

CHAPTER - 5

TRAFFIC SURVEY AND ANALYSIS

5.1 INTRODUCTION

Project Road provides important link between Aizawl, Lunglei and lawngtlai district of Mizoram with other NE states. The road serves as important link for transportation of men and materials including agriculture produce, forest and mineral wealth of the state to various centers of agricultural/industrial/ markets and to feed stock and raw material for various industries.

5.2 ANALYSIS

The collected data were analysed to get total daily traffic for the number of days during which Classified Traffic Volume Survey at each count station. The data analysis was calculated in terms of hourly traffic volumes, total PCU's values, traffic composition, Average Daily Traffic (ADT) and mode wise distribution of traffic. The analysis is represented in the form of Bar Charts, Pie Charts and other various graphical forms.

5.3 FACTORS FOR SEASONAL VARIATION

The seasonal variation in traffic occurs due to various reasons such as higher traffic during harvest and festival seasons, lower traffic during rainy season etc. Estimation of seasonal variation factors requires time series traffic count data on a monthly basis.

Seasonal variation factor, which is the ratio of the traffic for a particular month of the year to the average monthly traffic for that year, was not available. Seasonal correction factor, which is used to moderate the traffic observed in any month of the year to AADT by multiplying the observed traffic with the factor, is the inverse of the seasonal variation factor. In absence of time series data, it was decided to obtain data for the district. The data suggests the month of February as an average month.

A seasonal correction factor of 1.2 is applied to arrive at AADT.



5.4 TRAFFIC SURVEYS

Traffic Survey Locations for Classified Volume Count

Station	Section	Location/Chainage	Remarks
1	NH-54 Km 125 – Km 174.00	Km Stone-179.00 on NH54 Near Hnahthial	7 Days
2	NH-54 Km 174.00 to Km 203.825	Km Stone-209.00 on NH54 Near Dawn	7 Days
3	NH-54 Km 203.825 to Km 237.740	Km Stone-225.00 on NH54 Near Hrangchal Kawn	7 Days

5.4.1 CLASSIFIED TRAFFIC VOLUME COUNT

In order to assess the variation of traffic levels and traffic composition over the week, traffic surveys were conducted continuously for one-week duration. The survey was carried out 24 hrs for one week using the structured proforma given in the SP: 19 - 2001.

The traffic was broadly grouped into Fast Moving Vehicles and Slow Moving Vehicles. Further the fast moving vehicles have been classified into Cars/Jeeps, Two wheelers, three wheelers, Buses (Mini & Full), Trucks and Agricultural Tractors. Slow Moving Vehicles are Cycles, Cycle Rickshaws and Animal Drawn Vehicles.

The surveys were conducted using well-trained enumerators, under the supervision of Traffic and transportation professionals. These surveys were normally conducted during dry weather conditions.

The primary objectives of the traffic count were to:

- Determine the motorised and non-motorised traffic volumes along the corridor.
- Determine Average Daily Traffic
- Determine the distribution of traffic during peak and non-peak hours.
- Establish the mode wise distribution.
- Determine the current traffic pattern on the project road

Traffic Volume counts was carried out for both directions separately. Two enumerators in three shifts were deployed and an experienced supervisor was kept in charge of each location. Three locations were identified,

5.4.2 TRAFFIC COUNT PERIOD

The traffic surveys were conducted in the month of February 2010

Recommended PCU values for different Types of Vehicles

SI No.	Vehicle Type	Equivalency Factor
	Fast Vehicles	
1	Motor Cycle or Scooter	0.50
2	Car/Jeep, Van/Taxi or auto-rickshaw	1.00
3	Agricultural Tractor, LCV	1.50
4	Truck or Bus	3.00
5	Truck -Trailer, Agricultural Tractor-Trailer Unit	4.50
	Slow Vehicles	
6	Cycle	0.50
7	Cycle Rickshaw	2.00
8	Hand Cart	3.00
9	Horse -Drawn Cart	4.00
10	Bullock/Camel Cart	8.00

Different classes of vehicles which were obtained from the field surveys were converted into Passenger Car Units (PCU's) by using the PCU factors given in IRC:64-1990 "Guidelines for Capacity of Roads in Rural Areas".



Data Tabulation and result interpretation

The survey data collected have been tabulated hourly at three locations.

The tabulations also give traffic in Passenger Car Units (PCU's) per day for the survey locations. The survey data attached as under:

Daily Traffic Count	Station No.1 Km Stone 179.00	
Daily Traffic Count	Station No.2 Km Stone 209.00	
Daily Traffic Count	Station No.3 Km Stone 225.00	
ADT and CVPD	Station Km Stone 179.00	Annexure-1
ADT and CVPD	Station Km Stone 209.00	Annexure-2
ADT and CVPD	Station Km Stone 225.00	Annexure-3

S. No	Traffic Count Location	PCU	CVPD
1	Km Stone 179.00	662	210
2	Km Stone 209.00	1322	354
3	Km Stone 225.00	1244	324

5.4.3 ANALYSIS OF TRAFFIC VOLUME

Traffic Count Station Km stone 179

Traffic volume count survey has been carried out for location for seven days X 24 hours.

Seasonal variation of 20% is added to achieve the Design Traffic Volume. Variation is based on the high volume during tourist season.



Average Daily Traffic Based on Survey, ADT is as below:

Sn	Direction	PCU	CVPD
1	From Keitum to Hnahthial	369	117
2	From Hnahthial to Keitum	293	92
		662	209

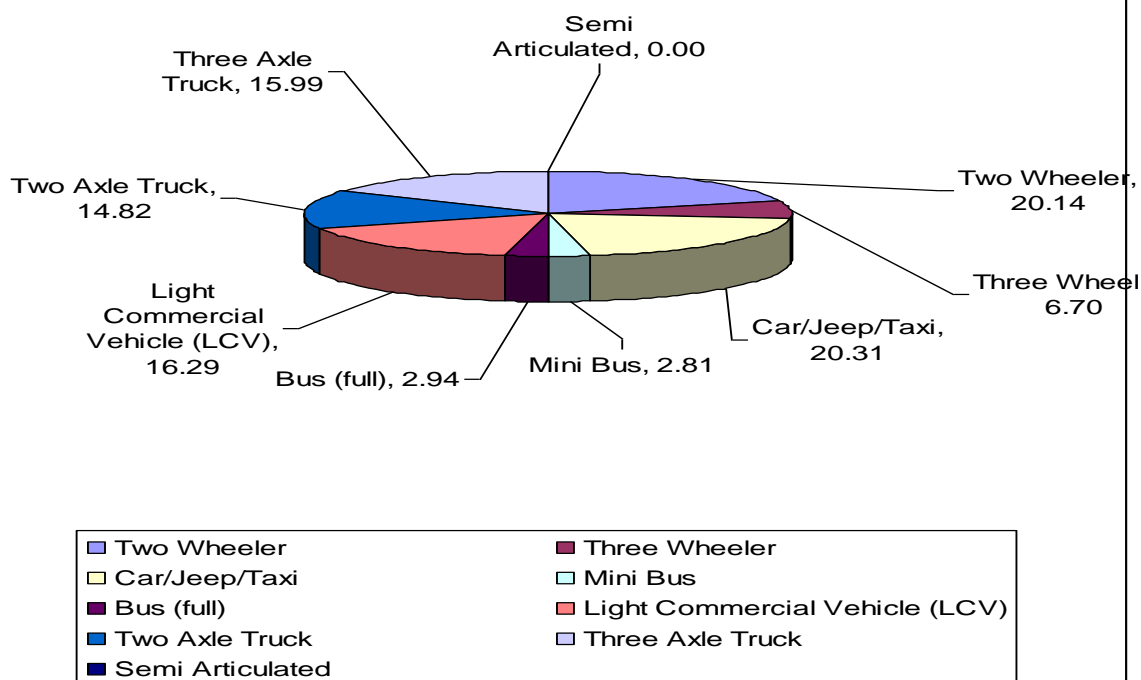
5.4.4 TRAFFIC COMPOSITION:

The Graphical Average Traffic Composition for three count stations is detailed under:

Km 179.000 Count Station-1

Sl.No.	Type of Vehicle	Total Nos. (UP & DOWN)	Percentage (%)
1	Two Wheeler	80	20.14
2	Three Wheeler	27	6.70
3	Car/Jeep/Taxi	81	20.31
4	Mini Bus	11	2.81
5	Bus (full)	12	2.94
6	Light Commercial Vehicle (LCV)	65	16.29
7	Two Axle Truck	59	14.82
8	Three Axle Truck	63	15.99
9	Semi Articulated	0	0.00
	Total (1 to 9)	397	100.00

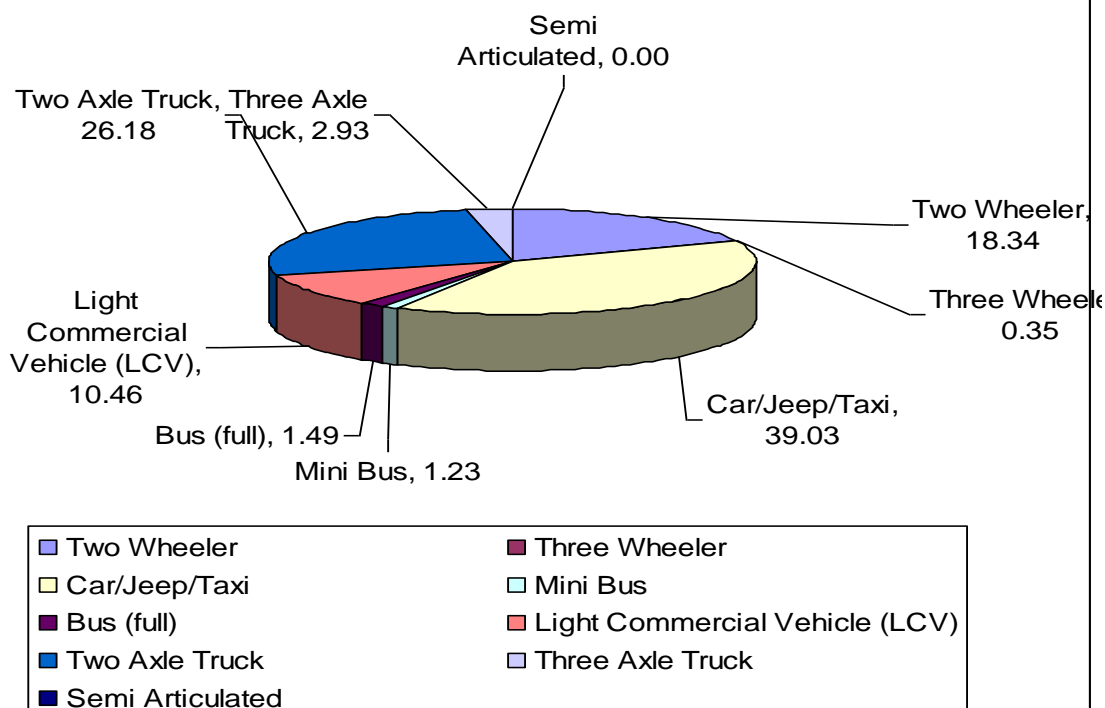
**Graphical Representation of Average Traffic
Compositon for Traffic Count Survey on NH-54 at
Km 179.000
from 15 February 2010 to 21 February 2010**



Km 209.000 Count Station-2

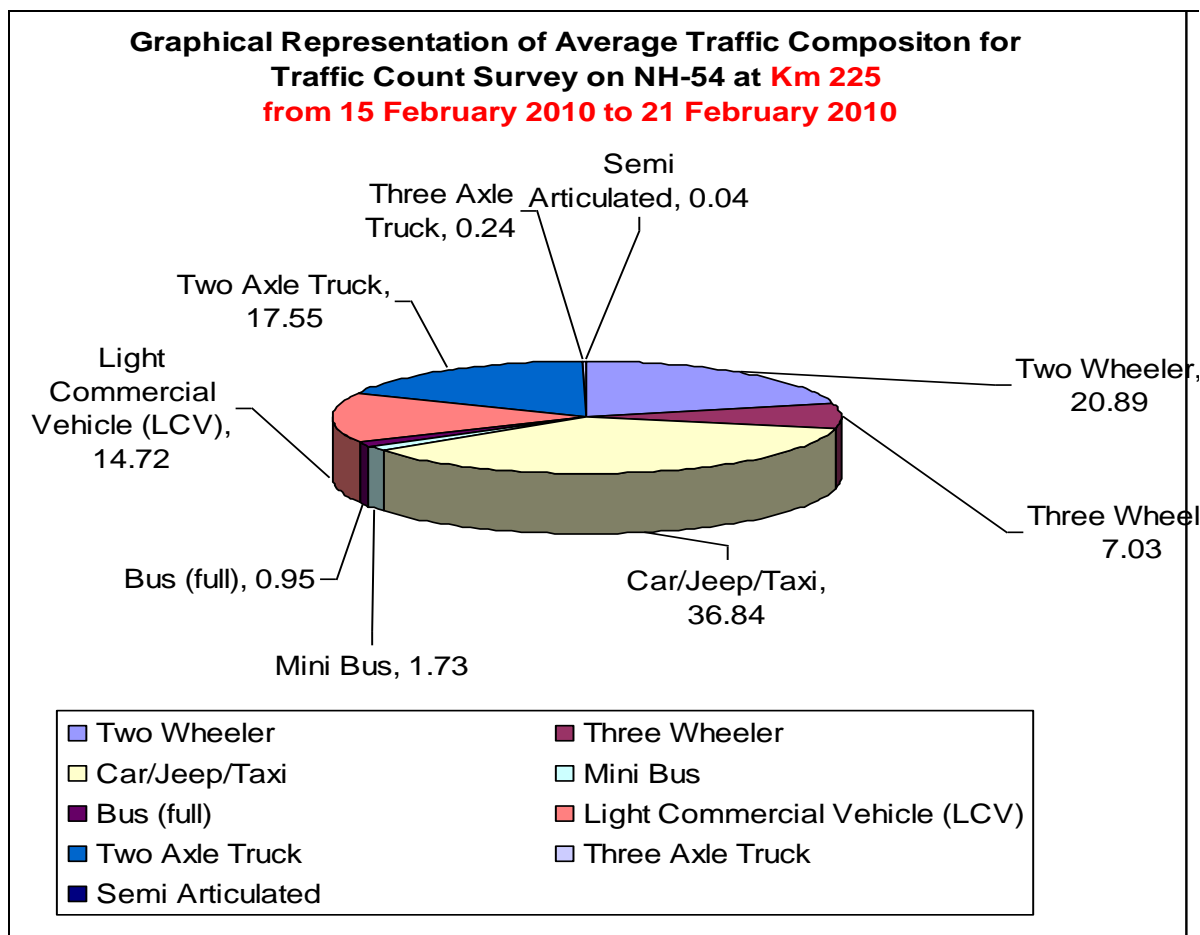
Sl.No.	Type of Vehicle	Total Nos. (UP & DOWN)	Percentage (%)
1	Two Wheeler	154	18.34
2	Three Wheeler	3	0.35
3	Car/Jeep/Taxi	327	39.03
4	Mini Bus	10	1.23
5	Bus (full)	13	1.49
6	Light Commercial Vehicle (LCV)	88	10.46
7	Two Axle Truck	219	26.18
8	Three Axle Truck	25	2.93
9	Semi Articulated	0	0.00
	Total (1 to 9)	838	100.00

**Graphical Representation of Average Traffic
Compositon for Traffic Count Survey on NH-54 at
Km 209.000
from 15 February 2010 to 21 February 2010**



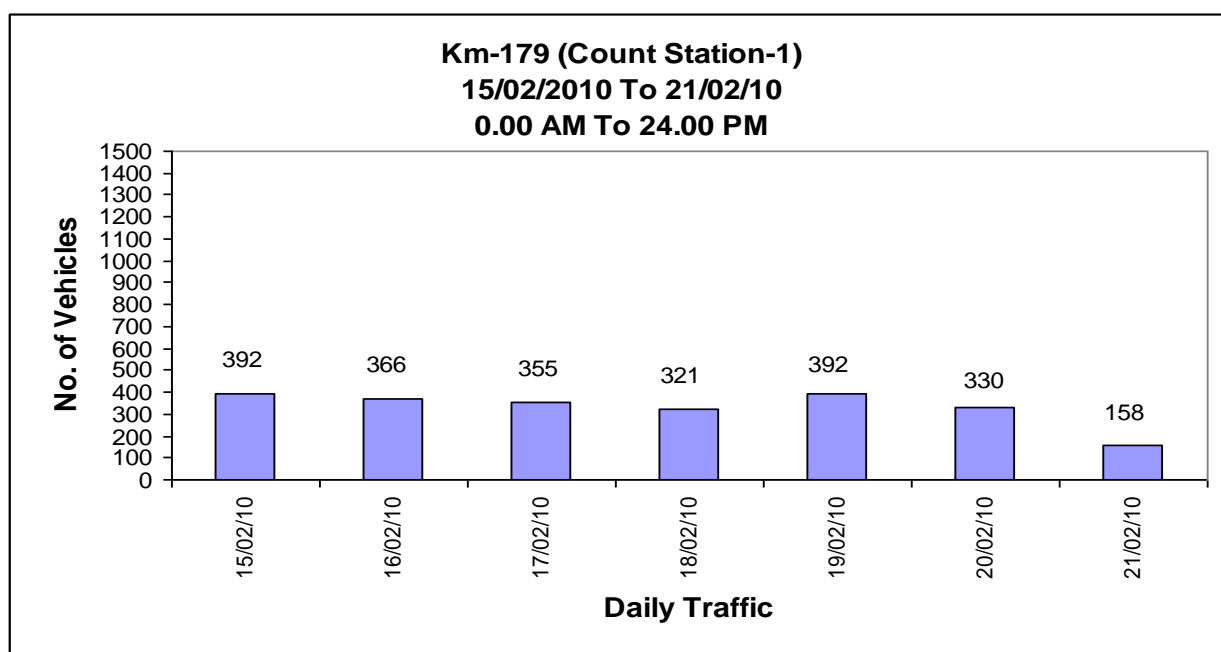
Km 225.000 Count Station-3

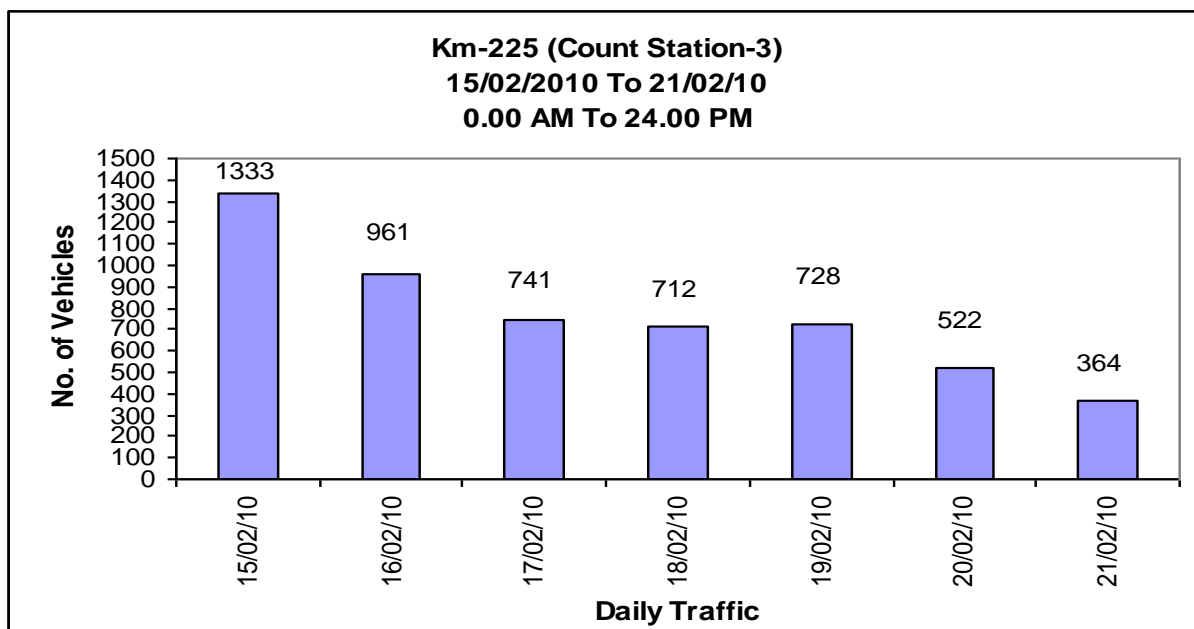
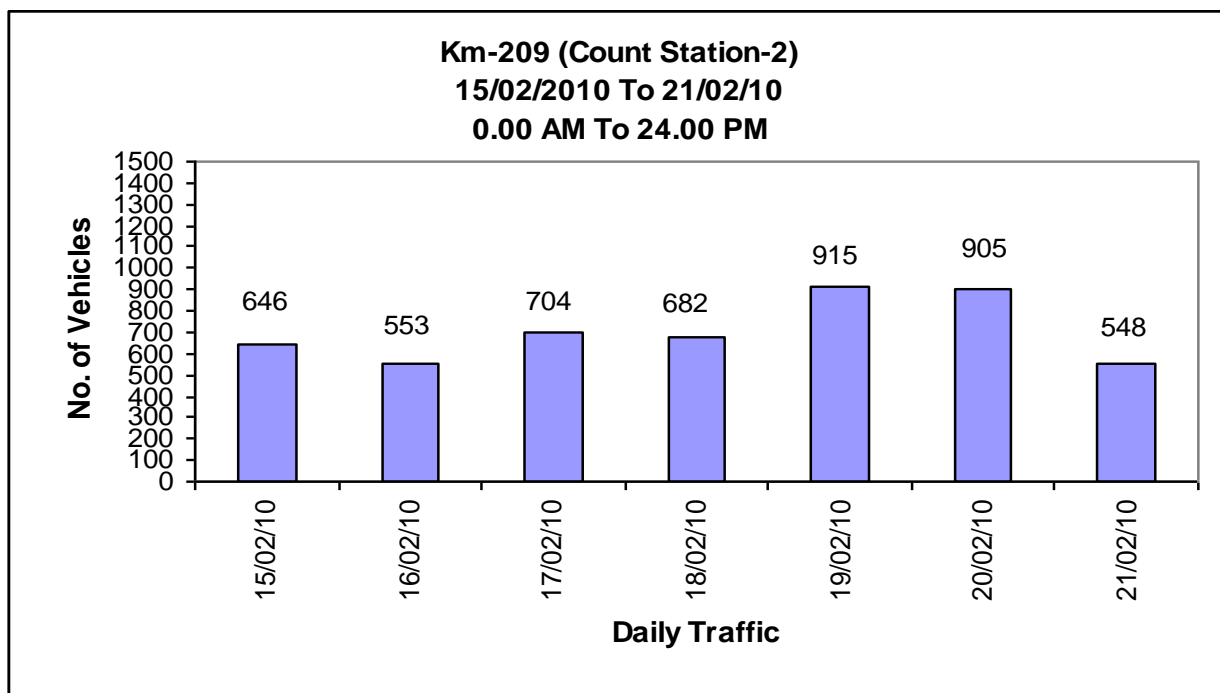
Sl.No.	Type of Vehicle	Total Nos. (UP & DOWN)	Percentage (%)
1	Two Wheeler	192	20.89
2	Three Wheeler	65	7.03
3	Car/Jeep/Taxi	339	36.84
4	Mini Bus	16	1.73
5	Bus (full)	9	0.95
6	Light Commercial Vehicle (LCV)	135	14.72
7	Two Axle Truck	161	17.55
8	Three Axle Truck	2	0.24
9	Semi Articulated	0	0.04
	Total (1 to 9)	919	100.00



5.4.5 DAILY VARIATION OF TRAFFIC:

The Daily Variation of Traffic for three count stations is detailed under:

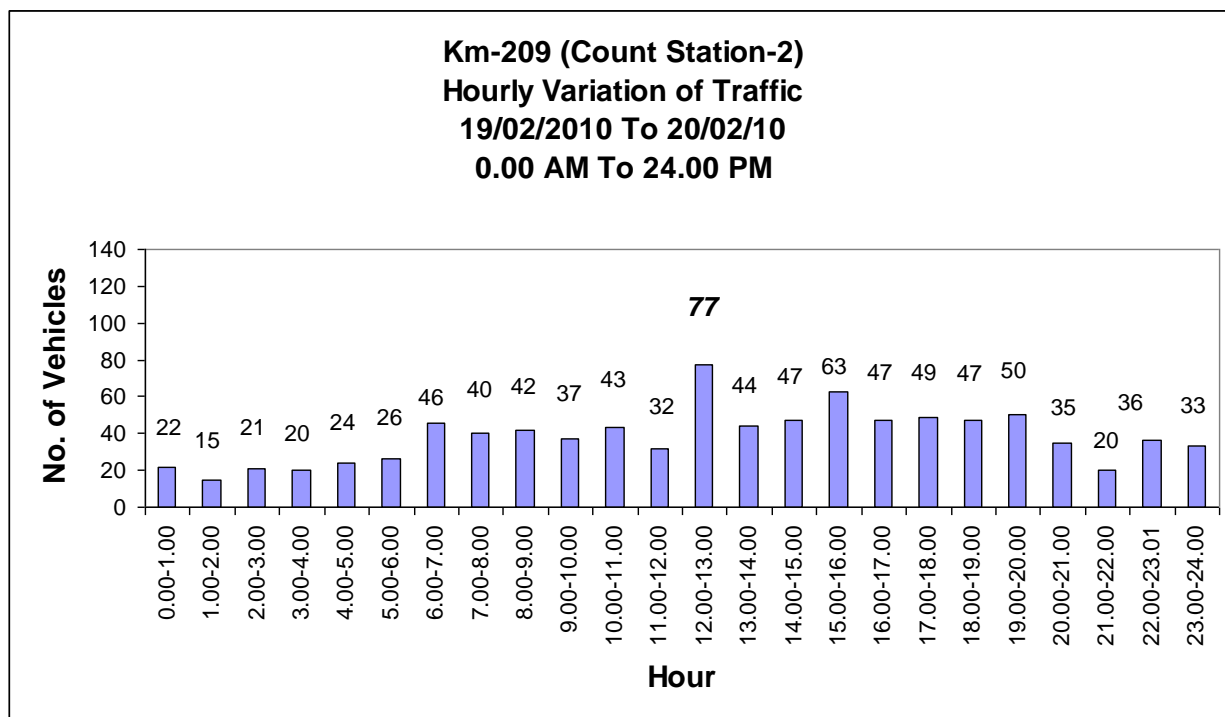
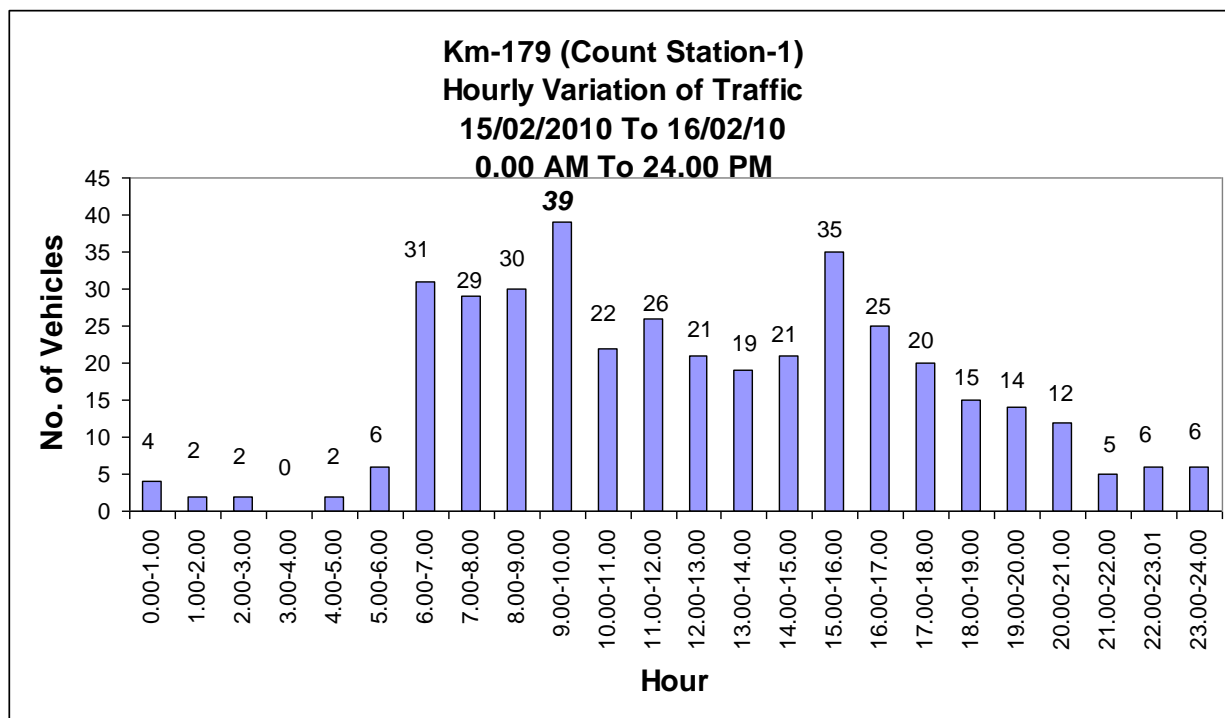


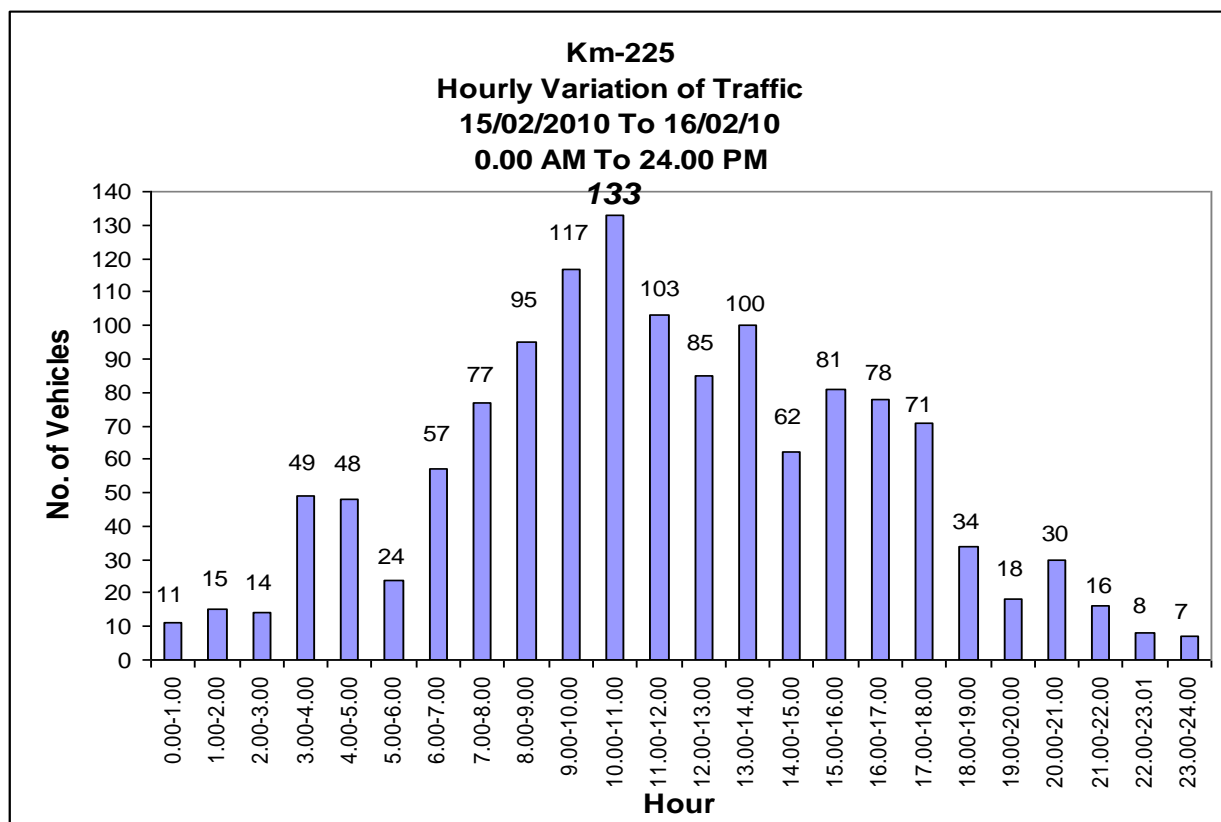


Based on the above survey of ADT, the daily variation of traffic in terms of numbers (for peak day) does not show any major variation.

5.4.6 HOURLY VARIATION OF TRAFFIC:

The Hourly Variation of Traffic for three count stations is detailed under:



Km 225.000 Count Station-3

Based on the classified traffic volume count survey, the hourly Variation of traffic in terms of number (for peak hour) does not show any major variation.

5.4.7 SUMMARY OF ANALYSIS**Traffic Volume at Km 179 (NH-54)**

- Total PCU : 662
- Total PCU Up (Keitum to Hnahthial) : 369
- Total PCU Down (Hnahthial to Keitum) : 293
- Total CVPD : 210
- Total CVPD Up (Keitum to Hnahthial) : 117
- Total CVPD Down (Hnahthial to Keitum) : 92
- The peak hour traffic on this section is 39 vehicles observed between 0900 hrs to 1000 hrs.

- The percentage of the passenger vehicles is much higher than the commercial vehicles.
- Passenger cars and two wheelers form a major portion of the passenger vehicles.

Traffic Volume at Km 209 (NH-54)

- Total PCU : 1322
- Total PCU Up (Hnahtial to Dawn) : 644
- Total PCU Down (Dawn to Hnahtial) : 678
- Total CVPD : 354
- Total CVPD Up(Hnahtial to Dawn) : 174
- Total CVPD Down (Dawn to Hnahtial) : 180
- The peak hour traffic on this section is 77 vehicles observed between 1200 hrs to 1300 hrs.
- The percentage of the passenger vehicles is much higher than the commercial vehicles.
- Passenger cars and two wheelers form a major portion of the passenger vehicles.

Traffic Volume at Km 225 (NH-54)

- Total PCU : 1244
- Total PCU Up (Hnahtial to Hrangchal Kawn) : 594
- Total PCU Down (Hrangchal Kawn to Hnahtial) : 651
- Total CVPD : 324
- Total CVPD Up) (Hnahtial to Hrangchal Kawn) : 159
- Total CVPD Down (Hrangchal Kawn to Hnahtial): 165
- The peak hour traffic on this section is 133 vehicles observed between 1000 hrs to 1100 hrs.
- The percentage of the passenger vehicles is much higher than the commercial vehicles.
- Passenger cars and two wheelers form a major portion of the passenger vehicles.

354 CVPD (Km 209) has been considered for traffic projection and MSA calculation.



5.4.8 TRAVEL PATTERN & COMPOSITION

Travel Pattern

An understanding of the travel pattern is key to transportation planners, researchers, engineers and policy analysts. The travel patterns relates to the changes in directionality, purpose, mode and time of the trip. Traffic counts, which directly measure volumes, are a more accurate measure of traffic pattern on specific facilities.

The traffic scenario at all the three Section is influenced by the local traffic. Cars and 2-wheelers form an important means of traffic in this region. As observed from the figures shows the hourly variation at the count location, traffic is more during the morning hours

5.4.9 TRAFFIC COMPOSITION

Table gives composition of traffic in each of the traffic survey locations in percentages.

Typical Composition of Traffic

Count Station N0. 1

Table – A

Vehicles	Km 125.000 to Km 179.000	
	Vehicles	Percentage
Two wheelers/Cars and light vehicles	187	47.15
Buses	23	5.75
LCV/2 Axle/3 Axle/ Semi Articulated	187	47.10
Total	397	100
Percentage of fast moving vehicles	100	
Percentage of slow moving vehicles	0.00	

Count Station NO. 2

Table – B

Vehicles	Km 179.000 to Km 209.000	
	Vehicles	Percentage
Two wheelers/Cars and light vehicles	484	57.72
Buses	23	2.72
LCV/2 Axle/3 Axle/ Semi Articulated	331	39.56
Total	837	100
Percentage of fast moving vehicles	100	
Percentage of slow moving vehicles	0.00	

Count Station NO. 3

Table – C

Vehicles	Km 209.000 to Km 225.000	
	Vehicles	Percentage
Two wheelers/Cars and light vehicles	595	64.76
Buses	25	2.69
LCV/2 Axle/3 Axle/ Semi Articulated	299	32.55
Total	919	100
Percentage of fast moving vehicles	100	
Percentage of slow moving vehicles	0.00	

From traffic volume counts supplemented by Table-A, B, C the following observations can be made,

- (i) There are large numbers of 2-wheelers using the road (19-20%). Slow moving traffic contribution is minimal
- (ii) The Traffic is dominated by the passenger vehicles (cars and two wheelers).
- (iii) The heavy vehicle traffic is very minimal as compared to the passenger traffic.



5.4.10 HISTORICAL DATA OF TRAFFIC VOLUME:

BRO has carried out the traffic count at Location Km 172. The historical data of December 2009 is attached as annexure -4.

Following comments are offered

- Traffic count station is at km 172 which is in the heart of Hnathial town consequently, the traffic is a mixed up of through traffic and local traffic.
- Traffic count is on higher side due to above reason
- Traffic data cannot be applied to the design of the up gradation work of the project road.

Traffic Volume at Hnathial Town Area Km 172 (NH-54) (B.R.O count)

- Total PCU : 1287
- Total PCU Up (Keitum to Hnahthial) : 673
- Total PCU Down (Hnahthial to Keitum) : 614
- Total CVPD : 410
- Total CVPD Up (Keitum to Hnahthial) : 214
- Total CVPD Down (Hnahthial to Keitum) : 196
- The peak hour traffic on this section is 34 vehicles observed between 1400 hrs to 1500 hrs.
- The percentage of the passenger vehicles is much higher than the commercial vehicles.
- Passenger cars and two wheelers form a major portion of the passenger vehicles.

Vehicles	Km 172.00 by BRO	
	Vehicles	Percentage
Two wheelers/Cars and light vehicles	307	42.82
Buses	113	15.72
LCV/2 Axle/3 Axle/ Semi Articulated	282	39.34



Cycle Rickshaw	15	2.13
Total	718	100
Percentage of fast moving vehicles	97.87	
Percentage of slow moving vehicles	2.13	

- Traffic Growth Rate**

Growth rate of 7.5% is adopted.

5.4.11 TRAFFIC DESIGN:

Project road will cater the traffic of Multi Modal Transit Transport Project as well. Therefore, the design traffic will be 354+472= 826 CVPD (in year 2010). Traffic survey was conducted in year 2010; therefore CVPD for year 2014 has been calculated for pavement design purpose.

Pavement Design for 15 Years for Bituminous Layers and 25 years for non-bituminous layers

Initial traffic =	A =	826	CVPD	2010
Design and Construction Period =	x =	9	years	Construction completion year 2019
Growth Rate =	r =	7.5%		
Traffic after construction Period	P =	$A(1+r)^x$		
	P =	1584	CVPD	

MSA Calculation :

$$N = 365 \times P \times LDF \times VDF \times [(1+r)^n - 1] / r$$

where

LDF =	0.5	Two lane	As per IRC-37-
VDF =	1.5	Hill	2012
n =	15	years	
r =	8%		



$N =$	11	msa
Adopt $N =$	20	msa

** As per discussion with NHIDCL officials 20 MSA has been considered for pavement design.*