Hyderabad Metropolitan Development Authority

IMMEDIATE ACTION PLAN

Comprehensive Transportation Study (CTS) for
Hyderabad Metropolitan Area (HMA)

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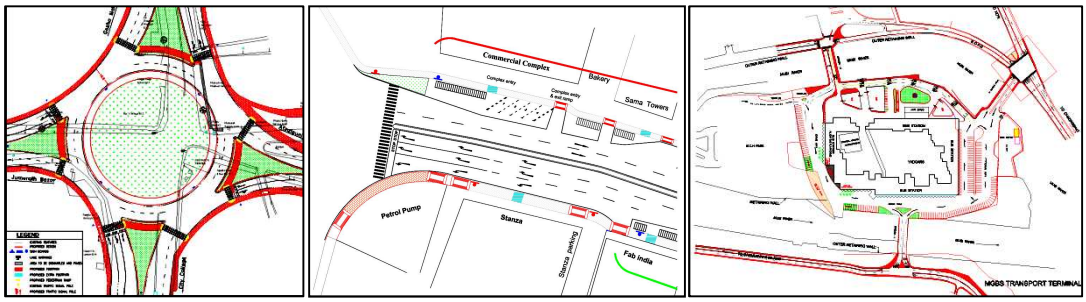
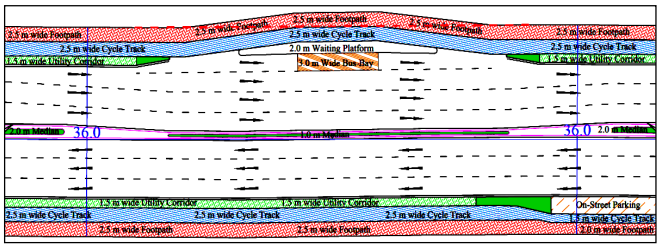
Immediate Action Plan: Summary





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LEA Associates South Asia Pvt., Ltd., New Delhi, India
in Joint Venture with
LEA International Ltd., Canada

Preface

LEA Associates South Asia Pvt Ltd., India along with LEA International Ltd., Canada are commissioned by the Government of Andhra Pradesh through HMDA to conduct Comprehensive Transportation studies and prepare long term strategic transportation plan for Hyderabad Metropolitan Area in March 2011. As a part of the Comprehensive Transportation Studies, to address the problems relating to the following aspects are required to be studied and evolve measures to mitigate these problems. These measures are to provide relief in the short term and be less resource intensive.

- Area Traffic Management (5 areas- 25 Sq.kms)
- Traffic corridor Management (7 corridors-15 Kms)
- Improvement of Intersections (30 Nos)
- Traffic Improvement plan for a terminal (MGBS)
- On Street parking facilities (6 corridors)
- Off Street parking facilities (6 locations)
- Pedestrians facilities (50km of road stretch)

In selecting the areas, corridors and junctions, to be studied, considerable amount of consultations with stakeholders like GHMC, Traffic police, HMR, APSRTC were held. After intensive deliberations the locations for study were selected and field studies were conducted. Field studies included reconnaissance, inventory of roads, classified traffic volume counts at midblocks and intersections, parking accumulation and duration surveys, pedestrian counts, speed and delay studies etc. The data collected from field surveys was thoroughly analysed to identify and quantify the problems of traffic. On the basis of the thorough understanding of the problems and existing ground conditions, the concepts of the improvement proposals were framed and possible solutions were designed. For conducting field surveys and preparing concept plans and solutions more than sixteen qualified traffic and transportation planners including eight Traffic and Transport Planners and Engineers from HMDA were involved. Through this exercise, the Traffic and Transport Planners and Engineers of HMDA are provided hands on training.

The concepts of improvement proposals and the solutions were presented to stakeholders like Traffic police, APSRTC, GHMC and HMDA, during the months of November and December 2011, for eliciting their reactions and suggestions. A large number of suggestions were offered by the stakeholders and those suggestions were given due consideration and modifications wherever required were effected to the proposed solutions. Detailed technical reports are prepared separately and submitted to the stake holders. In these reports field survey efforts and results of these studies and salient features of the problems and proposed solutions are described in greater detail. An attempt is also made to estimate the cost of the improvement proposals and the same are presented in the reports.

This summary report attempts to briefly present the findings of the field studies and proposed improvement proposals along with line cost estimates.

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1. INTRODUCTION

1.1 The context

HMDA[1], with the approval of UMTA (and Government of Andhra Pradesh) and in consultation with and support from the stake-holders viz. GHMC, Traffic Police, HMRL, APSRTC, etc., have taken up the mandate of preparing a Comprehensive Transportation Study for Hyderabad Metropolitan Area (HMA). Government of India, MoUD has agreed to extend advice and part funding to this major study[2]. Towards this major and important effort, HMDA has retained LEA Group as the Consultants[3].

The study is aimed at development of short term and long term transport strategies for the HMA. CTS is divided suitably into different phases in order to effectively address the various identified activities. Activity 2 is the **Immediate Action Plan (IAP)** phase of the project whose main goal is briefly given below:

Hyderabad city as a whole has witnessed spurt in travel demand, increase in vehicular ownership, spatial growth and population density. This has contributed to increase in levels of congestion on roads and at junctions. The supply of transport unfortunately could never met the demand requirements. It is therefore the keen desire of various stake holders to have immediate roadway improvement and traffic management plans which will bring some respite to the existing traffic problems in critical areas of transport network of HMA. The IAP phase of the CTS has focus on this.

As agreed in the Contract and based on the further discussions[4], the IAP is to cover the following six areas of concern as per the terms of reference for the project.

1. Junction Improvement Plans (30 No's)

   Junction improvement plans for 30 selected intersections are to be prepared. The improvements would include hard geometric improvements and soft measures such as traffic control and regulatory measures.

2. Traffic Management Schemes for 5 areas (each about 5 sqkm area)

   Five (5) areas are to be selected for the preparation traffic management schemes such as one way/contra flow movement, restricting movements at intersections, restricting particular modes

[1] HMDA apart from addressing many issues and mandates related to transport sector within its jurisdiction and at times as advised by GoAP, has further been contemplating to address the ever growing travel demand in Hyderabad Metropolitan Area. UMTA which was set up by Governmen0t of Andhra Pradesh is more than concerned and seized with the problems. HMDA on obtaining clearance from UMTA has sought participation and support from the stake-holders viz. GHMC, Traffic Police, HMRL, APSRTC, etc., to take up the mandate of preparing a Comprehensive Transportation Study for Hyderabad Metropolitan Area (HMA), by informing that Government of India, MoUD has agreed to extend advice and part funding to this major study. In this collective effort all the stake-holders are keenly taking part with continuous advice and monitoring by the Technical Advisory Committee (TAC) that is being set up for this purpose.

[2] HMDA had approached GoI for the advice and support on this major effort. With consent and approval of UMTA (and Government of Andhra Pradesh), HMDA sent proposal to and followed with MoUD, GoI for consideration and support. GoI has kindly agreed to support and advise this effort. Financial assistance is being given by the GoI.

[3] LEA Group Companies viz. LEA Associates South Asia Private Limited (LASA) and LEA International Limited (LIL), joint venture is selected to undertake this major study and prepare transportation plan for HMA.

[4] Extensive discussions are held with Technical Advisory Committee (TAC) and subsequently with HMDA and GHMC the locations and/or areas for IAP are finalised.

of transport at all times or certain time periods, developing traffic signage and marking schemes, providing road furniture, traffic calming measures etc. Selected five (5) areas should be measuring up to 5 sq km each.

3. Corridor Improvement Plan (15 km)

   Corridor(s), extending over length of 15 km to be selected for preparation of corridor improvement plan(s). This is to include re-distribution of available space for various needs, minor widening of roads to meet the demands of traffic, minimizing the bottle necks, review of location of bus stops, organization and regulation of parking spaces etc.

4. Pedestrian facilities (Up to 50 km)

   Pedestrian improvement plans for at least 50 km of length are to be prepared. This is to be undertaken as part of the Traffic Management Schemes of the selected Areas, to maximize the benefits to community and road users.

5. On- Street Parking Areas (10 km) and Off Street Parking (6 locations)

   On-Street parking along selected Corridors (of 10 Km) and Off-street locations (of 6 no's) are agreed to be taken up to develop parking plans depending upon the availability of space and generally consistent with the parking demand for the land use activities.

6. One transport terminal to assess Parking and Circulation requirements

   For the selected Intercity Bus terminal it is required to study the existing circulation plan to provide improved access to the terminal, improved circulation system for Buses, IPT and pedestrians. It is further required to assess the existing parking supply for different modes of transport and to study the impact of the terminal on the surrounding transport system.

1.2 IAP Coverage

As per the advice of the Technical Advisory Committee, the IAP locations were finalized in coordination with the Officials of HMDA, GHMC and other stake holders. Furthermore a presentation was made at CE, HMDA and other Offices to illustrate the approach to IAP study on 26th May 2011.

1.2.1 Selected Junctions

The table below identifies the names of the 30 intersections selected for IAP study. 16 intersections are selected from within the GHMC limits while 14 are selected from outside the GHMC limits.

S. No.	Name of the Intersection	S. No.	Name of the Intersection
1	Muslim Jung Bridge North (Bhumata temple) junction	16	Nagole X junction on IRR
2	Muslim Jung Bridge South (City College) Junction (a combination of one 4-arm and one 3-arm Junction)	17	Aliabad Junction on siddipet road
3	Tirumalagiri X Roads junction	18	Five armed staggered junction near Neredimet

S. No.	Name of the Intersection	S. No.	Name of the Intersection
4	Govt. Recruitment center Junction near Tirumalgiri	19	Dullapalli Road T Jun or Gandi Masa on Narsapur road
5	Bowenpally X roads junction	20	Kesara village Triangular junction
6	Alwal T Junction	21	Bhongiri T &Y junction
7	HMT Junction on Jeedimetla road	22	Hayathnagar T Junction
8	Motinagar X roads Junction near Borabanda	23	Ibrahimpatnam junction on sagar road
9	Kondapur T junction	24	Balapur X junction
10	Botanical garden T junction near Kondapur	25	Raviryal road Y junction on Srisailam road
11	Hafeezpet T junction on NH 9	26	T junction near Reddy Khanapur on Shankarpalli road
12	Old Raidurgam junction	27	Gopanampalli X roads junction
13	Raidurgam Police Station junction	28	Chilkuri Balaji road Y junction on Chevella road
14	DelhiPS junction near Khajaguda	29	Bahadurpally X junction
15	Wipro junction near Gachibowli	30	Jinnawaram Y junction

1.2.2 Selected Areas

The five sub-areas within HMA (the study area), each covering about 5 sqkm area, selected for the Area wide Traffic Management studies are as given below.

S. No.	Name of the Area	Approximate Area (sqkm)
1	Secunderabad area	5.0
2	Mehdipatnam area	4.6
3	Kukatpally Housing Board area	7.6
4	Malkajgiri area	16.5
5	Vanasthalipuram area	6.9

1.2.3 Selected Corridors

The following seven corridors measuring up to 15 km length are identified for a detailed transport improvement study.

S. No.	Name of the Corridor	Approximate Length (km)
1	Kukatpally JNTU to up to ROB (under construction)	3.0
2	Hi-tech City to Mindspace Junction	2.5
3	Chattabazar to Dabirpura Gate	1.1
4	Shobhana Theater to Narsapur junction	1.2
5	Fever Hospital to Shivam junction	1.8
6	Officers Colony to ECIL junction	2.4
7	6 No. Bus stop to Ramanthapur	3.1

1.2.4 Locations for Pedestrian Facilities Improvement Plan

Preparation of improvement plans for pedestrian facilities for 50 km of road length for both along and across movements is part of the Areas selected for traffic management scheme aforementioned (section 1.3.2).

1.2.5 On-Street Parking Locations

The corridors indicated in the table below are selected as the study corridors to study and provide parking solutions for On-street parking.

S. No.	Name of the Corridor	Approximate Length (km)
1	Moazzam Jahi Market to Afzal Gunj	1.30
2	Abids Road (Nizam College to GPO to IOB)	1.13
3	Bank Street (IOB to Andhra Bank, Koti)	0.50
4	Road No 1 Banjara Hills (Nagarjuna Circle to Masab Tank)	2.65
5	Abids to Kachiguda Station	2.20
6	Liberty to Narayanguda Flyover	1.80

1.2.6 Off-street Parking Locations

The areas indicated in the table below are selected as the study area to study and provide parking solutions for off street parking.

S. No.	Off Street Parking locations	Characteristics
1	Secretariat	Secretariat is the administrative headquarter of Govt. of Andhra Pradesh.
2	Begum Bazaar Market	Begum Bazar is the oldest Wholesale market for Household Commodities.
3	Ameerpet Market	Ameerpet is a well known Commercial & software training institutional Hub.
4	Charminar Bus station	Charminar is major Tourist attraction place with commercial and small scale industries
5	Kandaswamy Market	Kandaswamy market is a wholesale market for optical shops and its surrounded by residential use

1.2.7 Terminal for Parking and Circulation Plan

The **Mahatma Gandhi Bus Terminal** has been identified to study the circulation of traffic, parking requirements, pedestrian movements, and additional access requirements.

A schematic map showing all locations of all junctions/ areas/ corridors/ terminal selected for preparing an Immediate Action Plan within Hyderabad Metropolitan Area (HMA) is presented in Figure 1-1 for visual appreciation.

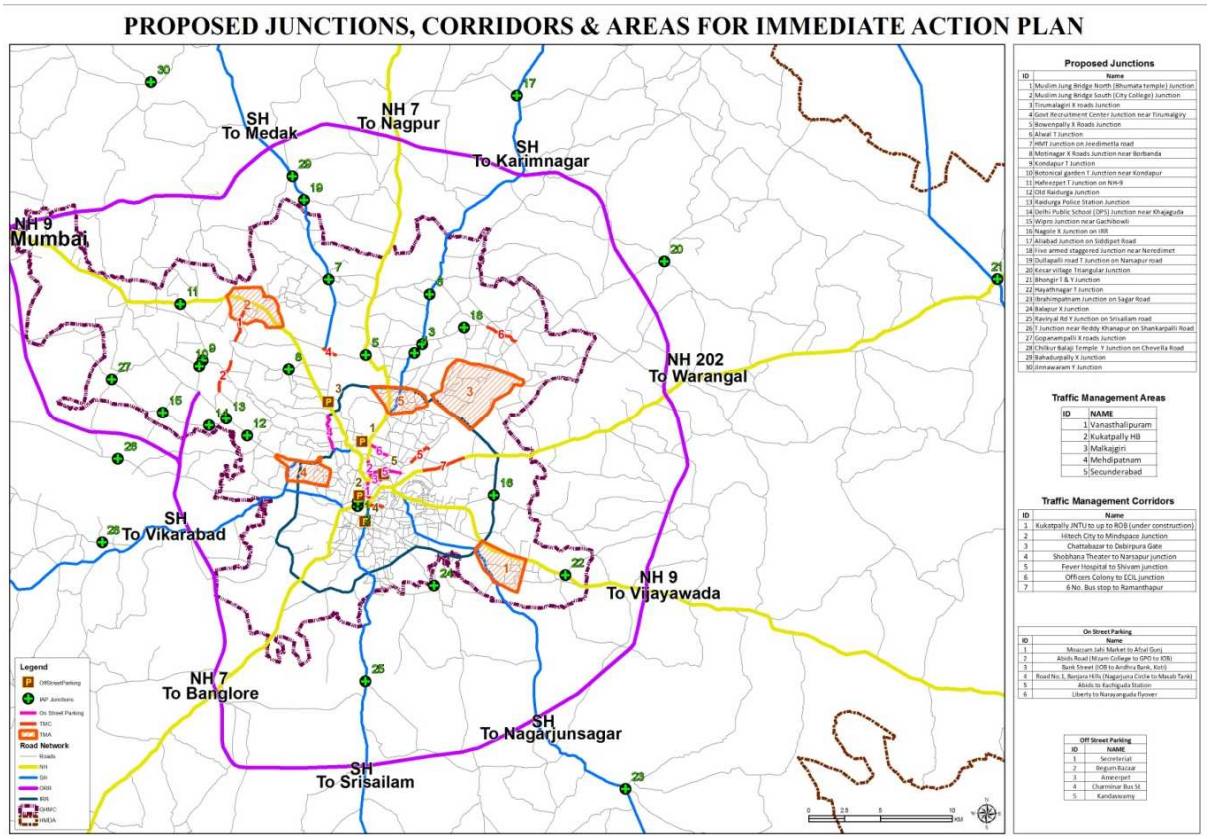

Figure 1-1: IAP Coverage

2. SUMMARY PROPOSALS

2.1 Intersections Improvement Plan

Thirty Intersections are identified for traffic studies and preparation of designs for improvements. Of these, sixteen intersections are falling in the GHMC jurisdiction and they are at S.No. 1, 2, 6 to 16, 18, 22 & 27 in the list; three are falling in Cantonment area that are S.No 3, 4, and 5 in the list; eleven are outside GHMC area that are at S.No 17, 19 to 21, 23 to 26, and 28 to 30 in the list. Traffic police jurisdiction wise six are falling under Hyderabad Traffic Police that are listed at S.No 1 to 6 and twenty two are under Cyberabad Traffic Police that are listed at S.No 7 to 20, and 22 to 29. Intersection at S.No 21 and 30 are under Nalgonda district and Medak district Police.

Traffic volume count survey for 12 hrs. (8:00 AM to 8:00 PM) and topographic survey has been conducted at each of 30 intersections. In addition, these junctions have been visited to assess the existing traffic situation, the nature of vehicular movements, pedestrian movement and the existing traffic control system. The commonly observed traffic problems at the intersections are as follows:

- Improper shape of traffic islands.
- Skewed and staggered approaches.
- Inadequate width of approaches with inadequate or no regulatory measures.
- Physically obstructions like Electrical Poles, Transformers, High Tension Electrical Towers, Telephone Poles, and Trees etc.
- Prevalent hazard on street parking in the junctions and along approaches.
- Religious structures and monuments.
- Defunct traffic signals and faded or nonexistent markings.
- Total absence of pedestrian facilities.
- Unpaved open areas in the intersection areas.
- Lack of lane discipline amongst the users.

2.1.1 Conclusions

1. A total of thirty intersections with varying configurations, traffic intensities and locations were studied critically to identify the inadequacies in the present design and operations and prepare improvement plans.
2. Out of these thirty intersections sixteen are located in Greater Hyderabad Municipal Corporation area, three are in Secunderabad Cantonment Board area and the remaining eleven are located in peripheral areas outside GHMC and within Hyderabad Metropolitan Area.
3. Of these intersections seventeen are three armed junctions, ten are four armed intersections and four are multi armed intersections.
4. Out of these three armed intersections eight are “T” junctions nine are “Y” junctions.

5. Out of four armed intersections three numbers of the intersections are normal right angle intersections while seven of the intersections are staggered with difficult maneuverability conditions.
6. Out of the multi-armed intersections No intersection is normal intersection where all the radial roads are converging at one point and four numbers of the intersections are staggered multi-armed intersections. Some of the intersections are chosen in combination with the neighboring intersections having mutual impact.
7. The range of traffic volumes in three arm junctions is 2470 PCUs to 76193 PCUs during 12 hours' time. While four arm junctions have traffic volumes ranging from 5810 PCUs to 74705 PCUs. The multi-arm junctions have traffic volume ranging from 17639 PCUs to 42947 PCUs.
8. The composition of traffic at intersections in the GHMC area was more or less consistent with two wheelers constituting about 50 to 55% of the total volume followed by cars about 20 to 25% and three wheelers about 10 to 18%. The exceptions to this are intersections located in Hitech city and Gachibowli areas where the car traffic is marginally higher than the two wheeler traffic in proportion.
9. The intersections located on regional roads like Rajiv Rahadhari (Siddipet road), NH-9, NH-7, Sagar Road and Srisailam Roads have considerable proportion of goods traffic at the intersections.
10. The traffic volumes observed at the intersections studied are large but not unmanageable in terms of intersection capacity. The major problem is the road side friction and the obstructions in the form of illegally parked vehicles, waiting IPT modes; hawkers close to the intersection affect the capacities of intersections in a large measure.
11. In a substantial number of intersections it is observed approaches have been widened but the total width of the approach is not being utilized. This is because it is not paved, sometimes the presence of the electric poles (or) other religious structures in the widened right of way also hinder the usage.
12. Out of the 30 intersections surveyed, 12 intersections are installed with signal and only 7 of them were functioning when surveys were conducted. Even where the signals were functioning the green phases and the cycle times require modification.
13. The staggered intersections are so complex and they defy normal methods of designing and controls of operations.
14. Majority of the intersections have very poorly maintained paved surface directly reducing the efficiency of operations and sometimes resulting in hazards.
15. Generally no serious thoughts have been given to design the intersections on a scientific basis.
16. The odd configuration of the intersections is the result of organic growth of the city with minimum or no application of traffic engineering principles / town planning norms at the time of permitting the development in the vicinity of the intersections.

2.1.2 Recommendations

1. On the basis of traffic studies and available ground plans obtained from topographic surveys, intersections have been designed to fit into the available space at the intersections.
2. The major thought has been to streamline the traffic flows using the channelizing islands with due care to ensure the pedestrians safety.

3. The traffic has been streamlined by liberal application of channelizers and regulated through appropriated traffic markings like zebra crossings, lane markings and directional arrows.
4. Keeping in view the need for effecting substantial improvements in the traffic capacity of the intersections designs have been evolved with higher standards of geometrics requiring land acquisition in the vicinity of the intersection. These designs are recommended as phase-II of the designs. Ten number of such designs are proposed for the intersections mentioned below:

S. No.	Name of the Intersection	Jurisdiction
1	Muslim Jung Bridge North (Bhumata Temple) Junction	GHMC
2	Tirumalagiri 'X' Roads Junction	SCB
3	Govt. Recruitment center Junction near Tirumalagiri	SCB
4	Bowenpally 'X' Roads Junction	SCB
5	Kondapur 'T' Junction	GHMC
6	Botanical garden 'T' Junction near Kondapur	GHMC
7	Old Raidurgam Junction	GHMC
8	Raidurgam Police Station junction	GHMC
9	Delhi Public School Junction near Khajaguda	GHMC
10	Nagole 'X' Roads Junction on IRR	GHMC

5. A total of 16 (12 existing + 4 new) intersections are recommended for signalization with provision for pedestrian aspects. As a matter of principle to enhance safety for the pedestrians free left turns are not permitted in any of the intersection operations. This is to say that the traffic using filter lanes will be stopped to give right of way to the pedestrians at all the junctions. The phasing of signals and the cycle times will have to be designed by conducting appropriate traffic volume surveys at the time of installation.
6. To ensure enhanced safety pedestrian refuge islands have been suggested at the junctions wherever it is feasible.
7. At the priority junctions (uncontrolled junctions) pedestrian facilities in the form of zebra crossing along with refuges and sidewalks are recommended to ensure the ROW to the pedestrian traffic.
8. It is noticed that fuel filling stations are located very close to the junctions (Tirumalgiri, Tirumagiri Govt Recruitment center, Neredmet and Balapur junctions) and these filling stations are not desirable at the junctions. These may be considered for shifting to a place at least 100m from the intersections on the downstream side.
9. It is recommended that for the success of any intersection functioning and management enforcement is of paramount importance. This aspect should be given utmost importance.
10. The signs as identified in section 2.2 are to be adopted at each of the junctions as per needs.
11. For successful implementation of the recommended plans it is essential to remove the obstructions created by utilities like statues (about 9), religious structures (about 10), electric poles (about 650), lamppost (about 140), transformers (about 14) and trees (about 411) are to be either relocated or removed.

12. From the experience gathered in designing the intersection improvements the following recommendations are made:
    a. Care should be taken to avoid large scale developments in the close vicinity of the existing intersections. Where a Greenfield developments are envisaged care should be taken to link the road leading to the development site to any of the distributor/sub-arterial roads with due care in providing the intersections which would be free of problems.
    b. A clear assessment should be made of the likely traffic that will be generated by the development and the link road and the intersection should be adequately designed.

2.2 Area Improvement Plan

- Area Traffic Management studies have been carried out for five selected areas:
  - **Secunderabad**
  - **Mehdipatnam**
  - **Kukatpally**
  - **Vanasthalipuram**
  - **Malkajgiri**
- Field surveys included reconnaissance, Road inventory, Traffic Volume Counts at mid-blocks, Traffic Volume Counts at intersections, Parking surveys, Pedestrian Surveys, Speed and Delay Studies.
- On the basis of the field surveys and the data analysis traffic problems that require immediate attention have been identified and possible improvement proposals that can provide relief to these problems were identified.
- The identified improvement proposals are detailed out in the report submitted to HMDA.
- The following are briefly the proposed improvements for each of the areas.

SECUNDERABAD:

- The area under the study is surrounded by Sardar Patel Road in the north, Rail Nilayam Road (Krishnadewaraya Road) in the east, Ministers Road in the west, and Boiguda Road and Railway track in the south.
- The area is served by the Rail Nilayam Road, Sadar Patel Road, Ministers Road, RP Road, M.G.Road, St. Mary's Road, Sarojinidevi Road, Rezimental Bazar Road, and Boiguda Road.
- Almost all the roads are thoroughfares carrying the traffic moving across the city. The proportion of thorough traffic is relatively less on St. Mary's Road, Rezimental Bazar Road, Sarojinidevi Road.
- The major problems in the area are inadequate pedestrian facilities at railway station as well as commercial areas, ill organised bus terminals resulting in U turns blocking traffic on main roads, Intense parking on thoroughfares like RP road, MG road resulting in heavy reduction in carriage way capacities.
- In order to ease the traffic problems, traffic circulation in the vicinity of Secunderabad Railway Station is proposed for reorganisation into one way system in the clockwise direction on St. Mary's Road, SD Road, Regimental Bazar Road and road in front of the Northern gate of station.
- The bus terminals are to be reorganised basically in terms of layout and capacity. The capacity of bus terminal at railway station is proposed to be increased by taking out some portion of land/ space under car parking lot and auto rickshaw bays as they are less utilised at present. The bus terminal space is totally inadequate as it exists today.
- Gurudwara bus terminal is to be provided with en-route bus stops along the road for serving the buses passing through the station area.
- The Uppal bus stop near Keyes High School will be totally segregated from the carriageway. Rathifile bus station will serve the buses as they are today, but the buses will move towards the station in one way direction instead of taking right turn blocking the traffic on station road.

- On Chilakalaguda side the terminal facility doesn't exist and as such the buses are parked on the road side at the periphery of the rotary hindering the traffic movements. For this case it is proposed to develop a terminal next to the parcel office or by acquiring the old quarters of railways to the southeast corner of underpass (Oliphenta bridge).
- Linking all the bus terminals a pedestrian skywalk is also suggested.
- All the junctions formed by the roads proposed for one way operation are proposed to be redesigned to facilitate the proposed operation.
- All the junctions in the area are proposed for signal controls and this includes Chilakalaguda Traffic Rotary which presently has 5 approaches. The rotary is recommended for removal as the intersection is going to be 5-arm signalised junction.
- On all the roads in the area a minimum of 2m side walk is suggested and this should be maintained free of encroachments.
- To minimise the impact of On-Street Parking and discourage long-term parking particularly on MG Road and RP Road, telescopic pricing along with time (Duration) restriction is proposed.
- To meet the parking demand of the future as well as the present, off street parking facilities are suggested to the north of SP Road in the corners of the intersections
- With the introduction of one way system the parking area at passport office can accommodate more vehicles than today this parking area has been redesigned.
- The need for increasing the capacity of underpass from Chilakalaguda to Alugaddabavi is very high and as such it is recommended that additional underpass may be provided to the south of the existing underpass which can increase the capacity by two folds
- It is noted that additional underpasses are approved and work is to commence at Alugaddabavi and Rail Nilayam.
- For Auto rickshaw parking the space is already designated and the same is proposed to be reorganised to develop into prepaid service facility.

MEHDIPATNAM:

- Mehdipatnam area is basically residential and interluded with educational and shopping facilities.
- The area is served by Vikarabad Road (Old Bombay Road), Old Bombay Road towards Gachibowli, Gudimalkapur Road, Ring Road, Laxminagar Road, Asifnagar Road.
- The thoroughfares are Vikarabad Road, Old Bombay road, and Ring Road while the other roads function as Distributors and Collectors.
- The major problems observed in the area are
- High volumes of bus traffic taking U -turns at Pillar no.3 and 23. The uncontrolled and ill organised auto rickshaws parked/ waiting everywhere.
- The absence of maintenance and upkeep of the bus terminal.
- The restrictions on boarding at the present Bus Terminal point.
- Total absence of pedestrian sidewalks and uncontrolled zebra crossings across Vikarabad Road/Old Bombay Road.
- The narrow width of Carriage-way at Rythu bazar coupled with hawkers all along the old Bombay Road.

- In order to minimise the problems it is proposed to reorganise the bus circulation plan so as to avoid U-turns.
- Re-designing of the junction at Humayun Nagar to facilitate right turns of traffic from Rethibowli to Miraj café junction. Acquisition of land towards cantonment area to provide additional traffic lanes for straight going and right turning traffic from Rethibowli.
- Provision of sidewalks along old Bombay road, Gudimalkapur Road, Laxminagar Road, andRing Road, Asifnagar Road, Ring Road.
- Redesigning of major junctions at Tolichowki, Nanalnagar, Rethibowli, Laxminagar, Padmanabhanagar, Miraj café etc.
- All the junctions are controlled with signals to ensure the safety of pedestrians and to achieve efficiency at the Junctions.
- Traffic calming measures along Laxminagar and Gudimalkapur Road are suggested to ensure the safety of pedestrians and non-vehicle occupants.
- To facilitate pedestrians crossings across old Bombay Road and PVNR Expressway a pelican crossing (signal) is suggested in the vicinity of the Bus Terminal. In the long term a pedestrian subway is recommended.
- At all the median openings and intersection approaches the height of the medians is to be reduced to 0.5m up to a length of 60m and 0.15 m at the mouth of the opening/intersection so to increase the visibility, facilitate pedestrians to cross and improve the safety.

KUKATPALLY:

Keeping in tune with the service provided by the roads passing through and terminating in the area, the traffic operations on each of the road links have been restructured and modified for operation.

- The NH-9, having wide RoW has been Re-designed to have service roads on either side and bus ways throughout the area from Nijampet Junction to BJP office. The entry and exits of the traffic are so designed to have smooth functioning and ensure minimum interruption to the long distance traffic moving on NH-9.
- The major roads namely JNTU Road, Road No. 1 and Phase 9 Road of KPHB have been redesigned to effect the distribution of traffic passing through and destined to KPHB.
- All the buses originating and terminating at KPHB are diverted to JNTU road for finding the access to NH-9 through the junction at JNTU.
- The Sardar Patel Nagar road is proposed to be extended to join Vasanth Nagar Road. This is to provide an alternative parallel road to JNTU road and relieve JNTU road from the traffic moving between Nijampet and Hi-Tech City. An existing H.T tower in Sardar Patel Nagar approach road needs to be shifted in the long-run.
- Utilising the available space in RoW along NH-9 and JNTU road, adequate on street/off street parking spaces are provided in the service roads and adjoining land.
- Keeping in view the demand for the hawkers, designated hawker zones have been identified along the service roads, so as to avoid their interference with main traffic.
- Commensurate with the proposed/modified traffic operational plans, the intersections treatment at JNTU Road, Nijampet Road, Ushamullapudi Road, Vivekananda Nagar Road, Rajiv Gandhi rotary have been addressed.

- The three main roads of KPHB namely, e-seva Road, Road No. 4, Dharmareddy colony Road will act as collector/distributor roads in the area.
- Keeping in mind the requirements of private long distance buses operating from/through the area a separate pickup point has been identified and designed near to Vivekananda statue junction.
- The road leading to Balaji Nagar joins the NH-9 at a point close to the bus service point opposite to CMR. In view of the necessity, this junction has been designed with appropriate geometrics with control measures.
- All the critical junctions are designed to meet the present and immediate future requirements of the traffic in the area as demanded by the proposed new circulation plans. All junctions are to be controlled with appropriately designed traffic signals to ensure safety and efficiency of operations.
- Keeping in view the heavy demand for pedestrian movements across NH-9 three pedestrian subways (two in between JNTU junction and Ushamullapudi junction Kukatpally Housing, one at at Kukatpally village) are proposed, these subways in Kukatpally area are integrated with parking spaces.
- Providing traffic calming measures like speed tables, speed limit signs along internal roads of KPHB and Pragathi Nagar, Vivekananda Nagar Road, Pipeline Road.
- “No parking” restrictions on Road No. 4, Phase IX Road, E-seva Lane, Dharmareddy colony Road are suggested.

MALKAJGIRI:

- Malkajgiri area is surrounded by Mallapur Road, Krishna Dewaraya Road, Anandbaugh Road, Dayanandnagar road and majorly marooned by railway tracks.
- Primarily the area contains residential land use. With commercial establishments located on the frontage of Anandbaugh Road, Malkajgiri Road.
- The area is served mainly by Malkajgiri Road, liking to Krishna Dewaraya road at Mettuguda.
- Malkajgiri road is the main life line for the area and carries large number of bus routes passing through and linking Secunderabad with Safilguda, Moula Ali Housing Board, ECIL, Neredmet etc.
- Generally the road network is inadequate in terms of ROW’s and other street furniture. Expansion of roads is technically not practical because of properties developed on either side of the roads.
- Keeping the bus traffic along Malkajgiri road and Anandbaugh road, in view necessary improvements have been proposed along these roads.
- The improvements are mainly limited to providing sidewalks on both sides for ensuring safety of pedestrians and appropriate Bus Stop locations.
- To improve the safety of traffic moving on Malkajgiri road a notional separator in terms of mountable kerb stone is suggested in the centre for separating the traffic moving in two directions.
- To manage the traffic moving in congested market one way system is proposed in the market area. At present only buses are moving in one way system.
- To improve the operations at the intersections, located at Anutex and Safilguda, have been improved in terms of geometrics and physical separators.

- In order to improve the safety of pedestrian moving in the residential colonies traffic calming measures have been suggested. These traffic calming devices include posting speed limit sign boards and speed tables at regular interval of 75-150 m as per the ground situations.
- To ensure the safety of traffic moving on main road particularly on Mallapur Road median height at the openings is recommended for reduction to 0.5m. This will improve visibility of the road users and enhance safety.
- All the junctions, both internal and external, are proposed for signalisation with appropriately designed geometrically.
- NTC Junction is redesigned as a signalised T-Junction.
- Nacharam junction has been redesigned to effect safety and efficiency of operations by providing channelizing islands and signal controls.
- To improve accessibility with in the area requires connectivity in form of RUBs and ROBs.

VANASTHALIPURAM:

- Vanasthalipuram area is particularly residential colony, surrounded by three major roads, NH-9, Nagarjuna Sagar Road, Ring Road.
- The area has access from NH-9 and Nagarjuna Sagar road, apart from minor access roads, There are 4 important junctions through which the area is accessed. They are Panama junction, Sushma Theatre junction, BN Reddy colony Junction and FCI Colony Junction.
- To facilitate the trucks to bypass the LB Nagar junction, Sagar Road and NH-9 are connected through Chinthalakunta bypass (Bairamalguda Road). The junctions at either end assume importance by virtue of movement of heavy commercial vehicles bypassing LB Nagar junction through this road.
- The roads/streets in the area are void off pedestrian facilities and appropriate traffic regulating measures are suggested to ensure safe and efficient movements of traffic and pedestrian alike.
- In order to improve the traffic flow on major corridor on NH-9, Sagar Road, Ring Road, junctions/accesses have been restricted to the 4 important junctions only and accordingly junction have been designed to suit the traffic needs of through traffic as well as accessing traffic on main roads.
- To improve pedestrian safety and environment, sidewalks of minimum 2m width have been proposed along all the roads that are running across the area.
- To effect traffic calming in the area speed tables have been suggested at regular intervals 75 – 150m as per the field situation and these Speed Tables will assist in crossing of Pedestrians.
- The speed calming zone signs are proposed to be installed at the entrances of the four access roads/junctions.
- Speed limit signs indicating restriction of 40kmph speed are proposed to be posted appropriately on the roads.
- To appropriately handle the heavy vehicular traffic on Bairamalguda Road (Chinthalakunta Checkpost – Sagar Road junction) junction designs have been suitably upgraded and along the bypass road sidewalks have been provided to ensure the safety of pedestrians.
- A suitable junction design is also suggested at the crossing of Sagar Road with Ring Road.

- At present Rythu bazar surroundings are ill organised and uncontrolled resulting in chaotic traffic movements. To bring the order to this area and to accommodate the unavoidable hawkers, suitable platforms are proposed and suitable parking has been provided.
- To meet the traffic accessing the properties on either sides of NH-9 service roads are proposed with limited parking facilities.
- As a part of improvement at LB Nagar junction, Saroor Nagar Road meeting at the junction is proposed to be closed and traffic on this road will be handled by a `T' junction existing on NH-9 towards Dilsukhnagar before the stadium.

2.3 Corridors Improvement Plan

Traffic studies and physical inventory have been carried out for the following seven corridors totals to about 15 kms in length represent varieties of issues within Hyderabad city Corridor Improvement Plan.

SL. No	Name of the Corridor	Approximate Length (Km)
1	JNTU to up to ROB (Kukatpally Housing Board Area)	3.0
2	ROB to Mindspace Junction (Hi-tech City Area)	2.7
3	Chattabazaar to Dabirpura Gate (Old city Area)	1.1
4	Shobhana Theatre to Narsapur Junction (Bala Nagar indust. Area)	1.1
5	Fever Hospital to Shivam Junction (Vidya nagar Area)	1.8
6	Officers Colony to ECIL Junction (North Malkajgiri Area)	2.4
7	6 No. Bus Stop to Ramanthapur (NH-202 Towards Warangal)	3.1

At each of the above mentioned list of corridors Traffic Characteristics, Roadway inventory, Land use Characteristics and Topographical information has been collected. Apart from these above information, field reviews to assess traffic circulation patterns, access management issues, traffic operations/safety issues, roadway connectivity etc and data on major traffic generators (residential, recreational and commercial) within the study area has been collected.

Salient features of improvements plans are briefly described hereafter.

Corridor-1 (JNTU to Hi-tech City - ROB)

Kukatpally (JNTU) to ROB corridor is about 3 km in length and connects Kukatapally residential community with the Hi-tech City which is a major employment centre. The corridor has a varying width and is generally between 35 m to 45 m. Currently JNTU corridor is a four lane divided roadway with a median width of 3.0 m.

- This is very important corridor as it connects residential and commercial districts of Kukatpally with employment centre like Hi-tech city.
- Presently high volume of work trips performed by private vehicles as well as IPT is noticed in the corridor.
- Presently the ROB at Hi-tech city station is under-construction and as such the heavy tidal flows utilize very narrow under bridge which is basically a stop gap arrangement to cross the railway line.
- The traffic police regulate/ control the movement of traffic through this stop-gap arrangement during morning and evening peak hours.
- It is to be noted that the present underpass are basically railway culverts to facilitate the cross drainage.

- As per the master plan the Right of Way from JNTU to Rajiv Gandhi Roundabout is 36 metres and from Rajiv Gandhi Roundabout to Hitech-city railway station is 45 metres.
- The land-use abutting to the corridor is primarily commercial with residential colonies behind the commercial spaces. As the name indicates Jawaharlal Nehru University (JNTU) is the major education centre located close to the junction on NH-9.
- Very large commercial centre and hotels are being developed on either side between Rajiv Gandhi Roundabout and Hitech-city station.
- Keeping in view the nature of traffic and available Right of Way (ROW) the cross-section of the corridor has been designed to accommodate vehicular as well as pedestrian traffic.
- Beside the traffic likely to use the corridor there is also immanent need for providing hawker's zone in small stretch near Rythu Bazar as they already exist and result in social issues if not provided.
- The salient features of the corridor improvements are:
    - JNTU to Rajiv Gandhi Roundabout
        - The cross section will have dual carriageway of 3 lanes with 2 metres median in addition to utility corridor of 1.5 m, Cycle Track of 2.5 m and Footpath of 2.5 m on both sides.
        - Hawker's zones are accommodated by squeezing some space from side walk, cycle track and utility corridor.
    - Rajiv Gandhi Roundabout to Hitech-city railway station
        - The cross section will consist of 3 lane dual carriage way with 2 metres median in addition to service lane of 7.0 m utility corridor of 1.5 m, and Footpath of 2.5 m on both sides. Cycle traffic is expected to use the service road in the stretch.
        - The bus bays have been appropriately located and suggested to meet the requirement of the bus traffic.
        - On street parking is also provided in a limited way at suitable locations.
- It is important to control the access to the properties to be at the same level as the side walk without any encroachment into the Right-of-Way.
- To maintain the quality of traffic flow only two intersections median opening are suggested on the corridor between JNTU and Rajiv Gandhi roundabout.
- The Stretch between Rajiv Gandhi roundabout and Hi tech city will have no median openings. The cross traffic will have to use connecting road Under the flyover at Hi tech city Railway station on one side and Rajiv Gandhi roundabout on the other side.
- Junctions in the corridor are redesigned in terms of creating island and lane marking to ensure safety at junctions.

- The 3rd Road which constitutes the two additional arms of the Rajiv Gandhi roundabout are proposed to be closed .This is to maintain the quality of flow as well as the efficiency of the junction.
- It is also noted that in future a grade-separator will be required at Rajiv Gandhi roundabout to meet the future traffic demand.

Corridor-2 (Hi-tech City ROB Station to Mind Space Junction)

This corridor is the extension of corridor from JNTU to Hi-tech city Railway Station carrying the traffic between Hi-tech city and Kukatpally area. The corridor length is around 2.7 km and the Right of way generally varies from 35 m to 45 m. Hi-tech city road is a six lane divided road with a median width from 1.2 m to 2.0 m.

- This corridor is the extension of corridor from JNTU to Hi tech city carrying the traffic between Hi-tech city and Kukatpally area besides catering to the developments that are existing and coming up on the either side of the corridor.
- The nature of the present as well as future traffic is expected to be primarily passengers movements with high proportion of private vehicles.
- The corridor is expected to have four major junction like Ayyapa society, Cyber Tower junction, Motorola junction and Mind space junction.
- The Right of Way along the corridor varies from 35 m to 45 m.
- The stretch from Hi-tech city to Cyber Towers will have mixed land use of residential and commercial spaces while the stretch from cyber towers to Mind Space is primarily commercial spaces.
- At Cyber Tower junction the corridor flies over Madhapur Road, connecting Kondapur and Madhapur.
- This corridor is expected to have high volume of vehicular traffic as well as Pedestrians traffic particularly during peak hours in morning and evening.
- Keeping in view the available Right of Way the corridor is designed to have 3 lane dual carriageways with 4 m to 1 m of median in addition to utility corridor (1.0 m) and footpath (3.0 m)
- The bus bays have been appropriately located and suggested to meet the requirement of the bus traffic.
- At present the carriageway and existing arrangements of merging /diverging traffic at the terminals of the flyover is inadequate and improperly designed. To correct the situation widening of carriage way at this location and the diverging and merging area has been designed to ensure safely.

Corridor-3 (Chatta Bazar to Dabirpura gate)

This corridor is located in the old city of Hyderabad in close proximity to Charminar monument. By virtue of its history, a very congested corridor with intense shopping activity of various kinds of goods. It starts at the intersection of Nayapul road and ends near the Dabirpura Kaman (Gate). This corridor has 2-lane single carriageway with varying width of 8 m to 19 m.

- This corridor is located in old city of Hyderabad. By virtue of its history a very congested corridor with intense shopping activity of various kinds of goods.
- In-spite of being very narrow Right of Way corridor there is a high demand for parking of 2-wheeler and also here and there sporadic car parking.
- The Pedestrians facilities like sidewalks and crossings are practically absent, even where they are existing their condition is very poor and occupied by shopkeepers.
- The already narrow carriageway is encroached upon by the shopkeepers.
- Keeping the nature of the activity along the corridor, it is proposed to give the due importance to pedestrians by creating sidewalks of 1.5 m in the corridor.
- To facilitate safe crossing of Pedestrians speed tables of 3 m width are suggested at intervals of 70 m to100 m.
- Traffic is predominantly consisting of 2-Wheeler and auto rickshaws and slow moving good vehicles.
- To meet the parking need and ensure safe passage of vehicles (2-wheeler and 3-wheeler) on street parking facility has been suggested along the stretch at appropriate places.
- At few places, the side walk could not be accommodated due to existing Religious structure and perceived difficulty in relocating them.

Corridor-4 (Narsapur Junction to Shobhana Theatre)

This corridor from Shobhana Theater to Narsapur junction is located in the North-West Sector of the City between its intersection with Old Airport road (Shobhana Colony Road) and Narsapur Road. The study corridor has a length of about 1.1 km. The corridor width generally varies between 26 to 32 m. The carriageway is currently a 6 lane divided with about 0.5 m median separator.

- This corridor is located in Balanagar/Sanathnagar.
- The land-use on either side is mostly commercial and on certain stretches industrial (at Balanagar).
- Major employment centres HAL, CITD and NRSC are also located on this stretch.
- Traffic moving on this stretch is highly mixed in nature with the predominance of passenger vehicles.
- The commercial vehicles account for 6% of the traffic flow.
- The traffic flow is tidal in nature with morning flow being heavy towards Kukatpally and evening towards Bowenpally.
- These are no regulated parking spaces in the corridor and as such the parking is haphazard and affects the traffic flow greatly.
- The condition of sidewalks is very poor and they are mostly encroached by the shopkeepers forcing the Pedestrians to use the carriageway.
- The signal provided in Narsapur and Balanagar intersection is defunct and mostly controlled by police.

- Proper Organisation of on-street parking facilities and restoring the pedestrian facilities will greatly improve the traffic operation.
- On street parking facilities have been suggested at appropriate places taking in to consideration the available space (ROW).
- Continuous sidewalks are suggested with good surface for making them pedestrians friendly.
- The Right of Way along the corridor varies from 26 m to 32 m. The narrowest stretch is at Fatehnagar junction.
- Taking the available Right of Way into consideration the cross-section has been designed to accommodate 3-lane dual carriageway along with sidewalks and Parking facilities where feasible.
- To reduce the impact of buses stopped at the service points appropriates Bus Bays have been provided.
- Standard road makings and signage at the junction and along the corridor is suggested.

Corridor-5 (Fever hospital to Shivam junction)

Fever Hospital to Shivam Junction corridor is located along Osmania University road from the intersections with Tilak Nagar road (near Fever Hospital) at one end and the Shivam road at the other end. The study corridor is 1.8 km long. The corridor width is generally around 22 m. The carriageway is currently 4 lane divided with median width of about 1.2 m.

- This corridor is located in south east area of Hyderabad with residential colonies like Nallakunta, Vidyanagar, Shankarmutt, Adikmet along the corridor. This is starting from fever hospital junction and ending at Shivam junction on Osmania University Road.
- The land on either side of the corridor is highly commercial with a flow institutional buildings and Hospitals.
- Junctions on the corridors are fever Hospital Junction, Windsor plaza junction, Hindi Mahavidyalaya junction and Adikmet junction.
- Traffic moving in the corridors is highly mixed in character with dominance of passenger vehicles.
- The traffic flows are tidal in nature with morning flow being heavy towards RTC X-Road from both side of corridor and vice-versa in the evening Peak hours.
- There is no parking place available in the corridor for major portion.
- Adikmet junction is very critical as traffic coming from Vidya Nagar colony is heavy in volume in the morning.
- Signal is not working at Adikmet junction and at present being controlled by Traffic police. However, Windsor Plaza junction is not signalized and controlled manually by police.
- Sidewalk in the corridor is not properly designed to safe guard Pedestrians.
- Footpath on the corridor is mostly encroached by shopkeepers forcing the Pedestrians to move in the carriageway.
- Organised on street parking and continuous side walk is suggested all along the corridor.

- Special care has been taken at the junction to provide Pedestrians friendly designs.
- The Right-of-Way along the corridor varies from 16 m to 28 m.
- Taking the available Right of Way into consideration the cross section has been designed to accommodate 2-lane dual carriageway along with sidewalk and parking facility where ever it is feasible.
- Intersections falling in the corridor are redesigned to facilitate the smooth traffic flow through them.
- There are a few minor access roads leading to residential areas that need to be considered in designing the corridor improvements.
- Bus Bays have been provided in the corridor to avoid the interruption due to the bus stop on the main carriageway.
- Standard road marking and signage at the junction and on the corridor are recommended.

Corridor-6 (Officers Colony to ECIL Junction)

Officers Colony to ECIL junction corridor is located to the North of Malkajgiri community in the North-East sector of HMA between Officers Colony to ECIL junction on Moula Ali road with a total distance of 2.4 km. At Radhika Theater junction the cross section of the road has an average of 45 m Right-of-Way with 3-lane dual carriageway on each side with ill maintained sidewalks towards Officer's Colony.

- This corridor falls in the north-east of Hyderabad. This is starting from officer's colony and ending at ECIL junction.
- Land-use on the both sides reflects the character of the corridor. It is highly commercialised with high rise buildings and shopping malls.
- Traffic moving in the corridor is heterogeneous in nature with high traffic volume of cars and 2-wheeler. Buses plying on the corridor are overcrowded during peak hrs.
- During Peak hours in morning and evening traffic congestion is observed at Radhika Theatre junction.
- To maintain the quality of traffic flow median gaps are closed at a few locations, to avoid the direct access on to the main c/w from side lanes.
- ECIL junctions and Radhika theatre junction are major intersections coming in the corridor and highly congested during peak hours.
- Bus terminal close to ECIL junction obstruct the smooth flow of traffic in this corridor due to the entry and exit of the buses from the terminal near to the junction.
- On street parking near to the ECIL junction, Radhika Theatre junction and A S Rao nagar junction is very high due to the abutting Land uses.
- At Radhika Theatre the cross section of the road has an average of 45 m Right-of-Way with 3 lane dual carriageway on each side with ill maintained sidewalks towards Officer's Colony.
- Hawkers and many informal shopping activities are present along the corridor.

- Footpath in this corridor is not properly maintained and is encroached by the Hawkers and on-street parking.
- Keeping in view the available Right of Way, 3-lane dual carriageway with 1.5 m of median is suggested in addition to the on-street parking of (4.5 m) Utility corridor (1.5 m) and footpath (3.0 m) on both sides.
- Hawker's zones also suggested nearby Radhika Theatre and A.S Rao nagar avoiding their presence and obstructing the traffic flows.
- Intersections falling in the corridor are redesigned to facilitate the smooth traffic flow through them.
- Bus Bays have been designed to ensure better service from public transport in corridor.
- Lane marking and proper signage has been proposed in this corridor.

Corridor-7 (6 No. Bus Stop to Ramanthapur TV Tower

This corridor is located in the Central-Eastern sector of HMA starting from 6 No. Bus Stop Junction and ends at TV tower office near Rahat Nagar along (NH-202) Warangal Road. The length of the corridor is about 3.1 km. The Corridor has four lane divided carriageway with many bottle necks like Graveyard and religious structures in the Right-of-Way.

- This corridor starts from 6 No. Bus stop junction and moves towards Ramanthapur TV tower.
- Land use in the corridor is mixed in nature with Residential colonies behind the commercial buildings. A Few Government offices are also located in the corridor.
- Doordarshan Kendra (TV Tower) is the major land mark in this corridor. Apart from this there are a few well Known educational institutions like Homeopathic College; Hyderabad public school comes in this corridor.
- Graveyard located in this corridor is a major bottle neck and at this location the Right of Way reduces by 9 meters.
- Traffic characteristics show that the traffic is dominated by Passenger vehicles with notable share of good vehicles.
- Speed in the corridor is very less due to many bottle necks like Graveyard and religious structures in the Right of Way.
- Un organized parking along the corridor also contributes to the congestion in the corridor
- Sidewalks are provided intermittently and at places where they exist, are occupied by the shopkeeper forcing the pedestrians to walk in the carriageway.
- Side walk is conspicuously missing at the mosque and graveyard.
- Amberpet junction is the only intersection which is in the corridor and highly congested during peak hours.
- Keeping in view of existing Right of Way cross section is suggested according to the available space.
- Footpath and on street parking is designed at suitable places. However a flyover is proposed in the long term to meet the traffic needs.

2.4 On-street Parking Management Plan

As a part of IAP, six corridors are selected for on-street parking study, they are (1) MJ Market to AfzalGunj (2) Nizam college to Abids GPO (3) Abids GPO to Koti Andhra Bank (4) Masab tank to Nagarjuna circle (5) Narayanguda fly over to Liberty (6) Abids Bata junction to Kacheguda. The following surveys are conducted along these corridors to assess the parking demand and its characteristics.

- Road Inventory
- Parking Inventory and Land Use Inventory
- On Street Parking Survey by Patrolling Method
- Mid-Block Volume Counts

Existing Parking Demand and Proposed Supply:

- In the **MJ Market to AfzalGunj** corridor, the peak hour parking demand observed is 224 ECS/hr, but only 184 ECS could be accommodated in the available space. The deficiency of 40 ECS should be allocated in off-street parking or appropriate pricing policy should be implemented to prohibit long term parkers.
- In the **Nizam College to Abids GPO** corridor, the peak hour parking demand observed is 246 ECS/hr, but only 80 ECS could be accommodated in the available space. The deficiency of 166 ECS should be allocated in off-street parking or appropriate pricing policy should be implemented to prohibit long term parkers.
- In the **Abids GPO to Koti Andhra Bank** corridor, the peak hour parking demand observed is 174 ECS/hr, but only 40 ECS could be accommodated in the available space. The deficiency of 134 ECS should be allocated in off-street parking or appropriate pricing policy should be implemented to prohibit long term parkers.
- In the **Masab Tank Fly over to Nagarjuna circle** corridor, the peak hour parking demand observed is 288 ECS/hr, but only 15ECS could be accommodated in the available space. The deficiency of 273 ECS should be allocated in off-street parking or appropriate pricing policy should be implemented to prohibit long term parkers.
- In the **Narayanguda fly over to Liberty** corridor, the peak hour parking demand observed is 417 ECS/hr, but only 320 ECS could be accommodated in the available space. The deficiency of 97 ECS should be allocated in off-street parking or appropriate pricing policy should be implemented to prohibit long term parkers.
- In the **Abids Bata junction to Kacheguda** corridor, the peak hour parking demand observed is 376 ECS/hr, but only 122 ECS could be accommodated in the available space. The deficiency of 254 ECS should be allocated in off-street parking or appropriate pricing policy should be implemented to prohibit long term parkers.

2.4.1 Summary of line cost estimations

The Table 2-1 shows the cost required for implementation of on street parking management plan. From the table it can be observed that the cost required for implementation is about Rs. 348 Lakhs. The details of line cost estimations for all six corridors are enclosed at Annexure –VII.

Table 2-1: Preliminary Cost Estimate of On-Street Parking Management Plan by Corridor

C. No.	Name of the Corridor	Estimated cost Rs in Lakhs
1	M.J. Market to Afzalgunj	63
2	Nizam college to GPO	27
3	GPO to Koti	18
4	Banjarahill Road No.1 (Masab Tank to NFCL Jn.	65
5	Abids to Kachiguda Railway station	87
6	Liberty to Narayanaguda Flyover	87
Total Cost		**348**

2.4.2 Conclusions

Parking Demand Vs Supply

The following figure 6.1 shows the present on-street parking demand, available supply thorough organized parking and proposed supply. It should be noted that these selected corridors have significant parking demand presently and will grow further in future. It would be unreasonable to expect the supply for such demand can be made within available right-of-way also satisfying C/W width requirement for through traffic. This should be managed at three levels:

1. Introduce organized paid[5] parking to control demand.
2. Encourage landuse which offers more space for parking.
3. Develop off-street parking lots.

From the Figure 2-1 it can be observed that the corridor 6 Liberty to Narayanaguda Flyover only at present is able to accommodate the present peak on-street parking demands. The other five corridors are significantly deficient in supply and management. There is a need to develop stringent parking policy for road side establishments to reduce on street parking demand.

[5] There is a need to evolve a parking policy for the city including pricing mechanism, necessary infrastructure development, possible use of modern technologies etc.

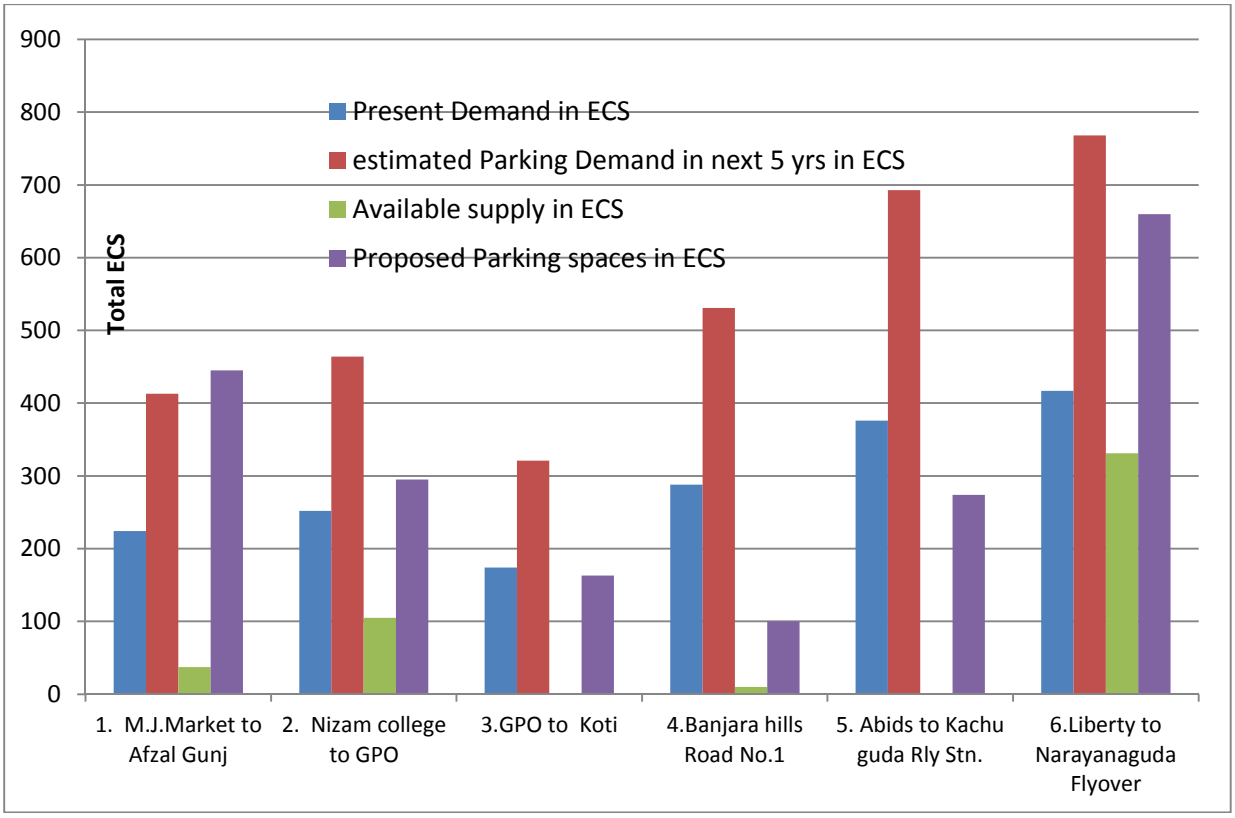

Figure 2-1: Summary of On-street Parking Management- Demand Vs Supply

Expected Revenue

An attempt has been made to estimate potential revenue in case the proposed on-street parking plan is implemented and priced as per recommendation. The corridor wise revenue estimate (Rs.589 Lakhs/year) is made and presented in Table 2-2. It should be noted that the revenue has been based on prevailing rates (Rs. 5/- per hour for two-wheelers, Rs. 10/- per hour for Cars) and for LCV (assumed rate of Rs. 15/- for every hour) does not account for expenses against parking fee collection.

Table 2-2: Estimated Revenue from Parking Charges by Corridor

C. No	Name of the Corridor	Estimated Revenue (Rs. in Lakhs / year)
1	M.J. Market to Afzalgunj	79
2	Nizam college to GPO	71
3	GPO to Koti	65
4	Banjarahill Road No.1 (Masab Tank to NFCL Jn.	87
5	Abids to Kachiguda Railway station	141
6	Liberty to Narayanaguda Flyover	146
Total Revenue		**589**

2.5 MGBS Terminal Study

Traffic studies were conducted to access the traffic problem within and in the neighborhood of MGBS. These studies included classified traffic volume count entering and existing traffic at MGBS, parking needs of bus and other traffic, circulation plan and possible improvements service time of buses etc. Based on the study results improvements are suggested below described are the findings of the studies in brief and proposed improvements.

- The Mahatma Gandhi Bus Station is located on Imlibun Island surrounded by Musi River on either direction. The terminal complex is spread over 8 hectares and has 74 platforms serving buses.
- Access into the station is provided at two points; namely 1) main entrance and 2) sub-station entry, with only one egress point linking to Chaderghat Road. The bus terminal facilitates 4200 bus trips and 1, 20,000 passengers daily. Of these, approximately, 3700 are Inter-City bus trips.
- Apart from the buses operated by APSRTC, many buses from other states like Chhattisgarh, Karnataka, Madhya Pradesh, Maharashtra and Tamil Nadu arrive are serviced at this bus station daily.
- Currently, there are 130 parking spaces available in the terminal complex to cater the parking needs of the buses. Of the 2500 bus-trips that are originating from the MGBS terminal, 6% of them are parked for more than 4hrs in the terminal area.
- Corroborating with the activity levels, maximum delays at the facility occur between 18:00-21:00.
- The major problems at this facility are irregular bus movements, long service times at the platforms, inadequate number of platforms, parking woes during weekend and festival seasons, and capacity constraints at entry and exit approaches. Furthermore, the above problems are compounded with bus circulation during the peak periods cause chaotic operational standards within the terminal.
- The entry and exit approaches are currently over saturated. From an operational standpoint, another access in and out of the terminal is highly needed.
- Two cases have been analyzed as a part of this Immediate Action Plan; 1) Without RangaMahal Bridge for suggesting improvements. and 2) With RangaMahal Bridge.
- Further to these options, it is recommended to limit the service times at the platforms to 20 minutes.

In the case without RangaMahal the following are proposed:

- Re-organize the Bus platforms based on proximity to their entry/exit
- Currently, only 20% of entering buses use the Sub-station Road. It is proposed for a fully functional entry catering to the buses served on platforms 40-65.
- Shift the exclusive bus lanes at the main entry to the left of the bridge and re-route the buses along the frontage of the Bus stand that are being served on platforms 1-40.
- This would require the buses to alight passengers at Gowliguda terminal prior to entering the MGBS facility empty.
- Entry and Exit junctions are proposed to be controlled with appropriately designed traffic signals, to allow maximum discharge for the vehicular traffic entering and exiting the facility.
- To cater to the heavy parking demand during the weekends and festival seasons, it is desirable to construct a dedicated multi-level parking facility.

Under the RangaMahal option the following are proposed:

- Bus routes serving cities along NH-7 north, NH-9 west, NH-202 and SH-1 would be served through the proposed RangaMahal Bridge.

- Bus routes serving cities along NH-7 south and NH-9 east would enter the facility through either the main or sub-station entrance, exiting the facility through Chaderghat Road.
- Re-organize the Bus platforms based on proximity to their entry/exit

As a long-term solution, to ease the load on MGBS, it is proposed to identify satellite bus terminals with radial connectivity as per direction.

2.6 Off-street Parking management Plan

Greater Municipal Corporation Area with an estimated 2011 population of 7.2 million has seen an average annual vehicular growth rate of 13% over the last decade. Due to the ever increasing vehicular growth there has been a greater increase in demand for vehicular parking in the GHMC area. The supply of parking spaces has not kept pace with the increasing demand. Further to study the parking demand and to rectify the situation, GHMC has identified below mentioned six areas for assessing the parking demand and recommend the required mitigation measures to tackle the parking problems. Below is the list of markets where the off-street parking is proposed:

- Ameerpet market
- Begum Bazar market
- Kandaswamy market
- Charminar Bus station
- Secretariat
- High Court

Primary Surveys Undertaken:

License plate method of Survey: In this survey, every parking stall is monitored at an interval of 15minutes and the license plate number is noted down. This will also help us in knowing the duration of the vehicle parked in a parking slot.

User Opinion Survey: Opinion surveys were conducted to know the opinion of the parkers about the facilities available for parking and about their willingness to pay the fee for using the proposed facility at the locations mentioned above. The survey was conducted on a weekday. The survey was done on a random basis of 50 samples. The users were asked about the problems in existing parking, origin, destination, distance travelled, frequency of the visit, parking duration and willingness to pay

Establishment Survey: In this survey, the owners of the establishments identified in the sample in the study area were asked regarding the, area of establishment, number of employees, number of visitors, travel details of employee and visitors, parking availability for those establishments.

i. Ameerpet Market:

Ameerpet market is located near Ameerpet junction and on Ameerpet to Begumpet road. The total area of the market is approximately 1306sqm. The market is used predominantly as a Chicken/Fish market. The area around the Ameerpet market is used primarily for Commercial (Offices, Software training centers, Malls etc.) purpose and then followed by residential use. A total road length of 4140 mts has been surveyed on 3 different roads in and around the Ameerpet market. A total of 4858(ECS) parked vehicles were found in around Ameerpet market on the day the survey was conducted. The peak parking demand for the Ameerpet market was 356(ECS) vehicles.

ii. Begum Bazar market:

Begum Bazar Market is located near Afzalgunz. The total area of the market is approximately 3311sqm. Begum Bazar market is primarily a fish market but you can also find vegetable shops around the market. The area around the Begum Bazar market is crowded with both residential and wholesale retail and commercial shops. A total road length of 1500 mts has been surveyed on 6 different roads in and around the Begum Bazar market. A total of 3143(ECS) parked vehicles were found in and around Begum Bazar market on the day the survey was conducted. The peak parking demand for the Begum Bazar market was 457(ECS).

iii. Kandaswamy market:

Kandaswamy Market is located in Sultan Bazar on Kandaswamy Lane. The total area of the market is 1463.50 sqm. The area around the Kandaswamy market is crowded with Residential, Commercial, Office and also some schools. There are 2149 (ECS) vehicles parking in and around Kandaswamy market on an average day. The peak parking demand of the market is 287 (ECS).

iv. Charminar Bus Station:

Charminar Bus Station is located near south of Charminar on Shah-ali-banda Road. The total area of the market is approximately 3572 sqm. Charminar Bus Station is primarily used for local buses going and coming from different parts of the city. The area around the Charminar Bus Station is densely crowded with both residential and commercial shops. As the area is major tourist destination there is a lot of vehicular movement which affects the parking demand in and around the Charminar Bus Station area. A total road length of 2900 m has been surveyed on 4 different roads in and around the Charminar Bus Station. A total of 1380 (ECS) parked vehicles were found in and around Charminar Bus Station on the day the survey was conducted. The peak parking demand for the Charminar Bus Station was 208 (ECS).

v. Secretariat:

Secretariat is located at south end of the HussainSagar Lake. The total area of the secretariat is approximately 1, 06,000 sqm. The entrance to the secretariat is limited and can be only accessed through the entrance on the NTR Marg. It has 9 administrative blocks. Secretariat boasts of approximately 3395 employee's. As it is the focal point of administration, there is a constant stream of visitors going in and out of secretariat. A total of 4582 (ECS) were parked on the day the survey was conducted at the secretariat. Due to this high volume and constant stream of visitors there is a constant demand for parking in and around the premises of the secretariat.

vi. High Court:

The studies of High court area are after the permission is received from them. On the basis of the studies supply augmentation and management policies will be identified and recommended.

3. Cost estimates

Below indicated are the line cost estimates made from the broad quantities of the works involved in implementing the proposed improvement plans. Work sheets of the estimates are provided in the technical reports. The estimates are tentative and need to be firmed up with the help of detailed project reports.

Sl. No.	Components of IAP	Estimated Cost (Rs. in Crs.)
1	Intersections Improvement Plan	28.10
2	Corridors Improvement Plan	73.10
3	Areas Traffic Management Plan	68.39
4	On-Street Parking Management Plan	3.50
5	MGBS Terminal Improvement Plan- Alternative-I (without Rangamahal bridge)	3.00
	MGBS Terminal Improvement Plan- Alternative-II (with Rangamahal bridge)	13.5
Total Cost		**190**
		(176) *

* Without Rangamahal Bridge