Transit Oriented Development Strategic Plan for Bhopal

IBI GROUP

26th February, 2015

SUTP
Sustainable Urban Transport Project (India)
## INTRODUCING BHOPAL

<table>
<thead>
<tr>
<th></th>
<th>Bhopal</th>
<th>Curitiba</th>
<th>Ottawa</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Population</strong></td>
<td>1.79 million (2011)</td>
<td>1.76 million</td>
<td>1.2 million</td>
</tr>
<tr>
<td><strong>Area</strong></td>
<td>684.24 sq.km</td>
<td>430.9 sq.km</td>
<td>5716 sq.km</td>
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<tr>
<td><strong>Gross Density</strong></td>
<td>2616 persons/sq.km</td>
<td>4095 persons /sq.km</td>
<td>196.6 persons/sq.km</td>
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<tr>
<td><strong>Urban Area Density</strong></td>
<td>6893 persons/sq.km</td>
<td>4200 persons/sq.km</td>
<td>1860 persons/sq.km</td>
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<tr>
<td><strong>Higher Order Transit</strong></td>
<td>BRTS + proposed MRTS</td>
<td>BRTS</td>
<td>BRTS + Proposed LRT</td>
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</tbody>
</table>

**Transport**

- Bhopal: BRTS + proposed MRTS
- Curitiba: BRTS
- Ottawa: BRTS + Proposed LRT

**Urban Form**

- Bhopal: Urban Form
- Curitiba: Urban Form
- Ottawa: Urban Form

**Policy Framework**

- Bhopal: Policy Framework
- Curitiba: Policy Framework
- Ottawa: Policy Framework
Need for TOD in Bhopal

• Prioritizing public transit use and reduced use of private vehicles for daily commuting

• Providing **policy directions to establish a TOD-centric growth pattern**

• Capitalizing upon the land value potential near BRTS and Metro stations to attract private sector investment in joint development

• Formulating a **strategic implementation programme that outlines the phasing strategy** for investment
Step-by-Step Process

1. **Assess**
   - Determines the Scale and scope for the Bhopal TOD Plan taking into consideration existing nodal agency priorities, data availability, and a cursory review of existing plans.

2. **Enable**
   - Recommendations to address these barriers in order to strengthen the role of Bhopal’s local administration in planning and implementing TODs.

3. **Plan + Design**
   - Brings forth the fundamental steps in the development of transit and pedestrian friendly communities in Indian cities.

4. **Invest**
   - The ‘Invest’ section presents a capital improvements programme for the implementation of the TOD Plan.

5. **Implement**
   - Government, experts and stakeholders formulate team with their roles and responsibilities for the process of implementation.
1. Review Nature of Transit

- High NMT Modal Share
- Expanding higher order transit service
  - BRTS (1 operational) and MRTS (planned)
- 10% annum growth in vehicular traffic over the last decade, of which 80% are 2wheelers
1. Review Nature of Transit

Public transport - Buses, mini buses and IPT modes (Tata Magic, auto-rickshaws).
1. Review Nature of Transit - BRT

**Total length:** 119.2 Km; 12 lines

**Total Bus Stops:** 573

**OPERATIONAL BRT:**
TR 4 - Bairagarh/ Sehore Naka to Misrod

**Bus Stops:** 44

**Length:** 24 Km

**Ridership:** 1.06 lakhs passenger per day
1. Review Nature of Transit - Metro

**Total length:** 85.66 Km; 6 lines

**Total Stops:** 81
1. Review Nature of Transit - Key Takeaway

- Proposed **Metro route alignment runs parallel** with the operations and proposed BRT routes

- Government intends to **gradually phase out the operational BRT route** or utilize it as a feeder system, once the Metro is operational

- **Corridor level TOD approach with multi-modal integration of different modes of transportation.**
1. Review Station Areas

Lack of multimodal integration

Poor Transit Quality
1. Review Station Areas

Unsafe access between BRT stops & surrounding development

Lack of traffic calming to improve safety for pedestrians
1. Review Station Areas

Lack of planned parking facility

High on-street parking encroaching NMT infrastructure
### 2. Institutional Framework

<table>
<thead>
<tr>
<th>Land Use</th>
<th>State level</th>
<th>District Level</th>
<th>City Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Formulation</td>
<td>Town and Country Planning</td>
<td>Regional Transport Office (RTO)</td>
<td>Capital Project Administration</td>
</tr>
<tr>
<td>Plan Development</td>
<td>Urban Administration and Development</td>
<td>Collectors Office</td>
<td>Development Authority</td>
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<tr>
<td>Implementation</td>
<td>Transportation Department</td>
<td>Traffic Police</td>
<td>Urban Local Body (BMC)</td>
</tr>
<tr>
<td>Enforcement</td>
<td></td>
<td></td>
<td>Bus SPV (BCLL)</td>
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</tbody>
</table>

- **Multiplicity of agencies**

- **Land use planning** falls under the purview of Town and Country Planning at state level or development authority.

- **Insufficient capacities** to develop and implement TOD projects
3. Previous Plans- Bhopal Master Plan

TOD Consistencies:

- **Differential densities** for city with higher density areas proposed around the existing and the proposed work centres

- **Proposed Mass Rapid Transit System** connecting major work centres, and traffic generating zones

- Recommends **variable FSI**s based on site context.

TOD Gaps:

- Does not **address regulatory or implementation mechanisms** for coordinated land use and transportation planning

- Does not identifies **mixed use as a land use category**

- Development controls are limited to FSI

- Does not plan for **pedestrian accessibility**
3. Previous Plans - DCRs

FAR
- Residential Use: 0.75 - 1.33
- Commercial Use: 1.5 - 2.5
- Mixed Use: FAR for commercial development will be 0.75 only where FAR for residential area is 0.75

DENSITIES PROPOSED (Development Plan - 2005)
- Low - upto 125PPH
- Medium - 126-250 PPH
- Medium & High - 251-400PPH
- High - 401-600PPH

PARKING:
- Multi-family Residential: 1ECS/100sqm
- Commercial:
  - 1 ECS/50 sq.m where shops size exceed 20 sq.m
  - 1 ECS/100 sq.m of floor space in other areas
- Hotels and Lodges: 1ECS/75 sq.m
- Govt. Semi-public and private offices: 1ECS/100 sq.m of built-up area
3. Previous Plans- Bhumi Vikas Adhiniyam

TOD Consistencies:

- Introduces a new category of residential use R2 that permits commercial on ground floor
- The assessment of the shopline is based on:
  - Infrastructure capacity
  - Traffic survey
- Express clearance require for permitting high-rise buildings to ensure balance of infrastructure and other utilities.

TOD Gaps:

- Does not include the concept of Transit Oriented Development.
- Does not include mixed use a category in the identified land uses that allows mix of uses other than commercial and residential
- Allows front setbacks and boundary wall which are not friendly for developments.
- No single window approval for development
3. Previous Plans - BRTS DPR

TOD Consistencies:

- Proposed typical **cross section based on different ROWs**
- **Segregated traffic lanes for BRT**, slow moving vehicles, non motorized transport and pedestrians.
- Proposed **integration of BRT with the existing feeder service**.
- Planned **the BRTS routes linking the proposed sub-cities**.

TOD Gaps:

- Does not discuss **micro-strategies to improve accessibility** to transit stations.
- **Lack of integration of parking** and with local feeder service - autos, tata magic.
- The plan does not take into consideration **universal accessibility**
4. Scale & Scope

Where does your city stand on the following?

- Development Plan / City Development Plan update underway/ ongoing/planned
- Compressive Mobility Plan under preparation
- BRT / Metro Rail system Detailed Project Report under preparation
- BRT / Metro Rail system Detailed Project Report prepared/ under preparation
- Special Purpose Vehicle for Transit oriented
- Development Control Regulation modifications/ Floor Area Ratio increase proposed
- Compressive Mobility Plan under preparation

- Transit operational/ under construction
- Government owned vacant lands / Redevelopment opportunities existing near transit
- Land Banking / Roofing Strategy underway
- Development Control Regulation modifications/ Floor Area Ratio increase proposed
- Increased pressure on existing Infrastructure
- Market Interest (rapid change in property values)
- Redevelopment opportunities near transit
- In greenbelts, land acquisition or development
- Land tracts of government owned land available near transit

LEGEND
- Municipal Boundary
- Transit Network
- BRT (Metro)
- Line 3 Metro
- Line 1 Metro
- TR-4 BRTs
- BRT STOP
- Metro STOP
- BRT + Metro STOP
- Influence Zone(400m)
- Influence Zone(800m)
5. Data Availability

### Existing Documents and Studies

- Comprehensive Development Plans/ Master Plans
  - Bhopal Development Plan 2005
  - Draft Development Plan 2021
- Comprehensive Mobility Plans/ Comprehensive Traffic and Transportation Plans
  - Comprehensive Mobility Plan 2012
- Transit Service Plan or DPRs
  - BRTS DPR
  - Metro DPR
- State Town & Country Planning Act
  - MP Town & Country Planning Act, 1973
  - Bhumil Vikas Aadhinyam- 2012
- Local Area Plans/ Detailed Development Plans/ Zonal Development Plans
  - Draft Zonal Plan for AITMS
  - Draft Zonal Plan for 4 zones

### Existing Condition Inventory

- Existing Land Uses/ Future Land Uses
- Road Inventory
- Transit Alignment & Station Location
  - Plot Sizes
  - Land Ownership
- Infrastructure
- Parking Location
- Public Facilities
- Major Nodes and Activity Center
- Pedestrian Infrastructure
- Cycle Tracks
- Real Estate circle rates

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### Data Limitations

- Data Limitations

### Multiple Agency involved

- Smart City Solution- centralized data clearing house
## 1. TOD Task Force

<table>
<thead>
<tr>
<th>Organization</th>
<th>TOD Principles</th>
<th>Roles and Responsibilities</th>
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</thead>
<tbody>
<tr>
<td>T&amp;CPO</td>
<td>Mix Land uses</td>
<td>Integration of TOD principles in the Regulatory Framework</td>
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<tr>
<td></td>
<td>Optimize Densities</td>
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<td></td>
<td>Street Oriented Buildings</td>
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<tr>
<td>UADD</td>
<td>Interconnected Street Network</td>
<td>Incorporating pedestrian related principles while formulating plans for city’s mobility</td>
</tr>
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<td></td>
<td>Complete Streets</td>
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<td></td>
<td>NMT Network</td>
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<tr>
<td>BDA</td>
<td>Housing Diversity</td>
<td>Formulate tools and strategies to produce affordable housing near public transit</td>
</tr>
<tr>
<td>BMC</td>
<td>Traffic Calming</td>
<td>Integration of traffic calming measures and first and last mile connection while planning transport infrastructure</td>
</tr>
<tr>
<td></td>
<td>First &amp; Last Mile Connectivity</td>
<td></td>
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<td></td>
<td>Informal Settlement</td>
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</tr>
<tr>
<td>BCLL</td>
<td>Multimodal Integration</td>
<td>Route rationalization and integrating feeder service with the transit and development</td>
</tr>
<tr>
<td>Police</td>
<td>Manage Parking</td>
<td>Enforcement and regulation of traffic and parking</td>
</tr>
</tbody>
</table>
2. Goal Setting

1. Two-Pronged Approach: BRTS vs. MRTS

2. Eliminating Policy/Regulations barriers - Acts/Development Plan/DCR modifications

3. Differential FARs/Optimized Densities based on Station Area Plans/Special TOD Zone

4. Prioritization for Development of Station Areas

5. Financial and non-financial incentives to push market towards desired investment
3. Eliminating Policy level Barriers

MULTIMODAL INTEGRATION

EXISTING POLICIES

• To establish reliable, efficient multimodal public transport system (Section 3.3)

• Provide for multi nodal Regional Bus Terminal facilities following regional bus stations should be developed according to the needs and the volume of the bus users (Section 3.32)

PROPOSED AMMENDMENTS

• Intermodal integration of formal public transport, para transit and cycle sharing should be within 200m from each other

• Coordinate local feeder transit service schedules and routes to provide seamless connectivity between local, regional, and rapid transit services by reducing waiting times.
  • Bus routes along collectors and arterial roads provided every 800m- 1km
  • Transit feeder stops/local bus stops: 400m or 5 min walk

• Adopt transit priority measures to ensure the efficient movement of surface transit to and from the station area, including measures such as signal priority and dedicated transit lanes.
3. Eliminating Policy level Barriers

EXISTING POLICIES

• Mixed land use- Mixed land use zone means a use zone in the land use plan consisting of more than one use zones, in such case use premises/use activities permitted in both the use zones shall be applicable. (Section 4.12)

• At the time of Zonal Development Plan, streets of mixed use activity shall be identified.

• Commercial activity allowed shall be only on the ground floor to the extent of 25% or 50sqm

PROPOSED AMMENDMENTS

• In all integrated schemes, a minimum of 30% of overall FAR shall be mandatory for Residential use, a minimum 10% of FAR for commercial use and minimum 10% of FAR for community facilities. Mix of uses and FAR utilization for the remaining 50% FAR shall be as per the land use category designated in the Zonal Plan.
3. Eliminating Policy level Barriers

EXISTING POLICIES
• Not Addressed

PROPOSED AMMENDMENTS

• Prioritization of public transport and non-motorized private modes in street design.
• Maximum number of people should be able to move fast, safely and conveniently through the city.
• To retrofit streets for equal or higher priority for public transit and pedestrians.
• Shift the balance of the roadway so that it caters more to NMT users of all types within station areas and transit zones.
• Provide enough room on the sidewalk for NMT users of varying speeds, ages, and abilities.
• Create street-level activity and well-watched streets for pedestrian security and enjoyment.
• Provide adequate amenities for pedestrians, cyclist, NMT and public transport users.
1. Map Transit Corridor

**Priority Corridor:**
- BRTS- TR4 (Operational Corridor)
- MRTS: Line 1 & Line 3

Critical link that connects the major activity centres in Bhopal.

**Metro** traces the same route except for the stretch extending from Board Office to Mandideep and an additional connectivity to Airport.

Overlapping Stretch: 14Km (Metro-21.58Km & BRT 30.59KM)
2. Influence Zone

Transportation Considerations

- Prioritize high levels of pedestrian, NMT activity
- Balance other modes of access to the stations e.g. IPT, MVs, cell-phone waiting etc.
- Reduction in parking

Land Use Considerations

- Highest Density & Mixed Uses to encourage high ridership & provide a mixed-use, vibrant activity spine
- High level of amenities – retail, bike parking, businesses, traffic calming etc.
3. Analyzing Development Opportunities

Misrod- Habibganj stretch
- High availability of vacant land.
- Close proximity to the railway station is attracting a lot of economic activities.

Habibganj Railway Station- T.T. Nagar is a high activity area with large residential areas on the left side and large commercial centre i.e. at MP Nagar on the right side.

T.T. Nagar- Kamla Park stretch has mix of activities- New Market, Kamla Park

Kamla Park- Bairagarh has a mixed use character- old area with high percentage of mix of

Towards Bairagarh- stretch maintains a mixed use character & low density development.
3. Analyzing Development Opportunities

Based on travel demand projections:

- Stretch from T.T. Nagar to Board Office is the highly used corridor;
- Stretch connecting Board Office to Habibganj Station
4. TOD Typologies

Why Typologies?

• Provide a snapshot of aspirational character
• Set expectations for development
• Establish a level of magnitude for possible investments
• Opportunity for replicability and scalability of standards at city scale
## 4. TOD Typologies

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mixed Use Commercial</th>
<th>Mixed use Neighbourhoods</th>
<th>Employment Centres</th>
<th>Retail Destinations</th>
<th>Heritage Precincts</th>
<th>Transit Interchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant center of economic and cultural activity with regional-scale retail destinations.</td>
<td>Significant centre of economic and community activity &amp; offices of the city + a moderate mix of retail.</td>
<td>Significant centre of economic and community activity &amp; offices of the city + a moderate mix of retail.</td>
<td>Famous destinations, recreation areas, mass congregation areas.</td>
<td>Old parts of the city with significant historical, cultural &amp; architectural characteristics</td>
<td>Predominantly a mix of commercial, institutional and residential district organized around transit stations</td>
<td></td>
</tr>
<tr>
<td>Land Use</td>
<td>Residential- 30-40% Commercial- 30-50% PSP &amp; Others- 10-20%</td>
<td>Residential- 30-40% Commercial- 20-30% PSP &amp; Others- 10-20%</td>
<td>Residential- 30-40% Commercial- 10-20% PSP &amp; Others- 30-50%</td>
<td>Residential- 30% Commercial- 10-20% Commercial- 50-60% PSP &amp; Others- 10-20%</td>
<td>Residential- 30% Commercial- 10-20% Commercial- 10-20% PSP &amp; Others- 10-20% Heritage Areas- 20-30%</td>
<td>Residential- 30% Commercial- 10-20% PSP &amp; Others- 10-20% Transportation- 20-30%</td>
</tr>
</tbody>
</table>
5. Accessibility

- Traffic calming
- Pedestrian crosswalks
- IPT integration
- Universal Access
5. Accessibility

RoW: 60m
## 5. Priority Station Areas - BRT

<table>
<thead>
<tr>
<th>Station Area</th>
<th>Land/Developable Land</th>
<th>Government Owned</th>
<th>Market Strength</th>
<th>Density Potential</th>
<th>Parking Capacity (vs. Demand)</th>
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<tbody>
<tr>
<td>Allahabad Bank</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
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<td>RKDF College</td>
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<td>Shri Ram Colony</td>
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<td>Kali Mata Mandir</td>
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<td>Chinsaur Fortune City</td>
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<td>University Gate</td>
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<td>Sargam Talkies</td>
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<td>Prakash Taran Pushkar</td>
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</tbody>
</table>

### Legend for Priority Level
- **Low**
- **Medium**
- **High**
5. Priority Station Areas- BRT

Development Potential
- Vacant Land Availability
- Government owned lands
- Market Strength
- Infrastructure Carrying Capacity

Improved Station Accessibility
- First and Last Mile Connectivity
- Multimodal Integration
- Walkability to Station
- Parking

Balanced Employment + Population Distribution
- Identify Origin & Destination Station
- Land Use Mix

Timing:
- Long Term TOD Opportunity
- Short-Term TOD Priority
- Emerging TOD Market
- Inactive TOD Market
### Development Opportunities
- Habibganj Station
- ISBT

### Accessibility
Destination areas that have high footfall of pedestrians:
- Habibganj Naka
- University Gate
- Nanke Petrol Pump
- Top N Down
- Roshanpura
- Nadra Bus Stand
- Bhopal Talkies
Financing Models

1. Land Banking- Urban Infill
2. Land Pooling- TP Schemes (Greenfield)
3. Premium FARs in exchange of providing:
   - Public amenities
   - Public open space
   - Achieving IGBC or Green Building certification
   - Affordable housing units
   - Public access for creating small block sizes
4. Transit Agency: Rail + Property
   - Land Value Capture
   - Joint Development
5. Align with Smart City Project/ funding & other central government programs
Implementation Strategy

- **Formulation of Task Force** to ensure continuity in TOD planning process
- Prepare **TOD policy and relevant bye-laws**
- Establish a **TOD Overlay District** as a Special Area in **Development Plan** under preparation
- **Notification of Rules & Regulations** to establish statutory relevance for TOD Principles.
- Improve **citywide Public Transport & NMT facilities** along with route rationalization for bus routes and feeder routes.
- Conduct **detailed Station Area Planning** for priority stations.
- Identify **key catalyst projects/s sites** for TOD.
Implementation Strategy - Key Sites

- Public Plaza
- Existing Drain
- Solar farm
- Lake
- Sports Academy

Key Sites:
- Retail Plaza at Knowledge Hub
- Multi Modal Integration at Central TOD
- Interactive Plaza at Innovation Hub
- Mixed Use at Periphery
Implementation Strategy - Key Sites

Habibganj (Bhopal)
Implementation Framework: Who Implements TOD?

- Alternative 1: UMTA/ MPUCD includes TOD coordination and planning
- Alternative 2: Revive BDA as the planning and implementation agency with a special TOD cell
- Alternative 3: Form a special SPV for TOD Overlay Zone under BMC?

- Detailed TOD Planning at varying scales
- Project Management
- Enforcement & Monitoring
## Implementation - Capacity Building

<table>
<thead>
<tr>
<th>TRAINING SECTORS</th>
<th>DEPARTMENT/ AUTHORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive Planning for Urban Transport</td>
<td></td>
</tr>
<tr>
<td>Formulating an Urban Transport Policy in MP</td>
<td>UADD</td>
</tr>
<tr>
<td>Preparation of CMPs, Scope and Purpose</td>
<td>BMC, BCLL</td>
</tr>
<tr>
<td>Setting up an untitled transport authority at regional level</td>
<td>TCPO, UADD ULB and BDA</td>
</tr>
<tr>
<td>Visioning and Goal setting for Sustainable Transport</td>
<td>UADD, TCPO, BMC, BDA, BCLL</td>
</tr>
<tr>
<td>Preparation of an integrated regional transport plan</td>
<td>BMC, BDA</td>
</tr>
<tr>
<td>Integrating Transport plan with statutory master plan</td>
<td>TCPO, UADD, BDA and BMC</td>
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# Implementation - Capacity Building

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<tr>
<td><strong>PUBLIC TRANSPORT AND IPT</strong></td>
<td></td>
</tr>
<tr>
<td>Planning for an appropriate organized Public Transport System</td>
<td>BMC, BCLL</td>
</tr>
<tr>
<td>Vehicle selection and procurement</td>
<td>BMC, BCLL</td>
</tr>
<tr>
<td>Transport demand surveys for route planning and preparing PT plan</td>
<td>BCLL</td>
</tr>
<tr>
<td>Business Model for SPV</td>
<td>BCLL</td>
</tr>
<tr>
<td>PPP contracts for bus operation</td>
<td>BCLL</td>
</tr>
<tr>
<td>Intelligent Transport Management System for bus services</td>
<td>BCLL</td>
</tr>
<tr>
<td>Infrastructure requirements such as depots and terminals for bus systems</td>
<td>BCLL</td>
</tr>
<tr>
<td>Planning and Designing a BRT including conducting feasibility study</td>
<td>BMC, BCLL</td>
</tr>
<tr>
<td><strong>INTEGRATING ORGANISED PT WITH OTHER PARA TRANSIT MODES</strong></td>
<td></td>
</tr>
<tr>
<td>Using Advertising on buses and bus stops for revenue collection</td>
<td>BCLL</td>
</tr>
<tr>
<td>Organisition and management of para transit</td>
<td>BMC, RTO Collectors Office, BCLL</td>
</tr>
<tr>
<td>Introduction to Cycle Sharing systems</td>
<td>BMC, BCLL</td>
</tr>
</tbody>
</table>
### Implementation - Capacity Building

**TRAINING SECTORS**

<table>
<thead>
<tr>
<th>STREET DESIGN WITH A FOCUS ON PEDESTRIAN AND CYCLE SAFETY</th>
<th>DEPARTMENT/ AUTHORITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principles and elements of complete street design</td>
<td>BMC, BDA</td>
</tr>
<tr>
<td>Conducting Primary surveys such as street audits and pedestrian counts</td>
<td>BMC, BDA</td>
</tr>
<tr>
<td>Standards and guidelines including IRC codes for footpath and cycle track construction</td>
<td>BMC, BDA</td>
</tr>
<tr>
<td>Intersection Design for pedestrian and cyclist safety</td>
<td>BMC, BDA</td>
</tr>
</tbody>
</table>
**Bhopal Key Inputs to Guidance Document**

### Learnings
- Transit planning needs to integrate TODs from the DPR stage
- Data availability challenges could potentially derail TOD process
- Multiple stakeholders within a TOD requires facilitated information exchange and agreements
- Implementation roles can affect project delivery
- Accessibility component in a TOD more critical than densification

### Input for Guidance Document
- The Guidance Document must recognize a city’s needs and be **applicable at all scales**
- The Step-by-Step TOD Process must be **flexible to accommodate data challenges**
- TOD Task Force must be **multi-disciplinary and multi-agency**
- Implementation roles are sensitive to local political context
- Accessibility can be addressed at smaller scales. **Pilot projects should be encouraged**
Thank You