



# **Jaipur Metro Rail Corporation Ltd.**

**Consultancy Services for Planning and preparation of Detailed Project  
Report for Jaipur Metro Line- 2  
Jaipur Metro Rail Corporation Ltd. (JMRCL)**

## **TASK-3**

### **Volume 1**

**Comprehensive Mobility Plan - Urban Transport Sector Assessment  
Report for Jaipur City**

**Executive Summary - Draft Report Final**

**May 2018**



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## QUALITY CONTROL SHEET

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JAIPUR METRO

# Report on Jaipur Comprehensive Mobility Plan - Urban Transport Sector Assessment (TASK-3)

Consultancy Services for Planning and  
Preparation of Detailed Project Report  
(DPR) for Jaipur Metro Line 2

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### **LIST OF ABBREVIATIONS**

ADB	Asian Development Bank
ADF	Asian Development Fund
AFS	Audited financial statements
ASI	Accident Severity Index
AEGR	Annual Exponential Growth Rate
BRTS	Bus Rapid Transit System
BPR	Bureau of Public Roads
BMTS	The Bus Mystery Traveller Survey
CQS	consultant qualification selection
CMP	Comprehensive Mobility Plan
CAGR	Compound Annual Growth Rate
CTVC	Classified Traffic Volume Count
DMF	Design and Monitoring Framework
DPR	Detailed Project Report
DMRC	Delhi Metro Rail Corporation
EARF	Environmental Assessment and review framework
EIA	Environmental impact assessment
EMP	Environmental management plan
ESMS	Environmental and social management system
FMC	First Mile Connectivity
FOB	Foot over Bridge
GACAP	Governance and anticorruption action plan
GDP	Gross domestic product
GHG	Green House Gases
GSDP	Rajasthan's Gross State Domestic Product
HIS	Home Interview Survey
ICB	international competitive bidding
IEE	Initial Environmental Examination
IPP	Indigenous people plan
IPPF	Indigenous people planning framework
IPT	Intermediate Public Transport
IPTS	Institute for Prospective Technological Studies
JMRC	Jaipur Metro Rail Corporation
JCTSL	Jaipur City Transport Services Limited
JNN	Jaipur Nagar Nigam
JMC	Jaipur Municipal Corporation
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
LAR	Land acquisition and resettlement
LIBOR	London Interbank Offered Rate
LRT	Light Rail Transit
LMC	Last Mile Connectivity
MOUD	Ministry of Urban development
MRTS	Mass Rapid Transit System
NCB	National Competitive Bidding
NMT	Non-motorisation Transport
NGOs	Non-government organizations
NDDP	Net District Domestic Product
NSDP	Net State Domestic Product (NSDP)
OCR	Ordinary Capital Resources
OD	Origin and Destination
OC	Outer Cordon



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ORR	Outer Ring Road
PAI	Project Administration Instructions
PAM	Project Administration Manual
PIU	Project Implementation Unit
PMU	Project management unit
PCU	Passenger Car Unit
PPHPD	Passengers per Hour per Direction
PCTR	Per Capita Trip Rate
QBS	Quality based selection
QCBS	Quality and cost based selection
RIICO	Rajasthan State Industrial Development and Investment Corporation Limited
RRP	Report and recommendation of the President to the Board
RNI	Road Network Inventory
RSRTC	Rajasthan State Road Transportation Corporation
RTA/RTO	Regional Transport Authority/ Regional Transport Organisation
SBD	Standard Bidding Documents
SOE	Statement of Expenditure
SPS	Safeguard Policy Statement
SPRSS	Summary Poverty Reduction and Social Strategy
SC	Screen Lines
TOR	Terms of Reference
TDM	Transport Demand Management
TOD	Transit Orient Development
TAZ	Traffic Analysis Zones
TMC	Turning Movement Count
PUDH	Urban Development and Housing Department
ULB	Urban Local Body
VKI	Vishwkarma Industrial Area
WPR	Work Participation Rate
WFPR	Work Force Participation Ratio
ITPI	Institute of Town Planners, India
UTM	Universal Transverse Mercator
UMTA	Unified Metropolitan Transport Authority



## 0. EXECUTIVE SUMMARY

### 0.1. Background

Jaipur Metro Rail Corporation (JMRC) Limited was established with the initiative of Government of Rajasthan as a Special Purpose Vehicle (SPV), for the purpose of planning, designing, execution and operation & maintenance of Metro Lines in Jaipur. Present study is a part of “Consultancy Services for Planning and preparation of Detailed Project Report for Jaipur Metro Line-2” initiated under the aegis of JMRC. The study report is part of deliverable “Comprehensive Mobility Plan -Urban Transport Sector Assessment Report for Jaipur City” submission under Task-3.

Over the last decade the city’s population has experienced a compound annual growth rate (CAGR) of 2.83% per annum. In addition to being a commercial capital of Rajasthan, Jaipur is also one of the most sought after tourist destination in the world with about 70,000-80,000 tourists visiting the city every day during the tourist season.

It is envisaged that by the year 2047, the population within Jaipur Region will be about 68.3 lakhs. This would translate into about 6.22 lakh peak hour motorised trips in the year 2047, which will be about 1.9 times the present day peak hour trips

The mandate of the present assignment includes identification of Mass Transit Corridor for Jaipur City, evaluation of alternate alignment options and there by the system selection for the implementation of MRTS facility. Formulation of mobility strategies for Jaipur city would be addressing long term (2047) and then developing medium and short term investment programs to address immediate travel requirements of its citizens within the context of the long term strategy and ongoing investments being planned in JNN (BOX 1-1).

#### BOX 1-1: Genesis

- Jaipur Smart City Mission (MoUD)
- DPR for the Jaipur Metro Line-1 and Jaipur Metro Line-2
- National Urban Transport Policy, 2014 (Ministry of Urban Development)
- Comprehensive Mobility Plan Tool Kit -2014
- New Metro Rail Policy 2017
- Comprehensive Mobility Plan Jaipur Final Report –Wilbur Smith (2010)
- Appraisal Guidelines for Metro Rail Project Proposals
- City Development Plan(CDP)-Jaipur (2006) LEA Associates

### 0.2. Vision for Jaipur City

As per the National Urban Transport Policy (NUTP), 2014, it is important to focus on personal mobility to achieve cost-effective and equitable urban transport measures within an appropriate and consistent methodology. Ministry of Urban Development (MoUD), Government of India, encourages cities to prepare a Comprehensive Mobility Plan (CMP), which is integrated with land use plan, as part of a long-term urban transport strategy for sustainable improvements. Thus, CMP needs to be prepared focusing on mobility of people rather than vehicles by way of promoting non-motorised transport (NMT), public transport (PT) and intermediate public transport (IPT). Also the CMP is focussing the contributions of NMT and para-transit/IPT while achieving the last and first mile connectivity from the main mode the MRTS. Accordingly this report has been prepared scientifically

formulating a transportation roadmap (i.e.) Comprehensive Mobility Plan - a vision document for future, including suitable investment programme for Jaipur city's mass transit transportation system

Strengths, Weaknesses, Opportunities and Threats (SWOT) analyses of Jaipur Metro Region is undertaken and the conclusions are summarized in Box 1-2.

<b>Box 1-2 SWOT Analysis for Jaipur City</b>	
<b>Strengths:</b>	<b>Opportunities:</b>
<ul style="list-style-type: none"> <li>• Well Connected with rest of the country by road, rail and airways.</li> <li>• Major tourism hub, forms part of Delhi-Jaipur-Agra Tourism Circuit</li> <li>• Proximity to National Capital Delhi is an added advantage</li> <li>• Long history of international trade and financial services</li> <li>• Presence of reputed educational institutions and universities</li> <li>• Large talent pool, good work culture</li> <li>• Good regional linkages with rest of the region</li> <li>• Presence of JDA – A metropolitan planning and development authority</li> <li>• Presence of JMRCL – A metropolitan Metro Rail Planning, Executing and Operating SPV.</li> <li>• Politically stable government</li> <li>• Easy of doing business and speedy approvals</li> </ul>	<ul style="list-style-type: none"> <li>• Presence of rich Heritage and Tourism places offer opportunities</li> <li>• GoI policy of SEZs to boost export</li> <li>• Possibilities of setting up of off-shore banking units and international financial services center in SEZs</li> <li>• An emerging ITO and BPO Center</li> <li>• Growth demand for IT and ITES</li> <li>• Growth of high end manufacturing-gems and jewelry, heritage fashion goods leather, apparels etc.</li> <li>• Potential for growth of media and entertainment.</li> <li>• Jaipur is selected as Smart city under the scheme its civic infrastructure is envisaged for improvement.</li> <li>• Jaipur will emerge as an important logistic and export hub through synergy between airports and the special economic zones (SEZs); as it is falling in Dedicated Freight Corridor zone connecting Jaipur and Delhi</li> </ul>
<b>Weakness:</b>	<b>Threats:</b>
<ul style="list-style-type: none"> <li>• Topographic constraints, limited land supply in the North Eastern part of Jaipur.</li> <li>• High real estate and housing prices</li> <li>• Large proportion of slum dwellers(22% of population)</li> <li>• Inadequate power supply</li> <li>• Overcrowded bus and slow moving buses on congested roads</li> <li>• Inadequate civic and infrastructure in Pink City.</li> </ul>	<ul style="list-style-type: none"> <li>• Competition from other Indian and developing tier –II cities in terms of better quality of life at lower real estate and housing prices</li> <li>• Inability to convert economic momentum into investment in infrastructure</li> <li>• Inability to improve business environment.</li> </ul>

Having considered spatial and geographical expansion of the Jaipur City, Master Development Plan-2025 is prepared to create residential and employment opportunities outside Pink City, at the peripheral areas. For this, the areas for potential development are identified under U1, U2, and U3 category in the Master Development Plan-2025. Jaipur is one of the cities recorded with high per capita vehicle ownership (470 vehicles per 1000 inhabitants) and mechanized per capita trip rate of



0.89 trips/capita/day. Currently Jaipur city is facing the major traffic and transport related issues, they are: city's trunk routes are characterized by poor LoS (F), traffic delay and low operating speeds of less than 18 kmph in non-commercial areas and less than 12 kmph in commercial areas. Except Sindhi Camp Bus Regional Bus Terminal, which is congested, there is urgent need to develop regional bus terminals to ease city traffic and smooth operation of regional bus traffic. Considering the growth and expansion of Jaipur beyond the municipal boundaries and the economic interdependence of the local jurisdictions, it is envisioned to have high capacity mass transit corridor connecting the urban periphery to the city core.

### 0.3. Strategic Objectives

The basic strategy to make Jaipur City a most happening place to sustain the population and economic growth, is by creating mass transit facility and encourage commuters to use public transportation facility. For this potential mass transit, corridors are being identified by the consultants for the implementation of Mass Rapid Transit System (MRTS).

Gradual shift of employment and business activity centers to the city periphery through development mass transit corridor connecting the city core to the periphery has been suggested. Development of Outer Ring Road and its connectivity to the city core through radial connectors is also indicated as a long term strategy.

### 0.4. Key Challenges

Address major challenges arising from existing shortfalls in the transport networks that are the results of decades of underfunding, and the significant population and employment growth observed in last decade and expected over the next 30 years. Extensive modelling, analysis and consultations with stakeholders are undertaken to arrive at the best strategies and investment programs to support Jaipur City as a world class city meeting its economic as well as social objectives.

Future transport corridors need to be carefully defined and protected. Measures to ensure fully integrated land use planning and transport infrastructure planning need to be implemented immediately, including establishing financial mechanisms that fairly allocate and accumulate capital funding for both deficit correction and expansions due to urban growth.

The ensuing sub-sections highlight some of the major challenges that have influenced the scope and issues considered in preparing an urban mobility plan for the Jaipur city to achieve the prime objective **“Transforming Jaipur Region into a world class Metro Region which will cater to tourism, IT and ITES and manufacturing with a vibrant economy and a globally comparable quality of life for all its citizens”**. Amongst challenges, which are described in the ensuing sections, the real challenge is to meet the requirements of expanding transportation infrastructure, strengthening the public transportation systems, and planning new mass transit corridors to sustain the growing economy. While planning and designing the public transportation systems, it should also address the transport needs of inclusive groups to empower them of their economic wellbeing.

### 0.5. Physical Challenges

#### 0.5.1. Landform – Geography - Land use and urban sprawl

Jaipur City is geographically very diverse with relatively narrow valleys and shoulder plains surrounded by the Aravali hill ranges. On the Eastern side it is occupied by the hill ranges and

partially on the Western side compelled, the city grows on Southern and Western side along the Gateway corridors. As various generations built bridges, particularly the railways, the urban structure took the initial form of ring radial communities, along the highway and railways, acting almost as umbilical cords, but the conical urban form prevailed. The core of the city is a walled city connected to different zones through number of linkages. Over the last three decades, built up area in Jaipur City consistently increased from 46.39 sq.km in 1975, 83.92 sq.km in 1986, 113.3 sq.km in 1991, 172 sq.km in 2003, 197 sq.km in 2009 and 467 sq.km in 2013 respectively. Growth in high density built-up areas is very significant as most of the low density and medium density areas converted to high density areas. During the urban sprawl process many waste land areas, agricultural areas have been converted to built-up form.

## **0.6. Social Challenges**

### **0.6.1. Heterogeneity**

About 6.88 Lakh<sup>1</sup> population is living in slums and large groups of population working in the informal sector; the region presents formidable social challenges as well. In many respects, Jaipur consists of many different social and economic strata each having distinct transportation needs and aspirations. It is now recognized that in large urban areas, governments have to attempt to provide transport choices with a “public transport first” agenda. However the maintenance and management of an efficient road network is also critical for the social and economic functioning of the city. Achieving the right modal balance is a key investment issue that has been addressed in the mobility plan.

### **0.6.2. Slums**

This is a manifestation of the historical magnetism of Jaipur City that has attracted rural populace from across Rajasthan and other adjacent states of India. Sixty percent of population growth rate in Jaipur City is due to in-migrations. This, coupled with unaffordable and restricted supply of housing, has resulted in large increase in slum population over last 10 to 20 years. The household study for the CMP Project (2018) indicates that, about 6.88 lakh population constituting 22.5% of the total population of Jaipur city lives in slums, however, Slum dwellers are an integral part of the economic and social fabric of Jaipur Metro Region (JMR). Rising education standards and income levels of slum dwellers over the next 25 years will inevitably materialize into a generational shift in housing from slums to regular, more permanent accommodation. This shift will be accompanied by increased demands for motorized travel with more people working in formal sectors. Predicting these generational socioeconomic changes is a key factor in travel demand forecasting for the Jaipur Region.

## **0.7. Economic Challenges and Opportunities**

### **0.7.1. Growth**

Jaipur is 10<sup>th</sup> largest city of India and 98<sup>th</sup> largest city<sup>2</sup> in the world. It is also one of the densest cities of the world due to many people living in slums or slum like conditions. In spite of this,

<sup>1</sup> As per survey findings of Rajiv Awaas Yojana, 2011 and JMC & JDA

<sup>2</sup> World Mayor -2018 <http://www.citymayors.com/statistics/largest-cities-population-125.html>

JMR has a unique role to play in the economy of the nation as country's most important heritage center tourism hub and one of its most important service sectors: wooden toys, diamond cutting, cloth printing, dyeing, education hub health centers and benefiting the whole country. Recorded per capita income of Jaipur District is 1.2 times to 1.5 times higher than the state per capita income in the period 2004-05 to 2011-12. Between the period 2004-05 to 2011-12 State per capita income grown at CAGR 14.4% whereas the Jaipur City Regions income has grown at CAGR of 12% for the same period. During the same period recorded per capita income was INR 65000 per year. Revealed income from HIS is 7321 per capita/month and INR 32362 per month per Household.

### **0.7.2. Institutional Challenges**

At the moment, multiplicity of organizations are working in Jaipur City and the region. Jaipur Development Authority (JDA) region comprises various habitations of varying sizes. It is governed by a multitude of Urban Local Bodies (ULBs) responsible for these different areas, posing enormous coordination issues. About eight satellite towns, 37 industrial parks and 750 villages govern major urbanized parts of Jaipur Metro Region. Rural areas are governed by village level bodies that are coordinated by district level coordinating authorities. While most of the urban habitations are contiguous, there are few small ones that are interspersed in the region. Contiguous parts are recognized by the Census of India as Jaipur Urban Agglomeration for reporting demographic statistics. Providing coordinated transport facility to these entities is a challenging task.

### **0.8. Transportation Challenges**

To support the anticipated scale of growth in population and economic development there are many inter-related transport challenges.

**The first challenge** is to improve Jaipur public transport system to accommodate the growth of population and employment and consequent travel demand<sup>3</sup>. This can be achieved by proposing high capacity mass transit (MRTS) corridors along the city trunk routes in North-South, South-West and Western directions. Capacity enhancements to the existing regional railway system by creating new suburban railway stations along the regional rail would augment the public transit. **Transit First** is therefore considered as the guiding principle in preparation of transportation plan for Jaipur City.

**The second challenge** is to create a hierarchical system of roads and freeways to meet a wide spectrum of travel desires, including goods vehicles and the projected large increases in traffic entering and leaving the Jaipur City. At the moment in Jaipur there is one Regional Bus Terminal and one truck terminal located at Sindhi Camp and Transport Nagar on Agra Road respectively, which are congested, hence, there is urgent need to develop Regional Bus Terminals and Truck Terminals to ease these terminals and the city traffic. It is proposed to develop Regional Bus Terminal facility at the Outer Cordons located at the City Gateway corridors. All proposed Regional Bus Terminals would be integrated or connected to the MRTS stations through Multi Modal Integration/ feeder service. Consultants identified the locations for Regional Bus Terminals and Truck Terminals along the ORR.

<sup>3</sup>By 2047 anticipated mechanized trips would be 6.3M out of which public transit share would be 3.2M

**The third challenge** is to structure the most effective institutional arrangements to efficiently implement the proposed regional mass transit plan in a timely and prioritized manner. An integral part of process is the mobilization of resources from traditional as well as new funding opportunities (PPP<sup>4</sup>). International experiences in resource mobilization did provide useful insights into successful financing mechanisms.

### 0.8.1. Travel Behaviour in Jaipur

To Capture travel behaviour in Jaipur Home Interview Surveys (HIS) have been carried in Jaipur City in 91 wards covering a 10,971 families across different housing and economic groups. From the survey it is revealed that a total 3.65 M people in Jaipur make 3.25M internal to internal trips a day. Most of the trips are Home Based Work (44%) and Home Based Education (41%). Modal share revealed during the survey is presented below:

**Table 0-1: Mode Distribution in Jaipur (Including Walk)**

Sl.No	Mode	Total Trips
1	Walk	16.06%
2	Cycle	6.01%
3	Bus & Minibus	18.49%
4	Car & Taxi	18.71%
5	Two Wheeler	31.70%
6	Auto Rickshaw	8.61%
7	Metro	0.42%
	<b>Total</b>	<b>100.00%</b>

Source: Egis Survey

**Table 0-2: Total Mechanized Trips Base Year 2017**

Sl.No	Mode	Trips in Lakhs	Share
1	Two Wheeler	13.21	40.67%
2	Three Wheeler	3.59	11.05%
3	Car and Taxi	7.80	24.01%
4	Bus and Mini Bus	7.71	23.73%
5	Metro	0.18	0.54%
	<b>Total</b>	<b>32.49</b>	<b>100.00%</b>

Source: Estimate by Egis Survey

<sup>4</sup>PPP public private participation

#### Summary of Travel Characteristics derived from HIS

- Total Population of Jaipur 2011 (census) – **30,73,350**; 2017 (projected) – **36,53,927**
- Average household size = **4.42**
- Total Households Surveyed = **10970**
- Per capita Vehicle ownership **0.5** vehicles per person
- Average Monthly Income INR **32,362**/Household
- Average per capita Income INR **7321**/Month
- Average Trip Lengths for Various Modes

**Table 0-3: Average Trip Length by various modes**

Mode		Average Trip Length (km)
Homebased Trips	Bus & Mini bus	11.40
	Car	12.60
	Two Wheeler	5.80
	Auto Rickshaw	5.40
	Bicycle	2.40
	Walk	1.80
	Metro	6.09
Total Homebased Trips		8.74
Total Non-Homebased Trips		7.87
Total Trips		9.12

Source: Egis Survey

## 0.9. Other Surveys carried in Jaipur to capture the level of service on major roads.

### 0.9.1. Turning movement surveys

As per JDA records in Jaipur altogether there is about 8581 km of road length exist. Among them the important roads are the Arterial Roads and Sub Arterial Roads where the majority of traffic operates. To assess traffic on these roads junction movement surveys have been carried on 14 important traffic junctions. These traffic junction movements are used, to establish mid-block volume counts. From the junction moment survey it is revealed that out of 14 junctions, 13 junctions are operating beyond warrant condition.

Also the level of service on all the major roads in Jaipur City are functioning under LOS-E and LOS-F

### 0.9.2. Operating Speeds

Average speeds observed in the city are in the range of 15-18 kmph, whereas, the average speed in Pink City is less than 10 kmph during peak hours. The low speed profile is due to the following reasons:

- Peak hour traffic on most of the arterial and sub-arterial roads has exceeded the capacity
- Heterogeneous traffic, mixing of slow moving vehicles with fast moving vehicles
- Pedestrian movement on the carriageway due to non-availability of footpath
- Encroachment on the carriageway by the street-hawkers
- Reduction in actual carriageway width due to un authorized on street parking

### 0.9.3. Summary of Screen Line Surveys

- All together there are **21.12 Lakhs** vehicles are crossing both the screen lines in a day.
- In North –South direction about **20.73 Lakh** passenger flows are happening
- Similarly in East –West direction **19.82 Lakhs** passenger flows are happening..
- All together internal-internal passenger flows captured while crossing the screen lines was **40.55 Lakhs** passenger trips/day.
- Total Internal-Internal trips by three wheeler as captured and reported at the screen point locations is **3,75,708** passenger trips.
- Modal share captured indicates **38%** of the commuter is using Two Wheeler and **34 %** are using car.
- Around **11%** of the commuter use Bus and Mini Bus. This is less than the city model share observed (**18.71%** including walk and **23.73%** excluding walk trips) from the household survey due to the reason that the screen lines do not intersect most of the bus routes as the majority of bus routes are running parallel to the screen lines.

### 0.9.4. Summary of Outer Cordon Line surveys

- **27%** of the passenger trips are through two-wheeler, and **35%** of the trips are by car and taxi.
- All Buses share is **35%**
- **72%** of the passenger flow is from Delhi, Ajmer and Sikhar Roads (North- South)
- Daily on, an average **6 Lakhs** people cross the Outer Cordon, out of which **85%** are External-Internal and Internal-External interactions.
- Daily, **2.55 Lakhs** persons either enter or leave (both directions comprise 5.1 Lakh passenger) Jaipur, out of which about 90,000 would be the domestic tourists.
- About **25%** of trips are daily trips and **57%** of trips include alternate trips and weekly trice trips.
- It can be concluded that Regions interaction with the City is taking place in North South, South West Direction and Western directions, indicates the need for MRTS corridor in North South direction connecting Outer Ring Road at South to the 200 feet Bypass at Harmada beyond Vishwa Karma Industrial area.

### 0.9.5. Summary of All Trips Captured at Transit Areas

- Total two way Internal-External Passenger Trips Captured at Outer Cordon Locations: **5.11 Lakhs/day**
- Total two way Internal- Internal Trips Captured at Screen Locations: **40 Lakhs passenger trips/day**
- Foot fall captured at the Jaipur Railway stations : **1.41 Lakhs passenger/day**
- Foot fall captured at the regional Bus Stations **60,000 passenger/day**
- Foot Fall Captured at the Jaipur International Airport **12,000 passenger/day**
- Daily Tourist Arrivals in to Jaipur City **70,000-100,000 tourists /day**
- Total Internal- Internal Trips generated within the city **32.5 Lakhs passenger Trips.**



### 0.10. Existing and Expected Traffic Flow Patterns in Jaipur City

Existing traffic flow patterns across Jaipur City is examined through home interview surveys, OC surveys, SC surveys and surveys carried at the transit locations like Bus stands, Railway Stations, Auto Stands and Airport. The results and analysis facilitated to consolidate and arrive at the most probable mass transit corridors in Jaipur City.

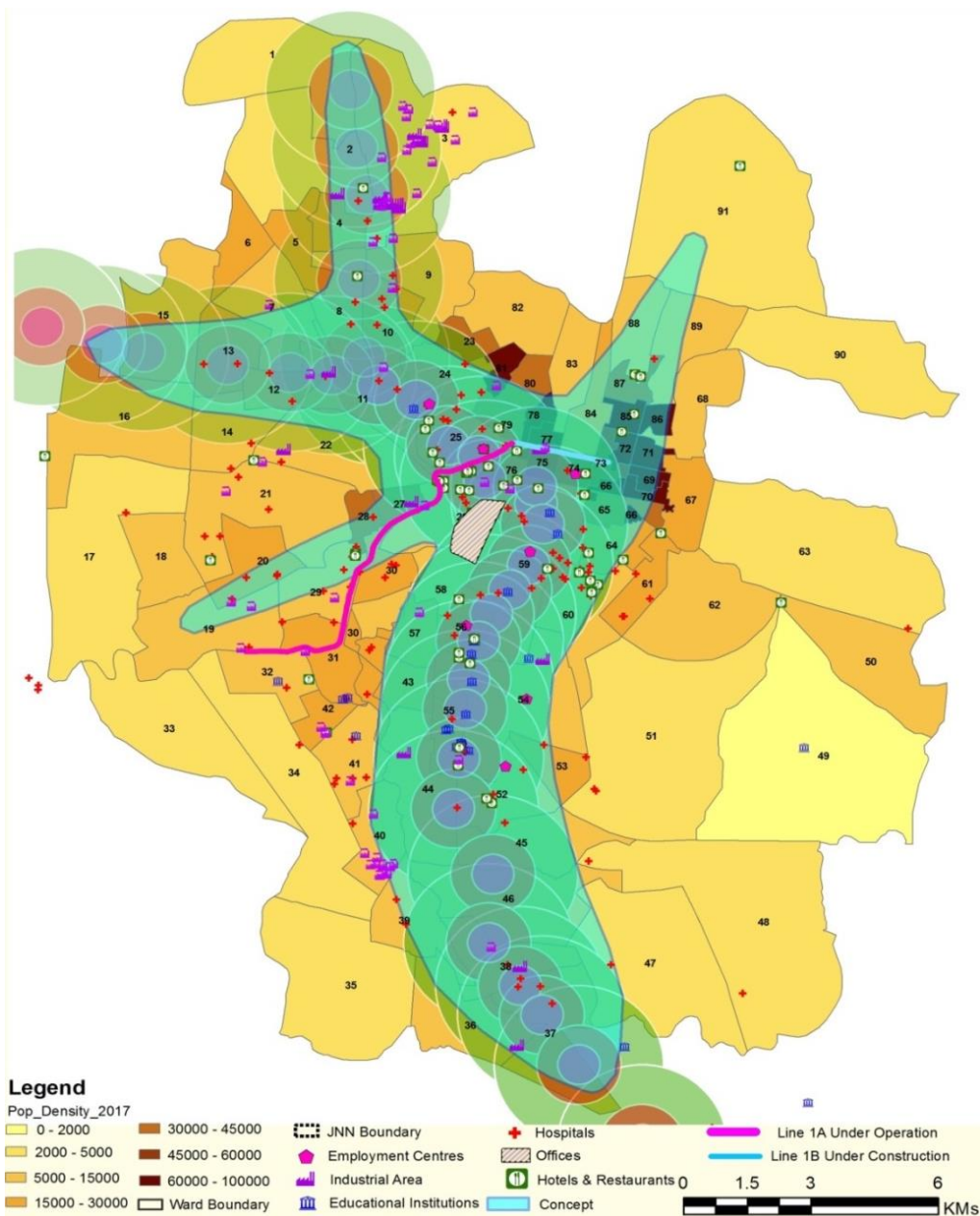
- Mapping of Population Density, Employment and Business Establishments, suggest alignment of Mass Transit facility in North- South, West and South –South West directions connecting the City Core.
- Further the land parcels under U1, U2 and U3 category recommend for the Planning of Mass Transit facility along these Gate Way corridors connecting the Pink City to the periphery.
- Also traffic flow counts and analysis at the Outer Cordon locations and HIS desire patterns strongly indicate the traffic flows in North –South, South-West and Western Directions.

### 0.11. Mobility strategies for Jaipur City

Collated data from HIS, primary traffic surveys, secondary sources and discussion with the stake holders formulated the strategies for the development of MRTS facility in Jaipur City. LoS analysis and Travel Demand Modelling and public bus route operation analysis, results have clearly shown the chaotic traffic conditions with most of the roads running with traffic volumes more than their rated capacity. High share of personalized modes (Two wheelers and cars) indicate the lack of adequate public transport system. Prevailing modal share (Public: Private::24:76) and traffic situation in Jaipur indicate the need for identification of corridors for MRTS and their development to improve traffic situation. The MRTS corridor would be mostly running along the highways and supported by high population density pockets and connecting business establishments- activity centres. For Jaipur city, MRTS corridors are identified by plotting and underpinning the following parameters:

- Population density
- Employment locations
- Trip Generation (Productions and Attractions)
- Public bus route network
- Traffic volumes and level of service

After mapping the population density and location of employment centres and business establishments, trip generation across all the TAZ's in Jaipur City, all the layers with different themes are super-imposed to established the potential corridors for identification of MRTS facility. The possible corridors for implementation of MRTS facility is indicated below.



**Figure 0-1: Corridors for the MRTS implementation in Jaipur City**

For running an MRTS system in any urban area, there should be adequate ridership available for its successful operations. Required commuters would be derived from the residential, institutional and commercial areas abutting to the major arterial roads and trunk routes. To attract adequate ridership on MRTS, catchments for 2.5 km radius is considered from each of the transit stop /station. From the conceptual MRTS corridor, it can be seen that the corridor is falling in North-South, South-West and Western directions. For planning the MRTS facility, various alignment options have been proposed and examined within a radius of 2.5 km or within a bandwidth of 5 km. The proposed MRTS alignment would be along the existing highways and arterials. Based on the collated information and Geo-spatial data, the possible corridors for MRTS Alignments were identified.

High density traffic corridors observed in the city are listed which warrant for development of mass transit corridors are listed in the following table:

**Table 0-4: High Traffic Density Corridors**

Sl.No.	Name of the road
1	Tonk Road
2	MI Road
3	Sikar Road
4	Kalwar Road
5	Gopalpura Bypass
6	Jawahar Lal Nehru Marg
7	Delhi Ajmer Express Highway
8	Hasanpura Road
9	Ashoka Marg
10	Jyoti Nagar Road
11	New Sanganer Road
12	Khatipura Road
13	Goner Road
14	New Sanganer Road
15	Dalda Factory Road
16	22 Godam ROB

After detailed alternate analysis of the Mass Rapid Transit Systems for the ridership on various corridors consultant recommend rail based transit system in the north-south direction. Prioritised corridors based on ridership estimates along with other alternative alignments are presented in the following table.

**Table 0-5: Identified Corridor Alignment options for the MRTS**

Sl. No.	Corridor
	MRTS Options
1	Sitapura - Ambabari – VKIA (Via Tonk Road-MI Road)
2	Ambabari - Govindpur (West Extension)
3	Outer Ring Road - Sitapura (South Extension)
4	Sitapura - Ambabari - VKIA (Via JLN Marg)
5	Sitapura - Ambabari (Via Ashoka Marg)
6	Stapura - Ajmeri Gate - Choti Chaupar (Termination)
7	Sitapura- SMS Hospital - Badi Chaupar – Jal Mahal
8	Sitapura- SMS Hospital - Badi Chaupar - Jorwar Singh Gate -Jal Mahal
9	Extension Haldi Ghati Road Section
10	Outer Ring Road -Sitapura -Ambabari- GovindPur West Extension
	Metro Line 1 (Mansarovar - Chandpole - Badi Chaupar)
11	Hirapura (200' Bypass) – Mansarovar Extension
12	Badi Chaupar- Jal Mahal Extension
13	Hirapura 200' Bypass-Mansarovar-Chandpole-Badi Chaupar-Jal Mahal Extension
14	Development of Outer Ring Road with at grade MRTS Facility

There is an urgent need for implementation of MRTS corridor in north south direction. The feasible alignment of this corridor is found to be Sitapura Ambabari-VKIA Road no.12. Accordingly Consultant Recommendation for implementation of MRTS corridors is given in the following table.

**Table 0-6: Summary and Recommendations of the Study**

Sl. No.	Name of the corridor	Length (km)	Ridership (Peak Hr. Passengers)	Section Load PHPDT	Daily passengers	MRTS System Recommended	Year
<b>Recommended Corridor (Ridership Estimations are for the Commissioned Years)</b>							
1	Sitapura-Amababari-VKIA	30.06	44896	23591	405065	Metro	2026

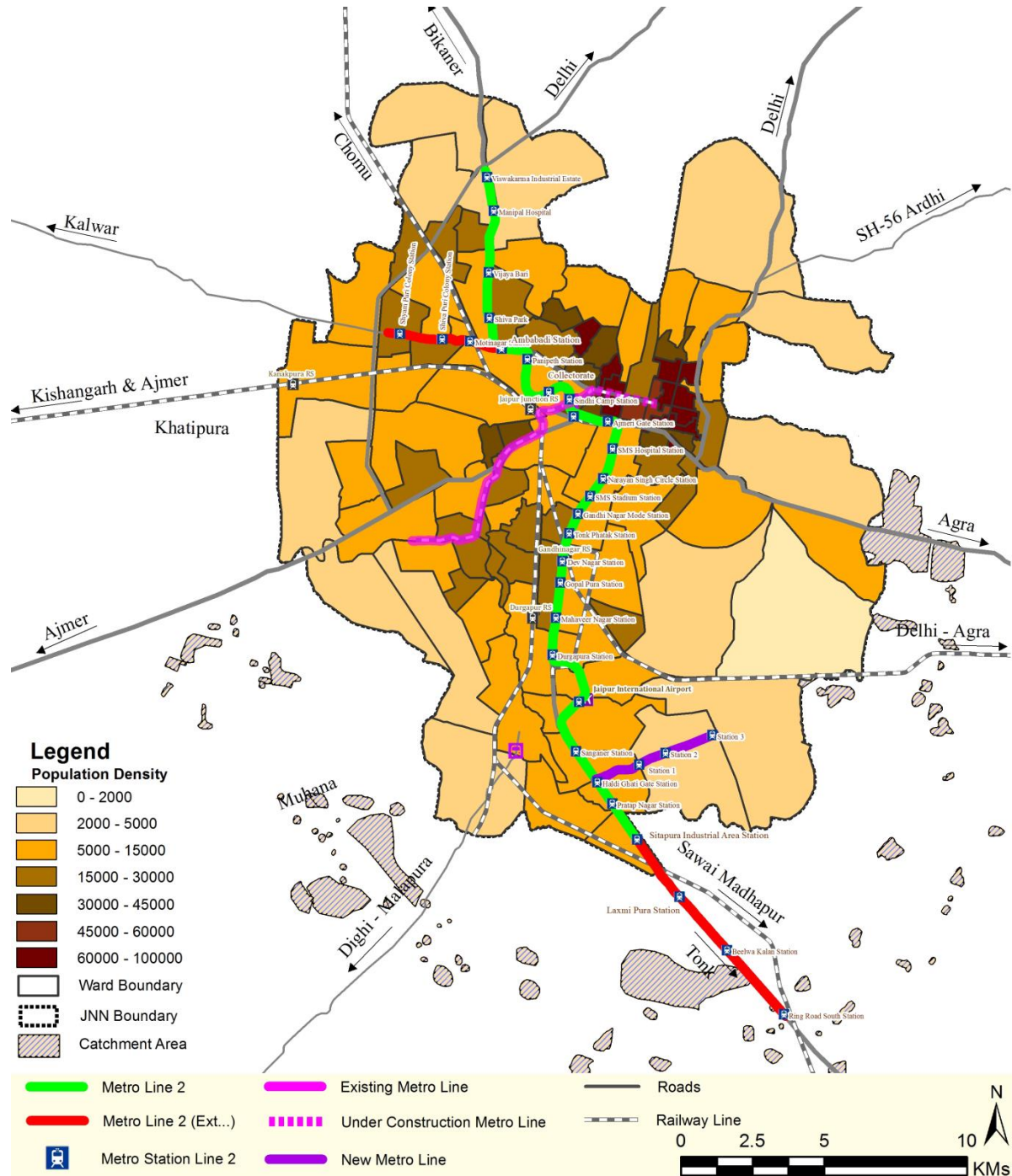
**Table 0-7: Summary of Transport Demand Projections**

2017				
Corridor	Section Load (PHPDT)	Daily Ridership	Daily Passenger	Average Lead (km)
Sitapura Industrial Area to Vishwa Karma Industrial Area Road No.12	17524	318586	3090284	9.7
2021				
Corridor	Section Load (PHPDT)	Daily Ridership	Daily Passenger-	Average Lead (km)
Sitapura Industrial Area to Vishwa Karma Industrial Area Road No.12	20501	372701	3659924	9.82
2026				
Corridor	Section Load (PHPDT)	Daily Ridership	Daily Passenger-	Average Lead (km)
Sitapura Industrial Area to Vishwa Karma Industrial Area Road No.12	23591	453448	4502739	9.93
2031				
Corridor	Section Load (PHPDT)	Daily Ridership	Daily Passenger-	Average Lead (km)
Sitapura Industrial Area to Vishwa Karma Industrial Area Road No.12	30347	551689	5544474	10.05
2036				
Corridor	Section Load (PHPDT)	Daily Ridership	Daily Passenger-	Average Lead (km)
Sitapura Industrial Area to Vishwa Karma Industrial Area Road No.12	36922	671214	6832959	10.18

<b>2041</b>				
<b>Corridor</b>	<b>Section Load (PHPDT)</b>	<b>Daily Ridership</b>	<b>Daily Passenger-</b>	<b>Average Lead (km)</b>
Sitapura Industrial Area to Vishwa Karma Industrial Area Road No.12	44921	816634	8427663	10.32
<b>2047</b>				
<b>Corridor</b>	<b>Section Load (PHPDT)</b>	<b>Daily Ridership</b>	<b>Daily Passenger-</b>	<b>Average Lead (km)</b>
Sitapura Industrial Area to Vishwa Karma Industrial Area Road No.12	56839	1033303	10818682	10.47

Comprehensive Mobility Plan Study (CMP) of Jaipur city further suggests improving the traffic circulation, public transportation system and mobility of the people. Issues pertaining to the improvement of public transportation, multi modal integration, last mile and first mile connectivity are also addressed. Specific recommendations for the implementation of transportation infrastructure like, junction improvements, Region Bus Terminals and truck terminals, ORR and its connectivity through radial road connectors, parking facilities, bus bays etc. across the city are also recommended.





**Figure 0-2: Recommended Mass Transit Corridor for Jaipur City with Phasing**