (Rs. Mn) for Expressway Network of Road Master Plan of Sri Lanka (2018-2027)

Year	STDP Overlay (km)	STDP Cost (Rs.Mn)	OCH Overlay (km)	OCH Cost (Rs.Mn)	Routine Maintenance Cost (Rs.Mn)	Total Length (km)	Total Works Cost (Rs.Mn)	Annual Percentage Distribution
2018	43.2	930.44	19.25	482.68	11.46	62.45	1,424.58	**13.0%**
2019	0	0	0	0	11.46	0	11.46	**0.1%**
2020	50.64	1,073.66	14.05	347.57	15.2	64.69	1,436.43	**13.1%**
2021	13.68	384.81	5.2	146.33	16.88	18.88	548.02	**5.0%**
2022	98.92	2,293.53	7.57	212.88	13.9	106.49	2,520.31	**23.0%**
2023	12.2	266.45	6.48	182.35	13.14	18.68	461.94	**4.2%**
2024	43.2	1,029.64	5.2	146.33	13.14	48.4	1,189.11	**10.8%**
2025	69.4	1,952.92	7.57	212.88	16.5	76.97	2,182.30	**19.9%**
2026	12.2	343.31	1.78	50.09	17.44	13.98	410.84	**3.7%**
2027	29.53	644.83	4.7	132.26	17.42	34.23	794.51	**7.2%**
Total	**372.97**	**8,919.59**	**71.8**	**1,913.37**	**146.54**	**444.77**	**10,979.50**	**100.0%**
%	**83.9%**	**81.2%**	**16.1%**	**17.4%**	**1.3%**	**100.0%**	**100.0%**	

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Table 5-J: The Details of Work Interventions of Revised Road Improvement works in Km and Expenditure (Rs. Mn) for National Network of Road Master Plan of Sri Lanka (2020-2029)

Year	Partial Widening		Add 1 Lane		Add 2 Lane		Reconstruction		AC Strengthening		Upgrade		Gravel Prime		AC Overlay		Total Length (km)	Total Cost per Year (Rs. Mn)	Annual Percentage Distribution
	Length (km)	Cost (Rs. Mn)	Length (km)	Cost (Rs. Mn)	Length (km)	Cost (Rs. Mn)	Length (km)	Cost (Rs. Mn)	Length (km)	Cost (Rs. Mn)	Length (km)	Cost (Rs. Mn)	Length (km)	Cost (Rs. Mn)	Length (km)	Cost (Rs. Mn)			
2020	149.51	11,802.44	52.51	5,199.98	204.25	61,626.64	1114.52	109,593.44	11.29	496.69	8.39	278.02	0.65	0.45	882.234	11,963.85	2,423.35	200,961.51	**37.7%**
2021	24.49	2,020.93	38.54	3,496.82	45.013	12,985.28	346.26	32,240.80	1.04	38.03	0.71	23.52			523.239	5,618.75	979.29	56,424.13	**10.6%**
2022	92.3	7,743.94	30.28	2,634.95	16.351	4,715.17	450.82	38,354.48	21.92	803.12	16.83	557.30			748.83	9,272.68	1,377.33	64,081.64	**12.0%**
2023	42.91	3,375.47	62.95	6,507.82	56.48	16,400.26	110.7	10,098.96			6.62	219.27			474.59	6,050.81	754.25	42,652.59	**8.0%**
2024	103.7	8,432.91	15.87	1,445.97	21.7	6,332.06	226.95	19,020.11			3.29	108.90			776.2	10,277.60	1,147.72	45,617.55	**8.6%**
2025	57.07	4,413.29	14.08	1,264.21	23.29	6,831.50	67.61	5,937.14							655.75	7,593.30	817.80	26,039.44	**4.9%**
2026	39.41	3,062.19	2.63	236.92	45.35	14,045.89	46.86	3,963.17							1070.14	15,321.32	1,204.39	36,629.49	**6.9%**
2027	10.79	821.02	11.07	932.85	40.67	12,223.21	63.97	5,177.90							912.01	11,934.91	1,038.51	31,089.89	**5.8%**
2028	28.95	2,520.15			17.71	5,197.33	13.95	1,309.85							904.73	11,310.42	965.34	20,337.75	**3.8%**
2029					5.02	1,481.62					37.73	1,249.85			463.65	6,844.32	506.40	9,575.79	**1.8%**
Total	**549.1**	**44,192.34**	**227.93**	**21,719.52**	**475.83**	**141,838.96**	**2441.64**	**225,695.85**	**34.25**	**1,337.84**	**73.57**	**2,436.86**	**0.65**	**0.45**	**7411.37**	**96,187.96**	**11,214.39**	**533,409.78**	**100.0%**
%	**4.9%**	**8.3%**	**2.0%**	**4.1%**	**4.2%**	**26.6%**	**21.8%**	**42.3%**	**0.3%**	**0.3%**	**0.7%**	**0.5%**	**0.01%**	**0.0001%**	**66.1%**	**18.0%**	**100.0%**	**100.0%**	

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Table 5-K: Summary of Revised Work Program of Road Widening and Improvement works for National Highway Network of Road Master Plan of Sri Lanka (2020-2029)

Year	Widening to 4-Lane and Multi-Lane		Widening to 2-Lane and Intermediate Lane		Improved to 2-Lane and Intermediate Lane		Asphalt Concrete Overlay of National Network		Asphalt Concrete Overlay of Expressway		Total		Annual Percentage Distribution
	km	Cost (Rs. Mn)	km	Cost (Rs. Mn)	km	Cost (Rs. Mn)	km	Cost (Rs. Mn)	km	Cost (Rs. Mn)	km	Cost (Rs. Mn)	
2020	204.25	61,626.64	202.02	17,002.42	1134.85	110,368.61	882.234	11,963.85	62.45	1,653.35	2485.80	202,614.87	**37.1%**
2021	45.01	12,985.28	63.03	5,517.76	348.01	32,302.34	523.239	5,618.75		-	979.29	56,424.13	**10.3%**
2022	16.35	4,715.17	122.58	10,378.89	489.57	39,714.91	748.83	9,272.68	64.69	1,662.83	1442.02	65,744.48	**12.0%**
2023	56.48	16,400.26	105.86	9,883.30	117.32	10,318.23	474.59	6,050.81	18.87	621.43	773.12	43,274.03	**7.9%**
2024	21.70	6,332.06	119.58	9,878.87	230.24	19,129.02	776.2	10,277.60	106.49	2,932.50	1254.21	48,550.05	**8.9%**
2025	23.29	6,831.50	71.15	5,677.50	67.61	5,937.14	655.75	7,593.30	18.68	525.10	836.48	26,564.54	**4.9%**
2026	45.35	14,045.89	42.04	3,299.12	46.86	3,963.17	1070.14	15,321.32	48.4	1,375.88	1252.79	38,005.38	**7.0%**
2027	40.67	12,223.21	21.86	1,753.87	63.97	5,177.90	912.01	11,934.91	76.96	2,533.99	1115.47	33,623.88	**6.2%**
2028	17.71	5,197.33	28.95	2,520.15	13.95	1,309.85	904.73	11,310.42	13.98	460.28	979.32	20,798.03	**3.8%**
2029	5.02	1,481.62			37.73	1,249.85	463.65	6,844.32	34.23	909.18	540.63	10,484.97	**1.9%**
Total	**475.83**	**141,838.96**	**777.07**	**65,911.88**	**2,550.11**	**229,471.02**	**7,411.37**	**96,187.96**	**444.75**	**12,674.54**	**11,659.14**	**546,084.36**	**100.00%**
%	**4.1%**	**26.0%**	**6.7%**	**12.1%**	**21.9%**	**42.0%**	**63.6%**	**17.6%**	**3.8%**	**2.3%**	**100.0%**	**100.0%**	

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Table 5-L: Summary of Revised Work Program of Road Widening and Improvement works for National Highway Network of Road Master Plan of Sri Lanka (2020-2029)

Province	Widening to 4-Lane and Multi-Lane		Widening to 2-Lane and Intermediate Lane		Improved to 2-Lane and Intermediate Lane		Asphalt Concrete Overlay		Total		Annual Percentage Distribution
	Km	Cost (Rs. Mn)	Km	Cost (Rs. Mn)	Km	Cost (Rs. Mn)	Km	Cost (Rs. Mn)	Km	Cost (Rs. Mn)	
Western	311.69	94,092.64	242.85	21,238.35	42.41	3,830.53	1455.941	28,808.70	2052.89	147,970.22	**27.7%**
Central	32.03	9,582.19	137.24	11,595.07	719.28	60,137.25	678.491	7,951.04	1567.04	89,265.55	**16.7%**
Southern	4.39	1,367.52	100.03	8,169.52	109.8	10,363.59	1174.888	12,805.45	1389.11	32,706.08	**6.1%**
Northern			8.1	654.09	226.66	23,133.08	546.299	5,472.58	781.06	29,259.75	**5.5%**
Eastern	4.30	1,292.51	34.68	2,703.25	312.01	31,287.45	575.565	5,760.39	926.55	41,043.60	**7.7%**
North Western	102.64	29,569.55	61.86	5,780.35	231.76	20,929.42	1051.449	13,994.56	1447.71	70,273.88	**13.2%**
North Central			46.6	3,779.69	244.73	23,211.78	527.011	5,764.56	818.34	32,756.03	**6.1%**
Uva			15.24	1,138.56	291.07	26,149.80	708.285	6,861.90	1014.60	34,150.26	**6.4%**
Sabaragamuwa	20.79	5,934.57	130.47	10,853.00	372.39	30,428.10	693.444	8,768.77	1217.09	55,984.44	**10.5%**
Total	**475.83**	**141,838.98**	**777.07**	**65,911.88**	**2,550.11**	**229,471.00**	**7,411.37**	**96,187.95**	**11,214.39**	**533,409.81**	**100.00%**
%	**4.2%**	**26.6%**	**6.9%**	**12.4%**	**22.7%**	**43.0%**	**66.1%**	**18.0%**	**100.0%**	**100.0%**	

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Figure 5-A: Annual Average Roughness for each of Optimized Budget Scenarios (weighted by length) for National Highway Network of Road Master Plan of Sri Lanka (2020-2029)

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Roughness: Average for Road Network by Budget Scenario (Graph)

Study Name: NRMP_(2018-2027)_Final
Run Date: 16-10-2018

Surface Class: Bituminous

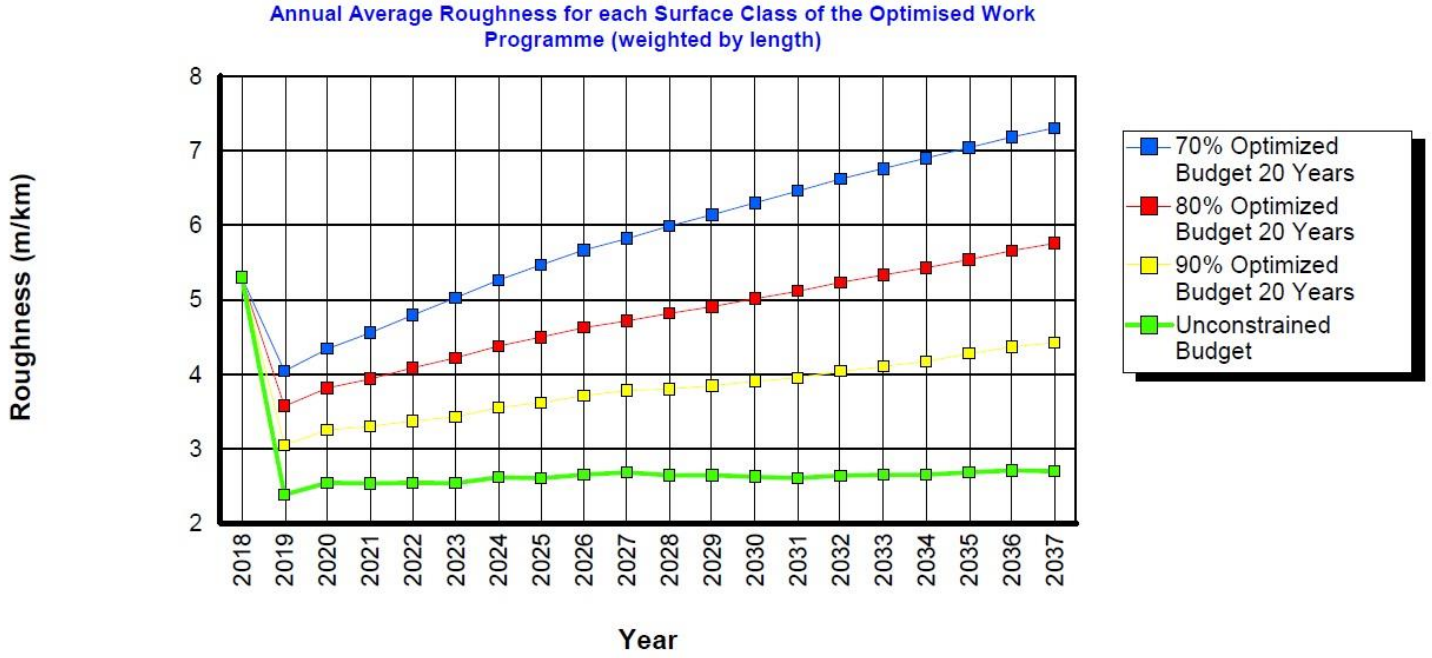

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***Figure 5-B:** Annual Average Roughness for each of Optimized Budget Scenarios (weighted by length) for Expressway Network of Road Master Plan of Sri Lanka (2020-2029)*

HDM - 4
HIGHWAY DEVELOPMENT & MANAGEMENT

Roughness: Average for Road Network by Budget Scenario (Graph)

Study Name: NRMP_(2018-2027)_Expressway
Run Date: 17-10-2018

Surface Class: **Bituminous**

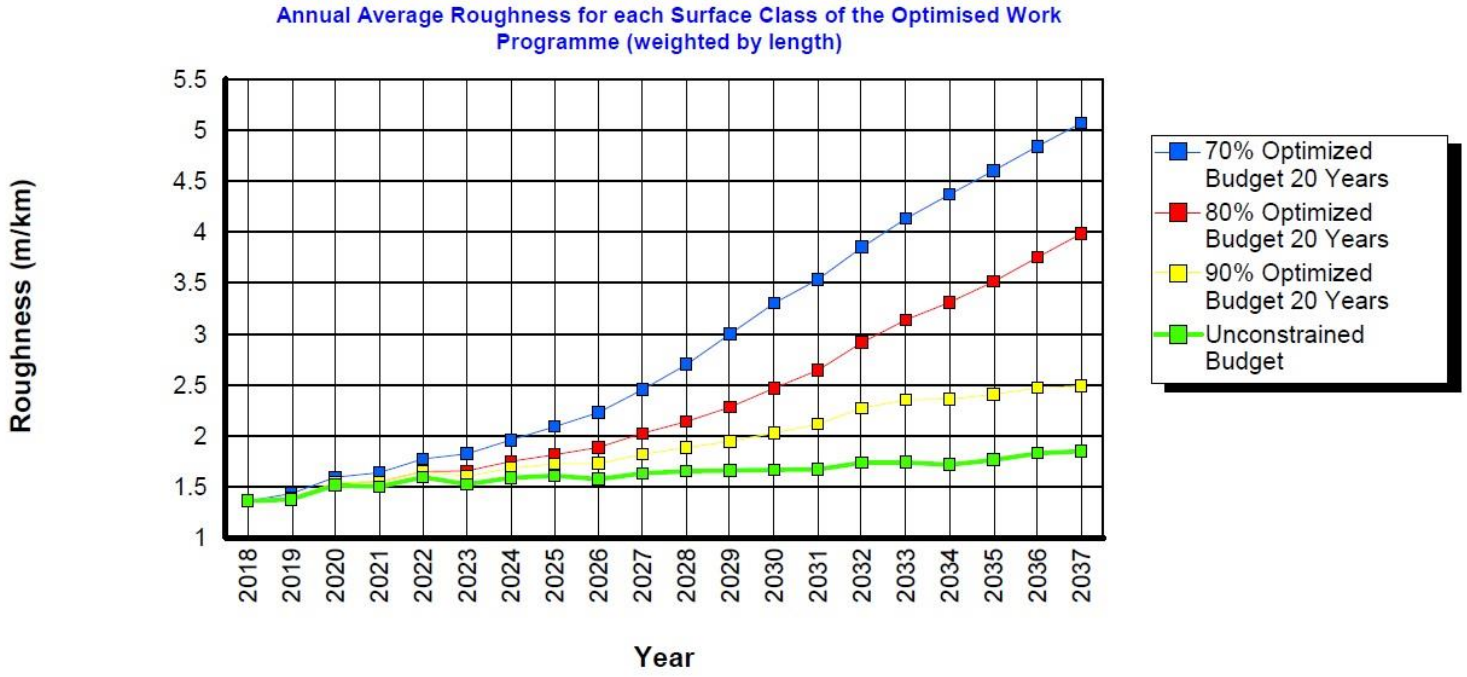

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Figure 5-C:

Notes on work interventions used in Road Works Summary

Example:

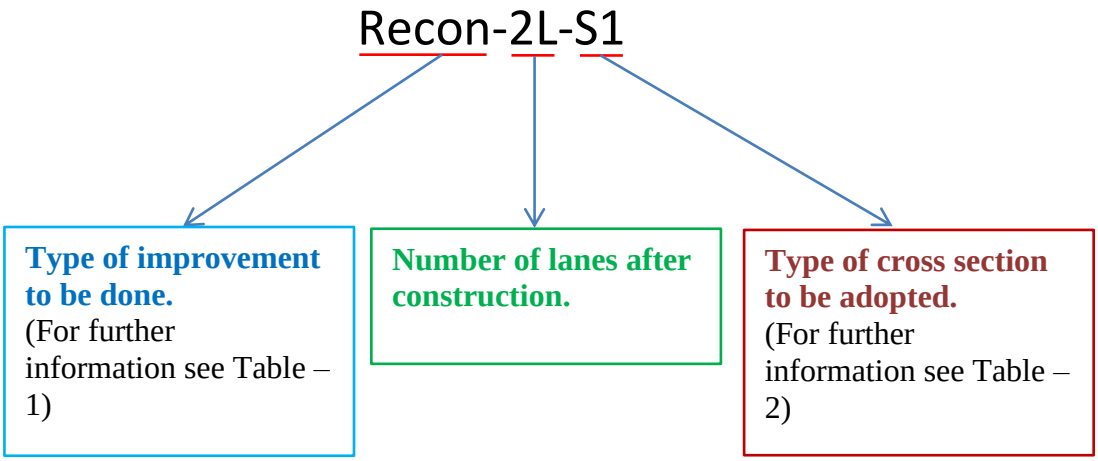


Table -1

Code	Description
Overlay	AC overlay of the existing road.
PW	Partial widening by 2m of the existing AC road.
Add_1	Widening by adding 1 lane (3.65m) to the existing AC road.
Add_2	Widening by adding 2 lanes (7.3m) to the existing AC road.
Recon	Reconstruction of the road to AC with structural improvement with widening.
Recon-Ex	Reconstruction of the road to AC with structural improvement to the existing width.
AC Strength	Structural strengthen of the AC road to the existing width.
Upgrade	Pavement upgrade of existing gravel road to AC road.
GR_Prime	Gravel priming.

Table -2

Type of Section	Two Lane					Four Lane		
	Section S0	Section S1	Section S2	Section S3	Section S4	Section S5	Section S6	Section S7
Lane Width (m)	2.5	3.1	3.5	3.5	3.5	2 x 3.25	2 x 3.25	2 x 3.25
Cycle lane (m)	-	-	-	-	1.5	-	-	1.5
Hard Shoulder (m)	-	0.5	0.5	1.0	-	0.5	0.5	-
Shoulder / Parking (m)	1.0	0.9	1.0	1.5	2.0	1.8	2.0	2.4
Drain / Walkway (m)	0.5	0.5	1.0	1.0	1.0	0.6	1.4	2.0
Median (m)	-	-	-	-	-	0.6	0.6	0.6
Total per one side (m)	4	5	6	7	8	10	11	13
ROW (m)	**8**	**10**	**12**	**14**	**16**	**20**	**22**	**26**

ANNEX-6

Annex-6
Table A6-1: Financial and Economic Prices of New Vehicles

Code	Selected Category	HDM-4 Base Vehicle Type	HDM-4 Description	Financial New Vehicle Price (Rs)	Economic New Vehicle Price (Rs)
MCL	Motor Cycle	Motorcycle	motorcycle or scooter	210,310.00	99,625.77
TWL	Three Wheeler	Car Small	small passenger cars	559,518.11	189,055.13
CAR	Car, SUV, Cab, Small Van	Car Medium	medium passenger cars	5,401,673.15	1,653,211.71
VAN	Van (10 -16 Seats)	Bus Light	light bus (approximately < 3.5 tonnes)	8,060,811.28	3,182,946.21
MBU	Medium Bus (16 - 40 seats)	Bus Medium	medium bus (3.5 - 8.0 tonnes)	9,057,556.02	3,576,527.55
LBU	Large Bus (56 seats)	Bus Heavy	multi-axle or large two-axle bus	7,811,821.16	5,317,456.75
LGV	Small Lorries	Truck Light	small two-axle rigid truck (approx. < 3.5 tonnes)	1,759,755.04	901,282.99
MG1	Medium Good Vehicle (2-axle, 6 wheels, < 8.5 Tons)	Truck Medium	medium two-axle rigid truck (> 3.5 tonnes)	4,299,352.55	2,326,426.53
MG2	Heavy Good Vehicle (2-axle, 6 wheels, > 8.5 Tons)	Truck Medium	medium two-axle rigid truck (> 3.5 tonnes)	4,429,503.38	2,543,839.37
HG3	Lorry (Large 3-axle, 10 wheels)	Truck Heavy	multi-axle rigid truck	7,732,068.76	4,183,906.69
ART	Heavy Good Vehicle (Articulated truck with trailer)	Truck Articulated	articulated truck or truck with drawbar trailer	5,824,994.58	4,765,441.39

Note: Economic values of the vehicles are based on units imported on 1st and 2nd quarter of 2016 from all the countries.

Table A6-2
Fuel and Lubricating Oil Prices

	Vehicle Types	Economic costs (Rs/ltr)
Petrol	Motor Cycle, Three Wheeler, Passenger Car	49.83
Diesel	Van, Buses, Goods Vehicles, Trucks	47.35
Lubricants	All Categories	263.27

Table A6-3
Passenger Time Costs

Vehicle Type	Passenger Time costs in working time (Rs/hr)	Passenger Time costs in non-working time (Rs/hr)
MCL	86.48	0
TWL	86.48	0
CAR	479.20	0
VAN	217.96	0
MBU	52.28	0
LBU	52.28	0

Table A6-4
Estimated Cargo Inventory Costs

	Payload (Tonnes)	Cargo cost (Rs/hr)
LGV	4.92	517.00
MG1	5.92	850.00
MG2	12.22	850.00
HG3	13.65	1250.00
ART	14.29	1250.00

Table A6- 5
Characteristics of the Representative Vehicles

	MCL	TWL	CAR	VAN	MBU	LBU	LGV	MG1	MG2	HG3	ART	FVH
PCSE	0.4	0.8	1.0	1.0	1.5	1.6	1.3	1.4	1.6	1.7	1.8	1.8
No. of Wheels	2	3	4	4	6	6	4	6	6	10	18	6
No. of Axles	2	2	2	2	2	2	2	2	2	3	6	3
Tire Type	bias	bias	radial	radial	bias	bias	bias	bias	bias	bias	bias	bias
Base No. of Recaps	0	0	0	0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Retread cost (% of new)	0	0	0	0	33	33	33	33	33	33	33	33
Annual kms	15,000	23,000	25,000	50,000	70,000	80,000	35,000	50,000	50,000	70,000	80,000	10,000
Annual Working Hours	500	600	500	600	1,800	2,200	1,300	1,500	1,500	2,000	2,000	300
Average Life of Vehicle	12	12	15	12	14	14	12	15	15	15	15	15
Private Use (% of total)	100	100	100	50	0	0	20	5	0	0	0	0
Passengers per Vehicle	1.37	1.2	1.82	3.64	17.6	40	2.2	2.2	2	2	2.11	1.1
Work-related passenger trips (% of total)	75	50	75	50	75	75	0	0	0	0	0	0
ESALF	0	0	0	0.0007	0.066	0.3728	0.1	0.232	6.284	10.404	12.79	0.0398
Operating Weight (tons)	0.2	0.9	1.2	1.65	4.49	6.57	4.92	5.92	12.22	13.65	14.29	4.02

Table A6- 6
Economic Unit Costs (Rs) of Vehicle Components

	MCL	TWL	CAR	VAN	MBU	LBU	LGV	MG1	MG2	HG3	ART	FVH
New Vehicle Price	99,625.77	189,055.13	1,653,211.71	3,182,946.21	3,576,527.55	5,317,456.75	901,282.99	2,326,426.53	2,543,839.37	4,183,906.69	4,765,441.39	1,271,586.26
New Tire	2,072.62	1,606.83	4,739.07	6,153.49	6,524.66	8,155.82	6,153.49	6,524.66	6,524.66	8,155.82	10,194.78	6,976.18
Fuel (per liter)	49.83	49.83	49.83	47.35	47.35	47.35	47.35	47.35	47.35	47.35	47.35	47.35
Lubricating Oil (per liter)	263.27	263.27	263.27	263.27	263.27	263.27	263.27	263.27	263.27	263.27	263.27	263.27
Maintenance Labour (per hr)	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Crew Wages (per hr)	131.25	131.25	131.25	131.25	187.50	187.50	131.25	187.50	234.37	234.37	234.37	131.25
Annual Overheads	10,694.27	14,625.08	86,949.85	167,635.50	149,350.52	141,345.94	34,835.25	74,185.53	77,204.95	129,928.63	151,875.16	21,357.61
Annual Interest (% per annum)	12	12	12	12	12	12	12	12	12	12	12	12
Passenger Working Time (per hr)	86.48	86.48	479.20	217.96	52.28	52.28	0	0	0	0	0	0
Passenger Non-Working Time (per hr)	0	0	0	0	0	0	0	0	0	0	0	0
Cargo Inventory (per hr)	0	0	0	0	0	0	517.00	850.00	850.00	1,250.00	1,250.00	517.00

NB. 1) Economic values of the vehicles are based on units imported on 1st and 2nd quarter of 2016 from all the countries.
2) Assume the tire price of LBU, HG3 is 25% more than the price of MBU.
3) Assume the price of ART tire is 25% of price of LBU.

The Cost of Routine Maintenance of Flexible Pavements

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
Pot hole Patching	(Rs/m^2)	1,400.00	1,850.00
Crack sealing	(Rs/m^2)	80.00	110.00
Edge Break Repair	(Rs/m^2)	1,650.00	2,180.00
Patch Sealing	(Rs/m^2)	250.00	330.00
Patch Raveling	(Rs/m^2)	240.00	320.00
Shoulder Repair	(Rs/km)	29,590.00	39,060.00
Drain Repair	(Rs/km)	12,870.00	16,990.00
Vegetation Control	(Rs/km)	8,650.00	11,420.00

The Cost of Periodic Maintenance of Flexible Pavements

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
AC Overlay (40mm) HMA	(Rs/m^2)	780.00	1,070.00
AC Overlay (50mm) HMA	(Rs/m^2)	960.00	1,320.00
AC Overlay (60mm) HMA	(Rs/m^2)	1,140.00	1,560.00
AC Overlay (70mm) HMA	(Rs/m^2)	1,340.00	1,840.00
AC Overlay (80mm) HMA	(Rs/m^2)	1,530.00	2,100.00
AC Overlay (70mm) PMA	(Rs/m^2)	1,470.00	2,010.00
AC Overlay (80mm) PMA	(Rs/m^2)	1,670.00	2,290.00
AC Overlay (100mm) PMA	(Rs/m^2)	2,080.00	2,850.00
AC Overlay (125mm) PMA	(Rs/m^2)	2,580.00	3,530.00

The Cost of Reconstruction of Flexible Pavements

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
Recon. with 40 mm HMA	(Rs/km)	17,926,480.00	24,559,280.00
Recon. with 50 mm HMA	(Rs/km)	21,020,940.00	28,798,690.00
Recon. with 60 mm HMA	(Rs/km)	25,149,490.00	34,454,800.00
Recon. with 80 mm HMA	(Rs/km)	32,599,440.00	44,661,230.00
Recon. with 100 mm HMA	(Rs/km)	49,389,820.00	67,664,050.00
Recon. with 125 mm PMA	(Rs/km)	98,232,430.00	134,578,430.00
Recon. with 150 mm PMA	(Rs/km)	120,849,130.00	165,563,310.00

HMA – Hot Mix Asphalt
PMA – Polymer Modified Asphalt

The Cost of Strengthen of Flexible Pavements

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
Strength. with 40 mm HMA	(Rs/km)	21,510,140.00	29,468,890.00
Strength. with 50 mm HMA	(Rs/km)	22,395,210.00	30,681,440.00
Strength. with 60 mm HMA	(Rs/km)	26,292,910.00	36,021,290.00
Strength. With 80 mm HMA	(Rs/km)	29,760,170.00	40,771,430.00
Strength. with 100 mm HMA	(Rs/km)	45,979,010.00	62,991,240.00
Strength. with 125 mm PMA	(Rs/km)	93,733,450.00	128,414,830.00
Strength. with 150 mm PMA	(Rs/km)	116,354,840.00	159,406,130.00

The Cost of Widening of Flexible Pavements

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
Partial Widening (1 m on both sides) and Rehab of Existing Surface with 40mm Overlay HMA	(Rs/km)	34,110,890.00	46,731,920.00
Add 1 Lane (3.65 m) and Rehab of Existing Surface 50mm Overlay HMA	(Rs/km)	51,556,160.00	70,631,940.00
Add 1 Lane (3.65 m) and Rehab of Existing Surface 70mm Overlay HMA	(Rs/km)	54,137,420.00	74,168,270.00
Add 2 Lanes (7.3 m) and Rehab of Existing Surface 100mm Overlay HMA	(Rs/km)	101,019,140.00	138,396,220.00
Add 2 Lanes (7.3 m) and Rehab of Existing Surface 125 mm Overlay PMA	(Rs/km)	120,895,650.00	165,627,040.00
Add 2 Lanes (7.3 m) and Rehab of Existing Surface 150 mm Overlay PMA	(Rs/km)	126,063,390.00	172,706,840.00

HMA – Hot Mix Asphalt
PMA – Polymer Modified Asphalt

The Cost of Maintenance of Rigid Pavements

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
Tied Concrete Shoulder	Rs/km	50,000.00	66,000.00
Retrofit Edge Drains	Rs/km	10,000.00	13,200.00
Joint Sealing	Rs/m	80.00	105.60
Shoulder Repair	Rs/km-Year	20,000.00	26,400.00
Bonded Overlay	Rs/m^2	1,400.00	1,848.00
Partial Depth Repair	Rs/m	100.00	132.00
Diamond Grinding	Rs/m^2	500.00	660.00
Full Depth Repair	Rs/m^2	1,500.00	1,980.00
Thin Bonded Overlay	Rs/m^2	1,000.00	1,320.00
Slab Replacement	Rs/m^2	31,250.00	41,250.00

The Cost of Maintenance of Gravel Roads

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
Grading	(Rs/km)	40,740.00	55,810.00
Regraveling	(Rs/m^3)	980.00	1,340.00
Spot Regraveling	(Rs/m^3)	1,500.00	2,060.00
Gravel Priming	(Rs/m^3)	3,440.00	4,710.00

The Cost of Upgrading of Gravel Roads

Works Name	Unit	Economic Cost (Rs)	Financial Cost (Rs)
Upgrading to SBSD	(Rs/km)	12,689,340.00	17,384,400.00
Upgrading to DBSD	(Rs/km)	20,663,580.00	28,309,100.00

The Cost of Widening and Improvement for Revised work Program of NRMP (2020-2029)

Section	Add_1		PW	Recon	
	T > 10,000	T < 10,000			
S4	116,250,435.33	100,674,546.28		155,207,421.61	Rs/km
S3	103,528,168.30	88,361,533.42	74,753,134.85	140,546,213.25	Rs/km
S2	89,607,167.52	80,119,288.49	65,514,909.07	119,851,047.52	Rs/km
S1	83,549,803.98	72,994,622.33	60,742,911.45	95,842,293.24	Rs/km
S0			49,009,710.79	68,616,339.90	Rs/km

AC Strength	5,088,486.99	Rs/m/km

Overlay Existing AC	**T > 10,000**	4,332,756.25	Rs/m/km
	T < 10,000	3,275,394.20	Rs/m/km

Add_2	S7	341,338,587.98	Rs/km
	S6	285,955,826.81	Rs/km
	S5	256,935,654.99	Rs/km

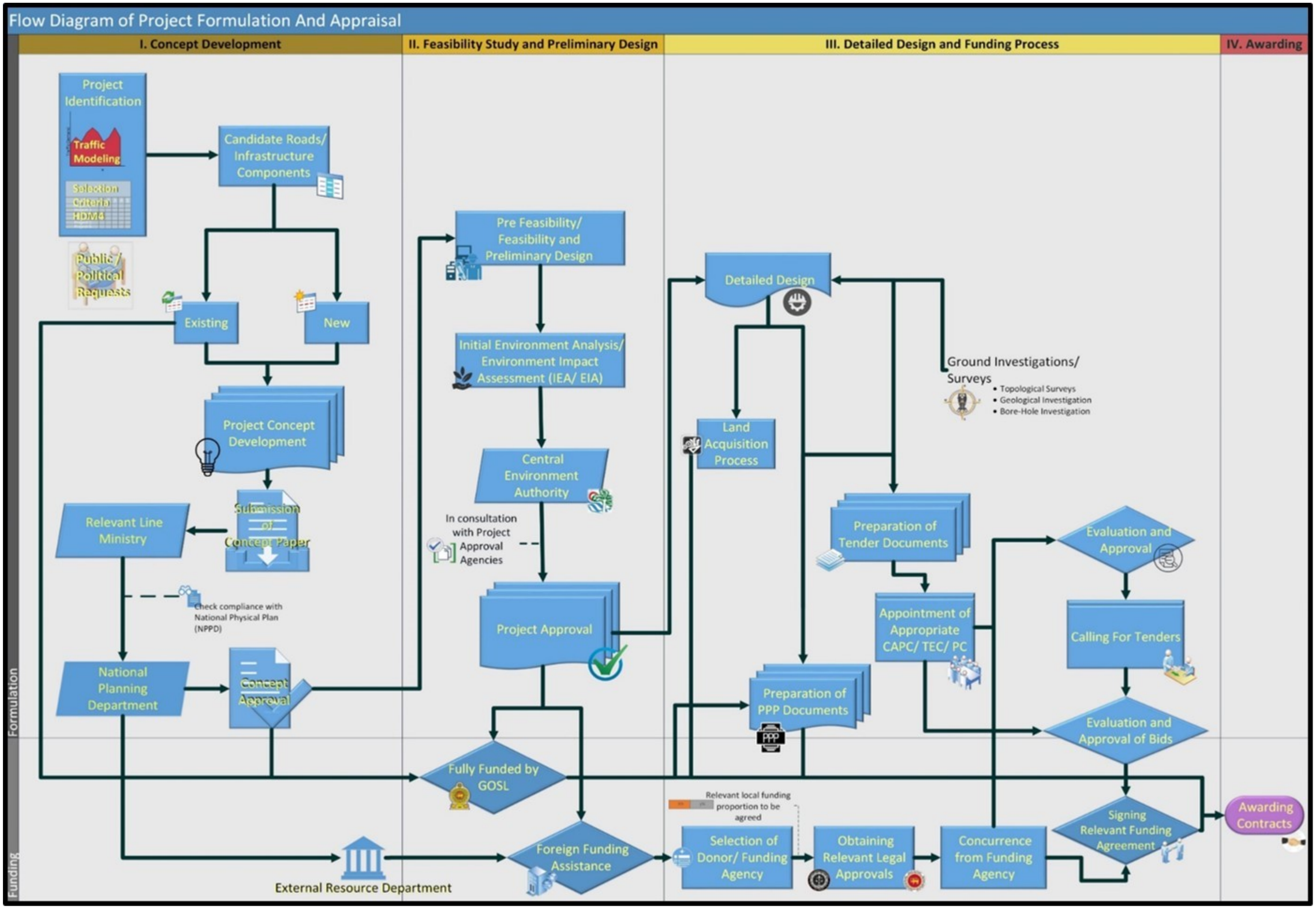
Recon Existing Width	15,574,372.65	Rs/m/km
Upgrading GR	33,121,647.00	Rs/km

Overlay	**T < 20,000**	1,544,400.00	Rs/m/km
	T > 20,000	2,351,700.00	Rs/m/km

Gravel Prime	688,837.50	Rs/km

ANNEX-7

Flow Diagram of Project Formulation And Appraisal



ANNEX-8

Ongoing Road Projects

Route No	Road Name	From (km)	To (km)	Length /km	Funding	PMU/Division
A004	Colombo - Ratnapura - Wellawaya - Batticaloa	23.31	27.3	3.99	NHSP	ADB
A005	Peradeniya - Badulla - Chenkaladi	132.8	271.69	138.89	Badulla - Chenkaladi	BCRIP
B084	Colombo - Horana	23.4	28.35	4.95		
B094	Dehiwela - Maharagama	0	2.51	2.51	GOSL (Widen & Improvement)	Colombo
B112	Elahera - Giritale	29.08	40.2	11.12	GOSL (Widen & Improvement)	Polonnaruwa
B139	Gonadeniya - Udugama	0	4.45	4.45	GOSL (Widen & Improvement)	Galle
B174	Kaduwela - Athurugiriya	0	9.45	9.45	OFID-3	MFAP
B180	Kalalpitiya - Ukuwala - Elkaduwa	2.1	4	1.9	GOSL (Widen & Improvement)	Matale
B229	Kohuwela - Dehiwela	0	2.4	2.4	GOSL (Widen & Improvement)	Colombo
B292	Miriswatte - Waturugama	3	10.26	7.26	GOSL (Widen & Improvement)	Gampaha
B303	Nagoda - Gonadeniya	0	3.59	3.59	GOSL (Widen & Improvement)	Galle
B371	Point Pedro - Maruthankerny	15.03	29.16	14.13	GOSL (Widen & Improvement)	Mullaitivu
B402	Soranapattu - Thalayadi	0	7.27	7.27	GOSL (Widen & Improvement)	Mullaitivu
B435	Urugodawatte - Ambatale	0	7.67	7.67	OFID-2	MFAP
B449	Wadduwa - Morontuduwa	0	5.26	5.26	OFID-3	MFAP
B451	Walgama - Aturugiriya	0	1.21	1.21	OFID-3	MFAP
B483	Sammanthurai - Malkampiddi - Deegawapiya	13	14.5	1.5	GOSL (Widen & Improvement)	Akkaraipattu
B544	Moragolla - Bellana	0	9.86	9.86	OFID-3	MFAP
B547	Kawdana Attidiya	0	2.5	2.5	GOSL (Widen & Improvement)	Colombo
B584	Lathpandura Molkawa	0	11.69	11.69	RMTF	Kalutara
B587	Sooriyawewa Hathporuwa Moraketiya	8.1	10.1	2	GOSL (Widen & Improvement)	Monaragala
B597	Kandawala Katunayake	0	1.32	1.32	GOSL (Widen & Improvement)	Gampaha
B598	Kandawala Katunayake	1.32	4.61	3.29	GOSL (Widen & Improvement)	Gampaha

Ongoing Bridge Projects

No	Road No	Road Name	Bridge No	Overall Length (m)	Province	District	Remarks
1	AB04	Kaduwela -Biyagama Road	1/1	92.8	Western	Colombo	Kuwait Package 1
2	B123	Galegedara-Horana Road	14/3	11.5	Western	Colombo	Kuwait Package 1
3	B123	Galegedera-Horana Road	14/8	11.5	Western	Colombo	Kuwait Package 1
4	A021	Kegalle-Karawenella-Bulathkohupitiya Road	11/4	31.6	Sabaragamuwa	Kegalle	Kuwait Package 1
5	B445	Veyangoda-Ruwanwella Road	32/1	19.3	Sabaragamuwa	Kegalle	Kuwait Package 1
6	B410	Tangalle-Weeraketiya Road	2/2	6.9	Southern	Hambanthota	Kuwait Package 1
7	B410	Tangalle-Weeraketiya Road	2/3	13.9	Southern	Hambanthota	Kuwait Package 1
8	B018	Ampalanthurai-Veeramunai Road	10/2	50.4	Eastern	Batticaloa	Kuwait Package 1
9	A003	Peliyagoda – Puttalam (Kochchikade bridge)	38/3	103.0	Western	Gampaha	new bridge on new alignment. Austrian funding
10	A009	Kandy - Jaffna	310/1	76.0	Northern	Jaffna	JICA Package 2
11	A009	Kandy - Jaffna	315/1	76.0	Northern	Jaffna	JICA Package 2
12	A014	Medawachchiya - Mannar - Talaimannar	31/1	38.0	Northern	Vauniya	JICA Package 2
13	A032	Navakkuli - Kerativu - Mannar	39/2	95.0	Northern	Kilinochchi	JICA Package 2
14	A032	Navakkuli - Kerativu - Mannar	66/5	76.0	Northern	Mannar	JICA Package 2
15	B403	Thallady - Arippu - Marichchukaddy Southcoast	7/1	57.0	Northern	Mannar	JICA Package 2
16	B403	Thallady - Arippu - Marichchukaddy Southcoast	21/1	76.0	Northern	Mannar	JICA Package 2
17	B403	Thallady - Arippu - Marichchukaddy Southcoast	39/2	95.0	Northern	Mannar	JICA Package 2
18	A015	Batticaloa - Tirikkondiadimadu - Trincomalee	1/1	27.0	Eastern	Batticaloa	CRIP
19	A004	Colombo - Ratnapura - Wellawaya - Batticaloa	53/1	13.5	Western	Colombo	CRIP
20	A004	Colombo - Ratnapura - Wellawaya - Batticaloa	53/2	12.0	Western	Colombo	
21	B457	Warakapola - Ruwanwella	23/1	70.0	Sabaragamuwa	Kegalle	CRIP
22	B614	Battuluoya - Udappuwa - Andimunai	6.10 km	95.0	North Western	Puttalam	New Bridge : CRIP
23	B640	Nainamadama-Iranawila-Chilaw	15.50 km		North Western	Puttalam	New Bridge CRIP

Committed Road Projects

Route No	Road Name	From (km)	To (km)	Funging/PMU/Division
A011	Maradankadawela Habarana Tirikkondiadimadu	0	25.09	iRoad
AB17	Jaffna - Manipay - Karainagar	0	27.45	to be finalized
AB21	Jaffna - Ponnalai - Point Pedro	0.9	36.5	to be finalized
AB21	Jaffna - Ponnalai - Point Pedro	41	55.4	to be finalized
AB31	Puloly - Kodikamam - Kachchai	0	14.5	to be finalized
AB039	Valukkairaru - Pungudutivu - Kurikadduwan	0	24.54	to be finalized
B004	Akuressa - Ketanwila	0	7.21	iRoad
B048	Batukotuwa - Medirigiriya	0	8.61	to be finalized
B069	Buwelikada - Lewella	0	0.85	to be finalized
B099	Deniyaya - Viharahena	2	7.93	iRoad
B114	Elpitiya - Avittawa - Lewwanduwa	0	9.83	iRoad
B128	Galle - Baddegama	0	18.53	SRCP
B150	Hedeniya - Pujapitiya	0	3.4	to be finalized
B155	Hingurakgoda - Yoda Ela	0	5.36	to be finalized
B182	Kalawewa - Avukana	0	4.51	iRoad
B205	Katugastota - Madawala - Bambarella	0	6.26	to be finalized
B238	Kottawa - Batemulla	1.62	12.95	Expressway Savings,STDP
B248	Labuduwa - Wandurambe - Sandarawela	0	2.2	Expressway Savings,STDP
B256	Madawala - Rajawella	0	8.22	to be finalized
B295	Moratuwa - Piliyandala	0	2.62	OFID-2/MFAP
B310	Nartupana - Warakagoda	0	3.21	to be finalized
B325	Nelukkulam - Neriyakulam	7.5	12.5	GOSL (Widen & Improvement)/Costruction
B325	Nelukkulam - Neriyakulam	12.5	21.6	to be finalized
B367	Piliyandala - Maharagama	0	6.38	OFID-2/MFAP
B371	Point Pedro - Maruthankerny	0	15.03	to be finalized
B407	St. Joseph's Street, Negombo	0	1.84	to be finalized
B452	Walgama - Diyagama	0	7.08	OFID-2/MFAP
B548	Ranna Angunakolapelessa Vatiya	0	16.14	Expressway Savings,STDP
B549	Embilipitiya - Moraketiya - Kiriibbanara - Uda Mauara	0	8.04	Extension of Southern Expressway
B550	Dharmashoka Mawatha	0	2.6	to be finalized
B587	Sooriyawewa Hathporuwa Moraketiya	10.1	14.1	to be finalized
B619	Sardhapura - Kanniya	0	5.16	to be finalized
B620	Kanniya - Illuppaikulam	0	4.05	to be finalized

Committed Bridges for Reconstruction

No	Road No	Road Name	Bridge No	Overall Length (m)	Overall Width (m)	Province	District	Remarks
1	A021	Kegalle - Bulathkohupitiya - Karawanella	39/4	9.10	6.95	Sabaragamuwa	Kegalle	Kuwait Package 2
2	B093	Dehiowita - Deraniyagala - Noor	2/2	7.50	4.60	Sabaragamuwa	Kegalle	Kuwait Package 2
3	B093	Dehiowita - Deraniyagala - Noor	5/1	29.80	4.80	Sabaragamuwa	Kegalle	Kuwait Package 2
4	B093	Dehiowita - Deraniyagala - Noor	7/1	9.60	4.60	Sabaragamuwa	Kegalle	Kuwait Package 2
5	B093	Dehiowita - Deraniyagala - Noor	8/9	21.00	4.60	Sabaragamuwa	Kegalle	Kuwait Package 2
6	B093	Dehiowita - Deraniyagala - Noor	14/1	21.40	4.80	Sabaragamuwa	Kegalle	Kuwait Package 2
7	B127	Galigomuwa - Ruwanwella	16/1	13.70	9.10	Sabaragamuwa	Kegalle	Kuwait Package 2
8	B127	Galigomuwa - Ruwanwella	20/2	6.20	8.00	Sabaragamuwa	Kegalle	Kuwait Package 2
9	B279	Mawanella - Hemmaththagama - Singhapitiya	17/1	31.20	4.30	Sabaragamuwa	Kegalle	Kuwait Package 2
10	A001	Colombo - Kandy	31/3	22.80	15.30	Western	Gampaha	Kuwait Package 3
11	A001	Colombo - Kandy	32/2	33.00	15.40	Western	Gampaha	Kuwait Package 3
12	A010	Katugastota - Kurunegala - Puttlam	75/1	121.00	5.80	North Western	Kurunegala	Kuwait Package 3
13	A010	Katugastota - Kurunegala - Puttlam	76/1	18.40	5.60	North Western	Kurunegala	Kuwait Package 3
14	A032	Navakkuli - Kerativu - Mannar	78/5	35.00	10.20	Northern	Killinochchi	Kuwait Package 3
15	A035	Paranthan - Kachchai - Mullaitivu	53/1	21.60	5.50	Northern	Mullaitivu	Kuwait Package 3
16	B419	Thoppu - Madampe	16/1	19.90	6.40	North Western	Puttalam	Kuwait Package 3
17	B614	Battuluoya - Udappuwa - Andimunai	3/5	35.25	6.75	North Western	Puttalam	Kuwait Package 3
18	B413	Tennekumbura - Rikiligaskada - Ragala	24/3	36.80	4.55	Central	Nuwaraeliya	Exim Bank Fund
19	B413	Tennekumbura - Rikiligaskada - Ragala	42/1	36.00	5.60	Central	Nuwaraeliya	Exim Bank Fund
20	B195	Kandy - Kirimetiya	3/2	9.10	5.60	Central	Kandy	Exim Bank Fund
21	B332	Nuwara Eliya - Ragala - Uda Pussellawa	23/3	14.70	7.30	Central	Nuwaraeliya	Exim Bank Fund
22	B332	Nuwara Eliya - Ragala - Uda Pussellawa	27/2	6.50	5.60	Central	Nuwaraeliya	Exim Bank Fund
23	B332	Nuwara Eliya - Ragala - Uda Pussellawa	30/4	9.10	7.30	Central	Nuwaraeliya	Exim Bank Fund
24	B332	Nuwara Eliya - Ragala - Uda Pussellawa	31/5	4.00	6.90	Central	Nuwaraeliya	Exim Bank Fund
25	B332	Nuwara Eliya - Ragala - Uda Pussellawa	34/8	7.40	4.50	Central	Nuwaraeliya	Exim Bank Fund

No	Road No	Road Name	Bridge No	Overall Length (m)	Overall Width (m)	Province	District	Remarks
26	B332	Nuwara Eliya - Ragala - Uda Pussellawa	37/1	5.40	4.60	Central	Nuwaraeliya	Exim Bank Fund
27	B332	Nuwara Eliya - Ragala - Uda Pussellawa	38/5	10.20	4.60	Central	Nuwaraeliya	Exim Bank Fund
28	B471	Welimada - Kirklees	1/1	33.50	6.70	Uva	Badulla	Exim Bank Fund
29	B471	Welimada - Kirklees	2/5	25.20	5.00	Uva	Badulla	Exim Bank Fund
30	B471	Welimada - Kirklees	7/7	6.80	4.80	Uva	Badulla	Exim Bank Fund

ANNEX-9

Proposed Bridges for Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
1	Colombo - Kandy	A001	31/3	Western	Gampaha	168.0	Reconstruction
2	Colombo - Kandy	A001	32/2	Western	Gampaha	588.0	Reconstruction
3	Colombo - Galle - Hambantota - Wellawaya	A002	20/1	Western	Kalutara	1,500.0	Reconstruction
4	Colombo - Galle - Hambantota - Wellawaya	A002	52/1	Western	Kaluthara	535.0	Reconstruction
5	Colombo - Galle - Hambantota - Wellawaya	A002	53/1	Western	Kalutara	152.0	Reconstruction
6	Colombo - Galle - Hambantota - Wellawaya	A002	58/1	Western	Kalutara	91.0	Reconstruction
7	Colombo - Galle - Hambantota - Wellawaya	A002	99/1	Southern	Galle	58.0	Reconstruction
8	Colombo - Galle - Hambantota - Wellawaya	A002	242/1	Southern	Hambantota	50.0	Reconstruction
9	Peliyagoda - Puttalam	A003	76/2	North Western	Puttalam	43.0	Reconstruction
10	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	31/1	Western	Colombo	275.0	Reconstruction
11	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	38/1	Western	Colombo	90.0	Reconstruction
12	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	40/1	Western	Colombo	120.0	Reconstruction
13	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	41/1	Western	Colombo	165.0	Reconstruction
14	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	53/1	Western	Colombo	270.0	Reconstruction
15	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	53/3	Western	Colombo	160.0	Reconstruction
16	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	187/11	Uva	Badulla	43.0	Reconstruction
17	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	188/15	Uva	Badulla	43.0	Reconstruction
18	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	212/9	Uva	Badulla	43.0	Reconstruction
19	Peradeniya - Badulla - Chenkaladi	A005	94/7	Uva	Badulla	120.0	Reconstruction
20	Ambepussa - Kurunegala - Trincomalee	A006	101/1	Central	Matale	39.0	Reconstruction
21	Avissawella - Hatton - Nuwara Eliya	A007	11/4	Sabaragamuwa	Kegalle	104.0	Reconstruction
22	Avissawella - Hatton - Nuwara Eliya	A007	48/2	Central	Nuwaraeliya	43.0	Reconstruction
23	Panadura - Nambapana - Ratnapura	A008	49/2	Sabaragamuwa	Ratnapura	77.0	Reconstruction
24	Panadura - Nambapana - Ratnapura	A008	54/1	Sabaragamuwa	Ratnapura	29.0	Reconstruction
25	Panadura - Nambapana - Ratnapura	A008	68/1	Sabaragamuwa	Ratnapura	43.0	Reconstruction
26	Kandy - Jaffna	A009	4/1	Central	Kandy	91.0	Reconstruction
27	Kandy - Jaffna	A009	10/9	Central	Kandy	60.0	Reconstruction
28	Kandy - Jaffna	A009	71/4	Central	Matale	42.0	Reconstruction
29	Kandy - Jaffna	A009	90/3	North Central	Anuradhapura	150.0	Reconstruction
30	Kandy - Jaffna	A009	185/2	Northern	Jaffna	95.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
31	Katugastota - Kurunegala - Puttalam	A010	76/1	North Western	Kununegala	100.0	Reconstruction
32	Maradankadawela - Habarana - Tirikkondiadimadu	A011	31/4	North Central	Polonnaruwa	98.0	Reconstruction
33	Maradankadawela - Habarana - Tirikkondiadimadu	A011	113/3	Eastern	Batticaloa	28.0	Reconstruction
34	Maradankadawela Habarana Tirikkondiadimadu	A011	117/1	Eastern	Batticaloa	28.0	Reconstruction
35	Medawachchiya - Mannar - Talaimannar	A014	4/2	North Central	Anuradhapura	38.0	Reconstruction
36	Medawachchiya - Mannar - Talaimannar	A015	42/2	Northern	Vavuniya	250.0	Reconstruction
37	Batticaloa - Tirikkondiadimadu - Trincomalee	A015	108/3	Eastern	Trincomalee	78.0	Reconstruction
38	Batticaloa - Tirikkondiadimadu - Trincomalee	A015	114 km	Eastern	Trincomale	352.0	New Bridge
39	Galle - Deniyaya - Madampe	A017	9/6	Southern	Galle	140.0	Reconstruction
40	Galle - Deniyaya - Madampe	A017	50/1	Southern	Matara	43.0	Reconstruction
41	Galle - Deniyaya - Madampe	A017	61/5	Southern	Matara	40.0	Reconstruction
42	Galle - Deniyaya - Madampe	A017	88/12	Sabaragamuwa	Ratnapura	16.0	Reconstruction
43	Galle - Deniyaya - Madampe	A017	89/8	Sabaragamuwa	Ratnapura	15.0	Reconstruction
44	Galle - Deniyaya - Madampe	A017	92/5	Sabaragamuwa	Ratnapura	15.0	Reconstruction
45	Galle - Deniyaya - Madampe	A017	92/8	Sabaragamuwa	Ratnapura	40.0	Reconstruction
46	Galle - Deniyaya - Madampe	A017	93/4	Sabaragamuwa	Ratnapura	28.0	Reconstruction
47	Galle - Deniyaya - Madampe	A017	106/13	Sabaragamuwa	Ratnapura	28.0	Reconstruction
48	Galle - Deniyaya - Madampe	A017	106/14	Sabaragamuwa	Ratnapura	43.0	Reconstruction
49	Galle - Deniyaya - Madampe	A017	115/4	Sabaragamuwa	Ratnapura	32.0	Reconstruction
50	Galle - Deniyaya - Madampe	A017	116/5	Sabaragamuwa	Ratnapura	43.0	Reconstruction
51	Galle - Deniyaya - Madampe	A017	127/3	Sabaragamuwa	Ratnapura	22.0	Reconstruction
52	Galle - Deniyaya - Madampe	A017	131/1	Sabaragamuwa	Ratnapura	188.0	Reconstruction
53	Pelmadulla - Embilipitiya - Nonagama	A018	4/1	Sabaragamuwa	Ratnapura	35.0	Reconstruction
54	Kegalle - Bulathkohupitiya - Karawanella	A021	17/8	Sabaragamuwa	Kegalle	78.0	Reconstruction
55	Kegalle - Bulathkohupitiya - Karawanella	A021	22/5	Sabaragamuwa	Kegalle	150.0	Reconstruction
56	Kegalle - Bulathkohupitiya - Karawanella	A021	28/2	Sabaragamuwa	Kegalle	90.0	Reconstruction
57	Kegalle - Bulathkohupitiya - Karawanella	A021	29/5	Sabaragamuwa	Kegalle	120.0	Reconstruction
58	Kegalle - Bulathkohupitiya - Karawanella	A021	31/2	Sabaragamuwa	Kegalle	60.0	Reconstruction
59	Kegalle - Bulathkohupitiya - Karawanella	A021	39/4	Sabaragamuwa	Kegalle	360.0	Reconstruction
60	Siyambalanduwa - Damana - Ampara	A025	30/3	Eastern	Ampara	128.0	Reconstruction
61	Anuradhapura - Padeniya	A028	75/4	North Western	Kurunegala	570.0	Reconstruction
62	Vavuniya - Horowopotana	A029	41/2	North Central	Anuradhapura	15.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
63	Karativu - Ampara	A031	1/2	Eastern	Ampara	350.0	Reconstruction
64	Navakkuli - Kerativu - Mannar	A032	36/3	Northern	Kilinochchi	20.0	Reconstruction
65	Navakkuli - Kerativu - Mannar	A032	36/4	Northern	Kilinochchi	20.0	Reconstruction
66	Navakkuli - Kerativu - Mannar	A032	70/1	Northern	Vavuniya	200.0	Reconstruction
67	Navakkuli - Kerativu - Mannar	A032	71/5	Northern	Vavuniya	190.0	Reconstruction
68	Navakkuli - Kerativu - Mannar	A032	72/4	Northern	Vavuniya	170.0	Reconstruction
69	Navakkuli - Kerativu - Mannar	A032	74/6	Northern	Vavuniya	160.0	Reconstruction
70	Navakkuli - Kerativu - Mannar	A032	78/5	Northern	Mannar	290.0	Reconstruction
71	Navakkuli - Kerativu - Mannar	A032	85/3	Northern	Mannar	160.0	Reconstruction
72	Navakkuli - Kerativu - Mannar	A032	86/4	Northern	Mannar	180.0	Reconstruction
73	Ja-Ela - Ekala - Gampaha - Yakkala	A033	8/5	Western	Gampaha	57.0	Reconstruction
74	Ja-Ela - Ekala - Gampaha - Yakkala	A033	10/3	Western	Gampaha	42.0	Reconstruction
75	Ja-Ela - Ekala - Gampaha - Yakkala	A033	13/2	Western	Gampaha	103.0	Reconstruction
76	Paranthan - Kachchai - Mullaitivu	A035	5/5	Northern	Mullaitivu	14.0	Reconstruction
77	Paranthan - Kachchai - Mullaitivu	A035	6/1	Northern	Mullaitivu	18.0	Reconstruction
78	Paranthan - Kachchai - Mullaitivu	A035	8/4	Northern	Mullaitivu	18.0	Reconstruction
79	Paranthan - Kachchai - Mullaitivu	A035	9/1	Northern	Mullaitivu	55.0	Reconstruction
80	Paranthan - Kachchai - Mullaitivu	A035	10/1	Northern	Mullaitivu	18.0	Reconstruction
81	Paranthan - Kachchai - Mullaitivu	A035	11/1	Northern	Mullaitivu	24.0	Reconstruction
82	Paranthan - Kachchai - Mullaitivu	A035	11/3	Northern	Mullaitivu	18.0	Reconstruction
83	Paranthan - Kachchai - Mullaitivu	A035	11/5	Northern	Mullaitivu	50.0	Reconstruction
84	Paranthan - Kachchai - Mullaitivu	A035	15/3	Northern	Mullaitivu	35.0	Reconstruction
85	Paranthan - Kachchai - Mullaitivu	A035	20/3	Northern	Mullaitivu	18.0	Reconstruction
86	Paranthan - Kachchai - Mullaitivu	A035	50/1	Northern	Mullaitivu	2,400.0	Reconstruction
87	Paranthan - Kachchai - Mullaitivu	A035	53/1	Northern	Mullaitivu	114.0	Reconstruction
88	Ampara - Inginiyagala	AB001	2/1	Eastern	Ampara	29.0	Reconstruction
89	Ampara - Inginiyagala	AB001	5/4	Eastern	Ampara	43.0	Reconstruction
90	Ampara - Inginiyagala	AB001	10/2	Eastern	Ampara	42.0	Reconstruction
91	Colombo - Hanwella Low Level Road	AB010	9/1	Western	Colombo	200.0	Reconstruction
92	Colombo - Hanwella Low Level Road	AB010	15/2	Western	Colombo	100.0	Reconstruction
93	Colombo - Hanwella Low Level Road	AB010	26/4	Western	Colombo	320.0	Reconstruction
94	Colombo - Hanwella Low Level Road	AB010	28/1	Western	Colombo	290.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
95	Jaffna - Manipay - Karainagar	AB017	11/1	Northern	Jaffna	78.0	Reconstruction
96	Jaffna - Manipay - Karainagar	AB017	27/1	Northern	Jaffna	22.0	Reconstruction
97	Jaffna - Point Pedro	AB020	21/3	Northern	Jaffna	370.0	Reconstruction
98	Jaffna - Ponnalai - Point Pedro	AB021	21/1	Northern	Jaffna	95.0	Reconstruction
99	Jaffna - Ponnalai - Point Pedro	AB021	25/1	Northern	Jaffna	22.0	Reconstruction
100	Jaffna - Ponnalai - Point Pedro	AB021	49/1	Northern	Jaffna	22.0	Reconstruction
101	Jaffna - Ponnalai - Point Pedro	AB021	51/1	Northern	Jaffna	34.0	Reconstruction
102	Jaffna - Ponnalai - Point Pedro	AB021	53/1	Northern	Jaffna	25.0	Reconstruction
103	Jaffna - Ponnalai - Point Pedro	AB021	55/2	Northern	Jaffna	25.0	Reconstruction
104	Old Colombo - Galle Road, Panadura	AB027	1/2	Western	Kalutara	25.0	Reconstruction
105	Puttur - Meesalai	AB032	5/2	Northern	Jaffna	38.0	Reconstruction
106	Valachchenai - Nasavantivu - Nawaladi	AB038	4/2	Eastern	Batticaloa	28.0	Reconstruction
107	Akkaraipattu - Sagamam	B002	8/5	Eastern	Ampara	64.0	Reconstruction
108	Akuressa - Kamburupitiya	B003	13/3	Southern	Matara	25.0	Reconstruction
109	Akuressa - Ketanwila	B004	4/4	Southern	Matara	20.0	Reconstruction
110	Akuressa - Ketanwila	B004	4/5	Southern	Matara	121.0	Reconstruction
111	Akuressa - Ketanwila	B004	4-Jul	Southern	Matara	60.0	Reconstruction
112	Aladeniya - Iriyagama	B005	1/3	Central	Kandy	15.0	Reconstruction
113	Alawatugoda - Ankumbura - Keppetigala	B007	12/2	Central	Kandy	55.0	Reconstruction
114	Aluthgama - Wigoda	B012	3/5	Western	Gampaha	25.0	Reconstruction
115	Alvai - Nelliady - Tunnalai	B013	6/3	Northern	Jaffna	30.0	Reconstruction
116	Ambalangoda - Elpitiya - Pitigala	B014	18/5	Southern	Galle	38.0	Reconstruction
117	Ambalangoda - Elpitiya - Pitigala	B014	18/6	Southern	Galle	38.0	Reconstruction
118	Ambalangoda - Elpitiya - Pitigala	B014	22/5	Southern	Galle	43.0	Reconstruction
119	Ambalangoda - Elpitiya - Pitigala	B014	28/2	Southern	Galle	55.0	Reconstruction
120	Ambatenne - Bokkawela - Arambekade	B015	11/5	Central	Kandy	18.0	Reconstruction
121	Ambatenne - Bokkawela - Arambekade	B015	12/4	Central	Kandy	28.0	Reconstruction
122	Ampilanthurai - Veeramunai	B018	8/3	Eastern	Batticaloa	60.0	Reconstruction
123	Ampilanthurai - Veeramunai	B018	9/5	Eastern	Batticaloa	130.0	Reconstruction
124	Ampilanthurai - Veeramunai	B018	9/11	Eastern	Batticaloa	90.0	Reconstruction
125	Balangoda - Rassagala - Uwella	B039	7/9	Sabaragamuwa	Ratnapura	28.0	Reconstruction
126	Bandarawela - Liyangahawela - Poonagala	B042	8/12	Uva	Badulla	43.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
127	Bandarawela - Liyangahawela - Poonagala	B042	10/2	Uva	Badulla	22.0	Reconstruction
128	Beliatta - Walasmulla	B054	12/1	Southern	Hambanthota	45.0	Reconstruction
129	Bentara - Uragaha - Elpitiya	B055	24/3	Southern	Galle	70.0	Reconstruction
130	Bibile - Medagama - Nakkala	B056	12/1	Uva	Monaragala	60.0	Reconstruction
131	Bulathkohupitiya - Dedugala	B067	10/2	Sabaragamuwa	Kegalle	30.0	Reconstruction
132	Carolina - Norton - Wanarajah	B071	3/6	Central	Nuwara Eliya	44.0	Reconstruction
133	Carolina - Norton - Wanarajah	B071	6/8	Central	Nuwara Eliya	20.0	Reconstruction
134	Chavakachcheri Puloly	B075	9/1	Northern	Jaffna	40.0	Reconstruction
135	Chavakachcheri - Thannankilappu	B076	2/4	Northern	Jaffna	20.0	Reconstruction
136	Daulagala - Watadeniya	B091	3/3	Central	Kandy	35.0	Reconstruction
137	Dehiowita - Deraniyagala - Noori	B093	2/2	Sabaragamuwa	Kegalle	58.0	Reconstruction
138	Dehiowita - Deraniyagala - Noori	B093	5/1	Sabaragamuwa	Kegalle	172.0	Reconstruction
139	Dehiowita - Deraniyagala - Noori	B093	7/1	Sabaragamuwa	Kegalle	55.0	Reconstruction
140	Dehiowita - Deraniyagala - Noori	B093	8/9	Sabaragamuwa	Kegalle	56.0	Reconstruction
141	Dehiowita - Deraniyagala - Noori	B093	14/1	Sabaragamuwa	Kegalle	118.0	Reconstruction
142	Demodera - Spring Valley - Badulla	B097	3/1	Uva	Badulla	70.0	Reconstruction
143	Demodera - Spring Valley - Badulla	B097	4/4	Uva	Badulla	29.0	Reconstruction
144	Demodera - Spring Valley - Badulla	B097	4/8	Uva	Badulla	25.0	Reconstruction
145	Demodera - Spring Valley - Badulla	B097	6/1	Uva	Badulla	37.0	Reconstruction
146	Demodera - Spring Valley - Badulla	B097	6/11	Uva	Badulla	26.0	Reconstruction
147	Demodera - Spring Valley - Badulla	B097	10/5	Uva	Badulla	26.0	Reconstruction
148	Demodera - Spring Valley - Badulla	B097	15/4	Uva	Badulla	61.0	Reconstruction
149	Demodera - Spring Valley - Badulla	B097	16/8	Uva	Badulla	42.0	Reconstruction
150	Dunagaha - Nilpanagoda	B108	1/2	Western	Gampaha	78.0	Reconstruction
151	Eheliyagoda - Dehiowita	B110	15/12	Sabaragamuwa	Kegalle	490.0	Reconstruction
152	Ekala - Kotadeniyawa	B111	4/1	Western	Gampaha	110.0	Reconstruction
153	Ekala - Kotadeniyawa	B111	4/2	Western	Gampaha	290.0	Reconstruction
154	Ella - Passara	B113	19/10	Uva	Badulla	20.0	Reconstruction
155	Ella - Passara	B113	21/12	Uva	Badulla	30.0	Reconstruction
156	Ella - Passara	B113	22/8	Uva	Badulla	13.0	Reconstruction
157	Ella - Passara	B113	23/10	Uva	Badulla	34.0	Reconstruction
158	Ella - Passara	B113	26/14	Uva	Badulla	54.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
159	Ella - Passara	B113	28/1	Uva	Badulla	31.0	Reconstruction
160	Elpitiya - Avittawa - Lewwanduwa	B114	16/3	Western	Kaluthara	135.0	Reconstruction
161	Elpitiya - Avittawa - Lewwanduwa	B114	16/5	Western	Kaluthara	180.0	Reconstruction
162	Elpitiya - Avittawa - Lewwanduwa	B114	17/1	Western	Kaluthara	115.0	Reconstruction
163	Elpitiya - Avittawa - Lewwanduwa	B114	22/3	Western	Kaluthara	210.0	Reconstruction
164	Galaha - Pupuressa - Delpitiya	B125	4/5	Central	Kandy	35.0	Reconstruction
165	Galaha - Pupuressa - Delpitiya	B125	4/10	Central	Kandy	43.0	Reconstruction
166	Galigamuwa - Ruwanwella	B127	16/1	Sabaragamuwa	Kegalle	112.0	Reconstruction
167	Galigamuwa - Ruwanwella	B127	17/3	Sabaragamuwa	Kegalle	43.0	Reconstruction
168	Galigamuwa - Ruwanwella	B127	18/3	Sabaragamuwa	Kegalle	43.0	Reconstruction
169	Galigamuwa - Ruwanwella	B127	20/2	Sabaragamuwa	Kegalle	152.0	Reconstruction
170	Galigamuwa - Ruwanwella	B127	21/1	Sabaragamuwa	Kegalle	35.0	Reconstruction
171	Galle - Baddegama	B128	9/5	Southern	Galle	60.0	Reconstruction
172	Galle - Baddegama	B128	9/8	Southern	Galle	110.0	Reconstruction
173	Galle - Baddegama	B128	17/6	Southern	Galle	108.0	Reconstruction
174	Galle - Wakwella	B130	5/3	Southern	Galle	42.0	Reconstruction
175	Gevilipitiya - Hettimulla	B136	15/7	Sabaragamuwa	Kegalle	39.0	Reconstruction
176	Hakmana - Meella - Talahaganwaduwa	B142	4/3	Southern	Matara	55.0	Reconstruction
177	Hakmana - Meella - Talahaganwaduwa	B142	8/6	Southern	Hambanthota	40.0	Reconstruction
178	Hatton - Maskeliya - Dalhousie	B149	1/1	Central	Nuwara Eliya	44.0	Reconstruction
179	Hatton - Maskeliya - Dalhousie	B149	30/5	Central	Nuwara Eliya	42.0	Reconstruction
180	Mattakkuliya- Uswetakeiyawa- Pinwattha	B152	4/1	Western	Gampaha	25.0	Reconstruction
181	Horana - Anguruwatota - Aluthgama	B157	8/4	Western	Kaluthara	80.0	Reconstruction
182	Jaffna Junction - Sri Maha Bodhi	B164	1/6	North Central	Anuradhapura	270.0	Reconstruction
183	Kadugannawa - Pottepitiya	B173	1/1	Central	Kandy	43.0	Reconstruction
184	Kalalpitiya - Ukuwala - Elkaduwa	B180	13/2	Central	Matale	43.0	Reconstruction
185	Kalawana - Depdene - Rakwana	B181	26/5	Sabaragamuwa	Ratnapura	28.0	Reconstruction
186	Kalawana - Depdene - Rakwana	B181	27/1	Sabaragamuwa	Ratnapura	75.0	Reconstruction
187	Kalawana - Depdene - Rakwana	B181	32/2	Sabaragamuwa	Ratnapura	42.0	Reconstruction
188	Kalawana - Depdene - Rakwana	B181	47/5	Sabaragamuwa	Ratnapura	28.0	Reconstruction
189	Kaleliya - Pallewela - Medagampitiya	B183	3/3	Western	Gampaha	112.0	Reconstruction
190	Kaleliya - Pallewela - Medagampitiya	B183	3/4	Western	Gampaha	72.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
191	Kalmunai - Chavalakadai	B187	4/3	Eastern	Ampara	170.0	Reconstruction
192	Kaluaggala - Labugama	B188	5/4	Western	Colombo	120.0	Reconstruction
193	Kaluaggala - Labugama	B188	7/4	Western	Colombo	110.0	Reconstruction
194	Kaluaggala - Labugama	B188	8/2	Western	Colombo	110.0	Reconstruction
195	Kaluaggala - Labugama	B188	10/6	Western	Colombo	80.0	Reconstruction
196	Karainagar Circular	B197	7/2	Northern	Jaffna	25.0	Reconstruction
197	Karaiyoor Reclamation	B198	1/3	Northern	Jaffna	80.0	Reconstruction
198	Kelaniya – Mudungoda	B214	21/1	Western	Gampaha	25.0	Reconstruction
199	Kelaniya – Mudungoda	B214	30/1	Western	Gampaha	32.0	Reconstruction
200	Kirimetiya - Yala	B224	6/1	Western	Kaluthara	140.0	Reconstruction
201	Kirimetiya - Yala	B224	7/1	Western	Kaluthara	142.0	Reconstruction
202	Kirimetiya - Yala	B224	7/2	Western	Kaluthara	130.0	Reconstruction
203	Kirindiwita - Ganemulla	B226	1/5	Western	Gampaha	30.0	Reconstruction
204	Korakahawewa - Srimaha Bodiya	B234	3/4	North Central	Anuradhapura	75.0	Reconstruction
205	Kolonnawa - Yakbedde	B232	1/4	Western	Colombo	58.0	Reconstruction
206	Koslande - Poonagala	B236	5/7	Uva	Badulla	80.0	Reconstruction
207	Kotadeniyawa - Mirigama	B237	3/2	Western	Gampaha	20.0	Reconstruction
208	Kottawa - Batemulla	B238	2/7	Southern	Galle	65.0	Reconstruction
209	Kottawa - Batemulla	B238	6/6	Southern	Galle	45.0	Reconstruction
210	Kottawa - Batemulla	B238	11/7	Southern	Galle	20.0	Reconstruction
211	Kottawa - Batemulla	B238	13/6	Southern	Galle	160.0	Reconstruction
212	Kuliyapitiya - Hettipola	B243	8/4	North Western	Kurunegala	130.0	Reconstruction
213	Labuduwa - Wandurambe - Sandarawela	B248	19/1	Southern	Galle	45.0	Reconstruction
214	Madulkelle - Kabaragala - Kandenuwara	B257	2/3	Central	Kandy	45.0	Reconstruction
215	Manipay Kaithady Road Bridge	B268	12/2	Northern	Jaffna	310.0	Reconstruction
216	Maradagahamulla - Badalgama	B271	7/3	Western	Gampaha	25.0	Reconstruction
217	Maskeliya - Upcot	B273	9/6	Central	Nuwaraeliya	70.0	Reconstruction
218	Matara - Hakmana	B275	2/1	Southern	Matara	60.0	Reconstruction
219	Mawanella - Hemmaththagama - Singhapitiya	B279	17/1	Sabaragamuwa	Kegalle	205.0	Reconstruction
220	Minneriya - Hingurakgoda (Airport Road)	B287	1/4	North Central	Anuradhapura	15.0	Reconstruction
221	Moragaswewa - Ilukwewa	B294	5/1	North Central	Polonnaruwa	32.0	Reconstruction
222	Nagoda - Gonadeniya	B303	1/2	Southern	Galle	45.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
223	Naula - Elahera - Pallegama - Hettipola	B312	23/1	North Central	Polonnaruwa	55.0	Reconstruction
224	Naula - Elahera - Pallegama - Hettipola	B312	30/1	Central	Matale	95.0	Reconstruction
225	Naula - Elahera - Pallegama - Hettipola	B312	32/2	Central	Matale	75.0	Reconstruction
226	Naula - Elahera - Pallegama - Hettipola	B312	58/5	Central	Matale	45.0	Reconstruction
227	Nawalapitiya - Dimbula	B317	11/7	Central	Kandy	20.0	Reconstruction
228	Nawalapitiya - Dolosbage	B318	7/5	Central	Kandy	25.0	Reconstruction
229	Nawalapitiya - Dolosbage	B318	7/8	Central	Kandy	40.0	Reconstruction
230	Nawalapitiya - Dolosbage	B318	7/11	Central	Kandy	44.0	Reconstruction
231	Nawalapitiya - Dolosbage	B318	12/7	Central	Kandy	120.0	Reconstruction
232	Nawalapitiya - Dolosbage	B318	15/2	Central	Kandy	50.0	Reconstruction
233	Nawalapitiya - Dolosbage	B318	18/1	Central	Kandy	50.0	Reconstruction
234	Nawalapitiya - Dolosbage	B318	18/2	Central	Kandy	48.0	Reconstruction
235	Nawalapitiya - Ginigathena	B319	2/11	Central	Kandy	44.0	Reconstruction
236	Negombo - Giriulla	B322	3/1	Western	Gampaha	90.0	Reconstruction
237	Negombo - Giriulla	B322	25/1	Western	Gampaha	142.0	Reconstruction
238	Negombo - Mirigama	B324	8/2	Western	Gampaha	40.0	Reconstruction
239	Negombo - Mirigama	B324	18/1	Western	Gampaha	45.0	Reconstruction
240	Negombo - Mirigama	B324	25/6	Western	Gampaha	30.0	Reconstruction
241	Norton - Maskeliya	B328	8/1	Central	Nuwaraeliya	40.0	Reconstruction
242	Norton - Maskeliya	B328	10/1	Central	Nuwaraeliya	45.0	Reconstruction
243	Norton - Maskeliya	B328	12/1	Central	Nuwaraeliya	45.0	Reconstruction
244	Norwood - Bogowantalawa - Campion	B329	15/5	Central	Nuwaraeliya	130.0	Reconstruction
245	Norwood - Upcot	B330	11/7	Central	Nuwaraeliya	30.0	Reconstruction
246	Nuwara Eliya - Ragala - Uda Pussellawa	B332	6/2	Central	Nuwaraeliya	35.0	Reconstruction
247	Oddamavadi - Vahaneri	B333	2/2	Eastern	Batticaloa	75.0	Reconstruction
248	Olugantota - Pinnawala - Bogowantalawa	B339	20/2	Sabaragamuwa	Ratnapura	43.0	Reconstruction
249	Padaviya - Parakrama Pura (Bandaranayake Mawatha)	B343		North Central	Anuradhapura	50.0	New Bridge
250	Padiruppu - Vellaveli	B344	1/1	Eastern	Batticaloa	710.0	Reconstruction
251	Palathoppu - Seruwila Road	B347	1/1	Eastern	Trincomale	70.0	Reconstruction
252	Pallang Oya - Inginiyagala	B350	3/2	Eastern	Ampara	94.0	Reconstruction
253	Panama - Kumbukkana	B355	8/1	Eastern	Ampara	130.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
254	Passara - Hingurukaduwa - Pelwatte	B359	16/1	Uva	Monaragala	120.0	Reconstruction
255	Passara - Hingurukaduwa - Pelwatte	B360	16/6	Uva	Monaragala	110.0	Reconstruction
256	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	9/1	Western	Kaluthara	35.0	Reconstruction
257	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	11/1	Western	Kaluthara	22.0	Reconstruction
258	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	12/1	Western	Kaluthara	43.0	Reconstruction
259	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	34/4	Southern	Matara	60.0	Reconstruction
260	Peradeniya - Deltota - Rikiligaskada	B364	7/15	Central	Kandy	44.0	Reconstruction
261	Peradeniya - Deltota - Rikiligaskada	B364	31/11	Central	Kandy	20.0	Reconstruction
262	Peradeniya - Deltota - Rikiligaskada	B364	36/10	Central	Nuwara Eliya	30.0	Reconstruction
263	Peradeniya - Deltota - Rikiligaskada	B364	41/4	Central	Nuwara Eliya	43.0	Reconstruction
264	Peradeniya - Deltota - Rikiligaskada	B364	43/3	Central	Nuwara Eliya	30.0	Reconstruction
265	Peradeniya - Deltota - Rikiligaskada	B364	45/2	Central	Nuwara Eliya	80.0	Reconstruction
266	Peradeniya - Deltota - Rikiligaskada	B364	46/1	Central	Nuwara Eliya	35.0	Reconstruction
267	Peradeniya - Deltota - Rikiligaskada	B364	46/8	Central	Nuwara Eliya	43.0	Reconstruction
268	Peradeniya - Deltota - Rikiligaskada	B364	48/3	Central	Nuwaraeliya	43.0	Reconstruction
269	Sangilithoppu - Chemmny	B399	3/1	Northern	Jaffna	25.0	Reconstruction
270	Sangilithoppu - Chemmny	B399	3/3	Northern	Jaffna	25.0	Reconstruction
271	Soranapattu - Thalayadi	B402	6/1	Northern	Jaffna	120.0	Reconstruction
272	Thihagoda - Kamburupitiya - Mawarala - Kotapola	B415	14/1	Southern	Matara	136.0	Reconstruction
273	Thihagoda - Kamburupitiya - Mawarala - Kotapola	B415	18/4	Southern	Matara	44.0	Reconstruction
274	Thoandamanaru - Vallai - Tunnalai	B417	4/1	Northern	Jaffna	20.0	Reconstruction
275	Thoandamanaru - Vallai - Tunnalai	B417	8/1	Northern	Jaffna	28.0	Reconstruction
276	Thoppu - Madampe	B419	16/1	North Western	Puttalam	222.0	Reconstruction
277	Tiruwanaketiya - Agalawatte	B421	28/5	Sabaragamuwa	Ratnapura	26.0	Reconstruction
278	Tiruwanaketiya - Agalawatte	B421	48/4	Western	Kaluthara	188.0	Reconstruction
279	Tonigala - Kalawewa - Galewela	B423	44/5	Central	Matale	55.0	Reconstruction
280	Trincomalee - Pulmoddai	B424	49/2	Eastern	Trincomale	175.0	Reconstruction
281	Trincomalee - Pulmoddai	B424	50/1	Eastern	Trincomale	175.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
282	Udawalawe - Tanamalwila	B427	20/4	Uva	Monaragala	200.0	Reconstruction
283	Udugampola - Divulapitiya	B430	11/3	Western	Gampaha	38.0	Reconstruction
284	Orugodawatte - Ambatale	B435	2/1	Western	Colombo	100.0	Reconstruction
285	Orugodawatte - Ambatale	B435	3/2	Western	Colombo	200.0	Reconstruction
286	Veyangoda - Kaleliya	B444	4/5	Western	Gampaha	72.0	Reconstruction
287	Wadduwa - Morontuduwa	B449	4/2	Western	Kaluthara	105.0	Reconstruction
288	Wandurambe - Ethumale - Yakkatuwa	B454	36/2	Southern	Galle	28.0	Reconstruction
289	Wandurambe - Kottawa	B455	10/3	Southern	Galle	140.0	Reconstruction
290	Warakapola - Ruwanwella	B457	7/6	Sabaragamuwa	Kegalle	70.0	Reconstruction
291	Warakapola - Ruwanwella	B457	19/4	Sabaragamuwa	Kegalle	75.0	Reconstruction
292	Weeraketiya - Middeniya	B463	10/2	Southern	Hambantota	22.0	Reconstruction
293	Weeraketiya - Middeniya	B463	12/2	Southern	Hambantota	20.0	Reconstruction
294	Weliweriya - Kirindiwela	B472	11/2	Western	Gampaha	50.0	Reconstruction
295	Weliweriya - Kirindiwela	B472	11/3	Western	Gampaha	75.0	Reconstruction
296	Weragantota - Randenigala	B474	27/3	Central	Kandy	300.0	Reconstruction
297	Weragantota - Randenigala	B474	27/4	Central	Kandy	240.0	Reconstruction
298	Wewelwatte - Agarsland - Uwella	B477	2/4	Sabaragamuwa	Ratnapura	95.0	Reconstruction
299	Wilakatupotha - Ganewattha - Kumbukgete	B478	10/1	North Western	Kurunegala	450.0	Reconstruction
300	Yakkalamulla - Ketanwila	B480	1/4	Southern	Galle	107.0	Reconstruction
301	Yatiyantota - Poonagala - Meenagala	B482	3/2	Sabaragamuwa	Kegalle	109.0	Reconstruction
302	Yatiyantota - Poonagala - Meenagala	B482	11/16	Sabaragamuwa	Kegalle	30.0	Reconstruction
303	Yatiyantota - Poonagala - Meenagala	B482	17/1	Sabaragamuwa	Kegalle	70.0	Reconstruction
304	Kandehandiya - Adikarigama - Randenigala - Loggal Oya	B492	35/10	Central	Nuwaraeliya	60.0	Reconstruction
305	Andarawewa - Balaluwewa(Jeya Mawatha)	B501	15/2	North Central	Anuradhapura	74.0	Reconstruction
306	Rendapola - Ambewela	B507	4/1	Uva	Badulla	50.0	Reconstruction
307	Welimade - Borelanda - Ohiya - Horton Plains	B508	21/3	Uva	Badulla	115.0	Reconstruction
308	Kahatagasdigiliya - Rathmalgahaweewa - Kivulekade	B538	20/2	North Central	Anuradhapura	22.0	Reconstruction
309	Nelundeniya - Tuntota - Galapitamada	B540	4/2	Sabaragamuwa	Kegalle	30.0	Reconstruction
310	Nelundeniya - Tuntota - Galapitamada	B540	7/4	Sabaragamuwa	Kegalle	29.0	Reconstruction
311	Polonnaruwa - Hingurakgoda	B552	9/1	North Central	Polonnaruwa	236.0	Reconstruction
312	Madatugama - Pubbogama - Andiyagala	B556	13/2	North Central	Anuradhapura	20.0	Reconstruction

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
313	Addalachenai Alankulam	B572	1/2	Eastern	Ampara	110.0	Reconstruction
314	Dedugala Dolosbage	B588	10/1	Sabaragamuwa	Kegalle	22.0	Reconstruction
315	Magmmana Kurupettha Daigala Gurugalla	B603	9/3	Sabaragamuwa	Kegalle	48.0	Reconstruction
316	Magmmana Kurupettha Daigala Gurugalla	B603	12/1	Sabaragamuwa	Kegalle	120.0	Reconstruction
317	Paragammana Dikella Atugoda Wanduradeniya	B604	8/5	Sabaragamuwa	Kegalle	15.0	Reconstruction
318	Paragammana Dikella Atugoda Wanduradeniya	B604	11/6	Sabaragamuwa	Kegalle	15.0	Reconstruction
319	Paragammana Dikella Atugoda Wanduradeniya	B604	12/6	Sabaragamuwa	Kegalle	20.0	Reconstruction
320	Bengamuwa - Molokgamuwa - Galdola	B607	10/5	Southern	Matara	25.0	Reconstruction
321	Battuluoya - Udappuwa - Andimunai	B614	10/5	North Western	Puttalam	183.0	Reconstruction

Proposed Bridges for Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
1	Kollupitiya - Sri Jayewardenepura	A000	5/1	Western	Colombo	95.0	Widening
2	Kollupitiya - Sri Jayewardenepura	A000	7/1	Western	Colombo	70.0	Widening
3	Colombo - Galle - Hambantota - Wellawaya	A002	52/3	Western	Kaluthara	92.0	Widening
4	Colombo - Galle - Hambantota - Wellawaya	A002	174/3	Southern	Matara	30.0	Widening
5	Peliyagoda - Puttalam	A003	92/4	North Western	Puttalam	100.0	Widening
6	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	7/1	Western	Colombo	150.0	Widening
7	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	33/3	Western	Colombo	240.0	Widening
8	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	34/4	Western	Colombo	50.0	Widening
9	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	36/4	Western	Colombo	60.0	Widening
10	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	37/2	Western	Colombo	60.0	Widening
11	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	42/1	Western	Colombo	165.0	Widening
12	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	47/1	Western	Colombo	105.0	Widening
13	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	49/1	Western	Colombo	160.0	Widening
14	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	50/7	Western	Colombo	130.0	Widening
15	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	54/2	Western	Colombo	75.0	Widening
16	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	72/3	Sabaragamuwa	Ratnapura	26.0	Widening
17	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	88/1	Sabaragamuwa	Ratnapura	30.0	Widening
18	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	99/6	Sabaragamuwa	Ratnapura	140.0	Widening
19	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	101/5	Sabaragamuwa	Ratnapura	1,000.0	Widening
20	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	105/5	Sabaragamuwa	Ratnapura	25.0	Widening
21	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	157/6	Sabaragamuwa	Ratnapura	200.0	Widening
22	Colombo - Ratnapura - Wellawaya - Batticaloa	A004	200/10	Sabaragamuwa	Ratnapura	30.0	Widening
23	Ambepussa - Kurunegala - Trincomalee	A006	184/1	Eastern	Trincomale	100.0	Widening
24	Avissawella - Hatton - Nuwara Eliya	A007	1/1	Western	Colombo	160.0	Widening
25	Avissawella - Hatton - Nuwara Eliya	A007	24/1	Sabaragamuwa	Kegalle	15.0	Widening
26	Avissawella - Hatton - Nuwara Eliya	A007	33/2	Sabaragamuwa	Kegalle	15.0	Widening
27	Avissawella - Hatton - Nuwara Eliya	A007	34/1	Sabaragamuwa	Kegalle	10.0	Widening
28	Avissawella - Hatton - Nuwara Eliya	A007	39/5	Sabaragamuwa	Kegalle	10.0	Widening
29	Panadura - Nambapana - Ratnapura	A008	49/3	Sabaragamuwa	Ratnapura	25.0	Widening
30	Panadura - Nambapana - Ratnapura	A008	51/4	Sabaragamuwa	Ratnapura	25.0	Widening
31	Panadura - Nambapana - Ratnapura	A008	68/1	Sabaragamuwa	Ratnapura	25.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
32	Kandy - Jaffna	A009	26/1	Central	Matale	40.0	Widening
33	Kandy - Jaffna	A009	26/2	Central	Matale	30.0	Widening
34	Kandy - Jaffna	A009	27/5	Central	Matale	20.0	Widening
35	Kandy - Jaffna	A009	29/4	Central	Matale	20.0	Widening
36	Katugastota - Kurunegala - Puttalam	A010	75/1	North Western	Kununegala	393.0	Widening
37	Maradankadawela - Habarana - Tirikkondiadimadu	A011	42/6	North Central	Polonnaruwa	60.0	Widening
38	Maradankadawela - Habarana - Tirikkondiadimadu	A011	52/12	North Central	Polonnaruwa	80.0	Widening
39	Maradankadawela - Habarana - Tirikkondiadimadu	A011	78/1	North Central	Polonnaruwa	200.0	Widening
40	Maradankadawela - Habarana - Tirikkondiadimadu	A011	82/3	North Central	Polonnaruwa	208.0	Widening
41	Maradankadawela - Habarana - Tirikkondiadimadu	A011	115/1	Eastern	Batticaloa	10.0	Widening
42	Galkulama - Anuradhapura	A013	5/1	North Central	Anuradhapura	10.0	Widening
43	Batticaloa - Tirikkondiadimadu - Trincomalee	A015	14/2	Eastern	Batticaloa	15.0	Widening
44	Batticaloa - Tirikkondiadimadu - Trincomalee	A015	15/2	Eastern	Batticaloa	15.0	Widening
45	Galle - Deniyaya - Madampe	A017	48/12	Southern	Galle	95.0	Widening
46	Galle - Deniyaya - Madampe	A017	85/7	Southern	Matara	32.0	Widening
47	Galle - Deniyaya - Madampe	A017	94/8	Sabaragamuwa	Ratnapura	15.0	Widening
48	Galle - Deniyaya - Madampe	A017	95/8	Sabaragamuwa	Ratnapura	25.0	Widening
49	Galle - Deniyaya - Madampe	A017	95/13	Sabaragamuwa	Ratnapura	16.0	Widening
50	Galle - Deniyaya - Madampe	A017	95/14	Sabaragamuwa	Ratnapura	16.0	Widening
51	Galle - Deniyaya - Madampe	A017	97/7	Sabaragamuwa	Ratnapura	18.0	Widening
52	Galle - Deniyaya - Madampe	A017	104/16	Sabaragamuwa	Ratnapura	17.0	Widening
53	Galle - Deniyaya - Madampe	A017	106/3	Sabaragamuwa	Ratnapura	28.0	Widening
54	Galle - Deniyaya - Madampe	A017	106/4	Sabaragamuwa	Ratnapura	18.0	Widening
55	Galle - Deniyaya - Madampe	A017	106/10	Sabaragamuwa	Ratnapura	28.0	Widening
56	Galle - Deniyaya - Madampe	A017	110/5	Sabaragamuwa	Ratnapura	18.0	Widening
57	Galle - Deniyaya - Madampe	A017	110/6	Sabaragamuwa	Ratnapura	30.0	Widening
58	Galle - Deniyaya - Madampe	A017	110/7	Sabaragamuwa	Ratnapura	15.0	Widening
59	Galle - Deniyaya - Madampe	A017	111/14	Sabaragamuwa	Ratnapura	16.0	Widening
60	Galle - Deniyaya - Madampe	A017	112/6	Sabaragamuwa	Ratnapura	16.0	Widening
61	Galle - Deniyaya - Madampe	A017	112/7	Sabaragamuwa	Ratnapura	16.0	Widening
62	Galle - Deniyaya - Madampe	A017	112/8	Sabaragamuwa	Ratnapura	18.0	Widening
63	Galle - Deniyaya - Madampe	A017	129/4	Sabaragamuwa	Ratnapura	22.0	Widening
64	Colombo - Hanwella Low Level Road	AB010	15/1	Western	Colombo	288.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
65	Colombo - Hanwella Low Level Road	AB010	19/2	Western	Colombo	140.0	Widening
66	Colombo - Hanwella Low Level Road	AB010	25/2	Western	Colombo	150.0	Widening
67	Colombo - Hanwella Low Level Road	AB010	30/3	Western	Colombo	150.0	Widening
68	Jaffna - Manipay - Karainagar	AB017	4/2	Northern	Jaffna	33.5	Widening
69	Jaffna - Manipay - Karainagar	AB017	4/3	Northern	Jaffna	22.0	Widening
70	Jaffna - Manipay - Karainagar	AB017	8/2	Northern	Jaffna	25.5	Widening
71	Jaffna - Manipay - Karainagar	AB017	24/3	Northern	Jaffna	27.5	Widening
72	Matale - Udupihilla	AB026	1/3	Central	Matale	18.0	Widening
73	Matale - Udupihilla	AB026	4/2	Central	Matale	18.0	Widening
74	Matale - Udupihilla	AB026	7/1	Central	Matale	20.0	Widening
75	Alakolanga - Pottepitiya	B006	2/1	Central	Kandy	21.0	Widening
76	Alawathugoda - Ankumbura - Keppetigala	B007	3/5	Central	Kandy	15.0	Widening
77	Alawwa - Dampelessa	B008	6/5	North Western	Kununegala	35.0	Widening
78	Alawwa - Dampelessa	B008	9/7	North Western	Kununegala	15.0	Widening
79	Allai Kanthalai	B010	8/1	Eastern	Trincomale	60.0	Widening
80	Anamaduwa - Uswewa - Galgamuwa	B019	6/2	North Western	Puttalam	25.0	Widening
81	Anamaduwa - Uswewa - Galgamuwa	B019	10/4	North Western	Puttalam	30.0	Widening
82	Anamaduwa - Uswewa - Galgamuwa	B019	13/1	North Western	Puttalam	25.0	Widening
83	Anamaduwa - Uswewa - Galgamuwa	B019	19/3	North Western	Puttalam	25.0	Widening
84	Anamaduwa - Uswewa - Galgamuwa	B019	26/3	North Western	Kununegala	25.0	Widening
85	Anamaduwa - Uswewa - Galgamuwa	B019	38/2	North Western	Kununegala	30.0	Widening
86	Ayagama - Kukulegama	B034	15/7	Sabaragamuwa	Ratnapura	28.0	Widening
87	Balangoda - Bowatte - Kaltota	B038	6/4	Sabaragamuwa	Ratnapura	20.0	Widening
88	Balangoda - Bowatte - Kaltota	B038	18/1	Sabaragamuwa	Ratnapura	40.0	Widening
89	Bandarawela - Liyangahawela - Poonagala	B042	13/12	Uva	Badulla	45.0	Widening
90	Bandarawela - Liyangahawela - Poonagala	B042	14/9	Uva	Badulla	30.0	Widening
91	Bandarawela - Liyangahawela - Poonagala	B042	17/1	Uva	Badulla	30.0	Widening
92	Bandarawela - Uva Hihglands - Ettampitiya	B043	8/1	Uva	Badulla	15.0	Widening
93	Battaramulla - Pannipitiya	B047	1/1	Western	Colombo	45.0	Widening
94	Batukotuwa - Medirigiriya	B048	14/2	North Central	Polonnaruwa	200.0	Widening
95	Beliatta - Walasmulla	B054	9/1	Southern	Hambanthota	22.0	Widening
96	Bentara - Uragaha - Elpitiya	B055	1/2	Southern	Galle	25.0	Widening
97	Bentara - Uragaha - Elpitiya	B055	24/3	Southern	Galle	20.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
98	Borella - Rajagiriya	B062	2/1	Western	Colombo	36.0	Widening
99	Chavakachcheri - Puloly	B075	10/2	Northern	Jaffna	22.5	Widening
100	Chavakachcheri - Puloly	B075	14/2	Northern	Jaffna	25.5	Widening
101	Chavakachcheri - Puloly	B075	13/2	Northern	Jaffna	21.0	Widening
102	Chilaw - Wariyapola	B079	6/2	North Western	Puttalam	35.0	Widening
103	Colombo - Horana	B084	9/2	Western	Colombo	20.0	Widening
104	Dambagahapitiya - Pinnagolla - Arawa - Meegahakiula	B086	5/1	Uva	Badulla	20.0	Widening
105	Danikithawa - Ambanpola	B089	11/2	North Western	Kununegala	30.0	Widening
106	Danowita - Mirigama	B090	7/3	Western	Gampaha	45.0	Widening
107	Dehiwela - Maharagama	B094	7/1	Western	Colombo	20.0	Widening
108	Dikwella - Beliatte	B101	6/2	Southern	Hambanthota	25.0	Widening
109	Dickwella - Jangulla - Talpitigala	B100	2/6	Uva	Badulla	14.0	Widening
110	Dickwella - Jangulla - Talpitigala	B100	4/8	Uva	Badulla	14.0	Widening
111	Dickwella - Jangulla - Talpitigala	B100	5/7	Uva	Badulla	14.0	Widening
112	Dickwella - Jangulla - Talpitigala	B100	9/1	Uva	Badulla	22.0	Widening
113	Dickwella - Jangulla - Talpitigala	B100	17/3	Uva	Badulla	16.0	Widening
114	Dickwella - Jangulla - Talpitigala	B100	17/7	Uva	Badulla	32.0	Widening
115	Dickwella - Jangulla - Talpitigala	B100	21/2	Uva	Badulla	28.0	Widening
116	Elahera - Giritale	B112	34/3	North Central	Polonnaruwa	30.0	Widening
117	Elahera - Giritale	B112	35/1	North Central	Polonnaruwa	30.0	Widening
118	Elahera - Giritale	B112	36/4	North Central	Polonnaruwa	20.0	Widening
119	Elahera - Giritale	B112	37/1	North Central	Polonnaruwa	10.0	Widening
120	Elahera - Giritale	B112	38/5	North Central	Polonnaruwa	10.0	Widening
121	Embilipitiya - Panamure - Bulutota	B115	27/4	Sabaragamuwa	Ratnapura	15.0	Widening
122	Embilmeegama - Daulagala - Penideniya	B116	11/2	Central	Kandy	20.0	Widening
123	Galagedara - Rambukkana	B122	3/2	Central	Kandy	34.0	Widening
124	Galaha - Pupuressa - Delpitiya	B125	8/5	Central	Kandy	35.0	Widening
125	Galle - Udugama	B129	19/7	Southern	Galle	15.0	Widening
126	Gampola - Craighead	B132	1/2	Central	Kandy	30.0	Widening
127	Gampola - Craighead	B132	14/1	Central	Kandy	26.0	Widening
128	Hakmana - Beliatte - Tangalle	B141	9/1	Southern	Hambanthota	22.0	Widening
129	Halpatota - Kurundugahahetekma	B143	11/5	Southern	Galle	30.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
130	Hanwella - Pugoda - Weke - Urapola	B146	1/1	Western	Gampaha	780.0	Widening
131	Hanwella - Pugoda - Weke - Urapola	B146	21/1	Western	Gampaha	70.0	Widening
132	Hikkaduwa - Baddegama - Nilhena	B153	14/4	Southern	Galle	70.0	Widening
133	Horana - Anguruwatota - Aluthgama	B157	3/7	Western	Kaluthara	15.0	Widening
134	Horawela - Pelawatte - Pitigala	B158	11/7	Western	Kaluthara	22.0	Widening
135	Horawela - Pelawatte - Pitigala	B158	11/7	Western	Kaluthara	22.0	
136	Idangoda - Ayagama	B160	1/4	Sabaragamuwa	Ratnapura	25.0	Widening
137	Imbulgoda - Weliweriya	B161	4/7	Western	Gampaha	20.0	Widening
138	Jaffna Junction - Sri Maha Bodhi	B164	1/1	North Central	Anuradhapura	10.0	Widening
139	Jaffna Junction - Sri Maha Bodhi	B164	1/5	North Central	Anuradhapura	10.0	Widening
140	Kadawalagedara - Vithikuliya	B167	11/3	North Western	Kununegala	30.0	Widening
141	Kahawa - Batapola	B176	2/1	Southern	Galle	15.0	Widening
142	Kahawa - Batapola	B176	6/4	Southern	Galle	20.0	Widening
143	Kalmunai - Chavalakadai	B187	4/1	Eastern	Ampara	15.0	Widening
144	Karuwalagaswewa - Miyallewa	B201	9/2	North Western	Puttalam	20.0	Widening
145	Karuwalagaswewa - Miyallewa	B201	10/2	North Western	Puttalam	20.0	Widening
146	Katugastota - Madawala - Bambarella	B205	23/3	Central	Kandy	50.0	Widening
147	Katugastota - Madawala - Bambarella	B205	30/10	Central	Kandy	50.0	Widening
148	Kirimetiya - Yala	B224	17/6	Western	Kaluthara	25.0	Widening
149	Kirindiwita - Aswannawatta	B225	8/4	Western	Gampaha	42.0	Widening
150	Kirindiwita - Aswannawatta	B225	8/5	Western	Gampaha	30.0	Widening
151	Kirindiwita - Aswannawatta	B225	9/2	Western	Gampaha	30.0	Widening
152	Kirindiwita - Aswannawatta	B225	11/3	Western	Gampaha	25.0	Widening
153	Kirindiwita - Aswannawatta	B225	12/2	Western	Gampaha	25.0	Widening
154	Kiriyankalli - Andigama	B227	1/1	North Western	Puttalam	15.0	Widening
155	Kiriyankalli - Andigama	B227	1/2	North Western	Puttalam	18.0	Widening
156	Kiriyankalli - Andigama	B227	14/3	North Western	Puttalam	18.0	Widening
157	Kolonnawa - Yakbedde	B232	2/4	Western	Colombo	40.0	Widening
158	Kolonnawa - Yakbedde	B232	4/3	Western	Colombo	40.0	Widening
159	Kotte - Bope	B240	21/1	Western	Colombo	60.0	Widening
160	Kuliyapitiya - Padiwela	B244	1/4	North Western	Kununegala	20.0	Widening
161	Kuliyapitiya - Padiwela	B244	7/3	North Western	Kununegala	20.0	Widening
162	Kuliyapitiya - Padiwela	B244	8/2	North Western	Kununegala	20.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
163	Kuliyapitiya - Padiwela	B244	8/3	North Western	Kununegala	20.0	Widening
164	Kuliyapitiya - Padiwela	B244	9/1	North Western	Kununegala	20.0	Widening
165	Kuliyapitiya - Padiwela	B244	9/2	North Western	Kununegala	25.0	Widening
166	Kurunegala - Narammala - Madampe	B247	1/2	North Western	Kununegala	28.0	Widening
167	Kurunegala - Narammala - Madampe	B247	2/1	North Western	Kununegala	25.0	Widening
168	Kurunegala - Narammala - Madampe	B247	19/1	North Western	Kununegala	20.0	Widening
169	Kurunegala - Narammala - Madampe	B247	19/2	North Western	Kununegala	22.0	Widening
170	Lady Macallums Drive	B249	4/11	Central	Nuwaraeliya	15.0	Widening
171	Lady Macallums Drive	B249	5/7	Central	Nuwaraeliya	25.0	Widening
172	Mabima- Sapugaskanda	B254	1/1	Western	Gampaha	20.0	Widening
173	Madulkelle - Kabaragala - Kandenuwara	B257	2/10	Central	Kandy	25.0	Widening
174	Makola - Udupila	B262	6/3	Western	Gampaha	45.0	Widening
175	Malabe - Kaduwela	B263	1/5	Western	Colombo	55.0	Widening
176	Malwala - Carney	B265	15/3	Sabaragamuwa	Ratnapura	80.0	Widening
177	Maradagahamulla - Badalgama	B271	4/6	Western	Gampaha	45.0	Widening
178	Mawanella - Aranayake - Horawela	B278	13/1	Sabaragamuwa	Kegalle	20.0	Widening
179	Mawathagama - Barandara	B280	6/3	North Western	Kununegala	25.0	Widening
180	Middeniya - Panamure	B286	9/4	Sabaragamuwa	Ratnapura	18.0	Widening
181	Middeniya - Panamure	B286	10/1	Sabaragamuwa	Ratnapura	26.0	Widening
182	Minuwangoda - Gampaha - Miriswatte	B288	8/3	Western	Gampaha	50.0	Widening
183	Minuwangoda - Gampaha - Miriswatte	B288	10/3	Western	Gampaha	120.0	Widening
184	Minuwangoda - Miriswatte - Katana	B289	8/1	Western	Gampaha	40.0	Widening
185	Mullaitivu - Kokkilai	B297	18/4	Northern	Mullaitivu	75.0	Widening
186	Mullaitivu - Kokkilai	B297	18/5	Northern	Mullaitivu	30.0	Widening
187	Nagoda - Kalawellawa - Bellapitiya	B304	35/3	Western	Kaluthara	30.0	Widening
188	Negombo - Giriulla	B322	2/1	Western	Gampaha	50.0	Widening
189	Negombo - Giriulla	B322	17/1	Western	Gampaha	50.0	Widening
190	Negombo - Giriulla	B322	38/3	Western	Gampaha	45.0	Widening
191	Negombo - Mirigama	B324	8/2	Western	Gampaha	60.0	Widening
192	Negombo - Mirigama	B324	10/4	Western	Gampaha	50.0	Widening
193	Nelukkulam - Neriyakulam	B325	12/1	Northern	Vavuniya	20.0	Widening
194	Olugantota - Pinnawala - Bogowantalawa	B339	25/1	Sabaragamuwa	Ratnapura	25.0	Widening
195	Palapathwela - Galewela	B346	23/2	Central	Matale	18.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
196	Palapathwela - Galewela	B346	26/2	Central	Matale	18.0	Widening
197	Palathoppu - Seruwila Road	B347	4/5	Eastern	Trincomale	20.0	Widening
198	Palavi - Kalladi	B348	4/1	North Western	Puttalam	18.0	Widening
199	Palavi - Kalladi	B348	6/1	North Western	Puttalam	22.0	Widening
200	Palavi - Kalladi	B348	7/1	North Western	Puttalam	20.0	Widening
201	Pallebedde - Medaganoya - Weligepola	B351	2/3	Sabaragamuwa	Ratnapura	15.0	Widening
202	Pallebedde - Medaganoya - Weligepola	B351	8/1	Sabaragamuwa	Ratnapura	45.0	Widening
203	Pallebedde - Medaganoya - Weligepola	B351	14/1	Sabaragamuwa	Ratnapura	20.0	Widening
204	Palugama - Boralande - Haputale	B353	8/9	Uva	Badulla	10.0	Widening
205	Palugama - Boralande - Haputale	B353	13/1	Uva	Badulla	22.0	Widening
206	Pannala - Kuliyapitiya	B356	1/2	North Western	Kununegala	30.0	Widening
207	Paranthan - Poonakary	B357	11/5	Northern	Mullaitivu	20.0	Widening
208	Paranthan - Poonakary	B357	14/2	Northern	Mullaitivu	60.0	Widening
209	Passara - Madulsima - Metigahatenna	B360	6/12	Uva	Badulla	17.0	Widening
210	Passara - Madulsima - Metigahatenna	B360	20/8	Uva	Badulla	31.0	Widening
211	Passara - Madulsima - Metigahatenna	B360	23/3	Uva	Badulla	18.0	Widening
212	Passara - Madulsima - Metigahatenna	B360	23/6	Uva	Badulla	36.0	Widening
213	Passara - Madulsima - Metigahatenna	B360	26/9	Uva	Badulla	9.0	Widening
214	Passara - Madulsima - Metigahatenna	B360	28/4	Uva	Badulla	13.0	Widening
215	Passara - Madulsima - Metigahatenna	B360	29/4	Uva	Badulla	22.0	Widening
216	Passara - Madulsima - Metigahatenna	B360	30/3	Uva	Badulla	66.0	Widening
217	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	16/2	Western	Kaluthara	29.0	Widening
218	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	17/2	Western	Kaluthara	22.0	Widening
219	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	19/4	Western	Kaluthara	25.0	Widening
220	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	24/6	Southern	Galle	40.0	Widening
221	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	39/4	Southern	Matara	18.0	Widening
222	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	40/2	Southern	Matara	18.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
223	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	41/7	Southern	Matara	18.0	Widening
224	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	42/3	Southern	Matara	22.0	Widening
225	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	44/10	Southern	Matara	20.0	Widening
226	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	45/5	Southern	Matara	16.0	Widening
227	Pelawatta - Kankotayawatta - Tinniyawela - Morawaka	B363	47/11	Southern	Matara	16.0	Widening
228	Peradeniya - Deltota - Rikiligaskada	B364	5/8	Central	Kandy	15.0	Widening
229	Peradeniya - Deltota - Rikiligaskada	B364	6/15	Central	Kandy	15.0	Widening
230	Peradeniya - Halloluwa - Katugastota	B365	6/6	Central	Kandy	18.0	Widening
231	Peradeniya - Halloluwa - Katugastota	B365	11/1	Central	Kandy	18.0	Widening
232	Piliyandala - Maharagama	B367	6/3	Western	Colombo	50.0	Widening
233	Poojapitiya - Alawatugoda	B377	3/3	Central	Kandy	50.0	Widening
234	Pitakotte – Thalawathugoda	B368	3/2	Western	Colombo	75.0	Widening
235	Pitakotte – Thalawathugoda	B368	3/4	Western	Colombo	105.0	Widening
236	Ratnapura - Wewelwatte	B391	22/9	Sabaragamuwa	Ratnapura	60.0	Widening
237	Ratnapura - Wewelwatte	B391	22/10	Sabaragamuwa	Ratnapura	60.0	Widening
238	Ratnapura - Wewelwatte	B391	24/13	Sabaragamuwa	Ratnapura	50.0	Widening
239	Rattota - Gammaduwa	B392		Central	Matale	25.0	Widening
240	Western Saltern Road in Puttalam Town	B395	1/1	North Western	Puttalam	20.0	Widening
241	Talduwa - Meewitigammana	B408	5/2	Western	Colombo	225.0	Widening
242	Tawalama - Neluwa - Batuwangala	B411	1/7	Southern	Galle	30.0	Widening
243	Tawalama - Neluwa - Batuwangala	B411	2/8	Southern	Galle	20.0	Widening
244	Tawalama - Neluwa - Batuwangala	B411	4/6	Southern	Galle	20.0	Widening
245	Tawalama - Neluwa - Batuwangala	B411	6/3	Southern	Galle	20.0	Widening
246	Tawalama - Neluwa - Batuwangala	B411	8/3	Southern	Galle	25.0	Widening
247	Tummodera - Puwakpitiya	B426	4/9	Western	Colombo	42.0	Widening
248	Tummodera - Puwakpitiya	B426	8/12	Western	Colombo	20.0	Widening
249	Tummodera - Puwakpitiya	B426	9/2	Western	Colombo	22.0	Widening
250	Udugampola - Divulapitiya	B430	15/2	Western	Gampaha	20.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
251	Urapola - Waturugama	B434	2/6	Western	Gampaha	20.0	Widening
252	Urapola - Waturugama	B434	3/1	Western	Gampaha	40.0	Widening
253	Veyangoda - Ruwanwella	B445	1/2	Western	Gampaha	50.0	Widening
254	Veyangoda - Ruwanwella	B445	1/3	Western	Gampaha	50.0	Widening
255	Veyangoda - Ruwanwella	B445	6/3	Western	Gampaha	40.0	Widening
256	Veyangoda - Ruwanwella	B445	7/1	Western	Gampaha	60.0	Widening
257	Veyangoda - Ruwanwella	B445	7/2	Western	Gampaha	50.0	Widening
258	Veyangoda - Ruwanwella	B445	8/3	Western	Gampaha	30.0	Widening
259	Veyangoda - Ruwanwella	B445	10/1	Western	Gampaha	30.0	Widening
260	Veyangoda - Ruwanwella	B445	11/4	Western	Gampaha	35.0	Widening
261	Veyangoda - Ruwanwella	B445	11/6	Western	Gampaha	30.0	Widening
262	Wadduwa - Morontuduwa	B449	4/2	Western	Kaluthara	50.0	Widening
263	Wandurambe - Kottawa	B455	10/6	Southern	Galle	28.0	Widening
264	Welikada - Kohilawatta	B469	1/1	Western	Colombo	120.0	Widening
265	Welikada - Kohilawatta	B469	4/3	Western	Colombo	243.0	Widening
266	Weliweriya - Kirindiwela	B472	13/2	Western	Gampaha	60.0	Widening
267	Yakkalamulla - Ketanwila	B480	1/1	Southern	Galle	20.0	Widening
268	Yakkalamulla - Ketanwila	B480	3/3	Southern	Galle	25.0	Widening
269	Yakkalamulla - Ketanwila	B480	5/2	Southern	Galle	30.0	Widening
270	Yakkalamulla - Ketanwila	B480	7/5	Southern	Galle	20.0	Widening
271	Yatiyantota - Poonagala - Meenagala	B482	16/2	Sabaragamuwa	Kegalle	22.0	Widening
272	Yatiyantota - Poonagala - Meenagala	B482	16/11	Sabaragamuwa	Kegalle	15.0	Widening
273	Sammanthurai - Malkampiddi - Deegawapiya	B483	3/2	Eastern	Ampara	61.0	Widening
274	Walasmulla - Katuwana - Middeniya	B485	1/6	Southern	Hambanthota	25.0	Widening
275	Walasmulla - Katuwana - Middeniya	B485	6/4	Southern	Hambanthota	25.0	Widening
276	Walasmulla - Katuwana - Middeniya	B485	12/3	Southern	Hambanthota	30.0	Widening
277	Walasmulla - Katuwana - Middeniya	B485	15/3	Southern	Hambanthota	35.0	Widening
278	Embilipitiya - Middeniya	B486	4/4	Sabaragamuwa	Ratnapura	130.0	Widening
279	Welimade - Borelanda - Ohiya - Horton Plains	B508	12/1	Uva	Badulla	20.0	Widening
280	Blackpool - Ambewela- Pattipola- Horton Plains	B512	1/1	Central	Nuwaraeliya	15.0	Widening
281	Buttala - Helagama - Okkampitiya	B522	1/2	Uva	Monaragala	20.0	Widening
282	Nelundeniya - Alawwa	B539	1/1	Sabaragamuwa	Kegalle	25.0	Widening
283	Nelundeniya - Alawwa	B539	4/7	Sabaragamuwa	Kegalle	22.0	Widening

No	Name of Road	Route No.	Br No	Province	District	Tentative Cost (Rs Mn)	Remarks
284	Embilipitiya - Moraketiya - Kiriibbanara - Uda Mauara	B549	15/1	Uva	Monaragala	27.0	Widening
285	Madatugama - Pubbogama - Andiyagala	B556	3/1	North Central	Anuradhapura	20.0	Widening
286	Madatugama - Pubbogama - Andiyagala	B556	3/2	North Central	Anuradhapura	25.0	Widening
287	Madatugama - Pubbogama - Andiyagala	B556	13/1	North Central	Anuradhapura	50.0	Widening
288	Madatugama - Pubbogama - Andiyagala	B556	13/2	North Central	Anuradhapura	50.0	Widening
289	Bengamuwa - Molokgamuwa - Galdola	B607	2/7	Southern	Matara	47.0	Widening
290	Mollipothana - Soorangal	B614	3/3	Eastern	Trincomale	15.0	Widening
291	Mollipothana - Soorangal	B614	6/3	Eastern	Trincomale	18.0	Widening
292	Walasmulla - Julampitiya	B629	4/3	Southern	Hambanthota	60.0	Widening
293	Walasmulla - Julampitiya	B629	7/1	Southern	Hambanthota	40.0	Widening
294	Walasmulla - Julampitiya	B629	7/3	Southern	Hambanthota	150.0	Widening
295	Walasmulla - Julampitiya	B629	7/5	Southern	Hambanthota	70.0	Widening
296	Walasmulla - Julampitiya	B629	8/1	Southern	Hambanthota	40.0	Widening
297	Beliatta - Kirinda	B630	4/6	Southern	Hambanthota	20.0	Widening
298	Beliatta - Kirinda	B630	6/5	Southern	Hambanthota	20.0	Widening
299	Beliatta - Kirinda	B630	6/6	Southern	Hambanthota	20.0	Widening
300	Nainamadama - Iranawila - Chilaw	B640	23/1	North Western	Puttalam	18.0	Widening

Note : If any national road section is rehabilitated as a standard two lane, four lane or six lane road, the bridges in the road section to be reconstructed or widened based on the existing bridge condition & designed horizontal alignment of the road section in addition to the above proposed bridges.

If any bridge is damaged or collapsed due to a natural disaster, immediate rehabilitation work will be attended.

Proposed Bridges for provide new connectivity to National Road Network

No	Name of Road	Route No.	Province	District	Tentative Cost (Rs Mn)	Remarks
1	Colombo - Kandy Road	A001	Central	Kandy	700.0	New Bridge parallel to Bridge No. 110/2
2	Jaffna - Manipay - Karainagar	AB017	Northern	Jaffna	1,300.0	New Bridge across sea
3	New bridge across Kelani river at Pattiya Junction		Western	Colombo	1,340.0	New Bridge across Kelani river
4	New bridge across Kelani river near Kalaniya temple		Western	Colombo	700.0	New Bridge across Kelani river
5	Across the Rajagiriya Nawala canal connecting Angampitiya road and School lane (Angampitiya bridge)		Western	Colombo	2,100.0	New Bridge
6	Proposed bridge at Avissawella bypass		Western	Colombo	615.0	New Bridge at Proposed Avissawella bypass
7	Construction of bridge across Kokilai Lagoon		Northern	Mullaitivu	4,000.0	New Bridge across lagoon
8	Construction of Madinnagoda Bridge		Western	Colombo		Reconstruction

Proposed Bridges for to improve connectivity in other roads & rural area

No	Name of Road	Province	District
1	Wakwella bridge across Gin Ganga	Southern	Galle
2	Proposed Bridge Across Madu Ganga	Southern	Galle
3	Proposed bridge at Horawala - Ittepana Thotupola across the Benthara Ganga	Western	Kaluthara
4	Kosgama- Kanampella- Pugoda road	Western	Gampaha
5	Construction of Bridges No. 1,2,3 at Kinnya Kuranchankerny Road	Eastern	Trincomale
6	Construction of Porupitiya Bridge across Nilwala River	Southern	
7	Reconstruction of Bridge Across Dandagama Oya on Kuliyapitiya Galhitiyawa Road	North Western	

ANNEX-10

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
1	B413	Tennekumbura - Rikillagaskada - Ragala Road.	2011	66.75	67	Landslide	Nuwara Eliya
2	A004	Colombo-Ratnapura-Batticaloa-Wellawaya road	1994	183	184	Landslide	Badulla
3	B318	Nawalapitiya - Dolosbage	2015	8/8	8/10	Landslide	Kandy
4	B391	Ratnapura - Wewalwatta Road	2017	12.3	12.5	Landslide	Ratnapura
5	B412	Tawalanthenna-Thalawakele road	2007	30/5	30/6	Landslide	Nuwra Eliya
6	A005	Peradeniya - Badulla - Chenkaladi road	1997	30/10	30/11	Landslide	Kandy
7	A007	Avissawella - Hatton - Nuwaraeliya	2014	3/3	3/5	Slope Failure	Kegalle
8	A016	Beragala - Haliela Road	2014	3.85	4.2	Rock fall	Badulla
9	A016	Beragala - Haliela Road	2014	5/3	5/4	Rock fall	Badulla
10	A016	Beragala - Haliela Road	2014	5/6	5/8	Rock fall	Badulla
11	A023	Wellawaya - Ella - Kumbalwela road	2013/15	19/9	19	Rock fall	Badulla
12			2014	25/2	25/3	Rock fall	Badulla
13			2014	27/4	27/5	Rock fall	Badulla

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
14	E01	Kottawa - Godagama Section	2006/ 2017	64.3	64.5	Rock fall	Galle
15				66.6	67.3	Rock fall	
16				74.8	75	Rock fall	
17				76.7	77.2	Rock fall	
18				77.9	79	Rock fall	
19				86.6	86.7	Rock fall	
20				87.8	88.8	Rock fall	
21				89.3	89.6	Rock fall	
22				99.8	100	Rock fall	
23				101.3	101.7	Rock fall	
24	B110	Eheliyagoda-Dehiowita road	2016	5/6		Slope Failure	Kegalle
25			2016	3	3.2	Slope Failure	
26	A004	Colombo-Ratnapura-Batticaloa-Wellawaya road	2017	105/3		Slope Failure	Ratnapura
27			2017	107/2	107/3	Slope Failure	
28			2012/ 2017	132/10	132/10	Slope Failure	
29	A001	Colombo - Kandy road	2016	99/8	99	Slope Failure	Kegalla

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
30	A005	Peradeniya - Badulla - Chenkaladi road	2014	99/18	99/20	Slope Failure	Badulla
31			2014	99/6	100/6	Rock fall	
32			2014	99	100	Rock fall	
33	B413	Tennekumbura - Rikillagaskada - Ragala Road.	2013	48/2	48/8	Slope Failure	Nuwara Eliya
34			2013	50/2	50/3	Rock fall	
35			2013	51/5	51/6	Rock fall	
36	B421	Thiriwaíketiya - Agalawatta Road	2017	9	10/1	Slope Failure	Ratnapura
37				25/4	25/6	Landslide	
38				26/8	26/10	Landslide	
39				49/10	50/1	Landslide	
40				51/7	51/8	Slope Failure	
41	B391	Ratnapura - Wewalwatta Road	2017	21.9	22.1	Slope Failure	Ratnapura
42				22.2	22.3	Slope Failure	
43				22.4	22.45	Slope Failure	
44	B328	Norton-Maskeliya	2017	0.8	0.9	Landslide	Nuwaraeliya
45	B390	Ratnapura- Palawela- Karavita	2017	12/4	12/7	Slope Failure	Rathnapura
46				18/3	18/4	Slope Failure	
47				18	19/1	Slope Failure	
48	B365	Peradeniya - Halloluwa - Katugastota	2014/2015	3	4	Rock fall	Kandy

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
49		Ayagama-Egaloya	2017	0	0.3	Landslide	Rathnapura
50				8km	8.25	Landslide	
51	B304	Nagoda - Kalawellawa - Ballapitiya		40/2 41/4	40/6 41/7	landslide	Kalutara
52	A008	Panadura - Nambapana - Ratnapura		36/5	36/6	landslide	Kalutara
53	B578	Dorape - Hiyare		2.7	2.8	Embankment Damage & 3/7 culvert damage	Galle
54	A002	Colombo-Galle-Hambanthota-Wellawaya		160	160.1	Road Eroded adjacent to nilwala river bank	Matara
55	B480	Yakkalamulla - Ketanwila		11.560 11.960	11.620 12.040	due to flood road damaged heavily	Matara
56	A017	Galle - Deniyaya - Madampe		26/1	26/2	Road Erosion (RHS) L=50m - H=8m	Matara
57				33	34/1	Road Erosion (RHS) L=40m - H=6m	Matara
58				35	36/1	Road Erosion (RHS) L=110m - H=3m	Matara
59				Near to 54 km		Road Erosion (RHS) L=50m - H=6m	Matara
60				57	58/1 culvert	Road Erosion (RHS) L=40m - H=6m	Matara

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
61	B003	Akuressa - Kamburupitiya		3 km Both sides		Road Erosion (RHS) L=200m - H=1.5m	Matara
62	A009	Kandy - Jaffana		5 10	6 11	Landslide	Kandy
63	B205	Katugasthota - Madawala - Bambaralla		28		Rock falls during the rain	Kandy
64	AB13	Gampola - Nawalapitiya		17/2	17.5	Inundation during heavy rain due to drainage problem	Kandy
65	B588	Nawalapiyiya -Dolosbage		7	8	Land slide	Kandy
66				8/10		Land slide	Kandy
67				16/10	16	Land slide	Kandy
68				19/10	19/11	Land slide	Kandy
69	B015	Ambathenna-Bokkawala-Arambekade		2/1 Bridge		flooding of area due to narrow and skew bridge and silted water way	Kandy
70				9/5 - (LHS)	9/6	collapsed of embankment to a waterway	Kandy
71	A010	Katugastota-Kurunegala-Puttlam		16/1 (LHS) 16/ (RHS)	16/8 16/10	Land slide Retaining wall	Kandy

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
72	B122	Galagedara - Rambukkana		18/3 (LHS) 7/3 (LHS) 4/3 (LHS)	18 7/4 4/4	Land slide Retaining wall Damaged section near house	Kandy
73	B409	Thalgodapitiya- Yatawatta -Dombawela .		26/3	26/4	Earth slips and washed off shoulder-LHS	Matale
74	B274	Matale- Illukkumbura- Laggala		2/2	2/6	washed off , shoulder & edge	Matale
75	B461	Wattegama -Kandenuwara -Wariyapola .		31/1	31/2	Earth slips and washed off shoulder-RHS	Matale
76				13	14/1	washed off shoulder and collapse shoulder & embankment	Matale
77				14	15/1	washed off shoulder and collapse shoulder & embankment	Matale
78	B484	Hasalaka -Handungamuwa		37.756		Slip length 28 m, Height 8.0 m	Matale
79	B319	Navalapitiya-Ginigathhena		11.800 (LHS) 10.700 (LHS)	12.000 11.000	Toe failure on LHS	Nuwaraeliya
80				11/3	11/4	Toe Failure	Nuwaraeliya
81	B506	Navalapitiya - Harangala		0	0.2	Toe Failure on RHS	Nuwaraeliya

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
82	B149	Hatton - Maskeliya-Delhouse		29	29.5	Rock and boulder falling	Nuwaraeliya
83	A007	Avissawella- Hatton- Nuwaraeliya		41.400 (LHS)	41.45	Earth slips	Nuwaraeliya
84				51.000 (LHS)		Rock falls	Nuwaraeliya
85				55/1(LHS)	55/2	Failure of R/W	Nuwaraeliya
86				44.00 (LHS)		Rock falls & Earth slips	Nuwaraeliya
87	B328	Nortan - Maskeliya		0.990 (LHS)	1.02	Rock falls & Earth slips	Nuwaraeliya
88	B582	Gomburuoya - Balapokuna		1.95	6.6	landslip	Nuwaraeliya
89	B413	Thannakumbura - Rikillagakada - Ragala		66.75	67.45	Earth slip, rock falling	Nuwaraeliya
90	A007	Avissawella - Hatton - Nuwaraeliya		86.4	86.5	landslip	Nuwaraeliya
91	B412	Tawalantenna - Thalawakele		18+000 - 21+000	21	Rock falling	Nuwaraeliya
92				18.00		subsidence	Nuwaraeliya
93	B110	Ehaliyagoda - Dehiowita		3 (RHS)	4/1	Earth slip	Ratnapura
94	B265	Malwala -Carney		5/3 (LHS)	5/4	Land Slide	Ratnapura
95	B222	Kiriella - Nedurana - Eheliyagoda		4/1 (RHS)	4/2	Rock fall & Earth Slip	Ratnapura
96				4/7 (RHS)	4/8	Rock fall & Earth Slip	Ratnapura

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
97	A004	Colombo - Ratnapura - Wellawaya - Batticaloa		155/5 LHS	155/6	Land slides/ Rock Falls	Ratnapura
98				108/4 LHS	108/6	Land slides	Ratnapura
99				137/6 LHS	137/7	Earth slips	Ratnapura
100	B339	Oruganthota - Piinnawala - Bagawanthalawa		12/2 (RHS)	12/3	Earth slip	Ratnapura
101	B421	Thiriwanaketiya - Agalawatta		8/10 (RHS)	8/11	Earth Slip	Ratnapura
102				27/8 (LHS)	27/9	Land Slide	Ratnapura
103	B475	Bulugolla - Dombemada - Wahawa		10/4 (RHS)	10/5	Earth slips, Embankment collapse	Kegalle
104	B385	Rambukkana - Mawanella		5/1 (LHS)	5/3	Head wall collapse	Kegalle
105				5/5 (LHS)		Road edge washed off & Retaining wall collapse	Kegalle
106				2/6 (LHS)	2	Embankment washed off	Kegalle
107				3(LHS)	4/1		Kegalle
108				4/4 (LHS)			Kegalle
109	B136	Gawilipitiya - Hettimulla		1/1(LHS)	1/2	Shoulder Wasedoff and Base failure	Kegalle
110				5/1 (LHS)	5/2	Damaged Retaining wall, Shoulder washed off & base failure	Kegalle

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
111	A021	Kegalla-Bulathkohupitiya-Karawanella		4/1 (RHS)	4/2	Washed off of Road Shoulder	Kegalle
112				11/1 (RHS)	11/2	Damaged and washed off Retaining wall	Kegalle
113	B358	Parussella - Panapitiya		27/9 (RHS)	27/10	30.0 m land slide	Kegalle
114				29/ 4 (RHS)	29/5	30.0 m land slide	Kegalle
115				37/5 (LHS)	37/9	300.0 m soil improvement	Kegalle
116				41/8 (LHS & RHS)	41	400.0 soil improvement	Kegalle
117	B482	Yatiyanthota - Poonagala - Meenagala		14/6 (RHS)	14/8	soil improvement	Kegalle
118				14/5 (LHS)	14/6	land slide	Kegalle
119				12.975	13.025	Earth Slip - 300.0 m	Kegalle
120				17/2 (LHS)	17/3	land slide	Kegalle
121	B397	Koahohabagas Junction to 1/6 Bridge		0	0.57	Flood & Inundate	Anuradhapura
122	B343	Padaviya – Parackramapura		6.9	7/2	Flood & Inundate (capacity of existing culvert is not sufficient)	Anuradhapura

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
123	A011	Maradankadawala – Habarana – Thirikkondiyadimadu		74 77.3 79.3	75 79 79.6	Flood & Inundate	Polonnaruwa
124				78/1		Inundate- (narrow bridge)	Polonnaruwa
125				82/3		Inundate- (narrow bridge)	Polonnaruwa
126	A011	Maradankadawala – Habarana – Thirikkondiyadimadu		28.600 47.030 60.200	29 47.3 60.35	Flood & Inundate (capacity of existing culvert is not sufficient)	Polonnaruwa
127	B244	Kuliyapitiya - Pandiwila		7.8	8.13	Flooded two time per year	Kurunegala
128	B419	Thoppuwa - Madampe		17	20	Sliding of road embankment towards Hamilton Canal and settlement of road surface	Puttlam
129	B614	Baththuluoya - Udappuwa - andimene		Bridge No. 6/2		failure of existing gabion wall and washed out of back fill	Puttlam
130	B079	Chillaw - Wariyapola		Bridge No 6/2		settlement of bridge	Puttlam

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
131	B045	Bangadeniya - Andigama - Anamaduwa		18		Inundation of the road section due to heavy water flow	Puttlam
132	B379	Puttlam - Marichchikaddi		Bridge No 9/2		settlement of bridge Pier (no. 02) due to heavy water flow	Puttlam
133	B019	Anamaduwa -Uswewa - Galgamuwa		Bridge No 13/1		scouring of bridge foundation due to insufficient bridge span	Puttlam
134	A023	Wellawaya-Ella-Kubalwela		25/1	25/2	Occurred in year 2019 land slide due to the adverse weather condition closed one month period due to failure of soil mass and rock	Badulla
135	A004	Colombo-Rathnapura-Wellawaya-Batticaloa		184	185.0	Activated Land Slide. There is a risk of land slide failure along the during adverse weather periods	Badulla
136	B508	Rendapola - Abewela		4-Mar	3/5	Activated Land Slide. There is an issue operation during adverse weather periods	Badulla

Identified Landslide / Slope Failures /Rock Fall/ Rock Slide /Flooding Locations

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				Start (km/cul.)	End (km/cul.)		
137	A016	Beragala - Haliela		21/13	22/1	unstable rocks are on the left hand side of the and continuously rocks were fallen during rainy times	Badulla
138	A023	Wellawaya-Ella-Kubalwela		26/3	26/4	Activated Land slide and Several rock fallings occurred	Badulla
139	B113	Dickwella-Jangulla-Thalpitigala		0	0.4	Flooding on heavy rain days	Badulla
140	A022	Passara-Monaragala		11-May	5/13	Large earth slips activating time to time on heavy rains	Badulla
141	B036	Badulla-Karamatiya-Andaulpotha		5-Oct	10/6	Land Slide Reactivated	Badulla
142	A004	Colombo-Rathnapura-Wellawaya-Batticaloa		232.5	233.5	The Buttala Town is submerged to a slight rain for considerable period disturbing to the day to day life of people	Monaragala
143	B018	Ampilanthurai - Veeramunai		9/5 Causeway		Getting flood specially in rainy season, water flooding 1.0 m above the existing causeway, Hence users are facing difficulties.	Batticaloa
144				14/6 Causeway			Batticaloa

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Item No.	Route No	Name of the Road	Year of Landslide recorded	Location		Disaster Type	District
				Start (km/cul.)	End (km/cul.)		
145	A015	Batticaloa-Triconamadu-Trincomalee		79	80.5	Damaging by Flooding	Trincomalee
146	B347	Palathoppur- Seruwila		5.3	5.5	Damaging by Flooding	Trincomalee
147	B424	Trincomalee-Pulmoddai		47	53.0	Damaging by Flooding	Trincomalee
148	B618	Mullipothana-Soorangal		3	5	Damaging by Flooding	Trincomalee
149	B541	Thambalagamam-Kinniya		5	6	Damaging by Flooding	Trincomalee