



# Technical Session 3 – Problems for Small and Medium Towns & Introduction of Public Transport Systems

## AMRITSAR METRO BUS - A NEW JOURNEY BEGINS

Urban Mobility India 2019

**PRESENTED BY:**

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PIDB & UMTC Team





**CATEGORY:**  
Best Urban Mass Transit Project

**NAME OF THE PROJECT:**  
Bus Rapid Transit System in  
Amritsar

# AMRITSAR METRO BUS

## GoI & GoP Initiative

|                                                               |                                                        |
|---------------------------------------------------------------|--------------------------------------------------------|
| <b>Approved Project Cost (as per Detailed Project Report)</b> | 495.54 Cr                                              |
| <b>Project Funding Ratio<br/>GoI / GoP / MC, Amritsar</b>     | 50:20:30                                               |
| <b>Additional Cost for GoP – Bus Purchase</b>                 | 54.38 Cr                                               |
| <b>Project Implementation Agency</b>                          | Punjab Bus Metro Society /<br>Punjab Bus Metro Society |
| <b>Project Management Services (PMS)</b>                      | Urban Mass Transit Company<br>Limited (UMTC )          |
| <b>Total length</b>                                           | 31 Kms                                                 |

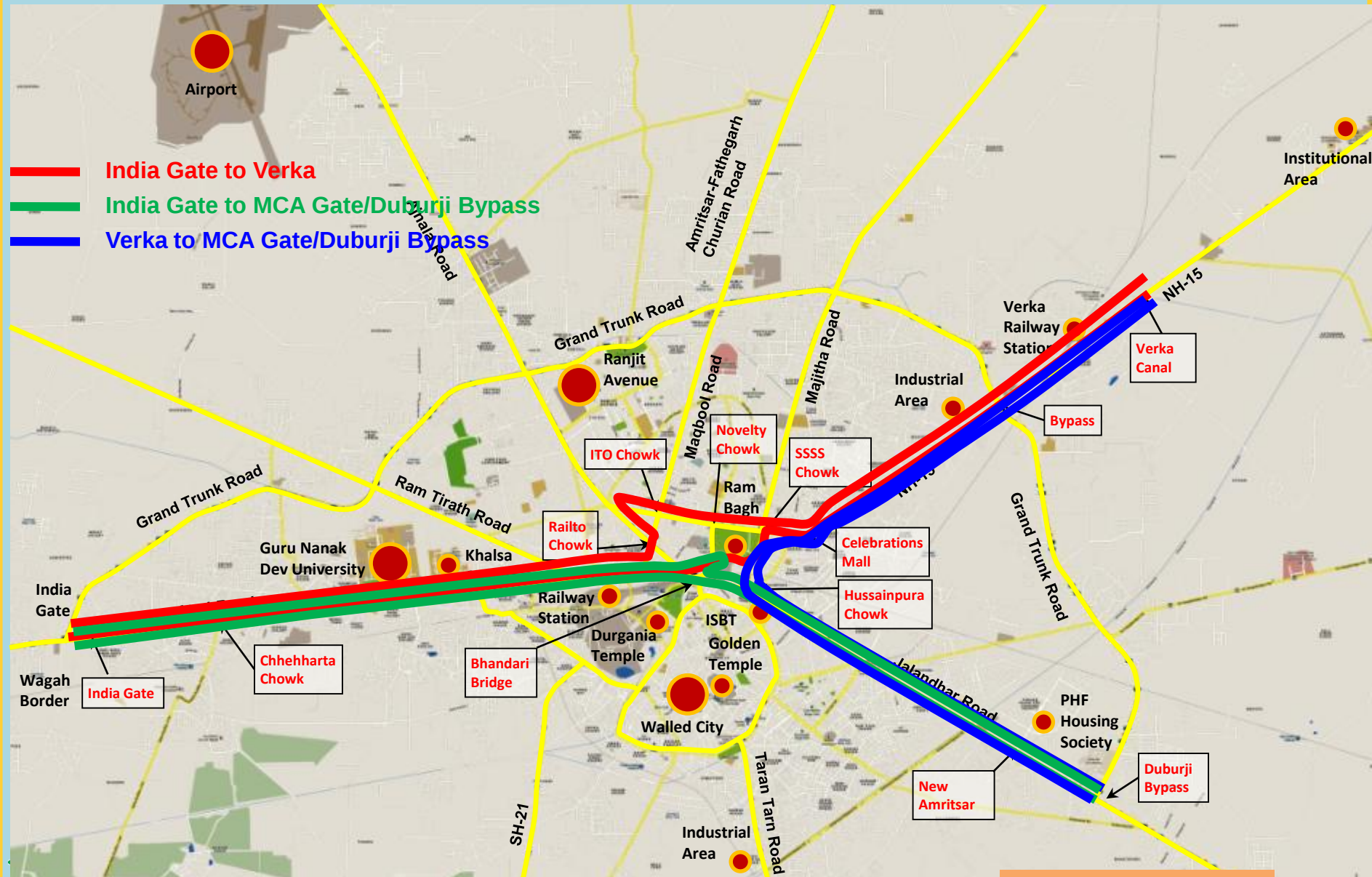
# Key System Features of Amritsar BRTS

- **31 km** of network including **~ 8 kms of elevated**
- **3 major corridors**, essentially for exclusive bus operations, Route length approx. 90 km
- **47 technology enabled BRT bus stations**; Access Controlled, Automatic Fare Collection, Level Boarding
- **2 ROB**s – Bhandari and Verka ROB enable smooth traffic flow for all vehicles
- **93 AC BRT Buses**, 12 meter length with **VTS and PIS** (900mm BS-IV AC Front Engine Diesel Tata Buses)

# Unique Features of Amritsar BRTS

- Conceived after **site visits to several Domestic and International BRT** projects
- **Implementation vehicle** is a Society (PBMS)
- A first time attempted **Retrofitting of Elevated road** to suit BRT requirements in Asia
- A first time implemented **Dedicated Elevated BRT** for 3.2 km length in India
- **Single Consultant-** PBMS engaged UMTC for Conceptualization, Planning & Design, Approvals, Tender Process, GFCs, Construction Supervision and Operational Hand Holding after commission; thus leaving no scope for anomalies that typically arise due to involvement of various agencies
- Splitting of BRT lanes on narrow roads - Mall road
- Coverage of 40% of the total City's core road network
- Storm water drainage system all along the BRT corridor

## BRTS Corridors & BRT Bus Routes



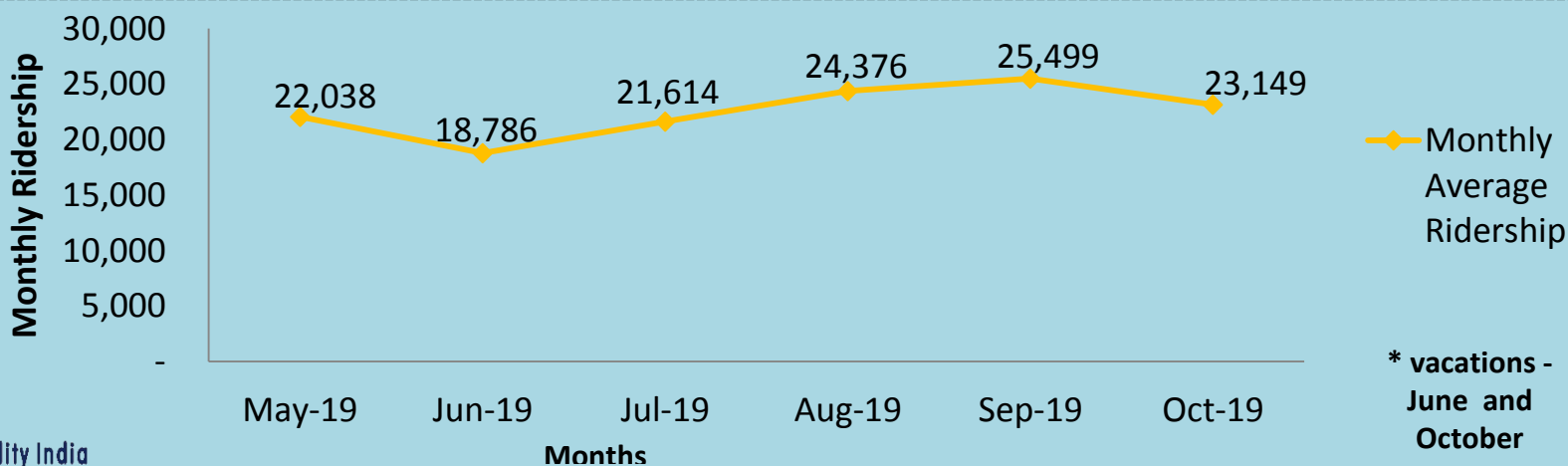
# BRT Routes in Operation – Lengths, Fleet & Run times

| Sl. No.                                           | Existing Route Details    | Route Length in kms ( one way) | Headway   | One side Running Time (minutes) | Terminal halt or turnaround Time (minutes) | Fleet size |
|---------------------------------------------------|---------------------------|--------------------------------|-----------|---------------------------------|--------------------------------------------|------------|
|                                                   |                           |                                | (minutes) |                                 |                                            |            |
| 1                                                 | India Gate to MCA gate    | 16.2                           | 4         | 48                              | 10                                         | 30         |
| 2                                                 | India Gate to Verka Canal | 18.4                           | 4         | 54                              | 6                                          | 32         |
| 3                                                 | Verka Canal to MCA gate   | 13.0                           | 4         | 39                              | 10                                         | 24         |
| <b>Total</b>                                      |                           | <b>47.6</b>                    |           |                                 |                                            | <b>86</b>  |
| Total buses in Depot with 93% Vehicle Utilization |                           | 93                             |           |                                 |                                            |            |

# BRT Routes in Operation – Daily Ridership

| Sl. No. | MONTH ( in 2019) | Avg. DAILY RIDERSHIP | Avg. Daily Fare Collection | Avg Fare collection per passenger | Avg Fleet Operational |
|---------|------------------|----------------------|----------------------------|-----------------------------------|-----------------------|
| 1       | May              | 22038                | 190173                     | 8.63                              | 72                    |
| 2       | June             | 18786*               | 154843                     | 8.24                              | 72                    |
| 3       | July             | 21614                | 164200                     | 7.60                              | 72                    |
| 4       | August           | 24376                | 179730                     | 7.37                              | 72                    |
| 5       | September        | 25499                | 172602                     | 6.77                              | 72                    |
| 6       | October          | 23149*               | 156227                     | 6.75                              | 76                    |

\* Vacation times



# Edge to Edge Development- Jalandhar Road

Service Road

Footpaths

Mixed Traffic

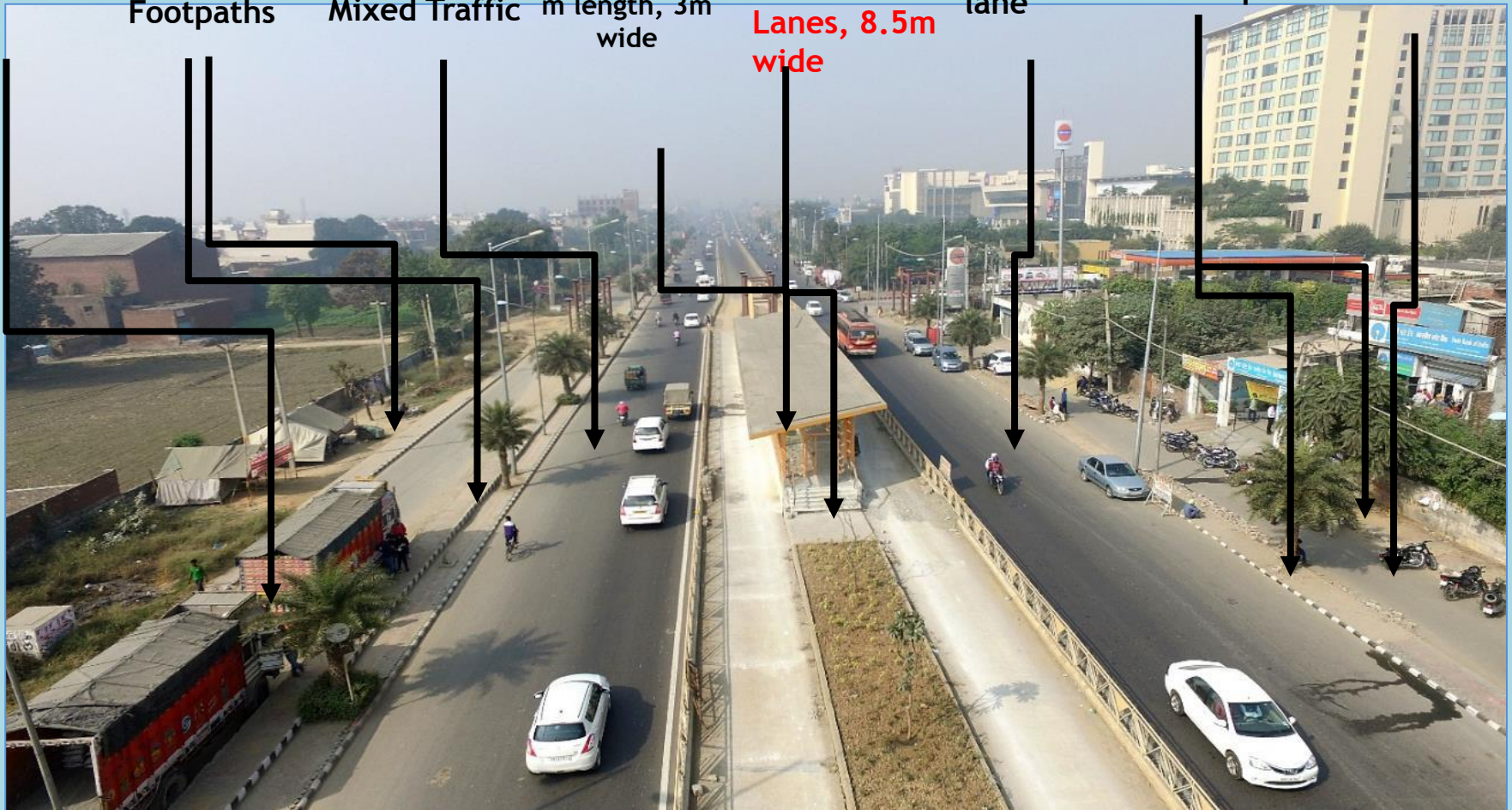
BRT Station- 36  
m length, 3m  
wide

2 way  
Dedicated BRT  
Lanes, 8.5m  
wide

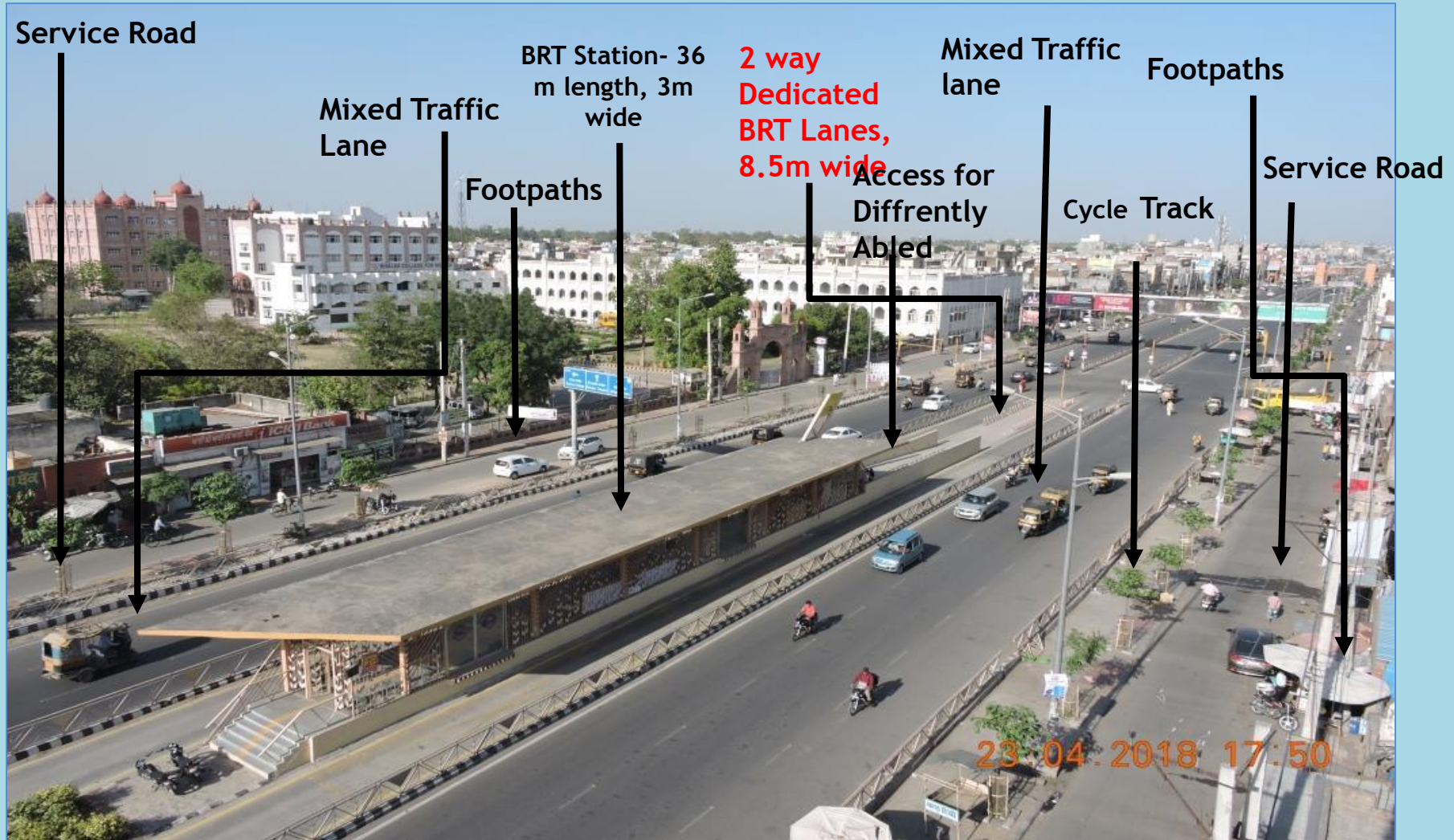
Mixed Traffic  
lane

Footpaths

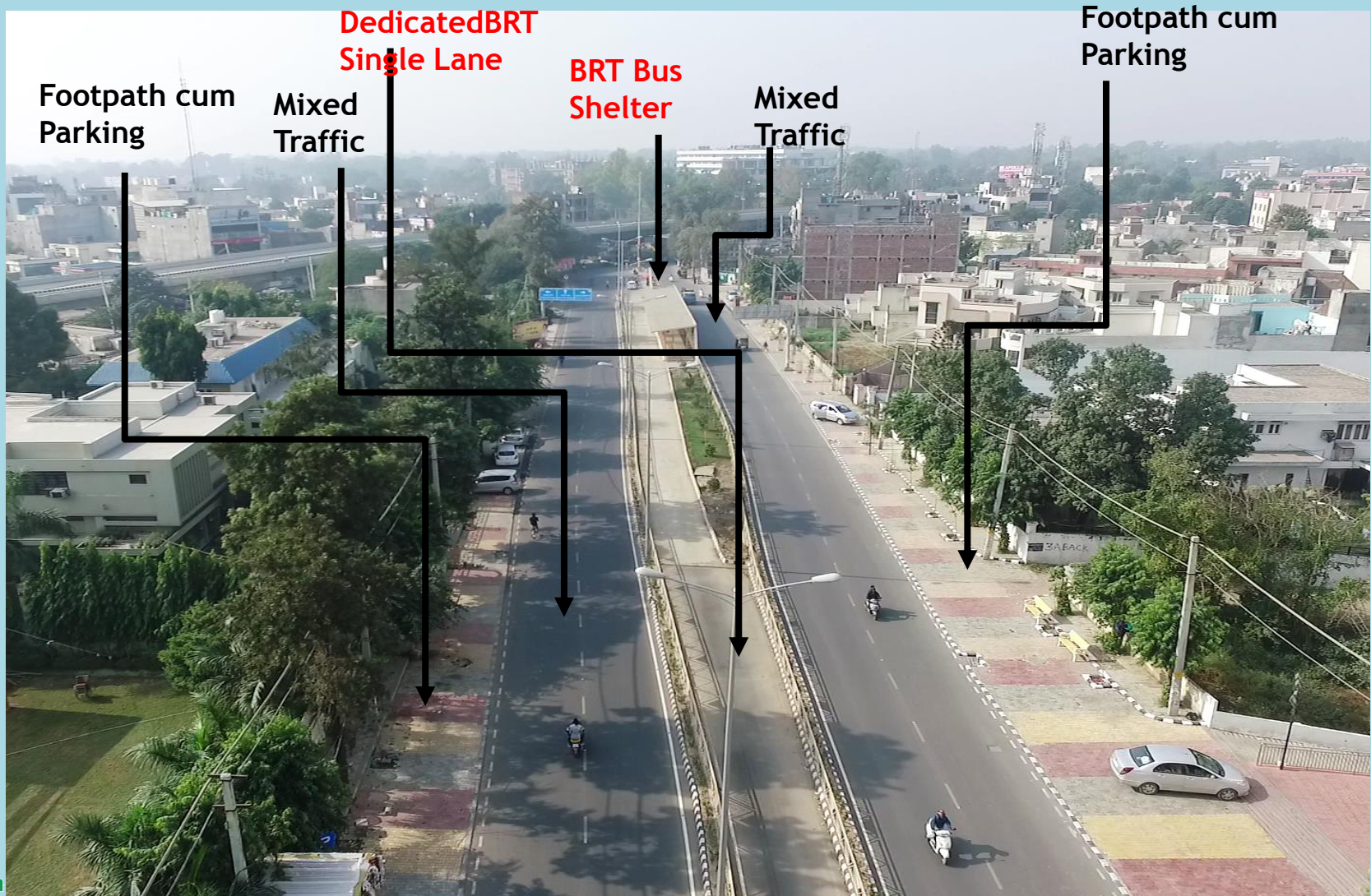
Service Road



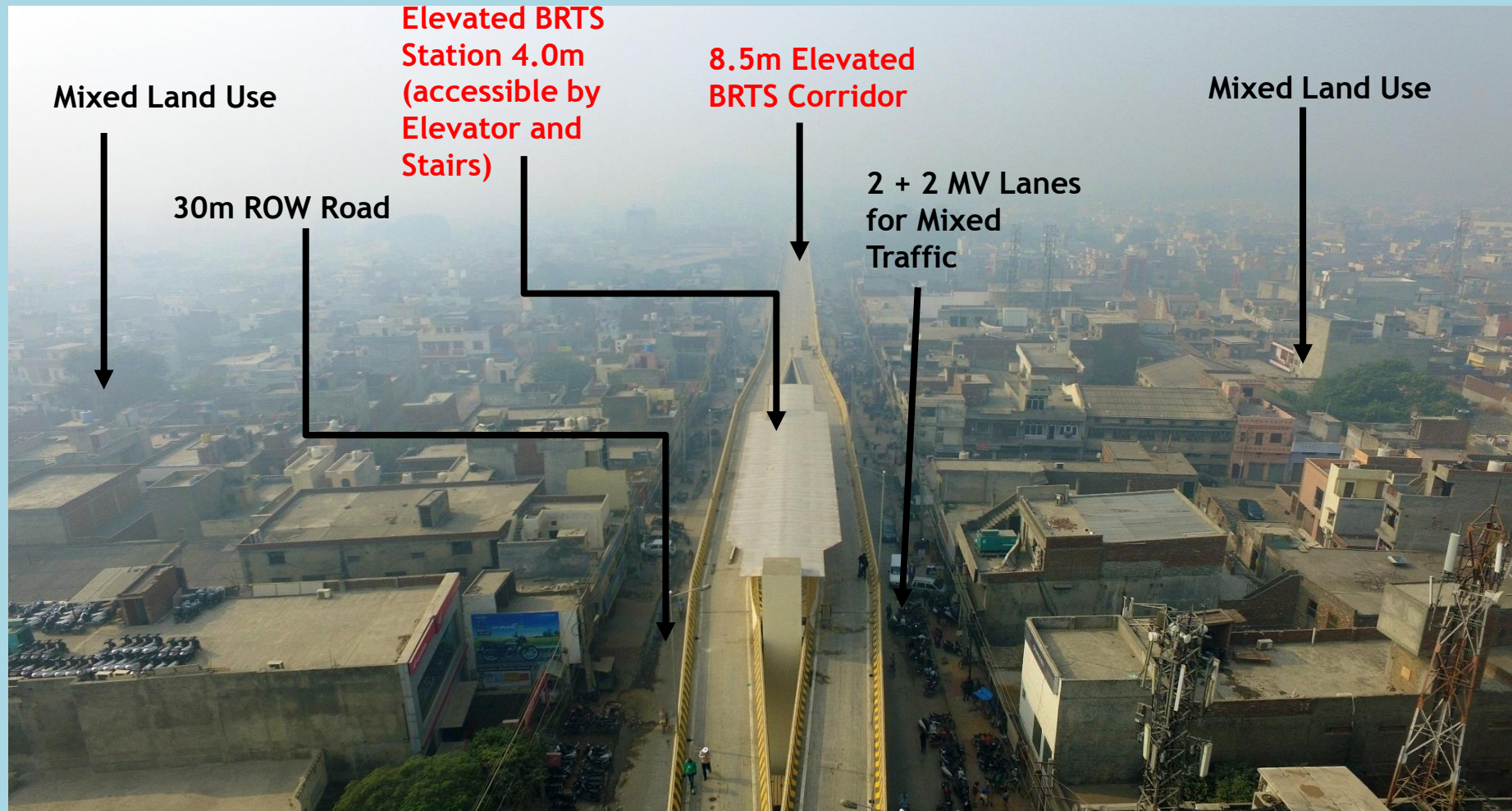
# Edge to Edge Development – Khalsa College Road



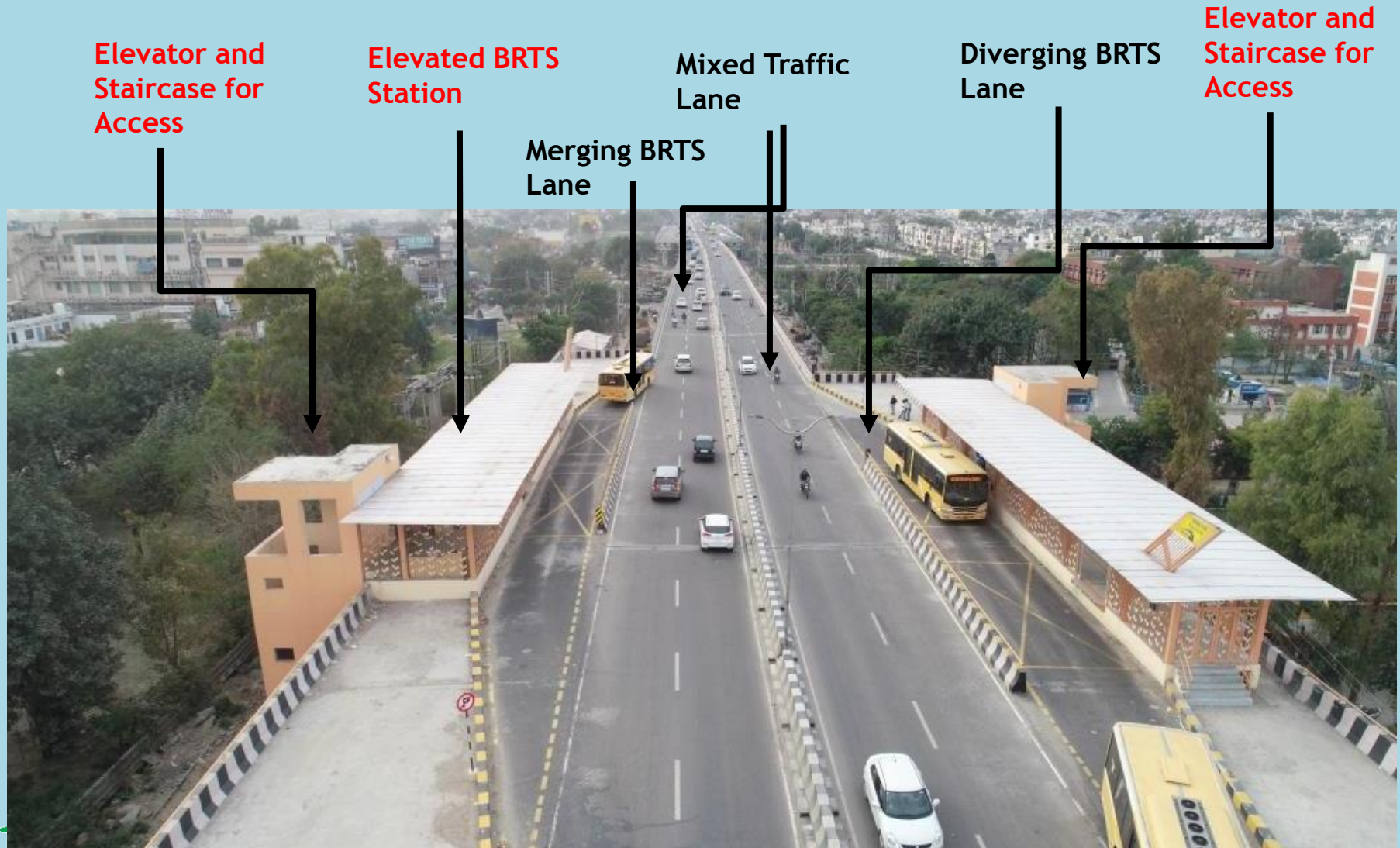
# Edge to Edge Development - Mall Road with single lane BRT



# Aerial View- Elevated BRT (3.2 Km) on Verka/Batala Road



# Aerial View- Retrofitted BRT on existing Elevated Road (2.6 km) on Jallandhar Highway



# Aerial View- Retrofitted BRT on existing Elevated Road on Jalandhar Highway-BRTS Bus stop integrated with the ISBT

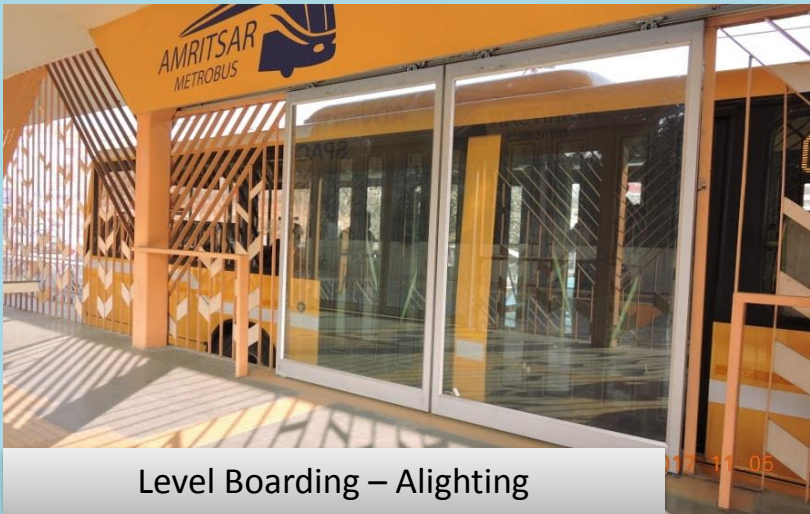


# Provisions For Specially-abled Persons



Space for wheelchair in Bus

- Tactile paving – Guiding and warning tiles
- Level boarding & alighting
- Entrance ramps to Stations
- Buses with uniform floor level
- Designated spaces for wheel chair inside buses
- Automated doors



Level Boarding – Alighting

Access to bus stops by Ramp- Suitable for Specially-abled





# CITY BEFORE AND AFTER BRTS

# Batala Road



Batala Road (Before)



Batala Road (After)

# Sher Shah Suri Road



Before



After

# Fare Structure

| Km Slab                                                                                                                                                                                                                                                                                                                                                               | Fare (Rs.)        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| 0-3                                                                                                                                                                                                                                                                                                                                                                   | 5                 |
| Above 3 upto 6                                                                                                                                                                                                                                                                                                                                                        | 10                |
| Above 6 and upto 12                                                                                                                                                                                                                                                                                                                                                   | 15                |
| Above 12 and upto 20                                                                                                                                                                                                                                                                                                                                                  | 20                |
| Above 20                                                                                                                                                                                                                                                                                                                                                              | Rs. 20 + Rs. 1/Km |
| <ul style="list-style-type: none"> <li>Concessional Fare for students (66% discount for college students, 100% Discount for school students)</li> <li>20% Discount for Smart Card Holders, 50% Discount for Senior citizens and Physically Challenged thru Smart Card, Rs. 25 daily pass for students and Senior Citizens and for others Rs. 50 Daily Pass</li> </ul> |                   |

**FARES COMPETITIVE WITH THE EXISTING IPT (SHARED AUTO)**

# Comparison of Travel Time by Shared Auto & BRTS

| Route Name                                        | Distance Travelled (in Kms) | Average Trip Time (in Mins) |          |            |
|---------------------------------------------------|-----------------------------|-----------------------------|----------|------------|
|                                                   |                             | BRTS Bus                    | Auto     | Difference |
| Amritsar Railway station to India gate            | 8.5                         | 0:24:53                     | 0:51:10  | 00:26:17   |
| India Gate to Amritsar Railway Station            | 8.5                         | 00:24:41                    | 0:37:10  | 00:12:29   |
| Amritsar Railway station to Verka Railway Station | 9.5                         | 0:21:57                     | 0:36:15  | 00:14:18   |
| Verka Railway Station to Amritsar Railway Station | 9.5                         | 0:30:30                     | 0:37:45  | 00:07:15   |
| Verka Railway Station to Amritsar Entry Gate      | 13                          | 00:34:18                    | 00:40:35 | 00:05:53   |
| Amritsar Entry Gate to Verka Railway Station      | 13                          | 00:34:05                    | 00:39:55 | 00:05:55   |

**BRTS Journey speeds are 1.25 times to more than 2 times of the Auto speed, thus considerable travel time savings being realized in BRTS travel**

# Emissions - Towards a Cleaner Amritsar

## Total Carbon Emissions and Vehicle Emissions for BRTS Buses and Shared Autos (both Diesel)

| Mode          | Occupancy | Fleet Size | Total Kilometer Per Day ('000') | Vehicle KM Travelled | Total Pollutant emission | Total Carbon Emission | Total Vehicle Emissions |
|---------------|-----------|------------|---------------------------------|----------------------|--------------------------|-----------------------|-------------------------|
| Bus           | 42        | 80         | 226                             | 18,080               | 3,65,379                 | 1,36,08,816           | 1,39,74,195             |
| Auto-Rickshaw | 4         | 840        | 226                             | 1,89,840             | 9,38,759                 | 2,85,82,310           | 2,95,21,069             |

## Carbon Emissions and Vehicle Emissions per vehicle (g/km) as per MoUD 2014

| Mode          | PM 2.5 | NOx    | CO    | HC    | Pollutants (g/km) | CO2    | Total Emissions |
|---------------|--------|--------|-------|-------|-------------------|--------|-----------------|
| Bus           | 0.504  | 16.788 | 2.352 | 0.565 | 20.209            | 752.7  | 772.909         |
| Auto-Rickshaw | 0.224  | 0.921  | 2.616 | 1.184 | 4.945             | 150.56 | 155.505         |

**Thus, 80 buses replace 840 Shared Auto rickshaws. Shared Autos emit more than 3 times the total Pollutants and more than 2 times the total Carbon emissions than BRTS Buses.**

# BRTS AMRITSAR : Measures for Sustainability

- PBMS handholding and supporting BRTS Amritsar
- **Urban Transport fund** set up at state level through the Act
- **Advertisement revenue to be shared** between MC Amritsar and PBMS - will help reduce the Viability Gap
- **Fruit & Snacks kiosks** to be set up at 10 BRTS stations as a pilot - will add on to the **non-fare revenues**
- **Public Bike Sharing scheme** proposals being actively considered for ensuring last mile connectivity and shared mobility ( proposal from Hero cycles received)

# **BRTS AMRITSAR**

## **THE SUCCESS STORY TO CONTINUE :**

### **PHASE 2 ....**

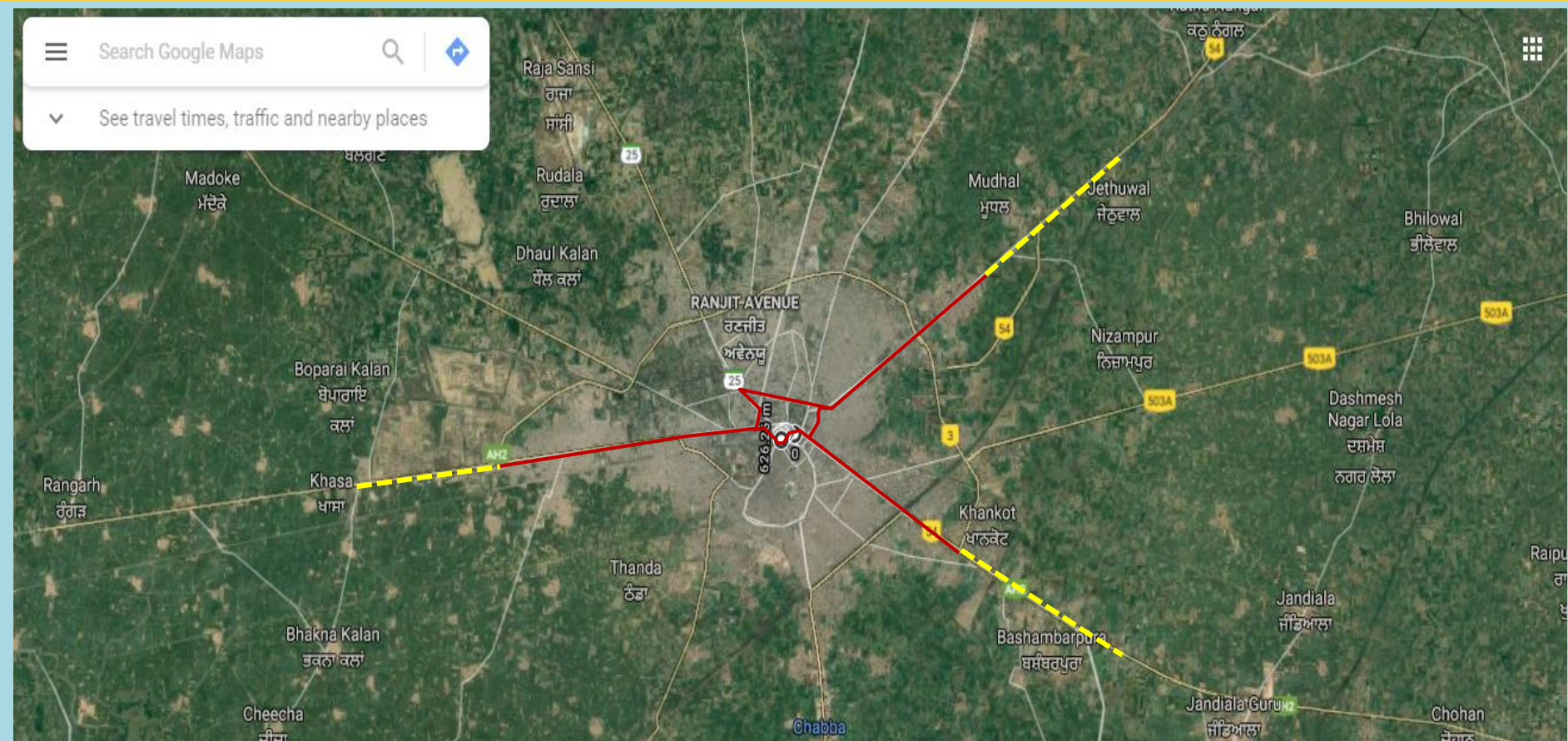
- **Amritsar BRTS is carrying more passengers on a daily basis than some of the new Metros constructed at 6-10 times of the cost of Amritsar BRTS.**
- **BRTS PHASE 1 covers 31 kms of the City's core road network of 75 Kms, the mass public transport availability has to be ensured for the maximum part of the core road network.**
- **Considering the popularity and patronage among commuters due to distinct advantages and features of BRTS system, PBMS can now actively plan Phase 2 of Amritsar BRTS .**

# Immediate Improvements

## Immediate Measures ( within 1 year)

- Routes to be extended in mixed traffic, with roadside Bus Stops
- Mixed BRT sections to be taken up for improvements-resurfacing and improved traffic signal, feeder routes to BRT by city buses need to be planned
- BRTS Infrastructure maintenance to be improved-lifts, AFC gates, surveillance cameras, lighting etc
- Construction and upgradation of footpaths to maintain adequacy and continuity in the by-lanes near BRT Bus stops
- Tourist attractions lying on /near BRT corridors to be highlighted through signages & AV media

# BRT Routes- Phase 2 – Proposed Extensions – At a glance



- Existing BRT Corridor

● Terminal Stops on existing Corridor
- - - Extensions of BRT Corridors

● BRT Stops on extension lines

# Amritsar BRTS - Phase 2 Extensions

## Stage 1 Extensions : To nearby settlements, can be taken up immediately

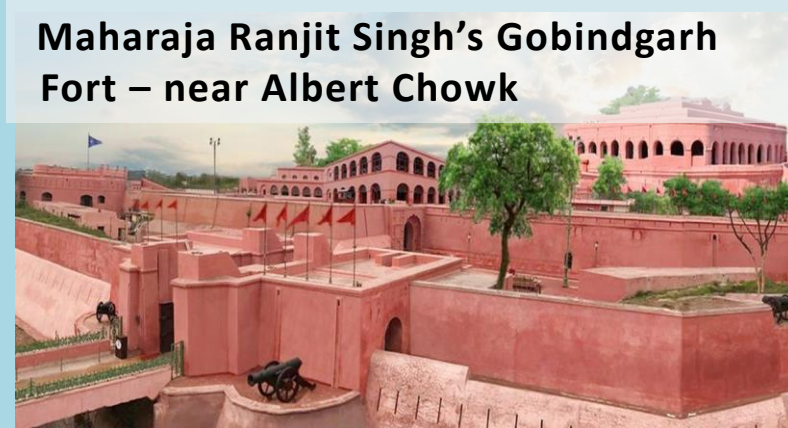
- MCA Gate to ACET via Manewala -6.2 kms, 2 Bus Stops in mixed traffic
- Verka canal to Jethowal via Muddal-4.7 kms, 2 Bus Stops in mixed traffic
- India Gate to Khasa Village via Dograi Brigade station -5.6 kms, with 3 Bus Stops in mixed traffic

## Stage 2 Extensions: To locations within the City or those which can be taken at a later date

- Elevated dedicated BRT from Kichlu Chowk to Airport, via Kucheri Chowk- 8.5 kms
- Civil hospital to Hall Gate- 0.6 kms, 2 Bus stops
- Albert Chowk to Lohgarh Chowk via Rigo Bridge-1.5 Kms,2 bus stops
- Kichlu Chowk to 4S Chowk via Ranjeet Avenue, Trillium Mall, Majitha road- 8.5 kms, 7 stops
- Brothers dhaba to Wagah Border, 23 kms

# Immediate Improvements

## Provisions of information signages for tourist attractions located on/near BRT Bus Stops



# Expected Outcomes with Improvements in system

- **Increased Accessibility for Public Transport, enhanced Ridership**
- **Reduced traffic, Reduction in shared autos**
- **Reduction in overall carbon footprint, as shared autos are 2/3 times more polluting than the BRT Buses**
- **Increase in Revenues, Reduction in Viability gap**
- **Improvement of City's overall Tourist attraction index**

# Comparative Analysis of Operational Metro and BRT Systems

| SYSTEM | S. No. | City                  | Total Length of System (KM) | Daily Ridership - 2019 | Ridership/ System Length (km) | Capital Cost in Crore per Km | Motorized Average TL (km) | Average Cost per Daily Rider in Lacs of Rs |
|--------|--------|-----------------------|-----------------------------|------------------------|-------------------------------|------------------------------|---------------------------|--------------------------------------------|
| MRTS   | 1      | Delhi                 | 343.36                      | 3000000                | 8737                          | 205                          | 11.2                      | 2.35                                       |
|        | 2      | Hyderabad             | 55.3                        | 255000                 | 4611                          | 250                          | 10.0                      | 5.42                                       |
|        | 3      | Chennai               | 45.1                        | 90,000                 | 1996                          | 443                          | 13.3                      | 22.20                                      |
|        | 4      | Banglore              | 42.3                        | 400000                 | 9456                          | 366                          | 10.0                      | 3.87                                       |
|        | 5      | Kolkata               | 27.22                       | 700000                 | 25716                         | 332                          | 10.0                      | 1.29                                       |
|        | 6      | Lucknow               | 23.7                        | 67,000                 | 2827                          | 276                          | 6.5                       | 9.76                                       |
|        | 7      | Kochi                 | 18.4                        | 50,000                 | 2717                          | 201                          | 10.8                      | 7.40                                       |
|        | 8      | Gurgaon               | 11.7                        | 55,000                 | 4701                          | 367                          | 9.3                       | 7.81                                       |
|        | 9      | Mumbai                | 11.4                        | 405000                 | 35526                         | 350                          | 10.0                      | 0.99                                       |
|        | 10     | Jaipur                | 9.63                        | 20,000                 | 2077                          | 277                          | 6.4                       | 13.34                                      |
| BRTS   | 1      | Amritsar              | 31                          | 26100                  | 842                           | 18                           | 7.2                       | 2.14                                       |
|        | 2      | Pune Pimpri Chinchwad | 61                          | 145000                 | 2377                          | 17                           | 8.0                       | 0.72                                       |
|        | 3      | Ahmedabad             | 125                         | 370,000                | 2960                          | 34                           | 8.1                       | 1.15                                       |
|        | 4      | Rajkot                | 10.5                        | 17000                  | 1619                          | 10                           | 5.1                       | 0.62                                       |
|        | 5      | Surat                 | 102                         | 80,000                 | 784                           | 16                           | 6.4                       | 2.04                                       |
|        | 6      | Indore                | 11.7                        | 50,000                 | 4274                          | 14                           | 7.1                       | 0.33                                       |
|        | 7      | Hubli-Dharwad         | 22                          | 60,000                 | 2727                          | 43                           | 8.6                       | 1.58                                       |

**As Amritsar BRT will achieve its potential ridership, it will be among the most economical mass transit systems in terms of cost per daily rider**

# Thank You

