8 ROAD AND TRANSPORTATION PLANNING

With the high population growth and changing travel & traffic characteristics, transportation problems are aggravating in the city of Kanpur. The yawning gap between demand and supply of transport infrastructure is steadily increasing. The capital intensive transport infrastructure development is imperative for medium and long-term solutions. Kanpur is facing the problem of regulating inter-city traffic together with the city traffic. The railway network passing through the city has resulted in a large number (16) of rail level crossings. The congestion is evident all along the G.T. Road and at all those places where the railway network cuts the road network. In the past, some remedial measures were exercised by constructing six Roads Over Bridges (Murray Crossing, Jhakkarkati, Narender Mohan Setu, Govind Puri, Dada Nagar and Panki) and a by-pass on the southern end of the city to ease the traffic congestion. The spurt in city population and motorized vehicles (3.3 lakh to 5.4 lakh) has compounded the problem further. The problem of pollution and air quality deteriorating, when the rail level crossings are closed, beside generating long queues of traffic leading to congestion and traffic jams are some of the major problems.

Moreover the focus of this section is to review the current status of transportation system, road network in Kanpur. The elements reviewed and assessed include:

- Existing Transport System
- Road Network Characteristics
- Traffic Characteristics

8.1 EXISTING TRANSPORT SYSTEM IN KANPUR

8.1.1 Public and Goods Transport System

- **Public Transport System**
  The city is predominantly dependent upon private buses and tempos for the intra-city passenger travel. There are approximately 80 private buses and 980 auto rickshaws and tempos plying in the city. Earlier, there were city buses operated by U.P.S.R.T.C. to cater to the need of commuters which have been withdrawn subsequently. Recently U.P.S.R.T.C has ordered 108 new CNG buses to replace old fleet of buses. One mother station and 7 daughter stations are under construction and 1000 new CNG taxi permit has been given.

  There are approximately 5,000 cycle-rickshaws in the city, commonly used for making short trips. In the absence of adequate public transport system, the people are forced to depend upon their personalized modes to sustain in the growing economic activities. The growth of

scooter/motorcycles has been phenomenal during the last decade. Motorized two wheelers grew from 2.7 Lakhs in 1999 to 4.5 Lakhs in 2006.

- **Goods Transport System:**
  Although intra-city goods transportation by light commercial vehicles is allowed within inner CBD circle, their operations and movements augments the congestion in main market area and slow down the traffic movement. The critical road stretches are Ambedkar Road, Mall Road, Meston Road, Latouce Road, P-Road, Nayaganj Road, Halsey Road, Canal Road, Cooperganj Road, Suterkhana Road, and section from Bakerganj to Ghantaghar.

  Loading, unloading and goods transport operation by handcarts, cycle carts, buffalo carts and by other slow vehicles are normally used during day time in the area encircling Ambedkar Road, Mall Road, Canal Road, Kidwai Nagar Road, Baradevi Road, Chawla Market Road, Fazalganj Road and Eye Hospital Road. At present, 500 Kharkharas, 200 bullock cart, 350 hand cart and 400 trolleys are plying within the city for transportation of goods. Light goods vehicles such as mini-trucks goods tempos and goods autos create the traffic congestion at intra-city goods operation within the above circle.

8.1.2 Vehicle Population in Kanpur

The vehicle registration data for Kanpur city was collected from R.T.O. department at Kanpur are tabulated in table 8.1. The maximum numbers of vehicles registration are of two wheelers from 1999 to 2006 followed by cars. The numbers of total vehicles registered were 32,932 in 1999-2000 whereas it was 49,468 in year 2005-06, indicating demand and need of these vehicles in Kanpur. The demand is moreover for two wheelers as the ratio of buying two-wheeler vehicles with in these years shows rapid increase of registration.

In Kanpur city, major share and maximum growth is observed in two wheelers. Out of total vehicles, in 2006 83 percentage two-wheelers, 13 % Cars, 4 % of trucks were registered whereas it was 79% two-wheelers, 18% cars and 1% each for Auto, Bus and Trucks in 1995.

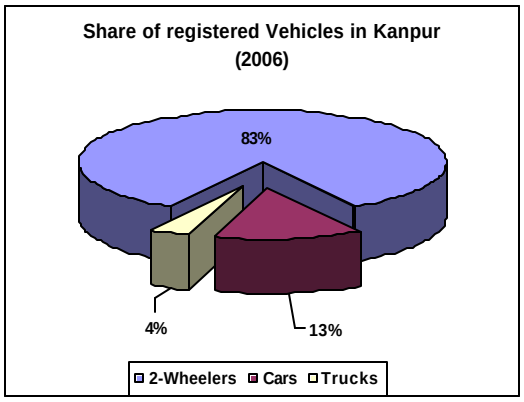


Table 8.1 Vehicle Registration Data for Kanpur City

YEAR	2-Wheelers	Cars	Bus	Auto	Trucks	Total
1999-00	21494	5831	47		1351	28723
2000-01	25112	4464	95	102	582	30355
2001-02	26470	4604	47	98	480	31699
2002-03	35510	5637	66	277	1299	42789
2003-04	39192	5962	63	336	1391	46944
2004-05	39512	6737	65	46	2014	48374
2005-06	39352	6415	84	119	1727	47697

Source: Regional Transport Office, 2006

- **Growth of Motor Vehicles**
  There is a huge gap between the demand and supply of public transport in Kanpur. This has resulted in manifold increase in personalized vehicles, both slow and fast modes and intermediate public transport modes such as tempos, cycle-rickshaws etc. Growth of motor vehicle s in Kanpur City for the period between 1999 and 2006 is presented in Table 8.2. The average growth rate of fast vehicles in the city has been to the tune of 9% between years 1999 and 2006. Motorized two wheelers constitute 84% of the total registered ve hicles in 2006.

Table 8.2 Growth of Registered Vehicles in Kanpur

Type of vehicles	YEAR							
	1999-2000 (a)	2000-01 (b)	2001-02 (c)	2002-03 (d)	2003-04 (e)	2004-05 (f)	2005-06 (g)	% growth (h)
Multi-axle/articulated vehicles	47	47	51	57	57	57	58	23.40
Medium & heavy tracks	13700	7271	7477	8196	7989	8986	10551	-22.99
LCV (4-wheelers)	1166	1209	1846	2183	2354	2469	2487	113.29
LCV (3-wheelers)	2678	605	557	894	1382	1872	2210	-17.48
Buses	218	301	376	288	317	85	80	-63.30
Mini Buses	69	153	267	45	56	232	235	240.58
Taxis	734	253	314	445	480	464	413	-43.73
Auto-rickshaws and Tempos	111	153	252	529	850	876	980	782.88
2-wheelers	273208	321215	298170	352698	381675	420465	455807	66.84
Car Jeeps	35812	43428	39453	48491	54194	60199	65994	84.28
Tractors	2566	3543	3409	4238	4645	5967	1327	-48.29
Trailers	406	422	434	425	425	425	1232	203.45
Others	2084	1181	1441	1192	1200	1216	1216	-41.65
TOTAL	**332799**	**379781**	**354047**	**419681**	**455624**	**503313**	**542590**	**63.04**

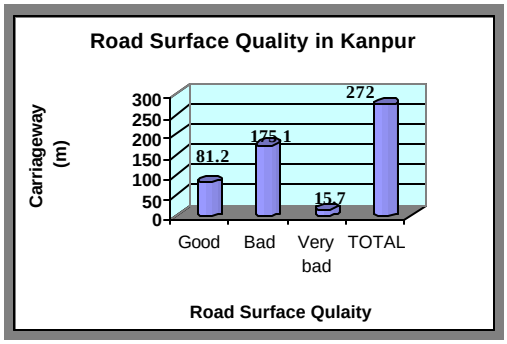
Source: Regional Transport Office 2006

8.2 ROAD NETWORK CHARACTERISTICS

Kanpur has a radial pattern of network, which include two National Highways namely, NH-25 (Kanpur-Lucknow Road) and NH-2 connecting Kanpur to Kolkata in East and Kanpur to Delhi in the North. G.T. road, Hamirpur road and bye pass roads are other major arterial roads in the city. Parwathy Bangla Road, Mall Road, Dad Nagger Road, Jawahar Road, Eye Hospital Road, Prithviraj Chauhan Road and Panki Road are some of the major sub-arterials roads within the city. The road infrastructure such as signage, signals etc. has not been expanded in accordance with the increase of population and vehicles. It has been observed that 71 percent of roads are already saturated or nearing saturation. Although 27 percent of road network has a width of over 30m, 50 percent capacity utilization has been deteriorated due to encroached roads. Out of total road network, 70 percent surface quality is poor.

8.2.1 Road Surface Quality

Most of the roads in Kanpur have poor surface quality. Out of total 272 meter road observed only 81.2 m (30%) of road length has a good surface quality whereas approximately 175.1 m was in bad condition and needed the repairs and 15.7 m (6%) have the very poor conditions. This coupled with inadequate carriageway width signifies lower road capacity which means reduced level of service on roads.



8.2.2 Speed and Delays on Road Systems

The road system in the study area offers a very poor level of service. Out of total road length, 65 percent offers traffic stream journey speed of only upto 20 km/h during peak periods whereas average journey and running speeds is 17.4km/h. There is not much significant variation between two speeds which indicates saturation-flow conditions on the road systems.

8.2.3 Level of Service of Road System

Level of service offered by roads depends upon volume of traffic and capacity of the road sections. Based on the capacities as recommended by IRC, Volume-Capacity ratios (V/C ratio) have been worked out. In Kanpur more than 26% of road lengths have V/C ratios of more than 0.8 which denotes forced traffic flow conditions and is worst level of services. Most of the city core roads (Meston road, Canal Road, Halsey road, Latouchey road, Birhana road (near Nayaganj), Canal road (near Narona), Nayaganj road and Kidwai Nagar road near Ghantaghar) have more than one V/C ratios. These roads are under utilized due to encroachments and poor surface quality. The journey speeds on these roads were found very low due to so much congestion and needs some remedial measures.

8.3 TRAFFIC CHARACTERISTICS

An unprecedented growth of motor vehicles has resulted in a host of traffic problems in the city. There were 5.4 lakh motorized vehicles registered in Kanpur till March 2006. Two wheelers share constituted 84 percent of the total registered vehicles. As against a fleet of 80 buses and 235 mini buses meant for intercity bus operation, a large proportion of public transport demand is catered by 980 tempos plying in different routes in the city.

8.3.1 Average Daily Traffic (ADT) at Outer Cordon

On an average day a total of 89468 vehicles in Kanpur enter and exit at the outer corridors. Amongst the various roads, Unnao Road carries the maximum volume of traffic with average daily traffic of 24472 vehicles while G.T. Road at Mandhana accounts for the least traffic of 8459 vehicles per day at outer cordon.

8.3.2 Average Daily Traffic (ADT) at Inner City Locations

Average daily traffic (16 hour duration) in terms of vehicles and PCUs at various inner-city locations reveals that Kalpi Road, M.G. Road, G.T. Road, Baker Road, Guru Gobind Singh Marg. Hamir Road are the heavily trafficked roads with ADT (16 hours) in excess of 30,000 vehicles.

8.3.3 Tempo Movement

In absence of adequate public transport system by bus, the large intracity passenger demand is catered by 980 auto-rickshaws and tempos registered with RTA. The tempo movement is very high especially on Ambedkar and Mall Road stretches and at Parade and Bara Chauraha. This leads to congestion on busy city roads.

8.3.4 Parking Demand and Supply

Due to a high demand of parking spaces, an effort was made to assess the current parking demand and supply on important roads in the inner CBD in Kanpur City. It has been observed that in absence of adequate off street parking the resultant demand is met primarily by on street parking which is prevalent on important road corridors. Unless some measures to create more off street parking spaces in the inner CBD are made, the traffic conditions will not improve. Scarcity of open spaces in the CBD may be substituted by construction of multi-storey and underground parking facility. Already four multi-storey parking spaces have been identified and will be developed on PPP basis.

8.4 ISSUES CONCERNING MOBILITY

Some basic issues are as follows:

- **Traffic Movement**
  - The railway line between Kanpur and Farrukhabad divides the city into north and south city and total 11 level crossing falls between main

Kanpur city and south city i.e. on other side of G.T. road. The traffic movement is restricted on railway crossings from Jarib Chawki to Kalyanpur on G.T. road and frequent traffic jam is seen all along the G.T. road due to passing of trains.

- Kanpur city is connected to industrial estate at Dada Nagar and Panki through Dada Nagar tri-junction and Vijay crossing. High traffic movement on this corridor cause frequent traffic jams.
- There is regular slow moving traffic by vehicles i.e. hand cart, buffalo cart, between transport nagar and trading centres like Gurmandi, Bansmandi, Hatia, Mani Ram Bagia located within inner city. The goods, which reach transport nagar first, are carted to wholesalers in inner city and after its re-packaging again transported back to transport nagar for further distribution to other cities in eastern U.P. and part of Bihar. This resulted in lots of traffic jams and immediate steps should be taken to avoid the movement of goods.
- There is a railway godown in city between Jhakarkati ROB and Kanpur Central. Items like cement, fertilizers etc. are off loaded in the godown and then sent further to Panki, FazalGanj and Dada Nagar industrial estate. The need is felt to shift the railway godown.

- **Low corridor speed due to high composition of slow traffic**
  Due to heterogeneous composition of Autos, Tempos, Rickshaws, Cycles, two-wheelers, cars and other small good vehicle traffic movement is very slow. There is no division of routes for fast and slow vehicles which cause congestion and increase the traffic problems. Another reason is that road surface quality is poor which also affects the steady movement of vehicles. Road like Ramadevi Chauraha, Vijay Nagar Road, Fajalgang and Station Road, etc. are facing bad surface quality and during rainy season the case becomes worst and alarming.

- **Poor intersection geometrics and non-functional signal**
  The intersections are very poorly designed. There is a need to improve the intersections of roads at many places of Kanpur City. The traffic signal, wherever installed, does not function properly which leads to slow traffic movement and reduce road safety. Steps shall be taken to install traffic signals on all the major intersections and traffic police shall be posted to follow the signal phasing. Presently traffic lights are controlled manually.

- **Poor Road Surface Quality**
  Transportation and movement of vehicles depends a lot on the road surface quality. In Kanpur city the road surface quality is poor on average due to lack of maintenance. The main problems related to road surface quality are in intra-city area. The areas such as Gumti, Shastri Nagar market area, Rawatpur, Azadpur, Nawabganj road, Kanpur Railway station to Fajalganj to Vijay Nagar road have poor road conditions due to lack of maintenance. Similarly, Ramadevi chauraha, Mall Road etc. needs improvement. The poor road surface quality leads to congestion and traffic slow down.

- **Inadequate parking space**
  The basic parking issues can be summarized as under:
  i) The parking supply and demand presents a very grim picture in Kanpur. With an unprecedented growth of motor vehicles the demand of parking is growing day by day. The commercial establishments are found all along the arterial roads need high parking space for owners, employees and visitors. Majority of commercial establishments doesn't account for parking space within their premises. Due to inadequate supply of off-street parking lots, supply is predominantly met on street with excessive use of inexpensive road space meant for traffic movement leading to haphazard parking and slow traffic movement.

  ii) Buses and trucks parked at G.T. Road between Jarib Chowki and Gol Chouraha creates chaos.

  iii) Absence of stringent measures for regulation

  iv) Absence of a parking policy

- **No tempo terminal facilities**
  Most of the local passengers depend upon the tempo and mini buses for their intra-city movement and transportation. Furthermost there are no terminals provided for tempo operation, the only space provided near Sirsaya Ghat is practically ignored by the operators. All operations originate and end at roadside. The worst being that tempo terminal exists on either side of Mall Road at Bara Chauraha which has resulted in chaotic traffic conditions at the intersections.

- **No tempo stops earmarked for boarding and alighting**
  In city, tempos and vikrams are plying unabated. These are backbone of public transport. But these vehicles cause big traffic nuisance and there is no proper place earmarked for boarding and alighting the commuters and they stop at any place and even if it is earmarked, no enforcement is there to check and control that tempos stop at earmarked place. It resulted in slow traffic movement.

- **Traffic Congestion and Ambient Air Quality**
  According to the study conducted by Central Pollution Control Board (CPCB), maximum numbers of vehicles (60%) held during the closure of level crossings are petrol driven two-wheelers. The number of diesel driven vehicles account for only 22 percent but they are enough to create a very thick smoke adding to visual obstruction and resulting in increased particulate mater in the air. Traffic congestion takes place on all significant crossings from Kalyanpur to Jarib Chowki on G.T. Road. The results of

Ambient Air Quality indicate that the suspended particulate matter (SPM) ranged between 780-788 ug/m3 when the crossings are open and shoots up to maximum of 4415 ug/m3 when the crossings are closed for train movement. The highest value was observed at Gumti Mo. 5.

- **Lack of Public Transport**
  The public transport system is non-existent in Kanpur. The only mode of travel for commuters is tempos and mini buses which contribute to air and noise pollution and traffic disorder.

- **Inadequate traffic staff**
  Present requirement of constables in traffic cell is 600 whereas only 400 constables (66.6 %) are sanctioned. Out of sanctioned staff only 50 percent is available for controlling the traffic.

- **Inadequate traffic signs and road markings**
  It has been observed that traffic Signs and road marking have not been marked on almost all the major arterial roads which leads to irregular traffic movement and reduced safety.

- **Encroachment on roads**
  Majority of the roads are encroached by venders selling fruits and other items due to which public mobilization is also occurring. In main market areas such as Birhana Road etc. there are many encroachments on the road side. This leads to traffic jam, congestion on roads and slow down of traffic movement.

- **Inadequate pedestrian facilities**
  Other than a few roads, all other roads lack footpath availability and marking of zebra crossing for the pedestrian movements.

8.5 STRATEGIES FOR TRAFFIC MANAGEMENT

P-Road, Meston Road, Halsary Road, Latouche Road Nayaganj Road, Sutarkhana Road, Cooperganj Road, Birhana Road fall in the inner CBD circle and being major market centre as well as shortest connection routes, these road have very high volume of slow and fast traffic. Chaotic traffic conditions persist during peak hours on busy roads. Although restricting movement of trucks and slow goods vehicles will ease the traffic situation to a great extent, it is also desirable to impose parking and other movement restrictions and segregate fast and slow vehicles in sections by providing separate tracks for slow vehicles wherever feasible.

8.5.1 Regulation /Segregation of Traffic

Assessment of traffic characteristics in Kanpur has revealed the presence of large proportion of slow traffic in the total traffic mix. To manage traffic in efficient and economic manner, one of the methods is to adopt traffic segregation principle i.e. guide slow and fast moving vehicles in separate lanes

in the corridor with proper traffic signs and markings. In case segregation is not possible for want of sufficient space, certain roads should be identified for exclusive use of fast or slow vehicles or alternatively one-way system should be introduced.

8.5.2 Regulation of Slow Traffic in Kanpur

Apart from segregation of slow and fast traffic, there is a need to regulate slow moving traffic in the city, specially in inner city. The composition of slow moving traffic (hand cart, bullock cart, trolleys and rickshaw) varies between 40-48 percent on Mall Road between Lal Imli and Bara Chauraha out of which cycle rickshaw accounts for about 35 percent. Although they do not contribute to vehicular pollution, yet they affect travel speeds of motorized vehicles leading to acute congestion and more cycle time required for clearance at the intersections. Keeping this in mind, two steps should be taken:

a) slow traffic movement should be banned on main arterial road sections (Mall road) and on some other roads (Meston road, Gumti No. 5 etc.) it should be banned during peak hours.
b) All small moving vehicles need to be phased out gradually.

8.5.3 Road Surface Improvements

Most of the roads have poor surface quality. Only 30 percent of road length has a good surface quality**.** After traffic segregation and regulation of slow moving traffic, road surface quality will be improved for uninterrupted traffic flow. Proper monitoring and maintenance of new constructed road will be done. Resurfacing of the broken roads should be taken phase wise depending upon the areas.

8.5.4 Intersection Improvements

The major characteristic of traffic in Kanpur is of mixed vehicular movement ranging from primitive animal drawn carts to latest in the motor technology. While speed maneuverability, dimensions, control and other static and dynamic operational characteristics are significantly different from each other, but they occupy the same road space and move in aggregated flows having all types of vehicular interactions and impede traffic flow at important intersections. All major intersections such as Rawatpur, Bakarmandi, Chunniganj, Lal Imli, Parade, Bara Chaura ha, Meghdoot, Phulbagh, LIC, Narona etc. should be improved.

8.5.5 Parking Spots

Haphazard parking of vehicles on roads should be stopped. Parking should only be allowed at identified 158 spots. Parking lots should be developed on public-private partnership basis. Parking fee should be charged from identified parking spots and from shop owners whose cars are allowed to park in front of their promises. Due consultative process should be adopted to fix different slabs for parking.

Proper signage for parking sign boards/ No Parking should be erected at identified locations. Strict actions should be taken against those vehicle

owners who park their vehicle on roads. Collection of parking fees should be resorted as a disincentive measures.

8.5.6 Removal of Encroachment

The carriageway of all roads in the inner CBD circle should be widened to maximum extent by removing encroachments. Removal of encroachment will result in smooth and efficient vehicular movement using all the available road width and minimize congestion.

8.5.7 Conversion of Non CNG Vehicles to CNG

The mother station of CNG already exists. Therefore there is an urgent need for conversion of bused and other vehicles to CNG to make city pollution free.

8.6 KEY ACTIONS

- The need is to construct a flyover on Vijaynagar crossing and widening of existing RoB connecting Vijay nagar crossing to Dada Nagar industrial estate.
- The main trading centres like Naya Ganj, Bansmandi, Hatia etc. needs to be shifted from inner core city to outskirts in the vicinity of Transport Nagar. This will minimise the movement of slow moving carts between trading centres located in inner core city and transport nagar.
- The railway godown between Jhakarkatti ROB and Kanpur Central should be shifted to Panki Railway yard in the outskirts of the city so that traffic congestion can be avoided.
- There is requirement of at least 6 ROB's between Jarib Chowki and Kalyanpur and also at Shyam Nagar, Dada Nagar, Govind Nagar and one running parallel to Govind Puri Railway Bridge.
- All main crossings and tri-sections need to be equipped with traffic lights and glow signs to regulate the movement of traffic.
- There is a need to develop public transport system using CNG buses (108 buses procured by U.P.S.R.T.C) in the first phase of the mission.
- All slow moving animal and manual carting vehicles need to be phased out gradually and should be replaced by CNG buses and 3 wheelers all over the city.
- All the tempos and loaders need to be phased out within next two-three years and buses more than 10 years should also be phased out.
- Parking lots at various locations needs to be developed for parking cars, two-wheelers etc. on PPP basis by KNN and KDA thereby removing congestion on roads due to parking of vehicles on either side of road.
- The suitable site should be identified for development of parking area for buses and trucks currently parked at G.T. Road.
- The sanctioned posts need to be filled immediately so that adequate constables could be posted in all the strategic points in city. This will help in improving the deteriorating law and order situation.
- Regulatory measures should be adopted for restricting heavy vehicular movement from city during peak hours in morning and evening

- Important intersections should be kept encroachment free by continuous monitoring. Boarding of passengers by cycle rickshaws and tempo's should be regulated 75 meter away from each approached arm to the intersection.
- Construction of public transport bays (Bus/ tempo terminal) shall be taken up.
- Tempo boarding/alighting should be displayed but it would not be allowed within 50 m reach of the intersection.