



**Project Handout  
Summer Internship Program- 2015**

**Directorate of Urban Land Transport | Urban Development Department  
Bangalore | Karnataka**



## Introduction

Directorate of Urban Land Transport (DULT) has been set up by the Government of Karnataka under the Urban Development Department with objective to coordinate planning and implementation of Urban Transport projects and programs. The Directorate is in general responsible for overseeing all the urban land transport initiatives in Urban/ Local Planning Areas of Karnataka.

Since its inception, the Directorate has implemented many initiatives including service level benchmarking in Bangalore; preparation of policies on parking; preparation of mobility plans for cities in Karnataka; feasibility studies for mass transit systems etc. It is also working in tandem with BBMP, the city corporation of Bangalore and other city corporations on NMT initiatives. The Directorate is also spearheading the implementation of Bus rapid Transit system between the twin cities of Hubli and Dharwad.

The Directorate has grown from its humble beginnings and has now set its sights on fresh challenges. It provides a rare opportunity for technical personnel, urban and transport planners etc to work on urban transport challenges by being a part of a government organization.

In order to provide exposure to students in transport and urban planning sectors, DULT provides opportunity for 2 month internships at its headquarter in Bangalore to Masters as well to Bachelors students from all over the country. The 2 months internship program is in tandem with the colleges/ university curriculum and usually the period is for May- July every year. In continuation to that, internship for the year 2015 is starting from 3<sup>rd</sup> week of May and this document intends to provide the insights of the selected projects to the interns. The document also looks into the desired deliverables expected from each intern.

This year internship program has been designed in such a way that students will not only be working on their respective team projects, but will also be sent to one of the tier II city in Karnataka for the Rapid Assessment (RA) of existing urban infrastructure & transport system in the city. Students will also be exposed towards various software (VISSIM, ArcGIS, Sketchup etc.) through short hands on training by DULT officials, which are useful for transportation as well as urban planning/ designing projects. As a part of this program a one day visit for students will be scheduled to Bangalore Metropolitan Transport Corporation (BMTCL) & Namma Metro (Bangalore Metro) Depots & control centre for them to understand the day-to-day operations and also to traffic police control centre to understand the

functioning of technology based (cameras, video wall etc.) initiative to manage the traffic related activities in the city.

Since it is a 6- 8 weeks program, the schedule has been designed in such a way that there is maximum exposure and value-addition to the students in this short span.

Students may have to travel to project locations for case study, site visit, data collection, and/ or for meeting with different authorities or stakeholders. In some case students may be stationed at project locations for the whole period of internships, depending on the requirements of the project and its proximity to Bangalore.

It would be important for the student to have done some background reading before entering the internship program. Being a graduate degree internship, some amount of independence of thought and work decisions, work ethics, and dedication is expected from the student for utmost impact and learning.

Students joining DULT for internship program has to fulfil the below stated administrative requirements:

- It is mandatory for all the students to register themselves with the Administrative office for administration purpose, while entering into Internship program.
- It is mandatory for the students to inform their respective mentor while going out of the office during office hours for official or personal reasons.
- Attendance on all days is mandatory. Leave, if any shall be granted with prior approval from the mentor.
- Time- in and Time- out shall be logged/ report on all days to the mentor (typical timings are from 10:00 AM to 5:30 PM, with 45 min lunch break.
- It is appreciated if personal laptops could be brought to work.

Below is the tentative program for this year internship, designed for maximum exposure and value-addition to the students.

Planned Activities	Broad level Tasks	Desired Exposure/ Value- addition	Time Period
<b>Individual/ Team Projects</b>	Secondary Data Collection	Exposure towards interacting with various government organizations, understanding and following govt. protocols and meeting with govt. officials will give fare idea of functioning of government departments.	Week 1-6
	Primary Data	Use of various survey formats & techniques (O-D	

	Collection	surveys, HHI, RSI, TVC, NMT etc.) exposing students towards conducting on- site surveys, which forms an integral part of any transportation & urban planning/ designing.	
	Use of various softwares	Exposure towards various softwares (VISSIM, ArcGIS, Sketchup, Photoshop, AutoCad, MS Excel/ Word/ PowerPoint) which are useful for transportation and urban planning/ designing projects for analysis, and producing drawings, reports & presentation.	
<b>Rapid Assessment (RA)</b>	Observational Survey	Short span for this exercise will keep students on their toes; hence sharpen the observation skills and attention to details. It will also expose them towards time management, which is the demand of professional work culture.	Week 7
<b>Site visit to Namma Metro Depot &amp; Control Centre (BMRCL), BMTC Traffic Control Centre and also to Traffic Police Control Centre</b>	Introduction to the operations of metro system and use of technological interventions in managing day- to- day traffic and transport activities.	This will expose students towards whole new dimension of transport planning, which is independent of their academic curriculum and adds strength to their knowledge by giving them the practical know how of the operations and management of transport activities, which they can use in their future endeavours.	Week 8 (2 days)

<b>Station Accessibility Plan (SAP)- Vijaynagar Metro Station</b>	
<b>Project Location</b>	Vijaynagar, Bangalore
<b>Introduction</b>	
<p>Bangalore, the capital of south Indian state Karnataka is India's fifth largest and a rapidly growing metropolis. It is known world over as India's Garden City and Silicon Valley. In the last decade or so, a genial small city, dotted with breathtakingly beautiful gardens and dominated by large defence establishments and government funded labs transformed quickly in to a teeming metropolis with large public sector companies, educational institutions and a global IT hub.</p> <p>The population of Bangalore city increased from 5.67 million (2001) to 7 million (2011). The need for efficient rail-based system was felt in to address its transport problems. That's when Bangalore Metro was proposed and readily accepted by GOI. BMRCL was constituted as a SPV for implementation of the Bangalore Metro Rail Project.</p>	
<b>Project Brief</b>	
<p>While there are different definitions of access, in transportation planning, accessibility (or just access) refers to the physical ease of reaching goods, services, activities and destinations. Access is the goal of most transport activity. Access to public transport can be achieved through different means/ modes. These are walking, bicycling, feeder public transport, intermediate public transport and private motor vehicles.</p> <p>Improving access to and from Metro is critical to meet ridership goals and serving customer needs. Potential riders may be lost or choose other means of travel if any of the following conditions exist:</p> <ul style="list-style-type: none"> <li>• Pedestrian paths are indirect and fragmented;</li> <li>• High traffic volumes and traffic conflicts exist in and around the station;</li> <li>• Pick-up/drop-off space is inconvenient or limited and access is not provided for shuttle buses;</li> <li>• Short-term and long-term parking are full or unavailable.</li> </ul> <p>Potential riders may also be lost if access constraints mean that the door-to-door journey involving Metro becomes more expensive, time consuming, unreliable or frustrating than an alternative means of travel, such as driving. Ultimately, the goal of improving station access is to better serve existing customers while attracting additional customers by:</p> <ul style="list-style-type: none"> <li>• Enhancing the pedestrian experience with a safer and more attractive walking environment;</li> <li>• Maintaining a good level of service for transit access to the site for buses and other transit vehicles;</li> <li>• Accommodating future access needs, which include vehicular traffic growth;</li> <li>• Making transit use more convenient and attractive.</li> </ul> <p>The introduction of Namma metro in Bangalore has initiated and accelerated transformation in the adjacent</p>	

<p>neighbourhoods with changing movement patterns within these neighbourhoods. The number of passengers expected to travel on the metro every day is estimated at 12 lakhs in 2013 and 19 lakhs in 2021.</p> <p>The Station Accessibility Plan is to be prepared within the overall framework of the National Urban Transport Policy (2006). It is to bring about more equitable allocation of road space with people, rather than vehicles, as its main focus; and encourage greater use of public transport and non-motorized modes. At the city level, the findings of the CTTTP (2007) need to be kept in mind and addressed, especially the decline in public transport modal share over the last two decades and overall inadequate and unmaintained footpath infrastructure. The travel patterns in each neighbourhood around the metro stations are characterized by their land uses, densities, built up area and urban fabric. The Station accessibility plan has to identify the distinct character of each area, identify their distinct travel patterns with a focus on pedestrian and cyclist and propose interventions to address their specific context.</p> <p>With the overall goal of creating a sustainable Bengaluru, the Station Accessibility Plan for Namma Metro is perceived to improve access to the metro stations by following the green hierarchy i.e. prioritizing walking, bicycling / movement of non-motorized vehicles (NMVs), public transport and intermediate public transport.</p>	
<p><b>Tentative Work plan</b> Below is the broad level of activities planned for an 8 - week period to achieve the above objective.</p>	
<ul style="list-style-type: none"> <li>• Week 1- Background Study, Site visit to project location- Reconnaissance survey of the area (socio-cultural activities, economic activities, existing infrastructures), stakeholder meetings and identify data collection needs</li> <li>• Week 2, 3 - Data collection &amp; analysis activities, preparation of conceptual and detail drawings</li> <li>• Week 4, 5- Preparation and submission of Draft Report with presentation</li> <li>• Week 6- Submission of final report and presentation (incorporating comments/ suggestion from DULT reviews)</li> </ul>	
<b>Project Duration</b>	6- 8 weeks
<b>Concerned Authorities</b>	BMRCL, DULT, BBMP, BDA,
<b>Related Documents</b>	CMP, CTTTP, TOR for SAP, SAP model document by Embarq for Indiranagar Metro Station, Consultant reports
<b>Mentor</b>	Yougal Tak & Sonal Kulkarni
<b>Deliverables</b>	<ul style="list-style-type: none"> <li>• Accessibility study of Jayanagar metro Station (Elevated)</li> <li>• At the end of each week, a summary report of the task assigned should be submitted to the mentor (by end- of- day every Saturday)</li> <li>• Design drawings in AutoCad, Sketchup renderings, renderings on Photoshop etc.</li> <li>• By end of 6th week a draft report including recommendation on suitable accessibility plan, detailing different components of design should be submitted</li> <li>• A final report and a presentation will due by 7th week</li> </ul>

<b>Development of Transport System Plans for Neighbourhood</b>	
<b>Project Location</b>	Jayanagar
<b>Introduction</b>	
<p>Bangalore is 5th largest economy in India and is growing rapidly. In recent decades, Bangalore has grown many folds in terms of population as well as area. 36% of urban population live in Bangalore and 1.5 million move in to the city each year. Due to unprecedented growth of Bangalore, the trips lengths have increased which is presently 11 kms per day. Due to increased trip lengths, dependency on private vehicle use has also increased. However, Public Transport (PT) is backbone of the mobility in the city where 42% trips are made by PT. Currently Bangalore Metropolitan Transport Corporation (BMTC) is main PT system provider in the region. However the mode share of PT is on decline, there is increase in private vehicle ownership which is increasing at the rate of 10% per year. As stated earlier more and more people are moving to city due to job prospective, the pressure on PT is increasing. To reduce this pressure, metro is being commissioned in Bangalore in 2 phases. Intermediate public transport (auto) is also catering to large bunch of commuters for medium/shorter distances and last mile connectivity.</p> <p>Bangalore used to have NMT as commuting mode due to shorter travel distances and salubrious climate which is declining and is now reduced to 2% in 2011 from 1985 which was 16%. Bangalore has dense network of roads with 11,000 kms with 40,000 intersections. Though the functional hierarchy is not defined leading to vehicle penetration and overcrowding almost all the roads.</p>	
<b>Project Brief</b>	
<p>Various transport systems are in place in the neighbourhood for commuting option as defined in introduction. These various transport systems has to be organized functionally to make them work as intended and serve specific purpose and trips lengths.</p> <p>The Transport Systems Plans at the neighbourhood level aims to achieve the above objective by understanding the travel pattern of roads users (residents, people who work in the neighbourhood or people who pass by the area). This will give a common ground for all stakeholders for planning options of the transport system.</p> <p>As pilot initiative, Jaynagar has been taken for <b>development of Transport Systems Plan</b>.</p> <p>Tasks:</p> <ol style="list-style-type: none"> <li>1. Understanding activity centres which comprises of generators and attractors</li> <li>2. Understanding trip pattern of neighbourhood-O-D matrix</li> <li>3. Mapping of existing transport systems</li> <li>4. Rationalization of transport services to meet the travel pattern.</li> </ol>	
<b>Tentative Work Plan</b>	
Below is the broad level of activities planned for an 8 - week period to achieve the above objective.	
Week 1, 2: Reconnaissance survey and secondary data collection	

<p><b>Understanding study area in terms of</b></p> <p>a. Mapping of activity centres</p> <p>b. Mapping/ updating roads/ PT network/cycle network</p> <p>c. Mapping of transport infrastructure (metro stations, bus stands, auto stands, cycle stands)</p> <p><b>Secondary data collection</b></p> <p>a. Population</p> <p>b. Job generators-attractors</p> <p>Week 3, 4: Understanding travel pattern</p> <p>a. development of O-D pattern</p> <p>b. Understanding mode share</p> <p>Week 5, 6: Development of TSM methodology</p> <p>Week 7: Preparation of report and analysis (incorporating any comments or suggestions from DULT reviews)</p>	
<b>Project Duration</b>	6- 8 weeks
<b>Concerned Authorities</b>	BBMP-Mu, Traffic Police,
<b>Related Documents</b>	CTTPs, CMPs, Other related reports.
<b>Mentor</b>	Richa Pandey & Shamanth Kuchangi
<b>Deliverables</b>	<ul style="list-style-type: none"> <li>• At the end of each week, a summary report of the task assigned should be submitted to the mentor (by end-of-day every Saturday)</li> <li>• By end of 7th week a draft report including recommendation on suitable intersection design, detailing different components of design should be submitted.</li> <li>• A final report and a presentation will due by 8th week</li> </ul>

<b>Traffic Impact Study for the Proposed Bus Terminals at Udupi - Malpe LPA</b>	
<b>Project Location</b>	Udupi - Malpe LPA
<b>Introduction</b>	
<p>The Government of Karnataka declared “THE UDUPI - MALPE LOCAL PLANNING AREA” in 1976 which comprises three important towns Udupi, Malpe and Manipal. The total geographical area of Udupi-Maple Planning area is 127.35 sq km. There are 19 Revenue villages in the LPA. Udupi is amongst the most prominent places of pilgrimage in the country and is famous for its temple enshrines Lord Krishna and many other deities. Whereas, Manipal is known as a major technology and medical research hub.</p> <p>In these cities, buses are likely to remain the primary mode of mass transit for the foreseeable future. Buses provide the greatest flexibility in service routes to meet the current transport demand. Thus, improved performance of urban bus service will essentially contribute to improved environmental conditions in medium sized cities by shifting mobility from private modes towards more efficient environmental-friendly and safer travel modes. The strategy to attract riders is based on reliability and on the many other aspects of a customer’s experience. Amongst one is the provision of a well-equipped bus terminal.</p> <p>Udupi District despite having a well-planned and established city transport service currently lacks basic infrastructure facilities such as bus shelters or bus terminals.</p>	
<b>Project Brief</b>	
<p>The Directorate of Urban Land Transport has taken up the initiative of preparation of a DPR for the Construction of a City Bus Terminal at Udupi. The objective is to assess the potential impact of traffic generated by the proposed Bus Terminal on the roadway segments, intersections and at access points of the Terminal and to recommend various roadway improvements and mitigation measures required for ensuring safe and efficient vehicular and pedestrian circulation in the study area upon the completion of the project. In addition to the Traffic Impact Study, an effort on preparing a conceptual plan to design a modernised bus terminal ensuring basic amenities shall also be incorporated.</p>	
<b>Tentative Work Plan</b>	
<p>Below is the broad level of activities planned for an 8 - week period to achieve the above objective.</p> <p>Week1: Site visit to project location: Reconnaissance survey of study area, junctions and traffic operations,</p> <p>Week 2/ 3: Data Collection: Surveys and Data Analysis, Identification of possible conflict points, preparation of Traffic Circulation Plans-Site and surrounding roadway segments, Presentation of the As-is scenario.</p> <p>Week 3/ 4/ 5: Preparation of recommendation/ mitigation measures for better and safe circulation of pedestrians and vehicles. Mitigation measures should be detailed out in AutoCad drawing. There should also be a validation of the proposed measures.</p> <p>Week 6: Preparation and submission of Draft report with presentation and submission of final report and presentation (incorporating any comments or suggestion from DULT reviews).</p>	

<b>Project Duration</b>	6 weeks
<b>Concerned Authorities</b>	Bus operators, Udupi CMC, Traffic Police, etc.
<b>Related Documents</b>	Site Plan, Traffic Data, etc
<b>Mentor</b>	Sylvia Prakash & Sreelakshmi
<b>Deliverables</b>	<ul style="list-style-type: none"><li>• At the end of each week, a summary report of the task assigned should be submitted to the mentor (by end-of-day every Saturday)</li><li>• By end of 9th week a draft report including conceptual plan, drawing detailing different components of design should be submitted.</li><li>• A final report and a presentation will due by 10th week.</li></ul>

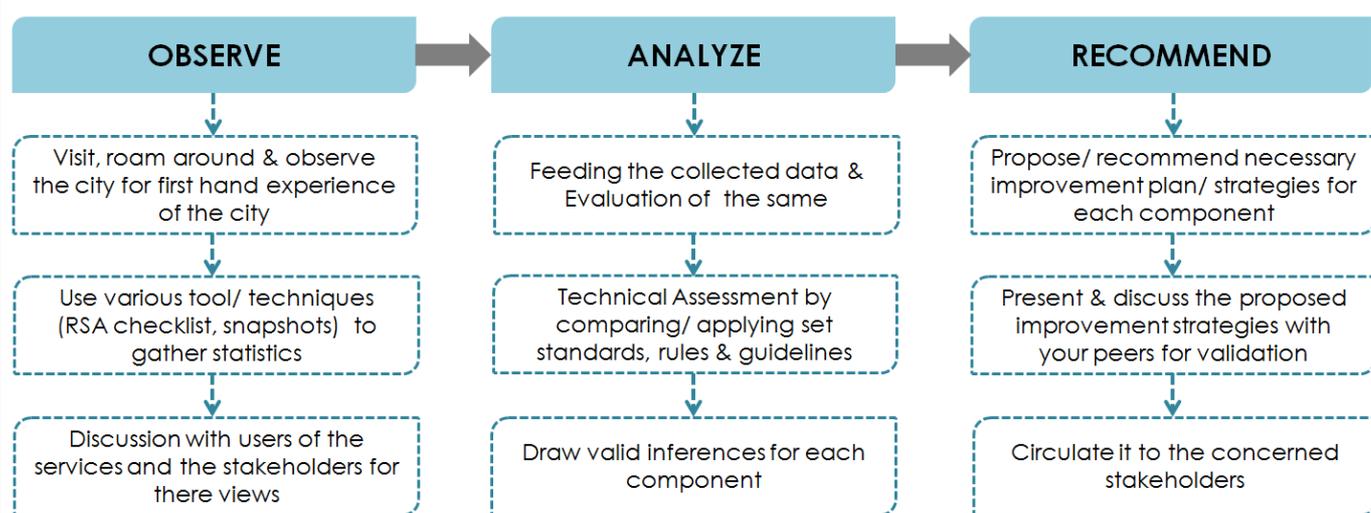
<b>Traffic Management Study (TMS)</b>	
<b>Project Location</b>	Belgaum
<b>Introduction</b>	
<p>The city of Belgaum is located to the north-west of Karnataka and lies on the NH-4 connecting Bangalore to Mumbai. The population of Belgaum is 488,292 as per 2011 census. The city is the gateway to both Mumbai and Goa from Karnataka. It is well connected by road and rail. The transportation system in the city is dependent primarily on roadway system. About 743 km. of road network connects various parts of Belgaum. The city has a road density of 7.90 km per sq. km and 1.56 km road length per 1000 persons. The total number of vehicles registered has grown at a CAGR of 12% in the last five years in Belgaum taluk. As per the existing land use it has been observed that the commercial activities are concentrated in CBD. The Central Business Area of the city is bounded by two highways on North, East and West namely NH- 4 &amp; NH- 4A. But, there are no well-structured city roads for the fast moving regional traffic to inter-connect these highways. Most of the roads especially in CBD area are unplanned and organic in nature. The freight traffic movement is heavy which raises concerns on road safety. There is a conflict between highway and city traffic, reducing the travel speed while increasing the hold-up time at junctions. These areas around CBD have not undergone any change in respect of road width. The commercial activity has increased several folds, but the area has not increased leading to acute congestion. Khade bazaar road running in east-west direction connecting Pune-Bangalore road and Belgaum-Panaji road and Ganapati Galli road running north-south are the important roads in the CBD area of Belgaum.</p>	
<b>Project Brief</b>	
<p>With increasing population and a growing economic base, Belgaum has witnessed a phenomenal rise in vehicular growth. As a consequence the city is facing the problem of congestion. Congestion occurs when demand for road space exceeds supply. Though space constraint seems to be of prime importance but most of the time reason for congestion is the poor allocation of resources &amp; lack of proper management of existing components. Hence, not only to save scarce resources but also to use/consume them wisely cities need traffic management studies.</p> <p>The aim of the traffic management studies is to improve the ease of accessibility &amp; enhance the mobility of the area in context. The above stated project also aims to conduct a traffic management study looking into the observed traffic operation conditions in the city.</p> <p>Traffic management studies investigate the existing traffic conditions, identify the constraints/problems, diagnose the same with the help of primary &amp; secondary data relevant to the study &amp; suggest mitigation measures as per the analysed results. Mitigation measures are suggested after comparing the impact on measures of effectiveness for the proposed scenario to that of the existing one.</p>	
<b>Tentative Work Plan</b>	

Below is the broad level of activities planned for a 7 - week period to achieve the above objective.	
Week 1: project understanding, Area delimitation, & Base map preparation of the area.	
Week 2: Site visit– reconnaissance survey of the area, Primary Data collection, identification of problems/bottlenecks, Meetings with concerned agencies, Secondary Data collection.	
Week 3/4: Data analysis, network preparation in Vissim, modifying AutoCAD map, junction design, report preparation	
Week 4/5: Draft conceptual plans and Preparation of draft final report and presentation (incorporating any comments or suggestions from DULT reviews)	
Weeks 6/7: Finalisation of report and presentation	
<b>Project Duration</b>	7 weeks
<b>Concerned Authorities</b>	DULT, Belgaum Traffic Police, Belgaum city Corporation.
<b>Related Documents</b>	CTTP, IRC, DULT Pedestrian guidelines etc. Traffic management Studies done by DULT
<b>Mentor</b>	Madhu Singh & Sourav Dhar
<b>Deliverables</b>	<ul style="list-style-type: none"> <li>• At the end of each week, a summary report of the task assigned should be submitted to the mentors (by end-of-day every Saturday)</li> <li>• By end of 5<sup>th</sup> week a draft report including conceptual plans, AutoCAD drawings detailing different components of the study should be submitted.</li> <li>• A final report and a presentation will be done by 7<sup>th</sup> week.</li> </ul>

<b>Rapid Assessment of Urban Infrastructure &amp; Transport components</b>	
<b>Project Location</b>	Nanjangud, Mysore
<b>Introduction</b>	
<p>Recent rapid urban development in India has resulted in transport problems, such as traffic congestion and an increase in traffic accidents. Although the national and state governments have made substantial efforts in their various capacities to prepare strategic plans focused on mobility of people as a basis for developing cost-effective and equitable urban transport measures with an appropriate and consistent methodology, in line with the National Urban Transport Policy (NUTP), problems have been exacerbated by the rapidly increasing number of private vehicles. Existing local government capacity for urban transport planning is still insufficient.</p> <p>All this plans required extensive data collection and analysis and are normally time consuming exercise with certain studies taking time as long as 3-5 years to choke out the basic plans and strategies for development. That's where Directorate thought of taking the pilot exercise of Rapid Assessment (RA) of the existing city needs in terms of transport infrastructure for one of the tier II city of Karnataka.</p> <p>The main objective is to do a quick assessment of the existing transport infrastructure and recommend the short term strategies which can be implementable without disturbing much of the local environment and at the same time doesn't required extensive financial assistance.</p>	
<b>Project Brief</b>	
<p>This year internship program has been designed in such a way that students will not only be working on their respective team/ individual projects, but will also be sent to one of the tier II city in Karnataka for the Rapid Assessment (RA) of existing urban infrastructure &amp; transport system in the city. This will be a 3 days exercise wherein students have to-</p> <ol style="list-style-type: none"> <li>1) Map and document the existing physical infrastructure of the town (roads, footpaths, junctions, street furniture, cycle tracks- if any, auto/ taxi stands, parking availability, bus terminals/ stops etc.);</li> <li>2) Do assessment of available public transport systems in the town (Intra/ city bus service, Intermediate public transport etc.), and;</li> <li>3) Do Activity mapping of different components such as Educational Institutions- schools, colleges, universities etc., Healthcare Facilities- hospitals, clinics etc., Transport Facilities- bus terminals, railways station, auto stands etc., Entertainment- theatres, shopping malls etc., Open Public Spaces- gardens, parks &amp; playgrounds etc., and others;</li> <li>4) Last but not the least, mapping of different traffic generators and attractors in the city such as markets, CBDs, etc.</li> </ol> <p>Rapid Assessment of physical urban infrastructure will give insights about the existing conditions of infrastructure and based on that, an improvement plan (if necessary/ required) will be drawn and can be given to the concerned stakeholders for them to take it forward from there.</p> <p>As a part of this exercise students will be stationed in the city for 2 days to capture the various aspects and components</p>	

of the roads (road markings and signages, footpath height and width according to landuse, street lighting and furniture etc.). This can be done using one of the RSA checklist (part of RSA guidelines) prepared in-house by the Directorate. Rapid Assessment of public transport system will be another important aspect of this exercise, capturing the existing penetration of public transport services in terms of comfort, safety, punctuality, reliability etc. in the city. An improvement plan (if necessary/ required) will be drawn and can be given to the concerned stakeholders for them to take it forward.

The approach of doing the Rapid Assessment will be-



#### Tentative Work Plan

Below is the broad level of activities planned for a week to achieve the above objective.

Site Visit for firsthand experience of the city for 2 days (1 day extra for Mysore tourist attraction)

Photographic documentation & Mapping of the observations and activities on workable map (generation of infographic).

<b>Project Duration</b>	3 days
<b>Concerned Authorities</b>	Nanjangud Town Municipal Council, KSRTC
<b>Related Documents</b>	RSA checklist,
<b>Mentor</b>	Ritumoni Sonowal & Sheeba Shetty
<b>Deliverables</b>	Preparation and submission of infographic of all the collected info, along with supporting documents.