

# PROJECT MANAGEMENT CONSULTANCY FOR IMPLEMENTATION OF SMART CITY MISSION PROJECTS FOR MANGA LURU CITY

## DETAILED PROJECT REPORT – PRIORITY LOOP ROAD

### VOLUME I - REPORT



The purpose of the Detailed Project Report is to provide details of various considerations made towards the elements proposed for the project as mentioned in the title above. It aims to give a basic design idea to all the stakeholders before proceeding for final design and estimates.

**MANGALORE SMART CITY  
PROJECT**

Lalbaug, M.G. Road, Mangalore  
- 575003

3/28/2018

## 1. INTRODUCTION

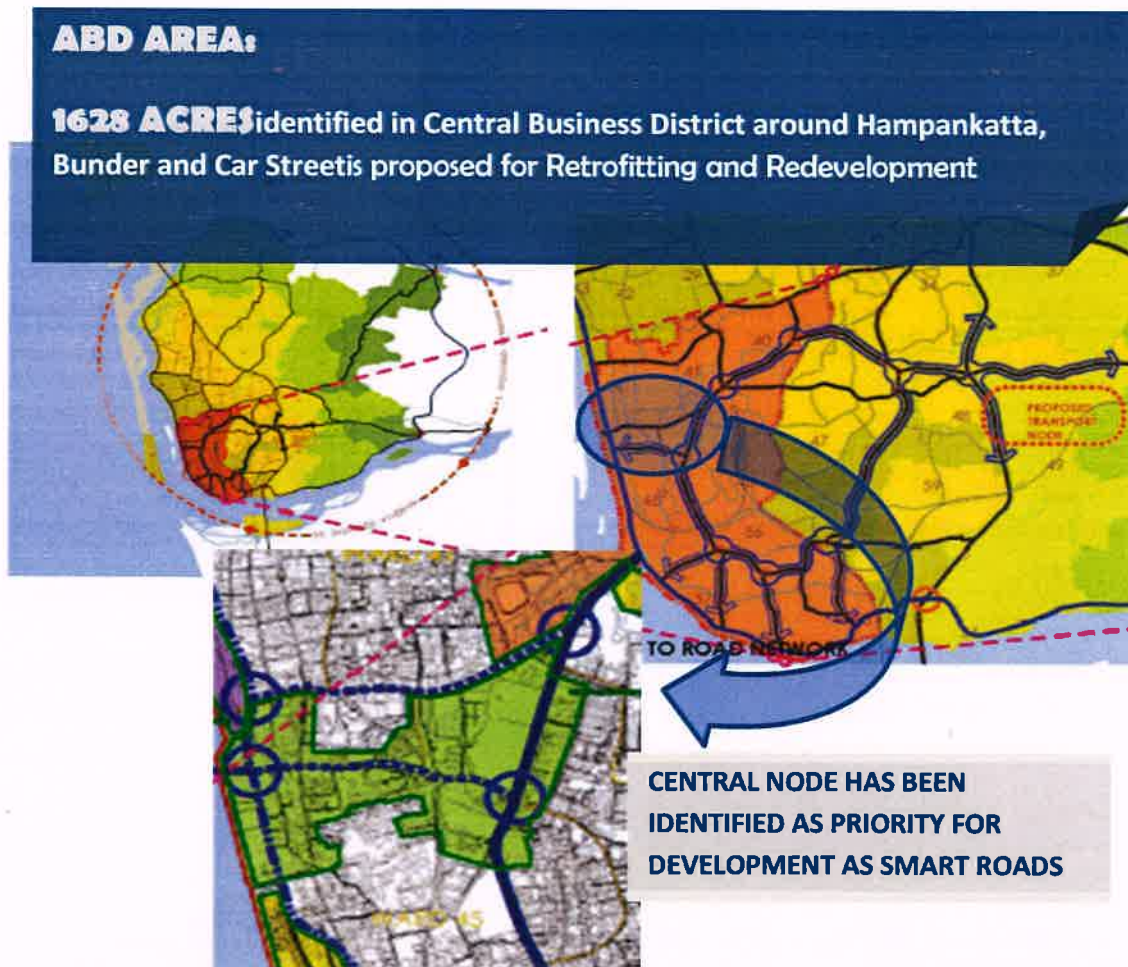
### 1.1. Mangaluru Smart City Proposal

Karnataka Urban Infrastructure Development & Finance Corporation Limited (KUIDFC) is the State Level Nodal Agency (SLNA) for the Smart Cities Mission in Karnataka. **Mangaluru was a proud Participant in second round of this Challenge and now aspires to translate the vision i.e. the broad components across both 'area-based' and 'pan-city' heads identified in the Smart City Proposal (SCP) into Reality.**

Mangaluru Smart City Proposals (SCP) is considered as Area Based Development Proposals (ABD) and Pan City Proposals. The SCP has identified 65 projects/sub projects to be taken up under ABD and Pan City Proposal

Figure 1-1 shows the ABD area considered under Mangaluru Smart City Proposal and the priority roads for development as smart roads

Figure 1-1 ABD area considered under Mangaluru Smart City and Priority Roads Identified for Development as Smart roads



## 1.2. Smart Road Proposals under Mangaluru Smart City Project

Transforming existing roads into Smart Roads has been envisaged under the Smart City Mission. In this regard, Mangaluru Smart City Ltd (MSCL) intends to develop world class road infrastructure that is efficient mode of transport and inclusive to all strata of society. This entails comprehensive upgrading of the public Right of Way (ROW) of the streets which includes refurbishment of existing carriageway, laying of new footpaths and cycle tracks, creating utility corridors, developing pedestrian facilities, development works for landscape, hardscape, street furniture, signage, lighting, etc.

The following projects proposed under Mangaluru SCP have been clubbed together and considered under Design and Development of Smart Roads

	Specialized Pedestrian Facilities along certain road sections	S NO. 19	ABD COMPONENT
	Widening of Roads	S NO. 21	ABD COMPONENT
	Upgradation of Roads with footpaths	S NO. 23	ABD COMPONENT
	Provision of Road side plantation	S NO. 25	ABD COMPONENT

### 1.2.1. Smart Roads under Mangaluru Smart City

The development of smart roads has been perceived in phased manner.

**Phase I included Maidan road (from Clock Tower Circle to AB Shetty Circle**

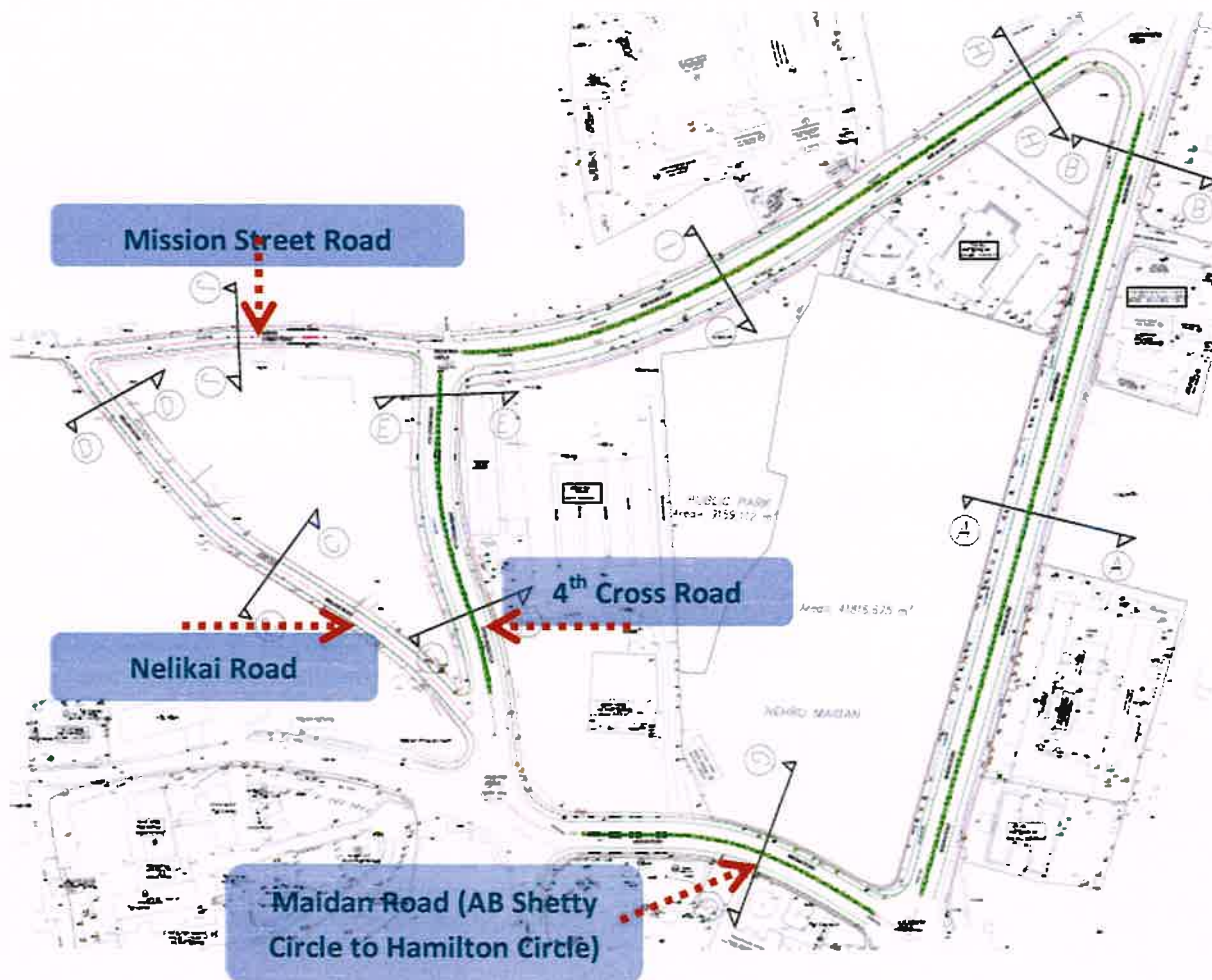
**Priority Loop Smart Roads include Maidan road II (from AB Shetty Circle to Hamilton Circle), 4th Cross Road, Mission Street Road, Nellikai Road.**

Other Roads to be developed in future phase(s) include Mangaladevi Road, Bunder road (from Hamilton Circle to Bunder), Rosario Church road (from Hamilton Circle to Hoige Bazaar), Car Street (from Sri Venkatramana Temple to Tile Factory), Bibi Alabi Road (from Junction with Nellikai Road to Bengre Ferry), Bunder Road (from Junction with Old Port Road to Hoige Bazaar), Marnamikatta Road

Junction Improvements are considered as integral part of smart roads design and development

Figure 1-2 shows the Priority Smart Road considered for development as smart road and are part of this DPR

Figure 1-2Phase I/Priority Smart Road considered for development as smart road



### 1.2.2. Need for Intervention

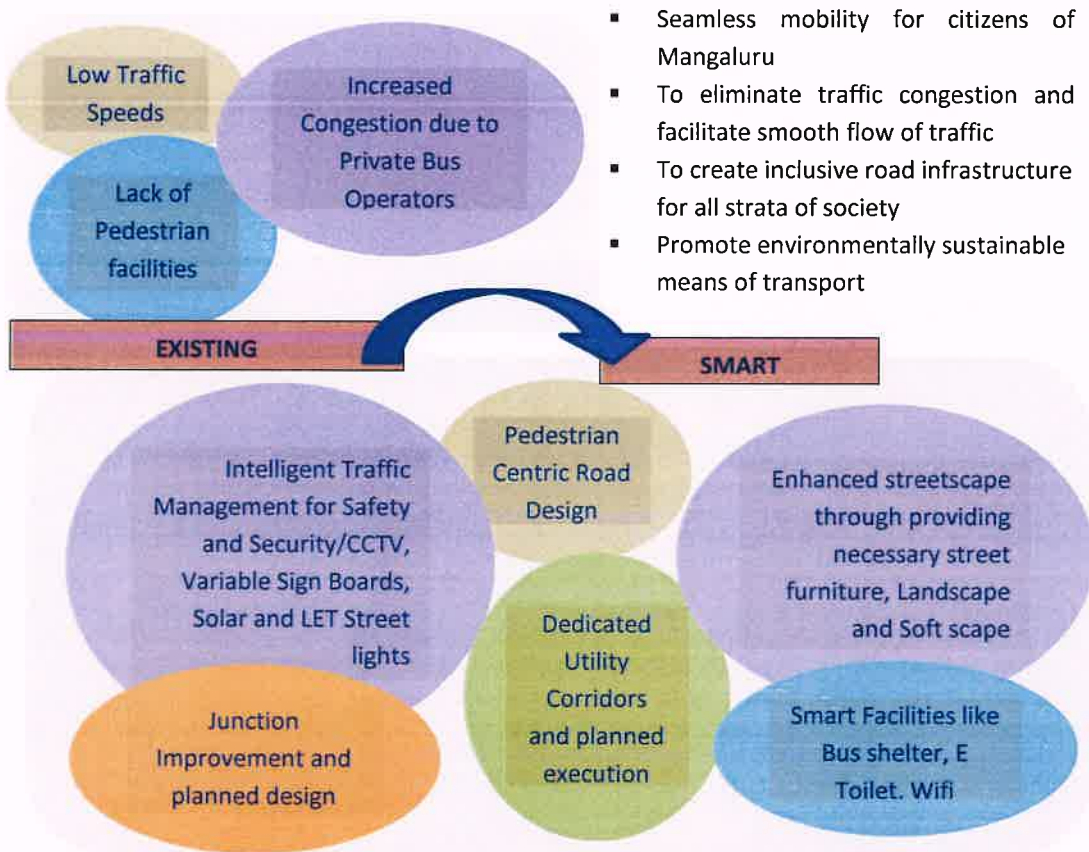
The existing road infrastructure and transport facilities in Mangalore are proving to be inadequate to meet the requirements of the city. 63% of the roads have speeds below 30 kmph as noted during the Comprehensive Traffic and Transportation Study of Mangalore. The delay is both due to traffic signals and interference of traffic movements, such as turning vehicles, parking and un-parking vehicles, pedestrians etc.

Due to substantial increase in the number of city buses in operation in addition to mixed flow of heavy traffic, the city is facing many traffic problems.

Further, with the increase in the commercial activity in some of the important areas like Hampankatta, Bejai, etc., there is an increased demand for better pedestrian facilities. The increase in vehicular traffic has given rise to widening the carriageway width to accommodate the vehicles resulting in reduction in the size of the foot paths. This in turn has given room for pedestrians to spill over to the carriageway, thereby affecting the flow of vehicles. Considering the present scenario the

main arterial roads and junctions require up gradation to improve the traffic and transport facilities for the citizens.

There is hence a need to transform the existing roads with above concerns into smart roads as depicted in diagram below



### 1.2.3. Proposed Interventions

The proposed intervention aims to achieve the following:

- Seamless mobility for citizens of Mangaluru
- To eliminate traffic congestion and facilitate smooth flow of traffic
- To create inclusive road infrastructure for all strata of society
- Promote environmentally sustainable means of transport



DETAILED PROJECT REPORT – PRIORITY LOOP SMART ROAD

Smart Roads include Four Broad Objectives, namely:

- 1) **EFFICIENT AND SAFE STREETS:** This involves road re-channelization whereby the effective width of the carriageway is reduced in order to achieve systemic improvements. Roads with clearly demarcated spaces for vehicles, pedestrians, cyclists and dedicated on-street parking to minimize conflicts between vehicular and pedestrian traffic.
- 2) **RESILIENT STREETS:** Streets with defined utility corridor including undergrounding overhead utilities where upgraded utilities can withstand severe natural and man-made disasters. Streets that provide infrastructure allowing safe walking experience in night through pedestrian lighting and clean public space through dustbins at regular intervals.
- 3) **INCLUSIVE STREETS:** Universal accessible design that allow safe walking experience with shaded walkways to all citizens and specific facilities for elderly and people with special needs.
- 4) **STREETS AS PUBLIC SPACES:** Streets that provide spaces outside our homes for social, cultural or intellectual interactions, to walk or to just breathe fresh air.

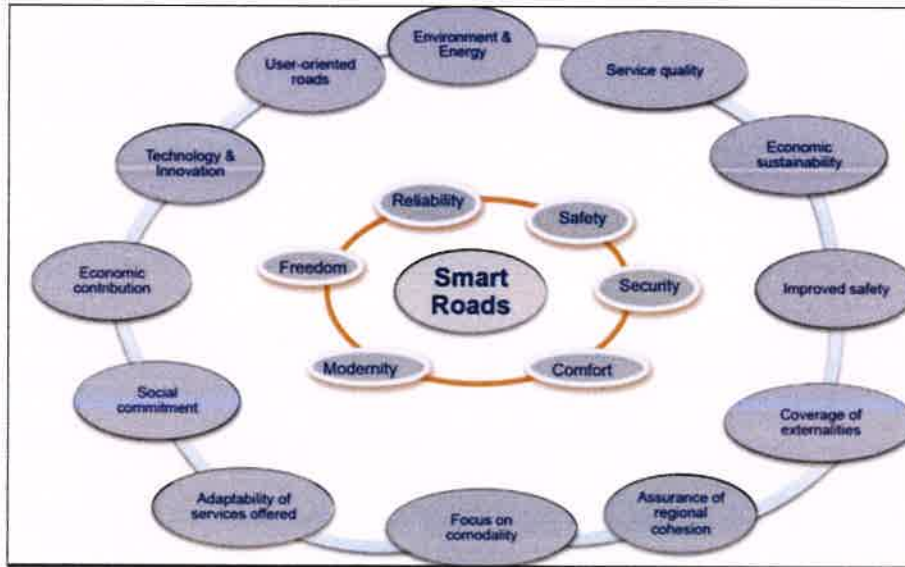
The Smart Road proposal would consist of the following specific interventions:



Details of proposed smart elements along the Priority Loop Road are covered in subsequent sections

### 1.2.4. Expected Benefits

The proposed up gradation of roads to Smart Roads would provide the following benefits to Mangaluru city:



### 1.2.5. Assumptions/Prerequisites

The assumptions for implementation of the Smart road are:

- There is no land acquisition involved and the selected road stretches are free of unauthorized encroachments
- The information about location of underground utilities and their alignment is available with the local authority
- Mangaluru City Corporation will facilitate the development of this project through facilitation of various statutory approvals and consultation with stakeholders
- 30% of median lighting poles to be replaced by new lighting poles.

### 1.2.6. Stakeholders/ Organizations involved

- Citizens
- Mangaluru Smart City Limited (MSCL)
- Mangaluru City Corporation (MCC)
- Mangaluru Smart City PMC
- Karnataka Public Works Department – Mangalore Division
- Traffic Police / RTO
- Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC)
- Mangalore Electricity Supply Company Limited (MESCOM)
- Karnataka State Road Transport Corporation (KSRTC)
- Private Bus Operators Association

### 1.2.7. Target Beneficiaries

The proposed up gradation of roads to Smart Roads would benefit the following:

- **Citizens:** The citizens would get better transport facilities for their mobility needs. The road improvement project would reduce traffic congestion; thereby result in travel time savings for the citizens. Smart roads also offer multiple mobility options such as walking, cycling, and public transport or through private vehicles. The upgraded roads would be inclusive to all citizens, i.e. would have facilities that would make them accessible to elderly or physically challenged persons.
- **Local Authority/ MCC:** The municipal corporation would get upgraded roads with more traffic handling capacity, smooth traffic flow and lesser congestion. Roads upgraded with state-of-the-art technology would result in fuel savings and lesser maintenance costs. Smart Roads would also help the local government in energy saving through energy efficient LED street lighting.
- **Local Economy:** The improved mobility and reduced travel times would result in improving the productivity of the citizens and thus benefit the local business and the city's economy.

### 1.3. Objective of the Report

The purpose of the Detailed Project Report is to provide details of various considerations and the elements proposed for the Priority Loop Smart Road. It aims to give a basic design idea to all the stakeholders before proceeding for final design and estimates.



## 2. PRIORITY LOOP ROAD - SITE RECONNAISSANCE AND SITUATION ANALYSIS

Detailed Site Reconnaissance was carried out along Priority Loop Road to assess the existing situation in terms of pavement condition, traffic situation/movements, existing facilities/structures, smart elements that can be proposed along Priority Loop Road. Section below describes brief of existing condition of Priority Loop Road

### 2.1. Nellikai Road

Nellikai Road stretches from Hamilton circle to Nellikai Junction

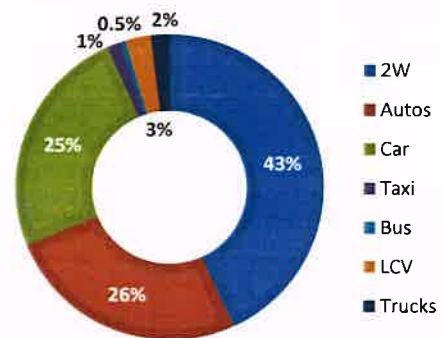
#### Facts:

1. Total length of road= 308.11m
2. Min. width = 14.20m
3. Max. Width = 15.59m
4. Slope: 2%;
5. Type of Carriage way: Bituminous in a poor condition

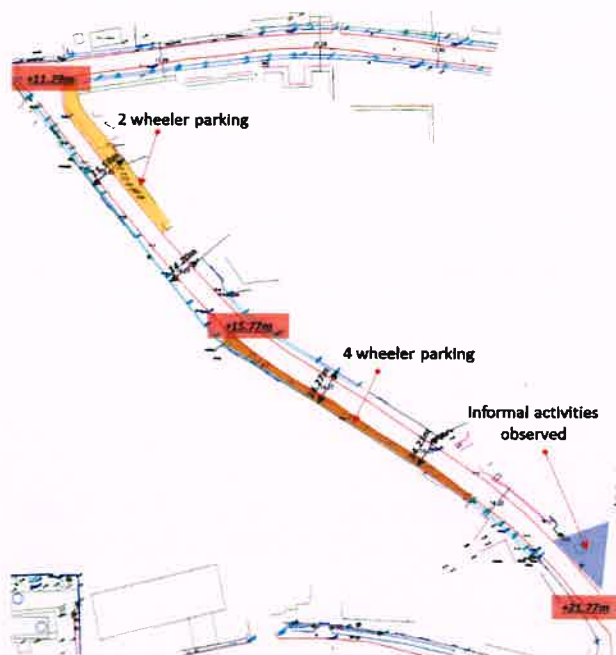
#### Existing Utilities:

1. The electrical lines are present above ground
2. Storm water drains are found at some stretches which are not functional
3. Waterline is present on both side of the carriage way.

MODAL SPLIT NELLIKAI ROAD



#### Present Scenario

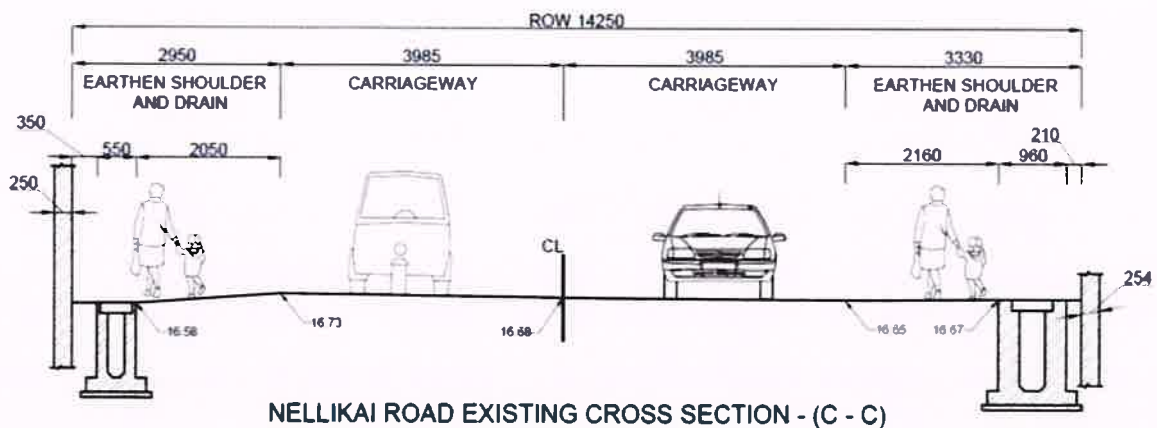




**Observations:**

1. The road is narrow with 6.00mtr bituminous old road and the rest of the area is of earthen shoulder.
2. Nellikai junction need to be developed.
3. Random parking is present on both side of the carriage way which obstruct the flow of the current vehicular traffic.
4. As the levels of the adjacent buildings basements to the eastern edge of the road are lower than the road level, storm water management is necessary to be addressed at this area.

**Existing Section for Nellikai Road**





Present state of Nellikai road.



The structures on the eastern side of the road are the lower level than the road level.

## 2.2. 4th Cross Road

4th cross road stretches from Hamilton circle to Rao and Rao Junction

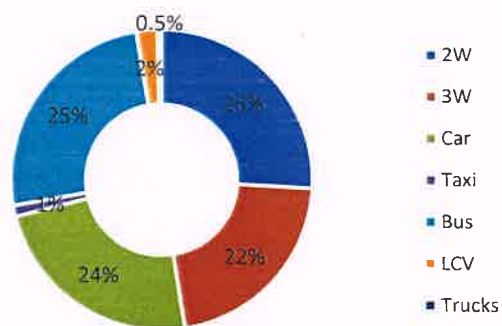
### Facts:

1. Total length of road= 254.25m
2. Min. width = 24.40m
3. Max. Width = 29.90m
4. Proposed road width = 24m
5. Slope: 2%;
6. Type of Carriage way: Cement concrete

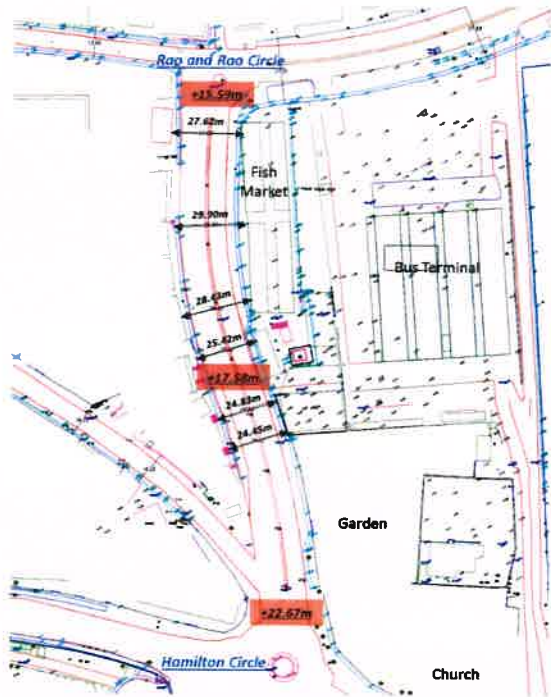
### Existing Utilities:

1. The overhead electrical lines are to the west of the carriage way.
2. Storm water drains are present on to the east of the carriage way which is filled with silt.

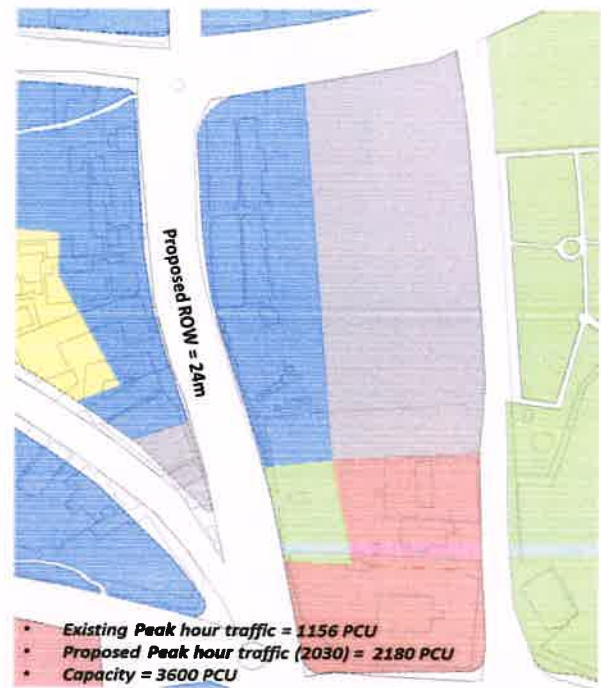
Modal Split - 4th Cross Road



**Present Scenario**



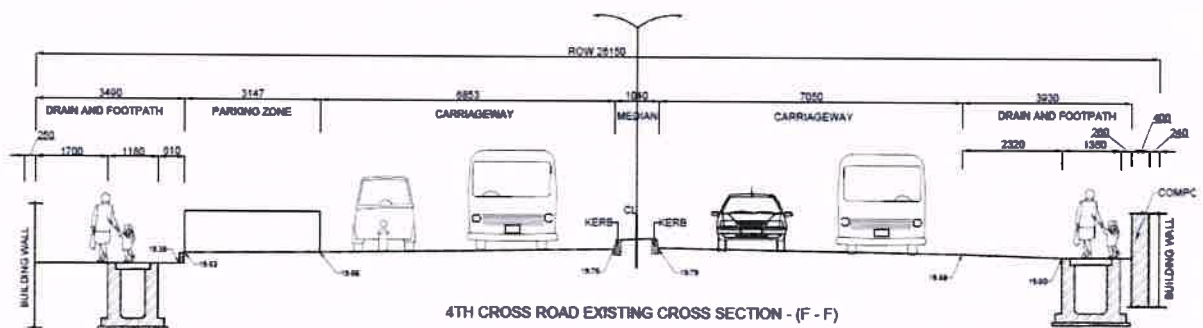
**Master Plan Proposal 2021**



**Observations:**

1. Lot of congestion is observed on this road due to disorganized activities. The random parking encroached informal activities over the footpath and the random bus parking over the western part of the road adds to the chaotic situation.
2. As the levels of the adjacent buildings basement to the western edge of the road are lower than the road level, storm water management is necessary to be addressed at this area.

**Existing Section for 4<sup>th</sup> Cross Road**





Shops are at the lower level than the road level



Randomness on to the road – encroachments and Hawking spaces on the footpath, double parking etc.

### 2.3. Mission Street Road:

Mission street road stretches from Nellikai Junction to Rao and Rao Junction.

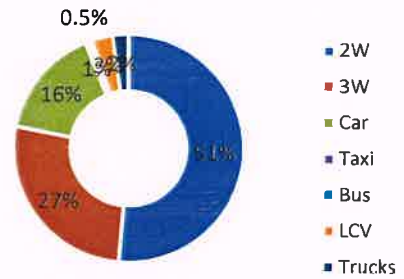
**Facts:**

1. Total length of road= 206.73m
2. Min. width = 13.40 m
3. Max. Width = 21.29 m
4. Slope: 2%;
5. Type of Carriage way: Bituminous in poor condition

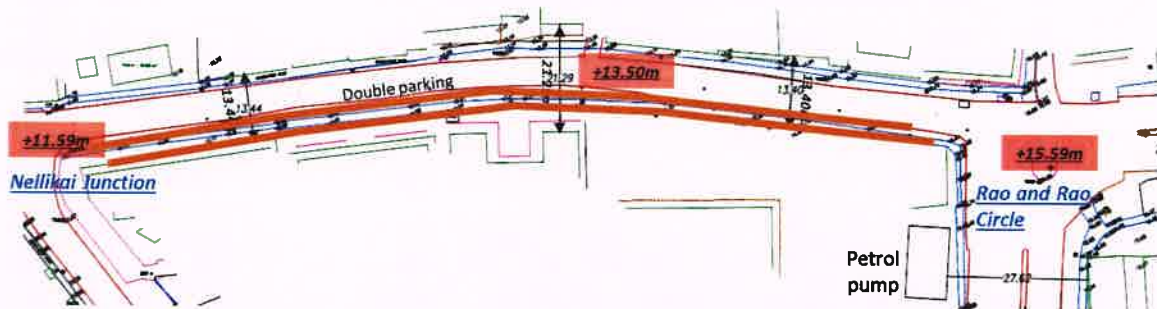
**Existing Utilities:**

1. Storm water drains with stone masonry are present at some stretches which are not functional
2. Waterline is present on both side of the carriage way.
3. Electrical cable above the ground to both side of road.

**Modal Split :  
Mission Street Road**



**Layout showing existing condition of Mission Street Road**





**Observations:**

1. The road is narrow with 6.00mtr bituminous old road and the rest of the area is of earthen shoulder where land acquisition is required at some stretches.
2. As it is very close to the central market, a lot of floating population is observed on this road.
3. The double parking is observed on both the sides of the road.

**2.4. Maidan Road II:**

Maidan Road stretches from Hamilton circle to AB Shetty Junction.

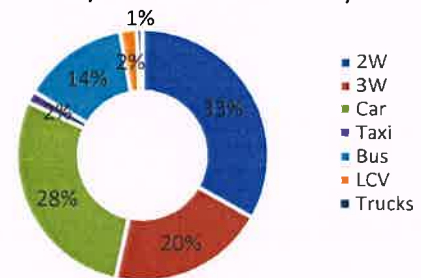
**Facts:**

1. Total length of road= 253.94m
2. Min. width = 23.41 m
3. Max. Width = 24.38 m
4. Slope – 2%
5. Type of Carriage way: Cement Concrete

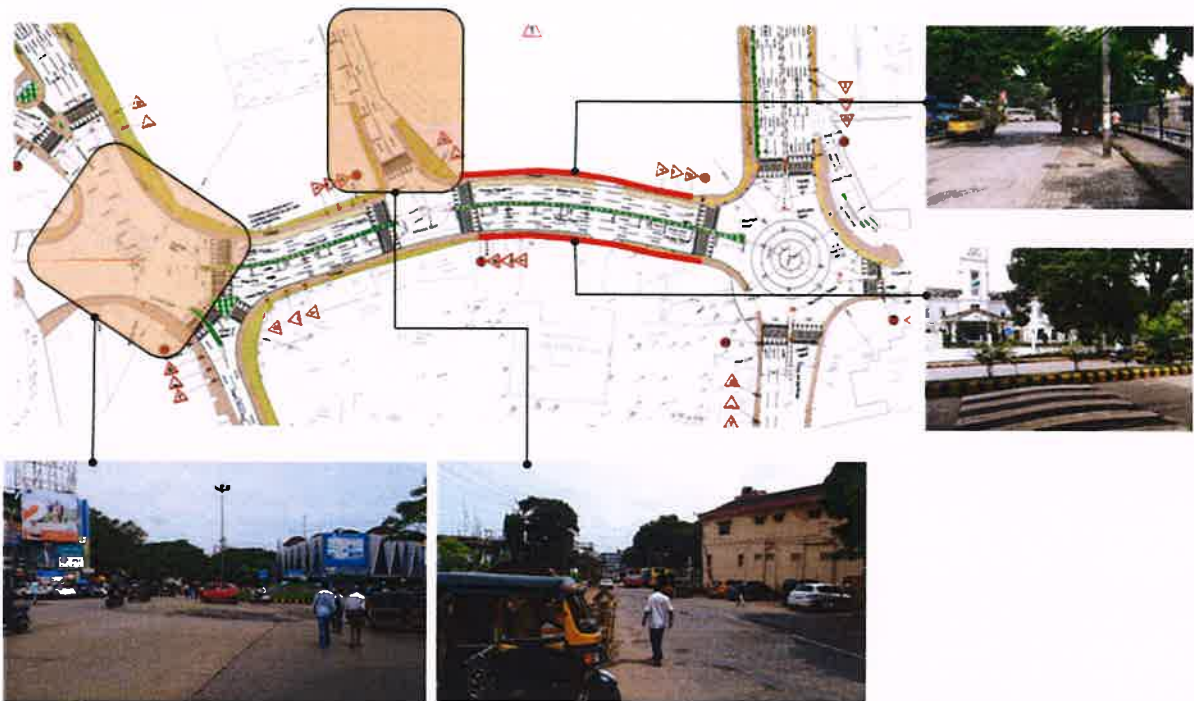
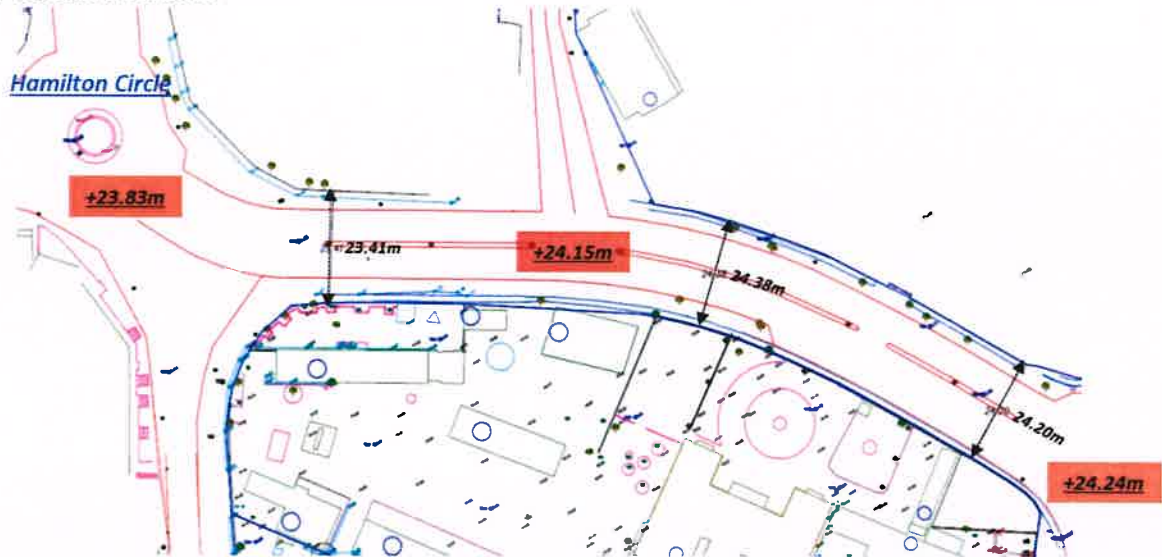
**Existing Utilities:**

1. Storm water drains are present on both sides of the road which is covered with slabs are nonfunctional since filled with silt
2. Waterline is present on along the Commissioner’s office below interlock lane
3. Electrical cable are overhead

**Modal Split: Maidan road (AB Shetty Circle to Hamilton Circle)**



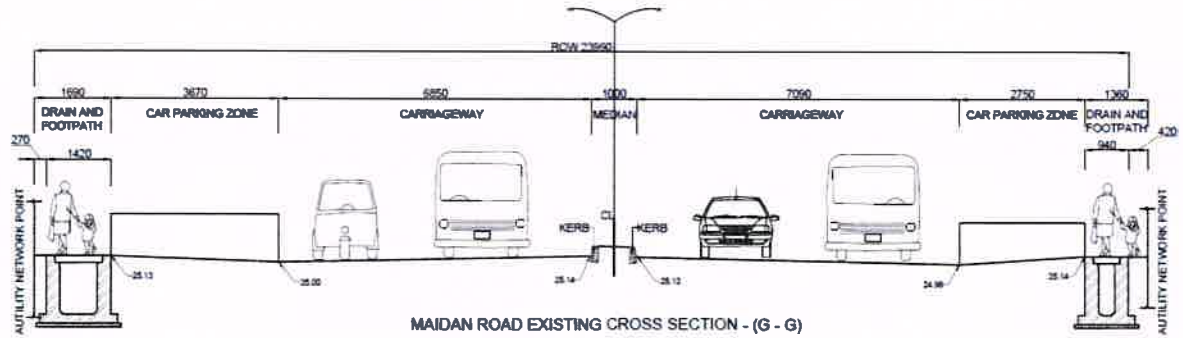
### Present Scenario



### Observations:

1. The existing carriageway is of 4 lanes with 3.50m wide concrete lanes. Rest of the carriageway is of interlock pavement which is settled at some areas
2. Parking is observed to the north of the road.
3. Narrow footpath is observed towards the south of the road.
4. Trees are observed at the shoulder of the road.

### Existing Section of Maidan RoadII





### 3. SURVEYS AND INVESTIGATIONS

#### 3.1. Road Inventory Survey

A detailed road inventory was done along the Priority Loop Road

At onset, the Ground Control Points (GCPs) were established using precision DGPS at appropriate intervals which shall be captured during DTM (Digital Terrain Model) for further geo referencing and Traversing using Total Station.

All the existing and proposed features, such as land-use, limits of right-of-way, embankment, structures, intersecting roads, existing utilities, electric and telephone installations (both O/H as well as underground), access roads, connectors, wayside amenities, safety structures, buildings, fencing and trees, street lights along the median/road side, oil and gas lines etc. falling within the extent of survey complete.

#### 3.2. Traffic Surveys

Based on the roads and junction identified under Priority Loop Road, detailed primary surveys and investigation were carried out.

The overall objective was to capture traffic flow characteristics, travel pattern; speed characteristics, on traffic passing through the project road and other characteristics related to miscellaneous requirements on the project road

**Table 3-1: Traffic Surveys and Investigations conducted along the Priority Loop Road**

Sl No.	Road name	Type of survey	Chainage
1	Maidan road (from AB Shetty Circle to Hamilton Circle)	3 days Classified Total Volume Count	0.1 km West of AB Shetty Circle
		1 Day Turning Movement Count	Hamilton Circle
		Pedestrian Count	Hamilton Circle
2	4 <sup>th</sup> Cross Road	3 days Classified Total Volume Count	0.1 km North of Hamilton Circle
		1 Day Turning Movement Count	Rao and Rao Circle
		Pedestrian Count	Rao and Rao Circle
3	Mission Street Road	3 days Classified Total Volume Count	0.1 km East of Rao and Rao Circle
		1 Day Turning Movement Count	Junction of Bus Stand Service Road and Bibi Alabi Road

Sl No.	Road name	Type of survey	Chainage
		Pedestrian Count	Junction of Bus Stand Service Road and Bibi Alabi Road
4	Nellikai Road	3 days Classified Total Volume Count	0.1 km North West of Hamilton Circle
		1 Day Turning Movement Count	Junction of Nellikai Road and Bibi Alabi Road
		Pedestrian Count	Junction of Nellikai Road and Bibi Alabi Road

Table 3-1 below shows locations where Traffic surveys and investigations were carried out along the Priority Loop Road

Figure 3-1 Traffic Survey Location

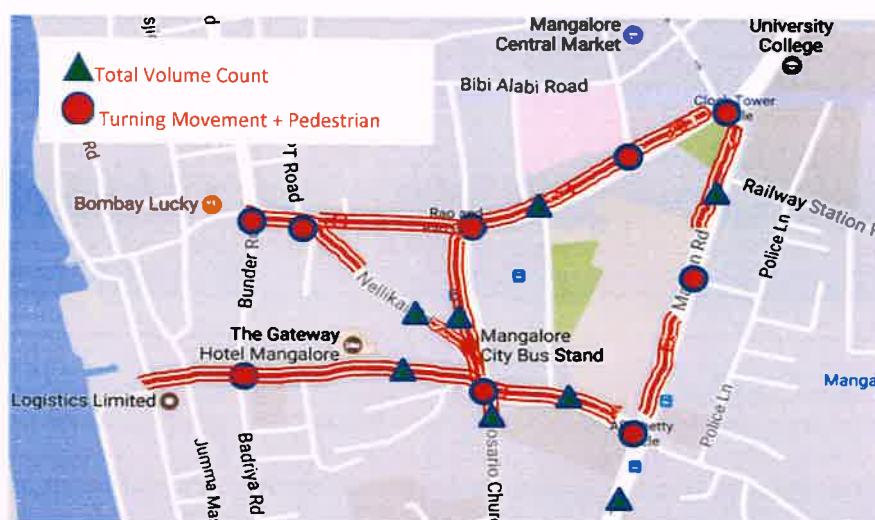


Figure 3-2 Survey work in progress



The Traffic Volume Counts were conducted as per guidelines illustrated in IRC: SP: 19 – 2001, 'Manual for Survey, Investigation and Preparation of Road Projects'.

Figure 3-2 shows the traffic survey in progress at the Project site.

For carrying out the counts, the vehicles were grouped under the categories given in Table 3-2 below.

Table 3-2: Traffic Surveys - Vehicle Classification system

Category	Examples of Vehicle Types
Two Wheelers	Scooters, Bikes, Motor cycles and Mopeds
Three Wheelers	Auto Rickshaw
Car	Car, Jeep, Taxi, and Vans
Bus	Mini Bus, Government Bus, Private Bus
Trucks	Light Commercial Vehicle (LCV), 2, 3, 4, 5, 6 and >6 Axle Trucks
Other	Tractor, Tractor & Trailer
Non-Motorized	Bicycle, Cycle Rickshaw, Animal drawn vehicles, Hand Cart

Intersection turning movement surveys have been carried out at all the major intersection locations. Classified traffic volume counts of all types of vehicles have been made separately for each direction including left and right turning traffic. The surveys have been conducted for successive 15 minutes interval for a period 24 hours.

## 4. CARRIAGEWAY AND JUNCTION IMPROVEMENT

### 4.1. Carriageway Improvement

#### 4.1.1. Right of Way (ROW)

Total four roads are being improved in this phase namely:

1. Maidan Road II – From A B Shetty Junction to Hamilton Intersection
2. 4<sup>th</sup> Cross Road – From Hamilton Intersection to Rao and Rao Junction
3. Mission Street Road – From Rao and Rao Junction to Nellikai Road Junction
4. Nellikai Road – From Nellikai Road Junction to Hamilton Intersection.

Existing Right of Way (ROW) are 24.0m to 26.0m, 25.0m to 27.0m, 15.0m to 18.0m and 13.0m to 15.0m for Maidan Road II, 4<sup>th</sup> Cross Road, Mission Street Road and Nellikai Road respectively. As per the classification as adopted by MoUD for Urban roads, these roads are considered under sub arterial road category. As the name suggests, this category of road follows all the functions of an Arterial Urban road and are characterized by mobility, and cater to through traffic with restricted access from carriageway to the side and hence it carries little less traffic volumes than that of arterial roads. Due to its overlapping nature, Sub arterial roads can act as arterials. This is context specific and is based on the function and the land use development it passes through and caters to a speed limit of 50 km/h.

#### 4.1.2. Design Speed

Design speed is related to the function of a road. Keeping in view the type of functions expected on these roads, design speed has been considered as 40 to 50 Kmph.

#### 4.1.3. Camber / Cross Fall

Since existing carriageway is being retained for Maidan Road II and 4<sup>th</sup> Cross Road, existing camber will be maintained. For Mission Street Road and Nellikai Road 2.0% camber has been provided.

#### 4.1.4. Geometry / Alignment

Geometric design & Alignment design has been done in accordance with IRC and MoUD guidelines.

## 4.2. Intersection Improvement

Road intersections are critical element of road section. They are normally a major bottleneck to smooth flow of traffic and a major accident spot. Function of a designed intersection is to control conflicting and merging streams of traffic, to minimize the delay including pedestrian traffic.

Intersection design influences the capacity of the corridor and the safe movement of conflicting directions. The pattern of the traffic movements at the intersection and the volume of traffic on each approach, during peak period of the day determine the lane widths required.

The general design principles of intersection design are the approach speeds, restriction on available land, sight distance available and the presence of the larger volume of all the road users in urban areas.

## 5. PROPOSED SMART ROAD COMPONENTS – URBAN DESIGN, LANDSCAPE AND ITMS

### 5.1. Urban Design and Landscape

Transforming existing roads into Smart Roads has been envisaged under the Smart City Mission. The design of Smart roads intends to develop world class road infrastructure inclusive to all strata of society with consideration for pedestrian safety and security as a prime importance. This entails comprehensive upgrading of the public Right of Way (ROW) of the streets which includes refurbishment of existing carriageway, laying of new footpaths and cycle tracks, creating utility corridors, developing pedestrian facilities, development works for landscape, hardscape, street furniture, signage, lighting, etc.

The proposed intervention aims to achieve the following:

- Seamless mobility for citizens of Mangaluru
- To eliminate traffic congestion and facilitate smooth flow of traffic
- To create inclusive road infrastructure for all strata of society
- Promote environmentally sustainable means of transport

As mentioned in Chapter 1, the Smart Road proposal for Priority Loop Road would consist of the following specific interventions:



### **5.1.1. Proposed Design Considerations**

#### **Proposed Design Consideration for Nellikai Road:**

1. As there are some new constructions seen on this road, they have left setbacks as per the new DP roads proposed. These areas are converted into Plaza spaces where innovative designed benches are proposed.
2. Wider road widths are observed in some stretches of these areas and keeping the carriageway uniform, diagonal parking is feasible at these areas. Landscape pockets so formed are interlocked within the parking spaces creating a shaded environment at the parking spaces and the plaza space. Seating areas are proposed under these shaded areas for a pleasing environment for the pedestrians.

#### **Proposed Design Consideration for 4<sup>th</sup> Cross Road:**

1. The existing ROW is organized and the traffic is segregated on this road. 2 Bus lanes are proposed, out of which one acts as a bus bay for the buses to stop and the other is a freeway for the buses to have a smooth movement of the buses.
2. Considering the Fish market and other hawking areas on this road, parallel parking is proposed to the east of the road intercepted by landscape pockets.

#### **Proposed Design Consideration for Mission Street road:**

1. As the ROW is narrow and no scope for road widening, this road is made one way considering the projected traffic volumes. The movement of the vehicles is proposed from Rao and Rao circle to Nellikai Junction.
2. The spaces where wider ROW is available two wheeler and 4 wheeler parking is segregated and proposed to the south of the road.

#### **Proposed Design Consideration for Maidan Road II:**

1. Bus lane is proposed on Maidan road.
2. The footpaths are wider and the utilities are proposed underground.
3. Parallel parking is proposed to the north of the road intercepted by seating and landscape pockets.

## 6. Timeline for execution

The Total timeline for project are divided into 3 broad categories:

### 6.1. Construction Phase

The construction phase is considered as 11 months excluding monsoon

### 6.2. Defect Liability

The Defect Liability period is considered as 1 Years

### 6.3. Maintenance Period

The Maintenance Period is considered as 3 years from date of DLP completion date

Note: Detailed schedule shall be during the final DPR and RFP Stage

## 7. COST ESTIMATES

The section of the report deals with the Cost Estimates for Priority Loop Smart Roads

### 7.1. Assumptions

- SOR rates as per Mangalore Circle SOR
- 12% weightage has been added to SOR rates of Mangalore Circle PWD
- Non SOR Items based on Vendor Quotations
- Landscaping rates as per EOI and Mangalore Circle PWD
- Water Supply Package are to be executed under ADB Project and as separate package, hence cost not to be considered in smart road tender cost
- ICT Package will be floated as separate tender, hence not to be considered in smart road tender cost

### 7.2. Summary of Estimate

Summary of the estimate is as stated in tale 11-1 below:

**Table 7-1: Priority Loop Smart Road – Summary of Estimate**

Sr. No.	Description	Cost In INR
1	Road and Other Works	10,48,06,661
2	Street Lighting	18,72,611
3	Landscape Work	5,68,177
4	Maintenance Cost	60,90,294
5	Provision for Third Party Damages and Maintenance at 1 st Year(DLP)	11,23,806
	<b>Sub Total</b>	<b>11,44,61,549</b>
	GST @ 12%	92,26,821
	Escalation and Tender Premium at 10%	107,24,745
	Add 3% Contengency	32,17,423
	Miscellaneous and Rounding off	9,462
	<b>Grand Total</b>	<b>13,76,40,000</b>



