WEBINAR SERIES ON

TRANSIT ORIENTED DEVELOPMENT IN INDIAN CITIES

Understanding the concept, TOD principles, and Design interventions

PRERNA V MEHTA, LEAD – URBAN DEVELOPMENT

A product of WRI Ross Center for Sustainable Cities
COMPONENTS

• Institutional Setup

• Regulatory Framework

• Mapping

• Design Interventions  (Planning & Design and implementation)

• Financing

• Monitoring and Evaluation
WEBINAR GOAL

To impart understanding of the concept of Transit Oriented Development, principles of TOD, Scales and categories of TOD, various planning & Design processes required to plan and implement TOD in cities.
TRANSIT ORIENTED DEVELOPMENT (TOD) CONCEPT

“Moderate and high-density housing, along with complementary public uses, jobs, retails and services, are concentrated in mixed-use developments at strategic points along the regional transit system.”

- Peter Calthorpe, The Next American Metropolis, 1993
WHAT IS TOD?

Transit Oriented Development, involves creating concentrated nodes of moderate-to-high density developments supporting a balanced mix of land uses around transit stations ideally within 500 – 800 mts from the station or 5 -10 minutes walking distance.
CONTINUED.....

Adopting TOD is a complex task considering the following:

- Involves **MULTIPLE** Stakeholders
- It is **COST** Intensive
- Requires **LONG term** vision
- Have **MULTIPLE** Components
- It is **NOT homogenous** i.e. One size doesn’t fit all
- Should respond to **LOCAL context**
URBANISATION CHALLENGES IN INDIAN CITIES
URBAN SPRAWL

- Rapid growth in satellite towns of Delhi (Gurgaon, Noida, Grt Noida, Faridabad etc.)
- Bengaluru is witnessing high-tech and IT/ITES offices proliferating and clustering at the peripheries
- Pune capitalising on Mumbai's slow down, attracting new economies like IT/ITES

Source: Generated by WRI India using data from Bhuvan NRSC
SPRAWL, CONGESTION, POLLUTION & HEALTH

Sprawl Will Cost India $1.8 Trillion Per Year by 2050

India suffers loss of $21.3 billion annually due to traffic jams

25,000,000 premature deaths/year in India due to air pollution

Source: http://www.livemint.com/Money/VX3SyEKuUZ/8kY/DOXyL-What-is-the-daily-traffic-jam-costing-you.html
3 PROBLEMS RISKING LOCK-IN

Congestion  Sprawl  Inefficiency

BUSINESS-AS-USUAL IS UNSUSTAINABLE

Photo credits: (left) WRI Ross Center for Sustainable Cities, (Mexico, center) Pablo Lopez Luz, (Mexico, right) Ruimc77/Flickr
CHOICES MATTER: ATLANTA AND BARCELONA HAVE SIMILAR POPULATIONS AND WEALTH LEVELS BUT VERY DIFFERENT SPRAWL

**ATLANTA**

Atlanta’s built-up area

Population: 2.5 million
Urban area: 4,280 km² (1652.517 Sq.mi.)

**BARCELONA**

Barcelona’s built-up area

Population: 2.8 million
Urban area: 162 km² (62.55 Sq. mi.)

NEW PARADIGMS

Compact urban growth
• Managed expansion, mixed-use urban form, good quality urban design

Connected infrastructure
• Smarter transport systems, smarter utilities, smart grids

Coordinated governance
• Integrated land use and transport authorities, integrated planning, PPPs
To ensure sustainable development, the Ministry of Housing and Urban Affairs (MoHUA) has recognized Transit Oriented Development (TOD) as the urban growth strategy of choice; for creating vibrant, liveable neighbourhoods along efficient public transit systems.
NATIONAL POLICIES AIDING CHOSEN STRATEGY

Both the National TOD Policy and the Metro Rail Policy mandates to adopt TOD as implementation strategy and leverage the benefits it offers.
GLOBAL TOD MODELS
### Arlington County, United States

**TOD as a ECONOMIC model to improve productivity**

- High Density Mixed Use around Transit Stops (Greenfield)
- Rosslyn-Ballston corridor
- 8.5 miles, 5 metro stations
- Mixed Land Use: Commercial, office, retail, hotels
- Residential: single-family, townhouse, condos, high-rise
- 26% of the county population lives in the Metro corridor
- Metro corridor takes up 8% of county land

**The North American Model**: High Density, Mixed Use around Transit (focused on better productivity)

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### Gurugram, Brazil

**TOD as a MEANS to INTEGRATE LAND USE AND TRANSPORT to improve connectivity**

- Integrated land use and transit
- Mixed land use
- Inclusion of affordable housing
- Protect historic city center
- Contain urban sprawl

**Passengers per day on the BRT system**: 2.7 million

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### Copenhagen, Denmark

**TOD as a LIVABILITY and ACCESSIBILITY model to improve QoL**

- Regional transport system
- Green fingers
- Decentralized concentration along transport corridors
- Pedestrian and bicycling priority

**The European Model**: Mid Density, Mixed Use around public spaces connected with Transit, Biking and Pedestrian facilities (focused on better livability)

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### Hong Kong SAR, China

**TOD as a CO-DEVELOPMENT model to create funding for development**

- High quality pedestrian infrastructure in R&T developments

**2001-2005 property development accounted for 52% of MTRC revenues**

**41% of population lived within 500 m of a rail station in 2002**

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### The South American Model: High Density corridors connecting parts of the city (focus on Integrate land use and transport)

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### The Asian Model: Co-development model to begin with, focused on leveraging real estate around transit to create funds for development,

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**Image Courtesy**: Reconnecting America, Flickr Stream

**Image Courtesy**: Design for Health, Flickr Stream

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INFERENCE?
TOD

• Is NOT homogenous i.e. One size doesn’t fit all
• Should respond to LOCAL context
• Requires LONG term vision
• Land use and transit integration is CRITICAL
• Means to IMPROVE productivity
• Must address LIVEABILITY
• EQUITY is critical

Hence Customize for Indian context……But How?
ASSESSMENT OF EXISTING SCENARIO
OVERLAY – LAND USE, ACTIVITY GENERATORS AND METRO ALIGNMENT
# REGION/CITY LEVEL CLASSIFICATION

## STATION AREA TYPOLOGIES

<table>
<thead>
<tr>
<th>Type 1a:</th>
<th>Regional Level Employment Centres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1b:</td>
<td>Regional Level Commercial Hub</td>
</tr>
<tr>
<td>Type 1c:</td>
<td>Regional Level Recreational Hub</td>
</tr>
<tr>
<td>Type 1d:</td>
<td>Regional Level Transportation Hub</td>
</tr>
<tr>
<td>Type 2a:</td>
<td>City Level Employment Centres</td>
</tr>
<tr>
<td>Type 2b:</td>
<td>City Level Transportation Hub</td>
</tr>
<tr>
<td>Type 3a:</td>
<td>Sub Centre Level Commercial Hub</td>
</tr>
<tr>
<td>Type 4a:</td>
<td>Neighbourhood Level –Mixed Residential Zone</td>
</tr>
<tr>
<td>Type 4b:</td>
<td>Neighbourhood Level –Residential Zone</td>
</tr>
</tbody>
</table>
### STATION AREA TYPOLOGIES

<table>
<thead>
<tr>
<th>Station Names</th>
<th>Scale of Influence</th>
<th>Predominant Land Use</th>
<th>Significant Landmark</th>
<th>Typology</th>
<th>Ecological Factors</th>
<th>Cultural Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bayyapparaballi</td>
<td>Regional</td>
<td>Industrial</td>
<td>Last Stop of Phase I + Railway Station</td>
<td>1D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naidupet</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>Ananthapur Road</td>
<td>1A</td>
<td></td>
<td>Traditional Fabric</td>
</tr>
<tr>
<td>Indiranagar</td>
<td>Regional</td>
<td>Residential</td>
<td>Srinivasa Eco Park</td>
<td>1A</td>
<td></td>
<td>Traditional Fabric</td>
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<tr>
<td>Krishna Park</td>
<td>Regional</td>
<td>Residential</td>
<td>Srinivasa Eco Park</td>
<td>1A</td>
<td></td>
<td>Traditional Fabric</td>
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<tr>
<td>Mahatma Gandhi Road</td>
<td>Regional</td>
<td>Commercial</td>
<td>Administrative Centre</td>
<td>1A</td>
<td></td>
<td>Traditional Fabric</td>
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<tr>
<td>Nizamabad</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>Srinivasa Eco Park</td>
<td>1A</td>
<td></td>
<td>Traditional Fabric</td>
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<tr>
<td>Vattam South</td>
<td>Regional</td>
<td>Public Semi-Public and Green Space</td>
<td>Administrative Centre</td>
<td>1A</td>
<td></td>
<td>Traditional Fabric</td>
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<td>Srinivasa Eco Park</td>
<td>Regional</td>
<td>Administrative Centre</td>
<td>Administrative Centre</td>
<td>1A</td>
<td></td>
<td>Traditional Fabric</td>
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<tr>
<td>Kempegowda Interchange</td>
<td>Regional</td>
<td>Transportation</td>
<td>Bus and Metro Interchange</td>
<td>1D</td>
<td></td>
<td>Traditional Fabric</td>
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<tr>
<td>City Railway Station</td>
<td>Regional</td>
<td>Transportation</td>
<td>Railway Station</td>
<td>1D</td>
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<td>Magadi Road</td>
<td>Sub-Centre</td>
<td>Mixed Use</td>
<td>2A System</td>
<td>2B</td>
<td></td>
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<td>Hosahalli</td>
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<td>Residential</td>
<td>TTNIC</td>
<td>2B</td>
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<td>Vithalapur</td>
<td>Sub-Centre</td>
<td>Residential</td>
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<td>2B</td>
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<td></td>
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<tr>
<td>City</td>
<td>Mixed Residential</td>
<td>TTNIC</td>
<td>TTNIC</td>
<td>2B</td>
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<tr>
<td>Mysoore Road</td>
<td>City</td>
<td>Industrial</td>
<td>Last Stop of Phase I</td>
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<tr>
<td>Nagarapalika</td>
<td>City</td>
<td>Industrial</td>
<td>Last Stop of Phase I</td>
<td>2A</td>
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<td>Ishalathli</td>
<td>City</td>
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<td>2A System</td>
<td>2A</td>
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<tr>
<td>Peeriga Industry</td>
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<td>Industrial</td>
<td>2A System</td>
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<td>Peeriga</td>
<td>City</td>
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<td>2A System</td>
<td>2A</td>
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<tr>
<td>Veerannadpur Industry</td>
<td>City</td>
<td>Industrial</td>
<td>2A System</td>
<td>2A</td>
<td></td>
<td></td>
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<td>Venkatachalam Temple</td>
<td>City</td>
<td>Industrial</td>
<td>2A System</td>
<td>2A</td>
<td></td>
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</tr>
<tr>
<td>Venkata eyopur</td>
<td>Regional</td>
<td>Commercial</td>
<td>TTNIC = Railway Station</td>
<td>3D</td>
<td></td>
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<tr>
<td>Sandal Jeeva Factory</td>
<td>City</td>
<td>Industrial</td>
<td>Orion Mall = Gajan temple</td>
<td>3A</td>
<td></td>
<td></td>
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<tr>
<td>Mahalakshmi</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>2B System</td>
<td>2A</td>
<td></td>
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<tr>
<td>Rajapura</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>2B System</td>
<td>2A</td>
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<tr>
<td>Kurukuru Road</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>2B System</td>
<td>2A</td>
<td></td>
<td></td>
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<tr>
<td>Vinnampura</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>2B System</td>
<td>2A</td>
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<tr>
<td>Sampige Road</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>Mantri Mall</td>
<td>3A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kempegowda Interchange</td>
<td>Regional</td>
<td>Transportation</td>
<td>Bus and Metro Interchange</td>
<td>1D</td>
<td></td>
<td>Traditional Fabric + Historical Structure</td>
</tr>
<tr>
<td>City</td>
<td>Commercial</td>
<td>Commercial</td>
<td>3B System</td>
<td>3A</td>
<td></td>
<td>Traditional Fabric + Historical Structure</td>
</tr>
<tr>
<td>National College</td>
<td>Sub-Centre</td>
<td>Residential + Green Space</td>
<td>TTNIC = MB Block Complex</td>
<td>3A</td>
<td></td>
<td>Historical Structure</td>
</tr>
<tr>
<td>Lailigh</td>
<td>Sub-Centre</td>
<td>Residential + Green Space</td>
<td>TTNIC = MB Block Complex</td>
<td>3A</td>
<td></td>
<td>Historical Structure</td>
</tr>
<tr>
<td>South End Circle</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>TTNIC = MB Block Complex</td>
<td>3A</td>
<td></td>
<td>Historical Structure</td>
</tr>
<tr>
<td>Jayanagar</td>
<td>Sub-Centre</td>
<td>Mixed Use</td>
<td>TTNIC</td>
<td>2B</td>
<td></td>
<td>Traditional Fabric + Religious Structure</td>
</tr>
<tr>
<td>Rachnevaya Vidyalaya Road</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>TTNIC</td>
<td>2B</td>
<td></td>
<td>Traditional Fabric + Religious Structure</td>
</tr>
<tr>
<td>City</td>
<td>Sub-Centre</td>
<td>Residential</td>
<td>TTNIC</td>
<td>2B</td>
<td></td>
<td>Traditional Fabric + Religious Structure</td>
</tr>
<tr>
<td>Jaya Prakash Nagar</td>
<td>Sub-Centre</td>
<td>Mixed Use</td>
<td>TTNIC</td>
<td>2B</td>
<td></td>
<td>Traditional Fabric + Religious Structure</td>
</tr>
<tr>
<td>Puttenhalli</td>
<td>Sub-Centre</td>
<td>Mixed Use</td>
<td>TTNIC</td>
<td>2B</td>
<td></td>
<td>Traditional Fabric + Religious Structure</td>
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<td>Puttenhalli</td>
<td>Sub-Centre</td>
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<td></td>
<td>Traditional Fabric + Religious Structure</td>
</tr>
</tbody>
</table>

*WRI India | Sustainable Cities*
HOW TO APPROACH DESIGN FOR THE CONTEXT?

THROUGH PRINCIPLES
WALKING & BICYCLING (COMPLETE STREETS)
Densify around transport nodes according to pedestrian and cycling 10-minute catchment areas; 800 meters for pedestrians and 3 km for cyclists.

Densified horizontally along a wide area, becoming denser towards the transit nodes.
PUBLIC TRANSPORT (INTEGRATED TRANSPORT)

Weather protected stations with seating and real time information systems

Dedicated priority lanes for public transport
ACTIVE EDGES (TRANSIT SUPPORTIVE USES)

Vertical diversity—mix of functions and uses from floor to floor

Permeable frontages

Horizontal diversity
PUBLIC SPACES/ PUBLIC REALM

Local markets reduce need for transport, while creating local jobs and a social forum.

A meeting place for all. A place for all kinds of activities.
ENVIRONMENTAL & CULTURAL LANDSCAPES
TRAVEL DEMAND MANAGEMENT

Giving priority to pedestrians and cyclists
TOD PRINCIPLES

Walking & bicycling (complete Streets)

Mixed Use & Density (Compact Development)

Public Transport (Integrated Transport)

Active edges (Transit Supportive Uses)

Public Spaces/ Public realm

Travel Demand Management

Environmental & Cultural Landscapes
DEMONSTRATION PROJECTS
INDIRANAGAR METRO SAFE ACCESS AND DCR

SCALE OF TOD: STATION AREA LEVEL

CATEGORY: RETROFITTING
**BACKGROUND & OBJECTIVE**

- 2003: DPR prepared
- 2006: Metro construction begins
- 2011: Reach 1 operational
- 2014: Reach 3 and 3A operational
- 2015: Complete Phase I expected to be operational
- 2019: Phase II expected to be operational

**Objective:**

- To facilitate a development trend that **discourages automobile dependent activities and encourages public transport** around the station area.
- To make the area **investment friendly** as well as inclusive
- To guide the design of built form to improve the street interface thereby creating a **more pedestrian friendly and safe environment**.
- To develop a station area analysis and **development plan methodology that can be applied to stations across the city** while ensuring that each **DCR proposal** caters to the needs of the context (ecological, historical, development) in which the station is set.
The aim of these analyses is to predict the transformations in these areas.
IDENTIFICATION OF STATION AREA
## Key Proposals

### Key Strategies - SAP

<table>
<thead>
<tr>
<th>Category</th>
<th>Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Management</td>
<td>Provide traffic calming measures such as surface treatment, table top crossing</td>
</tr>
<tr>
<td>IPT &amp; PT</td>
<td>Integrate bus stops and rickshaw stands with metro station</td>
</tr>
<tr>
<td>Continuity</td>
<td>Create complete and continuous pedestrian and NMT networks (from entry and exit of metro station)</td>
</tr>
<tr>
<td>Parking</td>
<td>Parking demand management, multi-level parking beyond core area</td>
</tr>
<tr>
<td>Street Design Guidelines</td>
<td>Safer intersections, reduced vehicular speeds, wider pavements, street furniture</td>
</tr>
</tbody>
</table>

### Key Strategies - DCRs

<table>
<thead>
<tr>
<th>Category</th>
<th>Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Landuse</td>
<td>Enforcing mixed-use, minimum % for residential and ancillary uses</td>
</tr>
<tr>
<td>Ground Coverage</td>
<td>Increasing ground coverage to ensure maximum utilization of FAR</td>
</tr>
<tr>
<td>FAR</td>
<td>Redistributing the FAR over a 500m</td>
</tr>
<tr>
<td>Parking</td>
<td>Controlled parking regulations, encourage metro ridership</td>
</tr>
<tr>
<td></td>
<td>- Parking maximums established</td>
</tr>
<tr>
<td></td>
<td>- Parking included in FAR in Core Area</td>
</tr>
<tr>
<td></td>
<td>- Restricted on-street parking</td>
</tr>
<tr>
<td>Street Design Guidelines</td>
<td>DCRs dovetail with Safe Access proposals to ensure a safe and walkable neighbourhood</td>
</tr>
</tbody>
</table>
PROPOSALS: URBAN DESIGN

Proposed FAR:
- 4.0 FAR
- 3.25 FAR
- 3.0 FAR
- ZR regulations
- Parks

Urban Design Concept
Scenario 1: RMP 2015

Scenario 2: RMP 2015 + UDD

Scenario 3: PROPOSAL
DETAILED PROPOSALS: COMPACT ZONE A

- Minimum Residential (ensures no mono-functional zones)
- Commercial use (specific to road)
- Min rear setback
- No minimum side setbacks
- Interactive front façade, no front boundary wall
- Fixed front setback
- Continuous pedestrian network, controlled vehicular entries
- Parking in FAR
## IMPACT

<table>
<thead>
<tr>
<th></th>
<th>UDD Notification</th>
<th>Proposal</th>
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<tbody>
<tr>
<td>Total estimated population</td>
<td>48,707</td>
<td>49,633</td>
</tr>
<tr>
<td>Estimated population within 150 m zone</td>
<td>10,999</td>
<td>8,906</td>
</tr>
<tr>
<td>Total Station Area built-up (sqm)</td>
<td>19,24,230</td>
<td>19,85,328</td>
</tr>
<tr>
<td>Total built-up area within 150 m zone (sqm)</td>
<td>4,39,948</td>
<td>3,56,237</td>
</tr>
<tr>
<td>Per capita footpath space in 150 m zone (sqm)</td>
<td>2.41</td>
<td>2.98</td>
</tr>
</tbody>
</table>

* Population of station area is 37,219 according to 2011 census data
HUBLI- DHARWAD TOD PROPOSAL FOR NAVANAGAR

SCALE OF TOD: CORRIDOR LEVEL

CATEGORY: URBAN INFILL
BACKGROUND AND OBJECTIVE

Demonstrate TOD around BRT station in Navanagar area and scale it to the rest of the stations along the entire corridor of BRT in Hubli-Dharwad.
PROJECT AREA AND APPLIED CONCEPT
PROPOSALS

Proposed Central Spine Plan

Proposed BRT Bus stop

Proposed Plan of Pond

Existing View of Street adjacent to Park

Proposed View of Street adjacent to Park

Institutions

Central Plaza

Cycle Track

Park

Temple Plaza

Vending Area

Stepped Seating around

Reed Bed Plantation

Viewing Points

Proposed Central Spine Plan

Domestic Pond

Recreational Pond

Domestic Pond
## IMPACT

<table>
<thead>
<tr>
<th>PROPOSALS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Public spaces</strong></td>
<td>At Neighbourhood level:</td>
</tr>
<tr>
<td></td>
<td>• Developing 8,000 sqm of dedicated Public spaces which includes children play area, parks, activity areas and resting spaces.</td>
</tr>
<tr>
<td></td>
<td>• Developing 2,300 sqm of Central plaza area adjacent to the proposed Navanagar Express stop, with provision of resting spaces, activity areas, cycle stands, public and private vehicular drop off points, and toilet facilities.</td>
</tr>
<tr>
<td></td>
<td>• Development of 15,000 sqm of public area around the pond with provision of footpaths and public activity areas, dedicated area of pond for domestic use.</td>
</tr>
<tr>
<td><strong>Cycling track &amp; Footpaths</strong></td>
<td>• Developing 2.3 rkm of streets with dedicated cycle track, with provision of footpaths</td>
</tr>
<tr>
<td><strong>Footpaths</strong></td>
<td>• Developing 2.8 rkm of streets without dedicated cycle track (mixed traffic), with provision of footpaths</td>
</tr>
</tbody>
</table>
ACCESSIBLE, SAFE AND INCLUSIVE NEIGHBOURHOOD DESIGN IN A GREEN-FIELD SCENARIO

CASE – NAYA RAIPUR, SECTOR 31

SCALE OF TOD: CITY AND SITE LEVEL

CATEGORY: GREENFIELD
BACKGROUND & OBJECTIVE

- Project type: Green field
- Demonstration Site: Sector 31 - Residential Site admeasuring 60.3 hectare.
- 16,000 population as per proposed Master Plan.
- Project worth is INR 300 Crore.

Need for the project:

- To integrate TOD principles in Designing the city.
- To preserve natural terrain and water networks.
LAYERED APPROACH TO SECTOR DESIGN

1 – Existing Terrain

2 – Riparian Corridors

3 – Road network

4 – NMT Network

5 – Amenities and Commercial Areas aligned to the NMT and open spaces

6 – Final layout
<table>
<thead>
<tr>
<th>TOD PRINCIPLES</th>
<th>PROPOSALS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete streets (Walking and cycling)</td>
<td>Walking Grid of 150m x 150 m, Connected Greens, Safe Junctions, Bicycle Paths</td>
</tr>
<tr>
<td>Transit Supportive Uses (Active Edges)</td>
<td>Shared uses along the transit corridors, Mixed/Commercial Uses on the ground floor, Permeable edges.</td>
</tr>
<tr>
<td>Integrated Transport (Public Transit)</td>
<td>The design integrates the feeder bus stops, thus making the transit stations accessible to both housing and public open spaces.</td>
</tr>
<tr>
<td>Public Spaces (Open Spaces)</td>
<td>Varied hierarchy, Inclusive greens, Inter-connected</td>
</tr>
<tr>
<td>Cultural Landscapes (Historic and Environmental)</td>
<td>The design respects the natural terrain. The valleys are retained. The traditional routes connecting the existing villages are also retained thus helping to preserve the memory of the place.</td>
</tr>
<tr>
<td>Compact development (Mixed Use and Density)</td>
<td>Tiered Density along the transit routes. Mixed-uses proposed at the junctions</td>
</tr>
</tbody>
</table>

1 - A Connectivity Index measures how well a road network connects destinations (VTPI 2012). One measure is the number of surface street intersections within a given area, such as a square kilometre; the more intersections, the greater the degree of connectivity. Generally 50 intersections per square kilometre is considered acceptable (Ewing and Cervero 2010) (MoUD n.d., 28). An Accessibility Index is a ratio of actual travelled distances to the direct travel distance. An index of 1.0 is considered best and an average of 1.5 is considered acceptable (UN Habitat 2013).
REIMAGING MIDC MAROL, MUMBAI

SCALE OF TOD: STATION AREA LEVEL

CATEGORY: RETROFITTING
BACKGROUND

- **Location**: MIDC Marol is adjacent to Chakala Metro Station located on the VAG corridor.
- **MIDC Marol**: A planned industrial area in 1961 with an area of 127.52 Ha.
- **Floating Population**: ~ 1.8 lakh people (2012)
- **DPR Mumbai MRTS Project**: VAG Corridor, (Feb 2005) the area is expected to have 2700 persons/hr (45 p/min) in the year 2021.

**Need for the Project:**

- Industrial to business district with excellent public transport connectivity
- Affordable real estate compared to CBD’s.
- Main mode of transport: 56% walk, bicycle and use public transport
- Estimated number of pedestrians during a peak hour =1,05,000*

*Includes predominant mode of transport, last mile connectivity and stage of trip i.e. from bus stop or train to the office; does not include SEEPZ and residential areas.
OBJECTIVE

- To provide a safe, comfortable and convenient environment for pedestrians within MIDC Marol.
- Improve pedestrian access to Chakala metro station.
- Act as a pilot for improving pedestrian access and mobility, providing amenities, regulating street vending and parking in other areas.

Main mode of transport to and from MIDC Marol
EXISTING SCENARIO OF STREETS

MIDC: Insufficient footpath widths and large pedestrian volumes

MIDC: Poorly maintained walkways

MIDC: Inaccessible and unclean walkways
Approach

Safe Access Approach

- Pedestrian and Cycling Priority
- Seamless integration with feeder infrastructure
- Parking Management
- Enhanced Public Realm
- Enhanced Safety and Security

Seamless integration with feeder infrastructure
APPROACH

- Streets as Public Spaces
- Plan for Women’s Safety, Universal Access & Vendors in Street Design
PROPOSALS

Pedestrian Priority: Complete Streets

- Introducing pedestrian networks

Parking Management: TDM

- PP Parking management strategy
- Parking private vehicles in depots

Enhanced Safety and Security: Complete Streets

- Road Safety in Street Design
  - Intersection geometry corrections

An Enhanced Public Realm: Public Spaces

- Design Streets as Public Spaces
- Creating Nodes / Place markers
- SV Street Vending Strategy
- SS Street Furniture and Signage guidelines
PROPOSALS

People exposed to vehicles
No safe pedestrian crossing at junctions
Obstructed footpaths

Provide sufficient space to walk
Pedestrian signage

Road markings to guide pedestrians and vehicles
Bollards to protect pedestrians

Vehicles move on the concrete carriageway
People wait on the road
Bus stop occupying extra footpath

Insufficient lighting and shade

Demarcate lanes
Demarcate bus stopping area
New bus shelters
Provide seating, shade, and waiting
Marol Depot entrance

Insufficient space to walk
CONTINUED…

- Coordinated Signage System
- Nodes or Place Markers

Signage at major, minor nodes, streets

Signage at bus shelters

Source: Andrew Collins ; http://gaytravel.about.com/od/gaydestinationgalleries/ig/Photos-of-Gay-Asheville/Flat-Iron-Sculpture.htm
Source: EMBARQ India
IMPACT

- Improved walking conditions ensuring safe access along 3 kms of road length
- Improved accessibility for around 2 lakh people
- Expected to scale up to 10 kms in MIDC Marol
- Pilot for improving business districts
SCALES OF TOD

Region/City Level

Corridor level

Station area level

Site level

Source: TOD guidance Document Executive summary
CATEGORIES OF TOD

Urban Infill or Redevelopment

Greenfield

Retrofitting
Assessment of preparedness for undertaking TOD (include defining the scale and scope as well as identifying stakeholders)

Tasks necessary to create an enabling environment for successful TOD (includes Establishing leadership & champions, setting vision goals & targets, Establishing partnerships, addressing policy barriers, defining delivery & associated methodology and undertaking capacity building.

Formulating TOD plans for various scales of intervention.

Overview of financial tools that can be used to achieve the initiatives defined in above steps i.e. secure adequate financing and defining private sector role.

Overview of tasks to implement TOD
## PROCESS FOR PREPARING TOD FOR VARIOUS SCALES

<table>
<thead>
<tr>
<th>Steps</th>
<th>Stages</th>
<th>City level</th>
<th>Corridor Level</th>
<th>Station area level</th>
<th>Site level</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Map land uses and key developments.</td>
<td>Map transit alignment and station locations.</td>
<td>Identify station area Planning boundary and influence zone.</td>
<td>Identify site context.</td>
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<td>Identify activity generators.</td>
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<td>Identify priority transit demand corridors.</td>
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<td>Assess</td>
<td>Mapping.</td>
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<td></td>
<td>Delineation of area.</td>
<td>Delineate influence zone of Transit.</td>
<td>Delineate influence zone along corridor.</td>
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<td></td>
<td>SWOT Analysis.</td>
<td>Determine development context.</td>
<td>Analyse development opportunities.</td>
<td>Develop Station area programming alternatives.</td>
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<td>Identify goals and targets.</td>
<td>Assess infrastructure carrying capacities.</td>
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<td>Evaluate connectivity alternatives.</td>
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<td>Conduct SWOT analysis.</td>
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<td>Review of Planning documents followed by existing conditions baseline assessment.</td>
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<td>Conduct an opportunities and constraint analysis.</td>
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<tr>
<td>Plans + Design</td>
<td>Classification/Typologies.</td>
<td>Develop station area typologies.</td>
<td>Develop Station area programming alternatives.</td>
<td>Prepare site development program alternatives.</td>
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<td>Establish statutory/ Planning relevance.</td>
<td>Prepare station are concept plan.</td>
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<td>Enable Invest Implement</td>
<td>Statutory alignment and Implementation strategy</td>
<td>Establish statutory/ Planning relevance.</td>
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Source: TOD guidance Document Executive summary, MoUD
THANK YOU!

https://thecityfixlearn.org/

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