

## International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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Vol. 8, Issue 5, May 2019

# The Pune Metro Station Area Management and Dispersal

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**ABSTRACT:** Indian cities, with the help of DMRC, are planning to invest about Rs 2 trillion in metro rail systems. But our analysis shows that the DPR prepared by DMRC for Pune has many serious analytical and methodological flaws, making the proposal highly questionable. Therefore, there is an urgent need to revisit all proposed metro rail projects and critically review them. An independent expert group should conduct the review based on clear, objective criteria and examine all aspects such as their justification, governance, accountability, viability and integration with other modes, and the review findings should be publicly debated. India is urbanising rapidly but its urban governance institutions, systems and capacities have not kept pace. This has given rise to the problems highlighted in this paper, resulting in big, expensive projects that often do not deliver the promised benefits and neglect of cheaper, quicker alternatives that may be more beneficial. The Urban local bodies must be reformed to make them transparent and directly accountable to citizens, and undertake integrated, comprehensive, least-cost planning considering supply and demand side options. Otherwise, it is very likely that there would be large investments in urban transport projects with very little benefits, and our cities will grow increasingly grid-locked and unliveable. In turn, this could well put the brakes on the country's much-touted economic growth story. So, provisions for other existing transport system like BRTS should be put and improvement for proper transportation should be made instead of merely focusing on metro rail. The above given solutions which are given, can be put to use to implement and eradicate some of the issues the metro is facing in the market. Care should be taken to develop an integrated transportation system and not favour any one mode of transportation. If the solutions are given and implemented, the problems can be dealt with and the issues which are being faced by other existing metros can be swayed and a faster integrated system can be achieved in a shorter span of time. If possible, underground corridor should be implemented to an extent to achieve an optimal plan with benefits from both the choices. An environmental impact assessment with socio economic surveys for both the corridors in detail can help keep the demands and the supplies under control and these above solutions can be implemented to achieve optimization and efficiency of the Pune metro rail in the following years

**KEYWORDS:** Technical Surveys, Infrastructure, Metro, Indian Transportation, Area Managemnet.

## I. INTRODUCTION

### 1.1.1 Introduction of the Project Work

Pune is well known as the 'Queen of Deccan' due to its scenic beauty and rich natural resources. Besides, it is famous for its religious and historical places. Pune city is known in the world map because of its educational, research and development institutions. The district also has an importance as an important military base. Pune is the most industrialized district in western Maharashtra and a famous IT hub in the country. Pune exemplifies an indigenous Marathi culture and ethos, in which education, arts & crafts and theaters are given due prominence. Pune is the cultural capital of Maharashtra. It is the birth place of the poet-saint Tukaram. It is the home of great freedom fighters like BalGangadharTilak, Agarkar and Gopal Krishna Gokhale. JayantNarlikar, the famous contemporary scientist is from Pune.

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## 1.1.2 Location

Pune district is located between  $17^{\circ} 54'$  and  $10^{\circ} 24'$  North Latitude and  $73^{\circ} 19'$  and  $75^{\circ} 10'$  East Longitude. The district is bound by Ahmadnagar district on the north-east, Solapur district on the south-east, Satara district on south, Raigad district on the west and Thane district on the north-west. Pune district forms a part of the tropical monsoon land and therefore shows a significant seasonal variation in temperature as well as rainfall conditions. Climate of the western region of Pune is cool whereas the eastern part is hot and dry.

## 1.1.3 Road Network

Pune district is well connected with the state capital and surrounding headquarters through road and rail linkages. The road network consists of Express Highways, National Highways, State Highways and Major District Roads. The district has total length of 13,642 km of roads. Following National Highways pass through the district :

1. National Highway No. 4 (Mumbai-Bangalore)
2. National Highway No. 9 (Pune-Solapur-Pune)
3. National Highway No. 50 (Pune-Nashik).

## 1.1.4 Rail Network

The district has a total rail network of 311 km. Pune and Daund are the two major junction stations. Following are the three main railway routes pass through the district:

1. Mumbai-Pune-Solapur
2. Pune-Miraj
3. Daund-Baramti.

## 1.1.5 Air Route

Pune is well connected through domestic airlines with the entire country. The airport located at Lohgaon has recently acquired status of an international airport. Also it is proposed to develop an international air-cargo hub near KhedTahsil of the district.

## 1.1.6 Study Area

The study area has been taken as the area comprising the present Pune Corporation (PMC), PimpriChinchwad Municipal Corporation (PCMC) and both the cantonment areas namely Pune and Khadki. The zoning system of the study area comprise of 53 zones in the PMC area and 38 zones in PCMC area. Pune and Khadki cantonments have been considered as two zones. In addition to 91 internal zones, 13 external zones are considered.

## 1.1.7 Demographic Profile

The total population of the study area in 2001 was 35.6 lakhs. The decadal growth in PCMC area is almost 100% in the past 3 decades. PMC area has registered an average decadal growth of around 35% and a decline in population is observed in both the cantonments. The population figures of study area for the base year 2011 and estimated population for the horizon years are as under:

## 1.1.9 NEED FOR METRO

Public Transport System is an efficient user of space and with reduced level of air and noise pollution. As the population of a city grows, share of public transport, whether road or rail-based, should increase. Experience has shown that, in cities like Pune where roads do not have adequate width and which cater to mixed traffic conditions comprising

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slow and fast moving vehicles, road transport can optimally carry 8,000 persons per hour per direction (phpdt). When traffic density increases beyond this level, average speed of vehicles comes down, journey time increases, air pollution goes up and commuters are put to increased level, of inconvenience. Thus when on a corridor, traffic density during peak hours crosses this figure, provision of rail-based mass transport, i.e. Metro system should be considered.

## 1.1 Objectives

1. Efficient and safe traffic dispersal in metro station areas
2. Efficient management of road space below metro stations
3. Efficient and safe movement of pedestrians at metro stations
4. To achieve integration amongst various modes at metro stations
5. Parking Provision near Metro Station areas.

Station Influence Zone for restricting

## 1.2 Scope of the Project Work

- To ensure uniform 2+2 lanes for traffic – Widening of Footpaths
- Efficient traffic and commuters dispersal
- Integration with Other Transport Modes
- Parking Provision near Metro Station areas.
- Station Influence Zone for restricting on-street parking, hawking & providing encroachment free footpaths.
- Footpath Railings

## II. LITERATURE REVIEW

Initially, to understand the problems being faced by the city, visits were made to the assigned offices and a better outlook towards the Pune Metro was achieved. Development plans of DMRC and BMRC were studied in detail along with the proposed development plan of the Pune Metro. Various persons associated with the Delhi or the Bangalore metro were approached and the problems faced during the construction were discussed. The problems being faced for Pune metro were also discussed. Various maps have also been used for reference and the geological problems concerning the strata were found out. Based on the study, the construction problems were sought after and the proposed solutions were given. For the traffic problems, traffic department of Pune was visited and the details regarding the Pune metro and the problems it will pose on the traffic were discussed. PCMC department was also visited regarding the surveys conducted for the metro and the approach to this methodology was discussed with the executive engineer. The proposed phases of the Pune metro also pose a problem for land acquisition and the existing structures will be hampered with at certain places which are valuable from the historic viewpoint. The cost proposed for the Pune Metro is close to 10,000 crores and for this amount, central government, state government and the municipal corporation along with the World Bank are expected to contribute. This burden on the government and public due to the civic taxes has been discussed too. The Vanaz- Ramwadi corridor has various construction problems and this point had been discussed with the officials and solutions for this problem were found out. Along with this, a pre feasibility survey was conducted on households near the PCMC region where the need for the metro was found out and the public view point was presented in the form of graphs and pie charts and solutions were found out.

### [1] Productivity Aspects of Concrete Boom Placer in Pune Metro Rail:

In spite of the development in construction industry; the productivity in this sector is still considered as critical factor for most construction firms. This paper reviews current productivity measurement literature, particularly that pertaining to the construction sites, and offers recommendations/suggestions, for improvement of productivity at the site. It also shows the productivity of a concrete boom placer based on its planned/targeted concrete vis-a-vie actual consumption,

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wherein targeted machine hours are the input value and actual machine hours is the output of the productivity. Considering single factor type of productivity i.e. amount of concreting done, calculations of the productivity of the boom placer in Pune metro rail project is made. This paper explains, why productivity at construction site is reduced due to improper shuttering, and unavailability of materials.

## **[2] Construction Equipment Fleet Management: Case Study of Highway Construction Project:**

Large numbers of construction equipment are required on construction site. The efforts of contractors are to constantly push machine capabilities forward. As the array of useful equipment expand, the importance of careful planning and execution of construction equipment's increases. The objective of the project is to predict the fleet production rate and to optimize the number and size of equipment's in the fleet to match the equipment to project situations. Equipment economics is taken into consideration for the optimization.

## **[3] Construction Quality Controlling for Urban Metro Projects based on CIC:**

At present, urban metro construction accidents occurred frequently in China are accompanying with the rapid growth of metropolis and infrastructure investment. Clear quality control during urban metro construction has become extremely important but is very difficult, time-consuming and chaotic due to the lack of product parameters, clear organization and process information. This paper presents the development and application of a CIC-based system for quality risk early warning in urban metro construction.

## **[4] AN OVERVIEW OF CONSTRUCTION SECTOR IN INDIAN ECONOMY, Dr.Pa.KajaMohideen:**

Throughout this paper, we tried to discuss the overview of construction sector in Indian economy. Construction starts with planning, design, and financing and continues until the structure is ready for occupancy. The Construction industry of India is an important indicator of the development as it creates investment opportunities across various related sectors. The industry is fragmented, with a handful of major companies involved in the construction activities across all segments; medium sized companies specializing in niche activities; and small and medium contractors who work on the subcontractor basis and carry out the work in the field.

## **[5] Research Trends in Information Technology Applications in Construction Safety Engineering and Management, Mirosław J. Skibniewski:**

Through analysis of articles published from 2000 to March 2014 in Automaton in Construction (AUTCON), an international research journal published by Elsevier, this paper summarizes the topics of research and the institutions worldwide where research was conducted in construction safety engineering and management. Seventy-one articles published during this time focused on Information Technology (IT) applications in this field were selected for analysis. The underlying research topics and their related IT implementations are discussed, and research trends in allied specialties are identified.

## **[6] GREEN CONSTRUCTION POLICY, Metropolitan Transportation Authority, CONSTRUCTION COMMITTEE:**

After the proposed Green Construction Policy is adopted by the LACMTA Board, staff will incorporate the requirements of this policy in all future procurement contracts. It is not retroactive. Staff will encourage Contractors that work on existing construction projects in LACMTA properties or rights-of-way to implement the provisions of this policy to the greatest extent feasible. Staff will develop a collaborative process to phase the implementation of this policy in other jurisdictions that receive/program LACMTA funding (in whole or in part) for construction projects.

## **[7] The Metro Project Construction Safety Risk Managing System of GMC, Guangwu Liu, FengxiaLuo, Gang Zeng:**

Based on the international vulgate safety risk managing theory, the Guangzhou Metro Corporation (GMC) summarizes the standard system of safety risk management in metro rail transit project, integrating with criterion files about project

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on safety risk management promulgated by the Ministry of Housing and Urban-Rural Development of the People's Republic of China (MOHURD), according to the project practice. The result of application indicated that this system, which has been popularized in several other Chinese cities, effectively guaranteed personnel and project safety, and promoted the safety risk managing level of project participators in the same time.

### [8] RAIL OPERATIONS & MAINTENANCE PLAN, DRAFT:

Organization structure and projected staffing numbers will be developed for all tasks associated with the operations, maintenance, security, safety and Agency oversight of the CP/EV LRT Project. A preliminary organization and staffing table was developed and is included in the Preliminary Industrial Engineering Report for the Maintenance and Storage Facility. As currently envisioned, three Contract Operator will be hired and will be responsible for all daily operations functions including maintenance and service of the following system elements:

### [9] Optimization of Pune Metro Rail, PriyankaChib:

The objective of this paper is to present a pre-feasibility study conducted by carrying out household surveys and focusing on the short-comings of the Pune metro (India) to be faced in near future based on the available data and providing suggestions for the afore-mentioned problems. Construction, geological and the cost factors have also been considered in the paper. The proposals given can serve as a reference to avoid the future infrastructure conflicts and planned development for the Pune metro department.

### [10] Detailed Study on Heavy Equipment with Its Latest Technologies and Recommendations for Its Usage for Different Metro Projects, Ritesh Kumar Biswas, Kesavan:

Tremendous increase in the numbers of vehicle inroads causing delay in road transportation due to traffic, but with the introduction of Metro Rail a huge number of passenger can travel in a much shorter time and also its very economical as compare to the travelling cost through private vehicle. To prepare this report first of all questionnaire survey and details regarding equipment was been collected from various construction site then it was converted in the form of Binary Variable for Cluster Analysis.

## III. METHODOLOGY

### 1. Parking system provided near Pune Metro station.



Fig No 01 Parking system provided near Pune Metro station

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- a. Parking lots have been provided at Metro stations to facilitate commuters to park their two wheeler and/or Four Wheelers at station and use metro service.
- b. The parking lots have been outsourced to the contractors who are solely responsible for the safety and security of all the vehicles parked in parking lot and is liable to pay compensation in case of theft of vehicles or damage to vehicles.
- c. Pune Metro supervises smooth operations and adherence to provisions made in contract by the contractors.
- d. Having constructed a massive network in record time, the Pune Metro today stands out as a shining example of how a mammoth technically complex infrastructure project can be completed before time and within budgeted cost by a Government agency.

Will be-



### 2. Multi-utility zone (MUZ) design principle

#### Problem-

1. Presently this is a wasted area neither needed for thoroughfare traffic nor by pedestrians.
2. Left unused it is prone to encroachment silt accumulation etc.

#### Solution-

1. Can be use to accommodate essential street elements like bus stops, auto rickshaw stand , parking and waiting area, utility boxes ETC.
2. Where the buffer area is in level with the footpath the difference between the two should be made easily visible to the pedestrian by using different surface treatment.

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Fig No 02 Multi-utility zone (MUZ) design principle

### 3. The proposed different elements on the road

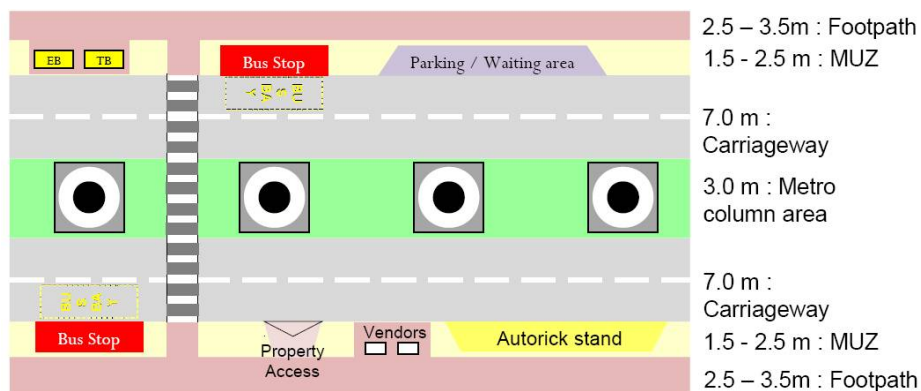


Fig No 03 The proposed different elements on the road

1. Consistent width and continuous length for footpath and carriageway
2. Wherever available, to be utilised for provision of bus-stops, parking/waiting area, auto-rickshaw stand, utility boxes, etc

### IV. NO PARKING, NO HAWKING & NO ENCROACHMENT ON FOOTPATH

- 4.1 **Main Arterial-** Restrictions of “No parking and No hawking” to be enforced below the station and also for a stretch of **100 m** on both sides from edge of the station;
- 4.2 **Connector Roads– 200m** stretch on both sides of the metro alignment shall be kept free for operations of feeder bus routes, IPT (auto/taxi pickup/drop off) & cycle/ two wheeler parking;
- 4.3 Encroachment on foot paths under Metro Station Influence zone to be removed.

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### V. BUS ROUTE INTEGRATION

- 5.1 Bus Stops to be located within **50m** distance from entry/ exit points of metro station;
- 5.2 Relocation of bus stops wherever required to optimize walking distance;
- 5.3 Maintain sufficient gap between bus stop and auto/taxi stands/pickup/drop-off places to avoid conflict of movement

### VI. TRAFFIC DISPERSAL (VEHICLE & PEDESTRIANS)

#### Vehicular Movement:

- Widening of Footpaths below metro stations
- Uniform 2+2 lanes for smooth flow of traffic (for stations Shivajinagar)
- Uniform 3+3 lanes for smooth flow of traffic at other stations.

#### Pedestrian Movement:

- Encroachment Free Footpaths along Main and Connector Roads.
- streamlining of existing utilities / facilities where ever required

### VII. TRAFFIC SIGNALS

- Traffic Signal timings to be synchronized after the Metro implementation.

#### **IPT OPERATIONS: Auto Rickshaw & Taxi**

- Auto/Taxi Pick up and Drop off Operations mainly on Connector Roads.

### CASE STUDY

#### **Pune Metro routes – Phase I**

- **Corridor 1** – PimpriChinchwad to Swargate
- Length - 16.589 km
- Elevated 11.570km – PC to Shivajinagar
- Underground 5.019km – Shivajinagar to Swargate
- Capital cost - Rs.7422 crores (with Central taxes only)
- **Corridor 2** – Vanaz to Ramwadi
- Length - 14.925 km – Fully ELEVATED
- Capital cost - Rs.3447 crores (with Central taxes only)
- Total cost of Phase I – Rs.10869 crores
- Total completion cost – Rs.11802 crores(incl State taxes &interest)
- Costs revised based on August 2014 prices
- Actual cost of execution could be much higher

#### **Pune Metro routes – Phase II**

- 1) Swargate – Katraj
  - 2) Chinchwad – Nigdi (15 km for (1) & (2))
  - 3) Deccan – Tilak road – Swargate – Shankerseth road – Race course – Bund garden (11 km)
  - 4) Pataleshwar – University – Aundh – Hinjewadi (18 km)
- Total Phase II – 44 Km  
Total **Phase I + II** – 75.5 km



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## PCMC- Swargate Route

PCMC to Agriculture College – Elevated  
Agriculture College to Swargate – Underground  
PCMC (START) – Old Pune Mumbai highway(service road) –  
(2) Tukaramnagar – (3) Bhosari – (4) Kasarwadi –  
(5) Fugewadi – (6) Dapodi – River crossing – (7) Bopodi –  
(8) Khadki – (9) Range hill – Agriculture college\*–  
(10) Shivajinagar – Police ground – Shivaji road –  
(11) Pataleshwar – (12) PMC – River crossing –  
(13) Budhwarpath – (14) Mandai – (15) Swargate (END)

# Numbered locations are 15 metro stations (1 to 9 Elevated and 10 to 15 Underground)

\*Metro passes through the Agriculture college campus

## Vanaz-Ramwadi Route

(1) Vanaz (START) – Paud road – (2) Anandnagar – (3) Ideal Colony – Paudphata – Karve road – (4) Nal stop –  
(5) Garware college – (6) Deccan – JM road –  
(7) Pataleshwar\* – Sanchetichowk – (8) Civil court – River crossing – Ambedkar road – (9) Mangalwarpath – (10) Pune  
Railway station – Railway crossing – Jehangir hospital –  
(11) Ruby hall clinic – (12) Bund garden – River crossing –  
Nagar road – (13) Yerawada – (14) Kalyaninagar –  
(15) Ramwadi (END)

# Numbered locations are 15 metro stations

\*Pataleshwar is protected ancient archaeological site

– Metro proposed within the 100 mtr ‘No construction zone’

□ Both corridors cross at Barvechowk but not interconnected as one is underground and the other elevated

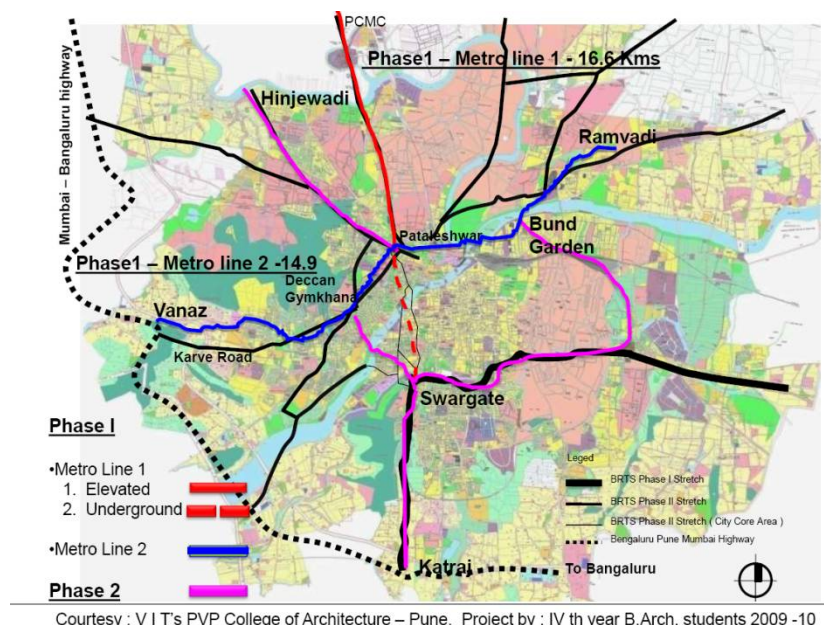


Fig No 04 Pune Metro routes – Phase I and II

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Vanaz-Ramwadi Elevated Metro Issues

Project is to be implemented through densely populated areas along highly congested arterial roads – Paud road, Paud phata, Karve road, Jangli Maharaj road, Sanchetichowk, Sangam bridge, Maldhakka, Railway station, Jehangir hospital, Bund garden road....

### 1) Metro columns on road

- Elevated Metro has to run on road at a height of about 10 mtr. There will be a flyover like structure called **viaduct** on piers at road median
- Reduction in road carriageway width by about 3 mtr.

### 2) Metro alignment on road

- Metro will deviate from road centre where obstructions, sharp turns on road which Metro cannot take, example Paudphata, Deccan corner....

### 3) Metro station on road

- 35 mtr.wide, 140mtr. long and 23 mtr. (6-7 storey) high Metro station
- road widths inadequate
- parking space not possible due to congested locations

### 4) Building demolitions, land acquisition required for (2) & (3) above

Vanaz-Ramwadi Elevated Metro Issues

### 5) Violation of fire safety norms and DC rules in Metro construction

- Insufficient space for Metro stations - part / full demolition of buildings
- Metro construction could be very close to existing buildings
- Rescue in case of emergencies could be severely hampered

### 6) Shifting of surface and under ground utilities required

- Serious problems in physical shifting, coordination between agencies

### 7) Road blockage / Traffic management during construction

- 9 mtr of central road portion will be barricaded during construction
- Suitable roads for traffic diversion not available
- Severe traffic bottlenecks and mobility will be seriously affected

### 8) Large number of trees on the corridor will be cut (example JM road)

### 9) Visual impact

- Metro track will be like a continuous flyover on road with huge metro stations across entire road width

### 10) Inordinate delays and cost escalation due to various reasons

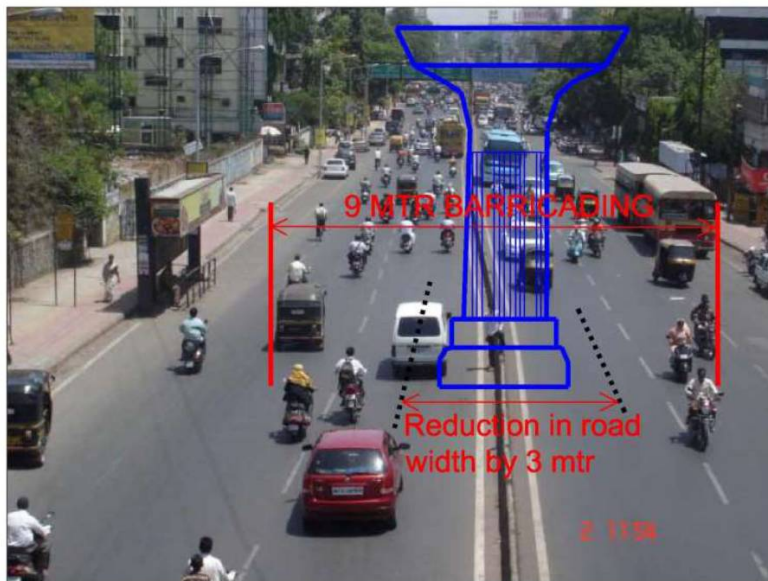
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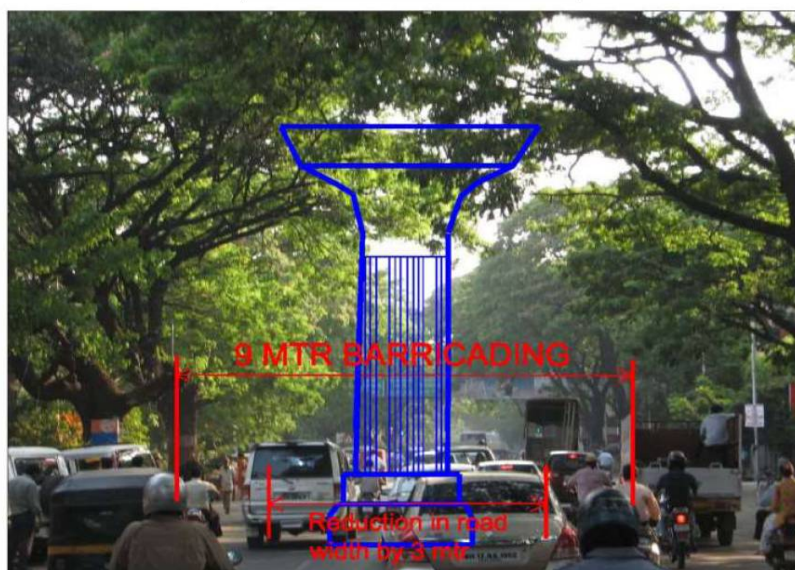
## Metro on road



Karve road

Fig. 5 Karve metro road

## Metro on road



JM road

Fig. 6 JM metro road

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## Metro Alignment

– Paud phata to SNDT

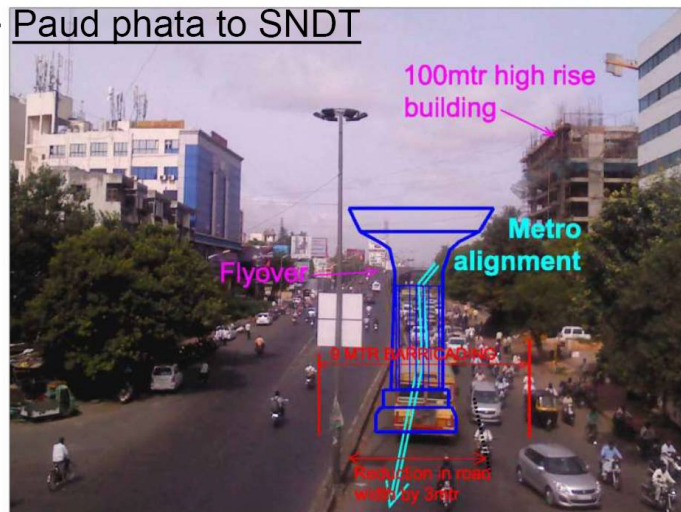


Fig. 6 Paudmetro road

## Metro Alignment – Deccan corner



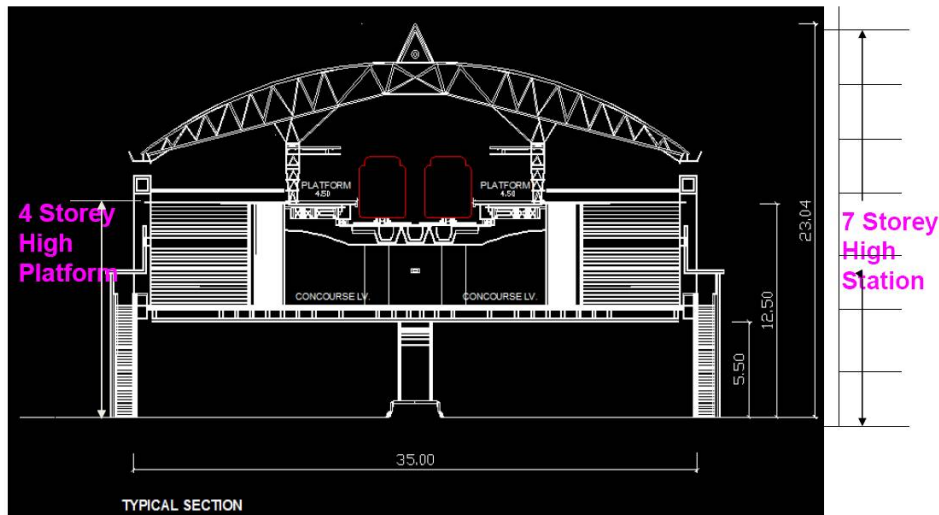
Fig. 7 Metro Alignment metro road

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### TYPICAL METRO STATION

(Indicative concept drawing)

Fig.8 Typical metro station

Some other important issues

Land for Metro depots not available ??

- Corridor 1 - PCMC to Swargate

Metro depot proposed within the Agriculture college

– Area required 11.5 hectares

– Metro to run inside the college premises for length of about 1 km

- Reported that Agriculture college unwilling to provide land

- Corridor 2 – Vanaz to Ramwadi

Metro depot proposed at old kachra depot site

– Another project ‘Shivrishti’ already approved at same site

– Area beyond site hilly and under BDP

- Issue not yet sorted out

Overlapping of Transport options

- Local train route, BRT corridors, grade separated highway, rapid transit riverside road overlap with Metro corridors
- will impact metro ridership, also wastage of public money

### Utility for citizens?

Low ridership

- Metro capacity is up to **30000 phpdt**(peak hour peak direction traffic)

Break-even point between bus transport and Metro is **15,000 phpdt**

Most likely maximum phpdt for Vanaz- Ramwadi route will be

**6203 in 2018, 8519 in 2021 and 10982 in 2031** --- indicates **very low ridership**.

This means that the Metro route is not suitable or convenient for people in the area considering their origin and destinations

Bus connectivity to proposed Metro stations not good

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- With no parking space at Metro stations, commuters will not be able to use own vehicle to travel up to the station.
- High passenger density areas not covered example Shivajinagar railway station and ST bus stand, Pune railway station and ST bus stand. Though Metro route passes through nearby areas, Metro stations are not directly accessible from within the premises.
- Due to such reasons utility of Vanaz-Ramwadi Metro will be low and also expected reduction in traffic on road may hence not take place – which means increased congestion on roads with reduced carriageway width – **This defeats the very purpose of having Metro !**

## MODEL APPLICATIONS, RESULTS AND DISCUSSIONS

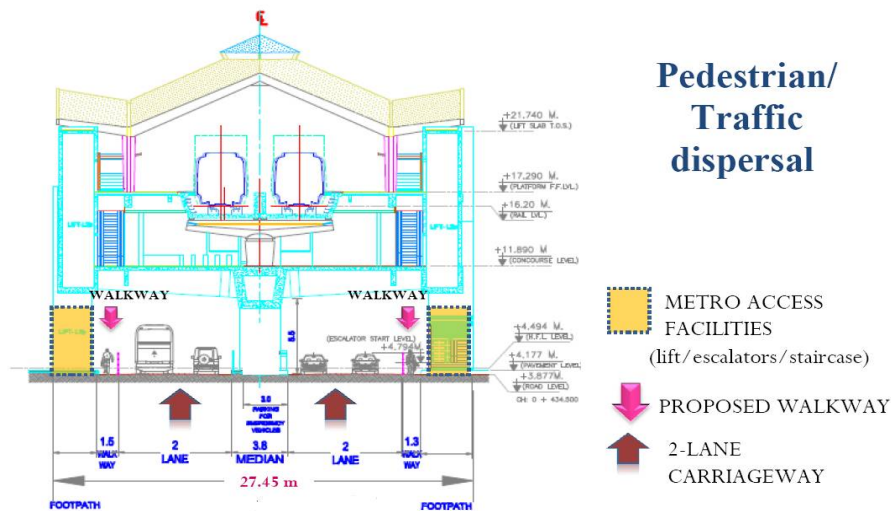
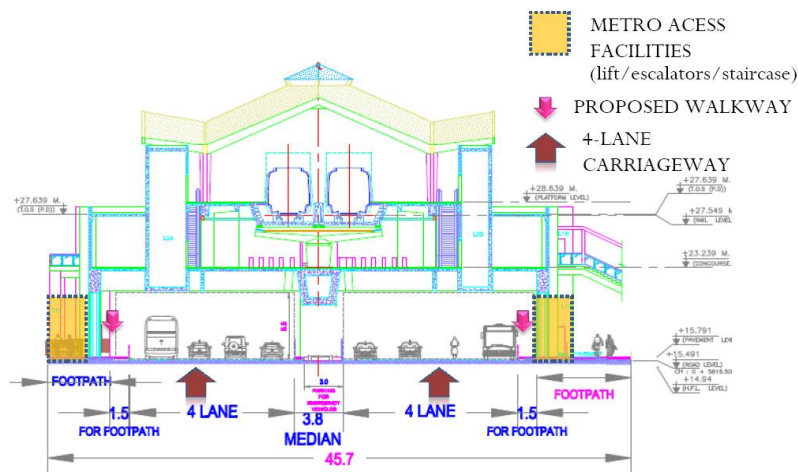


Fig No 9 Layout Ramwadi Station



## Pedestrian/Traffic dispersal

Fig No 10 Layout Shivajinagar Station

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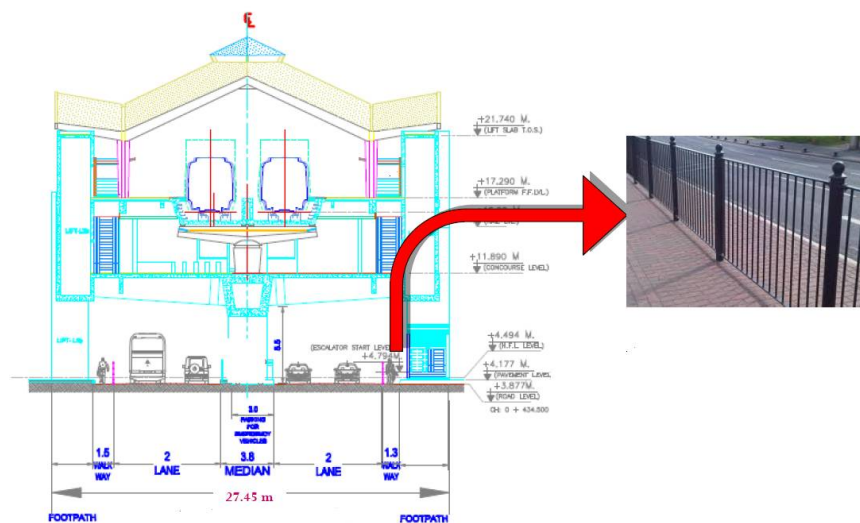


Fig No 11 On-Street Two Wheeler Parking Proposed On Connector Road (South)

## VIII. CONCLUSION

Indian cities, with the help of DMRC, are planning to invest about Rs 2 trillion in metro rail systems. But our analysis shows that the DPR prepared by DMRC for Pune has many serious analytical and methodological flaws, making the proposal highly questionable. Therefore, there is an urgent need to revisit all proposed metro rail projects and critically review them. An independent expert group should conduct the review based on clear, objective criteria and examine all aspects such as their justification, governance, accountability, viability and integration with other modes, and the review findings should be publicly debated. India is urbanising rapidly but its urban governance institutions, systems and capacities have not kept pace. This has given rise to the problems highlighted in this paper, resulting in big, expensive projects that often do not deliver the promised benefits and neglect of cheaper, quicker alternatives that may be more beneficial. The Urban local bodies must be reformed to make them transparent and directly accountable to citizens, and undertake integrated, comprehensive, least-cost planning considering supply and demand side options. Otherwise, it is very likely that there would be large investments in urban transport projects with very little benefits, and our cities will grow increasingly grid-locked and unliveable. In turn, this could well put the brakes on the country's much-touted economic growth story. So, provisions for other existing transport system like BRTS should be put and improvement for proper transportation should be made instead of merely focusing on metro rail.

The above given solutions which are given, can be put to use to implement and eradicate some of the issues the metro is facing in the market. Care should be taken to develop an integrated transportation system and not favour any one mode of transportation. If the solutions are given and implemented, the problems can be dealt with and the issues which are being faced by other existing metros can be swayed and a faster integrated system can be achieved in a shorter span of time. If possible, underground corridor should be implemented to an extent to achieve an optimal plan with benefits from both the choices. An environmental impact assessment with socio economic surveys for both the corridors in detail can help keep the demands and the supplies under control and these above solutions can be implemented to achieve optimization and efficiency of the Pune metro rail in the following years

# International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor, Monthly, Peer Reviewed Journal)

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Vol. 8, Issue 5, May 2019

**From the consideration of all the above points we conclude that, The Pune metro station area management and dispersal solution are achieved through this project-**

- 1) Efficient and safe traffic dispersal in metro station areas
- 2) Efficient management of road space below metro stations
- 3) Efficient and safe movement of pedestrians at metro stations
- 4) To achieve integration amongst various modes at metro stations
- 5) To ensure uniform 2+2 lanes for traffic – Widening of Footpaths
- 6) Efficient traffic and commuters dispersal
- 7) Integration with Other Transport Modes
- 8) Parking Provision near Metro Station areas.
- 9) Station Influence Zone for restricting on-street parking, hawking & providing encroachment free footpaths.
- 10) Footpath Railings.

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