Smart City Master Planning and Sector-specific Smart City Infrastructure Projects for Visakhapatnam

INTEGRATED SMART CITY FRAMEWORK PLAN
As a destination city, Visakhapatnam has a lot to offer: beautiful beaches, friendly people and a robust economy. With a great natural harbor, Vizag is a natural hub for defense, shipping, trade, and manufacturing. The division of Andhra Pradesh into two states has given additional impetus to an already vibrant economic growth trend in Vizag. The advantages of living in Vizag as opposed to other knowledge industry capitals have not been lost on India’s young professionals, who appreciate the unspoiled natural environment, affordable housing and laid-back lifestyle on offer. Vizag, with its increasingly diverse economy and proven leadership team, is poised to grow. The challenge for Vizag will be to realize its ambitious economic growth goals while preserving and enhancing livability for the benefit of local citizens.

The Smart City Framework Plan lays the groundwork for the development of Visakhapatnam from a 20th century port city into an integrated 21st century city-region. Each of the four major centers of Visakhapatnam Metropolitan Region (VMR) will develop its own distinct urban character:

1. **The city center will raise** its profile as the business and cultural center of the region by carrying out signature development projects in the Central Business District, along the beach road and at Old Town.

2. **The southern industrial area will develop** of smaller, mixed-use urban sub-centers that offer jobs-housing balance and improved living conditions for the local workforce.

3. **Madhurawada and Rushikonda will emerge** as high-end knowledge industry clusters that offer world-class educational, recreational and tourism facilities.

4. **Vizag’s unique selling point** — its coastline — will be developed as a set of distinct recreational, ecological and livelihood destinations.

New growth areas within all four centers will locate housing near jobs, preserve ecological assets, and minimize natural hazard risk. Binding the centers into a coherent regional whole will be smart transport, water and energy infrastructure that ensures smooth and timely flows of people and resources throughout the VMR. ICT innovations will allow infrastructure managers to anticipate stress points, take corrective action and enhance system performance. Citizens in Smart Vizag will also gain visibility into infrastructure systems and be able to participate in decisions about future improvements.

By embracing Green Living and Smart Business, Visakhapatnam Metro Region will become South and Southeast Asia’s Clean Commerce Capital for the 21st century.
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## Acronyms and Abbreviations

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<th>Acronym</th>
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<tr>
<td>APEPDCL</td>
<td>Andhra Pradesh Eastern Power Distribution Company Ltd.</td>
</tr>
<tr>
<td>APGENCO</td>
<td>Andhra Pradesh Power Generation Company</td>
</tr>
<tr>
<td>CEO</td>
<td>Chief Executive Officer</td>
</tr>
<tr>
<td>CMAR</td>
<td>Construction Manager at Risk</td>
</tr>
<tr>
<td>DB</td>
<td>Design-Build</td>
</tr>
<tr>
<td>DBF</td>
<td>Design-Build-Finance</td>
</tr>
<tr>
<td>DBFOM</td>
<td>Design-Build-Finance-Operate-Maintain</td>
</tr>
<tr>
<td>DBOM</td>
<td>Design-Build-Operate-Maintain</td>
</tr>
<tr>
<td>EoI</td>
<td>Expression of Interest</td>
</tr>
<tr>
<td>GHG</td>
<td>Greenhouse Gas</td>
</tr>
<tr>
<td>GVMC</td>
<td>Greater Visakhapatnam Municipal Corporation</td>
</tr>
<tr>
<td>HPSC</td>
<td>High Powered Steering Committee</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>kV</td>
<td>kilovolt</td>
</tr>
<tr>
<td>MW</td>
<td>megawatts</td>
</tr>
<tr>
<td>NREDCAP</td>
<td>New &amp; Renewable Energy Development Corporation of Andhra Pradesh Limited</td>
</tr>
<tr>
<td>O&amp;M</td>
<td>Operations and Maintenance</td>
</tr>
<tr>
<td>OT</td>
<td>Operational Technology</td>
</tr>
<tr>
<td>PV</td>
<td>Photovoltaic</td>
</tr>
<tr>
<td>RFP</td>
<td>Request for Proposals</td>
</tr>
<tr>
<td>RFQ</td>
<td>Request for Qualifications</td>
</tr>
<tr>
<td>SCADA</td>
<td>Supervisory Control and Data Acquisition</td>
</tr>
<tr>
<td>SOQ</td>
<td>Statement of Qualification</td>
</tr>
<tr>
<td>SPV</td>
<td>Special Purpose Vehicle</td>
</tr>
<tr>
<td>ULB</td>
<td>Urban Local Bodies</td>
</tr>
<tr>
<td>VfM</td>
<td>Value for Money</td>
</tr>
<tr>
<td>Vizag</td>
<td>Visakhapatnam</td>
</tr>
<tr>
<td>VUDA</td>
<td>Visakhapatnam (Vizag) Urban Development Authority</td>
</tr>
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</table>
II. URBAN DEVELOPMENT FRAMEWORK

Introduction

The Smart City Master Plan lays the groundwork for the development of Visakhapatnam from a 20th century port city into an integrated 21st century city-region. Each of the four major centers of Visakhapatnam Metropolitan Region will develop its own distinct urban character and economic function:

1. **The commercial center** will raise its profile as the business and cultural center of the region by carrying out signature development projects in the Central Business District, along the beach road and at Old Town:
   - RTC complex and adjacent properties can be redeveloped into a state-of-the-art smart and sustainable Central Business District that ties into new MRT and BRT lines, offers district cooling services, and provides an entertainment and shopping area necessary for a knowledge industry capital city.
   - A new cruise terminal will boost international tourism and provide revenue for upgrading facilities for the adjacent local fishing community. A culture and entertainment complex across the beach road will be attract tourists and provide a gateway into Old Town.
   - On the opposite side of Old Town, a revitalized Lavender Canal will provide green open space, accelerate freight evacuation from the port, and improve wastewater and storm water treatment.

These new development centers will be linked together with revitalized, pedestrian-friendly Smart Streets that provide enhanced public transportation services.

2. **The heavy industrial growth zone** will develop smaller, mixed-use urban sub-centers that offer jobs-housing balance and improved living conditions for the local workforce. Located near, but not adjacent to, factories and industrial parks, these centers will incorporate existing villages into larger agglomerations, while ensuring the delivery of higher quality water, wastewater and environmental management services. Future industrial development will be located between the sub-centers and adjacent to the existing industrial projects and parks located south of Dolphin Nose.
3. **The IT and education growth zone** north of Kailasgiri and extending to the Bhogapuram aerotropolis will be a high-end knowledge industry cluster offering world-class educational, recreational and tourism facilities. The coastline — Vizag’s unique selling point — will be developed as a set of distinct recreational, ecological and livelihood destinations appropriate for different types of visitors, residents and employees. At the southern end of this zone, Rushikonda will provide housing, recreation and social amenities to meet the demands of knowledge-industry workers. New parks, open spaces, and waterways will model low-impact development for the region by employing green infrastructure and waterway rehabilitation projects.

4. **The light industrial growth zone** from Pendurthi to Kothavalasa will use phased development of distribution centers to boost the logistics sector in the metropolitan region. Housing and commercial mixed-use development will allow workers to locate near their jobs, while the upgraded BRT line will provide access to other regional employment centers too.

New growth areas within all four centers will locate housing near jobs, preserve ecological assets, and minimize natural hazard risk. Binding the centers into a coherent regional whole will be smart transport, water and energy infrastructure that ensures smooth and timely flows of people and resources throughout the VMR. ICT innovations will allow infrastructure managers to anticipate stress points, take corrective action and enhance system performance. Citizens in Smart Vizag will also gain visibility into infrastructure systems and be able to participate in decisions about future improvements.
II. Urban Development Framework

Population

VUDA projections for the Greater Visakhapatnam Municipal Corporation and the Visakhapatnam Metropolitan Region (VUDA planning area) depict a region that will slowly expand to 6.1 million people by 2021. The Average Annual Growth Rate (AAGR) from 2001 to 2011 is only 1.34%. Based on an AAGR of 2%, the population will rise to 7.56 million in 2030. More than half of the total regional population will still live in GVMC.

Table 1.1 Population of VMR, 2016-2030

<table>
<thead>
<tr>
<th>Area</th>
<th>2001</th>
<th>2011</th>
<th>2021</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVMC area</td>
<td>2,200,000</td>
<td>2,797,100</td>
<td>3,195,200</td>
<td>4,169,000</td>
</tr>
<tr>
<td>Other VMR</td>
<td>2,000,000</td>
<td>2,542,900</td>
<td>2,904,800</td>
<td>3,395,674</td>
</tr>
<tr>
<td>Total VMR</td>
<td>4,200,000</td>
<td>5,340,000</td>
<td>6,100,000</td>
<td>7,564,674</td>
</tr>
</tbody>
</table>

Source: GVMC, VUDA 2006; Census of India 2001, 2011; GVMC = Greater Visakhapatnam Municipal Corporation; VMR = Visakhapatnam Metropolitan Region

The average household size in the planning area, according to the 2011 census, was 3.91 persons. The following table breaks population down into households during the planning period. The five-year period between 2016 and 2021 is treated separately from the ten-year period between 2021 and 2030 (inclusive).

Table 1.2 Household Projections, 2016-2030

<table>
<thead>
<tr>
<th>Area</th>
<th>Households 2021</th>
<th>Households 2030</th>
<th>Change in HH 2016-2021</th>
<th>Change in HH 2021-2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVMC area</td>
<td>817,187</td>
<td>1,066,240</td>
<td>51,740</td>
<td>249,053</td>
</tr>
<tr>
<td>Other VMR</td>
<td>742,916</td>
<td>868,459</td>
<td>47,032</td>
<td>125,543</td>
</tr>
<tr>
<td>Total VMR</td>
<td>1,560,102</td>
<td>1,934,699</td>
<td>98,772</td>
<td>374,597</td>
</tr>
</tbody>
</table>

Source: VUDA, AECOM, 2016
Housing

The household projections above form the basis of the following Housing Needs Projections. The largest generators of housing need are (1) the formation of new households from among the existing population, and (2) the in-migration of new households from outside the VMR. The total number of new households over the first five years of the planning period is approximately 135,000. During the following 10 years, an additional 375,000 households are expected to be formed or migrate to Vizag.

Table 1.3  Housing Needs Projection VMR, 2016-2030

<table>
<thead>
<tr>
<th>Area</th>
<th>Additional HH 2016-2021</th>
<th>Overcrowded Households 2016</th>
<th>Total DUs required 2021</th>
<th>Additional HH 2021-2030</th>
<th>Total DUs required 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>GVMC households</td>
<td>51,740</td>
<td>25,097</td>
<td>76,837</td>
<td>249,053</td>
<td>325,890</td>
</tr>
<tr>
<td>Other VMR households</td>
<td>47,032</td>
<td>10,756</td>
<td>57,788</td>
<td>125,543</td>
<td>183,331</td>
</tr>
<tr>
<td>Total households</td>
<td>98,772</td>
<td>35,853</td>
<td>134,625</td>
<td>374,597</td>
<td>509,222</td>
</tr>
</tbody>
</table>

Source: AECOM 2016 based on census data

In addition to the new households, existing households living in overcrowded conditions are in desperate need of new housing. The UN-Habitat’s work in slum housing indicates that approximately 50,000 households in existing slums in Vizag required new housing in 2006. Since then, 14,000 units have been delivered through low-income housing programs. For the remaining 35,000, housing solutions are still needed. This is a conservative estimate, as additional households have surely migrated to and settled in informal areas in the intervening years. The total number of required dwelling units during the planning period is about 509,000.

The expanding city should provide housing solutions for all of these households. The type, size, and character of the housing solutions will vary with the buying power and individual preferences of the household, among other factors. Most households will find housing through existing market mechanisms. Even for low-income households, it is not necessary for GVMC or any public entity to construct housing for all of the households; rather, satisfying housing need for the society as a whole is about enabling the provision by many different actors (most of them private sector) of a broad range of housing solutions, from apartments to free-standing houses to serviced residential land plots.
Densification Potential

Densification of existing urban areas presents opportunities to fully utilize existing infrastructure, and is therefore generally considered more economically efficient than greenfield development at the urban periphery. This section looks at the potential for densifying VMR’s existing urban fabric in order to absorb a share of the future population and household growth described above.

The existing urban centers around VMR have generally been developed to a density that is appropriate for the location and size of the city. The prevalent mid-rise, party-wall construction type (5-8 stories) has a number of attributes:

- It is relatively compact, with a corresponding small carbon footprint;
- It is human scale, and provides a physical framework for the creation of walkable streets and public open spaces;
- It has parcel sizes that are small enough to provide some diversity of urban form and building design, which adds to the character and attractiveness of the public realm.
- It sits comfortably within the green ridges that separate Vizag’s urban centers into a series of urban “rooms,” many of which face the sea.

For these reasons, redeveloping existing neighborhoods in Vizag to a higher density is generally not advised. Razing whole localities of mid-rise buildings and replacing them with high-rise buildings will not, in most cases, yield a higher quality urban environment. Moreover, mid-rise, party-wall development is often built at a similar density to high-rise development, given the need to locate the high-rise buildings farther from each other.

This does not preclude the redevelopment of some smaller localities within the city to a higher density than currently exists in Visakhapatnam. The revitalization of the central business district, which is identified as a key project in the Vision Statement, could potentially include some high-rise development. High-rise development may be appropriate if the future CBD sees an increase in explicit financial services functions concurrent with the strengthening of Vizag’s logistics sector. The CBD is one of a number of nodes within the existing fabric of the city center that would be an appropriate location for moderate densification using a mid-rise development model (see Figure 1-3).
Other sites with potential for densification are existing vacant parcels within the urbanized area. There are 2,740 vacant parcels with a total area of 534 acres scattered around the city, even in areas with high land values, such as those along R.K. Beach Road. These parcels should be prioritized for new development. Infill development using such parcels should be privileged over greenfield development outside of the existing urbanized area. The land use proposals in the Smart City Master Plan will support and target an infill development strategy.

**Challenges to Address**

The proposed urban development framework addresses a range of socio-economic, environmental and economic challenges identified during the assessment phase. Additional socio-economic, spatial, and environmental challenges inform the proposed urban development framework. Insights from the Task 2 representative household survey have guided the tone for interventions as part of the Smart City Master Plan and Sector-Specific Projects. Survey findings verify many of citizens’ concerns with quality and quantity of access to water, sewerage, energy, transit options, and a safe public realm. Field observation by the AECOM consortium team confirms these findings.

Another challenge is the current pattern of urbanization, and its conflicts with the existing water system, topography, and ecology. The Visakhapatnam regional study area includes greater Visakhapatnam and Vizianagaram, which are more intensely developed and connected, and lack the agricultural productivity of the diffused network of smaller towns, villages, industrial estates and agriculture that are also part of the greater regional study area. Agricultural land along transit and economic corridors has been the preferred land type for development in the recent past. Retrofitting dilapidated buildings/infilling vacant and reserved land within previously developed areas has been a less popular development option. This pattern of urbanization has occurred at times in conflict with the existing water systems, topography, and ecology, leading to erosion and increasing public health risks, such as flooding and landslides, ground and surface water pollution, and human settlement in areas with saturated, poorly-draining soils.
The region's watersheds, ridges, rivers, floodplains and wetland soils are critical features shaping quality of life for current and future residents. The optimal pattern of future growth must complement natural systems.
Alternative Growth Scenarios
As the VMR population grows to over 7.5 million people during the planning period, new growth areas must be planned, in order to accommodate population growth and preserve and enhance livability for all residents.

Given the limited densification potential that can be accommodated through infill development within existing localities, most of the new households and commercial growth will have to be accommodated through greenfield development. But the amount of land required, and the growth pattern for that expansion/development, will vary based on the predominant uses and density of the development type adopted.

Three alternative growth scenarios have been defined and evaluated using social, economic, and environmental criteria, with a view towards identifying a preferred scenario. These criteria include:

- The compactness of the metropolitan development pattern. Urbanizing land near existing built-up areas is both more effective and more cost efficient, as existing trunk infrastructure systems can often serve both existing and new areas. Siting of new mixed use residential areas near existing employment areas will shorten commute distances, which in turn enhances environmental quality and livability for residents, and can increase the competitiveness of the region’s urban economy. The mean distance from the center of growth areas at build-out to major employment centers is used to evaluate the compactness of the development patterns.

- Sensitivity to the regional water system. Urbanization away from low-lying and flood-prone areas lowers disaster risk, reduces the incidence of mosquito-borne diseases, and avoids some of the negative impacts of urban growth on natural watersheds. Growth scenarios are evaluated according to the percentage of built area constructed on saturated (wet) soils, and the percentage of built area lying within flood plains.

The following three scenarios are explored in this section:

5. **Business-as-usual** – Assumes that existing urban development trends will continue. Also takes into account existing plans for local area development. Manifests itself as contiguous, often ribbon-style development along roads and on greenfield sites, sometimes in flood-prone areas.

6. **Alternative 1** – Future growth occurs primarily as infill development in existing urbanized areas, and incrementally within a number of smaller greenfield development areas adjacent to existing urbanized areas distributed throughout the greater Visakhapatnam region. Explicitly aims to achieve live/work balance at the sub-regional level, and to locate development in areas with suitable soils/ lower natural hazard risks.

7. **Alternative 2** – Future growth occurs primarily as infill development in existing urbanized areas, and incrementally within a few large greenfield development areas distributed throughout the greater Visakhapatnam region. Explicitly aims to achieve live/work balance at the sub-regional level and to locate development in areas with suitable soils/ lower natural hazard risks.
II. URBAN DEVELOPMENT FRAMEWORK

II-11

SMART CITY VIZAG

Business-as-Usual
Linear corridor growth

Alternative 1
Many smaller growth areas

Alternative 2
Fewer larger growth areas

Existing roads
Existing urbanized
Proposed urbanized
In the Business-as-Usual scenario, 10% of the population growth would be accommodated through infill redevelopment, and the remaining 90% of the population growth would be accommodated through greenfield development. Assuming an average of 40 dwelling units per hectare (DU/ha), the total greenfield land requirement over the planning period is 15,903 hectares. This growth pattern yields a mean distance from growth areas to major employment centers of 7.87 km. Approximately 79% of the growth would be on saturated soils, and 27% would fall within floodplains.

In the Alternative 1 scenario, 20% of the population growth would be accommodated through infill redevelopment, and the remaining 80% would be accommodated through greenfield development. At an average of 40 DU/ha, the total greenfield land requirement over the planning period is 14,136 ha. This growth pattern yields a mean distance from growth areas to major employment centers of 3.33 km. Approximately 79% of the growth would be on saturated soils, and 27% would fall within floodplains.

In the Alternative 2 scenario, 20% of population growth would be accommodated through infill redevelopment, while the remaining 80% would be accommodated through greenfield development. The total greenfield land requirement over the planning period is 14,136 hectares at an average of 40 DU/ha. This growth pattern results in a mean distance from growth areas to major employment centers of 3.33 km. About 56% of the growth area would be on saturated soils, while 11% would fall within floodplains.

**Table 1.4 Evaluation of Growth Scenarios Against Criteria**

<table>
<thead>
<tr>
<th></th>
<th>Compactness (Mean distance from the growth area in 2030 to major employment centers)</th>
<th>Sensitivity to Watershed (Percentage of 2030 urbanized area within saturated soils)</th>
<th>Sensitivity to Watershed (Percentage of 2030 urbanized area within floodplains)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Condition</td>
<td>&gt;7.87 km</td>
<td>74.4 %</td>
<td>15.2 %</td>
</tr>
<tr>
<td>Business-as-Usual</td>
<td>7.87 km</td>
<td>78.92 %</td>
<td>27.4 %</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>3.33 km</td>
<td>55.71 %</td>
<td>11.4 %</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>4.28 km</td>
<td>55.71 %</td>
<td>11.4 %</td>
</tr>
</tbody>
</table>

The table shows that Alternatives 1 and 2 both achieve higher marks for compactness, as new growth areas are located closer to existing employment centers. They also interfere less with natural water systems than the "Business-as-Usual" scenario. Alternative 1 increases the proximity of new growth areas to existing employment centers more than Alternative 2 does, by dispersing the more compact, lower-impact development around employment centers throughout the region. As compared to Alternative 2, Alternative 1 is simpler and less costly to implement, because it takes advantage of existing trunk infrastructure (and therefore has lower per-unit development costs). Alternative 2 has the higher commercial risks associated with undertaking large satellite-city-type development in outlying locations, e.g., near the proposed Bhogapuram Aero City. (*Sometimes when you built it, they don’t come.*) Alternative 1 is considered the preferred scenario.
Figure 1.3  Schematic Representation of Urban Development Scenarios
Settlement Typologies

A number of high-level development typologies have been formulated to serve as guidance for the nature and character of the different proposed greenfield development areas. These typologies are mixed use, mimicking existing land use patterns in Vizag, and reflecting international best practices for developing vibrant and sustainable communities. However, each typology has a predominant use that is either commercial or residential. There is also a density (and built intensity) gradient originating from the city’s center, and spreading to the built-up areas at the urban edge and non-contiguous communities in more remote locations. The higher intensity of the more centrally-located areas reflects their complexity and socioeconomic functions within the metropolitan area.

The proposed settlement typology is not intended to replace the local area planning or zoning instruments in place in Vizag today. Rather, it provides a way to establish, at a high level, the character of each new development area, as well as the relationships among the 15 new greenfield areas in the VMR.
Figure 1.4  Transit Oriented Infill Typology for City Centre Growth Area
### Table 1.5 Settlement Typologies Hierarchy

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Type Name</th>
<th>Allowable Land Uses</th>
<th>Average Density (DU/ha)</th>
<th>Maximum Building Height (stories)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>City Centre - Commercial High Density</td>
<td>Primarily commercial; also residential, institutional</td>
<td>70</td>
<td>G+9 to G+13</td>
</tr>
<tr>
<td>2</td>
<td>City Centre - Commercial</td>
<td>Primarily commercial; also residential, institutional, low-impact industrial</td>
<td>50</td>
<td>G+4 to G+9</td>
</tr>
<tr>
<td>3</td>
<td>City Centre - Residential High Density</td>
<td>Primarily residential; also commercial, institutional</td>
<td>80</td>
<td>G+4 to G+9</td>
</tr>
<tr>
<td>4</td>
<td>City Centre - Residential</td>
<td>Primarily residential; also commercial, institutional, low-impact industrial</td>
<td>50</td>
<td>G+2 to G+5</td>
</tr>
<tr>
<td>5</td>
<td>Urban Edge - Commercial High Density</td>
<td>Primarily commercial; also residential, institutional</td>
<td>20</td>
<td>G+7 to G+9</td>
</tr>
<tr>
<td>6</td>
<td>Urban Edge - Commercial</td>
<td>Primarily commercial; also residential, institutional, low-impact industrial</td>
<td>40</td>
<td>G+3 to G+5</td>
</tr>
<tr>
<td>7</td>
<td>Urban Edge - Residential</td>
<td>Primarily residential; also commercial, institutional</td>
<td>40</td>
<td>G+3 to G+5</td>
</tr>
<tr>
<td>8</td>
<td>Satellite - Commercial</td>
<td>Primarily commercial; also residential, institutional, low-impact industrial</td>
<td>20</td>
<td>G+2 to G+4</td>
</tr>
<tr>
<td>9</td>
<td>Satellite - Residential</td>
<td>Primarily residential; also commercial, institutional, low-impact industrial</td>
<td>30</td>
<td>G+2 to G+4</td>
</tr>
<tr>
<td>10</td>
<td>Agricultural</td>
<td>Agricultural, Conservation</td>
<td>15</td>
<td>G to G+1</td>
</tr>
<tr>
<td>11</td>
<td>Industrial</td>
<td>Industrial</td>
<td>0</td>
<td>G to G+2</td>
</tr>
</tbody>
</table>
Figure 1.5 Expansion and Transit Oriented Infill Typologies for Urban Edge Growth Areas
<table>
<thead>
<tr>
<th>Land Use Typology</th>
<th>Vizag Airport</th>
<th>Mudasarlova Valley</th>
<th>Madhurawada</th>
<th>Rushikonda</th>
<th>Pendurthi</th>
<th>Pudimadaka</th>
<th>Atchutapuram</th>
<th>Cheepurupalli</th>
<th>Parawada</th>
<th>Anakapalli</th>
<th>Bheemunipatnam</th>
<th>Cherakupalle</th>
<th>Bhogapuram</th>
<th>Vizinagaram</th>
<th>Total HH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DU/ha</td>
<td>ha</td>
<td>688</td>
<td>541</td>
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<td>24,430</td>
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<td>53,960</td>
<td>18,050</td>
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Figure 1.6  Expansion and Transit Oriented Infill Typologies for Satellite Growth Areas
Area Vision Plan Summaries

Central Vizag

Context in Region
The proposed regional growth framework emphasizes using infill development strategies and building new settlements in close proximity to expandable existing infrastructure and employment centers. As the heart of regional employment, and the epicenter of both population and services, Central Vizag will need to accommodate future population growth within its boundaries, in order to maximize the benefit of both the existing and proposed infrastructure systems.

Socioeconomic Positioning
The central city must be able to support new residential, commercial, institutional and recreational amenities in order to achieve the city’s overall potential. The development of mixed-use infill sites and a hierarchy of improved corridors for better connecting these destinations with existing hubs of activity are key components of the overall strategy.

Improved Connectivity Corridors
The Central Vizag Area framework includes the following key connectivity and mobility enhancements:

- **Improved Primary Corridor** – Enhanced corridors with improved ITC, signalization, pedestrian space and multi-modal transport amenities.
- **New Primary Corridors** – New streets, pedestrian space and adjoining development built to better connect segments of existing primary corridors.
- **Port Logistics Route** – New roadway built to better convey port traffic.
- **Bus Rapid Transit (BRT)** – Enhanced and expanded routes for ICT-enabled dedicated bus facilities.
- **Metro Rapid Transit (MRT)** – New corridor for metrorail access connecting northeast to the new Airport and Southwest to Anakapalle.

Local Development Strategies
The Central Vizag Area framework includes the following key infill development opportunities:
- **Lavender Canal redevelopment** – Redevelopment along the eastern edge of a restored Lavender Canal. This will be completed along with new Port access road along the west side of the canal.

- **RTC transit oriented development** – Redevelopment of the exiting RTC complex to better integrate mixed-use development and multimodal connections between pedestrians, vehicles, BRT, and MRT, along with spaces for supporting amenities, and livelihood-generation through restaurants, rest areas, entertainment, and retail.

- **Gateway development** – Mixed-use infill development south of the Train station at the intersection of Port Main RD and Route 39.

- **Beachfront redevelopment** – Infill of new residential, hospitality, cultural, and recreational amenities along the Beach Rd.

- **Airport redevelopment** – After the new airport comes on line, the current airport site could be redeveloped to create new flood-protected, transit-oriented, mixed-use development opportunities, and a system of wetland parks along the waterfront.

- **Cruiseship Terminal** – Establishing a docking pier and associated retail/commercial tourism amenities that reinforce beachfront destinations and Old town area.

- **Fishing Harbor** – Modernizing the fishing harbor will include upgrades to facilities and water, energy, and structural infrastructure, for use in the operation of fishing boats, bunkering, cold storage, maintenance, and ecologically-responsible hygienic waste-handling by the fishing community, wholesalers, retailers, small vendors, retail buyers, and transporters.

- **Ryuthu Bazaars** – Modernization of existing markets will include upgrades to infrastructure for farmers, traders, transporters and customers, including hygienic restroom and waste processing facilities, rest areas, lighting, and circulation.

- **Poorna Market** – Enhance existing energy, water, circulation, and payments infrastructure
Figure 1.7 Proposed Regional Growth Framework in Central Visakhapatnam
Figure 1.8  Lavender Canal Existing Conditions
Figure 1.9  Proposed Tertiary Water Treatment and Public Realm Rehabilitation at Lavender Canal

- Primary and secondary water treatment upstream
- Tidal marsh system for flood control
- Tertiary water treatment through constructed wetlands
- Water quality and quantity monitoring
- Air quality monitoring
- Separated pedestrian and bicycle path
- Dedicated port truck route

PROPOSED
Parawada Area

Context in Region
The proposed regional growth framework targets the area southwest of Gajuwaka for industrial growth that will be served by compact villages offering services, amenities, and residential opportunities for employees. The area surrounding Parawada exemplifies how existing villages can be expanded to better serve growing populations, reduce commuting times, and support adjoining industrial development while promoting a higher quality of life.

Socioeconomic Positioning
Near Parawada, existing village clusters are in relatively close proximity to one another at the intersections of major thoroughfares. These villages are within 3 km of Pharma City, 4 km of the NTPC power plant, 10 km of the steel plant and 14 km of the Brandix complex. By sensitively expanding these villages and others in the area nearby, they will be well-positioned for future industrial growth, and in the meantime, employees can easily commute to existing industrial destinations.

Improved Connectivity
The proposed Parawada-area framework suggests the following mobility enhancements:

- Connect the fragmented primary road network to improve the flow of traffic, and establish locations for new commercial centers.
- Connect the heart of the new community to nearby industrial estates with both circulator bus routes and bus routes to and from Central Vizag.

Local Development Strategies
- The Parawada-area framework suggests the following local development strategies:
- Develop new housing areas between the three existing villages.
- Create a mixed-use activity hub at the center of the new development that can serve adjacent existing villages.
- Surround the development area with an agricultural preservation zone and a forest preservation area, located on the hill tops to the east.
Figure 1.10 Proposed Regional Growth Framework in Parawada
II. URBAN DEVELOPMENT FRAMEWORK

Figure 1.11  Parawada Community Existing Conditions

Figure 1.12  New Housing, Mixed Use Activity, and Water Storage Enhancements at Parawada
Figure 1.13 Stormwater Catchment and Groundwater Recharge at Parawada

- Smart grid infrastructure
- Infill housing
- Expand transit
- Preservation & expansion of storm water storage
- Expand existing structures
- Hilltop preservation
- New public open space
- Fine grain multi-modal circulation

PROPOSED
II. Urban Development Framework

Rushikonda Beach

Context in Region
The proposed regional growth framework emphasizes using infill development strategies and building new settlements in close proximity to expandable existing infrastructure and employment centers. As the core of regional knowledge industry employment, Rushikonda will need to provide housing, additional knowledge industry and support livelihoods, recreation, and social amenities to meet growth demands. New parks, open spaces, and waterways will model low impact development for the region by employing green infrastructure and waterway rehabilitation projects.

Socioeconomic Positioning
One key node in the coastline is Rushikonda, an area of natural beauty that also has significant economic development potential. The growth of the Rushikonda area will build on the tourism potential of the oceanfront, and the development potential of the nascent IT sector, to create an integrated, high-quality “live, work, play” environment.

Rushikonda will be developed as two distinct zones, with complementary economic functions and urban characters. The southern zone will be developed along the coastline (Ocean Drive) as a center for domestic beach/recreation tourism. The target market will be upper-middle-income Indian tourists, similar to those that already come to Vizag in significant numbers. There will be small “boutique” hotels on or near the beach, with some mid-sized resort hotels along the stream and facing the sea (see schematic plan diagram). One 5-star hotel on the peninsula at the southern end of the beach will cater to high-income visitors to Vizag.

In contrast, the proposed growth framework for the northern zone builds on the existing “IT City” on top of the ridges to create a vibrant, mixed-use seaside town. The residents are anticipated to be mostly members of the “creative class” that work in IT, R&D, education, and related fields that require highly skilled workers. The atmosphere of the town would resemble the highly liveable and attractive towns located on the coast of California, USA, like Santa Barbara, for example. The area in the valley in between the ridges and the sea will be developed as medium-to-lower-density housing, and will include local retail and services. The area will be pedestrian and bicyclist-friendly, and will incorporate high-quality public spaces. Infill housing would allow residents to travel short distances to the “knowledge industry” jobs in the IT City and in nearby Madhurawada. The area along the shoreline will be developed for entertainment uses. The dunes and beach on the east side of Ocean Drive will be a “no build” area, set aside for public access and use.

Rushikonda naturally divides into several distinct zones, each of which could develop its own distinct land uses that would accommodate different functions and activities.
Figure 1.14  Proposed Regional Growth Framework in Rushikonda
Figure 1.15 Rushikonda Existing Condition
Figure 1.16 Infill Development, New Parks and Waterway, And Hill Conservation at Rushikonda

- Infill development between existing buildings
- Wetlands and open space
- Protected public access coast and beaches
- Enhanced public realm along coast
- Zone water metering
- Preservation of hills, slopes, drainage areas
- Open space and riparian corridor along stream valley

PROPOSED
Ocean Drive
At the southern end, beginning at Rushikonda Point, the existing hospitality and tourism uses could be augmented with additional hospitality and entertainment options on a similar scale, using the Beach Road as a retail and dining “corniche” that connects the beachfront and beachfront views with hospitality options and a mix of uses. This area could capitalize on beachfront development for tourism and recreation, and provide a mix of uses, extending out to the natural greenway to the ocean. Beyond this area, it is recommended that development be less dense.

Town Center South: The “College Town”
Across the Beach Road, a mixed-use area will build on the presence of GITAM University and existing university housing to support tourism development. A mix of uses will be located on existing major roads, with a denser block layout and some mid-rise (G+4) development. Open space (intentionally identified for active use) and natural features would be preserved to form natural edges. These greenways and topography would support the denser development to the north of GITAM. A new neighborhood center with local retail and services can be located inland, away from Ocean Drive. This area would facilitate improved transportation throughout the region, with enhanced linkages to Madhurawada, Health Valley, and other inland areas.
**Town Center North: Live/Work/Play by the Sea**

To the north of the natural greenway area, Rushikonda would be developed at a lower density, but with a similar character, with a defined block network and a center of activity away from Ocean Road. While the waterfront would continue to be a point of reference and a commercial zone, tourism options would be more limited. The presence of existing IT and “creative class” employment provides a basis for the continued development of “knowledge industry” and IT jobs, with the addition of residential options that might attract the employees of these industries. While still compact, this area would be lower-density that the southern area, (G+1 to G+3), and the grid and site lines would be strongly oriented towards the coast. Leveraging the higher incomes and associated expectations of workers and residents, this area would develop a more modern, “higher end,” exclusive feel. A neighborhood center could be developed around a common park or plaza inland from the beach.

**Local Development Strategy**

The Rushikonda area framework suggests the following local development strategies:

- Critical to supporting the development of Rushikonda is the recognition that the area’s ecological assets provide significant value, and should therefore be protected. In particular, development should be extremely limited along the ridges, and beachfront development should be very sensitive to the environment, especially water sector and green infrastructure networks.
- Guidelines supporting appropriate building use and height should be developed and enforced. Additionally, a high-level architectural character for the area should be established and implemented. This would support a sense of character and of place that would help attract employees and residents.
- Supporting core infrastructure should be designed to support the anticipated development density, be environmentally sensitive, and meet the standard of its anticipated users.
- Development partners that have specific experience in the desired development type should be identified, and tax incentives/TIF tools should be evaluated as a way to attract and secure desired partners.
Coastal Development Strategy

Figure 1.17 Proposed Coastal Development Strategy
Context in Region
The regional growth framework aims to maximize the potential of one of Vizag’s “Unique Selling Points:” its coastline. The coastal development strategy covers the entire oceanfront, from the port in the south to Bheemilipatnam in the north. As context for the planning framework for Rushikonda, the diagram below and associated text identify the future positioning and character of the different segments that make up the coastline. The contract among the different segments is intentional, and is central to the successful development of the coastline. The Coastal Development strategy aims to facilitate the delivery of public and private sector investments along the oceanfront, and support integrated development opportunities.

Socioeconomic Positioning
A coastal system that integrates component sites is critical to increasing tourism along the regional coast per the Andhra Pradesh Department of Tourism’s planning agenda. Physical and programmatic infrastructures link the sites and reinforce the coast as a continuous set of livelihood, recreation, ecological and cultural experiences.

Local Development Strategy
The Coastal Development Strategy suggests integration of the following:

- **Modernization of the fishing harbor with enhanced amenities and harbor parks**
  Fishing communities will benefit from enhanced cold storage monitoring an inventory management, maintenance and operations facilities, and data generation, analysis, and communication on catch quality and quantity, climate, and safety. Residents and tourists will enjoy improved harbor parks.

- **Corniche with hospitality and cultural destinations, event venues along R.K. Beachfront**
  A wide signature public realm along the R.B. Beachfront will provide residents and tourists with continuous pedestrian experiences, infrastructural support for festivals and events, and integrate the numerous cultural heritage assets along the beach.

- **IT industry offices, leisure and hospitality destinations along Rushikonda Beachfront**
  Infill growth in the Rushikonda area will build on the tourism potential of the oceanfront, and the development potential of the nascent IT sector, to create an integrated, high-quality “live, work, play” environment.

- **Natural heritage preservation along the Kapuluppada and Thimmapuram coast**
  Preservation of sand dunes, grass habitats, wetlands and beaches will provide high value natural heritage experiences for residents and tourists along the coast.

- **Hospitality destinations and natural asset conservation at Bheemilipatnam**
  Activity: Small-scale hotels, restaurants, coastal parks and trails will support a range of experiences around the coast, lifestyle amenities, and coastal habitats.

- **Observation points, recreation, and natural asset conservation at Dolphin’s Nose, Kailasgiri**
  Residents and tourists will trek, picnic, and enjoy dramatic views of the Viskahapatnam’s coastline at Dolphin’s Nose and Kailasgiri hills through a network of low-impact walking trails, seating areas, and scenic overlooks.