



“STRUCTURING OF FEEDER BUS SERVICES OF METRO- A CASE STUDY OF EAST WEST CORRIDOR OF NAMMA METRO, BANGALORE” .

Under the Guidance of
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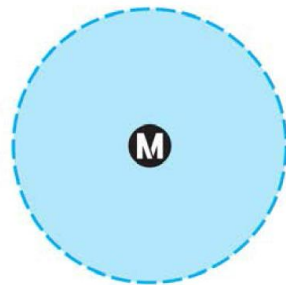
Aim

To address feeder bus network design and scheduling problem (FNSDP)

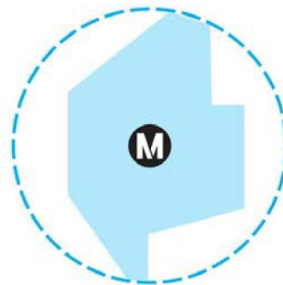
Objective

- To promote mass transport and better connectivity for metro users by integrating bus services and metro service.
- Channelling public transport routing into more focused, high frequency corridors
- Improvement of access to captive users and attraction of non-captive users to the network

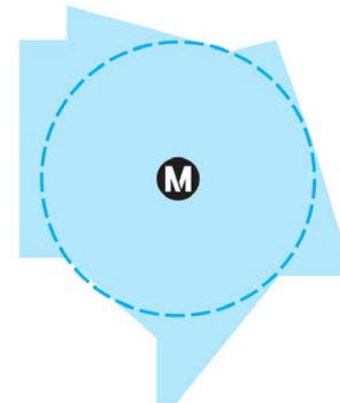
Policy:



Reality:

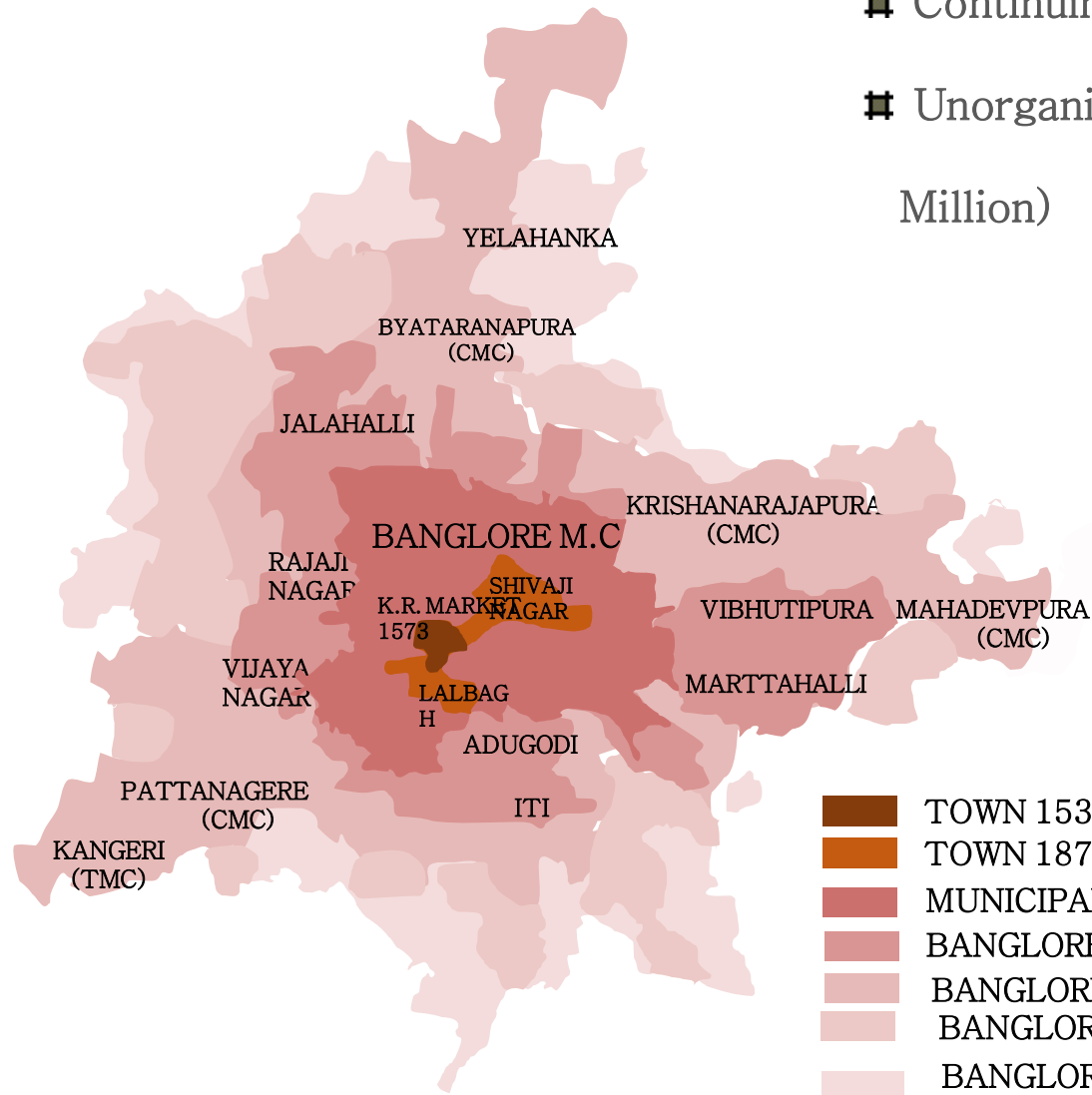


Goal:



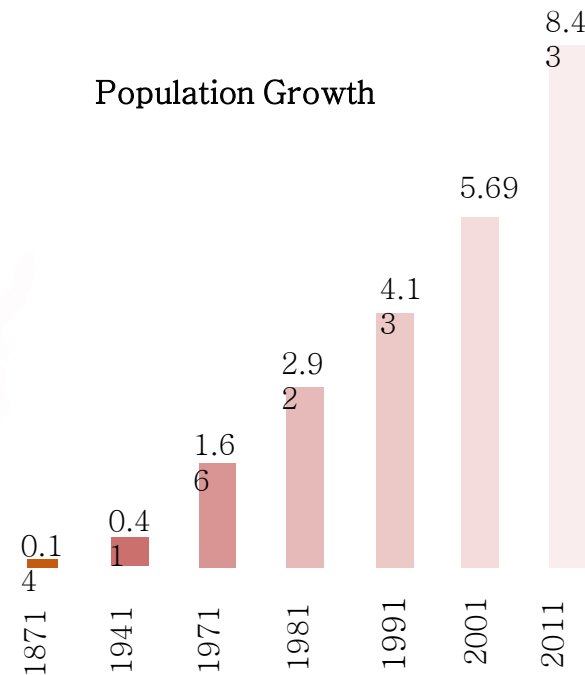
Bangalore's growth

- About 0.15 million people move into the city each year.
- Continuing migration linked to new jobs and opportunities.
- Unorganized growth leading to Urban sprawl (2015 population is 10 million)

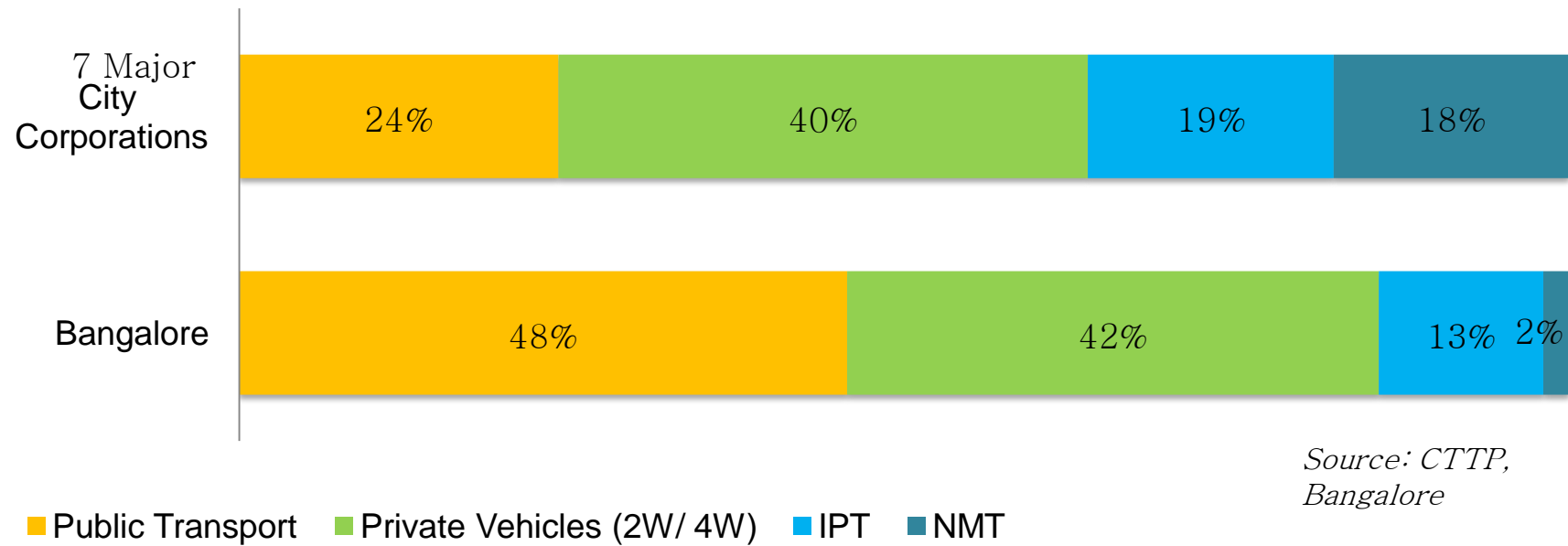


Million)

Population Growth

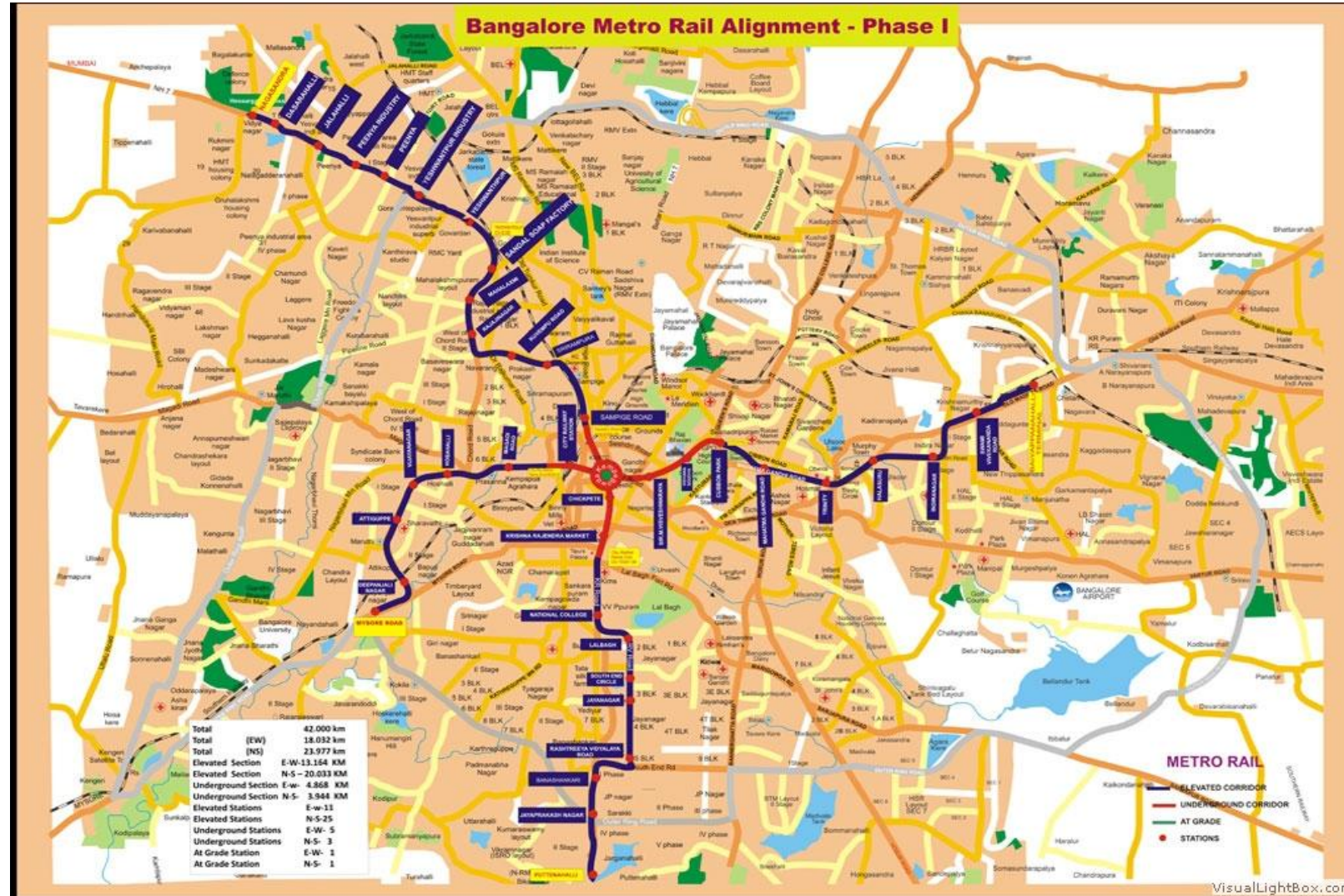


Mode Share



Note : 7 major city corporations 1) Mumbai 2) Delhi 3) Chennai, 4) Hyderabad
5) Pune 6) Kolkata 7) Ahmedabad

Bangalore Metro



Metro feeder : early epoch

- BMTC at its first step, introduced the feeder service together with the Reach-1 operation of BMRCL from Byappanahalli to M.G.Road.
- These Metro Feeder services were started in 2011, 24 routes were operated on 60 schedules covering 1248 trips.
- These services were covered small stretch of metro and one to one connectivity was given passing through one station.
- As these services did not have any speculative basis, this last mile connectivity provided by BMTC was not utilised by the commuters to the optimum extent.
- * Consequence : Earnings were absolutely low to the tune of only 10 to 15 Rs EPKM and hence feeder routes were curtailed.

Subsequent stages : Modification of Routes

- With the commencement of East West corridor Metro Services in April 2016, BMTC again introduced Metro Feeder Service
- This operation was based on adhoc basis on field Knowledge.
- Metro Feeder services were modified and operated from one destination to the other, passing through the metro stations.
- Total 67 schedules were operated out of 11 Metro Feeder Routes MF-1 to MF-11. Initially these services are not patronised. With trial and error method these services are rationalised.
- In this whole Exercise, it is realised that there is the lack of scientific and theoretical basis in feeder service scheduling approach. Hence this project.

Type of Feeder



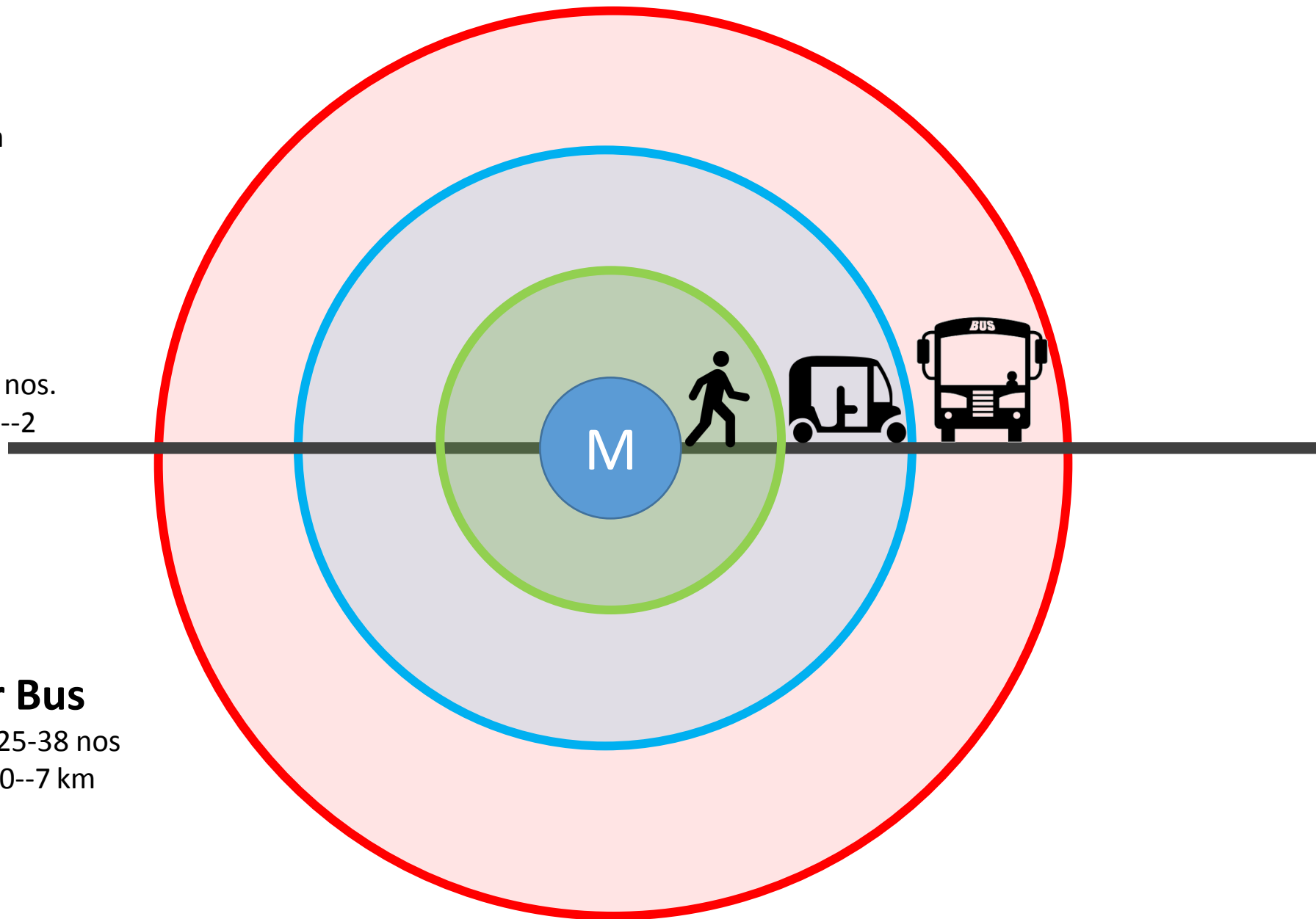
Walk/Cycle
Capacity- NA
Coverage-0-1Km
NMT

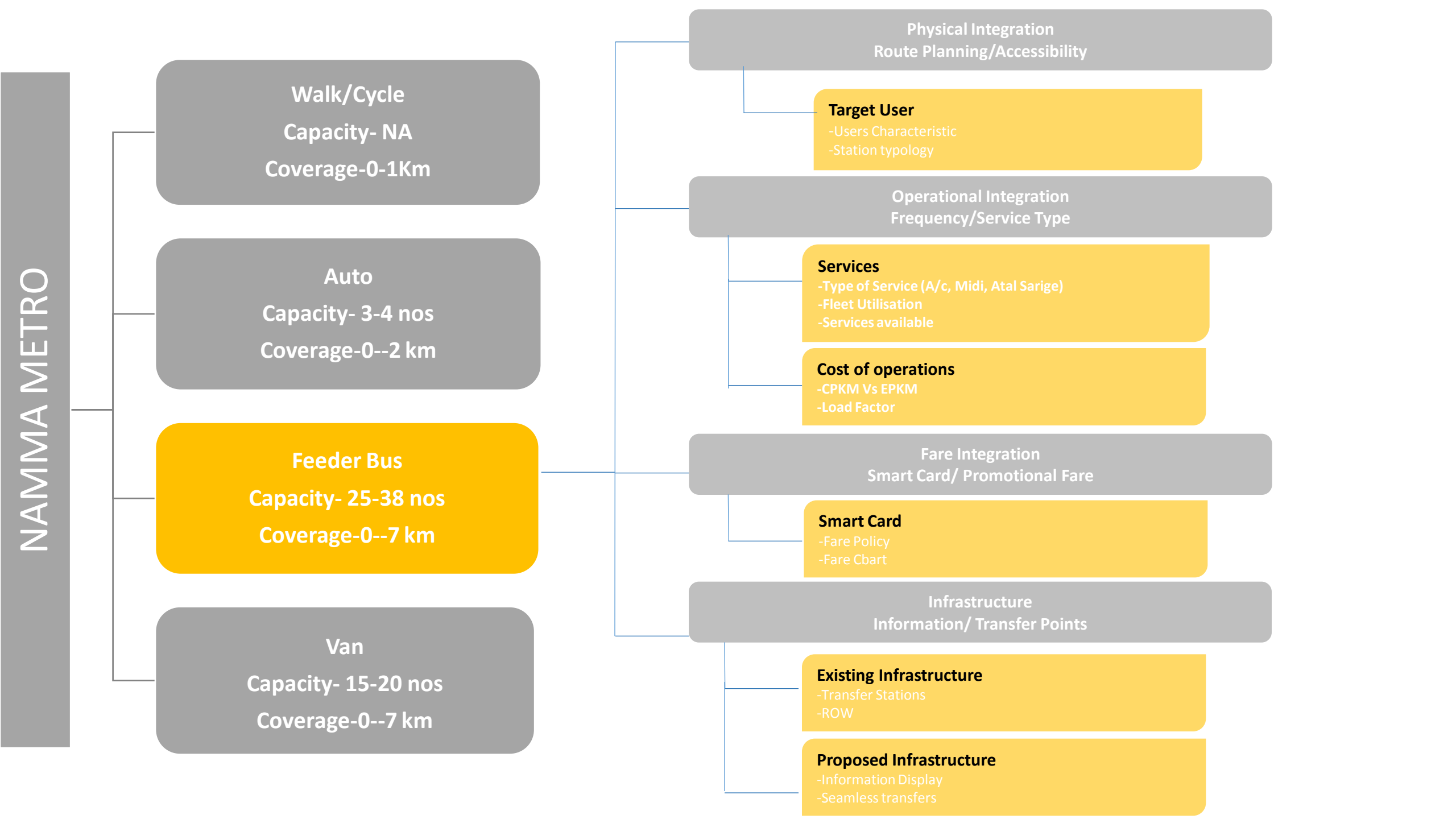


Auto
Capacity- 3 nos.
Coverage-0--2
km MPT

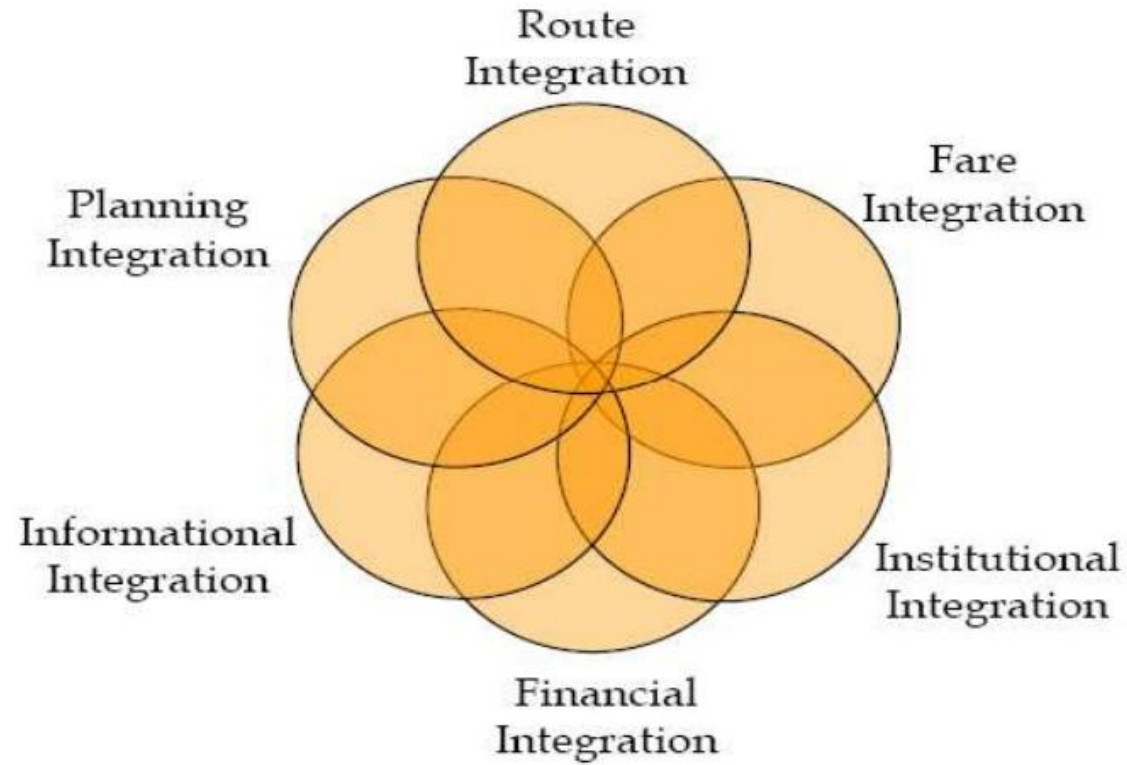


Feeder Bus
Capacity- 25-38 nos
Coverage-0--7 km
PT



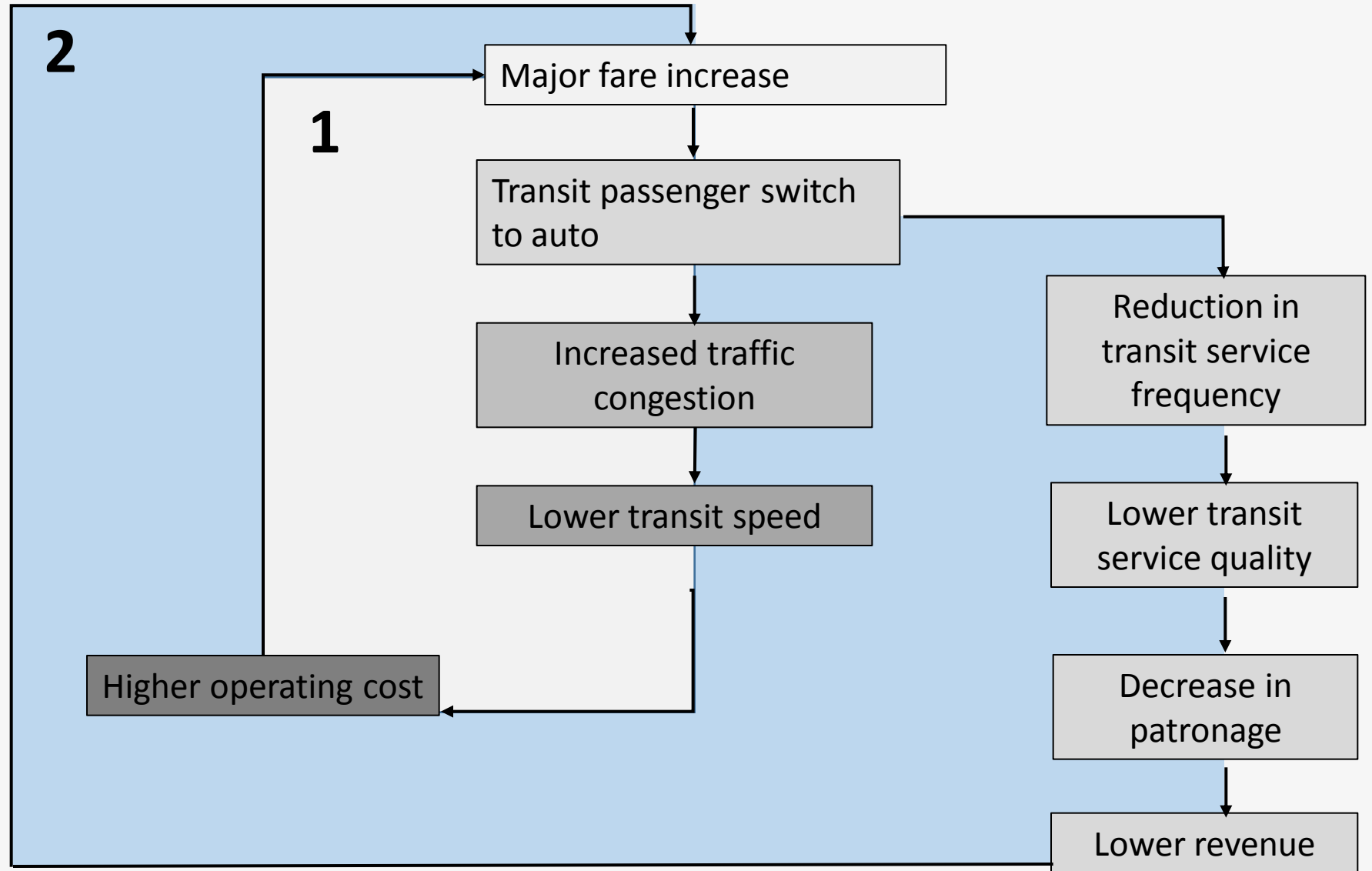


INTEGRATION



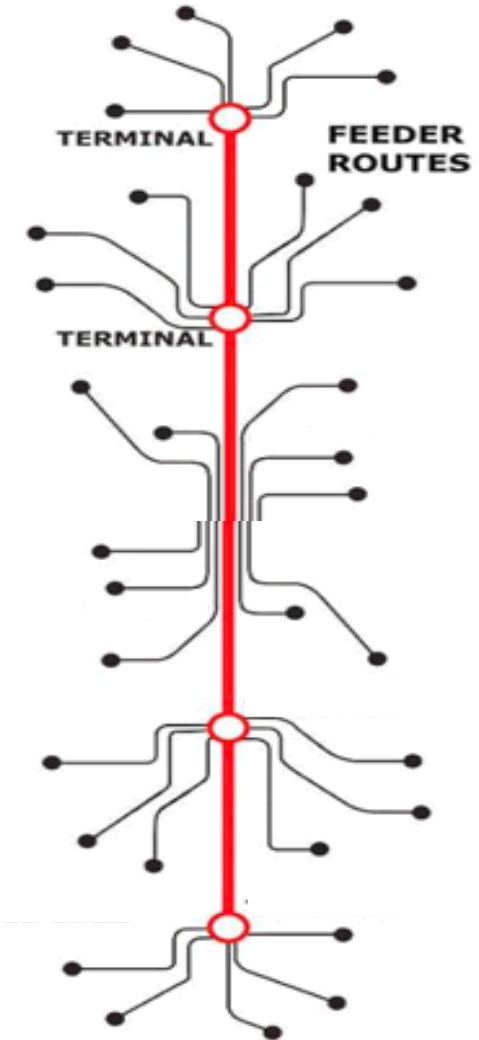
Integration is the key to sustainable and need responsive public transport

Vicious Cycle



Characteristics of a Feeder Bus Service:-

- Serves short distances.
- High frequency service.
- Connects commercial, residential nodes to the trunk corridor or major destinations
- Requires a transfer at the end of the journey
- Provides first / last mile connectivity
- Extends the trunk corridor's area of influence
- Vehicle type generally varies from the trunk mode
- Operates amongst mixed traffic, without priority infrastructure or space
- Bus stops are generally spaced within walking distance of each other



Challenges in structuring of Feeder Services

- Deciding prime criteria.
- Lack of information on origin/destination travel patterns.
- Establishing proper institutional co-ordination.
- Lack of infrastructure facilities.
- Integration problem from institutional, physical, service and financial perspectives.

Methodology

- The Conventional Approach to feeder bus planning
- Data sets relating to fares, operations, fleet size, route lengths, ridership, ticket sales and travel times facilitate the case analysis.
- Studying challenges and discussing how cities address them.
- Developing documentation of a systematic and scientific method for structuring feeder bus services to metro.
- Station area site analysis.
- Field survey : Collecting data from Nayandahalli and Swamy Vivekananda Metro Station
- Collecting data from metro riders, park and ride users regarding mode of their travelling to metro station, purpose of travelling, BMTC services existing in their neighbourhood, their preference for feeder services, facilities they are expecting in a metro station.
- Planning to conduct survey from morning 6.00 a.m. to 11.00 p.m. for continuous 3 days.
- Non –Metro riders : Surveying non-metro riders to obtain feedback for not opting for Metro service.
- Conclusion and way forward.

Parameters to assess suitability of type of feeder:

- Potential trip attractors
- Physical Suitability– ROW, Infrastructure, etc
- Transport Supply Status (PT Routes, IPT, etc)
- Missing Links
- Operational Cost
- Cost of Travel for users

Route Network	3-8 km
Frequency	5-7 min
Bus: Metro	1:2
Capacity	22
Fare	Rs 10 (<5Km) Rs 20 (>5Km)
Vehicle Utilisation (Km/bus)	160-180

Table : Metro Feeder characteristics

Methodology



Feeder Bus

Capacity- 25-38 nos
Coverage-0--7 km

Parameters to assess suitability of type of feeder:

1. Potential trip attractors
2. Physical Suitability- ROW, Infrastructure, etc
3. Transport Supply Status (PT Routes, IPT, etc)
4. Cost of Travel for users
5. Operational Cost
6. Missing Links

Legend

-  OD_stops
-  Roads
-  study_area
-  metro_line
-  BMTC_routes
-  Trip Attractors



Methodology





Feeder Bus

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Coverage-0--7 km

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Methodology








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Legend

-  OD_stops
-  Roads
-  study_area
-  metro_line
-  BMT routes

Methodology








Feeder Bus

Capacity- 25-38 nos
Coverage-0--7 km

Parameters to assess suitability of type of feeder:

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3. Transport Supply Status (PT Routes, IPT, etc)
4. Missing Links
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6. Operational Cost

Legend

-  OD_stops
-  Roads
-  study_area
-  metro_line
-  BMTG_routes

Planning a Feeder Bus System:

- Estimate the level of demand: data collection will assist in determining the characteristics of the route.
- Assess the site and physical conditions of the site to understand congestion levels, roadway geometry, **capacity aspects**, etc.
Necessary of buses
- Work with the constraints: final consideration to ensure optimal solutions; common constraints include turnaround space, trunk feeder integration space, proximity to depots, lack of resources.

Feeder bus systems enhance coverage and operational efficiency and it should not be an afterthought

THANK YOU