INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 4, Issue 2)
Available online at: www.ijariit.com

Land use Analysis on Urban Sustainability in a Transit Oriented Development

N Praveen
praveen.archizz@gmail.com
Hindustan Institute of Science and Technology, Chennai, Tamil Nadu

Emline Madonna R. Jose
emline.madonna.rj@gmail.com
Hindustan Institute of Science and Technology, Chennai, Tamil Nadu

ABSTRACT

Urban sustainability involves environmental, economic, social and political issues. The challenges in urbanization such as population growth, urban sprawl, poverty, inequality, pollution, congestion, and mobility need to be addressed to achieve a sustainable, livable, economical and energy efficient urban form. This paper aims to highlight the urban sustainability issues that arise due to rapid development of transit corridors by analyzing the changes in land use structure and urban form in relation to a transit-oriented development.

Keywords: *Sustainability, Transit Oriented Development, Land Use, Walk Ability, Urban Nodes.*

1. INTRODUCTION

A Transit-oriented development expedites urbanization as it serves as a catalyst which fuels growth both planned and organic. In India's mega cities or metropolitan agglomerations development takes place at alarming pace along the growth corridors creating many compounded urban issues needing interventions over time. National transport policy of India, 2006, advocated public transport and recommended to promote road transport, which is energy efficient, conserves the environment and meets social demand. It also advised promoting Non-Motorised transport. The national policy recommended, "Transit Oriented Development" with high- density areas.

Due to the liberalization of economic policies, major cities and their peripheries which have well-developed accessibility and transport systems are favored for investment in manufacturing and infrastructure. Transport has an important role in meeting the goals of urban sustainability. High percentages of the state's urban population are also likely to be located in these growth corridors. Hence the challenge for a sustainable urban form is to meet the economic performance objectives and environmental sustainability of a city at the same time. Road's with mass transit network facilitates the rapid growth and densification thus creating multiple urban nodes which are dynamic in nature. Low density sprawled development makes it difficult for the public transport system to survive hence high-density polycentric development is bound to take place along transit corridors.

The vision is to create cities that perform well economically and conforms to the objectives of environmental sustainability. In order to be economically efficient, a city needs to reduce production costs, reduce travel time between the different transient spaces. It may be useful to build multi-modal urban region and supply transport to take care of the different urban and economic activities. Two more factors namely, the speed of its transport system and the geographical spread of activities affect economic performance (Bertolini, 2005).

For a sustainable and efficient delivery, the land use and transport policies will have to match the demand of different activities.

Koyambedu –An Analysis

Koyambedu is the converging point of all types of roads based vehicles in Chennai city and over time has evolved as the life line to the city. It is the transportation hub of Chennai, it is surrounded by roads of all hierarchies like

- Arterial Roads,
- State Highways
- National Highways
- Inner Ring Roads

This connects the North, Central and Southern arms of Chennai. Koyambedu bus terminus also connects the Chennai International airport and Chennai Central Railway Station and Metro station. Koyambedu is undergoing constant development; it has evolved from an agricultural land to a thriving commercial and residential sector that people throng at all year round.The inner ring road Jawaharlal Nehru Salai , 100 feet road is a major transportation corridor connecting the Chennai international airport (13.2 kms) and Chennai central station (10.2 kms).This stretch is well connected to other parts of the city through – Mumbai High Road, NHB,EVR Periyar Sali,Vellore Chennai Road,Poonamallee High Road. The Koyambedu Junction connects the golden quadrilateral at NH4

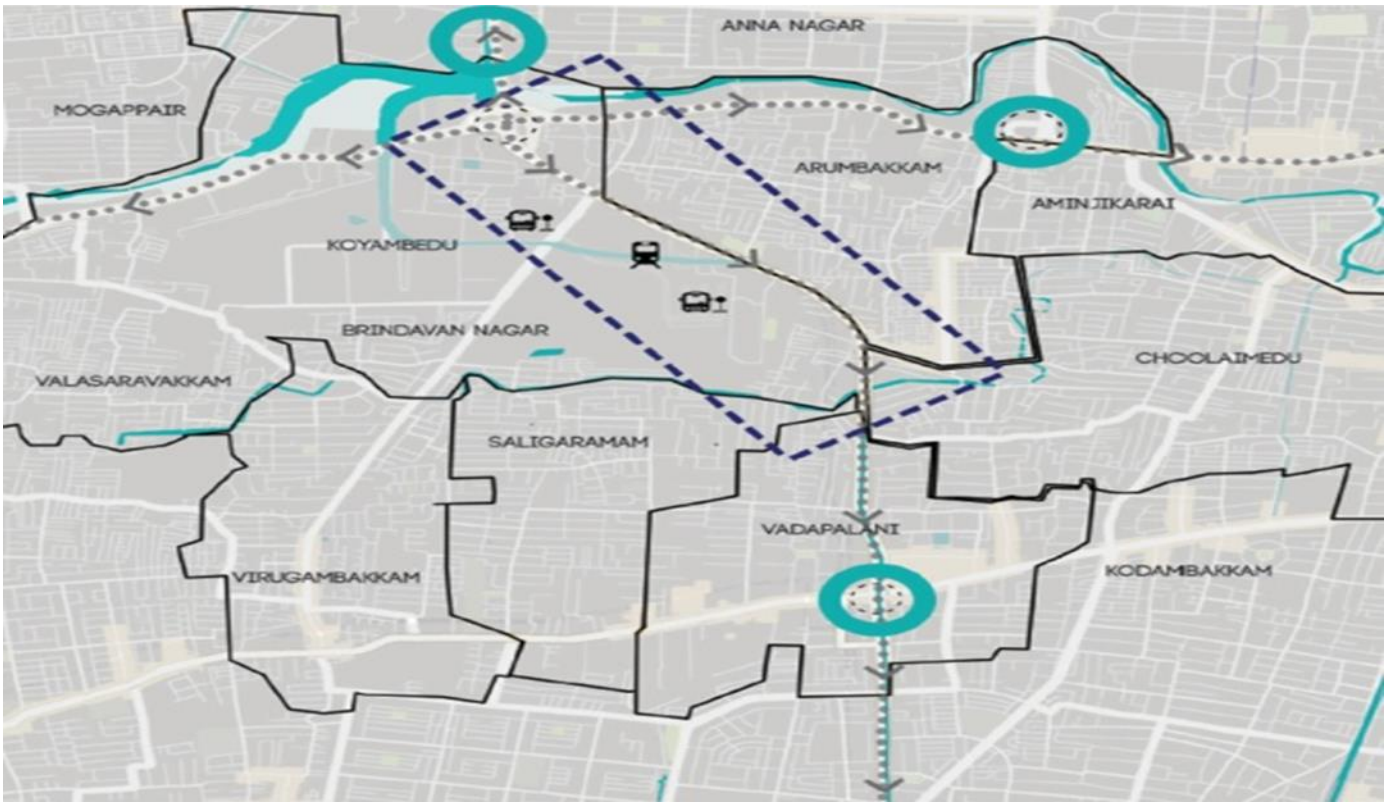


Fig 1 Location map of Koyambedu

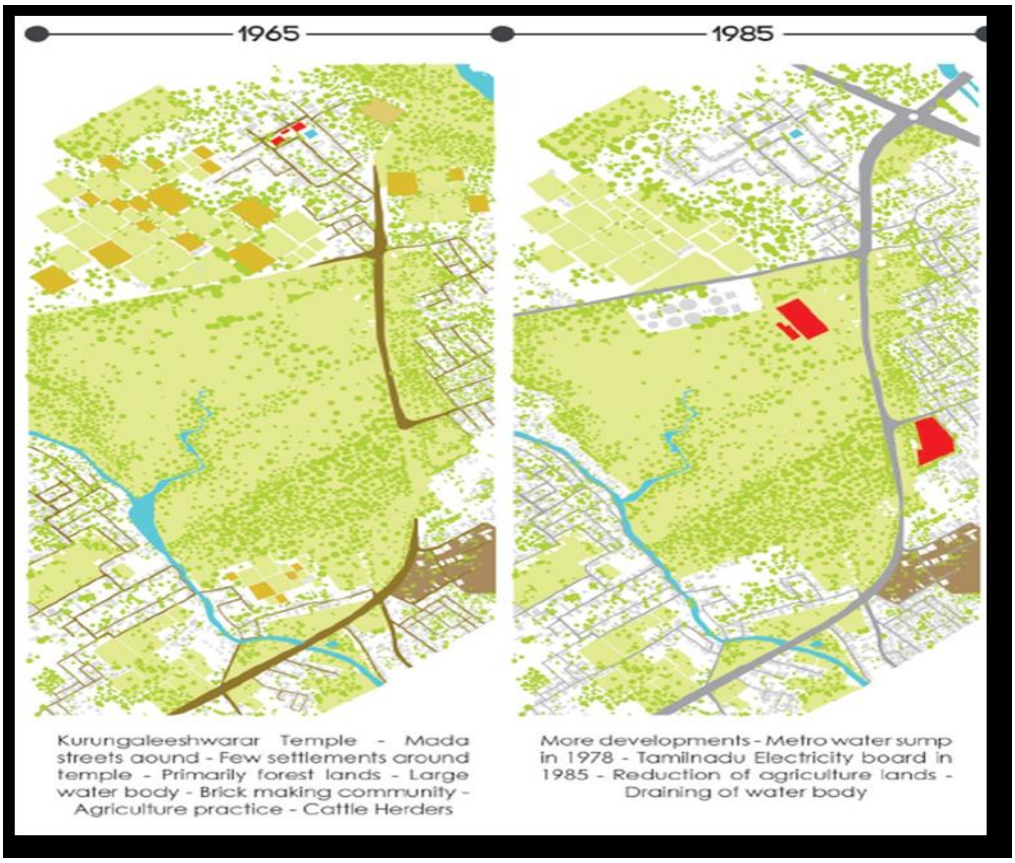


Fig 2 Urban Morphology of Koyambedu

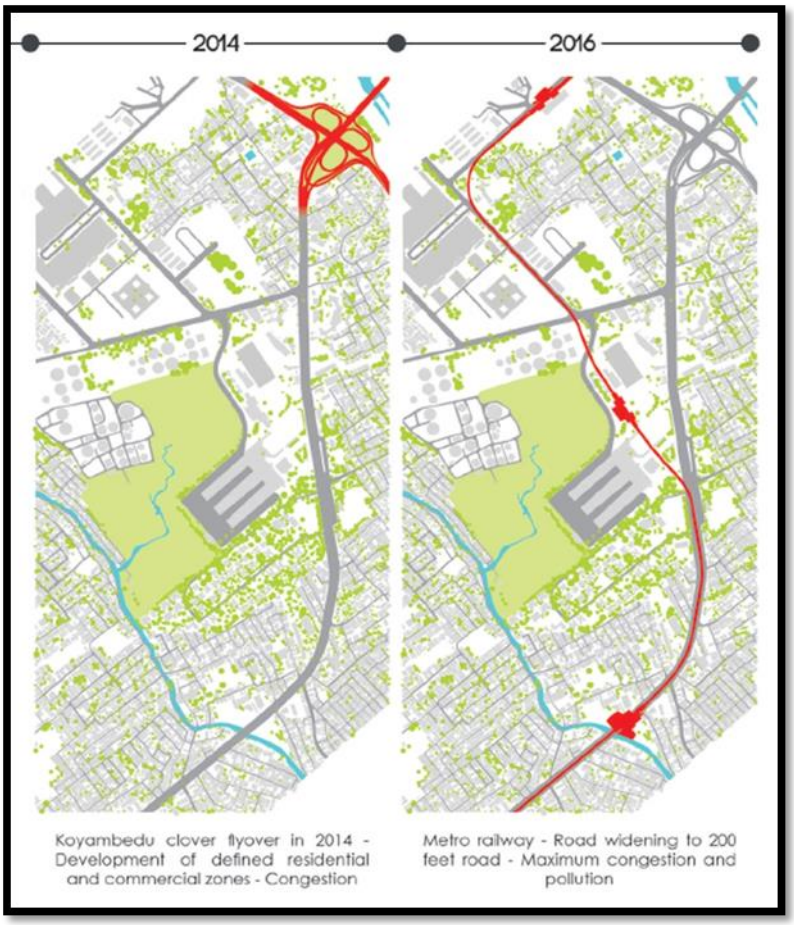


Fig 3 Urban Morphology of Koyambedu

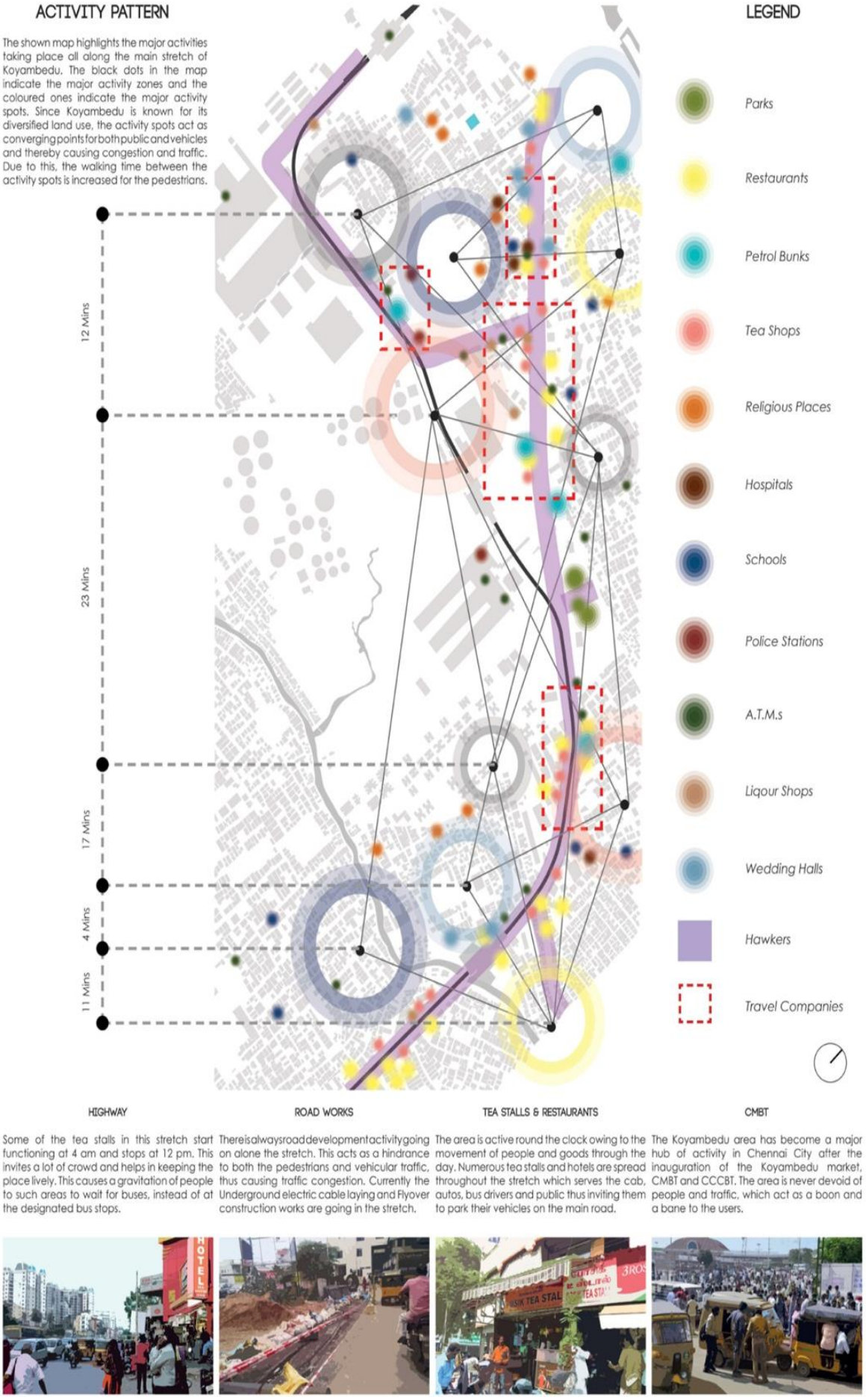


Fig 4 Activity Pattern

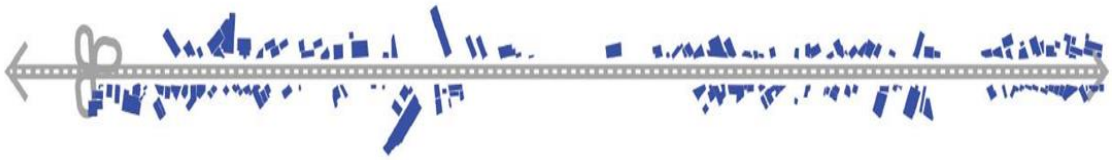
2. INFERENCES

BUILT VS. OPEN SPACES

- Indicates built and open spaces along 100 feet road

COMMERCIAL ACTIVITY

- Indicates areas of commercial activity along 100 feet road

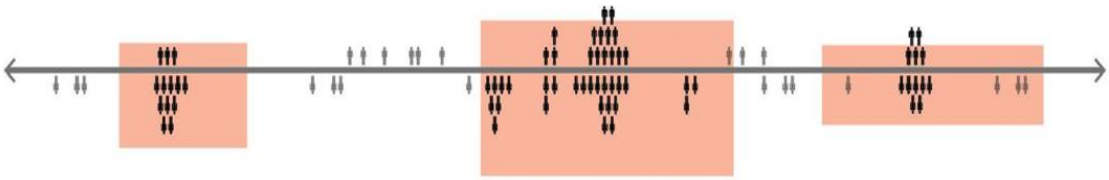


PARKING

High Parking Usage
Medium Parking Usage
Low Parking Usage

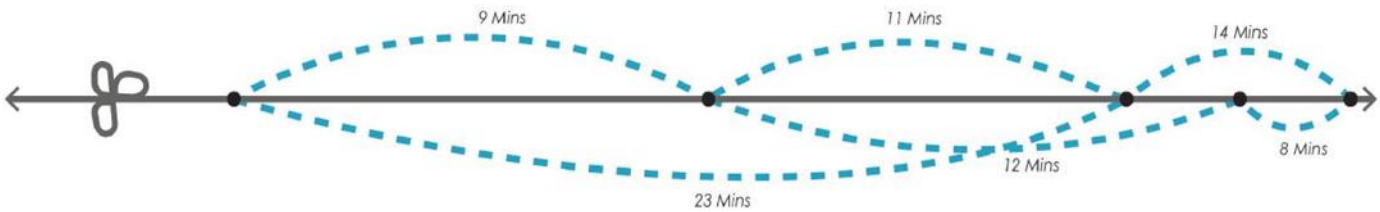
PEDESTRAIN AND PUBLIC TRANSPORT HOTSPOTS

- Indicates crowding zones of pedestrians and public transport vehicles (buses, autos, share autos) along 100 feet road.
- Public Transport Hotspots
- Pedestrian Traffic Hotspots



WALKABILITY

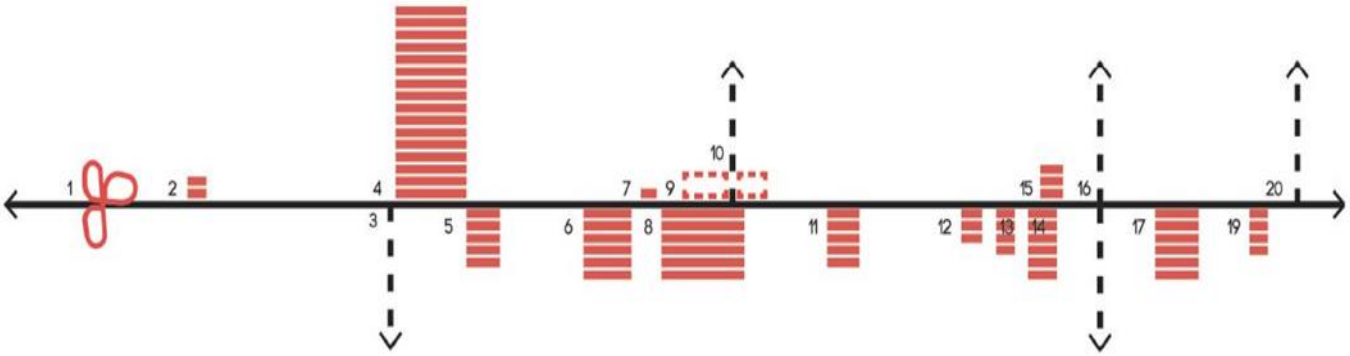
- Indicates walking time from and to indicated points along 100 feet road



LANDMARKS

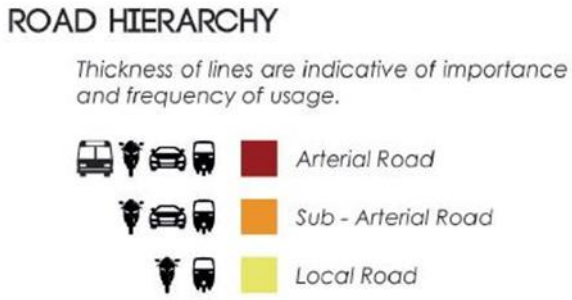
- Info graphic indicates mental and visual landmarks along 100 feet road. This shows that sizes of buildings are not deciding factors in creating landmarks

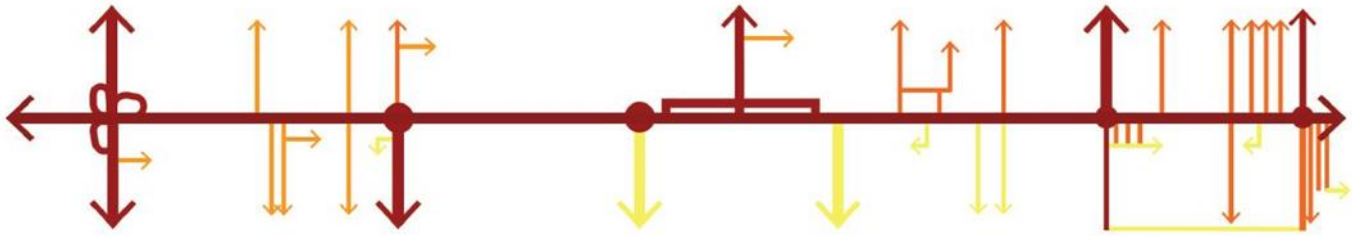
1. Koyambedu Flyover
2. DMDK Office
3. Kaliamman Street
4. Arihant Towers
5. 10 Square Mall
6. C.M.B.T. Metro Station
7. Ambedkar Statue
8. C.M.B.T.
9. Jai Nagar Park
10. Jai Nagar Street
11. SAF Games Village
12. Vijay Park
13. Radha Regent
14. Triumph Apartments
15. Vallavan Hotel
16. MMDA Junction
17. Arumbakkam Metro
18. Rayyan Tiles
19. Periyar Pathai



ROAD HIERARCHY

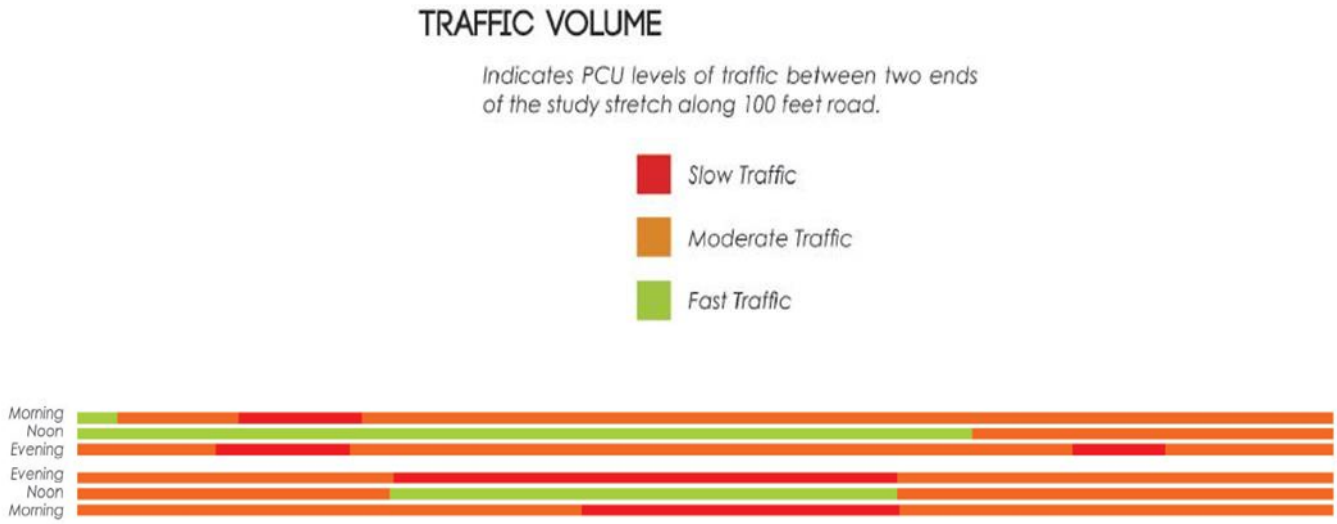
- The thickness of lines are indicative of importance and frequency of usage





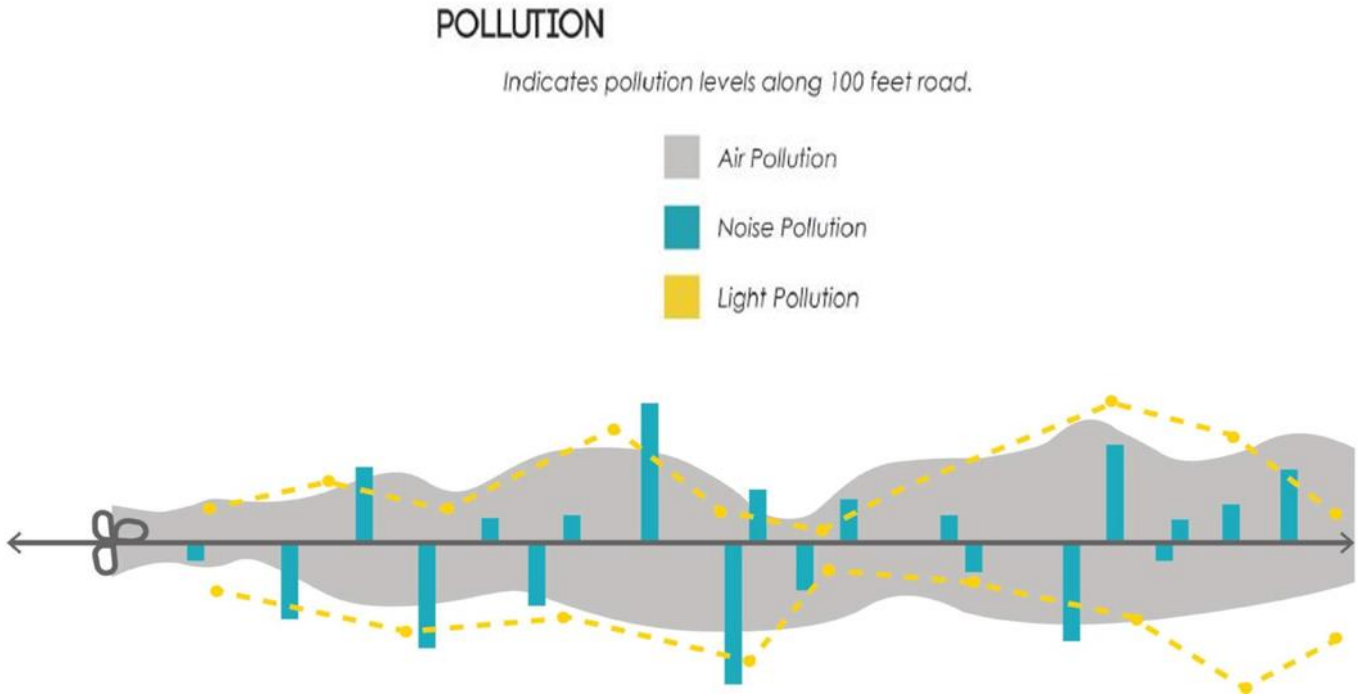
TRAFFIC VOLUME

- Indicates PCU levels of traffic between two ends of the study stretch along 100 feet road



POLLUTION

- Indicates pollution levels along 100 feet



Sustainable Urban Development

Our understanding of cities, in both theory and practice, is at a turning point. Urban areas across the world face complex and rapidly evolving challenges.

But what are the changes we need in order to transform our cities into liveable habitats? What shape does a city that inspires and engages citizens, governments and the public sector and private sectors to work together actually take? Is "sustainable urban development" still the best guiding concept for policy makers, urban planners, architects and investors in building the cities of the future?

Regenerative Urban development

A new urban agenda is necessary for ensuring that cities not only become resource-efficient and low carbon-emitting but go beyond that to positively enhance the ecosystems which provide them with goods and services. The solution lies in thinking beyond the

vague and unambitious notion of sustainability and, instead, actively working towards regenerating soils, forests, and watercourses. The aim is to improve rather than merely sustaining their currently degraded condition.

This new urban agenda transform urban areas into regenerative cities that dramatically reduce their dependency on fossil fuels, boost the deployment of renewable energies, reintroduce water to the hydrological cycle and make sewage reprocessing and nutrient capture a central plank of urban waste management. A wide range of technical and management solutions towards this end are already available, but so far implementation has been too slow and too little.

Sustainable development has been defined as development that meets the needs of the present without compromising the ability of future generations

To meet their own needs. Several themes Common to all definitions of Sustainable urban development have emerged: A change in the quality of growth.

Promote integrated and innovative infrastructure design and service delivery:

The challenges faced by cities are interconnected and must be dealt with in an integrated manner. Innovative infrastructure design, modern Technology solutions, and smart systems offer tremendous opportunities for Improving access to basic services and lowering their cost, increasing efficiency, Reducing per capita consumption of environmental resources, and reducing Pollution.

These opportunities can only be seized through integrated Infrastructure planning processes that span multiple services: water and Sanitation, energy, transport, broadband communications, and housing. Integration must occur at the city level and will be promoted by a dedicated urban SDG.

Promote land use planning and efficient spatial concentration: The Spatial Concentration of urban areas is a unique characteristic that enables economies Of Scale and scope, efficient delivery of services, and effective use of amenities. However, urban land use is often growing more rapidly than urban populations, leading to an urban density decline in many parts of the world. Good spatial Planning can minimize urban land use footprints and increase the efficiency of service provision. Well-planned, mixed-use, and compact cities generally offer higher levels of well-being at lower levels of resource use and emissions.

An urban SDG is needed to converge land-use planning with Economic development, livelihood creation, and the delivery of sustainable Transportation, energy, water, and communications infrastructure. An urban SDG will promote effective and integrated management of cities, suburban, Peri-urban, and exurban areas, as well as effective management of urban Ecosystems and rural development.

3. CONCLUSION

Thus the challenge is to conceive an urban form, which gives an efficient and sustainable scale by combining land use policies and transport alternatives. Two factors that are imperative in this regard are accessibility or the acceptable time and environmental sustainability by reducing CO2 emissions, air pollution, and traffic noise.

Land-use and transportation implication need consider the following criteria

- Develop nodes having dynamic nature that can be accessed by public transport.
- Develop multifunctional urban regions that can be accessed by energy efficient modes of transport.
- Develop multi-functional neighborhoods, which can be accessed by walking, cycling,

Dempsey and Jenks (2005) conclude that future urban forms for cities may include: “polycentric urban forms, closely linked to good public transportation systems; a development that is directly related to transport; culturally appropriate increases in the density of development, which is responsive to the urban context.

4. REFERENCES

[1]http://www.thehindu.com/news/national/tamil-nadu/transit-oriented-development-projects-likely-to-be-implemented-in-chennai/article17379339.ece
[2]http://ijariie.com/AdminUploadPdf/Spatial_Development_Trends_around_Arumbakkam_Metro_Rail_Station_in_Chennai_ijariie6151.pdf.
[3] http://www.spc.tn.gov.in/pdfs/cityconnect.pdf.
[4] http://www.itpi.org.in/files/oct3_11.pdf