



12 TRAFFIC AND TRANSPORTATION

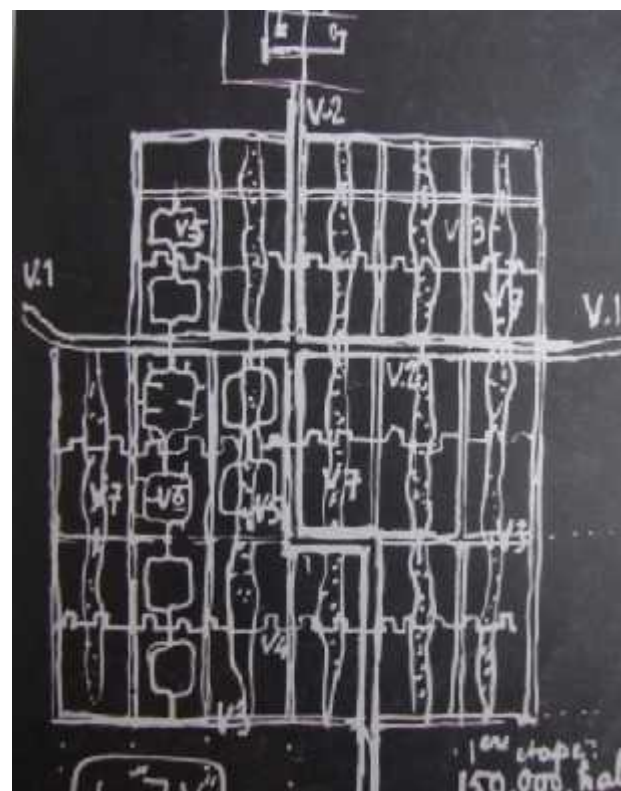
12.1 AN OVERVIEW

The original plan of the city was based on the gridiron defined by a system of seven types of roads, which was called the 7Vs. The system was designed to provide safe mobility to children and pedestrians within and between the sectors, while also permitting the benefits of fast movement for vehicular traffic. Based on the problems being faced by European cities after the industrial revolution, Le Corbusier intended to prevent the traffic congestion and pollution problems caused by the growth of the private motor car while simultaneously utilising the benefits the technology offered. Prevention of vehicular traffic jams on the roads designed for uninterrupted fast mobility was to be achieved by having an efficient system of public bus transport.

Sixty years later, although most elements of the original circulation system remain intact, it is the private car which rules the roost today. The pedestrian pathways for linking different sectors through open green spaces from north to south have largely remained on paper. Instead of cycle tracks going through the open spaces similarly connecting different sectors, some cycle tracks have been laid along the V3s dividing sectors but even these are poorly planned or incomplete, and in any case, do not provide safe continuity across the fast traffic roads.

With the city now having the highest per capita ownership of motorised vehicles in the country, and a dramatic increase in daily floating traffic from the extensive urbanisation which has taken place around the city, Chandigarh today faces the very problems that the carefully designed original Plan was meant to avoid. Pedestrians and cyclists can no longer move around the city safely as the motor car has become the prime determinant for traffic regulations and barriers across roads. Road widening has been encroaching on pedestrian pathways and many open spaces are getting encroached for car parking.

Travel in the city has become more risky with accident rates having gone up. the number of persons killed in road accidents has also gone up. This has tended to impact the poor more severely as many of those killed or injured are cyclists'/pedestrians. Increased use of personal vehicles has also lead to air pollution.



SKETCH BY LE CORBUSIER SHOWING 7V CONCEPT



12.2 REGIONAL CONNECTIVITY OF THE CITY

The city has good connectivity with the other surrounding region by road, rail and air.

Road connectivity

Chandigarh is well connected with the national capital by NH-21 which passes through the city. The four laning of the highway and the construction of a number of flyovers and bypasses has made it a fast travel corridor reducing travel time considerably. The city is also well connected to the major towns in Punjab, Haryana and Himachal Pradesh by road.



BUS STAND, SECTOR-17



INTER STATE BUS TERMINUS, SECTOR-43



MAP SHOWING REGIONAL CONNECTIVITY

The recent upgradation of the National Highway – leading to Shimla and the construction of a bypass around the towns of Pinjore and Kalka have removed the major traffic bottleneck in the road to Shimla .

The Inter State Bus Terminus (ISBT) in Sector 17 was the main ISBT for a number of decades till the recent construction of the ISBT in Sector 43. The new ISBT provides Interstate bus connectivity on all routes except for a few long route buses plying from ISBT Sector-17. The ISBT in Sector 17 will eventually be used as a local bus terminus.



RAILWAY CONNECTIVITY

The rail connectivity to the city is through twin track railway lines from Delhi and Mumbai upto Ambala , a single track broad gauge thereafter upto Kalka and a narrow-gauge single track between Kalka and Shimla having heritage value. The recently built single track Chandigarh to Morinda railway line provides rail connectivity to Punjab.

Besides serving the city, Chandigarh's railway station located in the north-eastern periphery of the city near the Industrial Area also serves the goods and the passenger traffic of the neighbouring region including the towns of Panchkula and Mohali. Direct access to the railway station from the Panchkula side has been facilitated.

With the increase in the frequency and number of trains together with faster speed and greater comfort, rail has become an important mode of transport.



CHANDIGARH RAILWAY STATION

AIR CONNECTIVITY

Located on the south eastern corner of the city and built in the fifties, Chandigarh's airport remains under the Ministry of Defence but also serves as a domestic airport. Over the years, direct flights to Delhi, Mumbai, Jammu, Srinagar, Jaipur, Leh and Bengaluru have been introduced with a daily footfall of around 2,000 passengers at the local airport. The proposal to start international flights has been under active consideration for some time.

A new, fully air-conditioned terminal building, equipped with modern facilities, has been built recently with a capacity to accommodate 500 passengers at a time. Chandigarh's airport today is among the best airports in the country in the category of B class cities.

The airport is in the process of being further upgraded as an international airport as a joint venture of Punjab, Haryana and the Airport Authority of India on 300 acres of land in Punjab.



OLD TERMINAL OF
CHANDIGARH AIRPORT



NEW TERMINAL OF
CHANDIGARH AIRPORT





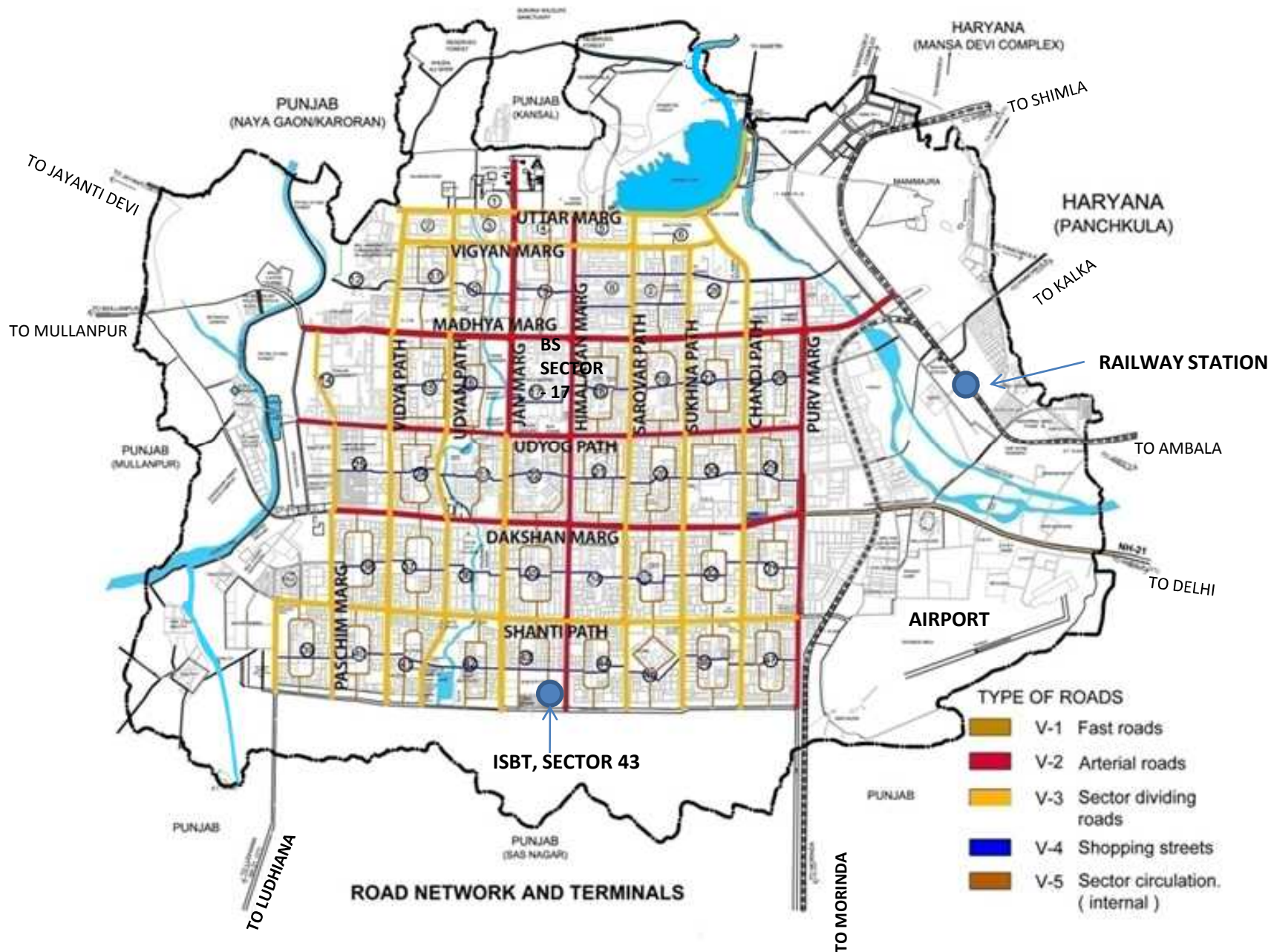
12.3 ROAD NETWORK OF 7VS WITHIN THE CITY

TABLE 1: THE HIERARCHICAL NETWORK OF 7VS (WHICH HAS INCREASED TO 8) HAD THE FOLLOWING FUNCTIONS IN CHANDIGARH'S ORIGINAL PLAN :

TYPE	FUNCTION
V1	Roads connecting Chandigarh with other cities in the region . The Madhya Marg and Dakshin Marg merge with the V1s leading to Kalka and Ambala respectively.
V2	The major avenues of Chandigarh, with important institutional and commercial buildings located on them. Madhya Marg, Dakshin Marg, Jan Marg, Himalaya Marg, Uttar Marg and Purv Marg are important examples of these.
V3	Roads between sectors for fast moving vehicular traffic. Each sector is surrounded either by a V2 or V3.
V4	Shopping streets cutting through sectors with shops on their southern side.
V5	Circulation roads within sectors .
V6	Roads providing access to houses .
V7	Foot paths through green belts enabling pedestrians to cross sectors without having to cross vehicular traffic and cycle tracks.
V8	Cycle tracks through green spaces Buses were to ply only along V2,V3 and V4 roads. Each sector was to have only four entry points from V3s no direct entry to houses was permitted from these roads.



PLAN P1 : ORIGINAL CIRCULATION NETWORK AND TRANSPORTATION NODES





PRESENT STATUS OF ROAD NETWORK

The 7V Circulation System has served the city well for decades. However the same is now under extreme pressure, both internal and external, which has begun to affect its efficiency.

The concept of the self contained neighbourhood intended to meet all the daily needs of the residents within walking distance without having to go outside the sector has not been fully successful ; freedom of choice for schools, shopping centres etc. outside the sectors results in inter sector movement of fast and slow vehicles across the city.

Further, Le Corbusier's concept of the 7Vs has not been fully implemented.

Detailed planning of the road network/road sections of each category of road was done in great detail by the original team including road carriageways, pedestrian and cycle tracks, tree plantation, and street lighting. Phased development of the system was planned to enable the infrastructure to keep pace with the growth of the town. Refer **Figure 4** and **Figure 5**.

Pedestrian pathways and cycle tracks not fully built

The V7s and V8s intended exclusively for the pedestrians and the cyclists respectively crossing road intersections by underpasses have not been implemented so far.

Figure 4 : Road sections 1st phase development

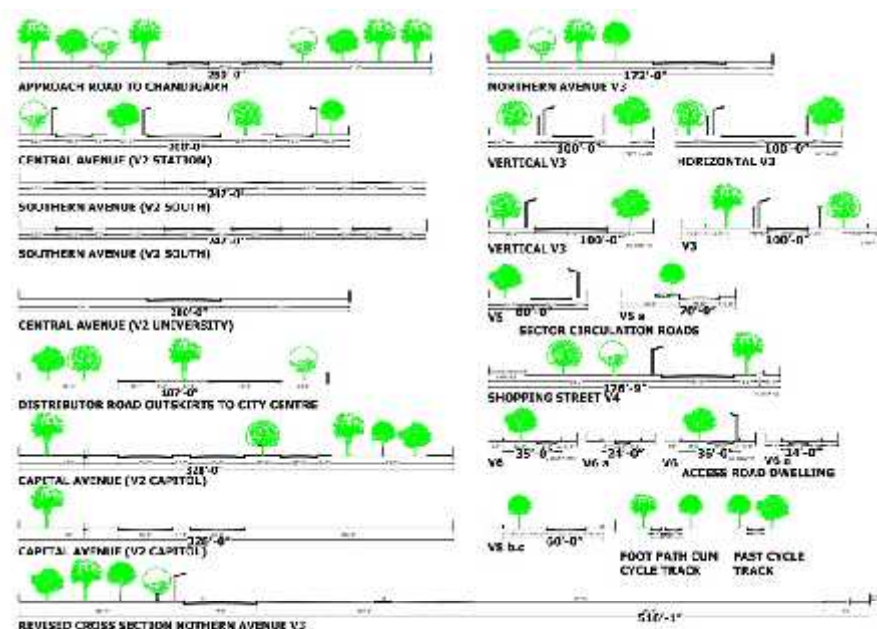
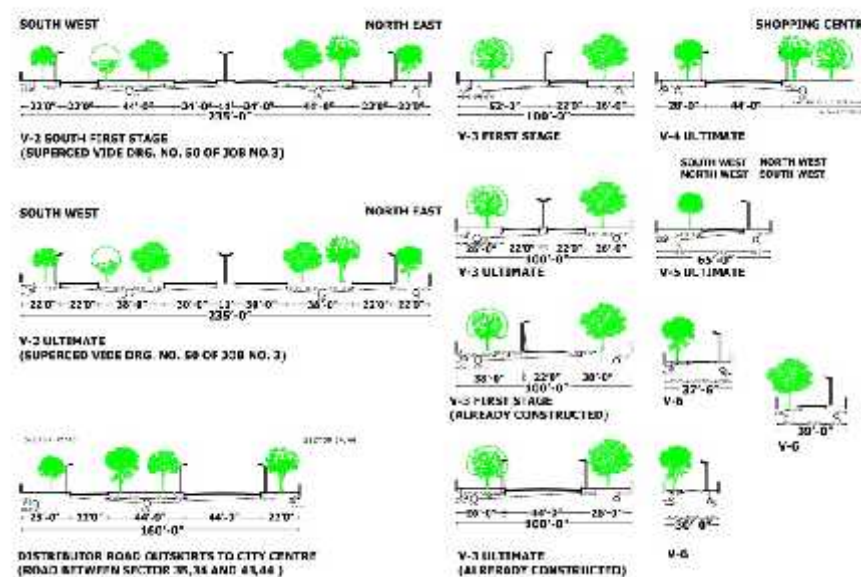
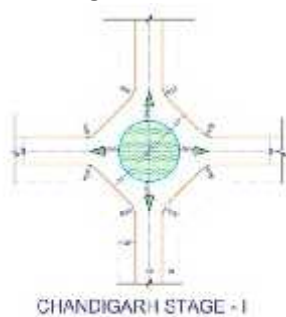


Figure 5 : Road sections 2nd phase development





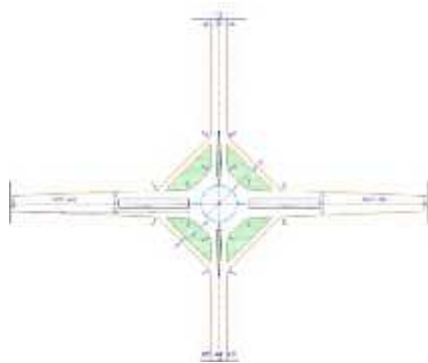
- The pathways that have been laid are poorly maintained and have trees, storm water drainage and other obstructions which compel pedestrians /cyclists to move on roads thereby defeating the very concept of dedicated space for them.
- Underpasses to connect V4 shopping streets across V3s/V2s have also not been implemented. The built environment and the road junctions also do not permit such interconnectivity at this stage .
- Four phased development of roundabouts has been carried out only upto the second phase. In most cases slip roads were built only recently. In some cases no space has been left for slip roads making them non feasible now.



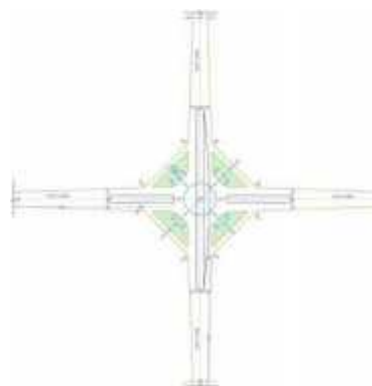
CHANDIGARH STAGE - I



CHANDIGARH STAGE - II



CHANDIGARH STAGE - III



CHANDIGARH STAGE - IV

DRAWING OF FOUR PHASED DEVELOPMENT OF ROUNDABOUTS



PEDESTRIAN SPACE ENCROACHED BY TREES, UTILITIES WHICH DEFEATS THE PURPOSE OF DEDICATED FOOTPATHS



POOR CONDITION OF ROADS AND CYCLE TRACKS



LANDSCAPED ROUNDABOUTS OF CHANDIGARH



12.4 PRESENT TRAFFIC CHARACTERISTICS AND PROBLEMS

Chandigarh's road network is under intense pressure today due to increase in population, explosive growth in the number of private vehicles which has increased the number of personalised vehicles, partly due to the absence of an efficient and reliable public transport system. There are limitations on the road space that can be provided within the existing built up environment.

Expansion of the city to the periphery of UT and permitted land use changes have resulted in new travel corridors. (Refer chapter - 13 on Land Use)

New roads to provide / improve connectivity of the developments in the peripheral areas generating criss-cross movement across the city and increased inter sector commuting.

- The 7V and the sectoral concepts have not been followed while urbanising the rural areas.
- Urban development across the Patiali ki Rao and Sukhna Choe has been piecemeal, with some areas having poor accessibility.
- No provision has been made for pedestrians /cyclists in trans choe developments or on the high level bridges constructed over the choes despite many commuters using these modes.

Large volumes of inter-city traffic

There is now a lot of intercity vehicular traffic from the neighbouring states which have strong daily interaction with the city. The emergence of the new towns of Mullanpur and Naya Gaon adjoining the city, and the planned expansion of existing towns in the neighbouring states are also likely to generate new travel corridors exerting further pressure on the city's arteries. Consequently, the well defined planned hierarchy of roads has been disturbed both due to intercity traffic and increased traffic within the city, including that from the wholesale markets.

High volumes of through traffic across the city:

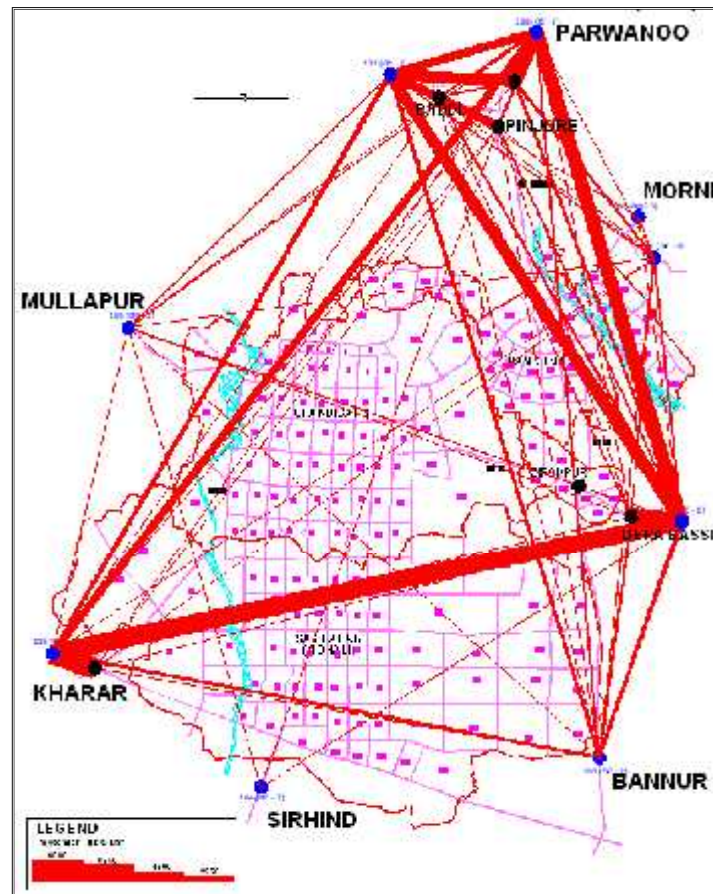
The total daily (24 hour) traffic studies at outer cordon points indicate that about 1,52,650 vehicles enter or leave Chandigarh Urban Complex on a typical working day. There is also high through passenger and freight traffic across the city. Madhya Marg is envisaged to be the worst affected of the roads since it provides the shortest and the direct connection between the towns of Punjab Mullanpur /Kharar /Anandpur Sahib and Baddi in Himachal on the West and the eastern towns of Manimajra, and towns of Panchkula, Panchkula Extension, Pinjore Kalka, Chandimandir Cantonment in Haryana and further to the towns of Parwanoo, Shimla etc. in the state of Himachal Pardesh. The through traffic across the city had added to the congestion on the road.

As per the surveys conducted by M/s Rites in 2008, the daily total inter city passenger traffic with the Chandigarh Urban Complex is 4.93 lakh trips (cars, 2 wheelers, auto rickshaws and buses) about 1.41 lakh of which comprise through trips which is 28.7% of the total traffic. The demand for through traffic is shown in **Figure 10**.

Of the total traffic of 26934 vehicles (LCV, Trucks and MAV) about 11062 vehicles are through which is about 41% of total traffic. Traffic desire for through movement is shown in **Figure 11**. This also indicates the need a bypass road to around Chandigarh Urban Complex. With business as usual scenario, the Volume /Capacity (V/C) ratios on all major corridors are expected to be well above '1' by year 2021. The situation is likely to worsen considering the high growth anticipated in CUC and nearby towns.

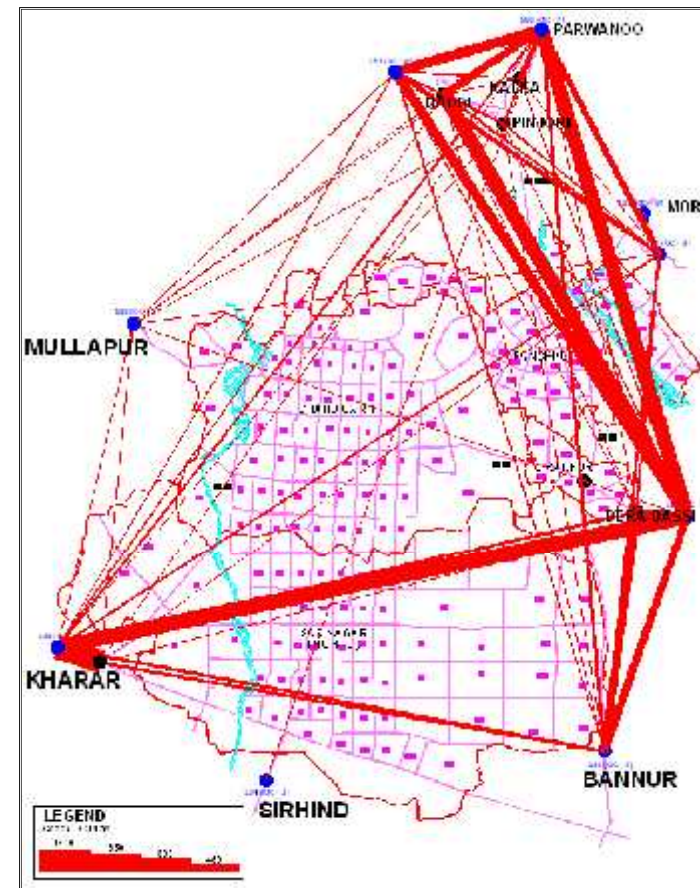


Figure 10



DESIRE PATTERNS OF INTER-CITY PASSENGERS
IN THE STUDY AREA (2008)

Figure 11



DESIRE PATTERN OF INTER-CITY GOODS TRAFFIC
IN THE STUDY AREA (2008)



- **Traffic composition** on roads indicates a very high share of two wheelers on most roads. The share of cars is also growing. On some of the roads, the share of two wheelers and cars in total traffic is more than 80% indicating inadequacy of the public transport system.
- The household travel surveys indicate **high ownership of cars** and two wheelers.
- 86% of households own at least one car or two-wheeler.
- At present, **modal split** in favour of public transport is only 16% of total motorised person trips which is much lower than that recommended in the National Urban Transport Policy. This is due to the high growth rate in personalized motor vehicles, This low modal share is likely to fall further unless an effective public transport system is put in place at the earliest.
- The city has the **highest car per capita** of motorised vehicles in the country. There were more than 6 lakh motor vehicles registered in Chandigarh in 2005. Two wheelers account for around 71.5% and cars/jeeps around 27% of the total vehicles registered.



HEAVY TRAFFIC JAMS ON THE CITY ROADS



7V CONCEPT NOT ADOPTED IN RURAL AREAS



CATTLE OBSTRUCTING TRAFFIC IN PERI URBAN AREAS



Railway line an obstruction to the smooth flow of traffic:

The railway line passing through the city is a hindrance to seamless connectivity in the absence of ROB's /RUB's Manimajra, Mauli Jagran, Panchkula Town located across the railway line and daily commuters are put to great inconvenience at railway crossings.



Railway line an obstruction to the smooth flow of traffic:



Pressure on Madhya Marg

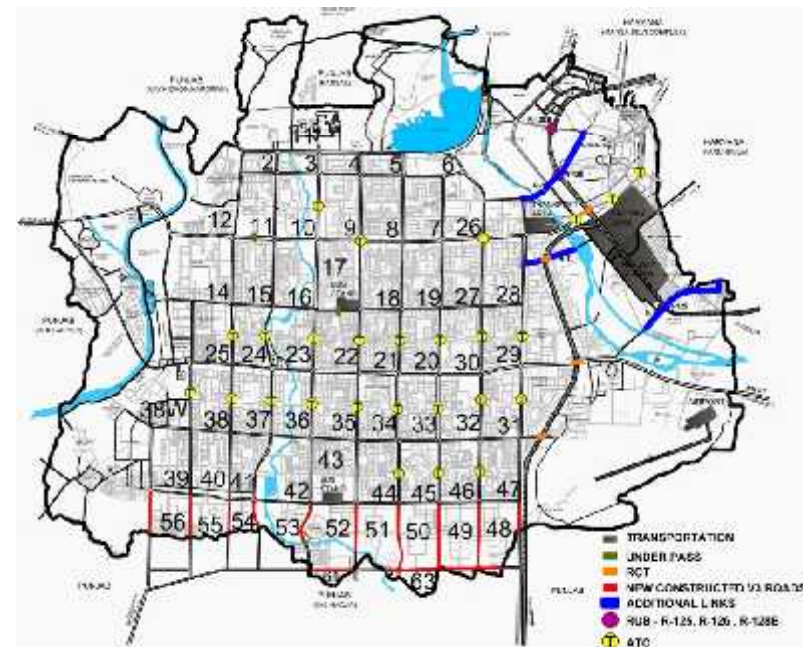
Madhya Marg with the high level bridge across the railway line and Sukhna Choe is at present the only encumbrance free direct approach to trans Sukhna Choe areas and as such attracts high traffic volumes which lead to high traffic congestion especially during working hours .

12.5 INTERVENTIONS / ADDITIONS MADE TO THE ROAD NETWORK OF THE ORIGINAL PLAN

Additions made to the road infrastructure

The following new roads have been planned /built to improve the connectivity of the areas mentioned above.

The Vertical V3s have been extended up to the interstate boundary to carve out additional sectors and connect with the V3's of Mohali which have replicated and synchronised the 7V network of Chandigarh .



PLAN P2

EXTENSION OF VERTICAL V3S TO THE INTER STATE BORDERS



Traffic surveys conducted by RITES for preparing the Comprehensive Mobility Plan indicate that

- Road network capacity in CUC is adequate for now but major travel corridors Madhya Marg, Udyog Path, Dakshin Marg are beginning to become congested.
- Many junctions particularly on Madhya Marg, Himalaya Marg, Dakshin Marg, Jan Marg, Purv Marg, Udyog Path etc have very high approach traffic volumes and most of the junctions with rotaries have exceeded their capacity. With expected growth of traffic, the situation at these junctions is likely to deteriorate fast.
- **Table 1** shows Vehicular Capacity ratios of various major roads in the study area. It can be seen from the table that in 2009 most of the roads had V/C ratios less than 1.0 except Madhya Marg and Udyog Path.
- Although Volume/capacity (VC) ratio on most of the roads are less than 1, these are fast approaching their full capacity. Some roads are already serving traffic volumes more than the capacity. The situation is likely to worsen considerably.
- Under these circumstances corridors like Vidya Path, Himalaya Marg, Madhya Marg, Udyog Path, Purv Marg, Vikas Marg and Dakshin Marg will get choked by personalized modes such as cars and two wheelers by 2021 and beyond. With most of the roads having already been widened to their full capacity, this indicates the need of augmenting road capacity by planning high capacity mass transport systems.

TABLE T1: TRAFFIC SURVEYS CONDUCTED BY RITES

Refer “Plan 1” on Page 5

Sr.No	Name of Road	Vehicle Capacity Ratio 2009
1	Vidya Path	0.8
2	Udyan Path	0.7
3	Jan Marg	0.8
4	Himalaya Marg	0.7
5	Sarovar Path	0.8
6	Sukhna Path	0.8
7	Chandi Marg	0.6
8	Purv Marg	0.8
9	Madhya Marg	1.2
10	Udyog Path	1.1
11	Dakshin Marg	0.8
12	Between Sec 10 and 15 (Panchkula)	0.8
13	Between Sec 6 and city center (Panchkula)	0.3
14	Near Sec 1 Shimla Road (Panchkula)	0.8
15	NH-21 (Near Tribune Chowk)	0.7



Route No. 1 (alternative route to Panchkula) - A 30.48.(100 ft.) wide road from Purv Marg to Sector 17/18 junction of Panchkula via Industrial Area Phase-I/CTU workshop/cremation ground has been constructed . The road width varies from 21.34 to 30.48 m within the Industrial Area Phase-I due to constraints of adjoining buildings. At present there is obstruction of railway level crossing.

Route No. 2 -A 60.96 m wide road (with 10.5 m wide metalled road and 5 meters wide slow carriageway on either side) from Hallomajra Chowk to Industrial Area in Panchkula via forest area/Industrial Area, Phase-III (Raipur Kalan), has been planned. At present 7m wide metalled road on either side of central verge has been constructed, however, the commuters are inconvenienced by a surface rail crossing (at Jn. 125) and the absence of pedestrian/cycle tracks.

Route No.3 – A 30.48 m wide road (with dual carriageway on either side) from Saint Kabir crossing (Chandi Path) to Fun Republic (Manimajra) via behind the Police Lines /railway crossing N126/Police Station (Manimajra)/Fun Republic has been planned/constructed. However, the RUB pedestrian paths/cycle tracks are yet to be constructed. The width of the road varies from 30.48m to 15.84m due to constraints posed by existing buildings in Manimajra along the road.

Widening of road carriageways beyond the ultimate prescribed in the road section to accommodate more cars. This has however been at the expense of the pedestrians and the cyclists and needs to be avoided in future .

Roundabouts replaced by ATC lights

The total replacement of roundabouts with ATC lights in a few cases such as the Press Chowk and the Transport Chowk along Madhya Marg has not been appreciated by the city residents who have a strong affinity with the city's beautifully landscaped roundabouts.

ATC lights have been installed at various junctions (Refer Plan 2)



ROUNDABOUTS WITH
TRAFFIC LIGHTS



ROUNDABOUTS REPLACED
BY TRAFFIC LIGHTS

Central verge constructed along V4 roads to segregate movement in opposite directions and to improve flow of traffic. This has however defeated the intended function of the V4 roads planned as slow carriageways.



CENTRAL VERGE ON V4

Closure of the central verge along V2/V3 roads between intersections to prevent crisis cross movement and accidents. This again has given priority to cars at the cost of the pedestrians, cyclists and other non motorised modes of mobility (such as cycle rickshaws and horse carts)



12.6 PLANNING FOR THE FUTURE – TRAFFIC AND TRANSPORT PLANNING

Vision

“One day people will come to Chandigarh to see the park wherein one does not see the automobile, where one sees the nature (a very impressive nature).”

Le Corbusier

The Chandigarh Master Plan 2031 vision for the traffic and transportation in Chandigarh is in sync with above quotation. The GOI's National Urban Transport Policy advocates people centric well contained city with efficient people-friendly transport system with minimum travel time & maximum safety and comfort that aims at reducing dependence on cars, with widespread use of non-motorised modes and mass rapid transit system.



MASTER PLAN'S VISION TO PROVIDE BETTER TRANSPORT FACILITIES

GOALS

- To improve connectivity and travel throughout the city and its region.
- To improve mobility within neighborhoods, wards, zones and satellite towns to address inner- and inter-city transportation needs to offer viable and reliable transportation options. At the same time the facility provided should be optimally used.
- Maintaining Chandigarh's outstanding universal appeal of a green, clean and spacious town which does not buckle under pressure.
- Adopting best practices -Use of green and energy efficient transportation modes which cause least damage to the environment.
- Sixty to seventy percent of total trips should be made by public transport, with one (or two) modal changes.
- Maximum population should be served by public transport.
- Trip origins and destination to be within 500m of public transport terminal and stops.
- Safe and convenient pedestrian/NMV facilities throughout the urban area.
- Safe bicycle lanes shall be provided to reach the public transport system, with secure bicycle parking provided for those who do not have access to public transport within walking distance.
- Integrated urban land use and transport system resulting in efficient and sustainable mobility for everyone and provide greater accessibility to opportunities (e.g. employment, education, health, goods, and other services).



REGIONAL CONTEXT

Need for Chandigarh Interstate Metropolitan Regional Plan to guide the traffic and transportation of the region and the city

High Inter City traffic expected within Chandigarh

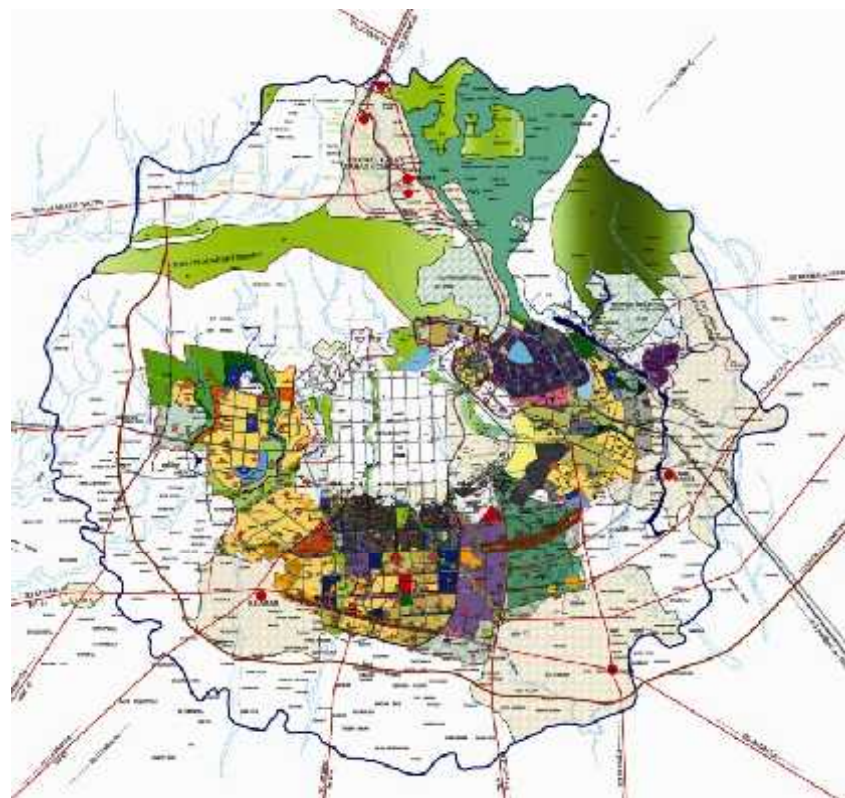
In view of the developments proposed by the neighbouring states the adjoining region around is targeted for high growth in the coming decades. The projected population for Chandigarh and other towns as per their development plans is expected to grow from 21 lakh in 2009 to 59 lakh in 2041. Many new work centres, industries, sports, recreational and cultural facilities are being planned across the region which will result in new travel corridors.

An Interstate Regional Traffic and Transportation Plan needs to be prepared in the over-all context of an Inter-State Metropolitan Region which spells out the augmentation and strengthening of the existing infrastructure, ensuring proper connectivity to the landlocked city .

Observations on traffic and transportation proposals by the neighbouring states in the region :

Independent transportation planning has been undertaken by the neighbouring states under the respective regional plans (Refer Chapter 2 on Regional Context). Chandigarh Administration engaged RITES to prepare the Comprehensive Mobility Plan for the Chandigarh Urban Complex. All the three need to be urgently synchronized under the ambit of an Interstate Regional Transportation Plan to provide seamless connectivity and prevent traffic congestion and bottlenecks.

PLAN P3 – Development on the periphery of Chandigarh



Punjab's GMADA Regional Plan provides for the following:

- GMADA Expressway connecting the agglomeration of SAS Nagar and the townships of Landran, Banur, Kharar, in Punjab and Baddi in Himachal Pradesh.
- Ring road between Sector 72 and 76 along Aero City road.
- New linkages i.e. MDRB, PR4, PR5 connecting Mullanpur township with Chandigarh's Madhya Marg, Dakshin Marg and Vikas Marg



RECOMMENDATION

Creation of by-pass around Chandigarh to prevent unwanted through traffic

There is need for creating a ring road /by-pass around Chandigarh to prevent unwanted through traffic within the Chandigarh. Traffic which is destined beyond Chandigarh on either side should be allowed to bypass without entering the city. In order to achieve the aforesaid, it is necessary that suitable bypasses are constructed. However in view of the non availability of land within Chandigarh to make provision for the same, the matter needs to be addressed at the interstate level.

The State Government of Panjab has stated that the GMADA Expressway and ring roads proposed in the GMADA Regional plan will serve the purpose due to the ROW's and the number of lanes proposed. Both the roads however are at a considerable distance from Chandigarh and these will also pass through busy areas of existing towns with continuous local and goods movement obstructing traffic flow which will act as a deterrent rather than facilitate diversion of unwanted through traffic from Chandigarh.

To enable the GMADA Expressway to effectively divert traffic away from Chandigarh, the possibility of enabling seamless movement through grade separation from the the local traffic needs to be considered.

Grade separation of the road between Sector 72 and 75 of Mohali christened Aero City Road to fulfil the functional requirements of a by-pass is also recommended to ensure uninterrupted connection to the International Airport.

Similar bye pass/Ring Road should also be planned by the neighbouring town of Panchkula on priority. The responsibility of constructing the ring road shall be that of the respective state through which it passes.

In the absence of ring roads, the Chandigarh city roads, which provide the shortest travel distance between towns, are likely to be put under extreme pressure to the detriment of the city's environment, and quality of life.

Additional road connectivity with the neighbouring towns of Punjab and Haryana

Additional road connectivity with Panchkula

While the city of Chandigarh is well connected with the town of SAS Nagar through the sectoral grid roads, the township of Panchkula is only connected through the Madhya Marg. **Additional road connectivity has been proposed along Route No. 2.**

Additional road connectivity with Mullanpur Township

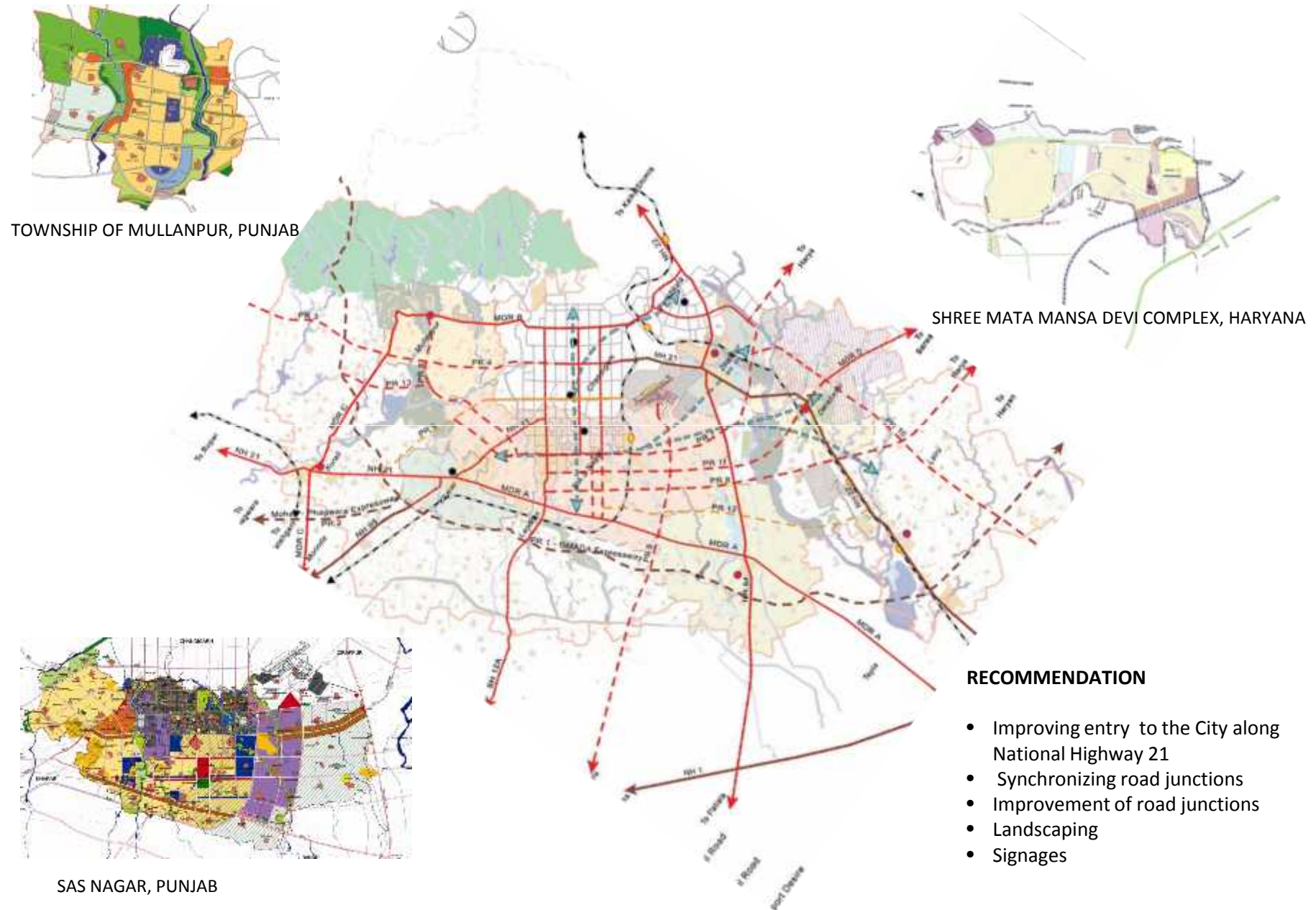
With the upcoming Mullanpur Township in Punjab adjoining the interstate boundary of Chandigarh, there is need to provide inter city connectivity to facilitate the residents of both the towns. Accordingly, the MDRB, PR4, PR5 roads of the Mullanpur Township are being connected with the roads of the Chandigarh, subject to feasibility on ground, and will provide new linkages facilitating residents of both the towns.

The Chandigarh Administration is already widening the PGI to Mullanpur Road as an extension of the Madhya Marg with a three lane dual carriageway together with a slow carriageway. High level bridge is also being planned across the Patilai ki Rao. The alignment of the overhead metro along the road is also being factored in. The proposal needs to be synchronized with the MDRB of the GMADA Regional Plan, Punjab. There is also a need to improve the intersection of the two roads which meet at the interstate boundary. Within the Chandigarh jurisdiction a stretch of 600 meters from the high level bridge at Khudda Jassu upto the Jayanti Devi Temple has constraints of widening beyond two lane dual carriageway due to developments of the villages on either side of the road. It is therefore proposed that to enable proper development, essential land required for the purpose be acquired in Khuda Lahora.

However for access from the north east near the Capitol Complex, housing the highest offices of the Legislative, Executive and the Judiciary, and the lake, the heritage, environment, security and practical issues of traffic must be taken into consideration .



PLAN P4- DEVELOPMENTS BY THE STATE OF PUNJAB AND HARYANA AROUND CHANDIGARH





Proposals of CMP 2031 - Improving entry to the city along National Highway 21 and Chandigarh-Mullanpur Road and Chandigarh- Kharar Road through interstate coordination



IMPROVEMENT OF ZIRAKPUR JUNCTION



MATTER TO BE TAKEN UP WITH THE STATE GOVERNMENT OF PUNJAB



IMPROVEMENT AND SYNCRONISATION AT MULLANPUR JUNCTION

RECOMMENDATION

- Organised pedestrian and cycle movement
- Space for feeder transport services – auto rikshaws, bicycle rikshaws,
- Landscaping
- Signages



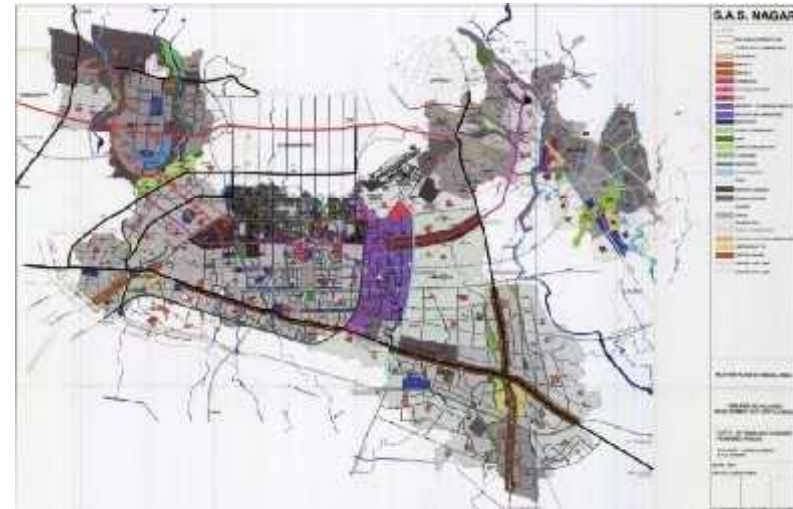
P5-ROAD NETWORK PROPOSED IN GMADA REGIONAL PLAN AND ITS CONNECTIVITY WITH CHANDIGARH



PLAN P5 - GMADA REGIONAL PLAN

Ribbon Development

The entry to Chandigarh is through National /State Highways that cut across the towns of the neighboring states. Smooth and unhindered entry into the city is required. The master plans of different townships notified by the State government indicate mixed use ribbon development along major travel corridors. In the absence of service lanes, the heavy traffic generating commercial activities will hinder the smooth flow of traffic into Chandigarh. To enable unhindered and comfortable entry into the city, direct opening of buildings along highways not recommended.



MIXED USED DEVELOPMENT

Recommendations - grade separations, Intersection improvements. Direct opening of buildings on highways not recommended.



ENVIRONMENTAL CONCERNS W.R.T TRAFFIC IN THE ECO SENSITIVE AREAS

The township of Shree Mata Mansa Devi Complex is being developed in Haryana on the north eastern side of the city abutting the Sukhna Lake, Sukhna Forest and in close proximity to the Sukhna Wild Life Sanctuary.

The Naya Gaon Township is being developed on the north of the Capitol Complex at the foot of the Shivalik Hills. The township abuts the Sukhna Wild Life Sanctuary.

Both the townships have been connected to Chandigarh through existing / proposed roads. The 60m. wide road of Shree Mata Mansa Devi Complex connects the 30 m wide road of Chandigarh at the regulator end which further along the Sukhna Choe skirting Kishangarh to enter Chandigarh via the Golf Course.

The Naya Gaon Township is accessed through the 16 ft. wide link road to village Naya Gaon abutting Rajindra Park leading to Khuda Ali Sher and Sukhna Wild Life Sanctuary.

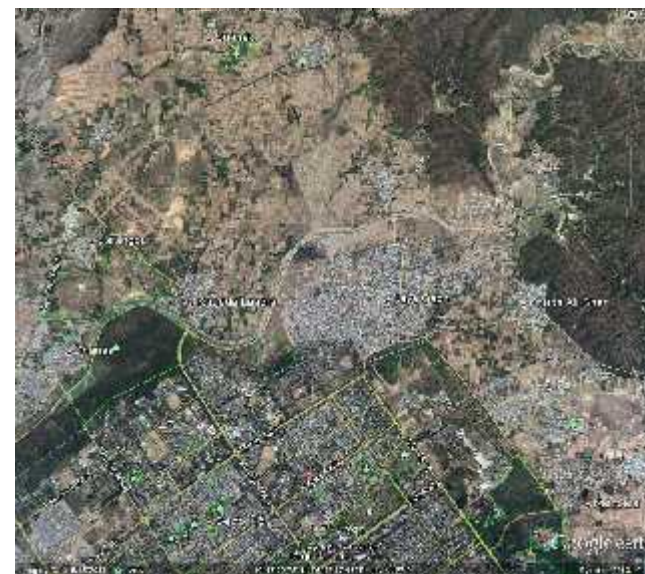
Though both the towns are being projected as low density residential towns, the work centers and social infrastructure being proposed will generate considerable traffic movement in the highly eco sensitive area.

As per directions of the Ministry of Environment & Forests, GOI, the area needs to be notified as Eco Sensitive Zone. The traffic volumes and movements need to be carefully regulated so as not to cause air and noise pollution which would disturb the flora and fauna of the Sukhna Wild Life Sanctuary. It is desirable that only limited traffic be allowed on these connecting roads as per guidelines of the Eco Sensitive Zone. (also see Chapter 17 on Ecology and Environment).

However for access from north east near the Capitol Complex, housing the highest offices of the Legislative, Executive and the Judiciary, and the lake, Sukhna Wildlife Sanctuary, the heritage, environment, security and practical issues of traffic must be taken into consideration.



LOCATION OF SHREE MATA MANSA DEVI COMPLEX (GOOGLE MAP)



LOCATION OF NAYA GAON TOWNSHIP (GOOGLE MAP)



ENVIRONMENTAL CONCERNS W.R.T TRAFFIC IN THE ECO SENSITIVE AREAS

The township of Shree Mata Mansa Devi Complex is being developed in Haryana on the north eastern side of the city abutting the Sukhna Lake, Sukhna forest and in close proximity to the Sukhna Wild Life Sanctuary.

The Naya Gaon Township is being developed on the north of the Capitol Complex at the foot of the Shivalik Hills. The township abuts the Sukhna Wild Life Sanctuary.

Both the townships have been connected to Chandigarh through existing / proposed roads. The 60m. wide road of Shree Mata Mansa Devi Complex connects the 30 m wide road of Chandigarh at the regulator end which further along the Sukhna Choe skirting Kishangarh to enter Chandigarh via the Golf Course.

The Naya Gaon Township is accessed through the 16 ft. wide link road to village Naya Gaon abutting Rajindra Park leading to Khuda Ali Sher and Sukhna Wild Life Sanctuary.

Though both the towns are being projected as low density residential towns, the work centers and social infrastructure being proposed will generate considerable traffic movement in the highly eco sensitive area.

As per directions of the Ministry of Environment & Forests, GOI, the area needs to be notified as Eco Sensitive Zone. The traffic volumes and movements need to be carefully regulated so as not to cause air and noise pollution which would disturb the flora and fauna of the Sukhna Wild Life Sanctuary. It is desirable that only limited traffic be allowed on these connecting roads as per guidelines of the Eco Sensitive Zone. (also see Chapter 17 on Ecology and Environment).

However for access from north east near the Capitol Complex, housing the highest offices of the Legislative, Executive and the Judiciary, and the lake, Sukhna Wildlife Sanctuary, the heritage, environment, security and practical issues of traffic must be taken into consideration.



LOCATION OF SHREE MATA MANSA DEVI COMPLEX (GOOGLE MAP)



LOCATION OF NAYA GAON TOWNSHIP (GOOGLE MAP)



IMPROVING CONNECTIVITY WITH CHANDIGARH AIRPORT UPGRADED TO AN INTERNATIONAL AIRPORT

At present, Chandigarh Airport has direct access from National Highway-21 which passes through the city. Land identified for expansion of the airport as an international airport falls within the State of Punjab.

The expansion plan envisages retention of the existing runway (in Chandigarh) and development of a new terminal in the additional land provided in Mohali by Government of Punjab (approximately 300 acres). The use to which the existing terminal would be put is not clear.

None of the access options for Chandigarh being considered for the expanded airport compares with the access currently enjoyed by Chandigarh's residents. The new terminal should be made accessible from Chandigarh by an underground tunnel if feasible, connecting the existing road to the airport with the new terminal building to the Chandigarh City. This is the most suited option for Chandigarh.

The other two options i.e. connectivity from Purv Marg near Sector 48, and connectivity from the Zirakpur side should also be implemented to enable easy accessibility from all directions, since the airport will also serve the larger northern region including the State of Himachal Pradesh.

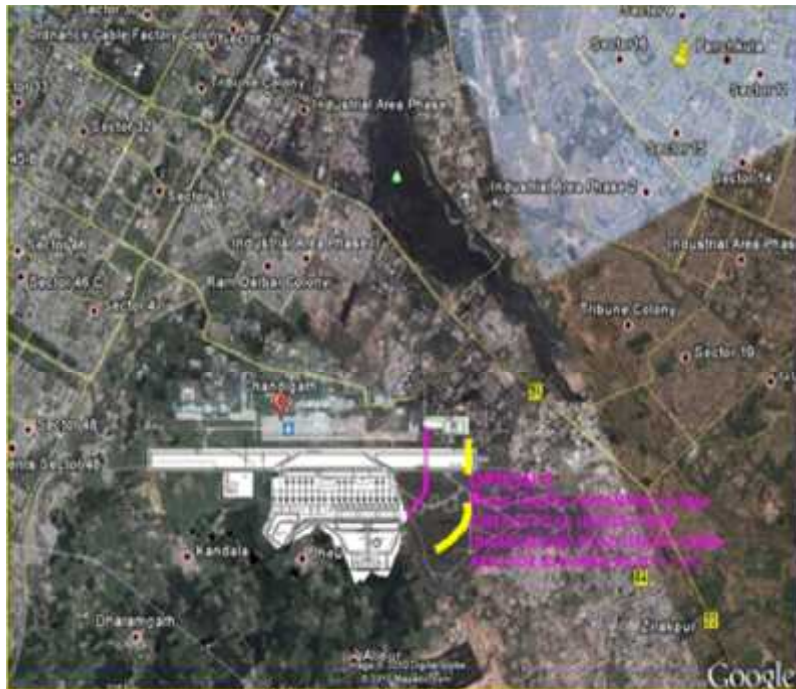
Chandigarh Administration has taken up the matter with the High Powered Inter-State Coordination Committee constituted by the GOI.



PLAN P6: UPGRADATION OF CHANDIGARH AIRPORT TO INTERNATIONAL AIRPORT.



PLAN P7 : PROPOSALS TO IMPROVE THE CONNECTIVITY TO THE AIRPORT



PLAN 1 - UNDERPASS ACROSS THE RUNWAY (GOOGLE MAP)



PLAN 2 - APPROACH FROM ZIRAKPUR SIDE (GOOGLE MAP)



PLAN 3 – APPROACH FROM PURAV MARG SECTOR 48 SIDE (GOOGLE MAP)



COMPREHENSIVE MOBILITY PLAN FOR CHANDIGARH URBAN COMPLEX (CUC)

In the absence of an Inter-State Regional Plan and with a view to holistically address the traffic and transportation problems the Chandigarh Administration took the initiative of getting a Comprehensive Mobility Plan for the Chandigarh Urban Complex prepared by engaging M/s. RITES. Chandigarh, Panchkula, Mohali and Zirakpur formed the study area with transport linkages with the towns of Kharar, Derabassi, Pinjore, Kalka, Alipur Kot Behlana, Parwanu and Baddi.

Integrated Multimodal Mass Transport

RITES has proposed an integrated multi-modal mass transport system consisting of metro rail, BRT, commuter rail system and normal city bus system for the Chandigarh Urban Complex and its linkages to nearby towns to meet the anticipated commuter travel needs.

Within Chandigarh Urban Complex

- Mass Transport System
 - Metro System
 - Bus Rapid Transport (BRT) System
- City Bus System
 - Augmentation of Bus Fleet
 - Bus Terminals
 - Bus Shelters
 - Additional Depots
- Inter-city Bus Terminal
- Road Infrastructure
- Parking Facilities
- Inter-modal Interchanges
- Integrated Freight Complexes

Outside Chandigarh Urban Complex

- Road Infrastructure
 - Bypasses
 - Road widening
- Commuter Rail System
- Bus Rapid Transit System

Heritage considerations in traffic and transportation planning

With a view to preserve Chandigarh's heritage, a conscious decision Chandigarh Administration has decided that the metro within the sectoral grid will be underground despite the substantially higher cost.

The basic objective of the Comprehensive Mobility Plan is to create an efficient, cost effective and extensive network of public transport providing comfortable, convenient and affordable means of transport to the maximum number of commuters.

The key components of this mass transport system are detailed below:

MASS RAPID TRANSPORT SYSTEM

METRO

M/s RITES has proposed a multimodal mass rapid transport system covering the cities of Chandigarh, Panchkula and Mohali with 144.2 kms of BRTS and 64.3 kms of Metro to be implemented in two phases. Out of the total length of 64.38 kms of the metro, 44.8 kms. fell in the Chandigarh area, 6.5 kms in Haryana (Panchkula) and 13 kms in Punjab (Mohali).

Subsequently it was decided to implement 25 kms. of the metro in the first phase. Out of the two corridors proposed one of 19 km connected the Sarangpur to Sector 15 Panchkula via Chandigarh Railway Station and the second connected the Capitol Complex to Sector 75 Mohali spanning 14 kms.

On the request of the Punjab and Haryana Government, it was decided to extend the east- west corridor upto Mullanpur (Punjab) at the western end and upto Sector 20 in Panchkula (Haryana) on the eastern end.

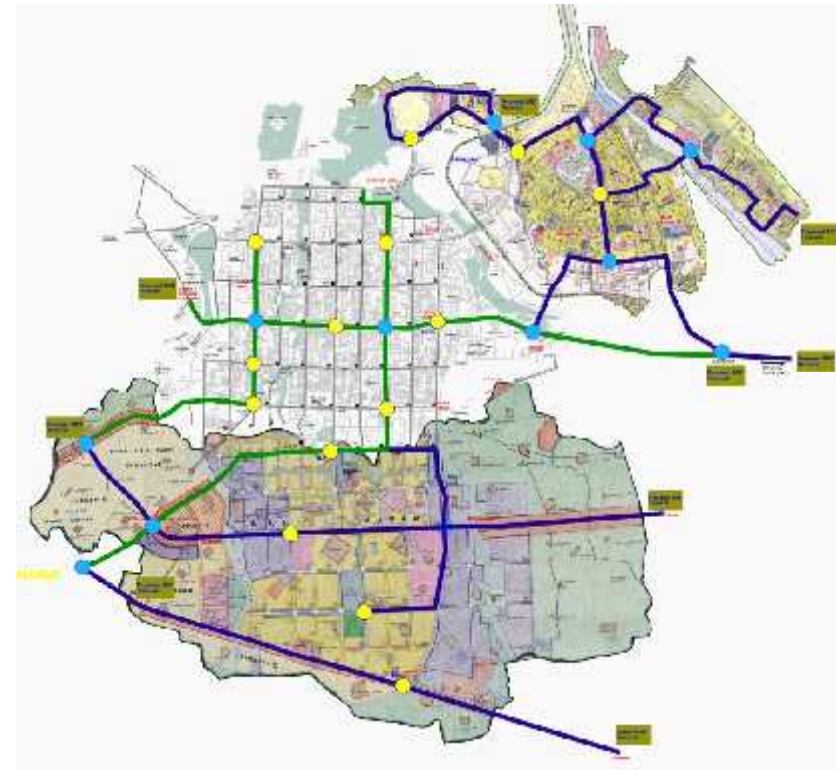
The Delhi Metro Rail Corporation was hired as consultant to prepare the detailed project report for the first phase of the Chandigarh Metro Rail Project network.



PLAN P8 : Comprehensive Mobility Plan by RITES – MRTS and BRTS corridors

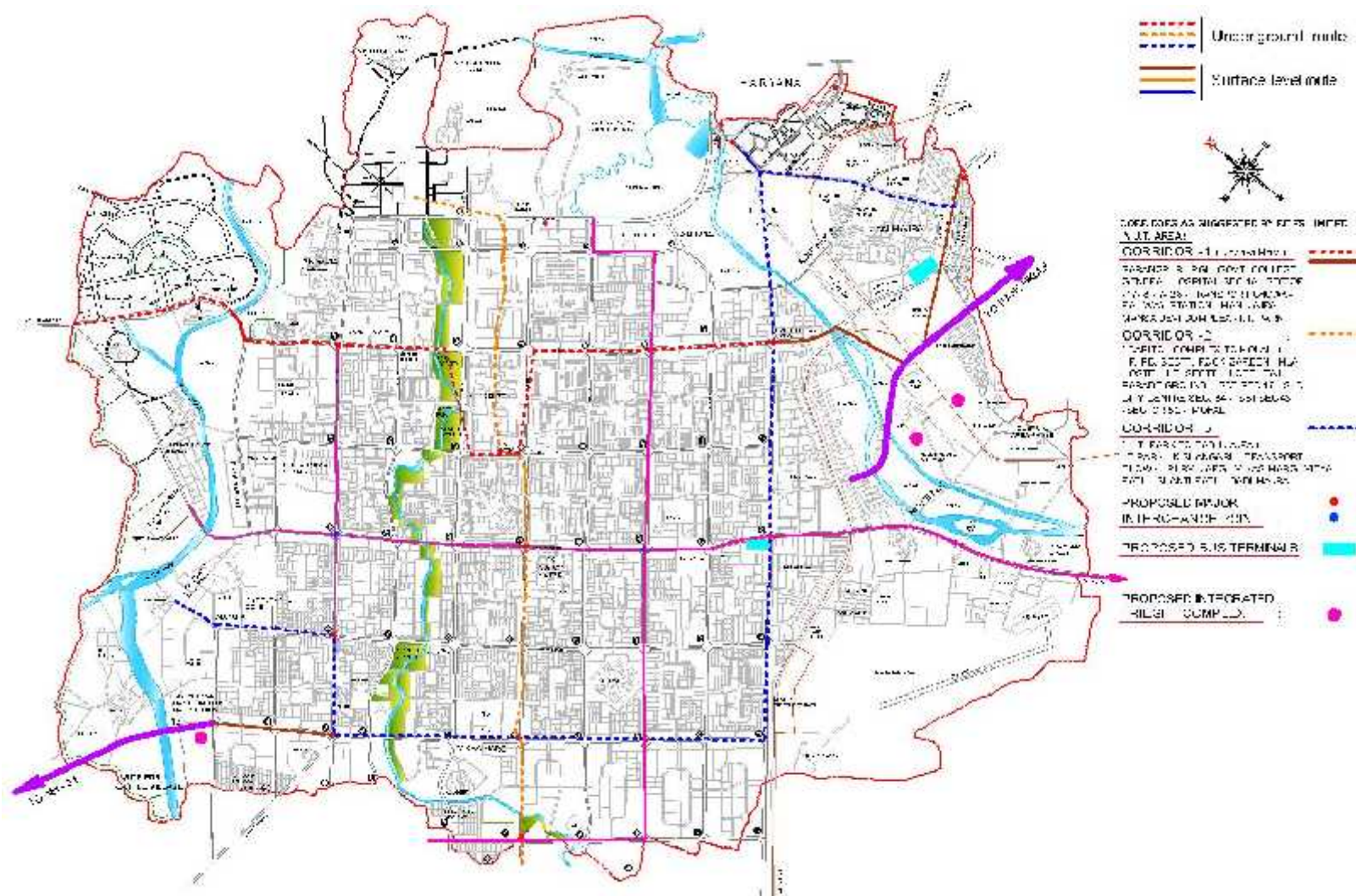


MRTS CORRIDORS BY RITES



BRTS CORRIDORS BY RITES

PLAN P9 : PLAN SHOWING MRTS, BRTS CORRIDORS & ADDITIONAL LINKS PROPOSED BY RITES





Detailed project report for the first phase of the Chandigarh metro rail network by DMRC :

The DPR prepared by DMRC for the Phase -1 of the Chandigarh Metro Rail Project Network provide for :

- North South Corridor - Capitol Complex to Gurudwara Singh Shaheeda, Mohali.
- East West Corridor - Transport Terminus Mullanpur to Grain Market, Panchkula.

TABLE 2 - Route length (end to end of station)

Description	Elevated (km)	Underground (km)	Total (km)
Line 1 – Capitol to Gurudwara Singh Shaheeda	4.427	8.070	12.497
Line – 2 Transport Terminus to Grain Market	19.041	6.035	25.076
Total	23.468	14.105	37.573

TABLE 3 - Number of stations

Description	Elevated	Underground
Line 1 – Capitol to Gurudwara Singh Shaheeda	4	6
Line 2 – Transport Terminus to Grain Market	15	5
Total	19	11

North South Corridor - Capitol Complex to Gurudwara Singh Shaheeda, Mohali (Corridor 1)

The projected number of passengers to be carried by this line are 1.43 lakh, 2.05 lakh, 3.20 lakh and 4.67 lakh in the years 2016, 2021, 2031 and 2041 respectively.

- This corridor will provide metro connectivity to the High Court, Secretariat, institutional buildings along Jan Marg including the Chandigarh UT Secretariat , Punjab Mini Secretariat, etc along Jan Marg ,tourism places such as Rock Garden and Rose Garden, City Centre Sector 17, Interstate Bus Terminus of Sector 17 and Sector 43, Sectors 9, 21, 22, 34, 35, 43, 44, 51, 52 of Chandigarh and Sectors 61, 62, 68, 69 & 70 of Mohali.
- The corridor will intersect with the EW Corridor at Matka Chowk Sector 9 enabling connectivity with Mullanpur in Punjab and Panchkula in Haryana.
- Integration of the corridor with the bus system will be through the bus terminus at sectors 17 and 43.
- Total 10 stations have been proposed on this corridor; out of these stations 6 stations are underground and remaining 4 are elevated. The entire length of this corridor in the Mohali area is proposed to be elevated.
- Future extension of the corridor to Aero City in Mohali is also being examined .



East West Corridor - Transport Terminus Mullanpur to Grain Market, Panchkula (Corridor 2)

This will extend from Transport Terminal –Mullanpur I & II – Sarangpur – Khuda Lahora – PGI – General Hospital – Sector 9 – Sector 7 – Sector 26 – Timber Market – Chandigarh Railway station – Housing Board Chowk – MDC Panchkula – HUDA Office Complex – City Center – Bus Station (Panchkula) – District Center – Village Raili – Grain Market. The number of passengers to be carried by this line are 1.48 lakh, 2.10 lakh, 3.90 lakh and 6.58 lakh in the years 2016, 2021, 2031, 2041 respectively.

This corridor will provide metro connectivity to the proposed new residential cum commercial development in Mullanpur and Sarangpur Area Chandigarh.

The corridor integrates with other transport modes such as Panchkula Bus Terminus and Chandigarh Railway station to the sectors 14, 11, 12, 10, 16, 9, 18, 8, 7, 19, 26, 27, 28, Manimajra, Rajeev Vihar and Mauli Jagran Complex, Chandigarh.

This corridor provides metro connectivity to the Panjab University, Punjab Engineering College, PGI Hospital, City Museum, market complexes, Wholesale Fruit and Grain market and Timber Market, Sector 26.

This corridor is proposed as elevated in the area of Mullanpur, Sarangpur and Panchkula.

There are a total of 20 stations on this corridor out of which 5 are underground and the remaining 15 are elevated.

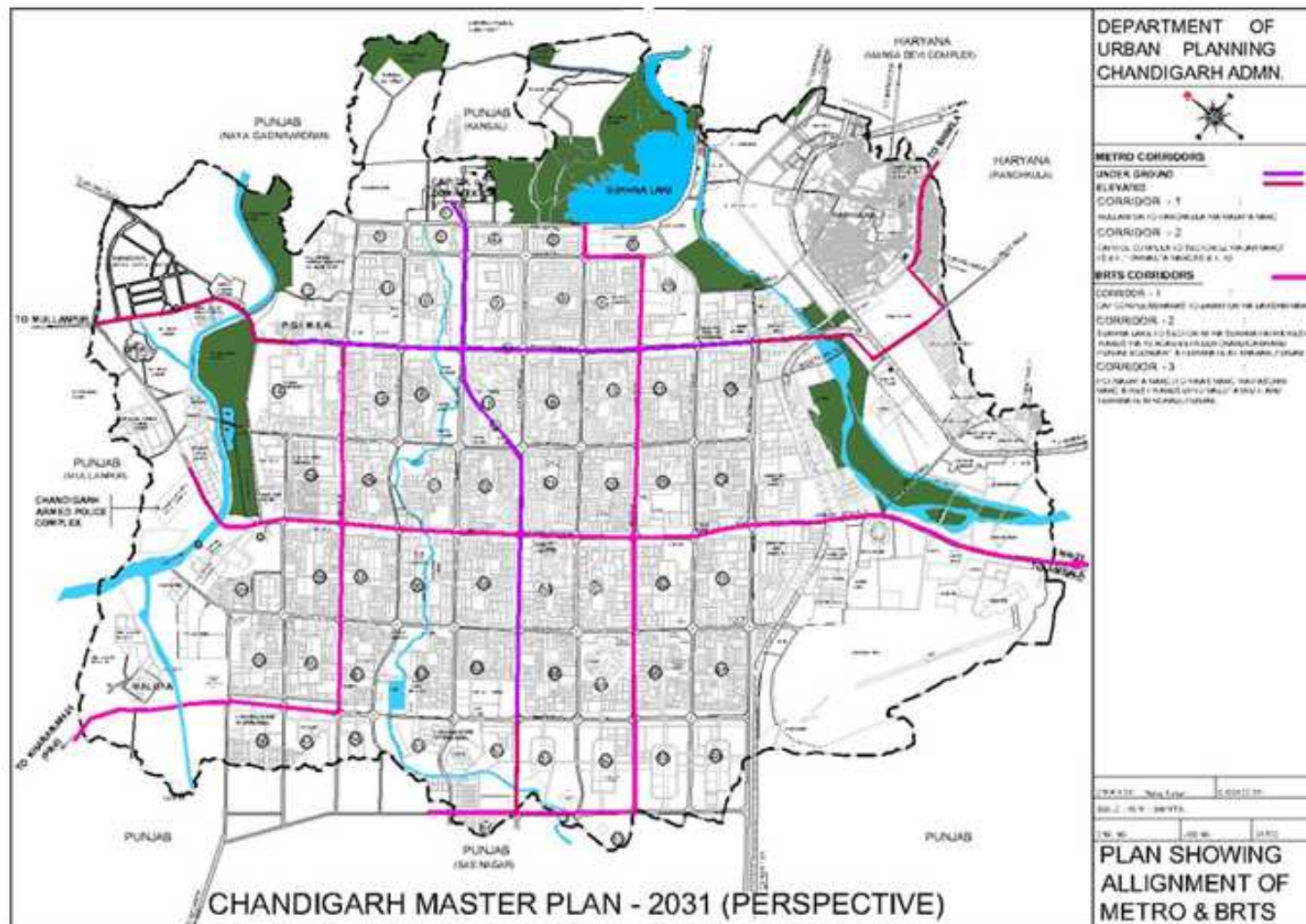
Construction of Metro will meet the requirements of Metro Act

TABLE T4 : Forecast of METRO ridership by DMRC

Year	Name of Corridor	Chandigarh	Punjab	Haryana	Total	PHPDT
2018	Corridor I	114876	53309		168185	7007
	Corridor II	118267	14645	40804	173716	6711
2021	Corridor I	134200	71000		205200	8128
	Corridor II	143000	19500	48300	210800	8597
2031	Corridor I	210300	110100		320400	12280
	Corridor II	268600	28900	92800	390300	22349
2041	Corridor I	3030000	164800		467800	17383
	Corridor II	462400	34900	161000	658300	35637



PLAN 10 - FIRST PHASE OF METRO PROPOSED BY DMRC FOR METRO AND BRTS CORRIDORS PROPOSED BY RITES WITHIN CHANDIGARH





Major interchange node – Matka Chowk

Chainage	9017.628m
Inter-station Distance	789.516m
Rail Level	334.600m
Platform Depth from Ground	15.875m
Location	Located under the intersection called Matka Chowk of Jan Marg & Madhya Marg, the center of the station is directly beneath Matka Chowk.
Entry / Exit Stairs	There are five entry structures and all are located on green belts flanking both the roads
Catchment Area	Rose Garden, Taj Hotel, City Museum, Sectors 9, 10, 16 & 17.



Rose Garden on the right



Buildings towards east of station



Road from Capitol Complex

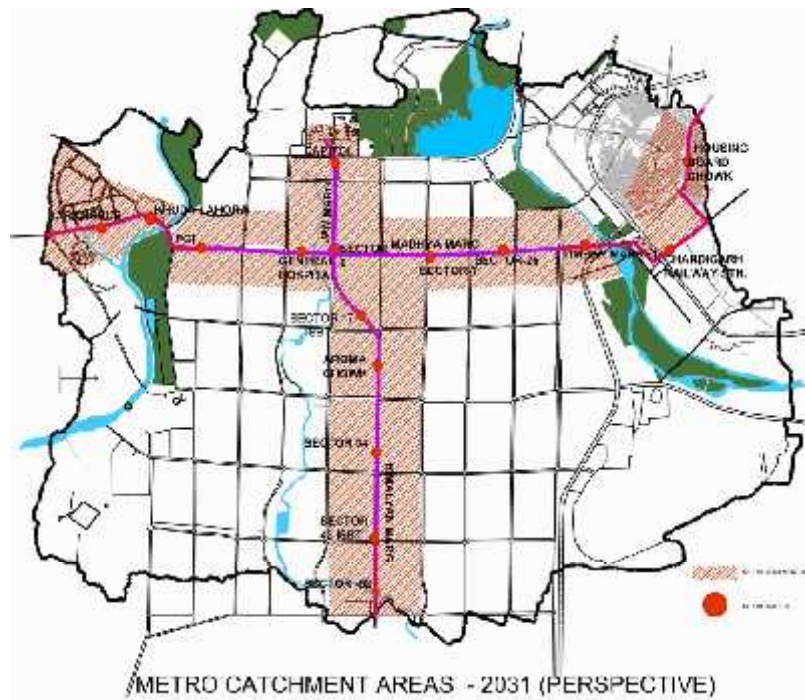
Typical underground station

Chainage	8228.112m
Inter-station Distance	985.421m
Rail Level	335.003m
Platform Depth from Ground	14.660m
Location	Located under Madhya Marg to the South East of Junction 18 (intersection of Madhya Marg & Udyan Path)
Entry / Exit Stairs	On south eastern end of the station the entry structures shall be placed on the green belt as per the proposed road section. On the other end the structures are aligned with the intersection to facilitate easy access.
Catchment Area	General Hospital, Home Science College, Govt. College for Girls, Ramakrishna Ashram



Himalaya Marg at station location. Sidewalks (indicating entry Structure locations) towards General Hospital





Catchment area shows the area that will be most conveniently served by the Metro



CAPITOL (UG & SIDE)



SECTOR 17 ISBT (U/G & ISLAND)



AROMA CHOWK(U/G & ISLAND)



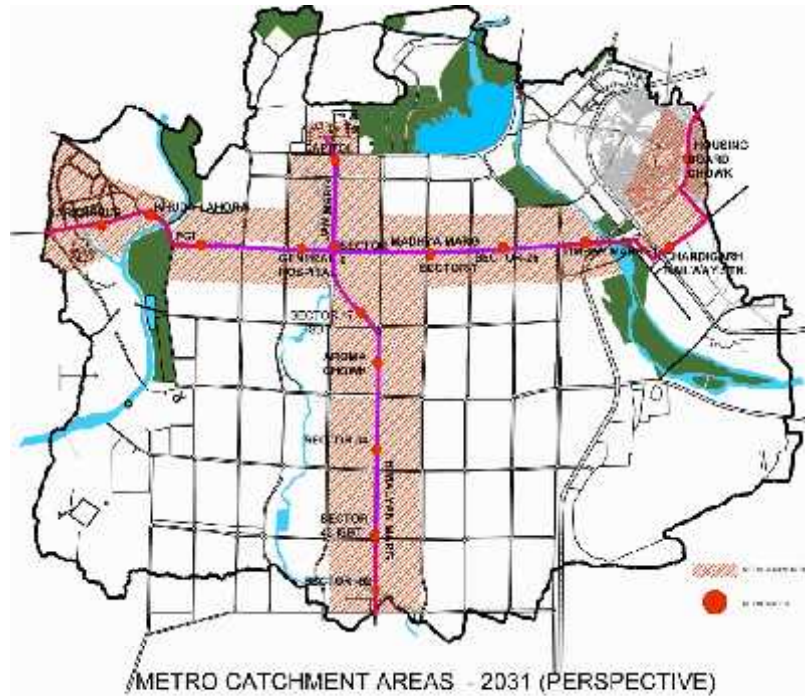
Sector 34 (U/G & ISLAND)



SECTOR 43
(U/G & SIDE)



SECTOR 52(ELEVATED)



Catchment area shows the area that will be most conveniently served by the Metro



SARANGPUR (ELEVATED)



KHUDA LAHORA (ELEVATED)



PGI (UG & ISLAND)



GENERAL HOSPITAL (UG & SIDE)



SECTOR 7 (U/G & ISLAND)



SECTOR 26
(U/G & ISLAND)



TIMBER MARKET
(ELEVATED)



RAILWAY STATION
(ELEVATED)



HOUSING BOARD
STAFF (ELEVATED)



JUSTIFICATION OF METRO SYSTEM BY DMRC

According to DMRC, since the Peak Hour Peak Direction Traffic in the case of Chandigarh metro is more than 15,000 in 2031 and it will be in the range of 50,000 in 2041, a light capacity metro system is recommended to keep down the capital and operating costs.

THE OBSERVATIONS OF THE MASTER PLAN COMMITTEE ON THE MULTI MODAL MASS TRANSPORT SYSTEM ARE AS UNDER:

- Public transport system is wanting in all the three towns: While Chandigarh is gradually improving its local bus transport system by increasing its fleet and services, the other towns have no public transport system. The residents of the cities depend heavily on private vehicles or on para transports- auto rickshaws, and taxis for inter city movement or on the limited service of the CTU. Cycle rickshaws are extensively used for short distance intra city travel in the cities.
- While the detailed planning of the first phase of the metro corridors is underway, no further planning has been done for the BRTS. Since the metro is to ply only on two corridors, it will not serve much purpose for the city, unless the BRTS and local feeder buses expected to handle the major share of public transport are put in place. There is thus a need to expedite implementation of the BRTS and improve the local bus services.
- With the present population of 10.5 lakhs for the entire UT, Chandigarh does not independently qualify for a metro for which a minimum population of 20 Lakhs has been recently mandated by the Government of India. (Earlier the minimum requirement was a population of 40 lakhs). The sharp decline in the UT's growth rate from 40 % to 17% also does not make the proposition viable even by 2031 as the

projected population for the Chandigarh Master Plan by that year is only 16 lakhs.

- Viewed from the regional perspective, however, and the requirements of not only the tricity but also of the metropolitan region, the proposition seems viable as it will take care of large volumes of intercity traffic. The present population of the CUC makes the proposition viable right away.

THE CONCERNS

Expecting Chandigarh's residents which is so heavily dependent on private vehicles to switch over to public transport together with the short distances of travel within the city will be a challenge. Due to high percentage of short intra-city trips the metro is unlikely to wean people away from the private vehicles and largely cater to inter-city commuters. For intra-city mobility the mobility plan needs to give greater attention to incentivizing pedestrians and cycle use combined with integration of para-statal transport like cycle and auto rickshaws.

APPROVAL OF CHANDIGARH HERITAGE CONSERVATION COMMITTEE

Keeping the metro underground within the sectoral grid is based on heritage considerations. However since both the proposed corridors are along Jan Marg and Madhya Marg have been approved for heritage status all interventions along the corridors, including the ancillary infrastructure for the metro shall comply with heritage consideration and approved by the Chandigarh Heritage Conservation Committee.

Redensification of the landuse along MRTS /metro corridors is generally recommended in sites, however in view of the heritage status the same is not recommended along these corridors. Moreover these corridors already have intense commercial /institutional development with high FAR along them and as such are the most appropriate areas for the corridors.



Strengthening the Public Transport System

Rites has proposed a modal share of 70% for public transport by 2041 from the present 16 %. This time line should be reduced to ensure that major load of the traffic should be taken by public transport / public transport system should be developed in such a way that major portion of the traffic use them. Expediting the implementation of the MRTS, BRTS and improvement of local bus system is recommended.

This is necessary for reducing the volume of traffic on the roads and maintaining the quality of life for the city residents and giving priority to pedestrians and cyclists .

Metro Stations

In segments where the metro is to be elevated, the elevated stations and elevated concourse have been proposed over the roads in most of locations to minimize land acquisition. To keep the rail level low, it is proposed not to take the via duct through the station, thus a separate structure configuration has been planned.

Planning and design criteria for stations

- Average inter station distance of 1.2 km has been tried to be maintained, however the same varies from 0.692 km to 2.18 km depending upon the site, operational and traffic constraints.
- Switch Over Ramps (SOR) have been planned at the junction of the elevated and the underground metro station.
- Provision for adequate parking of feeder services, public private and para transport and proper access by the pedestrians and cyclists will be required.
- The underground stations (island platform) applicable to Sector 17 ISBT, Aroma Chowk and Sector 34 of the NS corridor and PGI, Sector 7 & 26 stations on EW corridor, the underground stations follow a typical design, of a three level station with entrances and ventilation shafts at the ground level, a concourse with ticketing and AFCs at the mezzanine level and platforms at the lowest level. Platforms are 12 meter wide with 2 sets of stair/escalator banks leading to either end of the station. A lift is planned in the center.

- **Typical Elevated Section** - applicable to Sector 52, 60, 72 and Gurudwara Singh Shaheeda on NS corridor and the first 5 & last 10 stations of EW corridor: the station is generally located on the road median, and a 140~m long three level structure. Passenger area on concourse is spread throughout the length of the station, with staircases leading from either side of the road.
- **Underground Station (side platform)** – applicable to Capitol Complex & Sector 43 stations on the NS corridor & General Hospital Station on EW corridor: these underground stations follow a typical design, for a three level station with entrances and ventilation shafts at the ground level, a concourse with ticketing and AFCs at the mezzanine level and finally platforms at the lowest level.
- **Sector 9/17 station** - Sector 9/17 is an underground interchange station. The NS corridor travels under the Jan Marg and the EW corridor passes under the NS corridor and travels along Madhya Marg. The station has four levels with ground, mezzanine (concourse) and two platform levels.
- The station is located at Matka Chowk which is the intersection between Jan Marg and Madhya Marg. Four entrances have been planned to provide easy access to the station for all passengers, from each side of the intersection, without having to cross vehicular traffic on these busy roads.

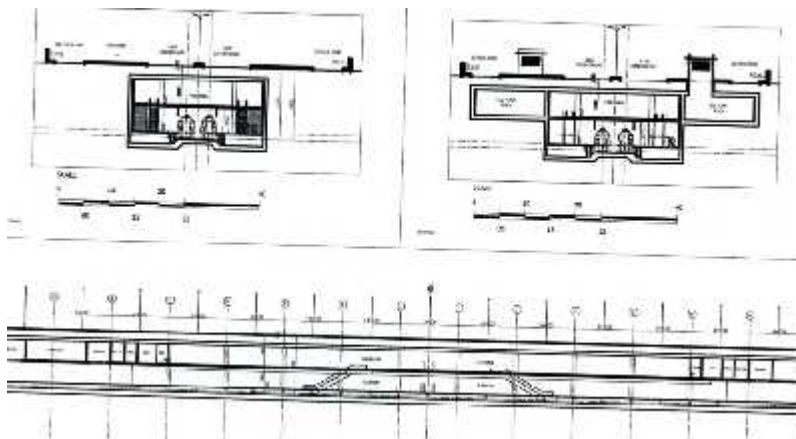
Sensitive detailing of stations and Metro nodes

Based on the sections proposed by DMRC, the Department of Urban Planning has prepared 3d views of the metro station. A perusal of the same indicates that the detailing of the same would need to be improved so that the structure is not too heavy on the road. (Refer View 1)

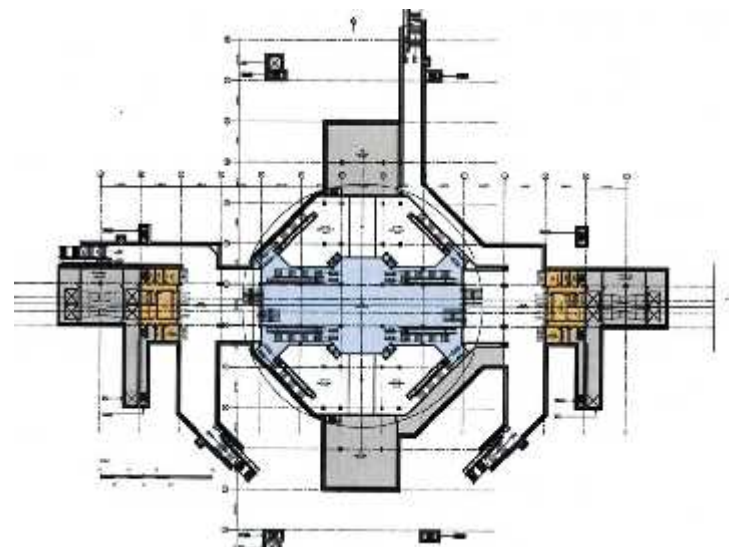
An alternative view has also been prepared ,wherein a green edge has been planned rather than a heavy structural wall (Refer View 2). This is suggestive and further detailing for the same is recommended due to the important location of the station to be approved by Chandigarh Heritage Conservation Committee. Similarly all over head structures will be need to be sensitively detailed out .



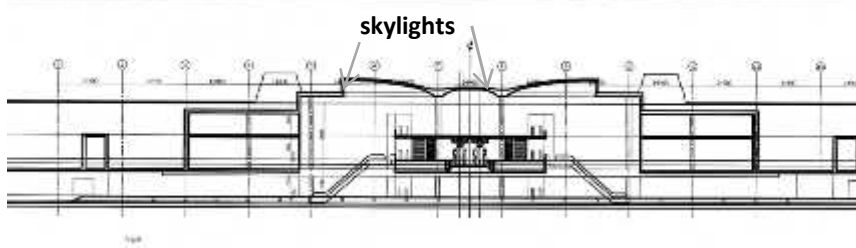
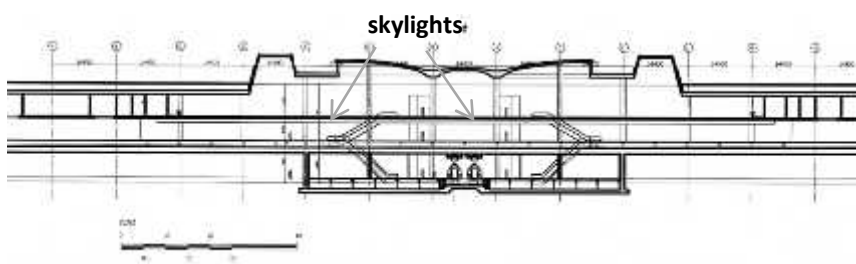
Plan P11- Typical Metro Station and Interchange Station at Matka Chowk



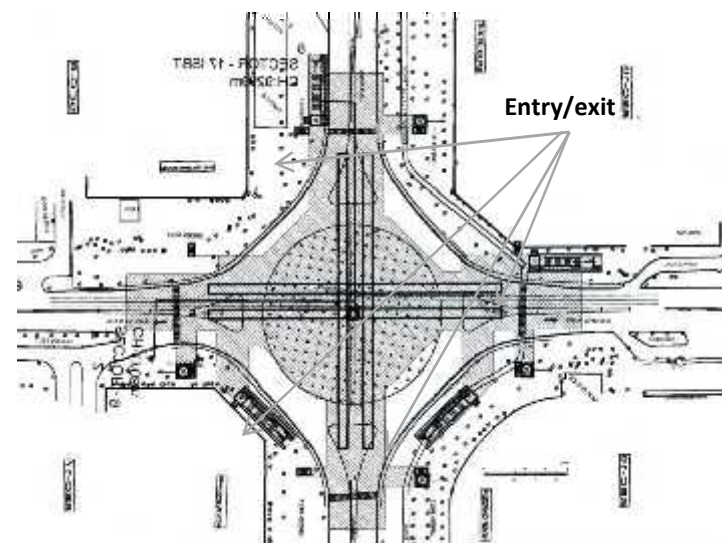
TYPICAL METRO STATION MATKA CHOWK



INTERCHANGE STATION MATKA CHOWK



MATKA CHOWK



MATKA CHOWK

Concerns and Recommendations

Matka Chowk will be redeveloped as an interchange station between the North South and East West corridors of the metro. Four entries have been proposed to the three level structure. The skylights for the central vestibule/concourse and entrance canopies to be sensitively designed to blend with Chandigarh's architectural style.



3D View 1 Overhead Metro and Metro Station along East West corridor



Sketch prepared by Department of Urban Planning, UT, Chandigarh based on DMRC report and details (architectural expression)

Concerns and Recommendations --- The detailing of the elevated corridor - size and design of columns, structure, escalators and the station needs to be thoroughly examined and detailed out. There is need for orderly development along the elevated corridor - architectural controls recommended at the entry to the city. Detailed landscaping proposal to avoid encroachment and misuse of the area under the corridors.



3D VIEW 1 METRO STATION AND INTERCHANGE STATION AT MATKA CHOWK AS PER PROPOSAL SUBMITTED BY DMRC



Sketch prepared by the Department of Urban Planning, UT, Chandigarh based on DMRC report and details

Concerns and Recommendations - There is need to carefully detail out the Matka Chowk which shall have a strong impact on the urban design along Jan Marg – the ceremonial boulevard. Approval of the Chandigarh Heritage Conservation Committee in view of the heritage status of the major artery .



**3D VIEW OF MATKA CHOWK AFTER DEVELOPMENT
SUGGESTIVE IMPROVEMENT TO THE PROPOSAL SUBMITTED BY DMRC**



Conceptual Sketch prepared by the Department of Urban Planning, UT, Chandigarh based on DMRC report and details

Suggestive improvements - Introducing green edge to the structure to avoid wall like effect



DESIGN AND ENTRY AND EXIT TO UNDERGROUND METRO STATIONS AND ELEVATED METRO STATIONS



ENTRANCE CANOPIES AT METRO STATIONS WILL IMPACT THE STREETScape/DESIGN AND DETAILING SUBJECT TO APPROVAL OF CHANDIGARH HERITAGE CONSERVATION COMMITTEE IN HERITAGE AREAS



UNDERGROUND METRO STATIONS



ELEVATED METRO OUTSIDE THE SECTORAL GRID



PUBLIC FACILITIES-CONCOURSE AREA WITH TICKETING FACILITIES

Recommendations

New interventions in the cityscape. Canopies will need to be carefully designed which with minimal interventions.



BRTS Corridors

- To supplement the metro a BRT system has been recommended on the following corridors.
- **CORRIDOR 1:-** Starting from Chandigarh Armed Police Complex, Dhanas this route via Dakshin Marg upto Punjab U.T. boundary on NH21 will terminate at Zirakpur Chowk in Punjab.
- **CORRIDOR 2:-** Starting from Sukhna Lake via Sukhna Path upto Sector-49 Chandigarh on North South axis and then west wards via V3 road between Chandigarh and Punjab boundary terminating at Kharar Punjab.
- **CORRIDOR 3:-** Starting from PGIMER (Madhya Marg) via Paschim Marg upto Vikas Marg and then moving west wards upto Maloya, Chandigarh and terminating in Pocket F Mohali Punjab.
RITES has supplied two separate cross sections and BRTS planning for roads having 30 m and 60 m ROW respectively .

Intercity BRTS

- In addition to the above routes, RITES has also recommended BRTS corridor for intercity connectivity to Mohali and Panchkula to be taken up in Phase-II.
- BRTS corridors of Chandigarh extend towards Mohali and Zirakpur/Derabassi along NH 21 integrated with the BRTS corridors of the state of Punjab.
- The BRTS corridor in Mohali are along the sectoral grid at the interstate boundary of UT & Punjab and extended upto City Center, Sector 62.
- BRTS has also been proposed along the GMADA Expressway.

BRTS Corridor In Panchkula

- A network of BRTS corridors have been proposed in Panchkula which will connect with BRTS of Chandigarh along Dakshin Marg (See Plan 12).

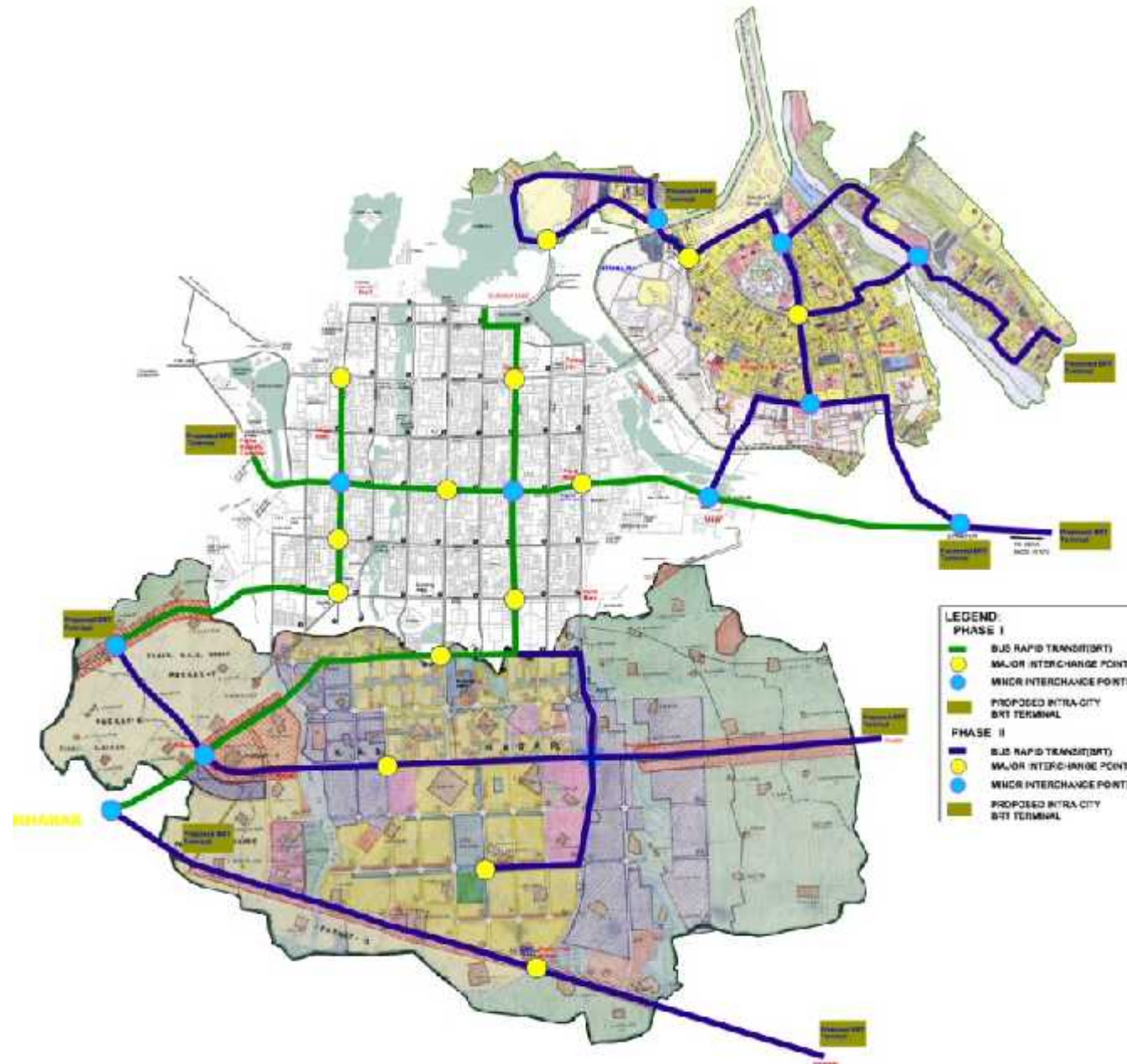
Two types of BRTS have been proposed by RITES

Observation of the Master Plan Committee:-

- Two types of BRTS corridors have been proposed, one for 60m right of way and the other for 30m right of way.
- Within Chandigarh, the 60m right of way will be applicable to Dakshin Marg and 30m right of way will be applicable to Sukhna Path and Vidya Path.
- The bus lanes have been proposed on both sides of the main carriageway along with footpaths and bus queue shelters.
- Adapting the existing roads to BRTS corridor would entail re-proportioning the carriageways and require shifting of services like electricity poles and would also involve tree cutting.
- The bus queue shelters would also need to be relocated .
- In the 30 m corridor the existing road section has been maintained, the bus lane would be demarcated through lane marking and would ply on the extreme left of the carriageway.
- **Dedicating a lane for BRTS to enable uninterrupted flow of buses would involve shifting the entire load of two wheelers, three wheelers and four traffic onto the other lanes. In case of roads with two lanes only, given the current traffic volumes, this could lead to congestion. The system would be practical and viable only if the corridor is optimally utilised for which the frequency of buses would need to be increased substantially for which modal shift to mass rapid transport is to be encouraged.**
- As per national mandate, provision for dedicated BRTS corridors is to be made along major regional roads and highways.



PLAN 12 : BRTS CORRIDORS PROPOSED BY RITES





BRTS CORRIDOR – RITES PROPOSAL

(a)



(b)



Conceptual Sketch prepared by the Department of Urban Planning, UT, Chandigarh based on RITES report



Augmentation and improvement in city bus system

A good public transport system is a modern day necessity. The development and quality of public transport system has not kept pace with this explosion in the economic activity during last two decades. The expectation of the public in terms of quality and comfort available in means of transport have risen sharply. This has led to increasing number of people using personal transport for all types of activities be it economic, professional or leisure. The increasing traffic and traffic density has started putting even greater pressure on the infrastructure in terms of roads and other infrastructure associated with it.

Chandigarh has confined geographical area whereas Mohali and Panchkula do not have a public transport system. Chandigarh Transport Undertaking has been providing public bus transport to the tricity since its inception. In addition, point to point local bus service is also provided to Kharar, Kurali and Zirakpur in Punjab, Kalka in Haryana and Baddi in Himachal Pradesh. This is because a large number of office goers and other traffic between the tricity and satellite towns.

While the metro and the high capacity BRT will be operational on selected routes, large areas will continue to be served by the local bus system which will also act as the most important feeder system to the Metro and BRT together with other modes of transport. Therefore, a good public transport system can be extremely successful if modernized so as to be aesthetically appealing, punctual in operation, modern and comfortable in use. Any transport plan for Chandigarh would be incomplete unless it takes the tricity of Chandigarh, Panchkula and Mohali into consideration by keeping in view, the vision and objectives of the National Urban Transport Policy, the Comprehensive Mobility Plan for Chandigarh Urban Complex, Master Plan Chandigarh projections upto 2031.

Augmentation of schedule and fleet

Irrespective of when the Metro and BRT become operational, local bus services will remain the mainstay of the public transport for large parts of the city. It is expected that 12.55 lakh trips per day by 2021 and 26.7 lakh trips per day by 2041 on BRT and the other bus system will be performed in Chandigarh Urban Complex. For this volume of traffic at least 1250 buses will be required by 2021 and 2570 buses by 2041.

However, this number may have to be increased substantially in case any of the MRTS components lag behind planned implementation.

Just increasing the bus fleet will not be enough, its quality will also have to be of much higher standard for achieving the National Urban Transport Policy objective of changing the passenger preference from personalized vehicles to public transport. Consequently, range of new buses should be added to fleet which should be low floor and of good quality. Air conditioned buses for improving the commuter comfort are also recommended.

Chandigarh's recent introduction of 100 JNNURM buses being operated by the Chandigarh Transport Undertaking are a great success enjoying an occupancy ratio of 110% against occupancy ratio of 70% of the old fleet. This is an indicator that modernizing the Chandigarh Transport Undertaking would lead to greater acceptability of the Public Transport System as an alternative to personal vehicles by the public for local travel in Chandigarh.

The State Governments of Punjab and Haryana also need to augment and integrate their intercity public bus systems within Chandigarh and the neighbouring towns.



The following is proposed to further motivate people to adopt public transport:

- Improve the quality and outlook of the buses so that they are comfortable, aesthetic, attractive as would be befitting a modern vibrant city.

To achieve this objective there is a need to qualitatively change the fleet of buses from the present to latest technologically advanced and ergonomically designed buses, which are also aesthetically attractive. This shall be achieved by gradually replacing the present fleet as it reaches the end of its age with the latest available in the market in terms of technology, ergonomics, aesthetics and fuel efficiency.

- To introduce user friendly service in term of route plan, efficiency and punctuality. Modernize the infrastructure to one which is user friendly and convenient.
- To use latest available IT services for public information, user friendly ticketing, monitoring, management and control of the fleet.
- To provide quality road transport over larger distances for work and leisure.

To achieve this objective, the existing fleet of long distance buses shall be gradually replaced with modern buses as it reaches the end of its life and becomes due for replacement.

- To achieve the objectives laid down in and National Action Plan on climate change and Chandigarh Master Plan.
- A gradual achievement of the objectives one to five shall lead to achieving this objective.

- To provide seamless travel in the tricity and its adjoining areas:

To achieve this objective in addition to traffic pattern study, coordinated effort shall be made with adjoining cities of Mohali and Panchkula to mesh their public bus service (as and when introduced) with Chandigarh Transport Undertaking so that the entire tricity public transports system functions as a single coordinate unit.



Integrated intercity and intracity bus terminals/ bus

Inter-City Bus Terminals

At present all the buses whether inter-city, inter-state or intra-city originate and terminate at the Sector 17 & Sector 43 ISBT in Chandigarh, Sector 5 City Center in Panchkula, and Sector 62 in Mohali. To meet future demands three intercity bus terminals are proposed by RITES at Mani Majra, Sector 31 Chandigarh near Tribune Chowk and Sector 102 Mohali, to cater to inter-state buses coming from different directions to Chandigarh Urban Complex.

It is also suggested that 4 intercity terminals to be revived with all terminal facilities immediately and three new put in place by 2021 at locations shown in Table 5. Later Sector 17 Inter State Bus Terminus may be converted into a city bus terminal.

For the proposed bus terminals in Mohali and Panchkula, the matter needs to be taken up with respective states of Punjab and Haryana.

Table T5. Existing and Intercity Bus Terminals proposed by RITES

Table – Bus Terminal
Existing
Sector 17
Sector 43
Sector 62 Mohali
Sector 5 Panchkula
Proposed (by 2021)
Sector 102 Mohali
Sector 31
Mani Majra

Intra-City Bus Terminals

- In addition to the above terminals, BRT terminals are also proposed for Intracity movement at the origin and destination of the BRT corridors and will also act as inter modal interchanges between regional and local traffic.
- All the Intercity and Intra-city bus terminals would also provide for tourist buses, with adequate parking facilities and tourist bureaus / offices etc and other tourist infrastructure for operation of private tour operators.

Bus depots

- At present all the buses whether inter-city, inter-state or intra-city use depots in Industrial Area Phase I workshop and Sector 25 CTU workshop.
- To meet the future demands of buses, five more bus depots have been proposed by RITES at the Police Housing Complex, Pocket E Mohali in Phase I, Sector 48 Chandigarh, Sector 1A Panchkula and Sector 104 Mohali. **The existing 3 bus depots need to be improved with all depot facilities immediately, and two new depots to be put in place by 2014 and three after 2021. Locations given in Table 6.**

Table T6. Existing and Bus Depot proposed by RITES

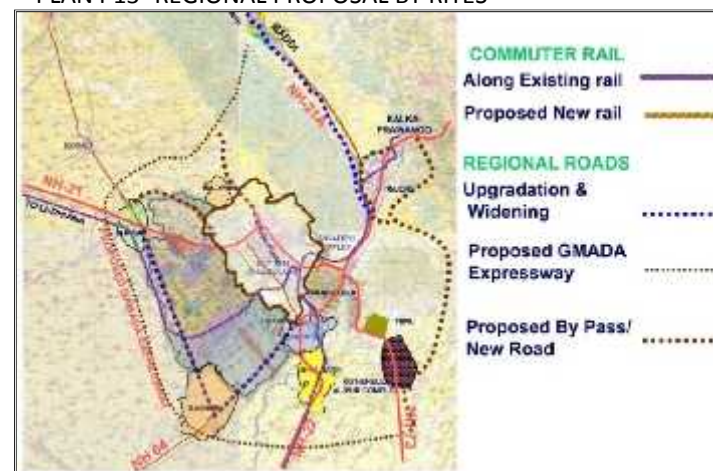
Bus Depots	Implementation by Year
Existing	
Industrial Area Ph 1 (CTU)	
Industrial Area Ph 1 (Haryana Roadways)	
West of Sector 25 (CTU Workshop)	
Proposed	
Police Housing Complex	2014
Sector 48	2021
Sector 1A Panchkula	2021
Sector 104 Mohali	2021



COMMUTER RAIL SYSTEM (CRS)

A large number of people commute between Chandigarh Urban Complex and nearby towns of Pinjore, Kalka, Baddi, Ambala, Kharar and beyond. Most of these commuters travel by road i.e. by buses, para transit modes and their own vehicles. Although Chandigarh is connected with Kalka, Ambala and Ludhiana by regional rail system, there are no commuter rail services. All these railway lines are with single track. Railway line to Baddi in Himachal Pradesh is not available right now. Considering that the nearby towns are expected to grow very fast in coming decades, their traffic interaction with Chandigarh Urban Complex is expected to grow. Therefore, it is important that these commuters are weaned away from the road based system to rail by providing a frequent commuter rail system from Chandigarh to Pinjore-Kalka, Ambala, Ludhiana and Baddi – Nalagarh. Rail to Baddi - Nalagarh will also serve the freight traffic. Refer Rites proposal at Plan P13.

PLAN P13- REGIONAL PROPOSAL BY RITES



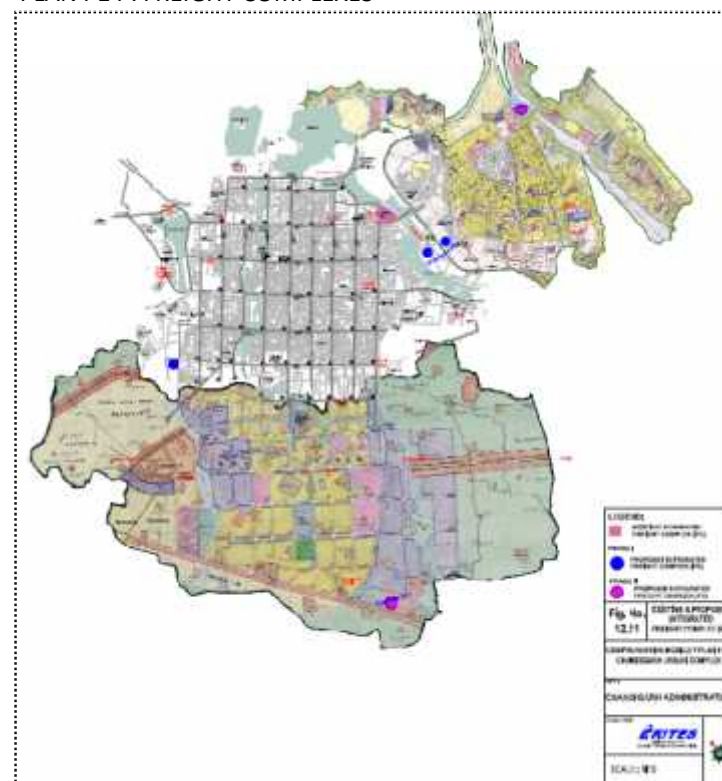
INTEGRATED FREIGHT COMPLEXES (IFC)

The freight movement through the city particularly on some of the arteries is already restricted within the city. At present all the goods traffic concentrates at Sector 26 Transport Nagar. There is inadequacy of space within the transport area as a result of which ideal truck parking, and loading unloading activity is also observed in its adjoining areas and at the entry to the city along the NH-21 near the Industrial Area and Village Daria close to the railway station.

To decongest the existing Transport Nagar, Rites has proposed five new IFCs at the periphery of the tricity complex, with all facilities of wholesale markets, loading /unloading facilities, parking, workshops etc. Heavy goods traffic entering the tricity complex would be stopped there itself and light/small goods carrier vehicles will be used to transfer goods within the complex. The provision of GMADA Expressway will also help diversion of through freight traffic.

The Integrated Freight Complexes proposed in the tricity complex are shown in the adjoining map (Refer Plan P14)

PLAN P14 : FREIGHT COMPLEXES



**FREIGHT COMPLEX WITHIN UT CHANDIGARH**

Chandigarh Administration has already identified 45 acre of land in Industrial Area Phase III for Warehousing and 105 acres in Village Daria is also proposed for acquisition for shifting of Transport Nagar from Sector 26 and expansion of warehousing.

An area has been proposed as Transport Area on the south eastern end of the city and in close proximity to the Second Grain Market and the Bulk Material Market. For rationalization of freight stations the matter needs to be addressed at the regional level with the neighbouring states.

It would be desirable to ensure that heavy vehicles are restricted to the fringe of the urban area. This needs to be examined holistically while preparing the Chandigarh Interstate Metropolitan Regional Plan which is to be prepared as decided in the High Powered Coordination Committee and is to cover an area of 50 km including areas of the states of Punjab ,Haryana and portions of Himachal as well.

FEEDER SERVICES

Feeder services to the proposed multi modal network will also be important to provide convenient and quick transfer of passengers from one mode of transport to another. As all commuters will not be living within walking distance of the proposed network, proper planning for feeder services will be necessary based on analysis of passenger demand on the system.

For catchment area of about 0.5-1 km from the proposed network, commuter can easily access it by walk. People residing in the next 1 km can reach the station by cycles, scooters, auto-rickshaws and mini-buses. Areas beyond the 2-km catchment area will require regular feeder bus services to important terminals/stations. Feeder services can also be provided by para transit modes.



Traffic Integration

- Traffic integration facilities would be provided at the metro stations to enable commuters to come and depart from the stations with ease.
- Linkages with public , private transport as well as walk links will need to be established with all existing rail services and road based systems .

Parking facilities at stations

- The Detailed Project Report prepared by DMRC has given details of facilities needed at each station for peak-hour station load at each of the 30 stations till 2041. The number of bays for buses, cars, two wheelers, autorickshaws and cycles have been increased. Provision of a large number of cycle bays has been made at every station, much more than those for cars, signaling therefore that cycle is to be introduced as one of the major mode of transport.
- Within Chandigarh along the North South Corridor the highest peak – hour traffic of 6283 passengers is expected at Aroma Chowk and provision of 6 bus bays, 503 car bays, 941 two wheelers, 8 auto rickshaws, 706 cycles has been projected which would require 13,614 sq m. The facilities required at the other stations have also been projected.
- A requirement of 11960 sqm at the metro station 9/17, 12089 sq m at ISBT Sector 17, 7644sqm at Sector 34, 6006 sqm at 43 Bus Stand, 4173, sq m at Sector 52, 5304 sq m at the Capitol Complex has been projected. The areas to be designated for parking need to be identified.

- On the East West Corridor the highest peak – hour traffic is expected at the Railways Station - 6,570 passengers. At this station, seven bus bays, 526 car bays, 1752 two – wheelers, 15 autos and 1,314 cycles have been proposed which would require 14,235 sq m of area.
- Similarly for the other metro stations the details of provisions have been provided which would require 3801 sqm at Sarangpur, 1765 sq m at Khudda Lahora, 5715 sqm at PGI, 8354 sqm at General Hospital, 6297 sqm at 9/17 station, 8892 sqm at Sector 7 and 13130 sqm at Sector 26, 8931sqm. At the Timber Market and 9880 sq m at Housing Board Chowk (**Refer Table 7**).
- **Pedestrian access to the stations to be planned.**
- **The other integration facilities** are approach roads to the stations, circulation areas for various modes including feeder bus or mini bus. Parking for private vehicles has however not been proposed.
- **A major switch over to public transportation, adoption of cycle as a mode of transport and improved pedestrian infrastructure is to be ensured while on the other hand dependence on private vehicles has to be discouraged.**



TRANSPORT INTEGRATION AND ENSURING LAST MILE CONNECTIVITY



PUBLIC SHARING BICYCLE SYSTEM PARK AND RIDE CONCEPTS AT BUS QUEUE SHELTER WITH GIS
ALL TRANSPORT NODES, BUS QUEUE SHELTERS



MAKING ADEQUATE PROVISION FOR PARK AND RIDE CONCEPT AT THE METRO/BRTS STATIONS
TO FACILITATE INTEGRATION OF BICYCLES WITH THE MASS TRANSPORT SYSTEM AND PROVIDING
LAST MILE CONNECTIVITY TO THE COMMUTERS.



TABLE T7 : FEEDER FACILITIES TO BE PROVIDED AT METRO NODES AS PER DMRC REPORT

No.	Name of the station	Peak Hour station Load	Number of Bays					Area Required (sq.m)			
			Bus	Car	Two Wheeler	Auto	Cycle	Car	Two wheeler	Cycle	Total
Capitol Complex – Gurudwara Singh Shaheeda											
1	Capitol Complex	2448	3	196	653	6	490	2938	1632	734	5304
2	Sector 9/17 ISBT	5520	6	442	1472	13	1104	6624	3680	1656	11960
3	Sector 17 TSBT	5579	6	446	1488	13	1116	6695	3720	1674	12089
4	Aroma Chowk	6283	6	503	1676	14	1257	7540	4189	1885	13614
5	Sector 34	3528	4	282	941	8	706	4234	2352	1058	7644
6.	Sec.43 Bus Terminus	2772	3	222	739	7	554	3326	1848	832	6006
7.	Sector 52	1926	2	154	514	5	385	2311	1284	578	4173
8.	Sec.62 City Centre	4022	4	322	1073	9	804	4826	2681	1207	8714
9.	Sector 70	7646	8	612	2039	17	1529	9175	5097	2294	16566
10	Gurudwara Singh Shaheeda	6252	6	500	1667	14	1250	7502	4168	1876	13546

Traffic Integration requirement for Stations (Projections for Year 2041)



Transport Terminal – Grain Market											
1.	Transport Terminal	1500	2	120	400	4	300	1800	1000	450	3250
2	Air force Station	720	1	58	192	2	144	864	480	212	1560
3.	Mullanpur	1673	2	134	446	4	335	2007	1115	502	3624
4.	Sarangpur	1754	2	140	468	4	351	2105	1170	526	3801
5.	Khuda Lahora	815	1	65	217	2	163	978	543	244	1765
6.	PGI	2638	3	211	703	6	528	3165	1758	791	5715
7.	General Hospital	3856	4	308	1028	9	771	4627	2570	1157	8354
8.	Sec.9/17 ISBT	2906	3	233	775	7	581	3488	1938	872	6297
9.	Sector 7	4104	4	328	1094	10	821	4925	2736	1231	8892
10.	Sector 26	6060	6	485	1616	14	1212	7272	4040	1818	13130
11.	Timber Market	4122	4	330	1099	10	824	4946	2748	1237	8931
12.	Chd. Railway Station	6570	7	526	1752	15	1314	7884	4380	1971	14235
13.	Housing Board Chowk	3960	5	365	1216	11	912	5472	3040	1368	9880
14.	MDC Panchkula	2010	2	161	536	5	402	2412	1340	603	4355
15.	HUDA Office Complex	1685	2	135	449	4	337	2022	1123	506	3651
16.	City Centre	1930	2	154	515	5	386	2316	1287	579	4182
17.	Bus Stand Panchkula	2304	3	184	614	6	461	2765	1536	691	4992
18.	Sector 14 Distt. Centre	1594	2	128	425	4	319	1913	1063	478	3454
19.	Raili Village	2148	2	172	573	5	430	2578	1432	644	4654
20.	Grain Market	2256	3	180	602	6	451	2707	1504	677	4888



STRENGTHENING OF ROAD NETWORK

PGI to Punjab/UT Boundary

Present Status:

- Road between Khuda Lahora/Khuda Jassu is narrow with construction abutting main road.

Proposal

- A 60.96 m. wide road with 10.5 m wide main carriageway, 2.44 cycle track, 4.87 m wide slow carriageway and provision of pedestrian path from PGI to Punjab/UT Boundary via Khuda Jassu/Khuda Lahora/Botanical Garden/Sarangpur.
- An elevated Metro will also run on this stretch.
- A pedestrian underpass across the road to connect Khuda Lahora and Khuda Jassu located on either side of the main road which have strong interaction and share community facilities.

Junction No.30 to UT/Punjab boundary via Dhanas:

Present Status:

- The width of the road varies due to the area falling between boundary wall of existing dumping ground and garbage processing plant.

Proposal

- 60.96 m. wide road with 10.5 m. wide main carriageway along with 4.87m wide slow carriageway and provision of pedestrian path from Junction No.30 to U.T./P.B. Boundary via Chandigarh Armed Police Complex (CAP), Dhanas.

Railway Light Point to Route No.2

Present Status:-

- The width of the road varies due to site constraints i.e. area between boundary wall of existing Dumping Ground and Garbage Processing Plant.

Proposal

- 60.96 m wide road with 10.5 m wide main carriageway along with 4.87 m wide slow carriageway and provision of pedestrian path from Junction No.30 to UT/Punjab Boundary via CAP Complex/Dhanas.

Railway Light point to Route No.2

Present Status:

- Dual Carriageway on either side has been constructed from Railway Light Point to Railway Station.

Proposal

- 60.96 m. wide road has been proposed between Railway Light Point to Route No.2 as road leading to I.T. Park and Route No.2 is 60.96 m.

Problems to be resolved

- Land required for 60.96 m. – Matter is to be taken with the Railway Authorities/Forest Department.
- Proposed alignment passes through the unauthorized construction existing at site.
- Alignment of road also falls in private lands. Hence, land is to be acquired for its execution.

Road along Patiali-ki-Rao Choe

Proposal

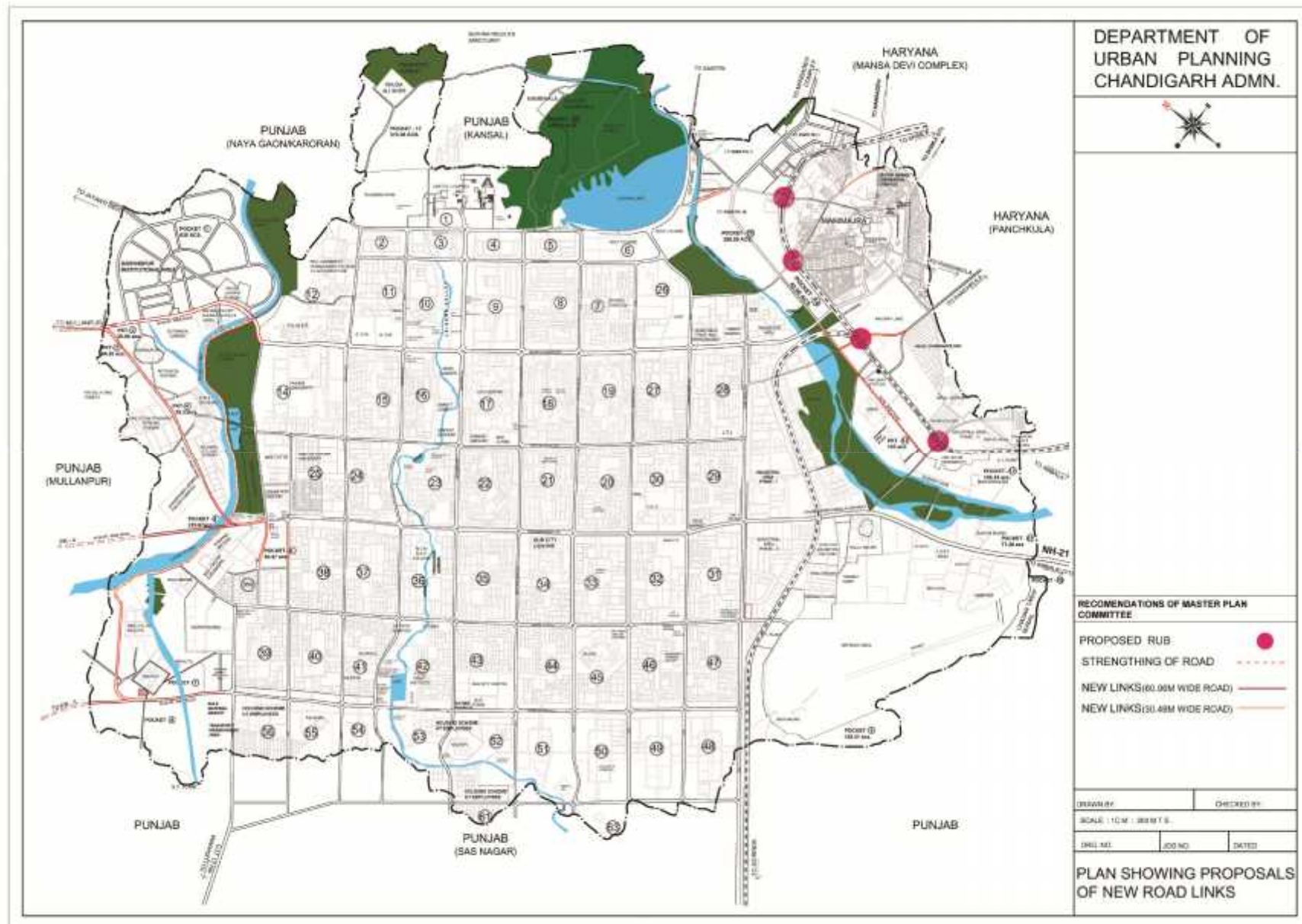
- The width of the existing road along Patiali-ki-Rao Choe is being proposed to be increased to 30.48 m which will serve as a bypass from PR5 to Dakshin Marg via Rehabilitation Colony, Maloya-I/Dadu Majra Colony/Dhanas.

Completion of the sectoral grid of Chandigarh

- The construction of incomplete portion of V3 road between sectors 51 & 62 to complete the Chandigarh sectoral grid by constructing high level bridge across N-choe, south of Model Jail, Burail.

Improvement of T Junction between Vidya Path and Chandi Marg near Golf Course, Chandigarh:-

- The geometry of this junction needs improvement to provide safe manoeuvrability of vehicles. The matter should be pursued with Sacred Heart School, Sector-26 or Golf Course Authorities for sparing some land.





NEW ROAD LINKS

Extension of Vikas Marg upto Punjab/U.T. Boundary

Proposal

60.96 m wide direct access to Punjab via Maloya which will merge into PR5 of GMADA Region. The same will ultimately merge with NH-21 at Kharar.

Extension of Dakshin Marg upto Punjab/U.T. Boundary

Proposal

60.96 m wide direct access to Punjab after extending Dakshin Marg which will merge into PR4 of GMADA Region.

Link behind Rehabilitation Colony, Maloya to Madhya Marg Via existing road along Patiali ki Rao choe.

Proposal

30.48 m wide road proposed behind Rehabilitation Colony , Maloya and existing road along Patiali Ki Rao Choe proposed to be widened upto 30.48m and will merge ultimately in Madhya Marg, which will act as a Bye- Pass.

Proposal

30.48 m wide additional access has been proposed behind Rehabilitation Colony which will merge into Dakshin Marg.

High Level Bridge

Proposal

- HLB over Patiali-Ki-Rao near Dadumajra
- HLB over Patiali-Ki-Rao near Khuda Jassu
- HLB over Sukhna Choe on Route No. 3
- HLB over Sukhna Choe near Kishangarh.

Link Behind Village, Kishangarh

Proposal

30.48 m wide road with 7 m wide dual carriageway, 3.3 m wide cycle track/slow carriageway and pedestrian path between Sukhna Choe Bridge and I.T. Park/Kishangarh crossing for the smooth flow of traffic.

30.48 m wide road along Sector-56(W)

Proposal

30.48 m. wide road has been proposed along Sector-56(W) which will merge in the existing road of Sector-56 near U.T. boundary.

Police Station Junction of Manimajra to road leading to Mansa Devi

Proposal

30.48 m wide road with 7 m. wide dual carriageway, 3.3 m wide cycle track/slow carriageway and pedestrian path between Manimajra Police Station crossing to road leading to Mansa Devi via Pocket 8 Manimajra for direct access to Mansa Devi Complex.



To improve connectivity with trans - Sukhna Choe areas

To improve connectivity of Chandigarh with Manimajra, the towns of Panchkula which are located across the Sukhna Choe /Railway line, grade separation has been proposed as under:

Proposed Rail Under Bridge (RUB)

Route No.1 (connect Panchkula at Junction between Sector 17/18 Panchkula via Industrial Area Phase-I/CTU Workshop/existing cremation ground)

- A underpass has been proposed on the existing Railway track to link between existing roads for the direct access of the vehicles.

Proposed Rail Under Bridge (RUBS)

- * Route No.2 (from Hallomajra Chowk to Industrial Area, Panchkula)
- * Route No.3 (from St. Kabir crossing to Fun Republic)
- RUB at Railway level crossing No.127 across Chandigarh Ambala Railway line near Raipur Kalan/Baltana.
- RUB at railway level crossing No.128 across Kalka-Chandigarh Railway Line near IT Park.



RUB with NMV facilities – first of its kind provided in Chandigarh along Route No. 2

The RUBs shall be designed with adequate provisions for the pedestrians and cyclists.

It shall be ensured that the construction will not adversely impact the adjoining properties accessibility and where required appropriate service roads/approach roads will be provided. Proper measures for rainwater disposal will be made to ensure there is no water logging or flooding.

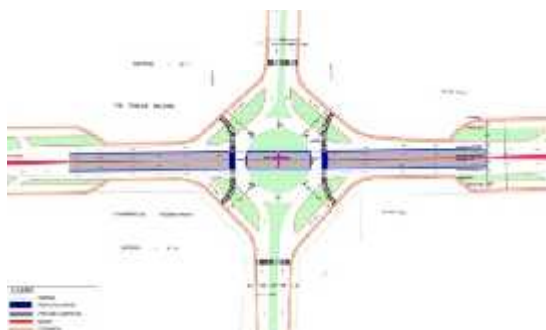
Landscaping, lighting, rhythmic shuttering patterns and Chandigarh style murals on the retaining walls shall be integrated into the design of the RUBs to make the overall ambience aesthetically appealing.



Underpasses proposed by Rites in Chandigarh

RITES has proposed following underpasses across the city in view of the large traffic volumes:

- Along Madhya Marg near PGI Chowk, Press Chowk, intersection of Sarovar Path and Madhya Marg and Transport Chowk
- Chandigarh-Kalka Road at Housing Board Chowk, Manimajra
- Dakshin Marg on Kissan Bhawan Chowk, Piccadilly Chowk and Tribune Chowk
- Across Dakshin Marg connecting V5 of Sector 22 and 35
- Across Himalaya Marg Connecting V4 of Sector 34 & 35
- Across Shanti Path connecting V5 of Sector 38 & 40, Sector 33 & 45 and Sector 35 & 43.



Proposal of underpass at Tribune Chowk



Proposal of underpass at Press Chowk

Observations on proposed underpasses

RITES recommendations are based on the projected traffic volumes for 2041 assuming a much higher growth rate of population than has been witnessed in the recent 2011 census. Since construction of underpasses is an irreversible process it needs to be seriously reconsidered.

The primary focus must remain on retrieving the city for the pedestrian and cyclists and ensuring that concerns over increasing vehicular traffic and congestion do not end up cutting the city into bits making life far more difficult for the majority of citizens. The other factors which need to be addressed while planning underpasses are :

- They will require re-routing of existing underground services like sewerage, storm water drains, telecommunications, and OFC cables running east west and north south along the grid loops around the ramp. Besides technical implications and cost, digging up large areas, will cause inconvenience to the public during implementation. The pedestrian movement will be adversely affected across the underpasses.
- The extra lanes required for the underpasses would almost eliminate berms/pedestrian pathways and full grown trees. In most cases underpasses have been proposed at alternate junctions of Madhya Marg and Dakshin Marg i.e. at a distance of 1600m out of which 400m would be consumed in the grades/ramps of the underpasses leaving 1200m as a straight stretch in between some of the underpasses have been proposed even at consecutive junctions i.e. 800 m, which leaves only 400m as a straight stretch in between. The up and down roller coaster movement is not desirable.



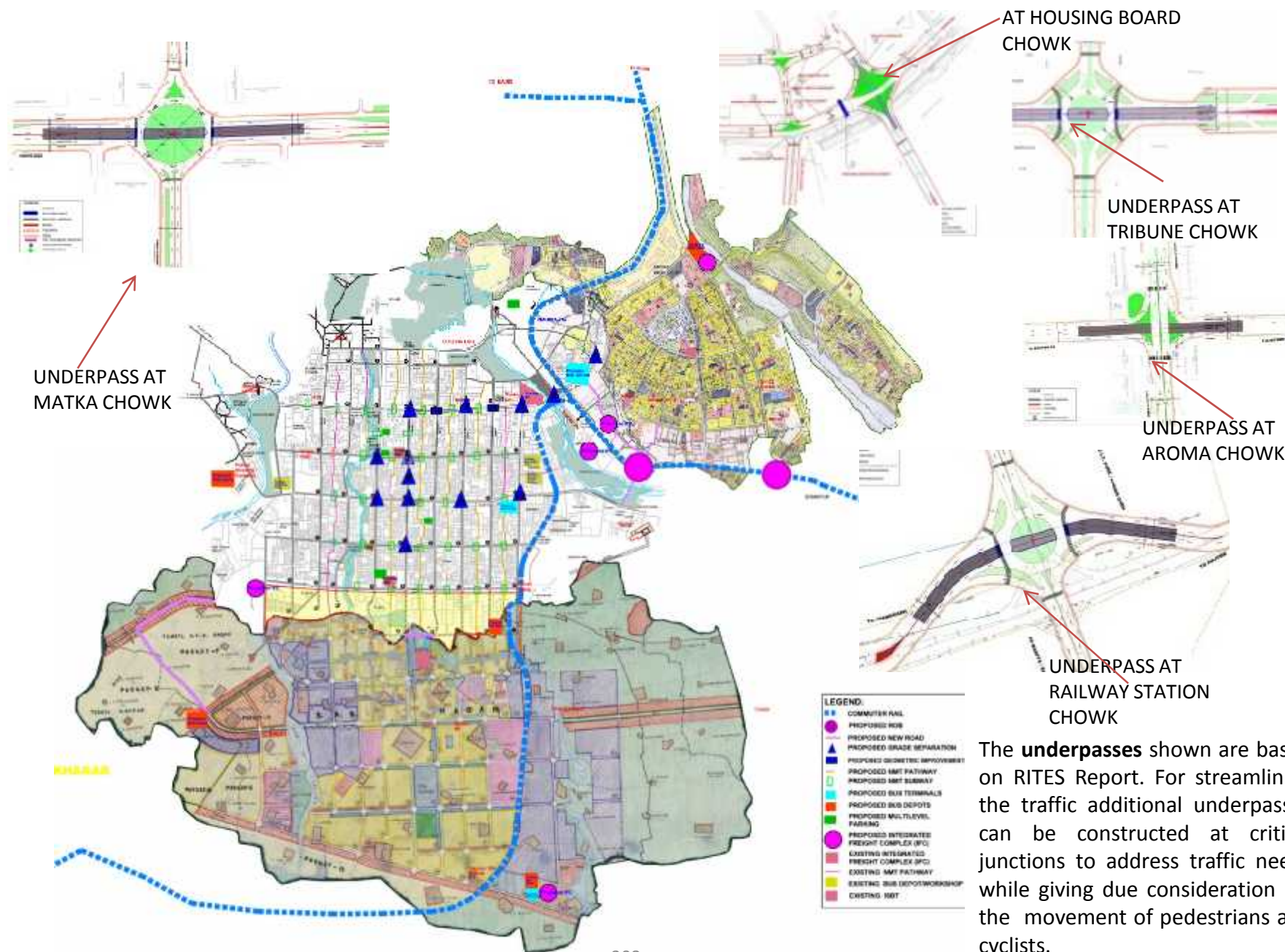
- Experience across the globe indicates that continuing upgradation of road infrastructure for ever increasing traffic takes place at the cost of other road users, negatively impacts the quality of the urban environment and is particularly damaging for the pedestrians and cyclists. The car oriented intervention would disturb the short routes and at grade access for public transport users, walkers and non motorized traffic users.
- The world wide trend is to promote pedestrian friendly cities based on new urbanism, eco city concepts where emphasis is on an efficient, green, and reliable public transport system rather than car dominated cities. In fact, instead of accommodating ever increasing private vehicles, the focus has thus shifted to controlling /discouraging their growth by introducing disincentives such as congestion charges, high parking fees and demarcating pedestrian only zones .
- In light of the above, it is strongly recommended that vehicular underpasses along the sectoral grids should be constructed only across very critical junctions after giving due consideration to the movement of pedestrians and cyclists. Unidirectional underpasses at consecutive intersections should be avoided.
- **Over bridges/ flyovers are not recommended** to be constructed in entire city of Chandigarh due to heritage considerations, since they impact the visual city scape, and cause inconvenience to the pedestrians.



CYCLE AND PEDESTRIAN FRIENDLY CITY



PLAN P17- IMPROVEMENT OF ROAD INFRASTRUCTURE PROPOSED BY M/S RITES



The **underpasses** shown are based on RITES Report. For streamlining the traffic additional underpasses can be constructed at critical junctions to address traffic needs while giving due consideration to the movement of pedestrians and cyclists.



CYCLING SHALL BE PROMOTED IN A BIG WAY THROUGHOUT THE CITY FOR ENJOYMENT AND EXERCISE, AND TRANSPORTATION ALONG PROPOSED GREEN CORRIDORS CONNECTING THE CITY

NON- MOTORISED TRANSPORT

Cycle Facilities

Their use in Chandigarh is not significant but still this needs to be encouraged on environmental considerations. Provision for safer and better section of road or cycle track is the best way to keep them on roads. Therefore, it is proposed to revive V7 and V8 roads as intended for bicycles. About 60 Km of cycle network has been identified with proposed cycle underpasses across V-2 or V-3 roads. In addition the existing cycle tracks along V3 roads will be improved and provided with proper integration along with the zebra crossing near intersection.



CHANDIGARH TO BE PROMOTED AS A PEDESTRIAN AND CYCLE FRIENDLY CITY

Special provisions are being made for pedestrians and cyclists in the city as per the original plan wherein the 7V road network was designed for safe movement of pedestrians and V8s were subsequently added as cycle tracks along major roads. The pedestrians and cycles were to move along city greens and interconnected through underpasses across intercepting vehicular roads.

Revival of this concept is strongly recommended however would entail a close look at the existing development wherein the central greens have been developed to a large extent as city level parks/gardens. Visits to sites indicate that revival of the concept is practically possible. In this context, 11 longitudinal green belts, as under, have been delineated which are to be developed as green corridors both for the pedestrians and cyclists.

Green Corridor along Patiali Ki Rao- 1

- Extending beyond Patiali Ki Rao Forest Area- Dhanas Lake-Shooting Range–Botanical Garden –Milk Colony Dhanas

Green Corridor 2

- Patiali Ki Rao Forest between Sarangpur Institutional Area and PEC-Sector 56
The Patiali Ki Rao Forest-Dhanas Lake-Shooting Range-Pocket 6-Sector 38 West-Sector 39 and Sector 56.

Green Corridor 3

- Areas connecting between Sector 25 to Sector 55
- Panjab University Sector 25-Sector 38-Sector 40-Sector 55-Palora-Old Ropar Road.

The Green Corridor 3 has been shown to be initiated from Sector 25 Panjab University. The same can be extended towards the north by taking up the matter with the Panjab University, PGI, PEC which are gated communities.

Green Corridor 4

- * Khudda Ali Sher – Rajindra Park –Sector 2 –Sector II –Sector 15 –Sector 24 –Sector 34 –Sector 37 –Sector 41 – Sector 54 Model Village Khudda Ali Sher hilly terrain, green pocket, Rajindra Park –Heritage houses in Sector 2 – villages Butrela – Badheri

Green Corridor 5

- Khudda Ali Sher to Sector 53
Khudda Ali Sher, green pocket, Rajindra Park Sector 3, War Memorial and Bougainvillea Garden, Sector 10, Leisure Valley, Sector 16, Heritage houses, Rose Garden / Shanti Kunj, Sector 23, Bamboo Garden, Traffic Park, Bal Bhawan, Sector 36 Fragrance Garden –Sector 42 Palm Garden, Beant Singh Memorial, Chatt Lake, Sector 53 Garden of Spring.

Green Corridor 6

- Capitol Complex – Sector 4 – Sector 9 Commemorative Park – Sector 17 City Centre – Sector 22 Heritage Sector – Sector 35 – Sector 43 Sub City Centre – Sector 52 – Garden of Conifers – Sector 61.

Green Corridor 7

- Kaimbwala – Sukhna Forest /Sukhna Lake /Rock Garden, Sector 5 –Sector 8 – Sector 18 – Sector 21 – Parrot Garden /Old Ropar Road –Sector 34, Sub City Centre /Nehru Centre for Performing Arts/State Library – Sector 34 Gurudwara – Sector 44 - Sector 51

Green Corridor 8

- Kaimbwala –Sukhna Forest /Sukhna Lake /Golf Course / Sector 7 Heritage Sector – Sector 19 –Sector 20 – Sector 33 – Sector 45 - Sector 50 - Sector 63

Green Corridor 9

- From Sukhna Lake - Golf Course - Sector 26 – Sector 30 – Sector 32 – Sector 46 – Sector 49

Green Corridor 10

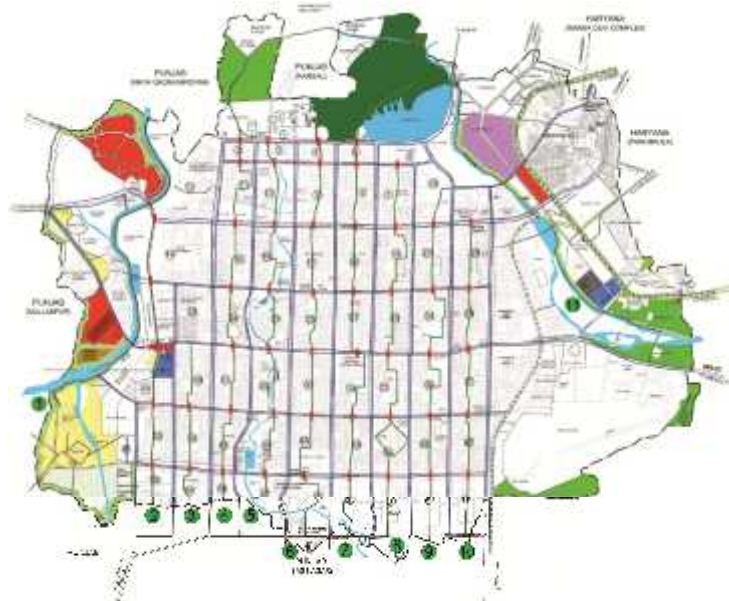
- Sector 28-Sector 29-Sector 31-Sector 47-Sector 48 B

Green Corridor Along Sukhna Choe 11

- Kaimbwala - Sukhna Wildlife Sanctuary – Sukhna forest - Lake – Regulator End /Golf Range /IT Park /26E/Pocket No 11 and 12 of Manimajra which are to be connected with pedestrian bridges.



Development plans for each corridor shall be worked out after detailed analysis of existing site conditions. Signages, public amenities to be carefully dovetailed into the route.



PLAN P18: PLAN SHOWING PROPOSED GREEN CORRIDOR

Pedestrian and cyclist movements is also to be facilitated both within the neighbourhood sector as well as along the main circulation arteries wherein will ply public transport including metro, BRTS, local bus service. The success of MRTS is directly linked to enabling last mile connectivity. Walking to an initial bus stop, an interchange between bus and metro, within a metro station and end of the trip is important. While underpasses are being proposed across major vehicular V2, V3 roads along the green corridors to enable constant contact with nature without having to merge with vehicular movement for the rest of the pedestrian / cycle movement at grade movement for the pedestrian is being preferred.

Experience has shown that grade separated pedestrian pathways / underpasses / flyovers are not popular despite being equipped with escalators/ramps.



Foot over bridge existing at Panchkula Kalka road – not popular



To facilitate the movement of patients and their attendants across the Chandigarh-Kalka Road passing adjoining Chandimandir Command Hospital, a foot over bridge has been constructed with a ramp and staircase connecting Sector 6 of Panchkula to the Command Hospital West Command, which is however not been used much.



Foot over bridges existing in Mohali Phase III, V & VII are also not in much use





In most advanced countries, the pedestrian is given due respect on the roads. Zebra crossings and ATC lights enable pedestrians to maneuver even heavy traffic roads with ease. Senior citizens, children & wheelchair users are able to move around safely and independently. The Chandigarh Master Plan 2031 strives to motivate the citizens of Chandigarh to develop similar values so that all people can move around the city comfortably and safely.

All new roads bridges /RUBs/ROBs shall make provisions for dedicated pedestrian and cycle paths. the existing road network shall also be suitably rectified to enable the same. This has been strongly advocated in the NUTP of the GoI.

The zebra crossings combined with ATC lights/pelican lights will be augmented on all city roads and preference and priority shall be accorded to the pedestrians and cyclists rather than to vehicles. The city will thus be a **pedestrian friendly city**. The **walkability index** shall thus increase manifold.

Cycling shall be a major mode of transport with cyclists feeling safe as they connect to work and shopping centres doing their daily chores.

Completion of cycle tracks and park and ride facilities at metro/BRTS nodes

- For promoting use of the bicycle as an energy conserving and healthier mode of transport for shorter distances and for reducing car use in the city.
- Cycle tracks planned as V8s; should be executed on priority.
- Use of traffic signals for the existing cycle tracks along with illumination for safety. To deter use of cycle traffic by vehicles, motorists shall be penalized.
- Pedestrian and cycle tracks shall be provided to connect to Metro Stations /BRTS Stations to ensure comfortable last mile connectivity.
- Sufficient space to be provided for Bicycle Sharing /Park and Ride concept at Metro nodes, bus stops.



IMPROVING WALKABILITY AND CYCLING WITHIN NEIGHBOURHOOD

The following principles are recommended for construction of new and improving the existing footpaths:

- Construction of footpaths recommended along V4s and V-5s for safety of pedestrians subject to approval from CHCC in identified heritage areas.
- Construction of footpaths not recommended along internal V6 roads due to less volume of traffic and to avoid excessive hard surfaces in the city to maintain green character of neighbourhoods. Footpaths along existing roads should be widened to a minimum width of 2.0 meters as per standardised specifications. (Refer Figure 26)
- **Continuity of footpaths** – bottlenecks in the form of electrical boxes and poles /dustbins /signages need to be removed..This is to be ensured through coordination of various implementation agencies .
- In addition it should be ensured that the covers for the underground services, if any, located below the footpaths or pedestrian crossings are at the same level as the surface of the footpath.
- Adequate ramp facilities for physically challenged people at junctions and crossovers.
- Proper merger of footpaths with underpasses/zebra crossings and junctions be provided with pedestrian priority signalling.
- Pedestrian / cycle tracks that have been compromised during previous road widening need to be reintroduced.
- For cycle tracks, a uniform cast with concrete pavement for underground ducts / sleeves at regular intervals for crossing of services across the cycle track to be adopted.

Comprehensive proposals will need to be prepared for the pedestrian movement across the city /at sector level /cluster level and campus level examining ground realities.

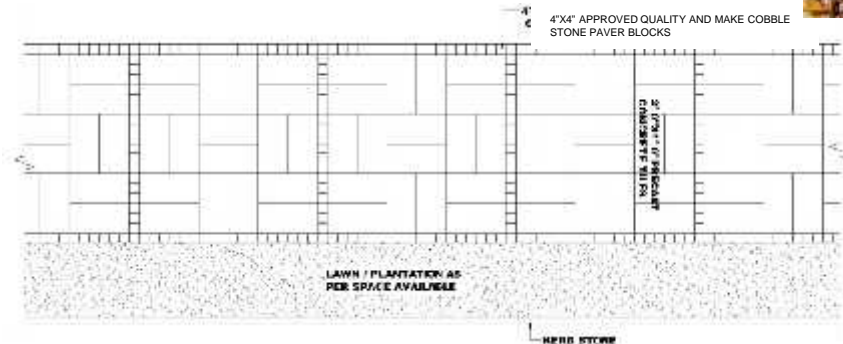


FIGURE 26. TYPICAL DETAIL OF FOOTPATH SHOWING GREEN EDGE ALONG ROAD

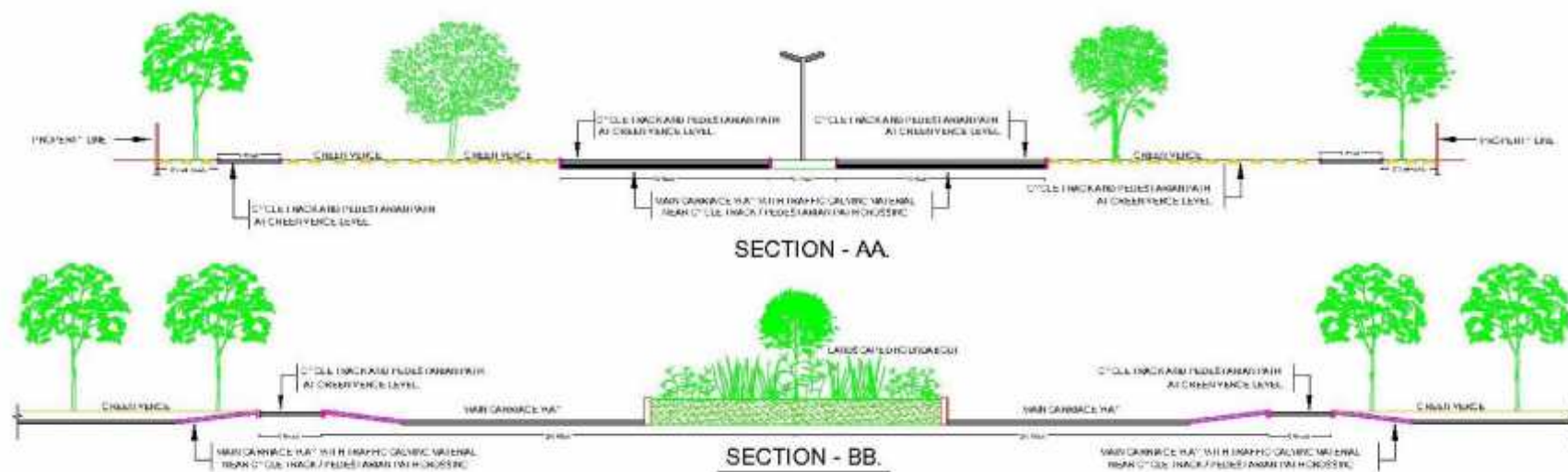
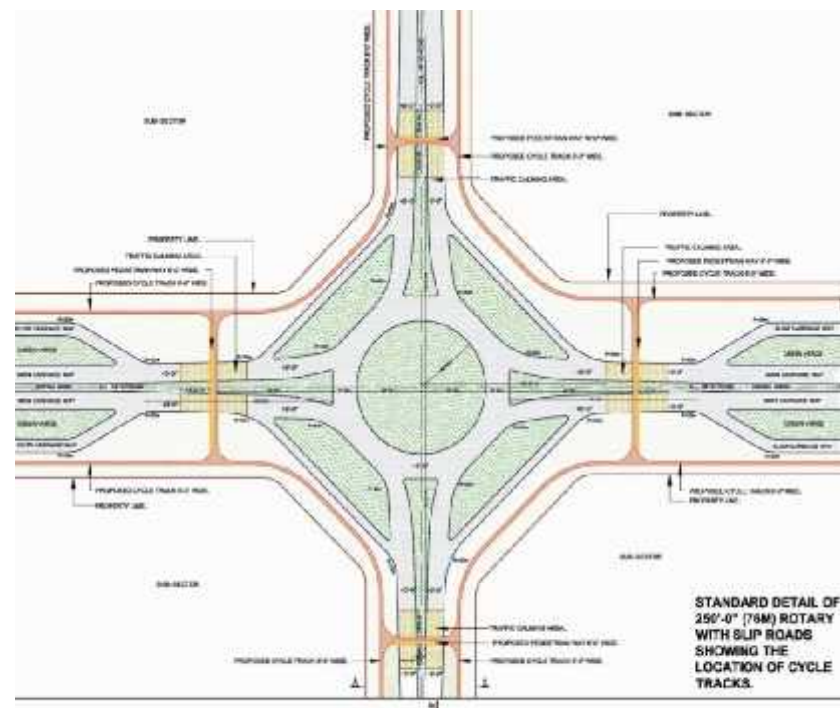
- Footpaths are to be laid at a set back from the road edge to maintain the green edge along the roads. In this area, low shrubs, greens, lawns, are to be planned. The underground services and street lights shall run along this stretch.
- Footpaths can be made to meander around existing trees to enable continuity in pedestrian movement and also prevent endangering trees.
- Ensuring proper execution and maintenance of footpaths. A minimum of 6'-0" wide pedestrian path with precast 2'-0" x 1'-0" precast tile and cobble stone paver block 4"x 4" is to be provided to maintain uniformity of design across the city is recommended. The precast concrete tiles are to be laid over sand bed which can be removed for maintenance of underground services if any and put back in place without any breakage. The tiles will be laid without any cement pointing to facilitate percolation of rain water. This detail is recommended for adoption for all pedestrian paths in the city.
- Advance cautionary signs, blinkers for safety of pedestrians at Zebra Crossings with high volume of pedestrian traffic.



PEDESTRIAN AND CYCLE CONNECTIVITY AT ROAD INTERSECTIONS

- The proposal is aimed at providing direct connectivity between footpaths / cycle tracks around road intersections. The table top is being proposed as a traffic calming measure.
- Ideally at grade zebra crossing supported with and ATC lights should meet the requirements, however since due respect and regard for pedestrians is presently not observed in the city, the calming measures are proposed.

PLAN P19 PEDESTRIAN AND CYCLE CONNECTIVITY AT ROAD INTERSECTIONS





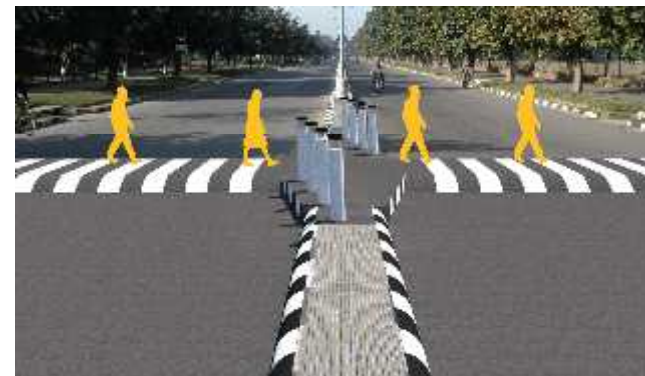
PLANNING FOR EASY FLOW OF CYCLISTS AND PEDESTRIANS



AT GRADE ZEBRA CROSSINGS FOR PEDESTRIAN AND CYCLISTS



TABLETOP CROSSING - TRAFFIC CALMING MEASURE



LANE MARKING FOR CYCLISTS



COURTESY: Chandigarh Urban Lab, University Of Washington



PARKING ASSUMING CRITICAL DIMENSIONS IN CHANDIGARH

Chandigarh is facing acute parking problems due to the manifold and unanticipated increase in vehicles in the city. The design of existing buildings and campuses undertaken by the original team only provides for surface parking which is totally insufficient for present demand. Only a few standalone underground community parking lots were planned in the city centre and in Sector 8 along 17 and 26 Madhya Marg.

Parking norms have been put in place only recently vide notification dated 16.10.2008.

The parking problems vary across different land uses as discussed below :

RESIDENTIAL AREAS

The problem of parking is acute in the residential areas specially In the Marla row housing, cheap housing/EWS which were designed for single family units but is now housing a minimum of three families each often possessing a car and/or a two wheeler. Construction of temporary car porches within the front setback has been permitted however the same does not meet the full requirements. Nursing homes, coaching schools, Guest houses, operating from residential plots. Further aggravate the shortage of parking.



SPILOVER OF TRAFFIC ONTO WALKWAYS AND PARKS OF RESIDENTIAL AREAS



COMMERCIAL AREAS

The neighbourhood commercial centres along V4 had large pavements and limited parking areas. With the increase of private cars, the parking lots have been extended at the expense of the pedestrian footpaths. Despite this, they suffer from parking shortage with cars intruding into vehicle free zones provided for emergency vehicles and parking spills on to the V4 roads to the extent of obstructing vehicular access to the adjoining residential areas. Increased air and noise pollution is an added problem.

The City Centre, Sector 17, Sub City Centre, Sector 34 and commercial belts along major arteries are also facing acute shortage of parking spaces despite provisions made in the original plan. The underground parking lots constructed in Sector 17 and Sector 8 are also not being utilised due to poor maintenance and management.



Institutional Buildings and Places of Worship

The planning of the institutional campuses has also not made provision for sufficient parking resulting in a spill over on to roads and green areas.



TRAFFIC PROBLEMS IN PARKING LOTS

INDUSTRIAL AREAS

The 'Chandigarh Conversion of Landuse of Industrial sites into commercial activity / services in the Industrial Area Phase - I & II, Chandigarh Scheme 2005' has caused manifold increase in parking requirement due to commercial activities generating large visitor footfalls. The requirements of organized loading and unloading of freight from goods vehicles cannot be met properly.



TRAFFIC SPILL OVER ONTO FOOTPATHS



PROPOSALS FOR PARKING

RESIDENTIAL AREAS

- Construction of underground community parking /beneath parks to accommodate cars /vehicles
- Permitting underground parking within courtyard plots
- Utilising services lanes of first phase sectors for parking
- Linking registration of cars with certification /availability of parking space
- Enabling use of neighbourhood level educational campuses for parking during off working hours



EXISTING SITUATION



REMOVAL OF FRONT BOUNDARY WALL
TO ACCOMMODATE CARS



UNDERGROUND COMMUNITY PARKING
/BELOW PARKS



UNDERGROUND COMMUNITY PARKING WITHIN INDIVIDUAL PLOTS



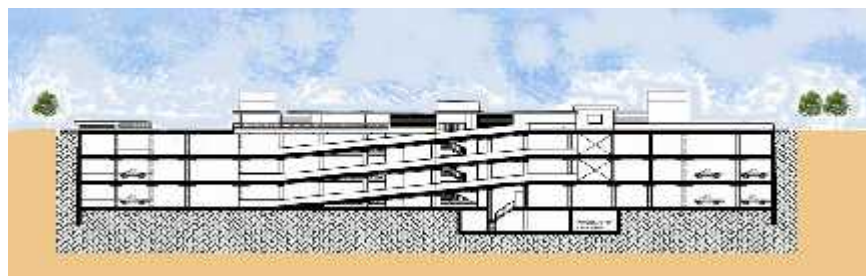
Commercial areas

City Centre Sector 17

The City Centre, Sector 17 is facing acute shortage of parking . RITES has projected deficit of 3000 car spaces in Sector 17. The deficit is to be addressed through underground parking lots for which sites have been identified at the four corners along the internal loop road of the centre. Proposal of underground parking near Gurdev Studio is at an advance stage of planning. The other parking lots are also to be taken up subsequently.

Optimum utilisation of existing underground parking lots. The parking lots which are not being used at present are to be utilised by renovation and proper management. For long term parking the use of underground parking should be mandated. The lots need to be upgraded to make them attractive and safe. State of the art signages, intelligent display systems, lane marking, proper light and ventilation, proper maintenance, safety, security, valet parking will go a long way in ensuring the same. The shop owners /stakeholders to be taken on board for the same.

Similar proposals are recommended for other existing underutilised underground parking lots at the rear of the shopping centres in sector 8, 9, 7, 26.



GURDEV MULTI-LEVEL PARKING PROPOSAL FOR SECTOR-17

SUB CITY CENTRE SECTOR 34

The partially built, Sub City Centre Sector 34 is also facing acute parking problems. The congestion of parking along the approach roads to buildings and parking lots leave no place for pedestrian movement. Revised proposal of the Sub City Centre includes construction of multilevel parking under the landscaped pedestrian plaza . The proposal needs to be executed .



ENTRY / EXIT TO BASEMENT PARKING



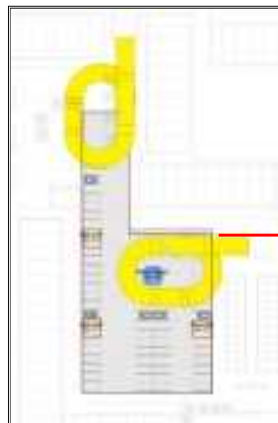
UNDERGROUND BASEMENT PARKING



NEIGHBOURHOOD SHOPPING CENTRES

- Comprehensive Urban Renewal proposal for neighbourhood shopping centres shall address the problem of parking on a case to case basis (Refer Chapter 7 on Commercial Areas) .
- **Creation of car free areas** in the neighbourhood shopping centres to be delineated based on detailed study/analysis. The car free concept for neighbourhood shopping centres revolves around transforming shopping centres from chaotic car dominating place to a **vibrant pedestrian core/vehicle free zone** to be accessed comfortably and enjoyed by the residents.
- As a pilot project Neighbourhood Shopping Centre, Sector 11 shall be taken up, where proposal of taking the V4 and parking subgrade can be explored while leaving free access to residential houses along V4. The feasibility of the concept and the view point of the stakeholders to be taken to finalise the proposal .
- In case of Sector 23 / Sector 8 for example, the underground parking can be created beneath the internal central court which will release land for open space /pedestrian plaza above.

SECTOR 23



Constructing vehicle free zone in neighbourhood shopping centre



EXISTING SITUATION



PROPOSAL OF SECTOR 11

TAKING THE V4 UNDERGROUND TO RELIEVE SPACE FOR PEDESTRIAN MOVEMENT AND COMMUNITY INTERACTIONS .



CASE STUDY SECTOR 23 – URBAN RENEWAL WITH UNDERGROUND PARKING



PARKING SOLUTIONS FOR INSTITUTIONAL BUILDINGS

- Parking within campus. - additional FAR is being allowed for making provisions
- Multi-level parking blocks
- For already constructed campuses which are architecturally controlled - underground parking beyond the footprint of buildings / along institutional belts Jan Marg and Madhya Marg.
- Parking demands can be controlled by implementing transport management measures such as
 - use of car pools for schools and offices.
 - odd and even number vehicles permitted on fixed days
 - car free days
 - segregated timing of office hours
 - use of power driven vehicles within car free zones.



OVERHEAD MULTILEVEL PARKING AT PGI



MULTILEVEL UNDERGROUND PARKING AT THE HIGH COURT



Parking lots at Metro Stations / Metro Nodes as per proposal of DMRC indicated at Table 7 and 8.

Park and Ride concept shall be facilitated at Metro/BRTS/Bus Stands.

Augmentation of parking facilities with latest State of the Art technology.

Whilst the ongoing proposals for multilevel parking are adopting traditional practices, in view of cost considerations, it is recommended that in future semi automated / fully automated / latest technology is adopted which will optimise space within city. The selection of the type of parking system shall take into consideration the ground realities/ feasibility / urban design aspects.

To maintain the green open spaces within city, underground parking lots are recommended as a general solution, however, in the Industrial Area, where high rise buildings are being constructed, over ground parking lots can be considered as community parking in vacant parking lots.

Mandating full occupancy of cars entering commercial centres and other designated areas.



OPENING OF BUILDINGS ON V2/V3 ROADS

The V2/V3 roads were planned as fast vehicular corridors to ensure uninterrupted movement of traffic with no buildings opening on to the roads.

A large number of private residential properties abutting the roads have however provided illegal openings on these roads and not only park vehicles but also carry out outdoor activity on the roadsides. The to and fro /criss- cross movement impedes the smooth flow of traffic while unauthorised construction of courtyard walls /drying of clothes/squatting on *charpoys* lends a poor urban image.



HOUSES WITH DOORS OPENING ON V2/V3 ROADS



BUSES CHARGED WITH SOLAR POWER IN TUNE WITH CONCEPT OF SOLAR CITY

Bus queue shelters be planned to enable charging of buses with solar power.



UNDERPASS FOR SLOW VEHICLES CONNECTING V5S ACROSS V3.

An underpass meant for slow vehicles and pedestrian has been constructed to connect V5 of Sector 15 with the V5 of Sector 11 across the busy Madhya Marg. The same is also extensively used by cars due to convenience and short travel distance.

The concept is worth emulating subject to feasibility on case to case basis in other sectors as well



OTHER PROPOSALS OF CMP 2031

- Concrete roads with different textures for pedestrians/cyclists wherever required.
- Best practices for road infrastructure shall be adopted.
- Incorporation of recycled plastic blended with bitumen to improve durability of roads .
- Use of advanced pavers, geo grid membrane, for pavements.
- Use of recycled aggregate to build roads as is being practiced in developed countries.
- Ensure proper drainage of roads, failure of roads occurs due to improper road drainage
- Synchronization of Signals.
- Identification of Black Spots and taking appropriate counter measures.
- Regular cutting of grass along road berms.
- Further widening of roads at the expense of pedestrian pathways / reduced green berms not recommended.
- Installation of speed governors on all buses plying in & through the city.
- **Buses with cycles** - To facilitate the cyclists while travelling by bus.



Designated lanes for cyclists/pedestrians

Traffic signals to regulate pedestrian/cycle movement

