



# REVITALISATION STRATEGIES FOR TRAMS IN A METROPOLITAN CITY – KOLKATA



# NEED OF THE STUDY

## ADVANTAGES OF TRAMWAYS

- Higher capacity than buses
- Eco-friendly
- Low operation & maintenance cost
- Comfortable Ride

## DISADVANTAGES OF TRAMWAYS

- Weak Financial Condition
- Lack Of Efficient Management, Infrastructure And Operational Improvement In Existing Service.
- Vehicular Congestion Due To Shared R.O.W.

To Facilitate An Adequate And Efficient ***Integrated Multimodal Intra-urban Mass Transportation System***, ***The Kolkata Trams need To Be Revitalized.***

## SCOPE OF WORK

- Appreciate **The Role Of Mass Transit System** in Urban Areas in General along with **Medium Capacity Systems(LRT, Trams)**
- Review **Global Best Practices for Planning Tram Systems** in Urban Areas, along with **Identification of the Attributes of a Good Corridor.**
- Assess the **Tram Network, Operational** and **Land Use Characteristics** in Case City Kolkata
- Assess other **Complementing And Supplementing Services** along the Tram Routes.
- **Evolve Alternate Revitalization Strategies** For Promoting Trams in Kolkata

# CHARACTERISTICS OF TRAMWAYS



## ADVANTAGES

- **Efficient road usage**
- **Larger carrying capacity** compared to buses
- **Low operation & maintenance cost**
- **Environment friendly** as it tends to cause low pollution
- **Flexible** in terms of usage of right of way as it can be integrated with other modes
- **Comfortable**
- **Capital cost lesser** compared to other light rail transit

## DISADVANTAGES

- **Congestion** as it interferes with other modes of transport.
- **Vibration** due to tracks
- Rail tracks sometimes when elevated are **unsafe for other modes.**
- Overhead wires **visually unpleasing.**

# GLOBAL SCENARIO OF LRT & BEST PRACTICES

## REVITALISATION STRATEGIES ADAPTED:

- Completely **new systems** developed with additional features of **automatic vehicle monitoring system**, for **better communication** and **passenger information system**, in turn reducing travel time.
- **Modernization** and **privatization of Tramways** like the way the Melbourne Yarra Tram services
- **Densification & Infilling of Activity Areas** along the Tram for **increased travel demand in public transport**, which has eventually led to **traffic decongestion**.
- **Lines converted to Light Rail Transit (LRT) for increased speed and frequency of service.**
- **Conversion of existing rolling stock to Heritage Trams** which would pass through ancient structures as a part of a heritage tour.
- **Integration within the mass transportation system** to act as **feeders** to other high-speed transit modes.

# SWOT ANALYSIS

## STRENGTH

- Extensive network
- Safe
- Eco-friendly
- Energy efficient

## OPPORTUNITIES

- Heritage tour
- Captive ridership
- Can act as a feeder

## WEAKNESS

- No proper infrastructure/ Fare revision
- Low speeds
- Traffic congestion
- Shared R.O.W. with other modes

## THREATS

- Network reduction
- Outdated system
- Competing modes
- Complaints from traffic department
- Movement Restriction (one way, peak hours)

# SURVEYS

## 1. Reconnaissance Survey

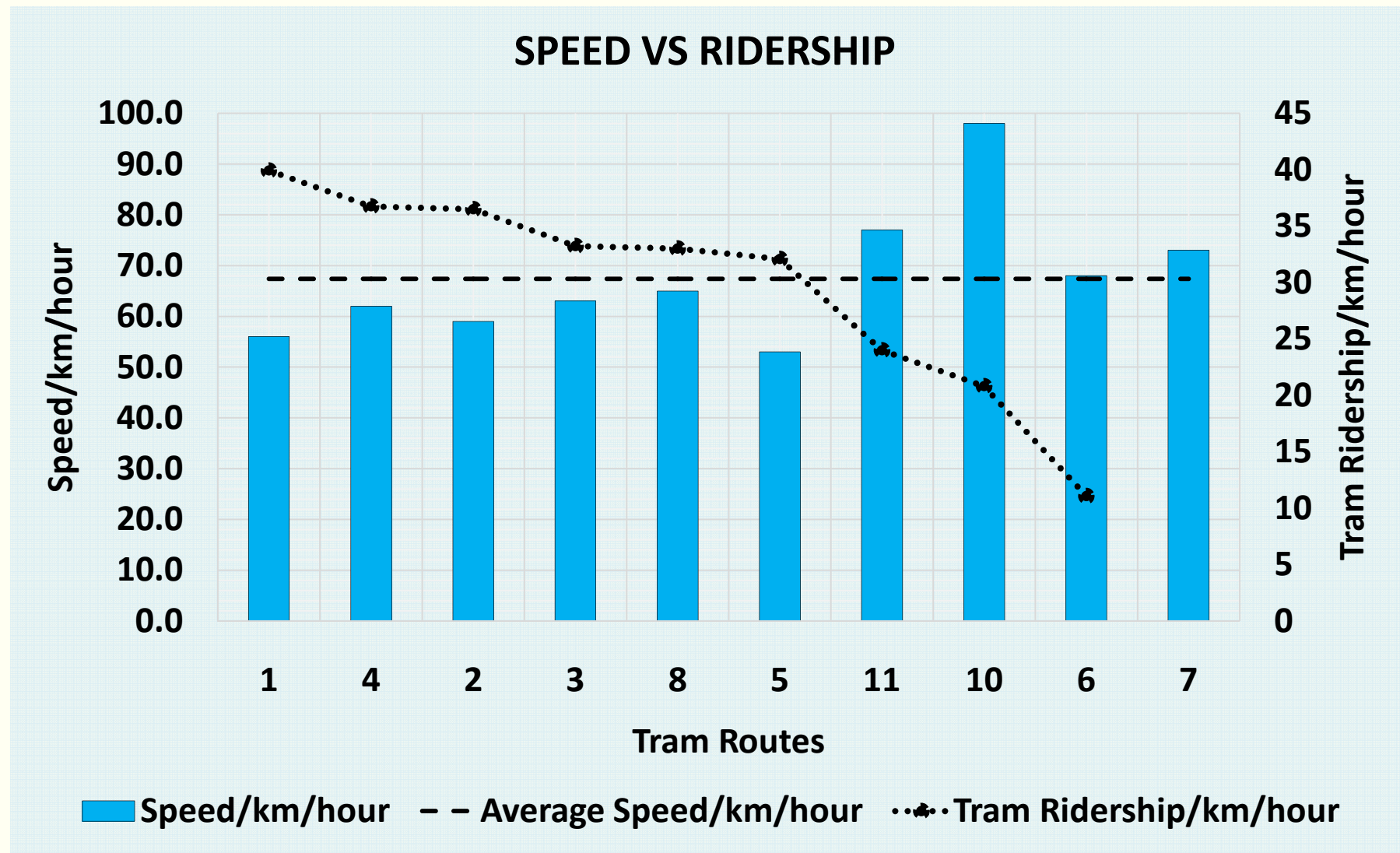
- a. Abutting Land use
- b. Other modes
- c. Number of stops

## 2. On-board boarding/alighting survey:

- a. Ridership of every stop

## 3. Tram user/non-user survey

# OBSERVATIONS



*Speed/km is not a criteria in the case of Kolkata for good ridership. People prefer lesser headway i.e. waiting time at the stop than on board.*



# EXISTING MOBILITY PATTERNS OF TRAM USERS IN KOLKATA

## TRIP ATTRIBUTES

- **Work purpose trips were observed more in number, around 45%**, which supports the fact that tram largely caters to activity areas.
- The **average trip length** was found to be **2.8 km**, which indicates its **preference** by people for **shorter trips**. Also tram ridership tends to increase with shorter trip length.
- The main reasons stated by the users for Trams being not a desirable choice of transit in Kolkata are its **unreliable nature**.
- **Improving frequency of services** was cited as the main strategy to revitalize the Tramways.

# CONCLUSION

**Effective tram operation in Kolkata can be attributed to:**

- Intense land uses such as commercial areas;
- High population density;
- Short to medium route lengths;
- Less competition from competing modes;
- Minimisation of waiting time at tram stop by increasing frequency;
- Reduction of inter stop distances

# PROPOSED PLANNING NORMS

## 1 LANDUSE FACTORS

**Residential:**

**34% - 48%**

**Commercial:**

**18% - 28%**

**PSP:**

**11% - 13%**

**Mixed Use:**

**26% - 38%**

## 2 POPULATION DENSITY FACTORS

**Population Density (P/Ha): 405 - 602**

## 3 OPERATIONAL FACTORS

**Length (km): 3.1 km – 5.8 km**

**Headway (minutes): 25 - 40**

## 4 COMPETING MODE ENVIRONMENT FACTORS

**Bus Coverage: 38% - 77%**

**Auto Coverage: Up to 40%**

# PROPOSED STRATEGIES

## IMPROVING EXISTING NON-PERFORMING ROUTES

### SHORT TERM STRATEGIES

- Alteration of the route length
- Increasing the frequency of tram services
- Lessening the inter-stop distance between trams stations
- Reducing competition from other modes like buses and autos by re-routing them

### MEDIUM TERM/LONG TERM STRATEGIES

- Densification and infilling
- Increasing activity areas and employment zones along the tram catchment area.
- Creating a TOD with redevelopment along the tram corridor.

### AUGMENTATION OF TRAM NETWORK

- Identification of potential areas for tram operation based on the characteristics of the catchment areas along the performing tram routes.
- Creating an integrated metro and tram transit system in uncovered areas, where tram can act as a feeder to the metro.

# ATTRIBUTES OF ROUTES BEFORE AND AFTER REVITALISATION\*

FACTORS		PERFORMING ROUTES (Before Revitalisation Measures)										NON-PERFORMING ROUTES (Before Revitalisation Measures)							
		1		2	3		4		5	8		6	7		10		11		
		U	D	D	U	D	U	D	D	U	D	D	U	D	U	D	U	D	
Route Length (Km)		5.30		4.80	4.90		5.50		3.10	6.00		7.20	7.40		5.20		8.10		
Inter-Stop Distance (Km)		0.24		0.23	0.28		0.28		0.28	0.32		0.31	0.34		0.27		0.30		
Headway (mm)		25.20		25.20	30.00		30.00		40.20	30.00		60	60.00		50.40		50.40		
Coverage of Competing Modes (%)	Bus	100	59	76	38	38	18	18	100	85	100	100	100	86	100	100	100	100	
	Auto	0	0	0	57	22	0	31	0	58	58	24	24	24	100	100	100	100	
FACTORS		PERFORMING ROUTES (After Revitalisation Measures)										NON-PERFORMING ROUTES (After Revitalisation Measures)							
		1		2	3		4		5	8		6	7		10		11		
		U	D	D	U	D	U	D	D	U	D	D	U	D	U	D	U	D	
Route Length (Km)		5.30		4.80	4.90		4.0		3.10	6.00			3.40		2.5		5.10		
Inter-Stop Distance (Km)		0.24		0.23	0.28		0.28		0.28	0.28			0.29		0.27		0.29		
Headway (mm)		25.20		25.20	30.00		30.00		40.20	30.00			30.00		25.00		30.00		
Coverage of Competing Modes (%)	Bus	47	59	76	38	38	25	25	68	52	67		100	47	100	100	100	100	
	Auto	0	0	0	19	19	0	31	0%	33	33		0%	0%	100	100	100	100	

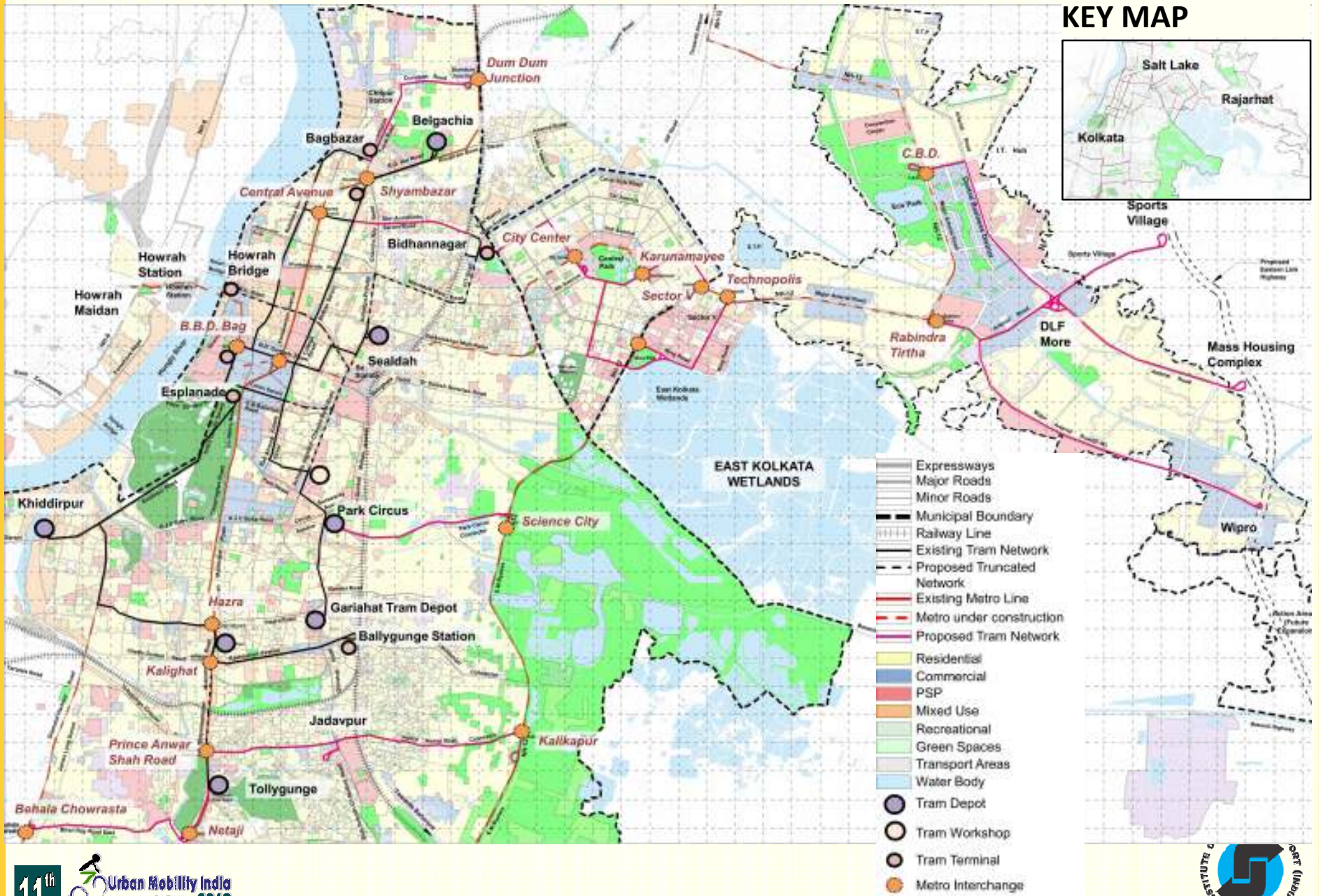
*The darker shades show change in value*

## OTHER RECOMMENDATIONS

- **Grade separated tracks on congested corridors for increased speed and frequency.**
- **Proper infrastructural facilities like boarding and alighting points to be provided.**
- **Two heritage trails** proposed on the existing network on weekends and government holidays, that would give a wonderful outlook of some interesting tourist spot, along with meals and audio visual display of the heritage structures.
- **Tram operation to be increased in festive seasons, like Durga puja and Christmas.**
- **Privatization of trams with proper revision of fare to increase revenue.**
- **Augmentation of network** in uncovered areas with the purpose of integrating it with the mass transportation system. A total of extra **48 km of more network** has been proposed which will act as **feeder to the new upcoming metro stations**, thus creating **an integrated tram and metro transit system, with common payment card.**
- **Replacement of existing outdated rolling stocks** with modern light rail vehicles and technology upgrade, for increased speed and efficiency of services, which would use **the GPS technology** for real-time tracking of trams to avoid bunching.

**“INTEGRATED MULTI-MODAL INTRA-URBAN MASS TRANSPORTATION SYSTEM.”**

# AUGMENTATION OF TRAM NETWORK



# THANK YOU