ANNEXURE- III

TRAFFIC CONGESTION STUDY REPORT

1. Background

The purpose of this study is to assist the client to study the regional transportation and traffic connectivity to the site and to ensure that the proposed development is able to have access to infrastructures needed for the future development and its functionality. This will also help in assessing the impact of increase in traffic due to the proposed project. The project site is located at Ira, Chelur, Balepuni and Kurnad villages of Bantwal taluk, Dhakshina Kannada district, Karnataka. It is well connected by road, rail and air port. The project site is about 282.68km from Bangalore and 517Km from Trivandrum. Traffic study was conducted at two locations to cover all possible traffic variations and to assess the peak traffic flow. The traffic study includes counting, categorization etc.

2. Objective

Objective is to review and study the present traffic pattern in the main public roads in and around the project site as well as to estimate the flow of traffic on completion of the proposed project.

3. Site Environment and Traffic Movement

The proposed Canara Industrial Area is located at Dhakshina Kannada District. The main access road to the project site is Mangalore – Mudipu – Bakrabail Road and NH 48 connecting Mangalore and Mysore. The roads have two way movements of vehicles which consist of different category of vehicles like two wheeler, four wheeler, buses, autos and logistic vehicles. The parking area provided in the proposed industrial area is 29.28 Acres. The Traffic flow diagram of the project site is represented in **Figure 1.**

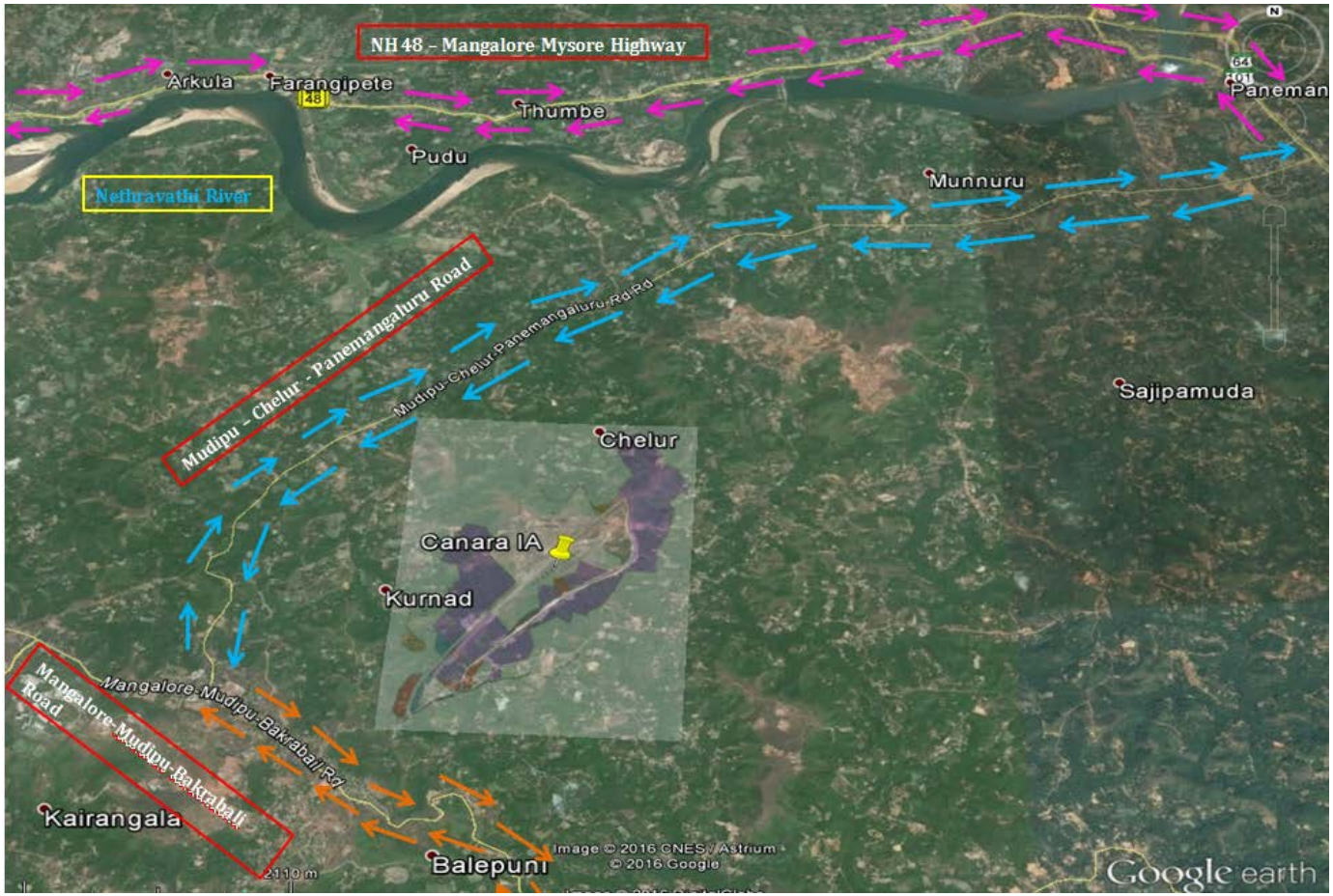

Figure 1: Map Showing Sampling Locations

3.1 Methodology

i. Vehicle Count

The vehicles passing through the road (in both ways) were counted separately for 24 hours at the two selected locations from 06.00 hrs to 06.00 hrs next day continuously. Category-wise vehicle counting has been done continuously and recorded in the traffic volume count on daily basis under respective categories.

ii. Categorization of Traffic

The engine driven vehicles were categorized into various heads viz. Trucks/Bus, Light Carriage Vehicles (LCV), Car/Jeep, Multi Axle Vehicles, Two/Three Wheelers and Cycles/others. The results of vehicle count are converted into Passenger Car Units (PCU) as per the equivalent PCUs prescribed by IRC guidelines (**Table 1**).

Table 1 – Equivalency factors for various types of vehicles on urban roads

Type of Vehicles	Equivalent PCUs	
	< 10%	>10%
Cycles	0.4	0.5
Two Wheelers	0.5	0.8
Auto Rickshaws	1.2	2.0
Cars/ Vans	1.0	1.0
LCV	1.4	2.0
Trucks/ Bus	2.2	3.7
Multi axles	4.0	5.0
Cart	2.0	3.0

Source: IRC 106:1990

iii. Sampling Locations

The Traffic locations are represented in **Table 2**.

Table 2 - Details of Traffic Sampling Locations

Location Code	Location Details
T1	NH 48 – Mangalore to Mysore Highway
T2	Mangalore – Mudipu – Bakrabail Road

4. Presentation of Results

The daily vehicular traffic densities for continuous normal day at each location observed during the study period and the same are presented in below mentioned in the following Tables and Figures.

Location Number : T1 [NH 48 – Mangalore to Mysore Highway]

Table 3 – Summary of PCUs observed on NH – 48 near project site

Total PCUs per day	13936	
Min.	129	PCU/hr
Max.	1241	PCU/hr
Average	581	PCU/hr

Details of vehicles counts for different category of vehicles for **National Highway - 48** are presented in the following fig

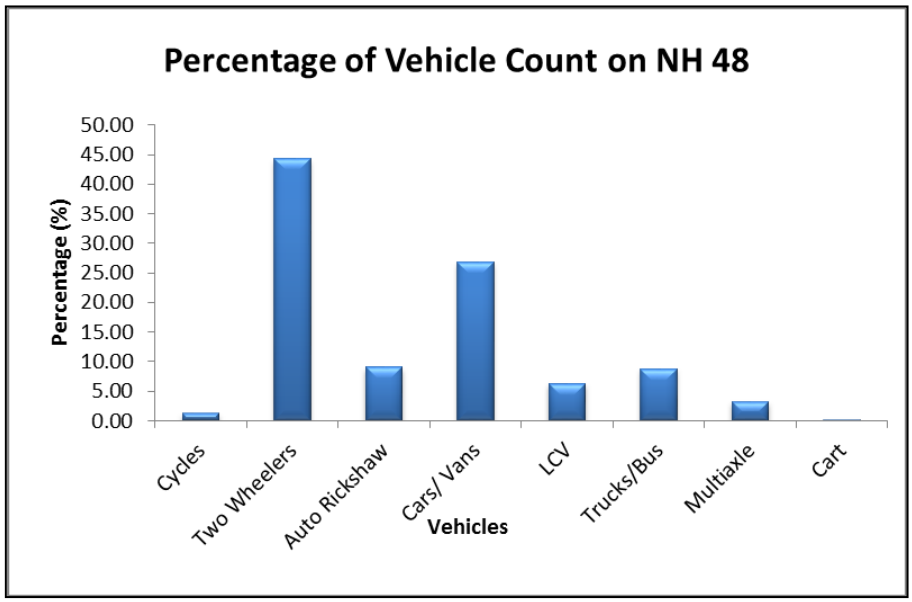

Figure 2: Map showing percentage of vehicle count on NH 48

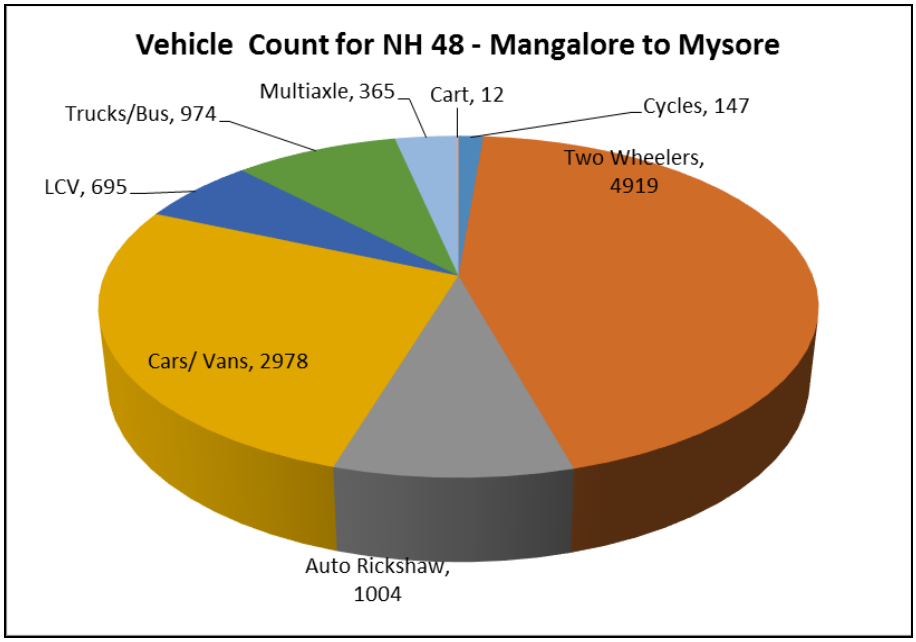

Figure 3: Pie chart showing percentage of vehicles count on NH 48

Location Number : T2 [Mangalore-Mudipu-Bakrabali Road]

Table 4 – Summary of PCUs observed on Mangalore-Mudipu-Bakrabail road near project site

Total PCUs per day	6953	
Min.	34	PCU/hr
Max.	567	PCU/hr
Average	290	PCU/hr

Details of vehicles counts for different category of vehicles for **Mangalore-Mudipu-Bakrabail Road** are presented in the following.

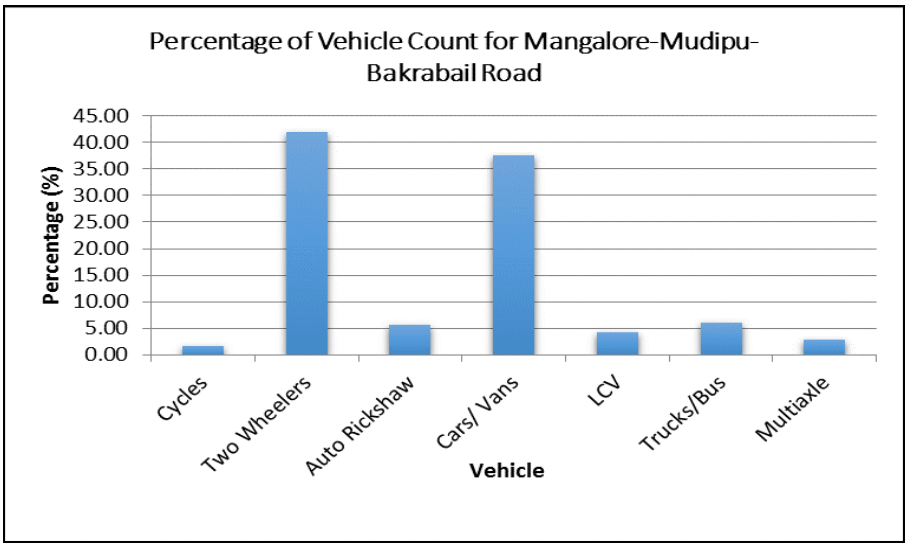

Figure 4: Map showing percentage of vehicle count on Mangalore -Mudipu-Bakrabail road

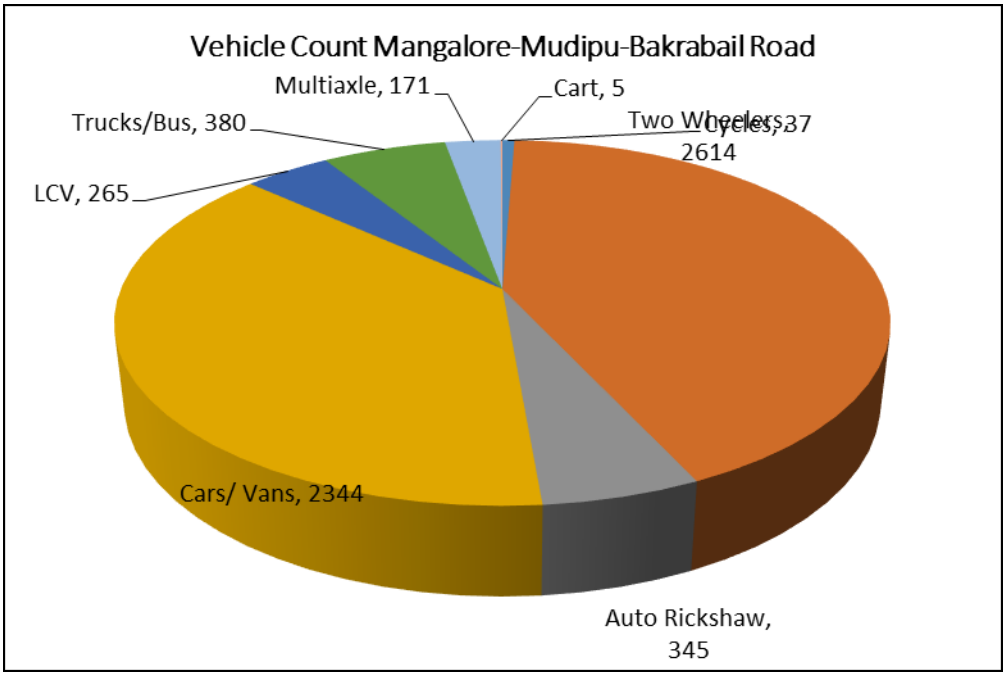

Figure 5: Pie chart showing percentage of vehicles count on Mangalore – Mudipu – Bakrabail road

4.1 TRAFFIC FLOW PATTERNS:

T1-NH 48 (Mangalore to Mysore Highway):

The traffic study was conducted for NH - 48 which is the main access road from the project site to the city. The average traffic on this road is observed as 581 PCU/hr (Passenger Car Units / hour). The peak traffic during day time on this is observed at 10:00 AM – 11:00 AM of 1048 PCU/hr (Passenger Car Units / hour) & the peak traffic during night time is observed at 8:00 P.M – 9:00 PM of 1241 PCU/hr (Passenger Car Units / hour).

T2- Mangalore – Mudipu – Bakrabali Road:

The traffic study was conducted for Mangalore-Mudipu-Bakrabail road which is another access road from the project site to the city. The average traffic on this road is observed as 290 PCU/hr (Passenger Car Units / hour). The peak traffic during day time on this is observed at 10:00 AM – 11:00 AM of 466 PCU/hr (Passenger Car Units / hour) & the peak traffic during night time is observed at 8:00 P.M – 9:00 PM of 567 PCU/hr (Passenger Car Units / hour).

4.2 VOLUME /CAPACITY RATIO:

The Volume/Capacity Ratio indicates the congestion levels on a particular road. The IRC specifies a design service volume (DSV) for each road type therefore indicating a level of service. Level of service of roads depends on the volume/capacity ratio of the respective roads. The level of service and performance as per IRC norms is given below,

Volume/Capacity Ratio (Range)	Level of Service (LoS)	Performance
0.0 – 0.2	"A"	Excellent
0.2 – 0.4	"B"	Very Good
0.4 – 0.6	"C"	Good
0.6 – 0.8	"D"	Fair
0.8 -1.0	"E"	Poor

T1 National Highway - 48:

The peak hour traffic was found to be 1241 PCU/hr. The capacity of road for 4 lane (two way) for arterial road is taken as 2500 PCU/hr as per IRC Standards. Hence the V/C Ratio for the road is found to be 1241/2500 = 0.49. Hence the level of service for the road is "C" & the performance is "Good".

T2 Mangalore-Mudipu-Bakrabail:

The peak hour traffic was found to be 567 PCU/hr. The capacity of road for 2 lane (two way) for arterial road is taken as 1200 PCU/hr as per IRC Standards. Hence the V/C Ratio for the road is found to be 567/1200 = 0.47. Hence the level of service for the road is "C" & the performance is "Good".

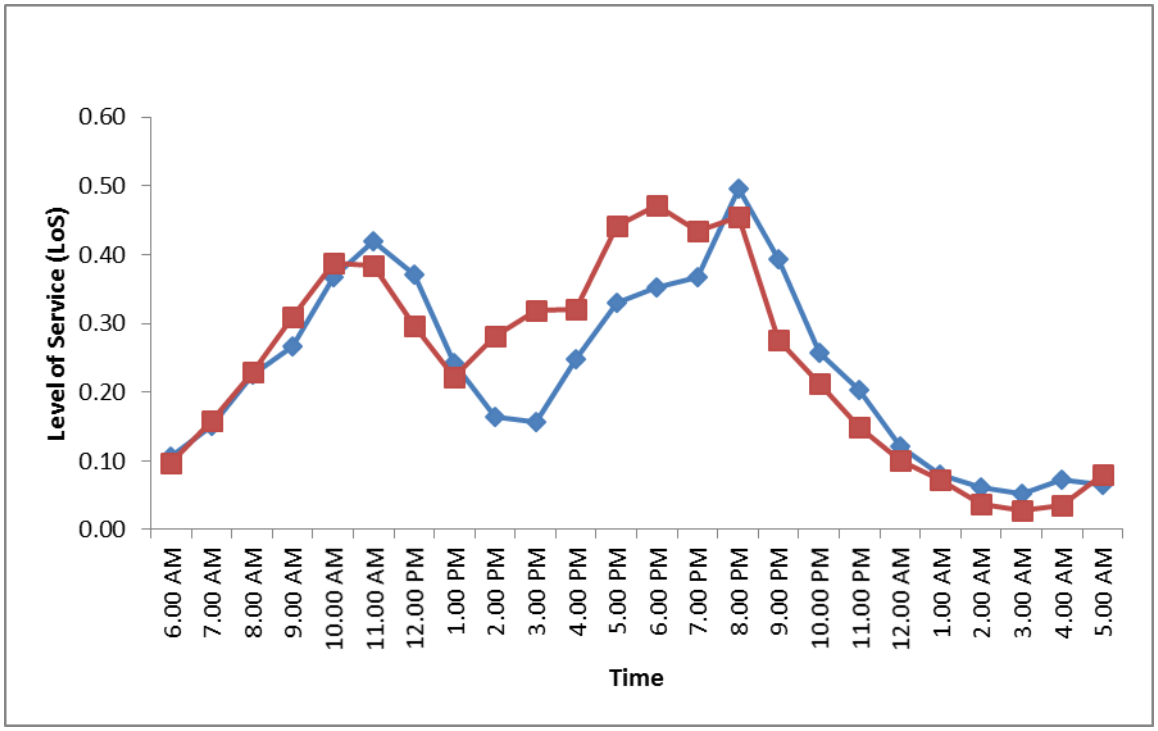

Figure 6–Observed results of Level of Service (LoS) for NH-48 & Mangalore-Mudipu-Bakrabail Road

The level of Service (Los) of the NH-48 and Mangalore-Mudipu-Bakrabali on the whole day of survey between every hour is represented in the **Figure 6.**

It is observed that Level of Service for NH-48 and Mangalore-Mudipu-Bakrabali are found to be '**Good**' respectively at present in most of the hours.

PROJECTED TRAFFIC

Type of Vehicles	**No of Vehicles**	**PCU**
2 wheelers	1040	520
4 wheelers		
i. Cars	104	104
ii. Trucks	520	1144
Total	**1664**	**1768**

4.3 Future Traffic Scenario

Total Nos. of vehicles added due to proposed project will be 1664 Nos. In terms of PCUs it will be 1768 PCUs. The vehicle distribution (cars & two wheelers) will be for 3 hrs in the morning and 3 hrs in the evening. Hence, total number of vehicles (cars & two wheelers) that might enter or exit for 1 hr = 624/3=208 PCUs. Additionally 520 no. of trucks are projected, in terms of the PCUs the addition will be in the range of 1144 PCUs whose distribution will be considered for the 8 hrs. Hence, total number of trucks that might enter or exit for 1 hr = 1144/8 = 143 PCUs. The increased number of vehicles due to proposed project are having direct access to the Sampling location 2 i. e. Mangalore- Mudipu- Bakrabail road. This traffic later on can get diverted to sampling location 1 i. e. NH 48 also. Hence there will be equal distribution of the vehicles. Therefore the overall impact of traffic on NH 48 and Mangalore-Mudipu- Bakrabail will be fair.

Modified Level of service & performance for the road is as shown in Table 5.

Sl. No.	Road	Existing Volume/ Capacity ratio	Existing LoS	Modified Volume/ Capacity ratio	Modified LoS
1	Sampling Location 2 Mangalore Mudipu Bakrabail road	0.47	Good	0.76	Fair

4.4 Measures for smooth traffic flow movement

1. Project proponent shall maintain the traffic signage with the premises wherever required.

2. Usage of phone calls during driving within and outside premises should be strictly avoided.

3. Project Proponent shall appoint traffic man at entry and exit point to manage the smooth traffic flow leading into project area.

4. Project proponent shall encourage the employees to use public transport.

5. Sufficient parking inside the site premises for employees as well as visitors are provided.

6. Project proponent shall ensure that the stacking of material which takes more time for unloading should have in some different area within the site premises so as to avoid waiting of other vehicles.