‘Naya Raipur’
A city of sustainable mobility

NAYA RAIPUR DEVELOPMENT AUTHORITY
Introduction

- Naya Raipur is being developed in greenfield area of 80.13 Sq. Km. for a projected population of 5.60 Lakhs, as a Capital City for the State of Chhattisgarh.
- It shall decongest Raipur and shall also be the engine of growth for the region.
- The State Secretariat has been shifted to Naya Raipur and is functioning since November 2012.
Raipur and Naya Raipur

- NH 6
- NH 6 – Ring Road
Vision of Naya Raipur

‘Naya Raipur’ to be developed as a modern but ‘green city’

For conservation of the environment and existing landscape, best practices for water harvesting, waste water recycling and use of non-conventional energy resources would be adopted.

Naya Raipur designed as a citizen friendly and visitor friendly city with sustainable mobility.

City design would promote sense of security and comfort among its citizens, especially women, children and the physically challenged.
The Development Plan-2031 consists of three layers-

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Layer</th>
<th>Area Included</th>
<th>Villages included</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Layer-I</td>
<td>Area–80.13 sq.km.</td>
<td>10 fully and 22 partly</td>
</tr>
<tr>
<td>2</td>
<td>Layer- II (Naya Raipur Peripheral Region)</td>
<td>Area–130.28 sq.km.</td>
<td>9 fully and 19 partly</td>
</tr>
<tr>
<td>3</td>
<td>Layer- III (Airport Zone)</td>
<td>Area–11.92 sq.km.</td>
<td>2 fully and 1 partly</td>
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13 Abadi areas have been included in layer -I
## Proposed Land Use

<table>
<thead>
<tr>
<th></th>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
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<tbody>
<tr>
<td>Population</td>
<td>150,000</td>
<td>215,000</td>
<td>195,000</td>
</tr>
<tr>
<td>Planning area</td>
<td>3057.46</td>
<td>3733.56</td>
<td>1222.16</td>
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</table>
Present Status of Development

- Around 3000 dwelling units of different categories have been handed over to the owners
- Another 4000 dwelling units are under construction
- Head of the Departments’ Building at the Capitol Complex is nearing completion
- Other government office buildings are under construction
- Multiple social, residential, recreational, institutional, and commercial projects are being developed
AERIAL VIEW
Public Mass Transport System

- To minimize usage of personalized modes public mass transport **Bus rapid transit system (BRTS)** and **Light rail Transit system (LRTS)** have been proposed.

- **Interim transport services** is being provided to facilitate the movement of people between Raipur and Naya Raipur till BRTS is operational.

- **Intermediate Public Transport modes** have also been incorporated in the Local Area Plans and space have been allocated for parking and other need off the operators.
Rail

- A broad gauge rail track is under implementation to provide connectivity with Raipur and suburbs
Bus Rapid Transit System

- In absence of public transport system from the beginning, informal para-transit services shall fill the space and it will be very difficult to replace those at later stage.
- A bus based efficient, reliable, affordable public transport service from the beginning would curtail use of personal vehicles and other modes of para-transit;
- BRTS will reduce congestion, decrease emission of green-house gases and will provide equitable accessibility
Bus Rapid Transit System Cont’d…

- Raipur and Naya Raipur shall be twin city needing seamless connectivity

- BRTS, being developed under the UNDP-GEF-World Bank supported SUTP, shall facilitate connectivity between Raipur and Naya Raipur and within Naya Raipur.
BRT Corridors

Corridor 1: BRT Lite

RLY. STATION (Y) TO NEW SECRETARIAT (P)
Vis: X, W, V, U, T, S, R, Q, O

LEGEND:
9.4 Km. = RAIPUR CITY LIMIT (Y, X, W, V)
2.4 Km. = NH-6 (V, U)
12.9 Km. = NAYA RAIPUR LIMIT (U, T, S, R, Q, O, P)
24.7 Km. = Total Corridor Length
BRT Architecture for Naya Raipur

Dedicated Bus Lanes within Naya Raipur
   a) Median Bus Lanes
   b) Initially, Bus lanes within Naya Raipur will be painted for segregation

Mixed lane beyond Naya Raipur

BRT Buses
   a) Fleet of 70 Nos., 12m long buses
   b) High Floor (900 mm) buses
   c) Door on both sides:
      I. Door at median side without any stairs for level boarding & alighting;
      II. Door with stairs at the left side of the bus
Images of proposed Bus Shelters at Naya Raipur
Images of proposed Bus Shelters at Naya Raipur
NMT

- Dedicated track for pedestrians and cyclists
- Total length for the first phase is 31.50km
- The layout is designed to connect the sector level to the BRT shelters
Sector designs: Sustainable design characteristics

Pedestrians trails connect the nodal shopping educational and health facilities in the neighborhood.

Major Components
1. CONVENIENT SHOPPING
2. LOCAL SHOPPING CENTRE
3. HEALTH CARE FACILITY
4. E.W.S.
5. LIBRARY
6. COMMUNITY HALL
7. COMMUNITY FACILITY
8. GROUP HOUSING
9. HIGH SCHOOL
10. NURSERY SCHOOL
11. PRIMARY SCHOOL
12. PLOTTED DEVELOPMENT
Transit Oriented Development

The Concept of Transit Oriented Development is being adopted for Naya Raipur for making it a sustainable city. The objectives of TOD are

- To reduce travels by means of mixed-use developments
- To encourage use of public transport by way of allowing more density along the public transport corridors, which makes the public transport financially sustainable and on the other hand it reduces usage of personal vehicles
- To construct bus shelters within a walkable range from the sectors
- To connect the sectors and BRT shelters with cycle tracks & walkways
- To design the shelters with facilities of bicycle parking

Thereby reducing the emission of GHGs, congestion on roads and reducing accidents

The TOD Concept for Naya Raipur will be elaborated by M/s. IBI Group, consultant to NRDA for TOD Study & Recommendation
Naya Raipur
Transit Oriented Development Study
TOD IN A GREENFIELD CONTEXT

DESIGNING A NEW CITY FOR SUSTAINABLE MOBILITY

- Comprehensively planned new cities offer an important solution to meet the nation’s urban crisis
  - Opportunity to create high-quality sustainable “places”
  - Reconnect people and planning proactively
  - Upfront infrastructure development
  - Strong leadership support and political will
  - Enable design of community driven processes and systems

Challenges/Unknowns

- Population composition?
- Employment Generators?
- Local Real Estate Market capacity?
UNFOLDING THE NAYA RAIPUR STORY

MASTER PLAN SALIENT FEATURES

- INSPIRED BY CORBUSIER’S CHANDIGARH & OTHER CAPITAL CITIES AROUND THE WORLD
- GARDEN CITY DENSITY - 560,000 PEOPLE IN 80 SQ.KMS.
- DIVERSE EMPLOYMENT BASE PROPOSED
- GREEN BELT AS AN URBAN GROWTH BOUNDARY
- MEGA BLOCK GRID SYSTEM - 800m X 800m SECTORS
- MONUMENTAL SCALE - 100m & 60m WIDE ROADWAYS
- AUTOMOBILE ORIENTED POLICIES - 2PPH ASSUMPTION
- SEGREGATED LAND USES
- EXTENSIVE OPEN SPACE NETWORK
UNFOLDING THE NAYA RAIPUR STORY

MASTER PLAN PHASE 1 IMPLEMENTATION

- PARALLEL PLANNING & CONSTRUCTION EFFORTS INITIATED - URBAN DESIGN STUDY/ CBD STUDY/ BRTS / NMT / TOD STUDY
- COMPREHENSIVE CITY WIDE MOBILITY PLAN - MISSING LINK

CONSTRAINTS

- ENVIRONMENTAL + NATURAL FEATURES CONSTRAINTS
- VILLAGE INTEGRATION & DEVELOPMENT POLICIES (120 sqm PER ADULT MEMBER)
- NET / GROSS LAND RATIOS NOT EFFICIENT
- MARKET ACCEPTANCE & DEVELOPER AWARENESS
The **vision** for the Naya Raipur TOD Study is to develop a transit supportive framework that supports a series of seamless self-sufficient neighbourhoods in Naya Raipur each with a distinct character- linked with sustainable mobility options.
TRANSIT ORIENTED DEVELOPMENT

T = Transit frequency and usefulness

O = Orienting infrastructure for making pedestrian connections between transit and development

D = Development featuring a mix of uses and densities

Source: Dena Belzer, Strategic Economics
“Now, I am able to combine and comprehend the meaning of "Bus do kadam", "75 m" and "400-600m" which collectively signifies that the Bus should be available within do kadam i.e. within a walking distance.”

Mr. L.K. Panigrahi, Chief Engineer (Projects) Naya Raipur Development Authority
1. MULTIMODAL TRANSIT STATION
Transit is at the heart of transit oriented development and transit facilities should be designed to connect with, not be isolated from, the surrounding neighbourhood. People should have their choice of transportation modes including cars, bicycles, BRT, LRT, two wheelers, cycle rickshaws, and auto rickshaws.

2. INTERCONNECTED STREET PATTERN
An interconnected street pattern is a traditional urban design technique that reduces congestion, encourages travel choice, and supports mixed use development. Block lengths should not exceed 400m.

3. MIXED USE DEVELOPMENT
A mix of diverse and complimentary land uses in a compact pattern allows residents and workers to walk to work or to shop rather than driving for all daily needs.

4. WALKABILITY
Pedestrian-friendly environments allow walking to be a pleasant, safe, and efficient alternative to (or extension of) the automobile. This includes design features such as safe crossing points near transit stations, shaded pedestrian routes, and continuous sidewalks and paths.

5. COMPACT DEVELOPMENT
The scale of transit oriented development approximates the scale of the pedestrian. The extent of these neighbourhoods is based on a comfortable walking distance from edge to centre (approximately 400 to 800 metres in radius).

6. STREET FACING BUILDINGS
Buildings should be placed near streets, not behind parking areas, to better define the street. Streetfront retail should be provided to humanize the building wall and activate the sidewalk. Building entrances should be close to transit entrances.

7. URBAN PLACEMAKING
Transit oriented development is defined as much by its public realm as its private development. Public and semi-public spaces enable the neighbourhood infrastructure to build community bonds, social interaction, and community participation.
TOD PRINCIPLES FOR NAYA RAIPUR

8. STREETSCAPE DESIGN
A highly connected street pattern with design elements coordinated to provide visual interest, pedestrian amenity, and sense of place improve the desirability of walking and shortens perception of distance.

9. BICYCLE FRIENDLY STREETS/PARKING
Bicycles are efficient ways to expand the service area of the station without relying on automobiles or bus service. Bike lanes, bike routes, and secure parking make the bicycle an easy option.

10. URBAN PARKS & PLAZAS
A variety of public open spaces near transit stations contribute to a sense of place, foster healthy communities, and provides places for interaction.

11. ARCHITECTURAL VARIETY
Promoting an architectural style that is pedestrian friendly, contains visual variation and, with improved economics of higher density, higher quality building materials.

12. WELL-DESIGNED TRANSIT STATION FOR A HIGH QUALITY USER EXPERIENCE
The transit station will be a focal point and a gateway to the regional transit network. Its design will be paramount to ensure a that a seamless, accessible, and attractive customer environment and experience.

13. REDUCED PARKING STANDARDS
By reducing parking standards to reflect increased transit use and walking, the amount of site area that can be used for active uses or public amenities increases.

14. SAFETY & SECURITY/CPTED
Developing the pedestrian environment to maximize safety and security will enhance patron experience and transit ridership.

15. MARKET ACCEPTANCE & SUCCESSFUL IMPLEMENTATION
A TOD is successful when it attracts sufficient jobs and residents to create a vibrant, transit supportive place. In order to ensure success of a TOD, strategies should be flexible, designed to respond to the diverse nature of the station areas, their surrounding community contexts, and Naya Raipur’s development market.
### KEY IDEAS

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<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Demarcation of TOD Influence Zone or “Station Area” – Station Area Planning vs Sector Based Planning</td>
</tr>
<tr>
<td>2</td>
<td>Complete Streets Approach</td>
</tr>
<tr>
<td>3</td>
<td>Best Practices Approach - Station Area Typologies as Building Blocks of TOD in Naya Raipur</td>
</tr>
<tr>
<td>4</td>
<td>Station Area TOD Planning Toolkit</td>
</tr>
<tr>
<td>5</td>
<td>Transit Supportive Development Code</td>
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</table>
RECOMMENDATION – REPLACE SECTOR BASED PLANNING WITH STATION AREA PLANNING
KEY IDEAS – STATION AREA TYPOLOGIES

Create seamless neighbourhoods - each with a distinct character- linked with diverse mobility options

- No “One-size Fits All” solution for TOD Station Area Development;

- Different TOD Stations Areas have different Land Uses / focus, cultural context, & character;
<table>
<thead>
<tr>
<th>Regional Intermodal Gateways</th>
<th>Urban Core (CBD)</th>
<th>Employment Centers</th>
<th>Destination Nodes</th>
<th>Transit Neighbourhoods</th>
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</thead>
<tbody>
<tr>
<td>Intermodal Stations which are the first point of arrival to Naya Raipur such as intercity railway stations</td>
<td>Stations which serve the main business areas such as Central Business District</td>
<td>Stations which provide access to the main public / semi public amenities &amp; offices.</td>
<td>Stations which provide access to Naya Raipur’s unique destinations.</td>
<td>Stations which knit Naya Raipur’s main residential sectors with the rest of the City.</td>
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</tbody>
</table>
KEY IDEAS – COMPLETE STREETS APPROACH – 100M ROW WITH BRT
18.6.3. DEVELOPMENT CONTROLS FOR PUBLIC REALM (ADDITIONAL SECTION UNDER 18.6)

It is important that individual buildings collectively promote a well-defined sense of place and provide comfortable, safe, and attractive streets and public spaces. Whether in a mixed use commercial or residential area, a safe, interesting, and engaging public realm encourages walking or cycling and makes the transit system more attractive to potential users. Providing visual interest at the pedestrian scale through thoughtful landscaping, lighting and building design will encourage people to use the public realm and help contribute to an active urban life.

The development in Naya Rapur should:

a) Create a vibrant public realm that is universally accessible, safe, and comfortable for users of all ages, genders, and socioeconomic backgrounds.

b) Promote mix of uses, active building frontages, and informal street uses to create round-the-clock activity.

c) Use passive climate control strategies to make the public realm comfortable all day and all through the year.

d) Maximise pedestrian linkages in the public realm to encourage pedestrian activity.

e) Create approachable, active, porous, and aesthetically pleasing building frontages, well designed lighting and amenities to make the public realm safer and more attractive.

f) Plan for informal users, viz. hawkers in the public realm, such that they encourage activity but do not prohibit pedestrian and NMV movement.
GAP: DENSITY ALLOCATION IN RELATION TO TRANSIT CORRIDORS

RECOMMENDATION: REDISTRIBUTION OF DENSITIES BASED ON PROXIMITY TO TRANSIT SERVICE
DEMONSTRATION STATION AREA BASED ON TRANSIT ORIENTED DEVELOPMENT STRATEGY
Typical Transit Neighbourhood Sectors Grid
Phase 1 BRT Alignment
Station Area - 400m / 5 min walk & 800m / 10 min walk
VEDANTA STATION AREA AS PER NRDP 2031

Existing Conditions Review
Preserve Existing Natural Features
Integrate Existing Village; Village Road & Connections to Sector 36 - Vedanta Hospital
Proposed Green Spaces as per NRDA Plan 2031 Provide East-West Green Connections to link existing natural features
Streets & Blocks Pattern
Proposed Land Use as per NRDA Plan 2031
Highest Densities are proposed closest to BRT ROW & Station
Medium Density along Principal Roads within Sector
Public / Semi-Public Amenities as per Proposed Land Uses, NRDA Plan 2031
Medium / Low Density Residential Development as per densities outlined in NRDA Plan 2031
VEDANTA STATION AREA AS PER TOD STRATEGY

Proposed Land Use as per TOD principles:

- Commercial Retail Use: right next to the Station Area and away from the busy street junctions with easy accessibility from inside the sectors.
- Mixed Use Type 1 (Commercial Retail, Public-Semi Public & High Density Residential & Affordable Housing): within 400m radius/ 5 minutes walking distance of the Station Area around the Commercial-Retail & Mixed Use Type 1 for better accessibility to the Station & Major Access Roads.
- Public-Semi Public Facilities: Educational, Health Facilities, Religious etc. Most conveniently located along the Major roads with good accessibility from inside the sectors also.
- Medium Density Flattened Residences near the station area and the Sector Edges, Low Density Flattened & Plotted Residences in the middle of the sectors outside 400m boundary but within 600m boundary.

Relevant Naya Raipur TOD Principles:

1. Transit Plaza & Urban Placemaking: Develop a high-quality transit plaza integrated within an urban park system including a full range of park types, open spaces, greenways, private, semi-public and public areas, identify and enhance existing places and landmarks and develop new landmarks.
The Toolkit is a guide which will assist NRDA in the process of developing Station Area Plans.

Toolkit will be applicable to all Stations including 14 Existing & Future Stations

The Toolkit is Comprised of Four Frameworks

- FRAMEWORK 1 – IDENTIFY CHARACTER OF STATION AREA
- FRAMEWORK 2 – REFINE BOUNDARY OF STATION AREA
- FRAMEWORK 3 – DEVELOP STATION AREA PLAN
- FRAMEWORK 4 – IMPLEMENTATION MECHANISMS
KEY IDEAS – STAKEHOLDER/ EXPERT CHARRETTE
IMPLEMENTATION FRAMEWORK

1. Legal Framework- Planning and Regulatory Changes
2. Administration and Enforcement
3. Financing Mechanisms
4. Creating a Market for TOD-Catalyst Projects; Incentives and Subsidies
5. Monitoring and Evaluation
6. Phasing Strategies
7. Capacity Building
Focus should be both on transit and development. TOD is Transit Oriented Development NOT Transit Or Development.

Social and Environmental benefits of TOD are equally important as the economic or development returns.

Attracting Anchors/ Economic Generators

Maintaining Affordability

Risk of Gentrification

Market Acceptance for TOD

Encouraging the “Right” mix of uses

Getting the Parking Right

Master Plan Amendments (Land Use Changes) are often a tedious process and need to be applied judiciously.

Naya Raipur is a greenfield project and growth will be incremental- flexibility is essential to adapt with market realities and future population composition.
"A developed country is not a place where the poor have cars. It's where the rich use public transportation."

Mayor of Bogota
TOD RECOMMENDATIONS

- **ROWs**
  - Strive to design for a human scale- 48m/ 24m in all future roadway projects
  - Design roadways from building edge-to- building edge (Complete Streets)
  - Depending on demand & utilization of major corridors, keep the option of “Road Diets” open

- **Parking**
  - Require Reduced Parking from developments within the Primary TOD Zone
  - Use a combination of public (short-term and long-term) parking facilities and private ECS parking depending on distance from the station

- **Station Spacing and Location**
  - Mid-block or Intersection
  - Spacing of transit stops
  - Curb- side or median transit stops
  - Connection with future LRT stations/ feeder network

- **Connectivity, Accessibility and Mobility**
  - IPT/ NMT and Feeder Services
  - Connect transit route with airport and railway stations

- **Transit Service and Quality**
**TOD RECOMMENDATIONS**

- **Land Use and Urban Form**
  - Prohibit sprawl inducing uses in the peripheral layers (e.g. IIIM)
  - Establish “minimum mixed-use” criteria in the 400m and 800 m radius surrounding the station
  - Maximize densities and FARs in the Primary and Secondary Station Area Zones to increase the population holding capacity of each TOD
  - Underutilization of FAR (below 3.0) not permitted in the Primary Zone
  - Increased FAR and high density should be used together in order to avoid gentrification
  - FAR and Densities should correlate to the capacity of public transport network and infrastructure systems in the station area

- **Affordability Mechanisms**
  - Minimum % of FAR in all TOD projects should be mandated in all developments for affordable housing supply catering to the low and medium income households that will use the transit service

- **Vision + City Form + Brand**
  - Change from AUTO-CENTRIC city to a PEDESTRIAN CITY
  - Building one complete community (Station Area) at a time
OPERATIONALIZING + IMPLEMENTATION STRATEGIES

- **Planning & Regulatory Strategies**
  - Adopt the Master Plan TOD Chapter
  - Prepare and adopt Zonal Development Plans incrementally for the TOD Station Areas as the market matures
  - Modify the Development Code Regulations applicable to the Station Areas
  - Draft Developer Agreements for investment within the TOD Station Areas
  - Create an incentives package

- **TOD as a Real Estate Development and Financing Tool**
  - Land Development and Disposal Strategy (Land Banking for TOD Projects to create a greater demand for the TOD Station Areas)
  - Conduct Economic and Financial Feasibility studies for each station area
  - Identify anchor/catalyst projects for station area
  - Utilize financing mechanisms such as creating a TIF/ TDRs/ Density Bonusing/ Impact Fees to fund transit and public infrastructure improvements

- **Physical Interventions**
  - Prioritize NMT improvements in the Primary and Secondary zones
  - Ensure high-quality transit service and upgraded capacity as the city grows
STUDY TOUR EXAMPLE: MEDELLIN
STUDY TOUR EXAMPLE: BOGOTA
STUDY TOUR EXAMPLE: SAO PAOLO + RIO
STUDY TOUR EXAMPLE: VANCOUVER
STUDY TOUR EXAMPLE: METROLINX, GREATER TORONTO AREA

Report No. S11-07-001
Appendix B: Quick Win Project Key Map – Quick Wins Tranche 2

York-VIVA Yonge St
York-VIVA Hwy 7
Bolton GO service improvement
Yonge Finch-Steeles BRT
Pearson Airport-Renforth Gateway
Yonge subway extension phase I - capacity and service improvements
Dundas-Hurontario higher-order transit
Halton Region BRT

Durham Hwy 2 BRT
Hamilton James Street North GO/VIA Station – Gateway to Niagara
Hamilton A and B Line BRT improvements

(Note: Transit City Headstart not shown)
1 MULTIMODAL TRANSIT STATION

STRAATEGIES

1. Create clear, direct, and short transfers between transit modes and routes by minimizing walking distances and removing physical and perceived barriers within transit stations.

2. Coordinate local feeder transit service schedules and routes to provide seamless connectivity between local, regional, and rapid transit services by reducing waiting times.

3. Create prioritized, safe and direct pedestrian and cycling routes to rapid transit stations from major destinations and regional cycling and pedestrian networks.

4. Provide secure and plentiful bicycle parking at station entrances with additional amenities at high volume locations.

5. 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.

6. Provide clearly marked and protected access for pedestrians and cyclists at station areas to minimize conflicts, particularly at passenger pick-up and drop-offs (PPUDCs), bus facilities, and parking access points.

Stratford Station in London demonstrates a well laid out, seamless transportation interchange.

Multimodal Transit Station

Transit is at the heart of transit oriented development and transit facilities should be designed to connect with, not be isolated from, the surrounding neighbourhood. People should have their choice of transportation modes including cars, bicycles, BRT, LRT, two wheelers, cycle rickshaws, and auto rickshaws.
2 INTERCONNECTED STREETS

Interconnected Streets

An interconnected street pattern is a traditional urban design technique that reduces congestion, encourages travel choice, and supports mixed-use development. Block lengths should not exceed 400m.
3 MIXED USE DEVELOPMENTS

A mix of diverse and complimentary land uses in a compact pattern allows residents and workers to walk to work or to shop rather than driving for all daily needs.

STRATEGIES

1. Provide a diverse mix of uses, including housing, employment, regional attractions and public spaces to create a high quality urban environment in close proximity to the transit station.

2. Focus on creating increased and transit-supportive densities at and around transit stations to create a compact built form and a critical mass of activity while ensuring an appropriate transition to the surrounding community.

3. Ensure the mix and balance of uses and the density of the development must be based on the infrastructure carrying capacity of the utilities network of the city such as road infrastructure, water supply, power supply etc., in addition to the capacity of the transit line.

4. Vertical type of mixed use development like residential land use over the commercial places so that the distances between the activities is decreased and accessibility between different activities is increased.

5. FAIR bonuses should be provided for affordable housing, public spaces and parks, & infrastructure.

6. Discourage land uses and industries which encourage car usage within 400m from the transit station.


Create diversity in land use mix.

Complimentary uses can be stacked to create TOD-friendly mixed-use building types. Active uses such as retail should be located at street level and at high-visibility corners.

Portico a high-density, mixed use development of different building types, ranging from four-story townhouses to five-story mid-rise blocks and eleven, fifteen and twenty-story towers. This array makes an effective transition in built form to the surrounding context. Portico, Vancouver.
4. WALKABILITY

Pedestrian-friendly environments allow walking to be a pleasant, safe, and efficient alternative to (or extension of) the automobile. This includes design features such as safe crossing points near transit stations, shaded pedestrian routes, and continuous sidewalks and paths.
The scale of transit oriented development approximates the scale of the pedestrian. The extent of these neighbourhoods is based on a comfortable walking distance from edge to centre (approximately 400 to 800 metres in radius).
6. STREET FACING BUILDINGS

**STRATEGIES**

1. Street-facing buildings should be arranged in a way that is sympathetic to the street.
2. Create pedestrian-friendly streets that are walkable and safe for pedestrians of all ages.
3. Encourage a mix of land uses and mixed-use buildings to create a sense of community.
4. Design buildings with street-facing entrances to facilitate easy access to transit.
5. Place street-facing buildings close to transit stops and other amenities.
6. Use street-facing buildings to activate the sidewalk and enhance the street experience.
7. Design street-facing buildings to be visually appealing and aesthetically pleasing.
8. Provide adequate space for outdoor seating and other outdoor amenities.

**IBI Group**
7. URBAN PLACEMAKING

STRATEGIES
1. Placemaking should build upon a neighbourhood’s unique character through context-sensitive architecture and landscaping, while supporting convenient, direct and enjoyable pedestrian linkages to and from all transit stations.
2. Provide a high quality and aesthetically pleasing public realm.
3. Create Places, not gated developments.
4. Build communities: Create interaction plazas, public places, markets and parks — near public transport nodes & along daily paths of people.
5. Mix of uses to provide people of varied social groups with options to live, work, shop and play within easy access to public transport and daily necessities.

Urban Placemaking
Transit oriented development is defined as much by its public realm as its private development. Public and semi-public spaces enable the neighbourhood infrastructure to build community bonds, social interaction, and community participation.

King Street Kitchener, Kitchener, Ontario
Anderson Station Area Plan, City of Calgary Alberta
Young Circle Park
Transit Placemaking, 16th Avenue Mall Denver
8. STREETSCAPE DESIGN

Strategies

1. Provide trees and street furniture to enhance the quality of the pedestrian experience and enhance safety by providing a physical and visual buffer between the pedestrian and the road, and encourage slower traffic speeds.

2. Create a high-quality public realm and pedestrian experience to encourage people to:
   - Walk to the transit station rather than using their automobiles.
   - Stop and socialize along main streets during both peak and off-peak travel times.

3. Create an organized and attractive street treatment that supports local small area community pride.

4. Helps to support a walkable station area and promotes the use of transit.

5. Trees and vegetation help to reduce the urban heat island effect and decrease energy costs related to air conditioning.

6. Street furniture and landscaping can provide traffic calming benefits and increased safety for pedestrians.

7. Trees and landscaping add visual interest, excitement, and continuity between urban spaces while contributing to a reduction of noise and air pollution.

8. Special paving and materials such as colored concrete, stamped concrete, colored pavers, paving blocks or colored and stamped asphalt should be used to identify high pedestrian traffic areas or community elements such as commercial zones, schools, and parks.

Streetscape Design

A highly connected street pattern with design elements coordinated to provide visual interest, pedestrian amenity, and sense of place improve the desirability of walking and shorten perception of distance.
9. BICYCLE FRIENDLY STREETS / PARKING

**STRATEGIES**

1. Create prioritized, safe and direct pedestrian and cycling routes to rapid transit stations from major destinations and regional cycling and pedestrian networks.
2. Provide secure and plentiful bicycle parking at station entrances with additional amenities at high volume locations.
3. Develop direct routes from regional and municipal cycling and citywide open space network to transit stations.
4. Ensure pedestrian and cycling facilities are designed to a high standard of safety, security, and comfort.
5. Provide visible and weather protected bicycle parking.
6. Bicycle parking should be in well-lit and visible areas to increase security.
7. Ensure bicycle parking does not conflict with vehicular traffic or pedestrians.
8. Where there are high volumes of bicycle access to the transit station, provide enhanced bicycle parking and amenities.
9. Ensure secure bicycle parking designs.

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**Case Study**

**USING ROAD DIETS TO BALANCE USER NEEDS & IMPROVE SAFETY AND OPERATION, ST. GEORGE STREET, TORONTO**

In the mid-1990s, the City of Toronto planned to carry out typical road rehabilitation work on St. George Street, a north-south road through the University of Toronto’s Geology Campus. As a result of a campus benefactor, and at the request of the University, the City changed the scope of the project to improve the road’s configuration while improving the environment for cyclists and pedestrians. The road diet was initially implemented on St. George Street resulted in the reduction of car lanes from four to two, retained the existing bike lanes, and expanded sidewalks and public realm space.

Despite the reduction in travel lanes, car volumes on St. George Street have remained constant, while bicycle volumes increased by 10%. In addition, road safety has increased with a reduction in travel speeds and collisions. Most importantly, the public realm improvements along the street have created an attractive corridor through the heart of the university campus, helping to foster a greater sense of place.
10. URBAN PARKS & PLAZAS

**Strategies**

1. Adopt measures in water management to minimize water consumption and the impact of runoff and wastewater in transit, facilities, public buildings, transit places and development.
2. Landscape and building design should maximize tree cover, reduce hard surfaces, and minimize heat retention and the urban heat island effect.
3. Adopt waste management strategies that reduce the output of waste to landfills and increases recycling and the reuse of materials.
4. Use native and drought-resistant species to minimize the need for irrigation.
5. Minimize the extent of impermeable surfaces by utilizing permeable pavers and soft landscaped areas.
6. Reduce the urban heat island effect by minimizing the extent of paved surfaces and encouraging the use of light colored materials and roof surfaces.
7. Set water efficiency standards for landscaping and reduce potable water consumption by using recycled water systems for irrigation and high efficiency irrigation technology (e.g., rainwater harvesting, grey water reclamation, drip line system).

**Urban Parks & Plazas**

A variety of public open spaces near transit stations contribute to a sense of place, foster healthy communities, and provides places for interaction.

Strategies for minimizing environmental footprint should consider how to reduce its impact on the urban heat island effect, energy efficiency, waste management, and storm water run-off management, as well as preserving and enhancing the natural environment and built heritage.
11. ARCHITECTURAL VARIETY

Architectural Variety

Promoting an architectural style that is pedestrian friendly, contains visual variation and, with improved economics of higher density, higher quality building materials.

strategies:
1. Create a variety of visually appealing building mass with a mix of buildings in the station area.
2. Building mass and height enhance residential and commercial effects, such as greenbelts of public spaces.
3. Developments exceeding 10 stories should have tall, slender towers, rather than bulkier, urban buildings.
4. Limit the building setback from the right of way. Loading buildings close to the sidewalk will help to create a sense of enclosure and comfort for pedestrians.
5. An appropriately street wall height will help maintain a human scale at the sidewalk, ensuring adequate sunlight and ventilation.
6. Ensure the height and width ratios that create a sense of thoroughfare in a community to provide and encourage walking (human scale).
7. Building scale should be modular and broken down through the judicious use of archers, projections, cornices, pilasters, columns, and doors.
8. Buildings should be oriented towards the pedestrian, with active uses located along the sidewalk and not isolated behind parking lots or back walls.
9. Alter buildings with the sidewalk, and design uses facing the street rather than parking lots.

Creating a variety of visually appealing building mass. Transit Oriented Development Guidelines, City of Calgary, Alberta. Built form and massing strategies. TOD Guidelines, City of Calgary, Alberta.
TOD PRINCIPLES FOR NAYA RAIPUR

1. WELL DESIGNED TRANSIT STATION FOR HIGH QUALITY USER EXPERIENCE

Attractive, efficient, and understandable station spaces like Liverpool Street Station in London are key to a high-quality user experience.

STRATEGIES

1. Encourage high-quality station architecture and public realm that is sensitive to the surrounding built context and community vision.
2. Develop a station retail program that is responsive to customer demand, convenience, and market needs.
3. Provide a minimum level of customer amenity to enhance customer comfort, safety, and information.
4. Create legible and permeable transit stations through consistency and clarity in station entrances and interfaces, spaces, layout, and visual cues connected by barrier-free movement spaces.
5. Develop wayfinding and signage to support the legibility and permeability of the transit station.

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Well-Designed Transit Station for a High Quality User Experience

The transit station will be a focal point and a gateway to the regional transit network. Its design will be paramount to ensure a that a seamless, accessible, and attractive customer environment and experience.
13. REDUCED PARKING STANDARDS

STRATEGIES
1. Assess commuter parking needs on a corridor or system basis and locate and design parking to maximize development and ridership potential at transit stations.
2. Limit commuter parking expansion by prioritizing feeder transit services to the stations.
3. Implement commuter parking pricing with incentives for carpooling and alternative fuel vehicles.
4. Develop a short and long term area-wide parking strategy with maximum and minimum parking standards and shared use parking practices.
5. Implement parking pricing strategies as part of an overall transportation demand management program, informed by modal split targets and local parking supply and demand.
6. Minimize surface parking and integrate parking within surrounding development and parking structures.
7. Design parking facilities to a high level of architectural and landscape quality to reduce negative impacts on the environment and streetscape.

Surface parking should be buffered from adjacent walkways. California Polytechnic State University, San Luis Obispo campus.

Provide clear and protected walkways in parking lots for pedestrian access. Lacey, WA.

Surface lots by buildings or fake building 'skins' to minimize visual impact. San Diego, CA.

Vegetation can buffer structured parking where ground floor uses are not feasible. Durham, NC.

Bio-swales reduce runoff from hard surfaces in parking lots. Pennsylvania State University.

Create parceled sections of parking separated by pedestrian walkways. Green Line in Portland, OR.

Encourage ground floor uses to animate pedestrian areas at structured parking lots. Reston Town Center, VA.

Provide shade with trees over large expanses of surface parking, and in this example, solar panels are installed over parking surface. Arizona State University.

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Reduced Parking Standards

By reducing parking standards to reflect increased transit use and walking, the amount of site area that can be used for active uses or public amenities increases.
14. SAFETY & SECURITY / CPTED

STRATEGIES

1. Provide a clear boundary of controlled space. Defining clear boundaries declares ownership of space and increases recognition of public versus private space. The declared space will then be more easily defended.

2. Provide clearly marked transitional zones. Transitional zones are a form of boundary definition and access control. It should be clear and visible when someone is crossing the boundary into the controlled space, thereby clarifying ownership and reducing the potential for improper behavior.

3. Gathering areas should be located where good natural surveillance and access control enable such areas to be more active and likely to support positive activity.

4. Locate vulnerable activities, such as waiting at night, in safe locations with good natural surveillance and street-level activity, such as along mixed-use streets or retail plazas. The controlled atmosphere creates a perception of risk for potential offenders and provides security to those using public space for legitimate uses.

5. Design the environment to optimize natural surveillance. Design strategies include: adequate site lighting; mixed-use development with retail at-grade and residential or office development above; avoiding blank walls and low-level fencing or vegetation that allows visual surveillance of semi-private areas and parking lots.

Safety & Security/CPTED

Developing the pedestrian environment to maximize safety and security will enhance patron experience and transit ridership.
TOD PRINCIPLES FOR NAYA RAIPUR

15. MARKET ACCEPTANCE & IMPLEMENTATION

STRATEGIES

1. Encourage development by providing developers incentives such as height and density exchange, flexible zoning and through mechanisms like Public Private Partnerships, Build-Operate-Transfer, and Design Build Finance and Manage models.
2. Plan public investment and infrastructure to create and/or enhance development potential.
3. Encourage public agencies and various Public Private Partnership models to capture the land value uplift from transit infrastructure investments.
4. Establish a development checklist as a tool for new development.
5. Consider design competitions for both public facilities and design review panels into the municipal development approval process.
6. Ensure flexible planning to accommodate growth and change.

Market Acceptance and Successful Implementation

A TOD is successful when it attracts sufficient jobs and residents to create a vibrant, transit supportive place. In order to ensure success of a TOD, strategies should be flexible, designed to respond to the diverse nature of the station areas, their surrounding community contexts, and Naya Raipur’s development market.